



Keuper Gas Storage Project

Preliminary Environmental
Information Report – Noise and
Vibration

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ACRONYMS AND ABBREVIATIONS

Acronym	Description
BPM	Best Practicable Means
BS	British Standard
BS 4142	BS 4142:2014+A1:2019 – Methods for rating and assessing industrial and commercial sound
BS 5228-1	BS 5228-1:2009+A1:2014 – Code of practice for noise and vibration control on construction and open sites – Part 1. Noise

Acronym	Description
BS 5228-2	BS 5228-2:2009 + A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 2. Vibration
BS 8233	BS 8233:2014 – Guidance on sound insulation and noise reduction for buildings
CEMP	Construction Environmental Management Plan
CoPA	Control of Pollution Act, 1974
CRTN	Calculation of Road Traffic Noise
CTMP	Construction Traffic Management Plan
dB	Decibel
dBA (A-weighted)	Sound measurement that has been adjusted to reflect how the human ear perceives loudness across different frequencies
DCO	Development Consent Order
DMRB	Design Manual for Roads and Bridges – LA111 Noise and Vibration
EIA	Environmental Impact Assessment
EPA	Environmental Protection Act, 1990
ERM	Environmental Resources Management
ES	Environmental Statement
GPP	Gas Processing Plant
ISO 9613	ISO 9613-2:2024 – Acoustics – Attenuation of sound during propagation outdoors. Part 2
KGSL	Keuper Gas Storage Limited
KGSP	Keuper Gas Storage Project
L _{A90,T}	A-weighted sound pressure level that is exceeded for 90% of a given measurement period (T)
L _{Aeq,T}	Equivalent Continuous A-weighted Sound Pressure Level over a specified time period (T)

Acronym	Description
L _{Amax}	Maximum A-weighted sound level measured over a specific time period (T).
LOAEL	Lowest Observed Adverse Effect Level
MC	Material Change
NML	Noise Monitoring Location
NOAEL	No Observed Adverse Effect Level, as referred to in PPGN. Note that this term has the same definition as NOEL
NOEL	No Observed Effect Level, as referred to in NPSE
NPPF	National Planning Policy Framework
NPS EN-1	Overarching National Policy Statement for Energy EN-1
NPS EN-4	National Policy Statement for Natural Gas Supply Infrastructure and Gas and Oil Pipelines EN-4
NPS EN-5	National Policy Statement for Electricity Networks Infrastructure EN-5
NPSE	Noise Policy Statement for England 2010
NSIP(s)	Nationally Significant Infrastructure Project(s)
NSR	Noise Sensitive Receptor
PEIR	Preliminary Environmental Information Report
PPGN	Planning Practice Guidance – Noise (2019)
SMC3	Solution Mining Compound
SOAEL	Significant Observed Adverse Effect Level
UAEL	Unacceptable Adverse Effect Level

9. NOISE AND VIBRATION

9.1 INTRODUCTION

- 9.1.1.1 This Chapter of the Preliminary Environmental Information Report (PEIR) assesses the effects of the Proposed Development with respect to noise and vibration.
- 9.1.1.2 This chapter will cover both the (short-term) effects during the construction phase and the (long-term) effects during the operational phase. The impact during the decommissioning phase is expected to be comparable to, and not exceed, that of the construction phase. Therefore, a separate assessment of decommissioning is not included.
- 9.1.1.3 The Chapter provides: the policy context; scoping responses; consultation feedback; the assessment methodology and criteria; the baseline conditions currently existing at the Proposed Development site and in the surrounding area; an assessment of the likely significant effects of the Proposed Development both on its own and in combination (cumulative effects) from nearby developments, with respect to noise and vibration; the mitigation measures that the Applicant is committed to implementing; and an assessment of the residual likely significant effects of the Proposed Development with these measures adopted.
- 9.1.1.4 This Chapter of the PEIR is supported by the following figure provided in Volume 2:
- **Figure 9.1** – Background noise survey and noise sensitive receptors.
- 9.1.1.5 This Chapter of the EIA Report is supported by the following Technical Appendix documents provided in Volume 3 Technical Appendices:
- Technical Appendix 9A – Background Noise Survey.

9.2 LEGISLATION, POLICY AND GUIDANCE

- 9.2.1.1 Key items of legislation, policy and guidance specifically relevant to noise and vibration for the Proposed Development are as follows:

9.2.2 LEGISLATION

Control of Pollution Act, 1974¹

- 9.2.2.2 The Control of Pollution Act 1974 (CoPA) provides the definition of Best Practicable Means (BPM) to minimise noise and vibration, and provides the basis for defence against noise abatement action taken by a local authority (Section 60). The Act also provides for persons responsible to seek prior consent for works on construction sites

¹ Legislation.gov.uk. Control of Pollution Act 1974. Legislation.gov.uk. [Online] [Cited: 01 July 2025.] <https://www.legislation.gov.uk/ukpga/1974/40>

(Section 61) including BPM steps to minimise noise, and the basis for defining codes of practice (applicable to BS 5228:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites, Part 1: Noise and Part 2: Vibration').

Environmental Protection Act, 1990²

- 9.2.2.3 The Environmental Protection Act 1990 (EPA) sets out the duty for local authorities to investigate and, where identified, take abatement action against noise nuisance. The Act provides the definition of BPM to minimise noise and vibration, the basis for defence against noise abatement action taken by a local authority (Section 80). The Act also provides a route for individuals to seek abatement action through application to the magistrate's court against noise nuisance (Section 82).

9.2.3 NATIONAL POLICY

Overarching National Policy Statement for Energy (NPS EN-1)³

- 9.2.3.2 The Overarching National Policy Statement for Energy (EN-1) provides the overarching government policy on energy Nationally Significant Infrastructure Projects (NSIPs), how planning applications relating to energy will be assessed, and the way in which any impacts and mitigation measures will be considered. Part 5, Section 5.12 of this policy statement specifically relates to noise and vibration.
- 9.2.3.3 Paragraph 5.12.6 states:
- *"Where noise impacts are likely to arise from the proposed development, the applicant should include the following in the noise assessment:*
 - *a description of the noise generating aspects of the development proposal leading to noise impacts, including the identification of any distinctive tonal characteristics, if the noise is impulsive, whether the noise contains particular high or low frequency content or any temporal characteristics of the noise;*
 - *identification of noise sensitive receptors and noise sensitive areas that may be affected;*
 - *the characteristics of the existing noise environment;*
 - *a prediction of how the noise environment will change with the proposed development;*
 - *in the shorter term, such as during the construction period;*

² Environmental Protection Act 1990. *Legislation.gov.uk*. [Online] [Cited: 01 July 2025.] <https://www.legislation.gov.uk/ukpga/1990/43/contents>.

³ Department for Energy Security & Net Zero. *Overarching National Policy Statement for Energy (EN1)*. s.l. : Open Government Licence v3.0, 2023. ISBN 978-1-5286-4582-9.

- *in the longer term, during the operating life of the infrastructure;*
- *at particular times of the day, evening and night (and weekends) as appropriate, and at different times of year;*
- *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 quality of life / well-being where appropriate, particularly among those disadvantaged by other factors who are often disproportionately affected by noise-sensitive areas;*
- *if likely to cause disturbance, an assessment of the effect of underwater or subterranean noise; and*
- *all reasonable steps taken to mitigate and minimise potential adverse effects on health and quality of life."*

National Policy Statement for Natural Gas Supply Infrastructure and Gas and Oil Pipelines (NPS EN-4)⁴

- 9.2.3.4 NPS EN-4 provides guidance relating to noise and vibration that is potentially generated from the construction and operation of gas storage facilities. It also highlights the requirement to include noise and vibration assessments in Environmental Statements that support development proposals.

National Policy Statement for Electricity Networks Infrastructure (NPS EN-5)⁵

- 9.2.3.5 The National Policy Statement for Electricity Networks Infrastructure (NPS EN-5) provides advice to operators of the electricity transmission and distribution networks and sets out additional technology-specific considerations for noise and vibration.
- 9.2.3.6 Section 2.9 provides guidance on possible causes for changes to noise from high voltage transmission lines and substations. Assessment guidance is provided, stating that it may be appropriate to use "modelling tools" for the prediction of noise propagation over distance. It states that assessment should follow the principles of the relevant British Standards, quoting the example of BS 4142.

