14 NOISE AND VIBRATION

Summary

This chapter assesses the potential impact of the Proposed Project on noise and vibration in the area. A combination of noise monitoring and predictive calculations have been undertaken to establish the existing noise climate and the change in noise levels predicted as a result of the Project construction phase. The assessment methodology is based on the assessment guidance in the relevant British Standard (BS5228). Baseline noise survey locations and survey methodology were agreed with Barnsley Metropolitan Borough Council.

BS5228 identifies construction noise levels at which residential dwellings and other property types, such as schools are likely to experience significant effects. The method uses these limits to identify whether measures are needed to reduce construction noise in order to avoid effects on sensitive receptors, such as people living in close proximity to the construction activities. Mitigation measures to be implemented include using quieter plant and less intrusive construction methods, acoustic screening and locating noise plant as far as possible from receptor location in alignment with Best Practicable Means as discussed below.

There are few activities and locations where the predicted noise levels are more than the weekend noise limit of 60 dB(A). If adopting Best Practicable Means does not achieve the required sound reduction, work hours at these locations may need to be confined to weekdays.

Most construction activities are not significant sources of vibration. Activities such as earth-moving, crane activities, pylon removal and concrete pouring would produce relatively low levels of ground borne vibration (vibration that travel through the ground). Piling activities (the insertion of materials such as steel into the ground to create foundations) could produce noticeable levels of vibration, depending on the method used. Piling works are located away from residential receptors and noise and vibration impacts here would not be significant.

14.1 Introduction

14.1.1 This chapter of the Environmental Assessment Report assesses the likely significant effects upon sensitive receptors of noise and vibration that are likely to be generated by the construction, overhead line (OHL) removal and future decommissioning of the Visual Impact Provision (VIP), Peak District (East) Project (here on referred to as the Proposed Project). Operational noise impacts are outside the scope of this assessment (see Section 14.2 below).

14.1.2 This chapter sets out relevant policy and legislation and outlines the data gathering methodology that was adopted as part of the noise and vibration assessment. This leads on to a description of the overall baseline condition that informs the assessment of noise and vibration impacts.

14.2 Scope and Methodology

Scope

14.2.1 The '*Visual Impact Provision: Peak District National Park (East) Overhead Line Scoping Report July 2016*'[1] was submitted to Barnsley Metropolitan Borough Council to request a Scoping Opinion in July 2016. The Scoping Report included the proposed scope of the noise and vibration assessment that will be included within the Environment Assessment Report.

14.2.2 The Scoping Report proposed to scope out operational noise and vibration from the underground cables, SECs and terminal pylons, including fixtures and fittings, for the Proposed Project. This was agreed by Barnsley Metropolitan Borough Council in the Scoping Opinion received.

14.2.3 The Study Area for the construction noise assessment comprises an area up to 300m from the Limits of Deviation to ensure potentially affected receptors are identified. Construction noise predictions are however made from the actual work locations. This was determined in accordance with guidance provided in BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Noise (British Standards Institution, 2014)[2]

14.2.4 BS 5228-1[2] states that at distances over 300m noise predictions should be treated with caution because of the increasing importance of meteorological effects. As such prediction of construction noise levels have been limited to within 300m.

14.2.5 Noise and vibration impacts from the construction of the Proposed Project have been assessed at the closest worst case sensitive receptors which are considered representative of all noise sensitive receptors within the immediate vicinity of the Proposed Project.

14.2.6 The Study Area for the construction vehicle noise and vibration assessment has considered noise changes within 300m of any road/ route identified with the Traffic and Transport Assessment (see Chapter 12 (Traffic and Transport)) as experiencing temporary increases in HGV activity accounting for a predicted increase in noise of greater than 1dB during the construction phase.

[1] National Grid (2016) 'Visual Impact Provision: Peak District National Park (East) Overhead Line Scoping Report July 2016'.

[2] British Standards Institution (2014) 'BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Part 1 – Noise'.

Limitations

14.2.7 The noise and vibration assessment has considered construction noise impacts from construction locations based on the current Proposed Project design.

Methodology

Baseline Data Collection

14.2.8 The monitoring was undertaken in line with the guidance set out within BS 7445:2003[3]; with the sound level meters programmed to monitor over 5-minute intervals. The equipment used was set to record the following parameters:

- L_{A10} is the A-weighted sound level that is exceeded for 10% of the sample period; this parameter gives an indication of the upper limit of fluctuating noise such as that from road traffic;
- L_{A90} is the A-weighted sound level that is exceeded for 90% of the sample period; generally used to quantify background noise;
- $L_{Aeq,T}$ is the A-weighted equivalent continuous sound level during the sample period (T) and effectively represents an average value;
- $L_{Amax,f}$ is the A-weighted maximum noise level measured during the sample period (T);
- $L_{Amin,f}$ is the A-weighted minimum noise level measured during the sample period (T).

14.2.9 The measurement equipment used complies with the performance specifications for Class 1 devices in accordance with BS EN 61672-1:2003[4].

Assessment of Construction and OHL Removal Noise

14.2.10 Construction noise and vibration impacts are likely from the fixed and mobile plant used for the construction and demolition activities. Noise and vibration impacts are also likely from the movement of construction vehicles on access tracks and on the public road network. The magnitude, extent and significance of noise and vibration effects on any individual receptor would depend on the nature of the works, the location of heavy plant and vehicles and the time of day that construction works are carried out.

14.2.11 Construction noise predictions have been carried out in accordance with BS5228-1[2] . The assessment of airborne construction noise is concerned with the impact on receptors within buildings. The predicted effects are calculated at the external façades of sensitive receptors; hence internal noise levels would be even lower due to attenuation across the façade. The building façade would serve to reduce the construction noise levels experienced within the building compared to that experienced at the building façade.

14.2.12 Construction noise impacts on residential properties are considered in accordance with Annex E of BS5228-1[2].

[3] BS 7445-1:2003 Description and measurement of environmental noise. Guide to quantities and procedures. British Standards Institute

[4] BS EN 61672-1:2013 Electroacoustics. Sound level meters. Specifications. British Standards Institute

14.2.13 The ABC Method in BS5228-1[2] is used to identify criteria for determining the significance of the effect of construction noise at residential receptors and is described in detail below under the heading 'Significance of Effect'.

14.2.14 Construction noise impacts on non-residential buildings such as schools, offices, health care facilities and places of worship is considered according to the Method 2 – the 5dB change criteria in BS5228-1[2], subject to lower cut off values of 65dB, 55dB and 45dB $L_{Aeq, T}$ from site noise alone, for the daytime, evening and night-time periods respectively.

14.2.15 Construction noise limits at non-residential receptors such as schools, health care facilities, community centres and places of worship are therefore set at 65dB for the daytime, 55dB for the evening and 45dB for the night-time where baseline noise levels are 5dB or more below these levels. The 5dB Change Method is used to identify criteria for determining the significance of the effect of construction noise at residential receptors and is described in detail below under the heading 'Significance of Effect'.

Table 14.1: Receptors to be considered and their sensitivity to construction noise

Sensitivity of receptor	Receptor description
High	Patients in hospitals/hospices/care homes etc. – defined as a "vulnerable subgroup" with very high or continuous rates of occupancy.
Medium	Occupied residential dwellings, including residential schools, schools and. places of worship
Low	Occupied buildings and sites of historic or cultural importance and businesses
Negligible	Occupied buildings and all other areas such as those used primarily for industrial or other agricultural purposes.

14.2.16 Residential receptors (i.e. including care homes and hospices) listed in Table 14.1 are classified as having high or medium sensitivity. Non-residential receptors in Table 14.1 are classified as having a low or negligible sensitivity.

14.2.17 During the construction of the Proposed Project there is potential for temporary noise and vibration to be generated.

14.2.18 The extent and significance of noise and vibration effects depends on the nature and location of the activities in relation to receptors and the time of day that construction works are carried out.

14.2.19 Based on available information and experience from similar projects, reasonable and appropriate assumptions have been made regarding construction plant to be used. The typical noise levels of such plant, when in use at a reference distance of 10m, is taken from tables within BS5228-1[2]. Construction plant would not normally operate continually throughout the working day, with the intensity of activities and noise levels fluctuating. BS5228-1[2] provides a method for estimating the noise level at an identified receptor based on the source sound pressure level and the percentage of the working day that such plant normally operates. In this instance a high percentage on-time has been assumed, adopting a precautionary approach.

14.2.20 The construction and dismantling activity noise levels have been predicted with distance from source using the measured $L_{Aeq\ 1h}$r and the following formula as described in BS5228-1[2]:

*K_h = 20 * log10 (R/10)*

Where:

- K_h = the correction for propagation across hard ground
- R = the distance to the receptor location
- 10m = the distance in metres at which the sound pressure level from the plant has been measured, as recorded in the Tables in BS5228-1[2].

14.2.21 The correction for the percentage on-time is obtained using the following formula:

*10 * Log10 (percentage on-time/100)*

14.2.22 Predicted noise levels have been calculated at all noise sensitive receptors within 300m of work locations based on the above information. This is in accordance with BS5228-1[2] which indicates that predicted noise levels beyond 300m should be treated with caution. In accordance with BS5228-1[2] a façade correction of +3dB has been applied. The predicted effects are calculated at the external façades of sensitive receptors and the +3dB correction accounts for noise levels reflected by the building façade.

14.2.23 The predictions of indicative construction noise levels have followed a precautionary approach in that the realistic worst-case assumption of plant to be used (and the expected noise from it) has been applied. In calculating the noise levels a high percentage on-time has been applied and it has been assumed that the ground would be hard such that no soft ground attenuation or screening from other buildings and structures has been included. This produces a precautionary, worst case assessment since plant does not ordinarily operate constantly and ground attenuation from soft ground or other structures for example, would in very many cases be present.

14.2.24 BS5228-1[2] Annex E recommends the 'ABC Method' to establish acceptable construction noise thresholds of significance at residential receptors.

14.2.25 The ABC Method involves rounding the existing ambient noise levels up to the nearest 5dB(A) for the appropriate time period (night, evening/weekends or day) and then comparing these levels to the total noise level, including construction noise. If the total noise level exceeds the threshold value, then a significant effect is deemed to have occurred. The categories of threshold values are shown in Table 14.2.

