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1. COVER PAGE

DATAVITA CHAPELHALL DV1, AIRDRIE, ML6 8HW

DV1 External Plant Expansion Noise Impact Assessment for SEPA – Rev 00

Report No. 7843-03-00

6th August 2026

This report is prepared by [redacted] who has over 8 years of conducting environmental noise assessments in Scotland and has been reviewed by [redacted] who has 21 years' experience of undertaking environmental noise impact assessment. Measurements discussed in this report were undertaken by [redacted] unless otherwise stated.	
Client: HFD DataVita Ltd	
Signed (Consultant):	[redacted]

New Acoustics Ltd
Registered in Scotland No 99092
Directors
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DATAVITA CHAPELHALL DV1, AIRDRIE, ML6 8HW

DV1 External Plant Expansion Noise Impact Assessment for SEPA – Rev 00

2 SYNOPSIS

Two separate assessments have been conducted to individually assess

1) noise from proposed fixed plant, including the rooftop plant and transformers which are understood to operate continuously

2) proposed ground level standby generators, which operate infrequently and do not constitute part of the 24/7 noise of the datacentre.

For fixed plant, mitigation includes acoustic louvres to the north of the dry air coolers as well as the existing building parapet which provides visual and acoustic screening. The worst case predicted rated noise levels are ≤+5dB above both daytime and night-time background noise levels under worst-case conditions.

As most of the plant is for ventilation and cooling, these worst-case conditions assume very warm weather for the Scottish climate. The corresponding noise level data used is for the unit's operating at the duty required to cool in these conditions. For most of the year, noise levels are predicted to be lower, and therefore, the rated exceedance over background is also expected to be lower under more typical conditions.

As part of the design, most of the generators have been specified as lower noise variants. This includes improvements to the acoustic design of the generator's container, including higher performance acoustic louvres and exhaust silencer, in order to reduce noise breakout.

The generators will undergo routine daytime testing which is understood to occur one generator at a time. Additionally, on infrequently occasions, up to 4no generators may be required to temporarily supplement the power load of the datacentre. These scenarios are predicted to have a rated exceedance of between +0dB and +2dB above daytime background. These scenarios are understood to not occur at night.

In an emergency scenario during a power cut, all 10no generators would turn on to cover the electrical demand of the datacentre until power can be restored. This would result in rated exceedances over background of +8dB during the day, and +15dB at night. However, it is understood the site has a highly resilient energy connection and has reportedly not experienced any power outages in the last ten years. This historical precedent strongly suggests that the probability of such an event occurring is small. As a result, the associated risk of adverse impact is considered to be significantly reduced.

3 INTRODUCTION

This report is prepared for HFD DataVita Ltd and presents the results of a noise impact assessment (NIA) for new rooftop ventilation and cooling plant, and ground level generators associated with the DataVita Data Centre, 1 York Rd, Chapelhall, Airdrie ML6 8HW.

The purpose of this assessment is to assess noise from new plant associated with the proposals at the nearest noise sensitive receptors (NSRs) on Girvan Crescent, in line with BS 4142:2014 + A1:2019 as required by SEPA.

The existing site is located in a mixed residential, commercial and industrial area within Airdrie. There are existing residential properties located approximately 75m north of the DataVita (DV1) building. Several commercial/industrial premises are located adjacent to the west and south within the wider industrial estate area. Glasgow & Edinburgh Road (A8 dual carriageway) and the M8 motorway are further south.

The extension proposals include developing land immediately to the east of the existing building, which is currently empty land, where 10no new generators will be located, as well as the addition of new plant on the rooftop of the existing building and at ground level immediately adjacent to the building. The existing and proposed site layouts are shown in Appendix 1.

The project Mechanical and Electrical engineers, Wallace Whittle, have provided manufacturers source noise level data for all new proposed plant, along with narrative on operational conditions. Plant noise levels from existing plant have been measured on site by New Acoustics.

Background noise levels have been obtained from the Sandy Brown report (Datavita Noise Impact Assessment I024324-R03-A - July 2024) covering DC02 rooftop plant expansion.

4 NEW PLANT PROPOSALS & DEVELOPMENT CONTEXT

Datavita is a major provider of Data Centre and Connectivity services in Scotland. The purpose of the upgrades to Datavita DV1 (Chapelhall) is to significantly increase the energy and cooling capacity available to the site and fulfil the growing requirements of the Datacentre. The revised scheme is understood to supersede previous expansion proposals for the DV1 site.

Due to the nature of a datacentre, it is understood the plant is operational continuously 24 hours a day, although it may operate at a lower capacity at night due to lower ambient temperatures and hence reduced cooling load.

Note that all new plant covered in this assessment is intended to serve the existing Data Halls. References to DC01 and DC02 relate to the two halves of the existing building. These can be seen visually in Appendix 1.

Typically, plant operates in an 'N+1' configuration which describes the need to have at least 1 additional unit for redundancy in case of unit failure e.g. if 1no Air Conditioning unit is required to serve a room then

there will need to be another installed for redundancy (2no in total) so that if one fails, the other can take over. In normal day to day operation, rather than operating one unit at 100% all the time, with the other remaining switched off, it is typical for the load to be spread proportionally over the number of units available (i.e. in the above example both units will operate at 50% instead of the one unit at 100%). In the majority of cases, spreading the load over multiple units is anticipated to result in a lower overall noise level than running at 100% on fewer units.

However, given most manufacturers provide a single noise level for their units it is not always possible to quantify the reduction in noise which may be obtained by running at a lower speed.

For the larger and higher noise generating plant items including the Dry Air Coolers and Existing Excool AHUs the manufacturers have assisted in providing data for the unit's operating at reduced load. For all other items of plant, due to lack of noise data at lower speeds, the model assumes these are operating at full load with the redundant (+1) units not operational.

The section below outlines the new proposed plant.

4.1 New Plant Proposals

The new plant proposed for the building is as follows:

Ground Level Generator Expansion

- The extension to the east will contain 10no containerised standby generators at ground level for the purpose of providing emergency power to the building in the unlikely event of a power cut. Additionally, they may supplement the power load during peak demand as outlined in Section 8.6.

Other Ground Level Additions

- There will be a total of 14no transformers (ranging from 1600KVA to 4500KVA) at ground floor level which are located within two separate enclosures on the north and east elevations of the building (the model considers all units).
- There are also multiple proposed enclosed control rooms and switchboard rooms, however given the enclosed nature these are not anticipated to generate appreciable noise.

Rooftop Plant Expansion

- The second floor forms the existing rooftop plant deck of the building includes the addition of the following plant items as part of the expansion:

- 4no Airedale chillers (2no for DC02 and 2no for DC01).
- 13no Mitsubishi Air Conditioning condensers - 7no for DC02 and 6no for DC01
- 14no Dry Air Chillers (11no for DC02 and 3no for DC01) These are supported above from second floor slab to allow airflow to the chillers underneath and are accessed via a gantry.
- 1no AHU supplying DC01.

4.2 Existing Plant

The existing datacentre plant includes 6no large & 2no smaller Air Handling Units (AHUs) and approximately 44no Air Conditioning (A/C) units on the roof (operating in an N+1 set up), as well as 2no single height standby generators at ground level to the rear of the building to the south.

5 PREVIOUS PLANNING APPLICATIONS

The following section highlights the planning applications (including those superseded) which are relevant to this development.

5.1 Section 42 Revision 25/01294/S42 - Planning Permitted

The Section 42 revision supersedes the previous noise impact assessments submitted for planning applications 25/00150/FUL. This revision reduced the scope with removal of the plant gantry building, relocation of plant onto the roof of the main DV1 building, and use of containerised standby generators at ground level.

5.2 25/00150/FUL - Planning Permitted

Planning application 25/00150/FUL was submitted with accompanying noise impact assessment from New Acoustics for a larger extension including a dedicated plant gantry building and generator building which have since been reduced in scope in the Section 42 revision (25/01294/S42).

5.3 DC02 Expansion 24/00311/FUL - Planning Permitted

The noise impact assessment for planning application 24/00311/FUL was prepared by Sandy Brown in July 2024 *(Datavita Noise Impact Assessment I024324-R03-A).*

The Sandy Brown report relates to an earlier proposed expansion of DC02 rooftop plant, which has since been superseded by the current proposals assessed in this report.

Planning permission was granted in September 2024 on the basis that the specified mitigation measures in this report (or equivalent) are implemented and verified for the condition to be discharged.

New Acoustics involvement in the Datavita project commenced in November 2024, after submission of this report.

The plant selections and scope of expansion have changed significantly since the Sandy Brown report was produced, including the selection of Dry Air Coolers which are of lower noise level than the previously proposed chillers, and inclusion of plant on DC01 (south side of the building), as well as the additional generators.

6 STANDARDS & GUIDANCE

The SEPA guidance states, *"For most industrial noise impact assessments (where sound levels have been monitored) the environment agencies expect you to follow the criteria and reporting requirements of BS 4142".*

6.1 BS 4142 + A1:2019

"BS 4142:2014 + A1:2019 – Methods for Rating and Assessing Industrial and Commercial Sound" is used to rate and assess "sound of an industrial and/or commercial nature" providing a method of comparing the noise level from identified source(s) with the existing background noise level in the area. It is used to "assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident" in order to determine the degree of impact on the residents.

This is done by comparing the average level of the noise source to be assessed (labelled the 'specific' noise, $L_{Aeq,T}$), rated depending on the acoustic characteristics of the noise, with the background noise level which existed before the noise source was installed (represented by the $L_{A90,T}$). All levels used in the assessment are external to the noise sensitive building being assessed.

The character correction penalties account the presence of certain acoustic features within the specific noise to be assessed at the NSR location (penalties of 0 to +6dB for tonality, 0 to +9dB for impulsivity and 0 to +3dB for intermittency).

This penalty is to be applied based on how perceptible these characteristics will be against the prevailing noise environment, when assessed at the NSR location.

BS 4142:2014+A1:2019 states that the significance of an industrial type noise depends upon both the exceedance over background and the context in which the sound occurs,

starting with "indication of low impact" when the new noise does not exceed the existing background noise (i.e. the rating level is 0dB above background noise level), with an exceedance of around +5dB above the existing background noise level "likely to be an indication of an adverse impact, depending on the context", and an exceedance of +10dB or more "likely to be an indication of significant adverse impact, depending on context". It goes on to say that, "when making assessment and arriving at decisions… it is essential to place the sound in context". Context can mean a number of things including; the time of day the sound occurs, the frequency of occurrence and the noises already present in the surrounding environment.

The BS 4142:2014 assessment period for daytime is 1 hour and for night-time is 15 minutes.

7 NOISE SENSITIVE RECEPTORS (NSRS)

The closest residential NSRs are located on Girvan Crescent, approximately 75m to the north of the existing DV1 Chapelhall building, and 90m north of the proposed new generators. They represent the properties most exposed to noise from the development. The NSR locations are highlighted in Appendix 1, with individual receivers shown in the noise modelling extracts in Appendix 5.

The NSRs are two-storey houses and are therefore assessed to a height of 4m above the relative ground height to represent worst case resultant noise levels at first floor level.

8 PLANT NOISE DATA & OPERATIONAL DESCRIPTIONS

Section 8.1 provides details of the new proposed fixed noise generating plant (provided by Wallace Whittle), Section 8.2 provides noise levels of existing rooftop plant items (combination of New Acoustics measurements, and manufacturers data), and Section 8.3 discusses the proposed standby generators.

8.1 Proposed New Plant Noise Sources

The Sound Power Level (SWL) for each item of proposed plant is provided in Table 8.1. These are either directly supplied in the manufacturer's datasheets provided by Wallace Whittle or calculated as per the notes below the table. Note that redundant units are not included in the model.

Proposed plant layouts are shown in Appendix 2.

Table 8.1 - Plant Source Sound Power Levels L_W (dB Leq) – New Plant													
Location	**Absolute Height (m)**	**Model**	**Quantity in Model**	**Octave Band (Hz)**								
				63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	**dBA**
Rooftop	145.2	DC02 Airedale Chiller	1	81	90	87	86	80	75	69	63	**86**
	145.2	DC01 Airedale Chiller	1	80	89	86	85	79	75	69	64	**85**
	144.7	DC01 / DC02 Battery Room Coolers	3	80	75	72	69	69	63	56	49	**73**
	143.2	DC01 Plantroom AHU	1	62	67	57	48	38	45	42	48	**55**
	149.7	Dry Air Cooler (Day Temp 24°C)*	9 (DC02)	97	92	89	89	85	80	75	68	**90**
	149.7	Dry Air Cooler (Night Temp 17°C)*	2 (DC01)	86	80	78	78	74	68	62	55	**79**
Ground Level	131.0	Transformers**	14	67	70	68	60	59	49	34	29	**64**

* See comments below table on ambient temperature. This noise level applies to the 11no Dry Air Coolers associated with DC02. Note the 3no DC01 chillers operate at a slightly higher fan speed resulting in a noise level 2dB higher (i.e. SWL 92 dB and 81 dB for daytime and night-time respectively).

** The manufacturer has not provided a noise spectrum for the transformers; therefore, a representative spectrum from New Acoustics library data has been applied to the sound power level of 64dBA provided by the manufacturer. Noise from transformers is concentrated in the 100Hz and 200Hz third octave frequency bands (harmonics of the 50Hz fundamental frequency).

8.2 Dry Air Cooler Operation

The noise level generated by the Dry Air Coolers is dependent on the external ambient air temperature, with higher temperatures requiring increased fan speeds to maintain the same cooling capacity.

The Dry Air Cooler manufacturer has provided sound power level data for the unit's operating at representative high end ambient temperatures for the Scottish climate. The temperatures which have been assessed against are 24°C for day-time and 17°C for night-time.

The following information in italics has been provided by the project mechanical engineers Wallace Whittle:

These temperatures are adopted from Test Reference Year (TRY) files, which are the files that are stipulated for determining energy consumption compliance with the Building Regulations in Scotland and the rest of the UK. Given that these files are deemed appropriate for ensuring buildings meet the required energy consumption targets as set by law – and these targets are set to take account of a building's full life carbon impact - it is thought they are the most appropriate for this assessment.

> *Within a TRY weather file for Glasgow, 24°C is above the 99th percentile for summer day-time temperatures and 17°C is above the 98th percentile for night-time temperatures.*
>
> *Based on a TRY file, 24°C will be equalled or exceeded for 0.14% of the summer or 0.21% of all daytime hours. Similarly, 17°C will be equalled or exceeded for 0.16% of summer nights or 0.24% of the year.*

Therefore, these temperatures represent near-peak annual conditions, and for most of the year, temperatures will be lower. Accordingly, noise from the dry air coolers will typically be reduced, and this assessment reflects a worst-case scenario.

8.3 Existing Plant Noise Survey

Individual nearfield measurements of existing external plant associated with Datavita were taken initially on 16th January 2025.

During the initial survey an Excool AHU was measured at full load. A follow up survey was conducted on Tuesday 25th November 2025 to measure the Excool AHU operating at more representative load in the N+1 configuration[1].

It is understood from correspondence with the Datavita, the project mechanical engineers Wallace Whittle, and the AHU manufacturer Excool, that a speed of 70% is representative of daytime operation at 24°C, and 50% is representative of nighttime operation at 17°C.

The calculated sound power levels are shown in Table 8.3.

Table 8.3 – Plant Source Sound Power Levels L_W (dB L_{eq}) – Existing Rooftop Plant

Existing Plant Item	Absolute Height of Unit (m)	Total No of Units	Quantity in Model	Octave Band (Hz)								
				63	125	250	500	1k	2k	4k	8k	dBA
EXCool AHU Intake (70%)	144	6	6	85	98	90	84	83	78	70	63	**88**
EXCool AHU Intake (50%)				84	90	81	76	75	69	63	54	**80**
EXCool AHU Exhaust (70%)	145	6	6	80	86	79	75	72	66	56	49	**78**
EXCool AHU Exhaust (50%)				79	81	82	75	72	65	57	48	**78**
VES MAX13/B/SW/S (AHU)	143	1	1	83	78	81	77	78	71	67	58	**81**
VES MAX17/B/SW/S (AHU)	143	1	1	86	85	83	73	73	67	59	53	**79**
Mitsubishi PUHZ-ZRP100VKA **	143.3	16*	8*	67	65	63	60	58	54	48	41	**63**
Mitsubishi PURY-P300YLM **	143.7	2	2	97	92	88	85	79	71	64	60	**86**
Mitsubishi PUHZ P250YKA **	143.3	20*	10*	78	74	72	70	69	64	59	51	**73**
Mitsubishi PUHZ-ZRP71VHA **	143.3	4*	2*	66	63	61	58	56	52	45	38	**60**

*Understood that at most only 50% of these units will operate at the same time, with the rest for redundancy.
** Noise data obtained from manufacturers literature

For the majority of the nearfield source measurements conducted, the microphone was handheld at heights of approximately 1 – 3m from the ground depending on the

[1] The N+1 configuration is understood to apply to the majority of plant items associated with the datacentre and describes the need to have at least 1 unit for redundancy in case of unit failure. Therefore, while there are 3no Excool AHUs per hall, 1no unit is for redundancy. Typically, the units will spread the load across all 3no units to reduce overall load and would only ever operate at 100% in the event that one of the units has failed.

particular source under test. A pole was used to measure above the Excool AHU at an approximate height of 3.5m above ground.

All items and plant appeared steady and continuous in nature when operating; therefore, all measurements were of short duration (20 seconds) which is considered an appropriate for a steady source.

Further details of the measurement equipment used, and weather conditions are provided in Appendix 4.

8.4 Standby Generator Noise Levels

Individual nearfield measurements of the existing standby generators at Datavita were also taken on 16th January 2025.

