Botley West Solar Farm

Preliminary Environmental Information Report

Volume 1

Chapter 13: Noise and Vibration

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Glossary

Term	Meaning
A-weighting	A frequency weighting devised to attempt to account for the fact that human response to sound is not equally sensitive to all frequencies. It consists of an electronic filter in a sound level meter which attempts to build this variability into the indicative sound level reading so that it will correlate, approximately, with the human response.
Ambient sound level, $L_a = L_{Aeq,T}$	The steady sound level which, over a period of time *T*, contains the same amount of A-weighted sound energy as the time varying sound over the same period. Also known as the equivalent continuous sound pressure level.
Background sound level, $L_{A90,T}$	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 fast time-weighting, F, and quoted to the nearest whole number of decibels.
Baseline	The status of the environment without the Project in place.
Best Practicable Means	Adopting the best available methods to reasonably control noise and vibration. Section 72 of the Control of Pollution Act (CoPA, 1974) and Environmental Protection Act Part III (EPA, 1990) states the following: "In that expression “practicable” means reasonably practicable having regard among other things to local conditions and circumstances, to the current state of technical knowledge and to the financial implications. The means to be employed include the design, installation, maintenance and manner and periods of operation of plant and machinery, and the design, construction and maintenance of buildings and acoustic structures."
Basic Noise Level	A measure of traffic source noise prior to development. It is calculated from traffic flows, road speed, and Heavy Goods Vehicle (HGV) percentage.
Code of Construction Practice	A document detailing the overarching principles of construction, contractor protocols, construction-related environmental management measures, pollution prevention measures, the selection of appropriate construction techniques and monitoring processes.
Cumulative Effects	The combined effect of the Project in combination with the effects from other proposed developments, on the same receptor or resource.
Decibel	A unit used to measure or compare the intensity of a sound by comparing it with a given reference level on a logarithmic scale.
Development Consent Order	An order made under the Planning Act 2008, as amended, granting development consent.
Effect	The term used to express the consequence of an impact. The significance of effect is determined by correlating magnitude of the impact with the importance, or sensitivity, of the receptor or resource in accordance with defined significance criteria.
Environmental Impact Assessment	The process of identifying and assessing the significant effects likely to arise from a project. This requires consideration of the likely changes to the environment, where these arise as a consequence of a project, through comparison with the existing and projected future baseline conditions.
EIA Scoping Report	A report setting out the proposed scope of the Environmental Impact Assessment process.
Environmental Statement	The document presenting the results of the Environmental Impact Assessment process.

Term	Meaning
Free-field	A situation in which the radiation from a sound source is entirely unaffected by the presence of any reflective boundaries.
Impact	Change that is caused by an action/project, e.g., land clearing (action) during construction which results in habitat loss (impact).
Intermittency	A measure of the 'on/off' nature of a sound source.
Impulsivity	A measure of the sharpness of sudden nature of a sound which is short in duration such as a gunshot or a blast.
Inter-related Effects	Inter-related effects arise where an impact acts on a receptor repeatedly over time to produce a potential additive effect or where a number of separate impacts, such as noise and habitat loss, affect a single receptor.
Local Authority	A body empowered by law to exercise various statutory functions for a particular area of the United Kingdom. This includes County Councils, District Councils and County Borough Councils.
Local Planning Authority	The local government body (e.g., Borough Council, District Council, etc.) responsible for determining planning applications within a specific area.
Maximum design scenario	The realistic worst case scenario, selected on a topic-specific and impact specific basis, from a range of potential parameters for the Project.
Noise	An unwanted or unexpected sound.
Peak Particle Velocity	An indicator of the magnitude of ground vibration which refers to the movement of molecular particles within the ground.
Power Conversion Station (PCS)	A device for bidirectional conversion of electrical energy connected between the battery system and the grid and/or load.
Preliminary Environmental Information Report	A report that provides preliminary environmental information in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. This is information that enables consultees to understand the likely significant environmental effects of a project and which helps to inform consultation responses.
Rating Level	The specific sound level plus any adjustment for the characteristic features of the sound
Residual sound level, L_r = $L_{Aeq,T}$	The ambient sound level at a receptor in the absence of influence from the sound source under assessment.
Scoping Opinion	Sets out the Planning Inspectorate's response (on behalf of the Secretary of State) to the Scoping Report prepared by the Applicants. The Scoping Opinion contains the range of issues that the Planning Inspectorate, in consultation with statutory stakeholders, has identified should be considered within the Environmental Impact Assessment process.
Sound	Fluctuations of pressure within a medium (gas, solid or fluid) within the audible range of loudness and frequencies which excite the sensation of hearing.
Sound power level, L_w	The total sound energy emitted by a source per unit time.
Sound Pressure Level, L_p	The amount of force a sound wave exerts on a surface area perpendicular to the direction of travel. A measure of the variation of sound level over a distance.
Specific sound level, $L_{s,}$ = $L_{Aeq,Tr}$	The equivalent continuous A-weighted sound pressure level produced by the specific noise source at the assessment location over a given reference time internal.

Term	Meaning
Study area	This is an area which is defined for each environmental topic which includes the project red line boundary as well as potential spatial and temporal considerations of the impacts on relevant receptors. The study area for each topic is intended to cover the area within which an impact can be reasonably expected. The specific study area used for this project is detailed in **section 13.4** of this chapter
Substation	Part of an electrical transmission and distribution system. Substations transform voltage from high to low, or the reverse by means of electrical transformers.
The Secretary of State for Energy Security and Net Zero	The decision maker with regards to the application for development consent for the Project.
Tonality	A measure of sound quality that correlates to how humans perceive certain frequencies of sound. A sound is considered tonal if the frequency spectrum contains a lot of sound energy at a single frequency.
Traffic Flows	Traffic flow describes the number of vehicles passing a reference point per unit of time (e.g., vehicles per hour).
Transboundary effects	Effects from a project within one state that affect the environment of another state(s).
Transformer	A component of a substation required to transform voltage from high to low, or the reverse, or perform any of several other important functions. Before being used, electric power may flow through several transformer substations at different voltage levels. A transformer substation includes transformers to change voltage levels between high transmission voltages and lower distribution voltages, or at the interconnection of two different transmission voltages

Abbreviations

Abbreviation	Meaning
BEIS	The former Department for Business, Energy and Industrial Strategy
BNL	Basic Noise Level
BPM	Best Practicable Means
BS	British Standard
CEA	Cumulative Effects Assessment
CoCP	Code of Construction Practice
CoPA	Control of Pollution Act
CRTN	Calculation of road traffic noise
CTMP	Construction Traffic Management Plan
DCO	Development Consent Order
DMRB	Design Manual for Roads and Bridges
EIA	Environmental Impact Assessment
EPA	Environmental Protection Act

Abbreviation	Meaning
ES	Environmental Statement
HDD	Horizontal Directional Drilling
HGV	Heavy Goods Vehicle
LOAEL	Lowest Observed Adverse Effect Level
MDS	Maximum design scenario
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NPSE	Noise Policy Statement for England
OS	Ordnance Survey
PCS	Power Converter Station
PEIR	Preliminary Environmental Information Report
PINS	The Planning Inspectorate
PPG	Planning Practice Guidance
PPV	Peak Particle Velocity
PV	Photovoltaic
SOAEL	Significant Observed Adverse Effect Level

Units

Unit	Description
%	Percentage
dB	Decibel
dB(A)	A-weighted decibel
mm/s	Millimetres per second
km	Kilometre
km^2	Square kilometre
m	Metre
h	Hours
ha	Hectare
ms	Milliseconds

13 Noise and vibration

13.1 Introduction

13.1.1 Overview

13.1.1.1 This chapter of the Preliminary Environmental Information Report (PEIR) has been prepared by RPS on behalf of Photovolt Development Partners GmbH. (PVDP) for the Applicant, SolarFive Ltd. (SolarFive). SolarFive is a licence holder under the Electricity Act 1989. SolarFive is also a company registered in England and Wales (company no. 12602740).

13.1.1.2 PVDP intends to submit an application on behalf of SolarFive for development consent to the Planning Inspectorate (PINS) under the Planning Act 2008 for Botley West Solar Farm (the Project). The proposal is to install and operate approximately 840MWe of solar generation in parts of West Oxfordshire, Cherwell and Vale of White Horse Districts. The application will be accompanied by an Environmental Statement (ES) prepared in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017, as amended (the EIA Regulations), and other required documents including a statement on pre-application consultation.

13.1.1.3 This PEIR provides preliminary results of the assessment to date, before being further refined and reported within the ES. The assessment was carried out in accordance with the approach set out in the Scoping Report.(Appendix .41) The purpose of the PEIR is to inform the statutory consultation process, enabling consultees to understand and comment on the likely significant effects of the Project.

13.1.1.4 The assessment presented has been informed by the following technical chapters of the PEIR:

- Volume 1, Chapter 6: Project description; and
- Volume 1, Chapter 12: Traffic and transport;

13.1.1.5 This chapter also draws upon information contained within:

- Volume 3, Appendix 13.1: Baseline sound survey;
- Volume 3, Appendix 13.2: Construction noise and vibration; and
- Volume 3: Appendix 13.3: Operational noise.

13.1.1.6 The PEIR will inform pre-application consultation. Following consultation, comments on the PEIR will be reviewed and taken into account, where appropriate, in preparation of the ES that will accompany the application to PINS for development consent.

13.2 Legislative and policy context

13.2.1 Legislation

Control of Pollution Act (CoPA) 1974

13.2.1.1 Section 60, Part III of the CoPA refers to the control of noise on construction sites. It outlines legislation by which local authorities can control noise from construction sites and prevent noise disturbance.

13.2.1.2 The CoPA provides a local authority with the power to serve a notice imposing requirements for the way in which construction works are to be carried out in their jurisdiction. This notice can specify:

- the plant or machinery permitted for use;
- the hours during which construction work may be undertaken;
- limits for the emission levels of noise and vibration due to the works at any time or spatial position on site; and
- any other change in circumstance.

13.2.1.3 Section 61, Part III of the CoPA refers to prior consent for work on construction sites. It provides a method by which a contractor can apply for consent to undertake construction works in advance.

13.2.1.4 Section 71, Part III of the CoPA refers to the preparation and approval of codes of practice for minimising noise.

13.2.1.5 British Standards (BS) 5228-1:2009+A1:2014 and BS 5228 2:2009+A1:2014 were approved within The Control of Noise (Code of Practice for Construction and Open Sites) Order 2015 as suitable guidance on appropriate methods for the control of noise from construction and open sites in exercise of the powers conferred on the Secretary of State by sections 71(1)(b), (2) and (3) of the CoPA.

13.2.1.6 Section 72, Part III of the CoPA refers to Best Practicable Means (BPM), which is defined as:

'In that expression, 'practicable' means reasonably practicable, having regards among other things to local conditions and circumstances, to the current state of technical knowledge and to the financial implications'. Whilst 'Means' includes 'the design, installation, maintenance and manner and periods of operation of plant and machinery, and the design, construction and maintenance of buildings and acoustic structures.'

Environmental Protection Act (EPA) 1990

13.2.1.7 Section 79, Part III of the EPA contains a list of matters that amount to statutory nuisances and places a duty on local authorities to regularly inspect areas in their jurisdiction to determine where statutory nuisances may exist.

13.2.1.8 This section also considers and defines the concept of BPM which originates from Section 72, Part III of the CoPA.

13.2.1.9 The local authority must serve an abatement notice where it is satisfied that a statutory nuisance does exist or is likely to occur/recur. Section 80, Part III of the EPA provides local authorities with the power to serve an abatement notice to prohibit or restrict its occurrence or recurrence; and to carry out works or other actions necessary to abate the nuisance.

13.2.1.10 Section 82, Part III of the EPA allows a magistrates' court to act on a complaint made by any person on the grounds that they are aggrieved by a statutory nuisance, such as noise.

13.2.1.11 The procedures for appeals against abatement notices are detailed in the Statutory Nuisance (Appeals) Regulations 1995.

13.2.2 Planning policy context

13.2.2.1 The Project would be located in the county of Oxfordshire, across an area of approximately 1,300 ha. The Project extends from an area of land in the north, situated between the A4260 and the Dorn River Valley near Tackley and Wootton, through a central section, situated broadly between Bladon and Cassington, and connecting to a section further south near to Farmoor Reservoir and north of Cumnor, where the Project will connect to the National Grid transmission network. The name 'Botley West' is derived from the location of the grid connection point.

13.2.2.2 The Project lies within the administrative areas of Cherwell District Council , West Oxfordshire District Council (where the majority of the Project is located) and Vale of White Horse District Council and Oxfordshire County Council .

National Policy Statements

13.2.2.3 There are currently six energy National Policy Statements (NPSs). The NPSs do not specifically reference the proposed energy generating technology that would be used for this Project, however, to ensure a robust assessment is undertaken the policies detailed within them have been adopted for this assessment. The NPSs relevant to this chapter include:

- NPS EN-1 – Overarching National Policy Statement for energy;
- NPS EN-3 – National Policy Statement for renewable energy infrastructure; and
- NPS EN-5 – National Policy Statement for electricity network infrastructure.

13.2.2.4 These NPSs are currently being updated and draft versions were published in March 2023 by the Department for Energy Security and Net Zero. NPS EN-1, NPS EN-3 and NPS EN-5, as well as the updated draft iterations, include guidance on what matters are to be considered in an assessment and also highlight a number of factors relating to the determination of an application and in relation to mitigation. **Table 13.1** sets out a summary of the policies within these NPSs, relevant to noise and vibration.

Table 13.1: Summary of designated and draft NPS document requirements relevant to this chapter

Summary of NPS EN-1, EN-3 and EN-5 requirement	How and where considered in the PEIR
NPS EN-1	
The project should demonstrate good design through the selection of the quietest cost-effective plant available, containment of noise within buildings wherever possible, optimisation of plant layout to minimise noise emissions and, where possible, the use of landscaping, bunds or noise barriers to reduce noise transmission. Paragraph 5.11.8 of NPS EN-1.	The Applicant will commit to good design principles to be adopted through the detailed design phase. Where the EIA process identifies any measures required to reduce noise, these have been identified (and will continue to be refined for the ES) (see **Table 13.12** of this chapter).
The Secretary of State should not grant development consent unless it is satisfied that the proposals will meet the following aims: • avoid significant adverse impacts on health and quality of life from noise; • mitigate and minimise other adverse impacts on health and quality of life from noise; and • where possible, contribute to improvements to health and quality of life through the effective management and control of noise. Paragraph 5.11.9 of NPS EN-1. When preparing the development consent order, the Secretary of State should consider including measurable requirements or specifying the mitigation measures to be put in place to ensure that noise levels do not exceed any limits specified in the development consent. Paragraph 5.11.10 of NPS EN-1	Potential noise mitigation measures are provided in section 13.9 of this chapter. Further details of the specification of mitigation for operational noise sources will be reported in the ES following further development of the Project design. Requirements to secure noise levels and mitigation measures, where applicable, will be included in the ES for the development consent order (DCO) submitted by the Applicants.
Where noise impacts are likely to arise from the Project, the applicant should include the following in the noise assessment: • a description of the noise generating aspects of the development proposal, including any distinctive tonal, impulsive or low frequency characteristics of the noise; • identification of the noise sensitive premises/areas that may be affected; • the characteristics of the existing noise environment; • a prediction of how the noise environment will change with the Project; • in the shorter term such as during the construction period; • in the longer term during the operating life of the infrastructure; • at particular times of day, evening or night as appropriate;	The following elements have been included in this chapter: • The noise generating equipment for the construction and operational noise phases of the development have been identified. Full details are provided in: – Volume 3, Appendix 13.2: Construction noise and vibration of the PEIR; and – Volume 3, Appendix 13.3: Operational noise of the PEIR. • Noise sensitive receptors within the study area for the construction and operational phases have been identified. Key receptors considered in the assessment are presented in **Table 13.10**. • A baseline sound survey has been undertaken to characterise the existing baseline sound environment at the nearest noise sensitive receptors. Details are provided in Volume 3, Appendix 13.1: Baseline sound survey and **section 13.5**.

