HORIZON NUCLEAR POWER

WYLFA NEWYDD

ENERGY WORKING FOR BRITAIN

Wylfa Newydd Project

6.4.23 ES Volume D - WNDA Development App D6-1 - Noise model inputs and outputs

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1 Construction noise model inputs and assessment

1.1 Modelling assumptions and inputs

1.1.1 The parameters and settings set out in table 1-1 are activated in the construction noise models.

Table 1- 1 Construction noise model parameters and settings

Buildings	Receptors	Roads	Point sources	Line sources	Ground and atmospheric conditions
Sound can be reflected by buildings. The proportion of the total sound which is incident on a building that is reflected depends on geometry and whether the building façade is acoustically reflective or absorbent. Within the noise model buildings are set to be 100% reflective to sound (absorption coefficient = 0). However, reflections from other buildings are not considered by the BS5228-1 methodology and therefore this parameter has no effect on the results. As free-field noise levels are required for the assessments, no façade corrections have been applied.	All buildings are assessed using the Cadna/A building evaluation tool. This tool generates receptor points on all façades and floors of a building. Ground floor receptors are 1.5m above the building ground floor level while first floor receptors are 4m above the building ground floor level. Only ground floor noise levels are considered for bungalows without obvious loft conversions.	Haul routes are modelled as per BS5228-1 haul route method.	In most of cases the preferred octave spectrum has been used, and broadband has been used only when the octave data has not been available. Point sources located within 3km of each receptor are considered.	In most of cases the preferred octave spectrum has been used, and broadband has been used only when the octave data has not been available. Line sources located within 3km of each receptor are considered.	Account needs to be taken of the nature of the ground over which noise propagates. BS5228-1 characterises ground as hard, soft or mixed. For the construction noise models, a global setting is enabled which sets all land to be mixed ground (comprising 50% soft ground, and entered as G=0.5), except over water where 100% hard ground (entered as G=0) acoustically reflective) is used.
Ground levels of buildings are established by interpolating the heights of the first and last nodes in the polygon which forms the building footprint. Reference points 1 to 3 of the Landscape and Environmental Masterplan, which is a coordinated environmental landscape design covering the Wylfa Newydd Development Area are used as digital terrain models which represent the bare ground.	The greatest result on any façade/floor is used in the assessment, regardless of whether daytime or night-time noise levels are being predicted.	Haul routes are fitted to the digital terrain model using relative heights.	Default directivity is 360 degrees (i.e. no source directivity). Note this parameter does not affect BS5228-1 calculations.	Default directivity is 360 degrees (i.e. no source directivity). Note this parameter does not affect BS5228-1 calculations.	Air temperature (°C): 10°C Note this parameter does not affect BS5228-1 calculations.
The building height relative to the ground is established by the Relative height – to ground setting and is set at 5.7m in all cases to represent a building with ground and first floor. This is considered a conservative assumption in respect to the screening effects from buildings, as the ridge height of very few buildings is below 5.7m.	For open space receptors, predictions to be carried out at 1.5m relative to ground level.				Air relative humidity (%): 70% Note this parameter does not affect BS5228-1 calculations.

1.2 Plant list and activity sound power levels used in noise assessment

1.2.1 The plant list and noise input data presented in table 1-2 has been developed with Horizon's contractors based on the anticipated construction activities, construction programme and expected percentage of the assessment period for which each activity will take place. The 'activity $L_{Aeq,T}$' method set out in BS 5228-1:2009+A1:2014 has been used for the noise predictions; this is based on activity noise levels presented in annex C of the standard which include for variations in plant cycle times, interactions between various items of plant during the activity, and the consequent overall variation of noise levels with time. The construction zones within which plant will be located are shown in figure D6-02 (Application Reference Number: 6.4.101). The presented A-weighted sound pressure levels at 10m relate to a single item of plant operating for the whole of the assessment period, and do not include any corrections for number of plant or for the percentage of the assessment period that the activity takes place.

1.2.2 The four periods which have been modelled are:

- The fourth quarter of 2019 (2019 Q4);
- The third quarter of 2020 (2020 Q3);
- The first quarter of 2023 (2023 Q1); and
- The second quarter of 2027 (2027 Q2).

Table 1- 2 Plant list and modelling input data

Phase	Plant description	Working hours	% of assessment period that plant is operational	BS5228-1:2009+A1:2014 reference or other source	Uncorrected Noise level at 10m, dB $L_{Aeq,T}$	Working within construction zones	Number of plant			
							2019 Q4	2020 Q3	2023 Q1	2027 Q2
Site grading and power block excavation	Tracked excavator: 75t: 352kW: Cat374FLME: 5000lt bucket: Mass excavation	07:00-19:00	80%	C2.2	77	1,2,3	0	0	0	0
	Tracked excavator: 75t: 352kW: Cat374FLME: 5000lt bucket: Mass excavation	07:00-19:00	80%	C2.2	77	4,6	4	3	0	0
	Tracked excavator: 75t: 352kW: Cat374FLME: 5000lt bucket: Mass excavation	07:00-19:00	80%	C2.2	77	1,2,3	0	0	0	0
	Tracked excavator: 75t: 352kW: Cat374FLME: 5000lt bucket: Mass excavation	07:00-19:00	80%	C2.2	77	4,6	2	3	0	0
	Tractor: Track: 442kW: Caterpillar D10T: Ripper	07:00-19:00	80%	C6.28	85	1,2,3	0	0	0	0
	Tractor: Track: 442kW: Caterpillar D10T: Ripper	07:00-19:00	80%	C6.28	85	4,6	2	3	0	0
	Tractor: Track: 228kW: D8T	07:00-19:00	80%	C6.30	86	5	2	0	0	0
	Tractor: Track: 228kW: D8T	07:00-19:00	80%	C6.30	86	E	3	3	0	0
	Roller: Steel/rubber: 16t: 129kW: Caterpillar CS74B	07:00-19:00	80%	C5.21	80	5	1	0	0	0
	Roller: Steel/rubber: 16t: 129kW: Caterpillar CS74B	07:00-19:00	80%	C5.21	80	E	3	3	0	0
	Compactor: 32t: Caterpillar 825G	07:00-19:00	80%	C8.3	80	5	1	0	0	0

Phase	Plant description	Working hours	% of assessment period that plant is operational	BS5228-1:2009+A1:2014 reference or other source	Uncorrected Noise level at 10m, dB $L_{Aeq,T}$	Working within construction zones	Number of plant			
							2019 Q4	2020 Q3	2023 Q1	2027 Q2
	Compactor: 32t: Caterpillar 825G	07:00-19:00	80%	C8.3	80	E	3	3	0	0
	Tractor: Track: 123kW: Caterpillar D6T LGP	07:00-19:00	80%	C5.15	83	5	0	0	0	0
	Tractor: Track: 123kW: Caterpillar D6T LGP	07:00-19:00	80%	C5.15	83	E	3	1	0	0
	Tracked excavator: 50t: 317kW: Cat349ELME: 3500lt Bucket: Mass excavation	07:00-19:00	80%	C2.3	78	1,2,3	1	0	0	0
	Tracked excavator: 50t: 317kW: Cat349ELME: 3500lt Bucket: Mass excavation	07:00-19:00	80%	C2.3	78	4,6	1	2	0	0
	Breaker: For 42-75t excavator:	07:00-19:00	80%	C9.12	85	1,2,3	1	0	0	0
	Breaker: For 42-75t excavator:	07:00-19:00	80%	C9.12	85	4,6	1	1	0	0
	Tracked excavator: 75t: 352kW: Cat374FLME: 5000lt bucket: Mass excavation	07:00-19:00	80%	C2.2	77	6, 7, 8	2	1	0	0
	Tracked excavator: 75t: 352kW: Cat374FLME: 5000lt bucket: Mass excavation	07:00-19:00	80%	C2.2	77	9	1	0	0	0
	Tracked excavator: 75t: 352kW: Cat374FLME: 5000lt bucket: Mass excavation	07:00-19:00	80%	C2.2	77	6, 7, 8	0	3	0	0
	Tractor: Track: 442kW: Caterpillar D10T: Ripper	07:00-19:00	80%	C6.28	85	6, 7, 8	0	3	0	0
	Tractor: Track: 228kW: D8T	07:00-19:00	80%	C6.30	86	C	1	1	0	0
	Tractor: Track: 228kW: D8T	07:00-19:00	80%	C6.30	86	A	2	3	0	0
	Roller: Steel/rubber: 16t: 129kW: Caterpillar CS74B	07:00-19:00	80%	C5.21	80	C	1	1	0	0
	Roller: Steel/rubber: 16t: 129kW: Caterpillar CS74B	07:00-19:00	80%	C5.21	80	A	2	3	0	0
	Compactor: 32t: Caterpillar 825G	07:00-19:00	80%	C8.3	80	C	1	1	0	0
	Compactor: 32t: Caterpillar 825G	07:00-19:00	80%	C8.3	80	A	2	3	0	0
	Tractor: Track: 123kW: Caterpillar D6T LGP	07:00-19:00	80%	C5.15	83	C	1	1	0	0
	Tractor: Track: 123kW: Caterpillar D6T LGP	07:00-19:00	80%	C5.15	83	A	1	1	0	0

Phase	Plant description	Working hours	% of assessment period that plant is operational	BS5228-1:2009+A1:2014 reference or other source	Uncorrected Noise level at 10m, dB $L_{Aeq,T}$	Working within construction zones	Number of plant			
							2019 Q4	2020 Q3	2023 Q1	2027 Q2
	Tracked excavator: 50t: 317kW: Cat349ELME: 3500lt Bucket: Mass excavation	07:00-19:00	80%	C1.10	85	6, 7, 8	0	1	0	0
	Tracked excavator: 50t: 317kW: Cat349ELME: 3500lt Bucket: Mass excavation	07:00-19:00	80%	C1.10	85	9	0	1	0	0
	Breaker: For 42-75t excavator:	07:00-19:00	80%	C9.12	85	6, 7, 8	0	1	0	0
	Breaker: For 42-75t excavator:	07:00-19:00	80%	C9.12	85	9	0	1	0	0
	Tractor: Track: 442kW: Caterpillar D10T: Ripper	07:00-19:00	80%	C6.28	85	4	2	2	0	0
	Tractor: Track: 442kW: Caterpillar D10T: Ripper	07:00-19:00	80%	C6.28	85	2, 6	1	1	0	0
	Drill rig: Quarry drifter: CHA 1100	07:00-19:00	80%	C9.1	90	4	14	14	0	0
	ANFO mixer truck: 3t: 4x4	07:00-19:00	80%	C11.20	83	4	2	2	0	0
	Explosives transport truck: 6t: 4x4	07:00-19:00	80%	C11.19	83	4	2	2	0	0
	Drill rig	07:00-19:00	80%	C9.1	90	4	21	21	0	0
	Drill rig	07:00-19:00	80%	C9.1	90	4	9	9	0	0
	Crane: All terrain: 30t	07:00-19:00	80%	C3.29	70	4	2	2	0	0
	Tracked excavator: 75t: 352kW: Cat374FLME: 5000lt bucket: Mass excavation 3.8m3 bucket	07:00-19:00	80%	C2.2	77	4	11	11	0	0
	Tracked excavator: 75t: 352kW: Cat374FLME: 5000lt bucket: Mass excavation 3.8m3 bucket	07:00-19:00	80%	C2.2	77	2,6	1	1	0	0
	Tracked excavator: 50t: 317kW: Cat349ELME: 3500lt Bucket: Mass excavation 3.2m3 bucket	07:00-19:00	80%	C1.10	85	4	2	2	0	0
	Tracked excavator: 50t: 317kW: Cat349ELME: 3500lt Bucket: Mass excavation 3.2m3 bucket	07:00-19:00	80%	C1.10	85	2,6	1	1	0	0
	Excavator: EX1900-6 190t 810kW (1086hp) (12m3 bucket/11m3 shovel)	07:00-19:00	80%	C6.3	86	4	10	10	0	0
	Excavator: EX2500 (specs for EX2600 260t 1119kW) (17m3 bucket/15m3 shovel)	07:00-19:00	80%	C6.2	89	4	3	3	0	0

