



Noise Impact Assessment

Land at Hanson Close, Middleton

Reference: 50-777-R1-2

Date: March 2024



NOISE IMPACT ASSESSMENT

**Land at Hanson Close
Middleton**

Prepared for:

Middleton Sheet Metal Co. Ltd

Report Ref: 50-777-R1-2

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E3P

Taylor Road
Trafford Park
Urmston
Manchester
M41 7JQ

+ 44 (0) 161 707 9612
<https://e3p.co.uk>

Registered in England
CRN: 807255262

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DATE	27th January 2023	8th March 2024	
PREPARED BY	S Boughton	S Boughton	
QUALIFICATIONS	BEng (Hons), MIOA	BEng (Hons), MIOA	
POSITION	Senior Consultant	Senior Consultant	
CHECKED BY	L Faulkner	L Faulkner	
QUALIFICATIONS	BSc (Hons) MEnvSci MIOA	BSc (Hons) MEnvSci MIOA	
POSITION	Associate Director	Associate Director	
AUTHORISED BY	L Faulkner	L Faulkner	
QUALIFICATIONS	BSc (Hons) MEnvSci MIOA	BSc (Hons) MEnvSci MIOA	
POSITION	Associate Director	Associate Director	

EXECUTIVE SUMMARY

BACKGROUND

Site Address	Land at Hanson Close, Middleton M24 2HS
National Grid Reference	E 387535 N 406095
Proposed Development	Relocation of an existing aerospace fabricators including for the erection of a commercial unit to house the relocated fabricators and two other commercial units together with associated infrastructure including means of access, landscaping and other associated works.
Report Objectives	To identify, measure and assess the potential impact of the proposed commercial development upon existing residential receptors in the immediate vicinity of the Site. The report follows current and relevant British Standards in order to provide a robust assessment.

ASSESSMENT

Surveys Completed	An unattended background sound survey has been conducted in a position considered representative of the closest existing residential receptors to the development. The sound level meter was located on the northern boundary of the proposed site and can be considered representative to the closest rear gardens of plots along Hulbert Street.
Assessments	A BS4142:2014+A1:2019 assessment has been undertaken, in accordance, accounting for any unloading/loading activities, heavy goods vehicle parking and car park usage associated with the proposed development and noise break-out potential. E3P has undertaken detailed 3D noise modelling of all the proposed sources in order to predict noise levels within gardens for the daytime period, in accordance with BS 4142:2014, at the closest receptors. The night-time period has not been assessed as the current hours of operation are between 08:00 and 17:00 only. The predicted rating level has been compared to the existing typical background sound level for the daytime. Consideration has been given to any acoustic characteristics associated with the proposed development.
Mitigation Requirements	No mitigation measures are required.

CONCLUSIONS

The assessment has determined that the typical background sound level will not be exceeded at any receptor during the daytime period.

As such, noise should not be a determining factor in the determination of the planning application.



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1. INTRODUCTION

1.1. BACKGROUND

E3P were commissioned by Middleton Sheet Metal Co. Ltd to undertake a Noise Impact Assessment for the proposed commercial development at land at Hanson Close in Middleton, to be referred to hereafter as *'the site'*.

This assessment looks to determine the key noise sources associated with the development and undertake an assessment of any impacts upon existing noise sensitive receptors.

1.2. PROPOSED DEVELOPMENT

The client is looking to relocate their existing facility to a new site located approximately 40 m to the north of their existing site. The construction of three commercial units with car parking and access on a vacant site south of Hanson Close.

The key sources of sound associated with the development will be Heavy Goods Vehicle (HGV) loading/unloading activities, HGV parking, noise break-out from the units and car park usage.

This assessment has been undertaken in accordance with the following supplied drawings:

-  Proposed Site Layout (Drawing number – 22.135_01_002_M) dated 25th January 2024.

The Site Plan is shown in Figure 1 of Appendix II.

1.3. LIMITATIONS

Where a noise or vibration survey is required to inform an assessment, E3P will endeavour to ensure that all noise and vibration measurements taken are robust, representative and reliable in order to inform an accurate assessment at the time.

E3P will endeavour to capture all existing and proposed sources of sound and vibration at the time of the surveys and/or assessments. However, should new sources of sound be introduced, existing sources modified/changed, or characteristics of the sound be altered following completion of such, E3P cannot be held accountable for this.

Where mitigation measures are specified in this report, it should be noted that these measures are relative to a specific sound or vibration source, both in terms of the measured sound pressure and vibration level and the character of the sound source. Where either the sound pressure level or the character of the sound varies following completion of the sound survey, E3P cannot be held responsible for any subsequent variations in the proposed mitigation performance, for either absolute levels or frequency content.



