

ENVIRONMENTAL STATEMENT (VOLUME III)

Appendix 15.3 Noise and Vibration Assessment Results

HyNet Carbon Dioxide Pipeline DCO

Planning Act 2008

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

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1. NOISE

1.1. CONSTRUCTION

CONSTRUCTION NOISE MODEL RESULTS

This section presents the results of the noise predictions for the Construction Stage of the DCO Proposed Development. As discussed in **Chapter 15 – Noise and Vibration (Volume II)**, a noise model was produced using CadnaA software. The following activities have been included in the model:

- Open cut trenches: daytime only;
- Trenchless crossings: daytime, evening and night-time;
- Compounds: daytime only;
- AGIs and BVSs: daytime only; and
- Access locations for heavy vehicles: daytime only

Open cut trenches have been modelled in three potential locations in order to predict the potential variation in noise impact. The following scenarios were modelled:

- Indicative Newbuild Carbon Dioxide Pipeline route, as presented in **Figure 3.2 DCO Proposed Development (Volume IV)**;
- Indicative Newbuild Carbon Dioxide Pipeline route near the north west part of the Newbuild Infrastructure Boundary, therefore closer to noise sensitive receptors located north west of the boundary; and
- Indicative Newbuild Carbon Dioxide Pipeline route near the south east part of the Newbuild Infrastructure Boundary, therefore closer to noise sensitive receptors located south east of the boundary.

Table 1, **Table 2** and **Table 3** present the number of noise sensitive receptors subject to a negligible to high magnitude of impact in accordance with the criteria presented in **Table 15.14** in **Chapter 15 – Noise and Vibration (Volume II)**. The tables show the number of receptors for both unmitigated and mitigated scenarios.

Table 1 - Magnitude of Construction Noise Impact – Indicative Route

Magnitude of Impact	Number of Receptors – Unmitigated			Number of Receptors – Mitigated		
	Day	Evening	Night	Day	Evening	Night
Negligible	922	1956	1556	2804	3294	2804
Low	2105	809	468	955	313	504
Medium	503	606	675	51	163	267
High	328	487	1159	8	88	283

Table 2 - Magnitude of Construction Noise Impact – Route near North West Boundary

Magnitude of Impact	Number of Receptors – Unmitigated			Number of Receptors – Mitigated		
	Day	Evening	Night	Day	Evening	Night
Negligible	919	1977	1556	2783	3289	2791
Low	2071	773	485	985	308	501
Medium	524	590	633	67	172	263
High	344	518	1184	23	89	303

Table 3 - Magnitude of Construction Noise Impact – Route near South East Boundary

Magnitude of Impact	Number of Receptors – Unmitigated			Number of Receptors – Mitigated		
	Day	Evening	Night	Day	Evening	Night
Negligible	937	1988	1594	2793	3340	2832
Low	2102	787	479	973	273	526
Medium	490	619	613	73	137	224
High	329	464	1172	19	108	276

Table 4, Table 5 and **Table 6** present a range of predicted noise levels associated with the three open trench routes modelled for both unmitigated and mitigated scenarios. The values shown in the tables correspond to façade noise levels at a height of 4m for receptors within the Study Area. Values for evening and night-time relate to associated variations in the locations for trenchless crossings.

Table 4 - Predicted Noise Levels – Indicative Newbuild Carbon Dioxide Pipeline Route

Magnitude of Impact	Unmitigated Central L _{Aeq} dB			Mitigated Central L _{Aeq} dB		
	Day	Evening	Night	Day	Evening	Night
Negligible	65 – 15	59 – 9	57 – 9	63 – 15	59 – 9	57 – 9
Low	70 – 48	65 – 43	54 – 40	70 – 48	64 – 42	55 – 40
Medium	75 – 65	70 – 55	60 – 46	71 – 65	69 – 55	60 – 45
High	83 – 70	83 – 60	83 – 50	73 – 70	73 – 60	73 – 50

Table 5 - Predicted Noise Levels – Route near North West Boundary

Magnitude of Impact	Unmitigated South-East Boundary L_{Aeq} dB			Mitigated South-East Boundary L_{Aeq} dB		
	Day	Evening	Night	Day	Evening	Night
Negligible	64 – 15	59 – 9	57 – 9	63 – 15	59 – 9	57 – 9
Low	70 – 48	65 – 43	53 – 42	69 – 47.	65 – 42	55 – 40
Medium	75 – 65	69.7 – 55	60 – 45	72 – 65	69 – 55	60 – 45
High	84 – 70	84 – 60	84 – 50	74 - 70	74 – 60	74 – 50