The existing generators consist of a single engine enclosed within an attenuated shipping container. The main breakout paths are via the inlet louvre, outlet louvre, case and exhaust as shown in the photographs in Appendix 3.

The measured sound pressure levels at 1m, and calculated sound power levels of the *existing generators* are shown in Table 8.4. The average sound pressure level is L_{Aeq} 73dBA at 1m.

Table 8.4 – Plant Source Sound Power Levels L_W (dB L_{eq}) – Existing Standby Generators

Existing Sound Pressure Level $L_{Aeq,T}$ at 1 meter (dB)	Octave Band (Hz)									Sound Power Level L_{WA} used in model
	63	125	250	500	1k	2k	4k	8k	dBA	
Existing Standby Generator Overall Average Noise Level (Note 1)	82	76	78	70	64	60	59	50	**73**	**96** (Note 6)
Case Breakout Overall Average (Note 2)	78	75	74	69	64	59	55	47	**71**	**94**
Outlet Louvre (Note 3)	85	78	85	67	65	60	53	46	**77**	**92**
Inlet Louvre (Note 4)	86	76	74	67	65	61	58	53	**72**	**87**
Exhaust (Note 5)	88	80	81	71	66	64	69	57	**77**	**88**

Notes

1 Log average of all 24 measurements taken at 1m surrounding the unit.
2 Log average of the 18 measurements where primary noise source was considered to be case breakout
3 log average of the 2 measurements taken of the outlet louvre
4 log average of the 2 measurements taken of the inlet louvre
5 log average of the 2 measurements taken of the exhaust. Exhaust is mounted horizontally. Measurements taken at 1m vertically below exhaust.
6 Overall total considering sound power level of all constituent components listed (i.e. case breakout, outlet, inlet and exhaust).

The proposed generators are understood to be similar to these existing generators and have been specified to achieve the following average noise levels.

- 8no out of the 10no generators will have an average sound pressure level of L_{Aeq} 70dBA at 1m from the unit.
- 2no out of the 10no generators will have an average sound pressure level of L_{Aeq} 75dBA at 1m from the unit.

The sound power levels have been used in the noise model and shifted up to provide the average noise levels at 1m of L_{Aeq} 75dB and L_{Aeq} 70dB (i.e. 2dB higher and 3dB lower than existing generators respectively).

Further details on the generators are provided in Appendix A2.2.

The final generator selection should be reviewed by a suitable qualified acoustic consultant to ensure that noise level output for the generators selected are in line with the above.

8.5 Generator Scenario 1 - Emergency Operation

This represents the worst-case scenario in which the generators will operate in response to a loss of electrical utility, meeting the entire power demand of the datacentre.

Datavita have provided the following commentary on the likelihood of this scenario occurring:

> *"The site has not experienced any utility outages in the last ten years as we have a resilient network connection from the utility, and the utility network has been extremely reliable. The resilient network connection allows routine maintenance of the utility network without any impact to DataVita as an end user. This type of resilient connection is fairly typical for buildings with critical infrastructure and this will continue to be the case for all of our growth plans at this site."*

Based on this, the probability of this scenario occurring is considered to be very low and as confirmed, has not occurred at all in the last 10 years.

8.6 Generator Scenario 2 - Load Support

If the power required by the data centre is more than the incoming electrical utility can handle, the generators switch on to supplement the load of the facility. This is also known as ambient load shedding.

There are two factors which contribute to when this second scenario will be realised; the IT load in the data centre and the external ambient air temperature. It is understood that both of these parameters have to be unusually high for load support to be required.

As the load support scenario is understood to be a highly infrequent occurrence, it has not been included in a cumulative assessment alongside fixed plant, as it will not form part of the everyday noise environment of the Datacentre. Consequently, considering these elements together may reflect a worst-case representation of the situation, which is unlikely to arise in practice.

Based on information provided by Wallace Whittle the building services engineers, the generators will not operate at night for load support or routine testing purposes. The only circumstance where this could occur is in a power cut, which as noted above has not occurred in 10 years due to the resilience of the network and as such is a very low probability.

Further commentary on this scenario provided by Wallace Whittle is provided below:

"The power drawn by the IT installation in the Data Hall varies significantly depending on demand and the greater the IT load in the data centre the less of the utility power is available to carry the load of the supporting plant. The greater the ambient temperature the more power the power the supporting plant requires to generate the required levels of cooling within the Data Hall.

An assessment has been carried out to determine at what external ambient temperature the generators are likely to run at.

DC1 and DC2 are served by separate utility power supplies and so have to be considered separately.

For DC1, when the customer IT demand is at 88% of its maximum the generators will not switch on regardless of the external ambient temperature. When the customer IT demand is at 100%, the generators will switch on at 22°C external ambient.

For DC2, when the customer IT demand is at 88% of its maximum the generators will not switch on regardless of the external ambient temperature. When the customer IT demand is at 100%, the generators will switch on at 23°C external ambient.

Based on the above trend it is anticipated that when the customer IT demand drops between 100% and 88%, the ambient temperature at which the generators will engage rises from 22°C/23°C for both DC1 and DC2.

Using published weather file data it is possible to estimate a number of hours each year that the generators will run. A Test Reference Year (TRY) weather file is the weather file that would be used for energy compliance calculations under the Building Regulations. Looking at the TRY weather file for Glasgow, the maximum overnight temperature (between the hours of 23:00 and 07:00) in a year is 19.4°C. Therefore, the generator sets are not anticipated to run overnight.

From the same weather file, the temperature is above 21°C for 80 hours a year and above 22°C for 46 hours a year.

Therefore, the maximum that the generators are likely to run are for a little over 80 hours on DC1 and a little over 46 hours on DC2. It should be noted that this maximum is highly unlikely to be realised as it would require these high external

ambient temperatures to coincide with an IT load above 88% of the customers maximum. The actual load profile of the customer's IT demand is commercially sensitive, but it is known that the annualised load demand is significantly below 88%"

Additionally,

"There is no scenario in which more than 4 generators will operate in a load support scenario. There are enough generators on the site to power the facility in a utility loss scenario. When the utility connection is intact a maximum of 4 generators would be required to supply the additional power required if the IT demand was very high and the ambient temperature was abnormally high.

As discussed above this would be for a maximum of 80 hours a year (the 46 hours when the temperature is above 22°C noted for DC2 are included in the 80 hours when the temperature is above 21°C noted for DC1) which accounts for less than 1% of the year. The generators will only operate for 80 hours a year if the IT demand is also at 100% during these hours.

It is difficult to predict the exact number of run hours. To predict the number of run hours for a set IT Load it requires the manufacturers to provide power consumption of their equipment at all possible ambient temperatures for that load. It would be too time consuming for them to generate that data for all IT loads and too time consuming to analyse. Between 88% IT load and 100% IT load (the loads which have been assessed) the temperature at which the generators operate will increase as the IT load decreases. I.e. extrapolating from the data available; at 94% IT load the generators will operate at 26°C. This is why Section 8.4 quotes, "the maximum that the generators are likely to run are for a little over 80 hours…", to account for the fact that with higher IT loads and higher temperatures the generators could operate in load support.

It is worth reiterating that operation of the generators for load support requires an overlap of two variables (ambient temperature and IT load) experiencing a very low probability peak at the same time."

8.7 Generator Scenario 3 - Routine Testing & Maintenance

The generators are understood to be routinely tested and maintained. This is conducted one generator at a time and will occur during the daytime only (i.e. not at night).

9 BACKGROUND NOISE MEASUREMENTS

Recent background noise measurements were conducted as part of the DC02 planning report by [redacted] (Datavita Noise Impact Assessment I024324-R03-A - July 2024) as noted in Section 5.3 of this report. The survey was conducted over approximately 6 days in March – April 2024. These are reproduced here with the permission of DataVita.

Further information on the measurement equipment used, including calibration data is provided in Appendix 4.

These measurements have been accepted by the local authority in the granting of planning permission for DC02 and are re-used by New Acoustics in this assessment.

The [redacted] report provides the following summary of background noise levels:

> *"…the prevailing background sound levels at the Girvan Cresent properties would be in the region of $L_{A90,10min}$ 46 - 47 dB during the daytime and $L_{A90,10min}$ 40 dB during the night-time.*

This appears to be based on the lowest background experienced over the survey period. The report also presents a time history of background levels across the six days.

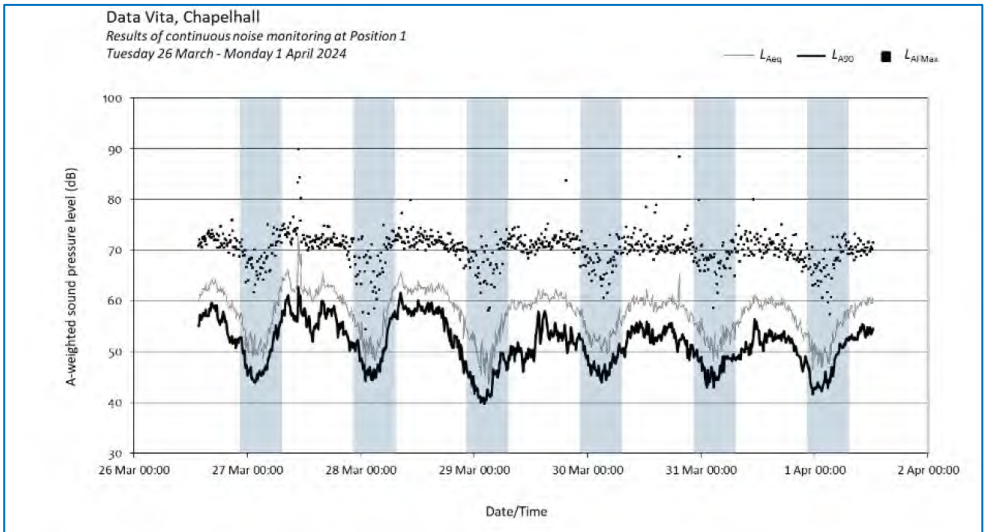


Figure 5 A time history of the noise levels measured at Position 1

Based on the above, the existing background noise is consistently above L_{A90} 50dB during most of the day (e.g. 09:00 – 21:00) and L_{A90} 40-45dB during the night.

10 NOISE MODEL

An ISO 9613-2 (2024) noise model was produced in the environmental noise prediction software CadnaA (Datakustik) Version 2025 MR1 (64bit) Build 211.5558 to predict noise levels at the nearest residential noise sensitive receptors (NSRs).

The default ground absorption within the models was set to 0.5 (mixed ground) representing the mixed concrete and grassy surroundings between the extension and the nearest NSRs. However, localised areas of 0.0 (hard ground) were applied to the yard areas where generators are located which appear to be primarily concrete, and 1.0 (soft ground) for areas which fully comprise of grass/trees (i.e. the land to the east, and sections to the north). A temperature of 10°C and a relative humidity of 70% was used. Buildings were set to reflective (structured façade), with a total of 3no reflections included in the modelling results.

The Datavita generator extension is understood to be on land at a height of approximately 132m. The 2nd floor rooftop plat deck height is approximately 142m, with the parapet extending to a height of approximately 146m. All proposed plant will be below the parapet height with the exception of the Dry Air Coolers, which are mounted approximately 3.5m above the existing parapet height on a plant gantry (absolute height of approximately 149.5m). These will be screened to the north by acoustic louvres as indicated in the dry air cooler sections shown in Appendix 2.

Topographical data for the surrounding area was based on Google Earth and from observations on site. The ground level is ~ 4-7m higher at the nearest NSR locations relative to ground level of the DV1 building, and this is included in the topography of the noise model. The NSR receiver heights are set to 4m relative to ground level to represent the first-floor windows facing towards DataVita (i.e. absolute height of between 139 – 142m depending on the property).

Given the large distance to the nearest houses, the majority of smaller rooftop plant items are modelled as point sources, with the Dry Air Coolers, Airedale Chillers, and Excool AHU Inlet & Outlet being represented as area sources. In each case, the height used in the model is the top height of the unit. The louvres are also modelled as vertical area sources, with noise levels incident on them obtained from receivers located adjacent in CadnaA and with the relevant transmission loss applied.

The generators are containerised units which have a louvred inlet and outlet connections for each generator as well as individually ducted exhaust connections above the unit. The generators are understood to be similar to the existing units on site as shown in Appendix 3. The louvres and case breakout are modelled as area sources, while the exhausts are modelled as point sources.

The ground floor transformers are contained within two separate enclosures, however these are presumed to be open for airflow and to provide negligible noise reduction.

The sound power levels (SWLs) used in the model for each source are provided in Sections 8.1 - 8.4. The NSR receiver locations are shown in Appendix 5.

11 MITIGATION & OPERATIONAL ASSUMPTIONS

A summary of acoustic mitigation requirements and operational assumptions used in the noise modelling and assessments in Sections 12 and 13 are as follows:

A. Acoustic louvres to the north of the Dry Air Coolers at an absolute height of approximately 150m and at least matching the height of the Dry Air Coolers.

B. Acoustic louvres based on the insertion loss of an Allaway AL1515D acoustic louvre. Louvres installed should match the insertion loss as provided in Table 11.1:

Table 11.1 - Insertion Loss Data

Insertion Loss (dB)	Octave Band (Hz)							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Allaway AL1515D Acoustic Louvre	5	5	8	13	22	30	28	23

C. Coolers and Chillers operating at a daytime temperature of 24°C and night-time temperature of 17°C ambient air temperature as outlined in Section 8.2.

D. Existing Excool AHUs operating at 70% maximum during daytime, and 50% during night-time as outlined in Section 8.3.

E. Standby generators not to exceed an average noise level of L_{Aeq} 70dB at 1 meter for 8no of the 10no units, and L_{Aeq} 75dB at 1 meter for the remaining 2no units. Proportion of noise breakout via inlet louvre, outlet louvre and exhaust assumed to be similar to existing units measured on site, outlined in Section 8.4.

F. Routine testing of generators is understood to be conducted during daytime hours only on an individual basis.

G. Load support (where generators provide additional power during times of very high IT load and high external ambient temperature) only expected in summertime conditions during the daytime period only (i.e. not at night) as described in Section 8.6. This corresponds to a maximum of 80 hours for DC01 and 46 hours for DC02 over the year. The model the maximum of 4no units operational in this configuration, using generators with an average noise level of L_{Aeq} 70dB at 1 meter.

H. Note the reduction in average generator noise level to L_{Aeq} 70dB at 1 meter supersedes the requirement for the *acoustic barrier* shown on the site plans (i.e. reducing noise at source by increasing attenuation to the generator enclosure was considered more effective than the barrier). While the barrier is still shown on the drawings, is has not been included in the modelling results shown in Section 13.

12 ASSESSMENT OF CONTINUOUSLY OPERATING FIXED PLANT

Modelled levels from the proposed continuously operating fixed plant are assessed at the NSR locations using BS4142 as required by SEPA.

12.1 Character Correction

The noise from continuously operating fixed plant is not expected to contain readily distinguishable intermittent or impulsive characteristics and based on the overall predicted octave noise spectrum at the NSRs (including all plant items), does not appear to contain obvious tonality with the resolution provided by octave band data.

However, given the industrial nature of the sound, a character correction penalty of +3dB for 'other sound characteristics' is included to account for the fact that the sound may be distinguishable from the residual acoustic environment.

12.2 Assessment of Fixed Plant Noise

The calculated external noise levels from fixed plant (not including standby generators) at the worst-case receptors NSR3 and NSR4 are presented for daytime and night-time scenarios in Table 12.2. Assessments at other nearby NSRs is presented in Appendix 5.

Achieving the predicted noise levels shown is contingent on the mitigation and operational assumptions set out in Section 11.

Table 12.2 – BS4142 Assessment of Continuously Operating Fixed Plant

Scenario	Time of Day	Specific Noise Level, $L_{Aeq,T}$ (dB)	BS4142 Rating Level, $L_{Ar,T}$ (dB)	Background Noise Level, $L_{A90,T}$ (dB)	Rated Exceedance over Background (dB)
Fixed Plant	Daytime (T=1 hour)	48	51	47	+4
	Night-Time (T=15 mins)	40	43	40	+3

The predicted rated daytime external noise level from all fixed plant (excluding standby generators) at NSR3 and NSR4 is L_{Ar} 51dB, which is +4dB above the daytime background.

In context, this assessment is made using noise level data for the dry air coolers operating at a daytime ambient temperature of 24°C which is only expected to occur on the hottest summer days as discussed in Section 8.2. For the vast majority of the year, the predicted noise levels will be lower (e.g. noise levels are predicted to reduce to L_{Ar} 43dB at a temperature of 17°C).

Additionally, 24°C is only expected during the middle of the day, when background noise levels from motorway traffic and the surrounding roads will be highest.

Based on the Sandy Brown six-day survey, background noise levels during the middle of the day are consistently above L_{A90} 50dB and are often above L_{A90} 55dB, therefore, during these times of day, the exceedance would fall in the range of -4dB to +1dB.

At nighttime the dry air coolers units operate at a lower speed due to the lower ambient temperature of 17°C, and the predicted rated exceedance over the night-time background is +3dB. Similarly, 17°C is only expected on the hottest summer nights, and likely not in the middle of the night when the background noise levels are lowest.

Given this context, the likelihood of adverse impact is considered low.

13 ASSESSMENT OF STANDBY GENERATORS

Noise from the proposed standby generators are assessed at the NSR locations using BS4142 as required by SEPA.

13.1 Character Correction

Standby generators typically have a low frequency noise characteristic which may make them more perceptible. However, considering the site location within an existing industrial estate, with regular industrial noise from vehicles and plant, and given the background noise from motorway road traffic is high in this area during both day and night-time periods, the perception of this may be reduced. The distance between the proposed standby generator location and the nearest NSRs is at least 90m.

On a precautionary basis the following character correction penalties are applied to the standby generators.

