



Park Lane Service Station, Bedhampton

Car Wash Noise Impact Assessment

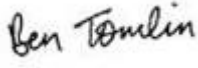
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Date: 09/03/2024

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REVISION HISTORY

Revision	Date	Revision Details	Author	Checked
R01	09/03/2024	Original Issue	 Susan Witterick BSc MIOA	 Ben Tomlin BSc MIOA

1 INTRODUCTION

- 1.1 dBx Acoustics has been appointed by Tankerford Ltd to provide a noise impact assessment for the proposed installation of a 2-bay Jet Wash at the Park Lane Service Station, Bedhampton, Havant PO9 3HQ.
- 1.2 Accordingly, this report presents the results of a noise survey conducted at the site, and an assessment of the potential noise impact arising from the Jet Wash at the surrounding noise sensitive receptors.
- 1.3 A glossary of acoustic terminology is presented in Appendix A.

2 ACOUSTIC DESIGN CRITERIA

Havant Borough Council

- 2.1 The Havant Borough Local Plan (Core Strategy) (2011) policies CS16 and DM10 requires that the amenity of local residents shall be protected.
- 2.2 It is understood that the hours of operation of the existing jet wash on site are restricted to 07:00h and 19:00h.
- 2.3 BS 4142:2014 '*Methods for Rating and Assessing Industrial and Commercial Sound*' (BS4142) will be used as the basis for the assessment of the proposed jet wash associated with this development.
- 2.4 Havant Borough Council requires that noise resulting from the use of plant and machinery shall be of a No Observable Adverse Effect Level (NOAEL) at the boundary of the nearest noise sensitive receptor.
- 2.5 On this basis, it is proposed that the BS4142 rating level, $dB_{L_{Ar,Tr}}$ of noise from the proposed jet wash shall be no higher than 5dB below the existing background noise levels dB_{LA90} measured during the relevant time period.

BS 4142:2014 '*Methods for Rating and Assessing Industrial and Commercial Sound*'

- 2.6 BS 4142:2014 sets out a procedure for assessing noise impact whereby a Noise Rating Level is determined and compared with the existing local Background Sound Level.
- 2.7 The Rating Level ($dB_{L_{Ar,Tr}}$) is evaluated from the Specific Noise Level by including cumulative corrections to account for factors such as distinguishable tone, impulsivity, intermittency or other readily distinguishable sound characteristics.
- 2.8 The assessment of the impact depends upon the margin by which the Rating Level of the specific sound source exceeds the Background Sound Level. An initial estimate of the impact of the specific sound is made by subtracting the Background Sound Level from the Rating Level, while considering the following points:
 - a) Typically, the greater this difference, the greater the magnitude of the impact.
 - b) A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.
 - c) A difference of around +5dB 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.

