National Grid

VIP COTSWOLDS ZF ROUTE

Winchcombe CSEC - Construction Noise Impact Assessment

70108276-RP-AC-01 REV P01
APRIL 2024

CONFIDENTIAL

National Grid

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Winchcombe CSEC - Construction Noise Impact Assessment

WSP

Amber Court
William Armstrong Drive
Newcastle upon Tyne
NE4 7YQ

Phone: +44 191 226 2000

WSP.com

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Signature				
Checked by	Robin Brown			
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Authorised by	Giles Hine			
Signature	Hine, Giles (UKGRH 775) Digitally signed by Hine, Giles (UKGRH775) DN: cn=Hine, Giles (UKGRH775), ou=Active, email=giles.hine@wsp.com Date: 2024.04.22 17:43:06 +01'00'			
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1 INTRODUCTION

1.1 BACKGROUND

WSP UK Limited (WSP) has been commissioned by National Grid Electricity Transmission PLC (National Grid) to undertake an assessment of the potential effects resulting from noise emissions associated with the Visual Impact Provision (VIP) construction works in the Cotswolds National Landscape.

This report relates to the construction activities associated with the northern Cable Sealing End Compound (CSEC) known as the 'Winchcombe CSEC'.

1.2 PROPOSED DEVELOPMENT

Construction of the Winchcombe CSEC to facilitate the connection between underground cables and existing OHL; permanent access road (and bell-mouth junction) to the CSEC Site; and construction of temporary access road and associated bell-mouth junction.

1.3 SITE LOCATION

The Site is in the Cotswolds National Landscape, a designated Area of Outstanding Natural Beauty (AONB), approximately 8 km northeast of Cheltenham. The proposed CSEC Site is predominantly open fields and agricultural land. The Site is in the administrative boundary of Tewkesbury Borough Council.

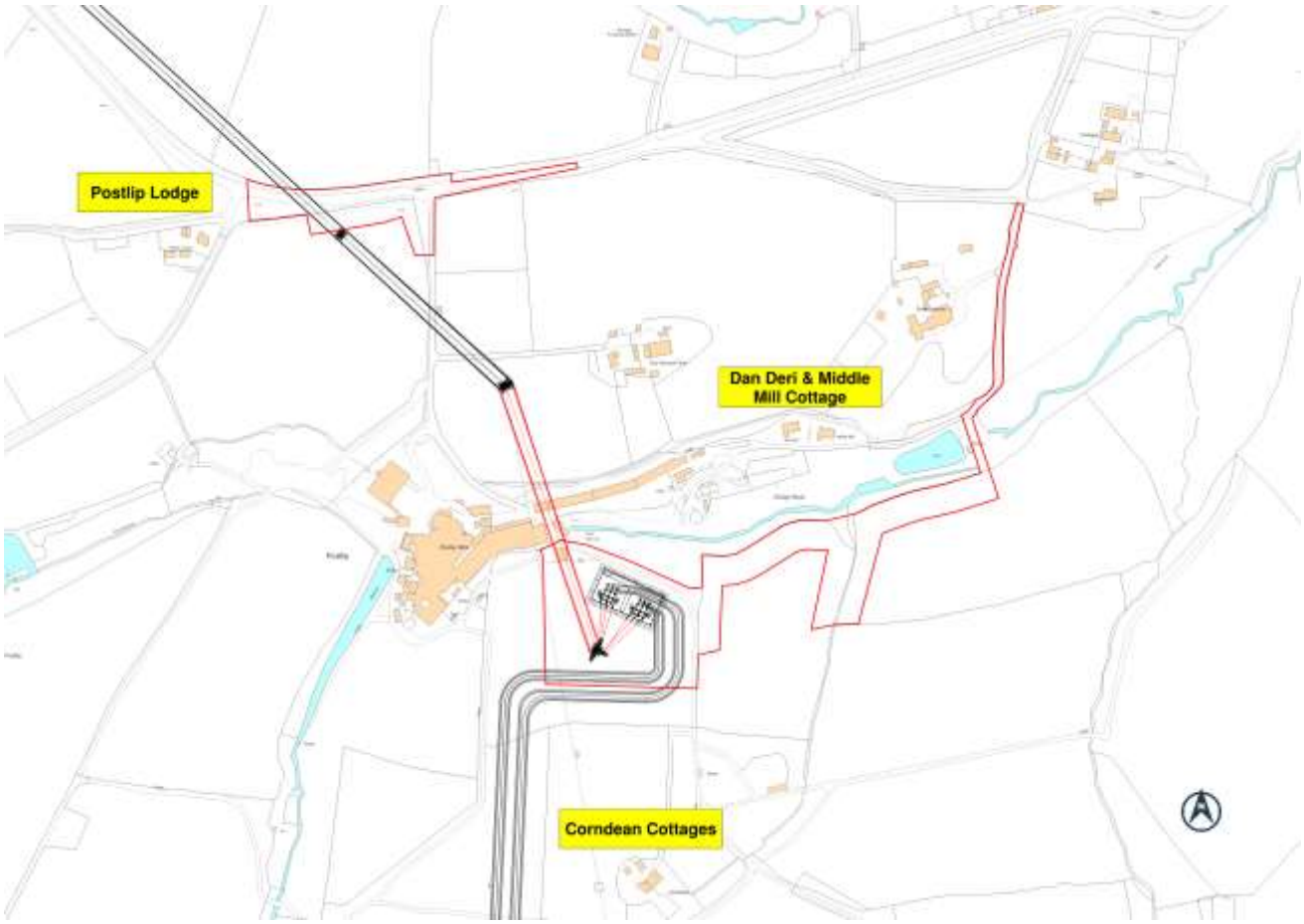
Plans showing the proposed Site location can be found in Appendix A.

