

Viking CCS Pipeline

**Environmental  
Statement Volume II –  
Chapter 13: Noise and  
Vibration**

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# 13 Noise and Vibration

## 13.1 Introduction

- 13.1.1 This chapter of the Environment Statement (ES) presents the assessment of the likely significant effects of the Viking CCS Pipeline (hereafter referred to as the Proposed Development) on noise and vibration during construction, operation and decommissioning. This chapter considers noise and vibration effects on human receptors and excludes assessment of noise and vibration on ecological receptors.
- 13.1.2 The potential disturbance of local ecological or heritage receptors from noise due to the introduction of the Proposed Development will be considered in *ES Volume II Chapter 6: Ecology and Biodiversity* and *Chapter 8: Historic Environment (Application Documents 6.2.6 and 6.2.8)*. Noise and vibration are interrelated with other environmental effects and so this chapter should also be read in conjunction with *ES Volume II Chapter 16: Socioeconomics and Chapter 17: Health and Wellbeing (Application Documents 6.2.16 and 6.2.17)*.
- 13.1.3 This chapter is supported by **Figure 13-1** and additional information contained in the following appendices *ES Volume IV (Application Document 6.4)*:
- *Appendix 13.1: Baseline Noise Monitoring;*
  - *Appendix 13.2: Construction Noise Calculations; and*
  - *Appendix 13.3: Construction Traffic Noise Calculations.*

## 13.2 Legislation, Policy and Guidance

### Introduction

- 13.2.1 The Legislation, Policy and Guidance section of this chapter provides an overview of the relevant legislation, planning policy and technical guidance relevant to the noise and vibration assessment.

### Legislation

#### ***Control of Pollution Act 1974***

- 13.1.1 The Control of Pollution Act 1974 (CoPA) (Ref 13-1) requires that Best Practicable Means (BPM), as defined in Section 72 of the CoPA, are adopted to control construction noise on any given site. Sections 60 and 61 of the CoPA provide the main legislation regarding enabling works and construction site noise and vibration. If noise complaints are received, a Section 60 notice may be issued by the Local Authority imposing requirements as to the way in which the works are to be carried out.
- 13.1.2 Section 61 of the CoPA provides a means to apply for prior consent to carry out noise generating activities during construction and allows the Local Authority to attach conditions to the consent.

#### ***Environmental Protection Act 1990***

- 13.1.3 The Environmental Protection Act 1990 (EPA) (Ref 13-2) prescribes a statutory nuisance as noise (and vibration) emitted from premises (including land) that is prejudicial to health or a nuisance.
- 13.1.4 Local Authorities are required to investigate any public complaints of noise, and if they are satisfied that a statutory nuisance exists, or is likely to occur or recur, they must serve a noise abatement notice. A notice is served on the person responsible for the nuisance. It

requires either simply the abatement of the nuisance or works to abate the nuisance to be carried out, or it prohibits or restricts the activity.

13.1.5 In determining if a noise complaint amounts to a statutory nuisance the Local Authority can take account of various guidance documents and existing case law as no statutory noise limits currently exist for defining a statutory nuisance. Demonstrating the use of BPM to minimise sound levels is an accepted defence against failure to comply with a noise abatement notice.

### National Planning Policy

13.2.2 The Proposed Development must have regard to the relevant policies of the relevant National Policy Statements (NPS) (Ref 13-5 and Ref 13-7) and National Planning Policy Framework (NPPF) (Ref 13-3). Key aspects of the relevant NPSs and NPPF, which have been considered during the development of this chapter, are outlined in **Table 13-1** below. An overview of how relevant national planning policy has been complied with is provided within the *Planning Statement (Application Document 7.1)*.

**Table 13-1: National Planning Policy Relevant to Noise and Vibration**

Policy Reference	Policy Context
<b>National Policy Statements</b>	
<i>Overarching National Policy Statement for Energy (EN-1) (Ref 13-5) published July 2011</i>	
Section 5.11, Paragraph 5.11.4	<p><i>“Where noise impacts are likely to arise from the proposed development, the applicant should include the following in the noise assessment:</i></p> <ul style="list-style-type: none"> <li><i>• a description of the noise generating aspects of the development proposal leading to noise impacts, including the identification of any distinctive tonal, impulsive or low frequency characteristics of the noise;</i></li> <li><i>• identification of noise sensitive premises and noise sensitive areas that may be affected;</i></li> <li><i>• the characteristics of the existing noise environment;</i></li> <li><i>• a prediction of how the noise environment will change with the proposed development;</i></li> <li><i>• in the shorter term such as during the construction period;</i></li> <li><i>• in the longer term during the operating life of the infrastructure;</i></li> <li><i>• at particular times of the day, evening and night as appropriate.</i></li> <li><i>• an assessment of the effect of predicted changes in the noise environment on any noise sensitive premises and noise sensitive areas; and</i></li> <li><i>• measures to be employed in mitigating noise. The nature and extent of the noise assessment should be proportionate to the likely noise impact.”</i></li> </ul>
Section 5.11, Paragraph 5.11.5	<p><i>“The noise impact of ancillary activities associated with the development, such as increased road and rail traffic movements, or other forms of transportation, should also be considered.”</i></p>
Section 5.11, Paragraph 5.11.6	<p><i>“Operational noise, with respect to human receptors, should be assessed using the principles of the relevant 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</i></p>

Policy Reference	Policy Context
	<i>(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.”</i>
Section 5.11, Paragraph 5.11.7	<i>“The applicant should consult Environment Agency (EA) and Natural England (NE), or the Countryside Council for Wales (CCW), as necessary and in particular with regard to assessment of noise on protected species or other wildlife. The results of any noise surveys and predictions may inform the ecological assessment. The seasonality of potentially affected species in nearby sites may also need to be taken into account.”</i>
Section 5.11, Paragraph 5.11.9	<p>To aid the Secretary of State in decision making, paragraph 5.11.9 of NPS EN-1 sets out the three aims relating to noise emissions from new developments:</p> <ul style="list-style-type: none"> <li>• <i>“avoid significant adverse impacts on health and quality of life from noise;</i></li> <li>• <i>mitigate and minimise other adverse impacts on health and quality of life from noise; and</i></li> <li>• <i>where possible, contribute to improvements to health and quality of life through the effective management and control of noise”.</i></li> </ul>
<i>Draft Overarching National Policy Statement for Energy (EN-1) (Ref 13-4) Draft published March 2023</i>	
Section 5.12	<p><i>“Where noise impacts are likely to arise from the proposed development, the applicant should include the following in the noise assessment:</i></p> <ul style="list-style-type: none"> <li>• <i>a description of the noise generating aspects of the development proposal leading to noise impacts, including the identification of any distinctive tonal, impulsive, low frequency or temporal characteristics of the noise</i></li> <li>• <i>identification of noise sensitive receptors and noise sensitive areas that may be affected</i></li> <li>• <i>the characteristics of the existing noise environment</i></li> <li>• <i>a prediction of how the noise environment will change with the proposed development</i> <ul style="list-style-type: none"> <li>– <i>in the shorter term, such as during the construction period</i></li> <li>– <i>in the longer term, during the operating life of the infrastructure</i></li> <li>– <i>At particular times of the day, evening and night (and weekends) as appropriate, and at different times of year</i></li> </ul> </li> <li>• <i>an assessment of the effect of predicted changes in the noise environment on any noise-sensitive receptors, including an assessment of any likely impact on health and well-being where appropriate, and noise-sensitive areas</i></li> <li>• <i>if likely to cause disturbance, an assessment of the effect of underwater or subterranean noise</i></li> </ul> <p><i>measures to be employed in mitigating the effects of noise using best available techniques to reduce noise impacts”</i></p>

Policy Reference	Policy Context
<p><i>Draft National Policy Statement for Natural Gas supply infrastructure and gas and oil pipelines (EN 4) (Ref 13-6) – Draft published March 2023.</i></p>	
<p>Section 2.17.10 to 2.17.14</p>	<p><i>“Section 5.12 of EN-1 sets out the generic considerations to be given to the impacts of noise and vibration. In addition, there are specific considerations which apply to gas reception facilities set out below.</i></p> <p><i>Gas reception facilities may be located in coastal regions and sources of noise will include above ground pipework, compressors (usually located in buildings) and process equipment such as heaters and inter-stage coolers.</i></p> <p><i>The compressors may either be electric motor or gas turbine driven. Electric motors are preferable in terms of environmental noise considerations.</i></p> <p><i>Where gas turbines are used, the gas turbine exhausts may be a significant source of low frequency noise unless adequately controlled. Control valves may also be a source of noise which can be radiated by the associated pipework systems.</i></p> <p><i>The ES must include an assessment of noise and vibration effects including the specific issues outlined above, where they are relevant.”</i></p>
<p>2.18.1</p>	<p><i>“Applicants should consider the following design measures which are typically taken to mitigate noise for gas supply infrastructure:</i></p> <ul style="list-style-type: none"> <li><i>• the use of sound attenuators on ventilation systems;</i></li> <li><i>• acoustic lagging on pipework;</i></li> <li><i>• multi-stage (inherently quiet);</i></li> <li><i>• control valves;</i></li> <li><i>• gas turbine exhaust silencers; and</i></li> <li><i>• acoustic enclosures on pumps and low-speed cooler fans.”</i> </li></ul>
<p>2.19.1</p>	<p><i>“The Secretary of State should follow the principles for decision making set out in Section 5.12 of EN-1.”</i></p>
<p>2.21.15 to 2.21.22</p>	<p><i>“Section 5.12 of EN-1 sets out the generic considerations in relation to the impacts of noise and vibration.</i></p> <p><i>In addition, there are specific noise and vibration considerations which apply to gas and oil pipelines during the pre-construction and construction phases.</i></p> <p><i>The applicant will need to identify all the noise and vibration sensitive receptors likely to be affected during these phases and consider any associated pipeline maintenance or protection that may be additionally required.</i></p> <p><i>During the pre-construction phase there could be vibration effects from seismic surveys. During construction, tasks may include site clearance, soil</i></p>



Policy Reference	Policy Context
	<p><i>movement, ground excavation, tunnelling, trenching, pipe laying and welding, and ground reinstatement.</i></p> <p><i>In addition, increased HGV traffic may be generated on local roads by the movement of materials. These types of noise and vibration impacts will need to be assessed.</i></p> <p><i>The commissioning of a new pipeline can involve extensive periods of drying after hydrotesting, using air compressors, and noise mitigation may be required for this type of activity.</i></p> <p><i>A new gas pipeline may require an above ground installation such as a gas compression station on the route of the pipeline to boost transmission line pressure; these should be outside of protected landscapes wherever possible.</i></p> <p><i>A new oil pipeline may require pumping stations. These may be located in quiet rural areas, and therefore the control of noise from these facilities is likely to be an important consideration.”</i></p>
2.22.3 to 2.22.5	<p><i>“Noise mitigation measure applicants should consider for gas and oil pipelines, in particular their associated above-ground installations, include screening or enclosure of compressors and pumps.</i></p> <p><i>Other measures could include the use of sound attenuators on ventilation systems, acoustic lagging on pipework, multi-stage (inherently quiet) control valves, gas turbine exhaust silencers, and high efficiency low speed cooler fans, depending on the specific issues.</i></p> <p><i>Vibration mitigation measures could include the use of non-impact piling such as augur boring.”</i></p>
2.23.2	<p><i>“The Secretary of State should follow the principles for decision making set out in Section 5.12 of EN-1.”</i></p>
<p><i>National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (Ref 13-7)</i></p>	
Paragraph 2.20.1	<p><i>“During the pre-construction phase there could be vibration effects from seismic surveys. During construction, tasks may include site clearance, soil movement, ground excavation, tunnelling, trenching, pipe laying and welding, and ground reinstatement. In addition, increased HGV traffic will be generated on local roads for the movement of materials. These types of noise and vibration impacts will need to be assessed.”</i></p>
Section 2.20 Gas and Oil Pipelines Impacts: Noise and	<p><i>“The commissioning of a new pipeline can involve extensive periods of drying after hydrotesting, using air compressors, and noise mitigation may be required for this type of activity.”</i></p>

Policy Reference	Policy Context
Vibration, Paragraph 2.20.3	
<b>National Planning Policy Framework</b>	
Paragraph 174	<p><i>“Planning policies and decisions should contribute to and enhance the natural and local environment by:[...] e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans.”</i></p>
Paragraph 185	<p><i>“Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should: a) 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; b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason...”</i></p>

### **Noise Policy Statement for England**

- 13.1.6 The Noise Policy Statement for England (NPSE) (Ref 13-8) seeks to clarify the underlying principles and aims in existing policy documents, legislation, and guidance that relate to noise. The statement applies to all forms of noise, including environmental noise, neighbour noise and neighbourhood noise.
- 13.1.7 The NPSE sets out the long-term vision of the government’s noise policy, which is to *“promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development”*.
- 13.1.8 This long-term vision is supported by three aims: *“Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:*
- *Avoid significant adverse impacts on health and quality of life;*
  - *Mitigate and minimise adverse impacts on health and quality of life; and*
  - *Where possible, contribute to the improvements of health and quality of life.”*
- 13.1.9 The ‘Explanatory Note’ within the NPSE provides further guidance on defining ‘significant adverse effects’ and ‘adverse effects’ using the concepts:
- No Observed Effect Level (NOEL) – the level below which no effect can be detected. Below this level, there is no detectable effect on health and quality of life due to noise;
  - Lowest Observable Adverse Effect Level (LOAEL) - the level above which adverse effects on health and quality of life can be detected; and

- Significant Observed Adverse Effect Level (SOAEL) - the level above which significant adverse effects on health and quality of life occur.

13.1.10 With reference to the SOAEL, the NPSE states:

*“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. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.”*

13.1.11 For situations where sound levels are between the LOAEL and SOAEL, all reasonable steps should be taken to mitigate and minimise the effects. However, this does not mean that such adverse effects cannot occur.

13.1.12 Further consideration of health effects and the interaction of noise with other effects (e.g., land quality, transport, and landscape and visual amenity) is presented in *ES Volume II Chapter 17: Health and Wellbeing*, and *Chapter 20: Cumulative Effects (Application Documents 6.2.17 and 6.2.20)*.

### Local Planning Policies

13.2.3 Local Planning Policies relevant to noise and vibration is detailed in **Table 13-2**. An overview of how relevant local planning policy has been complied with is provided within the *Planning Statement (Application Document 7.1)*.

**Table 13-2: Local Planning Policies Relevant to Noise and Vibration**

Policy Reference	Policy Context
<b>Central Lincolnshire Local Plan 2012-2036 (Ref 13-9)</b>	
Policy LP26: Design and Amenity	<i>“Proposals should demonstrate, where applicable and to a degree proportionate to the proposal, how the following matters have been considered, in relation to both the construction and life of the development: [...]. Adverse noise and vibration”</i>
<b>North East Lincolnshire Local Plan 2013-2032 (Ref 13-10)</b>	
Policy 5: Development Boundaries	<i>“All development proposals located within or outside of the defined boundaries will be considered with regard to suitability and sustainability, having regard to: [...]. Adverse noise and vibration”. Policy 31: Renewable and low carbon infrastructure states “Developments and their associated infrastructure will be assessed on their merits and subject to the following impact considerations, taking account of individual and cumulative effects: [...]. local amenity, including noise [...] impact”</i>
<b>East Lindsey Local Plan (Ref 13-11)</b>	
Paragraph 14.5	<i>“[...] development should not have an impact on residential amenity, for example with regard to [...] noise [...] or vibration”</i>

### Guidance

#### Planning Practice Guidance Noise

13.1.13 The Planning Practice Guidance concerned with noise (PPGN) (Ref 13-12) advises that:

*“Noise needs to be considered when development may create additional noise, or would be sensitive to the prevailing acoustic environment (including any anticipated changes to that environment from activities that are permitted but not yet commenced)”.*

13.1.14 It also provides guidelines that are designed to assist with the implementation of the NPPF.

13.1.15 The PPGN states that local planning authorities 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.”*

13.1.16 Factors to be considered in determining whether noise is a concern are identified including the absolute noise level of the source, the existing ambient noise climate, time of day, frequency of occurrence, duration, character of the noise, and cumulative effects.

13.1.17 Further details on the hierarchy of noise effects are presented in **Table 13-3**, which has been reproduced from PPGN.

**Table 13-3: Planning Practice Guidance Noise Exposure Hierarchy**

Perception	Examples of Outcomes	Increasing Effect Level	Action
<b>Not present</b>	No effect	No Observed Effect	No specific measures required
<b>No Observed Adverse Effect Level</b>			
<b>Present and not intrusive</b>	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life	No Observed Adverse Effect	No specific measures required
<b>Lowest Observed Adverse Effect Level</b>			
<b>Present and intrusive</b>	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g., turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life	Observed Adverse Effect	Mitigate and reduce to a minimum

Perception	Examples of Outcomes	Increasing Effect Level	Action
<b>Significant Observed Adverse Effect Level</b>			
<b>Present and disruptive</b>	The noise causes a material change in behaviour, attitude, or other physiological response, e.g., avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening, and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area	Significant Observed Adverse Effect	Avoid
<b>Present and very disruptive</b>	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g., regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g., auditory and non-auditory	Unacceptable Adverse Effect	Prevent

**World Health Organisation (2022)**

13.2.4 The World Health Organisation’s (WHO) ‘Community Noise Guidelines’ recommend external daytime and evening environmental noise limits and internal night-time limits to avoid sleep disturbance.

**British Standard 7445**

13.2.5 BS: 7445 ‘Description and Measurement of Environmental Noise’ defines the parameters, procedures and instrumentation requirements for noise measurement and analysis.

**British Standard 4142**

13.2.6 BS: 4142:2014+A1:2019 ‘Methods for rating and assessing industrial and commercial sound’ describes methods for rating and assessing sound of an industrial and/or commercial nature including sound from fixed installations which comprise mechanical and electrical equipment.

**British Standard 5228 (2009+A1:2014) Parts 1 and 2**

13.2.7 BS: 5228 ‘Code of practice for noise and vibration control on construction and open sites’ parts 1 provide a ‘best practice’ guide for noise control and includes sound power level (L<sub>w</sub>) data for individual plant as well as a calculation method for noise from construction activities. Part 2 of the standard provides recommendations for basic methods of vibration control relating to construction and open sites.

## 13.3 Scope of Assessment and Consultation

### Introduction

13.3.1 The scope of this assessment covers the following noise and vibration elements associated with the Proposed Development:

- Noise associated with construction and decommissioning works;
- Road traffic associated with construction and decommissioning works; and
- Noise associated with operational activities associated with Immingham Facility, Block Valve Stations and Theddlethorpe Facility (Options 1 and 2).

### Scoping Report and Scoping Opinion

13.3.2 A summary of stakeholder engagement specific to noise and vibration is provided in **Table 13-4**.

**Table 13-4: Noise and Vibration Scoping Opinion**

Section Reference to Scoping Opinion	Applicant's proposed matter	Planning Inspectorate / prescribed consultee comments	Response
Paragraph 13.3.7	Ambient vibration monitoring	Given the nature of the scoping area and the information provided in the Scoping Report (regarding likely vibration impacts), the Inspectorate agrees with the proposed approach to assess construction vibration on absolute levels.	Construction vibration effects have been considered in <b>Table 13-13</b> .
Paragraph 13.4.5, Table 13-1	Noise impacts from operational road traffic	The Inspectorate has considered the information provided, and accepts that significant effects are unlikely given the likely scale of operational traffic, however limited information on noise sensitive receptors that could be affected is provided in the Scoping Report. The Inspectorate advises that the ES should include the information on noise sensitive receptors used to establish that likely significant effects can be excluded, and demonstrate where this has been informed by the outcomes of consultation with stakeholders.	The identified noise-sensitive receptors are summarised in <b>Table 13-11</b> and shown in <b>Figure 13-1</b> .
Paragraph 13.4.8, Paragraph 13.5.5, Table 13-1	Vibration impacts from operational activities	In the absence of information on the likely vibration generated by operational activities, in particular the operation of equipment at Immingham, the offshore tie-in and outlet, and shutdown valves	The nearest sensitive receptor to operational facilities are 200 m away. At this distance, it is unlikely that

Section Reference to Scoping Opinion	Applicant's proposed matter	Planning Inspectorate / prescribed consultee comments	Response
		<p>associated with the Proposed Development, the Inspectorate is not in a position to agree to scope operational vibration from the assessment. Accordingly, the ES should include an assessment, or provide the relevant information, supported by advice from the relevant consultation bodies, to establish the absence of likely significant effects.</p>	<p>operational vibration would be perceptible. Consequently, potential operational vibration would not result in likely significant effects and an assessment has been scoped out. Additionally, as the pipeline would be buried, it is unlikely to generate perceptible levels of vibration at the surface and an assessment has been scoped out.</p>
<p>Paragraph 13.5.4, Table 13-1</p>	<p>Operational noise from the new pipeline</p>	<p>The Inspectorate has considered the information provided and agrees that significant effects are unlikely and that this matter can be scoped out of the ES.</p>	<p>The new pipeline itself would be installed below ground and would not produce any operational noise emissions that would be perceptible at ground level. Consequently, an assessment of operational noise associated with the pipeline has been scoped out of the assessment and it is noted that this has been agreed with the Planning Inspectorate.</p>
<p>Paragraph 13.3.2</p>	<p>Noise monitoring</p>	<p>The Scoping Report describes the intention to undertake unattended measurements at the Pipeline Offtake Facility at Immingham, the offshore pipeline tie-in and outlet at the former TGT Site and at selected shutdown valves along the pipeline. Short-term unattended measurements are proposed at selected locations along the</p>	<p>Section 13.5.8 provisionally describes the noise monitoring methodology. This methodology has been consulted on as per information in <b>Table 13-7</b>.</p>

Section Reference to Scoping Opinion	Applicant's proposed matter	Planning Inspectorate / prescribed consultee comments	Response
		pipeline route. The ES should contain detailed monitoring reports providing the data required by BS7445-1:2003.	
Paragraph 13.6.1	Mitigation and control measures	The Inspectorate welcomes the intention to describe mitigation and control measures in the ES, and advises that the ES clearly describes the efficacy of these measures in terms of the residual effects following their implementation. Where applicable, the ES should include an assessment of any environmental effects generated by the presence of noise mitigation measures e.g. the visual effects of noise attenuation measures.	Additional mitigation and control measures have been described in section 13.8 and residual effects that account for mitigation are described in section 13.9.
North Lincolnshire Council	Scope	The Council's Environmental Health Officer has confirmed that this proposed approach is acceptable.	This is noted.