Summary of NPS EN-1, EN-3 and EN-5 requirement	How and where considered in the PEIR
• an assessment of the predicted noise changes at sensitive receptors; and • measures employed in mitigating noise. Paragraph 5.11.4 of NPS EN-1.	• Construction, operation, and decommissioning phases of the Project have been assessed using the principles in the relevant British Standards and nationally accepted guidance in **section 13.9** of this chapter. Full details are provided in: – Volume 3, Appendix 13.2: Construction noise and vibration of the PEIR; and – Volume 3, Appendix 13.3: Operational noise of the PEIR. • Any mitigation measures required to comply with noise impact magnitude criteria have been identified. Construction, operation and decommissioning noise and vibration impacts are assessed in **section 13.9** of this chapter.
Applicants should consider the noise impact of ancillary activities associated with the development, such as increased road and rail traffic movements, or other forms of transportation. Paragraph 5.11.5 of NPS EN-1. Operational and construction noise impacts should be assessed using the relevant British Standards. Paragraph 5.11.6 of NPS EN-1.	The construction, operation and decommissioning phases of the Project have been assessed using the principles in the relevant British Standards and nationally accepted guidance as outlined in **section 13.8.3** of this chapter. Construction, operation and decommissioning noise and vibration impacts are assessed in **section 13.9.** In accordance with best practice, the noise and vibration assessment has been undertaken with reference to the guidance set out at **section 13.2**.
The applicant should consult with the Environment Agency and Natural England as necessary and in particular with regard to the assessment of noise on protected species or other wildlife. Paragraph 5.11.7 of NPS EN-1.	Noise impacts on wildlife are assessed in Volume 1, Chapter 9: Ecology and nature conservation of the PEIR. The inter-related effects methodology is defined in Volume 1, Chapter 19: Cumulative Effects and Inter-relationships of the PEIR.
NPS EN-3	
Proposals for renewable energy infrastructure should demonstrate good design to mitigate impacts such as noise. Paragraph 2.4.2 of NPS EN-3.	The Applicants will commit to good design principles to be adopted through the detailed design phase. Where the EIA process identifies any measures required to reduce noise, these have been identified (and will continue to be refined for the ES) (see **Table 13.12** of this chapter).
NPS EN-3 provides guidance specifically for renewable energy infrastructure. The applicant should identify impacts of a proposal and these impacts, together with proposals for their avoidance or mitigation wherever possible, should be set out in an Environmental Statement that should accompany each project application. Paragraph 2.6.5 of NPS EN-3.	Construction, operation and decommissioning phases of the Project have been assessed using the principles in the relevant British Standards. The assessment of noise and vibration impacts from the Project is presented in **section 13.9.** with details provided in: – Volume 3, Appendix 13.2: Construction noise and vibration of the PEIR; and – Volume 3, Appendix 13.3: Operational noise of the PEIR.

Summary of NPS EN-1, EN-3 and EN-5 requirement	How and where considered in the PEIR
	Noise impacts on wildlife are assessed in Volume 1, Chapter 9: Ecology and nature conservation of the PEIR. Mitigation measures are considered in **Table 13.12.**
NPS EN-5	
NPS EN-5 provides guidance which primarily relates to noise from overhead transmission lines which is not relevant here. Reference is also made to audible noise effects from substation equipment such as transformers. The guidance states that the relevant assessment methodologies should be adopted and that appropriate mitigation options should be considered and adopted where required. Paragraphs 2.9.10 and 2.9.11 of NPS EN-5.	Construction, operation and decommissioning phases of the Project have been assessed using the principles in the relevant British Standards. Careful consideration has been given to the tonal components within the noise spectrum of the substation transformers at low frequency, with additional consideration also given to the associated harmonics at higher frequencies. Measures to control this will be outlined within an operational noise management plan, as stated in **Table 13.12.** The assessment of noise and vibration impacts from the Project is presented in **section 13.9** with details provided in: – Volume 3, Appendix 13.2: Construction noise and vibration of the PEIR; and – Volume 3, Appendix 13.3: Operational noise of the PEIR.

The National Planning Policy Framework

13.2.2.5 The National Planning Policy Framework (NPPF) was published in 2012 and updated in 2018, 2019,2021 and 2023 (Department for Levelling Up, Housing and Communities, 2023). The NPPF sets out the Government's planning policies for England.

13.2.2.6 The NPPF does not contain any specific policy or criteria relating to noise and vibration. Instead, it provides a framework for local authorities to produce local and neighbourhood plans to reflect the needs and priorities of communities within their jurisdiction.

13.2.2.7 Paragraph 174(e) of the NPPF states the following:

"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.

[…]"

13.2.2.8 Paragraph 185 of Section 15 of the NPPF states the following:

"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[65];

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; and

c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.

[…]

[65] See Explanatory Note to the Noise Policy Statement for England (Department for Environment, Food & Rural Affairs, 2010).”

13.2.2.9 The Planning Practice Guidance (PPG) (Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities and Local Government, 2019) supports the NPPF and provides guidance across a range of topic areas.

13.2.2.10 The noise section of the PPG provides outline guidance and refers to general guidance on noise policy and assessment methodology detailed in the NPPF, the Noise Policy Statement for England (NPSE) and British Standards. The NPSE sets out noise management policy in the form of the Government’s long-term vision to manage noise and improve health and quality of life.

13.2.2.11 The following guidance is presented within the PPG on how noise impacts may be determined:

“Plan-making and decision making need to 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 standard of amenity can be achieved*.”

13.2.2.12 A noise exposure hierarchy is provided as supplementary guidance in tabular form and is recreated in **Table 13.2** below. The guidance outlines the need to avoid and prevent the occurrence of significant adverse effects due to noise.

Table 13.2: Summary of noise exposure hierarchy from NPSE and PPG

Response	Examples of outcomes	Increasing effect level	Action
No Observed Effect Level (NOEL)			
Not present	No effect.	No Observed Effect.	No specific measures required.
No Observed Adverse Effect Level (NOAEL)			

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

Local planning policy

13.2.2.13 The relevant local planning policies applicable to noise and vibration based on the extent of the study areas for this assessment are summarised in **Table 13.3**. All local planning policies have been applied to the study area as a whole.

Table 13.3: Summary of local planning policy relevant to this chapter

Policy	Key provisions	How and where considered in the PEIR
Cherwell Local Plan 2011-2031 (Part 1)		

Policy	Key provisions	How and where considered in the PEIR
ESD5	Planning applications involving renewable energy development will be encouraged provided that there is no unacceptable adverse impact, including cumulative impact, on the following issues, which are considered to be of particular local significance in Cherwell: • Residential amenity	The noise and vibration impacts due to the construction, operation and decommissioning of the Project have been assessed with reference to the principles outlined in the relevant British Standards. An assessment of the noise impacts due to construction traffic has been undertaken in line with the guidance within DMRB LA 111 (Highways England *et al.*, 2020). The assessment is presented in **section 13.9** with full details of the methodology and results provided in the following Appendices: – Volume 3, Appendix 13.2: Construction noise and vibration of the PEIR; and – Volume 3, Appendix 13.3: Operational noise of the PEIR.
West Oxfordshire Local Plan 2023		
EH8	Proposals which are likely to cause pollution or result in exposure to sources of pollution or risk to safety, will only be permitted if measures can be implemented to minimise pollution and risk to a level that provides a high standard of protection for health, environmental quality and amenity. The following issues require particular attention. Noise New development should not take place in areas where it would cause unacceptable nuisance to the occupants of nearby land and buildings from noise or disturbance.	The noise and vibration impacts due to the construction, operation and decommissioning of the Project have been assessed with reference to the principles outlined in the relevant British Standards. An assessment of the noise impacts due to construction traffic has been undertaken in line with the guidance within DMRB LA 111. The assessment is presented in **section 13.9** with full details of the methodology and results provided in the following Appendices: – Volume 3, Appendix 13.2: Construction noise and vibration of the PEIR; and – Volume 3, Appendix 13.3: Operational noise of the PEIR.
Vale of White Horse District Council Local Plan 2031: Part Two		

Policy	Key provisions	How and where considered in the PEIR
Development Policy 25: Noise Pollution	Noise-generating development that would have an impact on environmental amenity or biodiversity will be expected to provide an appropriate scheme of mitigation that should take account of: a. the location, design and layout of the Project. b. existing levels of background noise c. measures to reduce or contain generated noise, and d. hours of operation and servicing. Development will not be permitted if mitigation cannot be provided within an appropriate design or standard[a] [a] Currently set out in British Standards 4142:2014 and 8233:2014. The Council is currently developing guidance relating to noise mitigation.	The noise and vibration impacts due to the construction, operation and decommissioning of the Project have been assessed with reference to the principles outlined in the relevant British Standards. Operational noise impacts have been assessed with reference to the guidance in British Standard 4142:2014+A1:2019. Construction noise and vibration impacts have been assessed in accordance with: • British Standard 5228-1:2009+A1:2014 – 'Code of practice for noise and vibration control on construction and open sites – Part 1: Noise'. • British Standard 5228-2:2009+A1:2014 – 'Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration. An assessment of the noise impacts due to construction traffic has been undertaken in line with the guidance within DMRB LA 111. The assessment is presented in **section 13.9** with full details of the methodology and results provided in the following Appendices: • Volume 3, Appendix 13.2: Construction noise and vibration of the PEIR; and • Volume 3, Appendix 13.3: Operational noise of the PEIR.

13.3 Consultation and engagement

13.3.1.1 On 15 June 2023, the Applicants submitted a Scoping Report to the Planning Inspectorate (PINS), which described the scope and methodology for the technical studies being undertaken to provide an assessment of any likely significant effects for the construction, operation and decommissioning phases. It also described those topics or sub-topics which are proposed to be scoped out of the EIA process and provided justification as to why the Project would not have the potential to give rise to significant environmental effects in these areas.

13.3.1.2 Following consultation with the appropriate statutory bodies, PINS (on behalf of the Secretary of State) provided a Scoping Opinion on 24 July 2023. Key issues raised during the scoping process specific to noise and vibration are listed in **Table 13.4**, together with details of how these issues have been addressed within the PEIR.

Table 13.4: Summary of scoping responses

Comment	How and where considered in the PEIR
Planning Inspectorate	

Comment	How and where considered in the PEIR
The Applicant proposes to scope out baseline vibration surveys on the basis that the initial desk-based review of the site locations and surrounding areas indicate that no significant existing sources of vibration exist in the vicinity of the site. Whilst no baseline has been provided for this section in the Scoping Report, considering the baseline presented in other sections of the Scoping Report and in the description of the existing site (Section 2 of the Scoping Report) the Inspectorate is content that there are no existing sources of vibration that require surveys. Therefore, the Inspectorate is content to scope out baseline vibration surveys of the existing site.	Baseline vibration surveys have been scoped out of the PEIR, as agreed with PINS.
The Applicant proposes to scope out an assessment of vibration impacts during the operational phase on the basis that vibration isolation measures will be included as part of the plant design. Based on the characteristics of the Project the Inspectorate agrees that operational vibration effects may be scoped out from further assessment. However, the ES should describe the potential sources of vibration arising from the operation of the Project and any measures proposed to control emissions.	The impacts of operational vibration have been scoped out of the PEIR, as agreed with PINS. Once operational equipment selections have been made, a review of any potential vibration impacts will be undertaken as part of the ES.
The Applicant proposes to scope out an assessment of decommissioning phase impacts as these are likely to be similar or less significant than impacts during construction. Limited information is provided regarding the activities proposed for the decommissioning phase. As noted in ID 3.6.2 above, indicative traffic numbers are not provided for either the construction or decommissioning phases and so there is little evidence to support the claim that the decommissioning phase impacts would be less significant than during construction. On the basis of the information provided, the Inspectorate does not agree to scope this matter out at this stage.	An assessment of the noise and vibration impacts during the decommissioning phase of the Project is presented in **section 13.9**. This assessment has been undertaken with reference to the following guidance: • British Standard 5228-1:2009+A1:2014 – 'Code of practice for noise and vibration control on construction and open sites – Part 1: Noise'. • British Standard 5228-2:2009+A1:2014 – 'Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration.

Comment	How and where considered in the PEIR
Impacts on ecological features are proposed to be assessed within the ecology aspect chapter of the ES. The Inspectorate is content with this approach. However, the noise and vibration aspect chapter should provide cross-references to the relevant sections of the ecology chapter where appropriate e.g., alignment of the ZOI.	Noise impacts on wildlife are assessed in Volume 1, Chapter 9: Ecology and nature conservation of the PEIR.
The study area for noise is defined in Scoping Report paragraph 7.7.4, using arbitrary distances of 1 km, 300m and 100 m from the Project depending on the noise source. This does not include potential impacts from increased traffic noise and the distances are not justified. The ES should explain how the study area(s) and sensitive receptors have been selected with reference to extent of the likely impacts and relevant supporting evidence such as modelling and/or relevant guidance.	Full details and justification of the study areas proposed are outlined in **section 13.4.4**. Any potential increase in traffic flows will be assessed with the ES chapter.
Whilst the Inspectorate acknowledges that the methodology is proposed to follow relevant British Standards and guidance as listed in Scoping Report paragraph 7.7.14, the Scoping Report does not explain how these methodologies will be applied and how significant effects will be determined. No sensitive receptors, degree of sensitivity, impact magnitude or significance is defined in the Scoping Report relating to noise therefore it is unclear what will be assessed and how. The baseline only provides a very high-level description of land use and roads and it is unknown what surveys are proposed to inform the assessment. The ES should clearly set out the specific methodology employed to assess significant effects from noise and vibration with reference to guidance; the ES should not only rely on reference to guidance without explaining the methodology and its applicability in full. This should include explanation of how the baseline environment has been established with full survey details provided where they have been undertaken. The need for surveys and survey locations should be informed by consultation where appropriate.	A summary of the methodology and results of the baseline sound survey is presented in **section 13.5**. Full details of the methodology and results of the baseline sound survey are presented in Volume 3, Appendix 13.1: Baseline sound survey of the PEIR. Appendix 13.2 and 13.3 further details how methodologies will be applied for construction noise and operational noise respectively.
Cherwell District Council	

