tnei

A specialist energy consultancy

Appendix 11-1

Construction Noise Report

Sheskin South Wind Farm

SSE Renewables

14192-008
21 February 2023

COMMERCIAL IN CONFIDENCE

sse

Quality Assurance

TNEI Services Ltd, TNEI Africa (PTY) Ltd and TNEI Ireland Ltd operate an Integrated Management System and is registered with The British Assessment Bureau as being compliant with ISO 9001 (Quality), ISO 14001 (Environmental) and ISO 45001 (Health and Safety).

Disclaimer

This document is issued for the sole use of the Customer as detailed on the front page of this document to whom the document is addressed and who entered into a written agreement with TNEI. All other use of this document is strictly prohibited and no other person or entity is permitted to use this report unless it has otherwise been agreed in writing by TNEI. This document must be read in its entirety and statements made within may be based on assumptions or the best information available at the time of producing the document and these may be subject to material change with either actual amounts differing substantially from those used in this document or other assumptions changing significantly. TNEI hereby expressly disclaims any and all liability for the consequences of any such changes. TNEI also accept no liability or responsibility for the consequences of this document being relied upon or being used for anything other than the specific purpose for which it is intended, or containing any error or omission which is due to an error or omission in data used in the document that has been provided by a third party.

This document is protected by copyright and may only be reproduced and circulated in accordance with the Document Classification and associated conditions stipulated or referred to in this document and/or in TNEI's written agreement with the Customer. No part of this document may be disclosed in any public offering memorandum, prospectus or stock exchange listing, circular or announcement without the express and prior written consent of TNEI. A Document Classification permitting the Customer to redistribute this document shall not thereby imply that TNEI has any liability to any recipient other than the Customer.

Any information provided by third parties that is included in this report has not been independently verified by TNEI and as such TNEI accept no responsibility for its accuracy and completeness. The Customer should take appropriate steps to verify this information before placing any reliance on it.

Document Control

Revision	Status	Prepared by	Checked by	Approved by	Date
D1	DRAFT	AD	JS	JS	20/10/2022
D2	DRAFT	AD	JS	JS	21/11/2022
D3	DRAFT	AD	JS	JS	15/12/2022
R0	FINAL ISSUE	AD	JS	JS	21/02/2023

TNEI Services Ltd
Company Registration Number: 03891836 **VAT Registration Number: 239 0146 20**

Registered Address		
Bainbridge House	7th Floor West One	7th Floor
86-90 London Road	Forth Banks	80 St. Vincent Street
Manchester	Newcastle upon Tyne	Glasgow
M1 2PW	NE1 3PA	G2 5UB
Tel: +44 (0)161 233 4800	Tel: +44 (0)191 211 1400	Tel: +44 (0)141 428 3180

TNEI Ireland Ltd
Registered Address: 104 Lower Baggot Street, Dublin 2, DO2 Y940
Company Registration Number: 662195 **VAT Registration Number: 3662952IH**

Unit S12, Synergy Centre
TU Dublin Tallaght Campus
Tallaght
D24 A386
Tel: +353 (0)190 36445

TNEI Africa (Pty) Ltd
Registered: Mazars House, Rialto Rd, Grand Moorings Precinct,7441 Century City, South Africa
Company Number: 2016/088929/07

Unit 514 Tyger Lake
Niagara Rd & Tyger Falls Blvd
Bellville, Cape Town
South Africa, 7530

Executive Summary

TNEI was commissioned by SSE Renewables ('the Applicant') to undertake a construction noise assessment for the proposed Sheskin South Wind Farm (hereinafter referred to as 'the Proposed Development'). The aim of this was to assess the potential impact of noise attributable to the construction of the Proposed Development on the occupiers of nearby noise sensitive receptors.

The noise impact assessment was undertaken using guidance contained in BS 5228: Part 1 2009+A1:2014 *'Noise and vibration control on construction and open sites- Noise'* and the calculation methodology in ISO9613: 1996 *'Acoustics - Attenuation of sound during propagation outdoors' -Part 2: General Method of Calculation*', together with noise data for appropriate construction plant.

There are 23 Noise Sensitive Receptors (NSRs) in proximity (~2 km search area) of the Proposed Development. Seven Construction Noise Assessment Locations (CNALs) were chosen to represent the identified NSRs and predictions of the construction noise levels for each of the CNALs has been presented within the main body of this report, whilst an assessment for all 23 NSRs has been included within an Annex to the report. For clarity all NSRs are also labelled with 'H##', to ensure consistency with the labelling within the rest of the Environmental Impact Assessment Report (EIAR).

Predictions have been made assuming that all items of plant are operating continually throughout the assessment period to provide a worst-case scenario. In addition, the noise model assumes that noise sources would be located within the anticipated activity areas closest to the receptors, whereas in reality plant would move around the site and only a proportion of the plant may be operating at any one time. As such, the calculations will tend to over-predict the actual sound levels that are likely to be experienced.

The results show that the predicted noise levels would be below the most stringent of the noise threshold levels detailed in BS 5228. Accordingly, the assessment concludes that there would be no significant construction noise impacts.

Contents

TABLES

ANNEXES

Annex A – Figure

Annex B – Noise Model Data

Annex C – Noise Sensitive Receptor Results

1 Introduction

1.1 Brief

1.1.1 TNEI was commissioned by SSE Renewables to undertake a construction noise assessment for the proposed Sheskin South Wind Farm (hereinafter referred to as the Proposed Development). The following steps summarise the noise assessment process:

- Establish typical ambient noise levels at sensitive receptors located closest to the anticipated construction activities and derive appropriate noise threshold levels in accordance with BS 5228-1:2009 +A1:2014 [(1)];
- Undertake predictions of noise from different construction activities that would be incident at the nearest sensitive receptors;
- Compare the predicted noise levels with the derived threshold values; and,
- Identify any requirements for mitigation measures, if needed.

1.2 Nomenclature

1.2.1 The following terms and definitions are used throughout this report;

- **Emission** refers to the sound level emitted from a sound source, expressed as either a sound power level or a sound pressure level;
- **Immission** refers to the sound pressure level received at a specific location from a noise source(s);
- **SWL** indicates the sound power level in decibels (dB);
- **SPL** indicates the sound pressure level in decibels (dB);
- **NSR** (Noise Sensitive Receptor) are identified receptors that are sensitive to noise;
- **NML** (Noise Monitoring Location) refers to any location where baseline or specific noise levels have been measured; and
- **CNAL** (Construction Noise Assessment Location) refers to any location where the noise immission levels are calculated and assessed.