The nearest noise sensitive receptors (NSRs) from each element of the works are identified in Figure 1-1 and Table 1-1 below.

Table 1-1 - Nearest noise sensitive receptors

Work site	Receptor name	Approx. distance / direction from site	Receptor type
CSEC Construction	Dan Deri & Middle Mill Cottage	190m northeast	Residential
OHL Outages	Corndean Cottages	190m south	Residential
Temporary Access Roads	Corndean Cottages	170m east	Residential
Temporary Bellmouth Construction	Postlip Lodge	160m west	Residential
Permanent Access Road Improvements	Dan Deri & Middle Mill Cottage	70m north	Residential

Figure 1-1 - Nearest noise sensitive receptors



1.4 SCOPE OF THE REPORT

This report outlines the noise assessment of the proposed development at the Site and includes the following:

- a desktop review of the area surrounding the Site to determine NSRs that will potentially be adversely affected by the construction phase of the Proposed Development; and
- an assessment of construction noise using guidance provided within BS 5228:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Part 1: Noise* (BS 5228-1).

Operational noise is scoped out of the assessment as CSECs based on the low noise levels generated by the operational CSEC and the distance to NSRs, significant noise impacts are not expected.

Vibration effects from the construction works have also been scoped out of the assessment. Potential sources of vibration from the works include construction traffic on access and haul roads,

digging and drilling works. Vibration levels from these sources would be considered negligible at 30 m from the works[1]. All site works are at least 70 m from vibration sensitive receptors.

Construction road traffic noise is scoped out of the assessment as the number of construction vehicles is anticipated to be small relative to flows on existing roads; therefore, significant impacts are not expected at any receptor.

Vibration generated by construction traffic on public roads is scoped out of the assessment, as road surfaces are expected to be well maintained and free from irregularities, so operational vibration will not have the potential to lead to significant adverse effects.

[1] Historic case studies of tunnelling vibration within BS 5228:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration* (BS 5228-2) (Reference 103 in Table D.6) show that vibration levels from auguring results in a peak particle velocity (PPV) of 0.02 mm/s at a distance of 30 meters. According to the criteria within BS 5228-2 a PPV value of 0.02 mm/s would have a negligible impact on residential receptors.

2 RELEVANT LEGISLATION, POLICY AND GUIDANCE

2.1 CONTROL OF POLLUTION ACT 1974

The principal legislation covering demolition and construction noise is the Control of Pollution Act 1974[2], Part III. Sections 60 and 61 of the Act give the local authority special powers for controlling noise arising from construction and demolition works, regardless of whether a statutory nuisance has been caused or is likely to be caused. Works within the scope of these provisions include repair and maintenance work and road works. These powers may be exercised either before works start or after they have started.