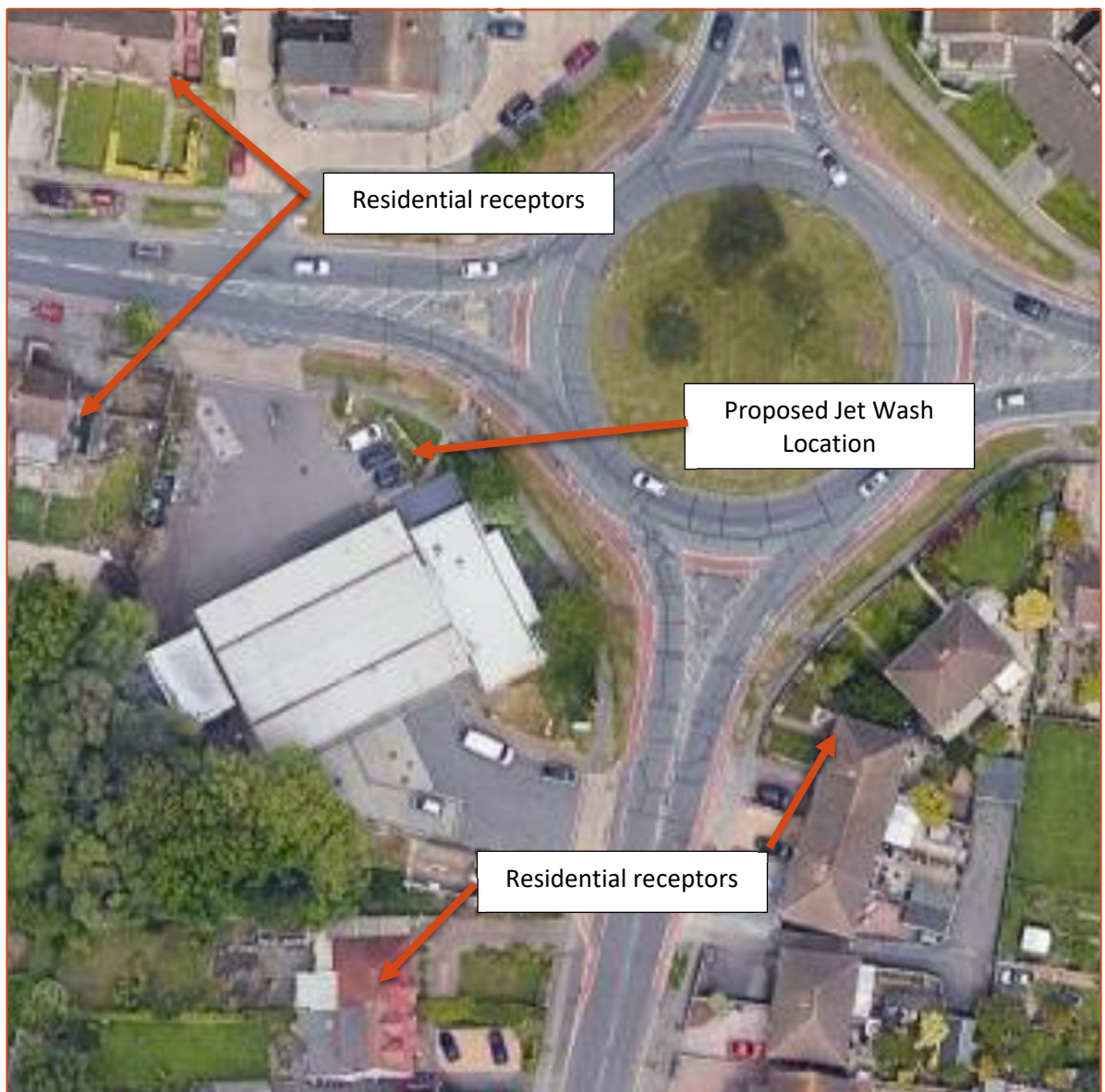
3 ENVIRONMENTAL NOISE SURVEY

- 3.1 An environmental noise survey was carried out between 08:00h on Tuesday 27th February 2024 and 10:15h on Thursday 29th February 2024.

Noise Sensitive Receptors

- 3.2 The nearby noise receptors (NSRs) used in the assessment have been identified on Figure 1. The nearest receptor to the proposed jet wash is housing to the west of the site, at a distance of approximately 30m from the proposed jet wash bays.

Figure 1: Noise Sensitive Receptors



Weather Conditions

- 3.3 The temperature during the noise survey varied between 7°C-10°C. There were scattered showers on Wednesday 28th February, but analysis of the survey data indicates that this did not have any effect on the measured noise levels. Wind speeds during the survey averaged 4m/s.

Equipment Used

3.4 The equipment used during the noise survey is presented in Table 1, below.

Table 1: Equipment Used

Equipment	Manufacturer & Part No.	Serial Number	Calibration Date
Meter	Casella C633C	1716934	21/09/2023
Pre-Amp	CEL 495	001773	
Microphone	CEL 251	000847	
Calibrator	CEL 120/1	1530668	29/01/24

3.5 The sound level meter was calibrated before and after measurements, with no significant drift recorded. An accredited laboratory calibrated the equipment not more than two years prior to the measurements being made, with the exception of the calibrator, which had been calibrated not more than one year prior to the survey.