1.2.2 Unless otherwise stated, all noise levels refer to free field levels i.e. noise levels without influence from any nearby reflective surfaces.

1.3 Site Description

1.3.1 The Proposed Development is located within an area of Coillte forestry 8 km north east of Bangor and 9 km south west of Glenamoy in County Mayo. The approximate Irish Transverse Mercator (ITM) reference for the centre if the site is 492870, 823674 and the proposed layout is shown on Figure A1.1 in Annex A.

1.3.2 During the construction period the Proposed Development would be accessed through a site entrance off the N59. Construction noise impacts associated with track upgrading activities from the site entrance, as well as vehicles using this access track, have been considered within the construction noise assessment.

1.3.3 Construction of the Proposed Development would require felling, the laying of tracks across the site, establishing four construction compounds, the opening up of up to two borrow pits, excavation of turbine foundations, construction of turbine bases, installation of turbines, and the installation of a substation and other infrastructure. *EIAR Chapter 4: Description of Proposed Development* can be referred to for a detailed description of the Proposed Development and the anticipated construction requirements.

1.3.4 Construction is expected to last for 12-18 months. An indicative construction timetable is provided in EIAR Chapter 4, which has been replicated here as Table 1.1. Activities denoted with blue cells have been included in the noise assessment. Periods denoted with grey cells have not been considered within the assessment, as they are not expected to generate high levels of noise.

Table 1.1: Indicative Construction Timetable

Task	Month																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Site Health and Safety																		
Site Compound																		
Site Roads																		
Turbine Hardstands																		
Turbine Foundations																		
Substation Construction & Electrical Works																		
Backfilling & Landscaping																		
Bolts/ Cans Delivery																		
Turbine Delivery & Erection																		
Substation Commissioning																		
Turbine Commissioning																		

1.3.5 TNEI has undertaken noise propagation modelling for months 2, 4, 6, 11, and 13, on the assumption that activities undertaken during these periods would generate the highest noise levels when considering the likely plant and activity locations to be involved. The modelling undertaken for each of these months is hereafter referred to as Scenario 01 (month 2) through the Scenario 05 (month 13). An additional night-time scenario, Scenario 06, has also been modelled to consider any potential noise from the operation of generators and other types of plant, that might be left on over-night outwith the normal construction hours.

2 Noise Planning Policy and Guidance

2.1 Overview of Noise Planning Policy and Guidance

2.1.1 There is no published Irish guidance that contains suggested noise limits or assessment methods for construction activities other than a 2014 document published by the National Roads Authority (NRA), which relates to noise from road developments only. The Association of Acoustic Consultants of Ireland, however, have published *Environmental Noise Guidance for Local Authority Planning & Enforcement Departments* (2), which states; *"The chief guidance document applied in the assessment of construction phase noise impacts is British Standard BS 5228:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites Part 1: Noise (2014).* Accordingly, in the absence of any other applicable legislation or guidance, this assessment is undertaken in accordance with BS 5228.

2.2 BS 5228:2009+A1:2014

2.2.1 The BS 5228 standard provides useful guidance on practical noise control. Part 1, provides recommendations for basic methods of noise control including sections on community relations, training, occupational noise effects, neighbourhood nuisance and project supervision. The annexes provide information on noise sources, noise calculation procedures, mitigation measures and their effectiveness.

2.2.2 Part 1 also contains sound power level data for a variety of construction plant. This data was obtained from field measurements of actual plant operating on construction and open sites and is therefore appropriate to use as source level data for construction noise predictions.

3 Potential Impacts

3.1 Construction Noise Sources

3.1.1 Noise levels from construction activities will vary continually over time as activities and plant start and stop and move around the site. To assess the potential impacts of construction noise the noise models assume all construction plant and activities are working continually and in locations closest to the nearest NSRs for specific construction activities.

3.2 Modelled Construction Scenarios

3.2.1 Although an indicative timetable has been provided, a specific construction schedule has not been determined at this stage. *Chapter 4: Description of the Proposed Development* of this EIAR does, however, provide descriptions of some of the likely construction activities that would be undertaken and the type of plant that would be used.

3.2.2 To consider the variation in noise levels that would occur throughout the construction period a series of scenarios have been modelled based on the combination of construction tasks detailed in the indicative timetable (see Table 1.1), the details provided in *Chapter 4: Description of the Proposed Development* and TNEI's knowledge and experience of other similar sites and construction schedules.

3.2.3 The assessment does not consider the noise impacts associated with decommissioning, as the plant and activities used for that phase are assumed to be similar in nature (and noise output) to those already considered in the modelled construction scenarios. Accordingly, if noise levels during the construction phases are acceptable, they should also be acceptable during decommissioning.

4 Methodology

4.1 Methodology for the Prediction of Noise

4.1.1 To predict the noise immission levels for each scenario, noise propagation models are produced using the propriety noise modelling software CadnaA. Within the software, complex models can simulate the propagation of noise according to a range of international calculation standards. For this assessment the immission levels have been predicted in accordance with ISO9613-2:1996 *'Acoustics – Attenuation of sound during propagation outdoors: General method of calculation'*. [(2)]

4.1.2 The ISO 9613 propagation model was chosen in preference to the calculation method presented in BS 5228, primarily because of some of the significant distances from source to receptor evident on this site. Specifically, BS 5228 notes in F 2.2.2.2, that at distances over 300 m noise predictions using the BS 5228 methodology should be treated with caution, especially where a soft ground correction factor has been applied because of the increasing importance of meteorological effects; whereas ISO 9613-2 provides equations that have been validated up to 1,000 m.

4.1.3 The ISO 9613 model can take account of the following factors that influence sound propagation outdoors:

- geometric divergence;
- air absorption;
- reflecting obstacles;
- screening;
- vegetation; and
- ground reflections.

4.1.4 The model uses the octave band sound power output of the proposed plant as its acoustic input data, and calculates on an octave band basis, attenuation due to geometric spreading, atmospheric absorption and ground effects.