2. ASSESSMENT METHODOLOGY

2.1. NATIONAL PLANNING POLICY FRAMEWORK

To prevent unacceptable risks from pollution, planning policies and decisions should ensure that new development is appropriate for its location. The effects (including cumulative effects) of pollution on health, the natural environment or general amenity, and the potential sensitivity of the area or proposed development to adverse effects from pollution, should be considered.

The national planning policy framework states that planning policies and decisions should aim to:

- ✿ Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development.
- ✿ Mitigate and reduce to a minimum, other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions.
- ✿ Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established.
- ✿ Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

2.2. NATIONAL PLANNING PRACTICE GUIDANCE

Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. When preparing local or neighbourhood plans, or taking decisions about new development, there may also be opportunities to consider improvements to the acoustic environment.

Local planning authorities' plan-making and decision-making should take account of the acoustic environment and in doing so consider:

- ✿ Whether or not a significant adverse effect is occurring or is likely to occur.
- ✿ Whether or not an adverse effect is occurring or is likely to occur.
- ✿ Whether or not a good standard of amenity can be achieved.

In line with the explanatory note of the NPSE, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase, where applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.



The “observed effect levels” are as follows:

-  **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.
-  **No observed effect level:** This is the level of noise exposure below which no effect at all on health or quality of life can be detected.

Table 2.1 summarises the noise exposure hierarchy, based on the likely average response.

TABLE 2.1 NOISE EXPOSURE HIERARCHY

PERCEPTION	EXAMPLES OF OUTCOMES	INCREASING EFFECT LEVEL	ACTION
Not Noticeable	No effect.	No observed effect	No specific measures required
Noticeable and Not Intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived 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 and/or attitude, e.g. turning up volume of television, speaking more loudly, or having to close windows for some of the time because of the noise where there is no alternative ventilation. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed adverse effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and Disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion, having to keep windows closed most of the time because of the noise where there is no alternative ventilation. 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 effect	Avoid
Noticeable and Very Disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening, loss of appetite, significant/medically definable harm (auditory and non-auditory).	Unacceptable adverse effect	Prevent



The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any situation. These factors include the following:

- ✿ The source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day. The adverse effect can also be greater simply because there is less background noise at night.
- ✿ For non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise can be important.
- ✿ The spectral content of the noise and the general character of the noise. The local topology and topography should also be considered along with the existing and, where appropriate, the planned character of the area.

More specific factors to consider when relevant:

- ✿ Where applicable, the cumulative impacts of more than one source should be considered along with the extent to which the source of noise is intermittent and of limited duration.
- ✿ Consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases, a suitable alternative means of ventilation is likely to be necessary.
- ✿ If external amenity spaces are an intrinsic part of the overall design, then the acoustic environment of those spaces should be considered so that they can be enjoyed as intended.

2.3. BS 4142: 2014+A1:2019 'METHODS FOR RATING AND ASSESSING INDUSTRIAL AND COMMERCIAL SOUND'

This standard describes methods for rating and assessing sound of an industrial or commercial nature which includes:

- ✿ Sound from industrial and manufacturing processes.
- ✿ Sound from fixed installations which comprise mechanical and electrical plant and equipment.
- ✿ Sound from the loading and unloading of goods and materials at industrial and / or commercial premises; and
- ✿ Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from processes or premises, such as that from forklift trucks, or that from train or ship movements on or around an industrial or commercial Site.

The procedure detailed in the standard compares the measured or predicted specific noise level from any of the above with the background sound level at a residential dwelling. The measured background sound level at a receptor should be reliable and should not necessarily ascertain a lowest measured background sound level, but rather to quantify what is typical.

The specific noise level also acknowledges the reference time intervals depending upon whether the noise source operates during daytime (1-hour) or night-time (15-minute) periods.



There are several 'penalties' which can be attributed to the specific sound level depending upon the 'acoustic features' of the sound level under investigation as follows:

Tonality

-  +2 dB: where the tonality is just perceptible.
-  +4 dB: where the tonality is clearly perceptible; and
-  +6 dB: where the tonality is highly perceptible.

Impulsivity

-  +3 dB: where the impulsivity is just perceptible.
-  +6 dB: where the impulsivity is clearly perceptible; and
-  +9 dB: where the impulsivity is highly perceptible.

Intermittency

-  +3dB: where the intermittency is readily distinctive against the acoustic environment.

In addition to the above, there is a penalty for 'other sound characteristics' of +3 dB where a sound exhibits characteristics that are neither tonal nor impulsive, though are readily distinctive against the acoustic environment. BS 4142 goes on to state that the rating level is equal to the specific sound level if there are no such features present or expected to be present.

Assessment of the rating level relative to the background sound level can yield the following commentary:

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

It is common that a Local Planning Authority (LPA) will specify their own criterion and, where this is the case, this criterion will usually take precedence over a simple comparison of the rating level against the background sound level.



