



Ashton Old Road Peaking Site, Manchester

Noise Assessment for Planning Application

16th January 2023

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1. INTRODUCTION

1.1. Overview

inacoustic has been commissioned to assess the impact of potential noise arising from a proposed Gas Peaking Power Generation Plant, on Land off Ashton Old Road, Openshaw.

The following technical noise assessment has been produced to accompany a Planning Application to Manchester City Council and is based upon environmental noise measurements undertaken at the site and a subsequent 3-dimensional noise modelling exercise.

The proposed development was previously permitted by Manchester City Council (Ref 121909/FO/2018), in January 2020.

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

1.2. Scope and Objectives

The scope of the noise assessment is summarised as follows:

- A 3-dimensional noise modelling exercise, in order to quantify the potential noise generation of the proposed site uses;
- An assessment of potential noise impacts with respect to the prevailing acoustic conditions at existing off-site receptors; and
- Recommendation of mitigation measures, where necessary, to comply with the requirements of the National Planning Practice Guidance in England: Noise¹ and any relevant Planning Conditions².

¹ Department for Communities and Local Government (DCLG), 2019. National Planning Practice Guidance for England: Noise. DCLG England: Noise. DCLG.

² Planning Condition 9 of 121909/FO/2018

2. LEGISLATION AND POLICY FRAMEWORK

The development proposals for the Site are guided by the following policy directives and guidance:

2.1. National Policy

2.1.1. National Planning Policy Framework, 2021

The *National Planning Policy Framework* (NPPF)³ sets out the Government's planning policies for England. Planning policy requires that applications for planning permission must be determined in accordance with the development plan, unless material considerations indicate otherwise.

The NPPF is also a material consideration in planning decisions. It sets out the Government's requirements for the planning system and how these are expected to be addressed.

Under Section 15; *Conserving and Enhancing the Natural Environment*, in Paragraph 174, the following is stated:

"Planning policies and decisions should contribute to and enhance the natural and local environment by:

- e) 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".*

Paragraph 185 of the document goes on to state:

"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 impacts 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"*

Paragraph 185 refers to the Noise Policy Statement for England, which is considered overleaf.

³ Ministry of Housing, Communities and Local Government (MHCLG), July 2021. National Planning Policy Framework. HMSO. London.

2.1.2. Noise Policy Statement for England, 2010

The underlying principles and aims of existing noise policy documents, legislation and guidance are clarified in *DEFRA: 2010: Noise Policy Statement for England* (NPSE)⁴. The NPSE sets out the “*Long Term Vision*” of Government noise policy as follows:

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

The NPSE outlines three aims for the effective management and control of environmental, neighbour and neighbourhood noise:

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

The guidance states that it is not possible to have a single objective noise-based measure that defines “*Significant Observed Adverse Effect Level (SOAEL)*” that is applicable to all sources of noise in all situations and that not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.

2.1.3. National Planning Practice Guidance in England: Noise, 2019

Further guidance in relation to the NPPF and the NPSE has been published in the *National Planning Practice Guidance in England: Noise* (NPPG Noise)⁵, which summarises the noise exposure hierarchy, based on the likely average response. The following three observed effect levels are identified below:

- **Significant Observed Adverse Effect Level:** This is the level of noise exposure above which significant adverse effects on health and quality of life occur;
- **Lowest Observed Adverse Effect Level:** This is the level of noise exposure above which adverse effects on health and quality of life can be detected; and
- **No Observed Adverse Effect Level:** This is the level of noise exposure below which no effect at all on health or quality of life can be detected.

⁴ Department for Environment, Food and Rural Affairs (DEFRA), 2010. Noise Policy Statement for England. DEFRA.

⁵ Department for Communities and Local Government (DCLG), 2019. National Planning Practice Guidance for England: Noise. DCLG.

Criteria related to each of these levels are reproduced in Table 1.

TABLE 1: SIGNIFICANCE CRITERIA FROM NPPG IN ENGLAND: NOISE

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not Noticeable	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Noticeable and Not Intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and Intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and Disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and Very Disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

2.2. Local Policy

The Core Strategy Development Plan 2012-2027 (CS) was adopted by Manchester City Council (MCC) on the 11th July 2012. It is the key document in Manchester's Local Development Framework and sets out the long-term strategic planning policies for Manchester's future development. 'Policy DM1: Development Management' of the Core Strategy refers to noise and new development, and states:

"All development should have regard to the following specific issues for which more detailed guidance may be given within a supplementary planning document:-

Effects on amenity, including privacy, light, noise, vibration, air quality, odours, litter, vermin, birds, road safety and traffic generation. This could also include proposals which would be sensitive to existing environmental conditions, such as noise."

Manchester City Council's Planning & Noise Technical Guidance⁶ note dated October 2022 states that the design objective for industrial/commercial developments should be as follows:

"The development should be designed so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location."

It notes that:

"Where this criterion cannot be achieved, the various noise control measures considered as part of the assessment should be fully explained (i.e. relocation of noise sources, use of quieter equipment, enclosures, screening, restriction of the hours of operation) and the achievable noise level should be identified. This information will allow a judgement to be made concerning the application and its likely impact on the surrounding area."

2.3. Assessment Criteria

2.3.1. Planning Conditions re Noise 121909/FO/2018

Planning Condition 9 of 121909/FO/2018, as permitted by Manchester City Council, states the following:

"9) Before first occupation of the development the building, together with any externally mounted ancillary equipment, shall be acoustically insulated in accordance with the mitigation measures specified within the RPS Noise Assessment dated 29th January 2019 JAT10543-STOR128-REPT-01-R1 and Stor Power email of 10 October 2019 confirming linear third octave sound pressure level at 250 metres from the site. The agreed measures shall be carried out and completed prior to the development being first brought into use and shall be retained thereafter."