### Feedback on the Preliminary Environmental Information Report

13.3.3 A summary of stakeholder engagement specific to noise and vibration has been provided in **Table 13-5**.



**Table 13-5: Noise and Vibration Feedback on PEIR**

Stakeholder	Comments	Response
North Lincolnshire Council	Having considered Chapter 13 of the PEIR, it is noted that the likely effects of noise and vibration would be limited. Comments have been sought from the Environmental Protection Team. In summary these advise: In considering the information provided to date based on baseline and design information there are no objections to the general approach set out within the PEIR at this stage. The Environmental Protection Team have also confirmed their agreement to the Planning Inspectorates approach to the scope of the noise and vibration assessment. It is noted that NLC have been in discussions with AECOM regarding the methodology for the noise and vibration assessments and further comments will be provided upon the submission of the final Environmental Statement.	Detailed information on the methodology for the assessment of noise and vibration is provided in section 13.4.
West Lindsey Council	13.4.14- The proposed working hours are noted and these are acceptable in the rural areas of the project. The working hours should be reviewed if the route corridor passes nearby to residential properties to avoid any prolonged disturbance during construction phases.	Noted. Working hours and activities will be reviewed as appropriate.
	13.4.19-13.4.20- The assessment of noise and vibration levels at chosen sensitive receptors is welcomed. The predictions, which will use representative noise levels taken from industry standard guidance and the comparison method is also acceptable.	This is noted.
	13.4.30-13.4.35- As stated above, Block Valve Station 1 is approx. 400m from the WLDC District boundary. The method of assessing the operational noise from the station is considered to be appropriate.	This is noted.
East Lindsey District Council	This note presents a review of the AECOM note 'Viking CCS Pipeline, Baseline Sound Monitoring Methodology' (2nd December 2022). The note includes the following sections:	This is noted.

Stakeholder	Comments	Response
	<ul style="list-style-type: none"> <li>• Introduction;</li> <li>• Study Area;</li> <li>• Sensitive Receptors;</li> <li>• Sound Monitoring Methodology;</li> <li>• Proposed Monitoring Locations; and</li> <li>• Appendix A: Project Map Three figures, showing the Draft Order Limits of the Project, the identified sensitive receptor locations, proposed sound level monitoring locations, and the Local Authority boundaries.</li> </ul> <p>Each of the above sections is reviewed separately as follows.</p>	
	<p><b>Introduction</b> No comment is provided on this section.</p>	<p>This is noted.</p>
	<p><b>Study Area</b> This section defines the study area for construction and operational sound effects to be “receptors within 500m of the Theddlethorpe Facility, Block Valve Stations and within 300m of the Draft Order Limits.” This requires clarification as it is understood that the Theddlethorpe Facility and Block Valve Stations are inside the Draft Order Limits therefore it is not clear which distance applies at these locations. The simplest solution to this would appear to be showing the proposed study area on the figures in Appendix A.</p>	<p><b>Figure 13-1</b> has been updated to clearly display the corresponding study areas of 500m of the Immingham and Theddlethorpe Facilities, and Block Valve Stations DCO Site Boundary, and 300m of the pipeline DCO Site Boundary.</p>
	<p><b>Sensitive Receptors</b> This section states that “The sensitive receptors considered are the nearest receptors to the Project (i.e., the receptors that will experience the highest levels of sound and vibration).” This statement is not considered completely correct, as this will only be the case if the noise emissions from the project are consistent along the entire length of the pipeline. If, for example, construction compounds, access tracks or road diversions are required, or any other change in working methods or hours, these may increase noise emissions at certain locations during the construction phase.</p>	<p>All sensitive receptors within the Study Area are being considered in the noise and vibration assessment and are covered in this chapter. The locations nearest to the Proposed Development have been selected for the purpose of selecting monitoring locations. As construction noise is assessed using fixed thresholds (see <b>Table 13-11</b>), the nearest receptors in the Study Area have been accounted for as these will experience the highest noise and vibration</p>

Stakeholder	Comments	Response
	<p>Further information is therefore required on if or how the project construction information has been used to determine the receptor locations, to determine whether additional receptors need to be included in the assessment.</p> <p>It is recognised (as per the information in Sound Monitoring Methodology describing long-term measurement locations) that the proposed sources of operational noise impacts have been considered in determining receptor locations.</p> <p>This section goes on to state that “Although sound and vibration may be perceivable at other receptors in the area around the Project, effects will not be significant if they are suitably controlled at the identified receptors.”</p> <p>This statement is only true if the noise emissions from the project are consistent (see previous point) and the baseline sound levels at properties further from the project are no lower than those which are relatively close.</p> <p>Further information is therefore required on the potential for additional receptors to be required which are further from the project than those identified due to either of these factors.</p>	<p>levels. Control of construction noise at the nearest receptors would mean that noise and vibration is subsequently controlled at receptors farther from the Site. Detailed information on construction information is not present at this stage, sensitive receptor locations have been selected based on proximity to the proposed development.</p>
	<p>Table 2 in this section details the identified sensitive receptors, these have been analysed in combination with the figures showing their locations in Appendix A. The following observations are made:</p> <ul style="list-style-type: none"> <li>The location of R1 on the Figure is Immingham Kennels, not the residential properties on School Rd. Immingham Kennels wouldn't be considered noise-sensitive and the Figure needs to be corrected. Clarification is required as to the decision to adopt R1, it appears to be to inform assessment of impact of North Compound option 1b. Properties on School Rd appear to be further away from the North Compound site than 1 to 8 Ulceby Road, plus The Poplars, also in South Killingholme. Please clarify why these are not included.</li> </ul>	<p>The location of R1 on the figure was incorrect and should have been located further north, this has been corrected in <b>Figure 13-1</b>.</p>
	<ul style="list-style-type: none"> <li>R2 (residential properties on Church Lane in Immingham) is not considered representative of the nearest receptors to the project,</li> </ul>	<p>No residential receptors have been identified on St Andrews Lane. From satellite imagery, there</p>

Stakeholder	Comments	Response
	<p>there are closer properties to the Order Limits to the west on St Andrews Lane and to the north-west on Church Lane.</p>	<p>is a former golf course club house and a community centre. Receptors have since been identified closer to the Immingham Facility to the northeast on Church Lane that have been included for the assessment. As background sound has been used for the basis of the operational noise assessment, the monitoring location is still valid.</p>
	<ul style="list-style-type: none"> <li>The Viking Route Maps Pack (available at <a href="https://consultation.vikingccs.co.uk/files/Viking-CCS-Route-maps-pack.pdf">https://consultation.vikingccs.co.uk/files/Viking-CCS-Route-maps-pack.pdf</a>) shows that the Draft Order Limits are close to the Lincolnshire Wolds Area of Outstanding Natural Beauty (AONB), but this is not included in Table 2. AONBs are considered noise sensitive; hence, justification is required for this exclusion.</li> </ul>	<p>Lincolnshire Wolds Area of Outstanding Natural Beauty (AONB) is not classed as a human receptor and has not been covered as part of the acoustic assessment.</p> <p>The AONB would be affected by temporary construction noise. Noise is assessed based on the effect on health and quality of life. Noise generated by the construction phases of the Scheme will only affect people in the AONB users for limited periods of time when they are in close proximity to a noise source.</p> <p>It is acknowledged that short-term exposure to noise can cause disturbance people in the AONB and result in adverse noise effects. Planning Practice Guidance Noise (Ref 13-13) identifies an adverse noise effect as “Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.”</p>

Stakeholder	Comments	Response
		<p>This is considered to describe the level of noise effect that may be perceived by AONB users.</p> <p>Consequently, no significant adverse effects on AONB users have been identified as arising from the Scheme.</p> <p>The NPSE (Ref 13-9) provides a means for noise effects to be identified. It allows for adverse effects on health and quality of life to occur where all reasonable steps have been taken to reduce these effects whilst taking into account sustainable development.</p> <p>In accordance with the NPSE, all reasonable steps to minimise the effects of noise on AONB users will be taken during the construction, operational and decommissioning phases of the Scheme. These measures are set out in the Framework CEMP (<i>Appendix 3-1, ES Volume IV</i>), Framework Decommissioning Environmental Management Plan (DEMP) (<i>Appendix 3-1, ES Volume IV</i>), and the Framework Operational Environmental Management Plan (OEMP) (<i>Appendix 3-6, ES Volume IV</i>).</p>
	<p><b>Sound Monitoring Methodology</b></p> <p>This section states that short-term attended measurements are proposed which will “define representative ambient sound conditions during weekday construction core work hours of 08:00 to 18:00.”</p> <p>Further information is required as to the proposed actual duration of these measurements and justification of the proposed process to determine robust baseline sound level data for the assessment. It is also unclear as to whether any of the short-term measurements will be used to determine baseline noise levels at receptors which could be</p>	<p>Short-term attended measurements have been conducted for a period of one hour at each location. Observations were made during the attended monitoring to understand whether noise conditions can be considered as representative of the area. Short-term baseline monitoring has been undertaken to fulfil the requirement of EIA Regulations to define the baseline conditions; however, the construction</p>

Stakeholder	Comments	Response
	<p>impacted by operational noise, or by noise from construction outside of the core work hours. If this is the case, then it will be necessary to determine baseline sound levels at times outside of the 08:00 to 18:00 period as appropriate.</p>	<p>noise assessment has been based on the typical DCO approach of defining absolute construction noise levels for the LOAEL and SOAEL. Consequently, the baseline monitoring provides contextual information that will not affect the result of the construction noise assessment. HDD locations are not yet finalised and alternative methods of pipe laying may be employed. As such, there is not a commitment to monitoring. For out of core hours works, consent will be obtained through the Section 61 process. This process would also secure any requirements for noise monitoring.</p>
	<p><b>Proposed Monitoring Locations</b> Table 3 in this section lists the proposed monitoring locations. The following observations are made:</p> <ul style="list-style-type: none"> <li>• NM8 is deemed representative of R16 to R22. R22 is 2 to 3 times the distance from the A19 when compared to NM8; hence, sound levels from this road are likely to be lower at R23. The Study Area section of the note identifies the A19 as a dominant source in the baseline sound climate; hence, baseline sound levels are likely to be lower at R23 than NM8, which could result in actual impacts being worse than assessed.</li> <li>• NM9 is deemed representative of R23, R24 and R25. R25 is 2 to 3 times the distance from the A19 when compared to NM9; hence, baseline sound levels are likely to be lower at R23 than NM9 and actual impacts could be worse than assessed.</li> </ul> <p>Based on the above, the note should consider whether alternative measurement locations are required to determine baseline sound levels at R22 and R25.</p>	<p>As described above the purpose of the monitoring locations at NM8 and NM9 are to provide a snapshot of noise levels during the daytime to provide contextualised information to be used in the noise assessment. Having multiple monitoring locations to cover this would not affect the results of the assessment. Receptors have been grouped together to allow representative noise data to be defined through measurements at the receptor group. Although noise levels will vary at receptors within each group, the measurement locations selected provide a representative noise data at a ‘quiet’ location within each receptor group. Consequently, this provides confidence that the definition of representative noise data for each receptor group is conservative and the assessment is robust.</p>

## Additional Consultation

- 13.3.4 A summary of stakeholder engagement specific to noise and vibration has been provided in **Table 13-6**.
- 13.3.5 An email was sent to the relevant host local authorities regarding the baseline sound monitoring methodology for the Viking CCS Pipeline. The methodology included an introduction to the Proposed Development, a description of the study area, a list of sensitive receptors, a sound monitoring methodology, proposed monitoring locations, and mapping of the monitor, and receptor locations:
- North Lincolnshire Council (6 December 2022);
  - North East Lincolnshire Council (6 December 2022); and
  - East Lindsey District Council (14 December 2022).
- 13.3.6 An email was not sent to West Lindsey District Council, however their responses to the noise and vibration chapter of the PEIR (Ref 13-13) accepted the methodology presented.
- 13.3.7 Responses were received from the aforementioned authorities on the monitoring methodology (a copy of which can be found in *ES Volume IV: Appendix 13.2 (Application Document 6.4.13.2)*). A summary of the comments received are presented in **Table 13-6**.

**Table 13-6: Noise and Vibration Additional Consultation**

Local Authority	Date of Response	Comment	Response
North Lincolnshire Council	6 December 2022 via email	Thank you for your email and attached information. Provided all sensitive receptors have been identified and accounted for this department finds the proposed baseline sound monitoring satisfactory.	n/a
East Lindsey District Council	18 January 2023 via email	Refer to <b>Table 13-7</b> for East Lindsey District Council response and subsequent project response.	

**Table 13-7: Further Consultation with East Lindsey District Council**

Item	Original Comment on Viking CCS Pipeline Baseline Review	Project Response 9 June 2023	East Lindsey District Council response 23 June 2023	Project Response
3. Study Area	This section defines the study area for construction and operational sound effects to be “receptors within 500m of the Theddlethorpe Facility, Block Valve Stations and within 300m of the Draft Order Limits.” This requires clarification as it is understood that the Theddlethorpe Facility and Block Valve Stations are inside the Draft Order Limits therefore it is not clear which distance applies at these locations. The simplest solution to this would appear to be showing the proposed study area on the figures in Appendix A.	An updated figure clearly displaying the corresponding study areas of 500m of the facilities, and 300m of the pipeline Draft Order Limits will be provided within the ES submitted with the DCO application.	Accepted	This is noted.
4. Sensitive Receptors	This section states that “The sensitive receptors considered are the nearest receptors to the Project (i.e., the receptors that will experience the highest levels of sound and vibration).” This statement is not	All sensitive receptors within the study area are being considered in the noise and vibration assessment and will be covered in the ES, the	Accepted	This is noted.



Item	Original Comment on Viking CCS Pipeline Baseline Review	Project Response 9 June 2023	East Lindsey District Council response 23 June 2023	Project Response
	<p>considered completely correct, as this will only be the case if the noise emissions from the project are consistent along the entire length of the pipeline. If, for example, construction compounds, access tracks or road diversions are required, or any other change in working methods or hours, these may increase noise emissions at certain locations during the construction phase. Further information is therefore required on if or how the project construction information has been used to determine the receptor locations, to determine whether additional receptors need to be included in the assessment. It is recognised (as per the information in Sound Monitoring Methodology describing long-term measurement locations) that the proposed sources of operational noise impacts have been considered in determining receptor locations. This section goes on to state that “Although sound and vibration may be perceivable at other receptors in the area around the Project, effects will not be significant if they are suitably controlled at the identified receptors.” This statement is only true if the noise emissions from the project are consistent (see previous point) and the baseline sound levels at properties further from the project are no lower than those which are relatively close. Further</p>	<p>locations nearest to the project have been selected for the purpose of selecting monitoring locations. Detailed information on construction information is not present at this stage, sensitive receptor locations have been selected based on proximity to the proposed development.</p> <p>Lincolnshire Wolds Area of Outstanding Natural Beauty is not classed as a human receptor and has not been covered as part of the acoustic assessment in line National Policy Guidance.</p>	<p>It is not clear what National Policy Guidance is referred to in this response. An AONB is considered to potentially be covered by the following definition of ‘tranquil area’ from the NPPF, which requires that the development should “identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason”. In terms of construction noise</p>	<p>This has been addressed in <i>ES Volume II Chapter 7: Landscape and Visual</i>. The AONB would be affected by temporary construction noise. Noise is assessed based on the effect on health and quality of life. Noise generated by the construction phases of the Scheme will only affect people in the AONB users for limited periods of time when they are</p>

Item	Original Comment on Viking CCS Pipeline Baseline Review	Project Response 9 June 2023	East Lindsey District Council response 23 June 2023	Project Response
	<p>information is therefore required on the potential for additional receptors to be required which are further from the project than those identified due to either of these factors.</p> <p>Table 2 in this section details the identified sensitive receptors, these have been analysed in combination with the figures showing their locations in Appendix A. The following observations are made:</p> <ul style="list-style-type: none"> <li>The location of R1 on the Figure is Immingham Kennels, not the residential properties on School Rd. Immingham Kennels wouldn't be considered noise-sensitive and the Figure needs to be corrected. Clarification is required as to the decision to adopt R1, it appears to be to inform assessment of impact of North Compound option 1b. Properties on School Rd appear to be further away from the North Compound site than 1 to 8 Ulceby Road, plus The Poplars, also in South Killingholme. Please clarify why these are not included.</li> <li>R2 (residential properties on Church Lane in Immingham) is not considered representative of the nearest receptors to the project, there are closer properties to the Order Limits to the west on St Andrews Lane and to the north-west on Church Lane.</li> </ul>		<p>impacts, BS 5228-1 is the accepted code of practice by the Secretary of State and Annex E3.3 provides an assessment method for determining the impacts on public open spaces. Further clarification is required as to what would distinguish Lincolnshire Wolds AONB from other AONB which may fall into the aforementioned scope of 'tranquil area' and/or 'public open space'.</p>	<p>in close proximity to a noise source.</p> <p>It is acknowledged that short-term exposure to noise can cause disturbance people in the AONB and result in adverse noise effects. Planning Practice Guidance Noise (Ref 13-13) identifies an adverse noise effect as "Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life." This is considered to describe the level of noise effect that may be perceived by AONB users.</p> <p>Consequently, no significant adverse effects on AONB users have been</p>

Item	Original Comment on Viking CCS Pipeline Baseline Review	Project Response 9 June 2023	East Lindsey District Council response 23 June 2023	Project Response
	<ul style="list-style-type: none"> <li>The Viking Route Maps Pack (available at <a href="https://consultation.vikingccs.co.uk/files/Viking-CCS-Routemaps-pack.pdf">https://consultation.vikingccs.co.uk/files/Viking-CCS-Routemaps-pack.pdf</a>) shows that the Draft Order Limits are close to the Lincolnshire Wolds Area of Outstanding Natural Beauty (AONB) but this is not included in Table 2. AONBs are considered noise sensitive; hence, justification is required for this exclusion.</li> </ul>			<p>identified as arising from the Scheme.</p> <p>The NPSE (Ref 13-9) provides a means for noise effects to be identified. It allows for adverse effects on health and quality of life to occur where all reasonable steps have been taken to reduce these effects whilst taking into account sustainable development.</p> <p>In accordance with the NPSE, all reasonable steps to minimise the effects of noise on AONB users will be taken during the construction, operational and decommissioning phases of the Scheme. These measures are set</p>

Item	Original Comment on Viking CCS Pipeline Baseline Review	Project Response 9 June 2023	East Lindsey District Council response 23 June 2023	Project Response
				out in the Draft CEMP (ES Volume IV <i>Appendix 3-1</i> ).
		The location of R1 on the figure was incorrect and should have been located further north, this will be corrected in the ES.	Accepted	This is noted.
		Regarding R2, no residential receptors have been identified on St Andrews Lane. From satellite imagery, there is a golf course club house and a community centre. Receptors have since been identified closer to the facility to the north east on Church Lane that will be included for the assessment. As background sound will be used for the basis of the operational noise assessment, the monitoring location is still valid.	Accepted	This is noted.
5. Sound Monitoring Methodology	This section states that short-term attended measurements are proposed which will “define representative ambient sound conditions during weekday construction core work hours of 08:00 to 18:00.” Further information is required as to the proposed actual duration of these measurements and justification of the proposed process to	Short-term attended measurements have been conducted for a period of one hour at each location. Observations were made during the attended monitoring to understand whether noise	What will be done if these observations reveal that noise conditions are not representative?	It was observed that there were significant periods of shooting during attended noise monitoring, which influenced ambient noise conditions.