Comment	How and where considered in the PEIR
Regarding the proposed baseline survey and impact assessment methodology, the following was response received: *"Satisfied approach is acceptable."*	No changes to the methodologies outlined in the scoping report are proposed.
Wooton Parish Council	
Aspects are currently scoped out - **section 7.7.20** page 85. This is not acceptable and a full noise assessment should be carried out for both construction and operational phases. WPC feels strongly this should be 'scoped in' and an acoustic map created for entire site.	The aspects scoped out are those which, based on professional judgement and historic experience with similar schemes, are unlikely to give rise to significant effects and those considered by other topics (e.g. ecology). Operational noise, construction and decommissioning noise and vibration are all scoped into the assessment and are considered fully in **section 13.9** with additional technical information provided in: • Volume 3, Appendix 13.2: Construction noise and vibration of the PEIR; and • Volume 3, Appendix 13.3: Operational noise of the PEIR.
Begbroke Parish Council	
The noise emitted is projected to be 69dB. This will be intolerable – especially to wildlife.	Impact thresholds have been identified based on the relevant guidance documents. Noise from construction, operation and decommissioning are all considered fully within the technical information provided in: • Volume 3, Appendix 13.2: Construction noise and vibration of the PEIR; and • Volume 3, Appendix 13.3: Operational noise of the PEIR. Ecological receptors are considered within the ecology chapter 9..
Planning decisions should ensure that new development is appropriate for its location considering the effects of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or wider area to impacts that could arise from the development.	The potential effects on health and amenity have been considered within: • Volume 3, Appendix 13.2: Construction noise and vibration of the PEIR; and • Volume 3, Appendix 13.3: Operational noise of the PEIR. The impact on the existing sensitive receptors will be assessed in full for the ES.
Avoid noise giving rise to significant adverse impacts on health and the quality of life and identify and protect tranquil areas which have remained undisturbed by noise and are prized for their recreational and amenity value for this reason.	Appendices 13.2 and 13.3 consider the sensitivity of the existing sensitive receptors with consideration to the impact on health and amenity.
The proposal conflicts with Policies of the LP which, amongst other aims seek to not permit developments where noise generated would cause material disturbance or nuisance to occupiers of surrounding properties.	The Project seeks to be in line with the local and national planning policies. The policies of the local plan have been discussed within Volume 1 Chapter 13 Section 13.2.
Bladon Parish Council	

Comment	How and where considered in the PEIR
Para 7.7.5 – The paragraph only lists a few of the villages surrounding the Site locations and does not include Bladon, Church Hanborough, Cassington, Begbroke or Wootton.	Relevant nearby sensitive receptors have been identified and considered within this assessment. OS address point data has been used to identify these receptors. These receptors are shown in **section 1.3.3** of Volume 1 Appendix 13.1. Bladon, Church Hanborough, Cassington, Begbroke and Wootton have been included.
Cassington Parish Council	
The village of Cassington and Jericho Farm also lie on the southern edge of the Central Site of the West Botley Utility-Scale Solar Power Station.	Relevant nearby sensitive receptors have been identified and considered within this assessment. OS address point data has been used to identify these receptors. These receptors are shown in **section 1.3.3** of Volume 1 Appendix 13.1. Bladon, Church Hanborough, Cassington, Begbroke and Wootton have been included.
Hanborough Parish Council	
HPC notes the point made that vibration as such is not likely to be an issue for scoping. However, HPC considers that noise is likely to be an issue during all phases of the construction, operation and decommissioning of BWSF, and that the SR should ensure that a proper assessment will be necessary for the ES. HPC further considers that a separate study of noise in respect of decommissioning will be necessary, because the nature of the noise is likely to be different to that emanating from the construction phase. There would be, for instance, no real requirement for pile driving noise at the end of the BWSF life: but HPC notes that no information would be available as to the methods of removing the BWSF structures if no separate scoping assessment is made.	The potential noise impacts during construction and operation have been considered within. • Volume 3, Appendix 13.2: Construction noise and vibration of the PEIR; and • Volume 3, Appendix 13.3: Operational noise of the PEIR. At the time of writing the plant that would be used during the decommissioning phase of the Project has not been finalised. However best practicable measures at the time will be implemented. For this assessment the same plant used within the construction phase assessment has been used to assess the impact from decommissioning.

13.3.1.3 Following scoping, consultation and engagement with interested parties specific to noise and vibration has continued.

13.3.1.4 A summary of the key issues raised during consultation activities undertaken to date is presented in **Table 13.5**, together with how these issues have been considered in the production of this PEIR chapter.

Table 13.5: Summary of consultation relevant to this chapter

Date	Consultee and type of response	Issues raised	How and where considered in the PEIR
April 2023	Cherwell District Council	Consultation was sought via email to agree upon the proposed baseline sound survey and noise impact assessment methodologies. Cherwell District Council advised acceptability of the proposed approach.	No changes to the methodologies outlined during consultation have been proposed.
	South Oxfordshire & Vale of White Horse District Council	Consultation was sought via email to agree upon the proposed baseline sound survey and noise impact assessment methodologies. Whilst clarification about the application was provided, at the time of writing, no response has yet been received.	N/A
	West Oxfordshire District Council	Consultation was sought via email to agree upon the proposed baseline sound survey and noise impact assessment methodologies. At the time of writing, no response has yet been received.	N/A

13.4 Baseline methodology

13.4.1 Relevant guidance

British Standard 4142:2014+A1:2019

13.4.1.1 British Standard 4142:2014+A1:2019 – '*Methods for rating and assessing industrial and commercial sound*' provides a method for rating industrial and commercial sound and a method for assessing resulting impacts upon people. The method is applicable to fixed plant installations, sound from industrial and manufacturing process and other associated activities.

13.4.1.2 In summary, this British Standard provides guidance on determining 'rating sound levels' by correcting the 'specific sound level' from the site or operations under consideration to account for any distinctive acoustic characteristics such as tonality, impulsivity and intermittency. Section 9.2 of the standard outlines the following corrections to be applied where each is appropriate.

- *'Tonality - For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible.*
- *Impulsivity - A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible, and 9 dB where it is highly perceptible.*
- *Intermittency - When the specific sound has identifiable on/off conditions, the specific sound level should be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. … If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.*
- *Other sound characteristics - Where the specific sound features characteristics that are neither tonal nor impulsive, nor intermittent, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.'*

13.4.1.3 An initial estimate of the impact of the source is obtained by subtracting the measured background sound level from the rating sound level of the proposed plant at the nearest noise sensitive receptors. The impact magnitude criteria are presented in **section 13.8.3**.

British Standard 5228

13.4.1.4 This British Standard comprises the following two parts.

- British Standard 5228-1:2009+A1:2014 – 'Code of practice for noise and vibration control on construction and open sites' – Part 1: Noise.

- British Standard 5228-2:2009+A1:2014 – 'Code of practice for noise and vibration control on construction and open sites' – Part 2: Vibration.

13.4.1.5 This provides guidance, information, and procedures for the control of noise and vibration from demolition and construction sites. British Standard 5228- 1:2009+A1:2014 and British Standard 5228-2:2009+A1:2014 provides guidance on appropriate methods for minimising noise from construction and open sites under the relevant sections of the CoPA 1974.

13.4.1.6 There are no set standards for the definition of the significance of construction noise effects. However, noise example criteria are provided in British Standard 5228-1:2009+A1:2014 Annex E and vibration example criteria are provided in British Standard 5228-2:2009+A1:2014 Annex B.

13.4.1.7 British Standard 5228-1:2009+A1:2014 provides basic information and recommendations for methods of noise control relating to construction and open sites where work activities/operations generate significant noise levels. It includes sections on:

- community relations;
- noise and persons on site;
- neighbourhood nuisance;
- project supervision; and
- the control of noise.

13.4.1.8 The annexes include information on legislative background, noise sources, remedies and their effectiveness (mitigation options); current and historic sound level data for on-site equipment and site activities; significance of noise effects; calculation procedures estimating sound emissions from sites and sound level monitoring; types of piling; and air overpressure.

13.4.1.9 British Standard 5228-2:2009+A1:2014 contains information and recommendations for basic methods of vibration control arising from construction and open sites where work activities/operations generate significant levels of vibration. It includes sections on community relations; vibration and persons on site; neighbourhood nuisance; project supervision; control of vibration and measurement. British Standard 5228-2:2009+A1:2014 refers to British Standard ISO 4866:2010; British Standard 7385-2:1993; British Standard 6472-1:2008, and British Standard 6472-2:2008 for further advice on the significance of vibration.

Design Manual for Roads and Bridges (DMRB) – LA 111 – Noise and vibration

13.4.1.10 The DMRB LA 111 (Highways England *et al.,* 2020), provides guidance on methods for assessing noise and vibration from construction traffic.

13.4.1.11 The magnitude of noise impacts is assessed using the predicted change in the Basic Noise Level (BNL) on the closest public roads to a receptor following the introduction of construction traffic.

13.4.1.12 The noise change is calculated using the methods outlined in the calculation of road traffic noise CRTN (Department of Transport, 1988) which considers:

- the change in traffic flow due to construction traffic;
- vehicle speed; and
- the percentage of Heavy Goods Vehicles (HGVs).

13.4.1.13 Paragraph 3.19 of DMRB LA 111 states the following:

'Construction noise and construction traffic noise shall constitute a significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:

- *10 or more days or nights in any 15 consecutive days or nights;*
- *a total number of days exceeding 40 in any 6 consecutive months.'*

13.4.1.14 Additional guidance is provided for the determination of construction noise impact criteria in terms of the LOAEL and the SOAEL. These are defined in **Table 13.15** and Volume 3, Appendix 13.2: Construction noise and vibration of the PEIR.

13.4.2 Scope of the assessment

13.4.2.1 The scope of this PEIR has been developed in consultation with relevant statutory and non-statutory consultees as detailed in **Table 13.4** and **Table 13.5**.

13.4.2.2 Taking into account the scoping and consultation process, **Table 13.6** summarises the issues considered as part of this assessment.

Table 13.6: Issues considered within this assessment

Activity	Potential effects scoped into the assessment
Construction and decommissioning phases	
Construction activities required for the Project	Noise and vibration effects due to all construction activities along the cable corridor, solar photovoltaic (PV) array areas and substations including: • Noise effects due to open cut trenching; • Noise and vibration effects due to trenchless techniques at crossings (e.g. roads, railway lines, rivers etc.); • Noise and vibration effects due to the construction and decommissioning of the solar PV array areas and associated plant such as transformers and substations; and • Noise effects due to construction traffic on local highway networks.
Operation	
Operation of the Project site	Noise effects due to the plant and equipment associated with the Project site such as: • Noise effects from the Power Converter Stations (PCS); • Noise effects from the secondary, main and National Grid substations.

13.4.2.3 Effects which are not considered likely to be significant have been scoped out of the assessment. A summary of the effects scoped out is presented in **Table 13.7**.

Table 13.7: Issues scoped out of the assessment

Issue	Justification
Baseline data collection	
Baseline vibration survey	Noise impacts are determined based upon analysis of predicted noise levels due to the Project relative to the existing baseline noise climate. The impact magnitude criteria for construction vibration are based upon absolute limits obtained from DMRB LA 111 and thus no baseline vibration data is required.
Operation phase	
Vibration effects due to the operation of the Project site	Operational vibration would be controlled at source as part of the design. As such, no significant effects are likely to occur as a result of operational vibration.

13.4.3 Study area

13.4.3.1 The study area for the noise and vibration assessment of the Project focuses on receptors where potential noise and vibration impacts are most likely to occur.

13.4.3.2 The study area relevant to this assessment is defined as:

- The area of land to be temporarily or permanently occupied during the construction, operation and decommissioning of the Project.
- Noise sensitive receptors located within 300 m of the export cable corridor, solar PV array areas and substations, as presented in Figure 13.1 of Volume 2. This distance has been chosen based upon guidance with DMRB LA111. Note 1 of paragraph 3.5 of the guidance states: '*A study area of 300m from the closest construction activity is normally sufficient to encompass noise sensitive receptors*'. This approach has been reviewed in context with the site boundary and noise sensitive receptors and deemed to be appropriate.
- Vibration sensitive receptors located within 100 m of construction activities as presented in Figure 13.2 of Volume 2. This distance has been chosen based on guidance within DMRB LA111. Note 1 of paragraph 3.29 of the guidance states: '*A study area of 100m from the closest construction activity with the potential to generate vibration is normally sufficient to encompass vibration sensitive receptors*.' This approach has been reviewed in context with the site boundary, approximate working areas and vibration sensitive receptors and deemed to be appropriate.
- Noise sensitive receptors located within 1 km of any operational noise sources as presented in Figure 13.3 of Volume 2. The operational noise sources will be located in the northern, central, and southern portions of the site and thus it is from the boundary of the solar PV array areas that this study area is defined.

13.4.3.3 The specific locations of the noise sensitive receptors have been identified in Volume 3, Appendix 13.1. Address points have been used within GIS mapping software to identify existing sensitive receptor locations. The receptor locations identified are shown in Volume 2, Figure 1.3 – 1.5 of Volume 1, 13.3: Operational noise of the PEIR.

13.4.4 Methodology for baseline studies

Desk studies

13.4.4.1 Information on sources of noise and vibration within the study area was collected through a detailed review of existing studies and datasets. These are summarised in **Table 13.8**.

Table 13.8: Summary of desk study sources used

Title	Source	Year	Author
Emapsite_LandPack_Title_and_Tenure_844260_1080149_OS_Mastermap.dwg	Ordnance Survey	2022	Ordnance Survey
OS Terrain 5	Ordnance Survey	2022	Ordnance Survey
OS AddressBase Plus	Ordnance Survey	2022	Ordnance Survey
Google Earth Imagery	Data SIO, NOAA, U.S Navy, NGA, GEBCO	2023	Google

Site specific surveys

13.4.4.2 Site specific surveys were undertaken in May 2023 to inform the PEIR. Full details are presented in Volume 3, Appendix 13.1: Baseline sound survey of the PEIR.

13.4.4.3 In summary, a series of long-term sound measurements were undertaken at locations representative of the nearest noise sensitive receptors to construction noise sources proposed as part of the Project.

13.4.4.4 The survey comprised long-term sound monitoring at 15 locations within the Project site boundary. These are presented in Figure 1.1 to Figure 1.3 of Volume 3, Appendix 13.1: Baseline sound survey of the PEIR.

13.5 Baseline environment

13.5.1 Site specific surveys

13.5.1.1 The baseline sound survey outlined above was undertaken at locations deemed suitably representative of the nearest noise sensitive receptors to the Project site. These positions are presented alongside the survey results in **Table 13.9**.

13.5.1.2 The results are presented as the following noise indices for use in the assessment of operational noise impacts:

- $L_{Aeq,16h}$ – 16-hour daytime ambient sound level used to characterise the average level over the period between 07:00 and 23:00;
- $L_{A90,1h}$ – 1-hour daytime background sound level used to characterise the level exceeded for 90% of a 1-hour period between 07:00 and 23:00;
- $L_{Aeq,8h}$ – 8-hour night-time ambient sound level used to characterise the average level over the period between 23:00 and 07:00; and
- $L_{A90,15min}$ – 15-minute night-time background sound level used to characterise the level exceeded for 90% of a 15-minute period between 07:00 and 23:00.

13.5.1.3 Representative ambient sound levels have been derived in accordance with the guidance presented in British Standard 4142:2014+A1:2019. The residual sound levels, $L_{Aeq,T}$, have been calculated by logarithmically-averaging the

measured data over 16-hour and 8-hour periods for the day and night-time, respectively.

