PREPARED FOR

Microsoft

Noise and Vibration

CWL01 & 02 – Microsoft Ltd

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Noise and Vibration

CWL01 & 02 – Microsoft Ltd

0657169

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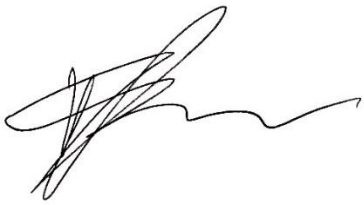

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1. INTRODUCTION

Environmental Resources Management Ltd (ERM) has been appointed by RED Engineering (on behalf of Microsoft Corporation) to undertake an assessment of noise and vibration from the construction, operation, and decommissioning of its Proposed Development. The proposal is for a new data centre complex on the site of the former Quinn Radiators Factory at Celtic Way, Celtic Lakes, Newport, South Wales NP10 8FS.

The aim of this assessment is to determine the existing acoustic climate and predict the sound levels due to three scenarios - normal operation, emergency operation (main power supply failure), and under the generator testing regime of the proposed Development, and to assess these levels against the relevant guidance. Where appropriate, mitigation measures have been recommended to protect the amenity of residents in the locality of the Proposed Development.

Further information and clarification were requested by National Resource Wales (NRW) in a Schedule 5 Notification letter dated the 25th April 2025.

This updated version of the noise impact assessment (NIA) addresses the Schedule 5 questions and requests and supersedes the previous version (dated 08th December 2023).

A summary of how NRW's queries have been addressed is outlined in Table 1. Updates to the report are shown in red text for ease of review.

TABLE 1 SUMMARY OF RESPONSES TO NRW SCHEDULE

NRW Schedule 5 Comment	ERM Update Response	Section of report updated
That all generator testing scenarios have been adequately assessed in the NIA. The Air Quality Impact Assessment (AQIA) presents generator operating scenarios that were not included or commented on in the NIA, i.e., "quarterly", "annual" and "quinquennial" testing.	Monthly, quarterly, and annual testing scenarios have been assessed together under "generator testing", with annual testing being modelled as a worst-case scenario. This is because it reflects the highest predicted noise levels from the loudest generator testing. Other scenarios were not modelled because these were not worst case and do not have a cumulative effect. Quinquennial testing has been assessed under "emergency operation" as functionally these are equivalent. This clarification has now been integrated into the NIA for consistency with the AQIA.	Section 7.2 Operation Page 22

NRW Schedule 5 Comment	ERM Update Response	Section of report updated
The submitted NIA presents contradicting information relating to the back-up generator sound power levels. The submitted modelling files contain two different sound power levels for the back-up generator. Please confirm what the sound power level is for the back-up generators and provide satisfactory justification for any assumptions made in the derivation of the sound power level. This must include information relating to operating loads and any potential acoustic enclosures, if proposed.	The sound power level of all generators has now been clarified in the re-submitted report. The final assessed sound power level reflects generator operation at full load, as this represents annual testing. The levels are based on manufacturer data which presents noise break-out of louvres at 75dB at 1m SPL. Area sources for these louvres have been calibrated to establish their sound power levels.	Section 6.2.3 Noise Modelling Page 18
Please confirm that the submitted NIA and associated modelling files correctly represent the proposed noise sources and buildings. Please should confirm that the number and height of the proposed generator stacks are correct, noting the discrepancy between the NIA and the AQIA.	The updated report and noise model reflect the current design of the development, including noise sources and buildings.	Section 6.2.3 Noise Modelling Page 18
Please provide further justification that background sound measurements at Nantymor Cottages, Blacksmith Way are representative of sensitive receptors on the southern end of Pencarn Avenue, noting the greater distance to the A48 and M4 and noting recent background surveys for other permit applications have indicated background sound levels are likely to be lower.	ERM has reviewed existing background sound data. The assessment has been updated to adopt a more appropriate baseline measurement for Pencarn Avenue in line with that adopted in the recently duly made Vantage CWL13 Environmental Permit Application. This measurement location is closer to the receptor and is more representative of acoustic conditions further from the A48 and M4.	Section 5 Baseline Environment Page 9
Please model sensitive receptors at a height representative of all floor levels, unless satisfactory justification can be provided otherwise. This applies to both day and night-time operating scenarios.	The noise model has been updated to include receiver locations at both ground floor (1.5 m) and first floor (4.0 m) heights to reflect the typical exposure levels at all floor levels of noise sensitive receptors.	Section 7.2 Operation Page 22

NRW Schedule 5 Comment	ERM Update Response	Section of report updated
	The NIA and noise figures have been updated to reflect these changes.	
Please provide justification for not applying a +3dB character correction for any scenario where the predicted specific sound level is above background at sensitive receptors.	A +3dB character correction has now been included in all scenarios where the specific sound level is less than 10dB below background sound level. This approach aligns with BS 4142:2014+A1:2019 guidance and ensures conservatism where any characteristics could be perceptible. Revised assessment results are presented in the updated NIA.	Section 6.2.4 Rating Level Corrections Page 20

2. THE PROPOSED DEVELOPMENT

The proposed Development is situated on a 40 acre / 16.49ha site, which lies in the Imperial Park within the business estate in the local planning authority jurisdiction of Newport City Council, which is currently vacant. It was recently granted planning permission for the subdivision of the building to create 5 new units and associated works for B1 (business), B2 (general industrial) and B8 (storage) use.

Current proposals are for the existing buildings on the site to be demolished and replaced by two single storey data centre buildings. The Development also includes associated offices, back-up generators, substation connection, waste treatment plant, vehicle parking, and security gatehouses.

A layout of the proposed Development is presented in Appendix A.

3. LEGISLATION, POLICY AND RELEVANT GUIDANCE

The assessment takes into account the following legislation and policy:

3.1 LEGISLATION

The following legislation are of particular relevance to the assessment:

- The Control of Pollution Act 1974 (CoPA 1974);
- The Environmental Protection Act 1990 (EPA 1990).

3.1.1 THE CONTROL OF POLLUTION ACT 1974

CoPA 1974 provides Local Authorities with powers to control noise and vibration from construction sites.

Section 60 of the CoPA 1974 enables a Local Authority to serve a notice to persons carrying out construction work of its requirements for the control of site noise. This may specify plant or machinery that is or is not to be used; the hours during which construction work may be carried out; the level of noise or vibration that may be emitted; and provides for changes in circumstances.

3.1.2 THE ENVIRONMENTAL PROTECTION ACT 1990

The EPA 1990 specifies mandatory powers available to Local Authorities in respect of any noise that either constitutes, or is likely to cause, a statutory nuisance, which is also defined in CoPA 1974. A duty is imposed on Local Authorities to carry out inspections to identify statutory nuisances, and to serve abatement notices against these. Procedures are also specified with regards to complaints from persons affected by a statutory nuisance.

3.2 POLICY

The following key policies are relevant to this assessment:

- Planning Policy Wales (PPW)[1];
- The Technical Advice Note (TAN).

3.2.1 PLANNING POLICY WALES

The policy document sets out the Government's planning policies for Wales, providing a framework within which local policies can be developed. The key principle of the policy is a presumption in favour of sustainable development. With regards to noise, the document states that in proposing new developments, planning authorities and developers must:

- Address any implications arising as a result of its association with, or location within, air quality management areas, noise action planning priority areas, or areas where there are sensitive receptors.
- Not create areas of poor air quality or inappropriate soundscape; and
- Seek to incorporate measures which reduce overall exposure to air and noise pollution and create appropriate soundscapes.

[1] Planning Policy Wales Edition 11 February 2021

With regards to industrial development, the policy states: *"…potentially polluting development includes commercial, industrial, energy and agricultural or transport infrastructure. Such development should be located in areas where there is low potential for public exposure, or where its impact can be minimised. Novel or new development types may potentially cause pollution and should be carefully considered, and where appropriate, decisions should be based on the precautionary principle."*

The policy document also highlights sustainability of new developments, stating: *"Taking a sustainable approach will mean balancing short-term needs against long-term objectives to reduce public exposure to airborne pollution and giving particular consideration to the presence of air quality management areas, noise action planning priority areas and areas with sensitive receptors when proposing new development and particularly when preparing development plans."*

The policy document refers to the associated Technical Advice Note on relevant guidance for noise assessments.

3.2.2 TECHNICAL ADVICE NOTE (TAN) 11

Technical Advice Note (TAN) 11[2] provides guidance to local authorities on how the planning system can be used to minimise the adverse impact of noise without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens of business. It outlines some of the main considerations which local planning authorities should take into account when determining planning applications for development which will either generate noise or be exposed to existing noise sources. TAN 11 also makes reference to guidance and criteria applicable to sources of noise such as industrial and commercial developments, roads and railways.

TAN 11 states that BS 4142 (1997)[3] is the most appropriate methodology to assess noise from industrial and commercial developments. This British Standard has since been updated in 2014. A clarification to TAN 11 was published in 2015 which confirm the updated version should be used.

An update to TAN 11 was published in draft in October 2022, for consultation, following revisions to Planning Policy Wales made in 2018. Consultation on the draft TAN ended in January 2023, however a revised TAN has not been issued for use and so the 1997 TAN remains the current guidance on noise assessment.

3.3 STANDARDS AND GUIDANCE

The following standard is relevant to noise generated by the construction phase of the Proposed Development:

- BS 5228:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites.

And the following standards are relevant to noise generated by the operation of the Proposed Development:

[2] Planning Guidance (Wales). Technical Advice Note 11, 1997.
[3] British Standard BS 4142: 1997 'Method for Rating industrial noise affecting mixed residential and industrial areas'

- BS 4142:2014+A1:2019: *'Methods for rating and assessing industrial and commercial sound'*;
- BS 8233: 2014: *'Guidance on sound insulation and noise reduction in buildings'*; and
- ISO 9613-2:2024*: 'Attenuation of Sound during Propagation Outdoors'*.

3.3.1 BS 5228: 2009+A1:2014

BS 5228:2009+A1:2014 Code of Practice for noise and vibration control on construction and open sites (BS 5228) refers to the need for the protection against noise and vibration of persons living and working in the vicinity of, and those working on, construction and open sites. The standard:

- Is published in two parts: Part 1 - Noise and Part 2 - Vibration. The discussion below relates mainly to Part 1, however, the recommendations of Part 2 in terms of vibration are broadly very similar;
- Refers to the need for protection against noise and vibration of persons living and working in the vicinity of, and those working on construction and open sites;
- Recommends procedures for noise and vibration control in respect of construction operations;
- Stresses the importance of community relations, and states that early establishment and maintenance of these relations throughout site operations will go some way towards allaying people's concerns;
- Provides recommendations regarding the supervision, planning, preparation and execution of works, emphasising the need to consider noise at every stage of the operation;
- Describes methods of controlling noise at source and its spread; and
- Includes a discussion of noise control targets, and example criteria for the assessment of the significance of noise effects.

3.3.2 BS 8233:2014

BS 8233 is mainly a guidance on sound reduction within domestic and non-domestic dwellings; the standard provides design guidance on acceptable noise levels for a variety of room types. These noise levels apply inside the respective building; for offices, BS 8233 provides a range of noise levels, $L_{Aeq,T}$ between 35dB(A) and 50dB(A) with the upper end of this range recommended for open plan offices. This can be used to derive suitable limits with which to assess potential effects on non-residential receptors.BS 8233 also provides a design target for external areas used for amenity space, such as gardens, of 50dB $L_{Aeq,T}$ or 55dB $L_{Aeq,T}$ in noisier environments.

3.3.3 BS 4142:2014+A1:2019

BS4142:2014+A1:2019 (BS 4142) describes methods for rating and assessing sound in order to provide an indication of its likely impact upon nearby premises (typically residential dwellings).

The specific sound emitted from the Development (dB, L_{Aeq}) is rated by taking into account both the level and character (i.e., tonal elements, impulsivity, intermittency and distinctiveness) of the sound. This is achieved by applying appropriate corrections to the specific sound level externally at the receptor location, which gives the rating level of the

sound in question. This is then assessed against the existing prevailing background sound level (dB, L_{A90}) at that location in order to determine a likely level of impact.

The level by which the rating level exceeds the prevailing background sound level indicates the following potential impacts:

- A difference of 10dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- A difference of 5dB or more is likely to be an indication of an adverse impact, depending on the context; and
- Where the rating level does not exceed the background level, this is an indication of the specific sound source having a low impact, depending on the context.

When considering the level of effect, BS 4142 emphasises the importance of the context in which a sound occurs.

3.3.4 ISO 9613-2:2024

ISO 9613-2:2024 *Attenuation of Sound during Propagation Outdoors* describes a method for calculating the attenuation of sound during propagation outdoors in order to predict the levels of environmental noise at a distance from a variety of sources. The method predicts the equivalent continuous A-weighted sound pressure level (as described in ISO 1996) under meteorological conditions by taking the octave band sound power level spectrum of the source and applying a number of attenuation factors that determine the resulting rating level at the receptor location.

4. CONSULTATION AND ASSESSMENT CRITERIA

Newport City Council provided pre-application advice in September 2022.

It was noted in the response to the Pre-Application that the further assessment work identified in the noise preliminary assessment report would be considered an acceptable approach. This included:

- Prediction and assessment of the noise during demolition and construction phases using BS 5228 to predict and assess the noise levels.
- A baseline noise survey in accordance with BS 4142 (and to establish baseline for the construction assessment). Monitoring locations to be selected in discussion with Newport City Council.
- Noise modelling to reflect the current design of the facility and to identify any potential noise impacts.
- Specification of noise mitigation to ensure that noise levels meet appropriate noise standards to avoid significant noise impacts in discussion with Newport City Council.

The noise baseline methodology and monitoring locations were approved by NCC in June 2023. However, it was not possible to arrange access at one of the locations and a suitable alternative was used. This is discussed further in Section 5 Baseline Environment.

NCC asked that the assessment include a 'worst case scenario' of data centre backup power generators activating overnight / early hours, and assessment of all applicable plant & equipment.