Measurement Location and Noise Climate

3.6 Noise levels were measured continuously at the southern boundary of the Service Station site, adjacent to 95 Park Lane, as shown in Figure 2, below.

Figure 2: Noise Monitoring Location



- 3.7 This measurement was selected as representing the noise sensitive receptor with the least exposure to road traffic noise.
- 3.8 This location is approximately 25m from Park Lane and 50m from Purbrook Road. On this basis, given the dominance of road traffic noise across the site, noise levels at the receptors adjacent to the road would be expected to be at least 5dB higher than those measured at the monitoring location.
- 3.9 A summary of the noise levels measured is presented in Table 2, below.

Table 2: Measured Noise Levels

Date	Period	Ambient Noise Level, dBL _{Aeq,T}	Background Noise Level, dBL _{A90,T}
Tuesday 27 th February	Daytime 08:00h-19:00h	63	57
	Evening 19:00h-23:00h	59	56
	Night 23:00h-07:00h	55	40
Wednesday 28 th February	Daytime 07:00h-19:00h	62	57
	Evening 19:00h-23:00h	59	51
	Night 23:00h-07:00h	56	38
Thursday 29 th February	Daytime 07:00h-10:15h	63	58

- 3.10 It can be seen that the measurements are consistent across the measurement periods, which is a good indication that the data gathered is representative of the noise climate at the surrounding residential receptors.
- 3.11 On this basis, the daytime (07:00h-19:00h), evening (19:00h-23:00h) and night time (23:00h-07:00h) background noise levels used within this assessment are summarised in Table 3, below.

Table 3: Background Noise Levels Used in Assessment, dBL_{A90,T}

Period	94 Park Lane	Purbrook Road
Daytime (07:00h-19:00h)	57	62
Evening (19:00h-23:00h)	51	56
Night (23:00h-07:00h)	38	43

Proposed Development

- 3.12 Figure 3, below, presents a block plan of the site indicating the proposed Jet Wash location. The nearest noise sensitive receptor to the proposed locations is the housing approximately 30m to the west at 301 Purbrook Way.