Section 60 enables a local authority in whose area work is going to be carried out, or is being carried out, to serve a notice of its requirements for the control of site noise on the person who appears to the local authority to be carrying out the works. Such a notice may also be served on others appearing to the local authority to be responsible for, or to have control over, the carrying out of the works.

This notice can:

- Specify the plant or machinery that is or is not to be used.
- Specify the hours during which the construction work can be carried out.
- Specify the level of noise that can be emitted.
- Provide for any changes of circumstances.

Section 61 of the Act provides a mechanism for the contractor or developer to take the initiative and approach the local authority to ascertain its noise requirements before construction work starts. If a formal application for 'prior consent' is received by the local authority it is obliged to give a decision within 28 days; failure to do so or the attachment of unnecessary or unreasonable conditions are grounds for appeal by the applicant.

In cases where the local authority determines that the proposals for minimising the noise of the construction activities are adequate it will issue a consent although this may be subject to conditions limiting certain aspects of the consent such as hours of use, noise levels for particular activities, etc. Provided that the applicant takes all reasonable steps to operate within the terms of the consent, even if the local authority subsequently decides to take proceedings under section 60(8), the applicant should be able to rely on the defence provided in the Act and prove that the alleged contravention amounted to the carrying out of works in accordance with a consent given under section 61.

[2] HM Government (1974). Control of Pollution Act 1974. Available at: https://www.legislation.gov.uk/ukpga/1974/40 [Accessed 13 February 2024].

2.2 ENVIRONMENTAL PROTECTION ACT 1990

Section 79 of the Environmental Protection Act 1990 (as amended)[3] declares a number of matters, including noise, to be statutory nuisances. Under the provisions of the Environmental Protection Act, the local authority is required to inspect its area periodically to detect any nuisance and, where a complaint of a statutory nuisance is made by a person living within its area, to take such steps as are reasonably practicable to investigate the complaint.

2.3 NOISE POLICY STATEMENT FOR ENGLAND (NPSE)

The NPSE[4] was published on 15 March 2010. It sets out the long-term vision for government noise policy, to promote good health and a good quality of life through the management of noise.

The policy ensures that noise issues are considered at the right-time during the development of policy and decision making, and not in isolation. It highlights the underlying principles on noise management already found in existing legislation and guidance. The NPSE should apply to all forms of noise, including environmental noise. It sets out the long-term vision of Government noise policy as follows:

> *"Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development."*

This long-term vision is supported by the following aims:

> *"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:*

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

To assist in the understanding of the terms "significant adverse" and "adverse", the NPSE acknowledges that there are two concepts being applied to noise impacts, for example, by the World Health Organisation. They are:

- NOEL - No Observed Effect Level - This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise; and
- LOAEL - Lowest Observed Adverse Effect Level - This is the level above which adverse effects on health and quality of life can be detected.

The NPSE introduces a third concept:

[3] Defra (March 2010). Noise Policy Statement for England. Available at:https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69533/pb13750-noise-policy.pdf [Accessed 6 February 2024].
[4] HM Government (1990). Environmental Protection Act 1990. Available at: https://www.legislation.gov.uk/ukpga/1990/43/contents [Accessed 13 February 2024].

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

However, the NPSE goes on to state that:

> *"It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."*

2.4 BS 5228:2009+A1:2014 CODE OF PRACTICE FOR NOISE AND VIBRATION CONTROL ON CONSTRUCTION AND OPEN SITES – PART 1: NOISE

BS 5228-1[5] contains recommendations for basic methods of noise control relating to construction sites, including sites where demolition, remediation, ground treatment or related civil engineering works are being carried out, and open sites, where work activities/operations generate significant noise levels, including industry-specific guidance. It also provides guidance concerning methods of predicting and measuring noise and assessing its effect on those exposed to it.

A methodology is detailed for determining the potential significance of construction noise levels by considering the change in the ambient noise level with the construction noise (called 'the ABC method'). Table E.1 from BS 5228-1 is recreated below in Table 2-1 where the ambient noise level is determined and rounded to the nearest 5 dB. This is then compared with the site noise level – if the site noise level exceeds the appropriate category value, then a potential significant effect is indicated.

