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Project:

MARS Letchworth Garden City

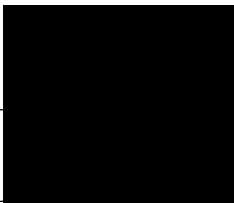
Title:

Noise Impact Assessment

quietly moving forward





Report Title		MARS Letchworth Garden City Noise Impact Assessment	
Reference		EEC/EC20922-5	
Version		3	
Issue Date		17 February 2025	
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Revision	Date	Author	Checked
0	28-10-24	Jon Mudd	Tim Meed
1	28-10-24	Jon Mudd	Tim Meed
2	4-2-24	Jon Mudd	Tim Meed

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1 INTRODUCTION

- 1.01 Environmental Equipment Corporation Limited has been commissioned by MBH Design Studio Ltd to undertake an assessment eight new EV charging bays as part of a new services provision at the existing Morrisons Supermarket in Letchworth Garden City. The proposed scheme will be developed on part of the existing Morrisons customer car park.
- 1.02 This assessment includes the prediction of noise impacts at the worst affected noise sensitive receptors in accordance with current British Standard and World Health Organisation guidance for community noise and the results of a noise survey carried out over a weekend period.
- 1.03 This assessment includes:
- The details of an ambient noise survey undertaken by this practice to measure the existing noise climate around the site; and
 - The prediction of noise impacts at the most affected noise sensitive receptors based on the possible operation of the plant between 0700-2200hrs every day..
- 1.04 Whilst every effort has been made to ensure that this report is easy to understand, it is necessarily technical in nature. To assist the reader, an explanation of the terminology used in this report is contained in Appendix A.

2 SITE

- 2.01 The Morrisons Supermarket site is within a residential area on the outskirts of Totton. The following Bing Maps image has been annotated to identify the Morrisons car park and the nearest noise sensitive residential dwelling of 49 Station Way. The proposed new provision of self service EV charging bays will replace the existing customer parking spaces as outlined in the image below. The measurement location used for the noise survey is also marked.



Figure 1: Site layout and nearest dwellings

- 2.02 The closest noise sensitive receptor to the site is 49 Station Way to the west of the site.
- 2.03 All other noise sensitive receptors are at a greater distance from the proposed location of the charging bays and designated plant areas or are protected by more screening by intervening structures, and as such will be subject to lower levels of noise.
- 2.04 This application is for redevelopment and reconfiguration of part of the existing store car park to include eight dedicated electric vehicle charging bays served by four EV charging stations and the electrical infrastructure required to support the new charging bays consisting of a separate LV panel and substation that will be sited in separate GRP enclosures. A large scale plan layout of the redeveloped site is presented in Appendix B. Figure 2 below overlays this plan onto a Google Maps image to put the proposed layout in context.

2.05



Figure 2: Proposed new site layout and existing surroundings.

- 2.06 The noise generating elements of the EV charging system will be the four charging stations that will serve the eight EV bays and the substation – the LV panel will not generate any noise.

3 GUIDANCE

3.01 A summary of the current National Planning Policy Framework including the Noise Policy Statement for England is presented in Appendix C of this document. We have reviewed the noise impact in line with current National Planning Policy guidance as this document is the basis upon which Local Council Plans are drawn up. The assessment methodology of 'BS4142:2014: 'Methods for rating and assessing industrial and commercial sound'' is the principle standard against which to assess potential impact in this context and that standard in turn requires that the assessment outcomes be judged and considered taking into account context and relevant guidance metrics.

3.02 Additional guidance has been taken from current British Standards and World Health Organisation Guidance. These documents provide useful reference for assessing acceptability against established absolute noise limits.

BS4142:2014 'Methods for rating and assessing industrial and commercial sound'

3.03 To assess the acceptability of the resultant noise levels we have consulted the relevant standards. BS 4142:2014 'Methods for rating and assessing industrial and commercial sound'. The scope of BS4142 includes that assessment of the following sources:

- 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

3.04 BS4142 gives guidance on assessing the likelihood of adverse impacts by calculating a 'rating level' of the new noise source and comparing its magnitude at noise sensitive locations to the existing or underlying background noise level. The background noise level is subtracted from the 'rating level' to assess the likelihood of complaints:

- The greater the difference the greater the likelihood of complaints.
- A difference of around +10dB or more is an indication of a significant adverse impact, depending on the context.
- A difference of +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 noise level, the less likely it is that the specific sound source will have an adverse impact or 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 sound impact, depending on the context.

3.05 This assessment is carried out over a one hour period for the daytime and a fifteen minute period for the night-time. For the purposes of the standard it states that daytime and night-time are typically 07:00 to 23:00 hours and 23:00 to 07:00 hours respectively.

- 3.06 The 'rating level' of the noise source is obtained taking the following factors into consideration:
- The new plant noise (the specific noise) is measured or predicted in terms of L_{Aeq} .
 - An additional correction shall be included if the noise contains a distinguishable, discrete continuous note, if the noise contains distinct impulses or if the noise is irregular enough to attract attention. The value for any tonal noise can be an addition of up to 6dB and for impulsive noise of up to 9dB.

- 3.07 The background sound level should be established in terms of the L_{A90} noise index. The standard states that the background sound level should be measured over a period of sufficient length to obtain a representative value. The standard states that *'a representative level ought to account for the range of background sound levels and ought not to automatically to be assumed to be either the minimum or modal value.'*

- 3.08 BS 4142 goes onto state that:

'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 effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context.'

- 3.09 BS4142 requires uncertainties in the assessment to be considered and, where the uncertainty is likely to affect the outcome of the assessment, steps should be taken to reduce the uncertainty.

BS8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings'

- 3.10 BS8233:2014, 'Guidance on sound insulation and noise reduction for buildings', section 7 gives guidance on acoustic criteria and noise levels appropriate for various internal spaces that have different functions. Section 7.7 relates specifically to buildings having a residential purpose and offers guidance on appropriate internal ambient noise levels for dwellings (when unoccupied) with specific consideration:

- for bedrooms, the acoustic effect on sleep; and
- for other rooms, the acoustic effect on resting, listening and communicating.

- 3.11 The guidance applies to external noise as it affects the internal acoustic environment from sources without a specific character.

- 3.12 Table 4 of section 7.7.2 recommends the following internal noise limits based on the presence of steady, external noise sources:

Table 4 Indoor ambient noise levels for dwellings

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq,16hour}$	—
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	—
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

- 3.13 The guidance criteria are based upon research and existing guidelines provided by the World Health Organisation.

- 3.14 It is generally considered that the sound insulation provided by a partially open window will be 15dB, dependent on window type, extent of opening and source frequency content.

- 3.15 It can be seen that in the worst case, with a partially open window reduction of 15dB, indoor ambient noise targets for bedrooms will be met where the external ambient noise level is below 45dB(A). This is based upon steady noise of an anonymous nature and is consistent with the World Health Organisations LOAEL.

4 MEASUREMENTS

- 4.01 Environmental noise measurements were carried out over an extended period including a weekend, between 0945 hours on Friday 6th September, 2024 and concluded 0600 hours Monday 9th September, 2024, to establish the existing noise levels at the site. The survey methodology and results are set out below.
- 4.02 Noise measurements have been carried out at the following position, as shown in Figure 1 and described as:
- Position 1: located at a height of approximately 1.8 metres above ground level close to the boundary of the rear gardens of 49 Station Way to the west of the proposed site of the new EV charging facility. The measurement was not located within 3.5 metres of any reflecting surfaces, other than the mounting surface.
- 4.03 The measurement location is considered to be representative of the nearest windows of 49 Station Way.