Phase	Plant description	Working hours	% of assessment period that plant is operational	BS5228-1:2009+A1:2014 reference or other source	Uncorrected Noise level at 10m, dB $L_{Aeq,T}$	Working within construction zones	Number of plant			
							2019 Q4	2020 Q3	2023 Q1	2027 Q2
	Tractor: Track: 442kW: Caterpillar D10T: Ripper	07:00-19:00	80%	C6.28	85	8	3	3	0	0
	Tractor: Track: 228kW: D8T	07:00-19:00	80%	C6.30	86	9	2	2	0	0
	Roller: Steel/rubber: 16t: 129kW: Caterpillar CS74B	07:00-19:00	80%	C5.24	84	9	2	2	0	0
	Compactor: 32t: Caterpillar 825G	07:00-19:00	80%	C8.3	80	9	2	2	0	0
	Drill rig: Quarry drifter: CHA 1100	07:00-19:00	80%	C9.1	90	8	14	14	0	0
	ANFO mixer truck: 3t: 4x4	07:00-19:00	80%	C11.20	83	8	2	2	0	0
	Explosives transport truck: 6t: 4x4	07:00-19:00	80%	C11.19	83	8	2	2	0	0
	Drill rig	07:00-19:00	80%	C9.1	90	8	21	21	0	0
	Drill rig	07:00-19:00	80%	C9.1	90	8	9	9	0	0
	Crane: All terrain: 30t	07:00-19:00	80%	C3.29	70	8	2	2	0	0
	Tracked excavator: 75t: 352kW: Cat374FLME: 5000lt bucket: Mass excavation 3.8m3 bucket	07:00-19:00	80%	C2.2	77	8	12	12	0	0
	Tracked excavator: 50t: 317kW: Cat349ELME: 3500lt Bucket: Mass excavation 3.2m3 bucket	07:00-19:00	80%	C2.14	79	8	3	3	0	0
	Excavator: EX1900-6 190t 810kW (1086hp) (12m3 bucket/11m3 shovel)	07:00-19:00	80%	C6.3	86	8	0	0	0	0
	Excavator: EX2500 (specs for EX2600 260t 1119kW) (17m3 bucket/15m3 shovel)	07:00-19:00	80%	C6.2	89	8	3	3	0	0
	Crusher and screen: 400t/hr: Mobile: jaw: Powerscreen Premiertrac 400: Diesel	07:00-19:00	80%	C11.14	79	2	1	1	0	0
	Loader: Wheel: Caterpillar 966K: 199kW: 3300-4100lt bucket	07:00-19:00	80%	C2.28	76	2	2	2	0	0
	Screen: Simba grid 300	07:00-19:00	80%	C10.14	81	2	2	2	0	0
	Loader: Wheel: 980K: Quarry spec.: 5300-5700lt bucket	07:00-19:00	80%	C2.26	79	2	2	2	0	0
	Tracked excavator: 50t: 317kW: Cat349ELME: 3500lt Bucket: Mass excavation	07:00-19:00	80%	C1.10	85	2	2	2	0	0
	Artic dump truck: 22.7t: 6x6: 725C	07:00-19:00	80%	C6.17	85	2	3	3	0	0

Phase	Plant description	Working hours	% of assessment period that plant is operational	BS5228-1:2009+A1:2014 reference or other source	Uncorrected Noise level at 10m, dB $L_{Aeq,T}$	Working within construction zones	Number of plant			
							2019 Q4	2020 Q3	2023 Q1	2027 Q2
	Artic dump truck: 22.7t: 6x6: 725C	07:00-19:00	80%	C6.17	85	2	4	4	0	0
	Artic dump truck: 22.7t: 6x6: 725C	07:00-19:00	80%	C6.17	85	6	4	4	1	1
	Crusher and screen: 400t/hr: Mobile: jaw: Powerscreen Premiertrac 400: Diesel	07:00-19:00	80%	C11.14	79	6	2	2	1	1
	Loader: Wheel: Caterpillar 966K: 199kW: 3300-4100lt bucket	07:00-19:00	80%	C2.28	76	6	2	2	1	1
	Screen: Simba Grid 300	07:00-19:00	80%	C10.14	81	6	2	2	1	1
	Bowser: Fuel: Truck mounted: 12,000lt: 4X2	07:00-19:00	80%	C6.23	82	1,2,3,4,5,6,7,8,9,10,11,12, A,C,E	2	2	2	2
	Mobile workshop/lubrication truck: 4x4: inc welder & compressor	07:00-19:00	80%	C6.23	82	1,2,3,4,5,6,7,8,9,10,11,12, A,C,E	1	1	1	1
Tunnelling & outfall	Twin mast drilling jumbo (Sandvik DT820 or similar)	24-hour working	100%	C9.2	92	11	1	2	0	0
	Twin mast drilling jumbo (Sandvik DT820 or similar)	24-hour working	100%	C9.2	92	1	1	0	0	0
	Basket lifter (Mobile elevating work platform) (Normet Himec 1125B or similar)	24-hour working	100%	C4.57	67	11	4	4	0	0
	Tunnel excavator/loader (Terex Shaeff ITC 312 or similar)	24-hour working	100%	C4.53	77	11	2	2	0	0
	Articulated dump truck (e.g. Volvo / Hydrema / Bell / Paus or simlar) Assumed small 23t tunnel dumper	24-hour working	100%	Average of all articulated dump trucks listed in tables C1 to C10.	82	11	2	2	0	0
	Shotcrete robot (e.g. Meyco Potenza / Normet or similar)	24-hour working	100%	C4.29	80	11	2	2	0	0

Phase	Plant description	Working hours	% of assessment period that plant is operational	BS5228-1:2009+A1:2014 reference or other source	Uncorrected Noise level at 10m, dB $L_{Aeq,T}$	Working within construction zones	Number of plant			
							2019 Q4	2020 Q3	2023 Q1	2027 Q2
	Concrete remixer trucks per tunnel (e.g. Carmix or similar)	24-hour working	100%	C4.20	80	11	8	8	0	0
	Tracked excavator >30T (eg: Cat330D2)	24-hour working	80%	C2.16	75	11	2	2	0	0
	Tracked excavator >30T (eg: Cat330D2)	24-hour working	80%	C2.16	75	11	2	2	0	0
	Tracked excavator >30T (eg: Cat330D2)	24-hour working	80%	C2.16	75	1	2	0	0	0
	Tracked excavator >30T (eg: Cat330D2)	24-hour working	80%	C2.16	75	11	4	4	0	0
	Tractor: Track: 442kW: Caterpillar D10T: Ripper	07:00-19:00	80%	C6.28	85	11	1	1	0	0
	Tractor: Track: 442kW: Caterpillar D10T: Ripper	07:00-19:00	80%	C6.28	85	1	1	0	0	0
	Diesel generator (assumed 500kVa)	24-hour working	100%	C6.39	65	11	1	6	0	0
	Artic dump truck >30T (assumed Cat 730C)	24-hour working	50%	C9.22	89	4	3	3	0	0
	Ventilation fan: 75kW: 1219mm dia	24-hour working	100%	Estimated based on 75kW fan operating at 300Pa static pressure.	81	11	4	4	0	0
	Ventilation fan: 110kW: 900mm dia	24-hour working	100%	Estimated based on 110kW fan operating at 300Pa static pressure.	81	11	4	4	0	0
	Pump: Electric: Submersible: 75mm	24-hour working	100%	C11.3	69	11	8	8	0	0
	Compressor: 400cfm(11.3m3/m): 7.5bar: Electric	24-hour working	60%	C3.19	75	11	4	4	0	0
	Concrete pump: Trailer: 54m3/hr; Schwing WP 750-18X	24-hour working	90%	C4.24	67	11	2	2	0	0
	Concrete remixer: Agitator: 9m3: Skid mounted	24-hour working	90%	C4.20	80	11	2	2	0	0
	Loader: Wheel: Caterpillar 950K: 172kW: 2500-3300lt bucket:	24-hour working	80%	C2.28	76	11	2	2	0	0

Phase	Plant description	Working hours	% of assessment period that plant is operational	BS5228-1:2009+A1:2014 reference or other source	Uncorrected Noise level at 10m, dB $L_{Aeq,T}$	Working within construction zones	Number of plant			
							2019 Q4	2020 Q3	2023 Q1	2027 Q2
	Tracked mobile crawler crane (eg: Manitowoc MLC165-1)	24-hour working	60%	C4.52	75	11	1	2	0	0
	Telescopic leader rig (hydraulic vibratory hammer) (eg; ABI TM13/16SL on SR35)	24-hour working	60%	C3.8	88	11	1	2	0	0
	Tractor (assumed Agri Tractor: 7760: 89kW)	24-hour working	60%	C4.74	80	11	1	2	0	0
	Rock wheel cutter, 60T excavator, on spud leg barge	24-hour working	60%	C9.13	95	11	1	1	0	0
	Crane 200T	24-hour working	60%	C6.4	80	11	1	1	0	0
	Compressor (180 CFM)	24-hour working	60%	C3.19	75	11	1	1	0	0
	Pumps (200mm) - electric, submerged (same as coffer dam pumps)	24-hour working	100%	C11.3	69	11	2	2	0	0
	Generator (1MVA)	24-hour working	100%	C2.44	77	11	1	1	0	0
	Concrete pump: Trailer: 100m3/hr: Putzmeister BPE 2107 HP E	24-hour working	80%	C4.24	67	11	1	1	0	0
	Concrete remixer: Agitator: 9m3: Skid mounted	24-hour working	80%	C4.20	80	11	1	1	0	0
	Truck mixer: 8m3	24-hour working	80%	C4.27	79	11	3	3	0	0
Marine Works	110 tonne long reach excavator (eg;Leibherr 9100 110T Excavator)	07:00-18:00	60%	C6.3	86	2, 10	1	1	0	0
	Backhoe dredger (Eg; NordicGiant or Liebherr P955)	24-hour working	60%	C7.1	78	2, 10	1	1	0	0
	Jack up barge 1 (deckmounted 100kVa generator)	06:00-19:00	60%	C6.39	65	2, 10	1	0	0	0
	Jack up barge 2 (deckmounted 100kVa generator)	06:00-19:00	60%	C6.39	65	2, 10	0	1	0	0
	70 tonne excavator (eg; Cat 374)	07:00-18:00	60%	C6.4	80	2, 10	5	3	0	0
	40 tonne articulated dump truck	07:00-18:00	60%	C1.10	85	2, 10	16	10	0	0
	BG 42 rotary drill	07:00-18:00	60%	C6.4	80	2, 10	1	0	0	0

Phase	Plant description	Working hours	% of assessment period that plant is operational	BS5228-1:2009+A1:2014 reference or other source	Uncorrected Noise level at 10m, dB $L_{Aeq,T}$	Working within construction zones	Number of plant			
							2019 Q4	2020 Q3	2023 Q1	2027 Q2
	CDZ 1830 cluster drill with 900cfm compressor	07:00-18:00	60%	C6.4	80	2, 10	1	0	0	0
	Jack up barge 3 (deckmounted 100kVa generator)	07:00-18:00	60%	C6.4	80	2, 10	1	0	0	0
	Patriot C330 numa down the hole hammer (alternative for mono piles)	07:00-18:00	60%	C6.4	80	2, 10	1	0	0	0
	45 tonne excavator (eg: Cat 345)	07:00-18:00	60%	C1.10	85	2, 10	3	1	0	0
	60 tonne excavator (eg: Cat365)	07:00-18:00	60%	C9.13	95	2, 10	3	1	0	0
	Rock cutter (Websters G55)	07:00-18:00	60%	C9.13	95	2, 10	1	1	0	0
	250 tonne crawler crane (eg: Kobelco CKE 2500: 247kW) 24hr	24-hour working	50%	C4.38	78	2, 10	3	1	0	0
	250 tonne crawler crane (eg: Kobelco CKE 2500: 247kW) 10hr	07:00-18:00	50%	C4.38	78	2, 10	3	1	0	0
	150 tonne crawler crane (eg: Manitowoc MLC165-1)	07:00-18:00	60%	C4.52	75	2, 10	2	2	0	0
	Compressor and tools	07:00-18:00	60%	C3.19	75	2, 10	14	10	0	0
	90 tonne crawler crane	07:00-18:00	60%	C4.39	77	2, 10	1	2	0	0
	300 tonne crawler crane (eg: Leibherr LR1300)	07:00-18:00	60%	C4.38	78	2, 10	1	1	0	0
	Drill and blast rig 1	07:00-18:00	60%	C9.1	90	2, 10	9	0	0	0
	35 tonne excavator (eg: Cat335)	07:00-18:00	60%	C2.16	75	2, 10	9	0	0	0
	30 tonne dump truck	07:00-18:00	60%	C8.16	81	2, 10	6	3	0	0
	Large impact breaker (excavator attachment)	07:00-18:00	60%	C9.13	95	2, 10	4	0	0	0
	Large eccentric ripper	07:00-18:00	60%	C9.13	95	2, 10	4	0	0	0
	60 tonne excavator	07:00-18:00	60%	C2.2	77	2, 10	0	0	0	0
	70 tonne crawler crane	07:00-18:00	60%	C3.30	70	2, 10	0	0	0	0
	Leader rig inc opp (eg; ABI TM13/16SL on SR35)	07:00-18:00	60%	C3.8	88	2, 10	0	0	0	0
	Drilling rig (eg; CHA 1100)	07:00-18:00	60%	C9.1	90	2, 10	0	0	0	0
	Transport barge	07:30-07:30	60%	C4.83	65	2, 10	3	2	0	0
	Tug Holyhead towing	07:30-07:30	60%	Data for tug from WesPac Pittsburg energy infrastructure project.	92	2, 10	3	2	0	0