Figure 3: Proposed Development



4 REFERENCE NOISE DATA

In-Situ Noise Measurements

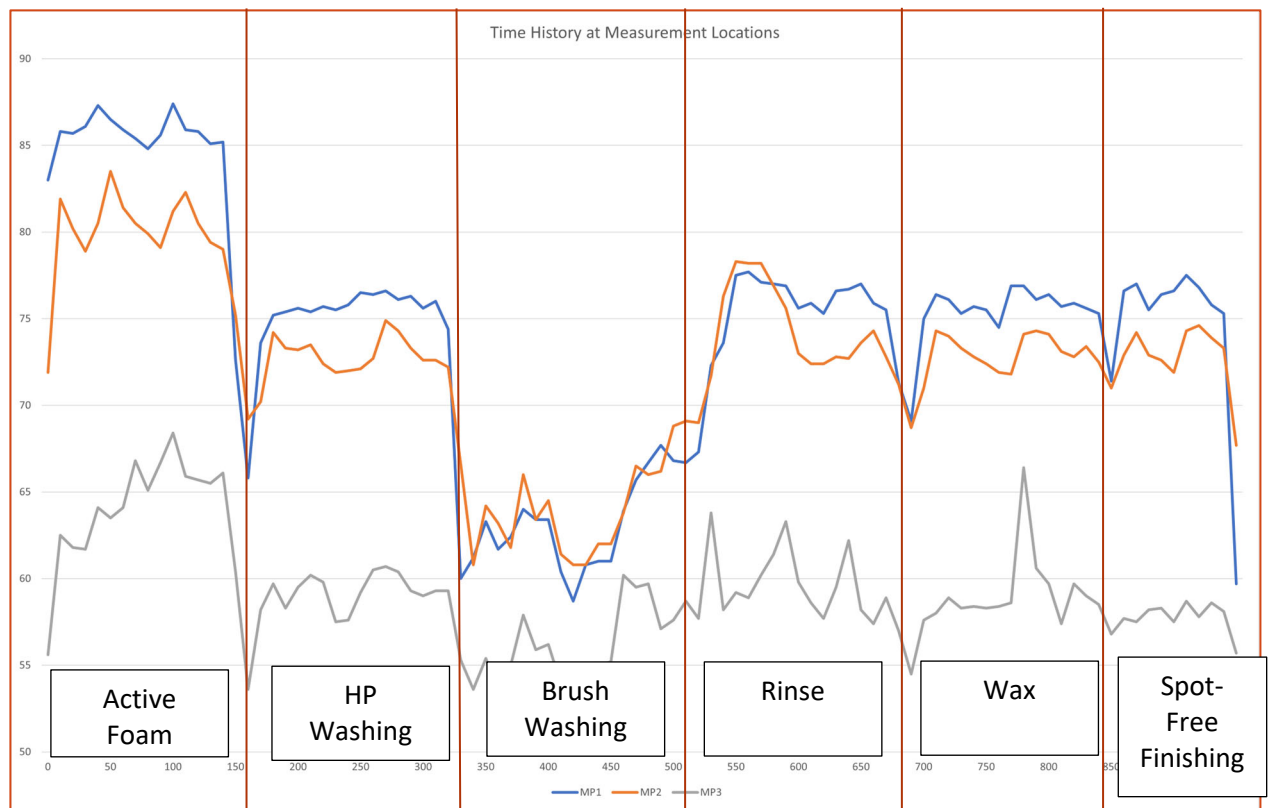
- 4.1 dBx Acoustics attended a site at Three Mile Cross Service Station, Reading, where the same model of jet wash bay has been installed. The installation comprises a four bay unit.
- 4.2 The full results of the assessment are presented in dBx Acoustics Ltd report reference 23088-R01-SW dated 3rd November 2023.
- 4.3 Customers purchase either 8, 12 or 16 minutes of wash time, within which period they are free to switch between washing programs as required.
- 4.4 The typical wash time is understood to be 8 minutes. This was verified by observations on site. Table 5, below, summarises the typical wash sequence and period.

Table 4: Typical Wash Sequence (8 minutes)

Wash Program	Duration
Active Foam	45 seconds
HP Washing	1 minute 30 seconds
Brush Washing	1 minute 30 seconds
Rinsing	2 minutes
Wax	1 minute 30 seconds
Spot Free Finishing	1 minute 15 seconds

- 4.5 Measurements were made during an artificially extended wash cycle to allow accurate analysis of the data.
- 4.6 Figure 4, below, shows a time history at each measurement location, annotated to indicate the wash programme.

Figure 4: Time History



- 4.7 It can be seen from Figure 4, above, that the initial 'active foam' program is the loudest part of the wash cycle, with a typical noise level at 1m from the bay entrance (MP1) of 86dB_{L_{Aeq,T}}.
- 4.8 HP Washing, Rinse, Wax and Finishing programs are similar in nature with a typical noise level at 1m from the bay entrance of 76dB_{L_{Aeq,T}}.
- 4.9 The brush washing programme is relatively quiet, with a typical noise level at 1m from the bay entrance of 65dB_{L_{Aeq,T}}.
- 4.10 A comparison of the data from MP1 (1m from the front of the wash bay) and measurements made at 1m from the plant enclosure (MP2) indicates that noise levels are dominated by noise from the wash bay itself, with no significant contribution from the enclosed plant. This is supported by subjective observations made on site.
- 4.11 The data for MP3, 5m to the west of the wash bays and shielded by the after-market noise barrier, clearly shows the influence of other noise sources on the site during all aspects of the wash cycle other than the initial Active Foam program. This data has therefore not been used further within this assessment.
- 4.12 Supplementary measurements were made at 1m from the entrance to Bay 2 during a typical wash cycle and support the data presented in Figure 4, above.