5 EQUIPMENT

- 5.01 The equipment used for the survey was as follows:-
- 01dB Metravib Black Solo Integrating Sound Level Meter conforming to Class 1 BS EN 61672, Type 1 BS EN 60804 & BS EN 60651: 1994;
 - 01dB Metravib MCE 212 Condenser Microphone, PRE 21 S Pre-amp and Connecting Leads;
 - 01dB Outdoor Microphone Kit and a
 - Tripod.
- 5.02 The equipment holds current UKAS or equivalent accreditation and serial numbers as follows:

Sound Level Meter 01dB Black Solo	Serial No.	61719
	Calibration Date	22 nd August 2022
	Cal Certificate No.	U41741
½" MCE 212 Condenser Mic.	Serial No.	166397
	Calibration Date	22 nd August 2022
	Cal Certificate No.	U41741
Calibrator CAL 21	Serial No.	34634297
	Calibration Date	2 nd May, 2023
	Cal. Certificate No.	U44154

N.B. Copies of calibration certificates are available upon request.

- 5.03 The equipment was calibrated both before and after the survey with no difference noted in the levels.

6 RESULTS

- 6.01 The weather for the majority of the survey was suitable for noise measurement, it being dry with little wind. Some rain showers occurred on the Sunday between 0800-1630 hrs, having a short term effect on measured noise.
- 6.02 Noise sources at the site include activity in the car park during the trading hours of the store along with local and distant road traffic and activity noise from the railway that is to the north of the site. There were no other significant sources of noise during the survey.
- 6.03 A list of the levels measured is included in Appendix D and represented graphically in Appendix E.
- 6.04 A summary of the time averaged ambient levels and measured background levels over the measurement periods are shown in Table 6.1.

Day	Period	Average L _{Aeq,T} – dB	Minimum L _{A90} – dB	Maximum L _{A90} – dB	Modal L _{A90} – dB	Mean L _{A90} – dB
Friday 6 th September	Day time (0945-1900 hrs)	50.4	40	44	43	42
	Evening (1900-2300 hrs)	47.4	29	40	39	36
	Night-time (2300-0700 hrs)	41.0	23	34	27	27
Saturday 7 th September 2024	Day time (0700-1900 hrs)	49.0	34	43	42	40
	Evening (1900-2300 hrs)	45.7	31	38	34	34
	Night-time (2300-0700 hrs)	43.1	25	39	26	28
Sunday 8 th September 2024	Day time (0700-1900 hrs)	50.6	31	48	42	40
	Evening (1900-2300 hrs)	45.7	31	37	34	34
	Night-time (2300-0600 hrs)	44.1	26	42	30	33

Table 6.1: Free-Field Measured Ambient and Background Noise Levels

- 6.05 The proposed EV Charging bays will be available for use between 0700-2200hrs
- 6.06 Table 6.2 presents a summary of the noise survey data between the hours of 0700-2200hrs. These values will be used as a basis to assess the noise impact (Section 8).

Day	Period	Average $L_{Aeq,T} - \text{dB}$	Minimum $L_{A90} - \text{dB}$	Maximum $L_{A90} - \text{dB}$	Modal $L_{A90} - \text{dB}$	Mean $L_{A90} - \text{dB}$
Friday 6 th September 2024	0700-2200 hrs	49.9	34	44	43	41
Saturday 7 th September 2024	0700-2200 hrs	48.6	33	43	42	39
Sunday 8 th September 2024	0700-2200 hrs	46.2*	31*	38*	34*	34*

Table 6.2: Free-Field Measured Ambient and Background Noise Levels

* excludes rain noise affected readings between 0800-1630hrs

7 PLANT ASSESSMENT

- 7.01 This application is for the installation of eight new electric vehicle charging bays that will replace customer parking as part of the redevelopment of the existing Morrisons store in Letchworth Garden City. The electrical infrastructure required to support the operation of the charging bays consists of a new LV Panel and substation in GRP enclosures.
- 7.02 With regards to the plant associated with the new EV charging provision, EEC Ltd have previously undertaken in-situ measurements of both noise associated with the substations used for these installations and the noise from the operation of the Alpitronic HYC-150 charging stations when in use. The site will be using the Alpitronic HYC-400 charging stations which we have not tested, however as presented in Appendix F, the manufacturer has published single figure broadband noise levels for the units, measured under laboratory conditions. The broadband noise levels are the same as the levels measured for the HYC-150 unit. We have currently used the third octave data we measured for the HYC-150 within our assessment to ensure a more accurate representation in the acoustic model of screening and distance losses can be accounted for. This measured data is in line with the manufacturer's broad band published data. Copies of the manufacturer's datasheets for the charging stations are included in Appendix F along with the full third octave data used for the charging stations and substations.

Substation		50 dBA Sound power level
Charging Station	Alpitronic HYC-400	< 55.6dBA at 1m (published)
		(HYC-150 measured level – 58dBA at 1m)

- 7.03 The propagation of noise from the proposed site due to the activities associated with the new installations has been modelled using CadnaA software produce by Datakustik. Calculations are undertaken using the General Method of Calculation from ISO9613-2:2024. Within the noise model, buildings and the immediate topography have been accounted.
- 7.04 The substation will operate 24 hours a day but the Alpitronic EV chargers available to be used at between 0700-2200hrs. The expected duration of any charging operation will typically be up to 20 minutes. The following illustrations show a graphical representation of the resulting noise

model and calculated noise levels due to the operation of the EV charging station when all in use (Figure 3) and the substation operating in isolation (Figure 4).

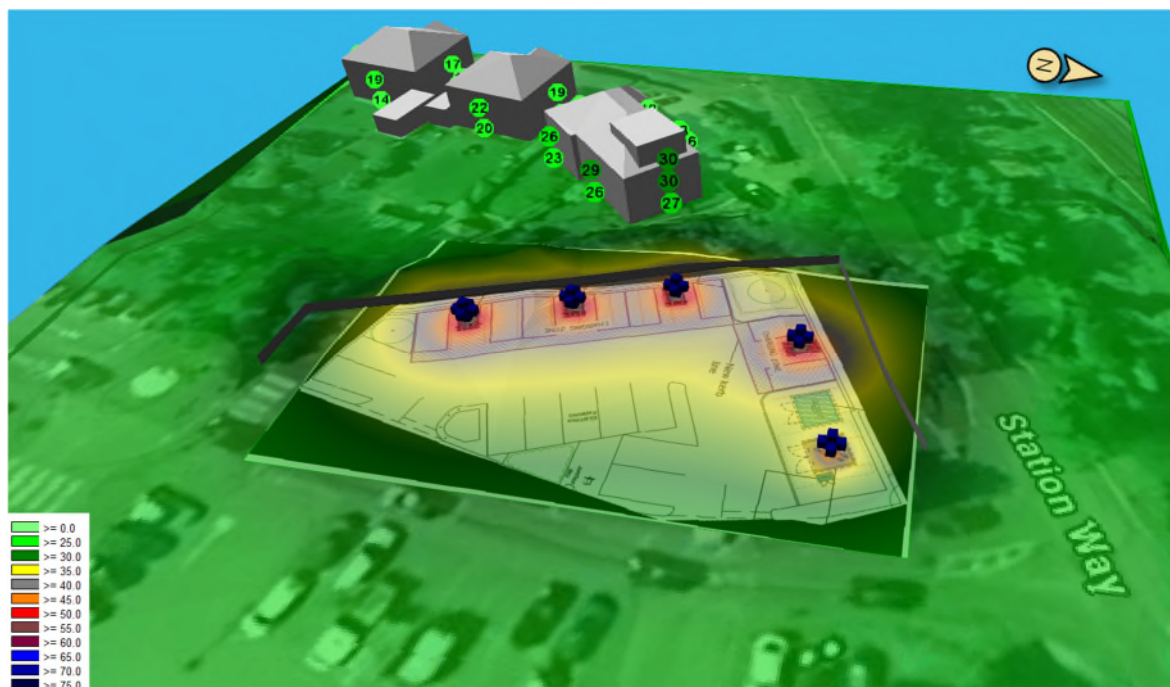


Figure 3: Specific Noise Levels as calculated for all charging stations operating – $L_{Aeq,T}$

