

Technical Appendix 11: Noise and Vibration

TA 11.1: Construction Noise Report

TA 11.2 Operational Noise Report

Technical Appendix 11.1: Construction Noise Report

Construction Noise Report

Artfield Forest Wind Farm

Artfield Forest Wind Farm Ltd

13865-007-R0
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PRIVATE AND CONFIDENTIAL



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Executive Summary

TNEI Services Limited (TNEI) was commissioned by Statkraft UK Ltd on behalf of Artfield Forest Wind Farm Ltd (the Applicant) to undertake predictions of the noise that may be emitted during the construction of the proposed Artfield Forest Wind Farm (the proposed development). Accordingly, noise predictions were used 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 has been undertaken using guidance contained in BS5228: 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.

Seven residential receptors neighbouring the proposed development were identified as the nearest properties located to the proposed construction activities on the site. Predictions have been made assuming that all plant are operating continually throughout the assessment period to provide a worst-case scenario. In addition, the noise model assumes that noise sources will be located at points closest to the receptors, whereas in reality plant will move around the site and only a proportion of the plant may be operating at any one time. As such, the predictions are inherently conservative.

The predicted noise levels will remain below the most stringent of the noise threshold levels detailed in the BS5228 standard. Accordingly, the assessment concludes that there will be no significant construction noise impacts.

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1 Introduction

1.1 Brief

- 1.1.1 TNEI was commissioned by Statkraft UK Ltd on behalf of the Applicant to undertake a construction noise assessment for the proposed Artfield Forest 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 closest to the anticipated construction activities and derive appropriate noise threshold levels in accordance with BS5228-1:2009 +A1:2014(1);
 - Undertake predictions of activity noise from different construction phases that will 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 It should be noted that the following terms and definitions, which 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) identified receptors which are sensitive to noise;
 - **NML** (Noise Monitoring Location) refers to any location where baseline or specific noise levels have been measured; and
 - **NAL** (Noise Assessment Location) refers to any location where the noise immission levels are calculated and assessed. In order to differentiate between the NALs used for the operational noise assessment and the construction noise assessment, this report refers to **CNAL** (Construction Noise Assessment Location).

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 site is located is located approximately 8 km northwest of Kirkcowan and 15 km west of Newton Stewart, Dumfries and Galloway. The area surrounding the site is rural in nature and sparsely populated.
- 1.3.2 Construction of the proposed development would require the laying of tracks across the site, excavation of turbine foundations, concrete batching, construction of turbine bases, and the installation of turbines, a substation and other infrastructure. EIAR Volume 2:

Chapter 2: Development Description can be referred to for a detailed description of the proposed development and the construction requirements.

- 1.3.3 The indicative construction timetable (Table 1-1) is proposed to last 18 months and consists of eight primary tasks, as follows;
- Task 1: Site investigation & forestry felling;
 - Task 2: Site establishment & plant deliveries;
 - Task 3: Borrow pit working, access track construction and hardstanding areas;
 - Task 4 Foundations;
 - Task 5: Substation construction;
 - Task 6: Cabling;
 - Task 7: Erection of Turbines; and,
 - Task 8 Site Reinstatement & restoration.

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
1	█	█	█	█	█	█	█	█										
2				█	█	█	█											
3							█	█	█	█								
4								█	█	█	█							
5								█	█	█	█							
6										█	█	█	█					
7										█	█	█	█	█	█	█		
8													█	█	█	█	█	█

1.3.4 TNEI have undertaken noise propagation modelling on a month by month basis to consider all of the anticipated construction activities.

Noise Planning Policy and Guidance

1.4 Overview of Noise Planning Policy and Guidance

1.4.1 In assessing the potential noise impacts from the construction of the proposed development, the following guidance and policy documents have been considered:

- The Environmental Noise (Scotland) Regulations ⁽²⁾;
- Planning and Advice Note (PAN) 1/2011 'Planning and Noise' ⁽³⁾;
- Technical Advice Note (TAN) 'Assessment of Noise' ⁽⁴⁾; and
- BS5228:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites. Noise'.

1.4.2 The overarching legislation in relation to terrestrial environmental noise is the 'Environmental Noise Directive' (The European Parliament and the Council of the European Union, 2002) (END). The END aims to limit people's exposure to environmental noise but does not prescribe noise limits. Instead, it requires each member state to provide data on noise exposure, and to develop action plans to prevent or reduce noise exposure, and to preserve existing quiet areas. In Scotland the END is transposed and implemented within 'The Environmental Noise (Scotland) Regulations' (Scottish Statutory Instruments, 2006). No changes have been made to The Environmental Noise (Scotland) Regulations' since the UK left the European Union (EU).

1.5 National Planning Policy

1.5.1 At a national level the relevant policy documents are: Planning Advice Note (PAN) 1/2011 – 'Planning and Noise,' and the associated *Technical Advice Note (TAN) – 'Assessment of Noise'*.

1.5.2 PAN 1/2011 provides little guidance in respect of construction noise, other than recommending that the use of planning conditions is not the preferred method for controlling temporary construction noise. Specifically, the document states:

"32. While planning conditions can be used to limit noise from temporary construction sites, it is most effectively controlled through the Control of Pollution Act 1974 (COPA74) and the Pollution and Prevention Control Act 1999 for relevant installations. Notice can be served in advance of works and site conditions set to control activities."

1.5.3 BS5228:1997 'Noise and vibration control on construction and open sites. Code of practice for basic information and procedures for noise and vibration control' parts 1 to 5 (BSI, 1997) is the approved Code of Practice under COPA74⁽⁵⁾, however, it is the 2009 version of the Standard which should be used for Environmental Impact Assessments (EIA) and planning applications. In this regards the TAN states:

"However, under Environmental Impact Assessments and for planning purposes i.e. not in regard to the Control of Pollution Act 1974, the 2009 version of BS 5228 is applicable. The 2009 version of the standard consists of Parts 1 and 2 for noise and vibration respectively."

1.6 Relevant Guidance

1.6.1 The BS5228:2009 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.

1.6.2 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 in the United Kingdom and is therefore appropriate to use as source level data for construction noise predictions.

1.6.3 The 2009 version of BS5228 was subject to an additional update in 2014. Accordingly, the construction noise assessment in this chapter has been undertaken in accordance with BS5228 1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites. Noise', (BSI, 2009), hereinafter referred to as BS5228.

2 Potential Impacts

2.1 Construction Noise Sources

- 2.1.1 Noise levels from construction activities will vary continually over time as activities and plant start and stop and move around the site. In order to assess the potential impacts of construction noise a worst case scenario is considered where all construction plant and activities are assumed to be working continually and in locations closest to the nearest NSRs.

2.2 Construction Phases

- 2.2.1 Although an indicative timetable has been provided no specific construction schedule has been determined. *EIAR Volume 2: Chapter 2: Development Description* does provide descriptions of some of the likely construction activities that will be undertaken and the type of plant that will be involved.
- 2.2.2 It is also 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 will be undertaken on Sundays or Public Holidays without prior agreement with Dumfries and Galloway Council (DGC).
- 2.2.3 To consider the variation in noise levels that will occur throughout the construction period a series of construction scenarios have been modelled. The scenarios are based on the combination of constructions tasks detailed in the indicative timetable (see Table 1-1), *EIAR Volume 2: Chapter 2: Development Description* and TNEI's knowledge and experience of other similar sites and construction schedules.
- 2.2.4 Each scenario has been assessed against a set of threshold levels in order to determine the likely temporary noise impacts.
- 2.2.5 The assessment does not consider the noise impacts associated with decommissioning, as the plant and activities used for this 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.

