

H2Teesside Project

Environmental Statement

Volume III – Appendices

Appendix 11A: Construction Noise Levels and Assumptions

Document Reference: 6.4.15

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended)

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 - Regulation 5(2)(a)



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11A.0 CONSTRUCTION NOISE LEVELS AND ASSUMPTIONS

11A.1 Introduction

11A.1.1 Free field construction noise levels have been predicted at five residential receptor locations (H1, H2, H3, H5 and H6) and non-residential receptors (H4 and H7) for the following construction activities:

- Construction of the Main Site and compounds:
 - Construction Compound Establishment;
 - Piling and Foundation Works;
 - Road Construction; and
 - General Site Activities.
- Construction of the Connection Corridors:
 - ROW Fencing and Prep;
 - Construction of Buried Pipelines;
 - Trenchless Crossings Specific Activities;
 - Above Ground Pipeline Construction Works;
 - Testing; and
 - Street Works (to provide construction access to pipelines compounds).

11A.1.2 A full list of plant associated with construction activities and associated sound power data from BS 5228-1 'Code of Practice for Noise and Vibration Control on Construction and Open Sites. Noise' (BSI, 2014a) and percentage (%) on time is presented in Tables 11A-1 to Table 11A-10. The list of plant was sourced from data from the client for pipeline construction in the outline construction methodology and from other similar projects.

11A.1.3 Construction models are evaluated with the use of three different models, those being: Main Site and Compound Construction, Connection Corridor Construction and Phase 1 operational levels.

11A.1.4 For plant lists in construction models, plant items highlighted in the project design team plant list as "Assumed" or pertaining to the "D" tables of BS 5228 have a spectrum taken from a relevant item in BS5228 C tables and the spectrum is adjusted to fit reported levels in the project design team plant list.

11A.1.5 For Connection Corridor construction, the chosen method for evaluation was in accordance with the extent of works assumed to be able to be done on a daily basis as reported by the project design team plant list. The assessment of noise emission is done for the worst case for each noise sensitive receptor. These noise sources were modelled as line sources.

11A.1.6 For Main Site and Compound construction, the activities have been modelled as area sources and assumed to be sitewide at the Main Site and each compound.

Detailed monthly levels were calculated and used to assess average monthly levels. A summary has been presented in Table .

- 11A.1.7 All sources in construction models except piling are assumed to be 1.5 metres above ground level.
- 11A.1.8 For testing in Connection Corridor construction assessment, line sources at the worst case for each receptor were modelled with a length of 250 metres.
- 11A.1.9 The highest construction noise level is presented for each pipeline construction activity rather than all activities at once, as only one activity could occur at the closest approach at any one time.
- 11A.1.10 For all construction models, each receiver has a ground floor level and a first-floor level receiver, only the highest one for each noise sensitive receptor is reported as a worst case.
- 11A.1.11 Pipeline construction methodology is assumed to be the same for each pipeline regardless of the type of material they transport once operational. Only changes from pipeline construction come from pipeline types (e.g buried, above ground or trenchless crossing), their corresponding plant list, programme and proposed layout.
- 11A.1.12 Street works have been assumed as small sections (corresponding to the access points from the shapefile provided) these are also evaluated as highest daily levels.

11A.2 Construction Noise Information

Noise Model Settings

- 11A.2.1 The Proposed Development was characterised in CadnaA (version 2023) acoustic modelling software. This software implements the sound propagation calculation methodology set out in BS 5228.

Data Sources

- 11A.2.2 The following data sources were used:
- surrounding area ground heights – downloaded from Open Survey Data;
 - Ordnance Survey mapping of the Site and surrounding areas;
 - sound levels provided from BS 5228;
 - sound power level data from similar projects; and

Modelling Assumptions

- 11A.2.3 The model has been prepared with the following configurations and assumptions:
- building dimensions as shown in Chapter 4;
 - receptor buildings heights – all 2 storey houses (6.5 m), all 1 storey houses (4 m);
 - receptor heights 1.5 m ground floor, 4 m first floor; and

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- ground absorption – industrial areas and hardstanding 0.0, vegetation 1.0, road surfaces 0.0, water bodies 0.0. The locations of each area have been determined from the OS Topography Layer.

