SSEN Transmission

Bingally 400 kV Overhead Line Tie-In

Environmental Appraisal

April 2025

CONTENTS

9. NOISE AND VIBRATION

9.1 Introduction

9.1.1 This EA chapter presents the appraisal of potential noise and vibration effects during the construction and operational phase of the Proposed Development.

9.1.2 The appraisal has been undertaken following guidelines set out in the IEMA publication "Guidelines for Environmental Impact Assessment" (IEMA Guidelines)[1], relevant British Standards, planning policy and guidance.

9.1.3 The following potential effects may result from construction of the Proposed Development, as follows:

- Noise effects during the construction phase which could affect existing nearby noise sensitive receptors (NSRs), including:
- Construction traffic movements along the proposed Bingally substation access track[2] connecting the A831 to the Site. For the purposes of this appraisal, construction traffic noise from use of the proposed Bingally substation access track has been classed as construction site noise (such as from a construction haul road) rather than road traffic noise from a public highway. Cumulative effects of the Proposed Development on the proposed Bingally substation are detailed in Chapter 11 Summary of Cumulative Effects; and
- Construction traffic movements on the public highway network used by construction traffic, potentially affecting NSRs in proximity to those routes.

9.1.4 Noise and vibration effects during the construction works at the Site have been scoped out on the basis that the nearest NSRs are over 1.5 km from the Site. At such a distance, noise and vibration impacts would be typically negligible / imperceptible.

9.1.5 Noise and vibration effects during the operational phase of the Proposed Development have been scoped out on the basis that:

- Typically, OHL operation is free of perceptible noise and vibration emissions (except under specific meteorological conditions when Corona Discharge can be observed);
- An existing 400 kV OHL already runs through the Site area (as shown on **Figure 2-1, Appendix A Figures**), with only a relatively small realignment required as part of the Proposed Development to tie-in with the proposed Bingally substation (as shown in **Figure 2-2a and Figure 2-2b, Appendix A Figures**), so any change in Corona Discharge noise would be negligible;
- OHL's require very little maintenance once operational, leading to very little / infrequent on-site or related road traffic activity; and
- The nearest NSRs are at significant distance from the Site (over 1.5 km away), and the distance to the realigned section of OHL would increase this distance as a result of the Proposed Development.

[1] IEMA, 2014. *Guidelines for Environmental Noise Impact Assessment*.
[2] The access track from the A831 to the Site would already be constructed as part of the proposed Bingally substation development and therefore ready to use for the Proposed Development.

9.2 Information Sources

9.2.1 This chapter is supported by the following figures and technical appendices:

- **Appendix A Figures:**
  - **Figure 9-1 Site Plan and Noise Sensitive Receptors**;
  - **Figure 9-2 Baseline Survey Monitoring Locations**;
- **Appendix J Acoustic Terminology;** and
- **Appendix K Background Sound Level Survey.**

9.2.2 The following information sources have been used to inform this chapter:

- Relevant local planning and policy documents;
- Consultation responses from THC;
- Construction traffic data provided by the project traffic and transport consultant;
- Baseline sound monitoring survey data (as summarised in **Section 9.5** and presented in **Appendix K Background Sound Level Survey**);
- Layout plans for the Proposed Development;
- Ordnance Survey (OS) mapping of the Site and surrounding area; and
- Topographical data (LiDAR data) and aerial photography.

9.3 Methodology

9.3.1 The ECU Screening Opinion stated that the Proposed Development does not qualify as an EIA development (see **Section 3.4.1**). The scope and approach of this noise and vibration appraisal outlined below reflects this status and the nature and scale of the Proposed Development.

Legislation and Policy

Relevant Legislation

9.3.2 The provisions of Sections 60 and 61 of the Control of Pollution Act (CoPA) 1974[3] offer protection to those living in the vicinity of construction sites.

9.3.3 Section 60 enables a local authority to serve a notice specifying its noise control requirements which may include:

- Plant or machinery that is or is not to be used;
- Hours of working; and
- Levels of noise or vibration that can be emitted.

9.3.4 Section 61 relates to prior consent and is for situations where a contractor or developer approaches the local authority before work starts, to obtain prior approval for the methods to be used and any noise and vibration control techniques that may be required.

9.3.5 The term 'Best Practicable Means' (BPM) is defined in Section 72 of the Control of Pollution Act 1974, where '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.

[3] UK Government, 1974. *The Control of Pollution Act (CoPA).*

National Planning Policy

National Planning Framework 4 (NPF4)[4]

9.3.6 NPF4 is Scotland's national spatial strategy. It outlines spatial principles, regional priorities, national developments, and planning policies. NPF4 replaces NPF3 and Scottish Planning Policy. This comprehensive framework aims to create sustainable, liveable, and productive places, aligning with the United Nations Sustainable Development Goals and Scotland's national outcomes.