Table 6 - Predicted Noise Levels – Route near South East Boundary

Magnitude of Impact	Unmitigated North-West Boundary L_{Aeq} dB			Mitigated North-West Boundary L_{Aeq} dB		
	Day	Evening	Night	Day	Evening	Night
Negligible	65 – 15	59 – 9	57 – 9	63 – 15	59 – 9	57 – 9
Low	70 – 52	65 – 43	54 – 43	70 – 47	65 – 42	55 – 40
Medium	75 – 65	70 – 55	60 – 46	75 – 65	70 – 55	60 – 45
High	88 – 70	84 - 60	84 - 50	78 – 70.	74 – 60	74 – 50

Important Areas and Noise Action Planning Priority Areas

Table 7 shows the Noise Important Areas (IAs) where there are noise sensitive receptors likely to experience a significant adverse effect during the construction period. No significant adverse effects were identified within Noise Action Planning Priority Areas (NAPPAs).

Table 7 - Significant Adverse Effects within IAs

Alignment Variant	Period	NIA ID	
		7024	10784
Central Indicative Alignment	Day	0	0
	Evening	0	0
	Night	0	X
North-West Boundary Alignment	Day	0	0
	Evening	0	0
	Night	0	X
South-East Boundary Alignment	Day	0	0
	Evening	0	0
	Night	X	X

Construction Road Traffic Noise

An assessment of the potential noise impact due to road traffic noise impact during the Construction Stage was undertaken. **Table 8** and **Table 9** present the changes in noise levels predicted for the following scenarios:

- Year 2025 without DCO Proposed Development (2025 Do-Minimum) versus Year 2021 without DCO Proposed Development (2021 Do-Minimum); and
- Year 2025 with DCO Proposed Development (2025 Do-Something) versus Year 2025 without DCO Proposed Development (2025 Do-Minimum).

The noise levels presented in the tables correspond to $L_{A10,18hr}$ dB in accordance with guidance in the Calculation of Road Traffic Noise (CRTN). For road links where the road traffic flows are low and outside the scope of CRTN, then noise levels $L_{Aeq,18hr}$ have been compared using guidance in the Advisory Council (1978): A guide to measurement and prediction of sound level L_{eq} .

Road links IDs referred in the tables are described in **Appendix 17-4 Baseline Traffic Data (Volume III)**.

Table 8 - 2021 and 2025 Road Traffic Noise Levels Comparison

Link ID	2021 Do-Minimum					2025 Do-Minimum					Change in Noise Level (dB)
	HGV	HGV (%)	Total	18 Hour Basic Noise Level (L _{A10} dB) at 10m	18 Hour Noise Level (L _{Aeq} dB) at 10m	HGV	HGV (%)	Total	18 Hour Basic Noise Level (L _{A10} dB) at 10m	18 Hour Noise Level (L _{Aeq} dB) at 10m	
1	337	8	4361	68	-	351	7	4545	68	-	0
2	336	7	4657	68	-	351	7	4854	68	-	0
3	26	2	1595	65	-	27	2	1662	65	-	0
4	11	1	1469	64	-	12	1	1531	64	-	0
5	7	2	291	-	50	7	2	303	-	50	0
6	10	1	1595	62	-	10	1	1662	62	-	0
7	302	2	16796	71	-	312	2	17332	71	-	0
8	222	3	7914	68	-	229	3	8167	68	-	0
9	27	0	6310	67	-	28	0	6512	67	-	0
10	10	1	1657	62	-	10	1	1710	62	-	0