3 Methodology

3.1 Methodology for the Prediction of Noise

- 3.1.1 In order to predict the noise immission levels attributable to the construction of the proposed development, noise propagation models are produced using the propriety noise modelling software CadnaA. Within the software, complex models can be used to simulate the propagation of noise according to a range of international calculation standards.
- 3.1.2 For each CNAL, the $L_{Aeq(12hours)}$ levels have been predicted in accordance with ISO9613-2:1996 '*Acoustics - Attenuation of sound during propagation outdoors: General method of calculation*'.⁽⁶⁾
- 3.1.3 The ISO 9613 propagation model was chosen in preference to the calculation method presented in BS5228, primarily because of some of the significant distances from source to receptor evident on this site. Specifically, BS5228 notes in F 2.2.2.2, that at distances over 300 m noise predictions using the BS5228 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.
- 3.1.4 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.
- 3.1.5 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.
- 3.1.6 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 except for water bodies, construction compounds, turbine bases and similar areas of hardstanding, which have been modelled with a ground attenuation of $G=0$ (hard ground). Air absorption based on a temperature of 10°C and 70 % relative humidity has been assumed.

3.2 Limitations of the Noise Model

- 3.2.1 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 fixed noise sources are operating continuously and simultaneously, estimating a worst-case source noise level; and
- All mobile plant (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 will fluctuate as construction plant and activities move around in their activity areas.

3.3 Assessing Construction Noise Effects

- 3.3.1 Annex E, part E.3.2 of BS5228 provides example criteria for assessing the significance of construction noise effects and acceptable limits for construction noise.
- 3.3.2 Table E.1 of BS5228 (represented here Table 3-1) contains an example of the significance criteria that can be used to assess construction activities.

Table 3-1: 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	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;			

- 3.3.3 The values can be considered thresholds for the construction noise levels (quantified using the L_{Aeq} 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. 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 3dB due to site noise.

Note 3: Applied to residential receptors only.”

- 3.3.4 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.
- 3.3.5 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”.*

3.4 Study Area

- 3.4.1 Noise Sensitive Receptors (NSRs) are properties, people or fauna which are sensitive to noise and, therefore, may require protection from nearby noise sources. The Study Area for the noise assessment has been defined through the identification of the closest NSRs to the proposed development and a representative CNAL has been specified to represent the closest receptor or group of receptors.
- 3.4.2 The CNALs are defined using the closest NSRs to the proposed development on the assumption that if noise levels are within acceptable levels at the closest receptors then it is reasonable to assume they will also be acceptable at more distant locations.
- 3.4.3 Table 3-2 details the CNALs considered within the NIA. Figure 11.1.1 in Annex A also details the CNALs as well indicating the closest identified NSRs.

Table 3-2: Construction Noise Assessment Locations

NSR Name	CNAL	Coordinates	
	ID	Eastings	Northings
Artfield	CNAL01	223713	566158
Low Airies	CNAL02	226107	566542
Torwood Two Dogs Lodge	CNAL03	224551	564121
Scotts Corner	CNAL04	225033	564053
Mark of Lochronald Bungalow	CNAL05	226031	564598
Balminnoch	CNAL06	226837	565411
Kilmacfadzean	CNAL07	220363	567523

3.5 Baseline Noise Levels

- 3.5.1 Baseline noise level monitoring was undertaken as part of the proposed development's operational noise impact assessment, as described in detail in EIAR Volume 4: Technical Appendix 8.2: *Operational Noise Report*.
- 3.5.2 At all locations the ambient sound levels were below the *Category A* Threshold Values, as detailed in Table 3-1: *Example of Threshold Of Potential Significant Effect at Dwellings (dB_(A))*.

3.6 Construction Noise Level Thresholds

- 3.6.1 Having due regard to the existing ambient noise levels at NSRs around the proposed development, the BS5228 *Category A* Threshold Values have been considered for the construction noise assessment.

4 Noise Impact Assessment

4.1 Modelling of Individual Sound Sources

- 4.1.1 Noise immission levels will vary throughout the construction period as construction activities, plant and locations vary. For much of the working day the noise associated with construction activities will 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.
- 4.1.2 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 SWL & SPL data is included in Annex B: Noise Model Data. Source noise level data is taken from Annex C of BS5228, which provides octave band SPL levels for a wide variety of construction plant and activities suitable for the estimation of noise immission levels.
- 4.1.3 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. For both mobile and static plant, activity noise levels will be transient in nature due to changes in location, on/off periods, and fluctuations of load on any individual machine.
- 4.1.4 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.

4.2 Modelling of Construction Phases & Activities.

- 4.2.1 The assessment considers a number of construction scenarios based on the key construction activities detailed in EIAR Volume 2: Chapter 2: Development Description and the indicative timetable (Table 1-1 of this report).
- 4.2.2 Noise propagation modelling has been undertaken for each month considering the key activities that are likely to occur throughout the construction period. Details of the activities assumed to occur in each modelled scenario as well as noise data for each modelled item of plant are included in Annex B: Noise Model Data.
- 4.2.3 Although no construction activities are anticipated at night-time there may be a requirement to generate power on site for welfare facilities, site cabins, lighting rigs et. Accordingly, an additional noise model has been produced to predict the likely noise levels from the use of generators on site at night-time.

4.3 Calculated Noise Immission Levels

- 4.3.1 Table 4-1 presents the calculated noise immission levels at each CNAL for all modelled scenarios.

Table 4-1: Predicted Construction Noise imission Levels, dB L_{Aeq(t)}: Months 1 - 10

Receptor		Month					
Receiver	ID	1,2,3	4,5,6	7	8	9	10
Artfield	CNAL01	33	33	46	46	46	46
Low Airies	CNAL02	40	41	49	49	48	48
Torwood Two Dogs Lodge	CNAL03	30	35	39	38	37	37
Scotts Corner	CNAL04	33	38	40	39	37	37
Mark of Lochnonald Bungalow	CNAL05	39	43	44	42	39	39
Balminnoch	CNAL06	29	32	39	39	39	39
Kilmacfadzean	CNAL07	20	20	31	32	32	32

Table 4-2: Predicted Construction Noise imission Levels, dB L_{Aeq(t)}: Months 11 – 18 and Night-time.

Receptor		Month					Night
Receiver	ID	11	12	13	14,15,16	17,18	
Artfield	CNAL01	44	43	44	43	32	20
Low Airies	CNAL02	42	41	43	43	39	19
Torwood Two Dogs Lodge	CNAL03	35	34	35	35	26	17
Scotts Corner	CNAL04	35	35	35	35	26	19
Mark of Lochnonald Bungalow	CNAL05	40	39	40	40	30	24
Balminnoch	CNAL06	35	34	35	35	27	14
Kilmacfadzean	CNAL07	35	35	35	35	18	10

4.3.2 For all CNALs the predicted noise levels for all months are well below the daytime threshold value of 65 dBA. Similarly, at night-time the predicted levels are well below the threshold value of 45 dBA.