Table 11A-1: Plant and Equipment Associated with Construction of Compound Works

ACTIVITY	PLANT	NO.	% ON-TIME	UNWEIGHTED OCTAVE BAND SOUND POWER LEVEL [L _w dB]								OVERALL SOUND POWER LEVEL [L _{WA} dB]	REFERENCE
				63	125	250	500	1K	2K	4K	8K		
Establishment Clearing Site	Dozer (20t)	2	67	107	105	104	102	96	95	88	87	103	BS 5228: Tab C.2 #1
	Tracked Excavator (22t)	4	67	108	111	104	101	100	98	97	94	106	BS 5228: Tab C.2 #3
Establishment Excavation/Earthworks	Tracked Excavator (25t)	4	67	123	112	107	101	98	96	92	85	105	BS 5228: Tab C.2 #19
Establishment Breaking Up Concrete	Breaker mounted on wheeled Backhoe	4	33	107	110	109	110	114	114	114	113	120	BS 5228: Tab C.1 #1
Establishment Loading Wagons	Wheeled Loader	2	67	113	111	104	103	103	100	100	89	108	BS 5228: Tab C.2 #27
Construction Compound Establishment Distribution of Material	Articulated Dump Truck (25t)	2	67	118	115	105	107	103	101	95	91	109	BS 5228: Tab C.4 #1
	Tipper Lorry	4	67	101	106	106	106	102	101	96	94	108	BS 5228: Tab C.2 #34
Establishment Rolling and Compaction	Roller (18t)	2	67	100	103	109	106	102	98	91	83	107	BS 5228: Tab C.2 #37
Establishment Crushing Concrete/Rubble	Tracked Crusher	1	33	114	112	112	109	106	103	99	94	112	BS 5228: Tab C.1 #15

ACTIVITY	PLANT	NO.	% ON-TIME	UNWEIGHTED OCTAVE BAND SOUND POWER LEVEL [L _w dB]								OVERALL SOUND POWER LEVEL [L _{WA} dB]	REFERENCE
				63	125	250	500	1K	2K	4K	8K		
Establishment Pumping Surface Water	Diesel Water Pump	2	90	109	111	105	103	104	103	97	91	109	BS 5228: Tab C.11 #1

Table 11A-2: Plant and Equipment Associated with Piling and Foundation Works

ACTIVITY	PLANT	NO.	% ON-TIME	UNWEIGHTED OCTAVE BAND SOUND POWER LEVEL [LW dB]								OVERALL SOUND POWER LEVEL [L _{WA} dB]	REFERENCE
				63	125	250	500	1K	2K	4K	8K		
Ground Investigation Drilling	Cable Percussion Drilling Rig	1	67	105	105	95	94	98	96	90	84	102	BS 5228: Tab C.2 #43
Breaking Concrete	Hand Held Pneumatic Breaker	4	33	110	109	115	115	116	114	111	115	121	BS 5228: Tab C.1 #7
Breaking Concrete Foundations	Tracked Excavator Fitted with Breaker	2	33	111	114	113	114	118	118	118	117	124	Based on C.1.#1
Piling(made ground)	Large Rotary Bored Piling Rig	4	75	112	120	109	108	106	104	96	89	111	BS 5228: Tab C.3 #14
Piling(obstructions)	Large Rotary Bored Piling Rig	4	15	116	124	113	112	110	108	100	93	115	Based on C.3.#14
Piling(natural ground)	Soilmec R622(CFA Piling)	4	90	111	111	108	106	104	102	98	93	109	Based on C.3.#21
Precast Concrete Piling (option3)	Hydraulic Hammer Rig	3	90	110	110	110	117	111	106	103	98	117	BS 5228: Tab C.3 #1
Craneage	Tracked mobile crane (110t)	2	33	109	105	94	90	87	85	79	74	95	BS 5228: Tab C.3 #28
	Tracked mobile crane (55t)	2	33	109	105	97	95	90	88	89	79	98	BS 5228: Tab C.3 #29

ACTIVITY	PLANT	NO.	% ON-TIME	UNWEIGHTED OCTAVE BAND SOUND POWER LEVEL [LW dB]								OVERALL SOUND POWER LEVEL [L _{WA} dB]	REFERENCE
				63	125	250	500	1K	2K	4K	8K		
Concreting	Cement mixer truck	10	67	111	102	94	97	98	106	88	83	108	BS 5228: Tab C.4 #20
Pumping Concrete	Concrete pump	3	33	111	105	103	103	102	103	95	91	108	BS 5228: Tab C.4 #29
Concreting(other)	Poker Vibrator	6	33	110	108	108	101	97	100	98	93	106	BS 5228: Tab C.4 #33
Sheet Piling	Vibratory Piling Rig	1	33	111	110	107	110	112	110	105	95	116	BS 5228: Tab C.3 #8
Excavation/Earthworks	Tracked Excavator (25t)	4	67	123	112	107	101	98	96	92	85	105	BS 5228: Tab C.2 #19

Table 11A-3: Plant and Equipment Associated with Road Construction Works

ACTIVITY	PLANT	NO.	% ON-TIME	UNWEIGHTED OCTAVE BAND SOUND POWER LEVEL [LW dB]								OVERALL SOUND POWER LEVEL [L _{WA} dB]	REFERENCE
				63	125	250	500	1K	2K	4K	8K		
Breaking Road Surface	Mini excavator with hydraulic breaker	2	33	107	103	101	102	105	105	103	98	111	BS 5228: Tab C.5 #2
	Hand held pneumatic breaker	4	33	111	111	109	102	101	104	106	105	111	BS 5228: Tab C.1 #6
	compressor for hand held pneumatic breaker	4	33	112	101	92	87	85	83	86	75	93	BS 5228: Tab C.5 #5
Breaking Concrete	Hand Held Pneumatic Breaker	4	33	118	107	103	106	106	111	119	120	123	BS 5228: Tab C.5 #6
	Mini excavator with breaker	2	33	107	103	101	102	105	105	103	98	111	BS 5228: Tab C.5 #2
Road Planing	Road Planer	1	67	109	115	107	105	105	102	98	95	110	BS 5228: Tab C.5 #7
Removing Broken Surface	Wheeled Excavator	1	33	106	102	96	99	96	92	87	80	101	BS 5228: Tab C.5 #11
Spreading chipping/fill	Dozer	1	67	110	112	104	103	106	104	98	90	110	BS 5228: Tab C.5 #13
Earthworks	Tracked Excavator (35t)	2	67	104	107	103	103	104	101	98	93	108	BS 5228: Tab C.5 #18

