H2Teesside Project

Environmental Statement

Volume III – Appendices

Appendix 11B: Operational Noise Information

Document Reference: 6.4.16

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

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

Rev: 0

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11B.0 OPERATIONAL NOISE INFORMATION

11B.1 Noise Model Settings

11B.1.1 The Proposed Development was characterised in CadnaA (version 2023) acoustic modelling software. This software implements the sound propagation calculation methodology set out in ISO 9613-2:1996 'Attenuation of Sound during Propagation Outdoors, Part 2: General Method of Calculation' (ISO, 1996).

Data Sources

11B.1.2 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 as A-weighted values at 1 m from the source;
- sound power level data from similar projects; and
- Proposed Development layout plans (as per Figure 4-1 to 4-8, ES Volume II, EN070009/APP/6.3).

Modelling Assumptions

11B.1.3 The model has been prepared with the following configurations and assumptions:

- building dimensions as provided by design team (where a range has been provided the maximum has been assumed as a worst case);
- 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;
- 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;
- sound levels have been provided by designers as A-weighted values at 1 m from the source, these have been supplemented with octave band spectra from other comparable projects;
- the sound emitted by each sound source has been calculated based on the source emitting sound equally across its surface and the sound power level for the sound source, distributed according to the surface area;
- all pumps have been modelled as point sources;
- where sound pressure level data for plant items has been provided inside an enclosure it is not yet been confirmed what material these enclosures will be constructed from. As a conservative assumption it has been assumed this will be 0.6 mm thick steel cladding;

- Phase 1 and Phase 2 of the development are assumed to be identical and source locations and sizes in the indicative concept layout plans have been modelled as the realistic worst-case location (e.g. closest to the nearest NSR);
- the Production Facility will operate continually at full load, 24 hours a day, all plant items apart from those listed as stand by or emergency will operate for 24 hours a day, it has been assumed as a worst case this will include those that operate for start-up only; and
- the compressors are partially enclosed although the bottom section is open for process safety considerations .

Table 11B-1: Sound Power Levels of Operational Equipment

DETAILS	LINEAR SOUND POWER LEVEL EACH FREQUENCY BAND dB									NUMBER OPERATIONAL IN PROPOSED DEVELOPMENT	L_{WA} dB
	31	63	125	250	500	1K	2K	4K	8K		
NH_3 Feed Pumps	36	49	70	77	77	77	74	67	56	2	81
Demineralised Water Pumps	46	59	80	87	87	87	84	77	66	4	91
Contaminated Water Sump Pump	36	49	70	77	77	77	74	67	56	2	81
Neutralisation Sump Effluent Pumps	36	49	70	77	77	77	74	67	56	4	81
Storm Water Sump Pumps	36	49	70	77	77	77	74	67	56	4	81
Oily Water Separator	36	49	70	77	77	77	74	67	56	2	81
Air Compressor/Dryer Package	43	56	63	71	77	80	75	74	65	2	83
Waste Water Feed/Treated Waste Wate Pumps	36	49	70	77	77	77	74	67	56	2	81
Auxiliary Boiler	62	75	80	84	85	83	73	68	58	2	87
Natural Gas Compressor	78	72	87	84	90	90	96	95	85	2	114
Lean Solution Cooler	127	119	113	112	119	108	103	97	89	2	117
CO_2 Cooler	118	110	104	103	110	99	96	88	80	2	108
Semilean Solution Pumps	51	64	85	92	92	92	89	82	71	6	96
Hydraulic Turbine	123	115	108	91	86	89	82	83	81	2	96
Lean Solution Pumps	51	64	85	92	92	92	89	82	71	2	96
Reflux Pumps	36	49	70	77	77	77	74	67	56	2	81

DETAILS	LINEAR SOUND POWER LEVEL EACH FREQUENCY BAND dB									NUMBER OPERATIONAL IN PROPOSED DEVELOPMENT	L_{WA} dB
	31	63	125	250	500	1K	2K	4K	8K		
First Fill Pumps	51	64	85	92	92	92	89	82	71	2	96
Make-up Pump	36	49	70	77	77	77	74	67	56	2	81
Process Condensate Pumps	36	49	70	77	77	77	74	67	56	2	81
PSA Unit	84	83	89	87	82	85	84	82	75	2	90
CO Preferential Oxidation Reactor	53	66	88	94	94	95	92	84	74	2	98
GHR	57	70	91	98	98	98	95	88	77	4	102
ATR	94	94	100	98	93	96	95	93	85	2	101
CO_2 Compressor	62	75	92	100	107	110	107	103	96	2	114
Fired Heater	139	130	128	109	105	104	101	99	106	6	112
Fired Heater stack exhaust	122	113	101	92	88	87	84	82	89	2	95
Process Condensate Circulation Pumps	46	59	80	87	87	87	84	77	66	2	91
Process Condensate Stripper Feed Pumps	41	54	75	82	82	82	79	72	61	2	86
Process Condensate Feed Pumps	46	59	80	87	87	87	84	77	66	2	91
Demineralised Water Plant Package	45	58	65	73	79	82	77	76	67	2	85
Flare KO Drum Pump	36	49	70	77	77	77	74	67	56	2	81
LP Flare Package	51	64	85	92	92	92	89	82	71	2	96
MP BFW Pumps	51	64	85	92	92	92	89	82	71	4	96
H2 Fiscal Meter	106	114	104	99	98	101	95	96	87	2	105

DETAILS	LINEAR SOUND POWER LEVEL EACH FREQUENCY BAND dB									NUMBER OPERATIONAL IN PROPOSED DEVELOPMENT	L_{WA} dB
	31	63	125	250	500	1K	2K	4K	8K		
Waste Water Treatment Package	64	77	99	105	105	106	103	95	85	2	109
H2 Compressor	-	110	111	112	108	106	104	98	91	4	111
H2 Recycle Compressor	44	57	74	82	90	93	90	78	96	4	96
ASU	45	58	79	86	86	86	83	76	65	2	90
Cooling Water Pumps	51	64	85	92	92	92	89	82	71	6	96
Cooling Water Tower	128	123	126	121	108	100	105	105	101	2	116
Cooling Water Dosing Package	63	76	83	91	97	100	95	94	85	2	103
Emergency Diesel Generator	-	115	109	92	89	88	83	80	72	2	96

11B.2 Uncertainty

11B.2.1 It should be noted than any sound level predictions have an associated degree of uncertainty. Modelling and measurement processes have been carried out in such a way to reduce such uncertainty. In particular, the following sources of uncertainty have been noted:

- sound levels for each noise sources have been provided by designers based on preliminary worst-case data and will be further updated during detailed design;
- the octave band spectra have not been available for each source so have been taken from other similar projects including other operational BP facilities; and
- predictions of sound pressure levels according to ISO 9613 are assumed based on moderate downwind propagation, and hence could be considered as a worst-case calculation. However, the standard also indicates an estimated accuracy of ±3 dB(A) in predicted levels.

11B.3 References

- International Organisation for Standard (ISO) (1996). *9613-2:1996 'Attenuation of Sound during Propagation Outdoors, Part 2: General Method of Calculation'.*