13.5.1.4 The representative background sound levels, $L_{A90,T}$, have been derived through statistical analysis of the measured background sound level data with reference to the guidance in British Standard 4142:2014+A1:2019 which states the following in Note 1 of paragraph 8.1.4:

'A representative level should account for the range of background sound levels and should not automatically be assumed to be either the minimum or modal value.'

13.5.1.5 Histograms of the cumulative frequency of occurrence plotted against the range of $L_{A90,T}$ levels during the relevant periods have been generated from the baseline survey data. Based on the above, an initial estimate of the representative background sound levels at each long-term measurement position have been derived by calculating the $L_{A90,T}$ levels that are not exceeded for more than 25 % of the relevant day or night-time period. Values have been reviewed against the time-history graphs in Appendix A of Volume 3, Appendix 13.1: Baseline sound survey of the PEIR and are considered acceptable.

13.5.1.6 The results are presented as the following noise indices for use in the assessment of construction noise impacts:

- $L_{Aeq,12h}$ – 12-hour daytime ambient sound level used to characterise the average level over the period between 07:00 and 19:00;
- $L_{Aeq,4h}$ – 4-hour evening ambient sound level used to characterise the average level over the period between 19:00 and 23:00; and
- $L_{Aeq,8h}$ – 8-hour night-time ambient sound level used to characterise the average level over the period between 23:00 and 07:00.

13.5.1.7 As with the noise indices to inform the operational noise assessment, representative ambient sound levels have been derived by logarithmically averaging the measured data over 12-hour, 4-hour, and 8-hour periods for the day, evening, and night-time, respectively.

Table 13.9: Baseline sound survey results

Position	Location	Measured Sound Level (dB)					
		Day		Evening		Night	
		$L_{Aeq,16h}$ (0700-2300)	$L_{Aeq,12h}$ (0700-1900)	$L_{A90,1h}$ (0700-2300)	$L_{Aeq,4h}$ (1900-2300)	$L_{Aeq,8h}$ (2300-0700)	$L_{A90,15min}$ (2300-0700)
LT1	Southwestern boundary near Upper Whitley Farm.	48	48	33	45	41	29
LT2	Northern boundary near Cumnor Road.	62	63	37	57	53	28
LT3	On the boundary of Denmans Farm.	46	46	39	46	43	33

Position	Location	Measured Sound Level (dB)					
		Day		Evening		Night	
		$L_{Aeq,16h}$ (0700-2300)	$L_{Aeq,12h}$ (0700-1900)	$L_{A90,1h}$ (0700-2300)	$L_{Aeq,4h}$ (1900-2300)	$L_{Aeq,8h}$ (2300-0700)	$L_{A90,15min}$ (2300-0700)
LT4	Northeastern boundary near Eynsham Road.	50	51	42	46	42	30
LT5	Southeastern boundary near the A420.	53	53	48	52	49	32
LT6	Southwestern boundary near City Farm.	64	64	46	61	56	32
LT7	Northwestern boundary near Church Road.	53	54	42	49	46	27
LT8	On the boundary of Purwell Farm.	47	48	34	46	43	29
LT9	Southeastern boundary near dwellings on Elms Road.	46	47	36	44	40	31
LT10	Eastern boundary near Cassington Road.	49	49	37	46	45	35
LT11	Northeastern boundary near Woodstock Road East.	59	59	43	48	44	28
LT12	Northwestern boundary near Grove Road.	48	49	39	43	42	29
LT13	Southeastern boundary near Banbury Road.	53	54	41	48	46	30
LT14	Western boundary near Tew Lane (B4027)	59	60	34	53	49	27
LT15	Northern boundary near Dornford Lane.	49	50	36	48	49	28

13.5.1.8 The existing sound climate is dominated primarily by distant traffic on local roads. Further details of the surveys and survey findings are presented in Volume 3, Appendix 13.1: Baseline sound survey of the PEIR.

13.5.2 Future baseline conditions

13.5.2.1 As the proportion of road traffic vehicles which are electrically powered increases, it is possible that traffic noise levels may reduce slightly due to the lower engine-noise levels on low speed roads, although on open roads and motorways, the noise emissions from passing vehicles is predominantly due to tyre-road interaction and aerodynamic deflections over the vehicle surface.

13.5.2.2 The study area comprises a mixture of fields and farmland with residential settlement areas and open roads. As such, it is not anticipated that the future baseline scenario will change significantly in the absence of the Project.

13.5.2.3 National planning policy (such as the NPPF, NPSE and PPG) require that all reasonable steps are taken to mitigate and minimise adverse noise effects on

health. As such, any future developments will be required to demonstrate compliance with these requirements.

13.5.3 Key receptors

13.5.3.1 **Table 13.10** identifies the receptors taken forward into the assessment. The sensitivity of each receptor has been listed as per the definitions in **Table 13.13.**

13.5.3.2 The sensitivity of the receptor has been identified based on the usage of the building, the methodology of which is detailed in **section 13.8** of this document.

Table 13.10: Key receptors taken forward to assessment

Receptor	Description	Sensitivity/value
Denmans Farm	Residential receptors considered in operational noise impact assessment for the Southern Site of the Project.	Medium
Jumpers Farm		Medium
Heidersbach		Medium
Tudor Court Park		Medium
Sansoms Barn	Residential receptors considered in operational noise impact assessment for the Northern Site of the Project.	Medium
Hordley Cottages		Medium
Weaveley Farm		Medium
Lower Dornford Farm		Medium
Upper Dornford Cottages		Medium
Old Weaveley Farm		Medium
Studys Castle		Medium
Upper Dornford Barn		Medium
Reeves Cottage		Medium
Wooton Downs Cottages		Medium
Threshers Barn		Medium
Milford Bridge Cottage		Medium
Field View Lane		Medium
Mulberry Cottage		Medium
Battimer	Residential receptors considered in operational noise impact assessment for the Central Site of the Project.	Medium
Burleigh House		Medium
Elms Road		Medium
Bladon House		Medium
Brackenwood		Medium
Worton Rectory Farmhouse		Medium

Receptor	Description	Sensitivity/value
Goose Eye Farm		Medium
Eynsham Road (South)		Medium
Toll Cottage		Medium
Purwell Farm		Medium
Pelican House		Medium
Burleigh Farm		Medium
Eynsham Road		Medium
Elms Road (South)		Medium
New Barns Farm		Medium
Heath Lane		Medium
Manor Road		Medium
Beyond		Medium
Jericho Farm		Medium
Bladon Pits		Medium
Hall Farm Paddocks		Medium
Campsfield Farmhouse		Medium
The Beeches		Medium
The Paddock		Medium
Heath Lane (South)		Medium
City Farm Cottages		Medium
Evenlode Crescent		Medium
Mill Farm		Medium
Eynsham Hill		Medium
Yarnton Nursing Home		Medium
New Wintles Farm		Medium

13.6 Key parameters for assessment

13.6.1 Maximum design scenario

13.6.1.1 The maximum design scenarios identified in **Table 13.11** have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. These scenarios have been selected from the Project Design Envelope provided in Volume 1, Chapter 6: Project Description of the PEIR. Effects of greater adverse significance are not predicted to arise should any other development scenario, based on details within the Project

Design Envelope (e.g., different infrastructure layout), to that assessed here be taken forward in the final design scheme.

Table 13.11: Maximum design scenario considered for the assessment of potential impacts

Potential impact	Phase[a]			Maximum Design Scenario	Justification
	C	O	D		
Noise and vibration impacts from construction and decommissioning activities	✓	×	✓	**Construction phase: cable corridor** • The 33/220 kilovolt (kV) cable route is approximately 22 km in length. • The cable installation would be undertaken via open cut trenching, cable jointing, and trenchless methods (e.g. Horizontal Directional Drilling (HDD)). • HDD would be undertaken at approximately 6 locations along the cable route. • The construction compounds for HDD would be approximately 30 m x 75 m for the entrance pit and 30 m x 25 m for the exit pit. • The maximum burial depths for the cables would be approximately 2 m for open cut trenching and 30 m for HDD. • HDD would require night-time working. • The total construction period is anticipated to be approximately 24-months. **Construction phase: solar array areas** • The total developable area for solar arrays is approximately: – 266 hectares (ha) in the Northern Site; – 639 ha in the Central Site; and – 51 ha in the Southern Site • The number of Solar PV modules would range from 1,800,000 to 2,300,000. • The modules would be mounted on a structure formed of a mix between galvanised steel and aluminium with stainless steel screws and clamps. • The foundations would be installed using solar pile driving techniques. Piling will be undertaken at up to 3 locations simultaneously. • The total number of piles would be between 1,900,000 to 2,500,000. Each pile would be buried to a depth of between 1.0 and 3.0 m. **Decommissioning phase**	**Construction phase: cable corridor** Trenchless techniques make use of equipment with higher noise emission levels than open cut trenching techniques and may require night-time works. This represents the maximum design scenario in terms of construction noise and vibration. Impacts due to construction are likely to be greater during the night-time since the baseline sound levels at receptors are likely to be lower. An assessment will be undertaken using typical spectra for the relevant noise-emitting plant items as presented in BS 5228-2:20009+A1:2014. **Construction phase: solar array areas** Solar pile driving would .require a rig system that operates intermittently across the array areas. Noise levels have been obtained from manufacturer datasheets and BS 5228-1:2009+A1:2014 for the piling rig both idling and in operation. The larger solar array areas are likely to require works of a longer duration.

Potential impact	Phase[a]			Maximum Design Scenario	Justification
	C	O	D		
				• Decommissioning is likely to operate within the parameters identified for construction (i.e., any activities are likely to occur within construction working areas and to require no greater amount or duration of activity than assessed for construction).	**Decommissioning phase** Decommissioning is likely to operate within the parameters identified for construction.
Noise and vibration impacts from the operation of the Project	×	✓	×	**Operation phase** • No fixed layout for the PV installation areas is yet available and thus an assessment has been undertaken based upon an indicative site layout provided by the Applicant. • There would be around one PCS unit per 7 ha, each containing a 6 megavolt ampere (MVA) Medium Voltage (MV) transformer and two inverters. The total number of PCS units is thus around 156. • The PCS units would have dimensions of around: – Height: 2.7 m – 3.5 m; – Width: 12.0 m – 14.0 m; and – Length: 2.2 m – 2.9 m • The PCS units would operate during the daytime only. They will 'ramp up' between 5-7am and reach maximum operation by around 8 am. • There would be around six High Voltage (HV) transformers across the Project site with indicative dimensions of: – Height: 4.0 m – 6.0 m (including isolator); – Width: 6.0 m – 10.0 m; and – Length: 12.0 m – 18.0 m • The main substation would be situated in the Southern Site of the Project and will contain a HV transformer. The main substation footprint will have a footprint with approximate dimensions 1 ha (10,000 m^2) • The National Grid Electricity Transmission (NGET) substation would also be situated in the Southern Site of the Project and would comprise a HV	**Operation phase** An assessment of the operational noise impacts has been undertaken based upon an indicative layout. Representative noise spectra for the PCS units and HV transformers have been applied to the broadband (single-figure) levels provided by the Applicant in units of dB(A). The PCS units are likely to 'ramp-up' in the early morning and thus consideration has been given to the likely impacts between 5-7 am. Limiting noise emission levels for the HV transformers in the Southern Site of the Project (main substation and NGET) have been derived based upon the existing background sound levels at the nearest receptors and the predicted noise emission levels from the PCS units across the site. The operational noise impacts have been assessed with reference to the guidance in BS 4142:2014+A1:2019. Acoustic character corrections applied to account for any distinct acoustic features associated with Project site. The HV transformers would be tonal at

Potential impact	Phase[a]			Maximum Design Scenario	Justification
	C	O	D		
				transformer. The NGET substation footprint would have dimensions of approximately 180 m x 150 m and a height of between 12 – 15 m.	low frequency which has been considered by applying a 1/3-octave band frequency spectrum to the HV transformer source noise levels (Gange, 2011).

[a] C=construction, O=operational and maintenance, D=decommissioning

13.7 Mitigation measures intended to be adopted as part of the Project

13.7.1.1 For the purposes of the EIA process, the term 'Measures adopted as part of the Project' is used to include the following types of mitigation measures (adapted from IEMA, 2016):

- Primary (inherent) mitigation - measures included as part of the project design. IEMA describes these as '*modifications to the location or design of the development made during the pre-application phase that are an inherent part of the project and do not require additional action to be taken'*. This includes modifications arising through the iterative design process. These measures will be secured through the consent itself through the description of the project and the parameters secured in the DCO. For example, a reduction in footprint or height.
- Secondary (foreseeable) mitigation. IEMA describes these as '*actions that will require further activity in order to achieve the anticipated outcome'*. These include measures required to reduce the significance of environmental effects (such as lighting limits) and may be secured through environmental management plan.
- Tertiary (inexorable) mitigation. IEMA describes these as '*actions that would occur with or without input from the EIA feeding into the design process. These include actions that will be undertaken to meet other existing legislative requirements, or actions that are considered to be standard practices used to manage commonly occurring environmental effects*'. It may be helpful to secure such measures through a Code of Construction Practice or similar.

13.7.1.2 For the purposes of this PEIR, mitigation measures set out are those considered to be appropriate for the Project at this time. They may evolve and/or be refined in response to the statutory consultation process and/or other considerations.

13.7.1.3 Where relevant, measures have been identified that may result in enhancement of environmental conditions. The measures relevant to this chapter are summarised in **Table 13.12.**

13.7.1.4 Primary and tertiary measures that are intended to form part of the final design (and/or are established legislative requirements/good practice) have been taken into account as part of the initial assessment presented in **section 13.9** below (i.e., the initial determination of impact magnitude and significance of effects assumes implementation of these measures). This ensures that the measures that the Applicants are intending to commit to are taken into account in the assessment of effects.

13.7.1.5 Where an assessment identifies likely significant adverse effects, further mitigation measures may be applied. These are measures that could further prevent, reduce and, where possible, offset these effects. They are defined by IEMA as actions that will require further activity in order to achieve the anticipated outcome and may be imposed as part of the planning consent, or through inclusion in the ES (referred to as secondary mitigation measures in

IEMA, 2016). For further or secondary measures both pre-mitigation and residual effects are presented.

Table 13.12: Mitigation measures intended to be adopted as part of the Project.

Mitigation number	Measure adopted	How the measure will be secured
Primary mitigation		
13.1	The following noise control measures will be considered in the design of the Project site. • The orientation and layout of the substations will be designed to minimise noise levels at nearby receptors. Quieter equipment will be selected, where available and practicable, and mitigation measures such as acoustic barriers and enclosures will be specified where necessary.	Noise limits to be implemented through the Operational Noise Management Plan to be secured as a requirement of the DCO.
Tertiary Mitigation		
13.2	The core working hours for the construction of the Project will be 07:00 – 19:00 hours Monday to Saturday. Activities carried out during mobilisation and maintenance will not generate significant noise levels (such as piling, or other such noisy activities). In circumstances outside of core working practices, specific works may have to be undertaken outside the core working hours (such as HDD). Vehicle movements may however be subject to unscheduled events outside these hours.	Secured through the DCO and Outline Code of Construction Practice (CoCP) and agreed with relevant stakeholders.
13.3	A Construction Traffic Management Plan (CTMP) will be prepared and submitted with the application for development consent. A CTMP will be developed in accordance with the outline CTMP to be submitted with the application for development consent. The CTMP will set standards and procedures for: 1. Managing the numbers and routing of HGVs during the construction phase; 2. Managing the movement of employee traffic during the construction phase; and 3. Details of measures to manage the safe passage of HGV traffic via the local highway network.	Secured through the DCO and the Outline Code of Construction Practice (CoCP) and agreed with relevant stakeholders.