Table 14.2: Threshold of significant effect at dwellings from construction noise (BS5228)

Assessment Category and Threshold Value Period	Threshold Value, in decibels (dB $L_{Aeq,T}$)		
	Category A	Category B	Category C
Night-time (23:00 – 07:00)	45	50	55
Evenings and weekends	55	60	65
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75

14.2.26 The categories set out above are applied as follows:

- Category A is the threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values;
- Category B is the threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as Category A values; and
- Category C is the threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than Category A values.

14.2.27 Where the existing ambient noise levels are higher than the threshold values presented in Category C of **Table 14.2** then a significant effect is deemed to have occurred if the total L_{Aeq} noise level for the period increases by more than 3dB due to construction activity.

14.2.28 BS5228-1[2] Annex E also provides threshold trigger levels above which there is a responsibility on the developer to provide noise insulation or a scheme to facilitate temporary re-housing. This would involve finding alternate accommodation for affected residents at times when noise levels would be very high, i.e. regularly exceeding 85dB(A) during the daytime. The standard suggests that noise insulation should be provided if the trigger levels shown in Table 14.3 are predicted to be exceeded for a period of ten or more days of working in any fifteen consecutive days, or for a total of days exceeding 40 in any six-month period.

Table 14.3: Construction noise triggers for noise insulation and temporary re-housing

Period	Time	Averaging Time	Noise Insulation Trigger Level L_{Aeq} (dB)	Temporary Re-housing Trigger Level L_{Aeq} (dB)
Monday to Friday	07.00 – 08.00	1 h	70	80
	08.00 – 18.00	10 h	75	85
	18.00 – 19.00	1 h	70	80
	19.00 – 22.00	3 h	65	80
	22.00 – 07.00	1 h	55	75
Saturday	07.00 – 08.00	1 h	70	80
	08.00 – 13.00	5 h	75	85
	13.00 – 14.00	1 h	70	75
	14.00 – 22.00	7 h	65	70
	22.00 – 07.00	9 h	55	65
Sunday & Public Holidays	07.00 –21.00	14 h	65	75
	21.00 – 07.00	10 h	55	65

14.2.29 BS5228-1[2] Annex E recommends the 'ABC Method' to establish acceptable construction noise thresholds of significance at residential receptors.

14.2.30 Based on the criteria in Table 14.2 and Table 14.3 the following thresholds have been set at residential receptors for considering construction noise impacts (Table 14.4).

14.2.31 The criteria for noise significance in Table 14.5 have been based on Category A noise levels in Table 14.2 which represent the most stringent criteria. The noise limit in Table 14.4 is based on the recommended noise limits in BS5228-1[2] for areas away from major roads.

14.2.32 The noise insulation trigger levels in Table 14.4 are taken directly from BS5228-1[2] (set out in Table 14.3 The noise insulation trigger levels in Table 14.4 are taken directly from BS5228-1[2] (set out in Table 14.3).

Table 14.4: Construction noise significance thresholds, limits and insulation trigger levels

Relevant time period	Noise significance threshold (dB $L_{Aeq,T}$)	Noise limit (dB $L_{Aeq,T}$)	Noise insulation trigger level (dB $L_{Aeq,T}$)
Daytime 0700-1800 and Saturday 0800-1300	65	70	75
Evening & Weekends (Saturday 1300-1900 and Sunday 0700-1900)	55	60	65
Night-time	45	50	55

14.2.33 The ABC Method is only applicable to residential receptors. For non-residential receptor buildings such as schools, health care facilities, places of worship and educational facilities, construction noise is 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 maximum values of 65dB, 55dB and 45dB $L_{Aeq, T}$ from site noise alone, for the daytime, evening and night-time periods. The lower cut off values correspond with the Noise significance threshold for residential receptors presented in Table 14.4.

14.2.34 For public open space, the impact might be deemed to cause significant effects if the total noise exceeds the ambient noise ($L_{Aeq, T}$) by 5dB or more for a period of one month or more. However, the extent of the area impacted relative to the total available area also needs to be taken into account in determining whether the impact causes a significant effect.

14.2.35 The criteria for assessing the magnitude of construction noise effects are set out in Table 14.5. The magnitude of effect criteria in Table 14.5 are consistent with the criteria presented in BS5228-1[2].

Table 14.5: Magnitude of effect – construction noise

Magnitude of Effect	Construction Noise
High	Daytime noise levels at houses in excess of 70dB L_{Aeq} (10 hour)* Evening and weekend (Saturday 13:00 to 1900 and Sunday 07:00 to 19:00) of 65dB L_{Aeq} (3 hour for weekday, Saturday 13:00 to 18:00 and 1 hour for all other periods). >55dB L_{Aeq} (1 hour) for night-time 2300-0700.
Medium	Daytime noise levels at houses in the range between 65 to 70dB L_{Aeq} (10 hour)* Evening and weekend (Saturday 13:00 to 1900 and Sunday 07:00 to 19:00) between 55 and 65dB L_{Aeq} (3 hour for weekday, Saturday 13:00 to 18:00 and 1 hour for all other periods). 50-55 dB L_{Aeq} (1 hour) for night-time 2300-0700.
Low	Daytime noise levels at houses in the range between 55 to 65dB L_{Aeq} (10 hour)* Evening and weekend (Saturday 13:00 to 1900 and Sunday 07:00 to 19:00) between 45 and 55dB L_{Aeq} (3 hour for weekday, Saturday 13:00 to 18:00 and 1 hour for all other periods). 45 to 50dB L_{Aeq} (1 hour) for night-time 2300-0700.
Negligible	Daytime noise levels at houses below 55dB L_{Aeq} (10 hour)* Evening and weekend (Saturday 13:00 to 1900 and Sunday 07:00 to 19:00) below 45dB LAeq (3 hour for weekday, Saturday 13:00 to 18:00 and 1 hour for all other periods). 40 to 45dB L_{Aeq} (1 hour) for night-time 2300-0700.
No effect	Daytime noise levels at houses below 45dB L_{Aeq} (10 hour)* Evening and weekend (Saturday 13:00 to 1900 and Sunday 07:00 to 19:00) below 40dB L_{Aeq} (3 hour for weekday, Saturday 13:00 to 18:00 and 1 hour for all other periods).
* The daytime averaging period has been adopted to correspond with the averaging times in **Table 14.4**. Noise levels will be predicted as $L_{Aeq, 1hr}$ values to provide precautionary noise levels for each hour in the 10-hour period.	

Assessment of Construction Traffic Noise

14.2.36 Construction vehicle movements may be significant in relation to existing traffic volumes where existing traffic volumes are low. A Traffic and Transport Chapter (Chapter 12 (Traffic and Transport)) has been prepared for the Proposed Project to support the planning application.

14.2.37 The noise impacts associated with increased construction traffic volumes (as will be reported in the Transport Assessment) have been assessed in accordance with the Design Manual for Roads and Bridges (DMRB) 'Volume 11 Environmental Assessment Section 3 Environmental Assessment Techniques; Part 7 HD 213/11 Revision1: Noise and Vibration' (Highways England et al, 2011)[5].

14.2.38 DMRB[5] is used to assess the impact of changes in traffic levels as the result of a scheme and the associated changes in noise climate, making DMRB the appropriate assessment method.

14.2.39 The Calculation of Road Traffic Noise (CRTN)[6] sets out procedures for predicting road traffic noise. CRTN warns that when calculating noise levels from roads where the flow is low, i.e. below 200 vehicles/hour or 4000 vehicles/18 hour day an additional correction may be required. CRTN[6] enables calculations of hourly L_{I0} dB(A) and $L_{10\ 18\ hour}$ dB(A) to be made for road schemes where traffic flows on any segment contained within the scheme are greater than or equal to 50 vehicles/hour or 1000 vehicles/18 hour. Where traffic flows fall below the low flow criteria in CRTN[6] the calculation method for mobile plant in BS5228-1[2] has been used to predict the construction traffic noise.

14.2.40 Construction vehicle movements on haul roads and access tracks and the associated additive impacts have been considered in accordance with BS5228-1[2]. The method in BS5228-1 for predicting noise levels for construction movements on haul routes and access tracks expressed as follows:

$$L_{Aeq,T} = L_{WA} - 33 + 10Log_{10}Q - 10Log_{10}V - 10Log_{10}d$$

Where:

L_{WA} is the sound power level of the plant, in decibels (dB);

Q is the number of vehicles per hour;

V is the average vehicle speed, in kilometres per hour (km/h);

d is the distance of receiving position from the centre of haul road, in metres (m).

14.2.41 DMRB HD213/11[5] provides classification for the magnitude of changes in road traffic noise. A change in road traffic noise of 1dB(A) in the short-term (Do-Minimum to Do-Something in the baseline year) is the smallest that is considered perceptible. The magnitudes of noise change in the short-term is reproduced from DMRB HD213/11[5] in Table 14.6.

Table 14.6: DMRB criteria to consider magnitude of noise change in the short-term

Noise Change (dB) $L_{A10, 18\ Hour}$)	Magnitude of Impact

[5] Highways England et al (2011) 'Design Manual for Roads and Bridges (DMRB) (Volume 11 Environmental Assessment Section 3 Environmental Assessment Techniques; Part 7 HD 213/11 Revision1: Noise and Vibration'.

[6] Department for Transport and Welsh Office (1988) The Calculation of Road Traffic Noise (CRTN

0	No Change
0.1 - 0.9	Negligible
1 - 2.9	Low
3 - 4.9	Medium
5 +	High

Ground-borne vibration – magnitude of effect

14.2.42 BS ISO 4866:2010 'Mechanical vibration and shock. Vibration of fixed structures. Guidelines for the measurement of vibrations and evaluation of their effects on structures (British Standards Institute, 2010)[7] and BS 7385 Part 2 'Evaluation and measurement for vibration in buildings. Guide to damage levels from ground-borne vibration' (British Standards Institute,1993)[8] sets guideline values for building vibrations based on the lowest vibration above which damage has been credibly demonstrated. The response of a building to ground-borne vibration is affected by various features of the building such as, the type of foundation, underlying ground conditions, type of building construction, the state of repair, etc. The response also depends upon whether the vibration is continuous or transient/intermittent.

