Connah's Quay Low Carbon Power

Environmental Statement Volume IV Appendix 9-C: Construction Noise Effects and Assumptions

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Prepared for:
Uniper UK Limited

Prepared by:
AECOM Limited

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1. Construction Noise Effects and Assumptions

1.1 Introduction

1.1.1 Free-field construction noise levels have been predicted at up to 33 noise sensitive receptor (NSR) locations for the following construction activities (as shown in **Figure 3-3: Areas described in the ES** (**EN010166/APP/6.3**)):

- Main Development Area construction including construction laydown areas in the Construction and Indicative Enhancement Area (C&IEA), comprising:
  - Site Enabling;
  - Main Civils Works (including earthworks / site preparation); and
  - Plant Installation.
- construction of the Proposed CO_2 Connection Corridor;
- Compound within the Proposed CO_2 Connection Corridor;
- construction of the Water Connection Corridor; and
- construction of the Electrical Connection Corridor.

1.1.2 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' (Ref 1) and percentage (%) on-time is presented in **Table 1** to **Table 3**. The list of plant was sourced from other similar projects.

1.1.3 For Main Development Area construction including construction laydown areas, the activities have been modelled as area sources and assumed to be site-wide across the Main Development Area and the C&IEA. The plant and equipment are split between the Combined Cycle Gas Turbine (CCGT) Train Area, and the laydown areas as shown in **Table 1** and **Table 2**.

1.1.4 For the Proposed Connection Corridors construction, the activities have been assumed to take place at the closest point along the relevant corridor to the receptor as a worst-case.

1.1.5 The effects of the predicted construction noise levels for the Main Development Area, C&IEA, CO_2 Connection Corridor Compounds and the Connection Corridors are presented in Section 1.3 of this Appendix.

1.2 Construction Noise Information

Main Development Area and Construction Laydown Areas

Noise Model Details

1.2.1 A 3-dimensional noise model has been created in CadnaA (version 2025) acoustic modelling software to predict the construction noise from the construction activities on the Main Development Area and the C&IEA, Water Connection Corridor and CO_2 Compound. This software implements the sound propagation calculation methodology set out in BS 5228-1.

Data Sources

1.2.2 The following data sources have been used:

- surrounding area ground heights – data from the Environment Agency National Light Detection and Ranging (LIDAR) programme - downloaded from Open Survey Data (Ref 2);
- Ordnance Survey (OS) MasterMap Topography Layer of the Order limits and surrounding areas;
- sound level data from BS 5228-1;
- sound power level data from similar projects; and
- design plans of construction works areas.

Modelling Assumptions

1.2.3 The model has been prepared with the following configurations and assumptions:

- receptor buildings heights – taken from OS MasterMap Building Height Attribute dataset;
- receptor heights are assumed to be 4 m above local ground to represent first floor;
- all construction noise sources have been modelled at 1.5 m above local ground;
- ground effect – industrial areas, hardstanding, road surfaces, and water bodies have been modelled with a 0.0 absorption co-efficient (i.e. acoustically hard and reflective), whilst grass (e.g. fields, parks etc) and vegetation have been modelled with a 1.0 absorption co-efficient (i.e. acoustically soft and absorptive). The locations of each area have been determined from the OS MasterMap Topography Layer;
- 3 m acoustic barriers have been modelled along the northern and western boundary of the Main Development Area and along the northern boundary of the C&IEA as shown on **Figure 5-3: Construction Areas** (**EN010166/APP/6.3**); and
- the activities have been modelled as area sources and assumed to be spread site-wide across the Main Development Area and the C&IEA.

Connection Corridor assumptions

1.2.4 The construction noise levels from the Connection Corridors have been predicted based on the following assumptions:

- all activities have been assumed to take place at the closest point along the relevant corridor to each receptor;
- the plant for the Proposed CO_2 Corridor, and Electrical Connection is assumed to be mobile, operating within a section of the corridor up to 400 m in length closest to each receptor; and
- all plant items are assumed to be in operation 100% of the working day.

Construction Plant Data

1.2.5 The percentage on-time for the items of plant in **Table 1**, **Table 2** and **Table 3** are 100% which is a worst-case assumption, as in reality the plant would not be in use for the full working day.