3. SURVEY RESULTS

3.1. UNATTENDED BACKGROUND AND AMBIENT SOUND SURVEY

E3P have undertaken an unattended background and ambient sound survey in a position considered representative of the closest receptors located on Hulbert Street.

The survey was carried out over the following time periods:

- 📍 13:00 Thursday 19th January to 13:00 Monday 23rd January 2023.

The following noise measurement position was chosen for the Background Sound Survey:

- 📍 Noise Measurement Position 1 (NMP1): Located along to the northern boundary of the site representative of the nearby residential receptors. The microphone of the sound level meter was set at a height of 1.5 m above ground level and in free-field conditions. Sound sources consisted of road traffic on the local road network and local commercial sources.

Table 3.1 details the measured background sound levels. The daytime levels correspond to the $L_{A90,1hr}$ and the night-time levels to the $L_{A90,15mins}$.

TABLE 3.1 MEASURED BACKGROUND SOUND PRESSURE LEVELS

DATE	TIME PERIOD	RANGE OF MEASURED BACKGROUND SOUND LEVELS, $L_{A90,T}$ (dB)	MODAL MEASURED BACKGROUND SOUND LEVEL, $L_{A90,T}$ (dB)
Thursday 19th January 2023	Daytime	41.6-48.4	46
	Night-time	34.3-47.9	38
Friday 20th January 2023	Daytime	40.5-49.8	46
	Night-time	39.5-46.0	42
Saturday 21st January 2023	Daytime	46.7-51.5	50
	Night-time	40.9-48.5	43
Sunday 22nd January 2023	Daytime	42.5-47.6	47
	Night-time	40.9-48.5	43

The levels highlighted above are the lowest measured modal levels to be used in the assessment to inform a worst-case assessment.

Weather forecasts were monitored throughout the surveys to ensure no adverse conditions as the location of the Site was not suitable for the installation of an unattended weather station. During the survey, conditions remained dry and wind speeds rarely exceeded 10 mph.



3.2. ATTENDED SOURCE SOUND MEASUREMENTS

E3P have undertaken detailed measurements of all existing significant operations that take place at the current operational site. These measured levels will be used to predict breakout noise at the new proposed development. The surveys were carried out over the following time periods:

 Thursday 19th January 2023 between 10:14 and 11:40.

Table 3.2 details the worst-case measured noise levels for measurement position and associated sound sources for the entire measurement periods undertaken. Measurements were completed with a sampling period of 20 ms to allow post analysis of the noise levels.

TABLE 3.2 MEASURED SOURCE NOISE LEVELS

LOCATION	SOURCE	MEASURED NOISE LEVEL, $L_{Aeq,T}$ (dB)	ASSUMED ON-TIME (seconds)	DISTANCE TO SOURCE (m)
NMP2	1000-ton press in operation pressing metal sheets	81.7	3600	2
NMP3	500-ton press in operation pressing metal sheets	80.6	3600	2
NMP4	1000-ton press in operation pressing metal sheets	80.4	3600	2
NMP5	Fluid Press in operation pressing metal sheets	75.8	3600	3
NMP6	Filing of circular metal sheet	82.0	900	1
NMP7	Doosan Puma – CNC machine in operation	70.0	3600	2
NMP8	Welding in operation	68.2	900	1
NMP9	Small handheld grinder in operation	81.3	900	1.5
NMP10	Hammering on metal	79.4	900	1
NMP11	Handheld polisher	73.5	900	1
NMP12	Small press machine in operation	83.4	1800	2
NMP13	Welding bay with welding in operation	74.5	1800	2
NMP14	Small press station in operation pressing small metal sheets into cone shapes	72.0	1800	2
NMP15	Large press in operation	73.4	3600	2
NMP16	Forklift truck movement – Forklift used to move metal sheets and other items around the unit	83.3	900	1

The levels and assumed worst case on-times noted in the Table are used to inform the noise model and assessment. Detailed data for all measured periods are available upon request but the above provides the levels to be assessed.



The equipment outlined in Table 3.3 was used for the noise survey.

TABLE 3.3 NOISE MEASUREMENT EQUIPMENT AND CALIBRATION DATES

MEASUREMENT POSITION	EQUIPMENT DESCRIPTION	MANUFACTURER & TYPE NUMBER	SERIAL NUMBER	CALIBRATION DUE DATE AT TIME OF SURVEY
All NMP's	Sound Level Meter	01dB Fusion	14616	29/06/2024
	Pre-amplifier	01dB Pre22	20951	
	Microphone	GRAS 40CD	494264	
	Calibrator	Cirrus CR 515	99206	25/07/2023

The sound level meter was field calibrated on site using the above-mentioned calibrator prior to and after noise measurements were taken. No significant drift was witnessed as noted above. Calibration certificates are available upon request.