Planning Condition 10 of 121909/FO/2018, as permitted by Manchester City Council, states the following:

"10) The development hereby approved shall operate a maximum of two nights (between 11:00 pm and 7:00 am) in any 12 month period. At all other times the development shall operate between the hours of Monday to Sunday: 7:00 am to 11:00 pm."

⁶ https://www.manchester.gov.uk/downloads/download/5199/information_for_developers Date Accessed 19th October 2022

The development was permitted on the basis of partial non-compliance with the criterion outlined in Manchester City Council's Planning & Noise Technical Guidance note, and this noise assessment report adopts the same position for the reasons previously accepted by the Local Planning Authority.

2.3.2. BS4142:2014+A1:2019

BS4142:2014+A1:2019 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+A1:2019 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 $L_{Ar,Tr}$ *rating sound level*.

BS4142:2014+A1:2019 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."*

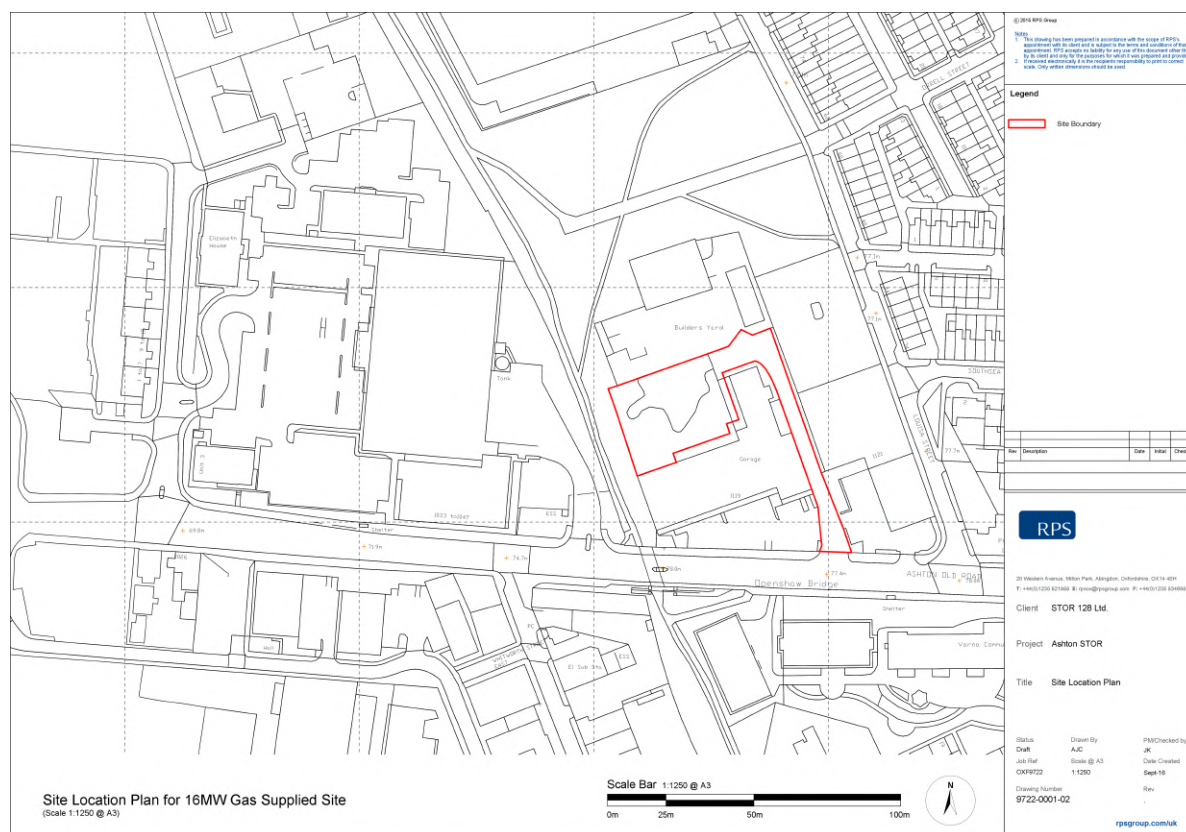
3. SITE DESCRIPTION

3.1. Site and Surrounding Area

The Proposed Development is on a parcel of Land off Ashton Old Road, Openshaw. The Proposed Development area can be seen in Figure 1, below, outlined in red.

The closest noise-sensitive receptors (NSRs) to the site comprise the residential dwellings located on Louisa Street, 80 metres to the east; Brade Close, 175 metres to the north-west; and Columbine Street, 115 metres to the south.

FIGURE 1: PROPOSED DEVELOPMENT SITE AND SURROUNDING AREA



3.2. Proposed Development Overview

Peaking Power Generation Plant are designed to cover potential energy shortages, supplying electricity to the National Grid when necessary. As such, they have a short-term operational nature, and they are more likely to operate during peak load hours only, when the demand for electricity is higher, but they have potential to operate at any time. The Proposed Development is designed to provide flexible back-up power at very short notice.