9.3.7 NPF4 Policy 11 states that:

"*a) Development proposals for all forms of renewable, low-carbon and zero emissions technologies will be supported. These include:*

i. wind farms including repowering, extending, expanding and extending the life of existing wind farms;

ii. enabling works, such as grid transmission and distribution infrastructure;

iii. energy storage, such as battery storage and pumped storage hydro;

iv. small scale renewable energy generation technology;

v. solar arrays;

vi. proposals associated with negative emissions technologies and carbon capture; and

vii. proposals including co-location of these technologies.";

It later states:

"e) In addition, project design and mitigation will demonstrate how the following impacts are addressed:

i. impacts on communities and individual dwellings, including, residential amenity, visual impact, noise and shadow flicker;"

Planning Advice Note (PAN) 1/2011: Planning and Noise[5] and Technical Advice Note (TAN): Assessment of Noise[6]

9.3.8 Current national guidance on noise is contained in PAN 1/2011 Planning and Noise. Paragraph 2 of PAN 1/2011 states that it:

"promotes the principles of good acoustic design and a sensitive approach to the location of new development. It promotes the appropriate location of new potentially noisy development, and a pragmatic approach to the location of new development within the vicinity of existing noise generating uses, to ensure that quality of life is not unreasonably affected, and that new development continues to support sustainable economic growth."

9.3.9 Part 3 of PAN 1/2011 states:

"The Environmental Noise (Scotland) Regulations 2006 transposed the European Directive 2002/49/EC (the Environmental Noise Directive) into Scottish law. This requires Scottish Ministers and airport authorities to manage noise through a process of strategic

[4] Scottish Government, 2023. *National Planning Framework 4*.

[5] Scottish Government, 2011. *Planning Advice Note (PAN 1/2011) – Planning and Noise.*

[6] Scottish Government, 2011. *Technical Advice Note (TAN) – Assessment of Noise.*

noise mapping and noise action plans. In the areas affected by the Regulations, planning authorities have a role in helping to prevent and limit the adverse effects of environmental noise."

9.3.10 It is understood there are no Noise Action Plans in proximity to the Proposed Development.

9.3.11 A TAN accompanies PAN 1/2011 and provides technical guidance on noise assessment.

Local Planning / Environmental Health Requirements

9.3.12 THC Environmental Health Officer (EHO) was initially contacted on 28 May 2024 to discuss the background sound level monitoring survey and appraisal methodology related to the proposed Bingally substation assessment. No specific consultation has taken place with THC regarding the Proposed Development, therefore guidance provided for the substation works, where applicable to this appraisal (noting operational noise and vibration effects are scoped out), is set out below. The following was stated by THC:

"The noise assessment should include the following:

- *A description of the proposed development in terms of noise sources;*
- *A plan showing the location of noise sources, noise sensitive premises and survey measurement locations;*
- *A survey of the background (LA90,T); ambient noise (LAeq,T), and 1/3rd octave band spectrum levels to determine the existing noise levels at sensitive receptors. Monitoring locations must be agreed beforehand with the Council's Environmental Health Service.*
- *A prediction of noise levels at noise sensitive premises;*
- *A description of any noise mitigation methods that will be employed including the calculated effect of mitigation;*
- *The raw data and equations used in the calculations must be made available on request.*
- *The assessment should demonstrate compliance with the following requirements:*

  […] With regard to construction noise, the recommended working hours for audible noise are 8am to 7pm Mon-Fri and 8am to 1pm on Saturdays. For work within these periods, we would accept a scheme demonstrating how the best practicable means will be employed to minimise the impact of noise. For audible work out-with these times, a detailed construction noise assessment would require to be submitted."

Chapter Specific Guidance

9.3.13 The following documents have been referred to as part of this appraisal. Further details about the documents can be found in the Guidance and Standards subsection below.

- BS 7445-1:2003 – 'Description and Measurement of Environmental Noise Part 1: Guide to Quantities and Procedures'[7];
- BS 5228-1:2009+A1:2014 – 'Code of practice for noise and vibration control on construction and open sites - Part 1: Noise'[8];
- 'Calculation of Road Traffic Noise' (CRTN)[9];

[7] British Standards Institute, 2003. BS 7445-1:2003 – *Description and Measurement of Environmental Noise Part 1: Guide to Quantities and Procedures*

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

[9] Department of Transport/Welsh Office, 1988. *Calculation of Road Traffic Noise* (CRTN).