NCC have advised that their standard noise condition is:

> *"Noise emitted from plant and equipment located at the site shall be controlled such that the rating level, calculated in accordance with BS4142 2014, does not exceed a level of 5dB below the existing background level, with no tonal element to the plant.*
>
> ***Reason:** To ensure that the amenities of occupiers of other premises in the vicinity are protected."*

Therefore, based on the consultation response by NCC, the assessment criteria for operation noise from the Development is:

- Rating levels from the proposed Development do not exceed 5dB below the prevailing background levels, with no tonal element to the plant.

5. BASELINE ENVIRONMENT

The site is located on an industrial site, previously Quinn Radiator Factory. Buildings remain in place but unused. The land to the north is currently occupied by the NHS. To the east is the continuation of the industrial estate.

The site is bounded by the M4 approximately 700 m to the north and a mainline railway approximately 1 km to the south. A48 also lies to the north of the site, in between the site and the M4.

To the east lies the town of Duffryn with the closest residential properties on its western outskirts situated at a distance of approximately 450 m to the proposed Development. To the South, there is open land with dense vegetation, which appears to be unofficially used by the public (including the use of motorbikes).

The closest residential properties to the site are situated to the west, on Church Lane and Church Crescent at a distance of approximately 280 m from the closest noise producing element on the site. In addition, a number of more isolated properties are situated to the south, with the closest (on a private road off Church Lane), including The Stud Farm, approximately 300 m from the site.

The site is adjacent to several commercial/industrial premises, including:

- Vantage Data centre, which is currently in operation with expansions proposed, approximately 230 m to the north-east of the closest noise producing element on the site;
- IQE – a supplier of semiconductor products, approximately 140 m to the north-east of the closest noise producing element on the site;
- NHS building (storage/pharmacy building), located along the northern boundary of the site and approximately 50 m from the closest noise producing element on the site;
- Other commercial business in the wider business park;
- Parc Golf Club approximately 290 m to the south-west of the closest noise producing element on the site; and
- Hotels and restaurants to the north.

A number of industrial/commercial premises, such as, the IQE industrial unit, and NHS building, are situated close to the site which may contain offices. As the buildings nearby are linked to relatively noisy industrial or commercial uses, they are expected to be of lower noise sensitivity and therefore, the upper end of the guide range has been adopted as outlined in Section 3.3.2. The assessment is undertaken against the upper limit of acceptable noise level within office spaces, assuming a partially open window, which is an equivalent external façade noise level would be 65dB(A).

Effects from construction noise on users of outdoor spaces such as golf courses and public parks are not significant and not assessed. Baseline noise monitoring was carried out at four locations between 8th and the 22nd August 2023, to quantify the noise environment at locations close to the Proposed Development. The monitoring locations were agreed in advance with NCC. The nearest NSRs and noise monitoring locations are shown in Figure 1.

Subsequently, however, it was not possible to arrange access at NSR7. Instead, noise monitoring was carried out nearby at location ML7, at the southern end of the site. Although the location is slightly closer to the M4 and A48, the measurement equipment was screened

from these noise sources by the (disused) southern building on-site. As a result, noise from these sources is likely to be lower than would be experienced at NSR7, which is conservative.

A summary of the baseline sound levels adopted for each residential NSR is presented in Table 2. Details of the method and results are presented in Appendix B.

As part of the literature review undertaken to support this assessment, relevant publicly available reports were examined to inform baseline sound levels at key receptor locations. The Vantage CWL13 Environmental Permit Application[4] presents baseline sound levels for Pencarn Avenue. This data has been adopted for the assessment.

The report identifies key sound sources at Pencarn Avenue including local and distant road traffic (notably the A48 and M4), birdsong, operational plant associated with nearby facilities such as Vantage and G24 Power (adjacent to Powis Close), occasional aircraft, and a single night-time freight train movement approximately 800 m to the south-east. Although some light construction activity was present on the Vantage site at the time of the 2019 survey, this was intermittent and judged to have had no material effect on the background sound levels measured. This location is represented as NML5 in Figure 1.

[4] Atkins (2022) Vantage_CWL13_EP_SID: Vantage CWL13 Environmental Permit Application Supporting Information Document. Prepared for Vantage Data Centers UK Ltd.

Noise Monitoring Locations
Noise Sensitive Receptor
Site Boundary

0 50 100 150 200 250
Metres

N

SCALE: See Scale Bar	VERSION: A01
SIZE: A4	DRAWN: MC
PROJECT: 0657169	CHECKED: VB
DATE: 05/06/2025	APPROVED:

Figure 1
Noise Monitoring Locations and Noise Sensitive Receptors

ERM

Microsoft

PROJECTION: British National Grid

Maxar, Microsoft

Path: \\uksprdgisfs01\Data\London\Projects\0657169 - Microsoft Quinn\Map\0657169 - MicrosoftQuinn.aprx\0657169 - Noise - Noise Monitoring Locations and Sensitive Receptors - A01

TABLE 2 SUMMARY OF BASELINE SOUND LEVELS AT RESIDENTIAL RECEPTOR LOCATIONS

Receptor Location	Construction Baseline, $L_{Aeq,T}$ dB (A) / (Adopted 'ABC' Category [1])			Operational Baseline, RBSL L_{A90} dB(A) [2]	
	Day	Evening	Night	Day	Night
Nanty-moor Cottages/Blacksmiths Way (ML3)	57 (A)	54 (B)	51 (C)	51	46
Church crescent (ML2)	55 (A)	54 (B)	50 (C)	52	46
Powis Close (ML4)	44 (A)	41 (A)	39 (A)	35	32
The Stud Farm (ML1)	46 (A)	46 (A)	44 (B)	43	38
Pencarn Avenue (ML5)[3]	54 (A)	47 (A)	49 (A)	45	41
The Parc Golf Club (ML1 Representative)	46 (A)	46 (A)	44 (B)	43	38

1) 'ABC' category as defined in BS 5228 (see Section 3.3.1).
2) Representative baseline sound level according to BS 4142 (see Section 3.3.3).
3) Baseline levels derived from Vantage CWL13 Environmental Permit Application

6. METHODOLOGY

6.1 DEMOLITION AND CONSTRUCTION NOISE

6.1.1 BASIS OF ASSESSMENT

Noise and vibration from the demolition of the existing buildings and construction of the Proposed Development has the potential to result in significant temporary effects at nearby noise sensitive receptors (NSRs). This assessment considers the main construction activities which are expected to be:

- Demolition of the existing buildings;
- Earthworks;
- Foundation works; and
- Superstructures.

At the time of this assessment, a contractor had not been appointed for the construction works, as such, a detailed construction programme and construction traffic data was not available. Therefore, the potential for effects from construction traffic are only considered subjectively in this assessment.

Studies show that levels of vibration from driven piling fall below the level that may be perceptible in a residential environment within a distance of 100 m[(5)]. Vibration from other construction activities that may be required are expected to generate lower levels of vibration. Therefore, as the nearest sensitive receptors are beyond this distance, vibration during construction has been scoped out of further assessment.

Construction noise has been predicted based on information from the Project engineering team and from experience of other similar projects of the types and numbers of construction plant that will be used. The assessment makes use of the indicative demolition and construction programme; detailing construction activities and the associated plant that will be operating simultaneously.

Table 3 and Table 4 summarise respectively the demolition and construction plant and associated noise levels included in each phase.

TABLE 3 DEMOLITION ACTIVITIES AND SOUND POWER LEVELS

Phase/Activity (duration in weeks)	Item	BS 5228 Reference	LAeq at 10m	No. of Items	Effective Sound Power Level (LW)
Mobilisation (4w)	Diesel Generator	C.4.76	61	1	89
Phase 1 Clearance Works (11w)	Tracked Excavator 14t	C.2.07	70	2	101
	Telescopic Handler 3.7t	C.4.55	70	1	98
	Mobile Telescopic Crane 50t	C.4.46	67	2	98

(5) TRL Report 429. Groundborne Vibration Caused by Mechanised Construction Works. D.M.Hiller & G.I.Crabb. Highways Agency 1995

Phase/Activity (duration in weeks)	Item	BS 5228 Reference	LAeq at 10m	No. of Items	Effective Sound Power Level (LW)
	Diesel Scissor Lift 6t	C.4.59	78	1	106
Soft Stripping (9w)	Tracked Excavator 21t	C.4.65	71	4	105
	Diesel Scissor Lift 6t	C.4.59	78	1	106
Trench Remedial Works (6w)	Fuel Tanker Pumping	C.4.16	72	1	100
L1 Building Demolition (5w)	Tracked Excavator 40t	C.1.16	82	2	113
	Tracked Excavator 40t	C.1.13	86	2	117
	Tracked Crusher 47t	C.1.14	82	1	110
	Tracked Excavator 40t	C.2.14	79	1	107
Sprinkler Pump Room (13w)	Water Pump	C.2.45	65	1	93
	Pulveriser mounted on excavator	C.1.03	80	2	111
	Tracked Crusher 47t	C.1.14	82	1	110
	Tracked Excavator 40t	C.2.14	79	1	107
Asphalt Removal (8w)	Tracked Excavator 22t	C.2.03	78	1	106
Sewer Diversion Works	Tracked Excavator 40t	C.2.14	79	2	110
	Cement Mixer truck (discharging)	C.4.18	75	1	103
Phase 1, 2, & 2a Combined effective Sound Power Level					**122**
Main Building Demolition (29w)	Tracked Excavator 40t	C.1.16	82	6	118
	Tracked Excavator 22t	C.2.03	78	14	117
	Tracked Excavator 44t	C.1.12	82	6	118
	Tracked Crusher 47t	C.1.14	82	2	113
	Tracked Excavator 40t	C.2.14	79	2	110
Phase 3 works Combined effective Sound Power Level					**123**

Phases 1, 2, and 2a works are expected to overlap in duration and dates of activity as such the worst-case scenario of all these activities undertaken simultaneously is assessed as a conservative approach.

TABLE 4 INDICATIVE CONSTRUCTION ACTIVITIES AND SOUND POWER LEVELS

Phase/Activity	Item	BS 5228 Reference	LAeq at 10m	No. of Items	Effective Sound Power Level (LW)
Substructure	360° excavator	C.2.14	79	6	115

Phase/Activity	Item	BS 5228 Reference	LAeq at 10m	No. of Items	Effective Sound Power Level (LW)
	Concrete Pump	C.3.25	78	3	111
	All terrain telescopic forklift	C.4.46	67	6	103
	Rigid 6-wheeler tipper (HGV)	C.8.20	79	16	119
	Vibrating roller	C.2.39	74	3	107
			Combined Effective Sound Power Level		**121**
Superstructure	Mobile Crane (250t)	C.4.38	78	2	109
	Mobile Crane (100t)	C.3.28	67	4	101
	Cherry Picker	C.4.57	67	5	102
	All terrain telescopic forklift	C.4.46	67	4	101
			Combined Effective Sound Power Level		**111**
Envelope	Cherry Picker	C.4.57	67	4	101
	MEWP	C.4.53	77	6	113
			Combined Effective Sound Power Level		**113**
Generators	Mobile Crane (100t)	C.3.28	67	1	95
Fitout	Hoist	C.4.61	68	2	99
	MEWP	C.4.53	77	30	120
	Mobile Crane (100t)	C.3.28	67	1	95
			Combined Effective Sound Power Level		**120**

As a worst-case, it is assumed that all items of plant for each period are operating 100 % of the time, and are placed at the closest point of the Project Boundary to the relevant NSR,

All construction work will be carried out during daytime hours only, from 07:00 until 19:00 on weekdays, and 08:00 until 13:00 on Saturdays. Night-time construction work is not expected to be required. In exceptional circumstances, some work may be required in the evening and night should works fall behind schedule. This will be limited to works that are not major sources of noise so that levels at NSRs are kept below the relevant criteria.

6.1.2 CONSTRUCTION NOISE CALCULATION

Demolition and Construction noise has been calculated in accordance with BS 5228-1. The total effective Sound Power Level from an activity, that may be undertaken simultaneously, is used to determine the sound level at the NSR by calculating sound propagation from the Site boundary to the NSR façade. The propagation calculation accounts for the following factors:

- Quantity of plant;
- Distance to the NSR from the boundary of construction area;

- Height of Source;
- Ground absorption (assumed soft ground between Site and NSRs);
- Plant On-time (assumed %100 as conservative);
- Façade correction (3dB); and
- Any screening correction (none in this instance).

The sound level is calculated by distance attenuation of total sound with corrections for difference in source height, ground type, screening, and façade correction to determine the sound level at the NSR façade.

6.2 OPERATIONAL NOISE

6.2.1 BASIS OF ASSESSMENT

The noise and vibration assessment of the operational phase makes use of the following sources of information:

- Preliminary layout of external fixed plant and other noise sources, such as waste treatment plant and Air Handling Units (AHUs), provided by the Project engineering team;
- Equipment noise source data and information regarding assumed at-source mitigation measures provided by the Project engineering team;
- Preliminary design information regarding building construction provided by the Project engineering team (assumptions regarding absorption / transmission values are based on SoundPLAN software library data); and
- Preliminary layout and height information for the main on-site buildings provided by Project engineering team.
- No significant vibration generating equipment will be required during operation. Therefore, an operational vibration assessment is scoped out of further assessment.

On-site vehicle movements during operation are expected to be minimal. Off-site vehicles are also expected to be minimal so that significant changes in traffic noise are not likely, and therefore an assessment of road traffic noise during the operation of the Development has been scoped out.

