



MFG Thames Valley Service Station

A noise impact assessment of service station forecourt changes

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Contents

1.0 Introduction 1

2.0 Assessment Methodology and Criteria 1

3.0 Noise Survey..... 5

4.0 Noise Assessment 7

5.0 Conclusions..... 10

Appendices

- Appendix A:** Drawings and Figures
- Appendix B:** Measured Data

1.0 Introduction

- 1.1 Sharps Acoustics LLP (SAL) have been instructed by Frowsbury Projects to undertake a noise assessment to support a planning application for service forecourt amendments including 4no. jet wash bays; associated plant room, and 2no. service bays.
- 1.2 Details of the assessment methodology employed, together with the results of the baseline survey, assessment and conclusions are presented within this report.

Site Description

- 1.3 Thames Valley Service Station is located at George Street, Reading RG4 8DH (hereinafter, "The Site").
- 1.4 The area surrounding The Site has been noted to be mixed commercial and residential in nature with Elis Laundry Services to the west, Hills Meadow public park to the southeast and residential premises to the north, with rear gardens bounding The Site to the north. The nearest noise sensitive receptors have been identified as the dwellings along Queens Road, nominally 17m north of The Site boundary.

2.0 Assessment Methodology and Criteria

National Planning Policy Framework (NPPF)

- 2.1 Government planning policy in relation to noise is contained in the National Planning Policy Framework (NPPF). The relevant paragraph from this (paragraph 191) states:

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

a) mitigate and reduce to a minimum potential adverse 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 ..."

- 2.2 The requirement to avoid significant impacts and to mitigate and reduce other adverse effects to a minimum was originally recommended in the Noise Policy Statement for England (NPSE).

Noise Policy Statement for England (NPSE)

- 2.3 The 2010 DEFRA publication 'Noise Policy Statement for England' (NPSE) sets out policy advice applicable to the assessment and management of noise, including environmental noise. The NPSE states three policy aims, which are:

- *"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."*

2.4 All three of these aims are to be considered in the context of Government policy on sustainable development.

2.5 The first two aims require that no significant adverse impact should occur and, where noise falls between the lowest observable adverse effect level (LOAEL) and the significant observed adverse effect level (SOAEL), then according to the NPSE:

"... all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life whilst also taking into consideration the guiding principles of sustainable development. This does not mean that such effects cannot occur."

2.6 The NPSE notes that, "It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times".

2.7 The NPSE describes the Government's "guiding principles of sustainable development", listing the following as underpinning their sustainable development strategy:

- ensuring a strong, healthy and just society;
- using sound science responsibly;
- living within environmental limits;
- achieving a sustainable economy; and
- promoting good governance.

2.8 Thus, noise should not be considered in isolation; the economic and social benefit of a proposed development should be considered alongside the potential adverse effects from noise.

Planning Practice Guidance on Noise (PPG: Noise)

2.9 The Government first published their Planning Practice Guidance on noise (PPG) in March 2014, with the most recent version issued in July 2019. The PPG provides guidance on the interpretation and implementation of planning policy, as contained in the NPPF and the NPSE.

2.10 The use of the lowest observed adverse effect level (LOAEL) and significant observed adverse effect level (SOAEL) for the assessment of noise impacts is reinforced in the PPG, which seeks to define human perception at these effect levels.

2.11 The PPG describes the LOAEL as the level at which "noise can be heard and causes small changes in behaviour, attitude or other physiological response" and it is "present and intrusive". Below this level, the PPG describes the NOAEL, or No Observed Adverse Effect Level, which it notes "can be heard but

does not cause any change in behaviour, attitude or other physiological response” as the noise is *“present but not intrusive”*. The NOAEL is not included in the NPSE and is introduced in the PPG. Below the NOAEL, the PPG describes the NOEL, or No Observed Effect Level, where noise is *“not present”* and has *“no effect”*.

2.12 The PPG describes the LOAEL as the:

“... boundary above which the noise starts to cause small changes in behaviour and attitude, for example, having to turn up the volume on the television or needing to speak more loudly to be heard. The noise therefore starts to have an adverse effect and consideration needs to be given to mitigating and minimising those effects (taking account of the economic and social benefits being derived from the activity causing the noise).”

2.13 Significant observable adverse effects, i.e. those occurring at or above the SOAEL, are described as *“present and disruptive”* and the PPG states that above the SOAEL:

“... the noise causes a material change in behaviour such as keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present. If the exposure is predicted to be above this level the planning process should be used to avoid this effect occurring, for example through the choice of sites at the plan-making stage, or by use of appropriate mitigation such as by altering the design and layout. While such decisions must be made taking account of the economic and social benefit of the activity causing or affected by the noise, it is undesirable for such exposure to be caused.”