- 'A guide to measurement and prediction of the Equivalent Continuous Sound Level, L_{eq}.'[10]
- Design Manual for Road and Bridges (DMRB) LA 111 (Revision 2) 'Noise and Vibration'[11]; and
- BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings'[12].

Magnitude of Impact and Significance of Effect Methodology

9.3.14 This section provides further details regarding the scope of the appraisal, discusses the specific guidance and appraisal criteria, and outlines limitations and assumptions made in undertaking the appraisal.

Scope of the Appraisal

9.3.15 As stated in **Section 9.1**, the temporal scope of this appraisal includes consideration of the construction phase of the Proposed Development but excludes further consideration of the operational phase on the basis of no identified significant effects.

9.3.16 The spatial scope of the appraisal is described at the end of **Section 9.4**.

9.3.17 Potential airborne noise impacts on ecological receptors are considered within **Chapter 5 Ecology** and **Chapter 6 Ornithology**.

Guidance and Standards

BS 7445-1:2003 – 'Description and Measurement of Environmental Noise Part 1: Guide to Quantities and Procedures'7

9.3.18 BS 7445 defines parameters, procedures and instrumentation required for noise measurement and analysis, and forms the basis of the guidance used during the baseline sound surveys.

BS 5228-1: 2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Part 1: Noise[8] (with 2014 amendment)

9.3.19 Advice is provided by British Standard BS 5228-1:2009+A1:2014 'Code of Practice for Noise and Vibration Control on Construction and Open Sites' with respect to noise assessment and mitigation.

9.3.20 With regard to acceptable noise levels, BS 5228 provides guidance within Annex E including the 'ABC Method', which enables the identification of potentially significant effects at dwellings. This proposes Threshold Values, in terms of the $L_{Aeq,T}$, as a function of baseline sound levels at the receptors, as shown in **Table 9-1** below.

[10] Noise Advisory Council (NAC), 1978. *A Guide to Measurement and Prediction of the Equivalent Continuous Sound Level L_{eq}*.

[11] National Highways, Transport Scotland, Welsh Government, and the Department for Regional Development in Northern Ireland, 2020. *Design Manual for Roads and Bridges (DMRB). LA111 Revision 2 Noise and Vibration*.

[12] British Standards Institution, 2014. BS 8233 – *Guidance on sound insulation and noise reduction for buildings – Noise*.

Table 9-1 Example Threshold of Potential Significant Effect at Dwellings

Appraisal Category and Threshold Value Period	Threshold Value $L_{Aeq,T}$ dB(A) façade		
	Category A (a)	Category B (b)	Category C (c)
Night-time (23:00 – 07:00)	45	50	55
Evenings and Weekends (d)	55	60	65
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	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: Applies 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) Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than Category A values.

(d) 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays, 07:00 – 23:00 Sundays.

9.3.21 For the appropriate period (night, evening / weekend, day), the baseline ambient sound level is determined at each NSR and rounded to the nearest 5 dB. The appropriate Threshold Value is then determined. The total construction noise level is then compared with this Threshold Value. If the total construction noise level exceeds the Threshold Value, then a potentially significant effect is deemed to occur.

Design Manual for Roads and Bridges LA 111 Noise and Vibration (Revision 2)[11], Calculation of Road Traffic Noise (CRTN)[9], and A Guide to Measurement and Prediction of the Equivalent Continuous Sound Level L_{eq}, 1978[10].

9.3.22 The Proposed Development has the potential to affect traffic flows on existing public highways in the area around the Site during construction.

9.3.23 Construction traffic noise has been appraised by considering the increase in traffic flows during the construction works, following the guidance of CRTN, NAC guidance and DMRB, as appropriate.

9.3.24 24-hour Annual Average Daily Traffic (AADT) flow data have been defined by the project traffic and transport consultant, based on information provided by the Applicant. The data have been provided for the 'with' and 'without' construction traffic scenarios for the following parameters for each road link across the 47-month programme, starting in September 2025:

- Annual Average Daily Traffic (AADT);
- Percentage HGV; and
- Vehicle speed (km/h).

9.3.25 These AADT flows, which include weekend traffic, have been taken as a proxy for the 18-hour (06:00 – 24:00) Annual Average Weekday Traffic (AAWT) data required by CRTN / NAC guidance. Where links are border line Significant Adverse this implication of this difference will be considered in further detail as appropriate.

9.3.26 Based upon the available traffic data, CRTN Basic Noise Level (BNL) calculations have been undertaken to predict the change in noise level between the 'with' and 'without' scenarios where flows are greater than 1000 vehicles AAWT, in order to determine if any existing roads are predicted to be subject to a potentially significant change in 18-hour traffic flows.