14.2.43 Most construction activities are not significant sources of ground-borne vibration. Activities such as earth-working, crane activities and concreting would produce relatively low levels of ground borne vibration. Piling activities could produce perceptible levels of vibration, depending on the method used.

14.2.44 In accordance with these standards, limits for transient vibration above which cosmetic damage could occur to a light framed structure or a residential building is 15mm/s ppv at 4Hz increasing to 20mm/s at 15Hz. BS7385[8] also considers that there is little probability of fatigue damage occurring in residential buildings due to construction activities. For this reason, the assessment of structural damage to buildings is scoped out from further assessment.

14.2.45 Construction vibration is considered in accordance with BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Vibration (British Standards Institution, 2014)[9]. BS5228-2[9] provides guidance in relation to the effects of construction vibration upon the surroundings. The assessment criteria based on BS5228-2[9] are summarised in Table 14.7. The criteria in BS5228-2[9] are set for residential buildings. The same criteria has been used for other occupied buildings such as schools.

[7] British Standards Institute (2010) BS ISO 4866:2010 'Mechanical vibration and shock. Vibration of fixed structures. Guidelines for the measurement of vibrations and evaluation of their effects on structures'.

[8] British Standards Institute (1993) BS7385 Part 2 'Evaluation and measurement for vibration in buildings. Guide to damage levels from ground-borne'.

[9] British Standards Institution (2014) 'BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Vibration'.

Table 14.7: Vibration effect levels for residential buildings

Vibration Level	Effect	Magnitude
0.14mm.s^{-1}	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.	Negligible
0.3mm.s^{-1}	Vibration might be just perceptible in residential environments.	Low
1.0mm.s^{-1}	It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if prior warning and explanation has been given to residents.	Medium
10mm.s^{-1}	Vibration is likely to be intolerable for any more than a very brief exposure to this level.	High

14.2.46 Vibration sensitive receptors would only experience effects if the vibrations produced by the Proposed Project are in close proximity to them. BS5228-2[9] indicates that significant vibration effects from piling are unlikely beyond 20m from source. The vibration effects at 20m are likely to be associated only with piling works.

Significance of effect

14.2.47 The above discussions of construction noise, construction traffic noise and ground-borne noise and vibration provide detail as to how the magnitude of the potential effects and the sensitivity of receptors to such effects is determined.

14.2.48 The sensitivity of the receptor and the magnitude of the effect are used to indicate the significance of effect in Table 14.8.

Table 14.8: Significance of effect - noise and vibration

Significance of Effect	Receptor Sensitivity			
Magnitude	**High**	**Medium**	**Low**	**Negligible**
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

14.2.49 It is proposed that effects assessed as major are considered likely to be typically significant, while impacts assessed as moderate may be significant, for example, where the duration exceeds the temporal criteria as set out in paragraph 14.2.28.

14.3 Consultation Undertaken

14.3.1 Consultation was carried out with the Environmental Health Officer (EHO) at Barnsley MBC. The consultation is summarised in

14.3.2

14.3.3

14.3.4 **Table 14.9** below.

Table 14.9: Summary of the construction noise and vibration consultation

Representation	Response
10 January 2017. Consultation document setting out proposed noise monitoring strategy and monitoring locations sent by e-mail to James Gardham, Pollution Prevention & Control Officer, Regulatory Services Barnsley MBC.	10 January 2017 response received by e-mail from James Gardham, Pollution Prevention & Control Officer, Regulatory Services Barnsley MBC to confirm the proposed noise monitoring strategy and noise monitoring locations are acceptable.

14.3.5 As part of consultation it was agreed that baseline noise surveys would be carried out at six locations as presented in Section 14.5.

14.4 Statutory and Planning Context

14.4.1 The impact assessment has been undertaken in accordance with current international and national legislation, and referencing national, regional and local plans and policies relating to noise and vibration in the context of the Proposed Project.

National Policy and Legislation

14.4.2 National policy relevant to considering the potential effects on construction noise and vibration is outlined below.

National Planning Policy Framework 2019

14.4.3 Paragraph 170 of the National Planning Policy Framework (NPPF)[10] states that "*planning policies and decisions should contribute to and enhance the natural and local environment by 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*".

14.4.4 Paragraph 180 of the NPPF states that "*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 impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

b. *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason*".

Noise Policy Statement for England (NPSE) 2012

14.4.5 The Noise Policy Statement for England (NPSE)[11] vision is to promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development. To achieve this vision the NPSE sets out the following aims for the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to improvement of health and quality of life.

14.4.6 Further explanation of compliance with National Policy is provided in section 14.7 of this chapter.

Planning Practice Guidance – Noise

14.4.7 The Department for Communities and Local Government has published an online explanatory note on the NPSE, providing planning practice guidance for noise[12]. Decision taking should take account of the acoustic environment and in doing so consider:

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

14.4.8 In line with the Explanatory Note of the Noise Policy Statement for England[12], this would include identifying whether the overall effect of the noise exposure (including

[10] Department for Communities and Local Government (2019) 'National Planning Policy Framework' February 2019.

[11] Defra (2010) 'Noise Policy Statement for England (NPSE) 2012

[12] Department for Communities and Local Government 'NPSE Explanatory Notes'(http://planningguidance.communities.gov.uk/blog/guidance/noise/noise-guidance/)

the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.

14.4.9 The noise and vibration assessment has taken into account whether or not a significant effect would occur as a result of the Proposed Project. What would be considered as significant observed effects has been defined in Section 14.2 of this chapter. Embedded mitigation measures are presented in Section 14.6 of this chapter and in Appendix 14.3. As required, additional mitigation measures are proposed in section 14.8.

Environmental Protection Act 1990

14.4.10 Under Part III of the Environmental Protection Act 1990[13] local authorities have a duty to investigate noise complaints from premises (land and buildings) and vehicles, machinery or equipment in the street.

Control of Pollution Act 1974

14.4.11 Where it appears to a local authority that works to which the Control of Pollution Act 1974[14] applies are being, or are going to be, carried out on any premises, the local authority may serve a notice imposing requirements as to the way in which the works are to be carried out and may, if it thinks fit, publish notice of the requirements in such way as appears to the local authority to be appropriate.

14.4.12 Embedded mitigation measures presented in Section 14.6 and additional mitigation measures presented in Section 14.8 are designed to keep any noise generated by the Proposed Project to a minimum.

Technical Guidance

BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Noise, British Standards Institution, 2014[2].

14.4.13 Part 1 of BS 5228-1[2] provides guidance on the methods that can be used to predict and measure noise from construction activities and how to assess the impact on those exposed to it. In particular Annex F sets out the methods of estimating noise from construction sites taking into account distance, ground effects, and reflections from surfaces, and screening by obstacles.

BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Vibration, British Standards Institution, 2014[9].

14.4.14 Part 2 of BS 5228[9] gives recommendations for basic methods of vibration control relating to construction and open sites where work activities/operations generate significant vibration levels, including industry specific guidance. Guidance is provided on methods of measuring vibration and assessment of its effects on the environment.

Calculation of Road Traffic Noise (CRTN), Department for Transport and Welsh Office, 1988

14.4.15 Calculation of Road Traffic Noise (CRTN)[6] is the standard method for calculating road traffic noise in the UK. It is the Design Manual for Roads and Bridges (DMRB) recommended method for calculating road traffic noise.

[13] HMSO (1990) 'Environmental Protection Act' 1990.

[14] HMSO (1974) 'Control of Pollution Act' 1974.

Design Manual for Roads and Bridges, Volume 11 Section 3 Part 7 (HD213/11) 'Noise and Vibration'

14.4.16 DMRB[5] provides guidance on the appropriate level of assessment to be used when considering the noise and vibration impacts arising from all road projects, including new construction, improvements and maintenance.

Local Policy

Commented [SH1]: Was not bolded – I have made it bold for consistency but if it shouldn't be please reject this change

14.4.17 The planning application for the Proposed Project is accompanied by a Planning Statement which considers the extent to which the proposed development complies with the following local planning policy:

- Barnsley Local Plan (BMBC, January 2019);
- Peak District National Park Authority Local Development Framework Core Strategy Development Plan Document (PDNPA, 2011); and
- Peak District National Park Authority Development Management Policies: Part 2 of the Local Plan (2019).

14.5 Existing Environment

14.5.1 A desktop review of the Study Area has been carried out and the Study Area is largely rural with few noise and vibration sensitive receptors. However, there are some isolated receptors within, and close to, the search area which have the potential to be affected by noise from construction and decommissioning works dependent on the separation distance to construction works.

14.5.2 Attended baseline surveys were carried out for a duration of 4 hours at representative locations to consider the noise impacts associated with transient works on the overhead lines.

14.5.3 Baseline noise surveys have been carried out at locations agreed with Barnsley MBC.

14.5.4 Various statistical acoustic parameters were recorded at each monitoring location, these included; L_{Aeq}, L_{AMax}, L_{Amin}, $L_{A10,}$ and L_{A90}. The monitoring locations are shown on Figure 14.1.

14.5.5 All measurements were taken using Type 1 sound level analysers. The monitoring equipment used was as follows:

Table 14.10: ABC Method analysis of baseline noise survey data

Equipment	Manufacturer	Type	Serial Number
Sound level meter	RION	NL52	010324490
Sound level meter	01dB	Fusion	11037
Sound level meter	01dB	Fusion	11039
Calibrator	RION	NC-74	34936366

14.5.6 The instruments were calibrated at the start and at the end of each noise survey period to 94dB using a NC-74 calibrator. Calibration drift was within acceptable limits. Calibration certificates for the above instrument can be provided on request.

14.5.7 Location LT1 was set up as a long-term monitoring location to provide daytime and night-time data should the need arise to consider any operational noise impacts.

Operational noise impacts have however been scoped out and the daytime data has been presented for a four-hour period outside of any possible peak traffic times. The baseline data is summarised in Table 14.11 and a full set of baseline data is presented in Appendix 14.1.