Item	Original Comment on Viking CCS Pipeline Baseline Review	Project Response 9 June 2023	East Lindsey District Council response 23 June 2023	Project Response
	<p>determine robust baseline sound level data for the assessment. It is also unclear as to whether any of the short-term measurements will be used to determine baseline noise levels at receptors which could be impacted by operational noise, or by noise from construction outside of the core work hours. If this is the case, then it will be necessary to determine baseline sound levels at times outside of the 08:00 to 18:00 period as appropriate.</p>	<p>conditions can be considered as representative of the area.</p>		<p>These instances of shooting noise were removed from presented noise data. Details on this are presented in <i>ES Volume IV: Appendix 13.1 (Application Document 6.4.13.1)</i>.</p>
		<p>Short-term baseline monitoring has been undertaken to fulfil the requirement of EIAR Regulations to define the baseline conditions; however, the construction noise assessment will be based on the typical DCO approach of defining absolute construction noise levels for the LOAEL and SOAEL. Consequently, the baseline monitoring provides contextual information that will not affect the result of the construction noise assessment.</p>	<p>It is accepted that fixed limit construction noise impact thresholds are a valid approach. However, this does not provide sufficient context in terms of the fact that, where baseline noise levels could be quiet, large changes in ambient sound level could occur, without exceedances of the adopted LOAEL and SOAEL values. This approach is considered potentially non-compliant with Paragraph 5.11.4 of</p>	<p>Providing context through baseline noise monitoring may be important in locations where existing noise levels are high. However, the DCO Site Boundary is largely in a rural location, so it is anticipated that ambient noise levels are typical of quiet environments. As such, the fixed construction noise criteria provide a means to assess</p>

Item	Original Comment on Viking CCS Pipeline Baseline Review	Project Response 9 June 2023	East Lindsey District Council response 23 June 2023	Project Response
			<p>Overarching National Policy Statement for Energy (EN-1) which states “Where noise impacts are likely to arise from the proposed development, the applicant should include the following in the noise assessment:…; a prediction of how the noise environment will change with the proposed development; in the shorter term such as during the construction period; … at particular times of the day, evening and night as appropriate.”</p>	<p>likely significant effects from temporary sources of noise in the context of a rural location.</p>
		<p>Monitoring outside of construction hours is not required as there will not be any operational activities at the attended monitoring locations.</p>	<p>This does not provide baseline data for the assessment of noise impacts from out of hours construction working. Unless the project is committing now that no out of</p>	<p>The assessment of construction noise has been undertaken using fixed noise limits, which are not reliant on baseline monitoring. The</p>

Item	Original Comment on Viking CCS Pipeline Baseline Review	Project Response 9 June 2023	East Lindsey District Council response 23 June 2023	Project Response
			hours working will be undertaken, baseline data is required for these time periods.	requirement for out-of-hours construction activities at pipeline crossing has not been determined at this stage of the application. Any out of hours works would be subject to a Section 61 application (see 13.8) where any requirement for baseline monitoring could be agreed.
6. Proposed Monitoring Locations	<p>Table 3 in this section lists the proposed monitoring locations. The following observations are made:</p> <ul style="list-style-type: none"> <li>NM8 is deemed representative of R16 to R22. R22 is 2 to 3 times the distance from the A19 when compared to NM8; hence, sound levels from this road are likely to be lower at R23. The Study Area section of the note identifies the A19 as a dominant source in the baseline sound climate; hence, baseline sound levels are likely to be lower at R23 than NM8, which could result in actual impacts being worse than assessed.</li> </ul>	<p>As described above the purpose of the monitoring locations at NM8 and NM9 are to provide a snapshot of noise levels during the daytime to provide contextualised information to be used in the noise assessment. Having multiple monitoring locations to cover this will not affect the results of the assessment. Receptors have been grouped together to allow representative</p>	<p>This response does not appear to understand the nature of the comments made. It is accepted that the standard approach is to group receptors and monitor at a quiet location representative of those receptors. However, we have identified that certain</p>	<p>The aim of noise monitoring is to provide representative noise conditions at a receptor; however, as effects are identified using fixed noise limits in the construction noise assessment, this data is used to provide context and</p>

Item	Original Comment on Viking CCS Pipeline Baseline Review	Project Response 9 June 2023	East Lindsey District Council response 23 June 2023	Project Response
	<ul style="list-style-type: none"> <li>NM9 is deemed representative of R23, R24 and R25. R25 is 2 to 3 times the distance from the A19 when compared to NM9; hence, baseline sound levels are likely to be lower at R23 than NM9 and actual impacts could be worse than assessed. Based on the above, the note should consider whether alternative measurement locations are required to determine baseline sound levels at R22 and R25.</li> </ul>	<p>noise data to be defined through measurements at the receptor group. Although noise levels will vary at receptors within each group, the measurement locations selected provide a representative noise data at a 'quiet' location within each receptor group. Consequently, this provides confidence that the definition of representative noise data for each receptor group is conservative, and the assessment is robust.</p>	<p>monitoring locations are further from sources likely to be contributing to baseline sound levels than certain receptors within the assigned receptor group; hence baseline sound levels at these receptors are likely to be lower than at the monitoring location considered representative of that group. Hence, the selected measurement locations are not considered representative of a quiet location and the assessment may not be robust. Further evidence is required to respond to this point.</p>	<p>would not result in an effect being worse than identified. Consequently, whilst the statement that data was measured at a 'quiet' location is somewhat misleading, the noise data is considered representative of typical ambient noise conditions for receptors in each group.</p>



## Scope of Assessment

13.3.8 The noise and vibration assessment considers the following:

- Construction noise;
- Construction noise associated with construction compounds;
- Construction vibration;
- Construction traffic noise; and
- Operational noise from the Theddlethorpe Facility (Options 1 and 2).

### Aspects scoped out of the assessment

13.3.9 An assessment of operational road traffic noise has been scoped out as operational traffic would be minimal and would not be sufficient enough to result in any significant effects.

13.3.10 An assessment of noise emissions from pipelines has been scoped out as the Proposed Development is installed below ground and would not produce any noise emissions.

13.3.11 Operational noise from the Immingham Facility has been scoped out as the nearest receptor (R50) to noise generating plant is over 500 m as operational noise is likely to be negligible at distances greater than 500m (see paragraph 13.5.1).

13.3.12 Operational noise from the Block Valve stations has been scoped out as no noise generating plant will be above ground at each installation. Consequently, any noise generating plant would be well attenuated and noise emissions would be minimal.

13.3.13 Operational vibration has been scoped out as no major sources of vibration would be introduced during operation so vibration would not be perceptible at the nearest receptor to an operational facility, which is as a distance of at least 200 m to receptor R41.

## 13.4 Assessment Methodology

### Receptor Sensitivity

13.4.1 Potential sensitive receptors (i.e., buildings whose occupants may be disturbed by adverse noise and vibration levels, and structures that are sensitive to vibration) have been taken into consideration when assessing the effects associated with noise and vibration levels from the construction, decommissioning and operational phases of the Proposed Development

13.4.2 The type of receptors that may experience significant effects due to the construction and operation of the Proposed Development are identified in **Table 13-8** as residential and non-residential.

13.4.3 None-human receptors such as animal and bird species have been considered for assessment but are presented in *ES Volume II Chapter 6: Ecology and Biodiversity (Application Document 6.2.6)*.

**Table 13-8: Receptor Types**

Receptor Group	Receptors In Group
Residential	Individual dwellings and private open spaces (e.g., gardens).
Non-residential	Non-residential community facilities such as schools, hospitals, places of worship, and noise sensitive commercial properties.

13.4.4 Noise and vibration effects due to the Proposed Development has been considered at nearby sensitive receptors. A number of receptors that may potentially be affected have been considered in this assessment. The sensitive receptors considered are the nearest receptors to the Proposed Development (i.e., the receptors that will experience the highest levels of noise and vibration). Although noise and vibration may be perceivable at other receptors in the area around the Proposed Development, effects will not be significant if they are suitably controlled at the identified receptors.

### Baseline Noise Monitoring Methodology

13.4.5 Baseline noise monitoring has been carried out to establish the existing noise climate at sensitive receptors within the noise and vibration study area (see paragraph 13.5.1). The monitoring procedures followed guidance from BS 7445 'Description and environment of environmental noise – Part 1: Guide to quantities and procedures' (Ref 13-21) and BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound' (Ref 13-17).

13.4.6 All noise measurements included  $L_{Aeq,T}$ ,  $L_{A90,T}$ ,  $L_{A10,T}$  and  $L_{AFmax}$  sound level indicators over 15-minute continuous periods. The surveys were planned to avoid periods of high wind (>5 m/s) and rainfall. Weather conditions (wind speed, rainfall etc.) were checked beforehand to ensure appropriate conditions were met. Periods of high wind and rainfall, identified in meteorological data, were removed from analysis.

13.4.7 Several other factors were also taken into consideration when identifying these locations, including safety of the operators, security of the monitoring equipment and site accessibility.

### Noise Monitoring Equipment

13.4.8 The equipment shown in **Table 13-9** was used for the baseline noise surveys.

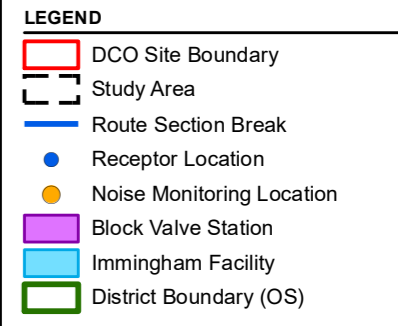
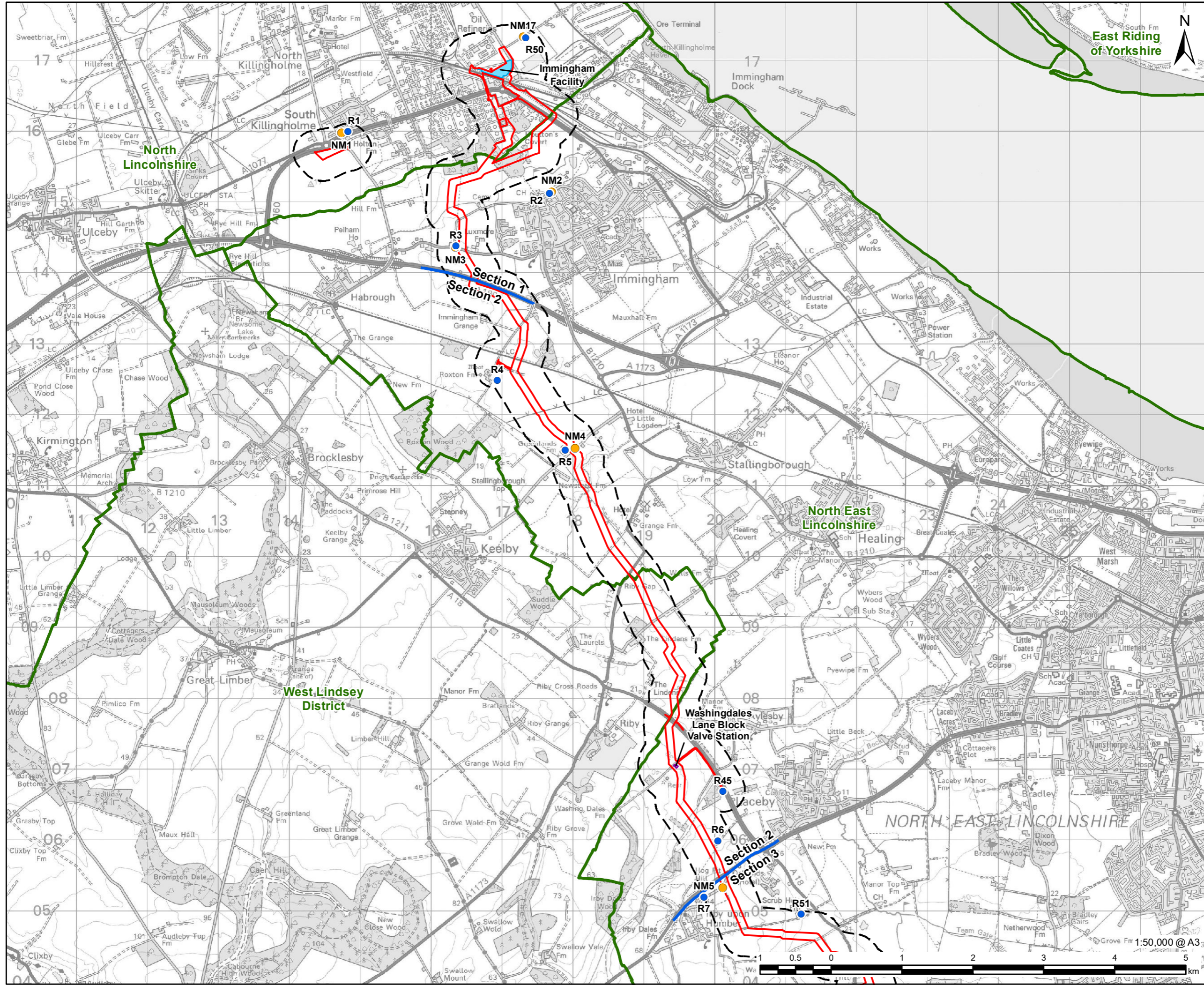
**Table 13-9: Noise Monitoring Equipment**

Description	Manufacturer	Type	Serial Number	Locations Used
Calibrator	Brüel & Kjær	4321	2642980	All Sites
Sound Level Meter	01dB	DUO	12039	LT1
Sound Level Meter	Rion	NL-52	743082	LT2, LT6
Sound Level Meter	Rion	NL-52	1021284	LT3
Sound Level Meter	Rion	NL-52	1143567	LT4
Sound Level Meter	Rion	NL-52	1143567	LT5
Sound Level Meter	Rion	NL-52	3866762	ST1-ST8, ST10-ST11
Sound Level Meter	Rion	NL-52	1021284	ST9

13.4.9 All the above equipment has in-date factory calibration certificates which is available upon request. The sound level meters were field calibrated before conducting measurements and calibration was checked at the end of measurements. No significant drift was recorded.

## Measurement Locations

- 13.4.10 Unattended measurements were undertaken at six locations representative of key identified receptors within 500m of proposed facilities generating operational noise. Monitoring was carried out for a minimum of six days, to include weekend, weekday and night-time periods. Measurements were undertaken from 19 January to 26 January 2023 and from 26 January to 3 March 2023. Each unattended sound level meter was housed within a weatherproof box with batteries to power the instrument for the full measurement duration. Appropriate outdoor all-weather equipment was used on all microphones.
- 13.4.11 Unattended measurement locations were selected to provide representative noise data for nearby sensitive receptors proposed at the pipeline where there will be long-term operational noise source from Immingham Facility (NM2, NM17), Theddlethorpe Facility (LT15), and Block Valve Stations along the route (NM5, NM7, NM11).
- 13.4.12 Attended daytime measurements were carried out at eleven locations along the Proposed Development route, where noise from construction works may affect nearby receptors. The receptors considered are the nearest receptors to the DCO Site Boundary, and although noise and vibration may be perceivable at other areas around the Proposed Development, effects will not be significant if they are suitably controlled at the identified receptors. Attended measurements were undertaken for a period of one hour during core daytime construction work hours on the 20, 23 and 24 January 2023, and 3 March 2023.
- 13.4.13 Attended sound level monitoring was also carried out at 20 additional locations to establish baseline conditions at ecological receptors as part of the Habitat Regulations Assessment, the details of which are presented in *ES Volume II Chapter 6: Ecology and Biodiversity (Application Document 6.2.6)*. Attended measurements were undertaken for a period of one hour during daytime construction hours.
- 13.4.14 Noise monitoring locations are illustrated below in **Figure 13-1** and detailed in **Table 13-10**.



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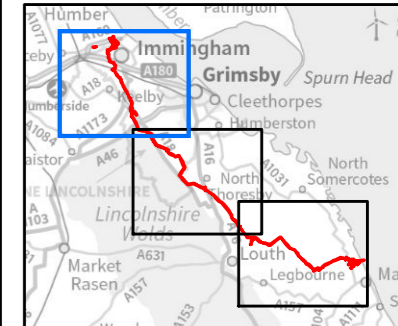
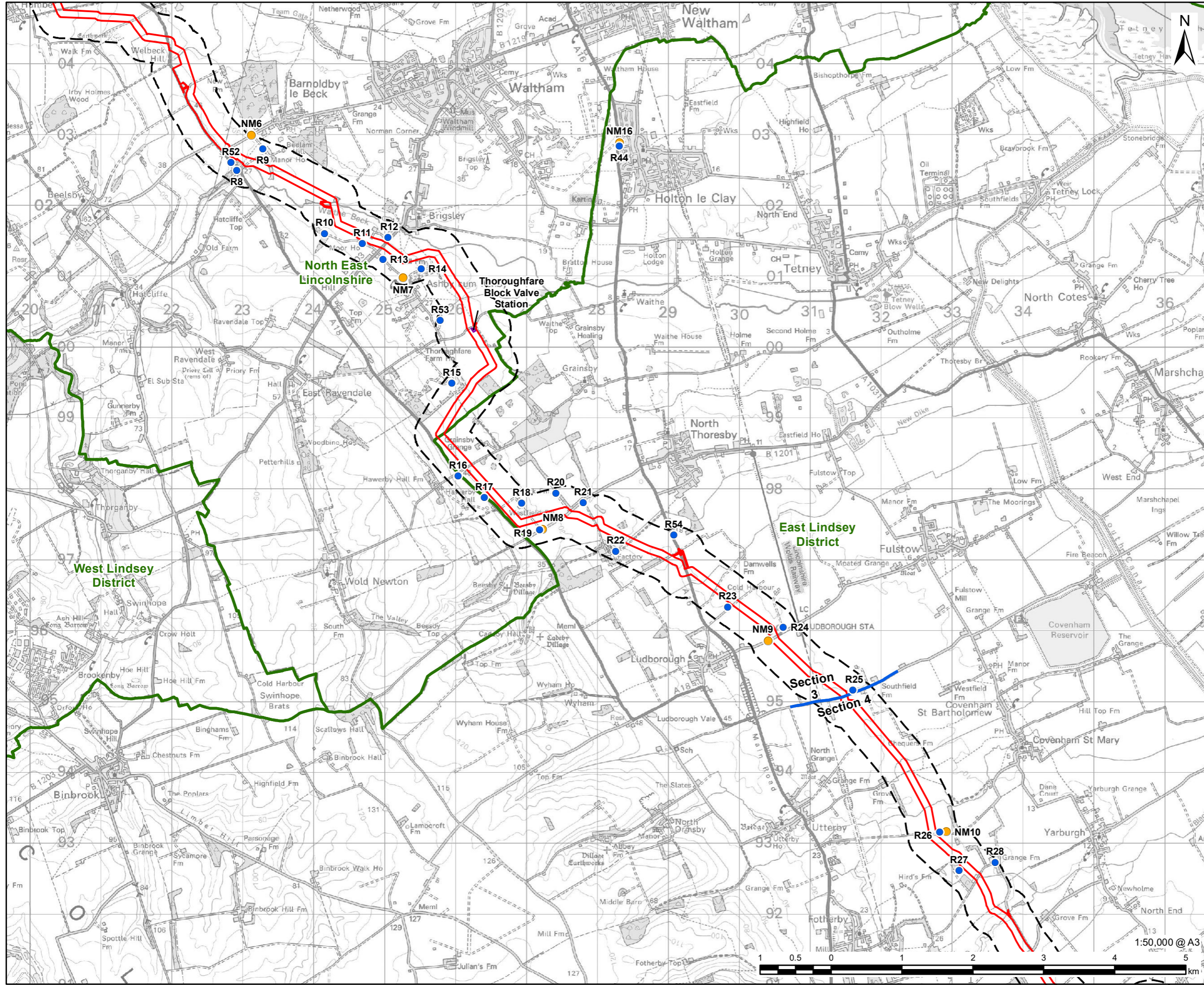


FIGURE TITLE

**Figure 13-1 (1 of 3)**

**Receptors and Noise Monitoring Locations**

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LEGEND

- DCO Site Boundary
- Study Area
- Route Section Break
- Receptor Location
- Noise Monitoring Location
- Block Valve Station
- District Boundary (OS)

