

1 Wilmott Street
Manchester
Greater Manchester
M15 6BD

Site Reference: 37904

Noise Impact Assessment

November 2024

Contents

1.	INTRODUCTION	4
1.1	Standards, Legislation, Policy & Guidance	4
1.2	Proposal Brief	5
1.3	Environmental Health Officer Comments	6
1.4	Local Planning Authority Technical Guidance	6
2.	ENVIRONMENTAL NOISE SURVEY	7
2.1	Measurement Methodology	7
2.1	Context & Subjective Impression	8
2.2	Environmental Noise Survey Results	9
3.	BS4142 NOISE IMPACT ASSESSMENT	11
3.1	Proposed External Fixed Plant & Specific Sound Levels	11
3.2	BS4142 Noise Impact Assessment	12
3.3	Recommendations & Mitigation Measures	12
4.	CONCLUSION AND ACTION PLAN	16
	APPENDIX A – ACOUSTIC TERMINOLOGY	17
	APPENDIX B – STANDARDS, LEGISLATION, POLICY, AND GUIDANCE	18
	B.1 – National Planning Policy Framework (2023)	18
	B.2 – Noise Policy Statement for England (2010)	18
	B.3 – BS4142:2014+A1:2019 – ‘Methods for rating and assessing industrial and commercial sound’	20
	APPENDIX C – LOCATION PLANS	23
	APPENDIX D – ENVIRONMENTAL SURVEY	26
	D.1 – Time History Noise Data	26
	D.2 – Surveying Equipment	29
	D.3 – Meteorological Conditions	30
	APPENDIX E – FULL CALCULATIONS	31

List of Figures

<i>Figure 1 – Proposed Development.....</i>	<i>5</i>
<i>Figure 2 – Measurement Locations and Site Surroundings.....</i>	<i>8</i>
<i>Figure 3 – Proposed Screening Location.....</i>	<i>14</i>
<i>Figure 4 – MP1 Noise Survey Time History (Original Survey)</i>	<i>26</i>
<i>Figure 5 – MP1 Noise Survey Time History (Updated Survey).....</i>	<i>26</i>
<i>Figure 6 – Background Sound Levels Histogram – Midweek (Updated Survey)</i>	<i>27</i>
<i>Figure 7 – Background Sound Levels Histogram – Saturday (Updated Survey).....</i>	<i>27</i>
<i>Figure 8 – Background Sound Levels Histogram – Sunday – (Updated Survey)</i>	<i>27</i>
<i>Figure 9 – MP1 Background Analysis – Daytime</i>	<i>28</i>
<i>Figure 10 – MP1 Background Analysis – Night-time</i>	<i>29</i>

List of Tables

<i>Table 1 – Measurement Methodology</i>	<i>7</i>
<i>Table 2 – NSRs Identification</i>	<i>8</i>
<i>Table 3 – Background Sound Level Results Summary (Original Survey)</i>	<i>9</i>
<i>Table 4 – Background Sound Level Results Summary (Updated Survey)</i>	<i>10</i>
<i>Table 5 – Calculated Specific Sound Levels of Plant Equipment.....</i>	<i>10</i>
<i>Table 6 – Sound Power Levels of Hybrid Generator.....</i>	<i>11</i>
<i>Table 7 – BS4142 Noise Impact Assessment (Daytime).....</i>	<i>12</i>
<i>Table 8 – BS4142 Noise Impact Assessment (Post-Mitigation).....</i>	<i>14</i>
<i>Table 9 – Surveying Equipment.....</i>	<i>29</i>
<i>Table 10 – Weather Conditions</i>	<i>30</i>

1. Introduction

In August 2024, CEP Telecoms Ltd worked in partnership with NOVA Acoustics Ltd to prepare a noise impact assessment for the already installed telecoms mast ('the development') at 1 Wilmott Street, Manchester, Greater Manchester, M15 6BD ('the site').

Since then, the applicant has submitted a full planning application 139465/FO/2024 – '*Retention of 30 metre high mast with associated antennae for temporary period of 12 months*' to Manchester City Council. The EHO has raised comments about the initial noise impact assessment (ref. NP-011574) and, therefore, CEP Telecoms Ltd worked in partnership with NOVA Acoustics Ltd to conduct a new noise impact assessment to address these comments. This report has been prepared to accompany the planning application and is suitable for submission to the Local Planning Authority ('LPA').

A noise survey has been undertaken to establish the prevailing background sound levels at the closest Noise Sensitive Receptors ('NSRs'). The report details the existing background sound climate and the predicted noise emissions associated with the proposed development. Measures required to mitigate noise impact from the proposed development have been recommended where necessary and assessed in accordance with the relevant performance standards, legislation, policy and guidance.

This noise assessment is necessarily technical in nature; therefore, a glossary of terms is included in Appendix A to assist the reader.

1.1 Standards, Legislation, Policy & Guidance

The following performance standards, legislation, policy and guidance have been considered to ensure good acoustic design in the assessment:

- The EHO comments.
- The LPA technical guidance, specifically; '*Manchester City Council's 'Planning & Noise Technical Guidance – December 2015 – Section 3.6.1.5.1 Noise and Vibration from Fixed Plant / Equipment*'.
- National Planning Policy Framework (2023).
- Noise Policy Statement for England (2010).
- British Standard BS4142:2014+A1:2019 – '*Methods for rating and assessing industrial and commercial sound*'.

Further information on the legislation can be found in Appendix B.

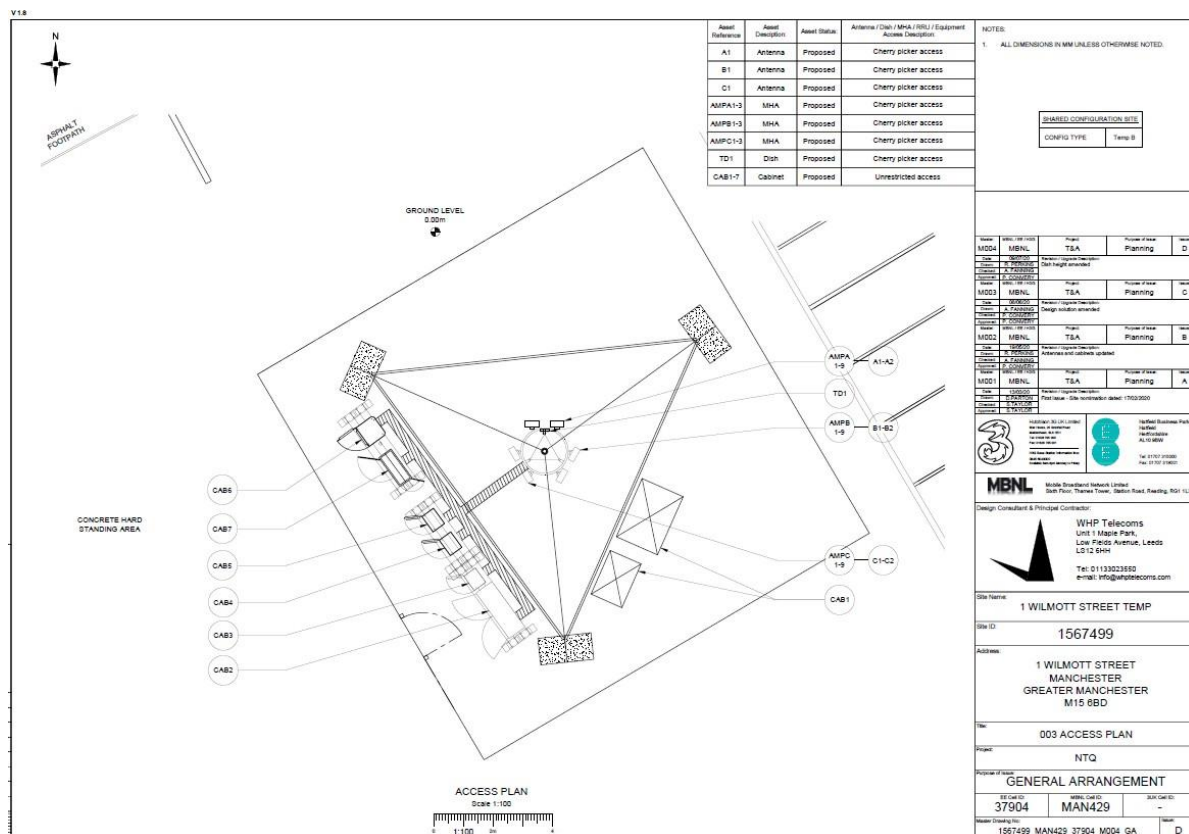
1.2 Proposal Brief

The proposal is for the installation of a new permanent telecommunications mast and supporting equipment; all of which is retrospectively installed and currently operational. The full list of equipment required is as follows:

- 1 No. MBLN Hybrid Generators (comprising of an external generator and a Powersafe Enclosure)
- 1 No. MBLN 30m High Steel Mast with 6 No. MBLN antennas
- 1 No. MBLN FCOA Cabinet
- 1 No. MBLN Mk5 Link Cabinet
- 1 No. EE BTS3900A Cabinet
- 2 No. AMP5930 Cabinets
- 1 No. H3G Bowler Cabinet

All equipment is designed to operate 24/7, with the exception of the hybrid generator which will operate for a limited 4-hour period per day to charge the batteries. Once fully charged, the batteries will gradually discharge over a 19-hour period before then requiring a recharge. The hybrid generator has been currently set-up to maximize fuel saving; however, the operating times can be fully controlled.

The figure below shows the proposed development.



Drawing Ref No. 1567499_MAN429_37904_M004_LPA from 'WHP Telecoms'

Figure 1 - Proposed Development

1.3 Environmental Health Officer Comments

The following comments have been raised by the EHO:

'This has now been reviewed by our EHO's. We note that no noise monitoring has been undertaken on a Sunday to determine the typical background, which will most definitely be lower than the other days of the week. We cannot accept the noise assessment without an assessment of the typical background on a Sunday, as additional noise mitigation measures may be required. Can this be carried out and the Report / Recommendations updated accordingly.'