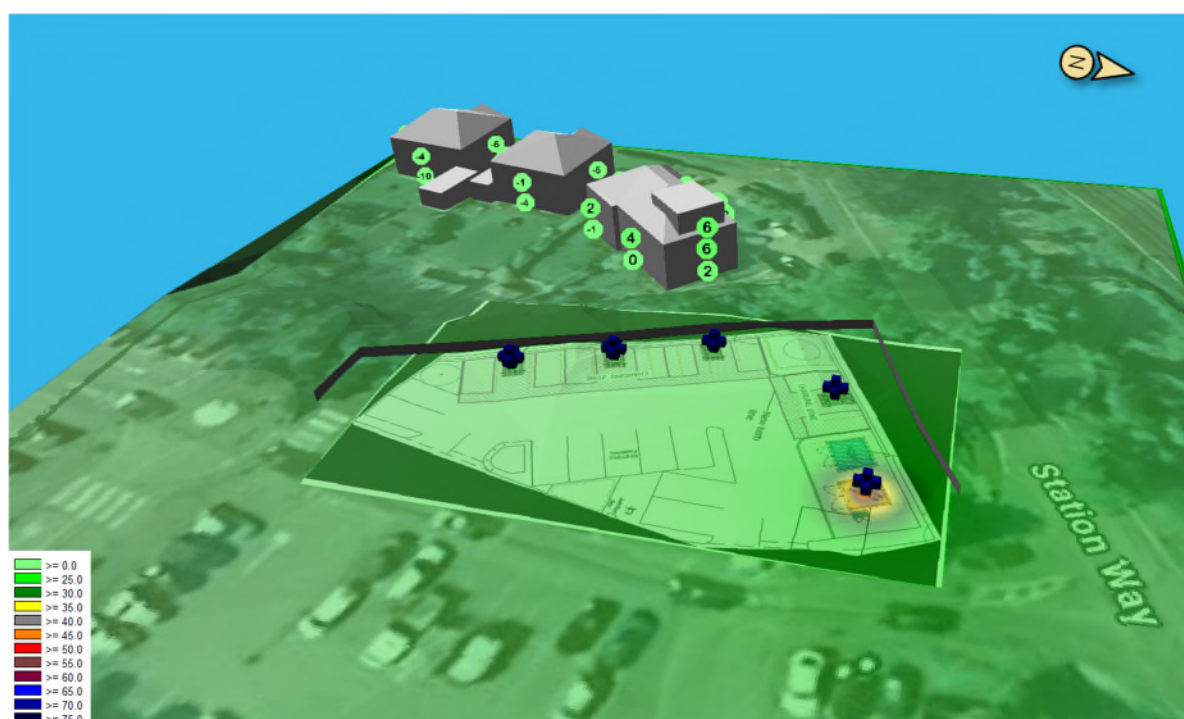


Figure 4: Specific Noise Levels as calculated substation operating in isolation – $L_{Aeq,T}$

Noise Source	Period	No 49 Station Way
4 No EV Charging Stations	0700-2200hrs	30 dB(A)
Substation	All times	6 dB(A)

A circle is divided into three regions by a horizontal line and a vertical line. The top region is a semi-circle. The bottom-left region is a quadrant labeled 'X'. The bottom-right region is a quadrant labeled 'Y'.

10

8 BS4142 ASSESSMENT

- 8.01 The impact of noise due to the operation of the new facilities would typically be assessed in accordance with BS4142 for the daytime and night time operating conditions described in Section 7.04.
- 8.02 The following representative values are derived from a review of the lowest, modal and mean background noise levels recorded across the three days of our survey as presented in Tables 6.1 and 6.2.

- | | | |
|------------------------|--------------|--------------------------|
| • EV Charging Stations | 0700-2200hrs | 34 dB(A) L ₉₀ |
| • Substation | Overnight | 23 dB(A) L ₉₀ |

The representative background noise levels adopted are based on the following considerations:

a. EV Charging Stations

Based upon the lowest modal values recorded on the Saturday and Sunday. This is considered to be provide a robust background noise during all of the daily peak time periods and the majority of the off-peak time periods that the EV Charging Stations will be available for use.

b. Night time periods

Based upon the lowest background noise level recorded at night over the duration of the survey period.

- 8.03 The following table shows the BS4142 assessment procedure for the daytime activities described above based upon the noise immissions modelled in CadnaA (Section 7 above). The assessments include commentary on context and reference to absolute noise standards found in BS8233:2014, 'Guidance on sound insulation and noise reduction for buildings' and WHO guidelines.
- 8.04 The assessment refers only to worst-case site-wide noise impacts at the most affected property of No. 49 Station Way.
- 8.05 All other receptors are either further away or are subject to the same or less noise than those noted above.

No 49 Station Way – 4 No. EV Charging Stations (0700-2200hrs)

Results		Relevant Clause	Commentary
Assessment made during the daytime, so reference time interval is 1 hour		7.2	
Calculated Specific Noise	30 dB $L_{Aeq,1 \text{ hour}}$	7.3.6	Noise modelled using CadnaA, assumes continuous operation of EV plant during off-peak periods
Acoustic Character Correction	+ 2 dB	9.2	Possible just perceptible tonality associated with operation of the EV Charging station
Rating Sound Level	(30+2) dB = 32 dB	9.2	Overall 1 hour level
Background Noise Level	34 dB $L_{A90,15min}$	8	Representative background
Difference	(32-34) dB= -2 dB	11	
Assessment indicates the impact of the noise will be low, depending on context		11	
Uncertainty of assessment	Not Significant	10	The noise model uses certified published source data and representative background noise levels are based extended survey including a weekend period.

Table 8.1: BS4142 Assessment for closest dwellings based on all EV charging bays – Peak Daytime Activity

No 49 Station Way – Substation only Night time

Results		Relevant Clause	Commentary
Assessment made during the night time, so reference time interval is 15 minutes		7.2	
Calculated Specific Noise	6 dB $L_{Aeq,1 \text{ hour}}$	7.3.6	Noise modelled using CadnaA, assumes continuous operation of substation
Acoustic Character Correction	+ 2 dB	9.2	Possible tonal noise from plant operating
Rating Sound Level	(6+2) dB = 8 dB	9.2	Overall 15 minute level
Background Noise Level	23 dB $L_{A90,15mins}$	8	Lowest background during night time
Difference	(8-23) dB = - 15 dB	11	
Assessment indicates the impact of the noise could be negligible, depending on context		11	Noise at the magnitude calculated is not expected to have any adverse impact.
Uncertainty of assessment	Not Significant	10	The noise model uses certified published source data and representative background noise levels are based extended survey including a weekend period.

Table 8.2: BS4142 Assessment for closest dwellings based on substation only operating

8.06 Table 8.3 presents a summary of the each assessed scenario at the closest most affected receptor during each period and the relevant BS 4142 conclusion.