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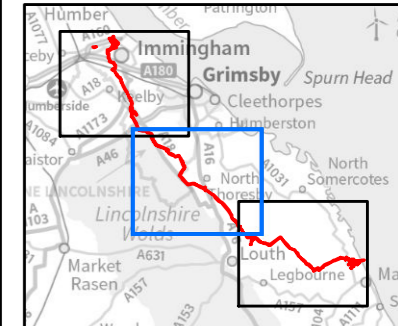
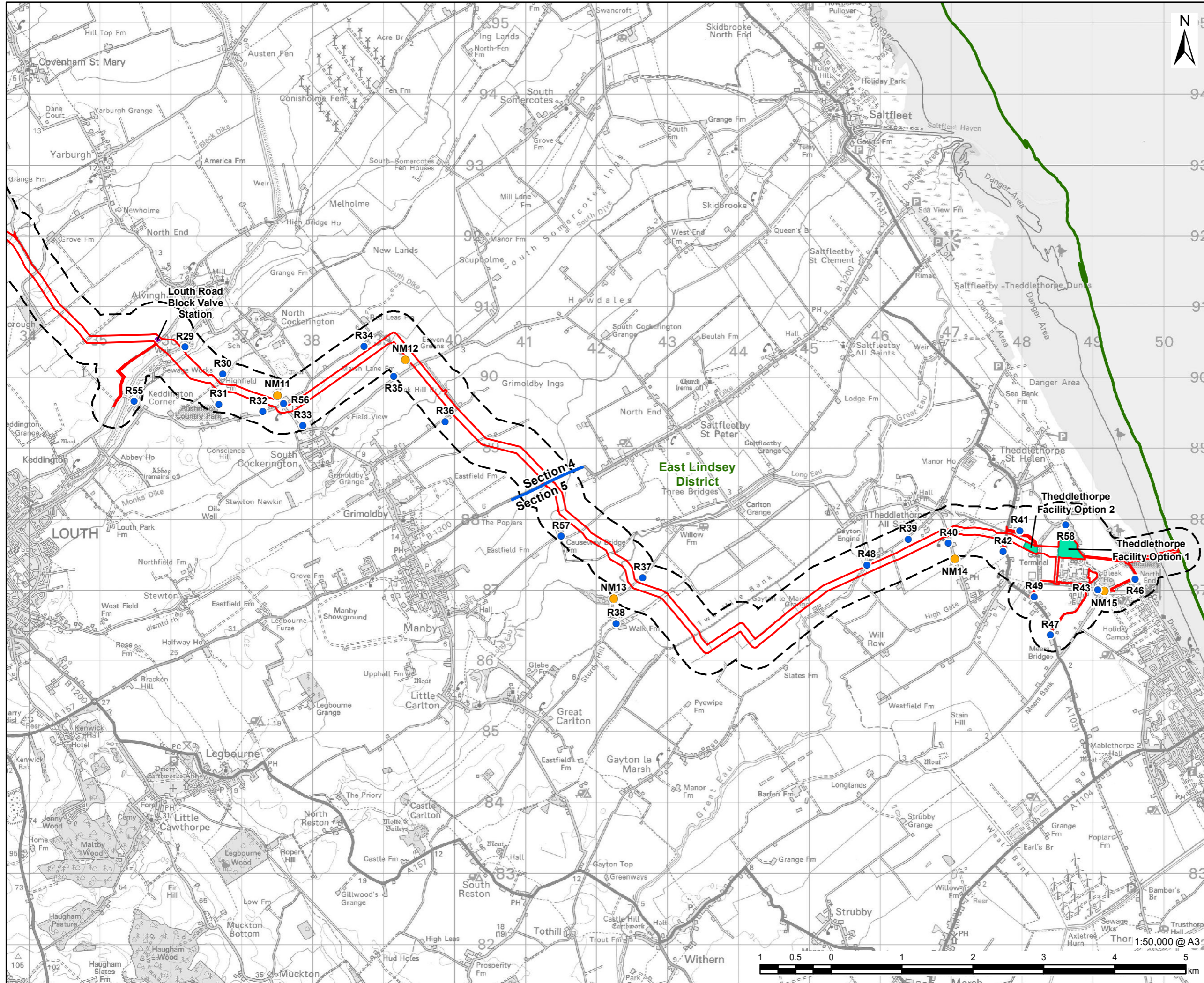


FIGURE TITLE

**Figure 13-1 (2 of 3)**

**Receptors and Noise Monitoring Locations**

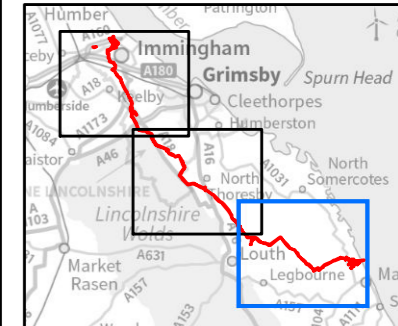
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**LEGEND**

- DCO Site Boundary
- Study Area
- Route Section Break
- Receptor Location
- Noise Monitoring Location
- Block Valve Station
- Theddlethorpe Facility
- District Boundary (OS)

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**FIGURE TITLE**  
**Figure 13-1 (3 of 3)**  
**Receptors and Noise Monitoring Locations**

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**Table 13-10: Noise Monitoring Locations**

Monitor ID	Location/Address	Coordinates (X/Y)	Measurement Type
NM1	South Killingholme	53°37'40"N, 0°15'58"W	Attended
NM2	Immingham Facility, South	53°37'09"N, 0°13'24"W	Unattended
NM3	Habrough	53°36'46"N, 0°14'34"W	Attended
NM4	Stallingborough	53°35'15"N, 0°13'02"W	Attended
NM5	Washingdales Lane Block Valve Station	53°31'51"N, 0°11'22"W	Unattended
NM6	Hatcliffe and Barnoldby-le-Beck	53°30'33"N, 0°8'43"W	Attended
NM7	Thoroughfare Block Valve Site	53°29'32"N, 0°6'58"W	Unattended
NM8	Hawerby and North Thoresby	53°27'30"N, 0°05'08"W	Attended
NM9	Ludborough and Fulstow	53°26'36"N, 0°02'17"W	Attended
NM10	Fotherby and Little Grimsby	53°25'06"N, 0°0'6"W	Attended
NM11	Louth Road Block Valve Station	53°21'32"N, 0°14'22"E	Unattended
NM12	South Cockerington, Grimoldby and Lordship Farm, Great Carlton	53°23'26"N, 0°05'36"E	Attended
NM13	Windswept, Great Carlton and Grove Road	53°21'35"N, 0°8'9"E	Attended
NM14	Theddlethorpe	53°21'47"N, 0°12'31"E	Attended
NM15	Theddlethorpe Facility	53°21'32"N, 0°14'22"E	Unattended
NM16	Holton le Clay	53°30'27"N, 0°4'1"E	Attended
NM17	Immingham Facility, East	53°38'22"N, 0°13'35"W	Unattended

### Effect Assessment Methodology

13.4.15 A new source of noise is assessed through the absolute noise level it generates at sensitive receptors. Where an exceedance of the defined SOAEL for each noise source occurs, it is an indication of a likely significant effect. However, where an existing noise source is changed (i.e., construction traffic changing road traffic noise levels), the assessment of the effect level due to the change in noise refers to guidance within the Design Manual for Roads and Bridges (DMRB) (Ref 13-16) and consideration of the absolute noise level based on national policy guidance.

13.4.16 Government policy for noise is based on community exposure response relationships and noise insulation of a typical dwelling. Consequently, an assessment based on LOAELs and SOAELs cannot be applied to non-residential sensitive receptors. As such, the approach to the assessment of non-residential receptors differs from that adopted for residential receptors. Non-residential receptors are considered on a case-by-case basis by considering the applicable design criteria for good internal noise levels.

## Construction and Decommissioning Noise

13.4.17 Noise levels experienced by sensitive receptors during construction and decommissioning works depend upon several variables, the most significant of which are:

- the noise generated by plant or equipment used on site, generally expressed as sound power levels (L<sub>w</sub>);
- the periods of use of the plant on site, known as its 'on-time';
- the distance between the noise/vibration source and the receptor;
- the noise attenuation due to ground absorption, air absorption and barrier effects;
- in some instances, the reflection of noise due to the presence of hard surfaces such as the sides of buildings; and
- the time of day or night the works are undertaken.

13.4.18 Noise effects during the decommissioning phase of the Proposed Development will be similar to or less than noise effects during the construction phase; therefore, construction and decommissioning noise effects are considered together. The construction noise assessment presented is considered equivalent to, or an overestimate of, the decommissioning phase.

### Construction Phase

13.4.19 The construction of the Proposed Development is anticipated to commence in 2026 and complete in 2027. A working day of 12 hours (07:00 to 19:00) Monday to Friday, five days a week, and six and a half hours (07:00 to 13:30) on Saturday is expected. Special circumstances could include continual 24 hour working, such as where Horizontal Directional Drilling (HDD) is required at major crossings.

### Pipeline Construction

13.4.20 The following activities will be undertaken to construct the pipeline:

- Set out Right of Way (RoW) and install all required fencing;
- RoW preparation works;
- Pipeline route marking;
- Pipe delivery and stringing;
- Pipe (cold) bending;
- Welding, inspection and joint coating;
- Trench excavation and pipe lower and lay;
- Backfilling and re-instatement; and
- Pre/Post construction drainage.

### Pipeline Crossing

13.4.21 The following techniques could be used for pipeline crossings:

- Installation of auger bore crossings;
- Installation of HDD crossings;
- Installation of open-cut crossings; and
- Utilisation of micro tunnelling techniques.



### Pipeline Pre-Commissioning

13.4.22 Hydrostatic testing will commence as part of pre-commissioning works with testing being carried out at each section of the pipeline and will take 24 hours to complete.

### Pipeline Commissioning

13.4.23 It is understood that there are few noise sources during commissioning and that the operational phase of the pipeline represents worst case.

### Construction and Decommissioning Noise Criteria

13.4.24 Noise generated by construction works have been predicted following guidance from BS 5228-1 ‘Code of practice for noise and vibration control on construction and open sites’ (Ref 13-13), which provides a realistic estimate of sound propagation from construction plant. The predictions use representative noise source data for typical items of plant that are used in such developments.

13.4.25 Annex E of BS 5228-1 provides example methods for the assessment of the significance of construction noise effects. With reference to the NPSE, the LOAEL and SOAEL thresholds have been set in **Table 13-11** below.

**Table 13-11: Thresholds of Potential Effects of Construction Noise at Residential Buildings**

Time Period	Threshold Value ( $L_{Aeq,T}$ dB)	
	LOAEL	SOAEL
Day (07:00 – 19:00) Saturday (07:00 – 13:00)	65	75
Evening (19.00 – 23.00) Weekends (13.00–23.00 Saturdays and 07.00–23.00 Sundays)	55	65
Night (23.00 – 07.00)	45	55

13.4.26 Although there is currently a lack of evidence relating to health effects from construction noise, the method for assessing construction noise effects is defined based on the current industry standard approach followed in other applications for development consent.

13.4.27 In terms of sound insulation or temporary rehousing due to construction noise, BS 5228-1 states that a property would be eligible if exposed to significant levels of noise “for a period of 10 or more days of working in any 15 consecutive days or for a total number of days exceeding 40 in any 6 consecutive months”. Consequently, these durations will be considered should a significant effect be identified.

### Construction and Decommissioning Vibration Criteria

13.4.28 BS 5228-2 ‘Code of practice for noise and vibration control on construction and open sites’ (Ref 13-13) provides guidance on the human response to vibration within occupied buildings. This provides a simple method of determining annoyance alongside evaluation of cosmetic damage associated with construction and decommissioning induced vibration. **Table 13-12** details Peak Particle Velocity (PPV) levels (a standard measure of vibration effects) and their potential effect on humans.

**Table 13-12: Criteria for Construction and Decommissioning Vibration (Human Response)**

Magnitude of Impact	PPV Vibration Level	BS 5228-2 Description of Impact
LOAEL	0.3 mm/s	Vibration might be just perceptible in residential environments
SOAEL	1.0 mm/s	It is likely that vibration of this level will cause complaint, but it can be tolerated if prior warning and explanation has been given to residents.

13.4.29 The recommended PPV vibration limits for transient vibration, above which cosmetic damage could occur for different types of buildings are provided in BS 5228-2 and presented in **Table 13-13**. For these limits, 'minor damage' is possible at vibration magnitudes that are greater than twice those given in **Table 13-12**, and 'major damage' can occur at values greater than four times the tabulated values. Consequently, the significance of effect has been provided based on the sensitivity of a building to vibration induced cosmetic damage. Cosmetic damage would precede the onset of any structural damage.

**Table 13-13: Transient Vibration Guide Values for Cosmetic Damage**

Type of building	Peak component particle velocity in frequency range of predominant pulse, at which cosmetic damage could occur	
	4 Hz to 15 Hz	15 Hz and above
Reinforced or framed structures, Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	50 mm/s at 4 Hz and above
Industrial and heavy 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
<p>Note 1: A potential negligible effect (not significant) is indicated at vibration levels up to the threshold values.</p> <p>Note 2: A potential minor adverse effect (not significant) is indicated at vibration levels up to a magnitude of twice the threshold values.</p> <p>Note 3: A potential moderate adverse effect (significant) is indicated at vibration levels up to a magnitude of four times the threshold values.</p> <p>Note 4: A potential major adverse effect (significant) is indicated at vibration levels equal to or greater than a magnitude of four times the threshold values</p>		

13.4.30 Vibration effects during the decommissioning phase of the Proposed Development will be similar to or less than vibration effects during the construction phase; therefore, construction and decommissioning vibration effects are considered together. The construction vibration assessment presented is considered equivalent to, or an overestimate of, the decommissioning phase.

**Construction and Decommissioning Traffic Noise**

13.4.31 Road traffic noise levels have been calculated with reference to the methodology included within the Calculation of Road Traffic Noise (CRTN) (Ref 13-15), which provides an equation for the calculation of the Basic Noise Level (BNL) from a road in terms of the 18-hour Average Annual Weekday Traffic (AAWT) flow from 06:00 to 24:00. The temporary changes in road traffic noise levels along the local road network due to construction traffic have been assessed based on short-term changes in noise from Table 3.54a of the Design Manual for Roads and Bridges LA111 (Ref 13-16). Assessment criteria are presented in **Table 13-14**.

**Table 13-14: Construction Traffic Noise Assessment Criteria**

Effect Level	Magnitude Criteria
Negligible	$\geq 0$ dB and $< 1$ dB
Minor	$\geq 1$ dB and $< 3$ dB
Moderate	$\geq 3$ dB and $< 5$ dB
Major	$\geq 5$ dB

13.1.18 Traffic during decommissioning is expected to be similar (or less) than the construction phase. Construction and decommissioning traffic noise has been assessed for a representative worst-case day during the construction stage based on information in *ES Volume II Chapter 3: Description of the Proposed Development (Application Document 6.2.3)*. Predicted construction traffic noise levels along the main access routes have been compared to measured ambient noise levels so a potential change in noise can be derived.

### Operational Noise

13.4.32 The impact of operational noise from the Immingham Facility, Block Valve Stations and the Theddlethorpe Facility (Options 1 and 2) have been assessed following the methodology set out in BS 4142 (Ref 13-17), whereby the rating level of noise emissions from activities are compared against the background sound level of the pre-development noise climate.

13.4.33 The relevant parameters for this methodology are as follows:

- Background sound level –  $L_{A90,T}$  – defined in the Standard as the ‘A’ weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels;
- Specific sound level –  $L_{Aeq,Tr}$  – the equivalent continuous ‘A’ weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, Tr; and
- Rating level –  $L_{Ar,Tr}$  – the specific sound level plus any adjustment made for the characteristic features of the noise.

13.4.34 BS 4142 (Ref 13-17) recognises that certain acoustic features of a sound source can increase the impact over that expected based purely on the sound level. The standard identifies the following features to be considered:

- Tonality - a penalty of 2 dB is applied for a tone which is just perceptible at the receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible;
- Impulsivity - a penalty of 3 dB is applied for impulsivity which is just perceptible at the receptor, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible. An impulse is defined as the sudden onset of a sound;
- Intermittency - a penalty of 3 dB can be applied if the intermittency of the specific sound is readily identifiable against the residual acoustic environment at the receptor i.e., it has identifiable on/off conditions; and
- Other sound characteristics - a penalty of 3 dB can be applied where the specific sound features characteristics that are neither tonal nor impulsive but are readily distinctive against the residual acoustic environment.

13.4.35 BS 4142 (Ref 13-17) states the following regarding the assessment of impacts, comparing the rating level of the new noise source with the existing background level:

- *"Typically, the greater this 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.*
- *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. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."*

13.4.36 BS 4142 advises that, where rating levels and background levels are low, which is the case in rural areas surrounding the DCO Site Boundary, the assessment of operational noise should take into context the absolute noise level. BS 8233:2014 ‘Guidance on sound insulation and noise reduction for buildings’ (Ref 13-18) and the World Health Organization (WHO) ‘Guidelines for Community Noise’ (1999) (Ref 13-20) provide guidance levels for internal noise within dwellings and external noise levels in gardens. For gardens, a precautionary approach has been taken when defining the LOAEL by applying a minimum LOAEL of 35 dB  $L_{Aeq,T}$ , which is applicable for relaxation within a property.

13.4.37 A similar approach has been taken for night-time noise when defining the minimum LOAEL of 30 dB  $L_{Aeq,T}$ . However, at night, residents are likely to be inside their properties. In accordance with examples in Annex A of BS 4142 (Ref 13-17), it is assumed that building envelope attenuation would be reduced to approximately 10 dB by a partially open window. Consequently, an external SOAEL of 40 dB  $L_{Ar,Tr}$  has been adopted for the night-time.

### Operational Noise Criteria

13.4.38 The assessment criteria for noise from fixed plant installations in low background noise environments are summarised in **Table 13-15**.

**Table 13-15: Operational Noise Assessment Criteria**

Effect Level	Rating Level (External) at Receptor, $L_{A,Tr}$	
	Daytime (07:00 – 19:00), and Evening (19:00 – 23:00)	Night-time (23:00 – 07:00)
LOAEL	Less than or equal to the typical background level ( $L_{A90,T}$ ) – minimum of 35 dB $L_{Ar,Tr}$	Less than or equal to the typical background level ( $L_{A90,T}$ ) – minimum of 30 dB $L_{Ar,Tr}$
SOAEL	Greater than 10 dB above the background noise level – minimum of 45 dB $L_{Ar,Tr}$	Greater than 10 dB above the background noise level – minimum of 40 dB $L_{Ar,Tr}$

### Non-Residential Receptors

13.4.39 Design guides for good internal conditions in non-residential receptors are set indoors. The only identified non-residential receptors that are sensitive to noise is a hotel and a caravan site that contains mobile homes. BS 8233 (Ref 13-18) states that the recommendations for ambient noise in hotel bedrooms are similar to those for residential receptors. Consequently, the same methodology has been used for hotel receptors as for residential receptors.

13.4.40 To ascertain the acoustic performance of static homes, reference has been made to proof of evidence submitted by Tetsworth Parish Council regarding a planning appeal for a proposed traveller site in Tetsworth (appeal A – P15/S3936/FUL, appeal B – P18/S0973/FUL) (Ref 13-19). The proof of evidence contains information on noise measurements made to determine the acoustic performance of mobile homes.

13.4.41 Noise monitoring inside and outside of a mobile home were undertaken with trickle vents in windows closed and open. Testing of the mobile homes provided a difference in noise between internal and external of 38 dB. Applying this reduction in noise to the daytime construction noise SOAEL of 75 dB  $L_{Aeq,T}$  would result in internal noise levels of 37 dB  $L_{Aeq,T}$ , which is marginally above BS 8233 (Ref 13-18) criteria for good internal daytime acoustic conditions. This is considered to represent a reasonable indication of a significant effect and so residential noise criteria are considered appropriate for mobile homes sites.

### Defining an Effect

13.4.42 All noise effects are local, only affecting the Proposed Development and nearby sensitive receptors, and are direct in nature; however, defining a likely effect and whether it is significant or not depends on the nature of a noise source. A new source of noise is assessed through the absolute noise level it generates at sensitive receptors. This assessment follows guidance for identification of significant effects set out in national policy. Where an existing noise source is changed, an assessment of the significance of effect due to the change in noise using guidance within the DMRB (Ref 13-16) and consideration of the absolute noise level based on national policy guidance. The duration of temporary changes in noise as a result of construction traffic are defined as follows:

- Short-term – period lasting for no longer than 1 months;
- Medium-term – period lasting for more than 1 months but no longer than 1 years or
- Long-term – period lasting for longer than 1 year.

13.4.43 Likely effects for new sources of noise (i.e., construction/decommissioning and building services plant) have been defined based on guidance set out in national policy. Where an exceedance of the defined SOAEL for each noise source occurs is an indication of a likely significant effect.