The report has recommended that acoustic screening needs to go around the generators as they are the only noise making equipment. It has also stated that the generator can only be charged between 7:30 and 18:00hrs due to higher noise levels. Charging will take 4 hours. This seems fine Monday-Friday due to construction noise. Saturday will need a smaller charging window 08:00hrs to 14:00hrs due to reduced construction hours - will this be sufficient? What would be the timescale for implementing the mitigation as recommended within the Report (and any update to the recommendations)?

We are not sure how the screening will work on a Sunday though with no construction work and the typical background, will most definitely be lower than the other days of the week. This will also need to be considered in terms of the need for any additional mitigation.'

1.4 Local Planning Authority Technical Guidance

Manchester City Council's 'Planning & Noise Technical Guidance – December 2015 – Section 3.6.1.5.1 Noise and Vibration from Fixed Plant / Equipment states the below:

"Noise from fixed plant, equipment or machinery can be very annoying and disruptive to people living nearby particularly where that item involved emits a noise with impulsive or tonal characteristics.

Many of the noise complaints Environmental Health receive about noise from plant, equipment and machinery specifically concern the character of the noise emitted. Any noise assessment needs to consider not only the overall level of noise emitted but also its particular characteristics. The noise assessment should be based on BS 4142: 2014 and any application for fixed plant, equipment or machinery must demonstrate that:

'Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location'.

By designing the sound pressure level of any plant items to generate a noise impact of at least 5dB below the existing background level, any plant noise impact should be of a negligible level which should not give rise to complaints from users or occupiers of existing noise-sensitive usages."

2. Environmental Noise Survey

2.1 Measurement Methodology

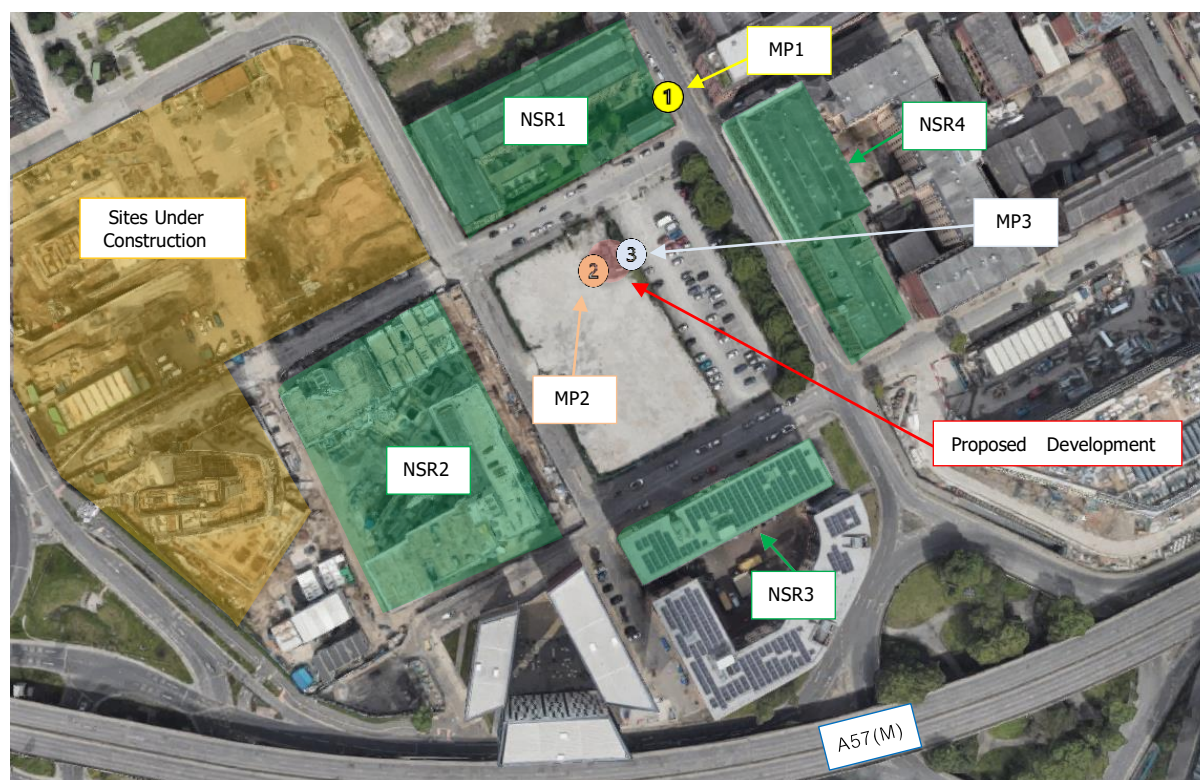
The following table outlines the measurement dates and particulars. Weather conditions during the environmental noise survey and details of the equipment used can be found in Appendix D. In all instances, a 130mm diameter windshield was fitted to the microphone, and all equipment was field calibrated before and after each set of other measurements; negligible drift was noted. All measurements were in free-field conditions.

Following the EHO comments, a second environmental noise survey was conducted during a weekend (8th to 11th November 2024). In addition, the spot measurements at 1m of both inlet and outlet of the Powersafe enclosure were also repeated to compare with the noise levels measured during the initial visits.

Location	Survey Dates	Measurement Particulars
MP1	28-30/08/2024 & 08/11/2024	Equipment mounted on a lamppost at Cambridge Street Waterside Way. Location was chosen to minimize the influence of noise emissions from construction works. The microphone was positioned approx. 4m above local ground.
MP2 (Spot Measurement)	28/08//2024 & 08/11/2024	Equipment handed at 1m of the Powersafe enclosure inlet. The microphone was positioned approx. 1.5m above local ground.
MP3 (Spot Measurement)	28/08//2024 & 08/11/2024	Equipment handed at 1m of the Powersafe enclosure outlet. The microphone was positioned approximately 1.5m above local ground.

Table 1 – Measurement Methodology

The figure below outlines the site surroundings and measurement locations:



Imagery ©2024 Infoterra Ltd & Bluesky, Maxar Technologies, The GeoInformation Group, Map data ©2024

Figure 2 – Measurement Locations and Site Surroundings

2.1 Context & Subjective Impression

The area surrounding the site is primarily residential in nature, comprising of large multistorey apartment buildings in all directions. To the immediate east is an existing ground floor level car park known as 'Manchester Hulme Street Car Park', with the plot of land in which the proposed development resides in also understood to be in use as parking facilities for the nearby construction site. Further to the south, at approximately 150m, runs the A57(M) which supports high traffic volumes and is used as one of primary access roads through the city of Manchester.

A number of NSRs have been identified within the locality of the site; namely 'Macintosh Mills' to the north, 'Square Gardens' to the west, 'Unite Students New Medlock House' to the south and 'Cambridge Mill' to the east. For conciseness, identifiers NSR1 – NSR4 have been used throughout the report in reference to the aforementioned residential buildings, with the approximate distances of the NSRs from the proposed development presented in the below table.

Reference	Name	Description
NSR1	Macintosh Mills	Apartments building at approx. 38m
NSR2	Square Gardens	Apartments building at approx. 64m
NSR3	Cambridge Mill	Apartments complex at approx. 52m
NSR4	Unite Students New Medlock House	Student dormitory at approx. 80m

Table 2 – NSRs Identification

During both environmental noise surveys, it was found that the noise profile of the area was high to moderate. Construction sites on Wilmott Street, Chester Street and River Street were all active during the surveyed period and construction-based noise emissions clearly audible at the site. Constant traffic noise from the A57(M) and the surrounding road network was also clearly prevalent in the acoustic environment and is thought to be the dominant noise source in the area in the absence of any construction-based activities. Considering the above, a surrogate long-term position off Cambridge Street Waterside Way was utilised to minimise the influence from construction noise.

A detailed site inspection was undertaken during both environmental noise surveys site visits and the noise emissions from the equipment already installed under assessment were found to be not audible at the site boundary. The only exception was noise emanating from the hybrid generator Powersafe Enclosure which was found to be highly audible over the existing noise climate when actively running.

2.2 Environmental Noise Survey Results

Background Sound Level Analysis

The LPA have a specific methodology for determining the background sound level, as outlined in Appendix A of their 'Planning and Noise Technical Guidance' document dated October 2022. The document requires that an arithmetic average of the measured $L_{A90,T}$ sound levels across every 15-minute period on each day is undertaken, with the lowest averaged value during the overriding assessment period deemed to be 'typical' background sound level. Full noise survey time histories and the background sound level calculations can be found in Appendix D.

Original Survey

Using the above methodology, the table below outlines the background sound levels measured during the initial environmental noise survey and the levels used in the initial BS4142 noise impact assessment. As stated earlier in the report, the measurement position utilised was in a shielded position and was not affected by any of the plant under assessment.

Location	Period	Background Sound Level $L_{A90,T}$ (dB)
MP1	Day: 07:00 – 23:00	52
	Night: 23:00 – 07:00	43

Table 3 – Background Sound Level Results Summary (Original Survey)

Updated Survey

The table below outlines the background sound levels measured during the second environmental noise survey. Again, the measurement position utilised was in a shielded position and was not affected by any of the plant under assessment.

Location	Period	Background Sound Level $L_{A90,T}$ (dB)
MP1	Midweek: 07:30 – 18:00	56 – 60
	Saturday: 08:30 – 18:00	55 – 62
	Sunday: 08:30 – 18:00	52 – 63

Table 4 – Background Sound Level Results Summary (Updated Survey)

Discussion

As can be seen, when comparing the background sound levels measured during both surveys, the lowest $L_{A90, 15 \text{ min}}$ value of 52dBA measured during the proposed Sunday operational hours (08:30 – 18:00) falls in line with the background sound level used on the initial BS4142 noise impact assessment.

Spot Measurement Results Summary

Spot measurements of the generator plant were conducted during site visits on 28th August 2024 and 8th November 2024. For all on site measurements the following methodology was adhered to:

- All measurements were taken using a fast time-weighting and the sound level meter was set to log every 0.1s.
- Measurements were taken in 1/3 octave frequency bands; however, the report details the 1/1 octave band sound levels used in the specific sound level calculations.