⁴ National Policy Statement for Natural Gas Supply Infrastructure and Gas and Oil Pipelines (EN4). s.l. : Crown copyright 2024, 2024. ISBN 978-1-5286-4585-0

⁵ National Policy Statement for Electricity Networks Infrastructure (EN-5). s.l. : Open Government Licence v3.0, 2023. ISBN 978-1-5286-4586-7.

National Planning Policy Framework (NPPF)⁶

- 9.2.3.7 The NPPF was introduced in March 2012 and most recently revised in December 2024. The document sets out the government's planning policies for England and how these are expected to be applied.
- 9.2.3.8 Applications for planning permission must be determined in accordance with a local planning authority's development plan unless material considerations indicate otherwise. The development plan includes any local plan or neighbourhood plans which have been adopted for the area.
- 9.2.3.9 The planning system is required to enhance the natural and local environment. Consequently, the aim is to prevent both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by, unacceptable levels of noise pollution. The NPPF at paragraph 198 states that planning policies and decisions should aim to:
- Mitigate and reduce to a minimum potential adverse impact resulting from noise from new development – and avoid noise from giving rise to significant adverse impacts on health and quality of life; and
 - Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.
 - With regards to 'adverse effects' and 'significant adverse effects' the NPPF refers to the Noise Policy Statement for England 2010 Explanatory Note.

Noise Policy Statement for England 2010 (NPSE)⁷

- 9.2.3.10 Paragraph 1.6 of the NPSE sets out the long-term vision of the government's noise policy, as reproduced below:
- *"Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development."*
 - The NPSE sets out aims that together with the vision should provide the necessary clarity and direction to enable decisions to be made regarding what is an acceptable noise burden to place on society:
 - Avoid significant adverse impacts on health and quality of life;
 - Mitigate and minimise adverse impacts on health and quality of life; and

⁶ Ministry of Housing, Communities & Local Government. *National Planning Policy Framework*. London : Crown Copyright 2025, 2025.

⁷ Department for Environment, Food & and Rural Affairs. *Noise Policy Statement for England (NPSE)*. London : Crown Copyright 2010, 2010.

- Where possible, contribute to the improvement of health and quality of life.

9.2.3.11 The explanatory note in the NPSE sets out the following concepts:

- No Observed Effect Level (NOEL) – the level below which there is no detectable effect on health and quality of life due to noise;
- Lowest Observed 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.

9.2.3.12 The NPSE recognises that it is not possible to have single objective noise-based measures that define the SOAEL and LOAEL that are applicable to all sources of noise in all situations. The levels are likely to be different for different noise sources, receptors and at different times of the day and night.

Planning Practice Guidance – Noise (2019) (PPGN)⁸

9.2.3.13 PPGN expands on the 'NOEL, LOAEL and SOAEL' concepts set out in the NPSE and introduces UAEL (Unacceptable Adverse Effect Level). A summary of the advice is reproduced in **Table 9.1**.

TABLE 9.1 – PPGN GUIDANCE ON NOISE ADVERSE EFFECT LEVELS

Response	Examples of outcomes	Increasing effect level	Action
No Observed Adverse Effect Level (NOAEL)			
Present and not intrusive	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
Lowest Observed Adverse Effect Level (LOAEL)			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude, or other physiological response, e.g.	Observed Adverse Effect	Mitigate and reduce to a minimum

⁸ Ministry of Housing, Communities and Local Government. Planning Practice Guidance on Noise. GOV.UK. [Online] March 6, 2014. [Cited: November 26, 2024.]

Response	Examples of outcomes	Increasing effect level	Action
	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.		
Significant Observed Adverse Effect Level (SOAEL)			
Present and disruptive	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
Unacceptable Adverse Effect Level (UAEL)			
Present and very disruptive	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	Unacceptable Adverse Effect	Prevent

Response	Examples of outcomes	Increasing effect level	Action
	definable harm, e.g. auditory and non-auditory.		

9.2.4 LOCAL PLANNING POLICY

Cheshire West and Chester Council Local Plan (Part One) Strategic Policies⁹

9.2.4.2 Policies that relate to noise within Part One of the Cheshire West and Chester Council Local Plan have been summarised below:

- SOC 5 Health and well-being:
 - *"Development that gives rise to significant adverse impacts on health and quality of life (e.g. soil, noise, water, air and light pollution, and land instability, etc) including residential amenity, will not be allowed."*
- ENV 9 Alternative energy supplies:
 - *"The Local Plan will support renewable and low carbon energy proposals where there are no unacceptable impacts on:

 - Landscape, visual or residential amenity.
 - Noise, air, water, highways or health.
 - Biodiversity, the natural or historic environment.
 - Radar, telecommunications or the safety of aircraft operations.*
 - *Proposals should be accompanied by appropriate arrangements for decommissioning and reinstatement of the site when its operational lifespan has ended.*
 - *Proposals to exploit the borough's alternative hydrocarbon resources will be supported in accordance with the above criteria and all other policies within the Local Plan."*

Cheshire West and Chester Council Local Plan (Part Two) Land Allocations and Detailed Policies¹⁰

9.2.4.3 Policy DM 30 within Part Two of the Cheshire West and Chester Council Local Plan document discusses noise specifically and has been reproduced below:

⁹ Cheshire West & Chester Council. Local Plan (Part One) Strategic Policies. s.l. : Cheshire West & Chester Council, 2015

¹⁰ Local Plan (Part Two) Land Allocations and Detailed Policies. s.l. : Cheshire West & Chester Council, 2015.

- *"In line with Local Plan (Part One) policy SOC 5, development must not give rise to significant adverse impacts on health and quality of life, from noise. Development which generates noise or is sensitive to it will only be permitted where it accords with the development plan and does not have an unacceptable adverse impact on human health or quality of life.*
- *Unless it can be demonstrated that a significant adverse impact on residential amenity arising from construction and demolition is unlikely it is expected that demolition and construction works shall be carried out during normal working hours.*
- *The Council must be satisfied that the proposed location of any construction/demolition site compound will minimise the noise impact on neighbouring residential uses."*

Cheshire East Local Plan Strategy 2010-2030¹¹

9.2.4.4 Policies SE8 and SE12 within the Cheshire East Local Plan references noise and have been presented below:

- Policy SE 8 Renewable and Low carbon Energy:
 - *"2. Weight will be given to the wider environmental, economic and social benefits arising from renewable and low carbon energy schemes, whilst considering the anticipated adverse impacts, individually and cumulatively upon:*
 - *ii. Residential amenity including visual intrusion, air, dust, noise, odour, traffic generation, recreation and access..."*
- Policy SE 12 Pollution, Land Contamination and Land Instability:
 - *"1. The council will seek to ensure all development is located and designed so as not to result in a harmful or cumulative impact upon air quality, surface water and groundwater, noise, smell, dust, vibration, soil contamination, light pollution or any other pollution which would unacceptably affect the natural and built environment, or detrimentally affect amenity or cause harm. Developers will be expected to minimise, and mitigate the effects of possible pollution arising from the development itself, or as a result of the development (including additional traffic) during both the construction and the life of the development. Where adequate mitigation cannot be provided, development will not normally be permitted.*
 - *5. In most cases, development will only be deemed acceptable where it can be demonstrated that any contamination or land instability issues can be appropriately mitigated against and remediated, if necessary."*

¹¹ Cheshire East Council. Local Plan Strategy 2010-2030. Crewe : Cheshire East Council, 2017.

Cheshire East Environmental Protection Supplementary Planning Document¹²

- 9.2.4.5 Section 6 of the Cheshire East Environmental Protection Supplementary Planning Document (the 'Cheshire East SPD') provides general guidance for noise impact assessments, which includes a summary of NPPF and NPSE, regarding NOAEL, LOAEL and SOAEL.