6.2.2 ASSESSMENT SCENARIOS

An assessment of the proposed Development is undertaken for three scenarios of activity:

- Normal Operation: this scenario is the typical operation of the data centre powered by the national grid, consisting of the AHU intake and exhaust noise emissions from CW01 & CW02 buildings plus the substation noise from the three 150 kV transformers. Back-up generators, and therefore, associated stacks and transformers do not operate during this scenario. Other external plant such as the Water Treatment Unit (WTU) is enclosed within an external plant room therefore, noise emissions are not expected to be significant.
- Generator Testing: this scenario reflects the monthly, quarterly and yearly testing of the generators which will be undertaken at the Proposed Development. This would involve 15, 30, 60 and 90 minute testing of each generator individually (with associated transformer and stack where applicable). These testing regimes are presented in Table 5. Quinquennial testing is not included as part of this scenario due to its infrequency. The modelled results reflect the annual testing scenario as this would represent the modelled worst-case. This

was modelled by determining NSR component levels of each generator (in addition to the normal operation of CW01&02), and assessing a reasonable worst-case during the testing period with due consideration for context under BS 4142.

- Emergency Mode: This scenario reflects the conditions of a complete power supply failure, which is also simulated by the atypical quinquennial test of all generators (with associated transformer and stack where applicable). This is the worst case which includes normal operation noise emissions from the buildings plus all external generators, stacks, and transformers in operation. During emergency mode AHU's operate at a higher noise mode.

TABLE 5 TESTING REGIME

Regime	Expected Frequency	Representative Duration	Scheduling	Number of generator engines	Load
Testing Regime – All tests					
Monthly Test	Monthly[b]	15-min	Weekdays	All engines individually[a]	No electrical load. Modelled as 30% load on engine
Quarterly Test	Quarterly[c]	30-min	Weekends	All engines individually[a]	70% engine load
Annual	Annually	1 hour	Weekends	All engines individually[a]	100% engine load
PIT Test	Annual	90 min	n/a	All engines individually[a]	Depending on load within associated CEL[d]
USS Switchgear	Quinquennial	90 min	n/a	All[e]	Depending on load within associated CELL/COLO
UPM Switchgear	Quinquennial	90 min	n/a	All[e]	Depending on load within associated CELL/COLO
Emergency Power					
Emergency power	Unpredictable	1 hour	Any time	All	60% engine load[f]
Emergency power	Unpredictable	72 hours	Any time	All	60% engine load[f]

[a] Tests occur in sequential hours, not in the same hour.
[b] The monthly load bank test is undertaken eight times a year at the Newport Site. Three of the remaining tests are replaced by the quarterly load bank test and the final test is replaced by the annual test.
[c] The quarterly test is undertaken three times a year. The fourth test is replaced by the annual load bank test.
[e] Specific groupings of engines were not supplied by the client for this assessment therefore a worst-case scenario in which all generators are run together was used for these tests.

[f] It has been assumed that all engines would be running at 60% load in case of emergency. This is a worst-case scenario and in reality, it is expected that only a part of the engines would be running, with others in standby in case of failure.

The three scenarios above have been modelled in this assessment; results for each scenario are presented in Section 7.2.

It should be noted that only the normal operation scenario is the typical continuous noise profile of the Development. Generator testing is temporary, undertaken over a monthly basis. The emergency mode is worst-case that would only occur during the unlikely event of a power failure after which as soon as possible, power would be restored and normal operational levels would resume.

6.2.3 NOISE MODELLING

The specific sound level at the nearest noise-sensitive receptors has been calculated in SoundPLAN version 9.1, using the environmental noise propagation model ISO 9613 2:2024 – Acoustics; 'Attenuation of sound during propagation outdoors – Part 2: General method of calculation'.

The Development comprises the following plant:

- CW01 Building;
  - 160x AHU unit intake louvres;
    - 96x fitted with louvre / damper only – no silencer (louvre 1)
    - 64x fitted with LDM Acoustic Module (louvre 2)
  - 160x AHU exhaust louvres;
  - 20x Colo generator units (with 10x exhaust stacks and 20x transformers);
  - 3x Mains 150kV Transformers;
  - 1x Admin office generator unit (with an associated stack and transformer); and
  - 1x WTU generator unit (with an associated stack and transformer).
- CW02 Building;
  - 64x AHU unit intake louvres;
    - 32x fitted with louvre / damper only – no silencer (louvre 1)
    - 32x fitted with LDM Acoustic Module (louvre 2)
  - 64x AHU exhaust louvres;
  - 8x Colo generator units (with 8x exhaust stacks and 8x transformers); and
  - 1x Admin office generator unit (with an associated stack and transformer).

The inlet louvres with LDM Acoustic Modules (louvre 2) form the embedded mitigation.

The sound power levels of the plant included in the noise model are presented in Table 6 and Table 7.

The octave band spectrum for the AHU intake / exhaust was taken from the manufacturer's specification reports. The octave band spectrum of a typical plant from our in-house SoundPLAN library was scaled and adjusted to sound power levels of the generators, stacks, and transformers of the Development.

TABLE 6 SOUND POWER LEVELS AND SPECTRA FROM DATA HALL AHUS

Item		Mode	A-Weighted Octave Band Frequency Spectrum (Hz)								Sound Power Level
			63	125	250	500	1000	2000	4000	8000	dB L_{WA}
Intake	At source	Normal	45	61	73	71	71	67	62	53	77
		Emergency	46	63	73	72	72	67	62	53	78
	At louvre 1	Normal	44	61	72	67	67	61	56	47	75
		Emergency	45	63	72	69	68	62	56	47	75
	At louvre 2	Normal	43	57	66	58	55	49	47	40	67
		Emergency	44	59	66	59	56	50	47	40	68
Exhaust	At source	Normal	49	65	70	80	83	78	73	63	86
		Emergency	50	67	71	80	84	79	74	64	87
	At louvre	Normal	33	49	54	62	66	59	54	44	68
		Emergency	34	51	55	62	67	60	55	45	69

TABLE 7 SOUND POWER LEVELS AND SPECTRA FROM GENERATORS, TRANSFORMERS, AND STACKS

Item	A-Weighted Octave Band Frequency Spectrum (Hz)								Sound Power Level
	63	125	250	500	1000	2000	4000	8000	dB L_{WA}
Admin Generator Louvre	80	85	75	77	80	76	73	63	88
Colo Generator Louvre (Side)	82	87	77	79	82	78	75	65	90
Colo Generator Louvre (Roof)	81	85	75	78	80	76	73	63	89
WTU Generator Louvre	80	85	75	77	80	76	73	63	88
Transformer (all)	13	49	65	64	63	62	57	53	70
Stack (all)	40	56	63	72	74	75	82	82	86

The sources were modelled at their respective positions and scenarios along with other site buildings.

6.2.3.1 MODEL PARAMETERS

The ISO 9613-2 method predicts the level of sound at a receptor by taking the octave band sound power level spectrum of the source and applying a number of attenuation factors that determine the resulting Specific level at the receptor location. The following parameters were used in the prediction model and are considered to provide a conservative prediction of the noise levels likely to be experienced in practice:

- All plant operating simultaneously and at full capacity;
- Includes local terrain and buildings with respective heights above ground level;
- Ground absorption of G=0 (hard) for hardstanding areas and G =0.6 (mixed ground) for surrounding ground between Development and NSRs;
- Generators modelled as radiating machines;
- All Transformers modelled as point sources;
- AHU louvres (intake and exhaust) modelled as transmission areas on the buildings;
- Stacks modelled as point sources at 14.5 m above ground; and
- Receivers placed at a height of 1.5 m and 4.0 m above ground in front of the NSR façade facing the development.

Two noise maps showing predicted specific levels for normal operation is presented in Appendix C, one for levels predicted at 1.5 m and one for levels predicted at 4.0 m.

6.2.4 RATING LEVEL CORRECTIONS

BS 4142 states that corrections should be applied to account for certain acoustic features which have the potential to increase the level of noise impact at nearby dwellings.

The acoustic features to be considered in the application of rating corrections are as follows:

- **Impulsivity**: No impulsive characterises are anticipated from the Development;
- **Tonal Elements**: The main noise sources from the Development are the AHUs intake/outlets for the CW01 and CW02 buildings, which are broadband in nature, although transformers will be operational at the site, the transformer are small in size and unlikely to produce tonal noise at the receptors, as such, no tonal penalties have been applied.
- **Intermittency**: The plant will operate 24/7 under normal conditions, the Development will therefore not have "identifiable on / off conditions" in terms of BS 4142; no correction for intermittency was therefore applicable.
- **Distinctiveness**: BS 4142 states that a distinctiveness penalty is applied when no other correction is applicable and the Development noise may be distinctive in the acoustic climate. A correction for distinctiveness will be applied where the operational noise is likely to be audible (the specific level is not less than 10dB below the background sound level).

Based on the above, a penalty of 3dB(A) has been applied at receptors where the predicted specific level is not less than 10dB below the background sound level.

7. ASSESSMENT OF EFFECTS

7.1 CONSTRUCTION

Table 8 presents the sound pressure level at the nearest NSRs surrounding the proposed Site for the respective demolition phases. Demolition and construction are only planned to be undertaken during daytime (0700-1900) as such only daytime assessment to respective threshold is undertaken.

TABLE 8 ASSESSMENT OF DEMOLITION WORKS

NSR	Distance to Site, m	Predicted Sound Pressure Level (at NSR façade), dB, $L_{Aeq,T}$		Difference to Category A Limit (65dB), dB	
		Phase 1, 2, 2a	Phase 3	Phase 1, 2, 2a	Phase 3
Church Crescent (all floors)	250	64	65	-1	0
The Stud Farm (all floors)	340	60	62	-5	-3
Blacksmiths Way (all floors)	420	58	60	-7	-5
Powis Close (all floors)	480	57	58	-8	-7
Pencarn Avenue (all floors)	570	58	60	-7	-5

It can be seen from Table 8 that noise from Demolition activity does not exceeds the Limit A category at any NSR during all phases of work.

Table 9 presents the predicted sound pressure level at the nearest NSRs surrounding the proposed Site for the respective construction phases.

TABLE 9 ASSESSMENT OF CONSTRUCTION WORKS

NSR	Predicted Sound Pressure Level (at NSR façade), dB, $L_{Aeq,T}$ and Difference (Δ) to Category A Limit (65dB), dB									
	Substructure		Superstructure		Envelop		Generator Installation		Fitout	
	$L_{Aeq,T}$	Δ, dB	$L_{Aeq,T}$	Δ, dB	$L_{Aeq,T}$	Δ, dB	$L_{Aeq,T}$	Δ, dB	$L_{Aeq,T}$	Δ, dB
Church Crescent (all floors)	63	-2	53	-12	55	-10	37	-28	62	-3
The Stud Farm (all floors)	59	-6	49	-16	51	-14	33	-32	58	-7
Blacksmiths Way (all floors)	58	-7	47	-18	49	-16	33	-32	56	-9
Powis Close (all floors)	56	-9	46	-19	48	-17	30	-35	55	-10

NSR	Predicted Sound Pressure Level (at NSR façade), dB, $L_{Aeq,T}$ and Difference (Δ) to Category A Limit (65dB), dB									
	Substructure		Superstructure		Envelop		Generator Installation		Fitout	
	$L_{Aeq,T}$	Δ, dB	$L_{Aeq,T}$	Δ, dB	$L_{Aeq,T}$	Δ, dB	$L_{Aeq,T}$	Δ, dB	$L_{Aeq,T}$	Δ, dB
Pencarn Avenue (all floors)	54	-11	44	-21	46	-19	28	-37	53	-12

It can be seen that all NSR are below the relative Limit A threshold in terms of BS5228-1, as such, effects from (worst-case) construction noise are not expected to be significant.

7.1.1 CONSTRUCTION TRAFFIC NOISE

As stated in Section 6.1.1, a construction programme is not available at this stage, therefore, a construction traffic noise assessment could not be undertaken. Subjectively, the proposed Development is located in an industrial / business park area, the area has two access roads coming off the A48 to the north which is a slip off road from the M4 motorway. Given that the construction traffic will be coming off major roads such as the M4 and A48 directly to the industrial area the change in traffic counts is expected to be negligible and therefore, noise effects to be minimal.

7.2 OPERATION

7.2.1 SCENARIO 1 – NORMAL OPERATION

An assessment of the likely impact from normal operation of the proposed Development has been made based on the difference between the Rating levels and representative background levels for daytime and night-time periods, as detailed in Section 3.3.3.

TABLE 10 BS 4142 ASSESSMENT – NORMAL OPERATION

Receptor	Floor Level	Specific Level, dB(A)	Rating Level, dB(A)		Background level, dB, LA90		Difference, dB	
			Day	Night	Day	Night	Day	Night
Church Crescent	GF	29	29	29	52	46	-23	-17
	1F	31	31	31			-21	-15
The Stud Farm	GF	24	24	24	43	38	-19	-14
	1F	27	27	27			-13	-11
Blacksmiths Way	GF	25	25	25	51	46	-27	-22
	1F	28	28	28			-23	-18
Pencarn Avenue	GF	21	21	21	45	41	-24	-20
	1F	24	24	24			-21	-17
The Parc Golf Club	GF	16	16	16	43	38	-27	-22
	1F	21	21	21			-22	-17

Receptor	Floor Level	Specific Level, dB(A)	Rating Level, dB(A)		Background level, dB, LA90		Difference, dB	
			Day	Night	Day	Night	Day	Night
Powis Close	GF	22	22	22	35	32	-14	-11
	1F	24	24	27(1)			-11	-5

1) 3dB penalty for distinctiveness applied (as discussed in 6.2.4)

Table 10 shows that the Rating levels at all receptors are less than the identified assessment criteria in Section 4. Noise from the Development is 5dB or more below the background levels during both day and night periods at all locations, resulting in 'no impact' in terms of BS 4142, which is considered to be Not Significant.

7.2.2 SCENARIO 2 – GENERATOR TESTING

An assessment of the likely impact during Generator testing has been undertaken, presented in Table 11. As generator testing will only be undertaken during the day noise impact during night-time is not relevant and as such a night-time assessment is not undertaken.