Data Summary

- 4.13 The measured noise levels at 1m from the front of the wash bay (3m from average lance position) are summarised in Table 5, below, along with the overall sound pressure level for a typical 8-minute wash cycle.

Table 5: MP1 Measured Noise Levels, dBL_{Aeq,T}

Wash Program	Sound Pressure Level, dBL _{Aeq,T}	Typical Duration
Active Foam	86	45 seconds
HP Washing	76	1 minute 30 seconds
Brush Washing	65	1 minute 30 seconds
Rinsing	76	2 minutes
Wax	76	1 minute 30 seconds
Spot Free Finishing	76	1 minute 15 seconds
Typical Full Cycle	80dBL_{Aeq,8min}	8 minutes

- 4.14 The third octave band data for each wash program have been interrogated to identify any potential tonality, in accordance with the methodology presented in Annex C to BS4142:2014. No tonality in the character of the noise generated by the jet wash is identified.

Derivation of Sound Power Levels

- 4.15 From the above data, the overall sound power level of an individual wash bay can be estimated.
- 4.16 Due to the constraints of the on-site installation, it should be noted that the indicative sound power levels presented below were not measured strictly in accordance with any formal International or British Standard, and cannot be considered equivalent to a laboratory test. The data presented herein is, however, considered sufficient to inform impact assessment for similar installations.
- 4.17 The typical noise emission from a single wash bay, at 1m from the front of the bay (3m from the centre of the bay) over the full wash cycle was measured as 81dBL_{Aeq,T}.
- 4.18 The measurement location had a direct line of sight to the wash bay and as such this data can be used to estimate the sound power level (dBL_W) for the wash bay where:

$$L_W = L_p + 20 \log(r) + 11 - 10 \log(Q)$$

- 4.19 Where;

- L_p is the measured sound pressure level
- r is the distance from the average lance position, in this case 3m
- Q is directivity, to allow for reflections from the ground and enclosure, in this case 4.

- 4.20 The calculation procedure is outlined below;

- $L_p = 80\text{dBL}_{Aeq,T}$ at 3m from average lance position
- Distance correction over 3m, $20 \log(3) = +10\text{dB}$
- Correction +11dB
- Allowance for hemispherical directivity -6dB
- Sound power level of bay 95dBL_{W,A}

- 4.21 From the measured spectral data, the indicative octave band sound power spectrum for a single bay has been derived and is presented in Table 6, below.

Table 6: Octave Band Sound Power Level, dBL_w, Full Wash Cycle

	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8Hz	dBA
Sound Power Level, dBL _w	92	92	89	88	89	88	87	88	88	95

- 4.22 This data has been used in the noise modelling exercise for Park Lane Service Station, which is presented in the following chapters.

5 SITE NOISE MODEL

- 5.1 A computer noise model of the site has been produced using the Soundplan 9.0 software package. OS Mastermap data has been used to model the site terrain and building footprints, as well as solid timber fencing to the surrounding residential properties where this was observed to exist during the site visit.
- 5.2 The proposed Jet Wash bays are modelled with a horizontal canopy and partially open, 2.0m high screens to the sides, as indicated in the visualisation drawings submitted by Tankerford.
- 5.3 In accordance with the data established by dBx Acoustics detailed in Section 4, above, each Jet Wash bay has been modelled as a point noise source at 1.5m above ground.
- 5.4 A screenshots from the model showing the noise sensitive receptors (green dots) and wash bays (blue dots) is presented as Figure 5.

Figure 5: Noise Model, 2D



6 ASSESSMENT

Model Results

- 6.1 With the model populated as described in Section 5, above, the specific noise level arising due to a worst-case condition with both bays in simultaneous operation has been calculated and is summarised in Table 7, below, along with the daytime and evening background noise data for reference.
- 6.2 All results are presented at first floor level (4.5m above ground) to represent upper floor windows which obtain less benefit of acoustic screening due to fencing and intervening structures.