However, due to the prevalence of construction noise during the first visit, the measured levels were inflated. During the second visit, construction works were less intensive, allowing for a higher level of confidence between the ambient and residual sound levels in order to determine the specific sound levels of the generator directly.

The following table shows the measured specific sound levels for each plant equipment.

Description	Distance (m)	Octave Band (Hz, L_{eq} dB)								Overall (dBA)
		63	125	250	500	1k	2k	4k	8k	
MBNL Hybrid Generator Inlet	1	85	75	70	63	61	58	56	51	68
MBNL Hybrid Generator Outlet	1	90	79	79	80	73	72	70	64	81

Table 5 – Calculated Specific Sound Levels of Plant Equipment

Previous project experience of telemast systems of a similar size and scale consistently shows that the generator is typically the dominant noise source, with noise emissions exceeding that of all other plant by upwards of 10dB.

All other plant on site was subjectively inaudible, even at close range, meaning that specific levels could not be determined due to the influence from the surrounding noise environment. This is a very strong positive indicator that noise emissions from all other plant will be significantly below the existing background sound level and thus does not require assessment.

3. BS4142 Noise Impact Assessment

In the following section of the report, the impact from the noise generating components of the proposed development is assessed. As previously mentioned, all other accompanying items of plant have not been assessed due to their low noise emissions and subject inaudibility whilst at the site.

3.1 Proposed External Fixed Plant & Specific Sound Levels

The following table shows the calculated 1/1 octave frequency band sound power levels emanating from the MBNL Hybrid Generator System that will be used in the subsequent calculations. The following assumptions have been made within the calculations:

- The specific sound levels and measurement distances contained in Table 4,
- Point source behaviour,
- The relevant Q factors depending on the source location.

Description	Q Factor	1/1 Octave Frequency Band (Hz, L _w dB)								Overall (dBA)
		63	125	250	500	1k	2k	4k	8k	
MBNL Hybrid Generator Inlet	2	92	88	81	73	69	67	63	58	78
MBNL Hybrid Generator Outlet	2	101	88	92	94	84	84	80	73	93

Table 6 – Sound Power Levels of Hybrid Generator

Note that no percentage on-time corrections have been applied as although the plant shall operate for a limited period of 4 hours per day, these 4 hours will be continuous and thus exceeds the relevant assessment periods in BS4142.

Given the noise level emissions and the sensitivity of the surrounding buildings, the use of the generator at night is strictly prohibited and should be limited to the less sensitive daytime hours only.

3.2 BS4142 Noise Impact Assessment

The table below shows the BS4142 assessment of the noise emissions associated with the MBNL Hybrid Generator System inlet and outlet, combined as a cumulative level at the most exposed NSR(1). For full specific sound level calculations please see Appendix E.

As discussed in the previous section, the use of the generator must be limited to daytime hours only. For this reason, only the daytime background sound level has been included in this assessment.

Description	1/1 Octave Frequency Band (Hz, dB)								Overall (dBA)
	63	125	250	500	1k	2k	4k	8k	
Cumulative Specific Sound Level at NSR1	62	51	53	54	45	44	40	34	54
Acoustic Feature Correction	A +2 dB penalty has been applied to account for the 'just perceptible' low frequency hum observed during the site visits. No penalty has been applied for intermittency as the generators will operate continuously through the BS4142 daytime integration period (1 hour).								+2
Rating Sound Level ($L_{A_r, Tr}$)	Specific Sound Level + Rating Penalties								56
Background Sound Level	Lowest $L_{A90, 15 min}$ (Table 4)								52
Exceedance	$L_{A_r, Tr} - L_{A90, 15 min}$								+4
BS4142 Assessment Outcome	Low Impact, dependent on context.								
NPPF & NPSE Outcome	Below the Lowest Observed Adverse Effect Level ('LOAEL').								
LPA Criteria	The rating level is predicted to exceed the LPA Criteria by 9dBA.								
Mitigation measures are required to achieve the LPA Criteria.									

Table 7 - BS4142 Noise Impact Assessment (Daytime)

3.3 Recommendations & Mitigation Measures

As the previous table shows, mitigation measures are required to reduce the impact and to demonstrate compliance with the LPA Criteria. This section outlines what mitigation measures will be required, considering good acoustic practice.

Detailed calculations demonstrate that the outlet is dominant in every frequency band, with the exception of 125Hz where the emissions are equal.

During the first environmental noise survey, the arithmetic average of the measured $L_{A90,15\text{ min}}$ noise levels were observed to drop after 19:00 hours, with the lowest calculated background sound level (52 dB) occurring at 22:30 hours. Between the hours of 07:30 and 18:30, the lowest arithmetic average of the measured $L_{A90,15\text{ min}}$ noise levels is 56dB; 4dB higher than that used within the initial assessment.

It is important to note that an assessment during the Saturday and Sunday period proposed by the EHO (08:00 – 14:00) has been also undertaken. Calculations show that the background sound levels are expected to be slightly lower during the early morning, but raise above 56dB after 10:30 hours. This

period coincides with when commercial premises are operational after Sunday trading law restrictions, potentially causing an increase in vehicle movements and pedestrian activity.

Considering the variation in background noise levels during the day, the reduced sensitivity during the daytime instead of the evening period, the background sound levels measured during the weekend, and that the client has full control over when the generator is active; the generator should only operate during the following operational hour:

- Monday to Friday – 07:30 – 18:30
- Saturdays: 09:30 – 18:30
- Sundays: 10:45 – 18:30

The restricted hours have been chosen to ensure that the lowest $L_{A90, 15 \text{ min}}$ does not fall below the value of 56dB, detailed histograms can be found in Appendix D. Timing control measures should be implemented to ensure this is adhered to.

Additional to the restricted operating period of the generator, the following mitigation measures should be implemented prior to the first operation of the external fixed plant:

- A 2.2m acoustic screen must be installed around the Powersafe Enclosure. The screen must have no holes or gaps and provide a minimum surface mass of 15 kg/m². The screen should be internally lined with 50mm Stratocell Whisper FR absorptive panels or similar absorptive material to reduce the build-up of reverberant sound energy that would otherwise reduce the fence performance.
- The proposed acoustic fence must be installed at a maximum distance of 2.5 from the Powersafe Enclosure to ensure its effectiveness. If a greater distance is required, a reassessment may be required.
- A visual inspection of all equipment should be made before use to ensure that there are no obvious faults or malfunctions that could lead to elevated or abnormal noise levels.
- All plant should be regularly serviced and maintained to ensure it is operating at optimal efficiency. Faulty and poorly maintained equipment can result in increased noise emissions.

The proposed location of the acoustic fence can be seen in the figure below. As can be seen in the figure below, both elements composing the hybrid generator have been included within the proposed fence for easier installation; however, only the Powersafe Enclosure is required to be enclosed.

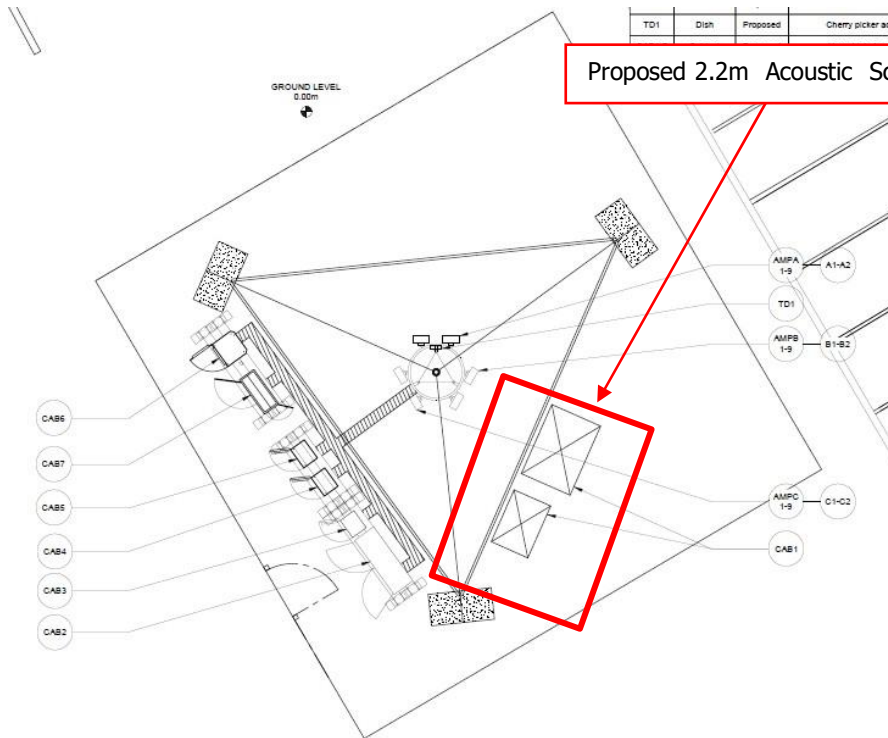


Figure 3 – Proposed Screening Location

The following table outlines the calculations and BS4142 noise impact assessment considering the proposed mitigation measures. For full specific sound level calculations please see Appendix E.

Description	1/1 Octave Frequency Band (Hz, dB)								Overall (dBA)
	63	125	250	500	1k	2k	4k	8k	
Cumulative Specific Sound Level at NSR1	57	46	48	49	40	39	35	29	49
Acoustic Feature Correction	A +2 dB penalty has been applied to account for the 'just perceptible' low frequency hum observed during the site visits. No penalty has been applied for intermittency as the generators will operate for a number of hours once they switch on.								+2
Rating Sound Level ($L_{Ar,Tr}$)	Specific Sound Level + Rating Penalties								51
Background Sound Level	MP1 (Op. Hours) $L_{A90,15min}$ (Section 3.3)								56
Exceedance	$L_{Ar,Tr} - L_{A90,15min}$								-5
BS4142 Assessment Outcome	Low Impact, dependent on context.								
NPPF & NPSE Outcome	Below the No Observed Adverse Effect Level ('NOAEL').								
LPA Criteria	The rating level is predicted to meet the LPA Criteria.								
No further mitigation measures are required.									