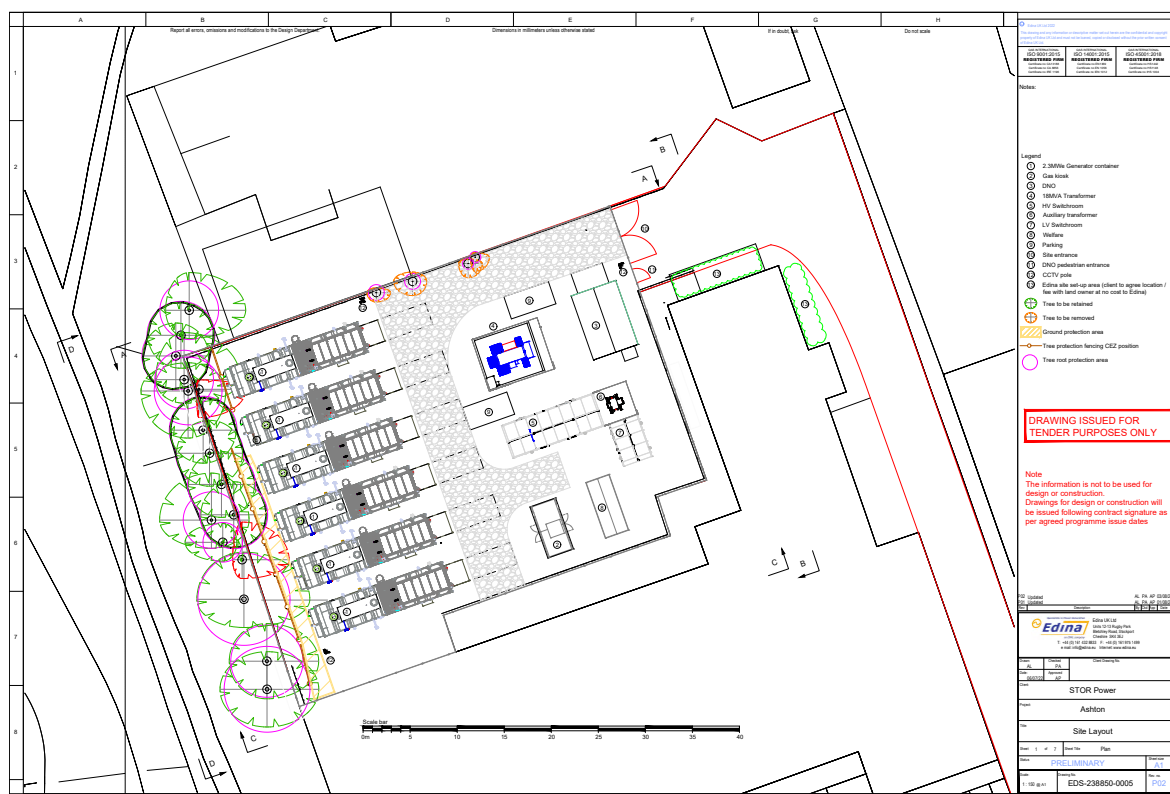
Though the facility would be available to supply National Grid 24-hrs a day, 7-days a week, the plant will not be used for base load. The gas engines will be able to reach full load in less than five minutes from cold and, after the required hours of operation, the engines will power down completely.

Typically, the station would be switched off, waiting for an instruction via National Grid to power-up. These instructions could come as a result of system instability or peaks in demand which would typically require generation support from the facility for between 1 to 7 hours per day, between 8am and 8pm, typically on weekdays. Outside of these hours, such as during a major power shortage or system stress events, National Grid may call the facility to support in an emergency situation.

The development proposals comprise 6 N^o gas engine-driven electricity-generating sets. The engines are proposed to be housed within purpose-built containers. It will be connected to the grid with 1 N^o transformer and 1 N^o DNO substation. The internal air temperature within the engine area is controlled by air cooler units and exhaust gases are vented through 13-metre-high stacks. The engines are fed by a 'Gas Skid' unit. The engines, the exhaust stacks, the coolers and the gas skid are all potentially significant sound sources.

An overview of the proposed site layout can be seen below in Figure 2.

FIGURE 2: PROPOSED DEVELOPMENT LAYOUT



4. MEASUREMENT METHODOLOGY

4.1. General

The prevailing noise conditions in the area have been determined by an environmental noise survey conducted during both daytime and night-time periods between 8th September 2016 and 15th September 2016, by the RPS Group, as part of the aforementioned planning application.

4.2. Measurement Details

4.2.1. Instrumentation and Competency

All noise measurements were undertaken with equipment, and by an appropriately competent consultant, in accordance with the principles of BS 7445⁷.

4.2.2. Meteorological Conditions

Meteorological conditions for the survey were monitored at a nearby site (Shirley), approximately 2.4 km south-east of the site. Wind speeds were varied (ranging between 0 and 17.4 ms⁻¹), however, it was considered that periods of high wind speeds did not influence the measured data. There were notable periods of rainfall between the 8th and 10th September 2016, and on the 13th September 2016; however, on analysis of the dataset, this rainfall did not appear to have significantly increased noise levels. Therefore, no data have been excluded from the dataset due to meteorological conditions.

4.2.3. Location

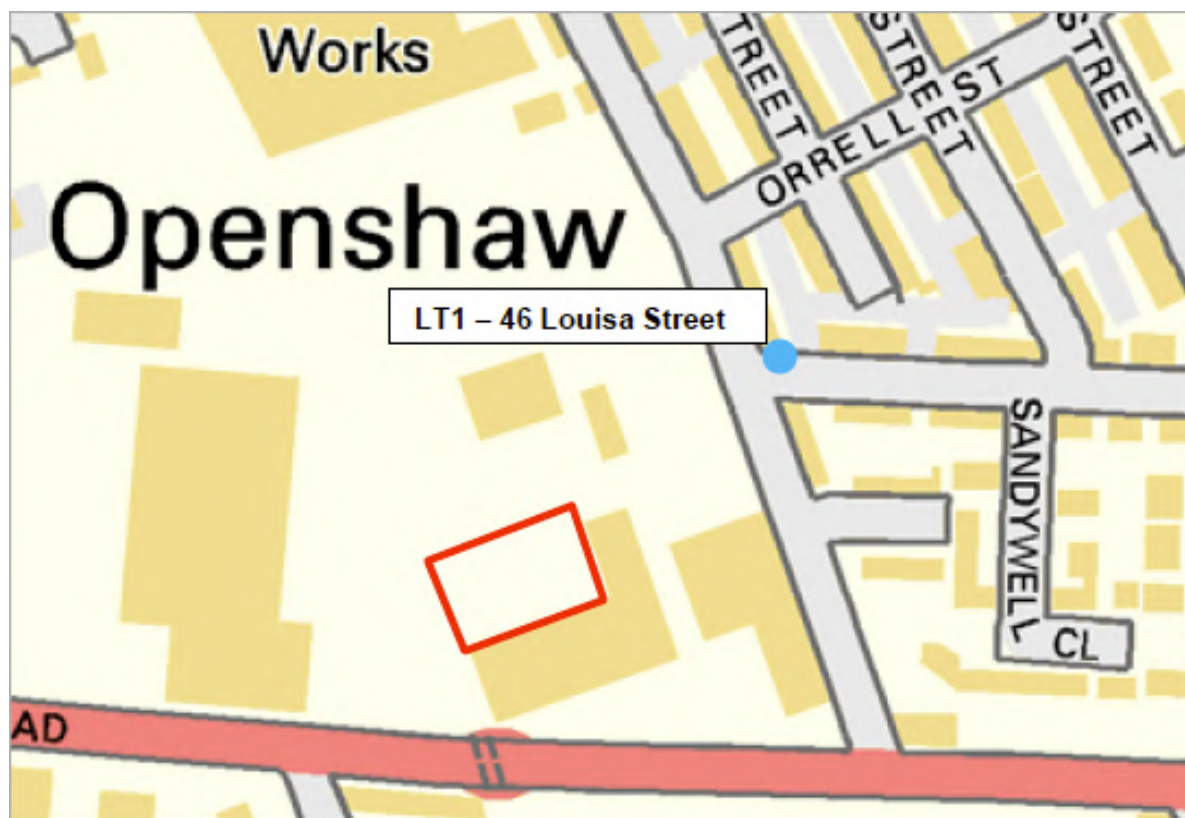
The location of the measurements can be seen below in Table 2, with its location relative to the Proposed Development shown overleaf in Figure 3.