+3dB for intermittency & +2dB for tonality

Total Rating + 5dB

13.2 Assessment of Standby Generators

The BS 4142 assessment of noise from the 10no. proposed standby generators are shown for both the daytime and nighttime periods in Table 13.2.2 below.

There are three scenarios considered, representing the types of operation expected from the generators – including emergency operation, load support and routine testing. Each scenario is explained in the notes underneath the table.

In all scenarios, the worst-case exceedance is at either NSR 3 or NSR4 which are the closest NSRs to the generators. Assessments at other nearby NSRs is presented in Appendix 5.

Table 13.2.2 – BS4142 Assessment of Proposed New Standby Generators

Scenario	Time of Day	Specific Noise Level, $L_{Aeq,T}$ (dB)	BS4142 Rating Level, $L_{Ar,T}$ (dB)	Background Noise Level, $L_{A90,T}$ (dB)	Rated Exceedance over Background (dB)
Emergency Operation (See Note A)	Daytime (T=1 hour)	50	55	47[D]	+8
	Night-Time (T=15 mins)			40[D]	+15
Load Support (See Note B)	Daytime (T=1 hour)	44	49	47[D]	+2
	Night-Time (T=15 mins)	N/A	N/A	N/A	N/A
Routine Testing (See Note C)	Daytime (T=1 hour)	42	47	47[D]	+0
	Night-Time (T=15 mins)	N/A	N/A	N/A	N/A

Notes:

A) Assumes all 10no generators operating at full load. These are assumed to be operating for 100% of the assessment period i.e. 1 hour during the day and 15 minutes at night. 8no of these units are an average 70dBA at 1m, while 2no of the pre-purchased units are 75dBA at 1m.

B) Load support is where generators provide additional power to the datacentre to supplement the grid during times of high datacentre IT load coinciding with high external ambient temperatures i.e. high cooling load. Wallace Whittle have confirmed, As noted in Section 8.6 *There is no scenario in which more than 4 generators will operate in a load support scenario. There are enough generators on the site to power the facility in a utility loss scenario. When the utility connection is intact a maximum of 4 generators would be required to supply the additional power required if the IT demand was very high and the ambient temperature was abnormally high.*

C) Assumes only one generator being tested at a time, based on the closest generators to the NSRs. Based on a worst-case assessment using 75dBA at 1m generator closest to NSRs, and operational for the full 1 hour assessment period.

D) Background noise level used in assessment based on Sandy Brown survey results from Section 9.

The assessment above for emergency operation, which assumes all 10no. proposed standby generators operating simultaneously during a power cut results in rated exceedances of +8dB over the daytime background and +15dB over the nighttime background.

While these exceedances are indicative of an adverse impact according to BS 4142, it should be noted that this scenario of emergency operation is highly unlikely. Notably there are understood to have been no power outages in the last ten years, as outlined by correspondence with Datavita:

> *"The site has not experienced any utility outages in the last ten years as we have a resilient network connection from the utility and the utility network has been extremely reliable. The resilient network connection allows routine maintenance of the utility network without any impact to DataVita as an end user. This type of resilient connection is fairly typical for buildings with critical infrastructure and this will continue to be the case for all of our growth plans at this site."*

Therefore, given the above resilience of the connection currently afforded to DV1, no additional mitigation is proposed for emergency operation, as it is extremely unlikely this scenario will occur.

It is understood that the load support scenario and routine testing of the generators will be conducted during daytime hours only when background noise level is significantly higher.

The scenario of load support may see up to 4no generators operating continuously. This scenario results in a rated exceedance of +2dB above the daytime background. The generators which will facilitate this will have an average noise level of 70dBA at 1m and be located as shown in Appendix 2.2.

Routine testing of generators is understood to occur one at a time. Based on the generators located closest to the NSRs, the worst-case rated exceedance for routine testing is +0dB above background. This is based on a generator with an average noise level of 75dBA at 1m, located as shown in Appendix 2.2.

These exceedances are based on a daytime background noise level of L_{A90} 47dB, which is only expected during the early morning and late evening periods. If operated during regular daytime hours when the background noise is above L_{A90} 50dB, then the rated exceedance for both scenarios will be below background.

Given the industrial context of the area and the fact that load support and routine testing will occur during daytime hours only, the likelihood of an adverse impact from these scenarios is considered low.

No further mitigation is proposed beyond the reduced noise level generators which have been specified (i.e. reduction in noise from 75dBA at 1m to 70dBA at 1m for 8no of the 10no generators - including all generators used for load support). Note this reduction in generator noise level supersedes the requirement for the *acoustic barrier* shown on the site plans.

14 DISCUSSION/CONCLUSION

Two separate assessments have been conducted to individually assess noise from proposed fixed plant including the rooftop plant and transformers which are understood to operate continuously, and proposed ground level standby generators, which operate infrequently and do not constitute part of the 24/7 noise of the datacentre.

Both assessments are conducted in line with BS4142 as required by SEPA.

14.1 Fixed Plant

For the fixed plant noise assessments, the worst case predicted exceedances over background are +4dB during the daytime, and +3dB at night.

This is based on noise level data for the dry air coolers and excool AHUs (the dominant items of fixed plant) operating at representative high end ambient temperatures for the Scottish climate of 24°C for day-time and 17°C for night-time. These temperatures represent near-peak annual conditions, and for most of the year, temperatures will be lower. Accordingly, noise from these items of plant will typically be reduced, and this assessment reflects a worst-case scenario.

Given the context of how infrequently these temperatures will occur, the probability of adverse impact is considered to be low.

Therefore, no further mitigation is proposed for daytime fixed plant noise beyond that stated in Section 11.

14.2 Standby Generators

The outcome of the BS 4142 assessment of noise from the emergency generators shows exceedances of +8dB over the daytime background and +15dB over the nighttime background. This is based on an *emergency scenario* during a power cut where all 10no generators are operational.

BS 4142 emphasises the importance of context when concluding on the potential impact. As outlined in Section 13.2.2, the Datavita Chapelhall site has not encountered a single power cut in the last 10 years, due to resilience built into the energy network, which is understood to be typical of buildings with critical infrastructure.

Therefore, over the past ten years, there have been no documented occurrences resembling the modelled emergency scenario. This historical precedent strongly suggests that the probability of such an event occurring is small. As a result, the associated risk of adverse impact is considered to be significantly reduced.

Two additional daytime scenarios were modelled to represent *load support*, where up to 4no generators may be required to provide supplementary power during periods of high load, and

routine testing, where one generator is tested at a time. The results indicate a rated level of +2 dB and +0dB above background noise level respectively. Considering the acoustic context of the area this outcome suggests that these scenarios are unlikely to result in an adverse acoustic impact.

APPENDIX 1 – SITE LOCATION & PROPOSALS

The datacentre is in the process of expanding capabilities in line with current and future demands.

This includes expansion of rooftop plant for the existing rooftop DC01 and DC02 areas (southern and northern half of the existing building respectively) as well as the addition of 10no containerised generators at ground level in the extension area indicated.

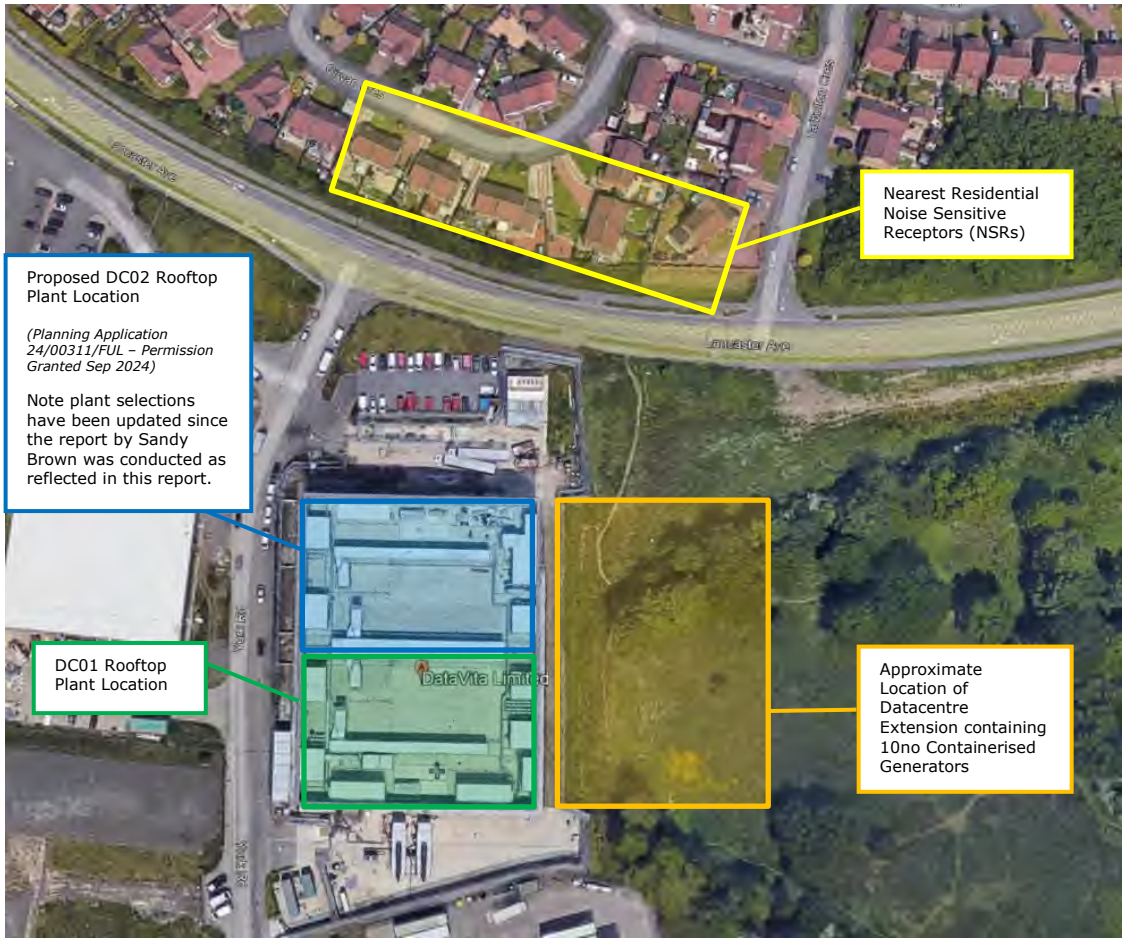


Figure A1.1 – Development Phases & NSR Location (Google Earth Imagery © Google Earth 2024)

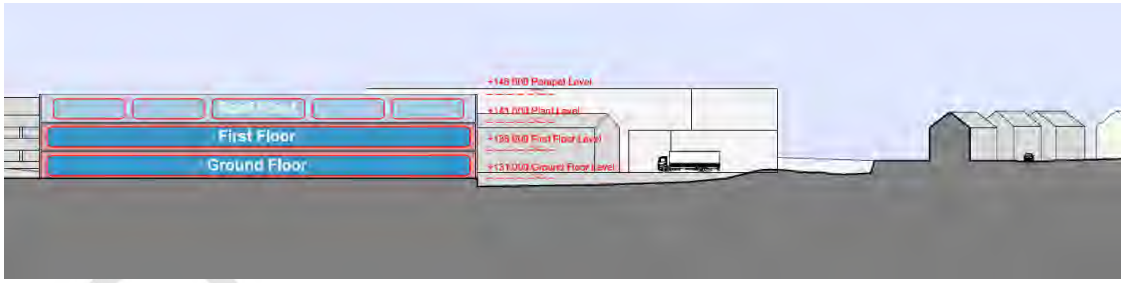


Figure A1.2 – Section drawing (approximately facing west) showing relative heights of rooftop plant/top of parapet relative to the nearest houses on Girvan Crescent.

Figure A1.3 – Google Earth 3D View (Google Earth Imagery © Google Earth & Airbus 2024)

The proposed site layout is shown in Figure A1.4, showing the extension of the site to the east.

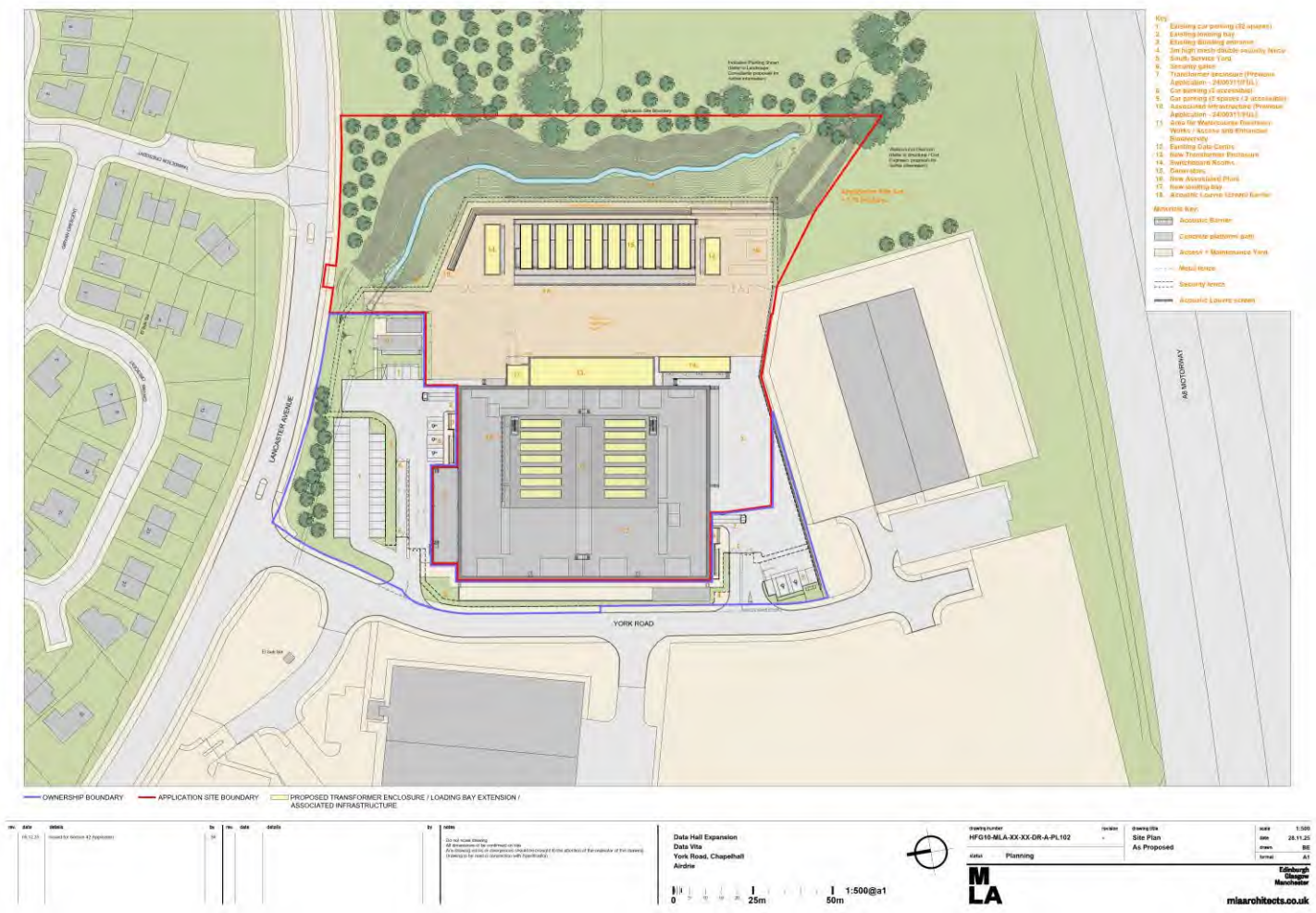


Figure A1.4 – Proposed Site Layout

The existing site layout is shown in Figure A1.5.