4.3.3 It is noted that 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.

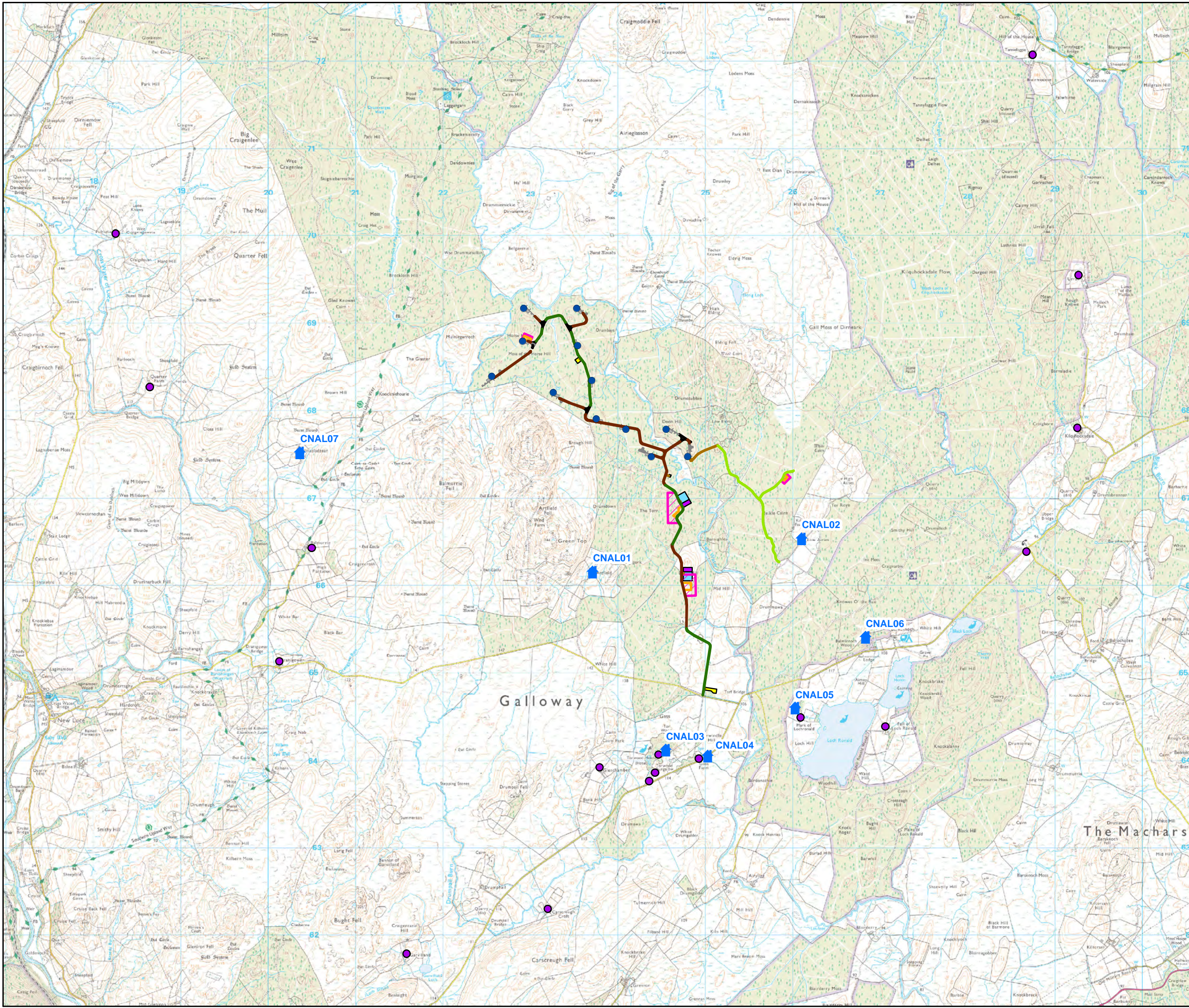
5 Summary

- 5.1.1 The noise impact assessment has considered the existing noise environment at local residential receptors in order to determine appropriate noise threshold levels for construction activities.
- 5.1.2 Noise propagation modelling has been undertaken in accordance with ISO 9613-2:1996 and the anticipated noise imission 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.
- 5.1.3 The predicted levels are below the Category A Threshold Levels as detailed within BS5228:2009. Accordingly, construction noise impacts are below the indicator for a potential significant effect.
- 5.1.4 No regular construction activities are currently proposed outwith of the BS5228 defined daytime periods, however, it is noted that the predicted noise levels are also below the BS5228 threshold levels for evenings, weekends and night-time.
- 5.1.5 The assessment concludes that construction noise levels will remain below the indicator for a potential significant effect.

6 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. **Scottish Statutory Instruments.** *2006 No. 465 Environmental Protection. The Environmental Noise (Scotland) Regulations.* Scotland : The Crown, 2006.
3. **The Scottish Government.** *PAN 1/2011 Planning and Noise.* Scotland : The Crown, 2011.
4. —. *Technical Advice Note (TAN).*
5. **HM Government.** *Control of Pollution Act 1974 Chapter 40.* London : Her Majesty's Stationery Office, 1974.
6. **(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.

Annex A – Figure



- Legend**
- Proposed Turbine Location
 - Construction Noise Assessment Locations (CNALs)
 - Noise Sensitive Receptors (NSRs)
 - Proposed Turbine Hardstanding
 - Existing Forestry Track No Upgrade
 - Existing Forestry Track Upgrade
 - New Track (Infrastructure only 4m)
 - New Track (6m)
 - Proposed Turning Head (Loaded)
 - Proposed Turning Head (Unloaded)
 - Proposed Temporary Construction Compound (CC)
 - Proposed Substation Option (SS)
 - Proposed Energy Storage Option (ES)
 - Proposed Met Mast and associated hardstanding
 - Proposed Borrow Pit Search Area (BP)
 - Potential Borrow Pit Excavation Area



REV.	DETAILS	DRAWN	CHK'D	APP'D	DATE
R2	FIRST ISSUE	GC	JB	JB	25/02/2021
R1	FIRST ISSUE	GC	JB	JB	01/02/2021
R0	FIRST ISSUE	JR	JB	JB	05/11/2020

Project	Artfield Forest Wind Farm
Client	Artfield Forest Wind Farm Ltd
Title	Construction Noise Assessment Study Area
Figure No.	11.1.1
Scale	1:40,000 @A3
Doc. Ref.	13865-008



Annex B – Noise Model Data

Noise Sources used for Modelling of Months 1,2 and 3 of Construction Schedule (All sources operating concurrently and continuously)						Lp at 10 m (dB)							
Item of Plant	BS5228 Table Reference	Number of plant	Associated Task	Activity	Work Area (s)	63	125	250	500	1000	2000	4000	8000
Tracked Excavator	C.2.16	6	Task 1 - Forestry	Timber Harvesting and Loading	Point sources modelled in work areas closest NSRs	72	71	74	73	69	66	63	58
Lorry with lifting boom	C.4.53	6	Task 1 - Forestry	Timber Harvesting and Loading	Point sources modelled in work areas closest NSRs	81	78	76	74	72	69	64	56
Lorry movements on access road	C.1.14	3	Task 1 - Forestry	Forwarder Hauling Timber and Lorry Removing Timber	Modelled as line sources operating on all site tracks	82	80	78	75	76	78	75	69
Tractor (towing trailer)	C.4.75	3	Task 1 - Forestry	Forwarder Hauling Timber and Lorry Removing Timber	Modelled as line sources operating on all site tracks	93	86	76	76	73	72	64	59