4.1.5 For the purposes of this assessment, all noise level predictions have been undertaken using a receiver height of 1.5 m above local ground level. Soft ground (G=1) attenuation has been assumed at all locations and air absorption is based on a temperature of 10°C and 70 % relative humidity.

4.2 Limitations of the Noise Model

4.2.1 The noise propagation models are intended to give a good approximation of the specific noise level and the contribution of each individual source. However, it is expected that actual levels are unlikely to be matched exactly with modelled values and the following limitations in the model should be considered:

- In accordance with ISO 9613-2, all assessment locations are modelled as downwind of all noise sources and propagation calculations are based on a moderate ground-based temperature inversion, such as commonly occurs at night;

- The predicted barrier attenuation provided by local topography, embankments, walls, buildings and other structures in the intervening ground between source and receiver can only be approximated and not all barrier attenuation will have been accounted for;
- Unless specifically stated, the models assume all noise sources are operating continuously and simultaneously, estimating a worst-case source noise level; and
- All mobile plant assumed to be working on tracks (excavators, dozers, rollers etc) have been modelled as moving point sources along their anticipated movement paths and the sound power level of the source is effectively averaged out across the length of the entire line. This will give an approximation of the overall noise levels from mobile plant at receptor locations; however, in reality noise levels would fluctuate as construction plant and activities move around in their activity areas.

4.3 Assessing Construction Noise Effects

4.3.1 Annex E, part E.3.2 of BS 5228 provides example criteria for assessing the significance of construction noise effects and acceptable limits for construction noise.

4.3.2 Table E.1 of BS 5228 (represented here as Table 4.1) contains an example of the significance criteria that can be used to assess construction activities.

Table 4.1: Example of Threshold of Potential Significant Effect at Dwellings ($dB_{(A)}$)

Assessment Category and Threshold Value Period	Threshold Value $L_{Aeq,T}$ dB		
	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 to 13:00)	65	70	75

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

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

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

(D) 19.00-23.00 weekdays, 13.00-23.00 Saturdays and 07.00-23.00 Sundays.

4.3.3 The values can be considered thresholds for the construction noise levels (quantified using the $L_{Aeq(t)}$ noise metric). The values in each category are to be used where the existing noise

level at each location, rounded to the nearest 5 dB, is below the level given for a particular time of day.

4.3.4 BS5228 provides the following advice regarding the threshold levels:

"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."

4.3.5 Therefore, the assessment of construction noise reflects a specific noise threshold for the locality (set relative to the existing ambient noise levels) for a particular period of the day, rather than an absolute noise level.

4.3.6 It is noted that construction activities are likely to be limited to between 07:00 and 19:00 on weekdays and 07:00 – 13:00 on Saturdays. No working would be undertaken on Sundays or Public Holidays without prior agreement with Mayo County Council. Accordingly, the *Daytime (07:00 – 19:00) and Saturdays (07:00 to 13:00)* threshold levels are the most appropriate to use for this assessment, although comparison is made between the predicted immission levels and all time periods detailed within Table 4.1

4.3.7 It should be noted that exceedance of the limit does not in itself indicate a significant effect, rather, the standard states *"If the site noise level exceeds the appropriate category value, then a potential significant effect is indicated. The assessor then needs to consider other project-specific factors, such as the number of receptors affected and the duration and character of the impact, to determine if there is a significant effect".*

4.4 Study Area

4.4.1 NSRs are properties, people or fauna that are sensitive to noise and, therefore, may require protection from nearby noise sources. There are 23 residential Noise Sensitive Receptors (NSRs) in proximity (~2 km search area) to the Proposed Development. These are generally located in clusters of dwellings due south and due west of the Proposed Development, although a single NSR has been identified just to the north.

4.4.2 Of the 23 identified NSRs, a total of seven have been chosen as Construction Noise Assessment Locations (CNALs). The CNALs represent the closest NSRs or clusters of NSRs to the Proposed Development. The modelling results for the CNALs has been presented within the main body of this report, however, an assessment that includes all 23 NSRs has been included within Annex C for completeness.

4.4.3 For clarity all NSRs are labelled as 'H##', to ensure consistency with the labelling used within the rest of the EIAR.

4.4.4 Table 4.2 details the CNALs, which are also shown on Figure A1.1 in Annex A alongside all 24 NSRs.

Table 4.2: Construction Noise Assessment Locations

CNAL Name	ITM Coordinates	
	Eastings	Northings
CNAL01 – H18	491517	825521
CNAL02 – H23	494271	830004
CNAL03 – H01	493866	822407
CNAL04 – H03	493743	822357
CNAL05 – H13	493014	822026
CNAL06 – H16	491561	822376
CNAL07 – H22	490697	825812

4.5 Baseline Noise Levels

4.5.1 Baseline noise level monitoring was undertaken as part of the operational noise assessment for Sheskin South Wind Farm.

4.5.2 At all locations the ambient sound levels were below the Category A Threshold Values detailed in Table 4.1.

4.6 Construction Noise Level Thresholds

4.6.1 Having due regard to the existing ambient noise levels around the Proposed Development, the BS 5228 Category A Threshold Values have been considered appropriate for the construction noise assessment at all NSRs.

4.6.2 Accordingly, the assessment is made against the following noise level limits;

- Daytime weekdays 07:00 – 19:00: 65 dB $L_{Aeq\ (12\ hours)}$
- Saturday 07:00 – 13:00: 65 dB $L_{Aeq\ (6\ hours)}$
- Evenings and weekends: 55dB $L_{Aeq\ (t)}$
- Night-time: 45 dB $L_{Aeq\ (8\ hours)}$

5 Noise Impact Assessment

5.1 Modelling of Individual Sound Sources

5.1.1 For much of the working day the noise associated with construction activities would be less than predicted, as the assessment assumes all equipment is continually operating at full power and in locations closest to the NSRs, whereas in practice, equipment load and precise location may vary throughout the day. This approach has been adopted to represent a worst-case assessment.

5.1.2 At this stage a detailed plant list is not available, therefore, a generic plant list based upon experience of similar projects has been used. All modelled noise sources and associated sound power level (SWL) and sound pressure level (SPL) data is included in Annex B: Noise Model Data.