Table 14.11: Summary of baseline noise survey data (dB(A))

Location	Date/ Time	LAeq	LAmin	LAmax	LA90	LA10
LT1 Don View	06/04/2017 10:30	47.9	36.8	68.2	40.2	50.2
ST1 Windle Edge	06/04/2017 11:05	54.8	33.6	82.2	40.5	56
ST2 Brook Hill	06/04/2017 11:25	47.4	28.8	86.8	36.2	47.4
ST3 Eltock Farm	06/04/2017 12:15	48.0	34.7	69.9	39.7	51.1
ST4 Hillside	07/04/2017 09:33	51.5	30.3	87.9	36.3	48.1
ST5 Pennine View	07/04/2017 09:45	51.3	33.3	72.8	41.5	54.2

14.5.8 The baseline surveys indicate that the area is typically quiet, with road traffic the most prominent noise source.

14.5.9 In accordance with the ABC Method in BS 5228-1, the baseline noise survey data have been rounded to the nearest 5dB and compared against the threshold values in Table 14.2.

14.5.10 Table 14.12 indicates that noise levels monitored at survey locations fall within Category A and that the noise limits in Table 14.4 are appropriate.

Table 14.12: ABC Method analysis of baseline noise survey data

Location	LAeq	Nearest 5 dB	Category
LT1 Don View	47.9	50	Category A
ST1 Windle Edge	54.8	55	Category A
ST2 Brook Hill	47.4	40	Category A
ST3 Eltock Farm	48.0	50	Category A
ST4 Hillside	51.5	50	Category A
ST5 Pennine View	51.3	50	Category A

14.6 Key Parameters for Assessment

14.6.1 The undergrounding of the VIP Subsection includes the following main elements that comprise the Proposed Project:

- Removal of the existing Dunford Bridge SEC to a depth of 1.1m below ground level. The existing tunnel shaft cap will be lowered and mounding created over the shaft for landscaping purposes. Gabion baskets (of approximately 1m in height and width) will be used to protect the shaft from any vehicle access.

- Removal of the existing VIP Subsection including eight pylons (one of which will be replaced, see replacement tension pylon below) and 2km of OHL.

- An underground XLPE cable 'here on referred to as the Cable Corridor' of approximately 1.8km beneath the route of the Trans Pennine Trail from the entrance of the Woodhead Tunnel to a proposed new SEC.

- Construction of a new SEC within Wogden Foot Local Wildlife Site (LWS) and a separate replacement tension pylon located approximately 40m north east of the SEC on the northern side of the River Don, close to the location of the existing Pylon 4ZO157. Within the SEC the circuits will terminate onto two full tension gantries to connect the Cable Corridor to the remaining existing OHL. A permanent access off the Trans Pennine Trail will be required to the proposed SEC.

- Temporary laydown areas, access tracks (including from the highway Windle Edge and Brook Hill Lane), to the pylons to be removed and along the Trans Pennine Trail to the SEC at Wogden Foot as well as site offices will be required to facilitate construction activities.

- Construction and removal of a temporary Trans Pennine Trail diversion for use during the construction phase of the Proposed Project. The diversion will involve the use of two bridges, one being a permanent replacement of an existing bridge; the other a temporary bridge to cross over the River Don. The diversion is proposed in farmland immediately north of the River Don.

14.6.2 Embedded mitigation has been considered in the design of the Proposed Project. The SECs have been located as close to the existing OHL as possible to minimise any new OHL required to connect the SEC to the existing remaining OHL.

14.6.3 The preferred corridor alignment is based on engineering and environmental constraints, avoiding known environmental constraints wherever possible.

14.6.4 For the removal of the existing OHL, removal techniques have been tailored to the Proposed Project. The method is described in Chapter 2 (Project Description).

14.6.5 The construction swathe width has been minimised where practicable to mitigate construction impacts effects.

14.6.6 A Construction Environmental Management Plan (CEMP) will be used to manage environmental impacts during construction.

14.6.7 As part of the embedded mitigation, the contractor will be obliged to implement Best Practicable Means (BPM) as set out in BS5228-1 and BS5228-2 to minimise construction noise and vibration levels to the lowest levels possible. BPM is discussed in Section 14.8.

14.6.8 Mitigation options and the associated noise reduction are presented in Appendix 14.3.

14.7 Predicted Impacts

14.7.1 Construction working hours are anticipated to be between 7am and 7pm Mondays to Fridays and between 8am and 5pm on Saturdays and Sundays. Construction noise impacts have been presented on this basis.

14.7.2 A description of the typical construction plant used for each construction activity is presented in Appendix 14.2 and the detailed construction noise predictions are presented in Appendix 14.4. The predicted impacts are confined to the period of construction and are therefore temporary and of relatively short duration. The predictions in Appendix 14.4 are unmitigated construction noise levels. Mitigation, as required, is discussed in Section 14.8.

Assessment of Impacts during Construction

Trans Pennine Trail Diversion – Subject to Planning Application

14.7.3 Construction noise impacts associated with construction of the Trans Pennine Trail are shown in Table 14.1A (Appendix 14.4).

14.7.4 Construction works on the Trans Pennine Trail will result in an exceedance of the weekday daytime limit of 70 dB(A) for road surfacing and weekend noise limit of 60 dB(A) for all activities at the Laurels. The magnitude of effect is considered to be high, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Major Adverse**. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.5 Construction works on the Trans Pennine Trail diversion will also result in an exceedance of the weekend noise limit of 60 dB(A) at 1,2 and 3 The Banks, with noise levels being above 65 dB(A) for site preparation, road construction and surfacing. The magnitude of effect is considered to be high, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Major Adverse** for the weekend period only. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.6 Laydown areas will be created along the Trans Pennine Trail Diversion. The noise predictions for the construction of the laydown areas are shown in Table 14.2A (Appendix 14.4).

14.7.7 The predictions indicate that construction of the laydown areas will result in the daytime noise daytime limit of 70 dB(A) being exceeded at The Laurels. The magnitude of effect is considered to be high, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Major Adverse**. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.8 The construction of the laydown areas will also result in an exceedance of the weekend noise limit of 65 dB at multiple receptors as shown in Table 14.6B. The magnitude of effect is considered to be high, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Major Adverse**. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.9 The noise predictions for the construction of permanent Bridge 1 (Jenga Bridge) are shown in Table 14. 3A (Appendix 14.4).

14.7.10 Due to the separation distance from receptor locations, the construction of Bridge 1 will not result in an exceedance of the weekday daytime limit of 70 dB(A) and the weekend noise limit of 60 dB(A) at any other receptor locations and the magnitude

of effect is considered to be low, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Minor Adverse**.

14.7.11 A temporary bridge (Bridge 2) is to be constructed and dismantled after the completion of construction works. The noise predictions for the construction of the temporary (Bridge 2) are shown in Table 14.3A (Appendix 14.4) and the impacts associated with the dismantling of the bridge are shown in Table 14.3A.

14.7.12 The construction and dismantling of Bridge 2 will not result in an exceedance of the weekday daytime limit of 70 dB(A) and the weekend noise limit of 60 dB(A) at any other receptor locations and the magnitude of effect is considered to be low, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Minor Adverse**.

Sealing End Compound – Subject to Planning Application

14.7.13 Construction noise predictions for the creation of the SEC are shown in Appendix 14.4 (Table 14.4A).

14.7.14 The construction of the SEC will not result in an exceedance of the weekday daytime limit of 70 dB(A) or the weekend noise limit of 60 dB(A). The large separation distance to receptor locations means the significance of effect is low, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Minor Adverse**.

Access Point 7 and Northern Access Route – Subject to Planning Application

14.7.15 The construction noise predictions associated with the construction of access point AP7 at Windle Edge are presented in Appendix 14.4. (Table 14.5A). The construction of the access point will not result in any exceedances of the weekday daytime construction noise limit of 70 dB(A) or the weekend noise limit of 60 dB(A) and the impacts are therefore considered to be **Minor Adverse**.

14.7.16 Construction works on Northern Access Route from AP7 (Appendix 14.4; Table 14.6A) will result in an exceedance of the weekend noise limit of 60 dB(A) at Brookside Farm, with noise levels being below 65 dB(A) for site preparation, road construction and surfacing. The magnitude of effect is considered to be medium, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Moderate Adverse** for the weekend period only. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.17 Road reinstatement works on AP7 will result in an exceedance of the weekend noise limit of 60 dB(A) at Brookside Farm, with noise levels being below 65 dB(A) for site preparation, road construction and surfacing. The magnitude of effect is considered to be medium, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Moderate Adverse** for the weekend period only. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

400 kV Cable (Undergrounding)

14.7.18 A section of the existing embankment at Dunford Bridge will need to be removed to accommodate the Cable Corridor. The associated noise predictions for the rock removal are shown in Table 14.7A (Appendix 14.4).

14.7.19 The predictions indicate that rock breaking will result in the daytime noise daytime limit of 70 dB(A) being exceeded at 6-8 Don View, 10 -12 Don View and Well. The magnitude of effect is considered to be high, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Major Adverse**.

Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.20 The rock breaking will also result in an exceedance of the weekend noise limit of 65 dB at multiple receptors as shown in Table 14.7A. The magnitude of effect is considered to be high, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Major Adverse** for works over the weekend. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.21 The noise predictions for the demolition of the SEC at Dunford Bridge are shown in Table 14.8A (Appendix 14.4).

14.7.22 The dismantling works and breaking of concrete result in exceedance of the weekday daytime limit of 70 dB(A) and the weekend noise limit of 60 dB(A) at 10 Don View and 12 Don View. The magnitude of effect is considered to be high, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Major Adverse**. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.23 The removal of the Dunford Bridge SEC also results in an exceedance of the weekend noise limit of 60 dB at multiple receptors as shown in Table 15.8A. The magnitude of effect is considered to be high, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Major Adverse** for works over the weekend. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.1 The predictions for the construction compound set up at Dunford Bridge and Wogden Foot are presented in Table 14.9A (Appendix 14.4).