Table 8 – BS4142 Noise Impact Assessment (Post-Mitigation)

It is important to note that the above assessment demonstrates a worst-case scenario during the limited 4-hour period whilst the batteries are charging. For the majority of the daytime , and the entirety of the night-time period, the generator will be inactive and the site operating from the batteries; resulting in noise emissions from the site being inaudible at the surrounding NSRs.

4. Conclusion and Action Plan

The proposed development has been assessed against the requirements of BS4142 and the Local Authority's Supplementary Planning Document, and a mitigation scheme has been provided to ensure the criteria can be achieved.

The initial BS4142 noise impact assessment showed that the rating level is predicted to exceed the measured typical background sound level, thus, showing 'low impact, dependent on context'. This is classed as Lowest Observed Adverse Effect Level ('LOAEL') when assessed in accordance with NPPF and NPSE. However, without any mitigation measures the rating level will not meet the LPA Criteria of 5dB below the calculated background.

However, after limiting the operational times of the hybrid generator and erection of a 2.2m fence around the units, as presented in Section 3.3, it has been demonstrated that proposed development can achieve the LPA criteria whilst simultaneously reducing the expected impact to 'No Observed Adverse Effect Level' ('NOAEL') in with NPPF and NPSE. When the site is operating exclusively using the battery sets, noise emissions are anticipated to be inaudible at the surrounding NSRs.

The findings of this report will require written approval from the Local Authority prior to work commencing.

Appendix A – Acoustic Terminology

A-weighted sound pressure level, L_{pA}	Quantity of A-weighted sound pressure given by the following formula in decibels (dBA). $L_{pA} = 10 \log_{10} (pA/p_0)^2$. Where: pA is the A-weighted sound pressure in pascals (Pa) and p_0 is the reference sound pressure (20 μ Pa)
Background Sound	Underlying level of sound over a period, T , which might in part be an indication of relative quietness at a given location
Equivalent continuous A-weighted sound pressure level, $L_{Aeq, T}$	Value of the A-weighted sound pressure level in decibels (dB) of a continuous, steady sound that, within a specified time interval, T , has the same mean-squared sound pressure as the sound under consideration that varies with time
Facade level	Sound pressure level 1 m in front of the facade
Free-field level	Sound pressure level away from reflecting surfaces
Indoor ambient noise	Noise in a given situation at a given time, usually composed of noise from many sources, inside and outside the building, but excluding noise from activities of the occupants
Noise Criteria	Numerical indices used to define design goals in a given space
Noise Rating (NR)	Graphical method for rating a noise by comparing the noise spectrum with a family of noise rating curves
Octave Band	Band of frequencies in which the upper limit of the band is twice the frequency of the lower limit
Percentile Level, $L_{AN, T}$	A-weighted sound pressure level obtained using time-weighting "F", which is exceeded for $N\%$ of a specified time interval
Rating Level, $L_{Ar, T}$	Equivalent continuous A-weighted sound pressure level of the noise, plus any adjustment for the characteristic features of the noise
Reverberation time, T	Time that would be required for the sound pressure level to decrease by 60 dB after the sound source has stopped
Sound Pressure, p	root-mean-square value of the variation in air pressure, measured in pascals (Pa) above and below atmospheric pressure, caused by the sound
Sound Pressure Level, L_p	Quantity of sound pressure, in decibels (dB), given by the formula: $L_p = 10 \log_{10} (p/p_0)^2$. Where: p is the root-mean-square sound pressure in pascals (Pa) and p_0 is the reference sound pressure (20 μ Pa)
Weighted sound reduction index, R_w	Single-number quantity which characterizes the airborne sound insulating properties of a material or building element over a range of frequencies

Appendix B – Standards, Legislation, Policy, and Guidance

This report is to be primarily based on the following standards, legislation, policy and guidance.

B.1 – National Planning Policy Framework (2023)

Government policy on noise is set out in the National Planning Policy Framework (NPPF), published in 2023. This replaced all earlier guidance on noise and places an emphasis on sustainability. In section 15, Conserving and enhancing the natural and local environment, paragraph 180, it states:

Preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans;

Paragraph 191 states:

Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- a) Mitigate and reduce to a minimum potential adverse impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
- b) Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
- c) Limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.*

B.2 – Noise Policy Statement for England (2010)

Paragraph 191 of the NPPF also refers to advice on adverse effects of noise given in the Noise Policy Statement for England (NPSE). This document sets out a policy vision to:

Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

To achieve this vision the Statement identifies the following three aims:

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- Avoid significant adverse impacts on health and quality of life;
- Mitigate and minimise adverse impacts on health and quality of life;
- Where possible, contribute to the improvement of health and quality of life.

In achieving these aims the document introduces significance criteria as follows:

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur. It is stated that “significant adverse effects on health and quality of life should be avoided while also considering the guiding principles of sustainable development”.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected. It is stated that the second aim above lies somewhere between LOAEL and SOAEL and requires that: “all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also considering the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur.”

NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise. This can be related to the third aim above, which seeks: “where possible, positively to improve health and quality of life through the pro-active management of noise while also considering the guiding principles of sustainable development, recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim.”

This is further expanded using the updated “Noise Exposure Hierarchy Table” which includes an additional level of impact referred to as the ‘No Observed Adverse Effect Level’ (‘NOAEL’). It is stated that at this level: *“noise can be heard, but does not cause any change in behaviour, attitude or other physiological response”*. In addition, noise at this level *“can slightly affect the acoustic character of the area but not such that there is a change in the quality of life”*.

The NPSE recognises that it is not possible to have a single objective noise -based measure that is mandatory and applicable to all sources of noise in all situations and provides no guidance as to how these criteria should be interpreted. It is clear, however, that there is no requirement to achieve noise levels where there are no observable adverse impacts but that reasonable and practicable steps to reduce adverse noise impacts should be taken in the context of sustainable development and ensure a balance between noise sensitive and the need for noise generating developments.

Any scheme of noise mitigation outlined in this report will, therefore, aim to abide by the above principles of the NPPF and NPSE whilst recognizing the constraints of the site.

B.3 – BS4142:2014+A1:2019 – ‘Methods for rating and assessing industrial and commercial sound’

Overview

BS4142:2014 sets out a method to assess the likely effect of sound from factories, industrial premises or fixed installations and sources of an industrial nature in commercial premises, on people who might be inside or outside a dwelling or premises used for residential purposes in the vicinity.

The procedure contained in BS4142:2014 for assessing the effect of sound on residential receptors is to compare the measured or predicted sound level from the source in question, the $L_{Aeq,T}$ ‘specific sound level’, immediately outside the dwelling with the $L_{A90,T}$ background sound level.

Where the sound contains a tonality, impulsivity, intermittency and other sound characteristics, then a correction depending on the grade of the aforementioned characteristics of the sound is added to the specific sound level to obtain the $L_{A,r,T}$ ‘rating sound level’. A correction to include the consideration of a level of uncertainty in sound measurements, data and calculations can also be applied when necessary.

Rating Penalty

Section 9 of BS4142:2014 describes how the rating sound level should be derived from the specific sound level, by deriving a rating penalty.

BS4142:2014 states:

“Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level. This can be approached in three ways:

- a) subjective method;*
- b) objective method for tonality;*
- c) reference method.”*

Due to the nature of the development the subjective method has been adopted to derive the rating sound level from the specific sound level. This is discussed in Section 9.2 of BS4142:2014, which states:

“Where appropriate, establish a rating penalty for sound based on a subjective assessment of its characteristics. This would also be appropriate where a new source cannot be measured because it is only proposed at that time, but the characteristics of similar sources can subjectively be assessed. Correct the specific sound level if a tone, impulse or other characteristics occurs, or is expected to be present, for new or modified sound sources.”

BS4142:2014 defines four characteristics that should be considered when deriving a rating penalty, namely; tonality; impulsivity; intermittency; and other sound characteristics, which are defined as:

a) Tonality

A rating penalty of +2 dB is applicable for a tone which is “just perceptible”, +4 dB where a tone is “clearly perceptible”, and +6 dB where a tone is “highly perceptible”.

b) Impulsivity

A rating penalty of +3 dB is applicable for impulsivity which is "just perceptible", +6 dB where it is "clearly perceptible", and +9 dB where it is "highly perceptible".

c) Other Sound Characteristics

BS4142:2014 states that where "the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distance against the residual acoustic environment, a penalty of +3 dB can be applied."

d) Intermittency

BS4142:2014 states that when the "specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time ... if the intermittency is readily distinctive against the residual acoustic environment, a penalty of +3 dB can be applied."

Background Sound Level

The background sound level is the underlying level of sound over a period, T, and is indicative of the relative quietness at a given location. It does not reflect the occurrence of transient and/or higher sound level events and is generally governed by continuous or semi-continuous sounds.

To ensure the background sound level values used within the assessment are reliable and suitably represent both the particular circumstance and periods of interest, efforts have been made to quantify a 'typical' background sound level for a given period. The purpose has not been to simply select the lowest measured value. Diurnal patterns have also been considered as they can have a major influence on background sound levels, for example, the middle of the night can be distinctly different (and potentially of lesser importance) compared to the start or end of the night time period for sleep purposes.

Since the intention is to determine a background sound level in the absence of the specific sound that is under consideration, it is necessary to understand that the background sound level can in some circumstances legitimately include industrial and/or commercial sounds that are present as separate to the specific sound.

Assessment of Impact

BS4142:2014 states: "The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs". An estimation of the impact of the specific sound can be obtained by the difference of the rating sound level and the background sound level and considering the following:

- "Typically, the greater this difference, the greater the magnitude of the impact."
- "A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context."
- "A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context."
- "The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact."