9.3.27 The NAC prediction method detailed in 'A Guide to Measurement and Prediction of the Equivalent Continuous Sound Level L_{eq}' is applicable for prediction of noise levels from low traffic flows. i.e. less than 1000 vehicles AAWT, where CRTN is not valid. This has been used as necessary.

Consultation

9.3.28 In relation to noise and vibration, THC EHO has been contacted prior to undertaking surveys for and their feedback has been detailed in **Section 9.3.12** above.

9.3.29 In addition, during the public consultation events for the proposed Bingally substation, a number of residents had queries about noise in general. A number of the residents were consulted and were willing to allow unattended sound monitoring equipment to be set up at their property to aid the appraisal for the proposed Bingally substation, and this appraisal for the Proposed Development.

Method of Baseline Sound Level Data Collation

9.3.30 Long-term and short-term baseline sound level monitoring has been undertaken following liaison with the EHO. The monitoring locations are shown on **Figure 9-2, Appendix A Figures**.

9.3.31 Measurements have been conducted in accordance with the principles of BS 7445-1:2003 'Description and Measurement of Environmental Noise Part 1: Guide to Quantities and Procedures'.

9.3.32 Long-term measurements have been undertaken in 15-minute logging intervals for parameters L_{Aeq}, L_{A90} and L_{Amax} as a minimum over the relevant time period. Short-term measurements have been undertaken in 1-second intervals.

9.3.33 Any periods with windspeeds exceeding 5 m/s and periods of rainfall have been excluded from the results based on observation while in the region and from public weather data sources.

9.3.34 The Baseline Environment is discussed in **Section 9.5** below.

Determining Magnitude of Impact

9.3.35 The following section sets out how the magnitude of impact is determined for each individual potential impact type scoped in.

Construction Noise – Daytime Construction Traffic Movements Along the Access Track from the A381

9.3.36 The magnitude of the impact of construction traffic using the access track is based on the difference between the likely construction noise level at the NSR and the Threshold Value for potentially significant effects derived using the methodology in BS 5228-1:2009+A1:2014 in **Table 9-1**, as shown in **Table 9-2**.

Table 9-2 Construction Noise Magnitude of Impact for Residential Receptors

Construction and Demolition Sound Level above Threshold Value (dB)	Magnitude of Impact
Exceedance of ABC Threshold Value by ≥ +5 dB	High
Exceedance of ABC Threshold Value by up to +5 dB	Medium
Equal to or below the ABC Threshold Value by up to -5dB	Low
Below the ABC Threshold Value by ≥ -5dB	Very Low

Construction Noise – Daytime Construction Traffic Movements on Public Highways

9.3.37 BNL calculations have been undertaken to predict the change in noise level between the 'with' and 'without' construction traffic scenarios. The predicted level difference between these scenarios determines if any existing public highways are predicted to be subject to a potentially significant change in 18-hour traffic flows.

9.3.38 As a rule of thumb, an increase in road traffic flows of 25 % (where the traffic speed and composition remain consistent) equates to an approximate increase in road traffic noise of 1 dB L_{pA}. A doubling of traffic flow would be required for an approximate increase in 3 dB L_{pA}.

9.3.39 It is generally accepted that changes in noise levels of 1 dB L_{pA} or less are imperceptible, and changes of 1 to 3 dB L_{pA} are not widely perceptible. Consequently, at the selected road traffic noise receptors the magnitude of the predicted change in noise levels uses the scale taken from Table 3.17 of DMRB[11] and as provided in **Table 9-3** below. The magnitude descriptors in parentheses are provided to align with the descriptors used in this appraisal.

Table 9-3 Construction Traffic Noise Change Criteria on Public Highways

Magnitude of Impact	Change in traffic noise level $L_{A10,18hr}$ dB
Major (High)	≥ 5
Moderate (Medium)	≥3 to <5
Minor (Low)	≥1 to <3
Negligible (Very low)	<1

Determining Sensitivity of Receptors

9.3.40 Receptor sensitivity in this appraisal has been assigned based on the example definitions provided in TAN to accompany PAN 1/2011, as presented in **Table 9-4** below.