[5] Subcommittee B/564/1 (2009). BS 5228-1:2009+A1:2014: Code of practice for noise and vibration control on construction and open sites – Part 1: Noise. BSi.

Table 2-1 - Example threshold of potential significant effect at dwellings

Assessment category and threshold value period	Threshold value, in decibels (dB) ($L_{Aeq,T}$)		
	Category A [A]	Category B [B]	Category C [C]
Night-time (2300 – 0700)	45	50	55
Evenings and weekends [D]	55	60	65
Daytime (0700 – 1900) and Saturdays (0700 – 1300)	65	70	75

NOTE 1: A potential significant effect is indicated if the $L_{Aeq,T}$ noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level.

NOTE 2: If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total $L_{Aeq,T}$ noise level for the period increases by more than 3 dB due to site noise.

NOTE 3: Applied to residential receptors only

A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values

B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values. C)

C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.

D) 1900 – 2300 Weekdays, 1300 – 2300 Saturdays and 0700 – 2300 Sundays.

3 NOISE IMPACT ASSESSMENT

3.1 ASSESSMENT CRITERIA

It is assumed that baseline noise levels are relatively low and that Category A threshold values would be applicable to all NSRs. In terms of NPSE significant effect levels (see Section 2.3 above), exceedances of Category A levels would be deemed a significant adverse effect (i.e. the SOAEL) if exceeded for a period of one month or more.

The assessment criteria (SOAEL) are summarised as follows:

- Noise duration in excess of a month:
  - daytime - 65 dB $L_{Aeq,T}$
  - evening - 55 dB $L_{Aeq,T}$
  - night-time - 45 dB $L_{Aeq,T}$
- 10 or more days or nights in any 15 consecutive days or nights:
  - daytime - 75 dB $L_{Aeq,T}$
  - evening - 65 dB $L_{Aeq,T}$
  - night-time - 55 dB $L_{Aeq,T}$

Currently no activities are anticipated during the evening and night-time hours. The night-time and evening criteria are provided for information purposes only in the event of occasional work out of hours.

3.2 SITE OVERVIEW

A review of Ordnance Survey mapping and Google Earth satellite imagery has been completed to identify the closest NSRs to the Site.

3.3 CONSTRUCTION SOURCE DATA

National Grid have provided details of the main construction activities, construction working hours and a plant list. The construction activities and approximate duration of the works are summarised in Table 3-1. Equipment lists are given in Table B-1.

Table 3-1 - Summary of Construction Activities

Activity	Approximate Location of Activity	Approximate Duration of Activity	Operational Hours of Activity (Monday to Friday)	Closest NSR and distance (m)	Applicable BS 5228-1 threshold value (dBA)
CSEC Construction	Winchcombe	6 months	0730-1700 hrs	Dan Deri & Middle Mill Cottage 190m	65
OHL Outages	Winchcombe	6 months	0730-1700 hrs	Corndean Cottages 190m	65
Temporary Access Roads Construction	Off B462, Winchcombe	1 month	0730-1700 hrs	Corndean Cottages 170m	65
Temporary Bellmouth Construction	Off B462, Winchcombe	1 month	0730-1700 hrs	Postlip Lodge 160m	65
Permanent Access Road Improvements	Winchcombe	< 1 month	0730-1700 hrs	Dan Deri & Middle Mill Cottage 70m	75

3.4 CONSTRUCTION SITE NOISE ASSESSMENT METHODOLOGY

Construction noise levels have been predicted using the methodology outlined in Annex F of BS 5228-1. It has been assumed that all plant will be stationary and located on the activity boundary at the closest point to the NSR for a worst-case assessment. In reality, plant will be spread out across the Site, along with some plant being mobile (such as lorries).

Noise levels from Annex C and Annex D of BS 5228-1 have been applied to the proposed plant associated with the activities outlined in Table 3-1. The sound power levels are provided in Table B-1 in Appendix B.

The combined sound power level for each activity is provided in Table 3-2.