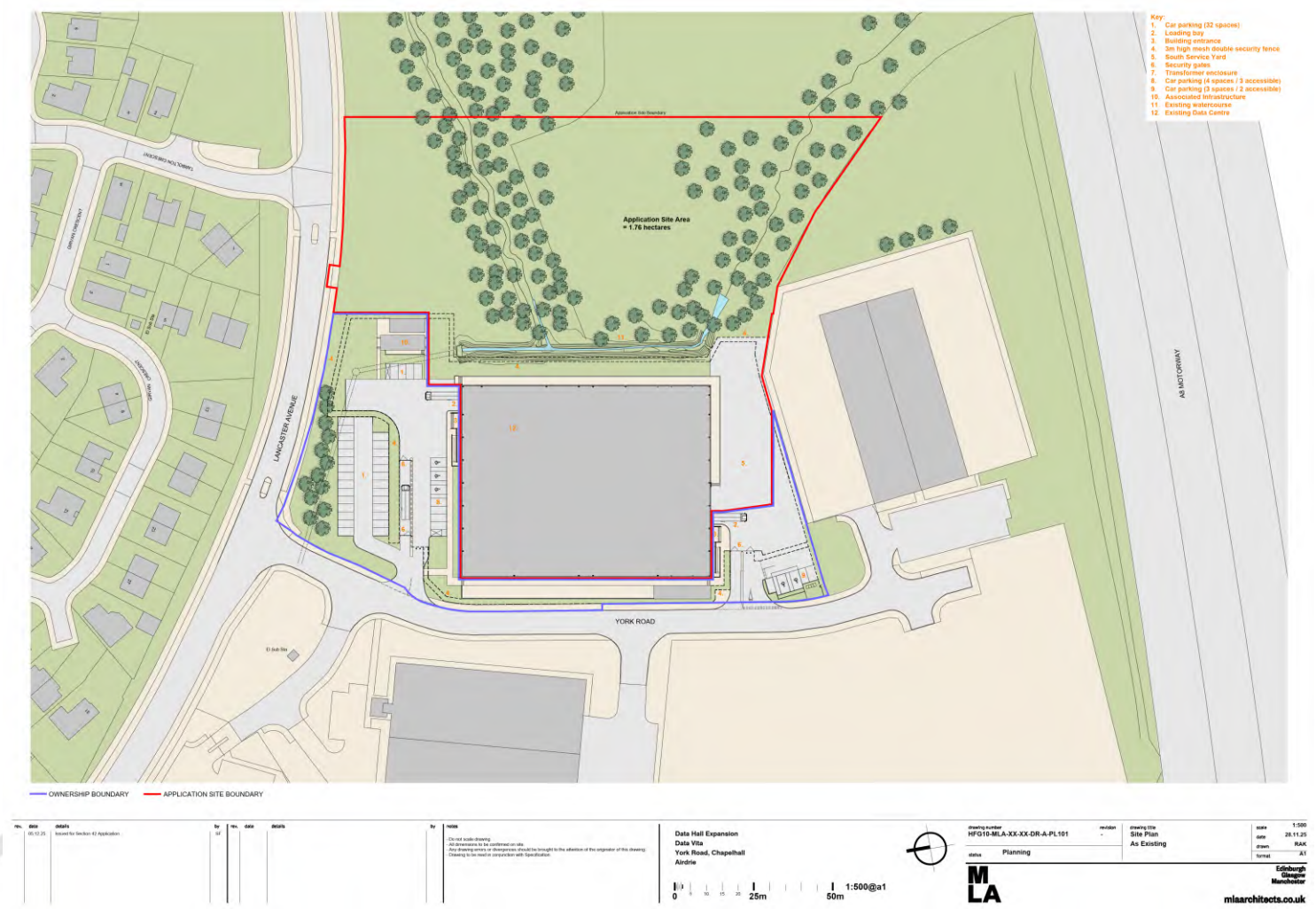


Figure A1.5 – Existing Site Layout

APPENDIX 2 – PROPOSED PLANT LAYOUTS

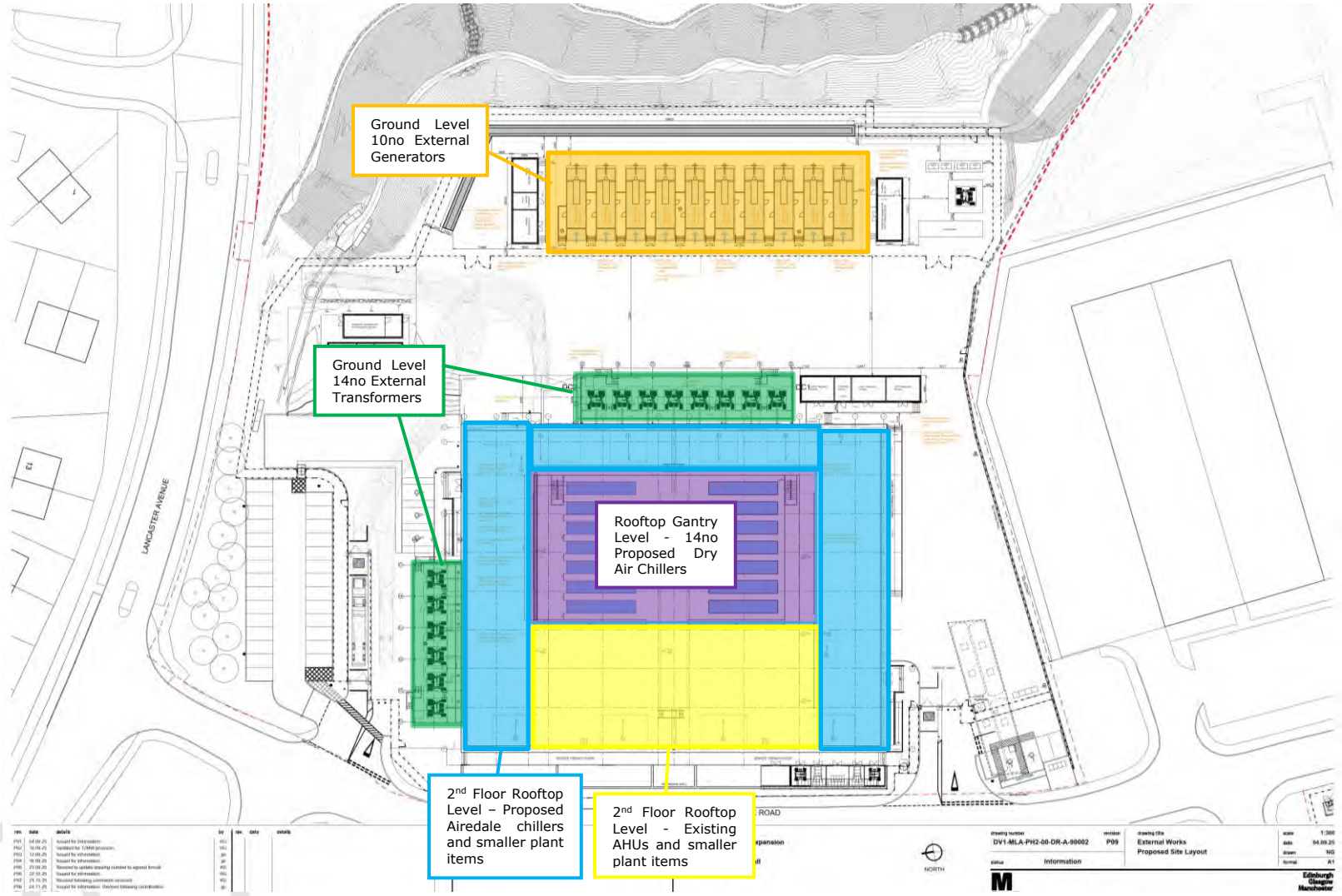


Figure A2.1 – Proposed Plant Location Summary

Proposed Generators

The current proposals include for 10no containerised standby generators to the east of the existing building at ground level. It is understood these will be similar to the existing generators, as photographed in Appendix 3.

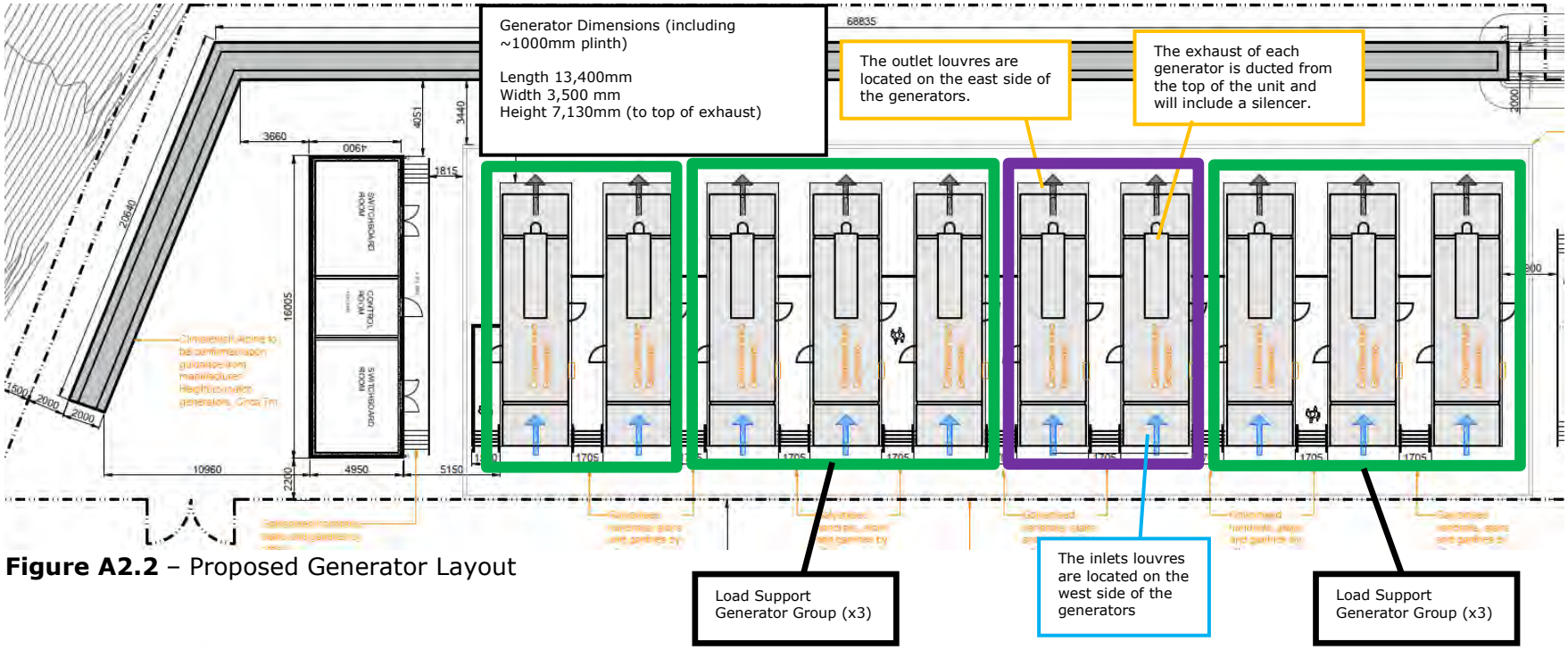


Figure A2.2 – Proposed Generator Layout

KEY

Average Noise Level 75dBA at 1m*

Average Noise Level 70dBA at 1m**

*These units are understood to have been pre-purchased and will operate at an average noise level of 75dBA at 1m. The proposal is for these units to be used for routine testing and emergency use only.

**These units have additional acoustic attenuation applied following design development and operate at an average noise level of 70dBA at 1m. These lower noise units will be used for the load support scenario as well as routine testing and emergency operation.