Table 9-4 Sensitivity / Value of Receptors

Sensitivity / value of resource / receptor	Description	Examples of receptor usage
Very High	Receptors where noise or vibration will significantly affect the function of a receptor.	• Auditoria / studios; and • Specialist medical / teaching centres, or laboratories with highly sensitive equipment.
High	Receptors where people or operations are particularly	• Residential; • Quiet outdoor areas used for recreation; • Conference facilities;

Sensitivity / value of resource / receptor	Description	Examples of receptor usage
	susceptible to noise or vibration. Sensitive ecological receptors known to be vulnerable to the effects of noise or vibration.	• Schools / educational facilities in the daytime; • Hospitals/residential care homes; and • Libraries.
Medium	Receptors moderately sensitive to noise or vibration where it may cause some distraction or disturbance	• Offices; • Restaurants / retail; and • Sports grounds when spectator or noise is not a normal part of the event and where quiet conditions are necessary (e.g. tennis, golf).
Low	Receptors where distraction or disturbance of people from noise or vibration is minimal	• Residences and other buildings not occupied during working hours; • Factories and working environments with existing high noise levels; and • Sports grounds when spectator or noise is a normal part of the event.

9.3.41 Non-residential receptors are not considered here as none have been identified as being potentially significantly affected by construction or operational phases of the Proposed Development.

9.3.42 The following terminology has been used in the appraisal to define noise and vibration effects:

- Adverse - detrimental or negative effects to an environmental resource or receptor;
- Neutral - effects to an environmental resource or receptor that are neither adverse nor beneficial; or
- Beneficial - advantageous or positive effect to an environmental resource or receptor.

9.3.43 The effect resulting from each individual potential impact type above has been classified according to the magnitude of the impact and the sensitivity or value of the affected receptor using the matrix presented in **Table 9-5** but where necessary also considering the context of the acoustic environment.

Table 9-5 Classification of Effects

Sensitivity / value of resource / receptor	Magnitude of Impact			
	High	Medium	Low	Very Low
Very High	Major	Major	Moderate	Minor
High	Major	Moderate	Minor	Negligible
Medium	Moderate	Minor	Negligible	Negligible
Low	Minor	Negligible	Negligible	Negligible

9.3.44 Where adverse or beneficial effects have been identified, these have been appraised against the following significance scale, derived using the matrix presented in **Table 9-5**:

- Negligible – imperceptible effect of no significant consequence;
- Minor – slight, very short or highly localised effect of no significant consequence;

- Moderate – limited effect (by extent, duration or magnitude), which may be considered significant; or
- Major – considerable effect (by extent, duration or magnitude) of more than local significance or in breach of recognised acceptability, legislation, policy or standards.

9.3.45 For the purposes of this appraisal, Negligible and Minor effects are considered to be Not Significant, whereas Moderate and Major effects are considered to be Significant.

Limitations and Assumptions

9.3.46 In order to provide a robust appraisal of the likely significance of effects of the Proposed Development, this appraisal has adopted reasonable / worst-case assumptions, where necessary, including:

- 24 hour AADT has been used to represent the 18 hour AAWT flows for calculating a BNL from each road link used by construction traffic on the public highway network. It is expected that this assumption will still provide a robust appraisal of potential effects; and
- Appraisals have been undertaken for the highest sensitivity (residential) NSRs known to be located closest to the proposed Bingally substation access track (as shown in **Figure 9-1, Appendix A Figures**) and public highway network noise sources under consideration, including A831 located north west of the access track and the OHL structures.

9.4 Study Area

9.4.1 The extent of the Study Area has been defined to include the closest NSRs / communities in each direction from the individual potential impact type, as below:

- Construction traffic using the proposed Bingally substation access track: a typical construction noise assessment study area is 300 m (based on BS 5228-1 guidance[8]) from site works, however, the construction noise study area has been extended to include the closest NSRs at Cannich, approximately 400 m to the northwest of the proposed Bingally substation access track; and
- Construction traffic on the public highway network: the study area extent is based on the traffic links in the transport model (as discussed in **Chapter 7 Traffic and Transport**), with a key focus on the A831 which provides the direct connection to the access track to the Site.

Noise Sensitive Receptors

9.4.2 NSRs closest to the Site have all been identified as residential and are presented in **Table 9-6** below and shown in **Figure 9-1, Appendix A Figures**. The properties selected for baseline monitoring are indicated in **Table 9-6** by a 'Monitoring Location ID' in the final column, and include the closest properties to the Site and proposed Bingally substation access track, Glass House and Challenger Lodge respectively.