Sound pressure levels have been calculated based on the stated combined sound power levels for each construction activity and assume ‘soft’ ground between the source and receptor. The following equation (from BS 5228-1 equation F.2) has been used:

$$L_{p2} = L_{p1} - \left(25log_{10}\frac{R}{10}\right) + 2$$

Where:

- L_{p2} is the sound pressure level ($L_{Aeq,T}$) at the point of interest
- L_{p1} is the sound pressure level ($L_{Aeq,T}$) at 10 metres from the works site / plant
- R is the distance in metres from the works site to the point of interest

Best practice mitigation, including equipment maintenance, turning off equipment not in use and using lower noise plant where practical is to be added into a Construction Environmental Management Plan (CEMP). Whilst these measures will reduce construction noise levels, it is not possible to quantify.

The approach of the assessment has been as follows:

- Calculate the distance from each construction activity at which the noise threshold values (outlined in Section 3.1) are met.
- Identify noise sensitive receptors (dwellings) within the calculated distance.

3.5 CONSTRUCTION SITE NOISE CALCULATION RESULTS

The distances at which construction noise equals the threshold values above for each construction activity are shown in Table 3-2.

Table 3-2 - Summary of noise propagation of construction activities without mitigation

Activity	Construction works sound power level, dB L_{wA}	Sound pressure level @ 10 m from works, dB L_{pA}	Calculated distance from activity (m) at which each BS 5228-1 threshold value may be exceeded			
			45 dBA	55 dBA	65 dBA	75 dBA
CSEC Construction	118	90	789	314	125	50
OHL Outages	117	89	662	263	105	42
Temporary Access Road Construction	119	91	807	321	128	51
Temporary Bellmouth Construction	117	89	665	265	105	42
Permanent Access Road Improvements	114	86	532	212	84	34

In all cases the construction works are sufficiently distant from NSRs that the daytime BS 5228-1 threshold values will not be exceeded.

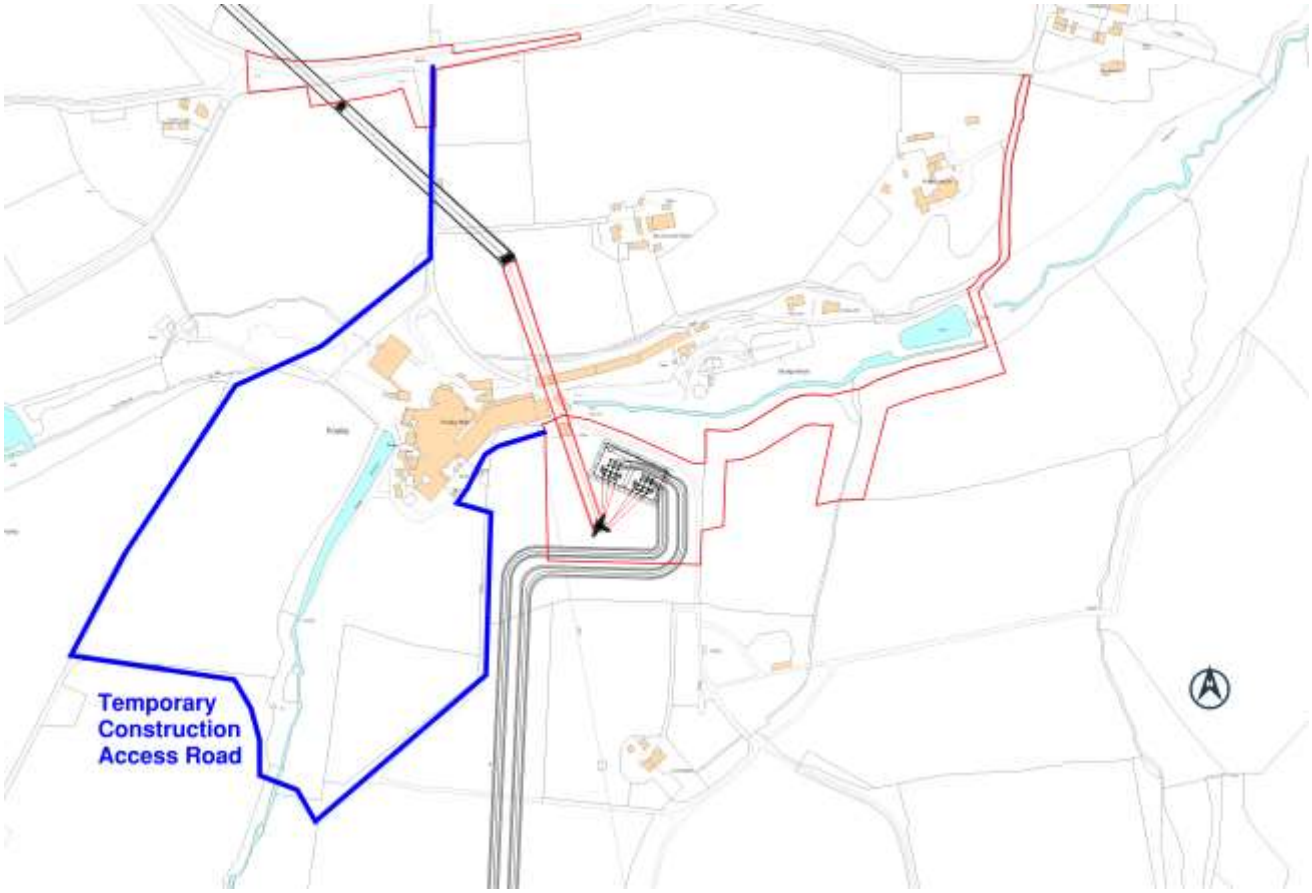
The noisiest construction activities occur during the temporary access road construction. For daytime works, potentially significant effects may occur within 128 m of the works and the closest noise sensitive receptors are Corndean Cottages 170 m away.