Phase	Plant description	Working hours	% of assessment period that plant is operational	BS5228-1:2009+A1:2014 reference or other source	Uncorrected Noise level at 10m, dB $L_{Aeq,T}$	Working within construction zones	Number of plant			
							2019 Q4	2020 Q3	2023 Q1	2027 Q2
	Vibratory pile hammer	07:00-18:00	30%	C3.8	88	2, 10	0	1	0	0
	200mm pumps (electric submersible)	07:00-18:00	60%	C11.3	69	2, 10	8	2	0	0
	Vibratory screen (eg; CMB BX500B)	07:00-18:00	60%	C10.14	81	2, 10	1	0	0	0
	Loader: Wheeled: Cat938M 2.5-5m3 bucket	07:00-18:00	60%	C10.17	84	2, 10	1	0	0	0
	Safety boat (assumed to be standard 6m rigid inflatable boat ~110hp 80kW)	24-hour working	10%	Assume similar noise emissions to Stermat 86.	88	2, 10	1	0	0	0
	Multicat MTS Vector: 2x 600hp CAT C18 engine	24-hour working	30%	Data for tug from WesPac Pittsburg energy infrastructure project.	92	2, 10	2	1	0	0
	Split hopper barge (eg; Jan de Nul Arent class 2x1850kW)	24-hour working	60%	Data for Stemat 86 barge provided by AECOM.	88	2, 10	4	2	0	0
	Mobile elevating work platform	07:00-18:00	30%	C4.57	67	2, 10	2	2	0	0
	Mobile concrete pump 25m3 - boom truck pump for anti-collision barrier and top of MOLF	07:00-18:00	30%	C3.25	78	2, 10	1	0	0	0
	Dawson pile hammer (operated from crane)	08:30-17:00	10%	C3.1	89	2, 10	0	0	0	0
	Tractor and trailer (assumed tractor and trailer for dust mitigation spraying)	24-hour working	60%	C11.4	83	2, 10	2	2	0	0
	Jackup split barge / barge	24-hour working	60%	C6.39	65	2, 10	5	4	0	0
	Backhoe dredger (Eg; NordicGiant or Liebherr P955)	24-hour working	60%	C7.1	78	2, 10	1	1	0	0

Phase	Plant description	Working hours	% of assessment period that plant is operational	BS5228-1:2009+A1:2014 reference or other source	Uncorrected Noise level at 10m, dB $L_{Aeq,T}$	Working within construction zones	Number of plant			
							2019 Q4	2020 Q3	2023 Q1	2027 Q2
	Diesel generators 50kVa for lighting (diesel worst case, could be mains powered or hydrogen fuel cell if required)	24-hour working	100%	C6.39	65	2, 10	4	4	0	0
	Cutter suction dreger	24-hour working	100%	C6.39	65	2, 10	0	0	0	0
Concrete production, distribution & pouring	Batching plant: 200m3/Hr: Bin feeder: No silos	24-hour working	80%	C4.22	76	2A	0	1	2	2
	Batching plant: 40m3/Hr: 6 section bin feeder: 200m3 cement silos	24-hour working	80%	C4.22	76	2A	0	1	1	1
	Generator (1MWe) to power 40m3 batching plant and then standby for full batching plant	24-hour working	100%	C2.44	77	2A	0	1	0	0
	Loader: Wheel: 966G: (3300-4100lt)	24-hour working	80%	C4.28	75	2A	0	1	1	1
	Concrete reclaimer: 20m3/hr: Stetter RA20	24-hour working	80%	C4.22	76	2A	0	1	1	1
	Compressor: 812cfm(22.8m3/m): 7.5bar: Electric	24-hour working	80%	C5.5	65	2A	0	1	2	2
	Concrete pump: Trailer: 100m3/hr: Putzmeister BPE 2107 HP E	24-hour working	80%	C4.24	67	4,6,8	0	2	3	3
	Concrete remixer: Agitator: 9m3: Skid mounted	24-hour working	80%	C4.20	80	4,6,8	0	2	3	3
	Compressor: 812cfm(22.8m3/m): 7.5bar: Electric	24-hour working	80%	C5.5	65	4,6,8	0	1	2	2
	Distributor boom: 38m radius: 42m up	24-hour working	80%	C4.37	65	4,6,8	0	4	8	8
	Distributor boom: 38m radius: 42m up	24-hour working	80%	C4.37	65	4,6,8	0	2	4	4
	Distributor boom: 38m radius: 42m up	24-hour working	80%	C4.37	65	4,6,8	0	1	2	2
	Distributor boom: 38m radius: 42m up	24-hour working	80%	C4.37	65	4,6,8	0	1	2	2
	Distributor boom: 38m radius: 42m up	24-hour working	80%	C4.37	65	4,6,8	0	1	2	2

Phase	Plant description	Working hours	% of assessment period that plant is operational	BS5228-1:2009+A1:2014 reference or other source	Uncorrected Noise level at 10m, dB $L_{Aeq,T}$	Working within construction zones	Number of plant			
							2019 Q4	2020 Q3	2023 Q1	2027 Q2
	Compressor: 180cfm(5m3/m): Diesel	24-hour working	80%	C5.5	65	4,6,8	0	2	3	3
Cut and bend reinforcement, couplers and distribution	Integrated rebar cutting, bending, swaging, threading facility, capacity 100T/day – all mains electric	07:00-19:00	80%	Estimated based on core drill (electric).	85	5	0	1	1	1
	Tower crane, 5T at 50m	07:00-19:00	80%	C4.49	77	5	0	2	2	2
	Tractor unit: 56t GCW: Tows low loader with 30t capacity	07:00-19:00	80%	C11.4	83	4,6,8	0	4	4	4
Craneage	Crane: Tower: Saddle jib: 6t@40m: Liebherr 250EC-B12: 35m UH	24-hour working	80%	C4.48	76	4	0	1	1	0
	Crane: Tower: Saddle jib: 4.5t@25m: Liebherr 110EC-6BFR: 27m UH: Special short jib	24-hour working	80%	C4.49	77	4	0	1	1	0
	Crane: Tower: Saddle jib: 4.5t@25m: Liebherr 110EC-6BFR: 27m UH: Special short jib	24-hour working	80%	C4.49	77	4	0	1	1	0
	Crane: Tower: Saddle jib: 4.5t@25m: Liebherr 110EC-6BFR: 27m UH: Special short jib	24-hour working	80%	C4.49	77	4	0	1	1	0
	Crane: Tower: Saddle jib: 6t@40m: Liebherr 250EC-B12: 35m UH	24-hour working	80%	C4.48	76	4	0	1	1	0
	Crane: Tower: Saddle jib: 6t@40m: Liebherr 250EC-B12: 35m UH	24-hour working	80%	C4.48	76	4	0	1	1	0
	Crane: Tower: Saddle jib: Liebherr 630HC-H40: 55m UH	24-hour working	80%	C4.48	76	4	0	1	1	0
	Crane: Tower: Saddle jib: Liebherr 550HC-H20: 60m UH	24-hour working	80%	C4.48	76	4	0	1	1	0
	Crane: Tower: Saddle jib: 6t@40m: Max 25t: Potain MD 485: 60m UH	24-hour working	80%	C4.48	76	4	0	1	1	0

Phase	Plant description	Working hours	% of assessment period that plant is operational	BS5228-1:2009+A1:2014 reference or other source	Uncorrected Noise level at 10m, dB $L_{Aeq,T}$	Working within construction zones	Number of plant			
							2019 Q4	2020 Q3	2023 Q1	2027 Q2
	Crane: Tower: Saddle jib: Liebherr 380EC-B12: 45m UH	24-hour working	80%	C4.48	76	4	0	1	1	0
	Crane: Tower: Saddle jib: Liebherr 630HC-H40: 55m UH	24-hour working	80%	C4.48	76	4	0	1	1	0
	Crane: Tower: Saddle jib: Liebherr 380EC-B12: 45m UH	24-hour working	80%	C4.48	76	4	0	1	1	0
	Crane: Tower: Saddle jib: 4.5t@25m: Liebherr 110EC-6BFR: 27m UH: Special short jib	24-hour working	80%	C4.49	77	4	0	1	1	0
	Crane: Tower: Saddle jib: 4.5t@25m: Liebherr 110EC-6BFR: 27m UH: Special short jib	24-hour working	80%	C4.49	77	4	0	1	1	0
	Crane: Tower: Saddle jib: 4.5t@25m: Liebherr 110EC-6BFR: 27m UH: Special short jib	24-hour working	80%	C4.49	77	4	0	1	1	0
	Crane: Tower: Saddle jib: 4.5t@25m: Liebherr 110EC-6BFR: 27m UH: Special short jib	24-hour working	80%	C4.49	77	4	0	1	1	0
	Crane: Tower: Saddle jib: Liebherr 380EC-B12: 45m UH	24-hour working	80%	C4.48	76	4	0	0	1	0
	Crane: Tower: Saddle jib: 6t@40m: Liebherr 250EC-B12: 35m UH	24-hour working	80%	C4.48	76	4	0	1	1	0
	Crane: Tower: Saddle jib: Liebherr 1000HC-H40: 35m UH	24-hour working	80%	C4.48	76	6	0	1	1	0
	Crane: Crawler: 100t: Manitowoc MTW12000: Lattice boom	24-hour working	80%	C4.52	75	4	0	0	0	0
	Crane: Crawler: 100t: Manitowoc MTW12000: Lattice boom	24-hour working	80%	C4.52	75	4	0	2	3	0
	Crane: Crawler: 100t: Manitowoc MTW12000: Lattice boom	24-hour working	80%	C4.52	75	4	0	1	2	0
	Crane: Rough terrain: 90t: Grove RT9130E-2	24-hour working	80%	C4.39	77	4	0	2	1	0
	Crane: All terrain: 30t	24-hour working	80%	C4.43	70	4	0	8	4	0
	Crane: Tower: Saddle jib: 6t@40m: Liebherr 250EC-B12: 35m UH	24-hour working	80%	C4.48	76	8	0	0	1	1