Table 9-6 Identified Key Sensitive Receptors

NSR Number	Receptor Name	Relevant Noise Source (approx. distance)	Easting	Northing	Monitoring Location ID
NSR1	Glass House	Proposed Bingally substation access track (400 m)	234476	831447	M1
NSR2	Birchwood House	Proposed Bingally substation access track (770 m)	233726	830796	M2
NSR3	Challenger Lodge	Proposed Bingally substation access track (1.14 km) & the Site (1.5 km)	229853	825981	M3
NSR4	The Sawmill	Proposed Bingally substation access track (1.15 km) & the Site (1.5 km)	229931	826100	M4
NSR5	Hilton Lodge	The Site (1.7 km)	228445	824527	M5
NSR6	Guisachan Cottage	Proposed Bingally substation access track (1.6km)	230224	826903	M6
NSR7	Plodda Cottage	The Site (2.2 km)	227955	824594	M7
NSR8	The Fank	Proposed Bingally substation access track (580 m)	231389	826966	--

9.5 Baseline Environment

9.5.1 The acoustic environment at all NSRs is consistent with a rural area that is remote and generally free from continuous road traffic, commercial or industrial related sounds. The area is covered by tall trees which often determine the background sound levels, as vegetation blows in the breeze, along with other natural sounds. Glass House is adjacent to a main through road in the area and therefore experiences greater contribution from road traffic, but movements on this road are not continuous and at night would be infrequent and sporadic at most. Otherwise at these NSRs everyday non-nature sounds are most likely to arise from domestic activities. The River Glass passes through the area as well as various burns which can generate noise particularly after prolonged periods of heavy rainfall. These can be the dominant source of noise, when wind speeds are low, at NSRs in proximity, i.e. including but not limited to The Sawmill and Plodda Cottage.

9.5.2 A summary of the measured sound levels at each monitoring location, relevant to this noise appraisal, is provided in **Table 9-7** for the durations indicated. The sound level meters were programmed to log L_{Aeq}, L_{Amax}, and L_{A90} values, and third-octave band spectral levels over a 15-minute measurement period – except for the attended measurements at Glass House and Birchwood House. The attended measurements logged the same values but over a 5-minute measurement period. **Appendix K Background Sound Level Survey** contains more detailed information about the baseline survey including equipment, sound level time histories and measured sound levels each day (0700-1900), evening (1900-2300), day-evening (0700-2300) and night (2300-0700) periods, and excludes periods due to adverse weather and atypical events as appropriate.

Table 9-7 A summary of the measured daytime (0700-1900) sound levels at the monitoring locations

NSR Number	Receptor Name	Reference Period	Reference Duration	Sound Level dB $L_{Aeq,15min}$
NSR1	Glass House	Day	1 hr (1030-1130)	60
NSR2	Birchwood House	Day	1 hr (1200-1300)	71
NSR3	Challenger Lodge	Day	7 days (0700-1900)	58
NSR4	The Sawmill	Day	7 days (0700-1900)	50
NSR5	Hilton Lodge	Day	7 days (0700-1900)	57
NSR6	Guisnachan Cottage	Day	7 days (0700-1900)	57
NSR7	Plodda Cottage	Day	7 days (0700-1900)	48

9.6 Embedded Mitigation

9.6.1 The layout and design of the Proposed Development has specifically considered the potential impacts on sensitive receptors and features of the surrounding environment. The iterative design process has sought to minimise the potential permanent effects of the Proposed Development on landscape, visual, protected species, habitats, trees, and noise receptors.

9.6.2 Mitigation measures embedded into the Proposed Development are listed in **Chapter 2 Description of the Proposed Development**. Of greatest relevance to the mitigation of noise impacts from the Proposed Development is the proposed adoption of a CEMP, GEMPs and CTMP.

9.6.3 The distance of the closest NSRs to the Site is approximately 1.5 km and therefore construction noise and operational sound impacts from the Site are likely to be negligible. Nevertheless, general best practice measures to minimise noise (as requested by THC) would be implemented during the Proposed Development construction phase to mitigate potential impacts at local NSRs, particularly with respect to activities required outside of normal working hours. General best practice mitigation included in the CEMP, GEMPs (**Appendix M GEMPs and SPPs**), or CTMP would include but not to be limited to:

- Abiding by any agreed construction noise limits at nearby NSRs;
- Avoiding working in the more sensitive evening and night times, where possible;
- Ensuring that processes are in place to minimise noise before works begin and ensuring that BPM are being achieved throughout the construction programme;
- Ensuring that modern plant is used, complying with the latest European noise emission requirements. Selection of inherently quiet plant where possible;
- Consideration of rotary bored rather than driven piling techniques where possible;
- All plant and equipment being used for the works to be properly maintained, silenced where appropriate, operated to prevent excessive noise and switched off when not in use;
- All contractor staff and sub-contractors to be made familiar with current legislation and the guidance in BS 5228[8];
- Appropriate routing of construction traffic on public roads and along access tracks, to minimise noise level increase;
- Consultation with THC and local residents to advise of potential noisy works that are due to take place when they may be considered a cause of disturbance; and

- Monitoring and reporting of noise complaints immediately to the contractor for investigation.

