



ACOUSTIC
CONSULTANTS LTD

Noise Impact Assessment

InstaVolt
Chippenham, SN14 0AF

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Client:



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The report has been prepared in good faith, with all reasonable skill and care, based on information provided or available at the time of its preparation and within the scope of work agreement with the Client. We disclaim any responsibility to the Client and others in respect of any matters outside the scope of the above. The report is provided for the sole use of the named Client and is confidential to them and their professional advisors. No responsibility is accepted to other parties.

The report limits itself to addressing solely on the noise, acoustic, and vibration aspects as included in this report. We provide advice only in relation to noise, vibration and acoustics. It is recommended that appropriate expert advice is sought on all the ramifications (e.g. CDM, structural, condensation, fire, legal, etc.) associated with any proposals in this report or as advised and concerning the appointment. It should be noted that noise predictions are based on the current information as we understand it and, on the performances noted in this report. Any modification to these parameters can alter the predicted level. All predictions are in any event subject to a degree of tolerance of normally plus or minus three decibels. If this tolerance is not acceptable, then it would be necessary to consider further measures.

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1. Introduction

InstaVolt appointed Acoustic Consultants Ltd to undertake a noise impact assessment for the proposed installation of six rapid electric vehicle charging stations to be located north of Bath Road, Chippenham SN14 0AF.

This report provides a noise assessment of activities associated with the charging station, specifically plant noise from the chargers.

A noise impact assessment has been undertaken in accordance with the guidance in the National Planning Policy Framework (NPPF), Noise Policy Statement for England (NPSE), National Planning Practice Guidance (NPPG), British Standard 4142:2014 (BS4142), and British Standard 8233:2014 (BS8233).

2. The Site & Development

The proposed location for the electric chargers is at the land north of Bath Road, Chippenham SN14 0AF. The client is proposing to install 16no. rapid chargers here to accommodate the need for electric charging.

The site is in a mixed-use area with a nursery to the west, a McDonalds to the south, and a Sainsburys to the east.

The nearest NSRs are approximately 60 meters north of the site along Ayr Close and Towcester Close.

The following figures show the NSR locations and proposed site layout.

Figure 1: Google Satelite View Annotated with NSR Locations (Blue)

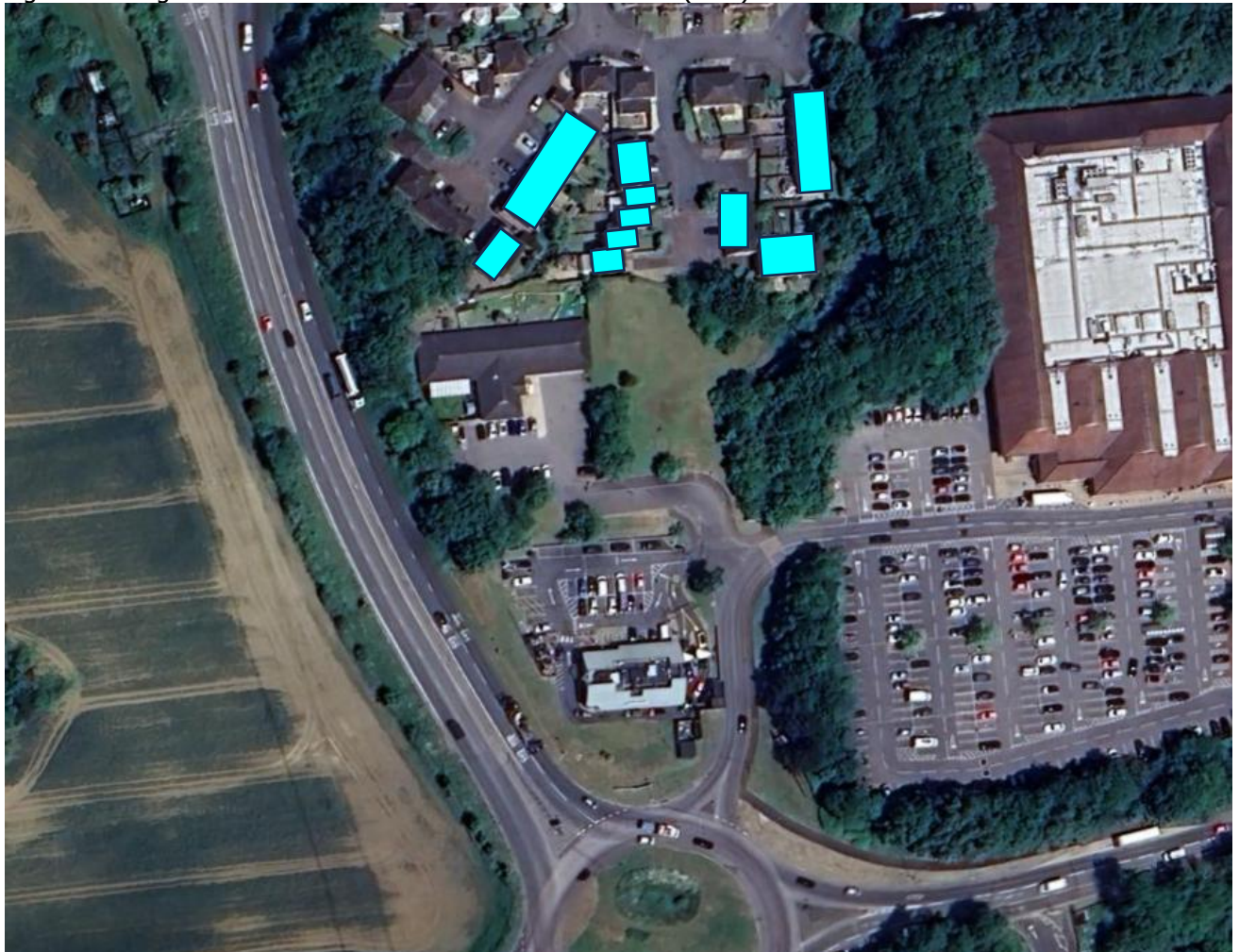
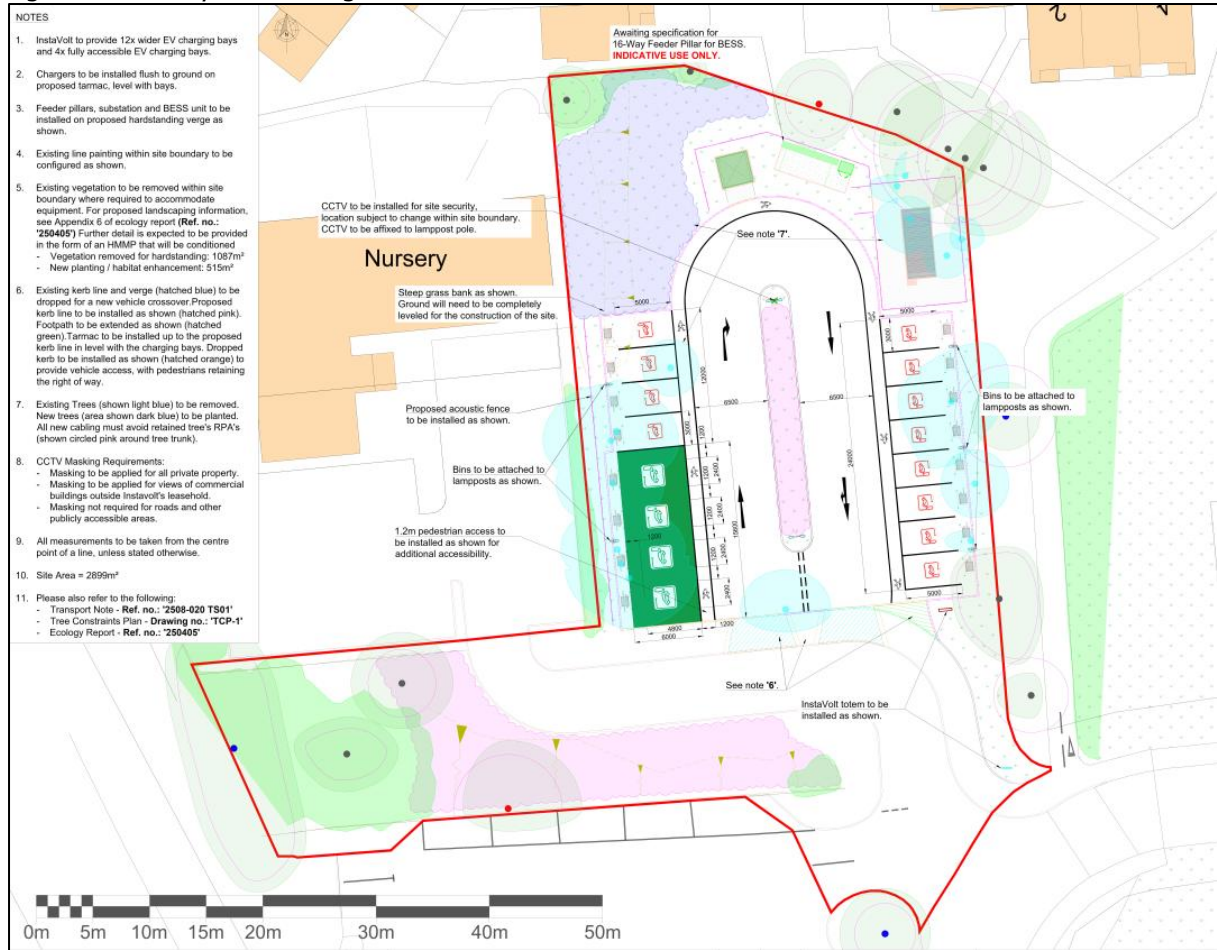