Table 1: Plant and Equipment Associated with Construction Works in the Main Development Area

Plant/Equipment	Sound Power Level (dB L_{wA}) Referenced from BS 5228	% on-time used in calculations (based on 12 hr working day)	Number in operation by stage of work		
			Site Enabling	Main Civils Work	Plant Installation
Truck mounted concrete pump and boom arm	108	100	0	3	0
Wheeled mobile telescopic crane	106	100	1	2	2
Tower crane	105	100	1	0	1
Lorry with lifting boom	105	100	0	0	1
Lifting platform	105	100	0	0	1
Fork-lift truck	95	100	0	0	1
Mini tracked excavator	102	100	0	0	1
Electric core drill (drilling concrete)	113	100	0	0	1
Concrete floor cutter	119	100	0	0	1
Diesel generator for site lighting	93	100	1	2	2
Angle grinder	108	100	1	1	1
Hand-held cordless bail gun	101	100	0	0	1
Electric water pump	96	100	2	2	2
Compressors	108	100	2	4	4

Plant/Equipment	Sound Power Level (dB L_{wA}) Referenced from BS 5228	% on-time used in calculations (based on 12 hr working day)	Number in operation by stage of work		
			Site Enabling	Main Civils Work	Plant Installation
Hand-held pneumatic breaker	111	100	2	0	0
Dump truck (tipping fill)	107	100	1	2	0
Dump truck (pass-by)	115	100	2	3	0
Lorry (delivery and collection)	108	100	2	4	4
Pre-cast concrete piling hydraulic hammer rig	117	100	0	4	0
Hand-held welder (welding piles)	101	100	0	1	0
Generator for welding	101	100	0	1	0
Tracked excavator	99	100	3	5	0
Concrete mixer truck	108	100	3	15	0

Table 2: Plant and Equipment Associated with the Construction Works in the Construction Laydown Areas

Plant/Equipment	Sound Power Level (dB) Referenced from BS 5228	% on-time used in calculations (based on 12 hr working day)	Number in operation by stage of work		
			Site Enabling	Main Civils work	Plant Installation
Wheeled mobile telescopic crane	106	100	1	2	2
Tower crane	105	100	1	0	1
Diesel generator for site cabins	93	100	1	2	2
Road sweeper	96	100	1	1	1
Angle grinder	108	100	1	1	1
Hand-held cordless bail gun	101	100	0	0	1
Electric water pump	96	100	1	0	0
Compressors	108	100	1	1	1
Hand-held pneumatic breaker	111	100	1	0	0
Dump truck (tipping fill)	107	100	1	0	0
Dump truck (pass-by)	115	100	1	0	0
Lorry (delivery and collection)	108	100	2	4	4
Tracked excavator	99	100	2	5	0
Concrete mixer truck	108	100	2	4	0

Table 3: Plant and Equipment Associated with Construction of the Connection Corridors

Plant/Equipment	Sound Power Level (dB) Referenced from BS 5228	% on time used in calculations (based on 12 hr working day)	Number in operation by stage of work			
			Proposed CO_2 Connection Corridor	Proposed CO_2 Connection Compound	Water Connection Corridor	Electrical Connection Corridor
Dozer/loader	107	100	2	0	0	0
Hiab, tracked excavator	105	100	1	0	0	0
Welding, grinding, etc.	108	100	1	0	0	0
Tracked excavator up to 40T	105	100	1	0	0	0
Dump truck up to 29T	107	100	1	0	0	0
Tracked excavator up to 40T	105	100	1	0	0	0
Tracked excavator up to 40T	105	100	1	0	0	0
30T backhoe	108	100	0	0	0	3
CAT D5	106	100	0	0	0	1
CAT D6	109	100	0	0	0	1
CAT D8	114	100	0	0	0	4
Diesel generator for site cabins	93	100	0	1	0	0
Road sweeper	104	100	0	1	0	0
Angle grinder	108	100	0	1	1	0

Plant/Equipment	Sound Power Level (dB) Referenced from BS 5228	% on time used in calculations (based on 12 hr working day)	Number in operation by stage of work			
			Proposed CO_2 Connection Corridor	Proposed CO_2 Connection Compound	Water Connection Corridor	Electrical Connection Corridor
Hand-held cordless bail gun	101	100	0	1	0	0
Electric water pump	96	100	0	1	0	0
Compressors	103	100	0	1	0	0
Handheld pneumatic breaker	114	100	0	1	0	0
Dump truck tipping fill	107	100	0	1	0	0
Dump truck pass by	115	100	0	1	0	0
Lorry delivery and collection	108	100	0	1	0	0
Tracked excavator	99	100	0	1	0	0
Concrete mixer truck	108	100	0	1	0	0
Crane mounted on barge	114	100	0	0	1	0
Hammer	112	100	0	0	1	0
Hand-held gas cutter	107	100	0	0	1	0
Hand-held circular saw	119	100	0	0	1	0

