voltalia

Technical Appendix 12.2: Construction and Operational Noise Modelling Inputs

Department: ERM
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Code: 0733745

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1 NOISE INPUTS APPENDIX

1.1 Introduction

1.1.1.1 The noise input data used in the construction noise model is presented in **Table 1.1**. The construction vibration source terms are in **Table 1.2**. The construction modelling assumes that construction activities within each construction phase will occur at the same time. The noise input data used in the operational model is presented in **Table 1.3**. The modelling has been based on the layout drawings listed below, as well as data provided by the Project design engineering team in the documents listed below.

1.1.1.2 Layouts:

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1.2 Noise Inputs

1.2.1.1 The assessment of construction noise is based on the project draft construction program (prepared February 2025). Construction has been assessed in three distinct phases:

- Phase 1: Site Preparation
  - Earthworks
  - Construction of site compounds

- Phase 2: Foundations and Civils
  - Civils
  - Trenching
  - Operation of site compounds
  - Transformer bases
  - Road construction
  - Mechanical Installations
  - Mobile traffic team
- Phase 3: Installations
  - Mobile traffic team
  - Operation of site compounds
  - PV Module installation
  - Installation of inverters and transformers

TABLE 1.1 NOISE INPUT DATA USED IN THE CONSTRUCTION NOISE MODEL

EQUIPMENT NAME	ASSUMED MITIGATED LW / UNIT, DB(A)	BS 5228 REFERENCE NUMBER	% ON-TIME	UNITS	EFFECTIVE LW / UNIT, dB(A)
Team: Earthworks		**Number of Teams:** 1		**Phase:** 1	
Tracked Excavator (40t)	107	C2.14	75	2	109
Hydraulic Vibratory Compactor	106	C2.42	75	2	108
Dump Truck	107	C2.30	75	2	109
Compressor	103	C3.19	75	2	105
Generator	94	C4.85	100	2	97
Tracked Crusher	112	C1.15	50	1	109
				Total:	**115**
Team: Compound Construction		**Number of Teams:** 1		**Phase:** 1	
50t all-terrain crane	104	C5.37	50	1	101
Lorry	105	C4.53	50	1	102

EQUIPMENT NAME	ASSUMED MITIGATED LW / UNIT, DB(A)	BS 5228 REFERENCE NUMBER	% ON-TIME	UNITS	EFFECTIVE LW / UNIT, dB(A)
Asphalt paver	103	C5.30	25	1	97
20t excavator	108	C5.18	75	1	107
Dumper	104	C.4.4	50	1	101
Roller	95	C5.27	25	1	89
Generator	102	C4.84	100	1	102
				Total:	**110**
Team: Trenching		**Number of Teams:** 1		**Phase:** 1	
Wheeled Backhoe Loader	97	C4.66	75	1	96
Wheeled Excavator (18T)	94	C4.10	75	1	93
Dump Truck (Full)	107	C2.30	25	1	101
Dumper Truck (Empty)	115	C2.31[(1)]	5	1	102
				Total:	**105**
Team: Compounds Operation		**Number of Teams:** 1		**Phase:** 1	
Lorry loader	105	C4.53	50	1	102
Dump Truck (Full)	107	C2.30	50	1	104
Concrete Mixer Truck	108	C4.20	50	1	105
Lorry Mounted Concrete Pump	109	D6.17	50	1	106
				Total:	**111**
Team: Civils (Substation Area)		**Number of Teams:** 1		**Phase:** 1	
Tracked excavator	107	C2.14	50	2	107
Bulldozer	114	C5.14	50	2	114
Dump Truck (Full)	107	C2.30	25	1	101
Dumper Truck (Empty)	115	C2.31[(1)]	5	1	102

EQUIPMENT NAME	ASSUMED MITIGATED LW / UNIT, DB(A)	BS 5228 REFERENCE NUMBER	% ON-TIME	UNITS	EFFECTIVE LW / UNIT, dB(A)
Concrete Mixer Truck	108	C4.20	75	1	107
Lorry Mounted Concrete Pump	109	D6.17	50	1	106
Vibratory Roler	102	C2.39	50	1	99
Hydraulic Vibratory Compactor	106	C2.42	50	1	103
				Total:	**117**
Team: Transformer Station Bases		**Number of Teams:** 1		**Phase:** 1	
Tracked excavator	107	C2.14	50	2	107
Dump Truck (Full)	107	C2.30	25	1	101
Dumper Truck (Empty)	115	C2.31[(1)]	5	1	102
Concrete Mixer Truck	108	C4.20	75	1	107
Lorry Mounted Concrete Pump	109	D6.17	50	1	106
Vibratory Roler	102	C2.39	50	1	99
Hydraulic Vibratory Compactor	106	C2.42	50	1	103
				Total:	**112**
Team: Mechanical Installations		**Number of Teams:** 1		**Phase:** 1	
Continuous flight auger piling	104	C3.17	100	1	104
Dump Truck (Full)	107	C2.30	25	1	101
Dumper Truck (Empty)	115	C2.31[(1)]	5	1	102
Concrete Mixer Truck	108	C4.20	75	1	107
Lorry Mounted Concrete Pump	109	D6.17	50	1	106