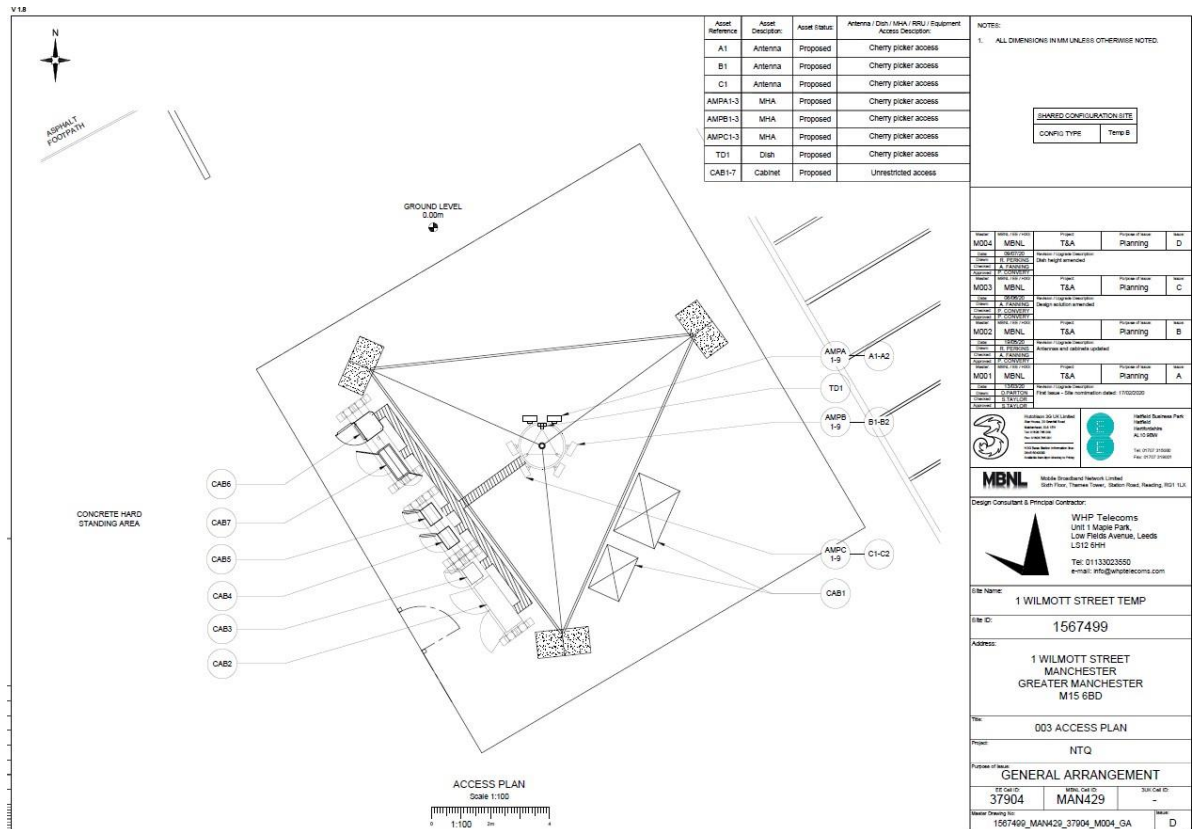
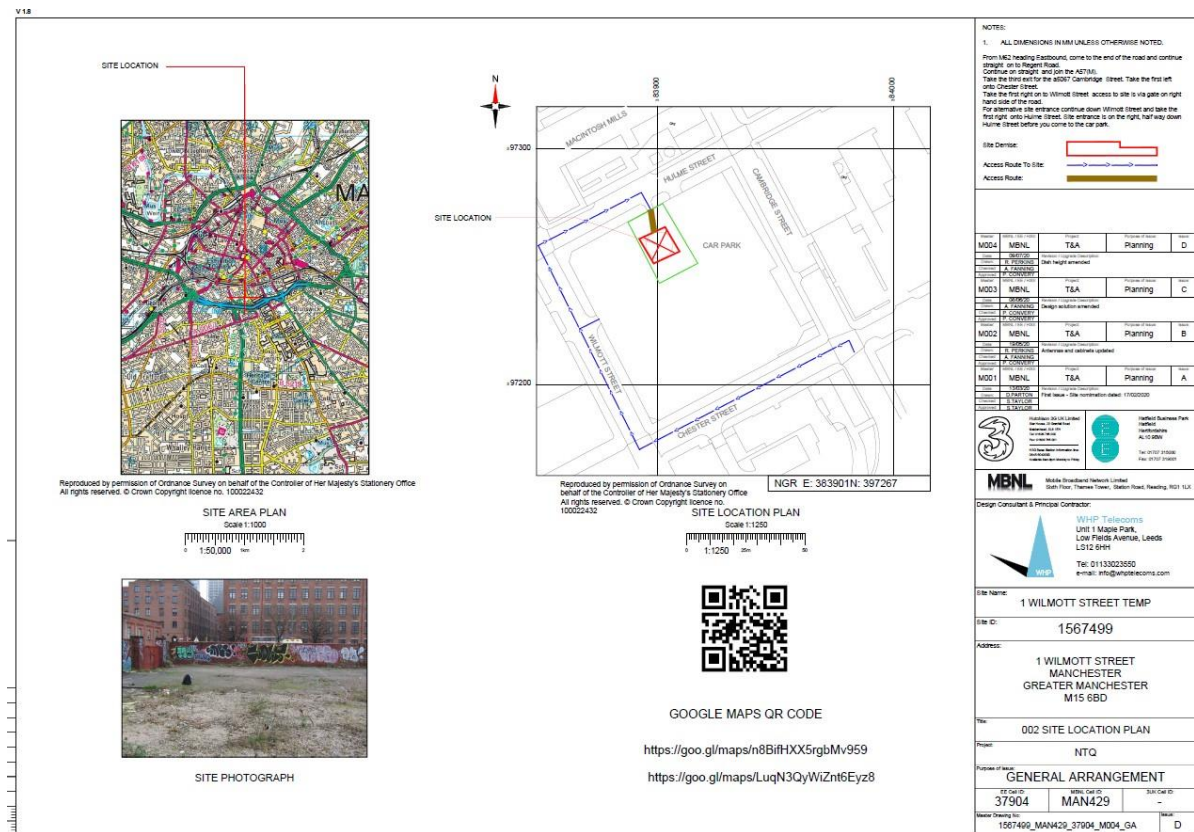
Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.”

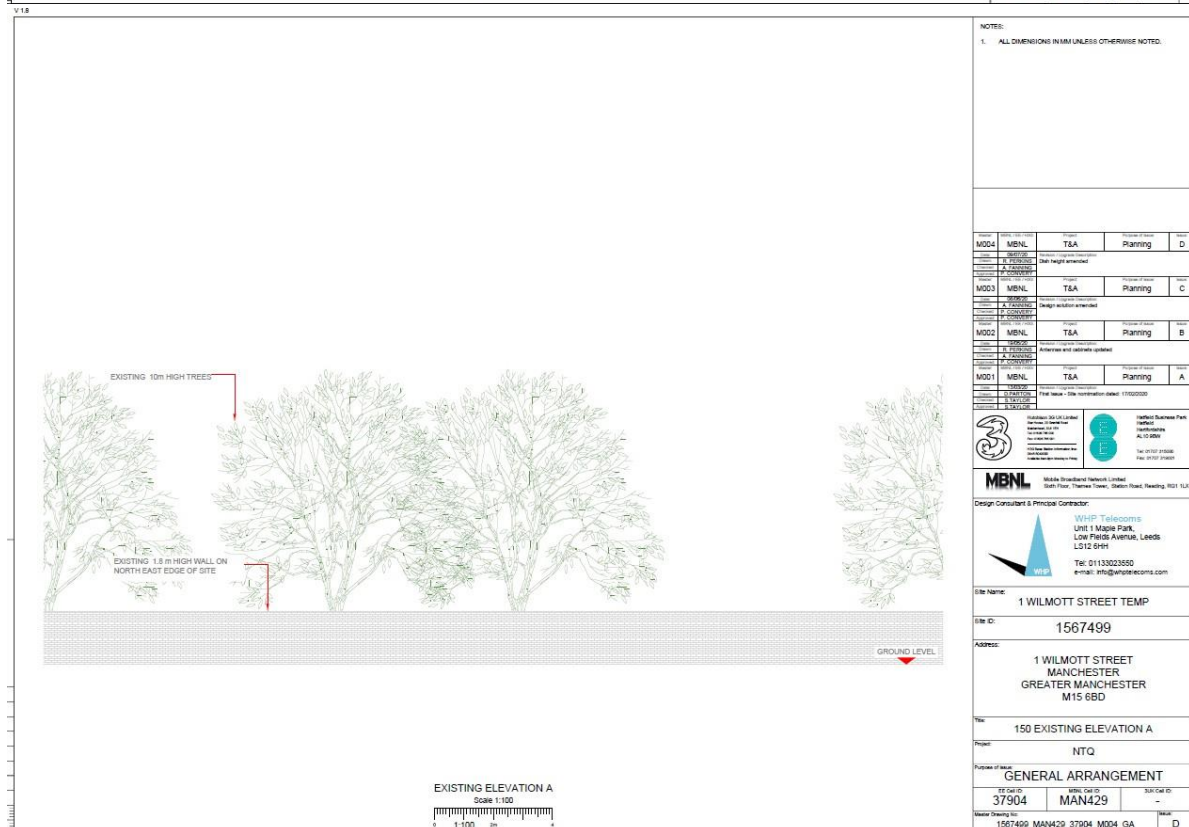
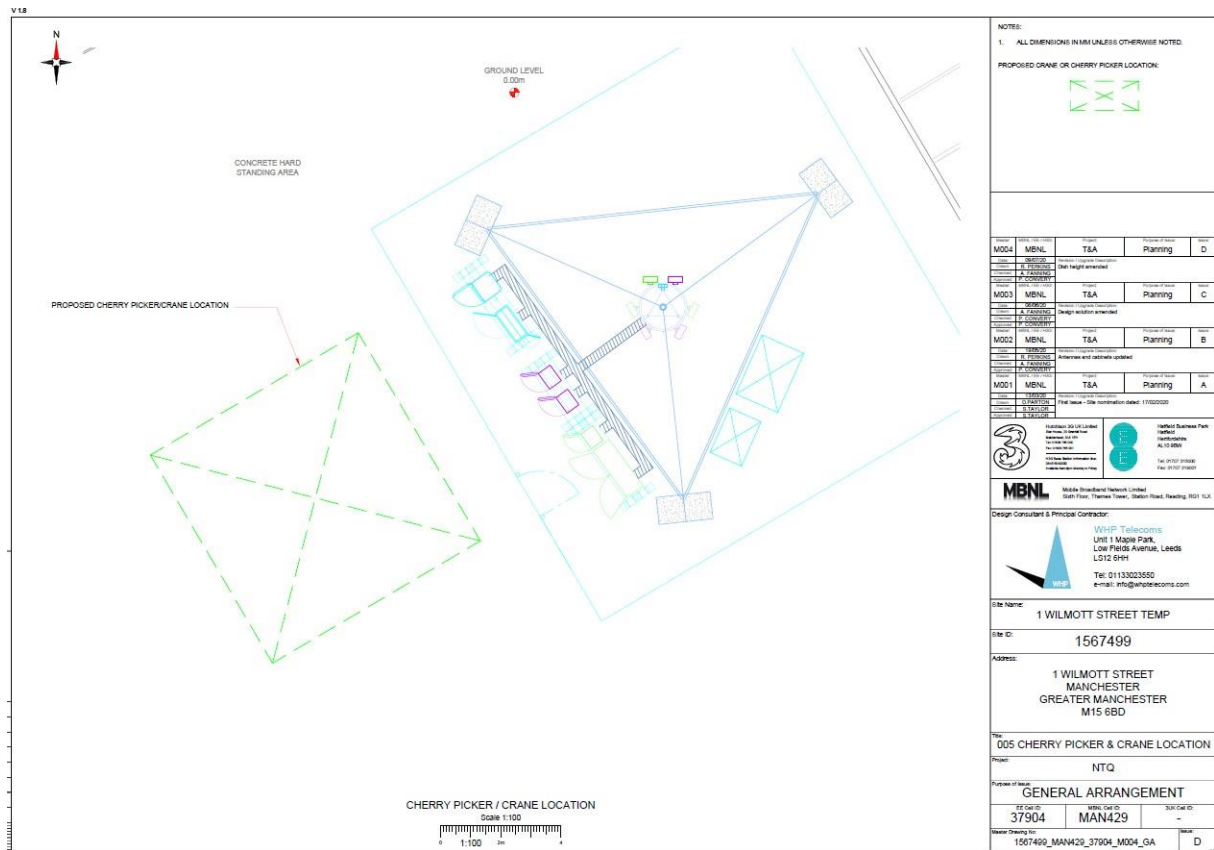
Interpreting the guidance given in BS4142:2014, with consideration of the guidance given in the NPSE and NPPG Noise, an estimation of the impact of the rating sound is summarised in the following text:

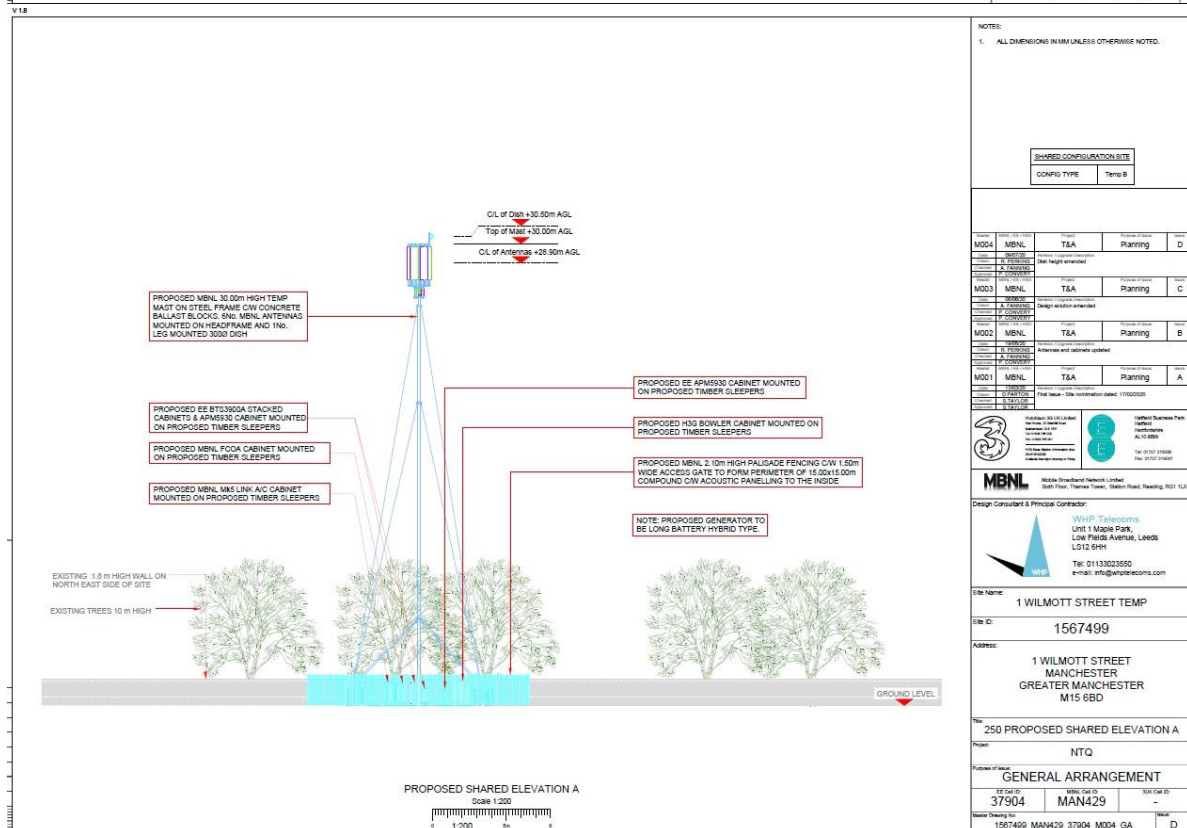
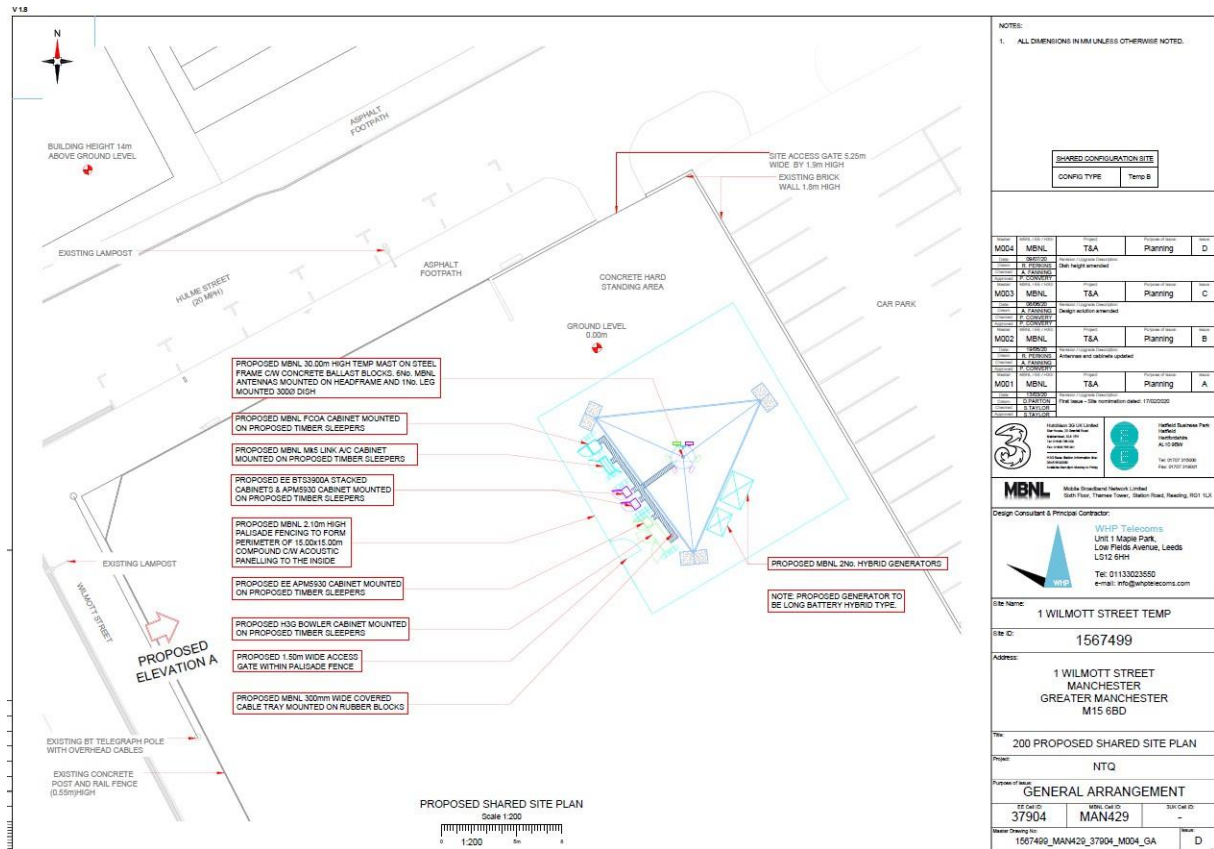
- A rating sound level that is +10 dB above the background sound level is likely to be an indication of a Significant Observed Adverse Effect Level;
- A rating sound level that is +5 dB above the background sound level is likely to be an indication of a Lowest Observed Adverse Effect Level;
- The lower the rating sound level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating sound level does not exceed the background sound level, this is an indication of the specific sound source having a low impact and would therefore be classified as No Observed Adverse Effect Level.

During the daytime, the assessment is carried out over a reference time period of 1 -hour. The periods associated with day or night, for the purposes of the Standard, are 07.00 to 23.00 and 23.00 to 07.00, respectively.