Scenario	Rating Level – Background noise dB	BS 4142 Assessment Conclusion
Peak Daytime (0700-2200hrs) All 8 No. EV Charging Bays in use	-2	Noise impact is considered to be low.
Night Time (2200-0700hrs) Substation only	-15	Noise impact is considered to be negligible.

Table 8.3: Summary of BS4142 conclusions for each potential worst case scenario

- 8.07 As indicated in the above BS4142 assessments, the impacts of the operational noise from the site are not expected to have any adverse impact, depending on context. In reality, the usage of each element occurring simultaneously, as modelled, is considered to occur only occasionally.
- 8.08 The context in this instance is that the impact will in practice be effectively mitigated by a number of contributing factors:
- the assessment is based on a worst case of items operating at their maximum capacity.
 - The existing ambient noise level is consistently over 45 dB L_{Aeq} during the daytime which is significantly higher than the calculated noise of the proposed plant operation and therefore can be expected to provide some useful masking.
- 8.09 Based on the above context it is not expected that the typical activities on site would lead to significant adverse impacts and any adverse impacts no worse or less than currently experienced around the site.
- 8.10 Additional reviews of the operational noise levels are presented below in the context of established and accepted absolute design targets and metrics for noise in dwellings as described in BS8233:2014, 'Guidance on sound insulation and noise reduction for buildings'.
- 8.11 The following review considers levels of noise that will result within the properties accounting for the noise reductions that will occur as sound passes across the building facades.
- 8.12 The sound insulation of the façade is very much governed by the type of glazing and whether the windows are open or not. Both cases are considered here assuming minimum levels of 20dB sound insulation likely from basic closed thermal double glazed windows. A typical loss of 15dB could be expected for noise passing through a partially open window.
- 8.13 Table 8.4 presents the noise levels that could be expected within the dwellings against the relevant BS 8233 design criteria. We have presented the summary based on the most affected receptors during the daytime and night time. A minimal loss of 15dB could be expected for noise passing through a partially open window.

Period	Condition	Calculated $L_{Aeq,1hour}$ external	Minimum sound reduction loss	Resultant internal ambient noise level	BS8233 Design Criterion
Daytime	Windows Closed	30 dB	20 dB	<10 dB(A) $L_{eq,15minutes}$	35dB(A) $L_{eq,16 hour}$
	Windows Open	30 dB	15dB	15 dB(A) $L_{eq,15 minutes}$	35dB(A) $L_{eq,16 hour}$
Night time	Windows Closed	6 dB	20 dB	0 dB(A) $L_{eq,15minutes}$	30dB(A) $L_{eq,8 hour}$
	Windows Open	6 dB	15dB	0 dB(A) $L_{eq,15 minutes}$	30dB(A) $L_{eq,8 hour}$

Table 8.4: Calculated Worst Case Internal Ambient Noise levels within closest dwellings

- 8.14 The operational noise of the EV charging stations should not be perceptible within the dwellings even with the windows open.

9 CONCLUSIONS

- 9.01 MBH Design Studio Ltd has appointed Environmental Equipment Corporation Limited to undertake a noise assessment for the new services provision within the Morrisons Letchworth Garden City store car park.
- 9.02 The assessment has been carried out in accordance with national planning guidance and current British Standard guidance and is based on an environmental noise survey conducted at the site over a weekend period.
- 9.03 A noise assessment has been undertaken to evaluate the potential worst case noise impact of the proposed operations and equipment.
- 9.04 The assessment has shown that during the respective daytime and night time operation of all services will be of low impact at all the nearest receptors when considered in the context of the existing activities around the site.
- 9.05 On the basis of this assessment it is considered that noise does not pose a material constraint to planning permission for the redevelopment of the site being granted.