13.4.44 Although a significant effect due to construction or decommissioning activities may be determined through an assessment based on exceedances of the defined SOAELs for construction noise and vibration, additional consideration of the overall significance of the effect for temporary construction activities will be provided through qualitative discussion of the following:

- Duration of temporary likely effects;
- Frequency of events; and
- Receptor type.

### Assumptions and Limitations

#### *Baseline Assumptions and Limitations*

13.4.45 Any measurement of existing ambient or background sound levels will be subject to a degree of uncertainty. Environmental sound levels vary between days, weeks, and throughout the year due to variations in source levels and conditions, meteorological effects on sound propagation, and other factors. Hence, any measurement survey can only provide a sample of the ambient levels. Every effort will be made to ensure that measurements are undertaken in such a way as to provide a representative sample of conditions, such as avoiding periods of adverse weather conditions, and school holiday periods (which are often considered to result in atypical sound levels). However, a small degree of uncertainty will always remain in the values taken from such a measurement survey.

#### *Construction Noise Assumptions and Limitations*

13.4.46 The preliminary assessment of construction noise (and vibration) has considered construction activities that have the potential to result in significant effects on identified

receptors, based on information presented in *Chapter 3: The Viking CCS Pipeline* and previous experience of construction sites and professional judgement. These assessments are based on a reasonable representative worst-case scenario.

13.4.47 Construction noise calculations have been undertaken based on an example schedule of plant items that are typically used in such developments for the purposes of carrying out a quantitative assessment at this stage (*ES Volume IV: Appendix 13.2 (Application Document 6.4.13.2)*).

13.4.48 Calculations have been undertaken using BS 5228:2014+A1:2019 'Code of practice for noise and vibration control on construction and open sites' (Ref 13-13) methodologies and AECOM library data of sound sources associated with the proposed construction activities. These sound sources are taken to be representative of the plant and/or activities that will be used during the construction process of the Proposed Development. Noise predictions have been carried out to provide a conservative scenario where construction plant is operational nearest to the identified receptors and do not take into account quieter periods when limited activities take place or at further distances. Consequently, noise predictions may overestimate construction noise levels and are therefore considered to be a reasonable likely worst case.

### **Operational Assumptions and Limitations**

13.4.49 A series of industry standard assumptions have been made for the generation of the operation noise model as follows:

- Digital noise modelling of the operational Proposed Development is based on the parameters set out in the drawings, plans, and construction and operation details as set out in *ES Volume II Chapter 3: Description of the Proposed Development*;
- Surrounding ground conditions has been modelled as 80% soft ground;
- Air temperature has been assumed to be 10 degrees and humidity 80%, which are considered typical annual average weather conditions for area covered by the DCO Site Boundary;
- One order of reflection has been modelled;
- Land topography has been incorporated into the noise modelling; and
- All receptor points has been set at a standard height of 1.5 m above local ground levels to calculate representative noise levels at sensitive receptors.

13.4.50 Operational noise has been predicted with all plant being in maximum operation at all times of day.

## **13.5 Baseline Conditions and Study Area**

### **Study Area**

13.5.1 The Study Area for construction and operational noise effects includes receptors within 500m of the Immingham Facility, Block Valve Stations, and Theddlethorpe Facility (Options 1 and 2) and within 300m of the DCO Site Boundary. These distances have been selected based on previous experience that operational noise sources are likely to be negligible at distances greater than 500m and that construction noise predictions are generally reliable up 300m (based on guidance in BS 5228-1).

13.5.2 There are no identified Noise Important Areas and Noise Action Plan Priority Areas within the Study Area.

## Sensitive Receptors

- 13.5.3 The identified noise-sensitive receptors are summarised in **Table 13-16** and shown in **Figure 13-1**. With reference to the construction phase a distance has been included to the nearest part of the DCO Site Boundary, and with reference to operational phases a distance has been provided to the nearest item of noise generating plant. The selection of receptors presented were agreed with local planning authorities through the consultation process, as described in **Table 13-6**. Since the consultation process, two new receptors (R45 and R46) have been identified through the evolution of the DCO Site Boundary.
- 13.5.4 After conducting further investigation of the noise and vibration study area using satellite imagery and GIS, an additional twelve receptors (R47, R49, R50, R51, R53, R54, R55, R57, and R58) have been introduced to the receptors covered in the PEIR (Ref 13-13).
- 13.5.5 All receptors covered in the PEIR have been included in **Table 13-16**; however, due to changes to the Draft Order Limits from that presented at the PEIR, some receptors are no longer in the study area. These receptors are identified as not covered in the construction or operational assessment phases.

**Table 13-16: Sensitive Receptor Locations**

Receptor Reference	Location	Pipeline Section	Description	Co-ordinates	Relevant Assessment Phase	
					Construction	Operational
R1	Properties on School Rd, South Killingholme, Immingham	1	Residential	53°37'40.49"N, 0°15'54.64"W	Yes (190m)	No
R2	Church Lane Properties Immingham	1	Residential	53°37'10.05"N, 0°13'21.05"W	No	No
R3	Immingham Rd Properties, Habrough, Immingham	1	Residential	53°36'47.12"N, 0°14'33.67"W	Yes (10m)	No
R4	Roxton Farm, Roxton Rd, Immingham	2	Residential	53°35'45.32"N, 0°14'4.54"W	Yes (90m)	No
R5	Keelby Rd Properties, Stallingborough, Grimsby	2	Residential	53°35'12.63"N 0°13'13.98"W	Yes (25m)	No
R5a	Newstead Farm, Keelby Road, Stallingborough, Grimsby	2	Residential	53°35'1.07"N, 0°13'14.82"W	Yes (150)	No
R6	The Crofts, Barton St, Laceby, Grimsby	2	Residential	53°32'12.82"N, 0°11'24.54"W	Yes (80m)	No
R7	Old Main Rd Properties, Irby upon Humber, Grimsby	3	Residential	53°31'47.33"N, 0°11'36.23"W	Yes (280m)	No
R8	Waithe Beck Lodge, Barton St, Hatcliffe, Grimsby	3	Residential	53°30'17.38"N, 0°8'53.81"W	Yes (95m)	No
R9	Manor House, Cherry Cobb Lane, Barnoldby-le-Beck, Grimsby	3	Residential	53°30'26.93"N, 0°8'33.09"W	Yes (170m)	No
R10	Moorhouse Farm, Brigsley Rd, Ashby cum Fenby, Grimsby	3	Residential	53°29'47.45"N, 0°7'47.87"W	Yes (180m)	No
R11	Moorhouse, Brigsley Rd, Ashby cum Fenby, Grimsby	3	Residential	53°29'42.30"N, 0°7'18.98"W	Yes (30m)	No
R12	Brigsley Rd Properties, Ashby cum Fenby, Grimsby	3	Residential	53°29'44.90"N, 0°6'59.42"W	Yes (65m)	No
R13	Ashby Lane Properties, Ashby cum Fenby, Grimsby	3	Residential	53°29'35.00"N, 0°7'3.66"W	Yes (125m)	No



Receptor Reference	Location	Pipeline Section	Description	Co-ordinates	Relevant Assessment Phase	
					Construction	Operational
R14	Hall Farm Hotel & Restaurant, Ashby Lane, Ashby cum Fenby, Grimsby	3	Non-residential (hotel)	53°29'30.20"N, 0°6'34.53"W	Yes (105m)	No
R15	South Farm, Barton St, Ashby cum Fenby, Grimsby	3	Non-residential (Equestrian Centre)	53°28'37.69"N, 0°6'13.55"W	Yes (60m)	No
R16	Corner Cottage, Hawerby, Grimsby	3	Residential	53°27'55.29"N, 0°6'10.47"W	Yes (140m)	No
R17	Barton Street Properties, Hawerby, Grimsby	3	Residential	53°27'45.10"N, 0°5'51.06"W	Yes (80m)	No
R18	Westfield Farm, White Rd, North Thoresby, Grimsby	3	Residential	53°27'41.97"N, 0°5'22.67"W	Yes (110m)	No
R19	Westfield Cottage, White Rd, North Thoresby, Grimsby	3	Residential	53°27'29.71"N, 0°5'9.48"W	Yes (110m)	No
R20	Park Farm, White Rd, North Thoresby, Grimsby	3	Residential	53°27'46.15"N, 0°4'56.30"W	Yes (210m)	No
R21	Throstles Nest, White Rd, North Thoresby, Grimsby	3	Residential	53°27'41.38"N, 0°4'35.31"W	Yes (140m)	No
R22	Gamekeepers Cottage, Autby Drive, North Thoresby, Grimsby	3	Residential	53°27'18.92"N, 0°4'11.58"W	Yes (150m)	No
R23	The Larches, Station Rd, Ludborough, Grimsby	4	Residential	53°26'52.09"N, 0°2'47.07"W	Yes (45m)	No
R24	Station Rd, Properties, Ludborough, Grimsby	4	Residential	53°26'42.16"N, 0°2'5.18"W	Yes (120m)	No
R25	Pear Tree Lane Properties, Fulstow, Louth	4	Residential	53°26'12.64"N, 0°1'13.50"W	Yes (80m)	No
R26	Yew Tree Cottage, Ings Lane, Fotherby, Louth	4	Residential	53°25'6.72"N, 0°0'10.14"W	Yes (15m)	No

Receptor Reference	Location	Pipeline Section	Description	Co-ordinates	Relevant Assessment Phase	
					Construction	Operational
R27	Woodhouse Farm, Fotherby Rd, Little Grimsby, Louth	4	Residential	53°24'48.98"N, 0°0'3.76"E	Yes (55m)	No
R28	Grange Farm, Little Grimsby, Louth	4	Residential	53°24'52.30"N, 0°0'31.47"E	Yes (135m)	No
R29	The Lodge, Alvingham Lakes, Lock Rd, Alvingham, Louth	4	Residential	53°23'35.53"N, 0°2'48.27"E	Yes (85m)	No
R29a	The Lodge, Alvingham Lakes, Lock Rd, Alvingham, Louth	4	Non-residential, (mobile homes and night-fishing)	53°23'35.53"N, 0°2'48.27"E	Yes (20m)	No
R30	Highfield House, Louth Rd, North Cockerington, Louth	4	Residential	53°23'22.74"N, 0°3'16.25"E	Yes (130m)	No
R31	Rushmoor Farm, Louth Rd, North Cockerington, Louth	4	Residential	53°23'8.90"N, 0°3'12.44"E	Yes (160m)	No
R32	Louth Rd Properties, North Cockerington, Louth	4	Residential	53°23'4.91"N, 0°3'46.19"E	Yes (35m)	No
R33	The Stables, Mill Hill Way, South Cockerington, Louth	4	Residential	53°22'57.97"N, 0°4'16.31"E	Yes (230m)	No
R34	Red Leas Lane Properties, South Cockerington, Louth	4	Residential	53°23'33.46"N, 0°5'4.86"E	Yes (60m)	No
R35	Marsh Lane Farm, Marsh Lane, South Cockerington, Louth	4	Residential	53°23'19.13"N, 0°5'26.83"E	Yes (240m)	No
R36	Pickhill Farm, Pickhill Lane, Grimoldby, Louth	4	Residential	53°22'57.88"N, 0°6'4.93"E	Yes (85m)	No
R37	Lordship Farm, Lordship Rd, Great Carlton, Louth	5	Residential	53°21'44.12"N, 0°8'31.95"E	Yes (90m)	No
R38	Windswept, Lordship Rd, Great Carlton, Louth	5	Residential	53°21'23.58"N, 0°8'10.84"E	No (500m)	No

Receptor Reference	Location	Pipeline Section	Description	Co-ordinates	Relevant Assessment Phase	
					Construction	Operational
R39	Grove Rd Properties (east), Theddlethorpe, Mablethorpe	5	Residential	53°21'57.97"N, 0°11'55.33"E	Yes (90m)	No
R40	Mill Rd Properties, Theddlethorpe, Mablethorpe	5	Residential	53°21'55.70"N, 0°12'26.00"E	Yes (90m)	No
R41	Harps Bridge Lane Properties, Theddlethorpe, Mablethorpe	5	Residential	53°22'0.24"N, 0°13'20.80"E	Yes (30m)	Yes (200m)
R42	Mablethorpe Rd Properties, Theddlethorpe, Mablethorpe	5	Residential	53°21'51.00"N, 0°13'7.65"E	Yes (100m)	Yes (290m)
R43	Kent Avenue Properties, Theddlethorpe, Mablethorpe	5	Residential	53°21'32.28"N, 0°14'18.74"E	Yes (20m)	No
R44	Pelham Rd Properties, Holton le Clay, Grimsby	3	Residential	53°30'23.71"N, 0°4'0.55"W	Yes (20m)	No
R45	Aylesbury Grange, Barton Street, Grimsby	2	Residential	53°32'35.22"N, 0°11'19.77"W	Yes (5m)	No
R46	Swallow Park Caravan Site, Bleak House Farm, North End, Mablethorpe	5	Non-residential (caravan site)	53°21'36.61"N, 0°14'47.53"E	Yes (5m)	No
R47	Properties on Mablethorpe Road	5	Residential	53°21'12.36"N, 0°13'41.58"E	Yes (80m)	No
R48	Grove Rd Properties (west), Theddlethorpe, Mablethorpe	5	Residential	53°21'46.80"N, 0°11'23.22"E	Yes (40m)	No
R49	Old Toads Barn, Mablethorpe Road	5	Residential	53°21'29.88"N, 0°13'29.94"E	Yes (20m)	No
R50	Hazel Dene, Marsh Lane	1	Residential	53°38'21.17"N, 0°13'36.26"W	No	No
R51	Scrub Holt, off A18	3	Residential	53°31'38.27"N, 0°10'22.06"W	Yes (260m)	No
R52	Mickling Barf, Barton Street	3	Residential	53°30'20.82"N, 0° 8'58.16"W	Yes (65m)	No

Receptor Reference	Location	Pipeline Section	Description	Co-ordinates	Relevant Assessment Phase	
					Construction	Operational
R53	The Oaks, Ashby cum Fenby, Grimsby	3	Residential	53°29'6.32"N, 0°6'21.16"W	No	No
R54	Micklemore Cottage, Grimsby	4	Residential	53°27'25.68"N, 0°3'27.09"W	Yes (260m)	No
R55	New House, Keddington Corner	4	Residential	53°23'11.34"N, 0°2'8.13"E	Yes (195m)	No
R56	Post House, Louth Road, North Cockerington	4	Residential	53°23'8.46"N, 0°4'2.23"E	Yes (15m)	No
R57	Causeway Bridge Farm, Church Lane, Manby	5	Residential	53°22'4.05"N, 0°7'31.02"E	Yes (215m)	No
R58	Crookbank Farmhouse, Theddlethorpe	5	Residential	53°22'2.31"N, 0°13'55.73"E	No	No

## Meteorological Conditions

13.5.6 Precipitation and windspeed measurements were observed throughout each attended survey. At no point during the attended surveys did the weather become unsuitable for monitoring, i.e., no precipitation and average wind speed not in exceedance of 5 m/s. Meteorological data was observed throughout the duration of unattended surveys. No periods of data were omitted from the results due to unsuitable monitoring conditions for any of the long-term monitoring locations.

## Survey Results and Observations

13.5.7 A summary of unattended measurement results can be seen in **Table 13-17**, and attended results can be seen in **Table 13-18** overleaf.

13.5.8 It was noted that there were sustained periods of gunfire data during attended measurements at noise monitor locations NM6, NM8, NM9, NM10, NM12, and NM14. Additional analysis has been carried out to remove gunfire from the measured data to provide representative data at the listed locations. Details of the analysis is presented in *ES Volume IV Appendix 13.1 (Application Document 6.4.13.1)*. It should be noted that periods of gunfire have only been excluded from the  $L_{Aeq,T}$  ambient level and still contribute to the presented  $L_{A10}$ ,  $L_{A90}$ , and  $L_{AFmax}$  levels.

13.5.9 New receptors that have been identified since the PEIR (Ref 13-13) have been assigned to noise monitor locations that are deemed representative of local conditions for the respective location. As a conservative approach for defining baseline conditions, newly identified receptors R47, R49, R50, R51, R53, R54, R55, R57, and R58 have been assigned baseline values accredited to NM10, which provided the lowest measured baseline noise level out of all monitoring locations.

**Table 13-17: Unattended Measurement Summary**

Monitor Location	Representative of Receptors	Day (07:00 – 19:00)			Evening (19:00 – 23:00)		Night (23:00 – 07:00)		
		L <sub>Aeq,10h</sub> dB	L <sub>A10,18h</sub> dB	L <sub>A90,10hr</sub> dB	L <sub>Aeq,4h</sub> dB	L <sub>A90,4hr</sub> dB	L <sub>Aeq,8h</sub> dB	L <sub>AFmax</sub> dB	L <sub>A90,15min</sub> dB
NM2	R2	62	63	48	56	44	52	80	43
NM5	R6, R7, R45, R51	56	58	47	51	37	47	79	31
NM7	R10, R11, R12, R13, R14, R15	62	59	45	56	37	51	86	37
NM11	R29, R30, R31, R32, R33, R56	59	55	37	52	27	48	84	24
NM15	R43, R46	48	50	41	41	33	40	67	33
NM17	R50	56	55	51	54	50	53	83	50

**Table 13-18: Attended Measurement Summary**

Monitor Location	Representative of Receptors	Date	Time Period (hh:mm)	L <sub>Aeq,1h</sub> dB	L <sub>A10,1h</sub> dB	L <sub>A90,1hr</sub> dB	L <sub>AFmax</sub> dB
NM1	R1	20/01/2023	13:00 - 14:00	61	65	54	71
NM3	R3	20/01/2023	14:30 - 15:30	71	75	54	85
NM4	R4, R5	23/01/2023	11:00 - 12:00	56	61	40	71
NM6	R8, R9, R52	23/01/2023	12:45 - 13:45	55*	73	46	85
NM8	R16, R17, R18, R19, R20, R21, R22	23/01/2023	15:30 - 16:30	56*	69	46	96
NM9	R23, R24, R25	24/01/2023	15:30 - 16:30	55*	59	51	85
NM10	R26, R27, R28, R47**, R49**, R50**, R51**, R53**, R54**	24/01/2023	14:00 - 15:00	40*	41	34	67

Monitor Location	Representative of Receptors	Date	Time Period (hh:mm)	L <sub>Aeq,1h</sub> dB	L <sub>A10,1h</sub> dB	L <sub>A90,1hr</sub> dB	L <sub>AFmax</sub> dB
	R55**, R57**, R58**						
NM12	R34, R35, R36	24/01/2023	11:45 - 12:45	50*	54	37	87
NM13	R37, R38	03/02/2023	14:00 - 15:00	48	47	35	75
NM14	R39, R40, R41, R42	24/01/2023	09:30 - 10:30	51*	61	36	85
NM16	R44	23/01/2023	14:15 - 15:15	59	62	48	80

*\*Periods of gunfire excluded*

*\*\*Lowest baseline value used as worse case*

## 13.6 Development Design and Embedded Mitigation

- 13.6.1 EIA is an iterative process which informs the development of a project's design. Where the outputs of the preliminary assessment identify likely significant effects changes to the design can be made or mitigation measures can be built-in to the proposal to reduce these effects.
- 13.6.2 This type of mitigation is defined as embedded mitigation, as mitigation measures which have been identified and adopted as part of the evolution of the project design ("embedded" into the project design). Part of the embedded mitigation includes designing the project so that it is located furthest away from residential properties as possible.
- 13.6.3 The design of the Proposed Development has been further developed to reflect the findings of ongoing environmental studies, comments raised during the statutory consultation and ongoing engagement with stakeholders. As the design has developed, embedded mitigation measures have been refined as part of an iterative process.
- 13.6.4 Those embedded mitigations relevant to noise and vibration are detailed below.

### Construction and Decommissioning Mitigation

- 13.6.5 The design of the Proposed Development with reference to *ES Volume II Chapter 2: Design Evolution and Alternatives (Application Document 6.2.2)*, has taken into account the location of sensitive receptors that may be affected by construction and decommissioning activities. The Proposed Development aims to avoid sensitive receptors and its location provides the largest practicable separation distance between construction and decommissioning works and sensitive receptors. This approach minimises the effect of construction and decommissioning noise and vibration as far as reasonably practicable.

### Operational Mitigation

- 13.6.6 Embedded mitigation measures was fundamentally built into the design of the Proposed Development as it sought to avoid densely populated areas as much as possible, as outlined in *ES Volume II Chapter 2 Design Evolution and Alternatives (Application Document 6.2.2)*. However, additional measures that would be applied also include:
- Plant selection (quiet as possible); and
  - Screening of noise sources where required.
- 13.6.7 Plant that will be used in the development has not yet been finalised. Quieter plant would be the most effective way of controlling noise emissions.
- 13.6.8 It is assumed that the Plant will be designed to achieve the operational limits consistent with the requirements of BS 4142 (Ref 13-17), which may require mitigation to be incorporated into the fixed plant design. Should the noise exhibit any such acoustic features then the relevant penalty/ correction should be applied in accordance with BS 4142 (Ref 13-17) to ensure that the resultant rating level falls within the limit levels. This has been submitted as a requirement in *ES Volume IV: Appendix 3.6 Operational Phase Mitigation (Application Document 6.4.3.6)*.