Figure 2: Site Layout Drawing



3. Planning and Noise

3.1. National Planning Policy Framework

The National Planning Policy Framework (NPPF) was published in March 2012 and revised in December 2024. Section 15 entitled 'Conserving and enhancing the natural environment' addresses noise as a requirement of planning. Paragraph 187 states:

"187. 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. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and."

Paragraph 198 states:

"198. 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; and*
- c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation. "*

The document does not prescribe any assessment methodology or criteria to assess the adverse effect of noise and refers you to the NPSE.

3.2. Noise Policy Statement for England

The NPPF refers to the Noise Policy Statement for England (NPSE). This was published in March 2010 and aims to provide clarity regarding current policies and practices to enable noise management decisions to be made within the wider context, at the most appropriate level, in a cost-effective manner and in a timely fashion and applies to all forms of noise including environmental noise, neighbour noise and neighbourhood noise.

The NPSE sets out the long term vision of Government noise policy. This long term vision is supported by three noise policy aims as follows:

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

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life."*

The NPSE introduces the concept of "Significant adverse" and "Adverse" impacts of noise which relate to the noise policy aims. These are applied as follows:

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.

SOAEL – Significant Observed Adverse Effect Level

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

The Noise Policy Statement for England (NPSE) states that noise levels above the Lowest Observed Adverse Effect Level are acceptable in planning where reduced to a minimum.

With regard to where there is potential for noise impact it states the following in relation to the second noise policy aim:

"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."

The NPSE does not provide any assessment criteria for the noted effect levels and each case must be considered on its merits.

The NPSE does, however, emphasise that in dealing with noise Local Planning Authorities are required to take a balanced approach in considering the benefits of development as against any adverse effects which arise. Paragraph 2.18 of the NPSE is particularly relevant in this respect and states:

"There is a need to integrate consideration of the economic and social benefits of the activity or policy under examination with proper consideration of the adverse environmental effects, including the impact of noise on health and quality of life. This should avoid noise being treated in isolation in any particular situation, i.e. not focusing solely on the noise impact without taking into account other related factors."

The planning need is outside the scope of noise and acoustics and will need to be addressed by others.

3.3. Planning Practice Guidance, Noise

The Planning Practice Guidance (PPG) on noise referred to here is based on the current version (July 2019) as provided on the Planning Guidance Website. It states that, *"Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment."*

It provides generic guidance on how to determine the noise impact and what factors could be a concern.

It includes the option types to mitigate any adverse effects of noise stating that there are four broad types of mitigation. These are engineering, layout, using planning conditions or obligations and noise insulation.

Paragraph 5 of the PPG provides a table identifying the effect level and examples of effect relating to the impact effect levels provided in the NPSE. The table is duplicated below:

Table 1: PPG Noise – Perception of Effect Levels

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present 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			
Present 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

The table does not provide any objective assessment which equates to the noted effect levels. However, the PPG identifies that where noise is audible, it is not necessarily intrusive. The effect and impact on people are based primarily on the level of noise.