9.2.5 GUIDANCE

BS 5228-1:2009+A1:2014 – Code of practice for noise and vibration control on construction and open sites – Part 1. Noise (BS 5228-1)¹³

- 9.2.5.2 BS 5228-1 refers to the need for the protection against noise for persons living and working in the vicinity of and those working on construction and open sites. It provides examples of noise control in respect of construction activities. Guidance on noise control targets and example criteria are provided. Methods of calculating the levels of noise resulting from construction activities are also provided along with sound data for various types of plant and equipment.
- 9.2.5.3 The standard discusses the importance of community relations, and states that early establishment and maintenance of these relations throughout site operations will go some way towards alleviating community concerns. In terms of neighbourhood nuisance, the following factors are likely to affect the acceptability of construction noise:
- Site location, relative to the noise sensitive premises;
 - Existing ambient noise levels;
 - Duration of site operations;
 - Hours of work;
 - The attitude of local residents to the site operator; and
 - The characteristics of the noise produced.
- 9.2.5.4 Recommendations are made regarding the supervision, planning, preparation and execution of works, emphasising the need to consider noise at every stage of the operation. Measures to control noise are described, including:
- Control of noise at source by, for example:
 - Substitution of plant or activities by less noisy ones;
 - Modification of plant or equipment to reduce noise emissions;

¹² Environmental Protection SPD. s.l. : Cheshire East Council, 2024.

¹³ British Standards Institution. *BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Noise.* s.l. : BSI, 2014. ISBN 978 0 580 77749 3.

- The use of noise enclosures;
- The siting of equipment and its method of use;
- Equipment maintenance; and
- Controlling the spread of noise, e.g. by increasing the distance between plant and noise-sensitive receptors or by the provision of acoustic screening.

BS 5228-2:2009 + A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 2. Vibration (BS 5228-2)¹⁴

- 9.2.5.5 BS 5228-2 discusses construction vibration affecting human receptors and buildings. BS 5228-2 provides guidance on typical vibration levels, associated risks, empirical prediction methods, and mitigation strategies.

BS 4142:2014+A1:2019 – Methods for rating and assessing industrial and commercial sound (BS 4142)¹⁵

- 9.2.5.6 BS 4142 sets out a method for the assessment of sound of an industrial and / or commercial nature. The method described in BS 4142 uses outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling used for residential purposes.

BS 8233:2014 – Guidance on sound insulation and noise reduction for buildings (BS 8233)¹⁶

- 9.2.5.7 BS 8233 provides guidance for the control of noise in and around buildings. BS 8233 provides absolute thresholds for internal and external noise levels affecting various noise-sensitive uses, including residential, educational and commercial premises.

ISO 9613-2:2024 – Acoustics – Attenuation of sound during propagation outdoors. Part 2 (ISO 9613)¹⁷

- 9.2.5.8 ISO 9613 specifies the engineering method for calculating the attenuation of sound propagation outdoors in order to predict the levels of environmental noise at a distance. The methods set out in ISO 9613 are implemented as part of the calculation algorithms for

¹⁴ British Standards Institution. *BS 5228-2:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites. Vibration*. s.l. : BSI, 2014. ISBN 978 0 580 77750 9.

¹⁵ British Standards Institution. *BS 4142:2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound*. s.l. : BSI, 2019. ISBN 978 0 539 02069 4.

¹⁶ British Standards Institution. *BS 8233:2014 - Guidance on Sound Insulation and Noise Reduction for Buildings*. s.l. : BSI Standards Limited 2014, 2014. ISBN 978 0 580 74378 8.

¹⁷ International Organization for Standardization. *ISO 9613-2 Acoustics - Attenuation of Sound During Propagation Outdoors - Part 2: Engineering Method for the Prediction of Sound Pressure Levels Outdoors*. Geneva : ISO 2024, 2024.

industry-standard noise modelling applications, such as SoundPLAN and CadnaA.

Design Manual for Roads and Bridges – LA111 Noise and Vibration (DMRB)¹⁸

- 9.2.5.9 The DMRB issued by National Highways provides noise assessment guidance relating to the construction, operation and maintenance of infrastructure projects that have the potential to produce changes in noise and vibration levels in the surrounding environment due to new or changes to existing roads.

Calculation of Road Traffic Noise¹⁹

- 9.2.5.10 Calculation of Road Traffic Noise (CRTN) is a guidance document issued by the Department of Transport and it outlines standardised procedures for estimating noise levels generated by road traffic. The methodology incorporates several input variables, including traffic flow rates, average speeds, proportions of heavy goods vehicles, road surface types, site geometry, and the presence of acoustic barriers or absorptive ground surfaces.

9.3 CONSULTATION

- 9.3.1.1 This section provides a summary of the consultation undertaken to date regarding the Proposed Development.

9.3.2 EIA SCOPING

- 9.3.2.1 A Scoping Opinion was sought from the Planning Inspectorate to determine the content of the assessment, as well as the approach and methods to be used. The outcomes of this exercise were documented in the Scoping Report which was submitted to the Planning Inspectorate on the 22nd of April 2025.
- 9.3.2.2 The Scoping Report²⁰ captures the findings of the scoping exercise and outlines the technical guidance, standards, best practices, and criteria to be applied in the assessment to identify and evaluate the likely significant effects of the Proposed Development on noise and vibration.
- 9.3.2.3 A Scoping Opinion was received from the Planning Inspectorate on the 5th of June 2025.

¹⁸ Highways England. *Design Manual for Roads and Bridges, LA 111 Noise and Vibration Revision 2*. London : Highways England, 2020.

¹⁹ Department of Transport Welsh Office HMSO. *Calculation of Road Traffic Noise*. London: Crown Copyright 1988, 1988. ISBN 0 11 550847 3.

²⁰ Keuper Gas Storage Project Scoping Report, April 2025, Reference EN030002. Available at: https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0310001-000003-EN0310001%20-%20Keuper%20Gas%20Storage%20Material%20Change%201_Redacted.pdf

9.3.2.4 **Table 9.2** summarises how this chapter of the PEIR addresses key points from the EIA Scoping Opinion comments related to noise and vibration.

TABLE 9.2 – PLANNING INSPECTORATE'S SCOPING OPINION RESPONSES

Issue Raised	How this is addressed	Where addressed in the Draft ES
The Inspectorate is content to scope out this matter (noise and vibration from the construction and decommissioning of the wellheads and below ground infrastructure) from the further assessment on the basis that the methods of construction would be the same as those set out and assessed in the original ES for the Consented Development. The Inspectorate agrees on this basis there would be no new or materially different effects to that originally assessed	Noise and vibration from the construction and decommissioning of the wellheads and below ground infrastructure is scoped out of the assessment. Drilling has not been scoped out of the assessment, as the night-time construction noise categories (see Table 9.6) are different to those presented in the ES of the Consented Development.	Assessment of construction noise from drilling is presented in Section 9.8.1 , including results in Table 9.13 .
The Inspectorate agrees that the proposed changes are unlikely to significantly alter the construction, operation and decommissioning traffic related noise and vibration levels such that they would be materially different from those assessed in the original ES. This matter can be scoped out of further assessment in the updated ES	Construction, operational, and decommissioning traffic is scoped out of the assessment.	N/A

Issue Raised	How this is addressed	Where addressed in the Draft ES
The Inspectorate is content to scope out further assessment of operational vibration effects on the basis that no significant vibration generating equipment would be required during operation	Operational vibration is scoped out of the assessment	N/A
It is unclear from the Scoping Report how the current study area has been selected. The ES should clearly define and justify the study area, with reference to the potential ZoI for the PD. Effort should also be made to agree the final study area with relevant consultation bodies, such as the host local authority	<p>The study area is defined based on the type of noise and vibration generated by the Proposed Development during the construction, operation and decommission phases in relation to distances from noise sensitive receptors at which noise and vibration has the potential to cause impacts. This includes:</p> <ul style="list-style-type: none"> • An area extending 300m from noise generating activities during the construction and decommissioning phases; and • An area extending 1km from noise generating plant during the operational phase. 	Section 9.5.4
It is noted that para D.9.1.3 lists 'construction noise' as being scoped out of the updated ES. However, this conflicts with the statements made	Construction noise has been assessed for construction of GPP. The scale of development and construction at the Solution Mining	Method in Section 9.5.6, results and assessment in Section 9.8.1.

Issue Raised	How this is addressed	Where addressed in the Draft ES
<p>in Table D.1 of the Scoping Report. For the avoidance of doubt, the ES should include an assessment of construction and decommissioning noise and vibration impacts due to changes to the proposed site infrastructure and its location, together with updates to equipment, where likely significant effects could occur</p>	<p>Compound (SMC3) has been reduced compared to that of the Consented Development, hence reduced any potential for any significant noise generation, so has therefore not been considered in this assessment for construction or operational noise. The methods of construction for the GPP are consistent with those assessed for the original ES for the Consented Development, albeit for the updated design. The construction noise criteria have been updated to reflect recent baseline noise monitoring.</p>	

9.3.3 OTHER CONSULTATION

- 9.3.3.1 Cheshire West and Chester Council were contacted in relation to the selection of noise survey locations on 25th June 2025 and 3rd July 2025. There has been no response to date.