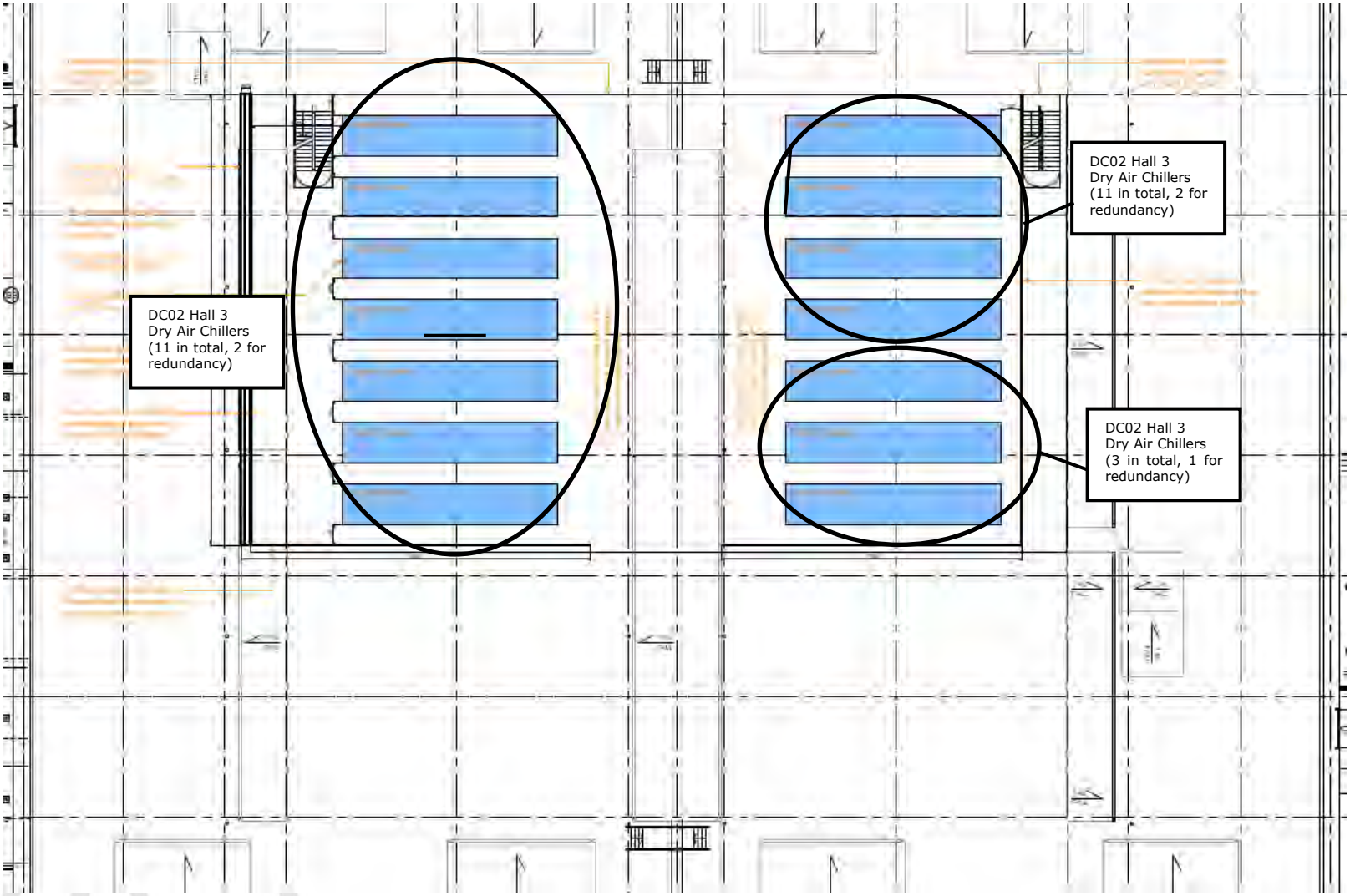


Figure A2.3 – Proposed Dry Air Cooler Layout

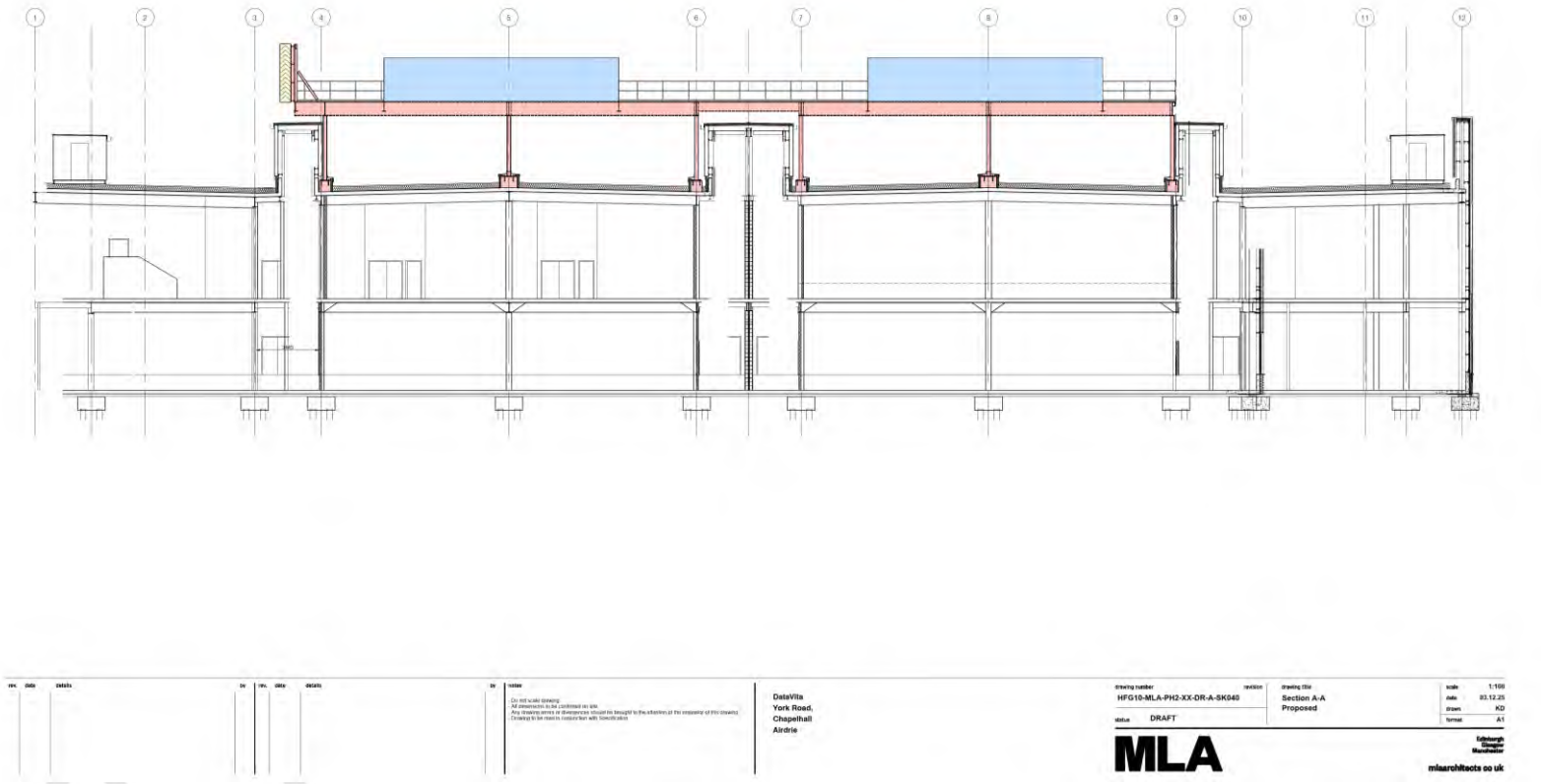


Figure A2.4 – Proposed Dry Air Cooler Section

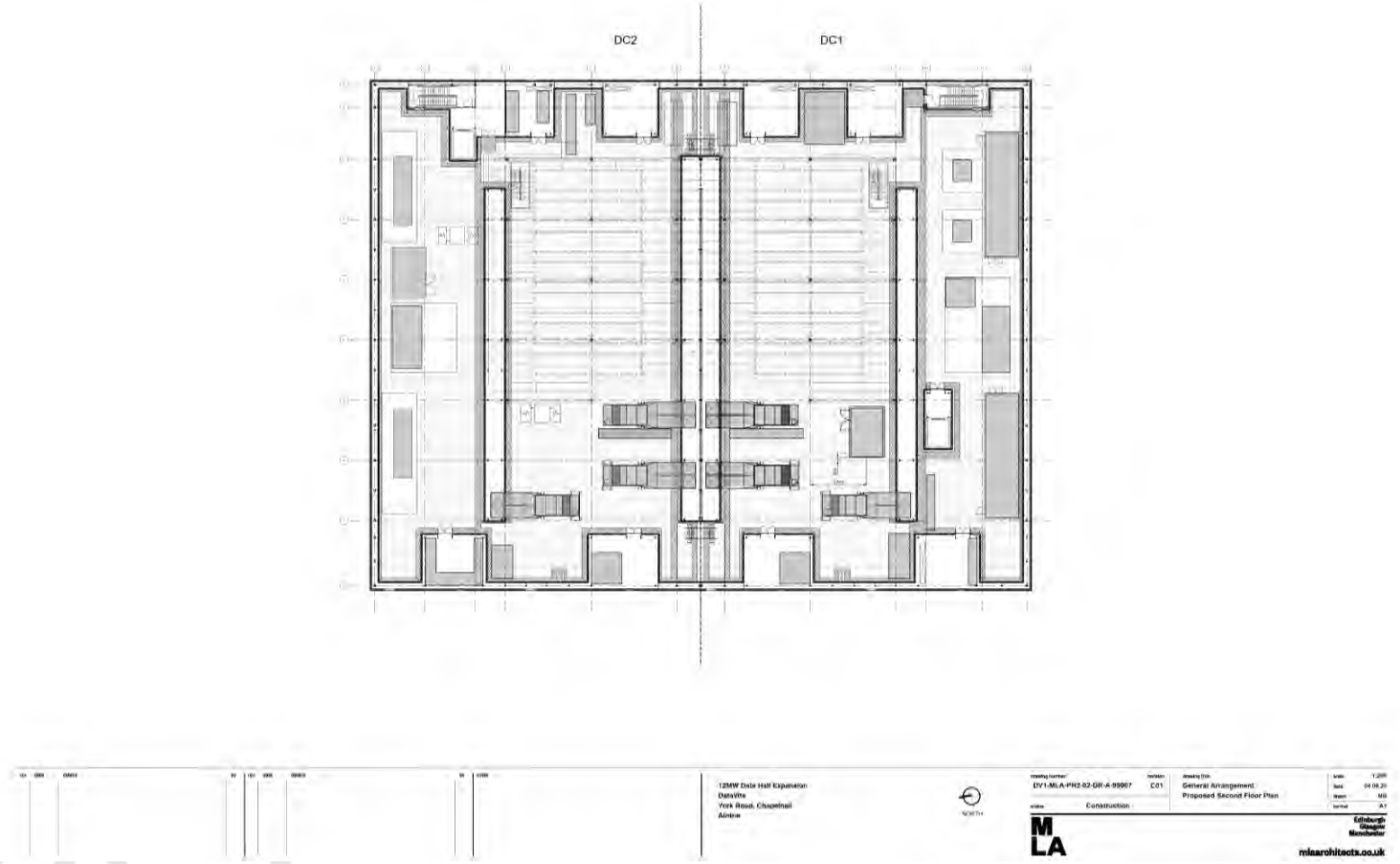


Figure A2.5 – Rooftop plant layout

APPENDIX 3 – PHOTOGRAPHS OF EXISTING GENERATORS

Figure A3.1 – Photograph of existing generator (side)

Figure A3.2 – Photograph of existing generator (facing inlet louvre)

Figure A3.3 – Photograph of existing generator (facing outlet louvre and exhaust)

APPENDIX 4 – MEASUREMENT EQUIPMENT

All measurements conducted by New Acoustics were made using a Bruel & Kjaer Type 2250 sound level meter fitted (serial no 3027918) with standard foam windshield Type UA 1650. The meter was calibrated before and after the measurements using a B&K Type 4231 sound level meter calibrator. The calibration drifts over the measurement period were +0.023 dB on 16th January 2025, and +0.083 dB on 25th November 2025. The measurements were attended throughout.

All measurements were made in third octave bands from 12.5Hz to 20kHz across the normal range of parameters and were attended throughout the measurement periods.

Weather conditions during measurements on 15th January 2025 were dry and clear with variable wind direction at speeds of less than 5m/s and temperatures of 8 - 10°C.

Weather conditions during measurements on 25th November 2025 were dry and clear with a predominantly SW wind direction at speeds of less than 5m/s and temperatures of 1 - 2°C.

Calibration certificates for the New Acoustics B&K 2250 and the calibrator covering the time periods of the surveys are provided on the following pages.

Calibration information for the [redacted] measurements as listed in the report Datavita Noise Impact Assessment I024324-R03-A - July 2024 is provided below. The measurements were conducted by [redacted]

Appendix A

Survey details

A1 Equipment

Table A1 Equipment details

Equipment description	Type/serial number	Manufacturer	Calibration expiry	Calibration certification number
2250				
Sound level meter	2250/3010038	Brüel & Kjær	8 Dec 25	UCRT23/2554, UCRT23/2555
Microphone	4189/3036540	Brüel & Kjær	8 Dec 25	UCRT23/2554, UCRT23/2555
Pre-amp	ZC-0032/31255	Brüel & Kjær	8 Dec 25	UCRT23/2554, UCRT23/2555
Calibrator	4231/3016410	Brüel & Kjær	4 Dec 25	UCRT23/2539
NL-52E				
Sound level meter	NL-52/00242703	Rion	10 Oct 25	TCRT23/1723
Microphone	UC-59/15771	Rion	10 Oct 25	TCRT23/1723
Pre-amp	NH-25/32731	Rion	10 Oct 25	TCRT23/1723
Calibrator	NC-75/34291324	Rion	10 Oct 25	TCRT23/1721
948B				
Vibration meter	SVAN948/9363	Svantek	23 Sep 24	TCRT22/1600
Accelerometer	3233A/188	Dytran	23 Sep 24	TCRT22/1597
Vibration Calibrator	4294/2602875	Brüel & Kjær	27 Sep 24	TCRT22/1599

Calibration of the sound level and vibration meters used for the measurements is traceable to national standards. The calibration certificates for the meters are available upon request.

The sound level meters and microphones and vibration meter were calibrated at the beginning and end of the measurements using a dedicated sound level calibrator and vibration exciter. No significant deviations in calibration occurred.

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 09 May 2023

Certificate Number: UCRT23/1618

Calibrated at & Certificate issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory [redacted]

CUSTOMER	New Acoustics Ltd Titan Enterprise 1 Aurora Avenue Queens Quay Clydebank G81 1BF
ORDER No	BK22502023
Job No	UKAS23/05316
DATE OF RECEIPT	03 May 2023
PROCEDURE	Procedure TP 9 - Calibration of Filters

IDENTIFICATION	*Manufacturer*	*Model*	*Serial No*
Filters in sound level meter	Brüel & Kjær	2250	3027918

CALIBRATED ON	09 May 2023
PREVIOUS CALIBRATION	Calibrated on 10 May 2021 Certificate No. UCRT21/1588 issued by this laboratory.

CERTIFICATE OF CALIBRATION

UKAS ACCREDITED CALIBRATION LABORATORY No 0653

Certificate N° UCRT23/1618

The sound level meter was calibrated in accordance with the manufacturer's instructions, using an appropriate sound level calibrator, prior to measurements being carried out on the filters. The sound level meter has also undergone a full verification procedure, see certificate UCRT23/1616 issued by this laboratory. The manufacturer claims that the filters were designed in accordance with the Class 0 octave and Class 0 third octave requirements of IEC 61260:1995, and these tolerances are given with the results in this certificate. Base 10 test frequencies have been used throughout the filter calibration, in accordance with manufacturers' information.

Inter-band level accuracy test

The meter was set to the single measurement range and the 1 kHz octave filter was selected. A 1 kHz sinusoidal signal was then injected and adjusted to give a reading of 94.0 dB. Following this each filter band was selected in turn, the signal frequency was adjusted to the centre-frequency of the filter, and the sound level meter reading relative to that for the 1 kHz band was noted. A similar test was carried out for the Z setting using a 1 kHz signal.

These tests were then repeated for third octave filters, readjusting the signal level for the 1 kHz filter where necessary.

As the tolerance at the centre frequency in each band is ± 0.15 dB , it is expected (but not explicitly required in IEC 61260:1995), that the relative levels at each centre frequency shall lie within this spread. Not all bands tested met this expectation. Points where this is the case are marked by a red cross immediately to the right of the result in the tables which follow.

Filter shape test

Using the same measurement range as above, the 1 kHz octave filter was again selected. A sinusoidal signal at the centre frequency of 1 kHz was injected, and its level adjusted to give a reading of 134.0 dB. The frequency of the input signal was then changed to each of the values shown in the table of results in turn, and the new meter reading was noted. Two further octave bands (as shown) were then selected and tested in the same manner, with the signal level being set at the new centre frequency in each case.

The above tests were repeated for the 1 kHz and two other third octave bands (as shown).

All bands tested met the requirements of the standard, which are shown with the results.

CERTIFICATE OF CALIBRATION

UKAS ACCREDITED CALIBRATION LABORATORY No 0653

Certificate N° UCRT23/1618

Uncertainties

The laboratories expanded measurement uncertainties are estimated as ± 0.16 dB at the centre frequency & at other frequencies within the pass-band of the filter, and ± 0.20 dB for frequencies outside the pass-band. **The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor *k*=2, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.**

NOTES

1 The attenuation figures given in the table(s) of filter shapes refer to the meter reading at the given frequency relative to that at the centre frequency in question. The required value is denoted as Δ in the column showing attenuation limits.

2 Since the tests carried out cover only a limited subset of the content of IEC 61260:1995, the results obtained do not confer compliance with the full requirements of that standard, and are applicable only to those filter bands tested.

3 Any linearity errors which the sound level meter may exhibit are included in the filter errors shown in this certificate. Since the meter errors may vary with frequency, it cannot be assumed that they are the same as those given in certificate number UCRT23/1616

4 The following firmware was in use at the time of the testing:

Identification	Version
BZ 7223	4.7.6

CERTIFICATE OF CALIBRATION	Certificate N° UCRT23/1618
UKAS ACCREDITED CALIBRATION LABORATORY No 0653	Page 4 of 7 Pages

1/1 octave filters: Inter-band accuracy

Band (Hz)	Error, dB
4	N/A
8	N/A
16	0.0
31.5	0.0
63	0.0
125	0.0
250	0.0
500	0.0
1000	Ref
2000	0.0
4000	0.0
8000	0.0
16000	-0.9
31500	N/A
Z @ 1 kHz	0.0

x

1/1 octave filters: Filter shape

1000 Hz band		250 Hz band		4000 Hz band		Attenuation
Freq, Hz	Atten, dB	Freq, Hz	Atten, dB	Freq, Hz	Atten, dB	limits, dB
63.096	82.2	15.849	82.2	251.190	82.2	$75.0 \le \Delta \le \infty$
125.893	63.8	31.623	63.8	501.191	63.8	$62.0 \le \Delta \le \infty$
251.189	44.6	63.096	44.6	1000.01	44.5	$42.5 \le \Delta \le \infty$
501.187	20.7	125.893	20.7	1995.28	20.7	$18.0 \le \Delta \le \infty$
707.946	3.6	177.829	3.6	2818.40	3.6	$-0.15 \le \Delta \le 4.5$
771.792	0.8	193.866	0.8	3072.58	0.9	$-0.15 \le \Delta \le 1.1$
841.395	0.1	211.350	0.1	3349.68	0.1	$-0.15 \le \Delta \le 0.4$
917.276	0.0	230.411	0.0	3651.77	0.0	$-0.15 \le \Delta \le 0.2$
1000.00	Ref	251.190	Ref	3981.10	Ref	$-0.15 \le \Delta \le 0.15$
1090.18	0.0	273.843	0.0	4340.13	0.0	$-0.15 \le \Delta \le 0.2$
1188.50	0.1	298.540	0.1	4731.55	0.0	$-0.15 \le \Delta \le 0.4$
1295.69	0.8	325.464	0.9	5158.26	0.8	$-0.15 \le \Delta \le 1.1$
1412.54	3.6	354.815	3.6	5623.45	3.5	$-0.15 \le \Delta \le 4.5$
1995.26	21.2	501.190	21.2	7943.34	21.1	$18.0 \le \Delta \le \infty$
3981.07	93.8	1000.01	93.5	15849.0	94.8	$42.5 \le \Delta \le \infty$
7943.28	>101.0	1995.27	>101.0	31623.0	87.6	$62.0 \le \Delta \le \infty$
15848.9	>101.0	3981.09	>101.0	63096.2	85.0	$75.0 \le \Delta \le \infty$

CERTIFICATE OF CALIBRATION	Certificate N° UCRT23/1618
UKAS ACCREDITED CALIBRATION LABORATORY No 0653	Page 5 of 7 Pages

1/3 octave filters: Inter-band accuracy

Band (Hz)	Error, dB
4	N/A
8	N/A
16	-0.1
31.5	-0.1
63	-0.1
125	0.0
250	0.0
500	0.0
1000	Ref
2000	0.0
4000	0.0
8000	0.0
16000	-0.9
31500	N/A
Z @ 1 kHz	0.0

Band (Hz)	Error, dB
5	N/A
10	N/A
20	-0.1
40	-0.1
80	0.0
160	0.0
315	0.0
630	0.0
1250	0.0
2500	0.0
5000	0.0
10000	-0.1
20000	0.2

Band (Hz)	Error, dB
6.3	N/A
12.5	0.0
25	-0.1
50	-0.1
100	0.0
200	0.0
400	0.0
800	0.0
1600	0.0
3150	0.0
6300	0.0
12500	-0.5
25000	N/A

1/3 octave filters: Filter shape

1000 Hz band	
Freq, Hz	Atten, dB
185.460	83.5
327.480	66.6
531.430	48.3
772.570	23.3
891.260	3.7
919.580	0.6
947.190	0.0
974.020	0.0
1000.00	Ref
1026.67	0.0
1055.75	0.0
1087.46	0.6
1122.01	3.7
1294.37	23.3
1881.73	48.5
3053.65	>101.0
5391.95	>101.0

160 Hz band	
Freq, Hz	Atten, dB
29.394	83.6
51.902	66.7
84.226	48.3
122.445	23.3
141.256	3.7
145.744	0.6
150.120	0.1
154.372	0.0
158.490	Ref
162.717	0.0
167.326	0.1
172.352	0.6
177.827	3.7
205.145	23.3
298.235	49.7
483.973	>101.0
854.570	88.2

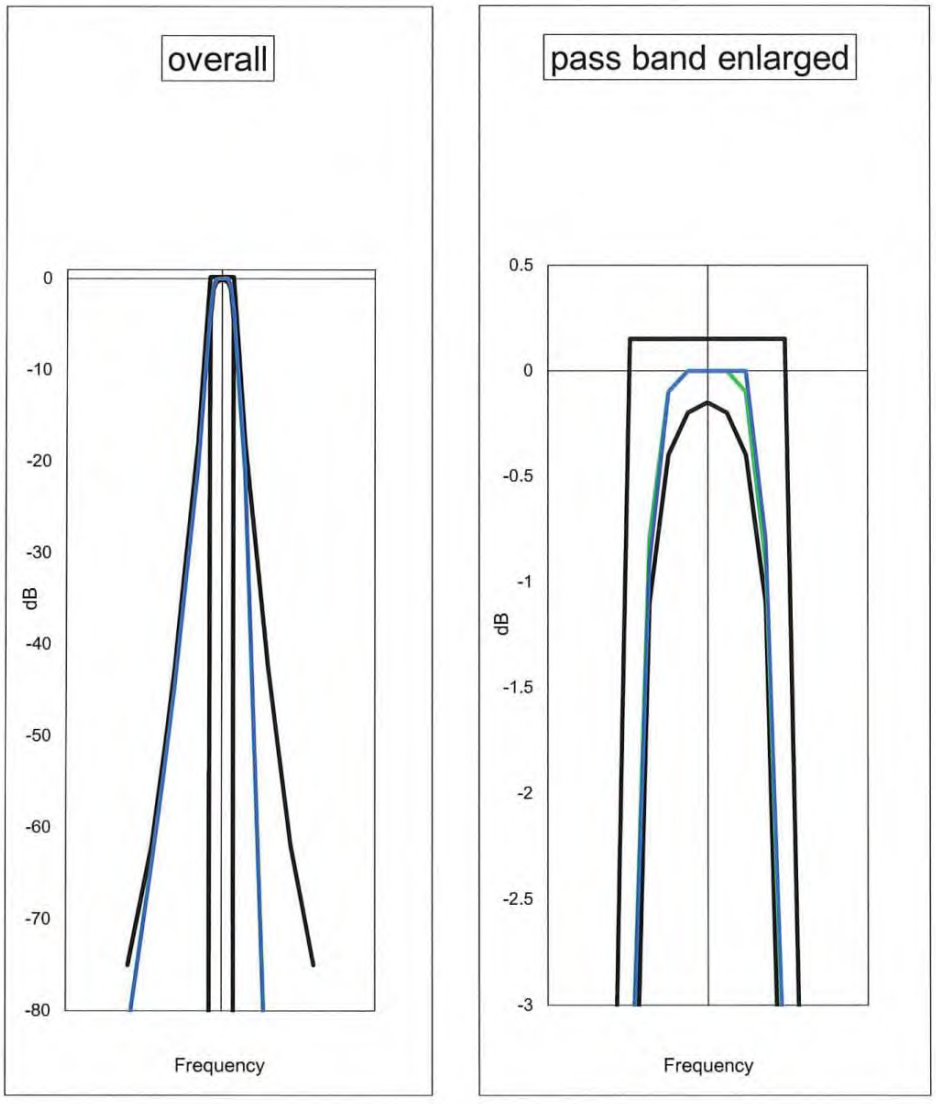
3150 Hz band	
Freq, Hz	Atten, dB
586.480	83.4
1035.59	66.5
1680.54	48.2
2443.10	23.3
2818.43	3.7
2907.99	0.6
2995.30	0.1
3080.14	0.0
3162.30	Ref
3246.64	0.0
3338.60	0.0
3438.87	0.6
3548.13	3.6
4093.19	23.3
5950.59	48.3
9656.56	69.0
17051.0	>101.0