4. NOISE IMPACT ASSESSMENT

This assessment has used the measured data within Table 3.1 to predict breakout noise from the proposed unit at which the current site is to be relocated to. The use of previously measured noise levels for HGV movements and unloading/loading activities have also been input into the model. This allows for the prediction of noise level impact on the existing closest residential dwellings during the daytime period. At this stage, it is assumed that the unit will operate based on the current operation times of the existing site (08:00 to 17:00) therefore the daytime period only is assessed.

With regard to assumptions for the assessment, the following has been considered for the full planning application aspects:

- ✿ Ground elevations have been taken as existing by way of a 2 m grid Digital Terrain Model (DTM) which contains public sector information licensed under the Open Government License v3.0.
- ✿ Proposed site layout Rev M.
- ✿ HGV unloading/loading are inputted as point sources with a sound power level of 78 dB, equating to a sound pressure level of 70 dB at 1 m as measured at source. This included for tailgate operation. The sound pressure level data is taken from historically gathered data at similar sites gathered by E3P.
- ✿ HGV movements within the site have been input as moving point sources with a sound power level of 82 dB, equating to a sound pressure level of 58 dB at 5 m as measured at source. The sound pressure level data is taken from historically gathered data at similar sites gathered by E3P.
- ✿ Forklift movements have been input as moving point sources using the measured-on site data (NMP16). E3P understands that forklifts are used internally at the existing site, but to assume worst case outdoor FLT movements have been input into the model within the proposed store/refuse area located on the eastern boundary.
- ✿ The daytime period has been assessed between the hours of 07:00 to 23:00. For the assessment, BS 4142:2014+A1:2019 has been used to determine the likelihood of adverse impact within the garden areas over a reference time period of 1 hour.
- ✿ The night-time period has not been assessed here as the hours of operation are only between 07:00 and 23:00.
- ✿ The measured on-time periods have been corrected to account for the hourly period as given in BS 4142:2014+A1:2019; and
- ✿ Soft ground attenuation has been applied, where necessary.

The proposed development is to consist of three units. The largest of which will be the relocated aerospace metal fabricators. As such, breakout noise from the largest unit has been calculated using the measured operations at the existing site. As the floor layout is not known, it is assumed all operations are within the same space. This can be considered worst case. The measured levels have been on-time corrected and logarithmically summed together, totalling 94 dB internally.

A simple equation of Sound pressure level outside = Sound pressure level inside – Sound Reduction Index (SRI) of building envelope – 6 dB for diffuse field to free-field correction. Given that a minimum sound reduction of 31 dB is expected for a typical industrial building façade this has been assumed to be the SRI of the building envelope.



This produced a sound pressure level of 57 dB radiating 1 m from the façade of the proposed relocated metal fabricators and has been input into the model as a vertical area source. Roller shutter entrances are assumed to be open with a vertical area source sound pressure level of 88 dB at 1 m, when a 6 dB correction is applied for between an internal diffused field and an external free field.

With regards to the remaining units the end usage is not currently known, as such to inform a worst-case assessment breakout noise at the same levels as the large unit has been assumed. With the same sound levels radiating from the facades and open roller shutters applied to these units.

For the BS 4142:2014+A1:2019 assessments, penalties are applied to the specific sound level in order to provide the rating level. However due to the nature of the development and the fact that the existing site is being relocated further from the existing noise sensitive receptors with no new sources of sound being introduced it is acceptable to not apply any penalties according to BS 4142+A1:2019.

4.1. DAYTIME ASSESSMENT

Table 4.1 details the resultant rating level at the worst affected receptor along Hulbert Street, Green Street and Spring Vale, output from the model. The grid noise map can be seen in Figure 2 of Appendix II.

Rating levels in rear gardens are assessed here.

The lowest measured median background sound level during the daytime periods have been used. This informs a worst-case assessment.

TABLE 4.1 BS 4142:2014+A1:2019 ASSESSMENT - DAYTIME

RECEPTOR – EXTERNAL GARDEN AREAS	CALCULATED RATING LEVEL, $L_{A,r}$ (dB)	LOWEST MEDIAN MEASURED BACKGROUND SOUND LEVEL, $L_{A90,1hr}$ (dB)	CRITERION, $L_{A90} = L_{A,r}$ (dB)	DIFFERENCE +/- (dB)
R1 – 42 Hulbert Street	37	46	46	-9
R2 – 15 Green Street	38	46	46	-8
R3 – 52 Spring Vale	37	46	46	-9

Table 4.2 indicates that the predicted rating level falls below the lowest measured median background sound level during daytime periods at the closest receptors rear gardens.

