

Proposed Solar PV Development

Preliminary Environmental Information Report

Chapter 11 Noise & Vibration

Byers Gill Solar

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11. Noise and Vibration

11.1. Introduction

- 11.1.1. This chapter presents the findings of the preliminary assessment of the likely significant effects arising from the construction, operation and decommissioning of the Proposed Development on Noise and Vibration.
- 11.1.2. This chapter details the methodology followed for the assessment, summarises the regulatory and policy framework, and describes the existing environment in the area surrounding the Proposed Development. Following this, the design, mitigation and residual effects of the Proposed Development within the limitations of the assessment are presented.
- 11.1.3. Noise and Vibration aspects considered within the chapter for the Proposed Development include:
- The potential impact of noise and vibration from the construction activities upon the nearest existing sensitive receptors
 - The potential impact of noise and vibration from construction traffic whilst on site and whilst using the road network on existing sensitive receptors
 - The potential impact of noise from the proposed operation including any plant and operational traffic related to the development upon the nearest existing sensitive receptors
 - The assessment methodology
 - Outline potential mitigation measures
- 11.1.4. Some of the content discussed in this chapter will cross-refer with discussions in other chapters. It may be useful to make reference to other chapters, most notably; Chapter 12 Traffic and Transport.
- 11.1.5. The approach to cumulative assessment of both in-combination effects across disciplines and with other projects is outlined in Chapter 13 Cumulative Effects. Further information is required to allow for a proportionate assessment to be made including the agreement of a list of cumulative developments to be considered.
- 11.1.6. Where in-combination effects are identified cross topics, these will be considered during the assessment process and reported within the appropriate topic chapter where the effect has been identified.

11.2. Competent expert advice

- 11.2.1. The chapter has been undertaken by Rosie Pitt, an Associate Director with over 10 years' experience in acoustics and vibration and full member of the Institute of Acoustics.

- 11.2.2. The chapter was reviewed by Mark Dawson, a Technical Director with over 30 years of experience in the acoustics and vibration and is a full member of the Institute of Acoustics.

11.3. Legislative and policy framework

- 11.3.1. The relevant legislation, planning policy and guidelines which underpin the assessment methodology for this chapter and inform the scope of the assessment are outlined in this section.

Legislation

The Control Pollution Act 1974 (COPA), 1974, is the key legislation of relevance for the assessment.

- 11.3.2. The Control of Pollution Act 1974 (COPA 1974) gives the local authority power to serve a notice under Section 60 imposing requirements as to the way in which works are to be carried out. This could specify times of operation, maximum levels of noise which should be emitted and the type of plant which should or should not be used.
- 11.3.3. However it may be preferable for the chosen contractor to obtain prior consent under Section 61 of COPA 1974. Section 61, enables anyone who intends to carry out works to apply to the local authority for consent. Under Section 61 the local authorities and those responsible for demolition and construction work, have an opportunity to settle any problems, relating to the potential noise, before work starts.

Policy

- 11.3.4. The following national and local policies of relevance have been considered:

National

- 11.3.5. The national policies of relevance include:

National Policy Statements

- 11.3.6. The Overarching National Policy Statement (NPS) for Energy (EN-1) [1] sets out the national policy for energy infrastructure and has influence on the decisions by the Infrastructure Planning Commission (IPC) (now Secretary of State or SoS) on applications for energy developments. Applicants should ensure that their applications are consistent with the instructions and guidance in the NPS.
- 11.3.7. Section 5.11 of NPS EN-1 sets out the national policy relating to noise and vibration impacts relating to nationally significant energy infrastructure development. It sets out how noise should be assessed by the applicant, stating under paragraph 5.11.6 that operational noise with respect to human receptors should be assessed using the principles of relevant British Standards and other guidance.

- 11.3.8. NPS EN-3 [2], Renewable Energy Infrastructure does not include specific reference to solar technologies however, alongside the NPS for Electricity Networks Infrastructure (EN-5) [3], should be read alongside NPS EN-1 where relevant to a project.
- 11.3.9. See Appendix 1.1 Planning Policy Framework for further detail on NPS policy regarding noise.

Draft National Policy Statements

- 11.3.10. On 30 March 2023, a draft suite of revised energy NPS were published for public consultation, which is ongoing at the time of preparation of this PEIR. Paragraphs 3.10.111 to 3.10.117 of draft NPS EN-3 [4] identifies the potential for effects relating to construction, including transport noise. The revised energy NPS are not designated and therefore the existing NPS EN-1, EN-3 and EN-5 remain the national policy documents of most relevance and importance, however the revised NPS are summarised in PEIR Appendix 1.1 Planning Policy Framework.

National Planning Policy Framework

- 11.3.11. In February 2021 the National Planning Policy Framework (NPPF) was amended as the current planning policy guidance within England.