9.6.4 Regular communication with the local community throughout the construction period would also serve to publicise the works schedule and provide lines of communication where complaints can be addressed. A communication plan would be included in the CEMP as required.

9.6.5 The appointed Principal Contractor would be encouraged to be a member of the 'Considerate Constructors Scheme' which is an initiative open to all contractors undertaking building work.

9.7 Appraisal

Noise from Construction Vehicle Movements on the Proposed Bingally Substation Access Track from the A831

9.7.1 The potential effects of noise from the Proposed Development construction traffic using the proposed Bingally substation access track (as shown in **Figure 9-1, Appendix A Figures**), have been considered.

9.7.2 The projected vehicle movements per day in the peak month of 'total construction traffic' using the proposed Bingally substation access track is 51, of which four are HGV movements. Alternatively, with a focus on HGVs, the projected vehicle movements per day in the peak month of 'HGV construction traffic' is 44, of which 24 are HGV movements.

9.7.3 A 3D noise model of the proposed Bingally substation access track and surrounding area has been prepared including land topography.

9.7.4 The non-HGV and HGV movements in a daily period have been modelled using the BS 5228 haul route calculation method and used to predict the 12-hour daytime construction noise level from the proposed Bingally substation access track movements specifically, based on a 10 km/h vehicle speed as shown in **Table 9-8**. The highest predicted noise level results from use of the proposed Bingally substation access track in the peak month of 'HGV construction traffic', due to the relative high level of noise from HGVs compared with light vehicles such as cars and small vans.

9.7.5 **Table 9-8** below presents the predicted proposed Bingally substation access track noise levels at NSRs for the worst-case peak month of 'HGV construction traffic' scenario, and as a further, likely exaggerate, worst-case the predicted levels assume that all construction traffic movements occur within a peak 1-hour period, within the 12-hour working day.

Table 9-8 BS5228-1 Predicted proposed Bingally substation access track traffic noise levels at receptors during the peak month of 'HGV construction traffic'

NSR Number	Receptor Name	Distance to proposed Bingally substation Access Track (m)	Daytime predicted proposed Bingally substation access track traffic noise levels dB $L_{Aeq,12hr}$		
			Non-HGV	HGV	Day Total
NSR1	Glass House	400	29	41	41
NSR2	Birchwood House	770	19	31	32
NSR3	Challenger Lodge	1140	18	30	30
NSR4	The Sawmill	1150	19	31	31
NSR6	Guisachan Cottage	1600	23	35	35

NSR Number	Receptor Name	Distance to proposed Bingally substation Access Track (m)	Daytime predicted proposed Bingally substation access track traffic noise levels dB $L_{Aeq,12hr}$		
			Non-HGV	HGV	Day Total
NSR8	The Fank	580	27	39	39

9.7.6 Even with the exaggerated worst-case scenario described above, **Table 9-8** shows that the predicted access traffic noise levels are significantly below the BS 5228 ABC Category A Threshold Value of 65 dB $L_{Aeq,12h}$ at all receptors. The predicted noise levels are also significantly below the baseline ambient sound levels at NSRs as presented in **Table 9-7**.

9.7.7 With reference to **Table 9-2** and **Table 9-5** the magnitude of impact in the daytime is Very Low, which for a High sensitivity residential NSR is classified as a Negligible effect (Not Significant).

Noise from Construction Vehicle Movements on the Public Highway Network

9.7.8 The potential changes in road traffic noise levels during the construction phase of the Proposed Development have been considered for each road link based upon data provided by the project traffic and transport consultant.

9.7.9 **Table 9-9** below presents the change in predicted BNL for the peak month (expected to be during late 2027 into early 2028). The noise change levels presented represent the highest (worst-case) change between either the 'with' Proposed Development peak month of 'HGV construction traffic' or peak month of 'total construction traffic' data, when compared to the 'without' Proposed Development traffic data.