14.7.2 Setup of the Dunford Bridge Compound requires the breaking of boulders, which results in an exceedance of the weekday daytime limit of 70 dB(A) and the weekend noise limit of 60 dB(A) at 10 Don View and 12 Don View. The magnitude of effect is considered to be high, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Major Adverse**. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.3 Rock breaking at the Dunford Bridge Compound will also result in an exceedance of the weekend noise limit of 60 dB(A) at South View and Stony Gate. The predicted noise levels are above 65 dB(A) and the magnitude of effect is considered to be high, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Major Adverse**. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.4 Compound setup at the Laydown Area at Wogden Foot will not result in an exceedance of the weekday daytime limit of 70 dB(A) or the weekend noise limit of 60 dB(A). The large separation distance to receptor locations means the significance of effect is low, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Minor Adverse**.

Construction of Access Roads

14.7.5 The predictions for the construction of the access roads are presented in Table 14.10A (Appendix 14.4).

14.7.6 Access road AP2 is located adjacent to Stony Gate. The close proximity of AP2 to the receptor locations means that when construction works take place at the closest

point to the receptor, the weekday daytime limit of 70 dB(A) and weekend noise limit of 60 dB(A) are exceeded. The magnitude of effect is considered to be high, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Major Adverse**. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.7 At its closest point, access road AP3 is located approximately 28m from Stony Gate. The close proximity of AP3 to the receptor locations means that when construction works take place at the closest point to the receptor, the weekday daytime limit of 70 dB(A) and weekend noise limit of 60 dB(A) are exceeded. The magnitude of effect is considered to be high, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Major Adverse**. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.8 At its closest point, access road AP4 is located approximately 15m from Well. The close proximity of AP4 to the receptor locations means that when construction works take place at the closest point to the receptor, the weekday daytime limit of 70 dB(A) and weekend noise limit of 60 dB(A) are exceeded. The magnitude of effect is considered to be high, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Major Adverse**. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.9 Access road AP5 is located in close proximity to a number of receptor locations. The close proximity of AP5 to Bar House and The Laurels means that when construction works take place at the closest point to the receptor, the weekday daytime limit of 70 dB(A) and weekend noise limit of 60 dB(A) are exceeded. The magnitude of effect is considered to be high, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Major Adverse**. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

Construction works on AP5 will also result in an exceedance of the weekend noise limit of 60 dB(A) at 1, 2 and 3 The Banks, with noise levels being above 65 dB(A) for site preparation, road construction and surfacing. The magnitude of effect is considered to be high, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Major Adverse** for the weekend period only. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.10 Maintenance of access roads will be crucial to reducing vehicle generated noise and vibration on access roads. The predictions for the maintenance of the access roads are presented in Table 14.11A (Appendix 14.4).

14.7.11 Access road AP2 is located adjacent to Stony Gate. The close proximity of AP2 to the receptor locations means that when maintenance works take place at the closest point to the receptor, the weekday daytime limit of 70 dB(A) and weekend noise limit of 60 dB(A) are exceeded. The magnitude of effect is considered to be high, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Major Adverse**. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.12 The close proximity of AP3 to the Stony Gate means that when road maintenance works take place at the closest point to the receptor, the weekend noise limit of 60 dB(A) are exceeded. The magnitude of effect is considered to be high, receptor

sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Major Adverse**. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.13 The close proximity of AP4 to the Well means that when road maintenance works take place at the closest point to the receptor, the weekday daytime limit of 70 dB(A) and weekend noise limit of 60 dB(A) are exceeded. The magnitude of effect is considered to be high, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Major Adverse**. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.14 Access road AP5 is located in close proximity to a number of receptor locations. The close proximity of AP5 to Bar House and The Laurels means that when road maintenance works take place at the closest point to the receptor, the weekend noise limit of 60 dB(A) are exceeded. The predicted noise levels are however below 65 dB(A) and the magnitude of effect is considered to be medium, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Moderate Adverse**. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.15 Road maintenance works on the Trans Pennine Trail diversion will result in an exceedance of the weekend noise limit of 60 dB(A) at the Laurels. Predicted noise levels are below 65 dB(A) and the magnitude of effect is considered to be medium, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Moderate Adverse**. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.16 Road maintenance works on the Trans Pennine Trail diversion will also result in an exceedance of the weekend noise limit of 60 dB(A) at 1,2 and 3 The Banks, with noise levels being above 65 dB(A) for site preparation, road construction and surfacing. The magnitude of effect is considered to be high, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Major Adverse** for the weekend period only. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.17 The predictions for the reinstatement and removal of the access roads are presented in Table 14.12A (Appendix 14.4).

14.7.18 The close proximity of AP2 to the receptor locations means that when road reinstatement works take place at the closest point to the receptor, the weekday daytime limit of 70 dB(A) and weekend noise limit of 60 dB(A) are exceeded. The magnitude of effect is considered to be high, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Major Adverse**. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.19 At its closest point, access road AP3 is located approximately 28m from Stony Gate. The close proximity of AP3 to the receptor locations means that when road reinstatement works take place at the closest point to the receptor, the weekday daytime limit of 70 dB(A) and weekend noise limit of 60 dB(A) are exceeded. The magnitude of effect is considered to be high, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Major Adverse**.

Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.20 At its closest point, access road AP4 is located approximately 15m from Well. The close proximity of AP4 to the receptor locations means that when road reinstatement works take place at the closest point to the receptor, the weekday daytime limit of 70 dB(A) and weekend noise limit of 60 dB(A) are exceeded. The magnitude of effect is considered to be high, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Major Adverse**. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.21 Access road AP5 is located in close proximity to a number of receptor locations. The close proximity of AP5 to Bar House, The Laurels and 1, 2 and 3 The Banks means that when road reinstatement works take place at the closest point to the receptor, the weekday daytime limit of 70 dB(A) and weekend noise limit of 60 dB(A) are exceeded. The magnitude of effect is considered to be high, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Major Adverse**. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.22 Road reinstatement works on the Trans Pennine Trail diversion will result in an exceedance of the weekday daytime limit of 70 dB(A) and weekend noise limit of 60 dB(A) at the Laurels and 1, 2 and 3 The Banks. The magnitude of effect is considered to be high, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Major Adverse**. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.23 Laydown areas will be created along the Cable Corridor to accommodate installation works. The noise predictions for the setup of the laydown areas are shown in Table 14.13A (Appendix 14.4).

14.7.24 The predictions indicate that construction of the laydown areas will result in the daytime noise daytime limit of 70 dB(A) being exceeded at 6-8 Don View, 10 -12 Don View and Well. The magnitude of effect is considered to be high, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Major Adverse**. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.25 The construction of the laydown areas will also result in an exceedance of the weekend noise limit of 65 dB(A) at multiple receptors as shown in Table 14.6A. The magnitude of effect is considered to be high, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Major Adverse**. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.26 The 400kV cable installation requires construction of a trench will be backfilled with a stabilised backfill, for example Cement Bound Sand (CBS). The noise prediction for the cable installation are shown in Table 14.14A (Appendix 14.4).

14.7.27 The cable installation works are predicted to result in exceedance of the weekday daytime limit of 70 dB(A) and the weekend noise limit of 60 dB(A) at 10 Don View and 12 Don View. The magnitude of effect is considered to be high, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Major Adverse**. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.28 The cable installation also results in an exceedance of the weekend noise limit of 60 dB(A) at multiple receptors as shown in Table 14.10A. The magnitude of effect is considered to be high, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Major Adverse** for works over the weekend. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

Removal of Existing Infrastructure (VIP Section)

14.7.29 Unmitigated noise levels for the removal of the pylons are presented in Table 14.15A (Appendix 14.4).

14.7.30 The dismantling of Pylon 4ZO163 results in an exceedance of the weekend noise limit of 60 dB(A) at South View and Well. The predicted noise levels are above 65 dB(A) and the magnitude of effect is considered to be high, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Major Adverse** for weekend works. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.31 The dismantling of Pylon 4ZO164R results in an exceedance of the weekday daytime limit of 70 dB(A) and the weekend noise limit of 60 dB(A) 12 Don View only. The magnitude of effect is considered to be high, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Major Adverse**. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.32 The dismantling of Pylon 4ZO164R also results in an exceedance of the weekday daytime limit of 70 dB(A) and the weekend noise limit of 60 dB(A) at 12 Don View only. The magnitude of effect is considered to be high, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Major Adverse**. Additional mitigation measures as listed in Appendix 14.3 would be required. The mitigation options are considered in Section 14.8.

14.7.33 The dismantling of all other pylons will not result in an exceedance of the weekday daytime limit of 70 dB(A) and the weekend noise limit of 60 dB(A) at any other receptor locations and the magnitude of effect is considered to be low, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Minor Adverse**.

Construction of replacement Pylon 4ZO157R

14.7.34 Noise levels for the construction of Pylon 4ZO157 at Wogden Foot are presented in Table 14.16A (Appendix 14.4).

14.7.35 The construction of Pylon 4ZO157 will not result in an exceedance of the weekday daytime limit of 70 dB(A) and the weekend noise limit of 60 dB(A) at any other receptor locations and the magnitude of effect is considered to be low, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Minor Adverse**.

Construction Traffic Noise on Public Roads

14.7.36 The assessment of construction traffic noise has considered the peak traffic flows over the entire construction period and therefore represents a possible worst-case assessment. For this reason the construction traffic noise effects have not been separated out under the headings presented above.

14.7.37 The noise predictions for road traffic on the public road network are presented in Table 14.17A (Appendix 14.4).

14.7.38 CRTN[6] provides the method for prediction road traffic noise. CRTN indicates that the methodology is suitable for road traffic predictions where road traffic flows are above 50 vehicles per hour (LA10 1-hour) and 1000 vehicles (LA10-18 hour). Flows on Goddard Lane and Windle Edge North fall below the thresholds in CRTN.