Attenuation limits, dB
$75.0 \le \Delta \le \infty$
$62.0 \le \Delta \le \infty$
$42.5 \le \Delta \le \infty$
$18.0 \le \Delta \le \infty$
$-0.15 \le \Delta \le 4.5$
$-0.15 \le \Delta \le 1.1$
$-0.15 \le \Delta \le 0.4$
$-0.15 \le \Delta \le 0.2$
$-0.15 \le \Delta \le 0.15$
$-0.15 \le \Delta \le 0.2$
$-0.15 \le \Delta \le 0.4$
$-0.15 \le \Delta \le 1.1$
$-0.15 \le \Delta \le 4.5$
$18.0 \le \Delta \le \infty$
$42.5 \le \Delta \le \infty$
$62.0 \le \Delta \le \infty$
$75.0 \le \Delta \le \infty$

CERTIFICATE OF CALIBRATION	Certificate N° UCRT23/1618
UKAS ACCREDITED CALIBRATION LABORATORY No 0653	Page 6 of 7 Pages

OCTAVE FILTERS

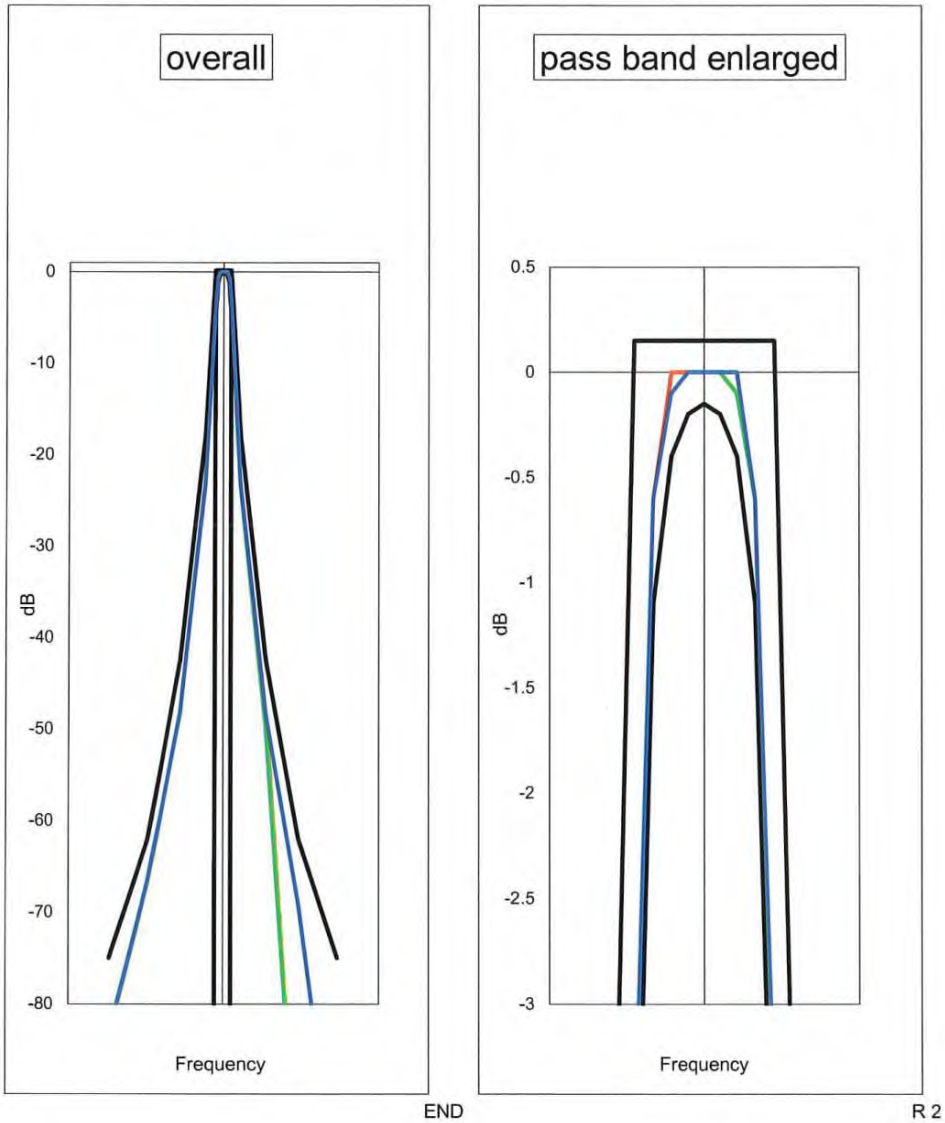
black IEC 61260 limits green 250 Hz band
red 1000 Hz band blue 4000 Hz band



CERTIFICATE OF CALIBRATION	Certificate N° UCRT23/1618
UKAS ACCREDITED CALIBRATION LABORATORY No 0653	Page 7 of 7 Pages

THIRD OCTAVE FILTERS

black IEC 61260 limits green 160 Hz band
red 1000 Hz band blue 3150 Hz band



END R 2

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 15 May 2025

Certificate Number: UCRT25/1750

Calibrated at & Certificate issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory [redacted]

CUSTOMER	New Acoustics Ltd Titan Enterprise 1 Aurora Avenue Queens Quay Clydebank Scotland G81 1BF
ORDER No	PO2250CalMay2025 Job No UKAS25/05374
DATE OF RECEIPT	12 May 2025
PROCEDURE	Procedure TP 9 - Calibration of Filters
IDENTIFICATION	Filters in sound level meter — Manufacturer: Brüel & Kjær; Model: 2250; Serial No: 3027918
CALIBRATED ON	15 May 2025
PREVIOUS CALIBRATION	Calibrated on 09 May 2023 Certificate No. UCRT23/1618 issued by this laboratory.

CERTIFICATE OF CALIBRATION

UKAS ACCREDITED CALIBRATION LABORATORY No 0653

Certificate N° UCRT25/1750

The sound level meter was calibrated in accordance with the manufacturer's instructions, using an appropriate sound level calibrator, prior to measurements being carried out on the filters. The sound level meter has also undergone a full verification procedure, see certificate UCRT25/1749 issued by this laboratory. The manufacturer claims that the filters were designed in accordance with the Class 0 octave and Class 0 third octave requirements of IEC 61260:1995, and these tolerances are given with the results in this certificate. Base 10 test frequencies have been used throughout the filter calibration, in accordance with manufacturers' information.

Inter-band level accuracy test

The meter was set to the single measurement range and the 1 kHz octave filter was selected. A 1 kHz sinusoidal signal was then injected and adjusted to give a reading of 94.0 dB. Following this each filter band was selected in turn, the signal frequency was adjusted to the centre-frequency of the filter, and the sound level meter reading relative to that for the 1 kHz band was noted. A similar test was carried out for the Z setting using a 1 kHz signal.

These tests were then repeated for third octave filters, readjusting the signal level for the 1 kHz filter where necessary.

As the tolerance at the centre frequency in each band is ± 0.15 dB , it is expected (but not explicitly required in IEC 61260:1995), that the relative levels at each centre frequency shall lie within this spread. Not all bands tested met this expectation. Points where this is the case are marked by a red cross immediately to the right of the result in the tables which follow.

Filter shape test

Using the same measurement range as above, the 1 kHz octave filter was again selected. A sinusoidal signal at the centre frequency of 1 kHz was injected, and its level adjusted to give a reading of 134.0 dB. The frequency of the input signal was then changed to each of the values shown in the table of results in turn, and the new meter reading was noted. Two further octave bands (as shown) were then selected and tested in the same manner, with the signal level being set at the new centre frequency in each case.

The above tests were repeated for the 1 kHz and two other third octave bands (as shown).

All bands tested met the requirements of the standard, which are shown with the results.

CERTIFICATE OF CALIBRATION

UKAS ACCREDITED CALIBRATION LABORATORY No 0653

Certificate N° UCRT25/1750

Uncertainties

The laboratories expanded measurement uncertainties are estimated as ± 0.16 dB at the centre frequency & at other frequencies within the pass-band of the filter, and ± 0.20 dB for frequencies outside the pass-band. **The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor *k*=2, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.**

NOTES

1 The attenuation figures given in the table(s) of filter shapes refer to the meter reading at the given frequency relative to that at the centre frequency in question. The required value is denoted as Δ in the column showing attenuation limits.

2 Since the tests carried out cover only a limited subset of the content of IEC 61260:1995, the results obtained do not confer compliance with the full requirements of that standard, and are applicable only to those filter bands tested.

3 Any linearity errors which the sound level meter may exhibit are included in the filter errors shown in this certificate. Since the meter errors may vary with frequency, it cannot be assumed that they are the same as those given in certificate number UCRT25/1749

4 The following firmware was in use at the time of the testing:

Identification	Version
BZ 7223	4.7.8

CERTIFICATE OF CALIBRATION	Certificate N° UCRT25/1750
UKAS ACCREDITED CALIBRATION LABORATORY No 0653	Page 4 of 7 Pages

1/1 octave filters: Inter-band accuracy

Band (Hz)	Error, dB
4	N/A
8	N/A
16	0.0
31.5	-0.1
63	0.0
125	0.0
250	-0.1
500	0.0
1000	Ref
2000	0.0
4000	0.0
8000	0.0
16000	-0.9 x
31500	N/A
Z @ 1 kHz	0.0

1/1 octave filters: Filter shape

1000 Hz band	
Freq, Hz	Atten, dB
63.096	82.2
125.893	63.8
251.189	44.6
501.187	20.8
707.946	3.6
771.792	0.9
841.395	0.1
917.276	0.0
1000.00	Ref
1090.18	0.0
1188.50	0.1
1295.69	0.9
1412.54	3.6
1995.26	21.2
3981.07	93.6
7943.28	>101.0
15848.9	>101.0

63 Hz band	
Freq, Hz	Atten, dB
3.981	89.4
7.943	63.8
15.849	44.4
31.623	20.7
44.669	3.6
48.697	0.8
53.089	0.0
57.876	0.0
63.096	Ref
68.786	0.0
74.990	0.0
81.753	0.8
89.125	3.5
125.893	21.2
251.190	93.2
501.189	>101.0
1000.00	>101.0

500 Hz band	
Freq, Hz	Atten, dB
31.623	82.1
63.096	63.9
125.893	44.6
251.190	20.7
354.815	3.6
386.814	0.8
421.699	0.1
459.730	0.0
501.190	Ref
546.390	0.0
595.665	0.1
649.385	0.9
707.950	3.6
1000.01	21.1
1995.27	93.6
3981.09	>101.0
7943.33	>101.0

Attenuation limits, dB
$75.0 \le \Delta \le \infty$
$62.0 \le \Delta \le \infty$
$42.5 \le \Delta \le \infty$
$18.0 \le \Delta \le \infty$
$-0.15 \le \Delta \le 4.5$
$-0.15 \le \Delta \le 1.1$
$-0.15 \le \Delta \le 0.4$
$-0.15 \le \Delta \le 0.2$
$-0.15 \le \Delta \le 0.15$
$-0.15 \le \Delta \le 0.2$
$-0.15 \le \Delta \le 0.4$
$-0.15 \le \Delta \le 1.1$
$-0.15 \le \Delta \le 4.5$
$18.0 \le \Delta \le \infty$
$42.5 \le \Delta \le \infty$
$62.0 \le \Delta \le \infty$
$75.0 \le \Delta \le \infty$

CERTIFICATE OF CALIBRATION

UKAS ACCREDITED CALIBRATION LABORATORY No 0653

Certificate N° UCRT25/1750

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1/3 octave filters: Inter-band accuracy

Band (Hz)	Error, dB
4	N/A
8	N/A
16	-0.1
31.5	-0.1
63	-0.1
125	0.0
250	0.0
500	0.0
1000	Ref
2000	0.0
4000	0.0
8000	0.0
16000	-0.9
31500	N/A
Z @ 1 kHz	0.0

Band (Hz)	Error, dB
5	N/A
10	N/A
20	0.0
40	-0.1
80	0.0
160	0.0
315	0.0
630	0.0
1250	0.0
2500	0.0
5000	0.0
10000	-0.1
20000	0.2

Band (Hz)	Error, dB
6.3	N/A
12.5	-0.1
25	0.0
50	0.0
100	0.0
200	0.0
400	0.0
800	0.0
1600	0.0
3150	0.0
6300	0.0
12500	-0.5
25000	N/A

1/3 octave filters: Filter shape

1000 Hz band	
Freq, Hz	Atten, dB
185.460	83.5
327.480	66.6
531.430	48.3
772.570	23.3
891.260	3.7
919.580	0.6
947.190	0.0
974.020	0.0
1000.00	Ref
1026.67	0.0
1055.75	0.0
1087.46	0.7
1122.01	3.7
1294.37	23.3
1881.73	48.5
3053.65	>101.0
5391.95	>101.0

315 Hz band	
Freq, Hz	Atten, dB
58.648	83.7
103.559	66.8
168.054	48.3
244.310	23.4
281.843	3.7
290.799	0.7
299.530	0.1
308.014	0.0
316.230	Ref
324.664	0.0
333.860	0.0
343.887	0.6
354.813	3.7
409.319	23.3
595.059	49.6
965.656	>101.0
1705.10	>101.0

1600 Hz band	
Freq, Hz	Atten, dB
293.936	83.5
519.023	66.6
842.263	48.3
1224.45	23.3
1412.56	3.7
1457.44	0.6
1501.20	0.1
1543.72	0.0
1584.90	Ref
1627.17	0.0
1673.26	0.0
1723.52	0.6
1778.27	3.7
2051.45	23.3
2982.35	48.4
4839.73	69.0
8545.70	>101.0

Attenuation limits, dB
$75.0 \le \Delta \le \infty$
$62.0 \le \Delta \le \infty$
$42.5 \le \Delta \le \infty$
$18.0 \le \Delta \le \infty$
$-0.15 \le \Delta \le 4.5$
$-0.15 \le \Delta \le 1.1$
$-0.15 \le \Delta \le 0.4$
$-0.15 \le \Delta \le 0.2$
$-0.15 \le \Delta \le 0.15$
$-0.15 \le \Delta \le 0.2$
$-0.15 \le \Delta \le 0.4$
$-0.15 \le \Delta \le 1.1$
$-0.15 \le \Delta \le 4.5$
$18.0 \le \Delta \le \infty$
$42.5 \le \Delta \le \infty$
$62.0 \le \Delta \le \infty$
$75.0 \le \Delta \le \infty$