Table 9-9 Predicted change in road traffic noise levels during construction, for high sensitivity receptors, in the peak month (late 2027 / early 2028)

Link #	Link Name	'Without' Proposed Development				'With' Proposed Development				Change in BNL, dB	Magnitude of Impact / initial Significance of Effect
		AAWT	% HGV	Speed (km/h)	Predicted BNL dB L_{Aeq}	AAWT	% HGV	SPEED (km/h)	Predicted BNL dB L_{Aeq}		
1	A831 Drumnadrochit to Site Access	654	0.3	80	57.8	698	3.7	80	58.6	0.8	Very low / negligible
2	A831 Site Access - Cannich	665	0.3	68	56.4	712	0.3	68	56.7	0.3	Very low / negligible
3	A831 Cannich Village	672	0.9	45	53.0	719	0.9	45	53.3	0.3	Very low / negligible
4	A831 North of Cannich	430	0.8	53	52.5	477	1.1	53	53.0	0.4	Very low / negligible
5	Main Street Cannich to Fasnakyle Power Station	719	0.6	34	50.8	766	0.6	34	51.1	0.3	Very low / negligible

9.7.10 **Table 9-9** shows that the predicted change in road traffic noise levels as a result of the worst-case peak month of construction traffic on all roads within the vicinity of the Site, leading to the proposed Bingally substation access track, are of Very Low impact magnitude resulting in Negligible effects (Not Significant) at nearby NSRs.

9.8 Cumulative Effects

9.8.1 An appraisal of potential cumulative impacts and effects to occur as a result of the Proposed Development with other known committed developments in the study area is presented in **Chapter 11 Summary of Cumulative Appraisal**.

9.8.2 With respect to potential cumulative construction and operational sound from the committed developments and the activities within the Site, given the nature, distance separation and / or programme timings, significant cumulative noise effects are not anticipated.

9.8.3 It is worth noting, however, that the construction vehicles associated with the Proposed Development using the proposed Bingally substation access track have the potential to combine with the construction traffic related to the proposed Bingally substation.

9.8.4 The cumulative construction traffic flows from the Proposed Development and the proposed Bingally substation have been reviewed for both the peak month of 'HGV construction traffic' and peak month of 'total construction traffic'. The flows associated with the proposed Bingally substation are substantially higher than those related to the Proposed Development. An additional 600 vehicles AADT are associated with the construction works on the proposed Bingally substation access track and Link 1, increasing HGVs on Link 1 from 3.7 % (without the proposed Bingally substation) to 18 % (with proposed Bingally substation) of the total AADT construction traffic flows.

9.8.5 Therefore, the magnitude of impact of adding the relatively small number of Proposed Development related construction vehicles is Very Low, resulting in Negligible additional effects (Not Significant). The cumulative effects of the additional construction traffic associated with the Proposed Developments does not affect the overall noise effects of the construction traffic flows due to the proposed Bingally substation which are assessed and reported in the noise and vibration appraisal EA chapter for the proposed Bingally substation.

9.8.6 In addition, construction vehicles associated with the Proposed Development using the public highway network have the potential to combine with the construction traffic related to the proposed Bingally substation and other cumulative developments as set out in **Chapter 7 Traffic and Transport, Section 7.7. Table 7-12 in Section 7.7** considers September 2027 as the peak month, albeit in that month no traffic related to construction of the Proposed Development is expected. Nevertheless, as a proxy for another peak month in late 2027 / early 2028, the flows in **Table 7-12** have been considered in combination with the "With" Proposed Development flows in **Table 9-9** above.

9.8.7 On each of the five roads in **Table 9-9**, the additional traffic related to construction of the Proposed Development leads to a very small 5-7 % increase in construction related flows from the other cumulative developments. This level of increase in construction related traffic flow would result in approximately 0.2-0.3 dB L_{Aeq} increase in construction traffic noise level, although when accounting for the additional existing traffic flows on each of those roads, the increase in road traffic noise levels due to Proposed Development construction traffic would be lower still.

9.8.8 Therefore, whilst there is the potential for cumulative construction road traffic noise impacts due to multiple developments progressing simultaneously, the small additional

construction traffic flows associated with the Proposed Development would result in a Very Low magnitude of impact at nearby NSRs, resulting in Negligible additional effects (Not Significant).

9.9 Recommendations and Mitigation

9.9.1 No significant adverse effects have been identified at NSRs in relation to the Proposed Development. No specific mitigation measures have therefore been proposed beyond the embedded mitigation measures previously outlined.

9.10 Summary of Findings

9.10.1 **Table 9-10** below provides a summary of findings of the noise and vibration appraisal.

Table 9-10 Summary of Findings

Receptor	Sensitivity	Description of Effect	Magnitude of Impact without Mitigation	Additional Mitigation	Magnitude of Impact with Additional Mitigation	Significance
All NSRs	High	Construction vehicle movements on the proposed Bingally substation access track from the A831 (daytime)	Very Low	None required	Very Low	Negligible (Not Significant)
All NSRs	High	Construction Vehicles Movements on the Public Highway Network (daytime)	Very Low		Very Low	Negligible (Not Significant)