5.1.3 For felling activities broadband noise level data for a harvester, a forwarder and a skidder has been taken from *Noise Hazards in Forestry Operations and Selection of Personal Protective Equipment* [3] (Forestry Commission). No octave band data is available therefore modelling has been undertaken using the 500 Hz octave band data, as recommended in ISO 9613. Noise levels for the harvester and forwarder are given at the operator position inside a Q Cab. In order to estimate external levels 10 dB has been added to the quoted levels and the SWL for each item of plant has been calculated within CadnaA assuming the quoted SPL have been measured at a distance of 1 m.

5.1.4 For all other construction activities source noise level data is taken from Annex C of BS 5228, which provides octave band SPL levels for a wide variety of construction plant and activities suitable for the estimation of noise immission levels.

5.1.5 Construction noise sources for any given activity will generally comprise a mix of both moving and static sources. Mobile sources include mobile construction plant and Heavy Goods Vehicles (HGVs), while static construction plant could include generators, lighting rigs and pumps. Static equipment is usually located at a fixed location for an extended period of time.

5.1.6 For both mobile and static plant, activity noise levels would be transient in nature due to changes in location (mobile plant only), on/off periods, and fluctuations of load on any individual machine.

5.1.7 All static items of plant and activities have been modelled as single point sources. All mobile plant (excavators, dozers, dumpers etc.) have been modelled as either a moving point source (line source) along their anticipated movement paths or as a stationary point source located at the closest point of its anticipated work area to any given CNAL.

5.2 Modelling of Construction Activities.

5.2.1 The assessment considers five construction scenarios based on the indicative timetable. In addition, a sixth scenario has been modelled assuming some plant is left running during the evening and night-time to provide power for site cabins, lighting etc.

5.2.2 Noise propagation modelling has been undertaken considering the key activities that are likely to occur throughout the construction period. Details of the items of plant assumed to

be operating in each modelled scenario, as well as the noise data for each modelled noise source, are included in Annex B: Noise Model Data.

5.2.3 The modelled scenarios represent the following construction activities;

- Scenario 01: Forestry activities, including felling of trees and forwarding of timber for transportation off site. Instances of felling activity have been modelled around the turbines located closest to the site boundary, towards the nearest receptors. These locations are near turbines 2, 5, 6, 8, 12, 15, 17 and 18. Scenario 01 assumes that alongside the felling, access track upgrades and construction is underway from the site entrance to each of the construction compounds and rock excavation has begun in the two proposed borrow pits. The Substation construction and associated electrical works has begun and the four proposed construction compounds are operational.
- Scenario 02: Felling activities are still active and are assumed to be occurring in the worst-case locations, as per scenario 1. Access track upgrades and construction are continuing beyond the construction compounds. All construction compounds are operational. Substation construction and associated electrical works are continuing. Hardstandings for turbines 3, 4, 5, 8, 14 and 20 are under construction.
- Scenario 03: Felling activities are still active and are assumed to be occurring in the worst-case locations, as per scenario 1. Access track upgrades and construction are continuing beyond the previously completed tracks. All construction compounds are operational. Substation construction and associated electrical works are continuing. Hardstandings for turbines 2, 6, 7, 11, 17, 18 and 19 are under construction. Concrete pouring for turbines 3, 4, 5, 8, 14 and 20 is underway. Construction of hardstand for the turbine storage area is underway.
- Scenario 04: Felling activities are still active and are assumed to be occurring in the worst-case locations, as per scenario 1. Access track upgrades and construction are continuing beyond the previously completed tracks. Substation construction and associated electrical works are continuing. Hardstands for turbines 1, 12, 15 and 16 are under construction. Concrete pouring for turbines 2, 6, 7, 11, 17, 18 and 19 is underway. Turbine installation at turbines 3, 4, 5, 8, 14 and 20 is underway.
- Scenario 05: Felling activities are still active and are assumed to be occurring in the worst-case locations, as per scenario 1. Access track upgrades and construction are continuing. All construction compounds are operational. Site restoration works are occurring at the peat replacement locations near turbines 2, 4, 6, 15, 16 and 19.
- Night-time: Diesel generators for the cabin and lighting at all construction compounds are operational.

5.3 Calculated Noise Immission Levels

5.3.1 Table 5.1 presents the calculated noise immission levels at each CNAL for all modelled scenarios. Additionally, Table C3.2 in Annex C presents the calculated immission levels at each NSR for all modelled scenarios.

Table 5.1: Predicted Construction Noise Immission Levels, dB $L_{Aeq(t)}$

CNAL	Scenario					
	1	2	3	4	5	Night
CNAL01 – H18	40	40	41	40	37	16
CNAL02 – H23	34	34	34	35	30	13
CNAL03 – H01	40	34	39	39	39	16
CNAL04 – H03	38	33	40	38	37	16
CNAL05 – H13	31	30	36	32	31	12
CNAL06 – H16	27	27	28	27	23	7
CNAL07 – H22	36	36	37	36	32	13

5.3.2 For all CNALs the predicted noise levels for all scenarios are well below the weekday and Saturday daytime threshold value of 65 dBA.

5.3.3 Although construction activities are not anticipated during weekend or evening hours, the predicted levels are also below the evening and weekend threshold level of 55 dBA.

5.3.4 No construction activities are anticipated during the night-time, however, some generation plant or similar may operate during night-time hours within the construction compounds. The predicted noise levels for the modelled night-time scenario are below the night-time threshold levels of 45 dBA.

6 Summary

6.1.1 The noise impact assessment has considered the existing noise environment at local residential receptors to determine appropriate noise threshold levels for construction activities.

6.1.2 Noise propagation modelling has been undertaken in accordance with ISO 9613-2:1996 and the anticipated noise immission levels presented for scenarios likely to occur throughout the construction period of the Proposed Development. The modelled scenarios consider the 'noisiest' activities that are likely to occur during the construction period and the modelling assumes that the construction activities are occurring at locations within the development site that are closest to the NSRs.

6.1.3 The predicted levels are below the Category A Threshold Levels as detailed within BS 5228:2009. Accordingly, construction noise impacts are below the indicator for a potential significant effect.

6.1.4 No regular construction activities are currently proposed outwith of the BS 5228 defined daytime periods, however, it is noted that the predicted noise levels are also below the BS 5228 threshold levels for evenings, weekends and night-time.

6.1.5 The assessment concludes that construction noise levels would remain below the indicator for a potential significant effect.