## 13.7 Potential Impacts and Assessment of Effects

### Assessment of Potential Construction and Decommissioning Phase Effects

#### Introduction

- 13.7.1 This section discusses the potential noise and vibration effects on sensitive receptors during the construction and decommissioning phase of the Proposed Development and related above ground infrastructure including the associated Immingham Facility, Block Valve Stations, and the Theddlethorpe Facility (Options 1 and 2). The indicative programme and duration of likely installation methods are described in *ES Volume II Chapter 3: Description of the Proposed Development (Application Document 6.2.3)*.
- 13.7.2 Construction noise effects are assessed in terms of LOAEL and SOAEL. Where construction noise levels exceed the LOAEL but are below the SOAEL, all reasonable steps, which are covered by embedded mitigation, should be taken to mitigate and minimise adverse effects. Where an exceedance of the SOAEL is identified, additional mitigation measures would be required.

### Potential Construction Noise Effects

#### Pipeline Route

#### Pipeline Construction Noise Effect Calculations

- 13.7.3 Noise generating activities identified in section 13.4.20 have been grouped by relevant activities and the worst-case noise generating activity from the group has been used to predict noise levels at nearby sensitive receptors.
- 13.7.4 **Table 13-19:** shows the range of distance in meters from the construction activity that would be required to not adversely be affected by noise. Full details of predicted pipeline construction noise levels for each works phase are presented in Section 5 of *ES Volume IV: Appendix 13.2 (Application Document 6.4.13.2)*.

**Table 13-19: Pipeline Construction Activity Distance for LOAEL and SOAEL**

Construction Works Phase	Worst Case Activity	Distance (m)	
		LOAEL	SOAEL
RoW Preparation works	Creation of access tracks	90	35
Pipe stringing	Pipeline stringing, bending, welding	50	20
Trench excavation	Trench excavation	65	25
Pre/post drainage	Dewatering the trench	60	25

- 13.7.5 Using the calculated distances in **Table 13-19**, distances between sensitive receptors and the nearest boundary of the DCO Site Boundary were used to predict what properties would be affected by the LOAEL and SOAEL for each assessment phase.
- 13.7.6 It is noted that the specific location of each construction activity may be subject to change at their respective location within the DCO Site Boundary. For the basis of the assessment, the distances in **Table 13-19** have been calculated from the edge of the DCO Site Boundary to nearby sensitive receptors as a worst-case scenario.

### Pipeline Crossing Noise Effect Calculations

13.7.7 HDD has the potential for a 24-hour working period and as such, has been assessed at receptor locations within close proximity to four HDD sites identified in *ES Volume II Chapter 3: Description of the Proposed Development (Application Document 6.2.3)*. It is noted that HDD methods require continuous operation and as such night-time adverse effect levels have also been considered for the assessment. Other forms of pipeline crossing methods such as auger boring, open-cut, and micro tunnelling have been assessed along the entire Proposed Development route.

13.7.8 **Table 13-20** shows the range of distances from the construction activity associated with each pipeline crossing method that would be required to not adversely be affected by noise. As HDD activities are likely to be continuous and may extend into the night-time period, the SOAEL for potential noise emissions has been identified.

**Table 13-20: Pipeline Crossing Construction Activity Distance for LOAEL and SOAEL**

Construction works Phase	Distance (m)		
	Daytime LOAEL	Daytime SOAEL	Night-time SOAEL
HDD	110	45	280
Auger	70	30	n/a
Open-cut crossing	60	25	n/a
Micro Tunnel	65	25	n/a

13.7.9 It is noted that the specific location of the entry and exit points of the HDD site may be variable to change at their respective location within the DCO Site Boundary. For the basis of the assessment, the distances in **Table 13-20** have been calculated from the edge of the DCO Site Boundary to nearby sensitive receptors as a worst-case scenario.

### Pipeline (Section 1)

13.7.10 **Table 13-21** shows receptors predicted to be affected by pipeline construction noise for the different elements of construction across Section 1 of the DCO Site Boundary.

**Table 13-21: Pipeline Section 1 Construction Noise Effects**

Affected Receptors	Representative Ambient Noise Conditions	RoW Preparation Works		Pipe Stringing		Trench Excavation		Pre/post Drainage	
		Between LOAEL and SOAEL	Above SOAEL	Between LOAEL and SOAEL	Above SOAEL	Between LOAEL and SOAEL	Above SOAEL	Between LOAEL and SOAEL	Above SOAEL
R3	71 dB L <sub>Aeq,T</sub>	-	Yes	-	Yes	-	Yes	-	Yes

13.7.11 Exceedances of the SOAEL are noted at properties along Immingham Road (R3) during all pipeline construction phases. This is a significant noise effect.

13.7.12 **Table 13-22** shows potential receptors predicted to be affected by construction noise associated with pipeline crossings across Section 1 of the Proposed Development Pipeline route should any occur at the closest location to the DCO Site Boundary.

**Table 13-22 Pipeline Section 1 Crossing Route Noise Effects**

Affected Receptors	Representative Ambient Noise Conditions	Auger boring		Open-cut		Micro tunnelling	
		Between LOAEL and SOAEL	Above SOAEL	Between LOAEL and SOAEL	Above SOAEL	Between LOAEL and SOAEL	Above SOAEL
R3	71 dB L <sub>Aeq,T</sub>	-	Yes	-	Yes	-	Yes

13.7.13 Exceedances of the SOAEL are predicted at properties on Immingham Road (R3) using any method of pipeline crossing technique. This is a significant noise effect. These noise levels have been predicted using distances calculated in **Table 13-20**.

13.7.14 The HDD crossing proposed south of the Immingham Facility would not have an adverse impact on nearby sensitive receptors based on distances provided in **Table 13-20**. The nearest residential properties to the HDD crossing are along Church Lane (R2) and are approximately 425 m away.

*Pipeline (Section 2)*

13.7.15 **Table 13-23** shows receptors predicted to be affected by pipeline construction noise for the different elements of construction across Section 2 of the Proposed Development route.

**Table 13-23: Pipeline Section 2 Construction Noise Effects**

Affected Receptors	Representative Ambient Noise Conditions	RoW Preparation Works		Pipe Stringing		Trench Excavation		Pre/post Drainage	
		Between LOAEL and SOAEL	Above SOAEL	Between LOAEL and SOAEL	Above SOAEL	Between LOAEL and SOAEL	Above SOAEL	Between LOAEL and SOAEL	Above SOAEL
R5	56 dB L <sub>Aeq,T</sub>	-	Yes	-	Yes	-	Yes	-	Yes
R45	56 dB L <sub>Aeq,T</sub>	-	Yes	-	-	-	-	-	-
R6	56 dB L <sub>Aeq,T</sub>	Yes	-	-	-	-	-	-	-
R52	55 dB L <sub>Aeq,T</sub>	Yes	-	-	-	Yes	-	-	-

13.7.16 Exceedances of the SOAEL are noted at Keelby Road (R5) during all pipeline construction phases and at R45 during RoW preparation works. This is a significant noise effect.

13.7.17 R45 is located approximately 5m from a proposed access road but is approximately 500m from the DCO Site Boundary surrounding the pipeline route. Consequently, this receptor will potentially only experience a SOAEL during RoW preparation works associated with the construction of the access road.

13.7.18 **Table 13-24** shows potential receptors predicted to be affected by construction noise associated with pipeline crossings across Section 2 of the Proposed Development Pipeline route should any occur at the closest location to the DCO Site Boundary.

**Table 13-24 Pipeline Section 2 Crossing Route Noise Effects**

Affected Receptors	Representative Ambient Noise Conditions	Auger boring		Open-cut		Micro tunnelling	
		Between LOAEL and SOAEL	Above SOAEL	Between LOAEL and SOAEL	Above SOAEL	Between LOAEL and SOAEL	Above SOAEL
R5	56 dB L <sub>Aeq,T</sub>	-	Yes	-	Yes	-	Yes

13.7.19 Exceedances of the SOAEL are predicted at properties on Keelby Road (R5) using any method of pipeline crossing technique. This is a significant noise effect. These noise levels have been predicted using distances calculated in **Table 13-20**.

13.7.20 The HDD crossing proposed at North Beck Drain would not have an adverse impact on nearby sensitive receptors based on distances provided in **Table 13-20** during the daytime. The nearest residential properties to the HDD crossing are at Newstead Farm (R5a) and are approximately 205 m away. This may cause an exceedance of the SOAEL during the night time period.

*Pipeline (Section 3)*

13.7.21 **Table 13-25** shows the predicted receptors affected by pipeline construction noise for the different elements of construction across Section 3 of the Proposed Development route.

**Table 13-25: Pipeline Section 3 Construction Noise Effects**

Affected Receptors	Representative Ambient Noise Conditions	RoW Preparation Works		Pipe Stringing		Trench Excavation		Pre/post Drainage	
		Between LOAEL and SOAEL	Above SOAEL	Between LOAEL and SOAEL	Above SOAEL	Between LOAEL and SOAEL	Above SOAEL	Between LOAEL and SOAEL	Above SOAEL
R11	62 dB L <sub>Aeq,T</sub>	-	Yes	Yes		Yes	-	Yes	-
R12	62 dB L <sub>Aeq,T</sub>	Yes	-	-	-	Yes	-	-	-
R15	62 dB L <sub>Aeq,T</sub>	Yes	-	-	-	Yes	-	Yes	-
R17	56 dB L <sub>Aeq,T</sub>	Yes	-	-	-	-	-	-	-
R52	59 dB L <sub>Aeq,T</sub>	Yes	-		-	Yes	-	-	-

13.7.22 Exceedances of the SOAEL are predicted at R11 during RoW preparation works. This is a significant noise effect.

13.7.23 It should be noted that at South Farm (R15) the distance nearest to the DCO Site Boundary was calculated from the nearest field that horses utilise as the receptor is an equestrian centre.

13.7.24 **Table 13-26** shows potential receptors predicted to be affected by construction noise associated with pipeline crossings across Section 3 of the Proposed Development Pipeline route should any occur at the closest location to the DCO Site Boundary.

**Table 13-26 Pipeline Section 3 Crossing Route Noise Effects**

Affected Receptors	Representative Ambient Noise Conditions	Auger boring		Open-cut		Micro tunnelling	
		Between LOAEL and SOAEL	Above SOAEL	Between LOAEL and SOAEL	Above SOAEL	Between LOAEL and SOAEL	Above SOAEL
R11	62 dB L <sub>Aeq,T</sub>	-	Yes	Yes	-	Yes	-
R12	62 dB L <sub>Aeq,T</sub>	Yes	-	-	-	Yes	-
R15	62 dB L <sub>Aeq,T</sub>	Yes	-	Yes	-	Yes	-
R44	59 dB L <sub>Aeq,T</sub>	-	Yes	-	Yes	-	Yes
R52	59 dB L <sub>Aeq,T</sub>	Yes	-	-	-	Yes	-

13.7.25 Exceedances of the SOAEL are predicted at properties on Pelham Road (R44) using any method of pipeline crossing technique. Properties at Moorhouse (R11) are predicted to experience noise levels exceeding the SOAEL if auger boring is located within the DCO Site Boundary nearest to the receptor. These noise levels have been predicted using distances calculated in **Table 13-20**.

*Pipeline (Section 4)*

13.7.26 **Table 13-27** shows the receptors predicted to be affected by pipeline construction noise for the different elements of construction across Section 4 of the Proposed Development route.

**Table 13-27: Pipeline Section 4 Construction Noise Effects**

Affected Receptor	Representative Ambient Noise Conditions	RoW Preparation Works		Pipe Stringing		Trench Excavation		Pre/post Drainage	
		Between LOAEL and SOAEL	Above SOAEL	Between LOAEL and SOAEL	Above SOAEL	Between LOAEL and SOAEL	Above SOAEL	Between LOAEL and SOAEL	Above SOAEL
R23	55 dB L <sub>Aeq,T</sub>	Yes	-	Yes	-	Yes	-	Yes	-
R25	55 dB L <sub>Aeq,T</sub>	Yes	-	-	-	-	-	-	-
R26	40 dB L <sub>Aeq,T</sub>	-	Yes	-	Yes	-	Yes	-	Yes
R27	40 dB L <sub>Aeq,T</sub>	Yes	-	-	-	Yes	-	Yes	-
R29	59 dB L <sub>Aeq,T</sub>	Yes	-	-	-	-	-	-	-
R32	59 dB L <sub>Aeq,T</sub>	-	Yes	Yes	-	Yes	-	Yes	-
R34	50 dB L <sub>Aeq,T</sub>	Yes	-	Yes	-	-	-	Yes	-
R36	50 dB L <sub>Aeq,T</sub>	Yes	-	-	-	-	-	-	-

13.7.27 Exceedances of the SOAEL are predicted at R26 during all pipeline construction phases and at R32 during RoW preparation works. These are a significant noise effect.

13.7.28 **Table 13-28** shows potential receptors predicted to be affected by construction noise associated with pipeline crossings across Section 4 of the Proposed Development Pipeline route should any occur at the closest location to the DCO Site Boundary.

**Table 13-28 Pipeline Section 4 Crossing Route Noise Effects**

Affected Receptors	Representative Ambient Noise Conditions	Auger boring		Open-cut		Micro tunnelling	
		Between LOAEL and SOAEL	Above SOAEL	Between LOAEL and SOAEL	Above SOAEL	Between LOAEL and SOAEL	Above SOAEL
R23	55 dB L <sub>Aeq, T</sub>	Yes		Yes		Yes	
R26	40 dB L <sub>Aeq,T</sub>		Yes		Yes		Yes
R27	40 dB L <sub>Aeq,T</sub>	Yes		Yes		Yes	
R32	59 dB L <sub>Aeq,T</sub>	Yes		Yes		Yes	
R56	59 dB L <sub>Aeq,T</sub>		Yes		Yes		Yes
R34	50 dB L <sub>Aeq,T</sub>	Yes		Yes		Yes	

13.7.29 Exceedances of the SOAEL are predicted at Yew Tree Cottage (R26) and Post House (R56) using any method of pipeline crossing technique. These are a significant noise effects that have been predicted using distances calculated in **Table 13-20**.

13.7.30 The HDD crossing proposed at the River Ludd / Louth Canal to the northeast of Louth would not have an adverse impact on nearby sensitive receptors based on distances provided in **Table 13-20**. The nearest residential properties to the HDD crossing are at The Lodge (R29a) and are approximately 305 m away from the proposed HDD laydown and stringing area.

13.7.31 Receptors at The Lodge (R29 and R29a) may experience noise levels exceeding the SOAEL if continuous HDD works are required under the River Ludd and Louth Canal during

the night. These noise levels have been predicted using distances calculated in **Table 13-20**. This would be a significant noise effect.

*Pipeline (Section 5)*

13.7.32 **Table 13-29** shows the receptors predicted to be affected by pipeline construction noise for the different elements of construction across Section 5 of the Proposed Development route.

**Table 13-29: Pipeline Section 5 Construction Noise Effects**

Affected Receptors	Representative Ambient Noise Conditions	RoW Preparation Works		Pipe Stringing		Trench Excavation		Pre/post Drainage	
		Between LOAEL and SOAEL	Above SOAEL	Between LOAEL and SOAEL	Above SOAEL	Between LOAEL and SOAEL	Above SOAEL	Between LOAEL and SOAEL	Above SOAEL
R37	48 dB L <sub>Aeq,T</sub>	Yes	-	-	-	-	-	-	-
R39	51 dB L <sub>Aeq,T</sub>	Yes	-	-	-	-	-	-	-
R40	51 dB L <sub>Aeq,T</sub>	Yes	-	-	-	-	-	-	-
R41	51 dB L <sub>Aeq,T</sub>	-	Yes	-	-	-	-	-	-
R42	51 dB L <sub>Aeq,T</sub>	-	Yes	-	-	-	-	-	-
R43	48 dB L <sub>Aeq,T</sub>	-	Yes	-	Yes	-	Yes	-	Yes
R46	48 dB L <sub>Aeq,T</sub>	-	Yes	-	-	-	-	-	-
R47	40 dB L <sub>Aeq,T</sub>	Yes	-	-	-	-	-	-	-
R48	40 dB L <sub>Aeq,T</sub>	Yes	-	Yes	-	Yes	-	Yes	-
R49	40 dB L <sub>Aeq,T</sub>	-	Yes	-	-	-	-	-	-

13.7.33 Exceedances of the SOAEL are predicted at Kent Avenue (R43) and during all pipeline construction phases. Exceedances of the SOAEL are also predicted at Harps Bridge Lane (R41), Properties on Mable Thorpe Road (R42), Swallow Park Caravan Site (R46), and Old Toads Barn (R49) during RoW preparation works.

13.7.34 It should be noted that locations R41, R42, R46, and R49 are all within close proximity to proposed access roads but are relatively far from the DCO Site Boundary surrounding the pipeline route. Consequently, these receptors are predicted to potentially experience a SOAEL during RoW preparation works associated with the construction of the access roads they are within proximity to.

13.7.35 All construction works that experience an exceedance of the SOAEL are significant noise effects.

13.7.36 **Table 13-30** shows potential receptors predicted to be affected by construction noise associated with pipeline crossings across Section 5 of the Proposed Development Pipeline route should any occur at the closest location to the DCO Site Boundary.

**Table 13-30: Pipeline Section 5 Crossing Route Noise Effects**

Affected Receptors	Representative Ambient Noise Conditions	Auger boring		Open-cut		Micro tunnelling	
		Between LOAEL and SOAEL	Above SOAEL	Between LOAEL and SOAEL	Above SOAEL	Between LOAEL and SOAEL	Above SOAEL
R41	51 dB L <sub>Aeq,T</sub>		Yes	Yes		Yes	
R42	51 dB L <sub>Aeq,T</sub>		Yes		Yes		Yes
R43	48 dB L <sub>Aeq,T</sub>		Yes		Yes		Yes
R46	48 dB L <sub>Aeq,T</sub>		Yes		Yes		Yes
R48	40 dB L <sub>Aeq,T</sub>	Yes		Yes		Yes	
R49	40 dB L <sub>Aeq,T</sub>		Yes		Yes		Yes

13.7.37 Exceedances of the SOAEL are predicted at Mablethorpe Road (R42), properties on Kent Avenue (R43), Swallow Park Caravan Site (R46), and Old Toads Barn (R49) using any method of pipeline crossing technique.

13.7.38 Properties at Harps Bridge (R41) are predicted to exceed the SOAEL if auger boring takes place within the DCO Site Boundary nearest to the receptor.

13.7.39 Residential properties along Grove Road (west) (R48), may experience noise levels exceeding the SOAEL if continuous HDD works are required under the Old Engine Drain and Great Eau West of Theddlethorpe during the day and night. These noise levels have been predicted using distances calculated in **Table 13-20**. This would be a significant noise effect.

13.7.40 These noise levels have been predicted using distances calculated in **Table 13-20**.

***Block Valve Stations and Cathodic Protection***

13.7.41 Three Block Valves Stations are proposed along the pipeline route to enable pipeline sections to be isolated for operational and maintenance reasons. A summary of the nearest receptors to Block Valve Station sites and associated distances are presented in **Table 13-31**.

**Table 13-31: Block Valve Stations and Nearest Sensitive Receptors**

Block Valve Site	Nearest Sensitive Receptor	Approximate Distance
Washingdales Lane Block Valve Station	R45	700 m
Thoroughfare Block Valve Station	R15	750 m
Louth Road Block Valve Station	R29	380 m

13.7.42 The nearest receptor to a Block Valve Station is approximately 380 m away and outside the distance of 300 m, which defines the construction noise study area. Consequently, noise effects due to construction activities during core work hours are temporary and not significant.

***Immingham Facility***

13.7.43 The nearest receptors to the Immingham Facility are at least 320m away and outside the distance of 300m, which defines the construction noise study area. Consequently, noise effects due to construction activities during core work hours are temporary and not significant.

## ***Theddlethorpe Facility***

### ***Theddlethorpe Option 1***

13.7.44 Option 1: new facility at the former Theddlethorpe Gas Terminal (TGT) site. Demolition of the former TGT was completed in 2021 but as the site was previously an operational facility, existing security fencing and road infrastructure remain in place. The site is currently clear with a mixture of hard standing, stoned areas and pipeline stubs.