As such no mitigation measures are required.



4.2. PROPOSED FIXED PLANT LIMITS

At the time of submission, details of proposed fixed plant items were unknown. As such, the following recommendations have been made:

-  Any fixed plant items should be located within the site and not on facades that are orientated towards noise sensitive receptors.
-  The resultant rating level from the cumulative impact of all proposed fixed plant items must not exceed the existing background sound levels, accounting for the above proposed noise levels, at the closest receptors.

It is assumed that any fixed plant items proposed would have a low noise level and most likely will consist of A/C units. Considering the typical noise levels of these units and the surrounding existing usage, the impact of these would be negligible.

Where this is not the case, it is recommended that an acoustician is involved to ensure the plant to be installed will not adversely affect the receptors.



5. CONCLUSION AND RECOMMENDATIONS

E3P were commissioned by Middleton Sheet Metal Co. Ltd to undertake a Noise Impact Assessment for the proposed commercial development at Hanson Close, Middleton.

This assessment looked to determine the key noise sources associated with the development and undertake an assessment of any impacts upon existing noise sensitive receptors.

An unattended background sound survey has been conducted in a position considered representative of the closest existing residential receptors to the development.

The sound level meter was located on the northern boundary of the proposed site and can be considered representative to the closest rear gardens of plots along Hulbert Street.

E3P has undertaken detailed 3D noise modelling of all the proposed sources in order to predict noise levels within gardens for the daytime period, in accordance with BS 4142:2014+A1:2019, at the closest receptors. The night-time period has not been assessed as the current hours of operation are between 08:00 and 17:00.

The predicted rating level has been compared to the existing typical background sound level for the daytime. Consideration has been given to any acoustic characteristics associated with the proposed development.

The assessment has determined that the typical background sound level will not be exceeded at any receptor during the daytime period.

As such, noise should not be a determining factor in the determination of the planning application.

END OF REPORT



APPENDIX I

GLOSSARY OF ACOUSTIC TERMINOLOGY

NOISE

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source. The most widely used weighting mechanism that best corresponds to the response of the human ear is the "A"-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq} , L_{A90} etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective but, as a general guide, a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions. An indication of the range of sound levels commonly found in the environment is given in the following table.

TABLE A1 TYPICAL SOUND PRESSURE LEVELS

SOUND PRESSURE LEVEL	LOCATION/EXAMPLE
0	Threshold of hearing
20–30	Quiet bedroom at night
30–40	Living room during the day
40–50	Typical office
50–60	Inside a car
60–70	Typical high street
70–90	Inside a factory
100–110	Burglar alarm at 1 m away
110–130	Jet aircraft on take off
140	Threshold of pain



ACOUSTIC TERMINOLOGY

TABLE A2 TERMINOLOGY

DESCRIPTOR	EXPLANATION
dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2E-05 Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. "A" weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
L_{Aeq, T}	L _{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.
L_{Amax}	L _{Amax} is the maximum A-weighted sound pressure level recorded over the period stated. L _{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, 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.
L₁₀ and L₉₀	If a non-steady noise is to be described, it is necessary to know both its level and the degree of fluctuation. The L _n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L ₁₀ is the level exceeded for 10% of the time and as such can be regarded as the "average maximum level". Similarly, L ₉₀ is the "average minimum level" and is often used to describe the background noise. It is common practice to use the L ₁₀ index to describe traffic noise.
Free-field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally, as measured outside and away from buildings.
Fast	A time weighting used in the root-mean-square section of a sound level meter with a 125-millisecond time constant.
Slow	A time weighting used in the root-mean-square section of a sound level meter with a 1000-millisecond time constant.



APPENDIX II

MEASURED SOUND PRESSURE LEVELS

TABLE A1: HOURLY AMBIENT AND BACKGROUND SOUND LEVEL DATA – NMP1

PERIOD START	AMBIENT SOUND LEVEL, $L_{Aeq,1hr}$ (dB)	BACKGROUND SOUND LEVEL, $L_{A90,1hr}$ (dB)
19/01/2023 13:00	49.6	45.4
19/01/2023 14:00	49.6	46.7
19/01/2023 15:00	49.4	46.0
19/01/2023 16:00	50.8	47.8
19/01/2023 17:00	51.5	48.4
19/01/2023 18:00	50.8	48.4
19/01/2023 19:00	49.4	47.0
19/01/2023 20:00	46.4	43.7
19/01/2023 21:00	45.2	42.5
19/01/2023 22:00	44.5	41.6
19/01/2023 23:00	43.4	39.6
20/01/2023 00:00	41.5	37.4
20/01/2023 01:00	38.2	35.5
20/01/2023 02:00	36.8	34.6
20/01/2023 03:00	37.9	35.7
20/01/2023 04:00	39.7	36.7
20/01/2023 05:00	46.0	40.5
20/01/2023 06:00	50.1	46.1
20/01/2023 07:00	53.7	48.9
20/01/2023 08:00	52.1	49.8
20/01/2023 09:00	51.9	48.8
20/01/2023 10:00	49.6	44.7
20/01/2023 11:00	48.8	43.3
20/01/2023 12:00	50.2	41.8
20/01/2023 13:00	45.7	40.5
20/01/2023 14:00	47.7	41.6
20/01/2023 15:00	47.2	41.2
20/01/2023 16:00	47.7	44.2
20/01/2023 17:00	49.7	46.2
20/01/2023 18:00	50.5	48.3
20/01/2023 19:00	50.7	47.7
20/01/2023 20:00	48.9	46.3