- 11.3.12. Paragraph 185 of the NPPF states:

‘Planning policies and decisions should also ensure that new development is appropriate for its location taking in 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 impact 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 impact on health and the quality of life;*
- b. Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason’...*

- 11.3.13. Paragraph 187 of the NPPF states:

‘Planning policies and decisions should ensure that new development can be integrated with existing business and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or ‘agent of change’) should be required to provide suitable mitigation before the development has been completed.’

Noise Policy Statement for England

- 11.3.14. With regard to ‘significant adverse impacts on health and the quality of life’ the NPPF refers to the ‘Noise Policy Statement for England’ (NPSE).
- 11.3.15. The Noise Policy Statement for England refers to the World Health Organisation when discussing noise impacts and introduces observed effect levels which are based on established concepts from toxicology that are applied to noise impacts by WHO.
- 11.3.16. Three levels are defined as follows:
- ‘NOEL – No Observed Effect Level - This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.
 - LOAEL – Lowest Observed Adverse Effect Level - This is the level above which adverse effects on health and quality of life can be detected.
 - SOAEL – Significant Observed Adverse Effect Level - This is the level above which significant adverse effects on health and quality of life occur’.
- 11.3.17. The first aim of the NPSE states that significant adverse effects on health and quality of life should be avoided. The second aim refers to the situation where the impact lies somewhere between LOAEL and SOAEL, and it requires that all reasonable steps are taken to mitigate and minimise the adverse effects of noise. However, this does not mean that such adverse effects cannot occur.

Local

- 11.3.18. The Proposed Development lies within the administrative boundaries of Darlington Borough Council, Stockton-on-Tees Borough Council and Durham County Council. Local planning policy of relevance to the assessment which would be considered includes:
- Darlington Borough Council Local Plan: Policy DC3 Health and Wellbeing, Policy DC4: Safeguarding Amenity;
 - Stockton-on-Tees Borough Council Local Plan: Policy ENV7 Ground, Air, Water, Noise and Light Pollution; and
 - County Durham Plan: Policy 31 Amenity and Pollution.

Guidance

- 11.3.19. The following guidance informs the assessment:

Planning Practice Guidance – Noise, 2019;

- 11.3.20. The Planning Practice Guidance (PPG) provides further detail about how the effect levels can be recognised. Above the NOEL noise becomes noticeable, however it has no adverse effect as it does not cause any change in behaviour or attitude. Once noise crosses the LOAEL threshold it begins to have an adverse effect and consideration

needs to be given to mitigating and minimising those effects, taking account of the economic and social benefits being derived from the activity causing the noise. Increasing noise exposure further might cause the SOAEL threshold to be crossed. If the exposure is above this level the planning process should be used to avoid the effect occurring by use of appropriate mitigation such as by altering the design and layout. Such decisions must be made taking account of the economic and social benefit of the activity causing the noise, but it is undesirable for such exposure to be caused. At the highest extreme the situation should be prevented from occurring regardless of the benefits which might arise. Table 11-1 summarises the noise exposure hierarchy.

Table 11-1 National Planning Practice Guidance noise exposure hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, 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 non-awakening sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, 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
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

- 11.3.21. The PPG summarises the approach to be taken when assessing noise. It accepts that noise can override other planning concerns, but states:
- 11.3.22. “Neither the Noise Policy Statement for England nor the National Planning Policy Framework (which reflects the Noise Policy Statement) expects noise to be considered in isolation, separate from the economic, social and other environmental dimensions of Proposed Development”

Guidelines for Environmental Noise Impact Assessment, 2014;

- 11.3.23. The guidelines considers the key principles of noise impact assessment and are applicable to all development proposals where noise effects are likely to occur. The guidance covers the following:
- How to Scope a noise assessment;
 - Issues to be considered when defining the baseline noise environment;
 - Prediction of changes in noise levels as a result of implementing development proposals; and
 - Definition and evaluation of the significance of the effect of changes in noise levels.

British Standard 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings – code of practice (BS8233);

- 11.3.24. British Standard 8233 “Guidance on sound insulation and noise reduction for buildings” 2014, suggests the following guideline noise levels and states that they are based on guidelines issued by the World Health Organisation;
- 35 dB L_{Aeq} (16 hour) during the day time in noise sensitive rooms;
 - 30 dB L_{Aeq} (8 hour) during the night time in bedrooms;
 - 45 dB $L_{Af,Max}$ during the night time in bedrooms ;
 - 50 dB L_{Aeq} (16 hour) desirable external noise levels for amenity space such as gardens and patios; and
 - 55 dB L_{Aeq} (16 hour) upper guideline value which would be acceptable in noisier environments.

- 11.3.25. In addition, for internal noise levels it states;

“Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.”

- 11.3.26. Furthermore, with regard to external noise, the Standard states:

“However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs

can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited”.