Derivation of suitable assessment methodology and criteria

2.14 It is possible to apply objective standards to the assessment of noise and the effect produced by the introduction of a certain noise source may be determined by several methods, as follows:

- i) The effect may be determined by reference to guideline noise values. British Standard (BS) 8233:2014 and several other sources such as the World Health Organisation’s (WHO) *“Guidelines for Community Noise”* contain such guidelines.
- ii) Alternatively, the impact may be determined by considering the change in noise level that would result from the proposal, in an appropriate noise index for the characteristic of the noise in question. There are various criteria linking change in noise level to effect. This is the method that is suited to, for example, the assessment of noise from road traffic because it can predict impact to all properties adjacent to a road link irrespective of their distance from the road.
- iii) Another method is described within British Standard BS 4142, the current version of which is BS 4142: 2014+A1: 2019, ‘Methods for rating and assessing industrial and commercial sound’, to determine the significance of sound impact from sources of industrial and/or commercial in nature. The sources that the standard is intended to assess are sounds from industrial and manufacturing processes, sound from fixed plant installations, sound from loading and unloading of goods at industrial and/or commercial premises and the sound from mobile plant and vehicles, such as forklift, train or ship movements.

- 2.15 In order to assess noise from mechanical plant, the approach set out in BS 4142 is most appropriate, as the noise sources present would be similar to those listed within the scope of that standard. Paragraphs 2.19 to 2.25 below explain the key features of this standard in more detail.

British Standard BS 4142: 2014 + A1:2019

- 2.16 British Standard (BS) 4142: 2014+A1: 2019 '*Methods for rating and assessing industrial and commercial sound*' (BS 4142) describes a method for rating and assessing sound of an industrial or commercial nature, which includes, in Section 1.1 of the standard:

"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 premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site."

- 2.17 The industrial or commercial sound is assessed outside an existing or proposed dwelling or premises used for residential purposes. BS 4142 does not consider internal spaces in terms of its numerical assessment.
- 2.18 The procedure contained in BS 4142 begins by quantifying the "specific sound level", which is the measured or predicted level of sound from the source in question over a one-hour period for the daytime or a 15-minute period for the nighttime. Daytime and nighttime are not defined in BS 4142, but the standard notes that they are typically taken to be 0700 to 2300 hours for daytime, and 2300 to 0700 hours for nighttime.
- 2.19 BS 4142 sets out a number of methods of determining the specific sound level including, for situations where the specific sound source does not yet exist, the ability to estimate it, stating, at Section 7.3.6:

"Determine the specific sound level by calculation alone if measurement is not practicable, for example if the source is not yet in operation. In such cases, report the method of calculation in detail and give the reason for using it."

- 2.20 The specific sound level is converted to a rating level by adding penalties on a sliding scale to account for potentially tonal, impulsive or intermittent elements. The standard sets out subjective and objective methods for determining the presence of tones or impulsive elements but notes that the objective methods should be used where the subjective method is not sufficient. For situations where the specific sound source does not yet exist, the objective methods cannot be used.
- 2.21 The assessment outcome results from a comparison of the rating level with the background sound level (which is determined by the assessment of typical background noise levels by survey). The standard states, in Section 11:

- "a) Typically, the greater this difference, the greater the magnitude of the impact.
- b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
- d) 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.

NOTE 2 Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact."

2.22 Finally, BS 4142 requires that the level difference is considered in the context in which it is found. Contextual considerations include:

- Absolute level of sound. If the existing level is particularly high or low, then this can affect the significance of a particular difference (assessed as described in 2.26 above).
- The character and level of the residual sound compared to the character and level of the specific sound.
- Sensitivity of receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions such as:
 - i. facade insulation treatment;
 - ii. ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and
 - iii. acoustic screening.

3.0 Noise Survey

- 3.1 An unattended noise survey was undertaken between Thursday 14th to Wednesday 20th May 2026.
- 3.2 A long-term measurement position was selected in the northeast corner of the site to determine existing noise levels at the closest noise-sensitive receptors (NSRs). The microphone was set at approximately 2.0m above ground level in free field conditions in the location shown in the aerial view in Figure A1 Appendix A.
- 3.3 The recording equipment used for the survey was a Larson Davis LxT unit. The equipment was calibrated before and after the survey with no significant drift. The noise monitoring equipment used during the

survey is shown in Table 3.1, and was set to record a number of parameters, including the $L_{Aeq,T}$, L_{A90} , L_{A10} and L_{AFmax} .