Mitigation number	Measure adopted	How the measure will be secured
13.4	A Construction Noise and Vibration Management Plan (CNVMP) will be prepared as part of the CoCP. It will include measures to mitigate noise from construction activities associated with the Project. If required, this will include a bespoke method statement for HDD (and other high-noise emitting works) undertaken close to noise sensitive receptors.	Secured through the Outline Code of Construction Practice (CoCP).
13.5	An Operational Noise Management Plan (ONMP) will be prepared. The Plan will identify the noise limits for the operation of the Project and the measures for how these limits would be monitored. It will be informed by a full assessment of operational noise to be undertaken once the plant design is complete.	Secured as a requirement of the DCO.
13.6	BPM will be implemented during the design, construction, operation, and maintenance of all aspects of the Project to ensure that noise levels in all reasonably foreseeable circumstances that adverse and significant adverse effects are minimised.	To be implemented through the Construction Noise & Vibration Management Plan and Operational Noise Management Plan.

13.8 Impact assessment methodology

13.8.1 Overview

13.8.1.1 The significance of an effect is determined based on the sensitivity of a receptor and the magnitude of an impact. This section describes the criteria applied in this chapter to characterise the sensitivity of receptors and magnitude of potential impacts. The terms used to define magnitude and sensitivity are based on and have been adapted from those used in the DMRB methodology (Highways England *et al.,* 2020).

13.8.1.2 The approach to determining the significance of effects is a two-stage process that involves defining the magnitude of the impact and the sensitivity of the receptor. This section describes the criteria applied in this chapter to assign values to the magnitude of potential impacts and the sensitivity of the receptors. The terms used to define magnitude and sensitivity are based on those which are described in further detail in Volume 1, Chapter 4: Approach to Environmental Assessment of the PEIR.

13.8.2 Receptor sensitivity/value

13.8.2.1 The criteria for defining sensitivity in this chapter are outlined in **Table 13.13** below. There is no existing document that provides specifically to England which provides guidance to identifying the sensitive of the receptors in terms of noise. Therefore, the Scottish Technical Advice Note (TAN) (Scottish Government, 2011) has been used for this assessment.

Table 13.13: Sensitivity criteria

Sensitivity	Definition	Examples
Very High	Very high importance and rarity, international scale and very limited potential for substitution.	Receptors which are very highly sensitive to noise and vibration and/or require low internal noise levels such as: • hospital wards containing high-dependency units, operating theatres, sensitive equipment (e.g., MRI scanners); • recording studios; and • care homes at night.
High	High importance and rarity, national scale and limited potential for substitution	Receptors which are highly susceptible to noise and vibration disturbance such as: • care homes (daytime); • theatres; and • hospital wards.
Medium	High or medium importance and rarity, regional scale, limited potential for substitution	Receptors where noise and vibration may cause disturbance, but a level of tolerance is expected such as: • residential accommodation; • holiday accommodation; • research facilities; and • schools/universities.

Sensitivity	Definition	Examples
Low	Low or medium importance and rarity, local scale	Receptors where noise and vibration may cause short duration effects in a recreational setting although particularly high noise levels may cause a moderate effect such as: • offices; • shops; • GP surgeries; and • sports facilities.
Negligible	Very low importance and rarity, local scale	Receptors where noise and vibration is not expected to be detrimental such as: • industrial facilities; • warehouses; and • car parks.

13.8.3 Magnitude of impact

13.8.3.1 The criteria for defining magnitude in this chapter are outlined in **Table 13.14** below.

Table 13.14: Impact magnitude criteria

Sensitivity	Magnitude of impact	Definition
High	Adverse	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements
	Beneficial	Large scale or major improvement or resource quality; extensive restoration or enhancement; major improvement of attribute quality
Medium	Adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality
Low	Adverse	Some measurable change in attributes, quality or vulnerability, minor loss or, or alteration to, one (maybe more) key characteristics, features or elements
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring
Negligible	Adverse	Very minor loss or detrimental alteration to one or more characteristics, features or elements
	Beneficial	Very minor benefit to, or positive addition of one or more characteristics, features or elements
No change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.	

13.8.3.2 The duration of the effect is important when considering the significance. The following definitions have been adopted for this assessment:

- Short-term: a period of months, up to one year;
- Medium-term: a period of more than one year, up to five years; or
- Long term: a period of greater than five years.

Construction and decommissioning noise

13.8.3.3 Impact criteria for construction and decommissioning noise have been determined in accordance with the guidance in DMRB LA 111 and Annex E of British Standard 5228-1:2009+A1:2014.

13.8.3.4 The threshold levels which quantify the LOAEL and SOAEL have been derived from Example Method 2 in Annex E 3.3 of British Standard 5228- 1:2009+A1:2014 which states the following:

'Noise levels generated by site activities are deemed to be potentially significant if the total noise (pre-construction ambient plus site noise) exceeds the pre-construction ambient noise by 5 dB or more, subject to lower cut-off values of 65 dB, 55 dB and 45 dB L_{Aeq}, from site noise alone, for the daytime, evening and night-time periods, respectively; and a duration of one month or more, unless works of a shorter duration are likely to result in significant effect.'

13.8.3.5 Full details are provided in Volume 3, Appendix 13.2: Construction noise and vibration of the PEIR. The LOAEL and SOAEL are defined in **Table 13.15** below, and the impact criteria are presented in **Table 13.16**.

Table 13.15: Construction time period – LOAEL and SOAEL

Time Period	LOAEL	SOAEL
Weekdays (0700-1900 hours) Saturdays (0700-1300 hours)	Baseline sound levels, $L_{Aeq,T}$	Lowest threshold values as presented Table E.1 British Standard 5228-1:2009+A1:2014(1).
Evenings (1900-2300 hours) Saturdays (1300-2300 hours) Sundays (0700-2300 hours)		
Night (2300-0700 hours)		

(1) This assumption may result in an overestimation of the effects due to construction noise at a limited number of locations and thus forms basis of a robust assessment.

Table 13.16: Construction and decommissioning noise impact magnitude criteria

Magnitude of impact	Construction noise level
High	$L_{Aeq,T} \geq$ SOAEL + 5 dB
Medium	SOAEL $\leq L_{Aeq,T} <$ SOAEL +5 dB
Low	LOAEL $\leq L_{Aeq,T} <$ SOAEL
Negligible	$L_{Aeq,T} <$ LOAEL

13.8.3.6 The impact criteria for the relevant locations are presented in **Table 13.17** below.

Table 13.17: Construction noise criteria

Magnitude of Impact	Threshold Value (dB)		
	Weekdays (0700-1900) and Saturdays (0700-1300)	Evening (1900-2300) and Weekends (1300-2300 on Saturdays and 0700-2300 on Sundays)	Night (2300-0700)
Northern Site			
High	$L_{Aeq,T} \geq 70$	$L_{Aeq,T} \geq 60$	$L_{Aeq,T} \geq 50$
Medium	$65 \leq L_{Aeq,T} < 70$	$55 \leq L_{Aeq,T} < 60$	$45 \leq L_{Aeq,T} < 50$
Low	$54 \leq L_{Aeq,T} < 65$	$48 \leq L_{Aeq,T} < 60$	$43 \leq L_{Aeq,T} < 45$
Negligible	$L_{Aeq,T} < 54$	$L_{Aeq,T} < 48$	$L_{Aeq,T} < 43$
Central Site			
High	$L_{Aeq,T} \geq 70$	$L_{Aeq,T} \geq 60$	$L_{Aeq,T} \geq 50$
Medium	$65 \leq L_{Aeq,T} < 70$	$55 \leq L_{Aeq,T} < 60$	$45 \leq L_{Aeq,T} < 50$
Low	$49 \leq L_{Aeq,T} < 65$	$43 \leq L_{Aeq,T} < 60$	$42 \leq L_{Aeq,T} < 45$
Negligible	$L_{Aeq,T} < 49$	$L_{Aeq,T} < 43$	$L_{Aeq,T} < 42$
Southern Site			
High	$L_{Aeq,T} \geq 70$	$L_{Aeq,T} \geq 60$	$L_{Aeq,T} \geq 50$
Medium	$65 < L_{Aeq,T} < 70$	$55 < L_{Aeq,T} < 60$	$45 < L_{Aeq,T} < 50$
Low	$48 < L_{Aeq,T} < 65$	$46 < L_{Aeq,T} < 60$	$43 < L_{Aeq,T} < 45$
Negligible	$L_{Aeq,T} < 48$	$L_{Aeq,T} < 46$	$L_{Aeq,T} < 43$

13.8.3.7 The duration of each construction activity is not yet known. As outlined in Volume 3, Appendix 13.2: Construction noise and vibration of the PEIR, the construction noise levels have been predicted by accounting for the estimated percentage of the construction period that each plant item is expected to operate. The resultant noise levels are thus the highest noise levels expected during the relevant period being assessed.

Construction and decommissioning traffic noise

13.8.3.8 There may be a change in local noise levels due to contributions from construction traffic on local road networks and temporary diversion networks during the construction of the Project.

13.8.3.9 The impact assessment takes account of the absolute level of the road traffic noise and the existing sound levels at the nearest receptors. Impact criteria for these changes have been obtained from the guidance in DMRB LA 111 and are presented in **Table 13.18** below.

Table 13.18: Construction and decommissioning traffic noise impact magnitude criteria

Magnitude of impact	Increase in BNL of closest public road used for construction traffic (dB)
High	BNL ≥ 5
Medium	3 ≤ BNL < 5
Low	1 ≤ BNL < 3
Negligible	BNL < 1

Construction and decommissioning vibration

13.8.3.10 Impact criteria for vibration from construction have been identified based on guidance provided in British Standard 5228-2:2009+A1:2014. The following outline criteria in **Table 13.19** in terms of peak particle velocity (PPV) can be used to identify potential significant impacts on nearby receptors.

Table 13.19: Construction and decommissioning vibration impact magnitude criteria

Magnitude of impact	Vibration level, PPV, mm/s
High	PPV ≥ 10(1)
Medium	1 ≤ PPV < 10
Low	0.3 ≤ PPV < 1
Negligible	PPV < 0.3

(2) Vibration at these levels is unlikely to be tolerable for more than a very brief period; major effects could occur below these levels, particularly where impacts occur for longer periods.

13.8.3.11 Further comment is provided in Note C of Table B.1 in Annex B of British Standard 5228- 2:2009+A1:2014 which states the following:

'Single or infrequent occurrences of these levels do not necessarily correspond to the stated effect in every case. The values are provided to give an initial indication of potential effects, and where these values are routinely measured or expected then an assessment in accordance with BS 6475-1 or -2, and/or other available guidance, might be appropriate to determine whether the time varying exposure is likely to give rise to any degree of adverse comment.'

Operational noise

13.8.3.12 The significance of noise effects associated with the operation of the Project has been determined based upon the methodology outlined in British Standard 4142:2014+A1:2019. This methodology includes calculating the operational rating sound level $L_{Ar,Tr}$ predicted at nearby receptors due to the operation of the Project, defined as the operational specific sound level plus any acoustic character corrections due to tonality, impulsivity, intermittency, or any other distinct acoustic characteristics.

13.8.3.13 The rating sound level is then compared to the representative background sound level $L_{A90,T}$ at the nearest receptors which is obtained via measurements of the baseline acoustic environment. The difference between the rating sound

level and the representative background sound level is used to determine the impacts which can be assessed in accordance with section 11 of British Standard 4142:2014+A1:2019, with consideration also required for the context in which the sound has been assessed.

'Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration including the following:

[…]

Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.

[…]

The sensitivity of the receptor and whether the dwellings or other premises for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as:

i) façade insulation treatment;

ii) ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and

iii) acoustic screening.'

13.8.3.14 Based on the above, the following impact criteria in **Table 13.20** have been defined for operational noise.

Table 13.20: Operational noise impact magnitude criteria

Magnitude of impact	British Standard 4142:2014+A1:2019 semantic description	Difference Δ between rating sound Level $L_{Ar,Tr}$ and background sound level $L_{A90,T}$ (dB)
High	A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.	Δ ≥ 10
Medium	A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.	5 ≤ Δ < 10
Low	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.	0 ≤ Δ < 5
Negligible		-10 ≤ Δ < 0
No change	-	Δ < -10

13.8.4 Significance of effect

13.8.4.1 The significance of the effect upon noise and vibration has been determined by taking into account the sensitivity of the receptor and the magnitude of the

impact. The method employed for this assessment is presented in **Table 13.21**. Where a range of significance levels is presented, the final assessment for each effect is based upon expert judgement.

13.8.4.2 In all cases, the evaluation of receptor sensitivity, impact magnitude and significance of effect has been informed by professional judgement and is underpinned by narrative to explain the conclusions reached.

13.8.4.3 For the purpose of this assessment, any effects with a significance level of minor or less are not considered to be significant in terms of the EIA Regulations.

Table 13.21: Assessment matrix

Sensitivity of Receptor	Magnitude of Impact			
	Negligible	Low	Medium	High
Negligible	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	Negligible or Minor	Minor	Moderate	Moderate or Major
High	Minor	Minor or Moderate	Moderate or Major	Major
Very High	Minor	Moderate or Major	Major	Major

13.8.4.4 Where the magnitude of impact is 'no change', no effect would arise.

13.8.4.5 The definitions for significance of effect levels are described as follows:

- Major: These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of local importance may also enter this category. Effects upon human receptors may also be attributed this level of significance.
- Moderate: These beneficial or adverse effects have the potential to be important and may influence the key decision-making process. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse or beneficial effect on a particular resource or receptor.
- Minor: These beneficial or adverse effects are generally, but not exclusively, raised as local factors. They are unlikely to be critical in the decision-making process but are important in enhancing the subsequent design of the project.
- Negligible: No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

- No change: No loss or alteration of characteristics, features or elements; no observable impact in either direction.

13.8.5 Assumptions and limitations of the assessment

Baseline sound survey

13.8.5.1 All sound surveys are limited by the instrumentation used to undertake the measurements. Uncertainty may arise as a result of the internal processes within the sound level meter to measure and process the measured data into the relevant noise indices. However, modern sound level meters are precision instruments.

13.8.5.2 The equipment used for the baseline sound survey are Class 1 instruments. According to British Standard EN 61672-1:2003, this has a sampling cycle of 100 milliseconds (ms) and a measurement range of A-weighted levels between 25 dB and 138 dB. The uncertainty due to fluctuations in temperature and humidity is ≤ 0.5 dB. The accuracy of the equipment used has been monitored via calibration both prior to and upon completion of the survey at each position.

13.8.5.3 There may be temporal and seasonal variations to the local sound climate. The temporal variation has been accounted for by undertaking long-term measurements over a period of one week at a time of year when baseline sound levels are considered likely to be typical of the annual average. The survey period adopted allows for statistical analysis of any temporal variations in the sound climate to reduce uncertainty in the derivation of representative sound levels at nearby receptors.

13.8.5.4 Any influence due to human error has been minimised by ensuring that all sound monitoring equipment was installed discreetly and securely. Installing the equipment securely minimises any movement of the microphone diaphragm with the wind and ensuring the equipment is discreet minimises interference with the equipment by the public. All measurements were undertaken at a minimum height of 1.5 m above local ground level and 3.5 m from other reflective surfaces to minimise interference from reflected sound waves.