TABLE 2: MEASUREMENT POSITION LOCATION

Measurement Position	Location
LT1	46 Louisa Street

⁷ British Standard 7445: 2003: *Description and measurement of environmental noise*. BSI.

FIGURE 3: MEASUREMENT POSITION



4.3. Summary Baseline Sound Levels

BS4142:2014+A1:2019 requires that the background sound levels adopted for the assessment be representative for the period being assessed. The Standard recommends that the background sound level should be derived from continuous measurements of normally not less than 15-minute intervals, which can be contiguous or disaggregated. However, the Standard states that there is no 'single' background sound level that can be derived from such measurements. It is particularly difficult to determine what is 'representative' of the night-time period is because it can be subject to a wide variation in background sound level between the shoulder night periods.

The accompanying note to paragraph 8.1.4 states that *"a representative level ought to account for the range of background sounds levels and ought not automatically to be assumed to be either the minimum or modal value"*.

The baseline sound levels used in the assessment are summarised in Table 3, as taken directly from the original RPS Group report for the site.

TABLE 3: REPRESENTATIVE BASELINE SOUND LEVELS USED IN THE ASSESSMENT

Period	Baseline Parameter	Representative Baseline Sound Levels dB
Day (07:00-19:00)	Residual Sound Level, $L_{Aeq,T}$ (dB)	58
	Background Sound Level, L_{A90} (dB)	45
Evening (19:00-23:00)	Residual Sound Level, $L_{Aeq,T}$ (dB)	55
	Background Sound Level, L_{A90} (dB)	43
Night (23:00-07:00)	Residual Sound Level, $L_{Aeq,T}$ (dB)	48
	Background Sound Level, L_{A90} (dB)	37

5. OPERATIONAL NOISE ASSESSMENT

5.1. Noise Modelling

5.1.1. Source Data

The noise emissions data associated with the Proposed Development have been provided by the Applicant and the equipment manufacturers, and can be seen below in Table 4.

TABLE 4: SOUND SOURCE DATA

Plant	Quantity	Sound Pressure Level, L_{pA} (dB)	Sound Pressure Level Distance (m)
Silenced Exhaust Stack	6	65	1
Dry Air Cooler	6	65	1
Engine Air Inlet	6	70	1
Engine Air Outlet	6	70	1
Engine Container Body (Northernmost)	3	65	1
Engine Container Body (Southernmost)	3	70	1
Gas Skid	1	83	1
Transformer	1	78	1

5.1.2. Calculation Process

Calculations were carried out using iNoise 2022, which undertakes its calculations in accordance with guidance given in ISO9613-1:1993 and ISO9613-2:1996.