Phase	Plant description	Working hours	% of assessment period that plant is operational	BS5228-1:2009+A1:2014 reference or other source	Uncorrected Noise level at 10m, dB $L_{Aeq,T}$	Working within construction zones	Number of plant			
							2019 Q4	2020 Q3	2023 Q1	2027 Q2
	Crane: Tower: Saddle jib: 4.5t@25m: Liebherr 110EC-6BFR: 27m UH: Special short jib	24-hour working	80%	C4.49	77	8	0	0	1	0
	Crane: Tower: Saddle jib: 4.5t@25m: Liebherr 110EC-6BFR: 27m UH: Special short jib	24-hour working	80%	C4.49	77	8	0	0	1	0
	Crane: Tower: Saddle jib: 4.5t@25m: Liebherr 110EC-6BFR: 27m UH: Special short jib	24-hour working	80%	C4.49	77	8	0	0	1	0
	Crane: Tower: Saddle jib: 4.5t@25m: Liebherr 110EC-6BFR: 27m UH: Special short jib	24-hour working	80%	C4.49	77	8	0	0	1	0
	Crane: Tower: Saddle jib: 6t@40m: Liebherr 250EC-B12: 35m UH	24-hour working	80%	C4.48	76	8	0	0	1	0
	Crane: Tower: Saddle jib: 6t@40m: Liebherr 250EC-B12: 35m UH	24-hour working	80%	C4.48	76	8	0	0	1	1
	Crane: Tower: Saddle jib: Liebherr 630HC-H40: 55m UH	24-hour working	80%	C4.48	76	8	0	0	1	0
	Crane: Tower: Saddle jib: Liebherr 550HC-H20: 60m UH	24-hour working	80%	C4.48	76	8	0	0	1	1
	Crane: Tower: Saddle jib: 6t@40m: Max 25t: Potain MD 485: 60m UH	24-hour working	80%	C4.48	76	8	0	0	1	1
	Crane: Tower: Saddle jib: Liebherr 380EC-B12: 45m UH	24-hour working	80%	C4.48	76	8	0	0	1	1
	Crane: Tower: Saddle jib: Liebherr 630HC-H40: 55m UH	24-hour working	80%	C4.48	76	8	0	0	1	1
	Crane: Tower: Saddle jib: Liebherr 380EC-B12: 45m UH	24-hour working	80%	C4.48	76	8	0	0	1	1
	Crane: Tower: Saddle jib: 4.5t@25m: Liebherr 110EC-6BFR: 27m UH: Special short jib	24-hour working	80%	C4.49	77	8	0	0	1	1
	Crane: Tower: Saddle jib: 4.5t@25m: Liebherr 110EC-6BFR: 27m UH: Special short jib	24-hour working	80%	C4.49	77	8	0	0	1	1

Phase	Plant description	Working hours	% of assessment period that plant is operational	BS5228-1:2009+A1:2014 reference or other source	Uncorrected Noise level at 10m, dB $L_{Aeq,T}$	Working within construction zones	Number of plant			
							2019 Q4	2020 Q3	2023 Q1	2027 Q2
	Crane: Tower: Saddle jib: 4.5t@25m: Liebherr 110EC-6BFR: 27m UH: Special short jib	24-hour working	80%	C4.49	77	8	0	0	1	1
	Crane: Tower: Saddle jib: 4.5t@25m: Liebherr 110EC-6BFR: 27m UH: Special short jib	24-hour working	80%	C4.49	77	8	0	0	1	1
	Crane: Tower: Saddle jib: Liebherr 380EC-B12: 45m UH	24-hour working	80%	C4.48	76	8	0	0	0	0
	Crane: Tower: Saddle jib: 6t@40m: Liebherr 250EC-B12: 35m UH	24-hour working	80%	C4.48	76	8	0	0	1	0
	Crane: Tower: Saddle jib: Liebherr 1000HC-H40: 35m UH	24-hour working	80%	C4.48	76	8	0	0	1	1
	Crane: Crawler: 100t: Manitowoc MTW12000: Lattice boom	24-hour working	80%	C4.52	75	8	0	0	3	1
	Crane: Crawler: 100t: Manitowoc MTW12000: Lattice boom	24-hour working	80%	C4.52	75	8	0	0	2	1
	Crane: Rough Terrain: 90t: Grove RT9130E-2	24-hour working	80%	C4.39	77	8	0	0	8	2
	Crane: All terrain: 30t	24-hour working	80%	C4.43	70	8	0	0	8	2
Structures access	Hoist: Goods/passenger: 2t: Alimak Scando 450	24-hour working	80%	C4.62	66	4	0	2	2	0
	Hoist: Goods/passenger: 2t: Alimak Scando 450	24-hour working	80%	C4.62	66	8	0	0	2	2
	Hoist: Goods/passenger: 2t: Alimak Scando 450	24-hour working	80%	C4.62	66	4	0	2	2	0
	Hoist: Goods/passenger: 2t: Alimak Scando 450	24-hour working	80%	C4.62	66	8	0	0	2	2
	Hoist: Goods/passenger: 2t: Alimak Scando 450	24-hour working	80%	C4.62	66	4	0	1	1	0
	Hoist: Goods/passenger: 2t: Alimak Scando 450	24-hour working	80%	C4.62	66	8	0	0	1	1
	Hoist: Goods/passenger: 2t: Alimak Scando 450	24-hour working	80%	C4.62	66	4	0	1	1	0

Phase	Plant description	Working hours	% of assessment period that plant is operational	BS5228-1:2009+A1:2014 reference or other source	Uncorrected Noise level at 10m, dB $L_{Aeq,T}$	Working within construction zones	Number of plant			
							2019 Q4	2020 Q3	2023 Q1	2027 Q2
	Hoist: Goods/passenger: 2t: Alimak Scando 450	24-hour working	80%	C4.62	66	8	0	0	1	1
	Hoist: Goods/passenger: 2t: Alimak Scando 450	24-hour working	80%	C4.62	66	4	0	1	1	0
	Hoist: Goods/passenger: 2t: Alimak Scando 450	24-hour working	80%	C4.62	66	8	0	0	1	1
	Access platform: 20m: Telescopic: RT: Genie model S65	24-hour working	80%	C4.57	67	4	0	1	1	0
	Access platform: 20m: Telescopic: RT: Genie model S65	24-hour working	80%	C4.57	67	8	0	0	1	1
	Access platform: 13m: Scissor: Slab: 680kg - Genie model 4390 RT 2WD	24-hour working	80%	C4.59	78	4	0	1	1	0
	Access platform: 13m: Scissor: Slab: 680kg - Genie model 4390 RT 2WD	24-hour working	80%	C4.59	78	8	0	0	1	1
	Access platform: 6m: Scissor - Genie model GS-2046	24-hour working	80%	C4.59	78	4	0	1	1	0
	Access Platform: 6m: Scissor - Genie model GS-2046	24-hour working	80%	C4.59	78	8	0	0	1	1
Site logistics and general	Pump: Electric: Submersible: 50mm	24-hour working	100%	C11.3	69	4	3	3	9	3
	Pump: Electric: Submersible: 50mm	24-hour working	100%	C11.3	69	5	2	2	3	2
	Pump: Electric: Submersible: 50mm	24-hour working	100%	C11.3	69	8	3	3	9	3
	Pump: Electric: Submersible: 50mm	24-hour working	100%	C11.3	69	9	2	2	3	2
	Pump: Electric: Submersible: 150mm	24-hour working	100%	C11.3	69	4	8	8	9	3
	Pump: Electric: Submersible: 150mm	24-hour working	100%	C11.3	69	5	2	2	3	2
	Pump: Electric: Submersible: 150mm	24-hour working	100%	C11.3	69	8	8	8	9	3
	Pump: Electric: Submersible: 150mm	24-hour working	100%	C11.3	69	9	2	2	3	2

Phase	Plant description	Working hours	% of assessment period that plant is operational	BS5228-1:2009+A1:2014 reference or other source	Uncorrected Noise level at 10m, dB $L_{Aeq,T}$	Working within construction zones	Number of plant			
							2019 Q4	2020 Q3	2023 Q1	2027 Q2
	Pump: Electric: Submersible: 50mm	24-hour working	100%	C11.3	69	4	0	10	10	0
	Pump: Electric: Submersible: 50mm	24-hour working	100%	C11.3	69	6	0	10	10	0
	Pump: Electric: Submersible: 50mm	24-hour working	100%	C11.3	69	7	0	0	10	10
	Pump: Electric: Submersible: 50mm	24-hour working	100%	C11.3	69	8	0	0	10	10
	Pump: Electric: Submersible: 150mm	24-hour working	100%	C11.3	69	4	0	10	10	0
	Pump: Electric: Submersible: 150mm	24-hour working	100%	C11.3	69	6	0	10	10	0
	Pump: Electric: Submersible: 150mm	24-hour working	100%	C11.3	69	7	0	0	10	10
	Pump: Electric: Submersible: 150mm	24-hour working	100%	C11.3	69	8	0	0	10	10
Site Campus	300 tonne crawler crane (eg: Leibherr LR1300)	07:00-18:00	80%	C4.38	78	12	1	1	0	0
	35 tonne excavator (eg: Cat335)	07:00-18:00	80%	C2.16	75	12	2	3	1	0
	Compactor: 32t: Caterpillar 825G	07:00-19:00	80%	C8.3	80	12	2	0	0	0
	Grader: 26t: 222kW: Caterpillar 16M artic	07:00-18:00	80%	C6.31	86	12	2	0	1	0
	Compressor: Diesel	07:00-19:00	80%	C5.5	65	12	2	2	2	0
	2x concrete pump: Truck: 34m Boom; Max output 90m3/hr plus	07:00-19:00	80%	C4.32	78	12	1	2	0	0
	Crane: All terrain, 30T	07:00-18:00	80%	C4.43	70	12	2	0	0	0
	Crane: All terrain, 50T	07:00-19:00	80%	C4.39	77	12	0	1	1	0
	Crane: Rough terrain: 90t: Grove RT9130E-2	07:00-19:00	80%	C4.39	77	12	0	0	0	0
	Articulated dump trucks (e.g. Volvo / Hydrema / Bell / Paus or similar)	07:00-18:00	80%	Average of all articulated dump trucks listed in tables C1 to C10.	82	12	4	4	2	0
	Road sweeper: Truck mounted: Vacuum	07:00-19:00	80%	C4.90	76	12	1	1	1	0

Phase	Plant description	Working hours	% of assessment period that plant is operational	BS5228-1:2009+A1:2014 reference or other source	Uncorrected Noise level at 10m, dB $L_{Aeq,T}$	Working within construction zones	Number of plant			
							2019 Q4	2020 Q3	2023 Q1	2027 Q2
	Van: Diesel: Payload: Escort	07:00-18:00	80%	Data provided by AECOM	72	12	2	2	2	0
	2x Telehandler: 3t: Rough terrain: Merlo ROTO 38.16K: Tunnel rib handler: Access basket	07:00-19:00	80%	C4.54	79	12	0	2	2	0
	Access platform: 6m: Scissor - Genie model GS-2046	07:00-19:00	80%	C4.59	78	12	0	4	4	0
	4x flat truck: 30,000kg: 18tm Crane: 4x4:	07:00-18:00	80%	C11.14	79	12	2	4	4	0
	3x generator 500 kVA	07:00-19:00	80%	C2.44	77	12	2	3	2	0
	6x truck mixer	07:00-19:00	80%	C4.27	79	12	4	6	4	0
	Bowser: Water: Truck mounted: 10,000lt: 4x2	07:00-18:00	80%	C11.4	83	12	1	1	1	0
	CAT H45 D rock breaker / hammer	07:00-19:00	80%	C11.4	83	12	2	2	1	0
Zone 9 and Mound A - final re-instatement / landscape formation	Tracked excavator: 75t: 352kW: Cat374FLME: 5000lt bucket: Mass excavation	07:00-19:00	80%	C2.2	77	A	0	0	0	4
	Tractor: Track: 228kW: D8T	07:00-19:00	80%	C6.30	86	9	0	0	0	3
	Tractor: Track: 228kW: D8T	07:00-19:00	80%	C6.30	86	A	0	0	0	2
	Roller: Steel/rubber: 16t: 129kW: Caterpillar CS74B	07:00-19:00	80%	C5.21	80	9	0	0	0	3
	Roller: Steel/rubber: 16t: 129kW: Caterpillar CS74B	07:00-19:00	80%	C5.21	80	A	0	0	0	1
	Compactor: 32t: Caterpillar 825G	07:00-19:00	80%	C8.3	80	9	0	0	0	3
	Compactor: 32t: Caterpillar 825G	07:00-19:00	80%	C8.3	80	A	0	0	0	1
	Tractor: Track: 123kW: Caterpillar D6T LGP	07:00-19:00	80%	C5.15	83	9	0	0	0	2
	Tractor: Track: 123kW: Caterpillar D6T LGP	07:00-19:00	80%	C5.15	83	A	0	0	0	1
	35 Tonne excavator (eg: Cat335)	07:00-19:00	80%	C2.16	75	9	0	0	0	2
Zone 5 and Mound E - final re-instatement / landscape formation	Tracked excavator: 75t: 352kW: Cat374FLME: 5000lt bucket: Mass excavation	07:00-19:00	80%	C2.2	77	E	0	0	0	3
	Tractor: Track: 228kW: D8T	07:00-19:00	80%	C6.30	86	E	0	0	0	1
	Tractor: Track: 228kW: D8T	07:00-19:00	80%	C6.30	86	5	0	0	0	2

Phase	Plant description	Working hours	% of assessment period that plant is operational	BS5228-1:2009+A1:2014 reference or other source	Uncorrected Noise level at 10m, dB $L_{Aeq,T}$	Working within construction zones	Number of plant			
							2019 Q4	2020 Q3	2023 Q1	2027 Q2
	Roller: Steel/rubber: 16t: 129kW: Caterpillar CS74B	07:00-19:00	80%	C5.21	80	E	0	0	0	1
	Roller: Steel/rubber: 16t: 129kW: Caterpillar CS74B	07:00-19:00	80%	C5.21	80	5	0	0	0	2
	Compactor: 32t: Caterpillar 825G	07:00-19:00	80%	C8.3	80	E	0	0	0	1
	Compactor: 32t: Caterpillar 825G	07:00-19:00	80%	C8.3	80	5	0	0	0	2
	35 Tonne excavator (eg: Cat335)	07:00-19:00	80%	C2.16	75	5	0	0	0	2
	Tractor: Track: 123kW: Caterpillar D6T LGP	07:00-19:00	80%	C5.15	83	E	0	0	0	1
	Tractor: Track: 123kW: Caterpillar D6T LGP	07:00-19:00	80%	C5.15	83	5	0	0	0	1

1.3 Input data used in vibration assessment

1.3.1 The following input data in table 1-3 is used for the vibration predictions, which have been conducted using the equations presented in BS5228-2:2009+A1:2014.