CERTIFICATE OF CALIBRATION	Certificate N° UCRT25/1750
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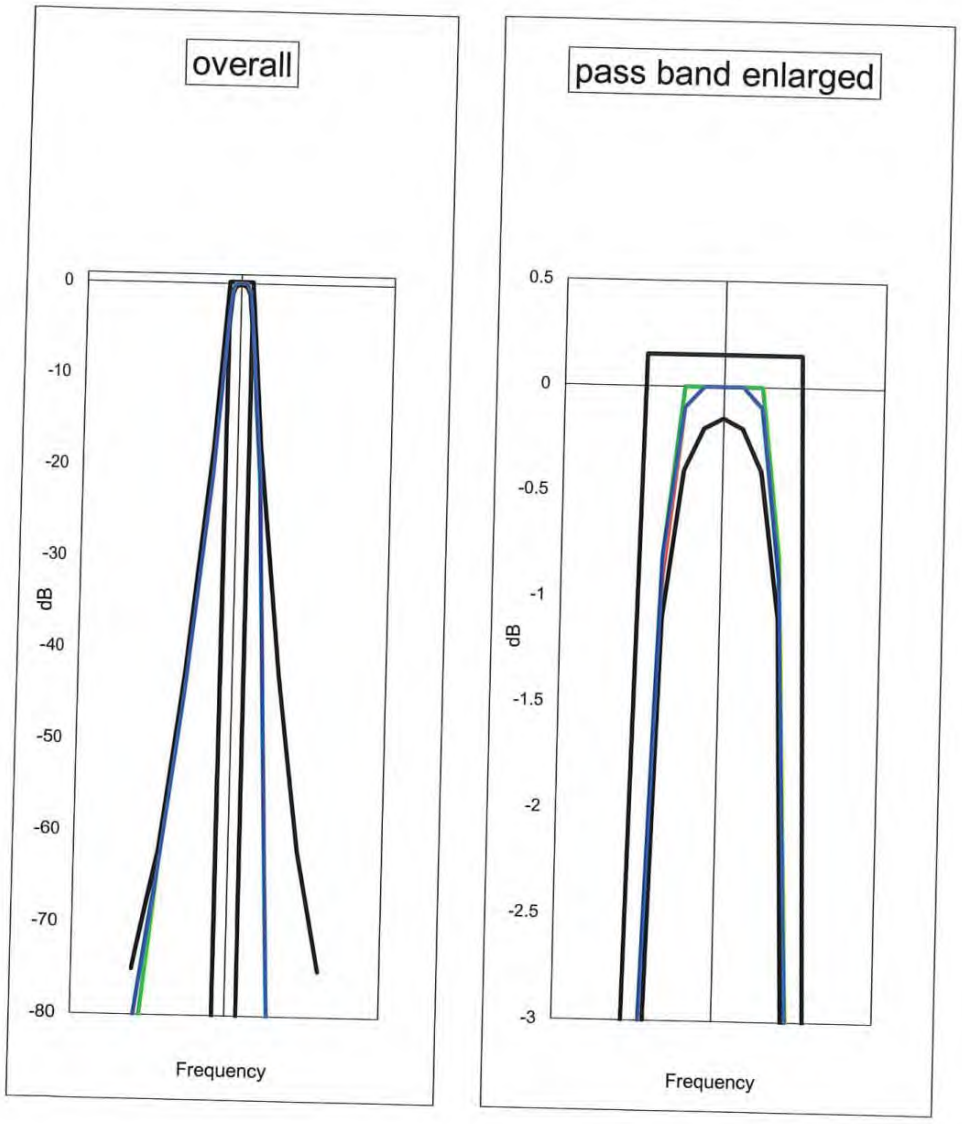
OCTAVE FILTERS

black IEC 61260 limits
red 1000 Hz band

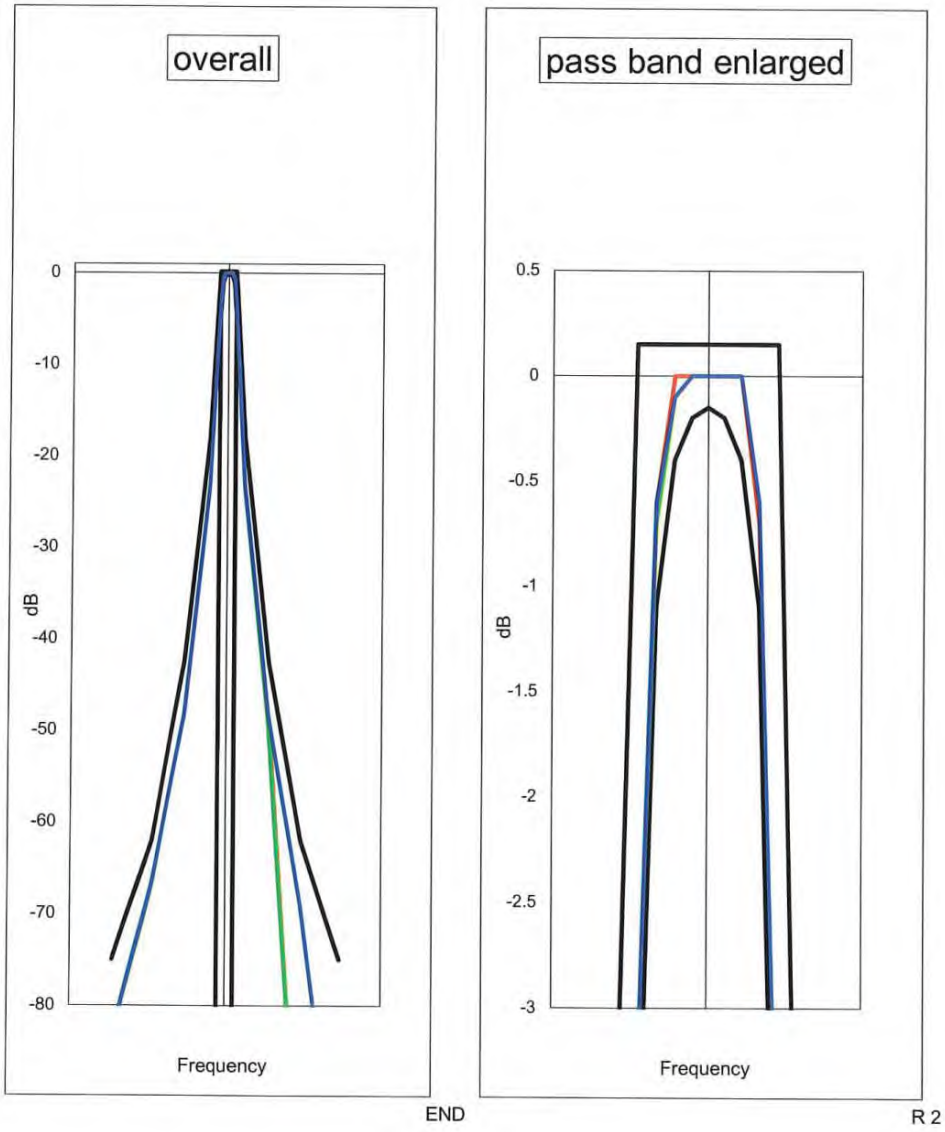
green 63 Hz band
blue 500 Hz band



CERTIFICATE OF CALIBRATION	Certificate N° UCRT25/1750
UKAS ACCREDITED CALIBRATION LABORATORY No 0653	Page 7 of 7 Pages

THIRD OCTAVE FILTERS

black IEC 61260 limits green 315 Hz band
red 1000 Hz band blue 1600 Hz band



END R 2

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 09 May 2023

Certificate Number: UCRT23/1616

Calibrated at & Certificate issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

[redacted]

CUSTOMER	New Acoustics Ltd Titan Enterprise 1 Aurora Avenue Queens Quay Clydebank G81 1BF
ORDER No	BK22502023 Job No UKAS23/05316
DATE OF RECEIPT	03 May 2023
PROCEDURE	Calibration Engineer's Handbook, section 25: periodic testing of sound level meters to IEC 61672-3:2006 (BS EN 61672-3:2006) as modified by UKAS TPS 49
IDENTIFICATION	Sound level meter Brüel & Kjær type 2250 serial No 3027918 connected via a preamplifier type ZC 0032 serial No 28810 to a half-inch microphone type 4189 serial No 3196156.
CALIBRATED ON	09 May 2023
PREVIOUS CALIBRATION	Calibrated on 07 May 2021, Certificate No. UCRT21/1586 issued by this laboratory.

CERTIFICATE OF CALIBRATION

UKAS ACCREDITED CALIBRATION LABORATORY No 0653

Certificate No UCRT23/1616

The sound level meter was set up using a type 4231 sound calibrator supplied by the laboratory; it was set to frequency weighting A, and initially read 93.9 dB. It was then adjusted to read 94.0 dB (corresponding to 94.0 dB at standard atmospheric pressure). This reading was derived from the certified output level of the calibrator and manufacturers' information on the free-field response of the sound level meter. The calibration check frequency was 1 kHz. The final microphone sensitivity calculated and stored by the instrument was 44.03 mV/Pa.

Procedures from IEC 61672-3:2006 (BS EN 61672-3:2006) as modified by UKAS TPS 49 were used to perform the periodic tests.

RESULTS

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006 (BS EN 61672-3:2006), for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organization responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2 : 2003 (BS EN 61672-2 : 2003), to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1 : 2002 (BS EN 61672-1 : 2003), the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1 : 2002 (BS EN 61672-1 2003).

The self-generated noise recorded with the microphone replaced by the electrical input device was:

13.2 dB (A) 14.1 dB (C) 19.2 dB (Z) 23.1 dB (Z, Extended low frequency range)

The environmental conditions recorded at the start and end of testing were:

Start: 22 to 23 °C, 52 to 62 %RH and 100.0 to 100.1 kPa
End: 22 to 23 °C, 53 to 63 %RH and 100.0 to 100.1 kPa

Technical information including adjustment data specified in the manufacturers' Instruction Manual BE 1712-19 (2012) and User Manual BE 1713-24 (2009) has been used to carry out this verification. These data include manufacturer-specified uncertainties.

Publicly-available evidence has been found that the B&K 2250 sound level meter design has successfully undergone pattern evaluation in accordance with IEC 61672-2:2002 (BS EN 61672-2:2003) by Physikalisch-Technische Bundesanstalt (PTB), an independent testing organisation responsible for pattern approvals.

All measurement data are held at ANV Measurement Systems for a period of at least six years.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

CERTIFICATE OF CALIBRATION

UKAS ACCREDITED CALIBRATION LABORATORY No 0653

Certificate No UCRT23/1616

NOTES

Any opinions or interpretations which may be expressed in the following notes are not UKAS Accredited.

1 All tests were carried out in "Broad Band".

2 Windscreen autodetect was set to "off", windscreen correction to "None", soundfield to "Free-field" and microphone to "4189".

3 The extended low-frequency facility was set to "off" for all tests except for the additional self-generated noise reading and "Frequency and time weightings at 1kHz" test.

4 No suitable microphone frequency response information was supplied with the instrument. It was therefore measured by this laboratory using the electrostatic actuator method. This response in isolation is not UKAS Accredited.

5 The electrical tests have been carried out with the instrument set for the nominal microphone sensitivity, as specified in the Instruction Manual. This may mean that the instrument has a slightly different linearity range when in normal use.

6 Typical case reflection factors specified by the manufacturer have been used for this verification.

The instrument was running on hardware version 4.0

The instrument firmware settings were:

Module i.d.	Function	Version	Active?	Licenced?	Template used?
BZ 7222	SLM	4.7.6	N/A	Y	Y
BZ 7223	Frequency analysis	4.7.6	N/A	Y	N
BZ 7224	Logging	4.7.6	N/A	Y	N
BZ 7225	Enhanced logging	4.7.6	N/A	N	N
BZ 7226	Sound recording	4.7.6	N/A	Y	N
BZ 7227	Reverberation time	4.7.6	N/A	Y	N
BZ 7228	Building acoustics	4.7.6	N/A	Y	N
BZ 7229	Dual-Channel Building acoustics	4.7.6	N/A	Y	N
BZ 7230	FFT analysis	4.7.6	N/A	Y	N
BZ 7231	Tone assessment	4.7.6	N/A	Y	N
BZ 7232	Noise monitoring	4.7.6	N/A	Y	N
N/A	N/A	N/A	N/A	N/A	N/A
BZ 7234	Low frequency option	4.7.6	N/A	N	N
BZ 7235	TM Basic engine	4.7.6	N/A	N	N
BZ 7236	TM Z41 Gear	4.7.6	N/A	N	N

The results on this certificate only relate to the items calibrated as identified above.

END

R 2

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 15 May 2025

Calibrated at & Certificate issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Certificate Number: UCRT25/1749

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CUSTOMER	New Acoustics Ltd Titan Enterprise 1 Aurora Avenue Queens Quay Clydebank Scotland G81 1BF
ORDER No	PO2250CalMay2025 Job No UKAS25/05374
DATE OF RECEIPT	12 May 2025
PROCEDURE	Calibration Engineer's Handbook, section 25: periodic testing of sound level meters to IEC 61672-3:2006 (BS EN 61672-3:2006) as modified by UKAS TPS 49
IDENTIFICATION	Sound level meter Brüel & Kjær type 2250 serial No 3027918 connected via a preamplifier type ZC 0032 serial No 28810 to a half-inch microphone type 4189 serial No 3196156.
CALIBRATED ON	15 May 2025
PREVIOUS CALIBRATION	Calibrated on 09 May 2023, Certificate No. UCRT23/1616 issued by this laboratory.

CERTIFICATE OF CALIBRATION

UKAS ACCREDITED CALIBRATION LABORATORY No 0653

Certificate No UCRT25/1749

The sound level meter was set up using a type 4231 sound calibrator supplied by the laboratory; it was set to frequency weighting A, and initially read 94.2 dB. It was then adjusted to read 94.0 dB (corresponding to 94.0 dB at standard atmospheric pressure). This reading was derived from the certified output level of the calibrator and manufacturers' information on the free-field response of the sound level meter. The calibration check frequency was 1 kHz. The final microphone sensitivity calculated and stored by the instrument was 43.60 mV/Pa.

Procedures from IEC 61672-3:2006 (BS EN 61672-3:2006) as modified by UKAS TPS 49 were used to perform the periodic tests.

RESULTS

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006 (BS EN 61672-3:2006), for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organization responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2 : 2003 (BS EN 61672-2 : 2003), to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1 : 2002 (BS EN 61672-1 : 2003), the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1 : 2002 (BS EN 61672-1 2003).

The self-generated noise recorded with the microphone replaced by the electrical input device was:

13.5 dB (A) 14.1 dB (C) 18.6 dB (Z) 24.8 dB (Z, Extended low frequency range)

The environmental conditions recorded at the start and end of testing were:

Start: 21 to 22 °C, 37 to 47 %RH and 101.5 to 101.6 kPa
End: 21 to 22 °C, 37 to 47 %RH and 101.5 to 101.6 kPa

Technical information including adjustment data specified in the manufacturers' Instruction Manual BE 1712-19 (2012) and User Manual BE 1713-24 (2009) has been used to carry out this verification. These data include manufacturer-specified uncertainties.

Publicly-available evidence has been found that the B&K 2250 sound level meter design has successfully undergone pattern evaluation in accordance with IEC 61672-2:2002 (BS EN 61672-2:2003) by Physikalisch-Technische Bundesanstalt (PTB), an independent testing organisation responsible for pattern approvals.

All measurement data are held at ANV Measurement Systems for a period of at least six years.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor *k*=2, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

CERTIFICATE OF CALIBRATION

UKAS ACCREDITED CALIBRATION LABORATORY No 0653

Certificate No UCRT25/1749

NOTES

Any opinions or interpretations which may be expressed in the following notes are not UKAS Accredited.

1 All tests were carried out in "Broad Band".

2 Windscreen autodetect was set to "off", windscreen correction to "None", soundfield to "Free-field" and microphone to "4189".

3 The extended low-frequency facility was set to "off" for all tests except for the additional self-generated noise reading and "Frequency and time weightings at 1kHz" test.

4 No suitable microphone frequency response information was supplied with the instrument. It was therefore measured by this laboratory using the electrostatic actuator method. This response in isolation is not UKAS Accredited.

5 The electrical tests have been carried out with the instrument set for the nominal microphone sensitivity, as specified in the Instruction Manual. This may mean that the instrument has a slightly different linearity range when in normal use.

6 Typical case reflection factors specified by the manufacturer have been used for this verification.

The instrument was running on hardware version 4.0

The instrument firmware settings were:

Module i.d.	Function	Version	Active?	Licenced?	Template used?
BZ 7222	SLM	4.7.8	N/A	Y	Y
BZ 7223	Frequency analysis	4.7.8	N/A	Y	N
BZ 7224	Logging	4.7.8	N/A	Y	N
BZ 7225	Enhanced logging	4.7.8	N/A	N	N
BZ 7226	Sound recording	4.7.8	N/A	Y	N
BZ 7227	Reverberation time	4.7.8	N/A	Y	N
BZ 7228	Building acoustics	4.7.8	N/A	Y	N
N/A	N/A	N/A	N/A	N/A	N/A
BZ 7230	FFT analysis	4.7.8	N/A	Y	N
BZ 7231	Tone assessment	4.7.8	N/A	Y	N
BZ 7232	Noise monitoring	4.7.8	N/A	Y	N
N/A	N/A	N/A	N/A	N/A	N/A
BZ 7234	Low frequency option	4.7.8	N/A	N	N
BZ 7235	TM Basic engine	4.7.8	N/A	N	N
BZ 7236	TM Z41 Gear	4.7.8	N/A	N	N

The results on this certificate only relate to the items calibrated as identified above.

END

R 2

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 03 December 2024 **Certificate Number: UCRT24/2616**

Calibrated at & Certificate issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

[redacted]

Customer	New Acoustics Ltd Titan Enterprise 1 Aurora Avenue Queens Quay Clydebank G81 1BF, Scotland
Order No.	NewAcoustics2024-NOV-Calibrator
Test Procedure	Procedure TP 1 Calibration of Sound Calibrators
Description	Acoustic Calibrator

Identification	*Manufacturer*	*Instrument*	*Model*	*Serial No.*
	Brüel & Kjær	Calibrator	4231	3008239

The calibrator has been tested as specified in Annex B of IEC 60942:2003. As public evidence was available from a testing organisation (PTB) responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, the sound calibrator tested is considered to conform to all the class 1 requirements of IEC 60942:2003.

ANV Job No.	UKAS24/12872	
Date Received	02 December 2024	
Date Calibrated	03 December 2024	
Previous Certificate	*Dated*	09 November 2023
	Certificate No.	UCRT23/2450
	Laboratory	0653

CERTIFICATE OF CALIBRATION	Certificate Number
	UCRT24/2616
UKAS Accredited Calibration Laboratory No. 0653	Page 2 of 2 Pages

Measurements

The sound pressure level generated by the calibrator in its WS2 configuration was measured five times by the Insert Voltage Method using a microphone as detailed below. The mean of the results obtained is shown below. It is corrected to the standard atmospheric pressure of 101.3 kPa (1013 mBar) using original manufacturers information.

Test Microphone	*Manufacturer*	*Type*
	Brüel & Kjær	4134

Results

The level of the calibrator output under the conditions outlined above was

94.12 ± 0.10 dB rel 20 µPa

Functional Tests and Observations

The frequency of the sound produced was	999.96	±	0.12 Hz
The total distortion was	0.25	±	0.03 % Distortion

During the measurements environmental conditions were

Temperature	23	to	23	°C
Relative Humidity	40	to	47	%
Barometric Pressure	101.2	to	101.3	kPa

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

The uncertainties refer to the measured values only with no account being taken of the ability of the instrument to maintain its calibration.

A small correction factor may need to be applied to the sound pressure level quoted above if the device is used to calibrate a sound level meter which is fitted with a free-field response microphone. See manufacturers handbook for details.

..... END .....

Note:

Calibrator adjusted prior to calibration?	NO	
Initial Level	N/A	dB
Initial Frequency	N/A	Hz

Additional Comments The results on this certificate only relate to the items calibrated as identified above.

None

Calibrated by: [redacted]

R 1

APPENDIX 5 – MODEL IMAGES

The following images are taken from CadnaA environmental modelling software to illustrate the various models used in the assessments.