9.4 BASIS OF THE ASSESSMENT

9.4.1 BASELINE

- 9.4.1.1 The Proposed Development is surrounded by arable land on all sides, and some nearby residential areas. Byley and Yatehouse Green Villages are the nearest residential developments to the Proposed Development and both are adjacent to the order limits.
- 9.4.1.2 Several local roads with low volumes of traffic are located close to the Proposed Development boundary. The M6 is located approximately 2.5 km west of the Proposed Development.
- 9.4.1.3 The nearest noise sensitive receptors to the Proposed Development have been identified using the original ES of the Consented Development and are presented in **Table 9.3**.

TABLE 9.3 – NOISE SENSITIVE RECEPTORS

ID	Name
NSR01	Newall Farm
NSR02	Boundary Farm
NSR03	Drakelow Farm
NSR04	Halfway House
NSR05	Brook House
NSR06a	Yewtree House
NSR06b	Kingstreet Hall
NSR07	Brownhayes Farm
NSR08	Drakelow Hall Farm
NSR09	Stublach Dairy Farm
NSR10	Drakelow Gorse Farm
NSR11a	Yatehouse Green Farm
NSR11b	Yewtree Farm

ID	Name
NSR12a	Dog and Partridge Farm
NSR12b	Higher Green Farm
NSR13a	Crosslanes Farm
NSR13b	Green Lea

9.4.2 CONSTRUCTION

- 9.4.2.1 Construction of the proposed development is indicative at this stage as outlined in Chapter 2. The Construction of the Gas Processing Plant (GPP) and Drilling activities are included in the assessment of the Proposed Development. While drilling activities are the same as those presented in the ES of the Consented Development, updates to baseline noise monitoring have demonstrated that the night-time construction noise categories (see **Table 9.6**) for each NSR are different to those presented in the ES of the Consented Development, and therefore the assessment of impacts has been updated.
- 9.4.2.2 The scale of development and construction at the Solution Mining Compound (SMC3) has been reduced compared to that of the Consented Development, hence reduced any potential for any significant noise generation, so has therefore not been considered in this assessment.
- 9.4.2.3 Noise and vibration from the construction and decommissioning of the wellheads and below ground infrastructure (pipeline construction) has been scoped out on the basis that the construction methods would be the same as those set out and assessed in the original ES for the Consented Development. The methods of construction for the GPP are consistent with those assessed for the original ES for the Consented Development, albeit for the updated design.
- 9.4.2.4 The final list of plant and operations schedule will be determined when a contractor is appointed to carry out construction of the Proposed Development. The indicative plant list from the original ES of the Consented Development has been used for this assessment.

9.4.3 OPERATION AND MAINTENANCE

- 9.4.3.1 Chapter 2 presents a description of the Proposed Development, and this forms the basis of the operational noise assessment. The GPP is likely to be the main source of operational noise.
- 9.4.3.2 The design details of the GPP operation for the Proposed Development are currently under development, however the following plant items are expected to produce noise during the operation of the Proposed Development:

- Building ventilation fans;
- Compressors;
- Dehydration valve modules;
- Emergency flares;
- Ground flares;
- Instrument air package buildings;
- Network metering packages;
- Pumps;
- Regeneration gas cooler fans;
- Regeneration gas heaters;
- Separators
- Sequence valves; and
- Transformers.

9.4.3.3 The GPP operates under four normal operational running modes:

- Withdrawal;
- Injection;
- Withdrawal with Compression; and
- First Gas.

9.4.3.4 The development is expected to operate typically on the Withdrawal or Injection mode. The Withdrawal with Compression mode is likely to represent the noisiest normal operation mode as it includes all plant except for the emergency flare.

9.4.3.5 An emergency mode may occur simultaneously with normal operation. The Emergency mode is likely to include the emergency flare but is unlikely to occur more than once every ten years.

9.4.4 DECOMMISSIONING

9.4.4.1 At this stage, the precise details of decommissioning activities are not available, however they will be similar in nature to construction activities.

9.5 ASSESSMENT METHODOLOGY

9.5.1.1 This section sets out the scope and methodology for the assessment of the impacts of the Proposed Development on noise and vibration from the construction, operation and decommissioning phases.

9.5.2 SCOPE OF ASSESSMENT

Baseline

- 9.5.2.2 A detailed knowledge of the baseline noise environment is required at the nearest noise sensitive receptors as this forms the basis of the criteria for the construction and operational noise assessments.
- 9.5.2.3 Baseline noise level metrics $L_{Aeq,T}$ and $L_{A90,T}$ are logged in accordance with BS 5228 and BS 4142 for the assessments of construction noise and operational noise respectively. Meteorological data such as rain and wind speed and direction is recorded to support filtering of weather-affected measurements.

Construction

- 9.5.2.4 Construction noise is assessed in accordance with BS 5228-1. The methodology is presented in Section 9.5.6.

Operation and Maintenance

- 9.5.2.5 Operational noise is assessed in accordance with BS 4142. The methodology is presented in Section 9.5.6.

9.5.3 ELEMENTS SCOPED OUT OF ASSESSMENT

- 9.5.3.1 Noise and vibration from the construction and decommissioning of the wellheads and below ground infrastructure is scoped out of the assessment. This approach is affirmed in the scoping opinion.
- 9.5.3.2 No significant vibration generating equipment will be required during operation. Therefore, an operational vibration assessment is scoped out.
- 9.5.3.3 Construction vibration has been considered, however only a high-level review is required given that the distance between the receptors and the main sources of vibration is a minimum of 105 m. Empirical studies suggest that at distances beyond 100 m, vibration is unlikely to be perceptible even from major sources of construction vibration, such as driven piling. Other construction activities have a much smaller zone of vibration effect or no perceptible effect at all. Therefore, construction vibration is scoped out from the assessment.
- 9.5.3.4 Construction, operation and decommissioning traffic related noise and vibration levels would not be materially different from those assessed in the original ES of the Consented Development, therefore this matter is scoped out of further assessment.

9.5.4 STUDY AREA

- 9.5.4.1 The Proposed Development is located within the administrative boundaries of Cheshire and Cheshire West Council.

9.5.4.2 The study area is defined based on the type of noise and vibration generated by the Proposed Development during the construction, operation and decommission phases in relation to distances from noise sensitive receptors at which noise and vibration has the potential to cause impacts. This includes:

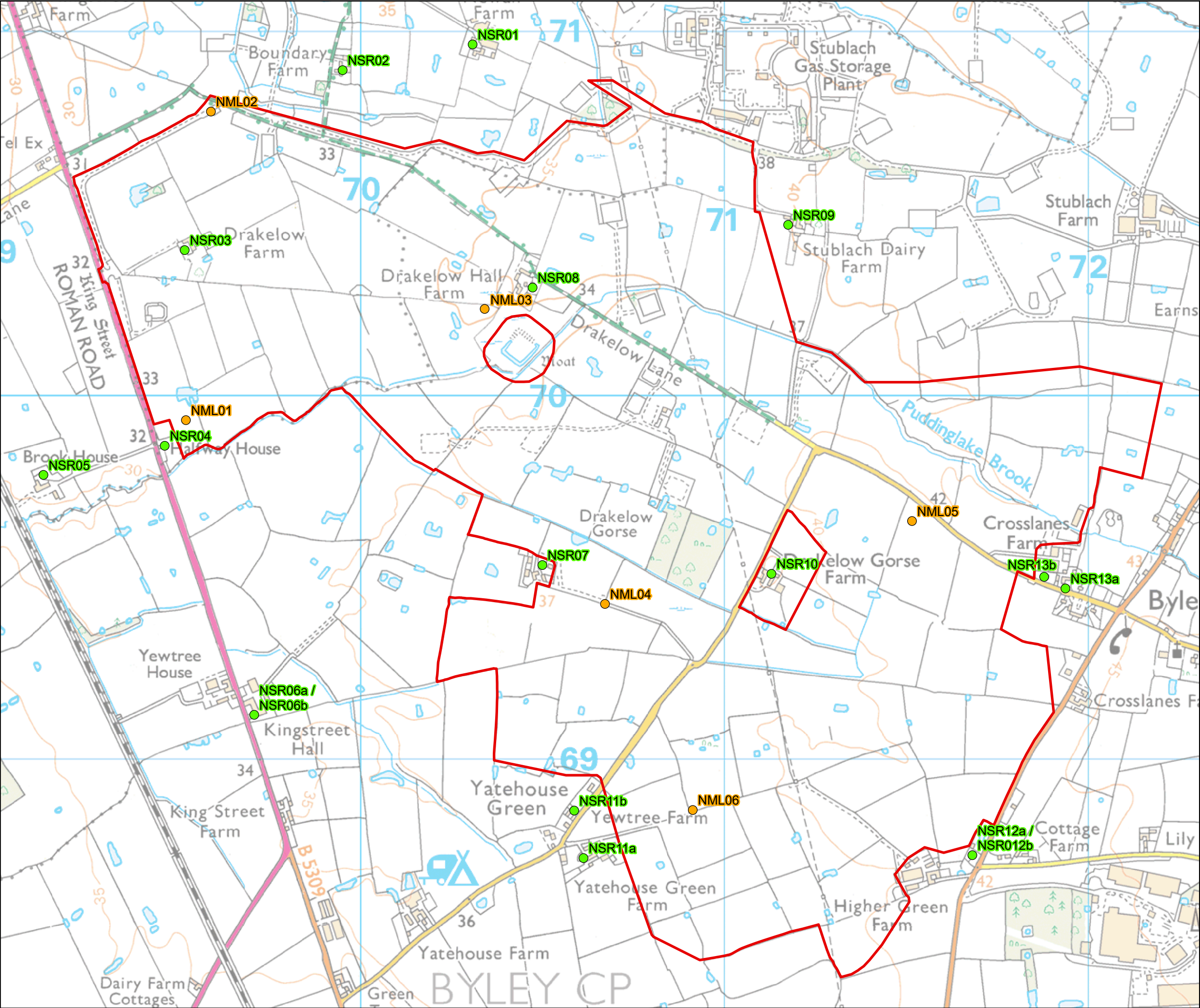
- An area extending 300 m from noise generating activities during the construction and decommissioning phases;
- An area extending 1 km from noise generating plant during the operational phase.

9.5.5 BASELINE SURVEY METHODOLOGY

9.5.5.1 Noise monitoring equipment was installed at six discrete monitoring locations to characterise the baseline, presented in **Table 9.4**, on **Figure 9.1**, and in **Technical Appendix 9A**.

TABLE 9.4 – NOISE MONITORING LOCATIONS

Noise monitoring location	Represented NSRs
NML01	NSR04 Halfway House NSR05 Brook House NSR06a Yewtree House NSR06b Kingstreet
NML02	NSR01 Newall Farm NSR02 Boundary Farm NSR03 Drakelow Farm
NML03	NSR08 Drakelow Hall Farm NSR09 Stublach Dairy Farm
NML04	NSR07 Brownhayes Farm NSR10 Drakelow Gorse Farm
NML05	NSR13a Crosslanes Farm NSR13b Green Lea
NML06	NSR11a Yatehouse Green Farm NSR11a Yewtree Farm NSR12a Dog and Partridge Farm NSR12b Higher Green Farm



Site Boundary

Noise Monitoring Location

Noise Sensitive Receptor Location

Noise Sensitive Receptor
NSR01 - Newall Farm
NSR02 - Boundary Farm
NSR03 - Drakelow Farm
NSR04 - Halfway House
NSR05 - Brook House Farm
NSR06a - Yewtree House Farm / NSR06b - King Street
NSR07 - Brown Hayes Farm
NSR08 - Drakelow Hall Farm
NSR09 - Stublach Dairy Farm
NSR10 - Drakelow Gorse Farm
NSR11a - Yatehouse Green Farm
NSR11b - Yew Tree Farm
NSR12a - Dog and Partridge House / NSR12b - Higher Green Farm
NSR13a - Cross Lanes Farm
NSR13b - Green Lea

0100200300400500

Metres

N

SCALE: See Scale Bar

VERSION: A01

SIZE: A3

DRAWN: MC

PROJECT: 0755727

CHECKED: ROO

DATE: 05/09/2025

APPROVED:

Figure 9.1
Noise Sensitive Receptors / Noise Monitoring Locations

- 9.5.5.2 Equipment used for baseline noise measurements complies with Class 1 requirements given in British Standard (BS) EN 61672-2. The sound level meters were fitted with a microphone and windshield which is suitable for the outdoor environment. All noise measurements were taken at a height of between 1.2 m and 1.5 m above local ground level.
- 9.5.5.3 All measurement locations were 'free field', i.e. at least 3.5 m from an acoustically reflective façade. Measurements were completed by a qualified acoustician competent in environmental noise monitoring and completed in accordance with the principles of BS 7445-1.
- 9.5.5.4 The calibration level of all equipment was checked before and after the measurement periods and no significant changes were noted in relation to the data reported. Further details are presented in **Technical Appendix 9A**.

9.5.6 METHODOLOGY FOR THE ASSESSMENT OF EFFECTS

- 9.5.6.1 The Noise Policy Statement for England (NSPE) requires noise and vibration assessments to identify effects from a development that would result in significant adverse impacts on health and quality of life.
- 9.5.6.2 The NPSE vision 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".
- 9.5.6.3 The PPGN presents a noise exposure hierarchy table which is presented in **Table 9.1**.
- 9.5.6.4 The NPSE acknowledges that it is not possible to determine a "single objective" noise based measure applicable to all sources and receptors to define LOAEL or SOAEL. However, thresholds may be defined using policy, available standards and technical guidance.
- 9.5.6.5 Where it is not possible to define the onset of LOAEL and SOAEL from policy, standards or guidance, effect levels have been defined with reference to those previously used for the assessment of other nationally significant infrastructure projects in England.
- 9.5.6.6 For the purposes of this assessment, noise exposure at assessment locations that are below the LOAEL are considered Not Significant in terms of EIA Regulations
- 9.5.6.7 Where the noise exposure at an assessment location exceeds the SOAEL, after noise mitigation measures are taken into account, a likely significant adverse effect in terms of the EIA Regulations is deemed to occur, in addition to a significant observed adverse effect on health and quality of life in terms of Government noise policy.
- 9.5.6.8 Determining whether a significant adverse effect occurs where noise exposure lies between the LOAEL and SOAEL requires consideration of additional quantitative and qualitative factors, for example:

- Noise level – the level of exposure between the LOAEL and SOAEL values;
- Change in noise level – the magnitude of noise level change;
- Acoustic context – features of the noise source (e.g. intermittency, tonality, distinctiveness, etc.) or the existing noise environment; and
- Receptor type (community population) – the size of population exposed.

9.5.6.9 **Table 9.5** summarises the LOAEL and SOAEL values adopted for the assessment of the Proposed Development.

TABLE 9.5 – SUMMARY OF LOAEL AND SOAEL VALUES ADOPTED FOR THE PROPOSED DEVELOPMENT

Assessment	Period	LOAEL	SOAEL
Construction and decommissioning noise	Daytime	Relevant category threshold – see Table 9.7	75 dB $L_{Aeq,T}$
	Evenings and Weekends	Relevant category threshold – see Table 9.7	65 dB $L_{Aeq,T}$
	Night-time	Relevant category threshold – see Table 9.7	55 dB $L_{Aeq,T}$
Operational noise	All	See Paragraph 9.5.6.21	See Paragraph 9.5.6.21

Construction and decommissioning Noise

9.5.6.10 Construction noise has been assessed in accordance with BS 5228-1 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise, using the 'ABC method' from section E.3.2. The ABC method proposes categories and thresholds to determine significance of effect.

9.5.6.11 The ambient baseline level for the given period (daytime, evenings and weekends, and night-time) is rounded to the nearest 5dB and the category is determined using **Table 9.6**.