Noise Sources used for Modelling of Months 4,5 and 6 of Construction Schedule (All sources operating concurrently and continuously)						Lp at 10 m (dB)							
Item of Plant	BS5228 Table Reference	Number of plant	Associated Task	Activity	Work Area (s)	63	125	250	500	1000	2000	4000	8000
Tracked Excavator	C.2.16	6	Task 1 - Forestry	Timber Harvesting and Loading	Point sources modelled in work areas closest NSRs	72	71	74	73	69	66	63	58
Lorry with lifting boom	C.4.53	6	Task 1 - Forestry	Timber Harvesting and Loading	Point sources modelled in work areas closest NSRs	81	78	76	74	72	69	64	56
Lorry movements on access road	C.1.14	3	Task 1 - Forestry	Forwarder Hauling Timber and Lorry Removing Timber	Modelled as line sources operating on all site tracks	82	80	78	75	76	78	75	69
Tractor (towing trailer)	C.4.75	3	Task 1 - Forestry	Forwarder Hauling Timber and Lorry Removing Timber	Modelled as line sources operating on all site tracks	93	86	76	76	73	72	64	59
Tracked Excavator	C.214	1	Task 2 - Site Establishment and Plant Delivery	Construct Temporary Site Compound	Point sources modelled within site compound	85	78	77	77	73	71	68	63
Tracked Excavator	C.214	1	Task 2 - Site Establishment and Plant Delivery	Construct Temporary Site Compound	Point sources modelled within site compound	85	78	77	77	73	71	68	63
Articulated Dump Truck (Tipping Fill)	C.232	1	Task 2 - Site Establishment and Plant Delivery	Construct Temporary Site Compound	Point sources modelled within site compound	80	76	73	70	69	66	63	58
Articulated Dump Truck (Tipping Fill)	C.232	1	Task 2 - Site Establishment and Plant Delivery	Construct Temporary Site Compound	Point sources modelled within site compound	80	76	73	70	69	66	63	58
Tracked Excavator	C.2.14	1	Task 2 - Site Establishment and Plant Delivery	Upgrade access track to site compound	Line source modelled from main road up to construction compound	85	78	77	77	73	71	68	63
Tracked Excavator	C.2.14	1	Task 2 - Site Establishment and Plant Delivery	Upgrade access track to site compound	Line source modelled from main road up to construction compound	85	78	77	77	73	71	68	63
Dozer	C.5.12	1	Task 2 - Site Establishment and Plant Delivery	Upgrade access track to site compound	Line source modelled from main road up to construction compound	80	78	71	70	74	68	65	61
Articulated Dump Truck (Tipping Fill)	C.2.32	1	Task 2 - Site Establishment and Plant Delivery	Upgrade access track to site compound	Line source modelled from main road up to construction compound	80	76	73	70	69	66	63	58
Articulated Dump Truck (Tipping Fill)	C.2.32	1	Task 2 - Site Establishment and Plant Delivery	Upgrade access track to site compound	Line source modelled from main road up to construction compound	80	76	73	70	69	66	63	58
Lorry	C.234	2	Task 2 - Site Establishment and Plant Delivery	Road Lorry Delivering Plant	Line source modelled from main road up to construction compound	73	78	78	78	74	73	68	66

Noise Sources used for Modelling of Month 7 of Construction Schedule (All sources operating concurrently and continuously)						Lp at 10 m (dB)							
Item of Plant	BS5228 Table Reference	Number of plant	Associated Task	Activity	Work Area (s)	63	125	250	500	1000	2000	4000	8000
Tracked Excavator	C.2.16	6	Task 1 - Forestry	Timber Harvesting and Loading	Point sources modelled in work areas closest NSRs	72	71	74	73	69	66	63	58
Lorry with lifting boom	C.4.53	6	Task 1 - Forestry	Timber Harvesting and Loading	Point sources modelled in work areas closest NSRs	81	78	76	74	72	69	64	56
Lorry movements on access road	C.1.14	3	Task 1 - Forestry	Forwarder Hauling Timber and Lorry Removing Timber	Modelled as line sources operating on all site tracks	82	80	78	75	76	78	75	69
Tractor (towing trailer)	C.4.75	3	Task 1 - Forestry	Forwarder Hauling Timber and Lorry Removing Timber	Modelled as line sources operating on all site tracks	93	86	76	76	73	72	64	59
Tracked Excavator	C.214	1	Task 2 - Site Establishment and Plant Delivery	Construct Temporary Site Compound	Point sources modelled within site compound	85	78	77	77	73	71	68	63
Tracked Excavator	C.214	1	Task 2 - Site Establishment and Plant Delivery	Construct Temporary Site Compound	Point sources modelled within site compound	85	78	77	77	73	71	68	63
Articulated Dump Truck (Tipping Fill)	C.232	1	Task 2 - Site Establishment and Plant Delivery	Construct Temporary Site Compound	Point sources modelled within site compound	80	76	73	70	69	66	63	58
Articulated Dump Truck (Tipping Fill)	C.232	1	Task 2 - Site Establishment and Plant Delivery	Construct Temporary Site Compound	Point sources modelled within site compound	80	76	73	70	69	66	63	58
Tracked Excavator	C.2.14	1	Task 2 - Site Establishment and Plant Delivery	Upgrade access track to site compound	Line source modelled from main road up to construction compound	85	78	77	77	73	71	68	63
Tracked Excavator	C.2.14	1	Task 2 - Site Establishment and Plant Delivery	Upgrade access track to site compound	Line source modelled from main road up to construction compound	85	78	77	77	73	71	68	63
Dozer	C.5.12	1	Task 2 - Site Establishment and Plant Delivery	Upgrade access track to site compound	Line source modelled from main road up to construction compound	80	78	71	70	74	68	65	61
Articulated Dump Truck (Tipping Fill)	C.2.32	1	Task 2 - Site Establishment and Plant Delivery	Upgrade access track to site compound	Line source modelled from main road up to construction compound	80	76	73	70	69	66	63	58
Articulated Dump Truck (Tipping Fill)	C.2.32	1	Task 2 - Site Establishment and Plant Delivery	Upgrade access track to site compound	Line source modelled from main road up to construction compound	80	76	73	70	69	66	63	58
Lorry	C.234	2	Task 2 - Site Establishment and Plant Delivery	Road Lorry Delivering Plant	Line source modelled from main road up to construction compound	73	78	78	78	74	73	68	66
Tracked Excavator	C.2.14	2	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct Site Tracks	Modelled as line sources operating on all site tracks	85	78	77	77	73	71	68	63
Tracked Excavator	C.2.14	2	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct Site Tracks	Modelled as line sources operating on all site tracks	85	78	77	77	73	71	68	63
Dozer	C.5.12	2	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct Site Tracks	Modelled as line sources operating on all site tracks	80	78	71	70	74	68	65	61
Articulated Dump Truck (Tipping Fill)	C.2.32	2	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct Site Tracks	Modelled as line sources operating on all site tracks	80	76	73	70	69	66	63	58
Articulated Dump Truck (Tipping Fill)	C.2.32	2	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct Site Tracks	Modelled as line sources operating on all site tracks	80	76	73	70	69	66	63	58
Tracked Excavator	C.1.12	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Borrow Pit Working	Modelled as point sources in all borrow pit areas of site	79	81	83	79	77	75	70	62
Dozer	C.2.1	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Borrow Pit Working	Modelled as point sources in all borrow pit areas of site	79	77	76	74	68	67	60	59
Wheeled Loader	C.9.26	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Borrow Pit Working	Modelled as point sources in all borrow pit areas of site	89	90	86	82	83	77	75	64
Tracked Semi-Mobile Crusher	C.9.15	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Borrow Pit Working	Modelled as point sources in all borrow pit areas of site	98	98	97	74	91	88	82	72
Screen Stockpiler	C.10.15	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Borrow Pit Working	Modelled as point sources in all borrow pit areas of site	84	82	79	79	74	74	71	64
Tracked Excavator	C.214	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct crane hardstandings	Modelled as point sources in crane hardstanding areas closest to NSRs	85	78	77	77	73	71	68	63