7 References

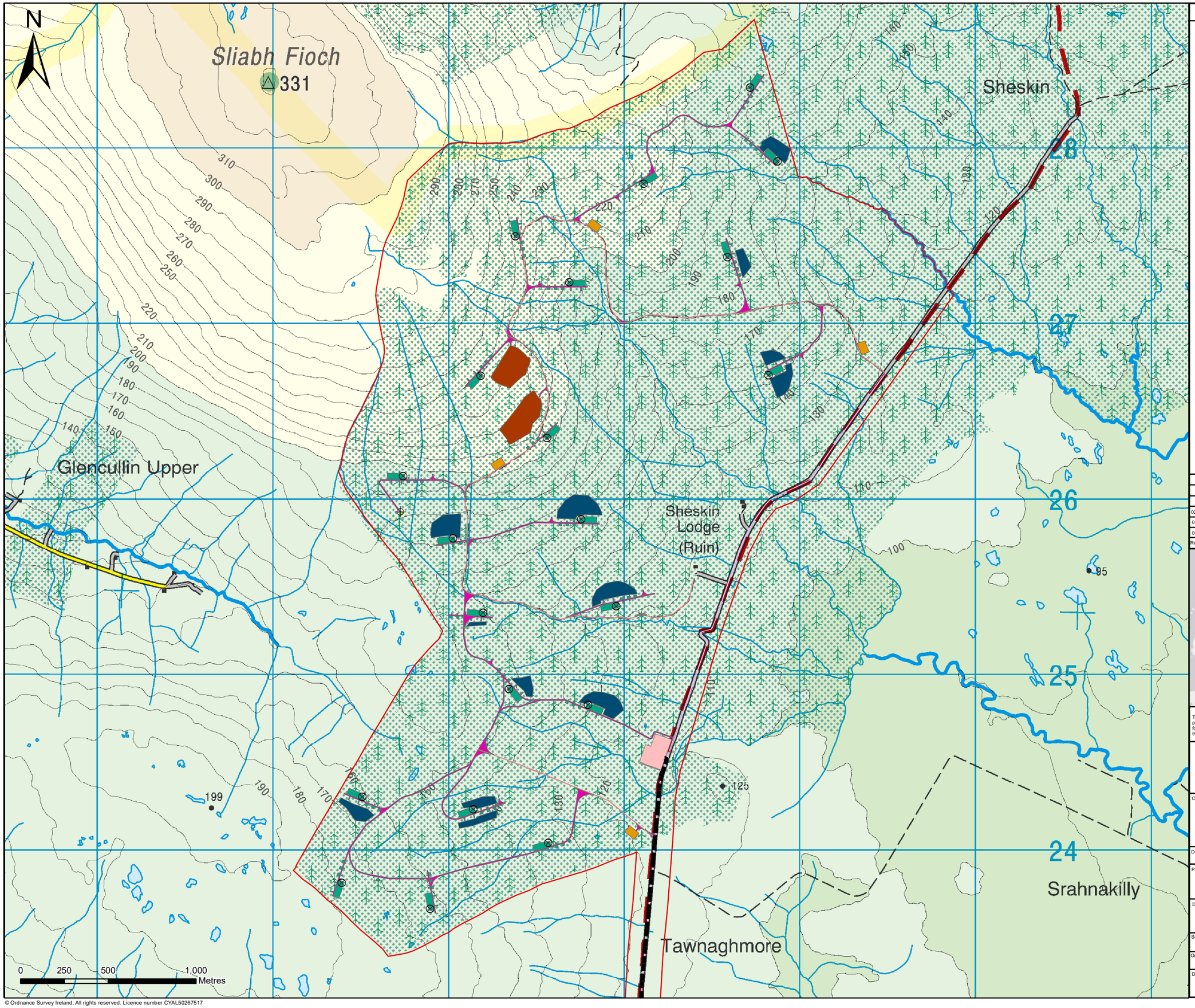
1. **British Standards Institute.** *Code of practice for noise and vibration control on construction and open sites. Noise.* UK : BSI, 2014. BS 5228-1:2009+A1:2014 .

2. **Association of Acoustic Consultants of Ireland (AACI).** *Environmental Noise Guidance for Local Authority Planning & Enforcement Departments.* Ireland : AACI, 2021.

3. **(ISO), International Organisation for Standardisation.** *Acoustics – Attenuation of Sound During Propagation Outdoors: Part 2 – General Method of Calculation.* Geneva : ISO, 1996. ISO 9613-2:1996.

4. **Forestry Commission.** *Noise Hazards in Forestry Operations and Selection of Personal Protective Equipment.* Edinburgh : The Crown, 2003.

Annex A – Figure



Legend

- EIAR Site Boundary
- Turbine Layout
- Proposed Met Mast Location
- Bellacorrick Substation
- Proposed Grid Connection Route
- Turbine Foundation & Crane Hardstands
- Proposed New Roads
- Proposed Met Mast Platform
- Proposed Construction Compounds
- Proposed Borrow Pits
- Peat Placement Areas
- Existing Roads - Upgrade Required
- Existing Roads - Upgrade Proposed
- Proposed Substation Compound

Rev.	Date	Amendment Details	Drw'n	Chk'd	App'd
02	13/02/2023	Minor Updates	AD	GC	GC
01	19/12/2022	Minor Updates	AD	GC	GC
00	05/12/2022	For Planning	AD	GC	GC

Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

This drawing should not be relied on or used in circumstances other than those for which it was originally prepared and for which TNEI Services Ltd was commissioned. TNEI Services Ltd accepts no responsibility for this drawing to any party other than the person by whom it was commissioned. Any party which breaches the provisions of this disclaimer shall idemnify TNEI Services Ltd for all loss or damage arising therefrom.

tnei

Client: sse

Drawing Status: For Planning

Project Title: Sheskin South Wind Farm

Drawing Title: Figure A1.1b: Site Layout

Scale	Designed	Drawn	Checked	Approved
1:20,000	AD	AD	GC	GC
Original Size	**Date**	**Date**	**Date**	**Date**
A3	13/02/2022	13/02/2023	13/02/2023	13/02/2023

Drawing Number: 14192-015

Revision: 2

© Ordnance Survey Ireland. All rights reserved. Licence number CYAL50267517

N

CNAL2 (H23)

Loch na nGiúróg

Barr Ruscaí

Sliabh Fioch
331

Gleann Toirc Mór

Loch na Meacan

Gleann Toirc Beag

Gleann Chuilinn Iochtarach

Glencullin River

Muingnakinkee

Glencullin Upper

Sheskin

Sheskin Lodge (Ruin)

Cloontakilla

Lenanadurtaun

CNAL7 (H22)
H21
H20
H19
CNAL1 (H18)

Tawnaghmore

Srahnakilly

Foot Br.