TABLE 9.6 – CONSTRUCTION NOISE BS 5228-1 CATEGORY ACCORDING TO ROUNDED AMBIENT NOISE LEVEL

Period		Assessment category ($L_{Aeq,T}$)		
		A	B	C
Daytime	T=12hr, Weekdays, 07:00-19:00; T=6hr, Saturday, 07:00-13:00	$\leq 60\text{dB}$	65dB	$\geq 70\text{dB}$
Evenings & weekends	T=4hr, Weekdays 19:00– 23:00; T=10hr, Saturdays 13:00-23:00; T=16hr, Sundays 07:00-23:00	$\leq 50\text{dB}$	55dB	$\geq 60\text{dB}$
Night-time	T=8hr, Every day 23:00- 07:00	$\leq 40\text{dB}$	45dB	$\geq 50\text{dB}$

9.5.6.12 The thresholds of potentially significant effects for each period and receptor category are proposed in Table E.1 of BS 5228-1 and presented in **Table 9.7**.

TABLE 9.7 – ASSESSMENT THRESHOLD AS A FUNCTION OF PERIOD AND ASSESSMENT CATEGORY

Period		Assessment threshold (façade) ($L_{Aeq,T}$)		
		A	B	C
Daytime	T=12hr, Weekdays, 07:00-19:00; T=6hr, Saturday, 07:00-13:00	65dB	70dB	75dB
Evenings & weekends	T=4hr, Weekdays 19:00– 23:00; T=10hr, Saturdays 13:00-23:00; T=16hr, Sundays 07:00-23:00	55dB	60dB	65dB
Night-time	T=8hr, Every day 23:00- 07:00	45dB	50dB	55dB

9.5.6.13 The noise level associated with the relevant assessment category is adopted as the LOAEL. The noise levels associated with Category C thresholds are adopted as the SOAEL.

9.5.6.14 **Table 9.8** presents the magnitude of impact of construction and decommissioning noise in the context of significance of effect.

TABLE 9.8 – CONSTRUCTION AND DECOMMISSIONING NOISE MAGNITUDE OF IMPACT

Magnitude of impact	Effect level – see Table 9.5	Significance of effect and context
Negligible	5dB or more below LOAEL	Not significant
Minor	Up to 5dB below LOAEL	Not significant subject to implementation of Best Practicable Means (BPM)
Moderate	Above LOAEL but below SOAEL	Significant if the impact will occur for 10 or more days or nights in any 15 consecutive days or nights, or a total number of days exceeding 40 in any 6 consecutive months. Noise mitigation measures may be required to avoid significant adverse effects on health and quality of life.
Major	Above SOAEL	Significant if the impact will occur for 10 or more days or nights in any 15 consecutive days or nights, or a total number of days exceeding 40 in any 6 consecutive months. Noise mitigation measures may be required to avoid significant adverse effects on health and quality of life.

9.5.6.15 Moderate and major impacts have the potential to constitute a significant effect, subject to additional considerations, such as:

- The magnitude of noise exposure;
- The change in noise exposure as a result of the construction activities; and
- The duration of the noise exposure.

9.5.6.16 Noise mitigation measures (beyond those defined in BPM) should be applied to minimise adverse effects where the magnitude of impact is Moderate or Major.

Operational Noise

9.5.6.17 Noise impacts associated with on-site operation have been assessed with reference to the criteria set out in BS 4142.

9.5.6.18 The assessment method described in BS 4142 uses outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling used for residential purposes.

9.5.6.19 BS 4142 defines the following terms, which are referred to in this assessment:

- Specific sound level, L_s : the A-weighted sound level of the sound source being assessed;
- Rating level, $L_{A,r,Tr}$: the specific sound level plus any adjustment for characteristic features of the sound;
- Residual sound level, L_r : the A-weighted sound level remaining when the specific sound level is sufficiently suppressed so as not to contribute to the ambient sound level; and
- Background sound level, $L_{A90,T}$: the L_{90} statistical measure of the residual sound level. The background sound level is an underlying level of sound over a time period, T . It does not reflect the occurrence of transient and / or higher sound level events and is generally governed by continuous or semi-continuous sounds.

9.5.6.20 The rating level is derived from the specific sound level with the addition of any corrections to account for any audible characteristic features of the sound at the assessment location. BS 4142 describes the following characteristic features and provides guidance on how to apply each correction:

- Tonality: up to +6 dB;
- Impulsivity: up to +9 dB;
- Intermittency: up to +3 dB; and
- other sound characteristics (neither tonal nor impulsive but still readily distinctive): up to +3 dB.

9.5.6.21 The assessment initially compares the difference between the background sound level and the rating level at the assessment location. BS 4142 does not seek to propose LOAEL or SOAEL, however it states that:

- *"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 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 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 low impact, depending on the context

- *Note: Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact."*

9.5.6.22 This provides the basis to determine the initial assessment in accordance with BS 4142. The final designation of significance applies the initial assessment in terms of context:

- the absolute level of sound;
- the character and level of the residual sound compared to the character and level of the specific sound; and
- the sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions.

9.5.6.23 **Table 9.9** presents the magnitude of impact of operational noise in the context of significance of effect.

TABLE 9.9 – OPERATIONAL NOISE MAGNITUDE OF IMPACT

Magnitude of impact	Rating level $L_{Ar,Tr}$	Significance of effect and context
Negligible	Less than a level of 5dB below prevailing background	Not significant
Minor	Greater than or equal to a level of 5dB below prevailing background and less than or equal to a level of 5dB above background	Not significant, depending on context.
Moderate	Greater than a level of 5dB above prevailing background and less than or equal to a level of 10dB above background	Potentially significant, depending on context. Noise mitigation measures may be required in order to avoid significant adverse effects on health and quality of life.
Major	Greater than a level of 10dB above prevailing background	Significant, depending on context. Noise mitigation measures are likely to be required in order to avoid significant adverse effects on health and quality of life.

- 9.5.6.24 As presented in Section 9.4.3, the design details of the GPP operation for the Proposed Development are currently under development. Therefore, the magnitudes of operational noise impacts have been assessed qualitatively in this assessment. This will be assessed quantitatively for the frozen design in the ES using noise modelling software implementing ISO 9613-2.
- 9.5.6.25 Moderate and major impacts have the potential to constitute a significant effect, subject to final designation which depends on context.
- 9.5.6.26 Noise mitigation measures (beyond those defined in BPM) should be applied to minimise adverse effects where the magnitude of impact is Moderate or Major.

9.5.7 ADDRESSING UNCERTAINTY

- 9.5.7.1 **Table 9.10** presents uncertainties which are common to the assessment of noise and vibration as well as ways in which this assessment has mitigated the uncertainty.

TABLE 9.10 – ASSESSMENT OF UNCERTAINTY

Source of uncertainty	Mitigation of uncertainty
Measuring baseline sound levels	Use of calibrated Class A sound level meter to accurately measure sound pressure level. Use of long measurement period (at least seven days). Statistical analysis of the measured levels to reduce the effect of extraneous events on the adopted representative background sound level. Filtering data for adverse weather conditions. See Technical Appendix 9A for more details.
Reliability of sound source data	Where supplier noise source data for equipment were not available, data have been taken from a literature review of noise assessments for similar applications. Noise source level values have conservatively been adopted from the upper end of the range of values identified in the review.
Construction method	The construction method assumes the plant list as used in the original ES of the Consented Development. Final details of the precise plant and equipment that will be used for the construction of the Proposed Development will be decided when a construction contractor has been engaged. Noise and vibration predictions for construction equipment have been based on standard source levels provided in BS 5228-1 and BS 5228-2.

9.6 BASELINE

9.6.1 BASELINE DATA SOURCES

- 9.6.1.1 Baseline data includes measured baseline, on-site observations, as well as OS data and open-source mapping.
- 9.6.1.2 The baseline acoustic environment was characterised by different noise sources for each location, but predominantly included road traffic noise from King Street, Drakelow Lane, Yatehouse Lane, and local access road, as well as birdsong, wind in vegetation, and occasional aircraft over head.
- 9.6.1.3 **Technical Appendix 9A** presents baseline noise levels for all baseline monitoring locations. A representative baseline monitoring location is indicated for each noise assessment location.

9.6.2 EXISTING BASELINE CONDITIONS

- 9.6.2.1 Baseline noise monitoring was carried out at six noise monitoring locations (NMLs) between 29th July and 6th August 2025 to measure noise levels representative of the noise environment at the nearest noise sensitive receptors to the Proposed Development.
- 9.6.2.2 **Table 9.11** presents a summary of the measured baseline at each noise monitoring location. The daytime and night-time $L_{A90,T}$ are representative levels for the duration of the survey.