British Standard 4142:2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Noise;

- 11.3.27. BS4142 is used to rate and assess sound of an industrial and/or commercial nature including:
- sound from industrial and manufacturing processes;
 - sound from fixed installations which comprise mechanical and electrical plant and equipment;
 - sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
 - sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.
- 11.3.28. The standard is applicable to the determination of the following levels at outdoor locations:
- rating levels for sources of sound of an industrial and/or commercial nature; and
 - ambient, background and residual sound levels, for the purposes of:
 1. Investigating complaints;
 2. Assessing sound from proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature; and
 3. Assessing sound at proposed new dwellings or premises used for residential purposes.
- 11.3.29. The purpose of the BS4142 assessment procedure is to assess the significance of sound of an industrial and/or commercial nature.
- 11.3.30. BS4142 refers to noise from the industrial source as the ‘specific noise’ and this is the term used in this report to refer to noise which is predicted to occur due to activities associated with industrial noise. The ‘specific noise’ sources, of the existing industrial premises that have been observed are detailed in Section 3 of this report.
- 11.3.31. BS4142 assesses the significance of impacts by comparing the specific noise level to the background noise level (LA90). Section 3 of this report provides details of the background noise survey undertaken.
- 11.3.32. Certain acoustic features can increase the significance of impacts over that expected from a simple comparison between the specific noise level and the background noise level. In particular, BS4142 identifies that the absolute level of sound, the character, and the residual sound and the sensitivity of receptor should all be taken into consideration. BS4142 includes allowances for a rating penalty to be added if it is found that the specific noise source contains a tone, impulse and/or other characteristic, or is

expected to be present. The specific noise level along with any applicable correction is referred to as the 'rating level'.

- 11.3.33. The greater the increase between the rating level over the background noise level, the greater the magnitude of the impact. The assessment criteria given by BS4142 are as follows:
- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;
 - A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context; and
 - The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. 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.
- 11.3.34. During the daytime, BS4142 requires that noise levels are assessed over 1-hour periods. However, during the night-time, noise levels are required to be assessed over 15-minute periods.
- 11.3.35. Where the initial estimate of the impact needs to be modified due to context, BS4142 states that all pertinent factors should be taken into consideration, including:
- The absolute level of sound;
 - The character and level of the residual sound compared to the character and level of the specific sound;
 - The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions; and
 - BS5228:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise (BS5228-1), and Part 2: Vibration (BS5228-2).
- 11.3.36. The activities associated with the demolition, earthworks and construction phase of the Proposed Development will have the potential to generate noise and create an impact on the surrounding area.
- 11.3.37. Guidance on the prediction and assessment of noise from development sites is given in British Standard 5228-1:2009+A1:2014 “Code of Practice for noise and vibration control on construction and open sites – Part 1: Noise” (BS5228-1) and BRE Controlling particles, vapour and noise pollution from construction sites, Parts 1 to 5, 2003.
- 11.3.38. Demolition and construction noise can have a disturbing effect on the surrounding neighbourhood. The effects are varied and are complicated further by the nature of the site works, which will be characterised by the type of noise sources and their locations throughout the demolition and construction period. The duration of site operation is

also an important consideration. Higher noise levels may be acceptable if it is known that the levels will occur for a limited period.

- 11.3.39. In addition to COPA 1974, BS5228-1 provides guidance on significance criteria for assessing the potential noise impacts associated with the demolition and construction phase of large projects. For the purposes of this noise assessment, the noise likely to be generated by the demolition and earthworks and construction phase, have been assessed against significance criteria established, using the BS5228-1 ABC Method.
- 11.3.40. The ABC method for determining significance criteria requires the ambient noise levels at existing sensitive receptors to be determined. The ambient noise levels at each existing receptor location are then rounded to the nearest 5dB(A) to determine the appropriate threshold value in accordance with the category value, A B or C, as detailed in Table 11-2.

Table 11-2 Thresholds of Significant Impact from Construction Noise at Residential Receptors in accordance with the ABC Method of BS5228-1

Assessment Category and Threshold Value Period (L_{Aeq})	Threshold Value, in decibels (dB)		
	Category A *1	Category B *2	Category C *3
Daytime (0700 to 1900 hours) and Saturdays (0700 to 1300 hours)	65	70	75
*1 Category A: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than this value.			
*2 Category B: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as Category A values.			
*3 Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than Category A values.			

- 11.3.41. The noise level likely to be generated at the receptor during the demolition and construction phase, i.e. the ambient noise level plus demolition and construction noise, is then compared to the appropriate category value. If the noise level is greater than the appropriate category value, a significant noise impact may be registered.
- 11.3.42. For the purposes of this assessment it is possible to estimate the degree of impact from the site works (demolition, earthworks and construction), according to the suggested standards, by reference to the time periods during which noise levels may occur in excess of the quoted values. These levels can be seen in Table 11-3.