EQUIPMENT NAME	ASSUMED MITIGATED LW / UNIT, DB(A)	BS 5228 REFERENCE NUMBER	% ON-TIME	UNITS	EFFECTIVE LW / UNIT, dB(A)
Vibratory Roler	102	C2.39	50	1	99
Hydraulic Vibratory Compactor	106	C2.42	50	1	103
				Total:	**111**
Team: PV Module Installation		**Number of Teams:** 1		**Phase:** 1	
Articulated dump truck	104	C5.16	75	1	103
Wheeled mobile telescopic crane	106	C4.38	50	4	109
Diesel generator	94	C4.85	100	1	94
Cement mixer truck (discharging)	103	C4.18	25	1	97
Dumper	105	C4.9	75	1	104
				Total:	**113**
Team: Installation of Inverters & Transformers			**Number of Teams:** 1		**Phase:** 1
Tracked excavator	107	C2.14	75	1	106
Wheeled loader	108	C2.27	50	1	105
Wheeled mobile telescopic crane	112	C4.38	50	1	109
Dump truck (tipping fill)	107	C2.30	25	2	104
Telescopic handler	99	C2.35	75	2	101
Cement mixer truck (discharging)	103	C4.18	25	1	97
				Total:	**111**
Team: Road Construction		**Number of Teams:** 1		**Phase:** 1	
Vibratory Roller	103	C5.20	100	1	103
Asphalt Paver (+ Tipper Lorry)	105	C5.31	50	1	102
Road Sweeper	104	C4.90	100	1	104

EQUIPMENT NAME	ASSUMED MITIGATED LW / UNIT, DB(A)	BS 5228 REFERENCE NUMBER	% ON-TIME	UNITS	EFFECTIVE LW / UNIT, dB(A)
Dozer	107	C2.11	50	1	104
Dump Truck (Full)	107	C2.30	25	2	104
Dumper Truck (Empty)	115	C2.31(1)	5	1	102
Tracked excavator	105	C2.01	25	4	105
				Total:	**100**
Team: Mobile Traffic Team		**Number of Teams:** 1		**Phase:** 2	
HGVs	107	C.8 20	100	14/day	n/a(2)

(1) Value is L_{max} and therefore the % on-time is reduced to estimate an equivalent $L_{Aeq,T}$.
(2) Calculated using BS 5228-1 F.2.5: "method for mobile plant using a regular well-defined route (e.g. haul roads)": $L_{Aeq,T} = L_{WA} - 33 + 10\log_{10}Q - 10\log_{10}V - 10\log_{10}d$ where L_{WA}=107, Q=1, V=16kph, and d is the distance from source to receptor

TABLE 1.2 CONSTRUCTION VIBRATION SOURCE TERMS

SOURCE	EQUATION	SOURCE TERMS
Vibratory piling	$v_{res} = \frac{k_v}{x^{\delta}}$	$k_v = 126$ x is the distance from source to receptor $\delta = 1.3$
Vibratory compaction	$v_{res} = k_s\sqrt{n_d}\left[\frac{A}{x + L_d}\right]^{1.5}$	$k_s = 143$ $n_d = 2$ $A = 1.72$ x is the distance from source to receptor $L_d = 0.75$

TABLE 1.3 NOISE INPUT DATA USED IN THE OPERATIONAL NOISE MODEL

EQUIPMENT NAME	SOUND LEVEL, LW / UNIT, dB(A)	EMBEDDED MITIGATION	SOURCE TYPE	ASSUMED SOURCE HEIGHT (M)	UNITS
BESS & Substation Area					
BESS Container	83	Reduction from acoustic barrier	Area source	2.9	40
Power Conversion System	73	Reduction from acoustic barrier	Point Source	2.4	20
MV Transformer	73	Reduction from acoustic barrier	Point Source	3.15	10
Primary Transformer	79	N/A	Point Source	3.0	1
Auxiliary Transformer	78	N/A	Point Source	3.0	1
Solar Panel Fields					
Central Transformer Inverter	88	Reduction from acoustic barrier	Industrial Building	2.44	16