1.3 Predicted Construction Noise Levels

1.3.1 As described in **Chapter 9: Noise and Vibration** (**EN010166/APP/6.4.9**), the potential noise impacts on sensitive receptors arising during the construction of the Proposed Development. Construction noise impacts are assessed for:

- construction activities on the Main Development Area and C&IEA including the temporary Construction Laydown Areas;
- construction of the CO_2 Connection within the Proposed CO_2 Connection Corridor and construction activities on the Compound within the Proposed CO_2 Connection Corridor;
- construction of the Electrical Connection within the Electrical Connection Corridor; and
- construction activities within the Water Connection Corridor.

1.3.2 Based on the indicative construction programme in Table 5-2 in **Chapter 5: Construction Programme and Management** (**EN010166/APP/6.2.5**) the following sub-activities may take place at the same time, and therefore a worst-case scenario is also predicted:

- main civils (including earthworks / site preparation);
- plant installation;
- works in the Water Connection Corridor; and
- CO_2 Connection Corridor Compound.

1.3.3 The noise predictions for construction works at the Main Development Area and the C&IEA are presented in **Table 4** and noise predictions at NSRs located along the Connection Corridors and in proximity to the CO_2 Connection Compound are presented in **Table 5**. Free-field noise levels have been predicted to allow subsequent comparison with the ABC categories derived from free-field baseline ambient noise levels at the residential NSRs.

Table 4: Construction Noise Predictions for the Main Development Area and C&IEA

NSR	Predicted free-field noise level for daytime construction activity, dB $L_{Aeq,12h}$			
	Site Enabling	Main Civils Works	Plant Installation	Worst-Case
R1	N/A	N/A	N/A	57
R2	N/A	N/A	N/A	56
R3	43	43	43	55
R4	46	46	46	49
R5	45	46	45	49
R6	39	40	39	43
R7	36	38	36	44
R8	45	45	45	48
R9	31	33	31	41
R10	46	45	46	49
R11	47	46	47	51
R12	47	47	47	50
R13	47	46	47	49
R14	45	45	45	48
R15	49	49	49	52
R16	39	40	39	45
R17	46	47	46	50

NSR	Predicted free-field noise level for daytime construction activity, dB $L_{Aeq,12h}$			
	Site Enabling	Main Civils Works	Plant Installation	Worst-Case
R18	52	52	52	55
R19	63	62	63	65
R20	58	58	58	61
R21	62	62	62	65
R22	62	62	62	65
R23	64	65	64	68
R24	50	52	50	54
R25	52	52	52	56
R26	49	50	49	53
R27	48	48	48	52
R28	48	48	48	52
R29	46	46	46	50
R30	50	49	50	54
R31	61	61	61	64
R32	45	44	45	48
R33	57	57	57	60

Table 5: Construction Noise Predictions for Connection Corridor Construction

NSR	Predicted free-field noise level for daytime construction activity, dB $L_{Aeq,12h}$			
	Proposed CO_2 Connection	Proposed CO_2 Connection Compound	Water Connection	Electrical Connection
R1	56	57	N/A	N/A
R2	64	56	N/A	N/A
R3	59	54	N/A	N/A
R4	51	39	N/A	N/A
R5	50	34	N/A	N/A
R6	49	36	N/A	N/A
R7	51	42	N/A	N/A
R8	49	39	N/A	N/A
R9	49	40	N/A	N/A
R10	47	33	N/A	N/A
R11	47	43	N/A	N/A
R12	47	38	N/A	N/A
R13	47	29	N/A	N/A