14.7.39 The change in road traffic noise as a result of construction traffic movements is shown in Table 14.13.

Table 14.13: Construction traffic noise increase on public roads

Location	Without Construction Traffic	With Construction Traffic	Difference	Significance
	$L_{A10\ 18\ hour}$	$L_{A10\ 18\ hour}$		
A628	74.1	74.1	0.0	No Change
A616 Whams Road	68.8	68.8	0.1	Negligible
B6106 Bents Road	67.7	67.7	0.0	No Change
	$L_{A10\ 1\ hour}$	$L_{A10\ 1\ hour}$		
A628	77.0	77.0	0.0	No Change
A616 Whams Road	71.7	71.7	0.0	No Change
B6106 Bents Road	66.6	66.6	0.0	No Change

14.7.40 The noise changes due to construction vehicle movements on public road presented in **Table 14.13** are shown to be Negligible (No Change) and therefore Minor Adverse and not significant. No further mitigation is required.

Construction Traffic Noise on Access Roads

14.7.41 As with the assessment of the construction traffic noise on public roads, the assessment of construction traffic noise on access roads has considered worst case construction traffic volumes during the construction period and has not been separated out under the headings presented above.

14.7.42 As set out in Section 14.2, the noise impacts associated with construction traffic movements on access roads has been assessed in accordance with the methodology in BS5228-1 for mobile plant. Construction traffic movements have been presented in Chapter 2 (Project Description) as traffic numbers per day. The methodology in BS5228 considers hourly traffic movements and the assessment has worst case daily vehicle movements. For the purposes of this assessment it has been assumed that, as a possible worst case, any access route could carry 12 HGVs in an hour (the hourly average presented in Table 12.8 is 8 per hour). Based on this assumption, the predicted construction traffic noise levels on haul and access roads have been presented in Table 14.18A (Appendix 14.4).

14.7.43 The construction traffic noise levels will not result in an exceedance of the weekday daytime limit of 70 dB(A) and the weekend noise limit of 60 dB(A) at any other

receptor locations and the magnitude of effect is considered to be low, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Minor Adverse**. No further mitigation is proposed.

Assessment of Impacts during Operation

Trans Pennine Trail Diversion – Subject to Planning Application

14.7.44 There will not be any noise impacts associated with the permanent aspects of the Trans Pennine Trail Diversion and the assessment of operational noise has therefore been scoped out.

Sealing End Compound – Subject to Planning Application

14.7.45 The Sealing End Compound is located approximately 300m from the nearest receptor location and does not generate noise. The assessment of operational noise for the Sealing End Compound has therefore been scoped out.

400kV Cable (Undergrounding)

14.7.46 The Proposed Project provides for the undergrounding of an existing OHL, thereby eliminating the operational noise impacts typically associated with an OHL. As there are no operational noise impacts associated with the undergrounded cables, the assessment of operational noise has therefore been scoped out.

Removal of Existing Infrastructure (VIP subsection)

14.7.47 The Proposed Project provides for the removal of the existing OHL, thereby eliminating the associated operational noise impacts. The undergrounding would therefore present a reduction in operational noise impacts.

Construction of replacement Pylon 4ZO157R

14.7.48 The existing Pylon 4ZO157 is to be replaced with Pylon 4ZO157R. Pylon 4ZO157R does not therefore present an additional noise source, but rather the replacement of an existing noise source with new technology, new fittings, insulators and conductors. The closest receptor location is approximately 400m from the pylon location and therefore the assessment of operational noise from replacement Pylon 4ZO157R has been scoped out.

Assessment of Impacts during Decommissioning

Trans Pennine Trail Diversion – Subject to Planning Application

14.7.49 There are no intentions to decommission the permanent aspects of the Trans Pennine Trail Diversion and therefore the assessment of noise on decommissioning the Trans Pennine Trail diversion has been scoped out.

Sealing End Compound – Subject to Planning Application

14.7.50 The lifespan of a SEC is approximately 40-50 years. When the SECs useful life has expired the materials would be removed and taken for recycling. Unless there is a compelling need for removal of the foundations, these would be removed to approximately 1m deep and subsoil and topsoil reinstated. If the foundations were to be removed, similar methods and access would be required as outlined for installation.

14.7.51 The detailed decommissioning methodology cannot be finalised until immediately prior to decommissioning, but would be in line with relevant policy at that time. For

assessment purposes, this assessment assumes that the SEC would be removed if no longer required, with the foundations removed to a depth of approximately 1m.

14.7.52 Noise impacts associated with decommissioning of the SECs are likely to be similar to those predicted for construction.

400kV Cable (Undergrounding)

14.7.53 The Cable Corridor has a life expectancy of approximately 40 years and National Grid would seek to utilise a maximum life expectancy. When they reach the end of their life or when a connection is no longer required it is proposed that the Cable Corridor would be left *in situ* to avoid disruption associated with their removal along the Trans Pennine Trail and at Wogden Foot.

14.7.54 If the cable installation was no longer required when they reached the end of their life it is expected that they would remain buried in the ground to avoid disruption associated with their removal along the Trans Pennine Trail. However, if the cable needed to be replaced it would be possible to remove the redundant cable and replace with a new solution. Noise impacts associated with any replacement works are likely to be similar to those for the 400kV undergrounding works.

Decommissioning of replacement Pylon 4ZO157R

14.7.55 Noise impacts associated with any decommissioning works are likely to be similar to those for the removal of the existing infrastructure. The closest receptor is approximately 400m from the pylon location and therefore, as indicated with the removal of the existing Pylon 4ZO157, the noise impacts are unlikely to be significant.

14.8 Mitigation

14.8.1 The mitigation measures applied for construction noise is in accordance with BS5228-1[2] and BS5228-2[9]. Best Practicable Means (BPM) as set out in BS5228-1 and BS5228-2 would be adopted to minimise construction noise and vibration levels to the lowest levels possible. BPM is defined by reference to the following provisions in Section 79(9) of the Environmental Protection Act 1990:

"'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 structures;

The test is to apply only so far as compatible with any duty imposed by law; and

The test is to apply only so far as compatible with safety and safe working conditions, and with the exigencies of any emergency or unforeseeable circumstances."

14.8.2 Mitigating measures associated with BPM would include (but would not be limited to) the following:

- Working hours restricted to core hours so far as appropriate. Core hours are between 0700 and 1900 Mondays to Fridays and between 0800 and 1700 on Saturdays and Sundays
- Selection of quieter plant and less intrusive methods (such as hydraulic plant rather than percussive) where appropriate and practicable.

- Locating plant and equipment as far as practicably possible from receptor locations.
- Site hoarding with acoustic properties to be provided at compounds.
- Proper maintenance of all plant and equipment.
- Noise and/or vibration monitoring where required.

14.8.3 With the intention to carry out construction works at weekends, the mitigation options set out below have been set to achieve the weekend noise limit of 60 dB(A) and thereby reduce the noise impact to **Minor Adverse**.

Mitigation of Impacts During Construction

Trans Pennine Trail Diversion – Subject to Planning Application

14.8.4 Construction noise impacts associated with construction of the Trans Pennine Trail diversion are shown in Table 14.1A (Appendix 14.4). Locations where the proposed noise limits set out in Table 14.4 are exceeded, are shown in Table 14.14.

Table 14.14: Mitigation required for construction of Trans Pennine Trail Diversion

Construction Works	Receptor	Highest Predicted Level $L_{Aeq\ (t)}$	Required Sound Reduction dB	Mitigation Measure (from Appendix 14.3)
Trans Pennine Trail Diversion	The Laurels	71.1	12	Acoustic screening 5 to 10dB Alternative super silenced plant 5 to 10 dB
	1,2,3 The Banks	68.7	9	Acoustic screening 5 to 10dB

14.8.5 Acoustic screening would generally achieve the required sound reduction to achieve a **Minor Adverse** impact. A combination of mitigation measures may be required where acoustic screening does not achieve the required sound reduction.

14.8.6 Maintenance of the Trans Pennine diversion will be crucial to reducing vehicle generated noise and vibration on access roads. Locations where the proposed noise limits set out in Table 14.4 are exceeded, are shown in Table 14.15.

Table 14.15: Mitigation required for maintenance of Trans Pennine Trail Diversion

Construction Works	Receptor	Highest Predicted Level $L_{Aeq\ (t)}$	Required Sound Reduction dB	Mitigation Measure (from Appendix 14.3)
Trans Pennine Trail Diversion	The Laurels	61.3	2	Acoustic screening 5 to 10dB

14.8.7 Acoustic screening would generally achieve the required sound reduction to achieve a **Minor Adverse** impact.

14.8.8 The noise predictions for the construction of the laydown areas for the Trans Pennine Trail diversion are shown in Table 14.2A (Appendix 14.4). Locations where the proposed noise limits set out in Table 14.4 are exceeded, are shown in Table 14.16.

Table 14.16: Mitigation required for construction of Trans Pennine Trail Diversion laydown areas

Construction Works	Receptor	Highest Predicted Level $L_{Aeq\ (t)}$	Required Sound Reduction dB	Mitigation Measure (from Appendix 14.3)
Trans Pennine Trail Diversion	Winscar Lodge	61.5	2	Acoustic screening 5 to 10dB
	Southview	60.5	1	Acoustic screening 5 to 10dB
	Well	64.9	5	Acoustic screening 5 to 10dB
	Bar House	69.7	10	Acoustic screening 5 to 10dB Alternative super silenced plant 5 to 10 dB
	The Laurels	70.3	12	Acoustic screening 5 to 10dB Alternative super silenced plant 5 to 10 dB
	1,2,3 The Banks	66.5	7	Acoustic screening 5 to 10dB

14.8.9 Acoustic screening would generally achieve the required sound reduction to achieve a **Minor Adverse** impact. A combination mitigation measures may be required where acoustic screening does not achieve the required sound reduction.

14.8.10 The noise predictions for the construction of permanent Bridge 1 (Jenga Bridge) are shown in Table 14. 3A (Appendix 14.4). Due to the separation distance from receptor locations, the construction of Bridge 1 and a temporary bridge (Bridge 2) are considered to be **Minor Adverse** and no additional mitigation is required.

Sealing End Compound – Subject to Planning Application

14.8.11 Construction noise predictions for the creation of the SEC are shown in Appendix 14.4 (Table 14.4A). The large separation distance to receptor locations means the significance of effect is low, receptor sensitivity is medium, and the effect of unmitigated construction noise levels are considered to be **Minor Adverse**. No additional mitigation is therefore required.