Fixed Plant Assessments:

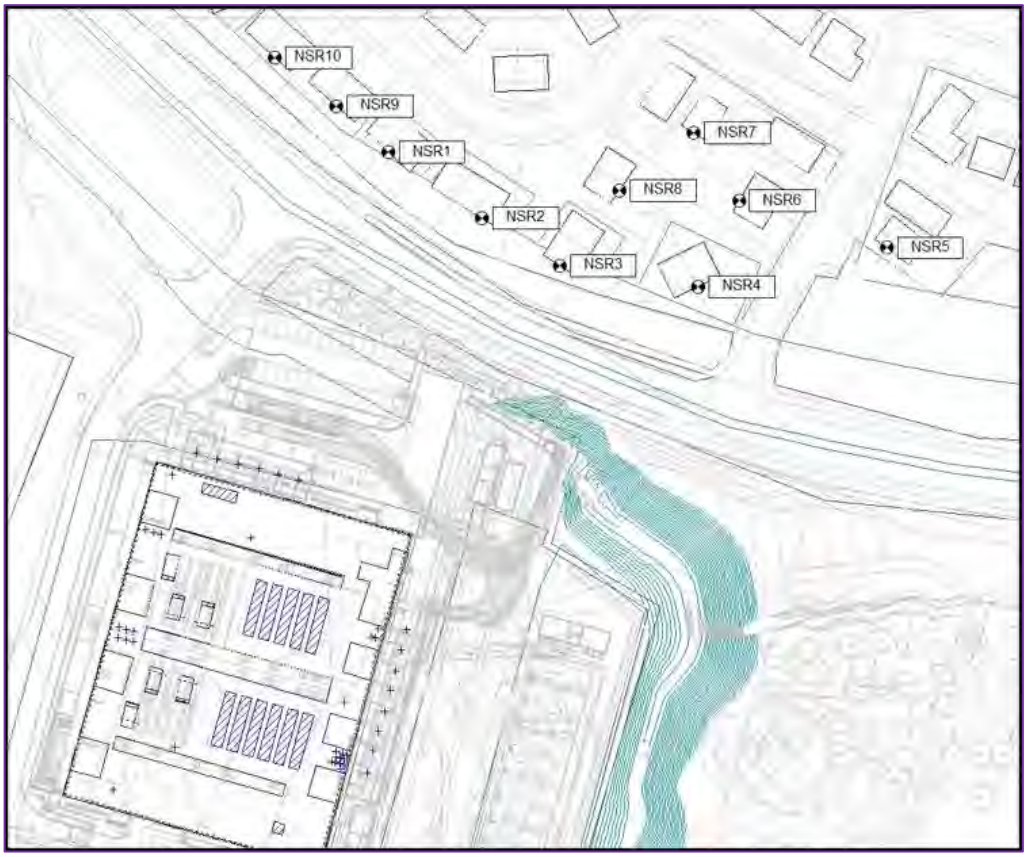

Figure A5.1 – Fixed Plant CadnaA Model Plan

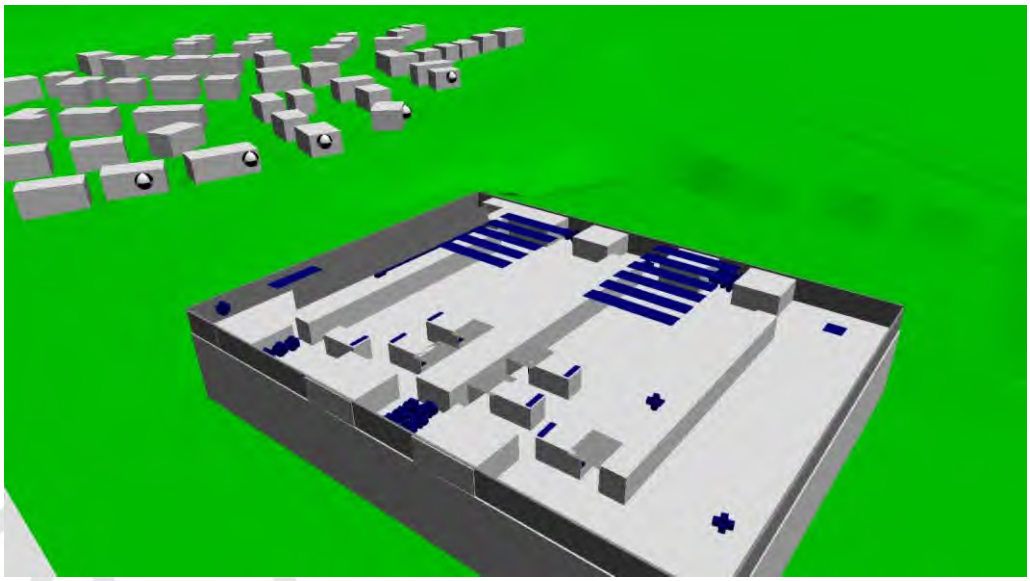

Figure A5.2 – Fixed Plant CadnaA Model 3D

Fixed Plant Daytime			
Receiver	**Fixed Plant Worst Case Daytime External Level $L_{Aeq,T}$ (dB)**	**Rated Fixed Plant LAr (dB)** (+3dB rating applied)	**Exceedance over Background level of LA90 47dB (dB)**
NSR1	43.8	46.8	+0
NSR2	45.7	48.7	+2
NSR3	47.5	50.5	+4
NSR4	48.0	51.0	+4
NSR5	46.3	49.3	+2
NSR6	46.4	49.4	+2
NSR7	46.4	49.4	+2
NSR8	42.8	45.8	-1
NSR9	44.4	47.4	+0
NSR10	43.8	46.8	+0

Fixed Plant Night-time			
Receiver	**Fixed Plant Worst Case Night Time External Level $L_{Aeq,T}$ (dB)**	**Rated Fixed Plant LAr (dB)** (+3dB rating applied)	**Exceedance over Background level of LA90 40dB (dB)**
NSR1	38.4	41.4	+1
NSR2	39.1	42.1	+2
NSR3	40.0	43.0	+3
NSR4	40.1	43.1	+3
NSR5	39.0	42.0	+2
NSR6	38.8	41.8	+2
NSR7	39.0	42.0	+2
NSR8	33.6	36.6	-3
NSR9	37.4	40.4	+0
NSR10	36.8	39.8	+0

Generator Assessments:

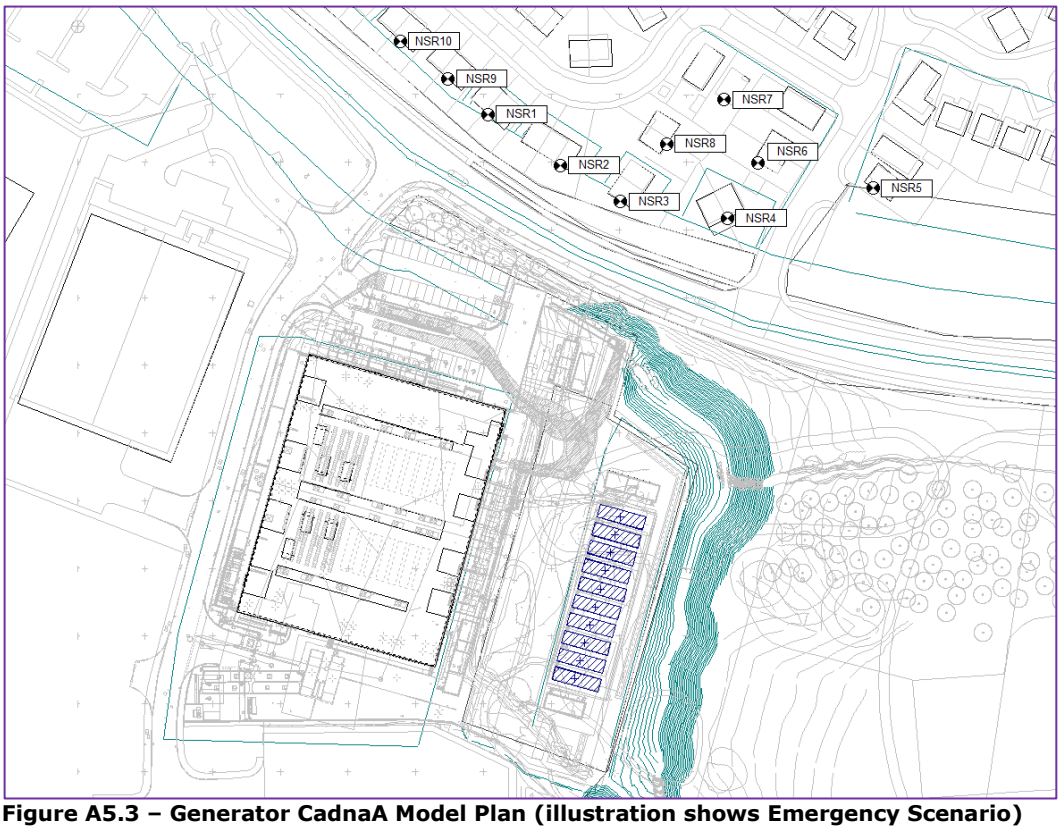

Figure A5.3 – Generator CadnaA Model Plan (illustration shows Emergency Scenario)

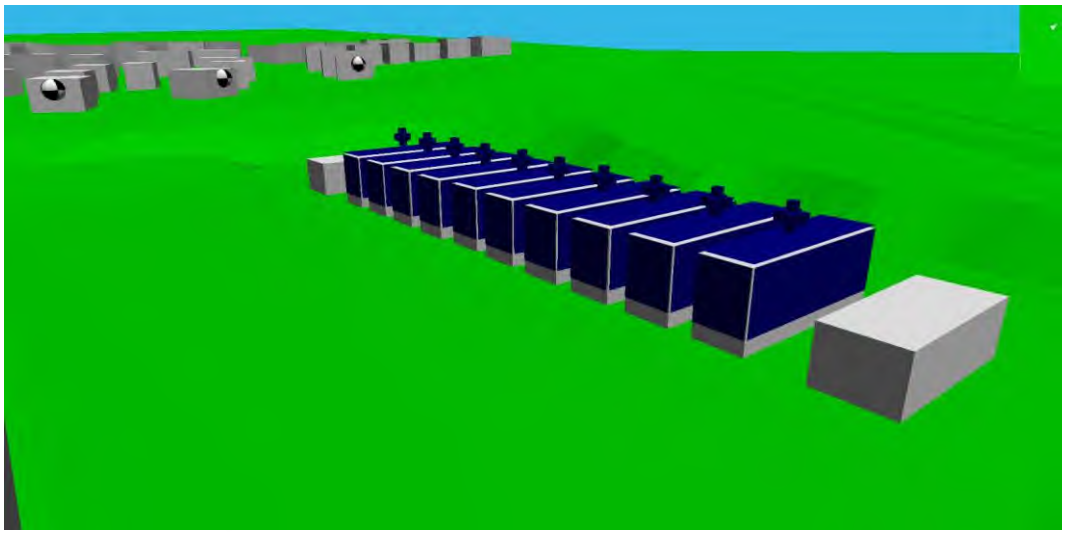

Figure A5.4 – Emergency Operation (10no generators operational)

Emergency Generator Daytime			
Receiver	**Worst Case Daytime External Level $L_{Aeq,T}$ (dB)**	**Rated Emergency LAr (dB)** (+5dB rating applied)	**Exceedance over Background level of LA90 47dB (dB)**
NSR1	47.3	52.3	+5
NSR2	48.7	53.7	+7
NSR3	49.6	54.6	+8
NSR4	50.3	55.3	+8
NSR5	48.3	53.3	+6
NSR6	46.0	51.0	+4
NSR7	43.9	48.9	+2
NSR8	47.8	52.8	+6
NSR9	46.3	51.3	+4
NSR10	44.7	49.7	+3
Emergency Generator Night-time			
Receiver	**Worst Case Night Time External Level $L_{Aeq,T}$ (dB)**	**Rated Emergency LAr (dB)** (+5dB rating applied)	**Exceedance over Background level of LA90 40dB (dB)**
NSR1	47.3	52.3	+12
NSR2	48.7	53.7	+14
NSR3	49.6	54.6	+15
NSR4	50.3	55.3	+15
NSR5	48.3	53.3	+13
NSR6	46.0	51.0	+11
NSR7	43.9	48.9	+9
NSR8	47.8	52.8	+13
NSR9	46.3	51.3	+11
NSR10	44.7	49.7	+10

Figure A5.5 – Generator CadnaA Model Plan (illustration shows Load Support Scenario)

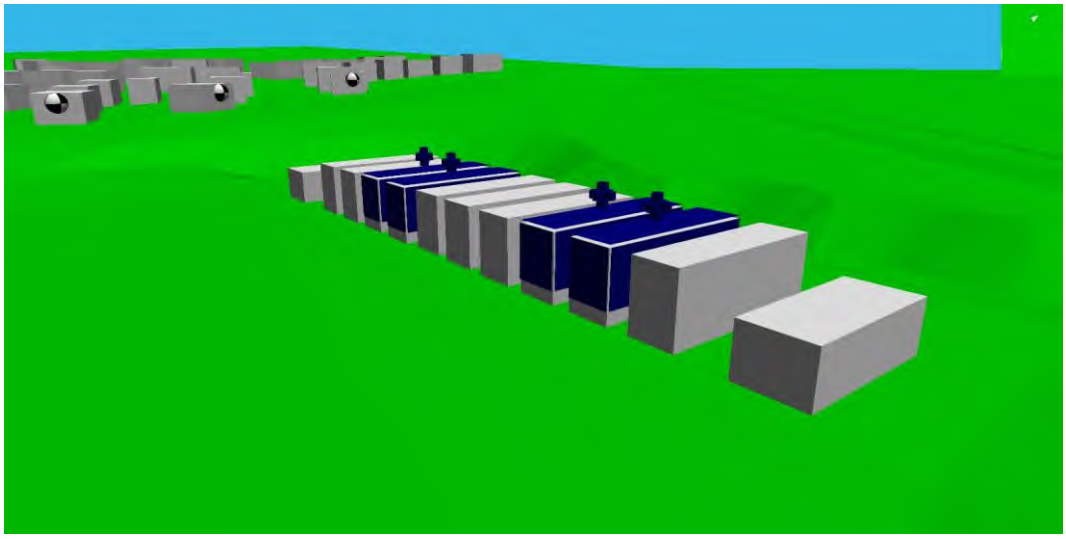

Figure A5.6 – Load Support (4no generators operational)

Load Support Daytime			
Receiver	**Worst Case Daytime External Level $L_{Aeq,T}$ (dB)**	**Rated Load Support LAr (dB)** (+5dB rating applied)	**Exceedance over Background level of LA90 47dB (dB)**
NSR1	40.9	45.9	-1
NSR2	42.3	47.3	+0
	43	48	+1
NSR4	43.9	48.9	+2
NSR5	42.3	47.3	+0
NSR6	40.6	45.6	-1
NSR7	38.7	43.7	-3
NSR8	41.6	46.6	+0
NSR9	39.9	44.9	-2
NSR10	37.8	42.8	-4

Figure A5.6 – Generator CadnaA Model Plan (illustration shows Routine Testing Scenario)

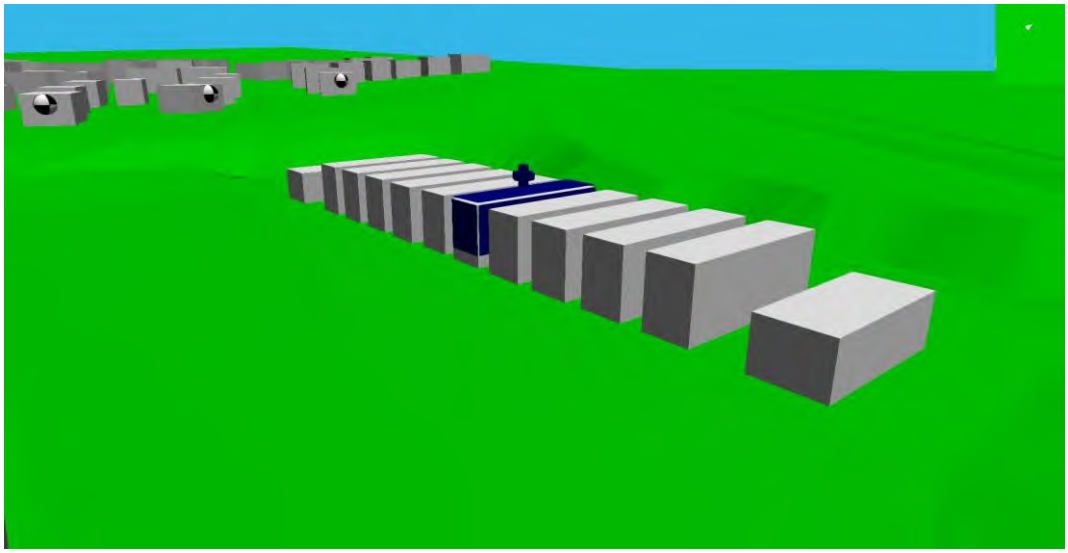

Figure A5.7– Routine Testing (1no generator operational)

Routine Testing Daytime			
Receiver	**Worst Case Daytime External Level $L_{Aeq,T}$ (dB)**	**Rated Routine Testing LAr (dB)** (+5dB rating applied)	**Exceedance over Background level of LA90 47dB (dB)**
NSR1	39.6	44.6	-2
NSR2	41	46	-1
NSR3	41.8	46.8	+0
NSR4	42	47	+0
NSR5	41.1	46.1	-1
NSR6	38.2	43.2	-4
NSR7	36.4	41.4	-6
NSR8	40.1	45.1	-2
NSR9	38.8	43.8	-3
NSR10	37.6	42.6	-4