Construction noise and vibration assessment

13.8.5.5 An indicative construction plant and equipment list has been formed based upon experience with similar schemes (see Volume 3, Appendix 13.2: Construction noise and vibration of the PEIR) which includes details of the indicative quantities, estimated percentage of operation during construction activities, and typical noise spectra for each item obtained from British Standard 5228:2009+A1:2014.

13.8.5.6 The exact locations of each construction activity have not yet been confirmed. As such, construction noise and vibration levels have been calculated at varying distances from the boundary of the relevant indicative works area, representing the maximum design scenario as defined in **Table 13.11**.

13.8.5.7 This is a standard approach and is considered both robust and acceptable at this stage.

Source data

13.8.5.8 The following source data in **Table 13.22** has been obtained and used to inform the assessment of noise and vibration impacts at nearby receptors.

Table 13.22: Source data information

Project phase	Source data
Construction and decommissioning	The exact locations and equipment required for the construction of the Project is not yet known. As such, an indicative construction plant and equipment list has formed based upon historic experience with similar schemes. Typical noise spectra have been obtained from British Standard 5228:2009+A1:2019.
Operation	The layout and plant strategy for the Project site have not yet been confirmed and thus a full assessment is not possible at this stage. Indicative sound pressure levels for the PCS units and HV transformers (secondary substations) are provided in Volume 1, Chapter 6: Project description of the PEIR, and an indicative layout has been provided by the Applicant. Frequency content obtained from similar projects have then been applied to the single-figure levels to obtain typical spectral noise levels thus allowing for a more robust assessment. This is a standard approach and is considered acceptable. Limiting levels for the main substation and NGET substation have been derived based upon the predicted noise emission levels and baseline sound climate at the nearest noise sensitive receptors. Information regarding the likely maintenance activities required as part of the Project is provided in Volume 1, Chapter 6: Project description of the PEIR. Operational and maintenance staff will undertake activities during daylight hours approximately 10 times per year. As such, any maintenance works are likely to be infrequent and for a short duration, and therefore are unlikely to have a significant impact on the noise sensitive receptors.
Digital mapping and location data	• The following OS digital mapping and location data have been used as part of this assessment: – OS Mastermap; – OS AddressBase Plus; and – OS Terrain 5.

Prediction methods

13.8.5.9 Uncertainty and limitations may arise during the modelling process due to the sound propagation models used to inform the calculations. The sound levels at the nearest receptors have been calculated using the internationally accepted guidance within ISO 9613-2:1996 which is implemented by the 3D acoustic modelling software (SoundPLAN) used to predict noise levels from the Project. This standard claims an accuracy of ±3 dB for source heights up to 30 m and propagation distances between 100 m and 1 km.

13.8.5.10 The assessment of construction noise impacts has been undertaken using typical source noise levels obtained from British Standard 5228-1:2009+A1:2019. The actual noise levels of the plant items may vary to those

used in the assessment. In cases where there are multiple noise spectra for the same equipment, the highest reasonable level has been selected for the assessment of impacts.

13.8.5.11 Vibration impacts due to HDD have been predicted based upon vibratory piling techniques assuming high hammer energies. Prediction methods for vibratory piling levels are outlined in British Standard 5228-2:2009+A1:2014 for distances up to 100 m. However, for vibratory piling techniques, prediction methods are only valid for hammer energies up to 10.5 kilojoules (kJ) per cycle. Library data has been used to inform the initial assessment of impacts and a hammer energy of around 13 kJ/cycle has been assumed. As such, alternative methods for the prediction of vibration impacts have been sought.

13.8.5.12 Vibration levels have been predicted at varying distances using a method by Heckman and Hagerty (1978). This method is conservative and has been known to overestimate the levels of vibration close to the source. This approach is considered acceptable, but other methods will also be explored once all information on piling plant and activities is available.

13.9 Assessment of effects

13.9.1.1 The impacts of the construction, operation and decommissioning phases of the Project have been assessed. These are identified in **Table 13.11**, along with the maximum design scenario against which each impact has been assessed.

13.9.1.2 A description of the potential effect on receptors caused by each identified impact is given below.

13.9.1.3 The assessment of construction noise and vibration impacts for the Project has been separated into the key construction activities in the various areas forming the Project site. The assessment has been broken down as follows:

- Noise and vibration impacts due to solar pile driving;
- Noise and vibration impacts due to HDD;
- Noise impacts due to open cut trenching along the cable route;
- Noise and vibration impacts due to the construction of the main substation and NGET substations; and
- Noise impacts due to additional vehicle movements on local highway networks.

13.9.1.4 During decommissioning, the substation would remain along with all cable routeing located under the road network but would be removed from all fields.

13.9.2 Noise and vibration impacts due to construction and decommissioning activities

Noise and vibration impacts due to solar pile driving

13.9.2.1 The solar PV modules are expected to be mounted upon a metal frame. This would be supported by galvanised steel piles or screws driven into the ground by impact piling to a depth of approximately 1.5 – 2.0 m. The maximum design

scenario is represented by a solar pile driving system as presented in **Table 13.11**.

13.9.2.2 The exact location and equipment to be adopted for the piling works is not yet known and thus predictions have been undertaken for construction noise levels from the boundary of the solar PV array area over a range of distances to determine at what distances impacts are reduced based on a worst-case scenario. It is understood that these activities would be undertaken during core construction hours and thus no night-time works are required. Further details of the assessment are provided in Volume 3, Appendix 13.2: Construction noise and vibration of the PEIR.

Sensitivity of the receptor

13.9.2.3 A number of assisted living facilities have been identified in the areas surrounding the Project site which are considered to be high sensitivity in **Table 13.13**. Since works are likely to be undertaken during the daytime only, these receptors are considered to be of high vulnerability and high recoverability. The sensitivity of the receptor is **high**.

13.9.2.4 The majority of receptors surrounding the site are residential dwellings. These receptors are considered to be of medium vulnerability and high recoverability. The sensitivity of these receptors is **medium**.

Magnitude of impact

13.9.2.5 The magnitudes at various distances from the boundary of the solar PV array areas for each of the northern, central, and southern sites and the number of receptors per impact magnitude band are presented in **Table 13.23** below.

Table 13.23: Construction noise impact magnitude – solar pile driving

Magnitude of impact	Solar pile driving	
	Distance *d* to receptor (m) for magnitude of impact	Number of receptors per impact magnitude band
High	$d < 1{,}344$	5,728
Medium	$1344 \leq d < 2{,}113$	5,989
Low	$2113 \leq d < 3{,}500$	548
Negligible	$d > 3{,}500$	N/A

13.9.2.6 The assessment above has been undertaken based upon predicted noise emission levels from the boundary of the solar PV installation areas. The number of receptors per impact magnitude band equates to the total number of receptors affected across the whole site. However, it is unlikely that all receptors would be affected simultaneously across all sections. Moreover, the solar pile driving works would be transient in nature and move across each of the PV installation areas thus receptors would not be exposed to high noise levels at all times.

13.9.2.7 The prediction of noise impacts has not accounted for screening provided by intervening buildings and thus the levels at receptors within built-up areas are likely to be at least 5 - 10 dB lower than those predicted.

13.9.2.8 The CoCP will include measures for the control of construction vibration including piling hammers with a lower maximum energy per cycle and cut-off trenches to interrupt the direct transmission path of vibrations between source and receiver and engagement with the local community throughout the construction period.

13.9.2.9 The assessment of impacts (see Volume 3, Appendix 13.2: Construction noise and vibration of the PEIR) includes an assumption that these measures will reduce the total activity construction noise level for each activity by 5 dB. This represents a conservative loss typically associated with that achieved by a barrier which only marginally intersects the direct path (i.e., line of sight) between a source and receiver. The actual noise reduction levels achieved via the methods outlined above may be much greater in practice.

13.9.2.10 The vibration impacts due to solar pile driving will depend on the location, equipment, and proximity to receptor. However, a typical specification for a solar pile driving hydraulic unit has been provided which has a maximum hammer energy of 1.1 kJ per blow. This is a relatively low hammer energy and is unlikely to give rise to adverse impacts, particularly since the works would not be undertaken in one location for the whole construction period. This will be considered fully as part of the ES once more information is available on the equipment and techniques proposed.

13.9.2.11 The impact is predicted to be of local spatial extent and short-term duration. The magnitude is **low**.

Significance of the effect

13.9.2.12 As discussed in paragraph 13.9.2.3 above, there are a number of residential institutions surrounding the Project site. However, most are situated in the 'low' impact magnitude band. The prediction of noise impacts has not accounted for screening due to built-up areas and thus the levels at residential institution receptors (e.g., care homes, assisted living facilities etc.) are likely to be at least 5 – 10 dB lower than those predicted.

13.9.2.13 The closest noise sensitive receptors to the PV installation area are residential in nature and thus, it is these receptors which have been considered in the assessment of significance.

13.9.2.14 The magnitude of the impact is low, and the sensitivity of the receptor is medium. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Noise and vibration impacts due to HDD

Sensitivity of receptor

13.9.2.15 The closest receptors surrounding the site are residential dwellings. These receptors are considered to be of medium vulnerability and high recoverability. The sensitivity of these receptors is **medium**.

Magnitude of impact

13.9.2.16 The magnitudes at various distances from the proposed HDD locations have been predicted and are presented in **Table 13.24** below.

13.9.2.17 There are four options for the location of HDD 5. The option with the greatest impact is HDD 5A and thus it is this option which has been brought forward to the assessment of significant effects. Full details are presented in Volume 3, Appendix 13.2: Construction noise and vibration of the PEIR.

Table 13.24: Construction noise impact magnitude – HDD

Magnitude of impact	HDD Noise				
	Distance *d* to receptor (m) for magnitude of impact				
	HDD 1	HDD 2	HDD 3	HDD 4	HDD 5
High	*d* < 1,325	*d* < 1,325	*d* < 1,325	*d* < 1,325	*d* < 1,325
Medium	1,325 ≤ *d* <1,883	1,325 ≤ *d* <1,883	1,325 ≤ *d* <1,883	1,325 ≤ *d* <1,883	1,325 ≤ *d* <1,883
Low	1883 ≤ *d* < 1,950	1883 ≤ *d* < 1,950	1883 ≤ *d* < 2,133	1883 ≤ *d* < 2,113	1883 ≤ *d* < 2,567
Negligible	*d* > 1,950	*d* > 1,950	*d* > 2,133	*d* > 2,113	*d* > 2,567
Magnitude of impact	**Number of receptors per impact magnitude band**				
	HDD 1	**HDD 2**	**HDD 3**	**HDD 4**	**HDD 5**
High	18	1,029	13	137	2,044
Medium	74	1,120	277	1,480	525
Low	32	105	234	214	307
Negligible	N/A	N/A	N/A	N/A	N/A

13.9.2.18 The activities within the HDD entry and exit pits are likely to require equipment with high noise emission levels. The drilling works are likely to require night-time working and thus the assessment has been undertaken with reference to the night-time noise criteria.

13.9.2.19 The noise impact is predicted to be of local spatial extent and short-term duration. The magnitude is **high**.

13.9.2.20 The impacts due to construction vibration have been undertaken based on data for vibratory piling techniques. Full details are presented in Volume 3, Appendix 13.2: Construction noise and vibration of the PEIR. The results are presented in **Table 13.25**.

Table 13.25: Construction vibration impact magnitude – HDD

Magnitude of impact	HDD Vibration	
	Distance *d* to receptor (m) required for magnitude of impact	Number of receptors per impact magnitude band
High	*d* < 10	0

Magnitude of impact	HDD Vibration	
	Distance *d* to receptor (m) required for magnitude of impact	Number of receptors per impact magnitude band
Medium	$10 \leq d < 80$	0
Low	$80 \leq d < 273$	0
Negligible	$d > 273$	N/A

13.9.2.21 The indicative locations for the HDD works are situated sufficiently far from receptors such that no high impacts are predicted due to vibration. This will be reviewed at the ES stage once further information is available on the equipment and techniques required.

13.9.2.22 The vibration impact due to construction is predicted to be of local spatial extent and short-term duration. The magnitude is **negligible**.

Significance of effect

13.9.2.23 The above activities are likely to be undertaken close to residential receptors. As discussed, the exact plant and location of the works are not yet known and thus there is a high degree of uncertainty to the significance of effects determined. This has been addressed by adopting precautionary thresholds and considering the distances at which the various effects might occur.

13.9.2.24 The prediction of noise impacts has not accounted for screening provided by intervening buildings and thus the levels at receptors within built-up areas are likely to be at least 5 - 10 dB lower than those predicted.

13.9.2.25 The CoCP will include measures for the control of construction vibration including piling hammers with a lower maximum energy per cycle and cut-off trenches to interrupt the direct transmission path of vibrations between source and receiver, and engagement with the local community throughout the construction period.

13.9.2.26 The magnitude of the noise impact is high, and the sensitivity of the receptor is medium. The effect will, therefore, be of **major adverse** significance, which is significant in EIA terms.

13.9.2.27 The magnitude of the vibration impact is negligible, and the sensitivity of the receptor is medium. The effect will, therefore, be of **minor adverse** significance which is not significant in EIA terms.

Further mitigation and residual effects

13.9.2.28 Enhanced acoustic mitigation such as mufflers, acoustic barriers and enclosures around continuously operating items, such as pumps and generators, would reduce the noise impacts at the source.

13.9.2.29 Activities generating high levels noise and vibration in close proximity to sensitive receptors may require bespoke method statements outlining how the noise and vibration criteria will be complied with.

13.9.2.30 The implementation of these measures may reduce the effect to be of **minor adverse significance** which is not significant in EIA terms.

Decommissioning

13.9.2.31 Decommissioning is likely to operate within the parameters identified for construction. As such, decommissioning activities will be limited to within the construction working areas and require a duration no greater than the activities assessed as part of the construction phase.

13.9.2.32 The export cable would either remain *in situ* or be removed from link boxes and joint bays. No new trenching or drilling is anticipated. Link boxes remain *in situ*.

13.9.2.33 The magnitude of the impact is low, the sensitivity of the residential receptors is medium. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Noise impacts due to open cut trenching along the cable route

13.9.2.34 The majority of the cable route would be constructed via open trenching techniques. The impact magnitude assessment has considered the works required to backfill the trench since the data provided shows this to be the highest noise-generating activity associated with open trench techniques.

Sensitivity of receptor

13.9.2.35 The closest receptors surrounding the site are residential dwellings. These receptors are considered to be of medium vulnerability and high recoverability. The sensitivity of these receptors is **medium**.

Magnitude of impact

13.9.2.36 The magnitudes at various distances from the boundary of the solar cable corridor (see Figure 2.4a-Figure 2.4c of Volume 2: Figures) and the number of receptors per impact magnitude band are presented in **Table 13.26** below.

Table 13.26: Construction noise impact magnitude – open cut trenching

Magnitude of impact	Open cut trenching	
	Distance *d* to receptor (m) for magnitude of impact	Number of receptors per impact magnitude band
High	$d < 167$	760
Medium	$167 \leq d < 266$	258
Low	$266 \leq d < 976$	4,100
Negligible	$d > 976$	N/A

13.9.2.37 There are a high number of receptors in the high impact magnitude band for the open trench construction works. However, construction works would be transient and would not be undertaken at a single location for the full

construction period. As such, the number of receptors affected will depend upon the locations of the construction works.