13.7.45 The nearest sensitive receptor to Option 1 is R58. This receptor is at least 350 m from the Option 1 site and outside the distance of 300m, which defines the construction noise study area. Consequently, noise effects due to construction activities during core work hours are temporary and not significant.

### ***Theddlethorpe Option 2***

13.7.46 A quantitative assessment of construction noise effects potential construction noise effects has been undertaken. Option 2 would be a new facility to the west of the former TGT site directly west of The Cut. The nearest sensitive receptors to the Option 2 site at an approximate minimum distance of 200 m are R41 and R42. As the distance from the Option 2 facility site is substantial, no significant noise effects would occur. However, there is potential for exceedances of the LOAEL to occur during periods when high noise generating plant are used.

### ***Maintenance Venting - Option 1 or 2***

13.7.47 Maintenance venting will be undertaken approximately every two years at the Theddlethorpe Facility. In advance of maintenance, valves and sections of the pipe will be vented down to release CO<sub>2</sub>. The venting of CO<sub>2</sub> will be undertaken at a rate whereby the noise at the nearest Noise Sensitive Receptor will be no greater than 10 db above daytime background levels, which are 38 dB at Theddlethorpe. These levels will be back calculated to the perimeter of the facility and monitored as such. It is therefore confirmed that venting noise would be Not Significant.

### ***Dune Isolation Valve***

13.7.48 There is an existing Dune Isolation Valve on the onshore section of the LOGGS pipeline, located close to the sand dunes to the east of the former TGT site. A new replacement valve will be provided in the same location.

13.7.49 A quantitative assessment of construction noise effects potential construction noise effects has been undertaken. The nearest sensitive receptor to the new Dune Isolation Valve is R46 at a distance of approximately 260 m. As the distance from the Dune Isolation Valve site is substantial, no significant noise effects would occur. However, there is potential for exceedances of the LOAEL to occur during periods when high noise generating plant are used.

### ***Hydrostatic Pressure Testing***

13.7.50 The main source of noise whilst hydrostatic testing is from the pump pushing water through the pipe for the test. BS5228-1 provides noise data for typical pumps being 81 dB L<sub>Aeq,T</sub> at 10 m (ref C11.1). As hydrostatic pressure testing will take 24 hours to complete residential receptors may be affected by noise during the night. It has been calculated that to reach the night-time SOAEL, and for significant effects to occur, hydrostatic testing would need to be within 200 m of the residential receptor. As locations of hydrostatic testing and locations of the pipeline are not yet confirmed additional mitigation must be considered if testing is within 200 m of a residential receptor.



## Construction Compounds

- 13.7.51 Three main construction compounds are proposed at specific locations, each of which will include pipe storage areas. The locations of these compounds are detailed in *ES Volume II, Chapter 3: Description of the Proposed Development (Application Document 6.2.3)* and will comprise of a northern, central, and southern compound.
- 13.7.52 Noise emissions from construction compound are highest during the set-up stage when the compound is being prepared.
- 13.7.53 The Northern compound located south of Harborough Roundabout and the A160 is approximately 200 m away from the nearest receptor R1 to the north. The set-up phase at the northern compound will likely require the use of bull dozers and graders to complete the earthworks. As these works are temporary in nature and 200 m away from the nearest residential receptor, noise emissions from plant would not generate a significant effect.
- 13.7.54 The southern compound is located at the car park of the former TGT site and approximately 45m north of the nearest residential receptor R43. As the site is already located on hardstanding ground, there would be minimal use of heavy vehicles to create suitable a suitable construction compound area during the setting up phase. Noise emissions would be from vehicle movements and minor site set-up activities, which are not expected to generate high levels of noise. As such, no significant effects are anticipated.
- 13.7.55 The central compound is located near Welbeck Hill to the east of Barton Street (A18). The proposed location is more than 300 m away from any residential receptors and as such falls outside of the study area for construction. Consequently, no significant effects are expected.
- 13.7.56 Activities in the construction compounds would be controlled through mitigation measures secured in the CEMP. These mitigation measures represent best practicable means and would reduce noise emissions as far as reasonably practicable.

## Construction Vibration Effects

### General Construction Vibration

- 13.7.57 It is generally accepted that, without a highly detailed understanding of the media, waveform, and frequency distribution, ground-borne vibration prediction methods are “*beset with complexities and uncertainties*” (Ref 11-24). However, it is unlikely that typical construction and decommissioning working routines would generate levels of vibration at local receptors at a level where cosmetic damage would be expected to be sustained or cause adverse effects for local residents. The level of impact at different receptors will be dependent upon a number of factors including distance between the works, ground conditions and the specific activities being undertaken. Consequently, vibration effects are defined with reference to information in guidance documents identified in the following paragraph.
- 13.7.58 Surface plant, such as cranes, compressors and generators, are not recognised as sources of high levels of ground-borne vibration. Reference to Figure C2 of ‘Control of Vibration and Noise During Piling’ (Ref 11-25) confirms that PPVs significantly less than 5 mm/s are generated by such machinery, even at distances of only 10 m. For example, the indication is that a bulldozer would generate a PPV of approximately 0.6 mm/s and a ‘heavy lorry on [a] poor road surface’ would generate a PPV of less than 0.1 mm/s at 10 m. These values below the 1.0 mm/s SOAEL (see **Table 13-12**) where it is likely that vibration in residential environments will result in complaints but can be tolerated if prior warning and explanation is given to residents. Vibration levels are also well below levels at which cosmetic building damage are predicted to occur; the lower levels being 15 mm/s for predominantly transient vibrations and 7.5 mm/s for continuous vibrations at the base of residential or lighter framed commercial buildings.

### *Pipeline Route*

- 13.7.59 The highest levels of vibration that would be generated by pipeline construction would be vibratory roller use during reinstatement. Vibratory rollers may generate significant levels of vibration (i.e., exceeding 1.0 mm/s) at receptors within 20 m. Consequently, receptors within 20 m of Proposed Development route are identified as experiencing an exceedance of the SOAEL and a significant vibration effect. Receptors within 50 m are identified as an exceedance of the LOAEL.
- 13.7.60 HDD and auger boring activities also have the potential to generate vibration, which are considered similar to bored piling activities. Consequently, receptors within 15 m of DCO Site Boundary are identified as experiencing an exceedance of the SOAEL and a significant vibration effect. Receptors within 40 m are identified as an exceedance of the LOAEL.
- 13.7.61 Construction vibration effects are assessed in terms of LOAEL and SOAEL. Where an exceedance of the SOAEL is identified, this is identification of a significant effect.
- 13.7.62 Where temporary exceedances of the LOAEL are identified, mitigation measures secured through the Draft CEMP (see paragraph 13.8) will ensure that construction noise is minimised as far as reasonably practicable throughout the construction programme.

#### *Pipeline (Section 1)*

- 13.7.63 An exceedance of the SOAEL is noted at properties along Immingham Road (R3) due to vibration induced by pipeline construction activities and potentially auger boring if entry point is within 15m of R3 when crossing Harbrough Road. This is a significant vibration effect.
- 13.7.64 The nearest residential properties to the HDD crossing south of the Immingham facility are along Church Lane (R2) and are approximately 420 m away. Consequently, vibration would not exceed the LOAEL and would not be a significant effect.

#### *Pipeline (Section 2)*

- 13.7.65 The only receptor within 50 m of the Proposed Development route is at properties on Keelby Road (R5), which is located 25 m away. As such, there may be temporary exceedances of the LOAEL, but the SOAEL is unlikely to be exceeded so vibration effects due to pipeline construction are not significant.
- 13.7.66 The nearest residential properties to the North Beck Drain HDD crossing is at Newstead Farm (R5a) and are approximately 380m away. Consequently, vibration would not exceed the LOAEL and would not be a significant effect.

#### *Pipeline (Section 3)*

- 13.7.67 The only receptor within 50 m of the DCO Site Boundary is Moorhouse (R11), which is located 30 m away. As such, there may be temporary exceedances of the LOAEL, but the SOAEL is unlikely to be exceeded so vibration effects due to pipeline construction are not significant.
- 13.7.68 Auger boring is planned within proximity of properties surrounding the Ashby Hill Main Road crossing (R11, R12, R13). The nearest residential properties to the crossing are approximately 90m away from the edge of the DCO Site Boundary. Consequently, vibration would not exceed the LOAEL and would not be a significant effect.

#### *Pipeline (Section 4)*

- 13.7.69 The only receptors that are within 50 m of the DCO Site Boundary are Yew Tree Cottage (R26) (15 m away), The Lodge (R29a) (20 m away) and Post House (R56) (15 m away). An exceedance of the SOAEL is noted at receptors R26 and R56 due to vibration induced by pipeline construction activities and potentially auger boring if entry point is within 15m of the relevant receptor. This is a significant vibration effect.

13.7.70 Temporary exceedances of the LOAEL may be experienced at R29a, but the SOAEL is unlikely to be exceeded so vibration effects due to pipeline construction are not significant.

13.7.71 The nearest sensitive receptor to the Louth Canal HDD crossing are mobile homes and people night-fishing at the Lodge (R29a) and are approximately 310m away from proposed HDD laydown and stringing area. As such it is likely there will not be experiences of a SOAEL at this location.

13.7.72 Auger boring is planned between 15m (worst case) to 120m (best case) of Yew Tree Cottage (R26). The property is approximately 20m east from the DCO Site Boundary. Consequently, vibration may exceed the LOAEL if the entry point is within 40m of the property but, as the receptor is not within 15 m of the DCO Site Boundary, vibration effects would not be significant.

#### *Pipeline (Section 5)*

13.7.73 The only receptors that are within 50 m of the DCO Site Boundary are R41 (30 m away), R43 (20 m away), R46 (5 m away), R48 (40 m away), and R49 (20 m away). A temporary exceedance of the SOAEL is noted at receptor R46 due to vibration induced by pipeline construction activities. This is a significant vibration effect.

13.7.74 At locations R41, R43, R48, and R49 there may be temporary exceedances of the LOAEL, but the SOAEL is unlikely to be exceeded so vibration effects due to pipeline construction are not significant.

The HDD crossing expected under the Old Engine Drain and the Great Eau may have an adverse vibration induced impact on nearby sensitive receptors. The nearest residential properties to the HDD crossing are at the end of Grove Road (R48) located adjacent to the Great Eau to the west and directly on the Proposed Development route. Any vibration works within 20m would be a significant vibration effect and would require additional mitigation. It is proposed that the HDD laydown and stringing area is 105m from the property so unlikely to result in a SOAEL.

#### *Block Valve Stations and Cathodic Protection*

13.7.75 The nearest receptors to the Block Valve Stations site are approximately 385 m away. At this distance, construction induced vibration is unlikely to be perceptible. Consequently, construction vibration effects are temporary and not significant.

#### *Immingham Facility*

13.7.76 The nearest receptors to the Immingham Facility are at least 320m away. At this distance, construction induced vibration is unlikely to be perceptible. Consequently, construction vibration effects are temporary and not significant.

#### *Theddlethorpe Facility*

##### *Theddlethorpe Option 1*

13.7.77 The nearest receptors to the Option 1 site are approximately 350m away. At this distance, construction induced vibration is unlikely to be perceptible. Consequently, construction vibration effects are temporary and not significant.

##### *Theddlethorpe Option 2*

13.7.78 The nearest receptors to the Option 2 site are approximately 170 m away. At this distance, construction induced vibration is unlikely to be perceptible. Consequently, construction vibration effects are temporary and not significant.

### **Dune Isolation Valve**

13.7.79 The nearest receptors to the Dune Isolation Valve site are approximately 260 m away. At this distance, construction induced vibration is unlikely to be perceptible. Consequently, construction vibration effects are temporary and not significant.

### **Construction Traffic Noise**

13.7.80 The potential changes in road traffic noise from construction of the Proposed Development have been considered by calculating the CRTN (Ref 13-15) BNL and comparing the change. Peak construction traffic flows have been considered in separate scenarios outlined below:

- Construction traffic during pipe set up and transport.
- Construction traffic associated with construction of site access.

13.7.81 Details of baseline traffic data, construction traffic flow data and calculations for both assessment scenarios can be found in *ES Volume IV: Appendix 13.3: Construction Traffic Noise Calculations (Application Document 6.4.13.3)*.

13.7.82 Calculations of construction traffic noise during pipe set up and transport indicate a change in road traffic noise of, at worst, 0.5 dB. This is equivalent to a Negligible effect, which is not significant.

13.7.83 Calculations of construction traffic noise during construction of site access indicate a change in road traffic noise of, at worst, 1.6 dB. This is equivalent to a Minor Adverse effect, which is not significant. The following roads have been predicted to have a Minor Adverse effect (not significant):

- A1173;
- Thoresby Road; and
- A1031 Main Road.

13.7.84 Changes in road traffic noise have only been calculated from roads with flows of greater than 1,000 AAWT. This is because the CRTN (Ref 13-15) calculations are unreliable for traffic flows below an AAWT of 1,000. Although construction traffic will not use roads of less than 1,000 AAWT during pipe set up and transport, low flow roads will be affected during construction of site access. Consequently, a qualitative assessment of potential construction traffic noise effects has been undertaken based on average hourly construction traffic flows.

13.7.85 The maximum number of average hourly vehicle movements along a low traffic flow road is six movements per hour. Whilst this level of construction traffic may cause disturbance, construction traffic flows are not considered of sufficient magnitude to result in a significant effect i.e., “*having to keep windows closed most of the time because of the noise*” (referenced from **Table 13-3**). Consequently, construction traffic noise effects on low flow roads are considered to be, at worst, Minor Adverse and not significant.

### **Assessment of Potential Impacts: Operational Phase**

13.7.86 Operational noise associated with the Proposed Development infrastructure at the Theddlethorpe Facility has been digitally modelled and assessed. There are two options for the location of infrastructure at Theddlethorpe, option 1 (preferred) location within the former Theddlethorpe Gas Terminal (TGT) site owned by National Grid and option 2, located approximately 275m west of the former TGT site. Both locations have receptors within the Study Area and as such both have been assessed.

13.7.87 Associated plant will operate continuously so there will not be any noticeable impulsive or intermittent characteristics from plant noise emissions experienced at the surrounding receptors.

13.7.88 There are two kiosks associated with the infrastructure both of which have air conditioning units and extraction fans generating noise. Air conditioning and extraction fan units can have tonal features which may be experienced at nearby receptors as a distinctive continuous and steady hum, therefore a 3 dB correction to account for noise that is distinctive against the residual acoustic environment has been applied in determining the rating level.

13.7.89 Details of the noise data input into the model is presented in **Table 13-32**. Noise contour plans are included in *ES Volume III, Figure 13.2 – Theddlethorpe Option 1 – Operational Noise Assessment* and *ES Volume III, Figure 13.3 – Theddlethorpe Option 2 – Operational Noise Assessment (Application Document 6.3)*.

**Table 13-32: Noise Data for Plant Associated with Infrastructure**

Plant	Quantity	Noise Level L <sub>WA</sub>
Air conditioning unit	2	73
Extraction fan	2	73

13.7.90 As the night-time period provides the most onerous assessment criteria and operational noise is assumed to be consistent, the assessment presented in **Table 13-34** for Option 1 and **Table 13-33** for Option 2 consider night-time noise only.

**Table 13-33: Theddlethorpe Option 1 - Operational Noise Effects**

Receptor Reference	Night-time LOAEL / SOAEL	Predicted Rating Level L <sub>Ar,Tr</sub>	Effect Level	Significance
R58	30 / 40	22	Below LOAEL	Not significant

**Table 13-34: Theddlethorpe Option 2 - Operational Noise Effects**

Receptor Reference	Night-time LOAEL / SOAEL	Predicted Rating Level L <sub>Ar,Tr</sub>	Effect Level	Significance
R41	30 / 40	27	Below LOAEL	Not significant
R42	30 / 40	25	Below LOAEL	Not significant

13.7.91 At all receptors for both options the rating level is below the LOAEL and therefore noise effects are **not significant**.

## 13.8 Additional Mitigation and Enhancement Measures

### Construction Mitigation

13.8.1 Measures to control noise as defined in Annex B of BS 5228-1 and measures to control vibration as defined in Section 8 of BS 5228-2 will be adopted where reasonably practicable. These measures are secured within a Draft Construction Environmental Management Plan (CEMP) for the construction phase and can be found in *ES Volume IV: Appendix 3.1 (Application Document 6.4.3.1)*. The mitigation presented in the Draft CEMP will be secured through a requirement within the DCO, which requires a CEMP to be submitted for approval after the grant of development consent.

13.8.2 The following types of mitigation measures (secure in the CEMP) would be adopted to mitigate against the effects on noise and vibration:

- **I1:** Pre-construction noise monitoring surveys will be undertaken as agreed with the relevant local authorities to establish a pre-construction baseline for the derivation of construction noise limits;
- **I2:** Following any changes to the design, the Contractor would ensure that an updated noise assessment has been carried out to ensure there would be no additional or increase in negative effects on nearby receptors;
- **I3:** The majority of works activities would be completed under normal working hours/restrictions as follows: Monday to Friday: 07.00 to 19.00; Saturday: 07.00 to 13:30; and no working on Sundays, or Bank Holidays unless otherwise agreed with the relevant local authority. The agreed working hours will be set out in the Final CEMP;
- **I4:** The Contractor would be responsible for notifying the local residents of particularly noisy work prior to commencement of those works. Effective communication should be established, keeping residents informed of the type and timing of works involved;
- **I5:** A set of generic best practice working methods referred to as Best Practicable Means (BPM) would be employed during the construction phase. Typical BPM are outlined in the following commitments;
- **I6:** Closed board fencing would be installed around the construction compounds;
- **I7:** Provision of contact details for a site representative in the event that disturbance due to noise or vibration from the construction works occurs; ensuring that any complaints are dealt with pro-actively and that subsequent resolutions are communicated to the complainant;
- **I8:** Site access routes would be in good condition and well maintained with no potholes or other significant surface irregularities;
- **I9:** Plant machinery would be turned off when not in use;
- **I10:** All vehicles and mobile plant would be well maintained such that loose body fittings or exhausts do not rattle or vibrate;
- **I11:** Silenced equipment would be used where possible, in particular silenced power generators and pumps;
- **I12:** All equipment used would be properly maintained and operated by trained staff;
- **I13:** Plant and equipment covers/hatches would be properly secured and there would be no loose fixings causing rattling;
- **I14:** Static noisy plant, including generators, would be located as far away from noise sensitive receptors as is feasible for the particular activity;
- **I15:** On site speed limits would be in place to reduce the effect of construction traffic noise. Speed limits would be enforceable within the main works sites, with all non-surfaced roads restricted to 10mph and any surfaced roads restricted to 15mph;
- **I16:** To minimise vibration from HGV movements, there would be monthly condition assessments to inspect for defects such as pot holes which could cause an increase in noise levels. Existing potholes would need to be considered by a condition assessment prior to the commencement of works;

- **I17:** As part of the plant selection process the contractor should adopt a procedure to ensure the quietest plant and equipment, techniques and working practices available would be selected and used;
- **I18:** No music or radios would be played on site; and
- **I19:** The applicant will submit an application for prior consent to carry out noisy work under Section 61 of the CoPA to demonstrate that noise and vibration has been minimised as far as reasonably practicable. The Section 61 application will set out the specific method of working, calculations of noise levels at nearby receptors, the actual working hours required, noise monitoring locations, details of communication measures and the mitigation measures implemented to minimise noise and vibration impacts.

13.8.3 As requirements and locations for all trenchless activities will not be finalised until a principal contractor is appointed, a hierarchy of mitigation measures is contained in the Draft CEMP (*ES Volume IV: Appendix 3.1 (Application Document 6.4.3.1)*) to ensure that significant noise effects do not occur due to potential night-time works:

- **I20:** Where practicable, avoid HDD works within 200 m (the distance at which significant effects are predicted at night) of residential receptors (although this will depend on the results of the GI survey);
- **I21:** The potential for the use of quieter equipment than listed in *ES Volume IV: Appendix 13.2 (Application Document 6.4.13.2)* will be explored by the Contractor; and
- **I22:** Depending on the location, plant and timing of works, acoustic fencing will be installed around the HDD site boundary to screen receptors from noise emission. This mitigation could provide up to 10 dB of attenuation when the fencing screens the sources from the receiver.

13.8.4 As requirements and locations for hydrostatic pump testing activities will not be finalised until a principal contractor is appointed, a hierarchy of mitigation measures is contained in the Draft CEMP (*ES Volume IV: Appendix 3.1 (Application Document 6.4.3.1)*) to ensure that significant noise effects do not occur due to potential night-time works:

- **I23:** Where practicable, avoid hydrostatic pump testing works within 200 m (the distance at which significant effects are predicted at night) of residential receptors;
- **I24:** The potential for the use of quieter equipment than listed in Section 13.7.50 will be explored; and
- **I25:** Depending on the location, plant and timing of works, acoustic fencing will be installed around the hydrostatic pump test site boundary to screen receptors from noise emission. This mitigation could provide up to 10 dB of attenuation when the fencing screens the sources from the receiver.