Table 1- 3 Vibration prediction input data

Activity	Parameter	Value	S.I. units / (notes)
Ground compaction (Caterpillar CS74B vibratory soil compactor and Caterpillar 825G soil compactor - data taken from manufacturer's data sheet for CS74B)	Number of drums	1	
	Scaling factor	276	(95% confidence – 5% chance that actual levels will exceed the predicted values)
	Max amplitude of drum vibration	2.1	mm / (It is noted that this amplitude is slightly greater than the scope of the formula in BS5228-2 which states the range 0.4-1.72mm. Nonetheless, an input of 2.1mm results in greater predicted values than 1.72mm)
	Roller width	2.134	m
Vibratory piling (also all crushers and screens)	Scaling factor	266	(95% confidence – 5% chance that actual levels will exceed the predicted values)
	Surface distance	12	m
	Phase	1.3	(all operations)
Percussive piling (Dawson piling hammer model HPH6500 – data from manufacturer's data sheet)	Scaling factor	5	(at refusal)
	Hammer energy	65	kJ

2 Construction noise effects at receptors

2.1 Residential receptors

2.1.1 Summaries of the residual magnitudes and significance of effects at residential properties during the relevant assessment periods are presented in tables 2-1 to 2-9. For a description of the noise assessment methodology and the derivation of the adopted magnitude scale please refer to chapter B6 (noise and vibration) (Application Reference Number: 6.2.6) and appendix B6-2 (noise and vibration modelling and assessment methodology report) (Application Reference Number: 6.2.21). Receptor groups are shown on figure D6-01 (Application Reference Number: 6.4.101).

Table 2- 1 Adopted magnitude scale for long term construction plant and machinery noise, dB $L_{Aeq,1h}$ free field

Magnitude of Change	Day / time period							
	Monday to Friday			Saturday			Sunday and Public Holidays	
	07.00 - 19.00	19.00 - 22.00	22.00 - 07.00	07.00 - 13.00	13.00 - 22.00	22.00 - 07.00	07.00 - 22.00	22.00 - 07.00
Large	≥72.0	≥67.0	≥62.0	≥72.0	≥67.0	≥62.0	≥67.0	≥62.0
Medium	62.0 – 71.9	57.0 – 66.9	52.0 –61.9	62.0 –71.9	57.0 –66.9	52.0 –61.9	57.0 –66.9	52.0 –61.9
Small	55.0 – 61.9	47.0 –56.9	42.0 –51.9	55.0 – 61.9	47.0 –56.9	42.0 –51.9	47.0 – 56.9	42.0 – 51.9
Negligible	<55.0*	<47.0*	<42.0*	<55.0*	<47.0*	<42.0*	<47.0*	<42.0*
* or less than a 3dB increase in the pre-existing ambient noise level								

Table 2- 2 Summary of effects and assessment of significance at residential properties – weekdays 07:00-19:00

Magnitude of change	Significance of effect	Receptor group A	Receptor group B	Receptor group C	Receptor group D	Receptor group E	Receptor group F	Receptor group G	Receptor group H	Total
Large	Major significance	0	0	0	1	0	0	0	0	1
Medium	Major significance	1	25	16	7	6	28	1	0	84
Small	Moderate significance	28	256	3	6	13	40	0	73	419
Negligible	Minor (not significant)	2	315	1	0	7	2	0	390	717

Table 2- 3 Summary of effects and assessment of significance at residential properties – weekdays 19:00-22:00

Magnitude of change	Significance of effect	Receptor group A	Receptor group B	Receptor group C	Receptor group D	Receptor group E	Receptor group F	Receptor group G	Receptor group H	Total
Large	Major significance	0	0	6	3	0	0	1	0	10
Medium	Major significance	26	175	12	10	12	64	0	10	309
Small	Moderate significance	5	413	2	1	14	5	0	410	850
Negligible	Minor (not significant)	0	8	0	0	0	1	0	43	52

Table 2- 4 Summary of effects and assessment of significance at residential properties – weekdays 22:00-07:00

Magnitude of change	Significance of effect	Receptor group A	Receptor group B	Receptor group C	Receptor group D	Receptor group E	Receptor group F	Receptor group G	Receptor group H	Total
Large	Major significance	0	0	0	0	0	1	0	0	1
Medium	Major significance	0	0	3	1	0	2	1	0	7
Small	Moderate significance	28	345	14	6	8	60	0	11	472
Negligible	Minor (not significant)	3	251	3	7	18	7	0	452	741

Table 2- 5 Summary of effects and assessment of significance at residential properties –Saturdays 07:00-13:00

Magnitude of change	Significance of effect	Receptor group A	Receptor group B	Receptor group C	Receptor group D	Receptor group E	Receptor group F	Receptor group G	Receptor group H	Total
Large	Major significance	0	0	0	1	0	0	0	0	1
Medium	Major significance	1	25	16	7	6	28	1	0	84
Small	Moderate significance	28	256	3	6	13	40	0	73	419
Negligible	Minor (not significant)	2	315	1	0	7	2	0	390	717

Table 2- 6 Summary of effects and assessment of significance at residential properties –Saturdays 13:00-22:00

Magnitude of change	Significance of effect	Receptor group A	Receptor group B	Receptor group C	Receptor group D	Receptor group E	Receptor group F	Receptor group G	Receptor group H	Total
Large	Major significance	0	0	6	3	0	0	1	0	10
Medium	Major significance	26	175	12	10	12	64	0	10	309
Small	Moderate significance	5	413	2	1	14	5	0	410	850
Negligible	Minor (not significant)	0	8	0	0	0	1	0	43	52

Table 2- 7 Summary of effects and assessment of significance at residential properties –Saturdays 22:00-07:00

Magnitude of change	Significance of effect	Receptor group A	Receptor group B	Receptor group C	Receptor group D	Receptor group E	Receptor group F	Receptor group G	Receptor group H	Total
Large	Major significance	0	0	0	0	0	1	0	0	1
Medium	Major significance	0	0	3	1	0	2	1	0	7
Small	Moderate significance	28	345	14	6	8	60	0	11	472
Negligible	Minor (not significant)	3	251	3	7	18	7	0	452	741

Table 2- 8 Summary of effects and assessment of significance at residential properties –Sundays and Public Holidays 07:00-22:00

Magnitude of change	Significance of effect	Receptor group A	Receptor group B	Receptor group C	Receptor group D	Receptor group E	Receptor group F	Receptor group G	Receptor group H	Total
Large	Major significance	0	0	6	3	0	0	1	0	10
Medium	Major significance	26	175	12	10	12	64	0	10	309
Small	Moderate significance	5	413	2	1	14	5	0	410	850
Negligible	Minor (not significant)	0	8	0	0	0	1	0	43	52

Table 2- 9 Summary of effects and assessment of significance at residential properties –Sundays and Public Holidays 22:00-07:00

Magnitude of change	Significance of effect	Receptor group A	Receptor group B	Receptor group C	Receptor group D	Receptor group E	Receptor group F	Receptor group G	Receptor group H	Total
Large	Major significance	0	0	0	0	0	1	0	0	1
Medium	Major significance	0	0	3	1	0	2	1	0	7
Small	Moderate significance	28	345	14	6	8	60	0	11	472
Negligible	Minor (not significant)	3	251	3	7	18	7	0	452	741

2.2 Assessment of effects at non-residential receptors

2.2.1 The summary of magnitudes of change and assessment of significance at residential properties during the relevant assessment periods are presented in tables 2-10 to 2-41.

Table 2- 10 Summary of effects and assessment of significance at hotels and schools - weekday 07:00-19:00

Magnitude of change	Significance of effect	Hotels	Schools
Large	Major significance	0	0
Medium	Major significance	0	0
Small	Moderate significance	2	1
Negligible	Minor (not significant)	3	1

Table 2- 11 Summary of effects and assessment of significance at hotels - weekday 19:00-22:00

Magnitude of change	Significance of effect	Hotels
Large	Major significance	0
Medium	Major significance	1
Small	Moderate significance	4
Negligible	Minor (not significant)	0

Table 2- 12 Summary of effects and assessment of significance at hotels - weekday 22:00-07:00

Magnitude of change	Significance of effect	Hotels
Large	Major significance	0
Medium	Major significance	0
Small	Moderate significance	3
Negligible	Minor (not significant)	2

Table 2- 13 Summary of effects and assessment of significance at hotels - Saturday 07:00-13:00

Magnitude of change	Significance of effect	Hotels
Large	Major significance	0
Medium	Major significance	0
Small	Moderate significance	2
Negligible	Minor (not significant)	3

Table 2- 14 Summary of effects and assessment of significance at hotels – Saturday 13:00-22:00

Magnitude of change	Significance of effect	Hotels
Large	Major significance	0
Medium	Major significance	1
Small	Moderate significance	4
Negligible	Minor (not significant)	0

Table 2- 15 Summary of effects and assessment of significance at hotels – Saturday 22:00-07:00

Magnitude of change	Significance of effect	Hotels
Large	Major significance	0
Medium	Major significance	0
Small	Moderate significance	3
Negligible	Minor (not significant)	2

Table 2- 16 Summary of effects and assessment of significance at hotels – Sundays and Public Holidays 07:00-22:00

Magnitude of change	Significance of effect	Hotels
Large	Major significance	0
Medium	Major significance	1
Small	Moderate significance	4
Negligible	Minor (not significant)	0

Table 2- 17 Summary of effects and assessment of significance at hotels – Sundays and Public Holidays 22:00-07:00

Magnitude of change	Significance of effect	
Large	Major significance	0
Medium	Major significance	0
Small	Moderate significance	3
Negligible	Minor (not significant)	2

Table 2- 18 Summary of effects and assessment of significance at community buildings and places of worship - weekdays 07:00-19:00

Magnitude of change	Significance of effect	Community buildings	Places of worship
Large	Major significance	0	0
Medium	Moderate significance	0	0
Small	Minor (not significant)	1	4
Negligible	Negligible (not significant)	3	3

Table 2- 19 Summary of effects and assessment of significance at community buildings and places of worship - weekdays 19:00-22:00

Magnitude of change	Significance of effect	Community buildings	Places of worship
Large	Major significance	0	0
Medium	Moderate significance	0	1
Small	Minor (not significant)	4	6
Negligible	Negligible (not significant)	0	0

Table 2- 20 Summary of effects and assessment of significance at community buildings and places of worship - weekdays 22:00-07:00

Magnitude of change	Significance of effect	Community buildings	Places of worship
Large	Major significance	0	0
Medium	Moderate significance	0	0
Small	Minor (not significant)	3	3
Negligible	Negligible (not significant)	1	4

Table 2- 21 Summary of effects and assessment of significance at community buildings and places of worship - Saturdays 07:00-13:00

Magnitude of change	Significance of effect	Community buildings	Places of worship
Large	Major significance	0	0
Medium	Moderate significance	0	0
Small	Minor (not significant)	1	4
Negligible	Negligible (not significant)	3	3