TABLE 11 BS 4142 ASSESSMENT – GENERATOR TESTING (WORST-CASE)

Receptor	Floor Level	Specific Level, dB(A)	Rating Level, dB(A)		Background level, dB, LA90		Difference, dB	
			Day	Night	Day	Night	Day	Night
Church Crescent	GF	29	29	-	52	-	-23	-
	1F	35	35				-17	
The Stud Farm	GF	24	24		43		-19	
	1F	32	32				-11	
Blacksmiths Way	GF	25	25		51		-26	
	1F	31	31				-20	
Pencarn Avenue	GF	21	21		45		-16	
	1F	29	29				-16	
The Parc Golf Club	GF	16	16		43		-27	
	1F	28	28				-15	
Powis Close	GF	24	24		35		-11	
	1F	27	30(1)				-5	

1) 3 dB penalty for distinctiveness applied (as discussed in 6.2.4)

Table 11 shows the rating levels during the generator testing do not exceed more than 5dB below the background levels at all NSR during daytime, resulting in 'no impact' in terms of BS 4142, which is considered to be Not Significant.

The generator testing levels are conservatively presented concurrent with AHU operations. This is not a requirement of permitting but as the levels are compliant with BS 4142 and the

planning criteria, there is no additional value in separately presenting the generator levels without AHU operations.

7.2.3 SCENARIO 3 – EMERGENCY OPERATION

As assessment of the likely impact during emergency scenario has been undertaken, presented in Table 12.

TABLE 12 BS 4142 ASSESSMENT – EMERGENCY MODE

Receptor	Floor Level	Specific Level, dB(A)	Rating Level, dB(A)		Background level, dB, LA90		Difference, dB	
			Day	Night	Day	Night	Day	Night
Church Crescent	GF	42	42	45(1)	52	46	-11	-2
	1F	42	42	45(1)			-10	-1
The Stud Farm	GF	40	43(1)	43(1)	43	38	0	5
	1F	40	43(1)	43(1)			0	5
Blacksmiths Way	GF	38	38	41(1)	51	46	-13	-5
	1F	39	39	42(1)			-12	-4
Pencarn Avenue	GF	36	39(1)	39(1)	45	41	-6	-2
	1F	37	40(1)	40(1)			-5	-1
The Parc Golf Club	GF	35	38(1)	38(1)	43	38	-5	0
	1F	36	39(1)	39(1)			-4	1
Powis Close	GF	36	39(1)	39(1)	35	32	4	7
	1F	37	40(1)	40(1)			5	8

1) 3 dB penalty for distinctiveness applied (as discussed in 6.2.4)

Table 12 indicates that, under the emergency scenario, the rating levels exceed the background sound levels during the daytime at Powis Close by 5dB. During the night-time period, exceedances are also observed at Powis Close by 8 dB and at The Stud Farm and The Parc Golf Club by 1dB and 5 dB respectively. As stated in Section 6.2.2, this scenario is based on a power failure emergency event and does not represent the typical operation of the Development, and therefore any residual impacts are considered Not Significant

7.2.4 ASSESSMENT OF INDUSTRIAL UNIT AND OFFICES

As stated in Section 5, directly north of the proposed Development is the NHS unit and offices, although the offices are low sensitivity receptors in terms of noise, the BS 8233 internal noise guide values for office have been adopted in this assessment to show effects from the proposed Development.

The assessment accounts for an open window attenuation of 15dB D_n, this value is taken from research results undertaken by Napier University[6] and supporting research findings in the

[6] NANR116: Open/Closed Window Research – Sound Insulation Through Ventilated Domestic Windows: Napier University 2007

Environmental Research and Public Health journal[7]. The research shows that typical attenuation of slightly open or tilted windows ranges from 14 to 19dB on average across frequencies, and as such a 15dB attenuation has been taken as representative. Table 13 presents the noise levels from the normal operation of the proposed Development.

TABLE 13 BS 8233 ASSESSMENT OF NEAREST OFFICES – NORMAL OPERATION

Receptor	Floor Level	Predicted Level at facade, dB(A)	Open Window Attenuation, dB	Internal Noise, dB, $L_{Aeq,T}$	Guide Level, dB(A)	Difference, dB
NHS Offices	GF	46	15	31	50	-19
	1F	47	15	32	50	-18

As demonstrated in Table 13, noise from the normal operation of the Development is considerably less than the upper guide value for offices, and therefore effects for NHS Offices would be Not Significant.

Table 14 presents the noise levels from the normal operation of the proposed Development.

TABLE 14 BS 8233 ASSESSMENT OF NEAREST OFFICES – GENERATOR TESTING

Receptor	Floor Level	Predicted Level at facade, dB(A)	Open Window Attenuation, dB	Internal Noise, dB, $L_{Aeq,T}$	Guide Level, dB(A)	Difference, dB
NHS Offices	GF	53	15	38	50	-12
	1F	53	15	38	50	-12

As demonstrated in Table 14, noise from generator testing is considerably less than the upper guide value for offices, and therefore effects for NHS Offices would be Not Significant.

7.3 DEVELOPMENT CONTEXT

The Development is located in an industrial estate / business park area where the acoustic climate consists predominantly of the business unit and activities as well as the traffic noise from the nearby M4 motorway to the north. The proposed Development, as such, will not be out of context or readily distinctive against the existing acoustic environment of the area.

Results from normal operation and generator testing are within the agreed criteria of 5dB or more below the respective background levels. Given that the proposed Development is not out of context of the area, noise emitted from the Development is considered to have no significant impact on the amenity of the local residential dwellings.

Internal noise levels at NHS Offices would be 31dB at ground floor and 32dB at first floor for normal operation and 38dB at both floors for generator testing. The guide level for this receptor is 50 dB(A) and so both operations are considered acceptable in terms of BS 8233.

[7] Barbara et al. Difference between Outdoor and Indoor Sound Levels for Open, Tilted, and Closed windows: International Journal of Environmental Research and Public Health.

Noise from the emergency scenario is expected to exceed the background levels at three NSRs (Table 12) during the night by up to 8dB. However, this scenario will only take place in during quinquennial testing or in the unlikely event of a power failure. Considering this context, the impact from the emergency scenario would be temporary and unlikely to occur regularly, and therefore, will not result in a significant impact on the quality of life or amenity of the local NSRs.

7.4 UNCERTAINTY

Modelling has been based on preliminary design and manufacturer's datasheets for the selected plant, a number of scenarios have been modelled to present the worst-case noise emissions possible for the proposed Development, modelling parameter have been chosen on the conservative basis (e.g., model assumes downwind conditions for all receptors, closest NSR façade facing the Development directly is chosen to represent receptors results etc.) and monitoring has been undertaken where possible over a long duration (2 weeks) to reduce uncertainty in measured levels as far a reasonably practicable.

A number of conservative approaches have been taken; including assessments of generator testing and emergency mode to show worst-case noise emission scenarios, and long-term background / baseline monitoring for accurate representative levels. Given this conservative approach in the assessment and that rating levels are 5dB or more below the background levels at all receptors during normal operation, the Development noise will have minimal/negligible effects on the acoustic context of the area.

Therefore, the conservative assumptions made in this assessment will likely result in an over-prediction of the level of impact in practice. The uncertainties inherent in the assessment will therefore not have a significant impact on the outcome of the assessment.

8. MITIGATION

No mitigation is required during the construction and demolition of the Development. The construction and demolition noise (assessed as a worst-case) are expected to be within the BS5228-1 lower limit threshold; therefore, no specific mitigation is required for demolition and construction activities. However, the contractor is expected to follow good practice as advocated in BS 5228-1 & 2 to ensure construction activities do not give rise to excessing noise or vibration. Some good practice measures are detailed below which should be implemented to manage the effects of noise and vibration during construction activities:

- The Applicant shall prepare a site-specific Noise Management Plan (NMP) to manage noise during the demolition and construction phases of the Development;
- Construction operations shall be limited to times stated in the NMP, and agreed with the Local Planning Authority;
- Deliveries of HGV to Site shall only take place within daytimes (0700 – 1900) ;
- The site contractors shall be required to employ the best practicable means of reducing noise emissions from plant, machinery, and construction activities, as advocated in BS 5228-1:2009;
- Where practicable, the work programme should be phased, which would help to reduce the combined effects arising from several noisy operations;
- Where necessary and practicable, loud noise from fixed plant and equipment should be shielded with suitable acoustic enclosures or acoustic screens;
- All construction traffic should be directed through Celtic Way (off A48 roundabout) which comes through the middle of the business park and will result in the minimum effects to NSRs in the area.

Mitigation during the operation of the Development would be limited to embedded mitigation. This includes a total of 96 inlet louvres fitted with LDM Acoustic Modules (labelled louvre 2 in Table 6), of which 64 would be for CWL01 and 32 would be for CWL02.

9. CONCLUSION

An assessment of potential noise effects associated with the Development has been carried out. Predicted noise effects from three operational scenarios have been assessed: consisting of noise due to the normal operation of the Development, noise from generator testing (reasonable worst-case scenario), and noise during an emergency scenario (main power supply failure).

Demolition and construction noise is predicted on a worst-case basis and does not exceed the lower category BS 5228-1 threshold of 65dB(A) at any NSR. Works are only expected to be undertaken during the daytime and as such only daytime assessment has been undertaken. Given that there are no exceedances, the impact is expected to be manageable by following the best practice principles outlined in Section 8.

The assessment has been undertaken in accordance with BS 4142:2014+A1:2019. The assessment criterion, as advised by the NCC, is that rating levels should be at least 5dB below the background sound level at nearby receptors to avoid adverse impact. For the typical operation and generator testing scenarios, the external rating levels do not exceed more than 5dB below the background during the daytime and night-time and meet the agreed criteria at all receptors. For the emergency scenario, external rating levels exceed more than 5dB below background, during both daytime and night-time, however this is deemed to be not significant as this is unlikely to occur.

Therefore, no significant effects are anticipated from demolition/construction works of the proposed Development or from operation of the Development in the three assessed scenarios, when considering the context.

10. GLOSSARY OF TERMS

Decibel (dB): The decibel is the basic unit of noise measurement. It relates to the cyclical changes in pressure created by the sound and operates on a logarithmic scale, ranging upwards from 0dB. 0dB is equivalent to the normal threshold of hearing at a frequency of 1000 Hertz (Hz). Each increase of 3dB on the scale represents a doubling of the Sound Pressure and is typically the minimum noticeable change in sound level under typical listening conditions.

dB(A): Environmental noise levels are usually discussed in terms of dB(A). This is known as the A-weighted sound pressure level, and indicates that a correction factor has been applied, which corresponds to the human ear's response to sound across the range of audible frequencies. The ear is most sensitive in the middle range of frequencies (around 1000-3000 Hz), and less sensitive at lower and higher frequencies.

A-Weighting: The A weighted noise level is derived by analysing the level of a sound at a range of frequencies and applying a specific correction factor for each frequency before calculating the overall level. In practice this is carried out automatically within noise measuring equipment by the use of electronic filters, which adjust the frequency response of the instrument to mimic that of the ear.

Frequency: The frequency of a sound is equivalent to its pitch in musical terms. The units of frequency are Hertz (Hz), which represents the number of cycles (vibrations) per second.

LA90,T: This term is used to represent the A-weighted sound pressure level that is exceeded for 90% of a period of time, t. This is used as a measure of the background noise level.

Noise: Unwanted sound. May refer to both natural (e.g., wind, birdsong etc.) and artificial sounds (traffic, industrial noise, aircraft etc.).

Z-Weighting: A dB noise level, with no weightings (e.g., A-weighting) applied.

Noise sensitive receptors: Locations that may potentially be adversely affected by the addition of a new source of noise, such as residential properties.

Sound power level (Lw): Sound power measured on the decibel scale, defined as the total acoustic energy of a sound emitting source.

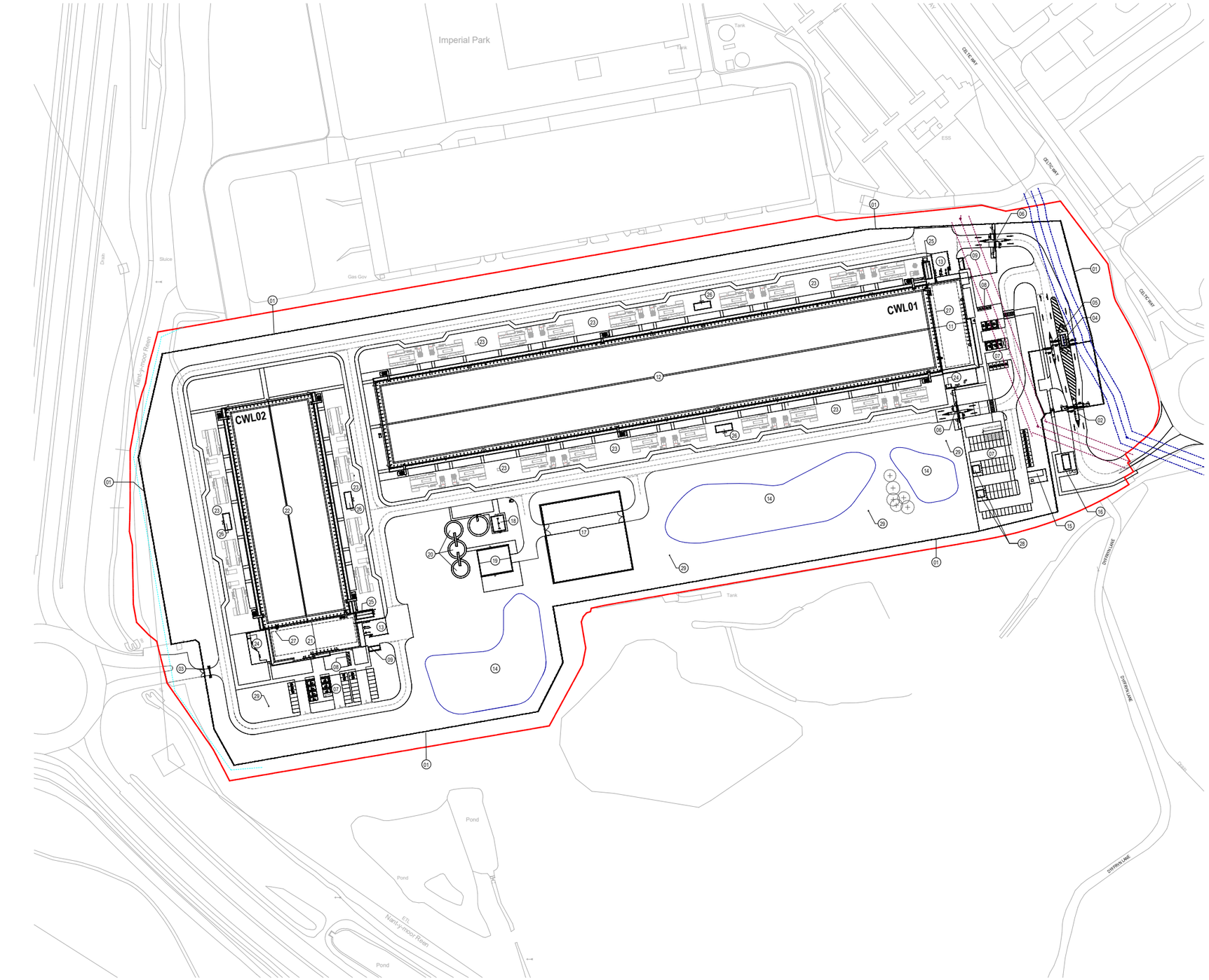
Background Sound: The background sound level is the underlying level of noise present at a particular location for the majority (usually 90%) of a period of time.