5.1.3. Sound Data Assumptions

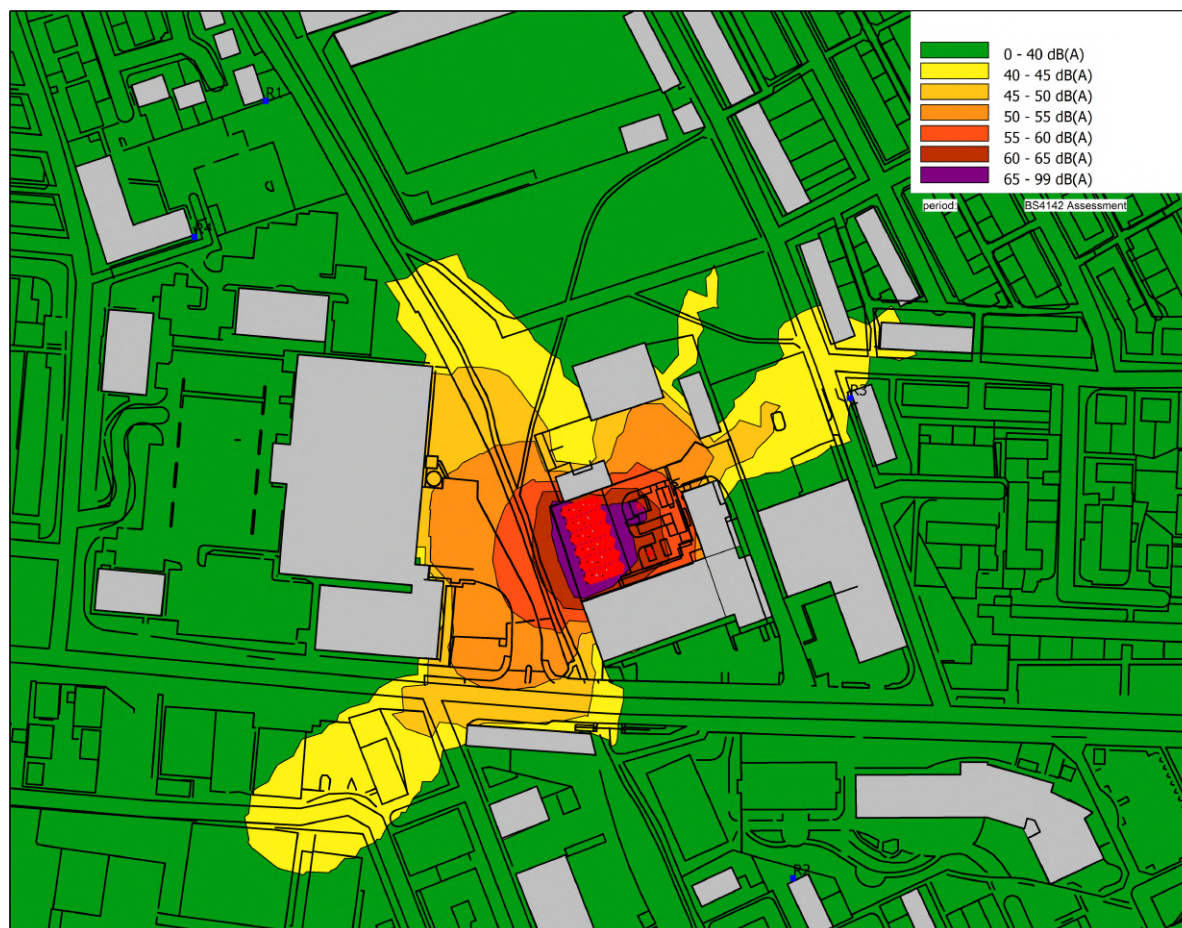
Given that the land between proposed development and nearest receptors is generally hard, with a biased towards hard, the ground factor has been set to 0.2, within the calculation software. In order to accurately model the land surrounding the development, an AutoCAD DXF drawing was produced, which was based on data provided by the Ordnance Survey.

It has been assumed that all processes will occur simultaneously, representing a worst-case scenario.

5.1.4. Specific Sound Level Map

The sound map showing the specific sound level emissions, at first-floor level, from the Proposed Development can be seen in Figure 4.

FIGURE 4: SPECIFIC SOUND LEVEL MAP



5.1.5. Specific Sound Level Summary

A summary of the predicted specific sound levels, at first-floor level, at the NSRs, based on the sound map shown in Figure 4 can be seen below in Table 5.

TABLE 5: PREDICTED SPECIFIC SOUND LEVEL SUMMARY

NSR	Location	Specific Sound Level (dB)
1	Brade Close	36
2	Columbine Street	33
3	Louisa Street	41
4	Victoria House	25

5.2. Assessment

5.2.1. Rating Penalty Principle

Section 9 of BS4142:2014+A1:2019 describes how the rating sound level should be derived from the specific sound level, by determining a rating penalty.

BS4142:2014+A1:2019 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.”*

Given that the Proposed Development is not operational, 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+A1:2019, 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+A1:2019 defines four characteristics that should be considered when deriving a rating penalty, namely; tonality; impulsivity; intermittency; and other sound characteristics, which are defined as:

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”*.

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”*.

Other Sound Characteristics

BS4142:2014+A1:2019 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.”*

Intermittency

BS4142:2014+A1:2019 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.”

5.2.2. Rating Penalty Assessment

Considering the content of Section 5.2.1, an assessment of the various sound sources associated with the Proposed Development, in terms of whether any rating penalties are applicable, and has been detailed in Table 6 below.

TABLE 6: RATING PENALTY ASSESSMENT

Source	Tonality	Impulsivity	Intermittency	Other Sound Characteristics	Discussion
STOR Plant	0 dB	0 dB	0 dB	0 dB	The gensets will operate as demand requires, however, once operating, do not cycle on and off. Tonality may be perceptible in the near-field, due to a low-frequency bias at source, but the residual acoustic environment will likely mask any significant tones.

In summary, no rating penalty has been included in the assessment. This is consistent with the previous noise assessment undertaken as part of the permitted planning application, and the submitted additional information agreed with the consulting Environmental Health Officer for the previous Planning Application, regarding 1/3rd octave band noise emissions associated with this type of energy generation.

5.2.3. Uncertainty in Calculations

BS4142:2014+A1:2019 requires that the level of uncertainty in the measured data and associated calculations is considered in the assessment. The Standard recommends that steps should be taken to reduce the level of uncertainty.

Measurement Uncertainty

BS4142:2014+A1:2019 states that measurement uncertainty depends on a number of factors, including the following, which are applicable to the Proposed Development:

- “ ...
- b) the complexity and level of variability of the residual acoustic environment;
 - “ ...
 - d) the location(s) selected for taking the measurements;
 - “ ...
 - g) the measurement time intervals;
 - h) the range of times when the measurements have been taken;
 - i) the range of suitable weather conditions during which measurements have been taken;

- ...
- k) *the level of rounding of each measurement recorded; and*
l) *the instrumentation used."*

Each of the measurement uncertainty factors outlined above have been considered and discussed in Table 7 below.

TABLE 7: MEASUREMENT UNCERTAINTY FACTORS

Measurement Uncertainty Factor Reference	Level of Uncertainty	Discussion
b)	0 dB	Residual acoustic environment is relatively constant, hence no correction for a complex residual acoustic environment.
d)	0 dB	Measuring at the closest affected receptors to the site has enabled the determination of robust background sound levels.
g)	0 dB	Measurement time intervals were set in accordance with BS4142:2014+A1:2019, hence no further correction needs to be made.
h)	0 dB	Measurements were undertaken over a continuous, day, evening and night-time period.
i)	0 dB	No periods of significant wind or precipitation were noted.
k)	0 dB	Measured values were rounded to 0.1 dB, therefore rounding would not have had a significant impact on the overall typical background sound levels.
l)	0 dB	The acoustic measurement equipment accorded with Type 1 specification of British Standard 61672, and were deployed with appropriate wind shields.