Noise Sources used for Modelling of Month 7 of Construction Schedule (All sources operating concurrently and continuously)						Lp at 10 m (dB)							
Item of Plant	BS5228 Table Reference	Number of plant	Associated Task	Activity	Work Area (s)	63	125	250	500	1000	2000	4000	8000
Dozer	C.512	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct crane hardstandings	Modelled as point sources in crane hardstanding areas closest to NSRs	80	78	71	70	74	68	65	61
Articulated Dump Truck (Tipping Fill)	C.232	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct crane hardstandings	Modelled as point sources in crane hardstanding areas closest to NSRs	80	76	73	70	69	66	63	58
Articulated Dump Truck (Tipping Fill)	C.232	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct crane hardstandings	Modelled as point sources in crane hardstanding areas closest to NSRs	80	76	73	70	69	66	63	58

Noise Sources used for Modelling of Month 8 of Construction Schedule (All sources operating concurrently and continuously)						Lp at 10 m (dB)							
Item of Plant	BS5228 Table Reference	Number of plant	Associated Task	Activity	Work Area (s)	63	125	250	500	1000	2000	4000	8000
Tracked Excavator	C.2.16	6	Task 1 - Forestry	Timber Harvesting and Loading	Point sources modelled in work areas closest NSRs	72	71	74	73	69	66	63	58
Lorry with lifting boom	C.4.53	6	Task 1 - Forestry	Timber Harvesting and Loading	Point sources modelled in work areas closest NSRs	81	78	76	74	72	69	64	56
Lorry movements on access road	C.1.14	3	Task 1 - Forestry	Forwarder Hauling Timber and Lorry Removing Timber	Modelled as line sources operating on all site tracks	82	80	78	75	76	78	75	69
Tractor (towing trailer)	C.4.75	3	Task 1 - Forestry	Forwarder Hauling Timber and Lorry Removing Timber	Modelled as line sources operating on all site tracks	93	86	76	76	73	72	64	59
Tracked Excavator	C.2.14	2	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct Site Tracks	Modelled as line sources operating on all site tracks	85	78	77	77	73	71	68	63
Tracked Excavator	C.2.14	2	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct Site Tracks	Modelled as line sources operating on all site tracks	85	78	77	77	73	71	68	63
Dozer	C.5.12	2	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct Site Tracks	Modelled as line sources operating on all site tracks	80	78	71	70	74	68	65	61
Articulated Dump Truck (Tipping Fill)	C.2.32	2	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct Site Tracks	Modelled as line sources operating on all site tracks	80	76	73	70	69	66	63	58
Articulated Dump Truck (Tipping Fill)	C.2.32	2	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct Site Tracks	Modelled as line sources operating on all site tracks	80	76	73	70	69	66	63	58
Tracked Excavator	C.1.12	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Borrow Pit Working	Modelled as point sources in all borrow pit areas of site	79	81	83	79	77	75	70	62
Dozer	C.2.1	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Borrow Pit Working	Modelled as point sources in all borrow pit areas of site	79	77	76	74	68	67	60	59
Wheeled Loader	C.9.26	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Borrow Pit Working	Modelled as point sources in all borrow pit areas of site	89	90	86	82	83	77	75	64
Tracked Semi-Mobile Crusher	C.9.15	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Borrow Pit Working	Modelled as point sources in all borrow pit areas of site	98	98	97	74	91	88	82	72
Screen Stockpiler	C.10.15	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Borrow Pit Working	Modelled as point sources in all borrow pit areas of site	84	82	79	79	74	74	71	64
Tracked Excavator	C.214	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct crane hardstandings	Modelled as point source in crane hardstanding areas closest to NSRs	85	78	77	77	73	71	68	63
Dozer	C.512	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct crane hardstandings	Modelled as point source in crane hardstanding areas closest to NSRs	80	78	71	70	74	68	65	61
Articulated Dump Truck (Tipping Fill)	C.232	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct crane hardstandings	Modelled as point source in crane hardstanding areas closest to NSRs	80	76	73	70	69	66	63	58
Articulated Dump Truck (Tipping Fill)	C.232	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct crane hardstandings	Modelled as point source in crane hardstanding areas closest to NSRs	80	76	73	70	69	66	63	58
Tracked Excavator	C.2.14	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	85	78	77	77	73	71	68	63
Dozer	C.5.12	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	80	78	71	70	74	68	65	61
Articulated Dump Truck (Tipping Fill)	C.2.32	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	80	76	73	70	69	66	63	58
Articulated Dump Truck (Tipping Fill)	C.2.32	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	80	76	73	70	69	66	63	58
Poker Vibrator	C.4.33	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	82	80	80	73	69	72	70	65

Noise Sources used for Modelling of Month 8 of Construction Schedule (All sources operating concurrently and continuously)						Lp at 10 m (dB)							
Item of Plant	BS5228 Table Reference	Number of plant	Associated Task	Activity	Work Area (s)	63	125	250	500	1000	2000	4000	8000
Vibratory Roller	C.5.26	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	84	84	78	70	70	70	67	61
Concrete Mixer Truck + Truck Mounted Concrete Pump + Boom Arm	C.4.32	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	73	73	77	76	72	70	65	62
Concrete Mixer Truck + Truck Mounted Concrete Pump + Boom Arm	C.4.32	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	73	73	77	76	72	70	65	62
Tracked Mobile Crane	C.4.50	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	68	71	68	62	66	66	55	46
Water Pump (Diesel)	C.4.88	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	70	65	66	64	64	63	56	46
Tractor (Towing Trailer)	C.4.75	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	93	86	76	76	73	72	64	59
Diesel Generator	C.4.76	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	80	74	57	54	53	48	45	37
Tracked Excavator	C.2.14	2	Task 5 - Substation Construction	Construct Substation	Modelled as point sources in substation area	85	78	77	77	73	71	68	63
Articulated Dump Truck (Tipping Fill)	C.2.32	2	Task 5 - Substation Construction	Construct Substation	Modelled as point sources in substation area	80	76	73	70	69	66	63	58
Articulated Dump Truck (Tipping Fill)	C.2.32	2	Task 5 - Substation Construction	Construct Substation	Modelled as point sources in substation area	80	76	73	70	69	66	63	58
Poker Vibrator	C.4.33	2	Task 5 - Substation Construction	Construct Substation	Modelled as point sources in substation area	82	80	80	73	69	72	70	65
Vibratory Roller	C.5.26	2	Task 5 - Substation Construction	Construct Substation	Modelled as point sources in substation area	84	84	78	70	70	70	67	61
Concrete Mixer Truck + Truck Mounted Concrete Pump + Boom Arm	C.4.32	2	Task 5 - Substation Construction	Construct Substation	Modelled as point sources in substation area	73	73	77	76	72	70	65	62