4. Assessment Criteria

The following section identifies guidance which is considered to provide noise criteria equivalent to or below the LOAEL described in the PPG and NPSE, i.e. *"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."*

For industrial and commercial noise, the most relevant guidance is provided within British Standard 4142:2014+A1:2019. The methods described in the British Standard use outdoor sound levels to assess the likely effects of sound upon people who might be inside or outside a dwelling or other premises used for residential purposes.

The initial estimate principle is that of establishing the 'difference' between the 'rating level' and the 'background sound level'. The 'rating level' is the 'specific sound level' of the source over a period of one hour during the day (07:00 to 23:00 hours) and over a period of 15 minutes during the night (23:00 to 07:00 hours). Clause 9 entitled 'Rating Level' 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."

An acoustic character correction should be added to the 'specific sound level' if it exhibits any tonality, impulsivity, other specific characteristics and/or intermittency at the assessment location. The value of the character correction varies, dependent on the prominence of the character of the sound source at the assessment location. In Clause 11 of the Standard, entitled 'Assessment of the Impacts', it states:

"Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level (see Clause 8) from the rating level (see Clause 9), and consider the following."

- *Typically, the greater this difference, the greater the magnitude of the 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.*
- *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."*

Based on the initial assessment outcomes of BS4142, and depending on context, it is our opinion that the NOEL, LOAEL and SOAEL levels stated in the Noise Policy Statement for England would generally fall within the following categories when considered in conjunction with the effect levels of the PPG Noise.

Table 2: BS4142 Difference in Relation to Effect Levels

BS4142 Assessment Difference	Corresponding Effect Level*	Action*
≤ -10 dB	No Observed Effect	No specific measures required
-9.9 dB to 0 dB	No Observed Adverse Effect	No specific measures required
	Lowest Observed Adverse Effect Level	
0.1 dB to 5 dB	Observed Adverse Effect	Mitigate and reduce to a minimum
	Significant Observed Adverse Effect Level	
5.1 dB to 10 dB	Significant Observed Adverse Effect	Avoid
≥ 10.1 dB	Unacceptable Adverse Effect	Prevent

* BS4142 states that “where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration”. Therefore, the assessment levels and effect levels above are not definitive and can be modified due to context.

It should be noted that the numerical outcome only represents the initial estimate of impact, as stated in the first paragraph of Clause 11, and that contextual matters should be considered before determining what the potential impact is. This paragraph 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 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.

Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level (see Clause [8](#)) from the rating level (see Clause [9](#)).

NOTE 1 More than one assessment might be appropriate.

The second part of Clause 11 sets out three contextual matters that should be taken into account once the initial numerical estimate has been determined. It is important to note that the three listed are not exhaustive and all pertinent factors should be considered. BS 4142:2014 states:

"Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following.

- 1) Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night. Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse.*
- 2) The character and level of the residual sound compared to the character and level of the specific sound. Consider whether it would be beneficial to compare the frequency spectrum and temporal variation of the specific sound with that of the ambient or residual sound, to assess the degree to which the specific sound source is likely to be distinguishable and will represent an incongruous sound by comparison to the acoustic environment that would occur in the absence of the specific sound. Any sound parameters, sampling periods and averaging time periods used to undertake character comparisons should reflect the way in which sound of an industrial and/or commercial nature is likely to be perceived and how people react to it.*

NOTE 3 Consideration ought to be given to evidence on human response to sound and, in particular, industrial and/or commercial sound where it is available. A number of studies are listed in the "Effects on humans of industrial and commercial sound" portion of the "Further reading" list in the Bibliography."

5. Noise Monitoring

A partially attended long-term noise monitoring exercise was undertaken from the 4th of September 2025 until the 8th of September 2025.

5.1. Monitoring Equipment

Sound Pressure Levels were measured using a Class 1 sound level meter with a half-inch condenser microphone, using the 'fast' setting. The equipment is checked regularly using a Quality System meeting the requirements of British Standard EN ISO/IEC 17025:2017 "General requirements for the competence of testing and calibration laboratories"; in accordance with British Standard EN 10012:2003 "Measurement management systems. Requirements for measurement processes and measuring equipment"; and traceable to the National Standards.

This equipment was checked and calibrated as noted below and the certificates are available for inspection.

Table 3: Monitoring equipment

Equipment Description / Manufacturer / Type	Serial Number	Date of Calibration	Calibration Certification Number
SLM, Svantek, 977A	69510	15/03/2024	1508101-1
Pre-Amplifier, Svantek, SV12L	73650	15/03/2024	1508101-1
Microphone, ACO Pacific, 7052E	90933	15/03/2024	1508101-1
Calibrator, Larson Davis, CAL200	17892	08/04/2025	1511884-1

The measurement equipment was checked before and after use with the noted calibrators and no significant drift was detected.

5.2. Weather Conditions

The following table summarises the weather conditions during the duration of the survey:

Table 4: Noise Survey Weather Conditions

Date	Wind Speed (m/s)	Wind Direction	Temperature (°C)	Precipitation (time/hrs)	Cloud Cover (%)
04/09/2025	4 – 9	W	12 – 17	0	50%
05/09/2025	1 – 4	WSW	12 – 19	0.5	25%
06/09/2025	3 – 9	ESE	13 – 21	0	50%
07/09/2025	2 – 11	SSE	14 – 21	3	50%
08/09/2025	2 – 5	SW	11 – 19	0	0%

Some periods during the survey had adverse weather conditions, these periods will be excluded from further analysis (see Figure 4). Outside these periods the weather conditions are not expected to have adversely impacted the collected data.

5.3. Monitoring Procedure

The survey aimed to determine background sound levels at the site in a location representative of the NSRs. A long-term noise measurement was conducted over a 4-day long period, with a microphone mounted on a tripod at a height of 1.5 meters in a free-field position (see the blue dot in Figure 3).

At the NSRs, the main noise source was road traffic from A350 to the west.

The monitoring location is marked on the below figure.