Table 11-3 Construction Noise Assessment Significance Criteria

Magnitude of Impact	Criteria for assessing Construction Noise Impact
Large	Noise levels exceed the Assessment Category threshold level for the duration of the construction works.

Medium	Noise levels exceed the Assessment Category threshold level for periods of more than one month, but for significantly less than the whole duration of the construction works.
Small	Noise levels exceed the Assessment Category threshold level for periods of less than one month.
Negligible	Noise levels do not exceed the Assessment Category threshold level during any period.

- 11.3.43. Work involving heavy plant on an open site is likely to generate vibration, which may, in certain circumstances, propagate beyond the boundary of the site. In situations where particularly heavy plant, vibrating compaction equipment or piling rigs are being used close to the site boundary, nearby properties may experience ground-borne vibration.
- 11.3.44. Guidance on the assessment of vibration from a development site is given in British Standard 5228-2:2009+A1:2014 “Code of Practice for noise and vibration control on construction and open Sites – Part 2: Vibration” (BS5228-2). BS5228-2 2009+A1:2014 indicates that vibration can have disturbing effects on the surrounding neighbourhood; especially where particularly sensitive operations may be taking place. The significance of vibration levels which may be experienced adjacent to a site is dependent upon the nature of the source.
- 11.3.45. It is not possible to mitigate vibration emissions from an open site. It is important therefore to examine the proposed working method to ascertain what, if any, operations would be likely to cause unacceptable levels of vibration at nearby sensitive locations. It is possible that these operations could be modified to reduce their vibration impacts.
- 11.3.46. BS5228-2 indicates that the threshold of perception is generally accepted to be between a peak particle velocity (PPV) of 0.14 and 0.3mm/sec. In an urban situation it is unlikely that such vibration levels would be noticed. BS5228-2 also indicates that it is likely that vibration of 1.0 mm/s in residential environments will cause complaint, but can be tolerated if prior warning and explanation have been given to residents. The standard also indicates that 10 mm/s is likely to be intolerable for any more than a very brief exposure to this level.
- 11.3.47. The Highways Agency Research report No. 53 “Ground Vibration caused by Civil Engineering Works” 1986 suggests that, when vibration levels from an unusual source exceed the human threshold of perception, complaints may occur. The onset of complaints due to continuous vibration is probable when the PPV exceeds 3mm/sec.
- 11.3.48. British Standard BS6472: 2008 “Guide to Evaluation of human exposure to vibration in buildings. Part 1: Vibration sources other than blasting” (BS6472-1) suggests that adverse comments or complaints due to continuous vibration are rare in residential situations below a PPV of 0.8mm/sec. Continuous vibration is defined as “vibration which continues uninterrupted for either a daytime period of 16 hours or a night-time

period of 8 hours”. The proposed demolition, earthworks and construction works at the site will not cause continuous vibration as defined in BS6472-1.

- 11.3.49. Human perception of vibration is extremely sensitive. People can detect and be annoyed by vibration before there is any risk of structural damage. Cases where damage to a building has been attributed to the effects of vibration alone are extremely rare; even when vibration has been considered to be intolerable by the occupants.
- 11.3.50. It is not possible to establish exact vibration damage thresholds that may be applied in all situations. The likelihood of vibration induced damage or nuisance will depend upon the nature of the source, the characteristics of the intervening solid and drift geology and the response pattern of the structures around the site. Most of these variables are too complex to quantify accurately and thresholds of damage, or nuisance, are therefore conservative estimates based on a knowledge of engineering.
- 11.3.51. Where ground vibration is of a relatively continuous nature, there is a greater likelihood of structural damage occurring, compared to transient vibration; for example that caused by transiting vehicles.
- 11.3.52. BS5228-2 suggests that the onset of cosmetic damage is 15mm/sec (15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz for residential or light commercial type buildings).

The adverse residual impacts are assessed against the categories set out in Table 11-4.

Table 11-4 Construction Vibration Assessment Significance Criteria

Magnitude of Impact	Criteria for Assessing Construction Vibration impact
Large	> 10mm per sec. Vibration likely to be intolerable for more than brief exposure. Approaching the level at which cosmetic damage may occur in light structures.
Medium	5mm - 10mm per second. Tolerance less likely even with prior warning and explanation.
Small	1mm – 5mm per second. Complaints are likely, but can be tolerated if prior warning and explanation given.
Negligible	<1mm per second. Below level at which complaints are likely.