Table 7: Predicted Noise Levels

Receptor	301 Purbrook Way (Front)	301 Purbrook Way (Rear)	128 Purbrook Lane (East of site)	95 Park Lane (South of site)
Specific Noise Level, $dBL_{Aeq,T}$	50	43	48	46
Background Noise Level, Daytime (07:00h-19:00h) $dBL_{A90,1hr}$	62	62	62	57
Evening (19:00h-23:00h) $dBL_{A90,1hr}$	56	56	56	51
Night (23:00h-07:00h) $dBL_{A90,15min}$	43	43	43	38

- 6.3 On this basis, it can be seen that the potentially worst affected receptors are at 301 Purbrook Way, and 95 Park Lane. The assessment therefore concentrates on these two receptors.

Detailed Assessment

- 6.4 As a worst case, it has been assumed that both bays could be in constant and simultaneous use. Based on the anticipated typical usage pattern, and an 8-minute wash cycle, the following corrections can be made to the predicted noise levels in Table 8, above.
- 6.5 The anticipated wash pattern (bays in use and number of wash cycles per hour), along with the associated correction, is shown in Calculation 1, below. Corrections for the number of bays in use are based on $10 \log n \text{ dB}$ where n is the number of bays in use. Corrections for the number of wash cycles are made on the basis of $10 \log (T/60)$ where T is the total number of wash cycle minutes anticipated per hour.

Calculation 1: Corrections for Likely Usage

Time	Bays in use	Bay correction, dB	Washes per hour	Wash Minutes per hour	Time correction, dB	Total correction applicable, dB
0700-0900	1	-3	4	32	-3	-6
0900-1100	2	0	4	32	-3	-3
1100-1500	2	0	7	56	0	0
1500-1900	2	0	7	56	0	0
1900-2300	1	0	4	32	-3	-3
1900-2300	1	-3	2	16	-6	-9

- 6.6 On this basis, whilst no correction to the predicted specific sound levels can be applied for a worst-case 1-hour assessment period during the period to 19:00h, a -6dB correction can be applied for operation in the period 19:00h-23:00h, with a -9dB correction in the overnight period (23:00h-07:00h).
- 6.7 As indicated by measurements made by dBx Acoustics for the installation at Three Mile Cross, no BS4142 character correction associated with tonality is required for operation of the Jet Wash.
- 6.8 It would, however, be anticipated that sound from the Jet Wash would be acoustically distinctive, and as such a +3dB character correction is applied within this assessment as described in BS4142:2014 section 9.2. The specific noise levels used in the BS4142 assessment are therefore summarised in Table 9, below.

Table 8: Specific Noise Level Used in Assessment, dBL_{Aeq,1hr}

Receptor	Assessment Period	Uncorrected Predicted Noise Level, dBL _{Aeq,1hr} (Table 7)	Correction for Time and Number of Bays (Calculation 1), dB	Acoustic Character Correction	Specific Noise Level, dBL _{Aeq,1hr}
301 Purbrook Way	Daytime (07:00h-19:00h)	50	0	+3	53
	Evening (19:00h-23:00h)	50	-3		50
	Night (23:00h-07:00h)	50	-6		47
95 Park Lane	Daytime (07:00h-19:00h)	46	0		49
	Evening (19:00h-23:00h)	46	-3		46
	Night (23:00h-07:00h)	46	-6		43

- 6.9 On this basis, the rating level in accordance with BS4142:2014 is presented in Table 10, below, with reference to the background noise level.

Table 9: BS4142 Rating Level vs Background

Receptor	Assessment Period	Rating Level, dBL _{Ar,Tr}	Background Noise Level, dBL _{A90,1hr}	Difference	Meets Havant BC Requirements?
301 Purbrook Way	Daytime (07:00h-19:00h)	53	62	-9dB	Yes
	Evening (19:00h-23:00h)	50	56	-6dB	Yes
	Night (23:00h-07:00h)	47	43	+4dB	No
95 Park Lane	Daytime (07:00h-19:00h)	49	57	-8dB	Yes
	Evening (19:00h-23:00h)	46	51	-5dB	Yes
	Night (23:00h-07:00h)	43	38	+5dB	No

- 6.10 It can therefore be seen that compliance with Havant BC requirements for a No Observable Adverse Effect Level (NOAEL) (i.e. a BS4142 rating level at least 5dB lower than the background noise level) can be achieved for operation of the proposed jet wash between 07:00h-23:00h.
- 6.11 No operation during the night time period (23:00h-07:00h) is proposed, as it would not be possible to meet the requirements of Havant BC during this period.