ACTIVITY	PLANT	NO.	% ON-TIME	UNWEIGHTED OCTAVE BAND SOUND POWER LEVEL [LW dB]								OVERALL SOUND POWER LEVEL [L _{WA} dB]	REFERENCE
				63	125	250	500	1K	2K	4K	8K		
	Articulated Dump Truck	2	67	116	118	108	107	104	99	93	89	109	BS 5228: Tab C.5 #16
	Bulldozer (35t)	1	67	105	114	103	103	110	108	101	95	114	BS 5228: Tab C.5 #14
Rolling and Compaction	Vibratory Roller	1	33	117	110	104	105	100	102	109	89	112	BS 5228: Tab C.5 #24
Paving	Asphalt Paver & Tipper Lorry	1	67	100	105	102	100	99	98	95	88	105	BS 5228: Tab C.5 #31
Trenching	Tracked Excavator	2	67	110	100	99	97	97	98	89	82	102	BS 5228: Tab C.5 #35
Cutting Concrete Slabs	Petrol Saw	2	33	112	114	106	106	105	106	110	108	115	BS 5228: Tab C.5 #36
Pumping Water	Electric Water Pump	1	67	99	92	92	95	91	85	82	77	96	BS 5228: Tab C.5 #40

Table 11A-4: Plant and Equipment Associated with General Site Activity Works

ACTIVITY	PLANT	NO.	% ON-TIME	UNWEIGHTED OCTAVE BAND SOUND POWER LEVEL [LW dB]								OVERALL SOUND POWER LEVEL [L _{WA} dB]	REFERENCE
				63	125	250	500	1K	2K	4K	8K		
Concreting	Cement mixer truck	20	33	111	102	94	97	98	106	88	83	108	BS 5228: Tab C.4 #20
Pumping Concrete	Truck mounted concrete pump	2	33	111	105	103	103	102	103	95	91	108	BS 5228: Tab C.4 #29
Concreting(other)	Poker Vibrator	4	33	110	108	108	101	97	100	98	93	106	BS 5228: Tab C.4 #33
Grinding Steel	Angle Grinder	10	33	85	79	80	88	98	105	101	101	108	BS 5228: Tab C.4 #93
Lorry movements on access road	Lorry	12	90	109	107	107	111	112	109	104	98	116	BS 5228: Tab C.11 #8
Lifting	Mobile Crane (400t)	1	67	108	107	101	102	101	101	92	83	106	BS 5228: Tab C.4 #38
	Tracked Mobile Crane (100t)	3	67	101	99	94	95	102	94	86	77	103	BS 5228: Tab C.4 #52
	Mobile Telescopic Crane (55t)	4	67	118	109	106	102	105	104	97	89	110	BS 5228: Tab C.4 #45
	Telehandler	4	67	107	101	94	93	106	94	82	75	107	BS 5228: Tab C.4 #54

ACTIVITY	PLANT	NO.	% ON-TIME	UNWEIGHTED OCTAVE BAND SOUND POWER LEVEL [LW dB]								OVERALL SOUND POWER LEVEL [L _{WA} dB]	REFERENCE
				63	125	250	500	1K	2K	4K	8K		
Access	Cherry Picker	4	67	106	104	90	91	88	87	86	77	95	BS 5228: Tab C.4 #57
	Scissor Lift	4	67	108	105	102	102	102	99	93	91	106	BS 5228: Tab C.4 #59
Pumping surface water	Diesel Water Pump	4	90	109	111	105	103	104	103	97	91	109	BS 5228: Tab C.11 #1
Fuel Deliveries	Fuel Tanker	4	10	107	101	99	103	100	95	87	78	104	BS 5228: Tab C.4 #15
Drilling Concrete	Core Drill (electric)	6	10	103	102	103	100	102	103	108	108	113	BS 5228: Tab C.4 #69
Cutting Concrete Floor Slab	Petrol Hand Held Circular Saw	2	10	100	106	108	105	102	101	105	100	110	Based on C.4.#72
Cutting Concrete Blocks	Petrol Saw	2	10	113	102	100	98	100	104	110	105	113	BS 5228: Tab C.4 #71
Trenching	Tracked Excavator (22t)	3	33	102	108	103	101	97	94	88	79	103	BS 5228: Tab C.4 #64
Temporary power supply	Diesel Generator	4	100	98	90	90	85	81	80	76	69	88	BS 5228: Tab C.4 #77
Pumping water	Water Tanker with Vacuum Pump	2	67	109	110	95	100	99	102	101	94	107	BS 5228: Tab C.4 #89