11.4. Assessment Methodology

- 11.4.1. Noise and vibration emissions due to the Proposed Development will occur during the construction, and decommissioning phases. The noise and vibration levels during the construction and decommissioning phases are likely to be similar. Noise emissions due to the Proposed Development during the operational phase of the development may also occur.
- 11.4.2. The noise assessment will be undertaken using the following steps:
 - Baseline noise monitoring to establish the existing noise levels at existing sensitive receptors. The monitoring has been undertaken in line with guidelines outlined in this

chapter to determine representative noise levels at the receptors during the daytime (0700-2300hrs) and night-time(2300-0700hrs). The survey is described in paragraph 11.4.3;

- Noise modelling using modelling software will be undertaken, taking into account the proposed site layout, proposed equipment noise levels and traffic data (operational phase) to predict noise levels at receptors associated with the Proposed Development;
- A comparison will be undertaken of the existing and proposed noise levels during the operational phase to determine the magnitude of impact and significant effects, according to the guidelines;
- An estimate of the degree of impact of the construction/decommissioning noise and vibration will be undertaken according to the suggested standards outlined in this chapter, by reference to the time periods, during which noise and vibration may occur in excess of quoted values;
- Review of requirements for potential noise mitigation;
- Re-assess magnitude of impact and subsequent residual significant effects; and
- Production of ES Chapter and associated Appendices.

11.4.3. Background noise monitoring was undertaken between 18th and 21st April 2023 at nine locations around the site that are considered representative of the nearest noise sensitive receptors. The monitoring was undertaken during dry calm weather with low wind speeds in line with relevant noise monitoring guidelines. The monitoring location are shown in Figure 11.2, and the. The monitoring data is shown in full in Appendix 11.1.

11.4.4. These monitoring data will be compared with predicted noise levels associated with the Proposed Development in line with guidelines, to determine the potential impact of the Proposed Development. This assessment will be completed as part of the ES, using the final design of the Proposed Development.

11.5. Scoping and Consultation

Scoping

11.5.1. An EIA Scoping Report was submitted to PINS on 27 October 2022, with an EIA Scoping Opinion received on 6 December 2022. Table 11-5 includes a summary of how this chapter of the PEIR has responded to each scoping opinion comment.

Table 11-5 Response to the Scoping Opinion

ID	Reference	Stakeholder	Comment	Response
3.7.19	Table 11.13 and paragraphs 11.10.16 to 11.10.35		<p>Noise and Vibration from traffic – All Phases</p> <p>The anticipated number of traffic movements during construction is set out in Scoping Report paragraph 11.10.13. Paragraph 11.10.24 states that movements during operation will be minimal. Construction traffic is proposed to be managed through a CTMP.</p> <p>The ES should clarify the number of anticipated movements during construction and operation and explain why the number and vehicle type of construction traffic movements would not have potential to lead to significant effects in line with relevant guidance.</p>	<p>Mitigation measures to manage traffic movements will be included in the Outline EMP and Outline Construction Traffic Management Plan (CTMP).</p> <p>An assessment of traffic movements will be provided within the ES. A preliminary assessment of traffic movements is provided in PEIR Chapter 12 Traffic and Transport.</p> <p>Traffic during the operational phase is estimated to be, less than 1 vehicle a day in section 10 of the transport chapter and is therefore not expected to be cause an adverse impact</p>
3.7.20	Table 11.13 and paragraphs 11.10.16 to 11.10.35	PINS	<p>Noise and Vibration from activities – All Phases</p> <p>The Scoping Report proposes to scope out effects from noise and vibration from activities for all phases on the basis that construction and decommissioning would be controlled through the CEMP and the Decommissioning Environmental Management Plan (DEMP) by adherence to best practice measures, specifically BS5228:2009+A1:2014 ‘Code of practice for noise and vibration control on construction and open sites – Part 1: Noise and Section 8 of British Standard 5228:2009+A1:2014 ‘Part 2: Vibration’. Effects during operation are not anticipated due to the nature of the infrastructure and where it has potential for impact e.g. battery storage would be located towards the centre of the array sites, away from receptors.</p> <p>The Inspectorate notes that some receptors identified in Scoping Report paragraph 11.10.8 are located within close proximity of the Proposed Development (10m). The Scoping Report does not anticipate the duration of and degree of impact from activities during construction and decommissioning relative to the baseline environment. The Inspectorate also considers there remains potential impacts during operation from battery cooling fans and tracker panels as the locations in relation to receptors have not been secured.</p>	<p>The predicted noise level from the Proposed Development will be modelled and assessed in line with relevant guidelines . Based on professional experience it is considered likely that the impact of the Proposed Development will be low to negligible and mitigation measures are likely to be minimal if required</p>

			<p>The Inspectorate considers that the Scoping Report lacks clarity regarding the specific measures to be adopted to control noise impacts and does not consider that sufficient evidence has been provided to demonstrate that significant noise and vibration effects will not arise. The ES should provide data to characterise the baseline noise environment and demonstrate that construction activities (e.g. piling) and operational plant (e.g. battery cooling infrastructure) will not give rise to significant effects. Proposed Development</p>	
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Consultation