Table 2- 22 Summary of effects and assessment of significance at community buildings and places of worship - Saturdays 13:00-22:00

Magnitude of change	Significance of effect	Community buildings	Places of worship
Large	Major significance	0	0
Medium	Moderate significance	0	1
Small	Minor (not significant)	4	6
Negligible	Negligible (not significant)	0	0

Table 2- 23 Summary of effects and assessment of significance at community buildings and places of worship - Saturdays 22:00-07:00

Magnitude of change	Significance of effect	Community buildings	Places of worship
Large	Major significance	0	0
Medium	Moderate significance	0	0
Small	Minor (not significant)	3	3
Negligible	Negligible (not significant)	1	4

Table 2- 24 Summary of effects and assessment of significance at community buildings and places of worship – Sundays and Public Holidays 07:00-22:00

Magnitude of change	Significance of effect	Community buildings	Places of worship
Large	Major significance	0	0
Medium	Moderate significance	0	1
Small	Minor (not significant)	4	6
Negligible	Negligible (not significant)	0	0

Table 2- 25 Summary of effects and assessment of significance at community buildings and places of worship - Sundays and Public Holidays 22:00-07:00

Magnitude of change	Significance of effect	Community buildings	Places of worship
Large	Major significance	0	0
Medium	Moderate significance	0	0
Small	Minor (not significant)	3	3
Negligible	Negligible (not significant)	1	4

Table 2- 26 Summary of effects and assessment of significance at commercial and offices - weekdays 07:00-19:00

Magnitude of change	Significance of effect	Commercial	Offices
Large	Moderate significance	0	1
Medium	Minor (not significant)	2	4
Small	Negligible (not significant)	9	1
Negligible	Negligible (not significant)	21	2

Table 2- 27 Summary of effects and assessment of significance at commercial and offices - weekdays 19:00-22:00

Magnitude of change	Significance of effect	Commercial	Offices
Large	Moderate significance	1	5
Medium	Minor (not significant)	2	0
Small	Negligible (not significant)	26	3
Negligible	Negligible (not significant)	3	0

Table 2- 28 Summary of effects and assessment of significance at commercial and offices - weekdays 22:00-07:00

Magnitude of change	Significance of effect	Commercial	Offices
Large	Moderate significance	0	4
Medium	Minor (not significant)	1	1
Small	Negligible (not significant)	9	1
Negligible	Negligible (not significant)	22	2

Table 2- 29 Summary of effects and assessment of significance at commercial and offices - Saturdays 07:00-13:00

Magnitude of change	Significance of effect	Commercial	Offices
Large	Moderate significance	0	1
Medium	Minor (not significant)	2	4
Small	Negligible (not significant)	9	1
Negligible	Negligible (not significant)	21	2

Table 2- 30 Summary of effects and assessment of significance at commercial and offices - Saturdays 13:00-22:00

Magnitude of change	Significance of effect	Commercial	Offices
Large	Moderate significance	1	5
Medium	Minor (not significant)	2	0
Small	Negligible (not significant)	26	3
Negligible	Negligible (not significant)	3	0

Table 2- 31 Summary of effects and assessment of significance at commercial and offices - Saturdays 22:00-07:00

Magnitude of change	Significance of effect	Commercial	Offices
Large	Moderate significance	0	4
Medium	Minor (not significant)	1	1
Small	Negligible (not significant)	9	1
Negligible	Negligible (not significant)	22	2

Table 2- 32 Summary of effects and assessment of significance at commercial and offices – Sundays and Public Holidays 07:00-22:00

Magnitude of change	Significance of effect	Commercial	Offices
Large	Moderate significance	1	5
Medium	Minor (not significant)	2	0
Small	Negligible (not significant)	26	3
Negligible	Negligible (not significant)	3	0

Table 2- 33 Summary of effects and assessment of significance at commercial and offices - Sundays and Public Holidays 22:00-07:00

Magnitude of change	Significance of effect	Commercial	Offices
Large	Moderate significance	0	4
Medium	Minor (not significant)	1	1
Small	Negligible (not significant)	9	1
Negligible	Negligible (not significant)	22	2

Table 2- 34 Summary of effects and assessment of significance at industrial receptors - weekdays 07:00-19:00

Magnitude of change	Significance of effect	Industrial
Large	Minor significance (not significant)	0
Medium	Negligible significance (not significant)	3
Small	Negligible significance (not significant)	0
Negligible	Negligible significance (not significant)	1

Table 2- 35 Summary of effects and assessment of significance at industrial receptors - weekdays 19:00-22:00

Magnitude of change	Significance of effect	Industrial
Large	Minor significance (not significant)	2
Medium	Negligible significance (not significant)	1
Small	Negligible significance (not significant)	1
Negligible	Negligible significance (not significant)	0

Table 2- 36 Summary of effects and assessment of significance at industrial receptors - weekdays 22:00-07:00

Magnitude of change	Significance of effect	Industrial
Large	Minor significance (not significant)	1
Medium	Negligible significance (not significant)	2
Small	Negligible significance (not significant)	0
Negligible	Negligible significance (not significant)	1

Table 2- 37 Summary of effects and assessment of significance at industrial receptors - Saturdays 07:00-13:00

Magnitude of change	Significance of effect	Industrial
Large	Minor significance (not significant)	0
Medium	Negligible significance (not significant)	3
Small	Negligible significance (not significant)	0
Negligible	Negligible significance (not significant)	1

Table 2- 38 Summary of effects and assessment of significance at industrial receptors - Saturdays 13:00-22:00

Magnitude of change	Significance of effect	Industrial
Large	Minor significance (not significant)	2
Medium	Negligible significance (not significant)	1
Small	Negligible significance (not significant)	1
Negligible	Negligible significance (not significant)	0

Table 2- 39 Summary of effects and assessment of significance at industrial receptors - Saturdays 22:00-07:00

Magnitude of change	Significance of effect	Industrial
Large	Minor significance (not significant)	1
Medium	Negligible significance (not significant)	2
Small	Negligible significance (not significant)	0
Negligible	Negligible significance (not significant)	1

Table 2- 40 Summary of effects and assessment of significance at industrial receptors – Sundays and Public Holidays 07:00-22:00

Magnitude of change	Significance of effect	Industrial
Large	Minor significance (not significant)	2
Medium	Negligible significance (not significant)	1
Small	Negligible significance (not significant)	1
Negligible	Negligible significance (not significant)	0

Table 2- 41 Summary of effects and assessment of significance at industrial receptors - Sundays and Public Holidays 22:00-07:00

Magnitude of change	Significance of effect	Industrial
Large	Minor significance (not significant)	1
Medium	Negligible significance (not significant)	2
Small	Negligible significance (not significant)	0
Negligible	Negligible significance (not significant)	1

3 Operational noise model inputs

3.1 Source data for standby emergency generators

3.1.1 Table 3-1 presents external sound power values for standby emergency generators used in the main site operational noise model, and internal sound pressure values used in the calculation of breakout noise from generator buildings. The values are provided for Emergency Diesel Generators (EDGs), Back-up Building Generators (BBGs) and Auxiliary Standby Generators (ASGs). The location of all plant in the noise model is provided in figure D6-11 (Application Reference Number: 6.4.101).

3.1.2 These values have been taken from manufacturer's information for commercially available equipment representative of the type proposed in each generator building. The internal sound pressure level is a maximum value at 1m, and therefore an overestimate of the sound pressure levels that would be incident on external walls, which results in a conservative calculation of noise breakout from the generator buildings.

Table 3- 1 Source levels for standby emergency generators

Unit	Source	Data type	Octave band centre frequency (Hz)									Overall dB(A)
			31.5	63	125	250	500	1k	2k	4k	8k	
EDG	Generator building	Internal sound pressure	101	102	100	102	100	99	93	84	105	101
	Combustion air intake	External sound power	112	102	97	90	83	80	92	97	99	112
	Exhaust stack	External sound power	112	105	95	86	81	90	91	95	99	112
BBG	Generator building	Internal sound pressure	101	102	100	102	100	99	93	84	105	101
	Combustion air intake	External sound power	108	99	94	86	80	77	88	93	95	108
	Exhaust stack	External sound power	108	101	92	82	78	86	87	91	95	108
	Radiator fans	External sound power	101	101	99	99	96	89	82	81	100	101
ASG	Generator building	Internal sound pressure	101	102	100	102	100	99	93	84	105	101
	Combustion air intake	External sound power	107	98	93	85	79	76	87	92	94	107

Unit	Source	Data type	Octave band centre frequency (Hz)									Overall dB(A)
			31.5	63	125	250	500	1k	2k	4k	8k	
	Exhaust stack	External sound power	107	100	91	81	76	85	86	90	94	107
	Radiator fans	External sound power	101	101	99	99	96	89	82	81	100	101

3.2 Source data for transformers

3.2.1 Table 3-2 presents initial estimates of external sound power values for transformers. The methodology used to derive these values is presented in section 6.4 of chapter D6 (noise and vibration) (Application Reference Number: 6.4.6).

3.2.2 The embedded mitigation described in section 6.4 of chapter D6 (Application Reference Number: 6.4.6) states that the transformers would be specified to meet a proposed criterion at local receptors. The operational noise modelling reflects this commitment, rather than the initial estimates presented in table 3-2.

Table 3- 2 Initial estimate of sound power values for transformers

Transformer	Octave band centre frequency (Hz)									Overall dB(A)
	31.5	63	125	250	500	1k	2k	4k	8k	
SGTs (super generator transformers, per limb)	98	107	112	111	111	105	100	95	88	111
ASTs (auxiliary standby transformers)	86	95	100	99	99	93	88	83	76	100
ANTs (auxiliary normal transformers)	87	96	101	100	100	94	89	84	77	100

3.3 Source data for other external sources

3.3.1 Table 3-3 presents external sound power values for other significant noise sources.

3.3.2 The value for the cooling towers has been taken from manufacturer's information for commercially available equipment representative of the proposed type. The values for air systems have been taken from initial estimates of fan sizes for the relevant air systems, accounting for the attenuation provided by splitter attenuators of the type and size expected.

Table 3- 3 Source levels for standby emergency generators

Source	Octave band centre frequency (Hz)									Overall dB(A)
	31.5	63	125	250	500	1k	2k	4k	8k	
Cooling towers (per bank)	118	118	118	113	108	103	98	96	93	110
Reactor building exhaust stack emissions	113	109	104	91	82	67	66	76	78	90
Major buildings air supply and exhaust	103	99	94	81	72	57	56	66	68	80
House boiler building forced draft fan intake	113	109	104	91	82	67	66	76	78	90
Cooling water intake pump motors (unenclosed)	102	103	104	106	106	109	106	102	96	113
Biocide pumps (unenclosed)	81	82	83	85	85	88	85	81	75	91

3.4 Building breakout calculations input data

3.4.1 Table 3-4 presents internal sound pressure values used in the calculation of breakout noise for the operational buildings that are identified as containing significant noise sources. These values have been derived from the internal sound pressure levels expected at 1m from the loudest item of equipment within each building. This value has been taken from manufacturer's information for commercially available equipment representative of the type proposed in each building. The internal sound pressure levels are therefore an overestimate of the sound pressure levels that would be incident on external walls, which results in a conservative calculation of noise breakout from each building. The octave band spectra for these sources are presented on the building breakout calculation sheets presented in section 3.5.

3.4.2 Table 3-4 also presents the proposed construction type for each wall, and identifies whether roller shutter doors will be included. This comes from existing building design information, and has been used to inform the calculation of breakout noise for the operational buildings.

Table 3- 4 Internal noise levels and construction details using in building breakout calculations

Building name	Internal sound pressure level dB(A)	Walls construction type	Potential breakout through roller shutter doors
Back-up Building	105	100mm concrete	None assumed
Turbine Building	76	Standard industrial cladding	None assumed
Emergency Diesel Generator Building	105	100mm concrete	None assumed
Fire Water Pump House	105	100mm concrete	None assumed
Auxiliary Boiler Building	80	Standard industrial cladding	Yes
Makeup Water Treatment Building	80	Standard industrial cladding	Yes
Lower Activity Waste Management Facility	80	Standard industrial cladding	Yes
ASG Building	85	Standard industrial cladding	None assumed
Switchgear Building	75	Standard industrial cladding	No

3.5 Building breakout calculation sheets

3.5.1 Calculations sheets showing parameters used in calculations of breakout noise (undertaken in accordance with BS EN 12354-4 2000) are presented as follows.