ACTIVITY	PLANT	NO.	% ON-TIME	UNWEIGHTED OCTAVE BAND SOUND POWER LEVEL [LW dB]								OVERALL SOUND POWER LEVEL [L _{WA} dB]	REFERENCE
				63	125	250	500	1K	2K	4K	8K		
Cleaning Roads	Road Sweeper	1	90	108	103	97	103	99	95	89	86	104	BS 5228: Tab C.4 #90
Concrete Batching	Batching Plant	1	67	115	115	105	104	102	101	95	87	108	Overall sound power level from BS 5228: Tab D.6 #11. Spectrum from BS 5228: Tab C.3 #26
Scaffolding	Various	1	67	98	104	94	89	94	101	105	98	108	Based on C.4.#92
Cutting Timber	Handheld Electric Circular Saw	8	33	100	106	108	105	102	101	105	100	110	Based on C.4.#72
Various including testing	Compressor	6	90	132	121	112	107	105	103	106	95	113	Based on C.5.#5
Unloading module Shipments	Geared Vessel	1	90	125	119	102	99	98	93	90	82	106	Based on C.4.#76
Transporting Modules	SPMT	2	67	109	114	114	114	110	109	104	102	116	Based on C.2.#34
Cutting	Reciprocating Saw	10	67	102	96	99	97	102	107	107	106	113	Based on C.4.#73
General Site Activities	Pneumatic nutrunner	6	67	103	105	105	106	105	109	104	101	113	Based on C.4.#95
	Various other tools (drills, saws, etc.)	30	67	85	79	80	88	98	105	101	101	108	Based on C.4.#93

ACTIVITY	PLANT	NO.	% ON-TIME	UNWEIGHTED OCTAVE BAND SOUND POWER LEVEL [LW dB]								OVERALL SOUND POWER LEVEL [L _{WA} dB]	REFERENCE
				63	125	250	500	1K	2K	4K	8K		
Other	Compressor for shot blasting	2	33	115	104	95	90	88	86	89	78	96	Based on C.5.#5

Table 11A-5: Plant and Equipment Associated with ROW Fencing and Prep Activity Works

ACTIVITY	PLANT	NO.	% ON-TIME	UNWEIGHTED OCTAVE BAND SOUND POWER LEVEL [LW dB]								OVERALL SOUND POWER LEVEL [L _{WA} dB]	REFERENCE
				63	125	250	500	1K	2K	4K	8K		
Lorry Movement on Access Road	Lorry	1	50	109	107	107	111	112	109	104	98	116	BS 5228: Tab C.11 #8
Lifting	Telehandler	1	67	107	101	94	93	106	94	82	75	107	BS 5228: Tab C.4 #54
Vegetation Clearance	Petrol Driven Chainsaw	2	67	95	112	104	103	103	105	109	108	114	Based on C.4.#70

Table 11A-6: Plant and Equipment Associated with Buried Pipeline Construction Activity Works

ACTIVITY	PLANT	NO.	% ON-TIME	UNWEIGHTED OCTAVE BAND SOUND POWER LEVEL [LW dB]								OVERALL SOUND POWER LEVEL [LWA dB]	REFERENCE
				63	125	250	500	1K	2K	4K	8K		
Topsoil Strip	Dozer D6	1	90	103	107	105	105	102	99	93	85	107	BS 5228: Tab C.2 #11
	Tracked Excavator (30t)	2	90	100	99	102	101	97	94	91	86	103	BS 5228: Tab C.2 #16
Dewatering Equipment	Tracked excavator (30t)	2	67	100	99	102	101	97	94	91	86	103	BS 5228: Tab C.2 #16
	Water jet pump	2	67	103	103	90	86	83	82	76	68	91	BS 5228: Tab C.3 #13
Trenching	Tracked excavator (30t)	2	67	100	99	102	101	97	94	91	86	103	BS 5228: Tab C.2 #16
Draining Evacuation	Diesel water pump	2	90	109	111	105	103	104	103	97	91	109	BS 5228: Tab C.11 #1
Distribution Of Material	Articulated dump truck (25t)	1	67	118	115	105	107	103	101	95	91	109	BS 5228: Tab C.4 #1
Lorry Movement on Access Road	Lorry	2	90	109	107	107	111	112	109	104	98	116	BS 5228: Tab C.11 #8
Pipe Storage and Stringing	Tracked excavator (30t) with vac lift	2	67	100	99	102	101	97	94	91	86	103	BS 5228: Tab C.2 #16
	Dozer D6	1	33	103	107	105	105	102	99	93	85	107	BS 5228: Tab C.2 #11
	Hiab	1	33	109	106	104	102	100	97	92	84	105	BS 5228: Tab C.4 #53
	Dumper (6t)	1	33	117	114	105	102	100	100	94	90	107	BS 5228: Tab C.4 #6
	Tracked mobile crane (60t)	1	67	100	99	102	101	97	94	91	86	103	BS 5228: Tab C.2 #16