Rating Level: Sound levels which have been corrected for certain acoustic features, as required under BS4142 methodology.

Sound pressure level (L_p): Sound pressure measured on the decibel scale, relative to a sound pressure of 2 x 10-5 Pa.

Specific Level: In terms of BS4142 methodology, the specific level is the sound level produced by a source, without corrections for acoustic features.

APPENDIX A PROPOSED DEVELOPMENT PLANS



01 PROPOSED MASTER PLAN

SCALE: 1 : 1000

0m 20m 40m 60m 80m 100m

SHEET NOTES

ALL VERTICAL DIMENSIONS ARE RELATIVE TO ASSOCIATED BUILDING SLAB LEVEL.

DO NOT SCALE FROM DRAWINGS.
ALL DISCREPANCIES TO BE REPORTED TO GENSLER ARCHITECTS IMMEDIATELY. ALL DIMENSIONS TO BE VERIFIED BY CONTRACTOR ON SITE PRIOR TO ANY WORKS.

A-B-11 SHEET NOTES	
Sheet Note Number	Description
01	SECURITY FENCE
02	PRIMARY CAMPUS ENTRANCE
03	SECONDARY CAMPUS ENTRANCE
04	GUARD HOUSE
05	PRIMARY ENTRANCE BARRIERS
06	BACK OF HOUSE GATE
07	PARKING
08	BICYCLES
09	BIN STORE
11	CWL 01 ADMIN
12	CWL 01 DATA CENTRE
13	LOADING DOCK
14	POND
15	SEWER PUMP STATION
16	DAY 1 SUB-STATION
17	FUTURE PRIMARY SUBSTATION
18	SPRINKLER TANK AND PUMP ROOM
19	WATER TREATMENT BUILDING
20	WATER STORAGE TANKS
21	CWL 02 ADMIN
22	CWL 02 DATA CENTRE
23	GENERATOR YARD
24	SMOKE SHELTER
25	EXTERNAL PLANT ROOM
26	UMS / E-HOUSE
27	PV AREA TO ADMIN ROOF
28	E HOUSE
29	BEE INSECT / BIRD BOX

LEGEND

- SITE BOUNDARY
- EXISTING COMBINED SEWER TO BE DIVERTED OUTSIDE OF BOUNDARY
- EXISTING STORM WATER SEWER TO BE DIVERTED OUTSIDE OF BOUNDARY
- DIVERTED STORM WATER SEWER
- RETAINED EXISTING TREES

SCHEDULE OF APPROX AREAS	
SITE BOUNDARY (RED)	165,4798.00 m²
CWL01 GIA	24,735.00 m²
CWL02 GIA	10,230.00 m²

SCHEDULE OF PARKING	
OVERALL PARKING	121 spaces
ELECTRIC PARKING	22 spaces
ACCESSIBLE PARKING	13 spaces
CYCLE PARKING	40

1 : 1000@A0

RED
1 Lower Farm Barns
Bainton Road, Bucknell
Bicester OX27 7LT, UK
www.red-eng.com
t: +44-(1869)355600
f: +44-(1869)250777
e: oxfordcad@red-eng.com

Gensler
4 St Philip's Place
First Floor
Birmingham
B3 2SL
United Kingdom
Tel. +44 (0)121 260 1600

Microsoft

CWL01-02

Duffryn Lane Newport
NP10 8BE

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Checked	JL
Date	11.10.23
Company Project No.	P-020340
M.S. Project No.	P-020340

Approvals

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Revisions

No.	Date	Description
P01	31.08.23	PLANNING
P02	12.09.23	PLANNING
P03	11.10.23	PLANNING

Registration

Bar Code

Sheet Title/Number

SITE - PROPOSED MASTER PLAN

CWL01-02-A-P-07

CWL01-02-A-P-07- P03

APPENDIX B BASELINE NOISE SURVEY

APPENDIX B BASELINE NOISE SURVEY

08 December 2023

B 1. INTRODUCTION

1.1.1.1 Baseline noise monitoring was carried out between 08th of August and the 22nd of August 2023, to quantify the noise environment at locations close to the Project.

1.1.1.2 This section presents details of the data recorded during the survey and the analysis that has been carried out to derive the representative background sound level (RBSL) according to BS 4142[1] as well as other key metrics used to describe the baseline noise environment.

1.1.1.3 This appendix is set out as follows:

- Section B 2 presents the survey methodology.
- Section B 3 presents an overview of the weather data measured over the survey period.
- Section B 4 presents the results of the monitoring at the south end of the Site), and the analysis used to derive the RBSL.
- Section B 5 presents the results of the monitoring at 10 Church Crescent, and the analysis used to derive the RBSL.
- Section B 46 presents the results of the monitoring at Nantymor Cottages, and the analysis used to derive the RBSL.
- Section B 7 presents the results of the monitoring at 43 Powis Close, and the analysis used to derive the RBSL.

B 2. METHODOLOGY

B 1.1 EQUIPMENT AND SETUP

1.1.1.4 Monitoring was carried out using Class 1 sound level meters (four Rion NL-52s set up as noise loggers). A weather station was set up at one location (at the south end of the Site) to record weather data throughout the survey period. A Rion WS-15 enhanced windshield with a large diameter windshield and a discrete secondary layer to minimize wind effects at the microphone was used with the two noise loggers.

1.1.1.5 The microphones were set at a height of approximately 1.5 m above the ground, and three of the four monitoring locations allowed for the measurement to be carried out in free-field conditions (i.e., at least 3.5 m from the nearest hard reflective surface). This was not the case for one of the locations, which it will be discussed further into this chapter.

1.1.1.6 The sound level meters were calibrated before the survey. Following the survey collection, the calibration levels were checked. No significant drift (i.e., > 0.5 dB) was observed. Copies of the SLM calibration certificates are available on request.

1 BS 4142:2014 Methods for Rating and Assessing Industrial and Commercial Sound, British Standards Institute.

B 1.2 DATA RECORDING

1.1.1.7 Noise measurements were carried out at four locations around the Project, the noise meters were installed and left to log 15-minute noise levels continuously for a period of approximately fifteen days. The noise monitoring locations are shown in Figure 1 of the main noise report.

1.1.1.8 Standard metrics including L_{Aeq}, L_{A90} and $L_{Amax,f}$ were recorded over the 15-minute intervals. In addition, meteorological data such as precipitation, wind speed and wind direction were continuously logged at one-minute intervals.

1.1.1.9 To minimise the influence on the measurements from sources of interference such as wind passing over the diaphragm of the microphone or rain falling on the microphone windshield, measurements made during rainfall events and wind speeds of greater than 5 m/s were discarded during data analysis. This follows the guidance given in BS 4142. The highest one-minute average wind speed recorded during each 15-minute noise measurement period was used to decide whether to discard noise measurements.

1.1.1.10 The weather during the survey period was relatively dry albeit with some periods of rainfall, and with wind speeds mostly less than 5 m/s. Consequently, only a very small proportion of the noise measurements had to be discarded.

B 3. SURVEY WEATHER

1.1.1.11 Figure B1 on the following page, details the measurements of wind and rainfall recorded during the survey period. Figure B2 on the following page details the measurements of wind direction recorded during the survey measured in graphed in degrees.

Figure B1 15-Minute Logged Rain and Wind Data, at the south end of the Site

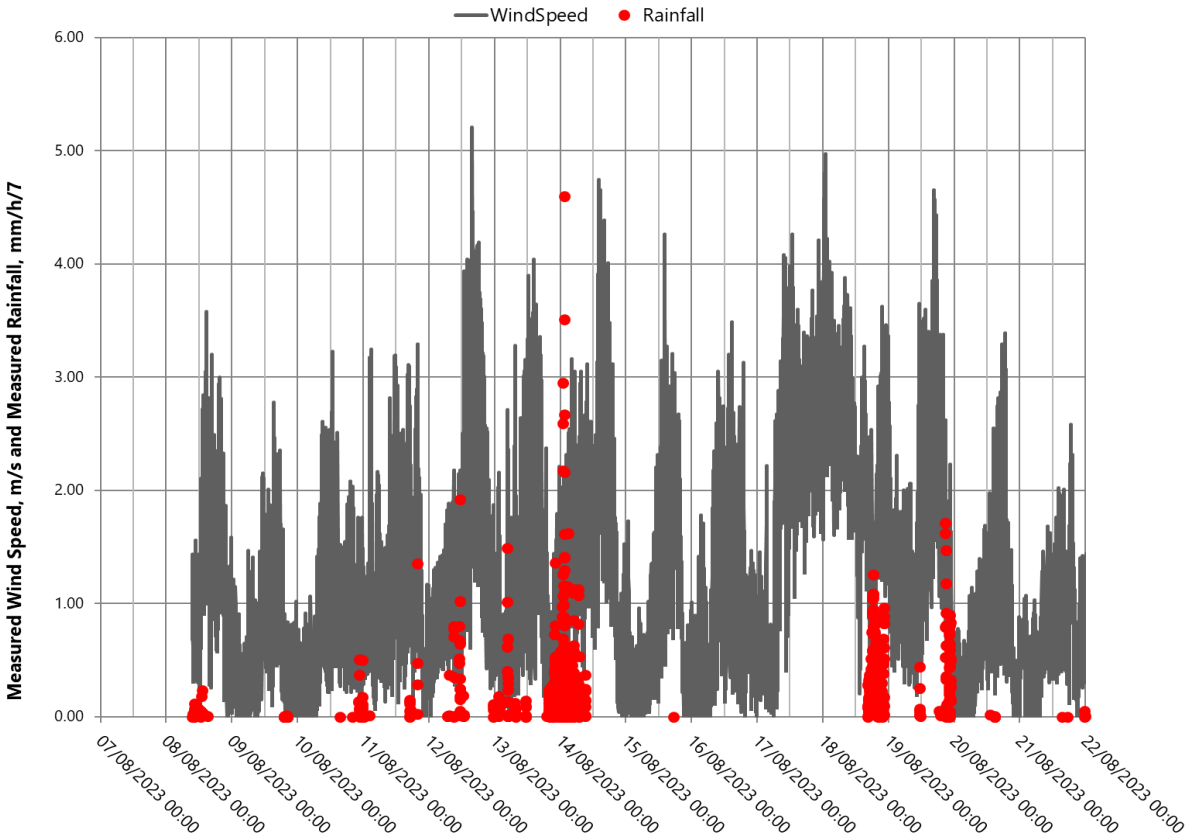
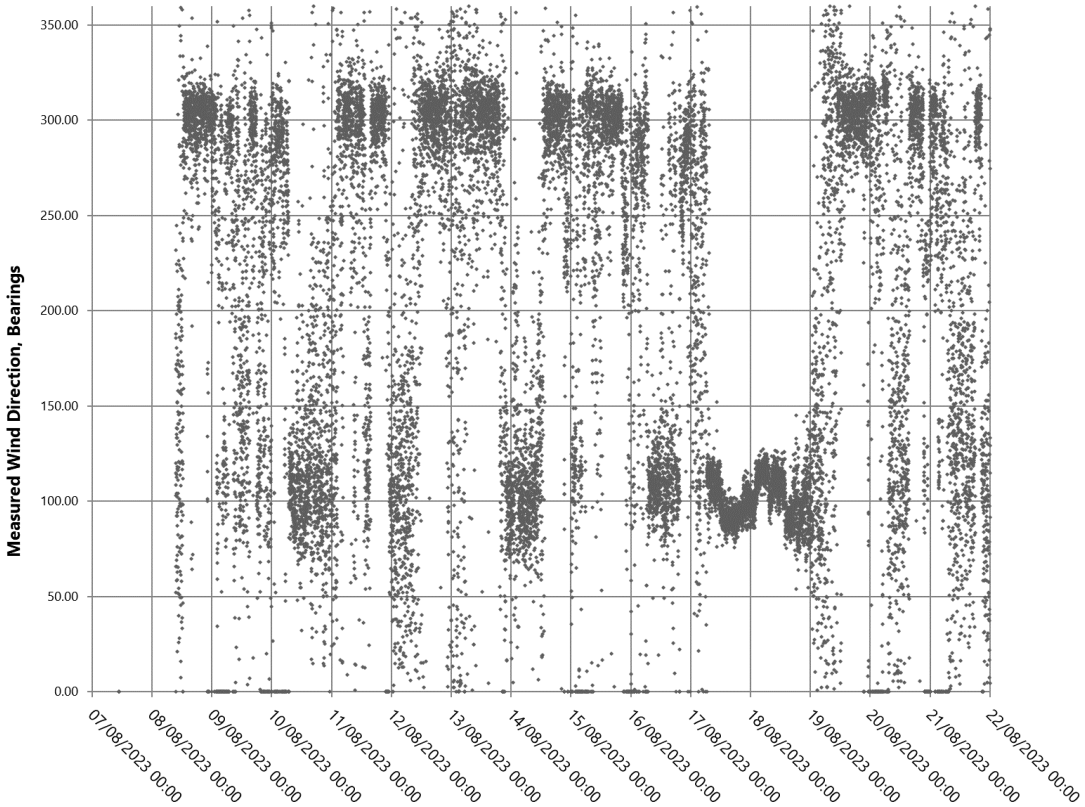


Figure B2 15-Minute Logged Wind Direction Data, at the south end of the Site



B 4. R1 AT THE SOUTH END OF THE SITE

1.1.1.12 The charts below present the following information:

- Figure B4 presents the 15-minute noise measurements logged over the survey period for the key noise metrics; L_{Aeq}, $L_{Amax,f}$ and L_{A90}.
- Figure B5 presents the distribution of daytime background $L_{A90,15mins}$ noise levels over the survey period.
- Figure B6 presents the distribution of night-time background $L_{A90,15mins}$ noise levels over the survey period.
- Table 1 and Figure B7 present the period L_{Aeq} noise levels over each day, evening, and night-time period.