Appendix C – Location Plans







Appendix D – Environmental Survey

D.1 – Time History Noise Data

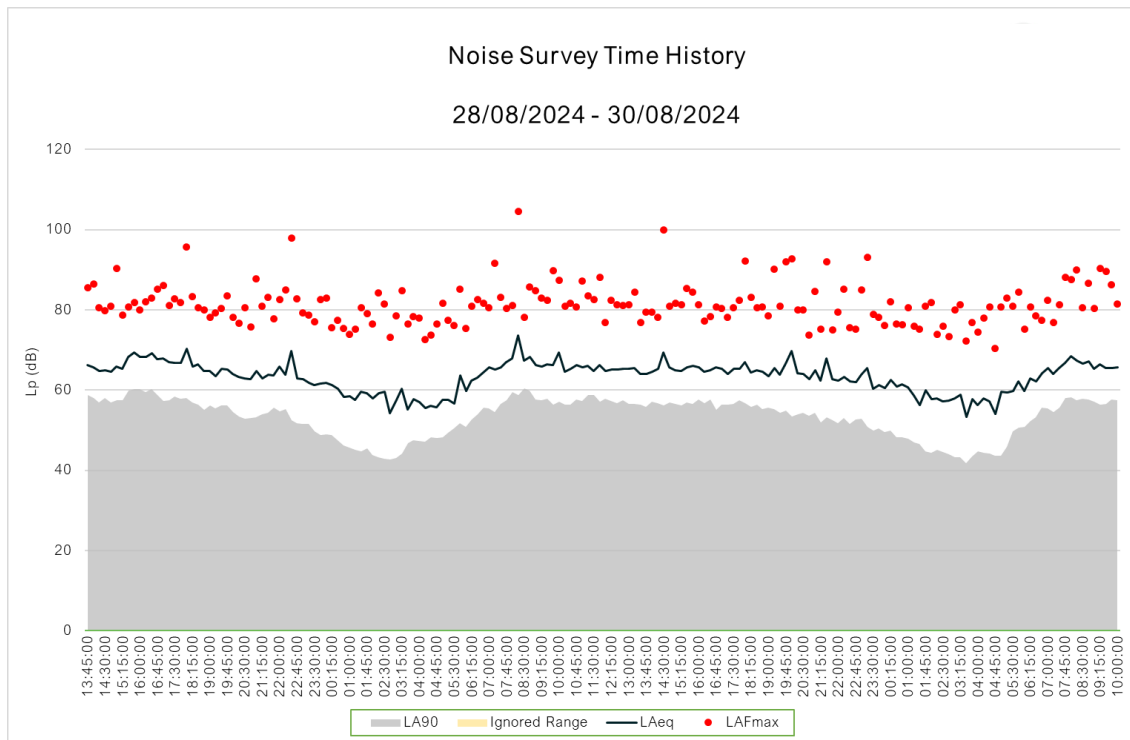


Figure 4 – MP1 Noise Survey Time History (Original Survey)

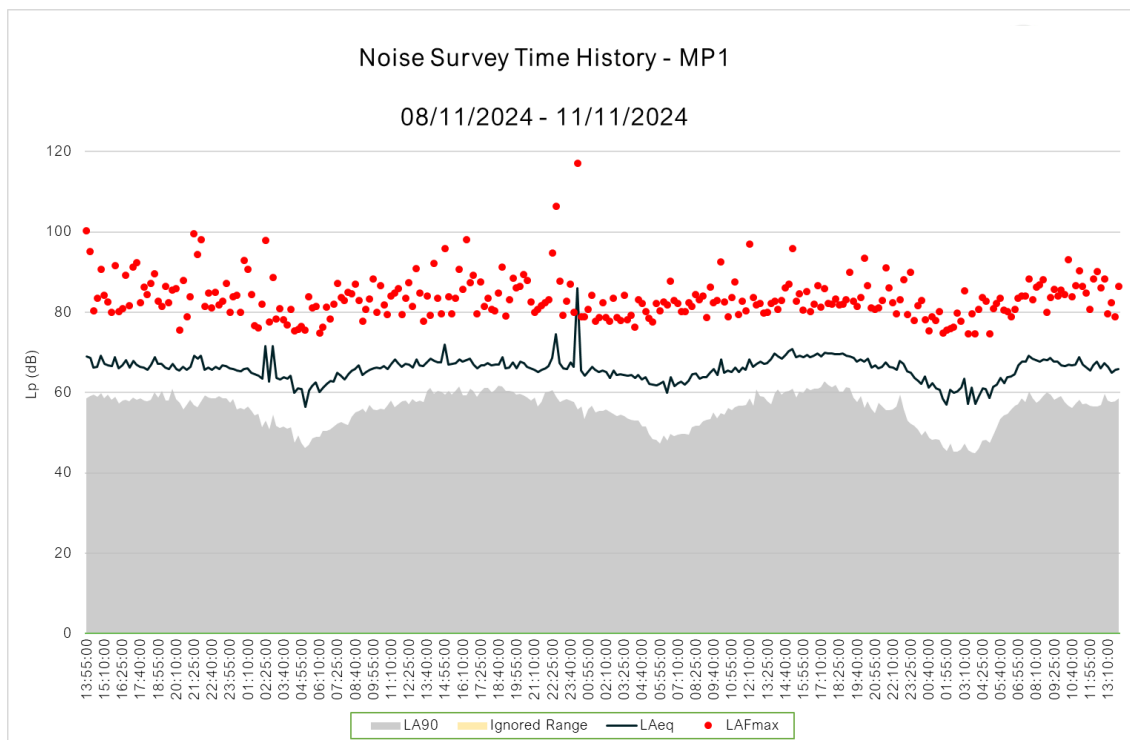


Figure 5 – MP1 Noise Survey Time History (Updated Survey)

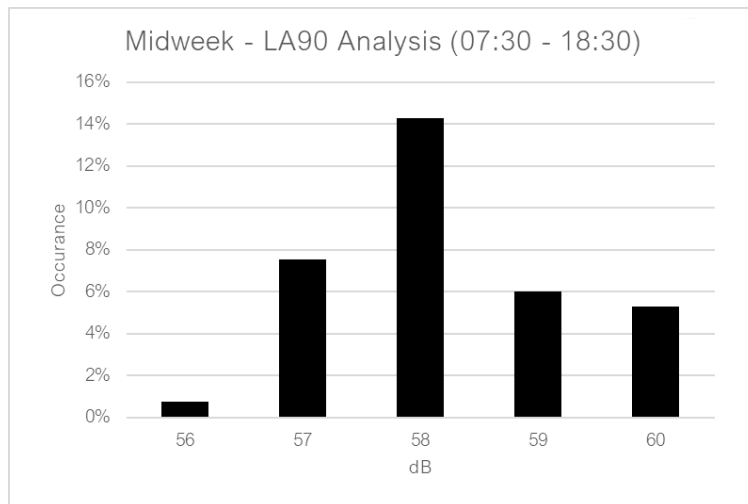


Figure 6 - Background Sound Levels Histogram - Midweek (Updated Survey)

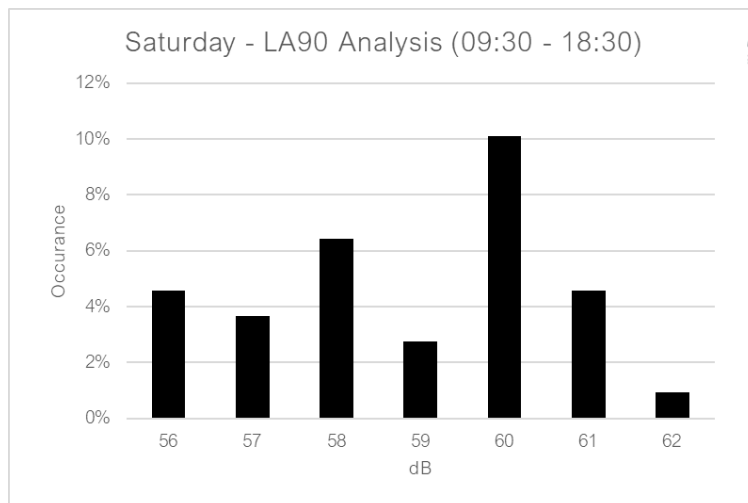


Figure 7 - Background Sound Levels Histogram - Saturday (Updated Survey)

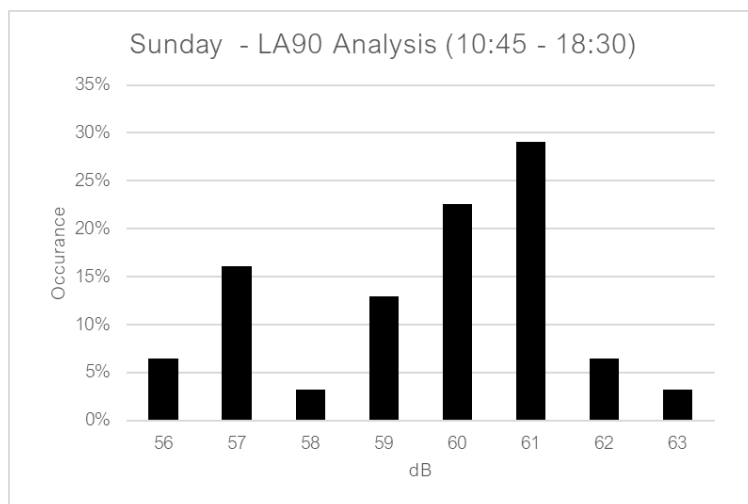


Figure 8 - Background Sound Levels Histogram - Sunday - (Updated Survey)