TABLE 9.11 – MEASURED BASELINE NOISE LEVELS INCLUDING BS 5228-1 RECEPTOR CATEGORIES (ABC)

Noise monitoring location	Daytime $L_{Aeq,T}$ [dB]	Evening and weekend $L_{Aeq,T}$ [dB]	Night-time $L_{Aeq,T}$ [dB]	Daytime $L_{A90,T}$ [dB]	Night-time $L_{A90,T}$ [dB]
NML01	59 (A)	56 (B)	53 (C)	50	33
NML02	56 (A)	51 (A)	49 (C)	45	34
NML03	56 (A)	51 (A)	49 (C)	38	31
NML04	53 (A)	48 (A)	47 (B)	36	30
NML05	51 (A)	47 (A)	44 (B)	35	29
NML06	53 (A)	48 (A)	45 (B)	38	30

9.6.2.3 Full details of the baseline noise survey are presented in **Technical Appendix 9A**.

9.6.3 FUTURE BASELINE CONDITIONS

- 9.6.3.1 While in principle it is possible that baseline noise levels could change between the current year and the future baseline year, it is unlikely that any changes would alter the outcome of the noise assessment.
- 9.6.3.2 For areas where the existing baseline is characterised by road traffic noise, increases in traffic would need to be significant to make a material difference to baseline noise levels (a 25% increase or 20% decrease for a change of approximately 1dB).
- 9.6.3.3 For areas where the characterisation of baseline would be impacted by another proposed development, this would be included under an assessment of cumulative effects.
- 9.6.3.4 There is a low probability that baseline noise levels would decrease for the future baseline. This means that the current designation of construction and operational criteria is unlikely to become more onerous. Therefore, it is not likely that noise impacts from the Proposed Development would be more adverse than those stated in this assessment.
- 9.6.3.5 On balance, the existing baseline noise levels are representative of the future baseline year.

9.7 MITIGATION

- 9.7.1.1 The following specific environmental measures relevant to noise and vibration have been identified and have been considered as part of the assessment. To ensure clarity as to how these Environmental Measures are secured, a Commitments Register has been included within the submission (see **Chapter 19**).

9.7.2 CONSTRUCTION

- 9.7.2.1 Measures will be undertaken during the construction phase to minimise disruption and manage the potential for adverse effects of the construction activities.
- 9.7.2.2 Construction hours would be between 0700hrs and 1900hrs Monday to Friday, 0700hrs to 1300hrs on Saturdays, and no working on Sundays or bank holidays. Exceptions to this may be required for drilling which could occur at any time, including at night.
- 9.7.2.3 The Applicant has committed to implementing a Construction Environmental Management Plan (CEMP) and Construction Traffic Management Plan (CTMP) during construction activities for the Proposed Development.
- 9.7.2.4 The CEMP defines the key construction activity principles that will be adhered to and developed during construction activities, including recommendations that represent good practice specific to the noise

and vibration assessment, based on the assumed construction plant list and working methodologies. It also includes details on roles and responsibilities, working hours, control measures and activities to be undertaken to minimise environmental effects as well as monitoring and record-keeping requirements. In addition, it will outline the methodology to be adopted should a complaint be received regarding excessive noise or vibration levels.

9.7.2.5 The following represent the kind of noise and vibration control measures that will likely be included in the CEMP, where necessary and practicable:

- Keeping local residents informed of the proposed working schedule, where appropriate, including the times and duration of any abnormally noisy activity that may cause concern;
- Scheduling work so that the noisier activities are undertaken, where possible, during the daytime when ambient sound levels are highest, rather than nights when ambient levels are lower;
- Installing exhaust silencers on vehicles and mechanical plant and regularly maintaining them;
- Selecting inherently quiet plant where appropriate;
- Installing mufflers or silencers on ancillary pneumatic percussive tools;
- Ensuring that machines are shut down between work periods or throttled down to a minimum;
- Regularly maintaining all equipment used on-site, including maintenance related to noise emissions;
- Loading vehicles carefully to ensure minimal drop heights;
- Positioning ancillary plant such as generators and pumps to cause minimum noise disturbance and if necessary, provide temporary acoustic screens or enclosures; and
- Fitting mobile plant with directional white noise reversing alarms to avoid tonal noise from the site.

9.7.3 OPERATION AND MAINTENANCE

9.7.3.1 At this stage, final design and noise mitigation measures are not fully developed. However, the Proposed Development is committed to avoiding significant effects by reducing operational noise impact magnitudes to Minor (no more than 5 dB above background) as defined in **Table 9.9**.

9.7.3.2 The following general mitigation measures will be considered in the final design of the Proposed Development, and implemented where necessary and practicable:

- Reducing noise at source, including enclosures, attenuators and louvres;

- Installing vibration generating plant on resilient mounts;
- Orientating units so that the main noise and vibration generating elements (such as ventilation openings) are facing away from nearby residential properties; and
- Installing barriers (including earth bunds) or enclosures to provide acoustic screening around noise generating plant.

9.7.3.3 During the operational phase of the Proposed Development, on-site maintenance will be minimal and will principally relate to the vegetation management, equipment maintenance and servicing, replacement and renewal of any components that fail, and monitoring and inspection, to ensure the continued effective operation of the Proposed Development. Any replacement of the equipment is likely to be lower than the effects predicted for the construction phase. Therefore, no specific measures are required to limit noise during maintenance activities.

9.8 ASSESSMENT OF EFFECTS

9.8.1 CONSTRUCTION

General construction noise

9.8.1.2 **Table 9.12** presents daytime ABC categories, predicted construction noise levels of the GPP, and magnitudes of impact for each noise sensitive receptor.

TABLE 9.12 – MODELLED GENERAL CONSTRUCTION NOISE LEVELS AND MAGNITUDE OF IMPACT

Noise sensitive receptor		Construction of GPP	
ID	Name	Daytime ABC Category and LOAEL	Predicted noise levels [dB] $L_{Aeq,T}$
NSR01	Newall Farm	A (65)	55 (negligible)
NSR02	Boundary Farm	A (65)	58 (negligible)
NSR03	Drakelow Farm	A (65)	65 (minor)
NSR04	Halfway House	A (65)	64 (minor)
NSR05	Brook House	A (65)	58 (negligible)
NSR06a	Yewtree House	A (65)	56 (negligible)
NSR06b	Kingstreet Hall	A (65)	56 (negligible)

Noise sensitive receptor		Construction of GPP	
NSR07	Brownhayes Farm	A (65)	57 (negligible)
NSR08	Drakelow Hall Farm	A (65)	61 (minor)
NSR09	Stublach Dairy Farm	A (65)	50 (negligible)
NSR10	Drakelow Gorse Farm	A (65)	51 (negligible)
NSR11a	Yatehouse Green Farm	A (65)	49 (negligible)
NSR11b	Yewtree Farm	A (65)	49 (negligible)
NSR12a	Dog and Partridge Farm	A (65)	44 (negligible)
NSR12b	Higher Green Farm	A (65)	44 (negligible)
NSR13a	Crosslanes Farm	A (65)	45 (negligible)
NSR13b	Green Lea	A (65)	45 (negligible)

- 9.8.1.3 Calculated construction noise level impacts are either Negligible or Minor for all noise sensitive receptors. This is considered Not Significant with the implementation of mitigation presented in Section 9.7.2.
- 9.8.1.4 Overhead cable construction has been assessed qualitatively. Impacts would be no worse than Minor on the basis that overhead cable construction would occur no closer than 135m to the nearest noise sensitive receptor. Therefore, the effect would be Not Significant.
- 9.8.1.5 Construction of access roads has been assessed qualitatively. Impacts would be Moderate or Major for noise sensitive receptors within 410m of the noisiest activities, which is likely to include most of the assessed receptors. However, it is likely that use of the noisiest plant will be relatively short term, and therefore the effect would be Not Significant.

Construction noise from drilling

- 9.8.1.6 Unlike general construction activities, drilling is likely to occur during the daytime, evening, and night-time. The assessment of drilling activities was carried out in the ES of the Consented Development on the basis that every receptor was Category A during the Evening and Weekends and the Night-time. However, the latest noise monitoring results demonstrate that all NSRs would be either Category B or Category C during the night-time. Therefore, the assessment has been updated to reflect these changes.