1.1.1.13 Notes regarding the local noise environment, made during installation and collection of the equipment are as follows;

1.1.1.14 Dominant sources: constant low-level road traffic noise from the M4 / A48 nearby was the dominant source, as well as intermittent industrial noise from South-Southwest.

1.1.1.15 Secondary sources: Occasional faint noise overhead from aeroplanes. Not dominant sources.

1.1.1.16 Figure B3 below shows the monitoring equipment set-up at at the south end of the Site.

Figure B3: Noise Monitoring Setup at the south end of the Site

Figure B4 Results of the Noise Monitoring at the south end of the Site)– Noise Levels L_{Aeq}, L_{A90}, L_{max}, 15mins

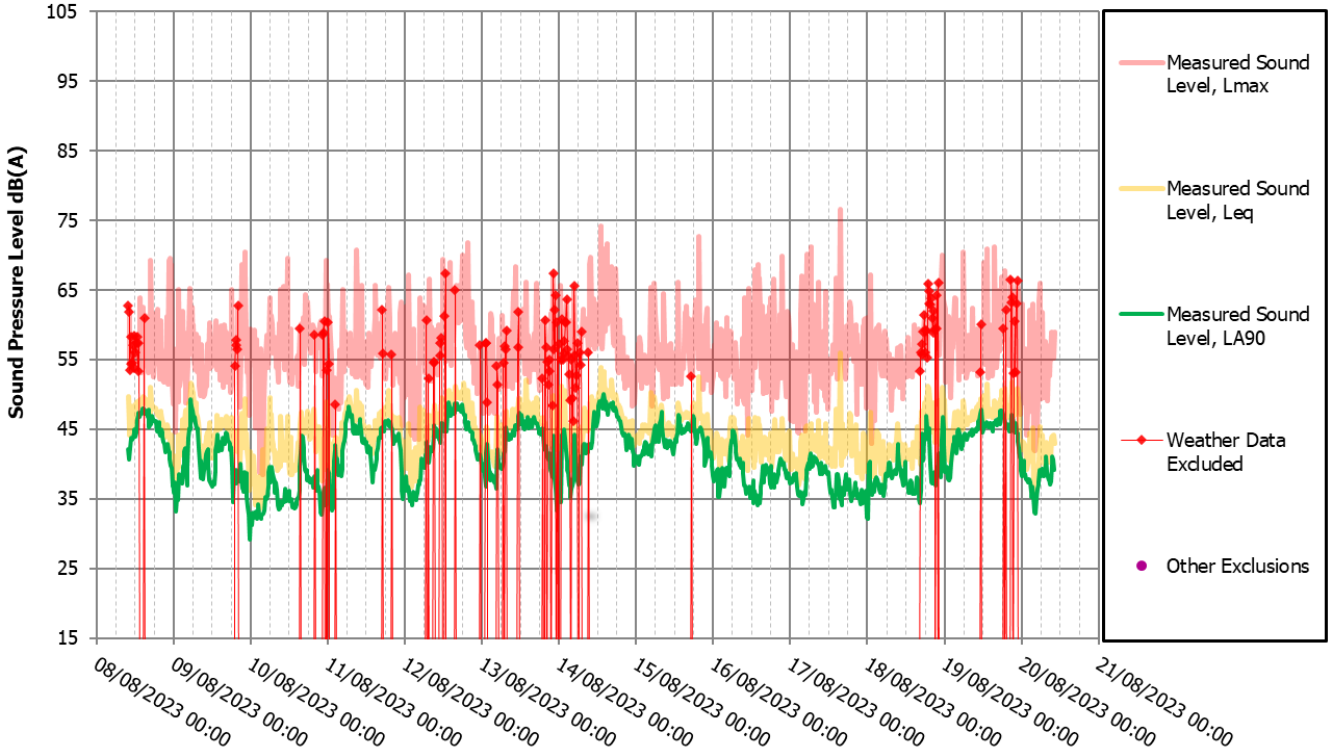
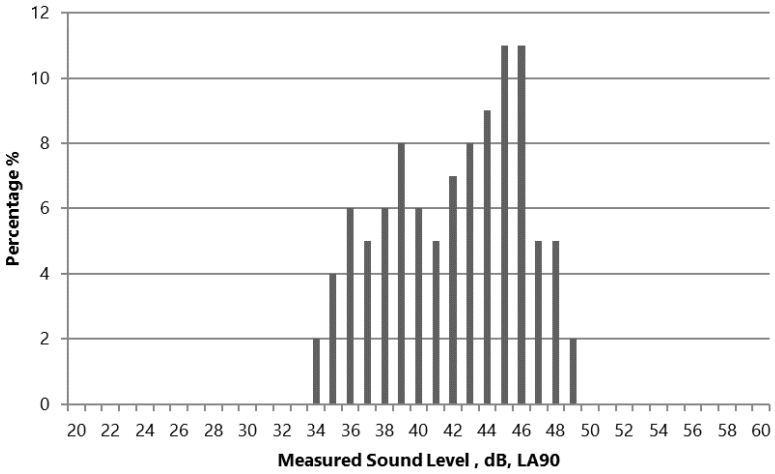
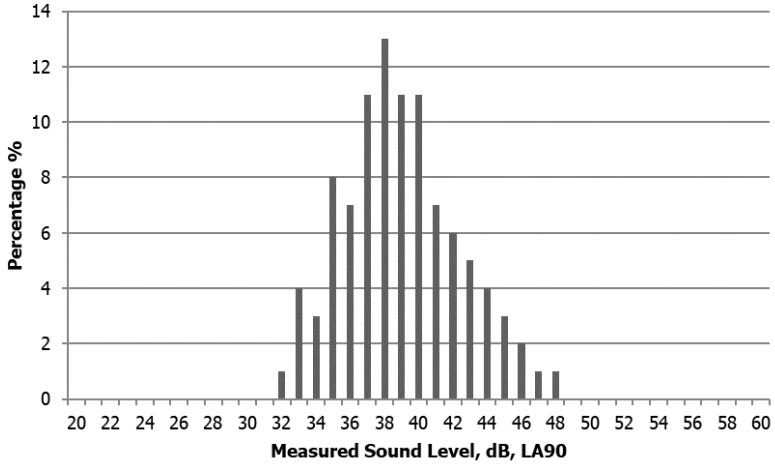


Figure B5 Distribution of Daytime Background Levels $L_{A90,15mins}$



1.1.1.17 L_{A90} measurements ranged between 34 and 49 dB(A). Two peaks are evident at the values of 45 and 46 dB(A). The 50th percentile value is 43 dB(A). The lower of the two values, 43 dB(A), has conservatively been adopted as the RBSL.

Figure B6 Distribution of Night-time Background Levels $L_{A90,15mins}$

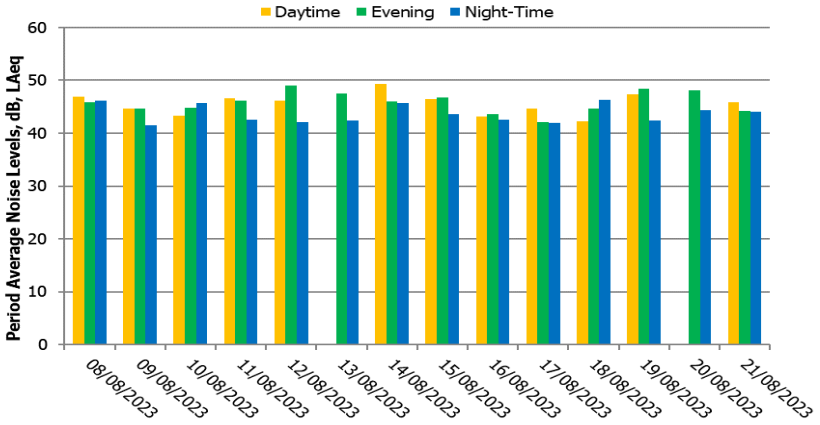


1.1.1.18 L_{A90} measurements ranged between 32 and 48 dB(A). A peak is evident at the modal value of 38 dB(A). The 50th percentile value is 39 dB(A). Therefore 38 dB has been adopted as the RBSL.

Table 1 Period Average Noise Levels

Survey Period		Noise Level, $L_{Aeq, period}$ dB(A)		
Date	**Day**	**Daytime**	**Evening**	**Night-Time**
08/08/2023	Tuesday	47	46	46
09/08/2023	Wednesday	45	45	41
10/08/2023	Thursday	43	45	46
11/08/2023	Friday	47	46	43
12/08/2023	Saturday	46	49	42
13/08/2023	Sunday	-	47	42
14/08/2023	Monday	49	46	46
15/08/2023	Tuesday	47	47	44
16/08/2023	Wednesday	43	44	43
17/08/2023	Thursday	45	42	42
18/08/2023	Friday	42	45	46
19/08/2023	Saturday	47	48	42
20/08/2023	Sunday	-	48	44
21/08/2023	Monday	46	44	44
Average	**14 Days**	**46**	**46**	**44**

Figure B7 Period Average Noise Levels



B 5. R2 10 CHURCH CRESCENT

1.1.1.19 The charts below present the following information:

- Figure B10 presents the 15-minute noise measurements logged over the survey period for the key noise metrics; L_{Aeq}, $L_{Amax,f}$ and L_{A90}.
- Figure B11 presents the distribution of daytime background $L_{A90,15mins}$ noise levels over the survey period.
- Figure B12 presents the distribution of night-time background $L_{A90,15mins}$ noise levels over the survey period.
- Table 2 and Figure B13 present the period L_{Aeq} noise levels over the day, evening, and night-time periods.

1.1.1.20 Notes regarding the local noise environment, made during installation and collection of the equipment are as follows;

1.1.1.21 Dominant Sources: constant low-level road traffic noise from the M4 / A48 nearby was the dominant source.

1.1.1.22 Secondary Sources: birdsong, trees rustling, wind.

1.1.1.23 Figure B9 below shows the monitoring equipment set-up at the 10 Church Crescent.

Figure B1 Noise Monitoring Setup at 10 Church Crescent

Figure B2 Results of the Noise Monitoring at the 10 Church Crescent – Noise Levels L_{Aeq}, L_{A90}, $L_{max, 15mins}$