Noise Sources used for Modelling of Month 9 of Construction Schedule (All sources operating concurrently and continuously)						Lp at 10 m (dB)							
Item of Plant	BS5228 Table Reference	Number of plant	Associated Task	Activity	Work Area (s)	63	125	250	500	1000	2000	4000	8000
Tracked Excavator	C.2.14	2	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct Site Tracks	Modelled as line sources operating on all site tracks	85	78	77	77	73	71	68	63
Tracked Excavator	C.2.14	2	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct Site Tracks	Modelled as line sources operating on all site tracks	85	78	77	77	73	71	68	63
Dozer	C.5.12	2	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct Site Tracks	Modelled as line sources operating on all site tracks	80	78	71	70	74	68	65	61
Articulated Dump Truck (Tipping Fill)	C.2.32	2	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct Site Tracks	Modelled as line sources operating on all site tracks	80	76	73	70	69	66	63	58
Articulated Dump Truck (Tipping Fill)	C.2.32	2	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct Site Tracks	Modelled as line sources operating on all site tracks	80	76	73	70	69	66	63	58
Tracked Excavator	C.1.12	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Borrow Pit Working	Modelled as point sources in all borrow pit areas of site	79	81	83	79	77	75	70	62
Dozer	C.2.1	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Borrow Pit Working	Modelled as point sources in all borrow pit areas of site	79	77	76	74	68	67	60	59
Wheeled Loader	C.9.26	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Borrow Pit Working	Modelled as point sources in all borrow pit areas of site	89	90	86	82	83	77	75	64
Tracked Semi-Mobile Crusher	C.9.15	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Borrow Pit Working	Modelled as point sources in all borrow pit areas of site	98	98	97	74	91	88	82	72
Screen Stockpiler	C.10.15	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Borrow Pit Working	Modelled as point sources in all borrow pit areas of site	84	82	79	79	74	74	71	64
Tracked Excavator	C.214	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct crane hardstandings	Modelled as point source in crane hardstanding areas closest to NSRs	85	78	77	77	73	71	68	63
Dozer	C.512	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct crane hardstandings	Modelled as point source in crane hardstanding areas closest to NSRs	80	78	71	70	74	68	65	61
Articulated Dump Truck (Tipping Fill)	C.232	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct crane hardstandings	Modelled as point source in crane hardstanding areas closest to NSRs	80	76	73	70	69	66	63	58
Articulated Dump Truck (Tipping Fill)	C.232	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct crane hardstandings	Modelled as point source in crane hardstanding areas closest to NSRs	80	76	73	70	69	66	63	58
Tracked Excavator	C.2.14	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	85	78	77	77	73	71	68	63
Dozer	C.5.12	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	80	78	71	70	74	68	65	61
Articulated Dump Truck (Tipping Fill)	C.2.32	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	80	76	73	70	69	66	63	58
Articulated Dump Truck (Tipping Fill)	C.2.32	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	80	76	73	70	69	66	63	58
Poker Vibrator	C.4.33	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	82	80	80	73	69	72	70	65
Vibratory Roller	C.5.26	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	84	84	78	70	70	70	67	61
Concrete Mixer Truck + Truck Mounted Concrete Pump + Boom Arm	C.4.32	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	73	73	77	76	72	70	65	62
Concrete Mixer Truck + Truck Mounted Concrete Pump + Boom Arm	C.4.32	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	73	73	77	76	72	70	65	62

Noise Sources used for Modelling of Month 9 of Construction Schedule (All sources operating concurrently and continuously)						Lp at 10 m (dB)							
Item of Plant	BS5228 Table Reference	Number of plant	Associated Task	Activity	Work Area (s)	63	125	250	500	1000	2000	4000	8000
Tracked Mobile Crane	C.4.50	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	68	71	68	62	66	66	55	46
Water Pump (Diesel)	C.4.88	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	70	65	66	64	64	63	56	46
Tractor (Towing Trailer)	C.4.75	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	93	86	76	76	73	72	64	59
Diesel Generator	C.4.76	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	80	74	57	54	53	48	45	37
Tracked Excavator	C.2.14	2	Task 5 - Substation Construction	Construct Substation	Modelled as point sources in substation area	85	78	77	77	73	71	68	63
Articulated Dump Truck (Tipping Fill)	C.2.32	2	Task 5 - Substation Construction	Construct Substation	Modelled as point sources in substation area	80	76	73	70	69	66	63	58
Articulated Dump Truck (Tipping Fill)	C.2.32	2	Task 5 - Substation Construction	Construct Substation	Modelled as point sources in substation area	80	76	73	70	69	66	63	58
Poker Vibrator	C.4.33	2	Task 5 - Substation Construction	Construct Substation	Modelled as point sources in substation area	82	80	80	73	69	72	70	65
Vibratory Roller	C.5.26	2	Task 5 - Substation Construction	Construct Substation	Modelled as point sources in substation area	84	84	78	70	70	70	67	61
Concrete Mixer Truck + Truck Mounted Concrete Pump + Boom Arm	C.4.32	2	Task 5 - Substation Construction	Construct Substation	Modelled as point sources in substation area	73	73	77	76	72	70	65	62

Noise Sources used for Modelling of Month 10 of Construction Schedule (All sources operating concurrently and continuously)						Lp at 10 m (dB)							
Item of Plant	BS5228 Table Reference	Number of plant	Associated Task	Activity	Work Area (s)	63	125	250	500	1000	2000	4000	8000
Tracked Excavator	C.2.14	2	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct Site Tracks	Modelled as line sources operating on all site tracks	85	78	77	77	73	71	68	63
Tracked Excavator	C.2.14	2	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct Site Tracks	Modelled as line sources operating on all site tracks	85	78	77	77	73	71	68	63
Dozer	C.5.12	2	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct Site Tracks	Modelled as line sources operating on all site tracks	80	78	71	70	74	68	65	61
Articulated Dump Truck (Tipping Fill)	C.2.32	2	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct Site Tracks	Modelled as line sources operating on all site tracks	80	76	73	70	69	66	63	58
Articulated Dump Truck (Tipping Fill)	C.2.32	2	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct Site Tracks	Modelled as line sources operating on all site tracks	80	76	73	70	69	66	63	58
Tracked Excavator	C.1.12	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Borrow Pit Working	Modelled as point sources in all borrow pit areas of site	79	81	83	79	77	75	70	62
Dozer	C.2.1	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Borrow Pit Working	Modelled as point sources in all borrow pit areas of site	79	77	76	74	68	67	60	59
Wheeled Loader	C.9.26	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Borrow Pit Working	Modelled as point sources in all borrow pit areas of site	89	90	86	82	83	77	75	64
Tracked Semi-Mobile Crusher	C.9.15	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Borrow Pit Working	Modelled as point sources in all borrow pit areas of site	98	98	97	74	91	88	82	72
Screen Stockpiler	C.10.15	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Borrow Pit Working	Modelled as point sources in all borrow pit areas of site	84	82	79	79	74	74	71	64
Tracked Excavator	C.214	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct crane hardstandings	Modelled as point source in crane hardstanding areas closest to NSRs	85	78	77	77	73	71	68	63
Dozer	C.512	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct crane hardstandings	Modelled as point source in crane hardstanding areas closest to NSRs	80	78	71	70	74	68	65	61
Articulated Dump Truck (Tipping Fill)	C.232	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct crane hardstandings	Modelled as point source in crane hardstanding areas closest to NSRs	80	76	73	70	69	66	63	58
Articulated Dump Truck (Tipping Fill)	C.232	4	Task 3 - Borrow pit working, access track construction and hardstanding areas	Construct crane hardstandings	Modelled as point source in crane hardstanding areas closest to NSRs	80	76	73	70	69	66	63	58
Tracked Excavator	C.2.14	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	85	78	77	77	73	71	68	63
Dozer	C.5.12	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	80	78	71	70	74	68	65	61
Articulated Dump Truck (Tipping Fill)	C.2.32	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	80	76	73	70	69	66	63	58
Articulated Dump Truck (Tipping Fill)	C.2.32	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	80	76	73	70	69	66	63	58
Poker Vibrator	C.4.33	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	82	80	80	73	69	72	70	65
Vibratory Roller	C.5.26	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	84	84	78	70	70	70	67	61
Concrete Mixer Truck + Truck Mounted Concrete Pump + Boom Arm	C.4.32	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	73	73	77	76	72	70	65	62
Concrete Mixer Truck + Truck Mounted Concrete Pump + Boom Arm	C.4.32	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	73	73	77	76	72	70	65	62