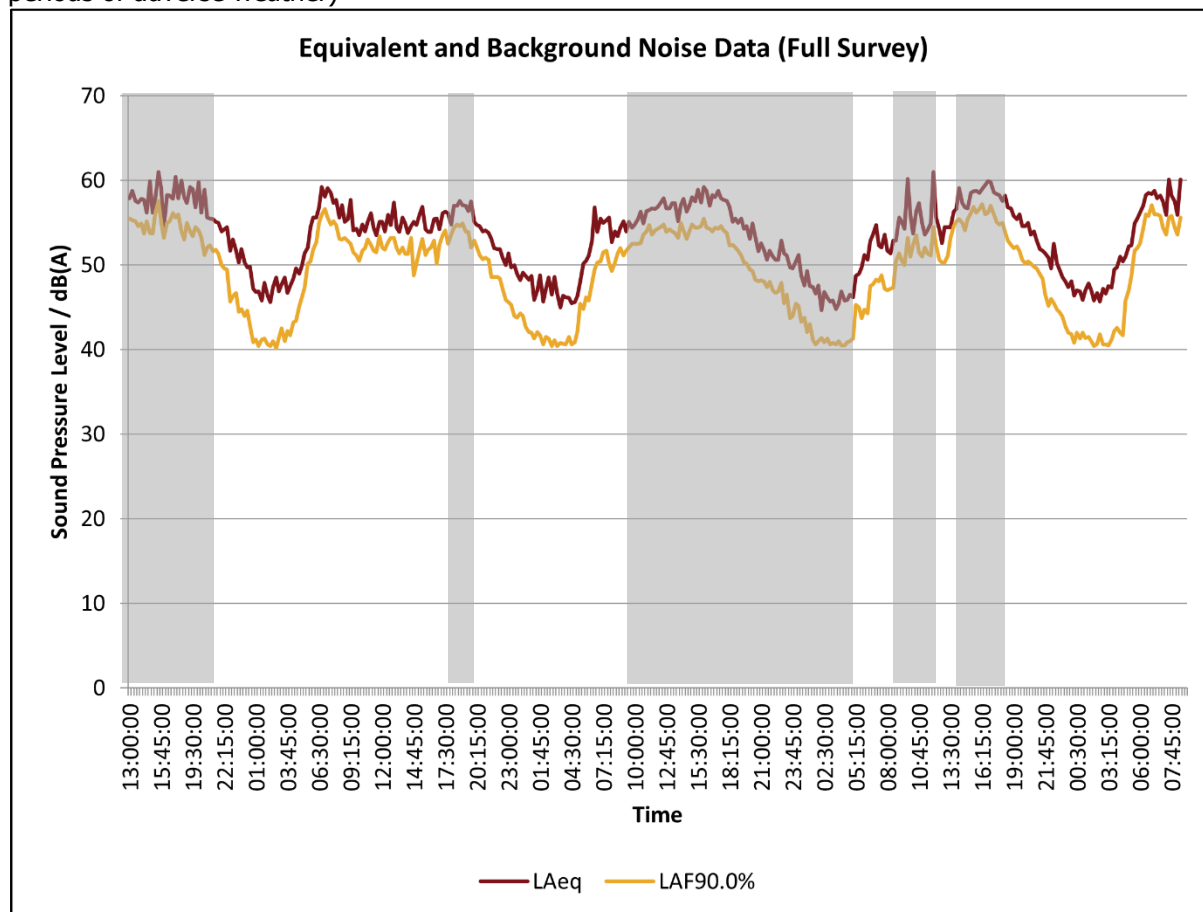
Figure 3: Monitoring Location (blue dot)



5.4. Measured Baseline Noise Levels

The measured background sound levels (dB $L_{A90,15\text{minute}}$) and equivalent noise levels (dB $L_{Aeq,15\text{min}}$) at the long-term monitoring location are provided in the chart below. Periods of adverse weather, have been excluded from the assessment, as indicated in grey on the chart below.

Figure 4: Chart Showing Sound Levels for the Duration of the Survey Period (greyed-out sections reflect periods of adverse weather)



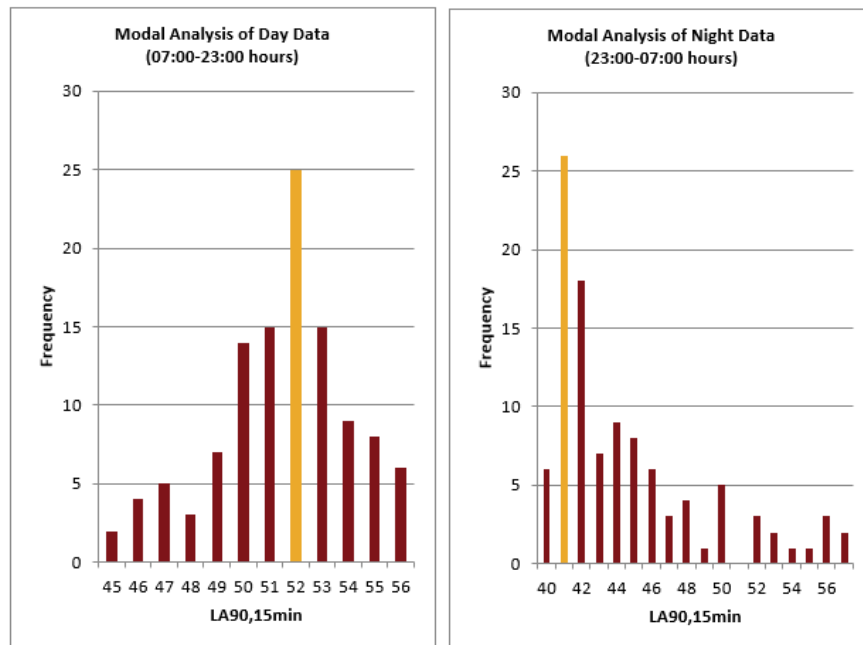
The following table shows the range and modal background and equivalent ambient noise levels, excluding periods of adverse weather:

Table 5: Measured Range and Modal Values of the Equivalent and Background Noise Levels (excluding periods of adverse weather conditions)

Period	dB $L_{A90,15\text{min}}$		dB $L_{Aeq,15\text{min}}$	
	Range	Mode	Range	Mode
Day (07:00 – 23:00)	45-56	52	50-60	55
Night (23:00 – 07:00)	40-57	41	45-59	47

The following figure shows a histogram modal analysis of the measured background sound levels, excluding periods of adverse weather:

Figure 5: Charts Showing the Modal Analysis of the Daytime and Night-time Data (excluding periods of adverse weather conditions)



Based on the analysis above, the following representative background sound levels at the nearest NSRs have been determined to be as follows:

Table 6: Summary of the Representative Background Sound Levels

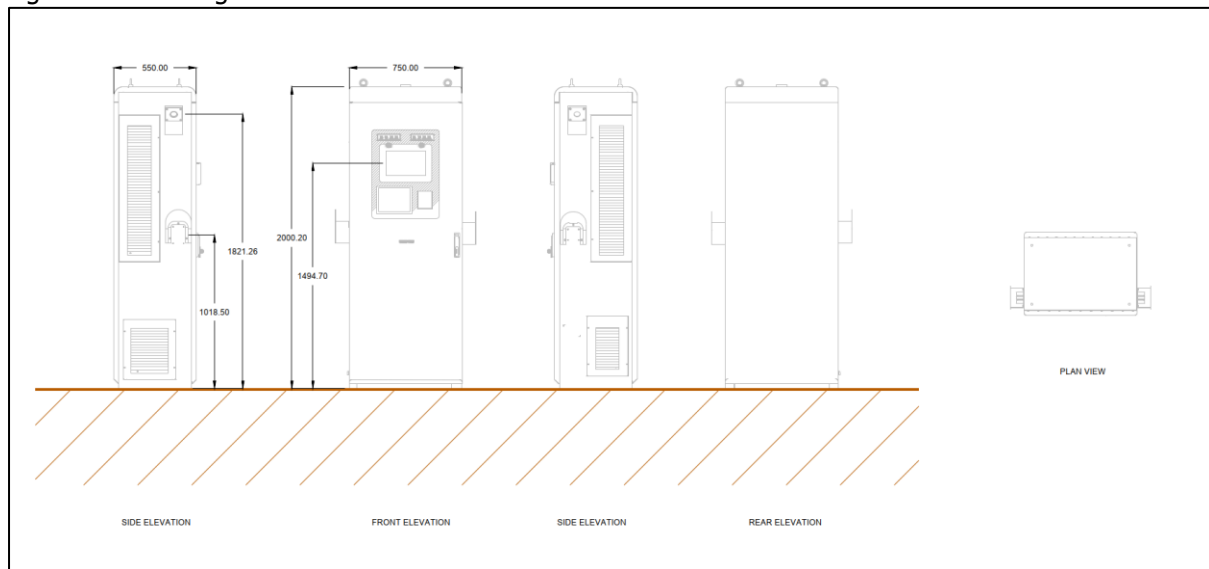
Period	Representative Background Sound Level, dB LA90,15min
Day (07:00 – 23:00)	52
Night (23:00 – 07:00)	41

6. Proposed EV Charging Plant

6.1. Proposed Plant

The proposed plant will be located east of the existing Nursery. It is understood the proposed EV charging plant will comprise of 12no. 160kW single arm DC chargers and 4no. 160kW double arm DC chargers as indicated below:

Figure 6: EV Charger Elevation and Plan View



Since both the single-arm and double-arm EV charging stations operate at the same power level, we have assumed they will produce the same noise levels.

This report only considers noise from the EV charging stations. If noise from other items of plant needs addressing additional plant noise data would need to be provided.

6.2. Operational Noise Levels

Acoustic Consultants Limited have undertaken a noise survey of InstaVolt 120kW DC charging units. We understand the 160kW units are of the same operating noise level from the manufacturers noise data.

6.2.1. Measurement Process

The survey was completed on the 13th of February 2023, at DoubleTree Hilton Congresbury, Frost Hill using a fully calibrated Class 1 sound level meter.

The charging station was operating under normal conditions, charging a Jaguar I-Pace electric car from approximately 40% battery level. Power drawn was noted to be in the region of 60 kW/hr.

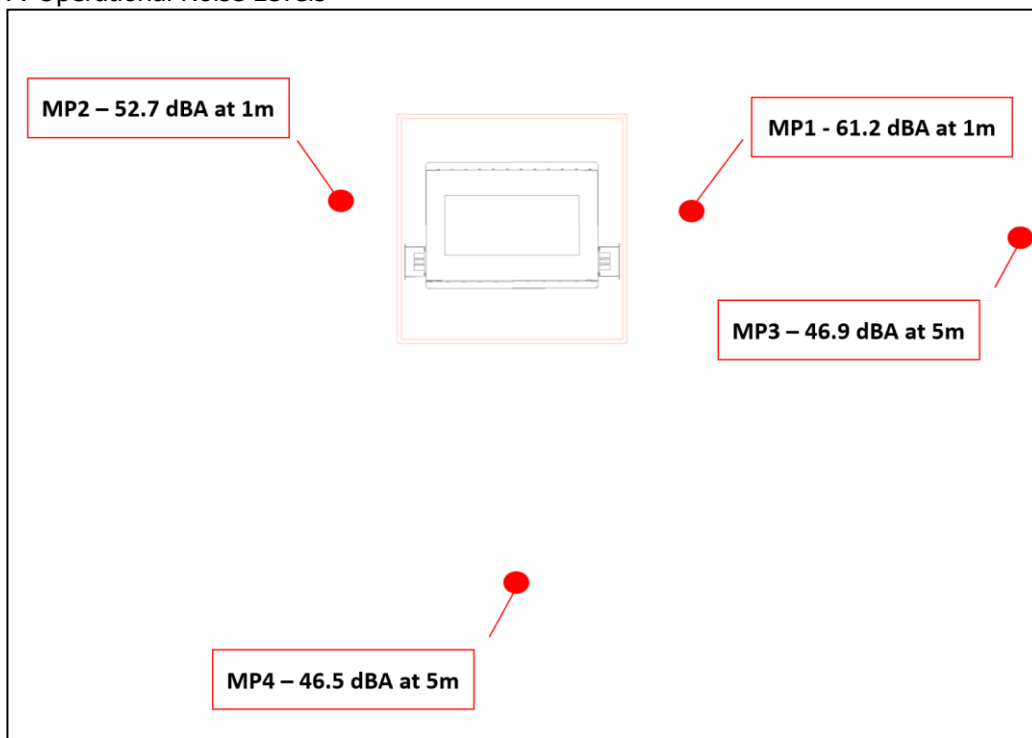
During the survey conditions were clear, dry, and calm, with an ambient temperature of 4 degrees centigrade.

The sound level meter was at a height of 1.5m (to the side), and 3m (to the front to be above the car). The survey was completed in third octave bands and the primary noise source was the DC charger. The sound level meter was in a free-field position for all measurements.