Largan

Ballymonnelly Br.

Kilsallagh

Bellacorick
Béal Átha Chomhraic

Bellacorick Br.

Sheean

N59

93

94

CNAL3 (H01)
H02
CNAL4 (H03)
H08
H07
H09
H05
H06
H04
CNAL5 (H13)
H11
H12
H14
H10

H17
CNAL6 (H16)
Graveyard
Megalithic Tomb
H15
CNAL5 (H13)
H14

CNAL4 (H03)
CNAL3 (H01)
H02
H07
H05
H09
H08
H04
H12
H11
H06
H10

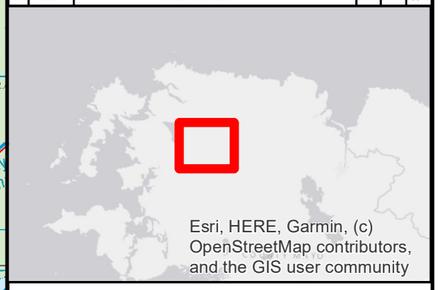
0 500 1,000 2,000 370 Metres

© Ordnance Survey Ireland. All rights reserved. Licence number CYAL50267517

Legend

- EIAR Site Boundary
- Construction Noise Assessment Location (CNAL)
- Noise Sensitive Receptor
- Turbine Layout
- Proposed Met Mast Location
- Bellacorrick Substation
- SHE Turbine Storage Area
- Proposed Grid Connection Route
- Turbine Foundation & Crane Hardstands
- Proposed New Roads
- Proposed Met Mast Platform
- Proposed Construction Compounds
- Proposed Borrow Pits
- Peat Placement Areas
- Existing Roads - Upgrade Required
- Existing Roads - Upgrade Proposed
- Proposed Substation Compound

Rev.	Date	Amendment Details	Drw'n	Chk'd	App'd
02	13/02/2023	Minor Updates	AD	GC	GC
01	19/12/2022	Minor Updates	AD	GC	GC
00	05/12/2022	For Planning	AD	GC	GC



This drawing should not be relied on or used in circumstances other than those for which it was originally prepared and for which TNEI Services Ltd was commissioned. TNEI Services Ltd accepts no responsibility for this drawing to any party other than the person by whom it was commissioned. Any party which breaches the provisions of this disclaimer shall idemnify TNEI Services Ltd for all loss or damage arising therefrom.

tnei

Client: sse

Drawing Status: For Planning

Project Title: Sheskin South Wind Farm

Drawing Title: Figure A1.1a: Construction Noise Assessment Locations

Scale	Designed	Drawn	Checked	Approved
1:40,000	AD	AD	GC	GC
Original Size	**Date**	**Date**	**Date**	**Date**
A3	13/02/2023	13/02/2023	13/02/2023	13/02/2023

Drawing Number: 14192-014

Revision: 2

Annex B – Noise Model Data

Modelled Noise Sources

Noise Source	Assumed working location	Data Source	Percentage time on	Number of
Scenario 01	**Month 2**			
Harvester	Near Turbines 2, 5, 6, 8, 12, 15, 17 and 18 and moving in the direction of CNALs.	https://www.forestresearch.gov.uk/documents/4798/fctn7.pdf	100	8
Forwarder	Near Turbines 2, 5, 6, 8, 12, 15, 17 and 18 and moving in the direction of CNALs.	https://www.forestresearch.gov.uk/documents/4798/fctn7.pdf	100	8
Skidder	Near Turbines 2, 5, 6, 8, 12, 15, 17 and 18 and moving in the direction of CNALs.	https://www.forestresearch.gov.uk/documents/4798/fctn7.pdf	100	8
Wheeled excavator	Construction compounds and substation.	BS 5228 C4.10	100	5
Generator for cabins	Construction compounds.	BS 5228 C4.84	100	4
Generator for lighting	Construction compounds.	BS 5228 C4.86	100	4
Lorry	Construction compounds and substation.	BS 5228 C11.14	100	5
Crane	Construction compounds and substation.	BS 5228 C4.45	100	5
Drilling rig	Borrow pits.	BS 5228 C9.3	100	2
Rock crusher	Borrow pits.	BS 5228 C9.15	100	2
Excavator mounted rock breaker	Borrow pits.	BS 5228 C9.12	100	4
Dump truck	Borrow pits.	BS 5228 C9.17	100	2
Wheeled Excavator (Line Source)	Along electrical cable route from the N91 to substation.	BS 5228 C4.10	100	1
Dumper, Dozer and Excavator (Line Source)	Various access tracks across the site.	BS 5228 C4.3, BS 5228 C2.31 and BS 5228 C2.14 respectively.	100	4

Modelled Noise Sources

Scenario 02	**Month 4**			
Harvester	Near Turbines 2, 5, 6, 8, 12, 15, 17 and 18 and moving in the direction of CNALs.	https://www.forestresearch.gov.uk/documents/4798/fctn7.pdf	100	8
Forwarder	Near Turbines 2, 5, 6, 8, 12, 15, 17 and 18 and moving in the direction of CNALs.	https://www.forestresearch.gov.uk/documents/4798/fctn7.pdf	100	8
Skidder	Near Turbines 2, 5, 6, 8, 12, 15, 17 and 18 and moving in the direction of CNALs.	https://www.forestresearch.gov.uk/documents/4798/fctn7.pdf	100	8
Wheeled excavator	Construction compounds and substation.	BS 5228 C4.10	100	5
Generator for cabins	Construction compounds.	BS 5228 C4.84	100	4
Generator for lighting	Construction compounds.	BS 5228 C4.86	100	4
Lorry	Construction compounds and substation.	BS 5228 C11.14	100	5
Crane	Substation.	BS 5228 C4.45	100	1
Drilling rig	Borrow pits.	BS 5228 C9.3	100	2
Rock crusher	Borrow pits.	BS 5228 C9.15	100	2
Excavator mounted rock breaker	Borrow pits.	BS 5228 C9.12	100	4
Dump truck	Borrow pits.	BS 5228 C9.17	100	2
Wheeled Excavator (Line Source)	Along electrical cable route from the N91 to substation.	BS 5228 C4.10	100	1
Dumper, Dozer and Excavator (Line Source)	Various access tracks across the site.	BS 5228 C4.3, BS 5228 C2.31 and BS 5228 C2.14 respectively.	100	4
Dumper	Turbine hardstandings 4, 5, 8, 14 and 20.	BS 5228 C4.3	100	5
Dozer	Turbine hardstandings 4, 5, 8, 14 and 20.	BS 5228 C2.31	100	5
Tracked Excavator	Turbine hardstandings 4, 5, 8, 14 and 20.	BS 5228 C2.14	100	5