No significant adverse noise effects are predicted. Additional specific noise mitigation measures are not required.

4 TEMPORARY ACCESS ROAD CONSTRUCTION TRAFFIC

Predicted monthly traffic flows due to construction activities have been used to calculate hourly predicted construction traffic on the temporary access road from heavy vehicles. The temporary access road location is shown in blue in Figure 4-1 below.

Figure 4-1 - Temporary construction access road



The equivalent continuous sound level of construction traffic noise has been calculated using the method from section F.2.5.2 of BS 5228-1:

> *"The general expression for predicting the L_{Aeq} alongside a haul road used by single engined items of mobile plant is:*
>
> $$L_{Aeq} = L_{wA} - 33 + 10\log_{10} Q - 10\log_{10} V - 10\log_{10} d \quad (F.6)$$
>
> *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)."*

The sound power level used in the calculation is based on BS 5228-1 Table D.3 reference 59 for a 35t lorry movement. The stated sound power level is 105 dB L_{wA}. The assumed speed is 30 km/h.

The calculations use the 35t lorry sound power level for all vehicle types, therefore, the calculation represents a conservative and robust approach.

The maximum predicted ‘peak’ construction traffic flow is 145 movements per day (approximately 15 per hour over a day 07:30-17:00hrs). The daytime construction noise threshold, 65 dBA, occurs at 2.5 m from the centre of the road. The closest NSRs are Corndean Cottages 170 m away, no significant adverse impacts from the temporary access road are predicted.

5 CONCLUSION

WSP UK Limited (WSP) has been commissioned by National Grid to undertake an assessment of the potential effects resulting from noise emissions associated with construction activities at the northern CSEC known as the ‘Winchcombe CSEC’.