Link ID	2021 Do-Minimum					2025 Do-Minimum					Change in Noise Level (dB)
	HGV	HGV (%)	Total	18 Hour Basic Noise Level (LA10 dB) at 10m	18 Hour Noise Level (LAeq dB) at 10m	HGV	HGV (%)	Total	18 Hour Basic Noise Level (LA10 dB) at 10m	18 Hour Noise Level (LAeq dB) at 10m	
11	98	1	8222	66	-	101	1	8484	66	-	0
12	153	1	11760	68	-	158	1	12135	68	-	0
13	238	4	5966	66	-	248	4	6219	66	-	0
14	391	10	3842	65	-	404	10	3965	65	-	0
15	0	0	4684	65	-	0	0	4882	65	-	0
16	7	2	323	-	49	7	2	334	-	49	0
17	1	1	146	-	48	1	1	150	-	48	0
18	6	2	347	-	51	6	2	358	-	51	0
19	232	2	13323	70	-	242	2	13886	71	-	0
21	7	0	1555	62	-	7	0	1604	62	-	0
22	345	6	5320	66	-	356	6	5490	66	-	0

Link ID	2021 Do-Minimum					2025 Do-Minimum					Change in Noise Level (dB)
	HGV	HGV (%)	Total	18 Hour Basic Noise Level (LA10 dB) at 10m	18 Hour Noise Level (LAeq dB) at 10m	HGV	HGV (%)	Total	18 Hour Basic Noise Level (LA10 dB) at 10m	18 Hour Noise Level (LAeq dB) at 10m	
24	4	5	85	-	44	4	5	88	-	44	0
25	432	9	4979	66	-	446	9	5138	66	-	0
26	168	11	1563	66	-	173	11	1613	66	-	0
27	38	2	1590	64	-	39	2	1640	64	-	0
28	111	2	4719	66	-	114	2	4870	66	-	0

Table 9 - 2025 Road Traffic Basic Noise Levels Comparison

Link ID	2025 Do-Minimum					2025 Do-Something					Change in Noise Level (dB)
	HGV	HGV (%)	Total	18 Hour Basic Noise Level (LA10 dB) at 10m	18 Hour Noise Level (LAeq dB) at 10m	HGV	HGV (%)	Total	18 Hour Basic Noise Level (LA10 dB) at 10m	18 Hour Noise Level (LAeq dB) at 10m	
1	351	7	4545	68	-	483	9	5205	69	-	1
2	351	7	4854	68	-	379	8	4994	68	-	0
3	27	2	1662	65	-	111	5	2082	66	-	1
4	12	1	1531	64	-	40	2	1671	64	-	0
5	7	2	303	-	50	35	8	443	-	52	2
6	10	1	1662	62	-	62	3	1922	63	-	1
7	312	2	17332	71	-	354	2	17542	72	-	1
8	229	3	8167	68	-	271	3	8377	69	-	1
9	28	0	6512	67	-	136	2	7052	68	-	1
10	10	1	1710	62	-	100	5	2160	63	-	1

Link ID	2025 Do-Minimum					2025 Do-Something					Change in Noise Level (dB)
	HGV	HGV (%)	Total	18 Hour Basic Noise Level (LA10 dB) at 10m	18 Hour Noise Level (LAeq dB) at 10m	HGV	HGV (%)	Total	18 Hour Basic Noise Level (LA10 dB) at 10m	18 Hour Noise Level (LAeq dB) at 10m	
11	101	1	8484	66	-	167	2	8814	67	-	1
12	158	1	12135	68	-	224	2	12465	68	-	0
13	248	4	6219	66	-	272	4	6339	66	-	0
14	404	10	3965	65	-	428	10	4085	66	-	1
15	0	0	4882	65	-	24	0	5002	66	-	1
16	7	2	334	-	49	31	7	454	-	51	2
17	1	1	150	-	48	25	9	270	-	51	3
18	6	2	358	-	51	58	9	618	-	54	3
19	242	2	13886	71	-	266	2	14006	71	-	0
21	7	0	1604	62	-	31	2	1724	62	-	0
22	356	6	5490	66	-	404	7	5730	66	-	0

Link ID	2025 Do-Minimum					2025 Do-Something					Change in Noise Level (dB)
	HGV	HGV (%)	Total	18 Hour Basic Noise Level (LA10 dB) at 10m	18 Hour Noise Level (LAeq dB) at 10m	HGV	HGV (%)	Total	18 Hour Basic Noise Level (LA10 dB) at 10m	18 Hour Noise Level (LAeq dB) at 10m	
24	4	5	88	-	44	28	14	204	-	49	5
25	446	9	5138	66	-	470	9	5258	66	-	0
26	173	11	1613	66	-	197	11	1733	66	-	0
27	39	2	1640	64	-	63	4	1760	65	-	1
28	114	2	4870	66	-	138	3	4990	66	-	0

Biodiversity Receptors

Table 10 presents the mitigated construction noise levels predicted at locations representative of biodiversity receptors. A description of the associated receptors and the assessment are presented in **Chapter 9 - Biodiversity (Volume II)**.