13.8.5 Notification and prior warning should be given to receptors within 200 m of hydrostatic pressure testing as they may be exposed to a level above the SOAEL during night-time periods. If receptors are within 200 m BPM measures should mitigate the SOAEL level regardless but prior warning must be given.

13.8.6 Consideration has been given to traffic routing, timing and access points to the Proposed Development to minimise noise impacts at existing receptors as detailed in *ES Volume II, Chapter 12: Traffic and Transport (Application Document 6.2.12)*. Management of Heavy Goods Vehicles (HGV) on the highway network will be managed through the Outline Construction Traffic Management Plan (CTMP) (*ES Volume IV: Appendix 12.7 (Application Document 6.4.12.7)*), which will be secured through the DCO. Appropriate routing of construction and D traffic on public roads and along access tracks will be pursuant to the CTMP.

## Construction Vibration

13.8.7 Where exceedances of the SOAEL are identified, there is potential significant effect. However, these effects are unmitigated and additional mitigation has the potential to reduce the level of effect to not significant.

13.8.8 The effect of vibration on nearby sensitive receptors can be minimised through a good communication strategy, which is secured in the CEMP. BS 5228-2 states that, where the duration of exposure will be suitably short (less than a day) that:

*“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”.*

13.8.9 Consequently, given that the potential exposure to high levels of vibration due to vibratory roller activity and trenchless crossing techniques, such as HDD, will likely last for no longer than three days, exceedances of the SOAEL do not constitute a significant effect. Consequently, vibration effects are not significant.

## Additional Mitigation and Enhancement – Operational Phase

13.8.10 No additional mitigation has been identified as being required during the operational phase.

## Additional Mitigation and Enhancement – Decommissioning Phase

13.8.11 Additional mitigation measures required during the decommissioning phase would be the same as those listed above during the construction phase.

# 13.9 Residual Effects

## Assessment of Residual Effects: Construction Phase

### Construction Noise

13.9.1 Where exceedances of the SOAEL are identified, there is a potential significant effect. However, these effects are unmitigated and additional mitigation is expected to reduce the level of effect to not significant.

13.9.2 The use of acoustic fencing which, if required, could provide up to 10 dB of noise attenuation. Application of acoustic fencing that blocks line-of sight from high noise generating plant to sensitive receptors would be suitable to reduce significant noise effects.

13.9.3 Wherever practicable, during construction acoustic fencing will be used to minimise the effect of noise on residents of sensitive receptors. However, there may still be periods of high noise generating activities that cannot be screened effectively.

13.9.4 The effect of noise on nearby sensitive receptors can be minimised through a good communication strategy. BS 5228-1 states that:

*“Local residents might be willing to accept higher levels of noise if they know that such levels will only last for a short time. It is then important that construction activities are carried out in accordance with the stated schedule and that the community is informed of their likely durations”.*

13.9.5 Prior to construction works being undertaken, liaison will be undertaken with occupiers of sensitive receptors that may be adversely affected by construction noise. Information will be provided on the timings and duration of high noise generating activity that may adversely affect them. This is considered the best reasonable approach to minimising the effect of construction noise where appropriate screening cannot be implemented.

13.9.6 If HDD works are necessary outside of core work periods, a Section 61 consent will need to be obtained by the principal contractor. This will be agreed with the local planning authority



and contain details on the methodology, mitigation, communication strategy and monitoring. As such, it is anticipated that significant HDD noise effects can be addressed through the Section 61 process.

- 13.9.7 The additional mitigation measures listed in Section 13.9 above are considered to represent all reasonable measures to reduce noise as far as reasonably practicable. Consequently, giving appropriate implementation of mitigation measures, there are anticipated to be **no significant residual effects** due to construction activities.

#### **Assessment of Residual Effects: Operational Phase**

- 13.9.8 **No significant residual effects** during the operational phase are expected.

#### **Assessment of Residual Effects: Decommissioning Phase**

- 13.9.9 **No significant residual effects** during the decommissioning phase are expected.

**Table 13-35: Summary of Construction and Decommissioning Phase Residual Effects**

Receptor	Sensitivity	Description of Potential Impact	Significance	Mitigation Measure(s)	Significance of Residual Effect
R1	Residential	Section 1 pipeline construction noise	Not significant	Best practicable means secured in the CEMP	Not significant
R3	Residential	Section 1 pipeline construction noise	Significant	Best practicable means, communication strategy and use of noise barriers secured in the CEMP	Not significant
R5, R45	Residential	Section 2 pipeline construction noise	Significant	Best practicable means, communication strategy and use of noise barriers secured in the CEMP	Not significant
R6, R52	Residential	Section 2 pipeline construction noise	Not significant	Best practicable means secured in the CEMP	Not significant
R11, R56	Residential	Section 3 pipeline construction noise	Significant	Best practicable means, communication strategy and use of noise barriers secured in the CEMP	Not significant
R12, R13, R17	Residential	Section 3 pipeline construction noise	Not significant	Best practicable means secured in the CEMP	Not significant
R26, R32	Residential	Section 4 pipeline construction noise	Significant	Best practicable means, communication strategy and use of noise barriers secured in the CEMP	Not significant

Receptor	Sensitivity	Description of Potential Impact	Significance	Mitigation Measure(s)	Significance of Residual Effect
R23, R25, R27, R29, R34, R36	Residential	Section 4 pipeline construction noise	Not significant	Best practicable means secured in the CEMP	Not significant
R41, R42, R43, R46, R47, R48, R49, R56	Residential	Section 5 pipeline construction noise	Significant	Best practicable means, communication strategy and use of noise barriers secured in the CEMP	Not significant
R37, R39, R40, R44	Residential	Section 5 pipeline construction noise	Not significant	Best practicable means secured in the CEMP	Not significant
All receptors	Residential	Section 1 pipeline crossing construction noise	Not significant	Best practicable means secured in the CEMP	Not significant
R5	Residential	Section 2 pipeline crossing construction noise	Significant	Additional mitigation and monitoring through Section 61	Not significant
R11, R12, R13	Residential	Section 3 pipeline crossing construction noise	Not significant	Best practicable means secured in the CEMP	Not significant
R26, R29	Residential	Section 4 pipeline crossing construction noise	Significant	Additional mitigation and monitoring through Section 61	Not significant
R48, R56	Residential	Section 5 pipeline crossing construction noise	Significant	Additional mitigation and monitoring through Section 61	Not significant
R15, R29, R45	Residential	Block Valve Station construction noise	Not significant	Best practicable means secured in the CEMP	Not significant
R43	Residential	Immingham Facility construction noise	Not significant	Best practicable means secured in the CEMP	Not significant

Receptor	Sensitivity	Description of Potential Impact	Significance	Mitigation Measure(s)	Significance of Residual Effect
R58	Residential	Theddlethorpe Facility construction noise	Not significant	Best practicable means secured in the CEMP	Not significant
R41, R42	Residential	Theddlethorpe Facility back-up option construction noise	Not significant	Best practicable means secured in the CEMP	Not significant
R46	Non-residential	Dune Isolation Valve construction noise	Not significant	Best practicable means secured in the CEMP	Not significant
All receptors	Residential	Hydrostatic testing along pipeline route	Significant	Best practical means and communication strategy secured in the CEMP	Not significant
R3	Residential	Section 1 pipeline construction and pipeline crossing construction vibration	Not significant	Best practicable means secured in the CEMP	Not significant
R5	Residential	Section 2 pipeline construction and pipeline crossing construction vibration	Not significant	Best practicable means secured in the CEMP	Not significant
R11	Residential	Section 3 pipeline construction and pipeline crossing construction vibration	Not significant	Best practicable means secured in the CEMP	Not significant
R26, R56	Residential	Section 4 pipeline construction and pipeline crossing construction vibration	Significant	Best practicable means and communication strategy secured in the CEMP	Not significant
R29a	Residential	Section 4 pipeline construction and pipeline crossing construction vibration	Not significant	Best practicable means secured in the CEMP	Not significant

Receptor	Sensitivity	Description of Potential Impact	Significance	Mitigation Measure(s)	Significance of Residual Effect
R46	Residential	Section 5 pipeline construction and pipeline crossing construction vibration	Significant	Best practicable means and communication strategy secured in the CEMP	Not significant
R41, R43, R48, R49	Residential	Section 5 pipeline construction and pipeline crossing construction vibration	Not significant	Best practicable means secured in the CEMP	Not significant
R15, R29, R45	Residential	Block Valve Station construction vibration	Not significant	Best practicable means secured in the CEMP	Not significant
R43	Residential	Immingham Facility construction vibration	Not significant	Best practicable means secured in the CEMP	Not significant
R58	Residential	Theddlethorpe Facility construction vibration	Not significant	Best practicable means secured in the CEMP	Not significant
R41, R42	Residential	Theddlethorpe Facility back-up option construction vibration	Not significant	Best practicable means secured in the CEMP	Not significant
R46	Non-residential	Dune Isolation Valve construction vibration	Not significant	Best practicable means secured in the CEMP	Not significant
All receptors	Residential	Construction traffic noise during pipe set up and transport	Negligible (not significant)	None	Negligible (not significant)
All receptors	Residential	Construction traffic noise during construction of site access	Minor Adverse (not significant)	None	Minor Adverse (not significant)

**Table 13.36: Summary of Operational Phase Residual Effects**

Receptor	Sensitivity	Description of Potential Impact	Significance	Mitigation Measure(s)	Significance of Residual Effect
R41	Residential	Theddlethorpe infrastructure operation – Option 1	Not significant	None	Not significant
R42	Residential	Theddlethorpe infrastructure operation – Option 1	Not significant	None	Not significant
R58	Residential	Theddlethorpe infrastructure operation – Option 2	Not significant	None	Not significant

## 13.10 Cumulative Effects

### Assessment of Intra-Project Effects

13.10.1 Table 20-11 of *ES Volume II Chapter 20: Cumulative Effects Assessment of Inter-Project Effects (Application Document 6.2.20)* presents a summary of the potential ‘shared receptors’ for intra-project effects. It is noted that Noise and Vibration share receptors with other technical areas presented in **Table 13-37**.

**Table 13-37: Shared Receptors with Noise and Vibration List**

Receptors	Technical Chapters													
	Ecology and Biodiversity	Landscape and Visual	Historic Environment	Geology and Hydrogeology	Agriculture and Soils	Water Environment	Traffic and Transport	Noise and Vibration	Air Quality	Climate Change	Socio-economics	Health and Wellbeing	Materials and Waste	Major Accidents and Disasters
Residential Receptors		✓						✓	✓					✓
Human Health								✓	✓			✓		
Communities		✓						✓	✓		✓	✓		
Ecological Receptors	✓							✓	✓					

13.10.2 There are anticipated to be no significant residual effects due to the operation, construction and decommissioning activities from the Proposed Development, and therefore noise and vibration would not contribute to any intra-project cumulative effects.

### Assessment of Inter-Project Effects

13.10.3 Cumulative noise effects during construction and operation phases may occur when developments are located nearby to a common receptor. Based on professional judgement, at distances of greater than 500 m any interaction of noise emissions from multiple developments would be attenuated such that there would normally be no effect.

13.10.4 A list of relevant developments is presented in *ES Volume II Chapter 20: Cumulative Effects Assessment*. The following developments in **Table 13-38** have been identified to be within 500 m of the Proposed Development.

**Table 13-38: Cumulative Developments within 500 m of the Proposed Development**

ID	Development Name	Location Description	Development Summary
#NELC CULM-2	Peter Ward Homes	Approximately 380 m east of the DCO Site Boundary	Residential development
#NELC CULM-12	Grimsby Solar Farm	Approximately 190 m north east of Section 2 of the DCO Site Boundary, north of Aylesby	Solar PV development
#NELC CULM-20	Brocklesby Estate	Approximately 450m east of the DCO Site Boundary.	Residential development
#NELC CULM-28	CHI Investments – The Willows	Approximately 209m east of the DCO Site Boundary.	Construction of new foul sewer and associated works
#NLC CULM-2	Associated British Ports (ABP) – Land adjacent to the Westgate Entrance, Port of Immingham	Approximately 160 m north of the DCO Site Boundary	A hybrid application comprising full planning permission for the development of land adjacent to the West Gate Entrance of the Port of Immingham for port related employment uses.
#NLC CULM-3	VPI Immingham - VPI Immingham Pilot Carbon Capture Plant	Approximately 40 m north west of the DCO Site Boundary.	Planning permission to construct and operate a temporary pilot post-combustion carbon capture plant and associated infrastructure
#NLC CULM-9	<u>Orsted Gigastack Limited and Phillips 66 Limited – Gigastack Project</u>	Intersects Section 1 of the DCO Site Boundary.	EIA Scoping request for a 100MV hydrogen electrolyser together with an underground electrical cable connection to the Hornsea Two onshore substation, water discharge and a hydrogen export pipeline to the Humber Refinery.
#NLC CULM-12	<u>Phillips 66 Limited - Humber Zero Project</u>	Intersects Section 1 of the DCO Site Boundary.	Planning permission for the construction and operation of a post-combustion carbon capture plant, including carbon dioxide compression and metering, cooling equipment, stacks,



ID	Development Name	Location Description	Development Summary
			substations, new and modified services, connections, internal roads, new access onto Eastfield Road, and maintenance
#NLC CULM-13	<u>Humber Zero – VPI Immingham Carbon Capture Plant</u>	Intersects Section 1 of the DCO Site Boundary.	Planning permission for the construction & operation of a post-combustion carbon capture plant, including carbon dioxide compressor & metering, cooling equipment, stacks, substations, internal roads, partial ditch realignment, new & modified services, connections, internal roads, accesses, maintenance & laydown areas.
#NLC CULM-14	<u>Associated British Ports – Immingham Onshore Wind</u>	Approximately 245m east of the DCO Site Boundary.	EIA Scoping request for Immingham onshore wind including up to three wind turbines (Immingham Dock Western Entrance, Humber Road, South Killingholme).
#NLC CULM-15	<u>Associated British Ports – Immingham Onshore Wind</u>	Approximately 85m east of the DCO Site Boundary.	EIA Scoping request for Immingham onshore wind including up to three wind turbines (Land Along Tracks, West Haven Way, South Killingholme).
#NLC CULM-16	<u>VEV Services Limited - Vitol (VPI Immingham)</u>	Approximately 248m north of the DCO Site Boundary.	Planning permission for the installation of a 71.28 kwp solar carport and infrastructure for renewable energy generation
#NLC CULM-17	PA/2018/918	Approximately 153m north of the DCO Site Boundary.	Planning permission to construct a new gas-fired power station with a gross electrical output of up to 49.9 megawatts
#ELDC CULM-1	N/085/00883/15	Approximately 380m north east of the DCO Site Boundary.	A hybrid application consisting of outline erection of up to 300 dwellings with means of access to be considered and full planning permission for change of use of land from agricultural land to a recreation ground.

ID	Development Name	Location Description	Development Summary
#OFF CULM-1	<u>Wider Viking CCS Project</u>	Immediately adjacent to the DCO Site Boundary at Theddlethorpe.	offshore elements including refurbishment of the existing offshore Lincolnshire Offshore Gas Gathering system (LOGGS) Pipeline and a newly installed spur pipeline, to the offshore injection facilities for permanent storage.

- 13.10.5 The precise scale of additional noise effects will be dependent on the exact works taking place at each location at any one time; however, compliance with the mitigation measures detailed within the CEMP in *ES Volume IV: Appendix 3.1 (Application Document 6.4.3.1)* will reduce these effects as far as practicable. It has been assumed that other developments will also be required to adopt BPM as standard working practices during their construction phases and that noise and vibration levels will comply with set limits in accordance with guidance in BS 5228-1 and BS 5228-2 (Ref 13-15).
- 13.10.6 Based on the distances from key project components to cumulative developments and requirements to implement BPM, it is considered that any overlapping of construction phases between the Proposed Development and the other nearby development schemes would not result in any in-combination cumulative effects at common noise-sensitive receptors.
- 13.10.7 There are anticipated to be no significant residual effects due to construction and decommissioning activities from the Proposed Development, and it is considered that cumulative effects will not be significant.
- 13.10.8 Operational noise emissions from cumulative developments will be required to be designed to achieve appropriate operational noise limits in accordance with guidance in BS 4142. This requirement would avoid any adverse effects to noise-sensitive receptors such that additional noise would not contribute to additional noise to the area (i.e., ‘background creep’). The control and mitigation of noise effects from surrounding development will be the responsibility of the developer. Given the relative distance between cumulative developments and the Proposed Development, operational noise effects from the Proposed Development will remain unchanged from the residual effects stated previously and therefore remain **negligible to minor adverse and not significant**.

## 13.11 Summary

- 13.11.1 Providing that all construction activities adhere to the mitigation measures listed in this chapter that are secured within the CEMP in *ES Volume IV: Appendix 3.1 (Application Document 6.4.3.1)*, There are anticipated to be no significant residual effects due to construction activities. These are therefore classed as not being significant. It should also be noted that all construction activities in any one place will be temporary, any resultant impact will also be temporary.
- 13.11.2 No significant effects on sensitive receptors have been identified as a result of noise from construction traffic movements associated with the Proposed Development.
- 13.11.3 No significant effects on sensitive receptors have been identified as a result of noise from operational noise associated with the Proposed Development.

## 13.12 References

**Ref 13-1** Her Majesty's Stationery Office (1974); Control of Pollution Act

**Ref 13-2** Her Majesty's Stationery Office (1995); Environmental Protection Act.

**Ref 13-3** Ministry of Housing, Communities & Local Government (2023); National Planning Policy Framework. Available at: [National Planning Policy Framework \(publishing.service.gov.uk\)](https://publishing.service.gov.uk). Accessed 13/09/2023

**Ref 13-4** Department for Energy Security and Net Zero (2023); Draft Overarching National Policy Statement for Energy (EN-1).

**Ref 13-5** Department of Energy and Climate Change (2011); Overarching National Policy Statement for Energy (EN-1).

**Ref 13-6** Department for Energy Security and Net Zero (2023); Draft National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4).

**Ref 13-7** Department of Energy and Climate Change (2011); National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4).

**Ref 13-8** Department for Environment Food and Rural Affairs (2010); Noise Policy Statement for England.

**Ref 13-9** Lincolnshire County Council (2017); Central Lincolnshire Local Plan 2012-2036

**Ref 13-10** North East Lincolnshire Council (2018); North East Lincolnshire Local Plan 2013-2032

**Ref 13-11** East Lindsey District Council (2018); Local Plan 2013-2032 – Core Strategy

**Ref 13-12** Ministry of Housing, Communities & Local Government (2019); Planning Practice Guidance - Noise.

**Ref 13-13** AECOM (2022). Preliminary Environmental Information Report (PEIR). Available at: <https://consultation.vikingccs.co.uk/consultation-documents>

**Ref 13-14** British Standards Institute (2009 with 2014 amendments); BS 5228:2009+A1:2014 – Code of practice for noise and vibration control on construction and open sites, BSi, London.

**Ref 13-15** Department of Transport/Welsh Office (1988); Calculation of Road Traffic Noise. Her Majesty's Stationery Office, London.

**Ref 13-16** Highways England (2020); Design Manual for Road and Bridges LA111: Noise and Vibration, Revision 2.

**Ref 13-17** British Standards Institute (2014 with 2019 amendments); BS 4142 – Methods for rating and assessing industrial and commercial sound, BSi, London.

**Ref 13-18** British Standards Institute (2014); BS 8233 – Guidance on sound insulation and noise reduction for buildings, BSi, London.

**Ref 13-19** Tetsworth Parish Council (2019). Proof of evidence regarding a planning appeal for a proposed traveller site in Tetsworth (appeal A – P15/S3936/FUL, appeal B – P18/S0973/FUL. Available at: [https://data.southoxon.gov.uk/ccm/support/dynamic\\_serve.jsp?ID=1998461836&CODE=D206A957B8F0FC1B69AA52847F5391C1](https://data.southoxon.gov.uk/ccm/support/dynamic_serve.jsp?ID=1998461836&CODE=D206A957B8F0FC1B69AA52847F5391C1)

**Ref 13-20** World Health Organization (1999); Guidelines for Community Noise.

**Ref 13-21** British Standards Institute (2003); BS 7445 – Description and environment of environmental noise – Part 1: Guide to quantities and procedures, BSi, London.

**Ref 13-22** (AECOM) V Net Zero Pipeline Project Environmental Impact Assessment - Scoping Report. Available at: [https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/EN070008/EN070008-000018-V%20Net%20Zero%20Pipeline\\_EIA%20Scoping%20Report.pdf](https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/EN070008/EN070008-000018-V%20Net%20Zero%20Pipeline_EIA%20Scoping%20Report.pdf)