APPENDIX A

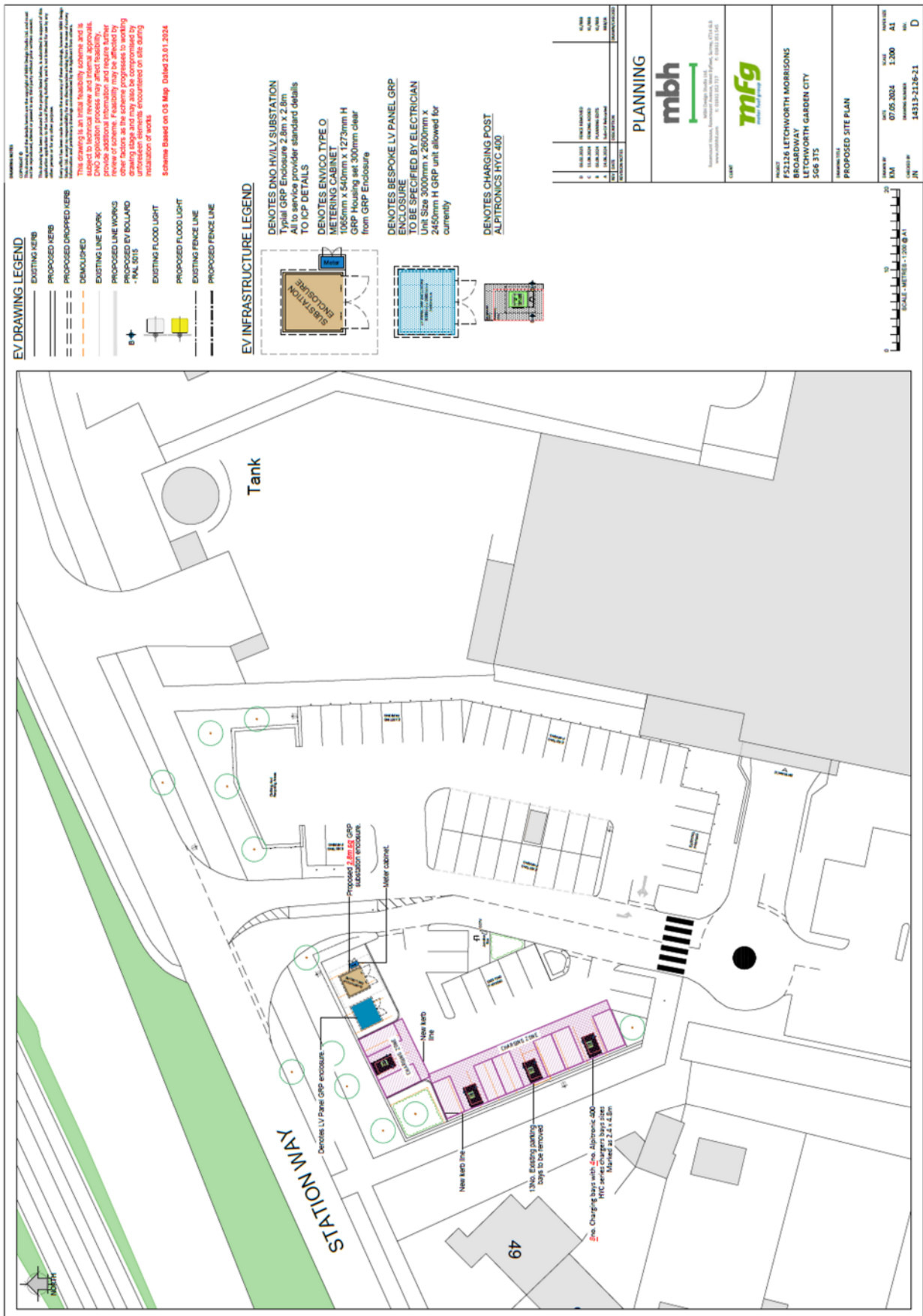
GLOSSARY OF TECHNICAL TERMS

ACOUSTIC TERMINOLOGY

Absorption Classes	The sound absorption of a material is rated from Class A to Class E, where Class A materials provide the highest level of sound absorption.
Ambient Noise Levels	Noise levels measured in the absence of noise requiring control, frequently measured to determine the situation prior to the additional of a new noise source.
dB	Decibel. The logarithmic unit of sound level.
dB(A)	A-weighted decibel. The A-weighting approximates the response of the human ear.
$D_{nT,w}$	Weighted standardized level difference. A single number quantity of the sound level difference between two rooms. $D_{nT,w}$ is typically used to measure the on-site sound insulation performance of a building element such as a wall, floor or ceiling. Measured in accordance with BS EN ISO 16283-1 and weighted in accordance with BS EN ISO 717-1.
$D_{n,e,w}$	The weighted element-normalized level difference. A single number rating of the sound reduction provided by a sound passing through an individual element. $D_{n,e,w}$ is typically used to define the sound insulation provided by ventilators. Measured in accordance with BS EN ISO 10140-2:2010 and rated in accordance with BS EN ISO 717-1.
Flanking	Transmission of sound energy through paths adjacent to the building element being considered. For example, sound may be transmitted around a wall by travelling up into the ceiling space and then down into the adjacent room.
Frequency	Sound can occur over a range of frequencies extending from the very low, such as the rumble of thunder, up to the very high such as the crash of cymbals. Sound is generally described over the frequency range from 63Hz to 4kHz, roughly equal to the range of frequencies on a piano.
Impact Sound	Sound produced by an object impacting directly on a building structure, such as footfall noise or chairs scrapping on a floor.
$L_{Aeq,t}$	The equivalent continuous sound level measured in dBA. This is commonly referred to as the average noise level. 't' is the interval time for the measurement. Typically 't' of 16hrs and 8hrs is used for day and night time ambient noise respectively or 't' is defined by the period of interest in BS4142 assessments.
$L_{A90,t}$	The noise level exceeded for 90% of the measurement period, measured in dBA. This is commonly referred to as the background noise level.
$L'_{nT,w}$	Weighted, standardized impact sound pressure level. A single number rating of the impact sound insulation of a floor/ceiling when impacted on by a standard "tapper" machine. The lower the $L'_{nT,w}$, the better the acoustic performance. Measured in accordance with BBS EN ISO 140-7 and rated in accordance with BS EN ISO 717-2.
NR	Noise Rating. A single number rating which is based on the sound level in the octave bands 31.5Hz – 8kHz inclusive, generally used to assess noise from mechanical services in buildings.
Octave Band	Frequencies are often grouped together into octaves for analysis. Octave bands are labelled by their centre frequency which are: 63Hz, 125Hz, 250Hz, 500Hz, 1kHz, 2kHz and 4kHz.
Reverberation Time (T_{mf})	Reverberation time is used for assessing the acoustic qualities of a space. It is defined as the time it takes for an impulse to decay by 60dB. T_{mf} is the arithmetic average of the reverberation time in the mid frequency bands (500Hz, 1kHz and 2kHz).
R_w	Weighted sound reduction index. A single number rating of the sound insulation performance of a specific building element. R_w is measured in a laboratory. R_w is commonly used by manufacturers to describe the sound insulation performance of building elements such as plasterboard and concrete. Measured in accordance with BS EN ISO 10140-2:2010 and rated in accordance with BS EN ISO 717-1.
Sound Absorption	When sound hits a surface, some of the sound energy is absorbed by the surface material. Sound absorption refers to the ability of a material to absorb sound, rated from 0, complete reflection, to 1, complete absorption.
Sound Insulation	When sound hits a surface, some of the sound energy travels through the material. 'Sound insulation' refers to the ability of a material to prevent the travel of sound.
Structure-borne transmission	Transmission of sound energy as vibrations via the structure of a building.

APPENDIX B

**PROPOSED
SITE PLAN**



APPENDIX C

PLANNING POLICY AND GUIDANCE

PLANNING POLICY AND GUIDANCE

National Planning Policy Framework and the Noise Policy Statement for England

The Department for Communities and Local Government published the National Planning Policy Framework (NPPF) on 27th March 2012 (as amended on 12th December 2024) and upon its publication, the majority of planning policy statements and guidance notes were withdrawn, including Planning Policy Guidance 24 Planning and Noise, which previously presented the government's overarching planning policy on noise.

Paragraph 187 in Section 15 of the NPPF, entitled Conserving and enhancing the natural environment, states that:

"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 198 in Section 15 also states that:

"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..."

The Department for Environment Food and Rural Affairs published the Noise Policy Statement for England (NPSE) in March 2010. The explanatory note of NPSE defines the following terms used in the NPPF:

"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.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

2.21 Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur."

The NPSE does not define any of the above effect levels numerically.

The NPSE presents the Noise Policy Aims as:

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

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.”

It can be seen that the first two bullet points are similar to Section 11 of the NPPF, with a third aim that seeks to improve health and quality of life. The NPSE later expands on the Noise Policy Aims, stating:

2.23 The first aim of the NPSE states that significant adverse effects on health and quality of life should be avoided while also taking into account the guiding principles of sustainable development (paragraph 1.8).

2.24 The second aim of the NPSE refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development (paragraph 1.8). This does not mean that such adverse effects cannot occur.

2.25 This aim (the third aim), seeks where possible, positively to improve health and quality of life through the pro-active management of noise while also taking into account the guiding principles of sustainable development (paragraph 1.8), 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.”

It is clear that noise described in the NPSE as SOAEL that would lead to significant adverse effects should be avoided, although there is no definition as to what constitutes a significant adverse effect. Similarly, noise should be mitigated where it is high enough to lead to adverse effects, termed the LOAEL, but not so high that it leads to significant adverse effects.

British Standard 4142

To assess the acceptability of the resultant noise levels we have consulted the relevant standards. BS 4142:2014 ‘Methods for rating and assessing industrial and commercial sound’ has been used to assess the likelihood any adverse impacts based on the resultant noise level from the new plant item, including any corrections for the character of the noise against the existing background noise level.

BS4142 gives guidance on assessing the likelihood of adverse impacts by calculating a ‘rating level’ of the new noise source and comparing its magnitude at noise sensitive locations to the existing or underlying background noise level. The background noise level is subtracted from the ‘rating level’ to assess the likelihood of complaints:

- The greater the difference the greater the likelihood of complaints.
- A difference of around +10dB or more is an indication of a significant adverse impact, depending on the context.
- A difference of +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 noise level, the less likely it is that the specific sound source will have an adverse impact or 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 sound impact, depending on the context.

This assessment is carried out over a one hour period for the daytime and a fifteen minute period for the night-time. For the purposes of the standard it states that daytime and night-time are typically 07:00 to 23:00 hours and 23:00 to 07:00 hours respectively.

The 'rating level' of the noise source is obtained taking the following factors into consideration:

- The new plant noise (the specific noise) is measured or predicted in terms of L_{Aeq} .
- An additional correction shall be included if the noise contains a distinguishable, discrete continuous note, if the noise contains distinct impulses or if the noise is irregular enough to attract attention. The value for any tonal noise can be an addition of up to 6dB and for impulsive noise of up to 9dB.

BS 4142 goes onto state that:

'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 effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context.'

BS4142 has been referenced in setting noise limits for any fixed plant proposed as part of the proposed development.