Access Point 7 and Northern Access Route – Subject to Planning Application

14.8.12 The construction noise predictions associated with the construction of access point AP7 at Windle Edge are presented in Appendix 14.4. (Table 14.5A). The

construction noise effects are considered to be **Minor Adverse** and no additional mitigation is required.

14.8.13 Construction and maintenance works on Northern Access Route from AP7 are presented in Table 14.6A (Appendix 14.4). Locations where the proposed noise limits set out in Table 14.4 are exceeded, are shown in Table 14.17.

Table 14.17: Mitigation required for construction and reinstatement of Northern Access Route

Construction Works	Receptor	Highest Predicted Level $L_{Aeq\ (t)}$	Required Sound Reduction dB	Mitigation Measure (from Appendix 14.3)
N. Access Route	Brookside Farm	63.5	4	Acoustic screening 5 to 10dB
N. Access Route reinstatement	Brookside Farm	66.6	7	Acoustic screening 5 to 10dB

14.8.14 Additional mitigation would achieve the required sound reduction to achieve a **Minor Adverse** impact.

400 kV Cable (Undergrounding)

14.8.15 A section of the existing embankment at Dunford Bridge will need to be removed to accommodate the Cable Corridor. The associated noise predictions for the rock removal are shown in Table 14.7A (Appendix 14.4).

14.8.16 Locations where the proposed noise limits set out in Table 14.4 are exceeded, are shown in Table 14.18.

Table 14.18: Mitigation required for construction of Dunford Bridge Compound

Construction Works	Receptor	Highest Predicted Level $L_{Aeq\ (t)}$	Required Sound Reduction dB	Mitigation Measure (from Appendix 14.3)
Dunford Bridge Rock Removal	Winscar Lodge	67.5	8	Acoustic screening 5 to 10d
	2-4 Don View	69.7	10	Acoustic screening 5 to 10dB Alternative super silenced plant 5 to 10 dB
	6-8 Don View	70.1	11	Acoustic screening 5 to 10dB Alternative super silenced plant 5 to 10 dB
	10-12 Don View	71.1	12	Acoustic screening 5 to 10dB Alternative super silenced plant 5 to 10 dB

Construction Works	Receptor	Highest Predicted Level $L_{Aeq\ (t)}$	Required Sound Reduction dB	Mitigation Measure (from Appendix 14.3)
	Southview	69.4	10	Acoustic screening 5 to 10dB Alternative super silenced plant 5 to 10 dB
	Well	70.8	11	Acoustic screening 5 to 10dB Alternative super silenced plant 5 to 10 dB
	Bar House	63.7	4	Acoustic screening 5 to 10dB
	The Laurels	62.7	3	Acoustic screening 5 to 10dB

14.8.17 Acoustic screening would generally achieve the required sound reduction to achieve a **Minor Adverse** impact. A combination mitigation measures may be required where acoustic screening does not achieve the required sound reduction.

14.8.18 Predicted noise levels at Don View, Southview and Well are however more than 10 dB(A) above the weekend noise limit of 60 dB(A) and a combination of methods will be required to achieve the weekend noise limit of 60 dB(A). If adopting BPM does not achieve the required sound reduction, work hours at these locations may need to be confined to weekdays.

14.8.19 The noise predictions for the demolition of the SEC at Dunford Bridge are shown in Table 14.8A (Appendix 14.4).

14.8.20 The noise predictions for the demolition of the SEC at Dunford Bridge are shown in Table 14.8A (Appendix 14.4). Locations where the proposed noise limits set out in Table 14.4 are exceeded, are shown in Table 14.19.

Table 14.19: Mitigation required for demolition of Dunford Bridge SEC

Construction Works	Receptor	Highest Predicted Level $L_{Aeq\ (t)}$	Required Sound Reduction dB	Mitigation Measure (from Appendix 14.3)
Dunford Bridge SEC Demolition	12 Don View	74.7	15	Acoustic screening 5 to 10d
	10 Don View	71.3	12	Acoustic screening 5 to 10dB Alternative super silenced plant 5 to 10 dB
	South View	65.3	6	Acoustic screening 5 to 10dB
	Stony Gate	64.5	5	Acoustic screening 5 to 10dB

14.8.21 Acoustic screening would generally achieve the required sound reduction to achieve a **Minor Adverse** impact. A combination of mitigation measures may be required where acoustic screening does not achieve the required sound reduction.

14.8.22 Predicted noise levels at 10 Don View and 12 Don View are however more than 10 dB(A) above the weekend noise limit of 60 dB(A) and a combination of methods will be required to achieve the weekend noise limit of 60 dB(A). If adopting BPM does not achieve the required sound reduction, work hours at these locations may need to be confined to weekdays.

14.8.23 The predictions for the construction compound set up at Dunford Bridge and Wogden Foot are presented in Table 14.9A (Appendix 14.4). Setup of the Dunford Bridge Compound requires the breaking of boulders, which results in an exceedance of the weekday daytime limit of 70 dB(A) and the weekend noise limit of 60 dB(A) at receptors indicated in Table 14.9A.

14.8.24 Locations where the proposed noise limits set out in Table 14.4 are exceeded, are shown in Table 14.20.

Table 14.20: Mitigation required for construction of Dunford Bridge Compound

Construction Works	Receptor	Highest Predicted Level $L_{Aeq\ (t)}$	Required Sound Reduction dB	Mitigation Measure (from Appendix 14.3)
Dunford Bridge Compound	12 Don View	76.4	17	Acoustic screening 5 to 10dB Alternative super silenced plant 5 to 10 dB
	10 Don View	72.9	13	Acoustic screening 5 to 10dB Alternative super silenced plant 5 to 10 dB
	South View	66.9	7	Acoustic screening 5 to 10dB
	Stony Gate	66.1	7	Acoustic screening 5 to 10dB

14.8.25 Acoustic screening would generally achieve the required sound reduction to achieve a **Minor Adverse** impact. Predicted noise levels at 10 Don View and 12 Don View are however more than 10 dB(A) above the weekend noise limit of 60 dB(A) and a combination of methods will be required to achieve the weekend noise limit of 60 dB(A). If adopting BPM does not achieve the required sound reduction, work hours at these locations may need to be confined to weekdays.

The predictions for the construction of the access roads are presented in Table 14.10A (Appendix 14.4).

14.8.26 Locations where the proposed noise limits set out in Table 14.4 are exceeded, are shown in Table 14.21.

Table 14.21: Mitigation required for construction of access roads

Construction Works	Receptor	Highest Predicted Level $L_{Aeq\ (t)}$	Required Sound Reduction dB	Mitigation Measure (from Appendix 14.3)
AP2	Stony Gate	83.0	23	Acoustic screening 5 to 10dB Alternative super silenced plant 5 to 10 dB
AP3	Stony Gate	74.8	15	Acoustic screening 5 to 10dB Alternative super silenced plant 5 to 10 dB
	South View	60.3	1	Acoustic screening 5 to 10dB
AP4	Well	80.3	21	Acoustic screening 5 to 10dB Alternative super silenced plant 5 to 10 dB
AP5	Bar House	71.1	12	Acoustic screening 5 to 10dB Alternative super silenced plant 5 to 10 dB
	The Laurels	72.7	13	Acoustic screening 5 to 10dB Alternative super silenced plant 5 to 10 dB
	1,2,3 The Banks	68.2	9	Acoustic screening 5 to 10dB

14.8.27 Acoustic screening would generally achieve the required sound reduction to achieve a **Minor Adverse** impact.

14.8.28 Predicted noise levels at Stony Gate and Well are however more than 20 dB(A) above the weekend noise limit of 60 dB(A) and a combination of methods will be required to achieve the weekend noise limit of 60 dB(A). If adopting BPM does not achieve the required sound reduction, work hours at these locations may need to be confined to weekdays.

14.8.29 Maintenance of access roads will be crucial to reducing vehicle generated noise and vibration on access roads. The predictions for the maintenance of the access roads are presented in Table 14.11A (Appendix 14.4).

14.8.30 Locations where the proposed noise limits set out in Table 14.4 are exceeded, are shown in Table 14.22.

Table 14.22: Mitigation required for maintenance of access roads

Construction Works	Receptor	Highest Predicted Level $L_{Aeq\ (t)}$	Required Sound Reduction dB	Mitigation Measure (from Appendix 14.3)
AP2	Stony Gate	73.2	14	Acoustic screening 5 to 10dB Alternative super silenced plant 5 to 10 dB
AP3	Stony Gate	65.1	6	Acoustic screening 5 to 10dB
	South View	60.3	1	Acoustic screening 5 to 10dB
AP4	Well	67.5	8	Acoustic screening 5 to 10dB
AP5	Bar House	61.3	2	Acoustic screening 5 to 10dB
	The Laurels	62.9	3	Acoustic screening 5 to 10dB

14.8.31 Acoustic screening would generally achieve the required sound reduction to achieve a **Minor Adverse** impact.

14.8.32 Predicted noise levels at Stony Gate for works on AP2 are however 13 dB(A) above the weekend noise limit of 60 dB(A) and a combination of methods will be required to achieve the weekend noise limit of 60 dB(A). If adopting BPM does not achieve the required sound reduction, work hours at these locations may need to be confined to weekdays.

14.8.33 The predictions for the reinstatement and removal of the access roads are presented in Table 14.12A (Appendix 14.4).