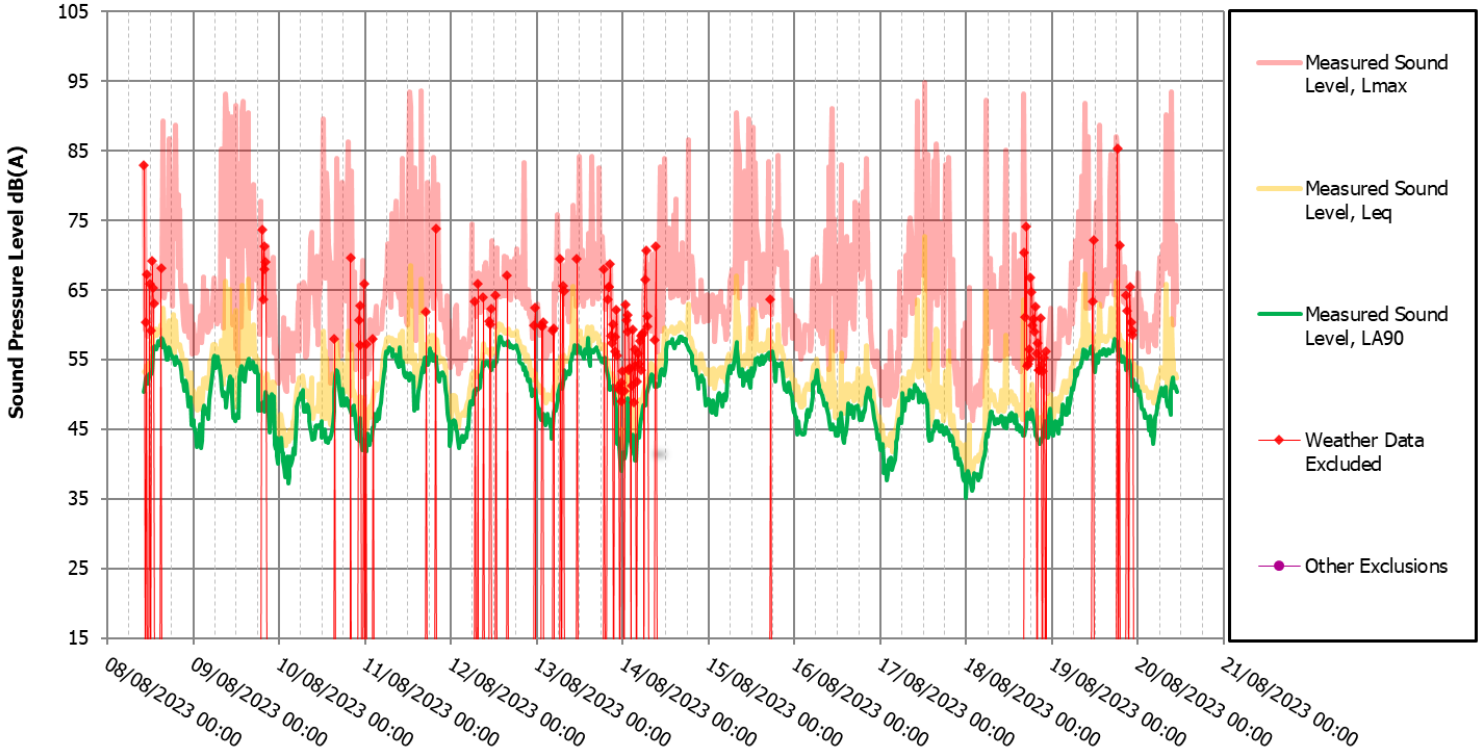
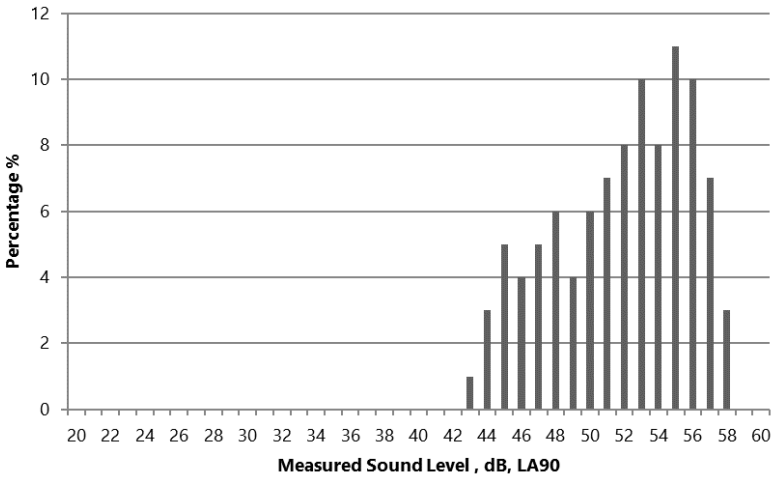
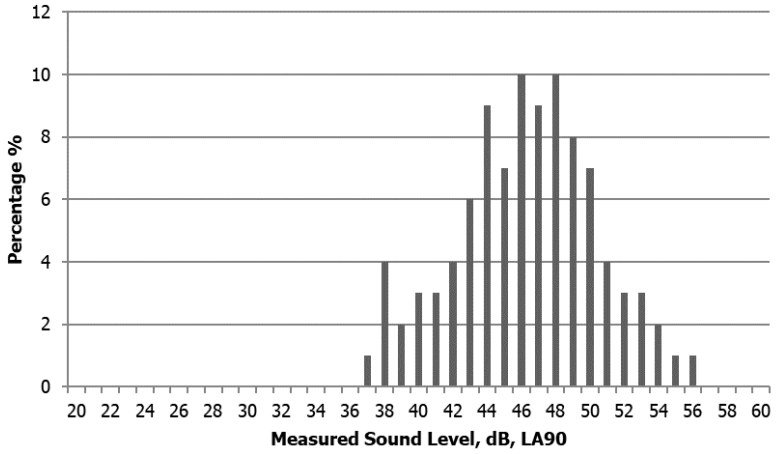


Figure B3 Distribution of Daytime Background Levels $L_{A90,15mins}$



1.1.1.24 L_{A90} measurements ranged between 43 and 58 dB(A). A peak is evident at the modal value of 55 dB(A). The 50th percentile value is 52 dB(A). Therefore, the 52 dB(A) level has been adopted as the RBSL.

Figure B4 Distribution of Night-Time Background Levels $L_{A90,15mins}$

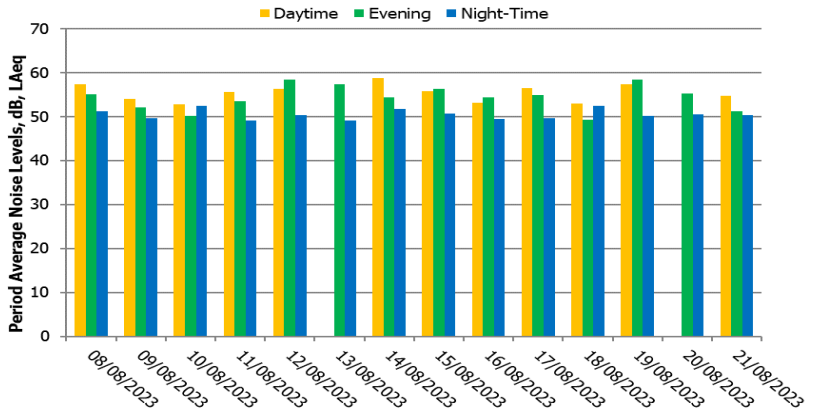


1.1.1.25 L_{A90} measurements ranged between 37 and 56 dB(A). Two peaks are evident at the values of 46 and 48 dB(A). The 50th percentile value is 47 dB(A). The lower peak value of 46 dB(A) has conservatively been adopted as the RBSL.

Table 2 Period Average Noise Levels

Survey Period		Noise Level, $L_{Aeq, period}$ dB		
Date	**Day**	**Daytime**	**Evening**	**Night-Time**
08/08/2023	Tuesday	57	55	51
09/08/2023	Wednesday	54	52	50
10/08/2023	Thursday	53	50	52
11/08/2023	Friday	56	53	49
12/08/2023	Saturday	56	58	50
13/08/2023	Sunday	-	57	49
14/08/2023	Monday	59	54	52
15/08/2023	Tuesday	56	56	51
16/08/2023	Wednesday	53	54	50
17/08/2023	Thursday	56	55	50
18/08/2023	Friday	53	49	52
19/08/2023	Saturday	57	58	50
20/08/2023	Sunday	-	55	51
21/08/2023	Monday	55	51	50
Average	**14 Days**	**55**	**54**	**50**

Figure B13 Period Average Noise Levels



B 6. R3 2 NANTYMOR COTTAGES

1.1.1.26 The charts below present the following information:

- Figure B15 presents the 15-minute noise measurements logged over the survey period for the key noise metrics; L_{Aeq}, $L_{Amax,f}$ and L_{A90}.
- Figure B16 presents the distribution of daytime background $L_{A90,15mins}$ noise levels over the survey period.
- Figure B17 presents the distribution of night-time background $L_{A90,15mins}$ noise levels over the survey period.
- Table 3 and Figure B18 present the period L_{Aeq} noise levels over each day, evening, and night-time period.

1.1.1.27 Notes regarding the local noise environment, made during installation and collection of the equipment are as follows;

1.1.1.28 Dominant Sources: constant low-level road traffic noise from the M4 / A48 nearby was the dominant source,

1.1.1.29 Secondary sources: dogs barking, trees rustling, wind & birdsong. None of these noise sources were dominant, but all of them were clearly audible sources.

1.1.1.30 Figure B14 below shows the monitoring equipment set-up at 2 Nantymor Cottages.

Figure B14 Noise Monitoring Setup at 2 Nantymor Cottages

Figure B15 Results of the Noise Monitoring at 2 Nantymor Cottages – Noise Levels L_{Aeq}, L_{A90}, L_{max}, 15mins

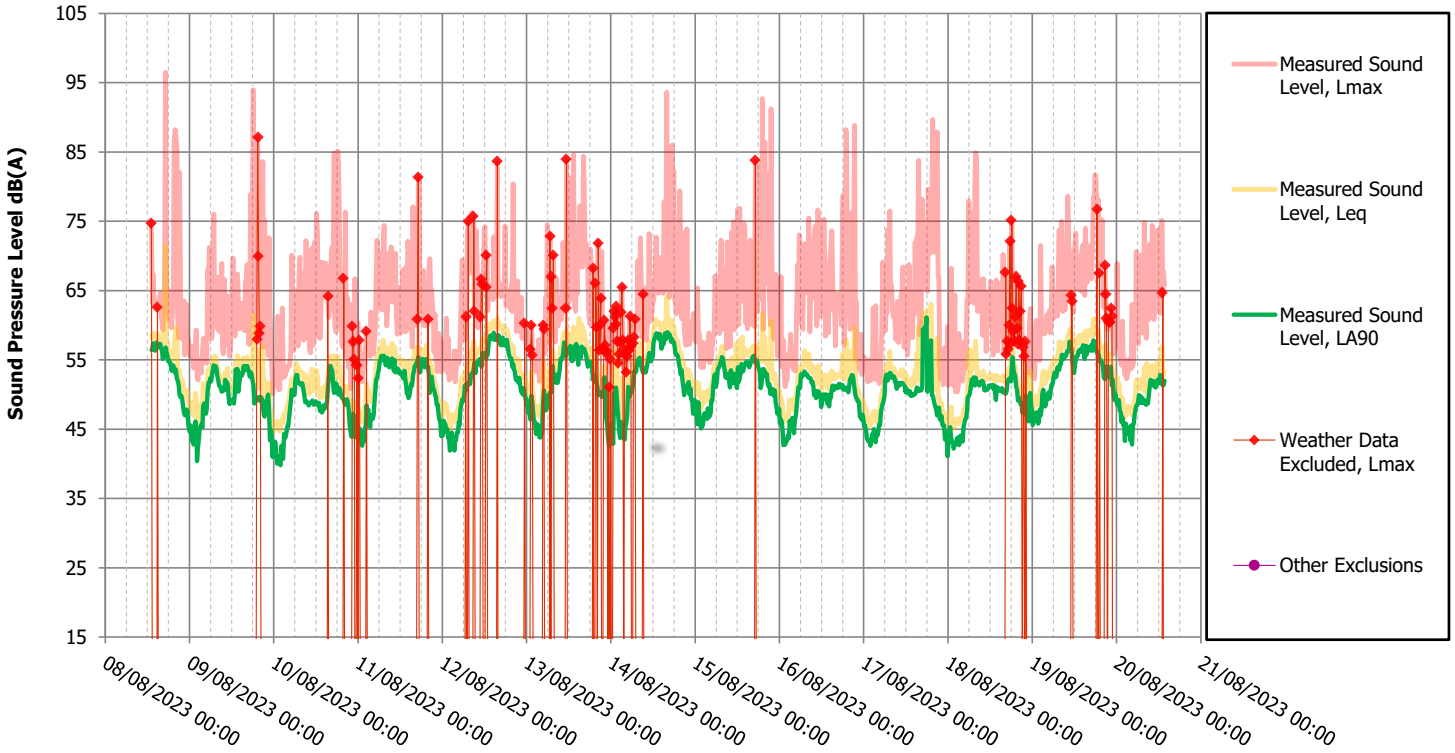
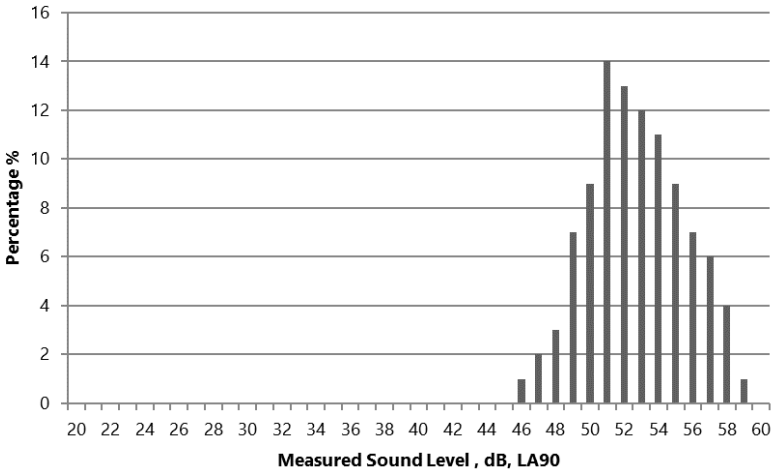
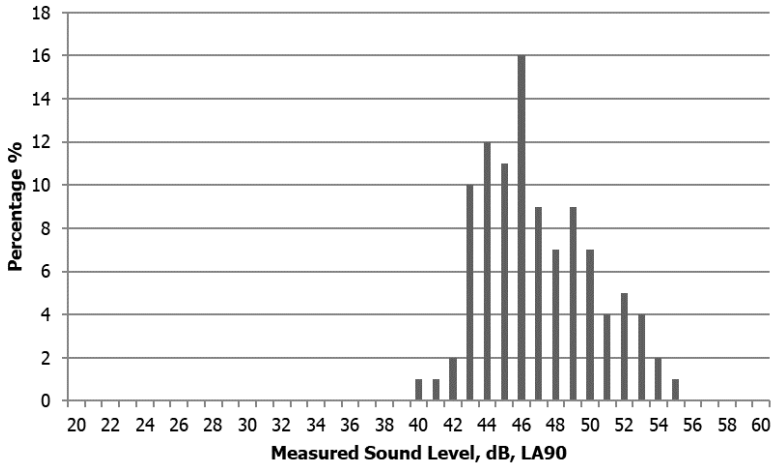


Figure B16 Distribution of Daytime Background Levels $L_{A90,15mins}$



1.1.1.31 L_{A90} measurements ranged between 46 and 59 dB(A). One peak is evident at the modal value of 51 dB(A). The 50th percentile value is 53 dB(A). Therefore, the value of 51 dB(A), has conservatively been adopted as the RBSL.