Noise Sources used for Modelling of Month 10 of Construction Schedule (All sources operating concurrently and continuously)						Lp at 10 m (dB)							
Item of Plant	BS5228 Table Reference	Number of plant	Associated Task	Activity	Work Area (s)	63	125	250	500	1000	2000	4000	8000
Tracked Mobile Crane	C.4.50	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	68	71	68	62	66	66	55	46
Water Pump (Diesel)	C.4.88	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	70	65	66	64	64	63	56	46
Tractor (Towing Trailer)	C.4.75	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	93	86	76	76	73	72	64	59
Diesel Generator	C.4.76	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	80	74	57	54	53	48	45	37
Tracked Excavator	C.2.14	2	Task 5 - Substation Construction	Construct Substation	Modelled as point sources in substation area	85	78	77	77	73	71	68	63
Articulated Dump Truck (Tipping Fill)	C.2.32	2	Task 5 - Substation Construction	Construct Substation	Modelled as point sources in substation area	80	76	73	70	69	66	63	58
Articulated Dump Truck (Tipping Fill)	C.2.32	2	Task 5 - Substation Construction	Construct Substation	Modelled as point sources in substation area	80	76	73	70	69	66	63	58
Poker Vibrator	C.4.33	2	Task 5 - Substation Construction	Construct Substation	Modelled as point sources in substation area	82	80	80	73	69	72	70	65
Vibratory Roller	C.5.26	2	Task 5 - Substation Construction	Construct Substation	Modelled as point sources in substation area	84	84	78	70	70	70	67	61
Concrete Mixer Truck + Truck Mounted Concrete Pump + Boom Arm	C.4.32	2	Task 5 - Substation Construction	Construct Substation	Modelled as point sources in substation area	73	73	77	76	72	70	65	62
Wheeled excavator	C.5.11	2	Task 6 - Cabling	Digging Road for Cabling	Modelled as a Line source along the length of the site tracks from the substation to the turbines	78	74	68	71	68	64	59	52
Backhoe mounted hydraulic breaker 67	C.5.1	2	Task 6 - Cabling	Digging Road for Cabling	Modelled as a Line source along the length of the site tracks from the substation to the turbines	86	80	78	77	81	83	82	81
Petrol driven generator (power supply for temporary traffic lights)	D.7.52	2	Task 6 - Cabling	Digging Road for Cabling	Modelled as a Line source along the length of the site tracks from the substation to the turbines	-	-	-	66	-	-	-	-
Tracked Mobile Crane	C.4.52	5	Task 7 - Erection of Turbines	Erect Turbines	Modelled as point sources at the turbines nearest to NSRs	73	71	66	67	74	66	58	49
Tracked Mobile Crane	C.4.50	5	Task 7 - Erection of Turbines	Erect Turbines	Modelled as point sources at the turbines nearest to NSRs	68	71	68	62	66	66	55	46
Diesel Generator	C.4.76	5	Task 7 - Erection of Turbines	Erect Turbines	Modelled as point sources at the turbines nearest to NSRs	80	74	57	54	53	48	45	37
Compressor	D.7.24	5	Task 7 - Erection of Turbines	Erect Turbines	Modelled as point sources at the turbines nearest to NSRs	-	-	-	61	-	-	-	-
Road Lorry (full)	C.6.21	3	Task 7 - Erection of Turbines	Lorry Delivering Turbines	Modelled as line sources from site entrance to turbine locations	96	82	74	73	77	72	71	64

Noise Sources used for Modelling of Month 11 of Construction Schedule (All sources operating concurrently and continuously)						Lp at 10 m (dB)							
Item of Plant	BS5228 Table Reference	Number of plant	Associated Task	Activity	Work Area (s)	63	125	250	500	1000	2000	4000	8000
Tracked Excavator	C.2.14	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	85	78	77	77	73	71	68	63
Dozer	C.5.12	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	80	78	71	70	74	68	65	61
Articulated Dump Truck (Tipping Fill)	C.2.32	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	80	76	73	70	69	66	63	58
Articulated Dump Truck (Tipping Fill)	C.2.32	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	80	76	73	70	69	66	63	58
Poker Vibrator	C.4.33	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	82	80	80	73	69	72	70	65
Vibratory Roller	C.5.26	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	84	84	78	70	70	70	67	61
Concrete Mixer Truck + Truck Mounted Concrete Pump + Boom Arm	C.4.32	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	73	73	77	76	72	70	65	62
Concrete Mixer Truck + Truck Mounted Concrete Pump + Boom Arm	C.4.32	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	73	73	77	76	72	70	65	62
Tracked Mobile Crane	C.4.50	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	68	71	68	62	66	66	55	46
Water Pump (Diesel)	C.4.88	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	70	65	66	64	64	63	56	46
Tractor (Towing Trailer)	C.4.75	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	93	86	76	76	73	72	64	59
Diesel Generator	C.4.76	3	Task 4 - Foundations	Construct Turbine Foundations	Modelled as point sources in foundation areas closest to NSRs	80	74	57	54	53	48	45	37
Tracked Excavator	C.2.14	2	Task 5 - Substation Construction	Construct Substation	Modelled as point sources in substation area	85	78	77	77	73	71	68	63
Articulated Dump Truck (Tipping Fill)	C.2.32	2	Task 5 - Substation Construction	Construct Substation	Modelled as point sources in substation area	80	76	73	70	69	66	63	58
Articulated Dump Truck (Tipping Fill)	C.2.32	2	Task 5 - Substation Construction	Construct Substation	Modelled as point sources in substation area	80	76	73	70	69	66	63	58
Poker Vibrator	C.4.33	2	Task 5 - Substation Construction	Construct Substation	Modelled as point sources in substation area	82	80	80	73	69	72	70	65
Vibratory Roller	C.5.26	2	Task 5 - Substation Construction	Construct Substation	Modelled as point sources in substation area	84	84	78	70	70	70	67	61
Concrete Mixer Truck + Truck Mounted Concrete Pump + Boom Arm	C.4.32	2	Task 5 - Substation Construction	Construct Substation	Modelled as point sources in substation area	73	73	77	76	72	70	65	62
Wheeled excavator	C.5.11	2	Task 6 - Cabling	Digging Road for Cabling	Modelled as a Line source along the length of the site tracks from the substation to the turbines	78	74	68	71	68	64	59	52
Backhoe mounted hydraulic breaker 67	C.5.1	2	Task 6 - Cabling	Digging Road for Cabling	Modelled as a Line source along the length of the site tracks from the substation to the turbines	86	80	78	77	81	83	82	81
Petrol driven generator (power supply for temporary traffic lights)	D.7.52	2	Task 6 - Cabling	Digging Road for Cabling	Modelled as a Line source along the length of the site tracks from the substation to the turbines	-	-	-	66	-	-	-	-
Tracked Mobile Crane	C.4.52	5	Task 7 - Erection of Turbines	Erect Turbines	Modelled as point sources at the turbines nearest to NSRs	73	71	66	67	74	66	58	49
Tracked Mobile Crane	C.4.50	5	Task 7 - Erection of Turbines	Erect Turbines	Modelled as point sources at the turbines nearest to NSRs	68	71	68	62	66	66	55	46