PERIOD START	AMBIENT SOUND LEVEL, $L_{Aeq,1hr}$ (dB)	BACKGROUND SOUND LEVEL, $L_{A90,1hr}$ (dB)
20/01/2023 21:00	48.6	46.2
20/01/2023 22:00	48.4	45.7
20/01/2023 23:00	48.9	44.7
21/01/2023 00:00	44.9	42.3
21/01/2023 01:00	45.0	41.4
21/01/2023 02:00	43.9	40.1
21/01/2023 03:00	52.2	41.0
21/01/2023 04:00	43.4	40.0
21/01/2023 05:00	44.2	41.3
21/01/2023 06:00	47.7	45.1
21/01/2023 07:00	49.9	46.7
21/01/2023 08:00	52.3	49.7
21/01/2023 09:00	53.1	51.1
21/01/2023 10:00	52.3	50.8
21/01/2023 11:00	51.6	49.4
21/01/2023 12:00	51.4	49.0
21/01/2023 13:00	51.6	49.3
21/01/2023 14:00	52.2	49.4
21/01/2023 15:00	51.4	49.3
21/01/2023 16:00	51.8	49.8
21/01/2023 17:00	52.2	50.5
21/01/2023 18:00	53.1	51.5
21/01/2023 19:00	52.2	50.3
21/01/2023 20:00	51.9	50.0
21/01/2023 21:00	52.1	49.8
21/01/2023 22:00	50.7	48.7
21/01/2023 23:00	50.1	47.5
22/01/2023 00:00	48.5	45.5
22/01/2023 01:00	46.1	43.5
22/01/2023 02:00	45.9	43.0
22/01/2023 03:00	45.6	42.7
22/01/2023 04:00	45.5	41.7
22/01/2023 05:00	44.1	41.6



PERIOD START	AMBIENT SOUND LEVEL, $L_{Aeq,1hr}$ (dB)	BACKGROUND SOUND LEVEL, $L_{A90,1hr}$ (dB)
22/01/2023 06:00	45.6	42.7
22/01/2023 07:00	46.9	44.3
22/01/2023 08:00	48.4	45.7
22/01/2023 09:00	49.3	46.9
22/01/2023 10:00	49.5	46.4
22/01/2023 11:00	49.2	46.7
22/01/2023 12:00	55.7	47.5
22/01/2023 13:00	50.8	46.6
22/01/2023 14:00	50.2	47.2
22/01/2023 15:00	50.1	46.3
22/01/2023 16:00	50.0	47.4
22/01/2023 17:00	49.5	47.6
22/01/2023 18:00	50.2	47.6
22/01/2023 19:00	48.2	45.7
22/01/2023 20:00	47.8	44.9
22/01/2023 21:00	47.6	44.4
22/01/2023 22:00	46.1	42.5
22/01/2023 23:00	43.0	39.1
23/01/2023 00:00	44.7	38.0
23/01/2023 01:00	38.8	37.2
23/01/2023 02:00	39.2	36.7
23/01/2023 03:00	40.4	37.5
23/01/2023 04:00	44.0	40.8
23/01/2023 05:00	47.3	42.6
23/01/2023 06:00	49.3	44.8
23/01/2023 07:00	52.0	49.2
23/01/2023 08:00	52.9	51.2
23/01/2023 09:00	53.0	49.7
23/01/2023 10:00	50.6	45.0
23/01/2023 11:00	48.4	44.9
23/01/2023 12:00	48.7	44.0