7 BS4142 ASSESSMENT

7.1 A full BS4142 assessment of noise to most affected residential receptor at 95 Park Lane during the daytime and evening period is presented in Table 8, below.

Table 10: BS4142 Assessment, 95 Park Lane

Item	Daytime	Evening	Relevant Clause	Comments
Measured background sound level	57dB _{LA90, 1hr}	51dB _{LA90, 1hr}	8.2	The typical background sound level measured during the reference period.
Specific sound level	46dB _{L_{Aeq,T}}	43dB _{L_{Aeq,T}}	7.3.6	A prediction made using the methodology outlined above, includes all sources, screening and distance corrections.
Assessment made during the daytime period, so reference period is 1 hour	7.2			-
Acoustic feature correction	+3dB	+3dB	9.2	Acoustically distinct characteristics
Rating Level	49dB _{L_{Ar,Tr}}	46dB _{L_{Ar,Tr}}	9.2	The predicted Rating Level during the daytime and night-time period.
Excess of Rating Level over background sound level	-8dB	-5dB	11	-
	Assessment indicates low likelihood of adverse impact		11	Predicted Rating Level is at least 5dB below the background level. This is an indication of the development having a low impact dependent on context and meets Havant BC requirements.
Uncertainty of the assessment	Minor		10	The predicted Rating Level is based on established prediction methodologies. The background sound level at the NSR has been established by the noise survey.

Context

- 7.2 The context of the BS4142 assessment is that the residential receptors are in a busy urban area. The existing noise climate includes both traffic noise as well as vehicle movements associated with the existing Park Lane Service Station.

Compliance with Havant BC Requirements

- 7.3 The Havant BC criterion of a No Observable Adverse Effect Level (NOAEL) indicates that the BS4142 rating level should be no greater than 5dB below the typical background noise level.
- 7.4 It can be seen from Table 10, above, that the requirements of the Local Authority can be met at the worst-affected receptor to allow operation of the proposed Jet Wash throughout the full daytime period (07:00h-23:00h).

8 CONCLUSION

- 8.1 A noise survey and noise impact assessment have been carried out for the proposed installation of a 2-bay Jet Wash at Park Lane Service Station, Bedhampton, Havant PO9 3HQ.
- 8.2 Based on the noise survey, background noise levels at the nearest noise sensitive receptors have been established for both the daytime (07:00h-19:00h) and evening (19:00h-23:00h) periods.
- 8.3 A noise model of the proposed development has been created using the Soundplan 9.0 software package. This has been populated with the proposed Jet Wash noise sources based on measurements made for a 4-bay installation of the same equipment at Three Mile Cross Services, Reading.
- 8.4 Relevant corrections have been made for the anticipated intensity of use of the Jet Wash.
- 8.5 It is demonstrated that the requirements of Havant BC can be met throughout the period 07:00h-23:00h. No overnight operation of the jet wash bays is proposed.
- 8.6 On this basis, noise should not be a limiting factor in the planning application submitted to Havant BC for the proposed Jet Wash.