APPENDIX D

SURVEY RESULTS
(TABULAR)

EC 20922 - MARS Letchworth

Morrisons Ltd

Tabulated Noise data

Sheet 1 of 3

Time	L _{Aeq}	L _{AMax}	L _{A90}
09:45	48.6	61.5	41.6
10:00	48.9	65.0	40.6
10:15	52.0	63.6	41.3
10:30	50.6	61.3	41.0
10:45	48.9	66.1	40.9
11:00	50.3	66.9	41.3
11:15	48.2	61.2	41.2
11:30	50.8	67.0	42.8
11:45	49.2	65.8	42.2
12:00	50.4	68.6	43.4
12:15	49.9	64.5	43.9
12:30	49.2	61.9	43.3
12:45	50.6	65.3	42.7
13:00	50.6	65.8	42.1
13:15	48.4	68.1	41.1
13:30	49.9	70.1	41.1
13:45	50.9	68.9	42.7
14:00	50.0	74.6	42.6
14:15	49.0	62.5	42.1
14:30	50.3	68.2	43.1
14:45	49.6	62.6	42.9
15:00	49.8	62.6	42.8
15:15	50.1	65.3	43.6
15:30	49.3	63.7	42.7
15:45	49.2	63.3	42.4
16:00	56.5	80.6	43.7
16:15	50.4	71.2	43.7
16:30	48.8	64.1	42.6
16:45	51.6	76.1	42.2
17:00	50.2	65.6	43.4
17:15	50.6	67.6	43.4
17:30	51.1	70.3	42.5
17:45	49.5	66.0	41.9
18:00	49.1	61.8	42.4
18:15	50.1	65.9	42.9
18:30	50.6	72.8	41.7
18:45	49.8	72.1	39.8
19:00	48.9	63.3	39.8
19:15	49.3	67.2	39.2
19:30	47.1	60.0	37.2
19:45	47.8	66.1	38.8
20:00	47.8	62.4	37.9
20:15	46.4	62.6	35.7
20:30	46.7	63.4	38.2
20:45	45.3	65.3	36.7
21:00	49.7	70.7	34.9
21:15	49.2	75.7	35.9
21:30	48.8	71.3	34.5

Time	L _{Aeq}	L _{AMax}	L _{A90}
21:45	44.8	61.3	34.3
22:00	47.4	66.6	33.1
22:15	45.5	61.9	33.7
22:30	45.9	65.7	31.4
22:45	39.4	55.0	28.7
23:00	43.9	63.6	30.1
23:15	43.1	60.4	29.8
23:30	40.9	57.9	28.7
23:45	45.8	60.0	29.2
00:00	40.0	59.0	28.1
00:15	40.2	64.0	26.3
00:30	39.6	61.4	27.0
00:45	31.4	51.9	26.7
01:00	36.6	55.3	27.4
01:15	35.6	57.0	27.8
01:30	33.6	49.5	27.4
01:45	33.1	53.9	24.2
02:00	34.3	55.3	25.4
02:15	29.5	50.4	23.8
02:30	38.2	61.4	24.8
02:45	31.4	50.9	24.1
03:00	27.6	50.3	23.0
03:15	34.3	61.6	23.2
03:30	32.2	55.7	23.0
03:45	37.0	60.2	24.0
04:00	34.3	50.6	27.1
04:15	33.5	53.3	25.0
04:30	32.7	51.2	25.6
04:45	37.3	54.8	24.9
05:00	37.1	59.1	24.8
05:15	38.8	59.1	25.3
05:30	44.1	61.9	27.2
05:45	43.6	68.3	28.1
06:00	41.9	59.3	31.0
06:15	43.7	61.1	32.4
06:30	48.3	70.6	32.4
06:45	47.8	63.2	33.8
07:00	48.1	60.2	34.2
07:15	49.6	65.8	35.5
07:30	47.8	62.8	35.3
07:45	46.2	61.2	35.3
08:00	47.1	63.0	35.1
08:15	48.3	71.1	36.0
08:30	47.9	62.0	37.0
08:45	48.7	62.0	39.6
09:00	48.7	60.8	39.8
09:15	48.4	64.6	38.5
09:30	47.4	61.6	38.0

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Tabulated Noise data

Sheet 2 of 3

Time	L _{Aeq}	L _{AMax}	L _{A90}
09:45	49.9	68.4	41.3
10:00	48.7	63.9	39.1
10:15	48.3	72.8	39.7
10:30	49.1	64.7	40.3
10:45	49.2	61.8	41.4
11:00	49.4	66.9	41.8
11:15	49.7	69.3	43.1
11:30	49.3	68.6	41.8
11:45	50.0	68.5	42.2
12:00	49.6	66.7	42.2
12:15	48.0	61.2	41.0
12:30	49.9	68.8	42.0
12:45	49.0	62.7	42.0
13:00	48.3	64.3	40.3
13:15	49.1	64.5	41.5
13:30	50.1	72.8	41.4
13:45	49.1	64.3	41.5
14:00	50.3	67.2	43.0
14:15	49.0	69.3	41.5
14:30	50.8	67.2	41.6
14:45	47.8	66.4	40.4
15:00	48.9	66.0	41.2
15:15	47.9	65.3	40.7
15:30	49.1	62.2	40.9
15:45	48.3	63.8	41.1
16:00	50.0	71.4	41.1
16:15	51.3	73.1	42.3
16:30	50.1	75.1	41.5
16:45	50.2	70.6	40.6
17:00	48.1	62.4	39.0
17:15	49.4	63.8	41.3
17:30	49.0	64.0	39.5
17:45	48.1	65.2	39.1
18:00	48.3	63.3	38.3
18:15	48.4	68.5	39.2
18:30	47.7	66.3	36.4
18:45	47.0	62.2	36.3
19:00	49.2	71.1	38.3
19:15	47.7	62.3	38.3
19:30	46.7	68.0	34.8
19:45	48.1	72.2	36.0
20:00	46.7	68.8	36.0
20:15	45.5	61.7	34.0
20:30	46.2	66.1	33.4
20:45	45.2	65.4	33.5
21:00	44.5	61.0	34.3
21:15	45.0	70.6	33.2
21:30	45.6	65.6	33.5

Time	L _{Aeq}	L _{AMax}	L _{A90}
21:45	44.0	62.5	34.0
22:00	42.9	62.6	34.1
22:15	43.5	62.7	32.3
22:30	41.5	58.4	32.6
22:45	38.1	56.0	31.0
23:00	42.8	57.4	32.7
23:15	41.2	57.8	32.0
23:30	39.7	57.7	30.2
23:45	40.9	56.0	32.2
00:00	38.7	55.0	27.5
00:15	37.9	58.5	26.2
00:30	35.7	56.8	27.1
00:45	32.8	50.0	26.2
01:00	35.4	58.3	26.7
01:15	45.2	65.0	26.2
01:30	33.2	51.3	26.0
01:45	38.3	62.8	25.7
02:00	30.2	44.5	25.5
02:15	32.6	49.2	25.2
02:30	34.5	54.4	25.7
02:45	31.5	50.0	25.2
03:00	53.9	65.9	29.9
03:15	49.7	61.4	39.2
03:30	36.6	54.8	30.0
03:45	36.0	57.9	27.9
04:00	34.5	52.1	29.8
04:15	35.9	58.5	26.6
04:30	36.6	61.2	26.3
04:45	34.2	56.0	26.0
05:00	31.5	54.2	25.7
05:15	37.8	58.4	26.8
05:30	41.2	58.8	27.0
05:45	40.3	59.4	29.0
06:00	41.1	60.2	30.2
06:15	44.0	58.1	32.0
06:30	48.6	71.1	31.9
06:45	44.4	57.9	31.5
07:00	41.6	64.9	31.1
07:15	48.4	70.4	31.6
07:30	43.3	63.6	30.8
07:45	45.2	64.3	32.0
08:00	41.8	56.4	31.9
08:15	46.5	58.2	32.8
08:30	55.1	64.3	47.9
08:45	52.3	78.8	42.9
09:00	56.0	66.8	46.8
09:15	54.0	70.1	44.6
09:30	52.1	65.8	43.8