6.2.2. Measured Noise Levels

The following noise levels were measured:

Figure 7: Operational Noise Levels



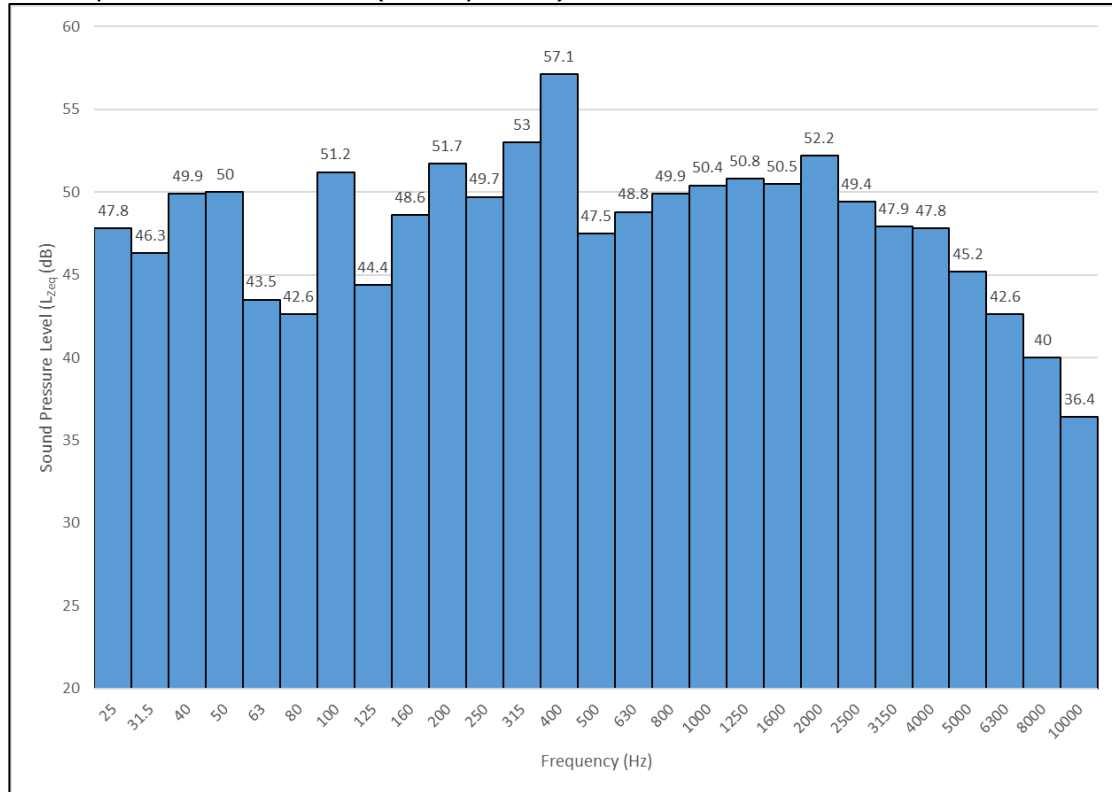
6.2.3. Sound Power Level

The derived plant sound power levels based on the highest measured level above is 69 dB L_{WA} .

6.2.4. Tonality

The third octave data at 1m (from MP1) is provided below, showing no tonality when assessed to BS4142.

Figure 8: Operational Noise Levels (Tonality Check)