3.5.2 Also shown on the calculation sheets are the derived external roof and wall sound power values for the operational buildings that are identified as containing significant noise sources. These sources have been incorporated into the operational noise model.

Building Breakout Calculations - Back-up Building

Roof Area (m2)	5762
Walls Area (m2)	11322
Building envelope construction type	100mm concrete
Unattenuated Ventilation Openings?	No
Roller shutter doors?	No

Assumed Reverberant level within building

Octave Band Centre Frequency								Overall dB(A)
63	125	250	500	1000	2000	4000	8000	
100.8	102.3	100.2	101.9	100.1	98.7	92.8	83.8	105.0

Calculation of Sound Power radiated by building walls

Quantity	Unit	Area (m^2)	Octave Band Centre Frequency								Overall dB(A)
			63	125	250	500	1000	2000	4000	8000	
Internal											
Internal Sound Pressure Level	$L_{p,in}$	-	100.8	102.3	100.2	101.9	100.1	98.7	92.8	83.8	105.0
Diffusivility term for industrial buildings	C_d	-	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-
Construction											
100mm concrete	R_i	11322	39.0	41.0	39.0	43.0	51.0	59.0	65.0	65.0	-
Roller Shutter Doors	R_i	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-
Apparent Sound Reduction Index	R'	-	39.0	41.0	39.0	43.0	51.0	59.0	65.0	65.0	-
Log Ratio of Segment Surface Area to Reference Area	10 log (S/S_0)	-	40.5	40.5	40.5	40.5	40.5	40.5	40.5	40.5	-
External											
Sound Power Level of Building Walls	L_w	11322	97.3	96.8	96.7	94.4	84.6	75.2	63.3	54.3	93.9

Calculation of Sound Power radiated by building roof

Quantity	Unit	Area (m^2)	Octave Band Centre Frequency								Overall dB(A)
			63	125	250	500	1000	2000	4000	8000	
Internal											
Internal Sound Pressure Level	$L_{p,in}$	-	100.8	102.3	100.2	101.9	100.1	98.7	92.8	83.8	105.0
Diffusivility term for industrial buildings	C_d	-	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-
Construction											
100mm concrete	R_i	5762	39.0	41.0	39.0	43.0	51.0	59.0	65.0	65.0	-
Apparent Sound Reduction Index	R'	-	39.0	41.0	39.0	43.0	51.0	59.0	65.0	65.0	-
Log Ratio of Segment Surface Area to Reference Area	10 log (S/S_0)	-	37.6	37.6	37.6	37.6	37.6	37.6	37.6	37.6	-
External											
Sound Power Level of Building Roof	L_w	5762	94.4	93.9	93.8	91.5	81.7	72.3	60.4	51.4	90.9

Building Breakout Calculations - Turbine Building

Roof Area (m2)	11712
Walls Area (m2)	21364
Building envelope construction type	Standard industrial cladding
Unattenuated Ventilation Openings?	No
Roller shutter doors?	No

Assumed Reverberant level within building

Octave Band Centre Frequency								Overall dB(A)
63	125	250	500	1000	2000	4000	8000	
71.7	73.2	71.1	72.8	71.0	69.6	63.7	54.7	75.9

Calculation of Sound Power radiated by building walls

Quantity	Unit	Area (m^2)	Octave Band Centre Frequency								Overall dB(A)
			63	125	250	500	1000	2000	4000	8000	
Internal											
Internal Sound Pressure Level	$L_{p,in}$	-	71.7	73.2	71.1	72.8	71.0	69.6	63.7	54.7	75.9
Diffusivility term for industrial buildings	C_d	-	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-
Construction											
Standard industrial cladding	R_i	21364	15.0	16.0	19.0	23.0	26.0	22.0	39.0	39.0	-
Roller Shutter Doors	R_i	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-
Apparent Sound Reduction Index	R'	-	15.0	16.0	19.0	23.0	26.0	22.0	39.0	39.0	-
Log Ratio of Segment Surface Area to Reference Area	10 log (S/S_0)	-	43.3	43.3	43.3	43.3	43.3	43.3	43.3	43.3	-
External											
Sound Power Level of Building Walls	L_w	21364	95.0	95.5	90.4	88.1	83.3	85.9	63.0	54.0	91.1

Calculation of Sound Power radiated by building roof

Quantity	Unit	Area (m^2)	Octave Band Centre Frequency								Overall dB(A)
			63	125	250	500	1000	2000	4000	8000	
Internal											
Internal Sound Pressure Level	$L_{p,in}$	-	71.7	73.2	71.1	72.8	71.0	69.6	63.7	54.7	75.9
Diffusivility term for industrial buildings	C_d	-	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-
Construction											
Standard industrial cladding	R_i	11712	15.0	16.0	19.0	23.0	26.0	22.0	39.0	39.0	-
Apparent Sound Reduction Index	R'	-	15.0	16.0	19.0	23.0	26.0	22.0	39.0	39.0	-
Log Ratio of Segment Surface Area to Reference Area	10 log (S/S_0)	-	40.7	40.7	40.7	40.7	40.7	40.7	40.7	40.7	-
External											
Sound Power Level of Building Roof	L_w	11712	92.4	92.9	87.8	85.5	80.7	83.3	60.4	51.4	88.4

Building Breakout Calculations - Emergency Diesel Generator Building

Roof Area (m2)	1872
Walls Area (m2)	8526
Building envelope construction type	100mm concrete
Unattenuated Ventilation Openings?	No
Roller shutter doors?	No

Assumed Reverberant level within building

Octave Band Centre Frequency								Overall dB(A)
63	125	250	500	1000	2000	4000	8000	
100.8	102.3	100.2	101.9	100.1	98.7	92.8	83.8	105.0

Calculation of Sound Power radiated by building walls

Quantity	Unit	Area (m^2)	Octave Band Centre Frequency								Overall dB(A)
			63	125	250	500	1000	2000	4000	8000	
Internal											
Internal Sound Pressure Level	$L_{p,in}$	-	100.8	102.3	100.2	101.9	100.1	98.7	92.8	83.8	105.0
Diffusivility term for industrial buildings	C_d	-	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-
Construction											
100mm concrete	R_i	8526	39.0	41.0	39.0	43.0	51.0	59.0	65.0	65.0	-
Roller Shutter Doors	R_i	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-
Apparent Sound Reduction Index	R'	-	39.0	41.0	39.0	43.0	51.0	59.0	65.0	65.0	-
Log Ratio of Segment Surface Area to Reference Area	10 log (S/S_0)	-	39.3	39.3	39.3	39.3	39.3	39.3	39.3	39.3	-
External											
Sound Power Level of Building Walls	L_w	8526	96.1	95.6	95.5	93.2	83.4	74.0	62.1	53.1	92.6

Calculation of Sound Power radiated by building roof

Quantity	Unit	Area (m^2)	Octave Band Centre Frequency								Overall dB(A)
			63	125	250	500	1000	2000	4000	8000	
Internal											
Internal Sound Pressure Level	$L_{p,in}$	-	100.8	102.3	100.2	101.9	100.1	98.7	92.8	83.8	105.0
Diffusivility term for industrial buildings	C_d	-	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-
Construction											
100mm concrete	R_i	1872	39.0	41.0	39.0	43.0	51.0	59.0	65.0	65.0	-
Apparent Sound Reduction Index	R'	-	39.0	41.0	39.0	43.0	51.0	59.0	65.0	65.0	-
Log Ratio of Segment Surface Area to Reference Area	10 log (S/S_0)	-	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	-
External											
Sound Power Level of Building Roof	L_w	1872	89.5	89.0	88.9	86.6	76.8	67.4	55.5	46.5	86.0

Building Breakout Calculations - Fire Water Pump House

Roof Area (m2)	675
Walls Area (m2)	960
Building envelope construction type	100mm concrete
Unattenuated Ventilation Openings?	No
Roller shutter doors?	No

Assumed Reverberant level within building

Octave Band Centre Frequency								Overall dB(A)
63	125	250	500	1000	2000	4000	8000	
100.8	102.3	100.2	101.9	100.1	98.7	92.8	83.8	105.0

Calculation of Sound Power radiated by building walls

Quantity	Unit	Area (m^2)	Octave Band Centre Frequency								Overall dB(A)
			63	125	250	500	1000	2000	4000	8000	
Internal											
Internal Sound Pressure Level	$L_{p,in}$	-	100.8	102.3	100.2	101.9	100.1	98.7	92.8	83.8	105.0
Diffusivility term for industrial buildings	C_d	-	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-
Construction											
100mm concrete	R_i	960	39.0	41.0	39.0	43.0	51.0	59.0	65.0	65.0	-
Roller Shutter Doors	R_i	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-
Apparent Sound Reduction Index	R'	-	39.0	41.0	39.0	43.0	51.0	59.0	65.0	65.0	-
Log Ratio of Segment Surface Area to Reference Area	10 log (S/S_0)	-	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8	-
External											
Sound Power Level of Building Walls	L_w	960	86.6	86.1	86.0	83.7	73.9	64.5	52.6	43.6	83.1

Calculation of Sound Power radiated by building roof

Quantity	Unit	Area (m^2)	Octave Band Centre Frequency								Overall dB(A)
			63	125	250	500	1000	2000	4000	8000	
Internal											
Internal Sound Pressure Level	$L_{p,in}$	-	100.8	102.3	100.2	101.9	100.1	98.7	92.8	83.8	105.0
Diffusivility term for industrial buildings	C_d	-	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-
Construction											
100mm concrete	R_i	675	39.0	41.0	39.0	43.0	51.0	59.0	65.0	65.0	-
Apparent Sound Reduction Index	R'	-	39.0	41.0	39.0	43.0	51.0	59.0	65.0	65.0	-
Log Ratio of Segment Surface Area to Reference Area	10 log (S/S_0)	-	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	-
External											
Sound Power Level of Building Roof	L_w	675	85.1	84.6	84.5	82.2	72.4	63.0	51.1	42.1	81.6

Building Breakout Calculations - Auxiliary Boiler Building

Roof Area (m2)	3060
Walls Area (m2)	4216
Building envelope construction type	Standard industrial cladding
Unattenuated Ventilation Openings?	No
Roller shutter doors?	Yes

Assumed Reverberant level within building

Octave Band Centre Frequency								Overall dB(A)
63	125	250	500	1000	2000	4000	8000	
75.8	77.3	75.2	76.9	75.1	73.7	67.8	58.8	80.0

Calculation of Sound Power radiated by building walls

Quantity	Unit	Area (m^2)	Octave Band Centre Frequency								Overall dB(A)
			63	125	250	500	1000	2000	4000	8000	
Internal											
Internal Sound Pressure Level	$L_{p,in}$	-	75.8	77.3	75.2	76.9	75.1	73.7	67.8	58.8	80.0
Diffusivility term for industrial buildings	C_d	-	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-
Construction											
Standard industrial cladding	R_i	4186	15.0	16.0	19.0	23.0	26.0	22.0	39.0	39.0	-
Roller Shutter Doors	R_i	30	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	-
Apparent Sound Reduction Index	R'	-	14.7	15.7	18.3	21.4	23.2	20.7	26.2	26.2	-
Log Ratio of Segment Surface Area to Reference Area	10 log (S/S_0)	-	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	-
External											
Sound Power Level of Building Walls	L_w	4216	92.3	92.9	88.1	86.7	83.1	84.2	72.8	63.8	89.7

Calculation of Sound Power radiated by building roof

Quantity	Unit	Area (m^2)	Octave Band Centre Frequency								Overall dB(A)
			63	125	250	500	1000	2000	4000	8000	
Internal											
Internal Sound Pressure Level	$L_{p,in}$	-	75.8	77.3	75.2	76.9	75.1	73.7	67.8	58.8	80.0
Diffusivility term for industrial buildings	C_d	-	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-
Construction											
Standard industrial cladding	R_i	3060	15.0	16.0	19.0	23.0	26.0	22.0	39.0	39.0	-
Apparent Sound Reduction Index	R'	-	15.0	16.0	19.0	23.0	26.0	22.0	39.0	39.0	-
Log Ratio of Segment Surface Area to Reference Area	10 log (S/S_0)	-	34.9	34.9	34.9	34.9	34.9	34.9	34.9	34.9	-
External											
Sound Power Level of Building Roof	L_w	3060	90.6	91.1	86.0	83.7	78.9	81.5	58.6	49.6	86.7