In summary, no uncertainty budget has been included in the assessment, to account for measurement uncertainty.

Calculation Uncertainty

BS4142:2014+A1:2019 states that calculation uncertainty depends on a number of factors, including the following, which are applicable to the Proposed Development:

- “
- ...
- b) *uncertainty in the operation or sound emission characteristics of the specific sound source and any assumed sound power levels;*
c) *uncertainty in the calculation method;*
d) *simplifying the real situation to “fit” the model (user influence on modelling); and*
e) *error in the calculation process."*

Each of the calculation uncertainty factors outlined above have been considered and discussed in Table 8 below.

TABLE 8: CALCULATION UNCERTAINTY FACTORS

Calculation Uncertainty Factor Reference	Level of Uncertainty	Discussion
b)	0 dB	Sound power levels for all plant are based on manufacturer data, measured in accordance with BS EN ISO 3740 and BS EN ISO 3747, hence no correction.
c)	0 dB	Calculations were undertaken in accordance with ISO 9613-2, which is considered a “ <i>validated method</i> ” by BS4142:2014+A1:2019.
d)	0 dB	The real situation has not been simplified for the purposes of this assessment.
e)	±1 dB	ISO 9613-2 indicates that there is a ±3 dB accuracy to the prediction method, therefore, an uncertainty factor of +1 dB is considered appropriate and proportional, given the separation distances involved.

In summary, an uncertainty budget of ±1 dB has been considered within the assessment, to account for calculation uncertainty.

The overall uncertainty is considered to be small enough that it would not affect the conclusions of the assessment.

5.2.4. BS4142:2014+A1:2019 Assessment

The rating sound level, as calculated from the predicted specific sound level, has been assessed in accordance with BS4142:2014+A1:2019, at all NSRs.

The resultant assessment summary, during the daytime period, can be seen in Table 9, below.

TABLE 9: DAYTIME BS4142:2014+A1:2019 ASSESSMENT SUMMARY

NSR	Rating Sound Level (dB)	Daytime Background Sound Level (dB)	Excess of Rating over Daytime Background Sound Level (dB)
1	36	45	-9
2	33	45	-12
3	41	45	-4
4	25	45	-20

It can be seen that the Proposed Development is likely to have a ‘*low impact*’ at the receptors during the daytime period.

The resultant assessment summary, during the evening time period, can be seen in Table 10, below.

TABLE 10: EVENING TIME BS4142:2014+A1:2019 ASSESSMENT SUMMARY

NSR	Rating Sound Level (dB)	Evening Time Background Sound Level (dB)	Excess of Rating over Evening Time Background Sound Level (dB)
1	36	43	-7
2	33	43	-10
3	41	43	-2
4	25	43	-18

It can be seen that the Proposed Development is likely to have a '*low impact*' at the receptors during the evening time period.

The resultant assessment summary, during the night time period, can be seen in Table 11, below.

TABLE 11: NIGHT TIME BS4142:2014+A1:2019 ASSESSMENT SUMMARY

NSR	Rating Sound Level (dB)	Night Time Background Sound Level (dB)	Excess of Rating over Night Time Background Sound Level (dB)
1	36	37	-1
2	33	37	-4
3	41	37	+4
4	25	37	-12

It can be seen that the Proposed Development is likely to have a '*low impact*' at the receptors during the night-time period, except at R3 Louisa Street, where an '*adverse impact*' is predicted to occur, depending on the context, which is discussed further in Section 5.2.5.

5.2.5. Discussion and Operational Recommendations

The results set out in Table 9, Table 10, and Table 11 identify that the operation of the scheme, as proposed, can occur without affecting the amenity of the closest residential receptors to the site.

In terms of the operational profile of the site; such sites tend to typically operate for approximately 90 to 120 minutes at a time, with a spike in demand reportedly occurring between mid-afternoon to early evening. Therefore, the predicted noise would not be constant, as the whole purpose of the site is to provide backup energy generation, as grid demand dictates, resulting in noise impacts being periodic and of a short duration.

The BS4142:2014+A1:2019 initial estimate of impact indicates that noise from the facility is unlikely to result in adverse impacts during the daytime and evening when the plant is most likely to operate. Taking account of the context of the scenario discussed above, it is considered that the BS4142:2014+A1:2019 initial estimate of impact during the daytime and evening is correct and that the likelihood of adverse impacts is confirmed as negligible.

The BS4142:2014+A1:2019 initial estimate of impact during the night-time, when the plant is less likely to operate, indicated that noise from the facility is unlikely to result in adverse impacts. Taking

account of the context of the scenario discussed above, and that the likelihood of night-time operation is minimal, and would be of limited duration, it is considered that the BS4142:2014+A1:2019 initial estimate of impact is correct and that there are no likely adverse impacts due to night-time operation.

5.2.6. Manchester City Council's Requirements

As per the noise assessment undertaken for the permitted development, the predicted rating sound level is in excess of the MCC design guide recommended level of 5 dB below the background sound level.

The equipment associated with the proposed site layout has been selected on the basis of incorporating acoustic louvres, silenced exhausts etc, such that they are demonstrably the most efficient option in terms of sound emission (sound power per MW generated) for such a site.

The orientation and location of the containers and coolers is as screened from noise-sensitive receptors as is possible. Screening from the facility cannot be improved through installation of additional barriers. A low noise transformer and gas skid will be employed at the facility.

The proposals for mitigation are substantial with no further practicable additional mitigation reasonably possible.

Taking all these factors into account, alongside the situation that the facility will only operate at night in national emergencies, the exceedance of the design guide recommended level of 5 dB below the background sound level is considered acceptable.