NSR	Predicted free-field noise level for daytime construction activity, dB $L_{Aeq,12h}$			
	Proposed CO_2 Connection	Proposed CO_2 Connection Compound	Water Connection	Electrical Connection
R14	48	32	N/A	N/A
R15	45	N/A	N/A	N/A
R16	47	41	N/A	N/A
R17	46	42	N/A	N/A
R18	N/A	N/A	N/A	N/A
R19	N/A	N/A	23	52
R20	N/A	N/A	27	54
R21	N/A	N/A	29	54
R22	N/A	N/A	28	55
R23	N/A	N/A	25	57
R24	N/A	N/A	28	60
R25	N/A	N/A	50	62
R26	N/A	N/A	36	59
R27	N/A	N/A	44	61

NSR	Predicted free-field noise level for daytime construction activity, dB $L_{Aeq,12h}$			
	Proposed CO_2 Connection	Proposed CO_2 Connection Compound	Water Connection	Electrical Connection
R28	N/A	N/A	43	61
R29	N/A	N/A	44	63
R30	N/A	N/A	48	61
R31	N/A	N/A	41	59
R32	N/A	N/A	38	57
R33	N/A	N/A	43	55

Note: N/A is assigned where the NSR is outside the study area

1.4 Construction Noise Effects

Daytime Effects

1.4.1 The effects of the predicted daytime free-field construction noise levels for the Main Development Area and C&IEA (as presented in Table 9-11 of **Chapter 9: Noise and Vibration** (**EN010166/APP/6.2.9**)) and the Connection Corridor construction (as presented in Table 9-12 of the **Chapter 9: Noise and Vibration** (**EN010166/APP/6.2.9**)), have been classified by considering the construction noise thresholds in Table 9-10 of **Chapter 9: Noise and Vibration** (**EN010166/APP/6.2.9**) and using the semantic scales in Table 9-7 of **Chapter 9: Noise and Vibration** (**EN010166/APP/6.2.9**) and Table 4 in **Appendix 9-A: Noise and Vibration Methodology** (**EN010166/APP/6.4**). These effects are presented in **Table 6** and **Table 7** below.

Table 6: Indicative Construction Noise Effects for The Main Development Area and Compounds – Daytime (07:00 to 19:00) and Saturday (07:00 to 13:00)

NSR	Construction Noise Effects			
	Site Enabling	Main Civils Works	Plant Installation	Worst-Case
R1	N/A	N/A	N/A	Negligible adverse
R2	N/A	N/A	N/A	Negligible adverse
R3	N/A	N/A	N/A	Negligible adverse
R5	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse
R15	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse
R19	Minor adverse	Minor adverse	Minor adverse	Minor adverse
R20	Negligible adverse	Negligible adverse	Negligible adverse	Minor adverse
R21	Minor adverse	Minor adverse	Minor adverse	Minor adverse
R22	Minor adverse	Minor adverse	Minor adverse	Minor adverse
R23	Minor adverse	Minor adverse	Minor adverse	Moderate adverse
R24	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse
R25	N/A	N/A	N/A	Negligible adverse
R28	N/A	N/A	N/A	Negligible adverse
R29	N/A	N/A	N/A	Negligible adverse
R30	N/A	N/A	N/A	Negligible adverse
R31	Minor adverse	Minor adverse	Minor adverse	Minor adverse
R33	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse

Note: NSRs beyond 300m of the construction works are only reported in this table if the predicted construction noise levels exceed the construction thresholds. N/A is assigned where the NSR is beyond 300 m and the predicted construction noise level is below the construction threshold.

Table 7: Indicative Construction Noise Effects for Connection Corridors – Daytime (07:00 to 19:00) and Saturday (07:00 to 13:00)

NSR	Construction Noise Effects			
	Proposed CO_2 Connection	Proposed CO_2 Connection Compound	Water Connection	Electrical Connection
R1	Negligible adverse	Negligible adverse	N/A	N/A
R2	Minor adverse	Negligible adverse	N/A	N/A
R3	Negligible adverse	Negligible adverse	N/A	N/A
R25	N/A	N/A	N/A	Minor adverse
R27	N/A	N/A	N/A	Minor adverse
R28	N/A	N/A	N/A	Minor adverse
R29	N/A	N/A	N/A	Minor adverse
R30	N/A	N/A	N/A	Minor adverse

Note: NSRs beyond 300 m of the construction works are only reported in this table if the predicted construction noise levels exceed the construction thresholds. N/A is assigned where the NSR is beyond 300 m and the predicted construction noise level is below the construction threshold.

References

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

Ref 2. Environment Agency National LIDAR Programme. Available at: National LIDAR Programme - data.gov.uk (Accessed: 10/07/2025)