Table 3.1: Survey Equipment

Equipment Description	Serial Number	Calibrator Reference Level
Larson Davis LxT sound level meter	3934	-
Larson Davis PCB microphone	29332	-
Larson Davis CAL200 calibrator	13691	114 dB

3.4 Measurements were taken over continuous 15-minute periods throughout the survey.

Survey Results

3.5 The average daytime and night-time L_{Aeq} , L_{A90} and L_{AFmax} results from the survey are summarised in Table 3.2 and provided in full graphically in Figure B1 in Appendix B.

Table 3.2: Summary of noise survey results

Position	Period	Sound Pressure Level dB	
		$L_{Aeq,T}$	Typical $L_{A90,15min}$
MP1	Daytime (07:00 to 23:00 hours)	57	53
	Night-time (23:00 to 07:00 hours)	49	40

3.6 For information purposes it can be noted:

- Measurements of sound level were all made with the A-weighting, which is a filter applied to the sound level meter to simulate the frequency response of the human ear, which is more sensitive to high frequency sound than low.
- L_{Aeq} is the equivalent continuous noise level which is a method of averaging the varying noise level over the measurement period into a single figure value. The L_{Aeq} has the same sound energy as the fluctuating level over that period. The L_{Aeq} is also known as the “ambient level” and in BS 4142 the L_{Aeq} in the absence of the proposed development sound is known as the “residual level”.
- L_{Amax} is the highest level within the measurement period.
- L_{A90} is the noise level exceeded for 90% of the time and is referred to as the background noise level.

Weather

3.7 The weather forecast throughout the survey was for dry conditions with a slight breeze and suitable for measurements of noise, with the exception of 19/05/2026, which has been omitted from the dataset (as highlighted in Figure B1 in Appendix B).

Description of Noise Climate

- 3.8 During the attended aspects of the survey the noise climate was predominantly controlled by road traffic noise along the B3345, with contributions from existing service station activities, including intermittent automated car wash operations.
- 3.9 Reference to Figure B1 in Appendix B shows that during the unattended aspects of the survey the noise levels follow a diurnal pattern, typical of road traffic noise in an urban environment, with a reduction in the evening and the lowest levels measured at night.

4.0 Noise Assessment

- 4.1 This section of the report outlines the prediction and assessment of noise generated by the proposed activities and items of mechanical plant.
- 4.2 The recognised methodology for assessment has been taken from BS 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound* which includes consideration of sound from fixed plant installations. The numerical assessment has been provided below for relevant periods of proposed operation, following the definition of specific sound levels.
- 4.3 It has been determined that the key sources of sound relating to the development proposals would be:
- Jet wash activities;
 - Associated plant room;
 - Air, water and vacuum combi units;
- 4.4 Noise data used in the assessment is detailed below. Reference measurement/source data for the proposed items/operations have been provided in Appendix B for reference.

Proposed Mechanical Plant

- 4.5 Noise levels emanating from the proposed mechanical plant and is presented in Table 4.1 below based on information provided by the Client.

Table 4.1: Proposed Mechanical Plant Noise Levels

Plant	Number of units	Sound Pressure Level at 1m $L_{Aeq,T}$ (dB)
Jet Wash Units	4	70
Combi Units	2	66
Plant Room	1	85*

*Internal reverberant sound level of 85 dB SPL_{INT} with one pump operating.

- 4.6 Jet wash units have been given an additional +8 dB adjustment (above those listed in Table 4.1) where operations have a high degree of variability and uncertainty.
- 4.7 A conservative 20 dB R_w has been assumed for the proposed plant room, in lieu of a more rigorous calculation of plant room enclosure break-out.

Specific Sound Level Prediction

- 4.8 To understand a specific sound level for the purposes of assessment, it has been necessary to make some level of assumption to the proposed usage times.
- 4.9 It is assumed that the jetwash bays and associated plant room would typically be used for 50% of any daytime reference period. However, it is not expected that the jetwash bays will be available for operation during night-time hours (23:00 – 07:00).
- 4.10 The two service bays would be served by 1 no. air, water and vacuum combi unit . It is assumed that service bay equipment may operate in any period of the day or night, with a 50% on-time during the daytime reference period (1-hour) and 100% during the night-time reference period (15-minutes).
- 4.11 The cumulative daytime and night-time noise levels generated by the proposed replacement mechanical plant has been predicted to the closest noise sensitive receptors identified in Figure A1 in Appendix A. The closest noise-sensitive receptors are approximately 30 – 70m north of development plant.
- 4.12 The results are presented in Table 4.2 below.