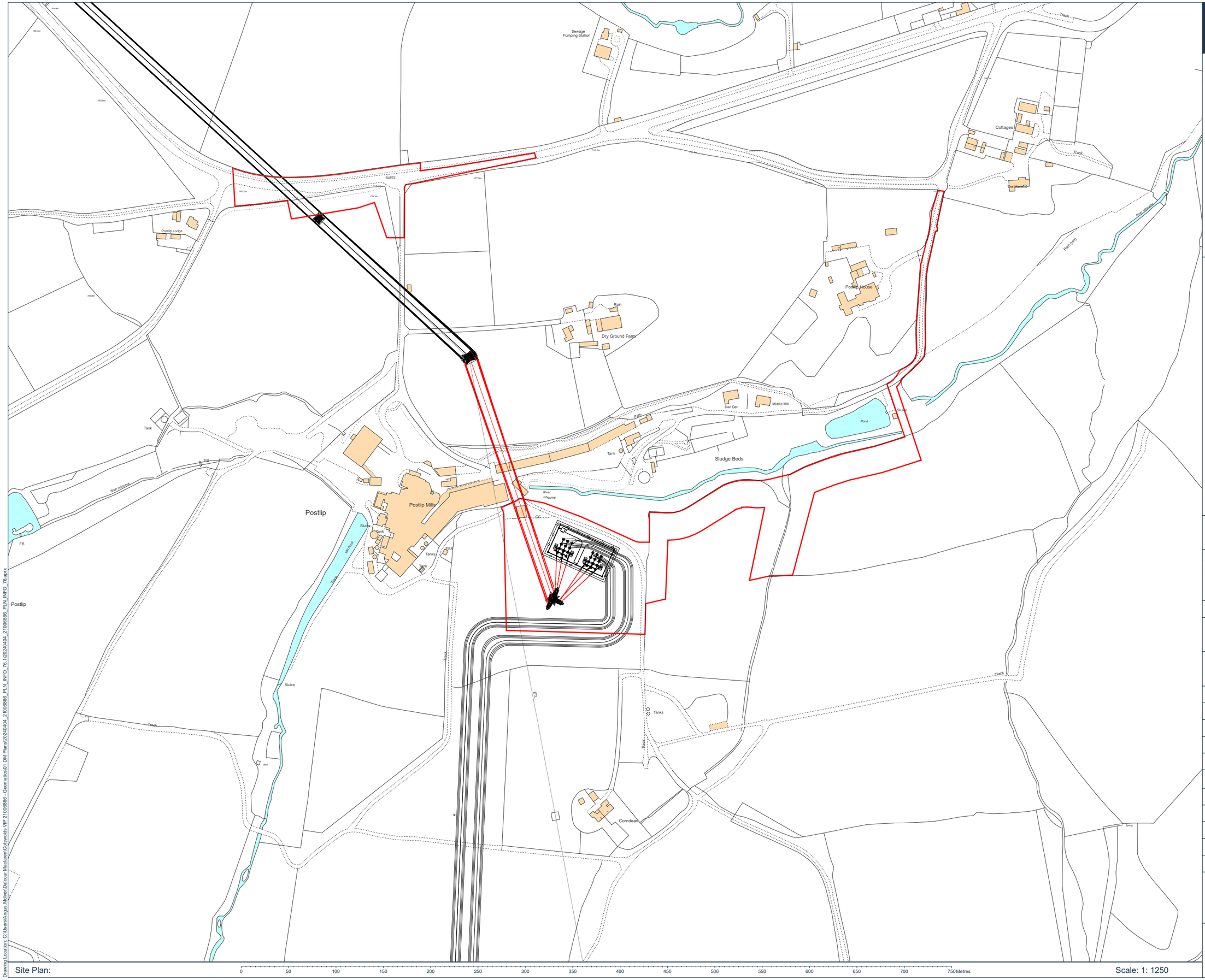
National Grid have provided the construction activities, associated plant and operational times and construction traffic data. Using this information the likelihood of significant adverse effects occurring at nearby sensitive receptors has been assessed.

The noisiest construction activities are calculated to be associated with construction of the temporary access road. For daytime works, potentially significant effects may occur within 128 m of the works and the closest noise sensitive receptors are Corndean Cottages 170 m away.

No significant adverse effects are predicted for any construction activities associated with the VIP works. Specific noise mitigation measures are therefore not required.

Appendix A

VIP COTSWOLDS – WINCHCOMBE CSEC LOCATION PLAN



Site Plan:

0 50 100 150 200 250 300 350 400 450 500 550 600 650 700 750 Metres

Scale: 1: 1250

DALCOUR MACLAREN

Key:

- Redline Boundary
- Overhead Line (Modified)
- Overhead Line (Retained)
- Cable Route (Preliminary)

Notes:

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936

Interest:
N/A

Location:
Winchcombe, Langley, Tewkesbury, Gloucestershire, GL54 5AG

Coords: 401052, 227111

Scheme Name:
Cotswolds VIP

Drawing Name:
Information Plan

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A	11.04.2024	Revised Red Line Boundary