ACTIVITY	PLANT	NO.	% ON-TIME	UNWEIGHTED OCTAVE BAND SOUND POWER LEVEL [LW dB]								OVERALL SOUND POWER LEVEL [L _{WA} dB]	REFERENCE
				63	125	250	500	1K	2K	4K	8K		
Fabrication And Ancillary Works	Tracked excavator (30t)	1	33	100	99	102	101	97	94	91	86	103	BS 5228: Tab C.2 #16
	Angle grinder	1	67	85	79	80	88	98	105	101	101	108	BS 5228: Tab C.4 #93
	Weld machine/hand-held welder	1	67	95	96	97	96	97	94	89	84	101	BS 5228: Tab C.3 #31
	Generator for welding	1	67	103	100	95	96	98	94	90	88	101	BS 5228: Tab C.3 #32
	Bending machine	1	67	119	115	111	105	99	96	91	87	108	Assumed to be similar to a hydraulic stress kit used in previous projects.
	Tracked mobile crane (60t)	2	33	101	99	94	95	102	94	86	77	103	BS 5228: Tab C.4 #52
	Coating truck	1	67	101	106	106	106	102	101	96	94	108	Based on C.2.#34
	NDT truck and equipment	1	67	101	106	106	106	102	101	96	94	108	BS 5228: Tab C.2 #34
	Compressor for shot blasting etc.	1	67	115	104	95	90	88	86	89	78	96	Based on C.5.#5
Concrete Coating	Cement mixer truck	2	67	111	102	94	97	98	106	88	83	108	BS 5228: Tab C.4 #20
	Truck mounted concrete pump	1	33	111	105	103	103	102	103	95	91	108	BS 5228: Tab C.4 #29
	Poker vibrator	2	33	110	108	108	101	97	100	98	93	106	BS 5228: Tab C.4 #33
Lower And Lay	Tracked excavator (30t)	2	33	100	99	102	101	97	94	91	86	103	BS 5228: Tab C.2 #16
	Tracked mobile crane (60t)	2	33	101	99	94	95	102	94	86	77	103	BS 5228: Tab C.4 #52

ACTIVITY	PLANT	NO.	% ON-TIME	UNWEIGHTED OCTAVE BAND SOUND POWER LEVEL [LW dB]								OVERALL SOUND POWER LEVEL [L _{WA} dB]	REFERENCE
				63	125	250	500	1K	2K	4K	8K		
Backfill And Reinstatement	Tracked excavator (30t)	2	67	100	99	102	101	97	94	91	86	103	BS 5228: Tab C.2 #16
	Hydraulic vibratory compactor (tracked excavator)	2	33	109	104	100	101	100	100	96	91	106	BS 5228: Tab C.2 #42
Temporary Power Supply	Diesel generator	2	100	115	107	107	102	98	97	93	86	105	Based on C.4.#77

Table 11A-7: Plant and Equipment Associated with Trenchless Crossings Construction Activity Works

ACTIVITY	PLANT	NO.	% ON-TIME	UNWEIGHTED OCTAVE BAND SOUND POWER LEVEL [LW dB]								OVERALL SOUND POWER LEVEL [L _{WA} dB]	REFERENCE
				63	125	250	500	1K	2K	4K	8K		
Setup/anchors	Hydraulic hammer	1	67	105	111	101	96	101	108	112	105	115	BS 5228: Tab C.4 #92
	Tracked excavator (30t)	1	67	100	99	102	101	97	94	91	86	103	BS 5228: Tab C.2 #16
Drilling And Pullback	Directional drill (generator)	1	100	95	108	102	100	100	100	96	89	105	BS 5228: Tab C.4 #96
	Tracked drilling rig	1	100	113	121	106	107	108	107	104	102	114	BS 5228: Tab C.6 #35
	Diesel water pump	1	100	109	111	105	103	104	103	97	91	109	BS 5228: Tab C.11 #1
	Mud Pump	1	100	127	122	116	116	115	110	107	95	119	Based on C.2.#45
Mud Processing	Shaker/filter press/lagoon	1	100	115	115	105	104	102	101	95	87	108	Based Spectrum from BS 5228: Tab C.3 #26
Other	Compressor	1	100	115	104	95	90	88	86	89	78	96	Based on C.5.#5
Lorry Movement on Access Road	Lorry	2	90	109	107	107	111	112	109	104	98	116	BS 5228: Tab C.11 #8
Lifting	Mobile telescopic (100t)	1	33	101	99	94	95	102	94	86	77	103	BS 5228: Tab C.4 #52
Pipe Storage and Stringing	Tracked excavator (30t) with vac lift	2	67	100	99	102	101	97	94	91	86	103	BS 5228: Tab C.2 #16
	Dozer D6	1	33	103	107	105	105	102	99	93	85	107	BS 5228: Tab C.2 #11
	Hiab	1	33	109	106	104	102	100	97	92	84	105	BS 5228: Tab C.4 #53
	Dumper (6t)	1	33	117	114	105	102	100	100	94	90	107	BS 5228: Tab C.4 #6