EC 20922 - MARS Letchworth

Morrisons Ltd

Tabulated Noise data

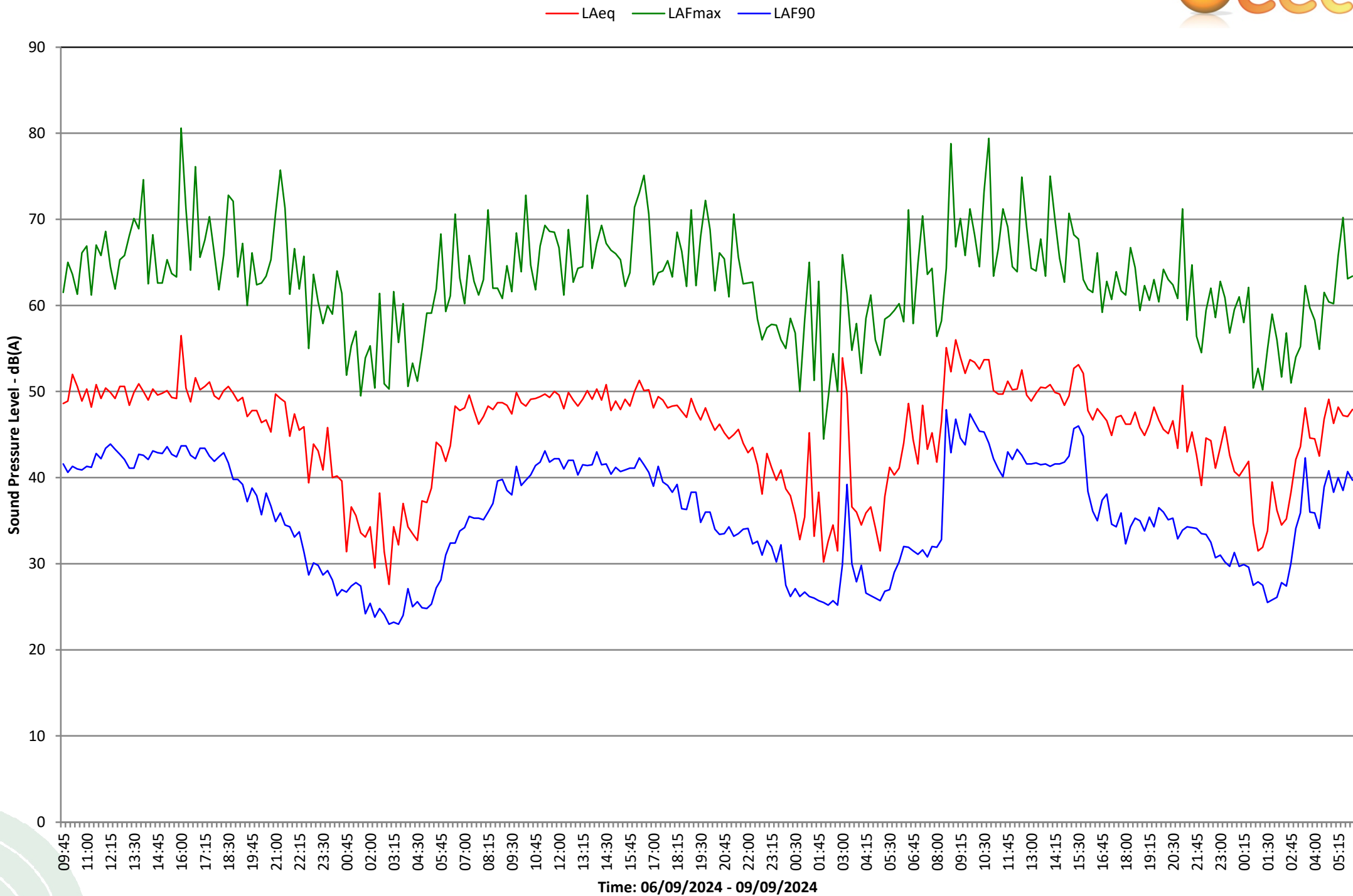
Sheet 3 of 3

Time	L _{Aeq}	L _{AMax}	L _{A90}
09:45	53.7	71.2	47.4
10:00	53.4	68.2	46.4
10:15	52.6	64.5	45.4
10:30	53.7	73.2	45.3
10:45	53.7	79.4	44.0
11:00	50.1	63.4	42.2
11:15	49.7	66.6	41.0
11:30	49.7	71.2	40.1
11:45	51.2	69.1	43.0
12:00	50.2	64.5	42.1
12:15	50.3	63.9	43.3
12:30	52.5	74.9	42.6
12:45	49.6	69.1	41.6
13:00	48.9	64.3	41.6
13:15	49.8	64.0	41.7
13:30	50.5	67.7	41.5
13:45	50.4	63.4	41.6
14:00	50.8	75.0	41.3
14:15	49.9	70.0	41.6
14:30	49.7	65.5	41.6
14:45	48.4	62.7	41.8
15:00	49.5	70.7	42.5
15:15	52.7	68.2	45.7
15:30	53.1	67.7	46.0
15:45	52.1	63.0	44.8
16:00	47.8	61.9	38.4
16:15	46.7	61.5	36.1
16:30	48.0	66.1	35.0
16:45	47.3	59.2	37.4
17:00	46.6	62.8	38.1
17:15	44.9	60.7	34.6
17:30	47.0	63.9	34.3
17:45	47.2	61.7	35.9
18:00	46.2	61.2	32.3
18:15	46.2	66.7	34.3
18:30	47.6	64.4	35.3
18:45	45.8	59.4	35.0
19:00	44.9	62.3	33.8
19:15	46.2	60.6	35.4
19:30	48.2	63.0	34.3
19:45	46.7	60.4	36.5
20:00	45.6	64.2	36.0
20:15	45.1	63.0	35.1
20:30	46.6	62.4	35.3
20:45	43.4	60.8	32.9
21:00	50.7	71.2	33.9
21:15	43.0	58.3	34.3
21:30	45.3	64.7	34.2

Time	L _{Aeq}	L _{AMax}	L _{A90}
21:45	42.6	56.4	34.1
22:00	39.1	54.5	33.5
22:15	44.6	59.4	33.4
22:30	44.3	62.0	32.5
22:45	41.1	58.6	30.7
23:00	43.5	62.8	31.0
23:15	45.9	60.9	30.2
23:30	42.6	56.8	29.7
23:45	40.7	59.5	31.3
00:00	40.2	61.0	29.7
00:15	41.0	58.0	29.9
00:30	41.9	62.1	29.6
00:45	34.7	50.4	27.5
01:00	31.5	52.7	27.9
01:15	31.9	50.2	27.5
01:30	33.8	54.9	25.5
01:45	39.5	59.0	25.8
02:00	36.2	56.0	26.1
02:15	34.5	51.7	27.8
02:30	35.2	56.8	27.4
02:45	38.3	51.0	30.1
03:00	42.1	54.0	34.1
03:15	43.6	55.2	35.9
03:30	48.1	62.3	42.3
03:45	44.6	59.7	36.0
04:00	44.5	58.3	35.9
04:15	42.5	54.9	34.1
04:30	46.8	61.5	38.9
04:45	49.1	60.4	40.8
05:00	46.3	60.2	38.3
05:15	48.2	65.8	40.0
05:30	47.2	70.2	38.5
05:45	47.1	63.1	40.7
06:00	47.9	63.4	39.7