13.9.2.38 The impacts due to construction noise have been predicted at distances from the boundary of the cable corridor (see Figure 2.4a-Figure 2.4c of Volume 2: Figures) since exact locations of construction activities are not yet available. It is unlikely that the construction activities would be undertaken on the site boundary concurrently and thus the actual impacts are likely to be lower. A more detailed assessment will be undertaken as part of the ES when more detailed information on the locations of the required construction works becomes available.

13.9.2.39 Due to the transient nature of the construction works along the cable corridor, the impact is predicted to be of local spatial extent and short-term duration. The magnitude is **low**.

Significance of effect

13.9.2.40 The magnitude of the impact for open cut trenching is deemed to be low and the sensitivity of the receptor is considered to be medium. The effect will therefore be of **minor adverse significance** which is not significant in EIA terms.

Noise and vibration impacts due to the construction of the main substation and NGET substation

13.9.2.41 An assessment of the likely noise and vibration impacts due to the construction of the substations has been undertaken for both the main substation and the NGET substation, both currently proposed to be located in the Southern Site of the Project. The maximum design scenario is represented by concurrent construction of the two substations.

13.9.2.42 Information on construction methods is not yet known and thus assumptions on the equipment required have been formed based on historic projects for similar sites to ensure a robust noise assessment. Full details are provided in Volume 3, Appendix 13.2: Construction noise and vibration of the PEIR.

Sensitivity of the receptor

13.9.2.43 The closest receptors surrounding the site are residential dwellings. These receptors are considered to be of medium vulnerability and high recoverability. The sensitivity of these receptors is **medium.**

Magnitude of impact

13.9.2.44 The magnitudes at various distances from the boundary of the cable corridor (see Figure 2.4a-Figure 2.4c of Volume 2: Figures) and the number of receptors per impact magnitude band are presented in **Table 13.27** below.

Table 13.27: Construction noise impact magnitude – open cut trenching

Magnitude of impact	Substations	
	Distance *d* to receptor (m) for magnitude of impact	Number of receptors per impact magnitude band
High	$d < 86$	0
Medium	$86 \leq d < 271$	1
Low	$271 \leq d < 857$	23
Negligible	$d > 857$	N/A

13.9.2.45 Construction of the substations would be undertaken during core working hours and thus are unlikely to require any night-time works. As such, the assessment has been undertaken with reference to the daytime noise thresholds.

13.9.2.46 The prediction of noise impacts has been undertaken from the boundaries of the main substation and NGET substation (see Figure 2.3 of Volume 2: Figures) since the location of works is not yet known.

13.9.2.47 The CoCP will outline general construction principles and mitigation to implement the BPM for the control of construction noise. This may include measures such as barriers, set working hours, quieter equipment, and acoustic enclosures for continuously operating plant such as generators; and/or construction noise monitoring, where necessary.

13.9.2.48 The noise impact is predicted to be of local spatial extent and short-term duration. The magnitude is **medium**.

13.9.2.49 The closest receptor is situated approximately 150 m from the boundary of the main substation site. As such, there is unlikely to be any impacts due to vibration. This will be assessed fully as part of the ES once more information on construction techniques is available. The impacts due to vibration are predicted to be of local spatial extend and short-term duration. The magnitude is **low**.

Significance of effect

13.9.2.50 The magnitude of the noise impacts for the construction of the substations is deemed to be medium and the sensitivity of the receptor is considered to be medium. The effect will therefore be of **moderate adverse significance** which is significant in EIA terms.

Further mitigation and residual effects

13.9.2.51 Enhanced acoustic mitigation (e.g., enclosures) around continuously operating items such as pumps and generators would reduce the noise impacts at the source.

13.9.2.52 If such measures are implemented, the effects may be reduced to **minor adverse significance**, which is not significant in EIA terms.

Noise impacts due to additional vehicle movements on local highway networks

13.9.2.53 The introduction of additional construction vehicles on local highways may increase noise levels at receptors close to the road. An indicative construction traffic noise assessment has been undertaken and is detailed in Volume 3, Appendix 13.2: Construction noise and vibration of the PEIR.

Sensitivity of receptor

13.9.2.54 The closest receptors surrounding the site are residential dwellings. These receptors are considered to be of medium vulnerability and high recoverability. The sensitivity of these receptors is **medium**.

Magnitude of impact

13.9.2.55 The baseline traffic flows on the key highway links surrounding the Project site, and thereby BNL, are relatively high. As such, the introduction of additional vehicular movements due to construction traffic does not significantly increase noise levels. The maximum increase predicted is +1 dB.

13.9.2.56 The CoCP will outline general construction principles and mitigation to implement the BPM for the control of construction noise. In addition, the CTMP will include measures to control construction traffic, such as reduced speed limits or a restriction on daily vehicular movements, where required.

13.9.2.57 The impacts due to construction traffic are predicted to be of local spatial extend and medium-term duration. The magnitude is **low**.

Significance of effect

13.9.2.58 The magnitude of the noise impacts due to construction traffic is deemed to be low and the sensitivity of the receptor is considered to be medium. The effect will therefore be of **minor adverse significance** which is not significant in EIA terms.

13.9.3 Noise and vibration impacts from the operation of the Project

13.9.3.1 An assessment of the likely noise impacts due to the operation of the Project has been undertaken. Full details are provided in Volume 3, Appendix 13.3: Operational noise of the PEIR.

Sensitivity of receptor

13.9.3.2 The closest receptors surrounding the site are residential dwellings. These receptors are considered to be of medium vulnerability and high recoverability. The sensitivity of these receptors is **medium**.

Magnitude of impact

13.9.3.3 The assessment of noise impacts has been undertaken based upon an indicative layout of the Project site. The primary noise sources associated with the development are PCS units housing solar inverters and medium voltage

transformers. The PCS units are understood to only operate during the daytime.

13.9.3.4 There are also six high voltage transformers distributed between the three sites of land forming the Project. These units are understood to operate continuously 24-hours a day and are situated within secondary substation areas.

13.9.3.5 The main substation site and NGET substation sites are currently proposed to be located in the Southern Site of the Project. As outlined in Volume 3, Appendix 13.3: Operational noise of the PEIR, limiting noise emission levels have been derived for the main substation and NGET substation plant since no information on the likely noise emission levels is yet available. Volume 3, Appendix 13.3: Operational noise of the PEIR contains full details of the noise emission levels to be achieved at the boundary of the substation sites to avoid significant adverse effects at the nearest receptors.

13.9.3.6 The design will incorporate noise control measures such as positioning plant items with higher noise emission levels away from receptors and/or within sound insulated buildings, selecting low-noise plant options where available, and mitigation measures such as acoustic enclosures or barriers.

13.9.3.7 The dominant noise source in all sites are the PCS units which are currently proposed to be open at the sides. Indicative estimations of the reduction in noise emission levels achieved by closing the sides have been undertaken and the results show the impacts to be significantly reduced.

13.9.3.8 An Operational Noise Management plan will outline how noise levels will be suitably controlled via the design of the Project site. This will be secured as part of the DCO.

13.9.3.9 The impact is predicted to be of local spatial extent and long-term duration. The magnitude is **low**.

Significance of effect

13.9.3.10 The magnitude of the operational noise impacts is deemed to be low and the sensitivity of the receptor is considered to be medium. The effect will therefore be of **minor adverse significance** which is not significant in EIA terms.

13.9.4 Future monitoring

13.9.4.1 Depending on the locations of the construction works and the activities required, a noise and vibration monitoring strategy may be agreed with the relevant stakeholders to ensure compliance with the agreed noise and vibration threshold values.

13.9.4.2 The need for monitoring will be developed thought the EIA process once further details of plant and locations relative to residential receptors are available.

13.10 Cumulative effect assessment methodology

13.10.1.1 The noise and vibration cumulative effects assessment (CEA) methodology has followed the methodology set out in Volume 1, Chapter 4: Approach to Environmental Assessment. As part of the assessment, all projects and plans considered alongside the Project have been allocated into 'tiers' reflecting their current stage within the planning and development process.

- Tier 1
  - Under construction
  - Permitted application
  - Submitted application
  - Those currently operational that were not operational when baseline data were collected, and/or those that are operational but have an ongoing impact
- Tier 2
  - Scoping report has been submitted
- Tier 3
  - Scoping report has not been submitted
  - Identified in the relevant Development Plan
  - Identified in other plans and programmes.

13.10.1.2 This tiered approach is adopted to provide a clear assessment of the Project alongside other projects, plans and activities.

13.10.1.3 Construction noise is variable in nature. As such, the cumulative effects of construction noise are generally no greater than those that arise for individual works since, most commonly, one construction project dominates the noise climate at a given receptor. The cumulative effect is thus likely to be equivalent to that for the construction activity with higher noise emission levels in isolation. As an example, two identical and concurrent construction projects in close proximity which use the same methods and equipment will result in a maximum increase in noise level at the nearest receptors of 3 dB (corresponding to a doubling in sound pressure level). This is unlikely to be the case, and for most projects, receptors are unlikely to be subjected to significant adverse cumulative effects above those identified for individual construction projects.

13.10.1.4 The specific projects, plans and activities scoped into the CEA, are outlined in **Table 13.28**.

Table 13.28: List of other projects, plans and activities considered within the CEA

Project/Plan	Status	Distance from the Project (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Project
Tier 1-						
20/01734/OUT	Pending	Adjacent	2,200 dwellings and 40 ha of employment land	N/A	N/A	Yes
20/01817/FUL	Permitted	Adjacent	Proposed Solar and Battery Energy Storage System (BESS) site 5 MW generating capacity on 9.1 ha of land.	N/A	N/A	Yes
21/03522/OUT	Pending	Adjacent	The erection of up to 540 dwellings (Class C3), up to 9,000 sqm Gross External Area (GEA) of elderly/extra care residential floorspace (Class C2), a Community Home Work Hub (up to 200 sqm)(Class E), alongside the creation of two locally equipped areas for play, one Neighbourhood Equipped Area of Play (NEAP), up to 1.8 ha of playing pitches and amenity space for the William Fletcher Primary School, two vehicular access points, green infrastructure, areas of public open space, two community woodland areas, a local nature reserve, footpaths, tree planting, restoration of historic hedgerow, and associated works. All matters are reserved, save for the principal access points.	N/A	N/A	Unknown
22/01715/OUT	Pending	Adjacent	Erection of up to 500 dwellings with associated access, open space and infrastructure.	N/A	N/A	Unknown
Tier 2-						
P22/V2581/SCO	Scoping opinion provided	Adjacent	Request for a Scoping Opinion for a proposed 49.99 MW solar scheme.	N/A	N/A	Unknown
P22/V0144/SCR	Screening decision – positive	Adjacent	Request for an EIA Screening Opinion prior to the submission of an application for the installation of a solar photovoltaic array.	N/A	N/A	Unknown

13.10.2 Maximum design scenario – cumulative effects assessment

13.10.2.1 The maximum design scenarios identified in **Table 13.29** have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. The cumulative effects presented and assessed in this section have been selected from the Project Design Envelope provided in Volume 1, Chapter 6: Project Description, of the PEIR as well as the information available on other projects and plans, in order to inform a 'maximum design scenario'. Effects of greater adverse significance are not predicted to arise should any other development scenario, based on details within the Project Design Envelope (e.g., different foundation type or substation layout), to that assessed here, be taken forward in the final design scheme.

Table 13.29 Maximum design scenario for the assessment of cumulative effects

Potential cumulative effect	Phase[a]			Maximum Design Scenario	Justification
	C	O	D		
Noise and vibration impacts from construction and decommissioning activities	✓	×	✓	Maximum design scenario as described for the Project (**Table 13.11**) assessed cumulatively with the following other projects/plans: **Tier 1** • 20/01734/OUT – Construction will be undertaken concurrently with the Project site; • 20/01817/FUL – Construction and decommissioning will be undertaken concurrently with the Project site; – Site will commence operation at the same time as the Project site. • 21/03522/OUT – Construction and decommissioning will be undertaken concurrently with the Project site; **Tier 2** • P22/V2581/SCO – Construction and decommissioning will be undertaken concurrently with the Project site; – Site will commence operation at the same time as the Project site. • P22/V0144/SCR – Construction and decommissioning will be undertaken concurrently with the Project site;	• Outcome of the CEA will be greatest when the greatest number of other schemes are considered. • The CEA is receptor-led. • Concurrent construction, where relevant, of the Project site with proposed developments represents the maximum design scenario in this case.

Potential cumulative effect	Phase[a]			Maximum Design Scenario	Justification
	C	O	D		
				– Site will commence operation at the same time as the Project site.	
Noise and vibration impacts from the operation of the Project	×	✓	×	**Tier 1** • 20/01817/FUL – Construction and decommissioning will be undertaken concurrently with the Project site; – Site will commence operation at the same time as the Project site. **Tier 2** • P22/V2581/SCO – Construction and decommissioning will be undertaken concurrently with the Project site; – Site will commence operation at the same time as the Project site. • P22/V0144/SCR – Construction and decommissioning will be undertaken concurrently with the Project site; – Site will commence operation at the same time as the Project site.	• Outcome of the CEA will be greatest when the greatest number of other schemes are considered. • The CEA is receptor-led. • Concurrent operation, where relevant, of the Project site with proposed developments represents the maximum design scenario in this case.

[a] C=construction, O=operational and maintenance, D=decommissioning

13.11 Cumulative effects assessment

13.11.1 Introduction

13.11.1.1 A description of the significance of cumulative effects upon noise and vibration receptors arising from each identified impact is given below.

13.11.2 Noise and vibration impacts from construction and decommissioning activities

Tier 1: 20/01734/OUT

Construction phase

Sensitivity of the receptor

13.11.2.1 The closest receptors surrounding the site are residential dwellings. These receptors are considered to be of medium vulnerability and high recoverability. The sensitivity of these receptors is **medium**.

Magnitude of impact

13.11.2.2 An ES has been submitted as part of the application for development reference 20/01734/OUT. Construction noise and vibration impacts are reported to give rise to minor adverse effects at all receptors except Cuckoo Wood Farm where a major adverse effect is predicted.

13.11.2.3 This receptor is situated sufficiently far from the Project site boundary such that no cumulative significant adverse effects are likely to occur at this receptor due to the construction activities required.

13.11.2.4 The ES for the Project states that all construction activities will be governed by a Construction Environmental Management Plan outlining methods by which compliance with the construction noise thresholds may be achieved including quieter equipment, enclosures, and screening. This will aid in reducing noise levels and minimising significant effects.

13.11.2.5 The cumulative effect is predicted to be of local spatial extent and short-term duration. The magnitude is **low**.

Significance of effect

13.11.2.6 The magnitude of the cumulative impact is low, and the sensitivity of the receptor is medium. The cumulative effect will, therefore, be of **minor adverse significance**, which is not significant in EIA terms.

Decommissioning

13.11.2.7 The Project reference 21/03522/OUT is a residential scheme, therefore it will not have a cumulative impact during decommissioning.

Tier 1: 20/01817/FUL

Construction phases

Sensitivity of the receptor

13.11.2.8 The closest receptors surrounding the site are residential dwellings. These receptors are considered to be of medium vulnerability and high recoverability. The sensitivity of these receptors is **medium**.