9.8.1.7 **Table 9.13** presents daytime, evening, and night-time ABC categories, predicted construction noise levels for mitigated and unmitigated drilling, and associated worst-case magnitudes of impact for each noise sensitive receptor.

TABLE 9.13 – MODELLED CONSTRUCTION NOISE LEVELS AND IMPACTS FROM DRILLING ACTIVITIES

Noise sensitive receptor		Daytime ABC Category and LOAEL	Evening ABC Category and LOAEL	Night-time ABC Category and LOAEL	Predicted noise levels [dB] L _{Aeq,T}	
ID	Name				Unmitigated drilling	Mitigated drilling
NSR01	Newall Farm	A (65)	A (55)	C (55)	48 (negligible)	37 (negligible)
NSR02	Boundary Farm	A (65)	A (55)	C (55)	49 (negligible)	38 (negligible)
NSR03	Drakelow Farm	A (65)	A (55)	C (55)	47 (negligible)	36 (negligible)
NSR04	Halfway House	A (65)	B (60)	C (55)	47 (negligible)	36 (negligible)
NSR05	Brook House	A (65)	B (60)	C (55)	41 (negligible)	30 (negligible)
NSR06a	Yewtree House	A (65)	B (60)	C (55)	49 (negligible)	38 (negligible)
NSR06b	Kingstreet Hall	A (65)	B (60)	C (55)	49 (negligible)	38 (negligible)
NSR07	Brownhayes Farm	A (65)	A (55)	B (50)	55 (moderate)	44 (negligible)
NSR08	Drakelow Hall Farm	A (65)	A (55)	C (55)	56 (major)	45 (negligible)
NSR09	Stublach Dairy Farm	A (65)	A (55)	C (55)	59 (major)	48 (negligible)
NSR10	Drakelow Gorse Farm	A (65)	A (55)	B (50)	54 (moderate)	43 (negligible)
NSR11a	Yatehouse Green Farm	A (65)	A (55)	B (50)	56 (major)	45 (negligible)
NSR11b	Yewtree Farm	A (65)	A (55)	B (50)	56 (major)	45 (negligible)

Noise sensitive receptor		Daytime ABC Category and LOAEL	Evening ABC Category and LOAEL	Night-time ABC Category and LOAEL	Predicted noise levels [dB] L _{Aeq,T}	
ID	Name				Unmitigated drilling	Mitigated drilling
NSR12a	Dog and Partridge Farm	A (65)	A (55)	B (50)	56 (major)	45 (negligible)
NSR12b	Higher Green Farm	A (65)	A (55)	B (50)	56 (major)	45 (negligible)
NSR13a	Crosslanes Farm	A (65)	A (55)	B (50)	55 (moderate)	44 (negligible)
NSR13b	Green Lea	A (65)	A (55)	B (50)	55 (moderate)	44 (negligible)

- 9.8.1.8 Construction noise from drilling with mitigation would be negligible at all receptors, which would be Not Significant.
- 9.8.1.9 As part of the plant specification and construction activity design, mitigation such as quieter rigs or screening will be used, where practicable, to reduce the noise at its source (i.e. the drilling point) so that drilling noise would not have the potential to lead to Significant Effects.

9.8.2 OPERATION AND MAINTENANCE

- 9.8.2.1 As discussed in Section 9.4.3, the design details of the operation of the Proposed Development are currently under development, therefore, potential operational noise impacts have been assessed qualitatively.
- 9.8.2.2 It is expected that noise from the Proposed Development will not be dominated by any specific item of plant. It is more likely that noise will be characterised by the cumulation of noise produced by the plant items listed in Section 9.4.3 in combination.
- 9.8.2.3 Noise levels at noise sensitive receptors are unlikely to differ significantly between the four normal operational running modes, as it is likely that a significant proportion of plant would be operational for each mode. However, impacts are likely to be greatest during the Withdrawal with Compression mode as this will include the largest proportion of concurrent plant operation.
- 9.8.2.4 **Table 9.14** presents representative background sound levels and the maximum rating levels $L_{Ar,Tr}$ that would result in Minor impacts or less from the operation of the Proposed Development.

TABLE 9.14 – REQUIREMENTS FOR MINOR NOISE IMPACTS OR LESS DURING OPERATION

Noise sensitive receptor location		Background sound level $L_{A90,T}$ [dB]		Maximum rating level for impact of Minor or less $L_{Ar,Tr}$ [dB]	
ID	Name	Day	Night	Day	Night
NSR01	Newall Farm	45	34	50	39
NSR02	Boundary Farm	45	34	50	39
NSR03	Drakelow Farm	45	34	50	39
NSR04	Halfway House	50	33	55	38
NSR05	Brook House	50	33	55	38

Noise sensitive receptor location		Background sound level $L_{A90,T}$ [dB]		Maximum rating level for impact of Minor or less $L_{Ar,Tr}$ [dB]	
NSR06a	Yewtree House	50	33	55	38
NSR06b	Kingstreet Hall	50	33	55	38
NSR07	Brownhayes Farm	36	30	41	35
NSR08	Drakelow Hall Farm	38	31	43	36
NSR09	Stublach Dairy Farm	38	31	43	36
NSR10	Drakelow Gorse Farm	36	30	41	35
NSR11a	Yatehouse Green Farm	38	30	43	35
NSR11b	Yewtree Farm	38	30	43	35
NSR12a	Dog and Partridge Farm	38	30	43	35
NSR12b	Higher Green Farm	38	30	43	35
NSR13a	Crosslanes Farm	35	29	40	34
NSR13b	Green Lea	35	29	40	34

- 9.8.2.5 The applicant intends to implement the mitigation presented in Section 9.7.3 with the aim of ensuring that operational noise impacts are no worse than Minor, which would be **Not Significant**.
- 9.8.2.6 Given their locations in relation to the proposed GPP, it is likely that the noise sensitive receptors that would be most impacted during the operation of the Proposed Development would be Drakelow Farm (NSR03), Halfway House (NSR04), and Drakelow Hall Farm (NSR08). Therefore, it is likely that the calculated unmitigated noise impacts at these noise sensitive receptors will inform the extent of requisite noise mitigation in order to result in Minor impacts or less.
- 9.8.2.7 Impacts during Emergency mode are likely to be Major for several noise sensitive receptors. However, as Emergency mode is unlikely to occur more than once every ten years, these impacts are expected to be **Not Significant**.

- 9.8.2.8 The final design of the Proposed Development, including embedded mitigation, will be determined for the material change to the DCO Application submission, and this will form the basis of the quantitative assessment in the ES.

9.8.3 DECOMMISSIONING

- 9.8.3.1 At this stage, details of works that will be required during decommissioning are not available. It is, however, likely that decommissioning works will be of a similar nature to those required during construction, therefore noise and vibration impacts during decommissioning are likely to be no worse than those during construction. For this reason, it is expected that the effects of both noise and vibration during decommissioning would be **Not Significant**.

9.9 SUMMARY OF INDIRECT EFFECTS

- 9.9.1.1 For the purposes of this EIA, 'indirect effects' are defined as the consequences of other development that is relied on by the Proposed Development, but not part of the Proposed Development (and therefore the Application). In this instance, the 'other development' comprises a hydrogen pipeline and an electrical connection, as described in Chapter 2, Proposed Development Description. The ES will include an assessment of the indirect effects of these two related developments.

9.10 SUMMARY OF CUMULATIVE EFFECTS

- 9.10.1.1 There are no developments in the planning system that would have the potential to contribute towards cumulative noise effects with the Proposed Development.

9.11 SUMMARY AND CONCLUSIONS

- 9.11.1.1 This Chapter has considered short- and long-term noise and vibration impacts arising as a result of the Proposed Development during construction and operation.
- An assessment of the potential construction noise impacts has been undertaken in accordance with BS 5228-1. Construction noise impacts would be negligible or minor and therefore would be **Not Significant**.
 - A qualitative assessment of the potential operational noise impacts has been undertaken in accordance with BS 4142. It is likely that unmitigated operational noise impacts would be Moderate or Major, however the applicant is committed to implementing mitigation to reduce impacts to no worse than Minor, which would be **Not Significant**.
 - It is likely that decommissioning works will be of a similar nature to those required during construction, therefore noise and

vibration impacts during decommissioning are likely to be no worse than those during construction. Therefore, impacts during decommissioning would be **Not Significant**.

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