ACTIVITY	PLANT	NO.	% ON-TIME	UNWEIGHTED OCTAVE BAND SOUND POWER LEVEL [LW dB]								OVERALL SOUND POWER LEVEL [L _{WA} dB]	REFERENCE
				63	125	250	500	1K	2K	4K	8K		
	Tracked mobile crane (60t)	1	67	100	99	102	101	97	94	91	86	103	BS 5228: Tab C.2 #16
Fabrication And Ancillary Works	Tracked excavator (30t)	1	33	100	99	102	101	97	94	91	86	103	BS 5228: Tab C.2 #16
	Angle grinder	1	67	85	79	80	88	98	105	101	101	108	BS 5228: Tab C.4 #93
	Weld machine/hand-held welder	1	67	95	96	97	96	97	94	89	84	101	BS 5228: Tab C.3 #31
	Generator for welding	1	67	103	100	95	96	98	94	90	88	101	BS 5228: Tab C.3 #32
	Bending machine	1	67	119	115	111	105	99	96	91	87	108	Assumed to be similar to a hydraulic stress kit used in previous projects.
	Tracked mobile crane (60t)	2	33	101	99	94	95	102	94	86	77	103	BS 5228: Tab C.4 #52
	Coating truck	1	67	101	106	106	106	102	101	96	94	108	Based on C.2.#34
	NDT truck and equipment	1	67	101	106	106	106	102	101	96	94	108	BS 5228: Tab C.2 #34
	Compressor for shot blasting etc.	1	67	115	104	95	90	88	86	89	78	96	Based on C.5.#5
	Temporary Power Supply	Diesel generator	1	100	115	107	107	102	98	97	93	86	105

Table 11A-8: Plant and Equipment Associated with Above Ground Pipeline Construction Activity Works

ACTIVITY	PLANT	NO.	% ON-TIME	UNWEIGHTED OCTAVE BAND SOUND POWER LEVEL [LW dB]								OVERALL SOUND POWER LEVEL [LWA dB]	REFERENCE
				63	125	250	500	1K	2K	4K	8K		
Pipe Storage and Stringing	Tracked excavator (30t) with vac lift	2	67	100	99	102	101	97	94	91	86	103	BS 5228: Tab C.2 #16
	Dozer D6	1	33	103	107	105	105	102	99	93	85	107	BS 5228: Tab C.2 #11
	Hiab	1	33	109	106	104	102	100	97	92	84	105	BS 5228: Tab C.4 #53
	Dumper (6t)	1	33	117	114	105	102	100	100	94	90	107	BS 5228: Tab C.4 #6
	Tracked mobile crane (60t)	1	67	100	99	102	101	97	94	91	86	103	BS 5228: Tab C.2 #16
Lorry Movement on Access Road	Lorry	2	90	109	107	107	111	112	109	104	98	116	BS 5228: Tab C.11 #8
Fabrication And Ancillary Works	Tracked excavator (30t)	1	33	100	99	102	101	97	94	91	86	103	BS 5228: Tab C.2 #16
	Angle grinder	1	67	85	79	80	88	98	105	101	101	108	BS 5228: Tab C.4 #93
	Weld machine/hand-held welder	1	67	95	96	97	96	97	94	89	84	101	BS 5228: Tab C.3 #31
	Generator for welding	1	67	103	100	95	96	98	94	90	88	101	BS 5228: Tab C.3 #32
	Bending machine	1	67	119	115	111	105	99	96	91	87	108	Assumed to be similar to a hydraulic stress kit used in previous projects.
	Tracked mobile crane (60t)	2	33	101	99	94	95	102	94	86	77	103	BS 5228: Tab C.4 #52

ACTIVITY	PLANT	NO.	% ON-TIME	UNWEIGHTED OCTAVE BAND SOUND POWER LEVEL [LW dB]								OVERALL SOUND POWER LEVEL [L _{WA} dB]	REFERENCE
				63	125	250	500	1K	2K	4K	8K		
	Coating truck	1	67	101	106	106	106	102	101	96	94	108	Based on C.2.#34
	NDT truck and equipment	1	67	101	106	106	106	102	101	96	94	108	BS 5228: Tab C.2 #34
	Compressor for shot blasting etc.	1	67	115	104	95	90	88	86	89	78	96	Based on C.5.#5
Temporary Power Supply	Diesel generator	1	100	115	107	107	102	98	97	93	86	105	Based on C.4.#77

Table 11A-9: Plant and Equipment Associated with Testing of Pipeline Construction Activity Works

ACTIVITY	PLANT	NO.	% ON-TIME	UNWEIGHTED OCTAVE BAND SOUND POWER LEVEL [LW dB]								OVERALL SOUND POWER LEVEL [L _{WA} dB]	REFERENCE
				63	125	250	500	1K	2K	4K	8K		
Testing	Compressor	1	100	132	121	112	107	105	103	106	95	113	Based on C.5.#5
Temporary Power Supply	Diesel generator	1	100	115	107	107	102	98	97	93	86	105	Based on C.4.#77