11.5.2. The results of consultation carried out as part of the assessment are summarised in Table 11-6 below.

Table 11-6 Response to Consultation

Stakeholder	Comment	Response
Stockton on Tees Borough Council	Proposed survey and assessment methodology issued via email on 3 rd of April 2023 to the Council from Wardell Armstrong	<p>A response was received on 17th April stating the following requirements:</p> <ul style="list-style-type: none"> ▪ In line with BS4142 guidelines, the predicted rating level of the Proposed Development should not exceed background noise levels by more than 5dB ▪ There should be no increase to ambient noise levels at receptors due to noise from the Proposed Development
Darlington Borough Council	Proposed survey and assessment methodology issued via email on 17 th of April 2023 to the Council from Wardell Armstrong	Response received on 21 st of April 2023 confirming the proposed methodology

11.6. Assessment Assumptions and Limitations

11.6.1. This PEIR provides preliminary information based on the development of the Proposed Development to date and the data gathered at this point in time. Some of the information gathered will be supplemented and provided in full and final form within the ES.

11.6.2. The PEIR is intended to deal with consultation responses and a more detailed assessment of the identified direct effects and potential indirect amenity effects on identified sensitive receptors will be undertaken at the ES stage, drawing on the further assessment work of other disciplines.

11.7. Study Area

11.7.1. For the purpose of the noise assessment, the study area will consist of the Site Area up to 300m from the Proposed Development where there any existing noise sensitive receptors in line with best practice. No specific dimension of a study area is given for assessment of industrial and commercial sound or construction noise and vibration; however, our professional judgment is that 300m is sufficient to encompass noise sensitive receptors potentially affected by a proposal of this type and has been used for this assessment. Where a receptor sits slightly outside the 300m buffer, but is representative of receptors in a certain direction, it has been included for completeness and to ensure a robust assessment.

11.8. Baseline Conditions

- 11.8.1. The baseline conditions for the Proposed Development at the time of the PEIR are presented below.
- 11.8.2. The Proposed Development is in a rural area of low population density, except for individual settlements such as Bishopton and Redmarshall to the north and Carlton to the east. Potential noise-sensitive dwellings are located within these settlements or as more isolated properties or farms. The nearest identified sensitive receptors to the Proposed Development are shown in Figure 11.1.

Panel Area A: Brafferton

- Properties in towns and settlements: Brafferton village 6km to the west, Newton Ketton 3km to the east;
- Local farms: Lovesome Hill Farm both within 100m north and west, High House 150m north, High Grange 500m north and East Ketton immediately south; and
- Ecological receptors: there are no onsite ecological receptors. The nearest designated sites are Redcar Field SSSI which is approximately 650m to the west of Panel Area A and Newton Ketton Meadow SSSI located approximately 900m to the east of Panel Area A.

Panel Area B: Hauxley Farm

- Properties in towns and settlements: there are no nearby towns or settlements;
- Local farms: Oat Hill Farm immediately west, Stainton Hill House immediately north, Fir Tree Farm approximately 300m southwest and Hauxley Farm which lies in the centre of Panel Area B; and
- Ecological receptors: there are no onsite ecological receptors. The nearest site is Newton Ketton Meadow SSSI located approximately 450m to the south of Panel Area B.

Panel Area C: Byers Gill Wood

- Properties in towns and settlements: there are no nearby towns or settlements;
- Local farms: The Mount immediately east, Viewley Hill Farm 350m east, Long Pasture Farm 500m southeast and Mount Pleasant Farm which lies in the centre of Panel Area B; and
- Ecological receptors: Byers Gill Wood and Square Wood within the centre of Panel Area C, Galloping Hill Plantation located east, with Nova Scotia Plantation and Catkill Lane Plantations to the south. The nearest designated site is Newton Ketton Meadow SSSI located approximately 100m to the west of Panel Area C.

Panel Area D: Great Stainton

- Properties in towns and settlements: Great Stainton village lies 10m north west;
- Local farms: Viewley Farm 250m west, Broad Lea farm 400m east, Woogra Farm 300m east and Mount Pleasant Farm 250m south west; and
- Ecological receptors: there are no onsite ecological receptors. The nearest designated site is Newton Ketton Meadow SSSI located approximately 1.5km to the south of Panel Area D.

Panel Area E: West of Bishopton

- Properties in towns and settlements: residential properties approximately 40m north and the small rural village Bishopton, along the north-western boundary;
- Local Farms: New Summer Farm adjacent to the northern site boundary of Panel Area E. and
- Ecological receptors: there are no onsite ecological receptors. The nearest designated site is Whitton Bridge Pasture SSSI located approximately 2.5km to the east of Panel Area E.

Panel Area F: North of Bishopton

- Properties in towns and settlements: Bishopton Village lies approximately 10m south, with Old Stillington village approximately 220m north;
- Local farms: Downland Farm which lies encircled in Panel Area F, Adeux Lodge 300m east, Glebe Farm 500m south-east and West House Farm immediately east; and
- Ecological receptors: there are no onsite ecological receptors. The nearest designated site is Whitton Bridge Pasture SSSI, located approximately 900m to the east of Panel Area F.