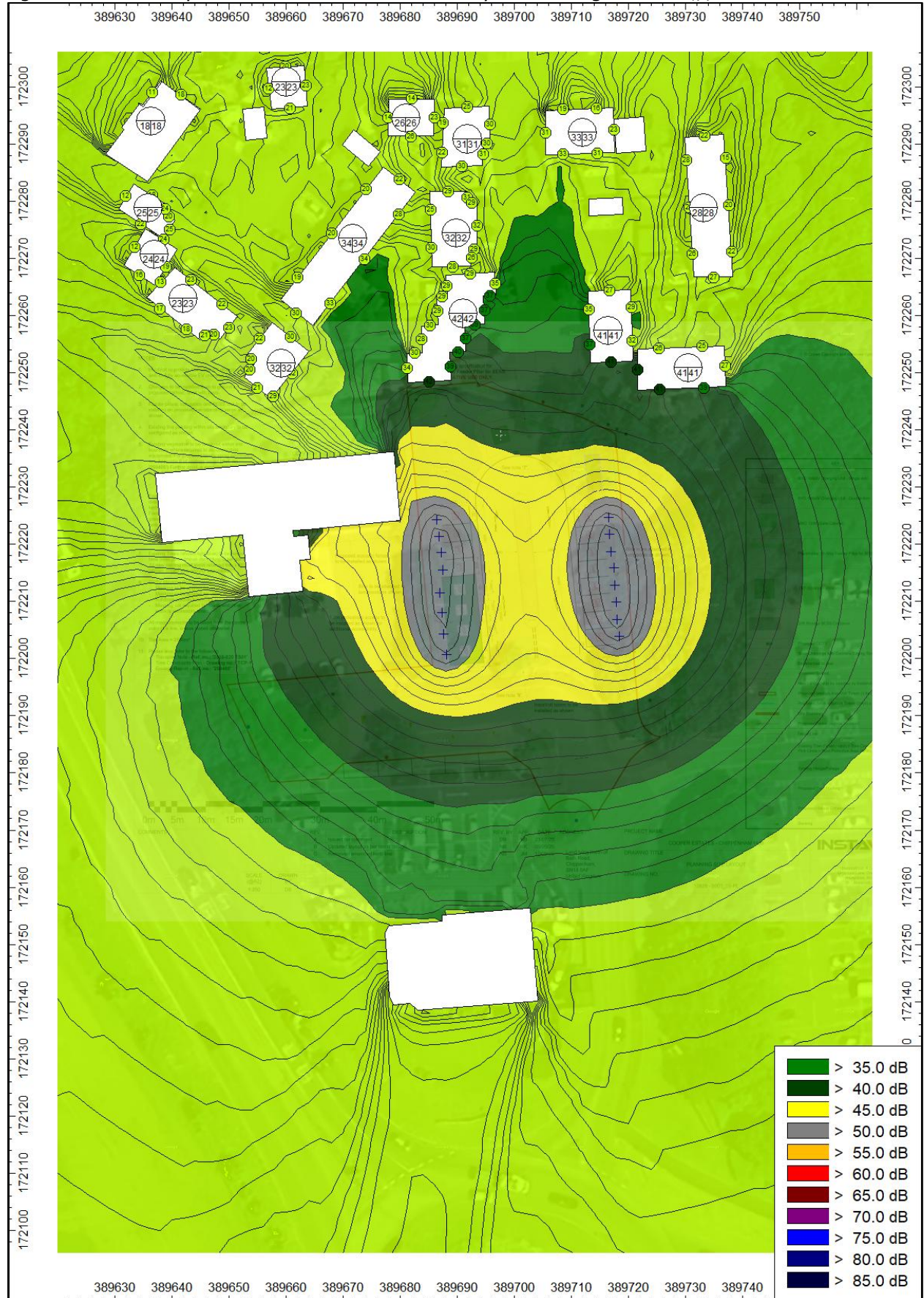
7. Noise Modelling

The plant noise emission has been modelled in the noise modelling software Cadna:A by DataKustik. The modelling software calculates sound levels based on the inputted sound emission values, source and receiver locations, and primarily distance, barrier and ground attenuation. Calculations are undertaken using the General Method of Calculation from ISO 9613-2:2024. The parameters within the Cadna:A model are as follows and are considered reasonable assumptions:

- The height of the surrounding buildings are based on a google maps images.
- The order of reflections is 3, and all buildings are reflective.
- The ground across the site and surrounding area is considered hard and reflective.
- The predictions are based on the measured DC Charger noise levels.
- The predictions are based on all plant operating continuously.
- The predicted noise map is at 4.5m high.
- We have assumed 16no. chargers are in use simultaneously during the day and night time assessment periods.
- Noise levels from any other plant are not considered in the noise model. If noise data is provided these can be included.
- The predicted building evaluation levels are free field.

A noise map of the plant specific sound levels is provided below for the daytime and night-time plant operation.

Figure 9: Predicted Specific Sound Level of Plant for Daytime and Nighttime $L_{Aeq(T)}$ dB



8. Noise Impact Assessment

A British Standard 4142:2014+A1:2019 assessment has been undertaken at the sensitive receivers on the site.

8.1. Background Sound Level

From the measured data we have determined a typical day time background sound level of 52 dB $L_{A90, 1 \text{ hour}}$ and the night-time background of 41 dB $L_{A90, 15 \text{ minutes}}$.

8.2. Predicted Specific Sound Level

The cumulative specific sound level at the proposed worst-case receiver is 42 dB $L_{Aeq(T)}$ free-field level. This is the level determined at the noise sensitive receivers without any character corrections applied.

8.3. Character Corrections

Character corrections should be added to the 'specific sound level' if it exhibits any *tonality, impulsivity, other specific characteristics and/or intermittency* at the assessment location. Based on our site visit and knowledge of such EV charging units, corrections to be applied are as follows:

- *Tonality* – The plant is not considered to be tonal as shown in our measurement data.
- *Impulsivity* – Plant such as this is not normally impulsive.
- *Intermittency* – We do not expect that the intermittency of the plant will be distinguishable at the sensitive receiver over the residual noise climate and no character correction is applied.
- *Other Sound Characteristics* – We do not believe any correction is due to other characteristics.

8.4. Initial Estimate

Therefore, the BS4142 initial estimate at the most sensitive location is as follows:

Table 7: BS4142 initial estimate for NSR

Parameter	Daytime	Night-time
Background Level, $L_{A90, (T)}$	52 dB	41 dB
Specific Sound Level, $L_{Aeq, (T)}$	42 dB	42 dB
Character Correction	0 dB	0 dB
Rating Level, $L_{Ar, T}$	42 dB	42 dB
Excess of rating over background level	- 10 dB	+ 1 dB

This suggests that the plant rating noise level at the nearest noise sensitive receiver will result in a low impact at NSRs during daytime and nighttime hours when assessed to BS4142.

However, it should be noted that the numerical outcome only represents the initial estimate of impact, as stated in the first paragraph of Clause 11, and that contextual matters should be considered before determining what the impact will be.

8.5. Context

With regard to context, BS4142 states *"Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following:"*

8.5.1. Absolute Levels

BS4142 states:

"1) The absolute level of sound. For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low. Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night. Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse."

With regard to 'absolute levels', the most relevant guidance is British Standard 8233:2014. Section 7.7.2 Table 4 of the British Standard provides internal ambient noise levels for dwellings from noise sources 'without a specific character'. We would advise the rating level is considered to allow for the character of the source.

The guideline states that noise levels should not exceed 35 dB $L_{Aeq(16hr)}$ within living rooms during the daytime, and 30 dB $L_{Aeq(8hr)}$ within night-time rooms. The internal level is approximately 15 dB quieter than the external free-field level (as stated by the BS8233:2014 and WHO 1999) allowing for the attenuation of a partially open window. Therefore, based on the predicted specific sound level noted above, the internal absolute levels are as follows.

Table 8: Comparison with British Standard 8233:2014 at Worst-Case Receiver

Parameter	Predicted Level dB $L_{Aeq(T)}$	Open Window Correction dB(A)	Predicted Internal Level dB(A)	Within BS8233 Criteria?
Day	42	-15	27	YES
Night	42	-15	27	YES

As can be seen from the above table, the predicted level internally to the NSR is clearly within the internal limits stated within British Standard 8233.

8.5.2. Residual Level

BS4142 also states:

"2. The character and level of the residual sound compared to the character and level of the specific sound. Consider whether it would be beneficial to compare the frequency spectrum and temporal variation of the specific sound with that of the ambient or residual sound, to assess the degree to which the specific sound source is likely to be distinguishable and will represent an incongruous sound by comparison to the acoustic environment that would occur in the absence of the specific sound. Any sound parameters, sampling periods and averaging time periods used to undertake character comparisons should reflect the way in which sound of an industrial and/or commercial nature is likely to be perceived and how people react to it."

We have compared the residual noise climate, i.e. *the ambient sound at the assessment location when the specific sound source (plant equipment) is suppressed to such a degree that it does not contribute to the ambient sound*, to the specific sound level (plant). This is summarised below:

Table 9: Residual Noise Climate

Parameter	Daytime	Night-time
Lowest Residual Sound Level $L_{Aeq(15 \text{ minutes})}$	50 dB	45 dB
Rating Sound Level $L_{Ar(T)}$	42 dB	42 dB
Difference	- 8 dB	- 3 dB

As can be seen above, the rating sound level is below the lowest residual sound level during the day and night period.