Table 4.2: Predicted Specific Sound Levels

Location		Period	Specific Sound Level, dB L _{Aeq,T}
South-facing windows of nearest dwellings along Queens Road	GF Window	Daytime	40
	1F Window	Night-time	34

Sound Rating Level

- 4.13 In accordance with the guidance contained in BS 4142 the specific sound level has been corrected for tonal, impulsive, intermittent or other acoustic characteristics which may be present at the receptor to determine the sound rating level.
- 4.14 A character correction of + 6 dB is generally applied for a jet wash plant, where intermittent and impulsive nature may be just perceptible at the nearest receptors; however, where the existing site already comprises various car wash activities, no character correction has been applied in this instance.
- 4.15 A character correction of + 2 dB has been applied for service bay equipment, where tonality may be just perceptible at the nearest receptors (if audible). This informs a worst-case where noise associated with service bay equipment would be of a similar character to existing service station plant.
- 4.16 The daytime and night-time sound rating levels are therefore presented in Table 4.3 below.

Table 4.3: Predicted Rating Sound Levels

Location		Period	Rating Sound Level, dB L _{A,r,T}
NSR	GF Window	Daytime	40
	1F Window	Night-time	36

BS 4142 Initial Estimate of Impact

- 4.17 The predicted daytime and nighttime sound rating levels at the closest noise-sensitive receptors has been compared to the BS 4142 background levels and are presented in the table below.

Table 4.4: Initial Estimate of Impact

Location	Period	Sound Rating Level (dB L _{Ar,T})	BS 4142 Background Level (dB L _{A90,T})	Level Exceeding Background (dB)
NSR1 – A1	Daytime	40	53	-13
	Night-time	36	40	-4

- 4.18 Table 4.4 shows that the sound rating level of the proposed plant would be below the representative background sound level during the daytime and night-time periods
- 4.19 As discussed in 2.21 above, in general, 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.
- 4.20 Based on the above, the initial assessment suggests that noise from the proposed mechanical plant and operations would have a low impact on surrounding receptors, depending on context.

Context

- 4.21 BS 4142 states that where the initial estimate of impact needs to be modified due to the context, all pertinent factors should be taken into consideration, including the following:

The Absolute Level of Sound

- 4.22 The proposed plant rating levels are predicted to fall significantly below the existing average ambient noise levels in the day and night (presented in Table 3.2 above). Existing ambient sound levels lie above the daytime rating levels by 17 dB and 13 dB during the night-time period.
- 4.23 Where there are large differences between the residual sound level over the specific sound level, of > 10 dB(A), then it has been realised in context that the ambient sound level should not change by any perceptible degree due to the instatement of the development.

The Character and Level of the Residual Sound

- 4.24 The assessment has shown that the existing noise climate is predominantly controlled by road traffic noise and existing commercial plant and forecourt operations, including automated car wash activities in the daytime. These are similar in character to the proposed development activities/plant.
- 4.25 Furthermore, plant character corrections applied in 4.16 – 4.17 should be viewed as absolute worst-case assumptions, where residual noise from the existing sound climate would likely mask any distinguishing features.

The Sensitivity of the Receptor

- 4.26 It has been established that the noise emanating from the proposal would not increase noise levels at the existing residential premises and the proposed changes would be in keeping with the service station use class.