Daytime Period (07:00 - 23:00)						
Time	28th Aug	29th Aug	30th Aug	Arithmetic Average	SUMMARY	
07:00		55.5	55.5	55.5	Arithmetic Average of Arithmetic Average	56.4
07:15		54.5	54.5	54.5	Lowest Averaged Value	52.1
07:30		56.5	55.7	56.1	Maximum Average Value	59.1
07:45		57.5	58.0	57.8	Lowest Average Value between 07:30 and 18:30 hours	
08:00		59.6	58.2	58.9		
08:15		58.7	57.5	58.1	56.1	
08:30		60.4	57.8	59.1		
08:45		59.8	57.6	58.7		
09:00		57.6	57.2	57.4		
09:15		57.5	56.3	56.9		
09:30		57.8	56.6	57.2		
09:45		56.3	57.6	57.0		
10:00		57.1	57.4	57.3		
10:15		56.4		56.4		
10:30		56.3		56.3		
10:45		57.6		57.6		
11:00		57.3		57.3		
11:15		58.7		58.7		
11:30		58.8		58.8		
11:45		57.2		57.2		
12:00		57.9		57.9		
12:15		57.3		57.3		
12:30		56.7		56.7		
12:45		57.4		57.4		
13:00		56.5		56.5		
13:15		56.5		56.5		
13:30		56.4		56.4		
13:45	58.8	55.8		57.3		
14:00	58.0	57.2		57.6		
14:15	57.0	56.7		56.9		
14:30	58.0	56.2		57.1		
14:45	57.0	57.0		57.0		
15:00	57.4	56.6		57.0		
15:15	57.4	56.2		56.8		
15:30	59.8	57.0		58.4		
15:45	60.3	56.6		58.5		
16:00	60.2	57.7		59.0		
16:15	59.6	56.8		58.2		
16:30	60.2	57.7		59.0		
16:45	58.8	55.0		56.9		
17:00	57.3	56.3		56.8		
17:15	57.4	56.4		56.9		
17:30	58.4	56.5		57.5		
17:45	57.9	57.5		57.7		
18:00	58.1	56.7		57.4		
18:15	57.0	55.8		56.4		
18:30	56.3	56.4		56.4		
18:45	55.0	55.2		55.1		
19:00	56.1	55.6		55.9		
19:15	55.4	55.2		55.3		
19:30	56.1	54.3		55.2		
19:45	56.1	54.9		55.5		
20:00	54.5	53.4		54.0		
20:15	53.5	53.9		53.7		
20:30	52.8	54.3		53.6		
20:45	53.0	53.6		53.3		
21:00	53.2	54.3		53.8		
21:15	53.9	52.0		53.0		
21:30	54.4	53.2		53.8		
21:45	55.6	52.5		54.1		
22:00	54.8	51.7		53.3		
22:15	55.2	53.0		54.1		
22:30	52.5	51.6		52.1		
22:45	51.8	52.6		52.2		

Figure 9 – MP1 Background Analysis – Daytime

Night-time Period (23:00 - 07:00)				
Time	28th - 29th Aug	29th - 30th Aug	Arithmetic Average	SUMMARY
23:00	51.6	52.9	52.3	
23:15	51.5	50.9	51.2	
23:30	49.8	50.0	49.9	
23:45	48.8	50.4	49.6	Arithmetic Average of Arithmetic Average
00:00	49.0	49.6	49.3	47.6
00:15	48.8	49.9	49.4	<u>Lowest Averaged Value</u>
00:30	47.6	48.3	48.0	43.2
00:45	46.2	48.2	47.2	Maximum Average Value
01:00	45.6	47.9	46.8	55.7
01:15	45.1	47.0	46.1	
01:30	44.7	46.5	45.6	
01:45	45.5	44.7	45.1	
02:00	43.9	44.4	44.2	
02:15	43.2	45.1	44.2	
02:30	42.9	44.6	43.8	
02:45	42.8	44.0	43.4	
03:00	43.0	43.3	43.2	
03:15	44.2	43.2	43.7	
03:30	46.8	41.8	44.3	
03:45	47.5	43.5	45.5	
04:00	47.4	44.7	46.1	
04:15	47.2	44.3	45.8	
04:30	48.2	44.1	46.2	
04:45	48.0	43.6	45.8	
05:00	48.3	43.7	46.0	
05:15	49.3	45.9	47.6	
05:30	50.4	49.7	50.1	
05:45	51.7	50.7	51.2	
06:00	50.9	50.9	50.9	
06:15	52.7	52.4	52.6	
06:30	54.0	53.2	53.6	
06:45	55.7	55.6	55.7	

Figure 10 – MP1 Background Analysis – Night-time

D.2 – Surveying Equipment

Piece of Equipment	Serial No.
Svantek SV307 Class 1 Sound Level Meter	84953
Svantek SV971A Class 1 Sound Level Meter	143581
Svantek SV36 Class 1 Calibrator	106876

Table 9 – Surveying Equipment

All equipment used during the survey was field calibrated at the start and end of the measurement period with a negligible deviation noted. All sound level meters are calibrated every 24 months and all calibrators are calibrated every 12 months by a third-party calibration laboratory. All microphones were fitted with a protective windshield for the entire measurements period. Calibration certificates can be provided upon request.

D.3 – Meteorological Conditions

As the environmental noise survey was carried out over a long un-manned period no localised records of weather conditions were taken. However, all measurements have been compared with met office weather data of the area, specifically the closest weather station, and the data from the weather station is outlined in the table below. When reviewing the time history of the noise measurements, any scenarios that were considered potentially to be affected by the local weather conditions have been omitted. The analysis of the noise data includes statistical and percentile analysis and review of minimum and maximum values, which aids in the preclusion of any periods of undesirable weather conditions. The weather conditions were deemed suitable for the measurement of environmental noise in accordance with BS7445 Description and Measurement of Environmental Noise. The table below presents the average temperature, wind speed and rainfall range for each 24-hour period during the entire measurement.

Weather Conditions – Chorlton Weather Station (Approx. 4.3km SW of Site)				
Time Period	Air Temp (°C)	Rainfall (mm/h)	Prevailing Wind Direction	Wind Speed (m/s)
28/08/24: 00:00 – 23:59	11.5 – 21.2	0.0 – 7.2 ^[1]	SE	0.0 – 2.1
29/08/24: 00:00 – 23:59	9.7 – 20.0	0.0	SW	0.0 – 1.3
30/08/24: 00:00 – 23:59	9.2 – 23.4	0.0	S	0.0 – 1.0
08/11/24: 00:00 – 23:59	7.8 – 11.4	0.0	SE	0.0 – 1.5
09/11/24: 00:00 – 23:59	6.7 – 7.9	0.0	SSE	0.0 – 0.8
10/11/24: 00:00 – 23:59	6.8 – 12.5	0.0 – 1.8	SE	0.0 – 0.8
11/11/24: 00:00 – 23:59	2.4 – 12.4	0.0	SSE	0.0 – 0.5
Notes:				
[1] The high rainfalls were measured outside the monitoring period (08:59 to 09:09) and, therefore, did not affect to the measured background noise levels that have been used as baseline for the BS4142 assessment.				

Table 10 – Weather Conditions

Appendix E – Full Calculations

Initial Assessment

Description	Item	Source	Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB)							
Model / Unit	Generator - Inlet	Octave-Band	Lp	Lp at 1m, Q factor (Q=2)	70	63	125	250	500	1k	2k	4k	8k
No. of	1					84	80	73	65	61	59	55	50
Data Type	Manufacturers Data			Total Lw	78	92	88	81	73	69	67	63	58
Source Mitigation	No												
Description	e.g. Caice Enclosure												
Time Corrected Lw of Fixed Plant	On-Time (min)	Time Period		Correction (dB)	78	92	88	81	73	69	67	63	58
	60	Day		0									
Propagation Loss to NSR1 (Point Source)	Distance (m)	Q Factor		Loss (dB)		Shielding (dB)							
	38	2		-40									No
Specific Sound Level at NSR1					38	52	48	41	33	29	27	23	18
Propagation Loss to NSR2 (Point Source)	Distance (m)	Q Factor		Loss (dB)		Shielding (dB)							
	64	2		-44									No
Specific Sound Level at NSR2					34	48	44	37	29	25	23	19	14

Description	Item	Source	Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB)							
Model / Unit	Generator - Outlet	Octave-Band	Lp	Lp at 1m, Q factor (Q=2)	85	63	125	250	500	1k	2k	4k	8k
No. of	1					93	80	84	86	76	76	72	65
Data Type	Manufacturers Data			Total Lw	93	101	88	92	94	84	84	80	73
Source Mitigation	No												
Description	e.g. Caice Enclosure												
Time Corrected Lw of Fixed Plant	On-Time (min)	Time Period		Correction (dB)	93	101	88	92	94	84	84	80	73
	60	Day		0									
Propagation Loss to NSR1 (Point Source)	Distance (m)	Q Factor		Loss (dB)		Shielding (dB)							
	38	2		-40									Nc
Specific Sound Level at NSR1					54	61	48	52	54	44	44	40	33
Propagation Loss to NSR2 (Point Source)	Distance (m)	Q Factor		Loss (dB)		Shielding (dB)							
	64	2		-44									Nc
Specific Sound Level at NSR2					49	57	44	48	50	40	40	36	29

Post-Mitigation Assessment

Description	Item	Source	Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB)							
Model / Unit	Generator - Outlet	Octave-Band	Lp	Lp at 1m, Q factor (Q=2)	85	63	125	250	500	1k	2k	4k	8k
No. of	1					93	80	84	86	76	76	72	65
Data Type	Manufacturers Data			Total Lw	93	101	88	92	94	84	84	80	73
Source Mitigation	No												
Description	e.g. Caice Enclosure												
Time Corrected Lw of Fixed Plant	On-Time (min)	Time Period		Correction (dB)	93	101	88	92	94	84	84	80	73
	60	Day		0									
Propagation Loss to NSR1 (Point Source)	Distance (m)	Q Factor		Loss (dB)		Shielding (dB)							
	38	2		-40		-5	-5	-5	-5	-5	-5	-5	-5
Specific Sound Level at NSR1					49	56	43	47	49	39	39	35	28
Propagation Loss to NSR2 (Point Source)	Distance (m)	Q Factor		Loss (dB)		Shielding (dB)							
	64	2		-44									No
Specific Sound Level at NSR2					49	57	44	48	50	40	40	36	29