11.9. Potential effects

Construction

11.9.1. During the construction phase, the Proposed Development may produce the following effects:

- construction traffic, including Heavy Goods Vehicles (HGV) trips to and from the Site Area; and
- construction activities, including preparatory works, and installation of solar PV modules and supporting equipment. These may include activities such as site clearance and ground excavation, which could all be sources of noise and vibration.

11.9.2. Construction of the Proposed Development will be transient in nature and best working practice will be implemented to ensure the effects associated with noise and vibrations are likely to be less significant.

Operation

11.9.3. During the operational phase, the Proposed Development may produce the following effects:

- Road traffic to and from the Proposed Development; and
- supporting infrastructure including inverters and transformers, Battery Energy Storage System (BESS) and the on-site substation.

Decommissioning

11.9.4. During the decommissioning phase, the methods and duration of works is expected to be similar to or lower than the construction phase meaning the potential effects will be

similar or less. Therefore, control and management procedures do not require explicit consideration.

11.10. Design, mitigation and enhancements

Embedded design measures

11.10.1. Inverters and any other sources of noise associated with the operational phase of the development have been located as far as reasonably possible from existing sensitive receptors, within the design, to minimise potential noise levels at the receptors. The inverters will also be housed within containers which will further reduce the noise levels at source. Best practicable measures will be employed during the construction phase to ensure construction noise is kept to a minimum.

Construction mitigation

11.10.2. It is proposed that any potential noise and vibration impacts are managed through the implementation of mitigation and management measures through the Construction Environmental Management Plan (CEMP). Travel planning and HGV management mitigation measures during the construction stage will be incorporated into a Construction Traffic Management Plan (CTMP).

11.10.3. An Outline EMP will be produced as part of the DCO application which will outline the environmental and ecological mitigation measures to be implemented during the construction phase. This will include the appointment of an Environmental Clerk of Works to advise and supervise the mitigation measures outlined in the CEMP. The measures, outlined in the OEMP will be carried forward to a CEMP, which will be produced by the appointed construction contractor and agreed with the relevant local planning authorities prior to construction.

11.10.4. Measures to control noise as defined in Annex B of BS 5228:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites - Part 1: Noise' and measures to control vibration as defined in Section 8 of BS 5228:2009+A1:2014 'Part 2: Vibration' will be adopted where reasonably practicable. These measures represent 'Best Practicable Means' (BPM) (as defined by section 72 of the Control of Pollution Act 1974) to manage noise and vibration emissions from construction activities. Measures will be included in the Outline EMP, which will be developed into a CEMP prior to the start of construction.

Operation mitigation

11.10.5. Based on similar types of development, there is a low likelihood of significant adverse noise and impacts resulting from the operational phase of the Proposed Development. If any additional mitigation measures, beyond those embedded into the design are required to reduce noise levels associated with the Proposed Development, these could include noise barriers around the noise sources, or selection of equipment with lower sound power levels.

Enhancement

11.10.6. There is no scope for enhancement in terms of noise and vibration.

11.11. Assessment of likely significant effects

Construction

- 11.11.1. There is the potential for noise and vibration effects due to construction traffic, as HGV trips to and from the Proposed Development will be required to deliver materials and equipment. These vehicle trips would be temporary and would be unlikely to include large scale material removal or delivery. For instance, due to the nature of the Proposed Development, it is unlikely there will be a need to remove large amounts of demolition material, spoil, earth etc. from the site, nor a need for large amounts of construction materials such as concrete to be delivered.
- 11.11.2. An assessment of estimated construction traffic vehicles, generated by the Proposed Development, has been undertaken, as outlined in Chapter 12. This assessment calculated that there will be approximately 6 HGV trips (12 HGV movements in total) per site per day. This has been calculated in Chapter 12 as a potential worst-case increase of 72 movements per day, is predicted to occur, which is determined to be less than a 10% change in current traffic levels.
- 11.11.3. A change of less than 10% in traffic is not discernible, therefore while there may be short term temporary noise impacts due to construction traffic, it is very unlikely that these would be sufficient to constitute a significant effect due to the temporary nature, and the relatively low volume of movements.
- 11.11.4. Perceptible vibration due to construction traffic is also unlikely, except for situations where construction traffic passes very close (i.e., within a few metres) to residential properties. However, this would occur for short periods only. As such, and because any vibration would be minor at worst, significant vibration effects due to vibration caused by construction traffic are unlikely.
- 11.11.5. Potential noise and vibration effects during the construction and decommissioning phases are likely to include works activities associated with site preparation, plant installation, substation construction, cable laying, and construction-related vehicle trips within the Site Area and along access routes.
- 11.11.6. Direct effects on designated sites are unlikely, the closest designated ecological receptor is Newton Ketton Meadow SSSI located approximately 100m to the west of Panel Area C, which is designated for plants only, which would not be impacted by noise or vibration.