APPENDIX E
SURVEY RESULTS
(GRAPHICAL)

Noise Level Time History at MARS Letchworth



APPENDIX F

PUBLISHED PLANT NOISE DATA

Alpitronic Published Noise Data for HYC-400



Figure 2.1 Setup Acoustic Measurement TÜV

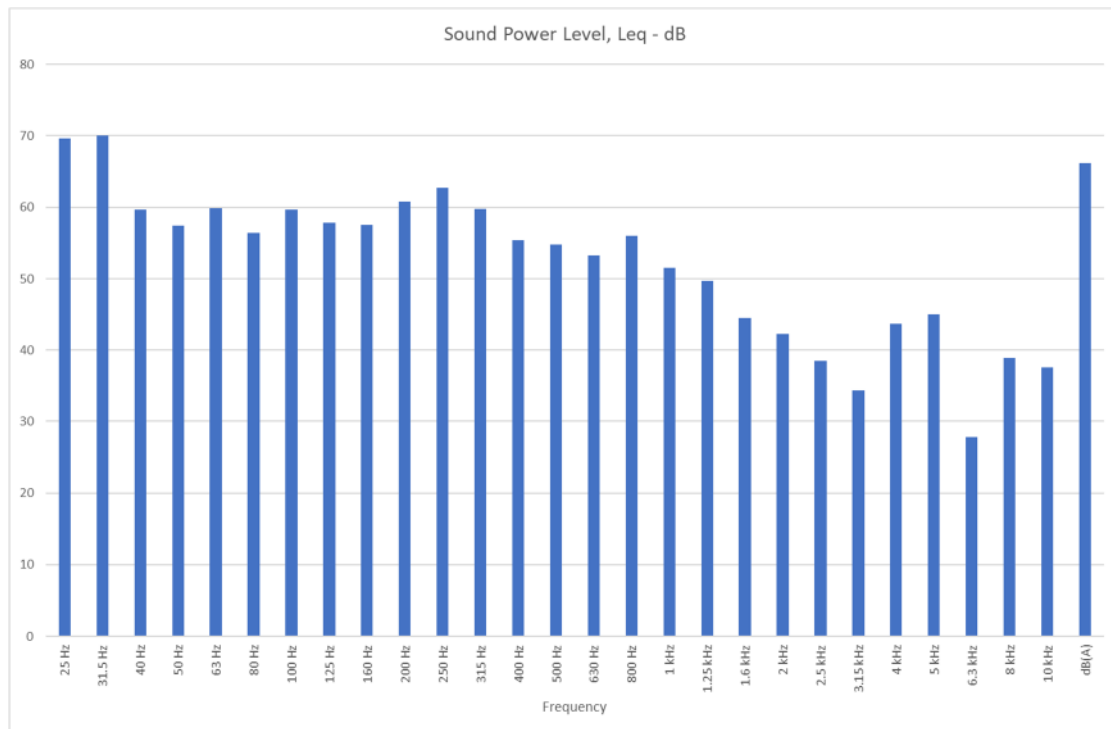
distance [m]	sound pressure level by distance [dB(A)]
1	55.6
2	53.3
3	51.5
4	50.0
5	48.7
6	47.6
7	46.6
8	45.8
9	45.0
10	44.2
11	43.5
12	42.9
13	42.3
14	41.8
15	41.3
16	40.8
17	40.3
18	39.9
19	39.4
20	39.0
30	35.8
40	33.5

Table 2.38 Sound Pressure levels

EEC Measured Data of HYC150 Alpitronic Charging station

		Frequency – Hz													
		25	31.5	40	50	63	80	100	125	160	200	250	315	400	500
Sound Power Level	dB	70	70	60	57	60	56	60	58	58	61	63	60	55	55
		Frequency – Hz													
		630	800	1k	1.25k	1.6k	2k	2.15k	3.15k	4k	5k	6.3k	8k	10k	dB(A)
Sound Power Level	dB	53	56	52	50	45	42	39	34	44	45	28	39	38	63

Calculated sound power levels for Alpitronic HYC-150 charging station based on measured data on site

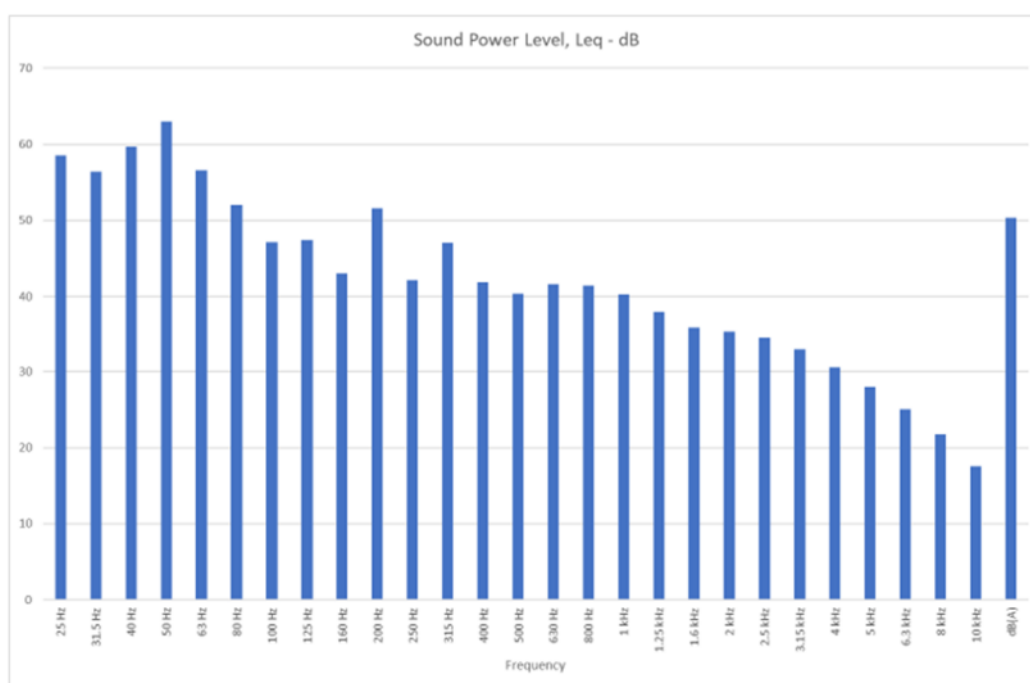


Graphical representation of calculated sound power levels of Alpitronic HYC-150

SUBSTATION NOISE DATA

	Frequency - Hz													
	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500
Sound Power Level dB	59	46	60	63	57	52	47	47	43	52	42	47	42	40
	Frequency - Hz													
	630	800	1k	1.25k	1.6k	2k	2.15k	3.15k	4k	5k	6.3k	8k	10k	dB(A)
Sound Power Level dB	42	41	40	38	36	35	35	33	31	28	25	22	18	50

Calculated sound power levels for substation based on lowest measured data on site to reduce the influence of surrounding activity on roads and forecourt



Graphical representation of calculated sound power levels of substation