6. CONCLUSION

inacoustic has been commissioned to assess the impact of potential noise arising from a proposed Gas Peaking Power Generation Plant, on Land off Ashton Old Road, Openshaw.

This technical noise assessment has been produced to accompany a Planning Application to Manchester City Council and is based upon environmental noise measurements undertaken at the site and a subsequent 3-dimensional noise modelling exercise.

The assessment considers the potential noise generation from the plant associated with the Proposed Development, with respect to the requirements of Planning Condition 9.

The assessment identifies that the Proposed Development will give rise to rating noise levels that are below the measured background sound level in the area, at the assessed residential receptors, thus giving rise to a Low Impact.

It is therefore asserted that, taking account of the operational profile of such sites, that the assessment demonstrates that the Proposed Development can be brought forward without operating restrictions.

Consequently, the assessment demonstrates that the Proposed Development will give rise to noise impacts that would be within the range of *No Observed Adverse Effect Level*/NOAEL of the NPPG England guidance, not exceeding the *Lowest Observed Adverse Effect Level*/LOAEL.

Since the Proposed Development conforms to British Standard and National and Local Planning Policy requirements, it is recommended that noise should not be a considered constraint to the approval of this Planning Application.

7. APPENDICES

7.1. Appendix A – Definition of Terms

Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level (Sound Level)	The sound level is the sound pressure relative to a standard reference pressure of $20\mu\text{Pa}$ (20×10^{-6} Pascals) on a decibel scale.
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s_1 and s_2 is given by $20 \log_{10} (s_1 / s_2)$. The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is $20\mu\text{Pa}$.
A-weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
$L_{eq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level during the period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{90,T}$	A noise level index. The noise level exceeded for 90% of the time over the period T. L_{90} can be considered to be the "average minimum" noise level and is often used to describe the background noise.
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. L_{10} can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise.
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5m
Facade	At a distance of 1m in front of a large sound reflecting object such as a building façade.
Fast Time Weighting	An averaging time used in sound level meters. Defined in BS 5969.

In order to assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided.

The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale is used. The decibel scale typically ranges from 0 dB (the threshold of hearing) to over 120 dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

TABLE 12: TYPICAL SOUND LEVELS FOUND IN THE ENVIRONMENT

Sound Level	Location
0dB(A)	Threshold of hearing
20 to 30dB(A)	Quiet bedroom at night
30 to 40dB(A)	Living room during the day
40 to 50dB(A)	Typical office
50 to 60dB(A)	Inside a car
60 to 70dB(A)	Typical high street
70 to 90dB(A)	Inside factory
100 to 110dB(A)	Burglar alarm at 1m away
110 to 130dB(A)	Jet aircraft on take off
140dB(A)	Threshold of Pain

The ear is less sensitive to some frequencies than to others. The A-weighting scale is used to approximate the frequency response of the ear. Levels weighted using this scale are commonly identified by the notation dB(A).

In accordance with logarithmic addition, combining two sources with equal noise levels would result in an increase of 3 dB(A) in the noise level from a single source.

A change of 3 dB(A) is generally regarded as the smallest change in broadband continuous noise which the human ear can detect (although in certain controlled circumstances a change of 1 dB(A) is just perceptible). Therefore, a 2 dB(A) increase would not be normally be perceptible. A 10 dB(A) increase in noise represents a subjective doubling of loudness.

A noise impact on a community is deemed to occur when a new noise is introduced that is out of character with the area, or when a significant increase above the pre-existing ambient noise level occurs.

For levels of noise that vary with time, it is necessary to employ a statistical index that allows for this variation. These statistical indices are expressed as the sound level that is exceeded for a percentage of the time period of interest. In the UK, traffic noise is measured as the L_{A10} , the noise level exceeded for 10% of the measurement period. The L_{A90} is the level exceeded for 90% of the time and has been adopted to represent the background noise level in the absence of discrete events. An alternative way of assessing the time varying noise levels is to use the equivalent continuous sound level, L_{Aeq} .

This is a notional steady level that would, over a given period of time, deliver the same sound energy as the actual fluctuating sound.

To put these quantities into context, where a receiver is predominantly affected by continuous flows of road traffic, a doubling or halving of the flows would result in a just perceptible change of 3 dB, while an increase of more than 25%, or a decrease of more than 20%, in traffic flows represent changes of 1 dB in traffic noise levels (assuming no alteration in the mix of traffic or flow speeds).

Note that the time constant and the period of the noise measurement should be specified. For example, BS 4142 specifies background noise measurement periods of 1 hour during the day and 15 minutes during the night. The noise levels are commonly symbolised as $L_{A90,1\text{hour}}$ dB and $L_{A90,15\text{mins}}$ dB. The noise measurement should be recorded using a 'FAST' time response equivalent to 0.125 ms.