14.8.34 Locations where the proposed noise limits set out in Table 14.4 are exceeded, are shown in Table 14.23.

Table 14.23: Mitigation required for reinstatement of access roads

Construction Works	Receptor	Highest Predicted Level $L_{Aeq\ (t)}$	Required Sound Reduction dB	Mitigation Measure (from Appendix 14.3)
AP2	Stony Gate	86.0	26	Acoustic screening 5 to 10dB Alternative super silenced plant 5 to 10 dB
AP3	Stony Gate	77.8	18	Acoustic screening 5 to 10dB Alternative super silenced plant 5 to 10 dB
	South View	63.3	4	Acoustic screening 5 to 10dB

Construction Works	Receptor	Highest Predicted Level $L_{Aeq\ (t)}$	Required Sound Reduction dB	Mitigation Measure (from Appendix 14.3)
AP4	Well	83.3	24	Acoustic screening 5 to 10dB Alternative super silenced plant 5 to 10 dB
AP5	Bar House	74.1	15	Acoustic screening 5 to 10dB Alternative super silenced plant 5 to 10 dB
	The Laurels	75.7	16	Acoustic screening 5 to 10dB Alternative super silenced plant 5 to 10 dB
	1,2,3 The Banks	71.2	12	Acoustic screening 5 to 10dB

14.8.35 Acoustic screening would generally achieve the required sound reduction to achieve a **Minor Adverse** impact.

14.8.36 Predicted noise levels at Stony Gate and Well are however more than 26 dB(A) above the weekend noise limit of 60 dB(A) and a combination of methods will be required to achieve the weekend noise limit of 60 dB(A). If adopting BPM does not achieve the required sound reduction, work hours at these locations may need to be confined to weekdays.

14.8.37 Laydown areas will be created along the Cable Corridor to accommodate installation works. The noise predictions for the setup of the laydown areas are shown in Table 14.13A (Appendix 14.4).

14.8.38 Locations where the proposed noise limits set out in Table 14.4 are exceeded, are shown in Table 14.24.

Table 14.24: Mitigation required for construction of Laydown Areas

Construction Works	Receptor	Highest Predicted Level $L_{Aeq\ (t)}$	Required Sound Reduction dB	Mitigation Measure (from Appendix 14.3)
Cable Laydown Areas	Winscar Lodge	67.2	8	Acoustic screening 5 to 10d
	2-4 Don View	68.5	9	Acoustic screening 5 to 10dB
	6-8 Don View	70.7	11	Acoustic screening 5 to 10dB Alternative super silenced plant 5 to 10 dB

Construction Works	Receptor	Highest Predicted Level $L_{Aeq\ (t)}$	Required Sound Reduction dB	Mitigation Measure (from Appendix 14.3)
	10-12 Don View	72.2	13	Acoustic screening 5 to 10dB Alternative super silenced plant 5 to 10 dB
	Southview	67.5	8	Acoustic screening 5 to 10dB Alternative super silenced plant 5 to 10 dB
	Well	72.2	13	Acoustic screening 5 to 10dB Alternative super silenced plant 5 to 10 dB
	Bar House	68.8	9	Acoustic screening 5 to 10dB
	The Laurels	66.2	7	Acoustic screening 5 to 10dB
	1,2,3 The Banks	66.9	7	Acoustic screening 5 to 10dB

14.8.39 Additional mitigation would generally achieve the required sound reduction to achieve a **Minor Adverse** impact.

14.8.40 Predicted noise levels at 6-8 Don View, 10-12 Don View and Well are however more than 10 dB(A) above the weekend noise limit of 60 dB(A) and a combination of methods will be required to achieve the weekend noise limit of 60 dB(A). If adopting BPM does not achieve the required sound reduction, work hours at these locations may need to be confined to weekdays.

400kV Cable Installation

14.8.41 The noise prediction for the cable installation are shown in Table 14.14A (Appendix 14.4).

14.8.42 Locations where the proposed noise limits set out in Table 14.4 are exceeded, are shown in Table 14.25.

Table 14.25: Mitigation required for Cable Installation (Trenching)

Construction Works	Receptor	Highest Predicted Level $L_{Aeq\ (t)}$	Required Sound Reduction dB	Mitigation Measure (from Appendix 14.3)
Cable Installation (Trenching)	10-12 Don View	73.9	14	Acoustic screening 5 to 10dB Alternative super silenced plant 5 to 10 dB
	6-8 Don View	71.0	9	Acoustic screening 5 to 10dB

	2-4 Don View	69.9	8	Acoustic screening 5 to 10dB
	Winscar Lodge	68.2	6	Acoustic screening 5 to 10dB
	Bar House	70.8	9	Acoustic screening 5 to 10dB
	The Laurels	72.2	10	Acoustic screening 5 to 10dB
	1,2,3 The Banks	68.8	7	Acoustic screening 5 to 10dB

14.8.43 Acoustic screening would generally achieve the required sound reduction to achieve a **Minor Adverse** impact.

14.8.44 Predicted noise levels at 10-12 Don View are however 14 dB(A) above the weekend noise limit of 60 dB(A) and a combination of methods will be required to achieve the weekend noise limit of 60 dB(A). If adopting BPM does not achieve the required sound reduction, work hours at these locations may need to be confined to weekdays.

Removal of Existing Infrastructure (VIP Section)

14.8.45 Unmitigated noise levels for the removal of the pylons are presented in Table 14.15A (Appendix 14.4).

14.8.46 Locations where the proposed noise limits set out in Table 14.4 are exceeded, are shown in Table 14.26.

Table 14.26: Mitigation required for pylon removal

Construction Works	Receptor	Highest Predicted Level $L_{Aeq\ (t)}$	Required Sound Reduction dB	Mitigation Measure (from Appendix 14.3)
Pylon 4ZO163	South View	69.7	10	Acoustic screening 5 to 10dB
	Well	66.8	7	Acoustic screening 5 to 10dB
Pylon 4ZO164R	12 Don View	70.2	11	Acoustic screening 5 to 10dB Alternative super silenced plant 5 to 10 dB
	10 Don View	69.7	10	Acoustic screening 5 to 10dB
	South View	62.0	2	Acoustic screening 5 to 10dB
Pylon 4ZO163	South View	69.7	10	Acoustic screening 5 to 10dB

14.8.47 Acoustic screening would generally achieve the required sound reduction to achieve a **Minor Adverse** impact.

14.8.48 Predicted noise levels at 12 Don View are however 11 dB(A) above the weekend noise limit of 60 dB(A) and a combination of methods will be required to achieve the weekend noise limit of 60 dB(A). If adopting BPM does not achieve the required

sound reduction, work hours at these locations may need to be confined to weekdays.

Construction of replacement Pylon 4ZO157R

14.8.49 Noise levels for the construction of Pylon 4ZO157 at Wogden Foot as presented in Table 14.16A (Appendix 14.4) indicates that the effect of unmitigated construction noise levels is considered to be **Minor Adverse** and no additional mitigation will be required.

Mitigation of Impacts during Operation

Sealing End Compound – Subject to Planning Application

14.8.50 The Sealing End Compound is located approximately 300m from the nearest receptor location and does not generate noise. The assessment of operational noise for the Sealing End Compound has therefore been scoped out. No mitigation is therefore required.

400kV Cable (Undergrounding)

14.8.51 The Proposed Project provides for the undergrounding of an existing OHL, thereby eliminating the operational noise impacts typically associated with an OHL. As there are no operational noise impacts associated with the undergrounded cables, no further mitigation measures are required.

Removal of Existing Infrastructure (VIP subsection)

14.8.52 The Proposed Project provides for the removal of the existing OHL, thereby eliminating the associated operational noise impacts. The undergrounding would therefore present a reduction in operational noise impacts and no additional mitigation is required.

Construction of replacement Pylon 4ZO157R

14.8.53 The existing Pylon 4ZO157 is to be replaced with Pylon 4ZO157R. Pylon 4ZO157R does not therefore present an additional noise source, but rather the replacement of an existing noise source with new technology, new fittings, insulators and conductors. The closest receptor location is approximately 400m from the pylon location and therefore the assessment of operational noise from replacement Pylon 4ZO157R has been scoped out and no additional mitigation is required.

Assessment of Impacts during Decommissioning

Sealing End Compound – Subject to Planning Application

14.8.54 The detailed decommissioning methodology cannot be finalised until immediately prior to decommissioning, but would be in line with relevant policy at that time. For assessment purposes, this assessment assumes that the SEC would be removed if no longer required, with the foundations removed to a depth of approximately 1m.

14.8.55 Noise impacts associated with decommissioning of the SECs are likely to be similar to those predicted for construction and the mitigation measures recommended for construction would be appropriate.

400kV Cable (Undergrounding)

14.8.56 It is proposed that the Cable Corridor would be left *in situ* to avoid disruption associated with their removal along the Trans Pennine Trail and at Wogden Foot and there would therefore be no decommissioning noise impacts.

14.8.57 However, if the cable needed to be replaced, noise impacts associated with any replacement works are likely to be similar to those for the 400kV undergrounding works and the mitigation proposed during construction would be appropriate.

Decommissioning of replacement Pylon 4ZO157R

14.8.58 Noise impacts associated with any decommissioning works are likely to be similar to those for the removal of the existing infrastructure. The closest receptor is approximately 400m from the pylon location and therefore, as indicated with the removal of the existing Pylon 4ZO157, the noise impacts are unlikely to be significant.

14.9 Summary of Residual Effects

14.9.1 The noise effects associated with the Proposed Project are described below.

14.9.2 ***During Construction***

14.9.3 The effects associated with unmitigated construction noise levels mainly range from low to moderate adverse and are not significant at most receptors.

14.9.4 Due to the close proximity construction noise impacts at Dunford Bridge are however predicted to be high and significant, in particular activities such as rock removal to accommodate the Cable Corridor and demolition of the Dunford Bridge SEC.

14.9.5 Construction works are generally of short duration, with most of the works, such as construction of the access roads and the Cable Corridor, and the removal of existing OHL infrastructure being transient in nature. With mitigation in place the effects are predicted to be **not significant** for most construction works.

14.9.6 Where construction noise levels remain above the weekend construction noise limit of 60 dB(A) despite the implementation of BPM, there may be a need to restrict noisy activities to weekdays.

14.9.7 ***During Operation***

14.9.8 Operational noise impacts have not been considered in this assessment. The Proposed Project provides for the removal of an OHL as a noise source and the provision of an underground cable, thereby removing the noise impacts typically associated with an OHL. Operational noise impacts would therefore be considered to be negligible and **not significant**.

14.9.9 ***During Decommissioning***

14.9.10 Decommissioning noise impacts are expected to be less than those identified during construction, given that the underground cable and infrastructure foundations will not be removed and, with mitigation in place, are predicted to be **not significant**.