Context Summary

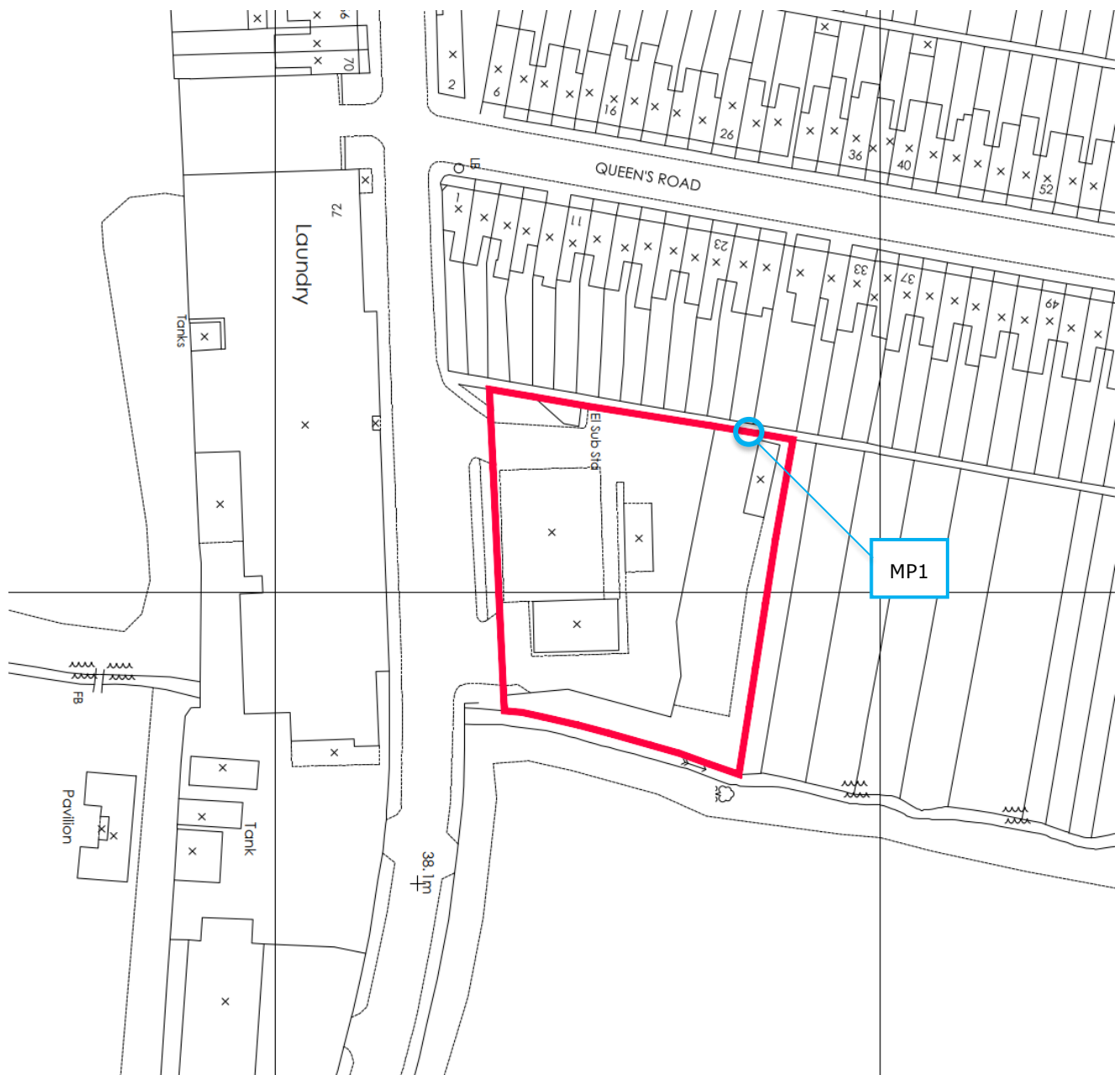
- 4.27 When accounting for context, noise emanating from the proposed mechanical plant and new operations would have a low impact during the daytime and night-time when assessed in accordance with BS 4142:2014.

5.0 Conclusions

- 5.1 SAL have been instructed to undertake a noise survey to support a planning application for proposed forecourt alterations at Thames Valley Service Station. Details of the assessment methodology employed, together with the results of the baseline survey, assessment and conclusions are presented within this report.
- 5.2 The assessment has shown that noise emanating from the proposed development would have a low impact during the daytime and night-time periods of operation when assessed in accordance with BS 4142:2014+A1:2019.