Magnitude of impact

13.11.2.9 No information is available detailing the proposed construction activities. However, the nearest receptors are situated approximately 750 m from the Project boundary.

13.11.2.10 This development is similar to the Project but of a much smaller scale and thus works are likely to be much shorter in duration.

13.11.2.11 The cumulative effect is predicted to be of local spatial extent and short-term duration. The magnitude is **low**.

Significance of effect

13.11.2.12 The magnitude of the cumulative impact is low and the sensitivity of the receptor is medium. The cumulative effect will, therefore, be of **minor adverse significance**, which is not significant in EIA terms.

Operational phase

Sensitivity of the receptor

13.11.2.13 The closest receptors surrounding the site are residential dwellings. These receptors are considered to be of medium vulnerability and high recoverability. The sensitivity of these receptors is **medium**.

Magnitude of impact

13.11.2.14 No information is available detailing the proposed construction activities. However, the nearest receptors are situated approximately 750 m from the Project boundary.

13.11.2.15 This development is similar to the Project but of a much smaller scale. The Project site will be designed to adhere to the operational noise limits at the nearest receptors. The shared receptors with the Project are situated much further from the Project and thus noise impacts are unlikely.

13.11.2.16 The cumulative effect is predicted to be of local spatial extent and short-term duration. The magnitude is **low**.

Significance of effect

13.11.2.17 The magnitude of the cumulative impact is low, and the sensitivity of the receptor is medium. The cumulative effect will, therefore, be of **minor adverse significance**, which is not significant in EIA terms.

Decommissioning Phase

Sensitivity of the receptor

13.11.2.18 The closest receptors surrounding the site are residential dwellings. These receptors are considered to be of medium vulnerability and high recoverability. The sensitivity of these receptors is **medium**.

Magnitude of impact

13.11.2.19 No information is available detailing the proposed decommissioning activities. However, the nearest receptors are situated approximately 750 m from the Project boundary.

13.11.2.20 This development is similar to the Project but of a much smaller scale and thus works are likely to be much shorter in duration.

13.11.2.21 The cumulative effect is predicted to be of local spatial extent and short-term duration. The magnitude is **low**.

Significance of effect

13.11.2.22 The magnitude of the cumulative impact is low and the sensitivity of the receptor is medium. The cumulative effect will, therefore, be of **minor adverse significance**, which is not significant in EIA terms.

Tier 1: 21/03522/OUT

Construction phase

Sensitivity of the receptor

13.11.2.23 The closest receptors surrounding the site are residential dwellings. These receptors are considered to be of medium vulnerability and high recoverability. The sensitivity of these receptors is **medium**.

Magnitude of impact

13.11.2.24 Whilst the proposed development site is situated along the eastern boundary of the Project site, the nearest receptors are situated within the 'negligible' impact magnitude band for construction noise.

13.11.2.25 The Project will likely operate under a CoCP and thus implement BPM to control construction noise impacts at nearby receptors.

13.11.2.26 The cumulative effect is predicted to be of local spatial extent and short-term duration. The magnitude is **low**.

Significance of effect

13.11.2.27 The magnitude of the cumulative impact is low and the sensitivity of the receptor is medium. The cumulative effect will, therefore, be of **minor adverse significance**, which is not significant in EIA terms.

Decommissioning

13.11.2.28 The Project 21/03522/OUT is a residential scheme, therefore it will not have a cumulative impact during decommissioning.

Tier 1: 22/01715/OUT

Construction phase

Sensitivity of the receptor

13.11.2.29 The closest receptors surrounding the site are residential dwellings. These receptors are considered to be of medium vulnerability and high recoverability. The sensitivity of these receptors is **medium**.

Magnitude of impact

13.11.2.30 The Project will likely be constructed under a CoCP and thus implement BPM to control construction noise impacts at nearby receptors.

13.11.2.31 The cumulative effect is predicted to be of local spatial extent and short-term duration. The magnitude is **low**.

Significance of effect

13.11.2.32 The magnitude of the cumulative impact is low and the sensitivity of the receptor is medium. The cumulative effect will, therefore, be of **minor adverse significance**, which is not significant.

Decommissioning

13.11.2.33 The Project 21/03522/OUT is a residential scheme, therefore it will not have a cumulative impact during decommissioning.

Tier 2: P22/V2581/SCO

Construction phase

Sensitivity of the receptor

13.11.2.34 The closest receptors surrounding the site are residential dwellings. These receptors are considered to be of medium vulnerability and high recoverability. The sensitivity of these receptors is **medium**.

Magnitude of impact

13.11.2.35 The local authority agrees that noise may be scoped out of the ES since it is unlikely to give rise to significant effects. The Project will likely be constructed under a CoCP and thus implement BPM to control construction noise impacts at nearby receptors.

13.11.2.36 The cumulative effect is predicted to be of local spatial extent and short-term duration. The magnitude is **low**.

Significance of effect

13.11.2.37 The magnitude of the cumulative impact is low and the sensitivity of the receptor is medium. The cumulative effect will, therefore, be of **minor adverse significance**, which is not significant in EIA terms.

Operational phase

Sensitivity of the receptor

13.11.2.38 The closest receptors surrounding the site are residential dwellings. These receptors are considered to be of medium vulnerability and high recoverability. The sensitivity of these receptors is **medium**.

Magnitude of impact

13.11.2.39 The local authority agrees that noise may be scoped out of the ES since it is unlikely to give rise to significant effects. A noise assessment will be submitted as part of the application detailing how noise from the Project will be controlled.

13.11.2.40 The cumulative effect is predicted to be of local spatial extent and short-term duration. The magnitude is **low**.

Significance of effect

13.11.2.41 The magnitude of the cumulative impact is low and the sensitivity of the receptor is medium. The cumulative effect will, therefore, be of **minor adverse significance**, which is not significant in EIA terms.

Decommissioning

13.11.2.42 The closest receptors surrounding the site are residential dwellings. These receptors are considered to be of medium vulnerability and high recoverability. The sensitivity of these receptors is **medium**.

Magnitude of impact

13.11.2.43 At the time of writing information regarding the decommissioning of the proposed scheme is not available however it is unlikely that the decommissioning works will be undertaken in during the same period.

13.11.2.44 The cumulative effect is predicted to be of local spatial extent and short-term duration. The magnitude is **low**.

Significance of effect

13.11.2.45 The magnitude of the cumulative impact is low and the sensitivity of the receptor is medium. The cumulative effect will, therefore, be of **minor adverse significance**, which is not significant in EIA terms.

Tier 2: P22/V0144/SCR

Construction phase

Sensitivity of the receptor

13.11.2.46 The closest receptors surrounding the site are residential dwellings. These receptors are considered to be of medium vulnerability and high recoverability. The sensitivity of these receptors is **medium**.

Magnitude of impact

13.11.2.47 The local authority has requested that a full EIA be undertaken for the Project. It is not clear if noise and vibration has been scoped into the assessment.

13.11.2.48 The screening opinion request outline commitments to control construction noise and vibration during construction and decommissioning via planning conditions where required. As such, the site is likely to be required to comply with construction noise and vibration thresholds regardless of whether the EIA includes noise and vibration impacts.

13.11.2.49 The cumulative effect is predicted to be of local spatial extent and short-term duration. The magnitude is **low**.

Significance of effect

13.11.2.50 The magnitude of the cumulative impact is low and the sensitivity of the receptor is medium. The cumulative effect will, therefore, be of **minor adverse significance**, which is not significant in EIA terms.

Operational phase

Sensitivity of the receptor

13.11.2.51 The closest receptors surrounding the site are residential dwellings. These receptors are considered to be of medium vulnerability and high recoverability. The sensitivity of these receptors is **medium**.

Magnitude of impact

13.11.2.52 The screening opinion request outline commitments to control operational noise via planning conditions where required. As such, the site is likely to be required to comply with operational noise limits at the nearest receptors regardless of whether the EIA includes noise and vibration impacts.

13.11.2.53 The cumulative effect is predicted to be of local spatial extent and short-term duration. The magnitude is **low**.

Significance of effect

13.11.2.54 The magnitude of the cumulative impact is low and the sensitivity of the receptor is medium. The cumulative effect will, therefore, be of **minor adverse significance**, which is not significant in EIA terms.

13.12 Transboundary effects

13.12.1.1 As per the scoping report, it was concluded that the proposed development is unlikely to have a significant effect either alone or cumulatively on the environment in a European Economic Area State (EEA states) and therefore a transboundary assessment is not proposed to be underaken.

13.13 Inter-related effects

13.13.1.1 Inter-relationships are the impacts and associated effects of different aspects of the Project on the same receptor. These are as follows.

- Project lifetime effects: Assessment of the scope for effects that occur throughout more than one phase of the Project (construction, operation and decommissioning), to interact to potentially create a more significant effect on a receptor than if just assessed in isolation in these three phases (e.g., construction noise effects from piling, operational substation noise, and decommissioning disturbance).
- Receptor led effects: Assessment of the scope for all effects (including inter-relationships between environmental topics) to interact, spatially and temporally, to create inter-related effects on a receptor. As an example, all effects on noise and vibration (such as adverse effects on human health, etc.) may interact to produce a different, or greater effect on this receptor than when the effects are considered in isolation. Receptor-led effects may be short term, temporary or transient effects, or incorporate longer term effects.

13.13.1.2 The inter-related effects methodology is provided in Chapter 19: Cumulative Effects and Inter-relationships of the PEIR and will be assessed at the ES stage.

13.14 Summary of impacts and monitoring

13.14.1.1 Information on noise and vibration within the study area was collected through desktop reviews of the Project site and surrounding area, consultation with the relevant local authorities and the Planning Inspectorate and a baseline sound survey.

13.14.1.2 **Table 13.30** presents a summary of the potential impacts and residual effects in respect to noise and vibration. The impacts assessed include:

- Noise and vibration impacts from construction and decommissioning activities; and
- Noise and vibration impacts from the operation of the Project.

13.14.1.3 It is concluded that there would be the following significant effects arising from the Project during the construction, operation or decommissioning phases:

- Noise and vibration impacts due to HDD; and
- Noise and vibration impacts due to the construction of the main substation and NGET substation.

13.14.1.4 Further mitigation measures have been identified for these impacts and it is concluded that the implementation of these measures may reduce the effect to be of minor adverse significance which is not significant in EIA terms.

13.14.1.5 **Table 13.31** presents a summary of the potential cumulative impacts, mitigation measures and residual effects. The cumulative impacts assessed include:

- Noise and vibration impacts from construction and decommissioning activities; and
- Noise and vibration impacts from the operation of the Project.

13.14.1.6 It is concluded that there would be no significant cumulative effects from the Project alongside other projects/plans.

13.14.1.7 No potential transboundary impacts have been identified in regard to effects of the Project.

Table 13.30: Summary of potential environmental effects and monitoring.

Description of impact	Phase[a]			Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
	C	O	D						
• Noise and vibration impacts due to solar pile driving;	✓	×	✓	C: Low D: Low	C: Medium D: Medium	C: Minor adverse D: Minor adverse	N/A	C: Minor adverse D: Minor adverse	
• Noise and vibration impacts due to HDD;	✓	×	✓	C: High D: Low	C: Medium D: Medium	C: Major adverse D: Minor adverse	Enhanced acoustic mitigation such as mufflers, acoustic barriers, and enclosures around continuously operating items (such as pumps and generators) would reduce the noise impacts at the source. Activities generating high levels noise and vibration in close proximity to sensitive receptors may require bespoke method statements outlining how the noise and vibration criteria will be complied with.	C: Minor adverse D: Minor adverse	Depending on the locations of the construction works and the activities required, a noise and vibration monitoring strategy may be agreed with the relevant stakeholders to ensure compliance with the agreed noise and vibration threshold values.
• Noise impacts due to open cut trenching along the cable route;	✓	×	✓	C: Low D: Low	C: Medium D: Medium	C: Minor adverse D: Minor adverse	N/A	C: Minor adverse D: Minor adverse	
• Noise and vibration impacts due to the construction of the main substation and	✓	×	✓	C: Medium D: Medium	C: Medium D: Medium	C: Moderate adverse D: Moderate adverse	Enhanced acoustic mitigation such as mufflers, acoustic barriers, and enclosures around	C: Minor adverse D: Minor adverse	Depending on the locations of the construction works and the activities required, a noise and vibration monitoring strategy may

Description of impact	Phase[a]			Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
	C	O	D						
NGET substations; and							continuously operating items (such as pumps and generators) would reduce the noise impacts at the source		be agreed with the relevant stakeholders to ensure compliance with the agreed noise and vibration threshold values.
• Noise impacts due to additional vehicle movements on local highway networks	✓	×	✓	C: Low D: Low	C: Medium D: Medium	C: Minor adverse D: Minor adverse	N/A	C: Minor adverse D: Minor adverse	

[a] C=construction, O=operational and maintenance, D=decommissioning

Table 13.31: Summary of potential cumulative environmental effects and monitoring.

Description of effect	Phase[a]			Magnitude of impact	Sensitivity of the receptor	Significance of effect	Residual effect	Proposed monitoring
	C	O	D					
Tier 1								
Noise and vibration impacts from construction and decommissioning activities	✓	×	✓	C: Low D: Low	C: Medium D: Medium	C: Minor adverse D: Minor adverse	C: Minor adverse D: Minor adverse	
Noise and vibration impacts from the operation of the Project	×	✓	×	C: Low D: Low	C: Medium D: Medium	C: Minor adverse D: Minor adverse	C: Minor adverse D: Minor adverse	
Tier 2								
Noise and vibration impacts from construction and decommissioning activities	✓	×	✓	C: Low D: Low	C: Medium D: Medium	C: Minor adverse D: Minor adverse	C: Minor adverse D: Minor adverse	
Noise and vibration impacts from the operation of the Project	×	✓	×	C: Low D: Low	C: Medium D: Medium	C: Minor adverse D: Minor adverse	C: Minor adverse D: Minor adverse	

[a] C=construction, O=operational and maintenance, D=decommissioning

13.15 Next steps

13.15.1.1 The design of the Project will be refined during the EIA process to confirm the routing of the cable corridor, as well as the locations and equipment to be installed in the solar PV installation areas and substation sites. The updated construction and operational noise assessments will inform the selection of mitigation measures in consultation with the local planning authorities.

13.15.1.2 Additional baseline survey measurements will be undertaken to quantify the noise climate at human and recreational receptors (receptors on public rights of way), where each is necessary, to ensure all relevant noise impact criteria are suitably representative following design refinement.

13.15.1.3 The assessment of impacts due to increased construction traffic flows on local highway networks will also be updated in line with refinements of the traffic and transport assessment. Additionally, a full noise assessment will be undertaken for the main substation and NGET substations based on the plant list and detailed layout.

13.15.1.4 Mitigation measures can be implemented at the source or between the source and receiver of noise. This includes careful plant selection and design, acoustic enclosures, and barriers. The noise management plan will set out agreed principles and parameters for noise attenuation, which will be incorporated into future noise modelling, as part of the final application.

13.15.1.5 Measures to manage potential construction effects will be further developed and set out in the CoCP. As above, those measures will be developed in consultation with the relevant local planning authorities. This will also include proposed construction hours, covering the different construction sites and types of construction activities that are anticipated for the Project.

13.16 References

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