7.2. Appendix B – Full Measurement Results

FIGURE 5: MEASURED TIME HISTORY – MP1

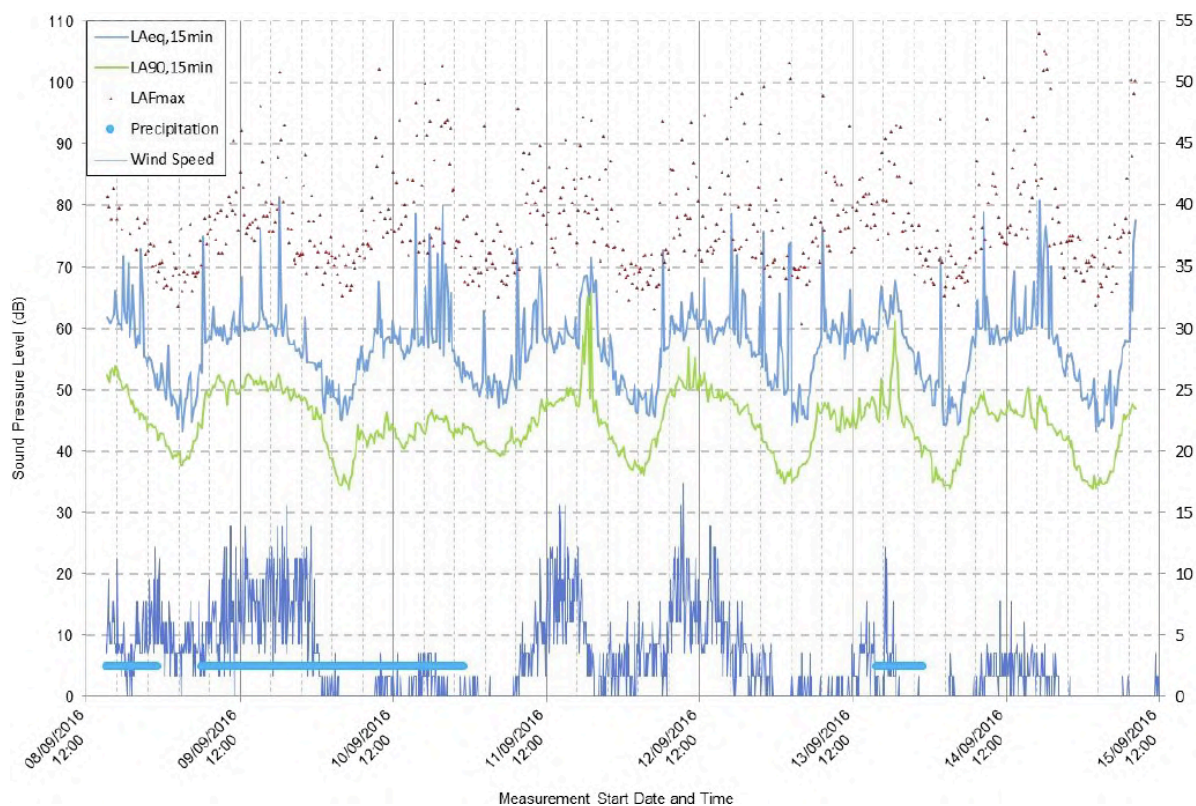
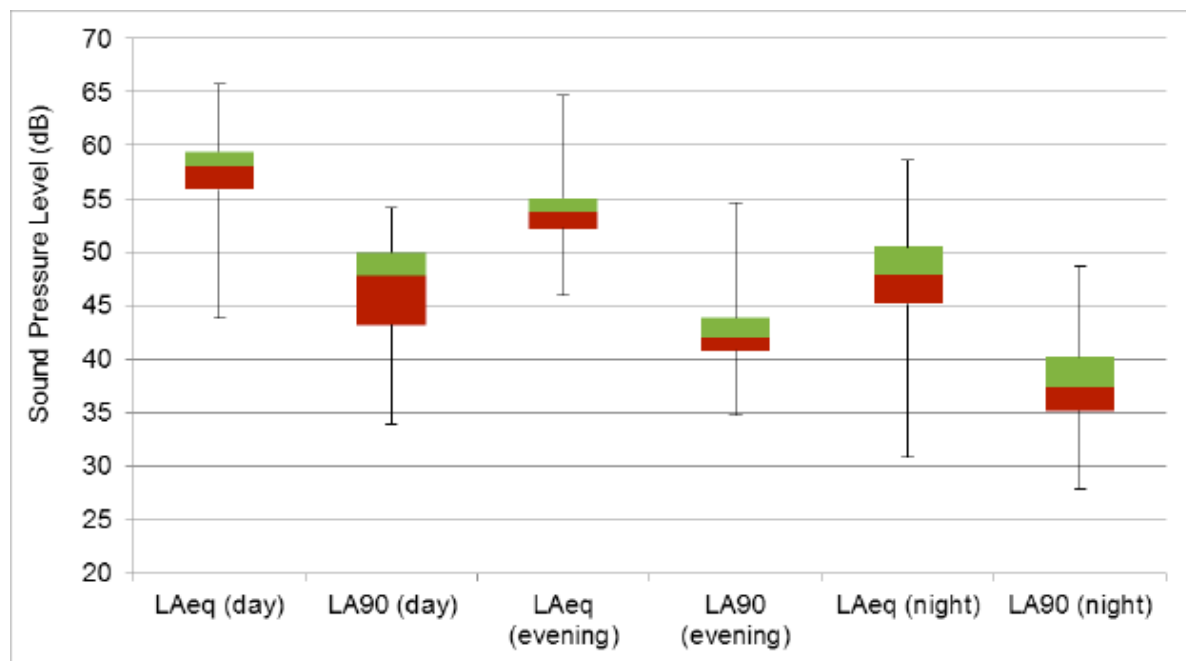


FIGURE 6: BOX AND WHISKER PLOTS OF SOUND MONITORING DATA – MP1



7.3. Appendix C – Statement of Qualifications and Competency

Antony Best – Managing Director

BSc (Hons) Acoustics; Corporate Member of the Institute of Acoustics

Antony is the Managing Director of Inacoustic. Antony has over thirteen years' experience of working in Acoustic Consultancy. Experienced in a wide range of noise measurement, prediction and assessment projects. These include environmental noise and vibration surveys, compliance monitoring, Environmental Impact Assessments, Environmental Permit assessments and planning, occupational, construction, wind farm, energy generation and storage, road traffic, rail traffic, aircraft and industrial noise and vibration assessments.

Current areas of specialism include the provision of industrial noise abatement mitigation design, energy generation and storage including wind farms, solar farms, short-term operating reserves, and battery energy storage, road traffic noise assessments, and planning noise assessments. These assessments use state of the art noise and vibration measurement instrumentation and noise modelling suite software.

Antony has been involved in hundreds of BS4142 noise assessments, and has given evidence at public inquiries where BS4142 has been the primary assessment methodology. On the basis of Antony's overall experience in acoustics (particularly in relation to industrial noise) combined with particular focus on BS4142, he is deemed competent for BS4142 assessments.

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