Appendix A: Drawings and Figures

Figure A1: Existing site, surrounding area and measurement positions



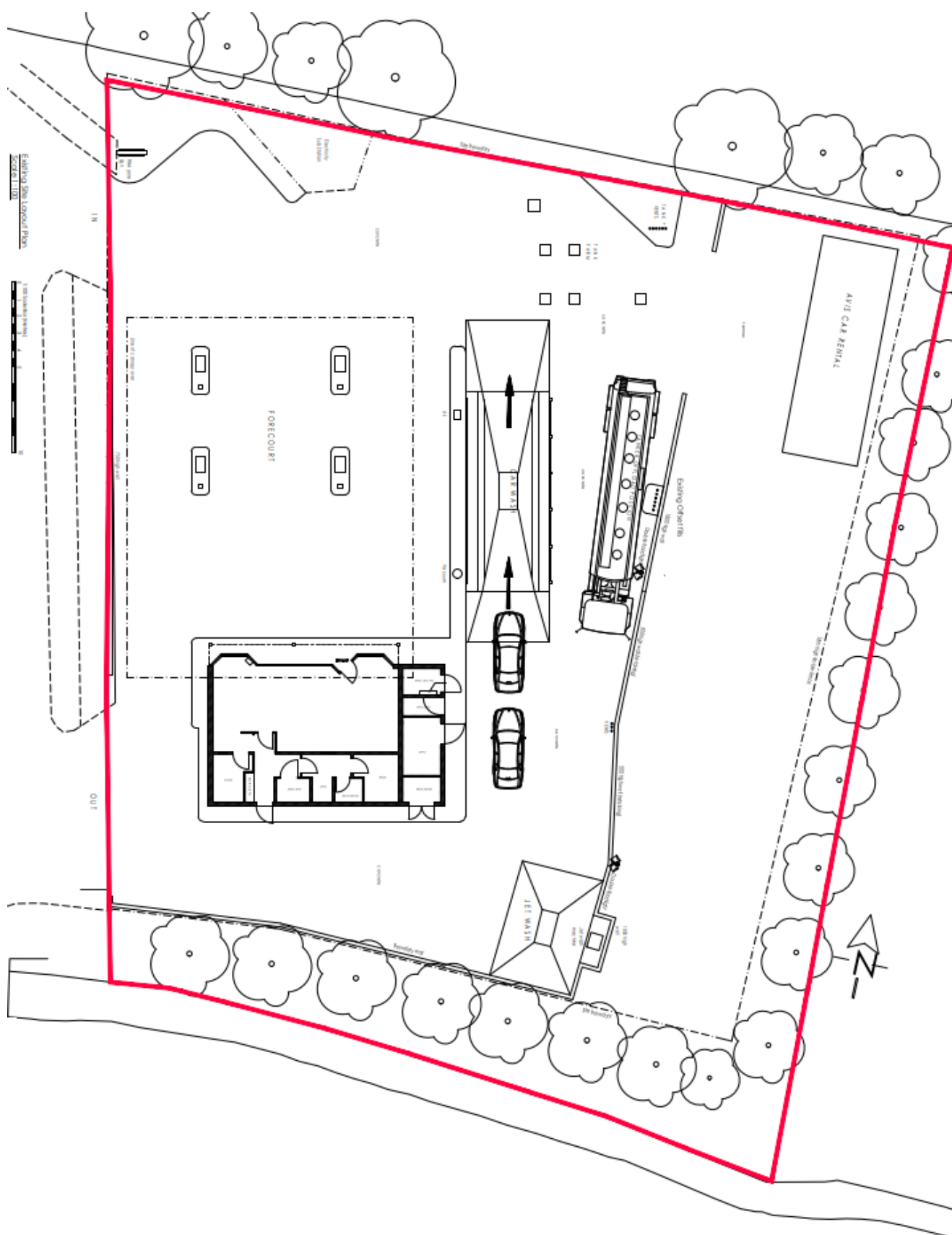


Figure A4: Technical specifications of proposed valeting equipment

Technical Specification - Istobal Valeting Equipment



4CA2000 Jet Wash

Water consumption	12 Litres per minute on highest the function
Operating Pressure	65 Bar
Sound level	70 db
Electrical supply requirement	Single phase 40 amp or 3 phase N + E 20 amp
Water supply requirement	Recommended 20mm MDPE with isolation valve or a suitable pipe capable of delivering a minimum of 12 litres per minute.

4KA0000 Combo Unit

Water consumption	4 Litres per minute
Sound level	65.6 db
Electrical supply requirement	Single phase 16 amp
Water supply requirement	Recommended 20mm MDPE with isolation valve or a suitable pipe capable of delivering a minimum of 4 litres per minute.

4AA1000 Vacuum

Sound level	65.6 db
Electrical supply requirement	Single phase 16 amp
Water supply requirement	N/A

4VA1100 Air / Water / Screenwash

Water consumption	4 Litres per minute (If an Air only is being installed this is N/A)
Sound level	70 db
Electrical supply requirement	Single phase 16 amp
Water supply requirement	Recommended 20mm MDPE with isolation valve or a suitable pipe capable of delivering a minimum of 4 litres per minute. (If an Air only is being in-

Appendix B: Measured Data

Figure B1: MP1 measured noise levels