Figure B17 Distribution of Night-time Background Levels $L_{A90,15mins}$

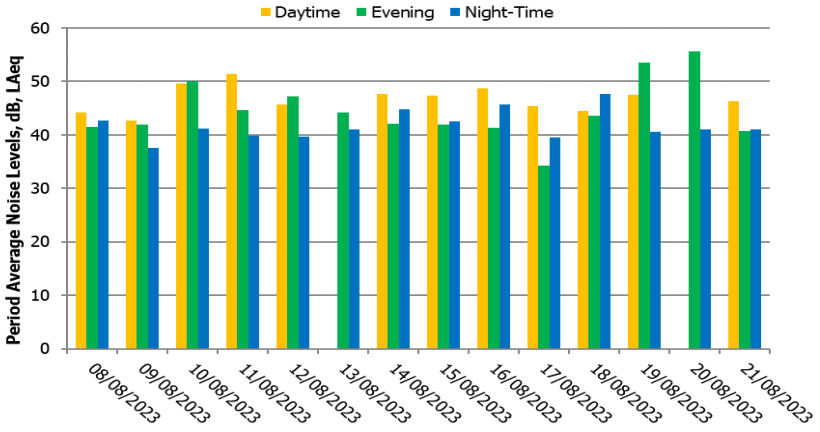


1.1.1.32 L_{A90} measurements ranged between 40 and 55 dB(A). A peak is evident at the modal value of 46 dB(A). The 50th percentile value is 46 dB (A). Therefore, the value of 46 dB(A) has been adopted as the RBSL.

Table 2 Period Average Noise Levels

Survey Period		Noise Level, $L_{Aeq, period}$ dB		
Date	**Day**	**Daytime**	**Evening**	**Night-Time**
08/08/2023	Tuesday	57	56	53
09/08/2023	Wednesday	59	51	48
10/08/2023	Tuesday	52	53	53
11/08/2023	Friday	59	56	49
12/08/2023	Saturday	55	58	51
13/08/2023	Sunday	-	58	46
14/08/2023	Monday	58	56	54
15/08/2023	Tuesday	58	56	52
16/08/2023	Wednesday	51	52	47
17/08/2023	Thursday	58	47	51
18/08/2023	Friday	52	46	51
19/08/2023	Saturday	60	59	52
20/08/2023	Sunday	-	57	52
21/08/2023	Monday	60	53	51
Average	**14 Days**	**57**	**54**	**51**

Figure B18 Period Average Noise Levels



B 7. R4 43 POWIS CLOSE

1.1.1.33 The charts below present the following information:

- Figure B20 presents the 15-minute noise measurements logged over the survey period for the key noise metrics; L_{Aeq}, $L_{Amax,f}$ and L_{A90}.
- Figure B21 presents the distribution of daytime background $L_{A90,15mins}$ noise levels over the survey period.
- Figure B22 presents the distribution of night-time background $L_{A90,15mins}$ noise levels over the survey period.
- Table 4 and Figure B23 present the period L_{Aeq} noise levels over each day, evening, and night-time period.

1.1.1.34 Notes regarding the local noise environment, made during installation and collection of the equipment are as follows;

1.1.1.35 It was not possible to position the sound level meter 3.5 m from all surfaces because of the size of the garden. The meter was set up approximately 2 m from either side of the garden and approximately 3 m from garden shed. BS 4142 suggests a correction of -3 dB is applied when the noise meter at a distance of 1 m from a façade (and when measured noise sources are distant). This is to account for increases in the measured sound level due to reflections. Although the noise meter installation position was further from the nearest surfaces than 1 m, there were several nearby surfaces. Therefore the full correction of -3 dB has been applied to the sound level measurements carried out at this location.

1.1.1.36 Dominant Sources: constant low-level road traffic noise from the M4 and A48 was the dominant source.

1.1.1.37 Secondary sources: faint noise from overhead aeroplanes. A wooden garden windchime produced sporadic noise. None of these noise sources were dominant.

1.1.1.38 Figure B19 below shows the monitoring equipment set-up at 43 Powis Close.

Figure B19 Noise Monitoring Setup at 43 Powis Close

Figure B20 Results of the Noise Monitoring at 43 Powis Close – Noise Levels L_{Aeq}, L_{A90}, L_{max}, 15mins

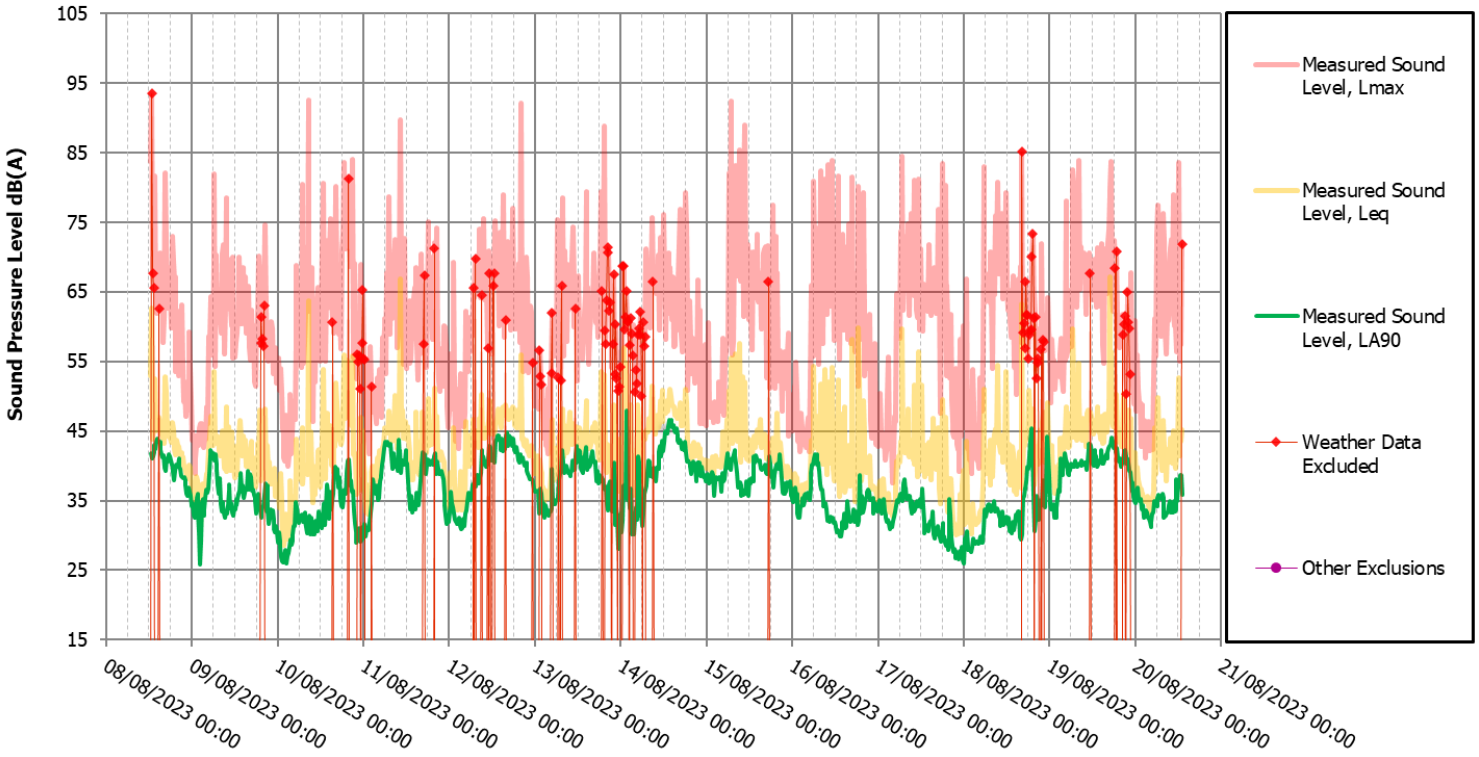
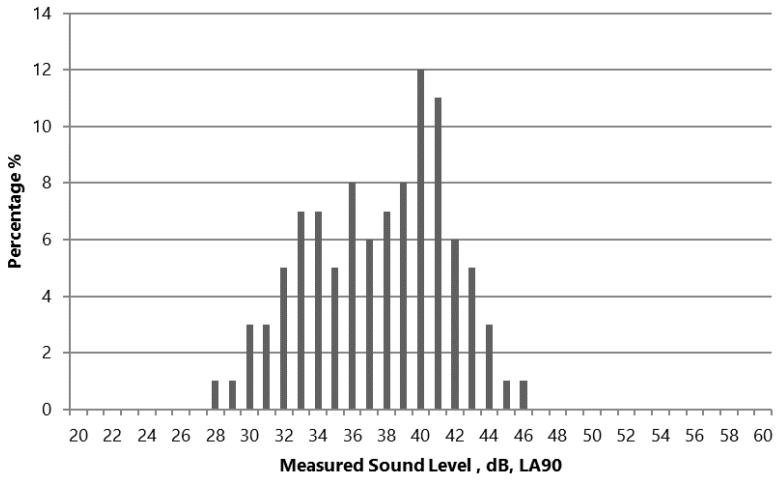
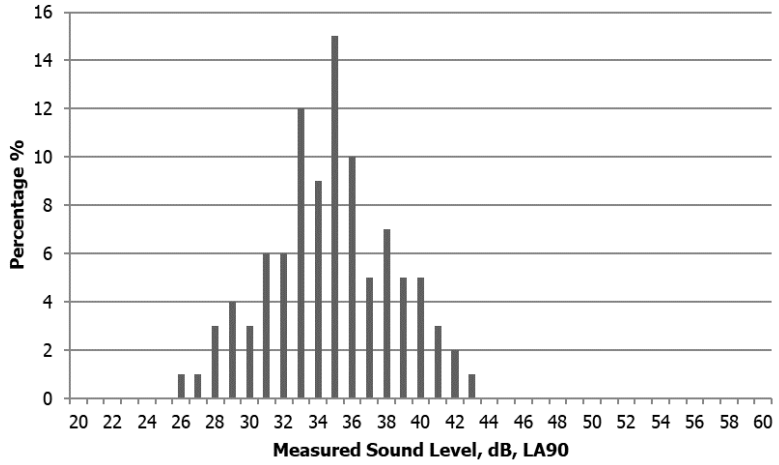


Figure B21 Distribution of Daytime Background Levels $L_{A90,15mins}$



1.1.1.39 L_{A90} measurements ranged between 28 and 46 dB(A). One peak is evident at the modal value of 40 dB(A). The 50th percentile value is 38 dB(A). The 50th percentile value has conservatively been adopted. Applying a correction of -3 dB for reflections (as discussed above) results in a RBSL of 35 dB(A).

Figure B22 Distribution of Night-time Background Levels $L_{A90,15mins}$



1.1.1.40 L_{A90} measurements ranged between 26 and 43 dB(A). A peak is evident at the modal value of 35 dB(A). The 50th percentile value is 35 dB (A). Applying

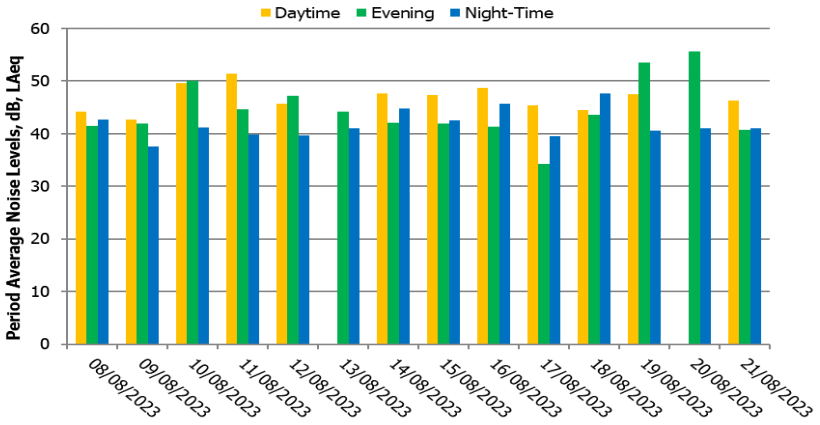
a correction of -3 dB for reflections (as discussed above) results in a Therefore, the level of 35 dB(A) has been adopted as the RBSL. Applying a correction of -3 dB for reflections (as discussed above) results in value of 32 dB(A) which has been adopted as the RBSL.

Table 3 Period Average Noise Levels

Survey Period		Noise Level, $L_{Aeq, period}$ dB		
Date	**Day**	**Daytime**	**Evening**	**Night-Time**
08/08/2023	Tuesday	44	41	43
09/08/2023	Wednesday	43	42	38
10/08/2023	Thursday	50	50	41
11/08/2023	Friday	51	45	40
12/08/2023	Saturday	46	47	40
13/08/2023	Sunday	-	44	41
14/08/2023	Monday	48	42	45
15/08/2023	Tuesday	47	42	43
16/08/2023	Wednesday	49	41	46
17/08/2023	Thursday	45	34	39
18/08/2023	Friday	44	44	48
19/08/2023	Saturday	47	54	41
20/08/2023	Sunday	-	56	41
21/08/2023	Monday	46	41	41
Average (1)	**14 Days**	**44**	**41**	**39**

1) As discussed above, a correction of -3 dB has been applied to account for reflections in the measured sound levels.

Figure B23 Period Average Noise Levels



APPENDIX C NOISE CONTOUR MAP

Customer: Red Engineering (Microsoft)
Project: Newport Quinn Datacentre
Project-No. 0654550

Microsoft

Appendix

C

NormalOP-NoiseMap_V1_BA
Result number 5
Calculation in 1.5 m above ground

Project engineer: BA
Created: 05/10/2023
Processed with SoundPLAN 8.2, Update 16/01/2020

Levels Lr24hr
in dB(A)

<	32
32 -	34
34 -	36
36 -	38
38 -	40
40 -	42
42 -	44
44 -	46
46 -	48
48 -	50
50 -	52
>=	52

Signs and symbols

- Main building
- Wall
- Transparency wall areas
- Point receiver
- Transformers/Stacks
- CW01 & CW02 Building
- AHU Louvres

N

Length scale 1:5700
0 50 100 200 300 400 m

ERM

C:\Users\bilal.ahmed\Desktop\0654550 Newport_Model_BA_20230911\NoiseMap.sgs

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