We would consider the noise source would not be dominant over the residual noise climate. Therefore, it can be concluded that the plant noise would result in a low impact at the NSRs when compared to the residual noise climate during both the day and night.

8.6. **Summary of Assessment**

As can be seen above, it is clear that noise from the charging stations will be acceptable and of a low impact during both day and night when assessed to British Standard 4142:2014+A1:2019 and once context has been considered.

On this basis, we would consider the noise impact of the proposed plant to fall in the No Observed Adverse Effect Level (NOEL) of the NPSE and NPPG and achieves the aims of National Planning Policy Framework (NPPF).

We consider that noise should not be considered a material constraint in determining the plant noise aspects of the planning application.

9. Summary and Conclusions

InstaVolt appointed Acoustic Consultants Ltd to undertake a noise impact assessment for the proposed installation of 16 rapid electric vehicle charging stations located at the land north of Bath Road Chippenham SN14 0AF.

This report provides a noise assessment of activities associated with the charging station, specifically plant noise from the chargers.

A baseline noise survey and plant noise assessment has been completed. The assessment clearly indicates that the plant noise will be acceptable and of a low impact during both day and night when assessed to British Standard 4142:2014+A1:2019.

On this basis, we would consider the noise impact of the proposed plant to fall below the Lowest Observed Adverse Effect Level (LOAEL) of the NPSE and NPPG and achieves the aims of National Planning Policy Framework (NPPF).

We consider that noise should not be considered a material constraint in determining the plant noise aspects of the planning application.

10. Appendix 1 – Glossary of Acoustic Terminology

A-weighted sound pressure p_A – value of overall sound pressure, measured in pascals (Pa), after the electrical signal derived from a microphone has been passed through an A-weighting network.

A-weighted sound pressure level, L_{pA} – quantity of A-weighted sound pressure given by the following formula in decibels (dBA)

$$L_{pA} = 10 \log_{10} (p_A/p_0)^2$$

where:

p_A is the A-weighted sound pressure in pascals (Pa);
 p_0 is the reference sound pressure (20 μ Pa)

Background sound level, $L_{A90,T}$ – A-weighted sound pressure level that is exceeded by the residual sound assessment location for 90% of a given time interval, T, measured using weighting F and quoted to the nearest whole number of decibels

Break-in - noise transmission into a structure from outside.

Decibel (dB) – The decibel is the unit used to quantify sound pressure levels. The human ear has an approximately logarithmic response to acoustic pressure over a very large dynamic range (typically 20 micro-Pascals to 100 Pascals). Therefore, a logarithmic scale is used to describe sound pressure levels and also sound intensity and power levels. The logarithms are taken to base 10. Hence an increase of 10 dB in sound pressure level is equivalent to an increase by a factor of 10 in the sound pressure level (measured in Pascals). Subjectively, this increase would correspond to a doubling of the perceived loudness of sound.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$ – value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, $T = t_2 - t_1$, has the same mean-squared sound pressure as a sound that varies with time, and is given by the following equation:

$$L_{Aeq,T} = 10 \log_{10} \left\{ (1/T) \int_{t_1}^{t_2} [p_A(t)^2 / p_0^2] dt \right\} \quad (1)$$

where:

p_0 is the reference sound pressure (20 μ Pa); and

$p_A(t)$ is the instantaneous A-weighted sound pressure (Pa) at time t

NOTE The equivalent continuous A-weighted sound pressure level is quoted to the nearest whole number of decibels.

Facade level – sound pressure level 1 m in front of the façade. Facade level measurements of L_{pA} are typically 1 dB to 3 dB higher than corresponding free-field measurements because of the reflection from the facade.

Free-field level – sound pressure level away from reflecting surfaces. Measurements made 1.2 m to 1.5 m above the ground and at least 3.5 m away from other reflecting surfaces are usually regarded as free-field. To minimize the effect of reflections the measuring position has to be at least 3.5 m to the side of the reflecting surface (i.e. not 3.5 m from the reflecting surface in the direction of the source).

Octave and Third Octave Bands – The human ear is sensitive to sound over a range of frequencies between approximately 20 Hz to 20 kHz and is generally more sensitive to medium and high frequencies than to low frequencies within the range. There are many methods of describing the frequency content of a noise. The most common methods split the frequency range into defined bands, in which the mid-frequency is used as the band descriptor and in the case of octave bands is double that of the band lower. For example, two adjacent octave bands are 250 Hz and 500 Hz. Third octave bands provide a fine resolution by dividing each octave band into three bands. For example, third octave bands would be 160 Hz, 250 Hz, 315 Hz for the same 250 Hz octave band.

Sound pressure level – Sound pressure level is stated on many of the charts. It is the amplitude of the acoustic pressure fluctuations in a sound wave, fundamentally measured in Pascals (Pa), typically from 20 micro-Pascals to 100 Pascals, but commonly simplified onto the decibel scale.

Sound reduction index, R – laboratory measure of the sound insulating properties of a material or building element in a stated frequency band.

Specific sound level, $L_s = L_{Aeq,T_r}$ – equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r .

Structure-borne noise – audible noise caused by the vibration of elements of a structure, the source of which is within a building or structure with common elements.

Rating level, L_{Ar,T_r} – Specific sound level plus any adjustment for the characteristic features of the sound.

Reverberation Time, T – The reverberation time is defined as the time taken for a noise level in an enclosed space to decay by 60 dB from a steady level once the noise source has stopped. It is measured in seconds. Often a 60 dB decay cannot be measured so the reverberation time is measured over a lesser range and corrected back to the time for a 60 dB drop assuming a constant decay rate. Common parameters are T20 (time taken for a 20 dB decay multiplied by three) and T30 (time taken for a 30 dB decay multiplied by two).

Vibration Dose Value, VDV – measure of the total vibration experienced over a specified period of time.

Estimated Vibration Dose Value, $eVDV$ – estimation of the total vibration experienced over a specified period of time. This is usually based on the number of events and shortened measurement data.

Weighted sound reduction index, R_w – Single-number quantity which characterizes the airborne sound insulating properties of a material or building element over a range of frequencies. The weighted sound reduction index is used to characterize the insulation of a material or product that has been measured in a laboratory (see BS EN ISO 717-1).



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