

National Grid Cable Tunnel Replacement Project

Environmental Statement Volume VI

Appendix 11.3 Noise and Vibration Calculations and Modelling

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Quality information

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1 Noise Modelling

1.1 Assumptions

1.1.1 In order to determine potential operational noise emissions from the development, noise prediction models have been prepared using the CadnaA® v2022 software package. The following assumptions were applied in noise models:

- The ground acoustic absorption has been set to 0.8 (i.e., assumed soft ground conditions which is considered appropriate for predominantly open grass field and farmland);
- The maximum order of reflections was 1;
- Air temperature was assumed to be 10 degrees Celsius and humidity 80%, which is typical annual average weather conditions in Yorkshire;
- Building massing in the surrounding area outside of the Order limits has been sourced from Ordnance Survey Open Map data and modelled with a standard height of 7 m.
- Land topography has been sourced from Ordnance Survey Open Map data;
- No boundary fences/walls have been included in the noise model; and
- Receiver points have been modelled as 1.5 m above local ground level (representative of ground floor windows) for daytime noise.

1.1 Construction Noise

1.1.2 CadnaA® noise mapping software was used to predict construction noise levels at the selected receptors. The construction noise model followed the procedures for prediction of demolition and construction noise set out in BS 5228-1. Sound power levels for each of the following construction activities have been calculated:

1.1.3 Noise source data for construction plant are presented in Table 1. Construction noise predictions were carried out to represent a worst-case scenario where all plant is operational on-site. Consequently, construction noise predictions may overestimate construction noise levels so can be considered as worst case.

Table 1: Construction Plant

Work Package	Plant / Equipment	Reference	Sound Power Lw (dBA)	Quantity
Site set up	Breaker	BS 5228 Table C.1, Item 9	118	1
	Bulldozer	Based on Caterpillar D6	109	4
	Concrete poker	BS 5228 Table C.4, Item 33	106	1
	Concrete pump	BS 5228 Table C.3, Item 26	103	1
	Concrete truck	BS 5228 Table C.4, Item 20	108	1
	Crane	BS 5228 Table C.4, Item 50	99	1
	Dumper	BS 5228 Table C.4, Item 1	109	4
	Excavator	BS 5228 Table C.2, Item 14	107	7
	Generator	http://www.aggreko.co.uk/pdf/Diesel-generator-information-sheet	93	1
	Transit tipper	BS 5228 Table C.8, Item 20	107	3
	Vibro roller	BS 5228 Table C.5, Item 25	107	1

Work Package	Plant / Equipment	Reference	Sound Power Lw (dBA)	Quantity
Piling/ excavation	Compressor	BS 5228 Table C.3, Item 19	103	1
	Concrete poker	BS 5228 Table C.4, Item 33	106	1
	Concrete pump	BS 5228 Table C.3, Item 26	103	1
	Concrete truck	BS 5228 Table C.4, Item 20	108	1
	Crane	BS 5228 Table C.4, Item 50	99	1
	Dumper	BS 5228 Table C.4, Item 1	109	2
	Excavator	BS 5228 Table C.2, Item 14	107	1
	Forklift	BS 5228 Table C.2, Item 35	99	1
	Generator	http://www.aggreko.co.uk/pdf/Diesel-generator-information-sheet	93	1
	Grout mixer	BS 5228 Table D.6, Item 13	108	1
	Jet wash	BS 5228 Table C.3, Item 13	91	1
	Piling rig	BS 5228 Table C.3, Item 17	104	2
Tunnelling	Compressor	BS 5228 Table C.3, Item 19	103	1
	Concrete poker	BS 5228 Table C.4, Item 33	106	1
	Concrete pump	BS 5228 Table C.3, Item 26	103	1
	Crawler crane	BS 5228 Table C.4, Item 52	103	1
	Dumper	BS 5228 Table C.4, Item 1	109	1
	Excavator	BS 5228 Table C.2, Item 14	107	2
	Forklift	BS 5228 Table C.2, Item 35	99	3
	Gantry Crane	BS 5228 Table C.4, Item 43	98	1
	Generator	http://www.aggreko.co.uk/pdf/Diesel-generator-information-sheet	93	1
	Grout mixer	BS 5228 Table D.6, Item 13	108	1
	Jet wash	BS 5228 Table C.3, Item 13	91	1
	Loading shovel	BS 5228 Table C.9, Item 8	114	1
	Mobile crane	BS 5228 Table C.4, Item 50	99	1
	Pump	BS 5228 Table C.3, Item 3	98	4
	Rotary core rig	BS 5228 Table C.3, Item 18	103	1
	Transit tipper	BS 5228 Table C.8, Item 20	107	1
	TBM Generator	BS 5228 Table C.2, Item 44	105	2
Slurry Treatment (Tilbury)	Desanding pumps	Long Itchington Wood North Portal - Slurry Treatment Plant - Noise Impact Assessment	108	1
	Desilting pumps		109	1
	Dewatering		109	1
	Hydricyclones		97	1
	Trommel		115	1
Installation	Crawler crane	BS 5228 Table C.4, Item 52	103	1

Work Package	Plant / Equipment	Reference	Sound Power Lw (dBA)	Quantity
	Dumper	BS 5228 Table C.4, Item 1	109	1
	Excavator	BS 5228 Table C.2, Item 14	107	2
	Gantry Crane	BS 5228 Table C.4, Item 43	98	1
	Generator	http://www.aggreko.co.uk/pdf/Diesel-generator-information-sheet	93	1
	Jet wash	BS 5228 Table C.3, Item 13	91	1
	Pipe thruster	BS 5228 Table C.3, Item 7	98	1
	Pump	BS 5228 Table C.3, Item 3	98	4
Reinstatement	Bulldozer	Based on Caterpillar D6	109	2
	Dumper	BS 5228 Table C.4, Item 1	109	2
	Excavator	BS 5228 Table C.2, Item 14	107	2
	Harrow	BS 5228 Table C.4, Item 74	108	1
	JCB	BS 5228 Table C.4, Item 66	97	1
	Ripper	http://www.eod.gov.hk/epd/english/application_for_licences/guidance/files/OtherSWLe.odf	105	1
	Seeder	BS 5228 Table C.4, Item 74	108	1
	Tractor	BS 5228 Table C.4, Item 75	107	2
	Transit tipper	BS 5228 Table C.8, Item 20	107	2

1.2 Impact Piling Vibration Calculations

Impact piling vibration calculations were calculated based on the formula below from BS 5228-2. Calculations were made assuming $K_p=1.5$ and $W=60Kj$.

Percussive piling

$$v_{res} \leq k_p \left[\frac{\sqrt{W}}{r^{1.3}} \right]$$