Operation

- 11.11.7. During the operational phase, it is possible that noise could be generated by road traffic to and from the Proposed Development, as well as by the operation of electrical plant and equipment, such as inverters or transformers that would be installed.
- 11.11.8. Traffic trips to and from the Proposed Development during operation will be for maintenance purposes only and will be minimal. It is considered that the volume of traffic trips generated by the Proposed Development. will cause significant noise or vibration effects.
- 11.11.9. A BS4142 assessment will be carried out at locations representative of the ESRs within 300m of noise emitting infrastructure.

Decommissioning

- 11.11.10. During the decommissioning phase, the intensity/duration of work is expected to be similar to or lower than the construction phase, therefore the potential effects will be similar or lower.

Preliminary Construction/Decommissioning Assessment

- 11.11.11. Construction and decommissioning of the Proposed Development would be likely to have an overall negligible impact on existing sensitive receptors. The traffic associated with the construction of the Proposed Development which is expected to have an insignificant impact on existing sensitive receptors as it is determined to be less than a 10% increase in current traffic flow. This would likely be less for decommissioning. Noise and vibration from the construction/decommissioning activities are also expected to be negligible as it will primarily consist of site preparation and substation construction/decommissioning, which will be short in duration and controlled with a CEMP. As the closest designated ecological receptor, Newton Ketton Meadow SSSI, is 100m to the west of Panel Area C, which is designated for plants only, direct impacts from construction/decommissioning are unlikely.

Preliminary Operational Assessment

- 11.11.12. Operation of the Proposed Development would have a long-term effect on existing receptors, but the majority of the solar farm will not produce noise which means the noise impact is likely to be minor adverse/negligible. Any potential impact may be a result of the BESS and supporting infrastructure, such as inverters, transformers, and the on-site substations. A noise survey has been carried out at the receptors closest to the supporting infrastructure to assess whether any mitigation will be needed.

11.12. Monitoring

- 11.12.1. It is considered unlikely that monitoring would be required during the operational phase of the Proposed Development. This would not normally be a requirement for this type of development. If at the detailed design stage, it is proposed to include this, this could be addressed as part of a noise management plan and would likely consist of spot measurements at pre-agreed locations and intervals to ensure any noise limits implemented are achieved.
- 11.12.2. There is unlikely to be any requirement for noise and vibration monitoring during the construction, operation or decommissioning phases. However, once the construction/decommissioning methods are defined, this can be agreed within a CEMP.

11.13. Summary

- 11.13.1. This chapter has considered:
- The potential impact of noise and vibration on sensitive receptors during the construction and decommissioning phase; and
 - The potential impact of noise on sensitive receptors during the operational phase of the development.

Table 11-7 Summary of effects

Receptor type	Description of potential impact	Embedded design, mitigation, and enhancement measures	Sensitivity of receptor	Duration and reversibility	Magnitude of impact	Significance of effect
Residential	<ul style="list-style-type: none"> Construction/decommissioning Traffic noise and vibration 	<ul style="list-style-type: none"> Low level of traffic predicted 	<ul style="list-style-type: none"> High 	<ul style="list-style-type: none"> Short term and reversible 	<ul style="list-style-type: none"> Negligible 	<ul style="list-style-type: none"> None
Residential	<ul style="list-style-type: none"> Construction/decommissioning Activities noise and vibration 	<ul style="list-style-type: none"> CEMP 	<ul style="list-style-type: none"> High 	<ul style="list-style-type: none"> Short term and reversible 	<ul style="list-style-type: none"> Small 	<ul style="list-style-type: none"> Moderate
Residential	<ul style="list-style-type: none"> Operational Traffic 	<ul style="list-style-type: none"> Low level of traffic predicted 	<ul style="list-style-type: none"> High 	<ul style="list-style-type: none"> Long Term and reversible 	<ul style="list-style-type: none"> Negligible 	<ul style="list-style-type: none"> None
Residential	<ul style="list-style-type: none"> Operational Activities noise 	<ul style="list-style-type: none"> Location of 'noisy' equipment placed as far as practicable from receptors 	<ul style="list-style-type: none"> High 	<ul style="list-style-type: none"> Long Term and reversible 	<ul style="list-style-type: none"> Negligible 	<ul style="list-style-type: none"> None

Further work

11.13.2. Further assessment and development of mitigation measures will be undertaken as part of the ES and through the completion of the following assessments and management plans:

- Noise modelling;
- Construction noise and vibration assessment;
- Operational noise impact assessment;
- Mitigation recommendations; and
- Undertake the in-combination and cumulative effects assessments.

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