Building Breakout Calculations - Makeup Water Treatment Building

Roof Area (m2)	777
Walls Area (m2)	928
Building envelope construction type	Standard industrial cladding
Unattenuated Ventilation Openings?	No
Roller shutter doors?	Yes

Assumed Reverberant level within building

Octave Band Centre Frequency								Overall dB(A)
63	125	250	500	1000	2000	4000	8000	
75.8	77.3	75.2	76.9	75.1	73.7	67.8	58.8	80.0

Calculation of Sound Power radiated by building walls

Quantity	Unit	Area (m^2)	Octave Band Centre Frequency								Overall dB(A)
			63	125	250	500	1000	2000	4000	8000	
Internal											
Internal Sound Pressure Level	$L_{p,in}$	-	75.8	77.3	75.2	76.9	75.1	73.7	67.8	58.8	80.0
Diffusivility term for industrial buildings	C_d	-	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-
Construction											
Standard industrial cladding	R_i	898	15.0	16.0	19.0	23.0	26.0	22.0	39.0	39.0	-
Roller Shutter Doors	R_i	30	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	-
Apparent Sound Reduction Index	R'	-	13.9	14.6	16.5	18.2	19.0	17.9	19.9	19.9	-
Log Ratio of Segment Surface Area to Reference Area	10 log (S/S_0)	-	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.7	-
External											
Sound Power Level of Building Walls	L_w	928	86.5	87.3	83.3	83.3	80.8	80.5	72.6	63.6	86.4

Calculation of Sound Power radiated by building roof

Quantity	Unit	Area (m^2)	Octave Band Centre Frequency								Overall dB(A)
			63	125	250	500	1000	2000	4000	8000	
Internal											
Internal Sound Pressure Level	$L_{p,in}$	-	75.8	77.3	75.2	76.9	75.1	73.7	67.8	58.8	80.0
Diffusivility term for industrial buildings	C_d	-	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-
Construction											
Standard industrial cladding	R_i	777	15.0	16.0	19.0	23.0	26.0	22.0	39.0	39.0	-
Apparent Sound Reduction Index	R'	-	15.0	16.0	19.0	23.0	26.0	22.0	39.0	39.0	-
Log Ratio of Segment Surface Area to Reference Area	10 log (S/S_0)	-	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	-
External											
Sound Power Level of Building Roof	L_w	777	84.7	85.2	80.1	77.8	73.0	75.6	52.7	43.7	80.8

Building Breakout Calculations - Lower Activity Waste Management Facility

Roof Area (m2)	8515
Walls Area (m2)	5488
Building envelope construction type	Standard industrial cladding
Unattenuated Ventilation Openings?	No
Roller shutter doors?	Yes

Assumed Reverberant level within building

Octave Band Centre Frequency								Overall dB(A)
63	125	250	500	1000	2000	4000	8000	
75.8	77.3	75.2	76.9	75.1	73.7	67.8	58.8	80.0

Calculation of Sound Power radiated by building walls

Quantity	Unit	Area (m^2)	Octave Band Centre Frequency								Overall dB(A)
			63	125	250	500	1000	2000	4000	8000	
Internal											
Internal Sound Pressure Level	$L_{p,in}$	-	75.8	77.3	75.2	76.9	75.1	73.7	67.8	58.8	80.0
Diffusivility term for industrial buildings	C_d	-	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-
Construction											
Standard industrial cladding	R_i	5458	15.0	16.0	19.0	23.0	26.0	22.0	39.0	39.0	-
Roller Shutter Doors	R_i	30	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	-
Apparent Sound Reduction Index	R'	-	14.8	15.7	18.5	21.7	23.7	21.0	27.3	27.3	-
Log Ratio of Segment Surface Area to Reference Area	10 log (S/S_0)	-	37.4	37.4	37.4	37.4	37.4	37.4	37.4	37.4	-
External											
Sound Power Level of Building Walls	L_w	5488	93.4	93.9	89.1	87.5	83.7	85.1	72.8	63.8	90.6

Calculation of Sound Power radiated by building roof

Quantity	Unit	Area (m^2)	Octave Band Centre Frequency								Overall dB(A)
			63	125	250	500	1000	2000	4000	8000	
Internal											
Internal Sound Pressure Level	$L_{p,in}$	-	75.8	77.3	75.2	76.9	75.1	73.7	67.8	58.8	80.0
Diffusivility term for industrial buildings	C_d	-	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-
Construction											
Standard industrial cladding	R_i	8515	15.0	16.0	19.0	23.0	26.0	22.0	39.0	39.0	-
Apparent Sound Reduction Index	R'	-	15.0	16.0	19.0	23.0	26.0	22.0	39.0	39.0	-
Log Ratio of Segment Surface Area to Reference Area	10 log (S/S_0)	-	39.3	39.3	39.3	39.3	39.3	39.3	39.3	39.3	-
External											
Sound Power Level of Building Roof	L_w	8515	95.1	95.6	90.5	88.2	83.4	86.0	63.1	54.1	91.2

Building Breakout Calculations - Switchgear Building

Roof Area (m2)	2660
Walls Area (m2)	9936
Building envelope construction type	Standard industrial cladding
Unattenuated Ventilation Openings?	No
Roller shutter doors?	No

Assumed Reverberant level within building

Octave Band Centre Frequency								Overall dB(A)
63	125	250	500	1000	2000	4000	8000	
70.8	72.3	70.2	71.9	70.1	68.7	62.8	53.8	75.0

Calculation of Sound Power radiated by building walls

Quantity	Unit	Area (m^2)	Octave Band Centre Frequency								Overall dB(A)
			63	125	250	500	1000	2000	4000	8000	
Internal											
Internal Sound Pressure Level	$L_{p,in}$	-	70.8	72.3	70.2	71.9	70.1	68.7	62.8	53.8	75.0
Diffusivility term for industrial buildings	C_d	-	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-
Construction											
Standard industrial cladding	R_i	9936	15.0	16.0	19.0	23.0	26.0	22.0	39.0	39.0	-
Roller Shutter Doors	R_i	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-
Apparent Sound Reduction Index	R'	-	15.0	16.0	19.0	23.0	26.0	22.0	39.0	39.0	-
Log Ratio of Segment Surface Area to Reference Area	10 log (S/S_0)	-	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	-
External											
Sound Power Level of Building Walls	L_w	9936	90.7	91.2	86.1	83.8	79.0	81.6	58.7	49.7	86.8

Calculation of Sound Power radiated by building roof

Quantity	Unit	Area (m^2)	Octave Band Centre Frequency								Overall dB(A)
			63	125	250	500	1000	2000	4000	8000	
Internal											
Internal Sound Pressure Level	$L_{p,in}$	-	70.8	72.3	70.2	71.9	70.1	68.7	62.8	53.8	75.0
Diffusivility term for industrial buildings	C_d	-	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-
Construction											
Standard industrial cladding	R_i	2660	15.0	16.0	19.0	23.0	26.0	22.0	39.0	39.0	-
Apparent Sound Reduction Index	R'	-	15.0	16.0	19.0	23.0	26.0	22.0	39.0	39.0	-
Log Ratio of Segment Surface Area to Reference Area	10 log (S/S_0)	-	34.2	34.2	34.2	34.2	34.2	34.2	34.2	34.2	-
External											
Sound Power Level of Building Roof	L_w	2660	85.0	85.5	80.4	78.1	73.3	75.9	53.0	44.0	81.1

Building Breakout Calculations - ASG Building

Roof Area (m2)	660
Walls Area (m2)	2544
Building envelope construction type	Standard industrial cladding
Unattenuated Ventilation Openings?	No
Roller shutter doors?	No

Assumed Reverberant level within building

Octave Band Centre Frequency								Overall dB(A)
63	125	250	500	1000	2000	4000	8000	
80.8	82.3	80.2	81.9	80.1	78.7	72.8	63.8	85.0

Calculation of Sound Power radiated by building walls

Quantity	Unit	Area (m^2)	Octave Band Centre Frequency								Overall dB(A)
			63	125	250	500	1000	2000	4000	8000	
Internal											
Internal Sound Pressure Level	$L_{p,in}$	-	80.8	82.3	80.2	81.9	80.1	78.7	72.8	63.8	85.0
Diffusivility term for industrial buildings	C_d	-	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-
Construction											
Standard industrial cladding	R_i	2544	15.0	16.0	19.0	23.0	26.0	22.0	39.0	39.0	-
Roller Shutter Doors	R_i	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-
Apparent Sound Reduction Index	R'	-	15.0	16.0	19.0	23.0	26.0	22.0	39.0	39.0	-
Log Ratio of Segment Surface Area to Reference Area	10 log (S/S_0)	-	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1	-
External											
Sound Power Level of Building Walls	L_w	2544	94.8	95.3	90.2	87.9	83.1	85.7	62.8	53.8	90.9

Calculation of Sound Power radiated by building roof

Quantity	Unit	Area (m^2)	Octave Band Centre Frequency								Overall dB(A)
			63	125	250	500	1000	2000	4000	8000	
Internal											
Internal Sound Pressure Level	$L_{p,in}$	-	80.8	82.3	80.2	81.9	80.1	78.7	72.8	63.8	85.0
Diffusivility term for industrial buildings	C_d	-	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-
Construction											
Standard industrial cladding	R_i	660	15.0	16.0	19.0	23.0	26.0	22.0	39.0	39.0	-
Apparent Sound Reduction Index	R'	-	15.0	16.0	19.0	23.0	26.0	22.0	39.0	39.0	-
Log Ratio of Segment Surface Area to Reference Area	10 log (S/S_0)	-	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	-
External											
Sound Power Level of Building Roof	L_w	660	89.0	89.5	84.4	82.1	77.3	79.9	57.0	48.0	85.0

Building Breakout Calculations - MG Sets breakout from EDG buildings

Roof Area (m2)	1872
Walls Area (m2)	8526
Building envelope construction type	100mm concrete
Unattenuated Ventilation Openings?	No
Roller shutter doors?	No

Assumed Reverberant level within building

Octave Band Centre Frequency								Overall dB(A)
63	125	250	500	1000	2000	4000	8000	
77.8	79.3	77.2	78.9	77.1	75.7	69.8	60.8	82.0

Calculation of Sound Power radiated by building walls

Quantity	Unit	Area (m^2)	Octave Band Centre Frequency								Overall dB(A)
			63	125	250	500	1000	2000	4000	8000	
Internal											
Internal Sound Pressure Level	$L_{p,in}$	-	77.8	79.3	77.2	78.9	77.1	75.7	69.8	60.8	82.0
Diffusivility term for industrial buildings	C_d	-	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-
Construction											
100mm concrete	R_i	8526	39.0	41.0	39.0	43.0	51.0	59.0	65.0	65.0	-
Roller Shutter Doors	R_i	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-
Apparent Sound Reduction Index	R'	-	39.0	41.0	39.0	43.0	51.0	59.0	65.0	65.0	-
Log Ratio of Segment Surface Area to Reference Area	10 log (S/S_0)	-	39.3	39.3	39.3	39.3	39.3	39.3	39.3	39.3	-
External											
Sound Power Level of Building Walls	L_w	8526	73.1	72.6	72.5	70.2	60.4	51.0	39.1	30.1	69.7

Calculation of Sound Power radiated by building roof

Quantity	Unit	Area (m^2)	Octave Band Centre Frequency								Overall dB(A)
			63	125	250	500	1000	2000	4000	8000	
Internal											
Internal Sound Pressure Level	$L_{p,in}$	-	77.8	79.3	77.2	78.9	77.1	75.7	69.8	60.8	82.0
Diffusivility term for industrial buildings	C_d	-	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-
Construction											
100mm concrete	R_i	1872	39.0	41.0	39.0	43.0	51.0	59.0	65.0	65.0	-
Apparent Sound Reduction Index	R'	-	39.0	41.0	39.0	43.0	51.0	59.0	65.0	65.0	-
Log Ratio of Segment Surface Area to Reference Area	10 log (S/S_0)	-	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	-
External											
Sound Power Level of Building Roof	L_w	1872	66.5	66.0	65.9	63.6	53.8	44.4	32.5	23.5	63.1