Table 11A-10: Plant and Equipment Associated with Street Works Activity Works

ACTIVITY	PLANT	NO.	% ON-TIME	UNWEIGHTED OCTAVE BAND SOUND POWER LEVEL [LW dB]								OVERALL SOUND POWER LEVEL [L _{WA} dB]	REFERENCE
				63	125	250	500	1K	2K	4K	8K		
Breaking Road Surface	Handheld pneumatic breaker	2	33	112	112	102	103	101	105	111	109	114	BS 5228: Tab C.5 #4
	Compressor for hand-held pneumatic breaker	2	33	112	101	92	87	85	83	86	75	93	BS 5228: Tab C.5 #5
Breaking Concrete	Hand held pneumatic breaker	2	33	118	107	103	106	106	111	119	120	123	BS 5228: Tab C.5 #6
	Mini excavator fitted with breaker	2	33	107	103	101	102	105	105	103	98	111	BS 5228: Tab C.5 #2
Road Planing	Road planer	1	33	109	115	107	105	105	102	98	95	110	BS 5228: Tab C.5 #7
Removing Broken Surface	Wheeled excavator	1	67	106	102	96	99	96	92	87	80	101	BS 5228: Tab C.5 #11
Spreading Chipping	Dozer	1	33	110	112	104	103	106	104	98	90	110	BS 5228: Tab C.5 #13
Earthworks	Tracked excavator (35t)	1	67	104	107	103	103	104	101	98	93	108	BS 5228: Tab C.5 #18
	Articulated dump truck	1	67	116	118	108	107	104	99	93	89	109	BS 5228: Tab C.5 #16

ACTIVITY	PLANT	NO.	% ON-TIME	UNWEIGHTED OCTAVE BAND SOUND POWER LEVEL [LW dB]								OVERALL SOUND POWER LEVEL [L _{WA} dB]	REFERENCE
				63	125	250	500	1K	2K	4K	8K		
Rolling And Compaction	Vibratory roller	1	67	117	110	104	105	100	102	109	89	112	BS 5228: Tab C.5 #24
Paving	Asphalt paver & tipper lorry	1	67	100	105	102	100	99	98	95	88	105	BS 5228: Tab C.5 #31
Cutting Concrete Slabs	Petrol saw	2	33	112	114	106	106	105	106	110	108	115	BS 5228: Tab C.5 #36
Pumping Water	Electric water pump	2	67	99	92	92	95	91	85	82	77	96	BS 5228: Tab C.5 #40

11A.3 Free Field Noise Predictions for Pipeline Construction Works (Worst-Case per Receptor)

Table 11A-11: Buried Pipeline Construction Works

ACTIVITY	PREDICTED FREE-FIELD NOISE LEVEL FOR CONSTRUCTION ACTIVITY						
	dB $L_{Aeq, T}$						
	H1	H2	H3	H4	H5	H6	H7
Top Soil Strip	61	-	-	21	25	23	59
Dewatering Equipment	57	-	-	17	-	-	-
Trenching	59	-	-	20	21	19	55
Draining Excavation	66	-	-	26	27	26	62
Distribution of Material	62	-	-	23	24	23	57
Lorry Movements on access road	73	-	-	33	34	32	69
Pipe Storage and Stringing	64	-	-	25	25	24	59
Fabrication and Ancillary Works	68	-	-	28	29	28	64
Concrete coating	66	-	-	26	26	24	62
Lower and Lay	59	-	-	19	20	18	54
Backfill and reinstatement	62	-	-	22	23	21	58
Temporary Power Supply	63	-	-	24	24	27	58

Table 11A-12: Above Ground Pipeline Construction Works

ACTIVITY	PREDICTED FREE-FIELD NOISE LEVEL FOR CONSTRUCTION ACTIVITY						
	dB $L_{Aeq, T}$						
	H1	H2	H3	H4	H5	H6	H7
Pipe Storage and Stringing	18	28	46	67	27	42	33
Lorry Movements on Access Road	26	38	56	78	33	48	43
Fabrication of Ancillary Works	18	29	49	71	24	40	36
Temporary Power Supply	14	24	41	63	21	35	29

Table 11A-13: Trenchless Crossings (HDD) Construction Works

ACTIVITY	PREDICTED FREE-FIELD NOISE LEVEL FOR CONSTRUCTION ACTIVITY						
	dB $L_{Aeq, T}$						
	H1	H2	H3	H4	H5	H6	H7
Setup/anchors	10	-	-	55	11	-	<u>25</u>
Drilling and Pullback	23	-	-	62	21	-	<u>36</u>
Mud Processing	12	-	-	50	9	-	<u>23</u>
Other	2	-	-	37	-	-	<u>13</u>
Lorry Movements	19	-	-	60	17	-	<u>32</u>
Lifting	-	-	-	40	-	-	<u>12</u>
Pipe Storage and Stringing	12	-	-	51	9	-	<u>24</u>
Fabrication and Ancillary Works	15	-	-	55	13	-	<u>28</u>
Temporary power supply	9	-	-	47	6	-	<u>21</u>

Table 11A-14: Testing Construction Works.