APPENDIX III

FIGURES

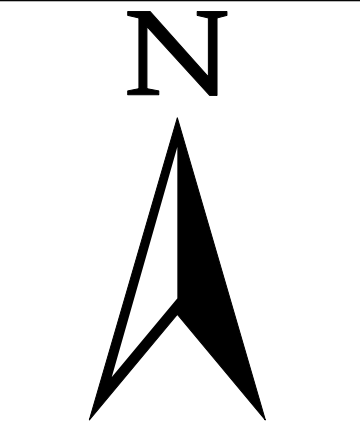
Figure 1 - Noise Measurement Positions



Project:
Land at Hanson Close,
Middleton

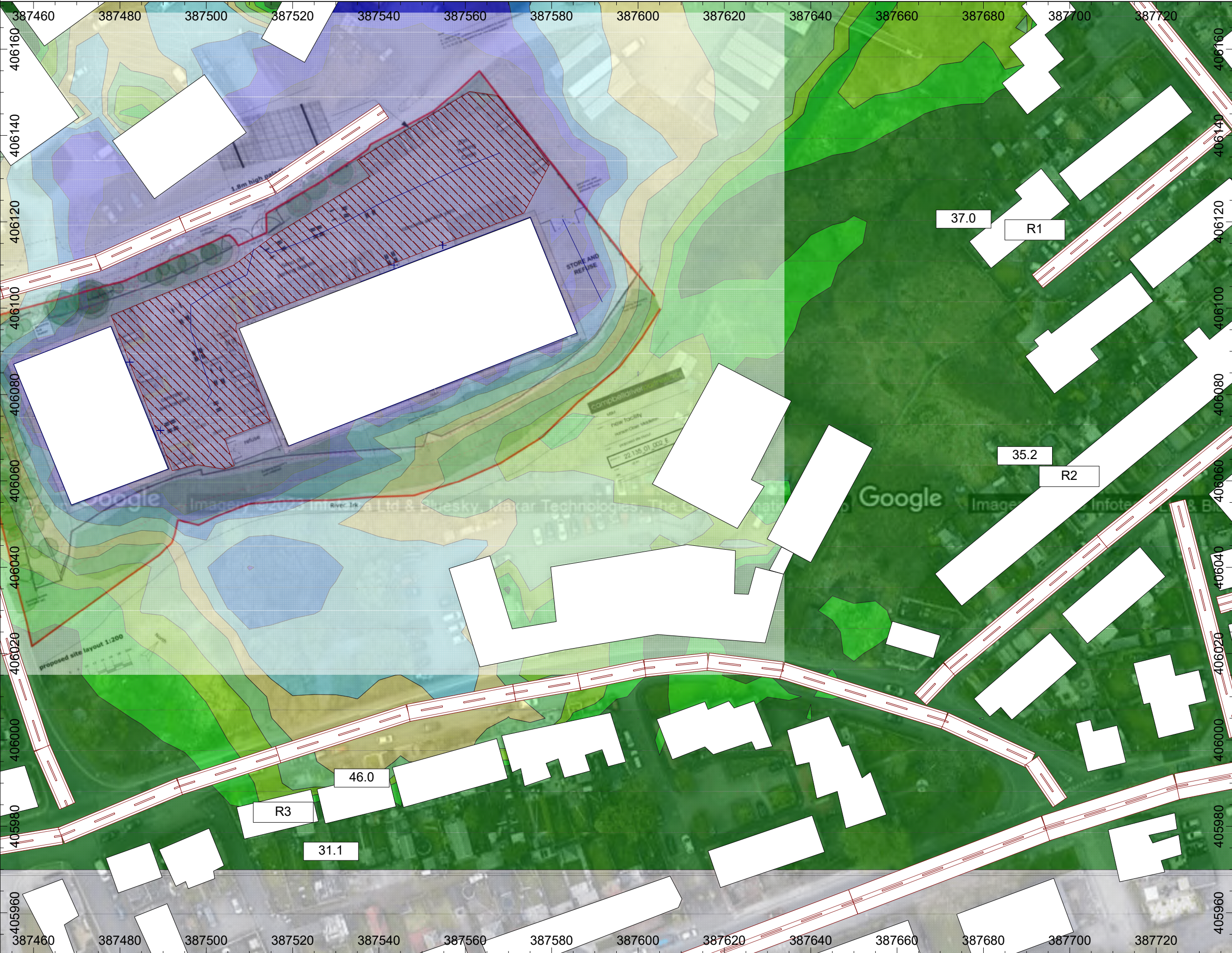
Project-No:
50-777

Client:
MSM Ltd



Project Engineer: Scott Boughton
Date: 26/01/2022

Figure 2 - Daytime Grid Noise Map - Calculation at 1.5m above ground level



Project:
Land at Hanson Close,
Middleton

Project-No:
50-777

Client:
MSM Limited

**Daytime Noise Level,
LA,r (dB)**

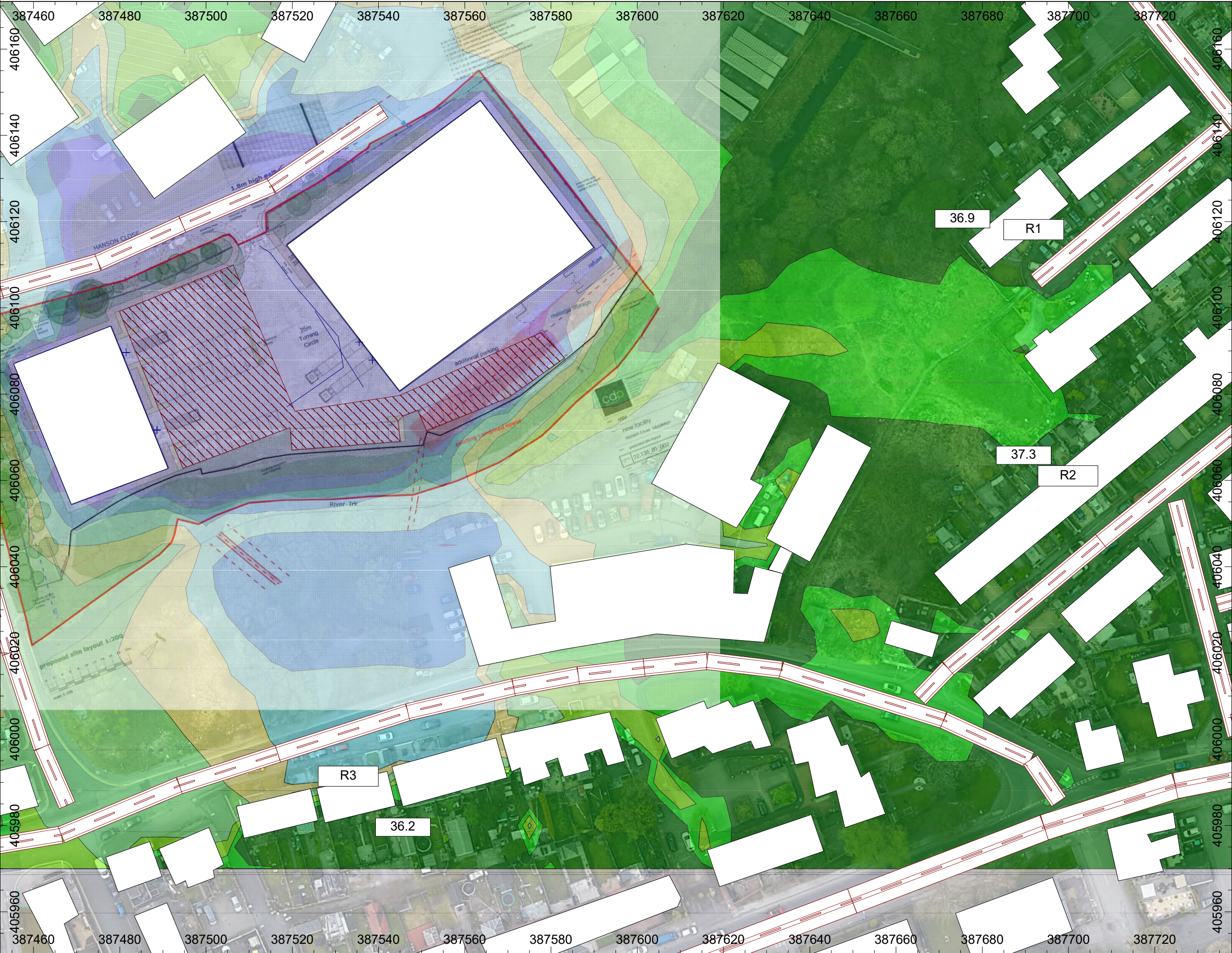
...	<= 38
38 < ...	<= 40
40 < ...	<= 42
42 < ...	<= 45
45 < ...	<= 48
48 < ...	<= 50
50 < ...	<= 52
52 < ...	<= 55
55 < ...	

Noise Map Objects

- + Point Source
- Line Source
- vert. Area Source
- Road
- ▨ Parking Lot
- ▭ Building
- ▭ Calculation Area

Project Engineer: Scott Boughton
Date: 26/01/2023

Figure 2 - Daytime Grid Noise Map - Calculation at 1.5m above ground level



Project:
Land at Hanson Close,
Middleton

Project-No:
50-777

Client:
MSM Limited

**Daytime Noise Level,
LA,r (dB)**

- ... <= 38
- 38 < ... <= 40
- 40 < ... <= 42
- 42 < ... <= 45
- 45 < ... <= 48
- 48 < ... <= 50
- 50 < ... <= 52
- 52 < ... <= 55
- 55 < ...

Noise Map Objects

- + Point Source
- Line Source
- vert. Area Source
- Road
- ▨ Parking Lot
- ▭ Building
- Barrier
- ▭ Calculation Area

Project Engineer: Scott Boughton
Date: 07/03/2024