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Appendix B

CONSTRUCTION NOISE SOURCES

Table B-1 - Construction noise sources

Activity name	Equipment	Number in use	Percentage operational time	BS 5228-1 reference	SWL dB(A) of single use, 100% operational time	Combined SWL dBA of activity
CSEC	Tractor/ Low loader	1	55%	Table D.11 ref 200	114	118
	12t Excavator	1	55%	Table C.2 ref 25	97	
	6t Excavator	1	55%	Table C.2 ref 25	97	
	9t Dumper	1	55%	Table C.4 ref 4	104	
	10t Roller	1	55%	Table C.5 ref 21	108	
	7t Roller	1	55%	Table C.5 ref 20	103	
	6m3 Concrete Wagon	3	100%	Table D.6 ref 34	107	
	8m3 Concrete Wagon	3	100%	Table D.6 ref 34	107	
	Curtain sider lorry (deliveries)	3	40%	Table C.2 ref 34	108	
	Open/Flat bed lorry (deliveries)	3	40%	Table C.2 ref 34	108	
	4x4 Hiab Truck	1	55%	Table C.11 ref 9	108	
	P40.12 360 Merlo Telehandler	2	55%	Table C.4 ref 57	95	
	Z40 MEWP	2	55%	Table C.4 ref 57	95	

Activity name	Equipment	Number in use	Percentage operational time	BS 5228-1 reference	SWL dB(A) of single use, 100% operational time	Combined SWL dBA of activity
OHL Outage Works	Tractor/ Low loader	2	55%	Table C.4 ref 74	95	117
	12t excavator (wheeled)	1	55%	Table C.5 ref 11	95	
	18t Tipper Wagon	3	55%	Table D.3 ref 112	109	
	Bomag Tarmac Roller	1	55%	Table D.3 ref 114	114	
	9t Dumper	1	55%	Table C.4 ref 4	102	
	Tractor/ Low loader	2	55%	Table C.4 ref 74	108	
	12t excavator (wheeled)	1	55%	Table C.5 ref 11	108	
Temporary Access Roads Construction	30t Excavators (tracked)	1	55%	Table C.2 ref 16	103	119
	20t Excavators (tracked)	1	55%	Table C.2 ref 21	99	
	12t excavator (tracked)	1	55%	Table C.2 ref 25	97	
	D6 XE Dozer	1	55%	Table C.2 ref 10	108	
	D8T Dozer	1	55%	Table C.2 ref 10	108	
	Tractor/ Low loader	1	55%	Table D.11 ref 200	114	
	18t Tipper Wagon	3	55%	Table D.3 ref 112	113	
	18/20t dumper	2	55%	Table C.4 ref 2	109	
	10t dumper	1	55%	Table C.4 ref 4	104	
	10t Roller	1	55%	Table C.5 ref 21	108	

Activity name	Equipment	Number in use	Percentage operational time	BS 5228-1 reference	SWL dB(A) of single use, 100% operational time	Combined SWL dBA of activity
	7t Roller	1	55%	Table C.5 ref 20	103	
	4x4 Hiab Truck	1	55%	Table C.11 ref 9	108	
Temporary Bellmouth Construction	Tractor/ Low loader	2	55%	Table C.4 ref 74	108	117
	12t excavator (wheeled)	1	55%	Table C.5 ref 11	101	
	18t Tipper Wagon	3	55%	Table D.3 ref 112	113	
	Bomag Tarmac Roller	1	55%	Table D.3 ref 114	108	
	9t Dumper	1	55%	Table C.4 ref 4	104	
Permanent Access Road Improvements	20t Excavators (tracked)	1	55%	Table C.2 ref 21	99	114
	D8T Dozer	1	55%	Table C.2 ref 10	108	
	Tractor/ Low loader	1	55%	Table D.11 ref 200	114	
	18t Tipper Wagon	1	25%	Table D.3 ref 112	113	
	10t dumper	1	25%	Table C.4 ref 4	104	
	7t Roller	1	50%	Table C.5 ref 20	103	
	4x4 Hiab Truck	1	25%	Table C.11 ref 9	108	

Amber Court
William Armstrong Drive
Newcastle upon Tyne
NE4 7YQ

wsp.com