ACTIVITY	PREDICTED FREE-FIELD NOISE LEVEL FOR CONSTRUCTION ACTIVITY						
	dB $L_{Aeq, T}$						
	H1	H2	H3	H4	H5	H6	H7
Testing	65	33	50	68	31	43	37
Temporary Power Supply	57	24	42	60	21	34	29

Table 11A-15: ROW Fencing and Prep Construction Works

ACTIVITY	PREDICTED FREE-FIELD NOISE LEVEL FOR CONSTRUCTION ACTIVITY						
	dB $L_{Aeq, T}$						
	H1	H2	H3	H4	H5	H6	H7
Lorry Movement	65	30	50	68	26	41	67
Lifting	58	22	42	61	18	34	59
Vegetation	68	30	53	71	26	41	70

Table 11A-16: Street Works

ACTIVITY	PREDICTED FREE-FIELD NOISE LEVEL FOR CONSTRUCTION ACTIVITY						
	dB $L_{Aeq, T}$						
	H1	H2	H3	H4	H5	H6	H7
Breaking Road Surface	53	-	43	63	21	41	35
Breaking Concrete	62	-	52	72	28	49	43
Road Planning	45	-	35	56	19	38	32
Removing Broken Surface	39	-	29	50	13	33	26
Spreading Chipping	45	-	35	56	18	38	31
Earthworks	50	-	39	60	24	43	37
Rolling And Compaction	51	-	40	61	21	41	34
Paving	43	-	33	54	16	36	29
Cutting Concrete Slabs	53	-	43	64	23	43	37
Pumping Water	38	-	27	48	11	31	24

Table 11A-17: Main Site and Compound Construction Quarterly Average Monthly Free Field Predictions for Standard Hours

RECEPTOR	PREDICTED FREE-FIELD NOISE LEVEL FOR CONSTRUCTION ACTIVITY																			
	dB $L_{Aeq, T}$																			
	2025				2026				2027				2028				2029			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
H1	38	38	38	38	38	37	37	37	37	40	40	40	40	40	40	40	40	31	31	31
H2	41	41	41	41	41	40	40	40	40	42	42	42	42	42	42	42	42	34	34	34
H3	44	44	43	43	44	43	43	43	43	45	45	45	45	45	45	45	45	37	37	37
H4	49	49	49	49	49	49	49	49	49	50	50	50	50	50	50	50	50	43	43	43
H5	46	46	47	47	47	46	45	45	45	47	47	47	47	47	47	47	47	41	41	41
H6	47	47	47	47	47	46	46	46	46	48	48	48	48	48	48	48	48	40	40	40
H7	40	40	41	41	41	40	39	39	39	42	42	42	42	41	41	41	41	35	35	35

Note: Levels reported in this table include operational phase 1 from 2028 onwards and do not include Pipeline Construction Works.

11A.3.1 Outside of standard hours, only the following activities are evaluated as per the programme of works.

Main Site and Compound Construction Works outside of Standard Hours (Extended):

- Piling and Foundation Works:
 - concreting;
 - pumping concrete; and
 - concreting other.
- Road Construction:
 - breaking road surface;
 - breaking concrete;
 - road planing;
 - removing broken surface;
 - spreading chipping/fill;
 - earthworks;
 - rolling and compaction;
 - paving;
 - trenching;
 - cutting concrete slabs; and
 - pumping water.
- General Site Activities:
 - Concreting;
 - pumping concrete;
 - concreting other;
 - lorry movements on access road;
 - lifting; and
 - concrete batching.

Main Site Compound Construction Works outside of Standard Hours (24/7):

- General Site Activities:
 - pumping surface water;
 - temporary power supply;
 - scaffolding;
 - various including testing;

-
- unloading module shipments; and
 - transporting modules.

Pipeline Construction Works outside of Standard Hours (Extended):

- Street Works to provide construction access to pipelines compounds:
 - breaking road surface;
 - breaking concrete;
 - road planning;
 - removing broken surface;
 - spreading chipping/fill;
 - earthworks;
 - rolling and compaction;
 - paving;
 - cutting concrete slabs; and
 - pumping water.

Pipeline Construction Works outside of Standard Hours (24/7):

- Buried Pipelines:
 - draining excavation; and
 - temporary power supply.
- Trenchless Crossings:
 - drilling and pullback;
 - mud processing;
 - other;
 - lorry movements on access road;
 - lifting;
 - pipe storage and stringing;
 - fabrication and ancillary works; and
 - temporary power supply.
- Above Ground Pipelines:
 - temporary power supply.
- Testing:
 - testing; and
 - temporary power supply

Table 11A-18: Main Site Compound Construction Quarterly Average Monthly Free Field Predictions for Non-Standard Hours

RECEPTOR	PREDICTED FREE-FIELD NOISE LEVEL FOR CONSTRUCTION ACTIVITY dB $L_{Aeq, T}$																			
	2025				2026				2027				2028				2029			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
H1	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	38
H2	29	29	29	29	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
H3	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
H5	34	34	34	34	34	34	35	35	34	34	35	35	34	34	35	35	34	35	35	36
H6	38	38	38	38	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39

Note: Levels reported in this table include operational phase 1 from 2028 onwards and do not include Pipeline Construction Works.

11A.4 References

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