Modelled Noise Sources

Scenario 03	**Month 6**			
Harvester	Near Turbines 2, 5, 6, 8, 12, 15, 17 and 18 and moving in the direction of CNALs.	https://www.forestresearch.gov.uk/documents/4798/fctn7.pdf	100	8
Forwarder	Near Turbines 2, 5, 6, 8, 12, 15, 17 and 18 and moving in the direction of CNALs.	https://www.forestresearch.gov.uk/documents/4798/fctn7.pdf	100	8
Skidder	Near Turbines 2, 5, 6, 8, 12, 15, 17 and 18 and moving in the direction of CNALs.	https://www.forestresearch.gov.uk/documents/4798/fctn7.pdf	100	8
Wheeled excavator	Construction compounds and substation.	BS 5228 C4.10	100	5
Generator for cabins	Construction compounds.	BS 5228 C4.84	100	4
Generator for lighting	Construction compounds.	BS 5228 C4.86	100	4
Lorry	Construction compounds and substation.	BS 5228 C11.14	100	5
Crane	Substation.	BS 5228 C4.45	100	1
Drilling rig	Borrow pits.	BS 5228 C9.3	100	2
Rock crusher	Borrow pits.	BS 5228 C9.15	100	2
Excavator mounted rock breaker	Borrow pits.	BS 5228 C9.12	100	4
Dump truck	Borrow pits.	BS 5228 C9.17	100	2
Wheeled Excavator (Line Source)	Along electrical cable route from the N91 to substation.	BS 5228 C4.10	100	1
Dumper, Dozer and Excavator (Line Source)	Various access tracks across the site.	BS 5228 C4.3, BS 5228 C2.31 and BS 5228 C2.14 respectively.	100	4
Dumper	Turbine hardstandings 2, 3, 4, 5, 6, 7, 8, 11, 14 17, 18, 19 and 20. Turbine storage area.	BS 5228 C4.3	100	14
Dozer	Turbine hardstandings 2, 6, 7, 11, 17, 18 and 19. Turbine storage area.	BS 5228 C2.31	100	8

Modelled Noise Sources

Tracked Excavator	Turbine hardstandings 2, 6, 7, 11, 17, 18 and 19. Turbine storage area.	BS 5228 C2.14	100	8
Concrete Pouring	Turbine hardstandings 3, 4, 5, 8, 14 and 20.	BS 5228 C4.32	100	6

Modelled Noise Sources

Scenario 4	**Month 11**			
Harvester	Near Turbines 2, 5, 6, 8, 12, 15, 17 and 18 and moving in the direction of CNALs.	https://www.forestresearch.gov.uk/documents/4798/fctn7.pdf	100	8
Forwarder	Near Turbines 2, 5, 6, 8, 12, 15, 17 and 18 and moving in the direction of CNALs.	https://www.forestresearch.gov.uk/documents/4798/fctn7.pdf	100	8
Skidder	Near Turbines 2, 5, 6, 8, 12, 15, 17 and 18 and moving in the direction of CNALs.	https://www.forestresearch.gov.uk/documents/4798/fctn7.pdf	100	8
Wheeled excavator	Construction compounds and substation.	BS 5228 C4.10	100	5
Generator for cabins	Construction compounds.	BS 5228 C4.84	100	4
Generator for lighting	Construction compounds.	BS 5228 C4.86	100	4
Lorry	Construction compounds and substation.	BS 5228 C11.14	100	5
Cranes	Substation turbine foundations 3, 4, 5, 8, 14 and 20..	BS 5228 C4.45	100	13
Drilling rig	Borrow pits.	BS 5228 C9.3	100	2
Rock crusher	Borrow pits.	BS 5228 C9.15	100	2
Excavator mounted rock breaker	Borrow pits.	BS 5228 C9.12	100	4
Dump truck	Borrow pits.	BS 5228 C9.17	100	2
Wheeled Excavator (Line Source)	Along electrical cable route from the N91 to substation.	BS 5228 C4.10	100	1
Dumper, Dozer and Excavator (Line Source)	Various access tracks across the site.	BS 5228 C4.3, BS 5228 C2.31 and BS 5228 C2.14 respectively.	100	5
Dumper	Turbine hardstandings 1, 2, 6, 7, 11, 12, 15, 16, 17, 18 and 19.	BS 5228 C4.3	100	11
Dozer	Turbine hardstandings 1, 12, 15 and 16.	BS 5228 C2.31	100	4

Modelled Noise Sources

Tracked Excavator	Turbine hardstandings 1, 12, 15 and 16.	BS 5228 C2.14	100	4
Concrete Pouring	Turbine hardstandings 2, 6, 7, 11, 17, 18 and 19.	BS 5228 C4.32	100	7
Lorry (Line Source)	Along access road.	BS 5228 C11.14	100	1