Noise Sources used for Modelling of Month 11 of Construction Schedule (All sources operating concurrently and continuously)						Lp at 10 m (dB)							
Item of Plant	BS5228 Table Reference	Number of plant	Associated Task	Activity	Work Area (s)	63	125	250	500	1000	2000	4000	8000
Diesel Generator	C.4.76	5	Task 7 - Erection of Turbines	Erect Turbines	Modelled as point sources at the turbines nearest to NSRs	80	74	57	54	53	48	45	37
Compressor	D.7.24	5	Task 7 - Erection of Turbines	Erect Turbines	Modelled as point sources at the turbines nearest to NSRs	-	-	-	61	-	-	-	-
Road Lorry (full)	C.6.21	3	Task 7 - Erection of Turbines	Lorry Delivering Turbines	Modelled as line sources from site entrance to turbine locations	96	82	74	73	77	72	71	64

Noise Sources used for Modelling of Month 12 of Construction Schedule (All sources operating concurrently and continuously)						Lp at 10 m (dB)							
Item of Plant	BS5228 Table Reference	Number of plant	Associated Task	Activity	Work Area (s)	63	125	250	500	1000	2000	4000	8000
Wheeled excavator	C.5.11	2	Task 6 - Cabling	Digging Road for Cabling	Modelled as a Line source along the length of the site tracks from the substation to the turbines	78	74	68	71	68	64	59	52
Backhoe mounted hydraulic breaker 67	C.5.1	2	Task 6 - Cabling	Digging Road for Cabling	Modelled as a Line source along the length of the site tracks from the substation to the turbines	86	80	78	77	81	83	82	81
Petrol driven generator (power supply for temporary traffic lights)	D.7.52	2	Task 6 - Cabling	Digging Road for Cabling	Modelled as a Line source along the length of the site tracks from the substation to the turbines	-	-	-	66	-	-	-	-
Tracked Mobile Crane	C.4.52	5	Task 7 - Erection of Turbines	Erect Turbines	Modelled as point sources at the turbines nearest to NSRs	73	71	66	67	74	66	58	49
Tracked Mobile Crane	C.4.50	5	Task 7 - Erection of Turbines	Erect Turbines	Modelled as point sources at the turbines nearest to NSRs	68	71	68	62	66	66	55	46
Diesel Generator	C.4.76	5	Task 7 - Erection of Turbines	Erect Turbines	Modelled as point sources at the turbines nearest to NSRs	80	74	57	54	53	48	45	37
Compressor	D.7.24	5	Task 7 - Erection of Turbines	Erect Turbines	Modelled as point sources at the turbines nearest to NSRs	-	-	-	61	-	-	-	-
Road Lorry (full)	C.6.21	3	Task 7 - Erection of Turbines	Lorry Delivering Turbines	Modelled as line sources from site entrance to turbine locations	96	82	74	73	77	72	71	64

Noise Sources used for Modelling of Month 13 of Construction Schedule (All sources operating concurrently and continuously)						Lp at 10 m (dB)							
Item of Plant	BS5228 Table Reference	Number of plant	Associated Task	Activity	Work Area (s)	63	125	250	500	1000	2000	4000	8000
Wheeled excavator	C.5.11	2	Task 6 - Cabling	Digging Road for Cabling	Modelled as a Line source along the length of the site tracks from the substation to the turbines	78	74	68	71	68	64	59	52
Backhoe mounted hydraulic breaker 67	C.5.1	2	Task 6 - Cabling	Digging Road for Cabling	Modelled as a Line source along the length of the site tracks from the substation to the turbines	86	80	78	77	81	83	82	81
Petrol driven generator (power supply for temporary traffic lights)	D.7.52	2	Task 6 - Cabling	Digging Road for Cabling	Modelled as a Line source along the length of the site tracks from the substation to the turbines	-	-	-	66	-	-	-	-
Tracked Mobile Crane	C.4.52	5	Task 7 - Erection of Turbines	Erect Turbines	Modelled as point sources at the turbines nearest to NSRs	73	71	66	67	74	66	58	49
Tracked Mobile Crane	C.4.50	5	Task 7 - Erection of Turbines	Erect Turbines	Modelled as point sources at the turbines nearest to NSRs	68	71	68	62	66	66	55	46
Diesel Generator	C.4.76	5	Task 7 - Erection of Turbines	Erect Turbines	Modelled as point sources at the turbines nearest to NSRs	80	74	57	54	53	48	45	37
Compressor	D.7.24	5	Task 7 - Erection of Turbines	Erect Turbines	Modelled as point sources at the turbines nearest to NSRs	-	-	-	61	-	-	-	-
Road Lorry (full)	C.6.21	3	Task 7 - Erection of Turbines	Lorry Delivering Turbines	Modelled as line sources from site entrance to turbine locations	96	82	74	73	77	72	71	64
Articulated Dump Truck	C.2.33	2	Task 8 - Site Reinstatement and Restoration	Land Reinstatement	Modelled as line sources operating on all site tracks	85	87	77	75	76	73	69	62
Articulated Dump Truck (Tipping Fill)	C.2.32	2	Task 8 - Site Reinstatement and Restoration	Land Reinstatement	Modelled as line sources operating on all site tracks	80	76	73	70	69	66	63	58
Tracked Excavator (Loading Dump Truck)	C.1.10	2	Task 8 - Site Reinstatement and Restoration	Land Reinstatement	Modelled as line sources operating on all site tracks	82	78	82	81	81	78	72	64
Tracked Excavator (Loading Dump Truck)	C.1.10	2	Task 8 - Site Reinstatement and Restoration	Land Reinstatement	Modelled as line sources operating on all site tracks	82	78	82	81	81	78	72	64
Tracked Excavator (Loading Dump Truck)	C.1.10	2	Task 8 - Site Reinstatement and Restoration	Land Reinstatement	Modelled as line sources operating on all site tracks	82	78	82	81	81	78	72	64
Tracked Excavator	C.1.14	2	Task 8 - Site Reinstatement and Restoration	Land Reinstatement	Modelled as line sources operating on all site tracks	85	78	77	77	73	71	68	63

Noise Sources used for Modelling of Night-time operations (All sources operating concurrently and continuously)						Lp at 10 m (dB)							
Item of Plant	BS5228 Table Reference	Number of plant	Associated Task	Activity	Work Area (s)	63	125	250	500	1000	2000	4000	8000
Water pump (diesel)	C.4.48	2	Night-time Operations	Night-time Operations	Modelled as point source at construction compound and substation areas	70	65	66	64	64	63	56	46
Diesel Generator	C.4.43	2	Night-time Operations	Night-time Operations	Modelled as point source at construction compound and substation areas	57	71	65	61	60	56	52	44