Table 10 - Predicted Mitigated Construction Noise Levels at Biodiversity Receptors

Biodiversity Receptor	Noise Level L _{Aeq} dB								
	Indicative Route			Route near North West Boundary			Route near South East Boundary		
	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
B113	64	15	15	61	22	22	79	34	34
T49	63	46	46	61	49	49	68	43	43
T102	32	32	32	32	32	32	32	32	32
T190	65	62	62	67	64	64	64	62	62
T200	64	63	63	61	56	56	63	62	62
T220	65	58	58	68	62	62	64	51	51
T325 – T327	65	51	51	61	50	50	73	51	51
T365	63	< 10	< 10	76	< 10	< 10	60	< 10	< 10
T371	60	57	57	58	56	56	74	64	64
T111	64	50	50	60	50	50	82	51	51
T166	72	56	56	66	57	57	63	56	56
T321	63	50	50	74	50	50	59	49	49
L5455	71	34	34	71	33	33	71	35	35
L5455	66	35	35	66	34	34	66	36	36
L6455	62	57	57	69	60	60	60	55	55

DECOMMISSIONING

AGI and BVS

Table 11 presents the number of receptors that would receive either a medium or high magnitude of impact from noise levels during decommissioning of AGIs and BVSs. The receptor experiencing a medium magnitude of impact after mitigation is near the BVS proposed on Cornist Lane, south of Bryn Awel.

Table 11 - Number of Receptors during Decommissioning

Unmitigated		Mitigated	
Medium	High	Medium	High
132	40	1	0

1.2.

VIBRATION

CONSTRUCTION

Piling and Ground Compaction

Table 12 and **Table 13** present the peak particle velocities predicted for the vibratory piling and ground compaction activities during the Construction Stage. The values correspond to steady state operation.

The predictions presented in the table are presented for a range of distances including the SOAEL and LOAEL defined for human perception in **Chapter 15 – Noise and Vibration (Volume II)**.

No significant sources of vibration are expected during decommissioning.

Table 12 - Peak Particle Velocity During Vibratory Piling

Distance (m)	Peak Particle Velocity (mm/s)		
	95 % Confidence Level	67 % Confidence Level	50 % Confidence Level
5	27.9	13.2	6.3
10	10.6	5.0	2.4
15	6.0	2.8	1.4
20	4.0	1.9	0.9
25	2.9	1.4	0.7
30	2.3	1.1	0.5

Distance (m)	Peak Particle Velocity (mm/s)		
	95 % Confidence Level	67 % Confidence Level	50 % Confidence Level
35	1.8	0.9	0.4
40	1.5	0.7	0.3
45	1.3	0.6	-
50	1.1	0.5	-
55	1.0	0.5	-
60	0.9	0.4	-
65	0.8	0.4	-
70	0.7	0.3	-
75	0.6	-	-
80	0.6	-	-
85	0.5	-	-
90	0.5	-	-
95	0.5	-	-
100	0.4	-	-
105	0.4	-	-
110	0.4	-	-
115	0.3	-	-

Table 13 - Peak Particle Velocity During Ground Compaction

Distance (m)	Peak Particle Velocity (mm/s)		
	95 % Confidence Level	67 % Confidence Level	50 % Confidence Level
5	19.6	10.2	5.3
10	8.5	4.4	2.3
15	5.0	2.6	1.4
20	3.4	1.7	0.9
25	2.5	1.3	0.7
30	1.9	1.0	0.5
35	1.5	0.8	0.4

Distance (m)	Peak Particle Velocity (mm/s)		
	95 % Confidence Level	67 % Confidence Level	50 % Confidence Level
40	1.3	0.7	0.3
45	1.1	0.6	-
50	0.9	0.5	-
55	0.8	0.4	-
60	0.7	0.4	-
65	0.6	0.3	-
70	0.6	-	-
75	0.5	-	-
80	0.5	-	-
85	0.4	-	-
90	0.4	-	-
95	0.4	-	-
100	0.3	-	-