Modelled Noise Sources

Scenario 5	**Month 13**			
Harvester	Near Turbines 2, 5, 6, 8, 12, 15, 17 and 18 and moving in the direction of CNALs.	https://www.forestresearch.gov.uk/documents/4798/fctn7.pdf	100	8
Forwarder	Near Turbines 2, 5, 6, 8, 12, 15, 17 and 18 and moving in the direction of CNALs.	https://www.forestresearch.gov.uk/documents/4798/fctn7.pdf	100	8
Skidder	Near Turbines 2, 5, 6, 8, 12, 15, 17 and 18 and moving in the direction of CNALs.	https://www.forestresearch.gov.uk/documents/4798/fctn7.pdf	100	8
Wheeled excavator	Construction compounds.	BS 5228 C4.10	100	4
Generator for cabins	Construction compounds.	BS 5228 C4.84	100	4
Generator for lighting	Construction compounds.	BS 5228 C4.86	100	4
Lorry	Construction compounds.	BS 5228 C11.14	100	4
Cranes	Turbine foundations 2, 6, 17, 18 and 19.	BS 5228 C4.45	100	10
Dumper	Peat replacement near turbines 2, 4, 6, 15, 16 and 19.	BS 5228 C4.3	100	6
Dozer	Peat replacement near turbines 2, 4, 6, 15, 16 and 19.	BS 5228 C2.31	100	6
Tracked Excavator	Peat replacement near turbines 2, 4, 6, 15, 16 and 19.	BS 5228 C2.14	100	6
Lorry (Line Source)	Along access road.	BS 5228 C11.14	100	1

Scenario 6	**Night-time**			
Generator for cabins	Construction compounds.	BS 5228 C4.84	100	4
Generator for lighting	Construction compounds.	BS 5228 C4.86	100	4

Modelled Noise Sources

Noise Source Library – Sound Power Levels

Name	BS5228 Reference	31.5	63	125	250	500	1k	2k	4k	8k	A	lin	Source
Harvester	-					103					103	106	Noise Hazards in Forestry Operations and Selection of Personal Protective Equipment
Forwarder	-					101					101	104	Noise Hazards in Forestry Operations and Selection of Personal Protective Equipment
Skidder	-					108					108	111	Noise Hazards in Forestry Operations and Selection of Personal Protective Equipment
Tracked Excavator	C2. 14	28	113	106	105	105	101	99	96	91	107	115	BS 5228-1:2009+A1:2014
Dump Truck (empty)	C2. 31	28	114	107	107	107	107	112	97	88	115	118	BS 5228-1:2009+A1:2014
Dumper	C4. 3	28	112	109	102	101	100	96	89	81	104	115	BS 5228-1:2009+A1:2014
Wheeled Excavator	C4. 10	28	92	88	91	92	90	85	79	73	94	98	BS 5228-1:2009+A1:2014
Concrete mixer truck	C4. 20	28	111	102	94	97	98	106	88	83	108	113	BS 5228-1:2009+A1:2014

Modelled Noise Sources

Noise Source Library – Sound Power Levels

Name	BS5228 Reference	31.5	63	125	250	500	1k	2k	4k	8k	A	lin	Source
Concrete mixer truck + truck mounted concrete pump + boom arm	C4. 32	28	101	101	105	104	100	98	93	90	106	110	BS 5228-1:2009+A1:2014
Mobile telescopic crane	C4. 45	28	118	109	106	102	105	104	97	89	109	119	BS 5228-1:2009+A1:2014
Diesel generator	C4. 84	28	103	100	104	98	97	93	84	75	102	108	BS 5228-1:2009+A1:2014
Diesel generator	C4. 86	28	106	99	94	90	87	83	84	77	94	107	BS 5228-1:2009+A1:2014
Water pump (diesel)	C4. 88	28	98	93	94	92	92	91	84	74	97	102	BS 5228-1:2009+A1:2014
Vibratory roller	C5. 20	28	118	110	101	100	98	93	87	82	103	119	BS 5228-1:2009+A1:2014
Road lorry (full)	C6. 21	28	124	110	102	101	105	100	99	92	109	124	BS 5228-1:2009+A1:2014
Tracked mobile drilling rig	C9. 3	28	105	111	110	112	113	113	112	107	119	120	BS 5228-1:2009+A1:2014
Excavator mounted rock breaker	C9. 12	28	119	117	113	117	115	115	112	108	121	125	BS 5228-1:2009+A1:2014
Tracked semi-mobile crusher	C9. 15	28	119	119	116	115	113	111	106	96	118	124	BS 5228-1:2009+A1:2014

Modelled Noise Sources

Noise Source Library – Sound Power Levels

Name	BS5228 Reference	31.5	63	125	250	500	1k	2k	4k	8k	A	lin	Source
Rigid dump truck	C9. 17	28	114	117	116	116	114	111	104	98	119	123	BS 5228-1:2009+A1:2014
Lorry	C11. 14	28	121	107	104	102	101	100	97	94	107	121	BS 5228-1:2009+A1:2014

Annex C – Noise Sensitive Receptor Results

Noise Sensitive Receptors Identified for Construction Noise Assessment

Noise Sensitive Receptor (H)	Easting	Northing	Is this NSR also an CNAL?
	(m)	(m)	
H01	493866	822407	Yes – CNAL03
H02	493785	822376	No
H03	493743	822357	Yes – CNAL04
H04	493862	822004	No
H05	493697	822070	No
H06	493662	822026	No
H07	493503	822198	No
H08	493468	822203	No
H09	493365	822162	No
H10	493365	821844	No
H11	493114	822026	No
H12	493053	821995	No
H13	493014	822026	Yes – CNAL05
H14	492794	821881	No
H15	492121	822047	No
H16	491561	822376	Yes – CNAL06
H17	491346	822405	No
H18	491517	825521	Yes – CNAL01
H19	491351	825484	No
H20	491073	825672	No
H21	490918	825617	No
H22	490697	825812	YES – CNAL07
H23	494271	830004	Yes – CNAL02

Predicted Construction Noise immission Levels, dB LAeq(t)

Noise Sensitive Receptor (H)	Scenario					
	1	2	3	4	5	Night
H01	40	34	39	39	39	16
H02	38	34	40	38	37	16
H03	38	33	40	38	37	16
H04	43	32	47	42	41	14
H05	39	32	44	38	38	14
H06	38	32	44	38	38	14
H07	35	33	40	36	36	13
H08	35	33	39	36	35	14
H09	34	31	38	34	33	14
H10	34	31	40	35	34	12
H11	32	31	37	33	32	12
H12	32	31	36	33	32	12
H13	31	30	36	32	31	12
H14	30	30	34	32	30	11
H15	29	29	30	29	27	9
H16	27	27	28	27	23	7
H17	26	27	27	27	22	6
H18	40	40	41	40	37	16
H19	39	40	40	40	36	16
H20	38	38	38	38	34	14
H21	37	37	38	37	33	14
H22	36	36	37	36	32	13
H23	34	34	34	35	30	13