APPENDIX A – GLOSSARY OF ACOUSTIC TERMINOLOGY

Decibel, dB	A unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. For sound pressure level (L_p) the reference quantity is 2×10^{-5} N/m ² . The sound pressure level existing when microphone measured pressure is 2×10^{-5} N/m ² is 0 dB, the threshold of hearing.
L	Instantaneous value of Sound Pressure Level (L_p) or Sound Power Level (L_w).
Frequency	Number of cycles per second, measured in hertz (Hz), related to sound pitch.
A-weighting	Arithmetic corrections applied to values of L_p according to frequency. When logarithmically summed for all frequencies, the resulting single "A weighted value" becomes comparable with other such values from which a comparative loudness judgement can be made, then, without knowledge of frequency content of the source.
$L_{eq,T}$	Equivalent continuous level of sound pressure which, if it actually existed for the integration time period T of the measurement, would possess the same energy as the constantly varying values of L_p actually measured.
$L_{Aeq,T}$	Equivalent continuous level of A weighted sound pressure which, if it actually existed for the integration time period, T, of the measurement would possess the same energy as the constantly varying values of L_p actually measured.
$L_{n,T}$	L_p which was exceeded for n% of time, T.
$L_{An,T}$	Level in dBA which was exceeded for n% of time, T.
L_{Fmax}	The instantaneous maximum sound pressure level which occurred during the measurement. F indicates that the fast time-weighting is used.
L_{AFmax}	The instantaneous maximum A weighted sound pressure level which occurred during the measurement. F indicates that the fast time-weighting is used.
$L_{Ar,Tr}$	The rating level: the equivalent continuous A-weighted sound pressure level of the noise, plus any adjustment for the characteristic features of the noise.
Reverberation Time, T	The time that would be required for the sound pressure level to decrease by 60 dB after the sound source has stopped. The descriptor T, often includes other nomenclature to describe the type of reverberation time measurement or if the reverberation time is an average taken for specific frequencies. For example, a T_{mf} is the mid-frequency reverberation time.
Absorption Coefficient, α	The fraction of reverberant sound energy absorbed by a material. It is expressed as a value between 1.0 which equates to perfect absorption and 0 which equates to zero absorption.
Acoustic Class, A - E	Classification of sound absorbers into Sound Absorption Classes A-E, according to BS EN ISO 11654, including frequencies 200-5000 Hz
NRC	A single-number rating system used to compare the sound-absorbing characteristics of building materials. A measurement of the acoustical absorption performance of a material, calculated by averaging its Sound Absorption Coefficients at 250, 500, 1000 and 2000 Hz
STI	Speech Transmission Index , Metric ranging between 0 and 1 representing the transmission quality of speech with respect to intelligibility by a speech transmission channel
R	Sound Reduction Index , the laboratory measured sound insulation properties of a material or building element in octave or third octave bands.
R_w	Weighted Sound Reduction Index , a single number which represents the sound reduction of a material. It is derived by plotting the sound reduction index against a set of reference curves. The curves are shifted until a best-fit is established and the curve which best fits the sound reduction spectrum is used to represent the single figure value.
D_w	Weighted Level Difference , the weighted level difference between a pair of rooms, stated as a single figure.

D_{nT}	Standardised Level Difference, a frequency-dependent measurement of airborne sound insulation, calculated using the following formula: $D_{nT} = L_1 - L_2 + 10\log(T/T_0)$ dB Where: L_1 is the energy-averaged sound pressure level due to the pink noise source measured in the source room using a sweep technique. L_2 is the energy-averaged sound pressure level measured in the receiving room using a sweep technique. T is the mean receiving room reverberation time (derived from T_{30} measured in seconds). T_0 is the reference reverberation time (= 0.5s for dwellings).
$D_{nT,w}$	Weighted Standardised Level Difference, a single-figure value of airborne sound insulation performance, derived according to procedures in BS EN ISO 717-1, based on the D_{nT} values at different frequencies (100-3150 Hz third octave bands).
$D_{nF,w}$	Weighted, Normalised Flanking Level Difference, the normalised, weighted difference in sound level between a pair of rooms via a flanking element, such as mullion or ceiling detail. The level difference in octave bands is first normalized to a reference amount of absorption and then plotted against a set of reference curves to establish a single figure value.
D_{ne}	Normalised Element Level Difference. The normalised difference in sound level between a pair of rooms via a small element such as a trickle ventilator. The level difference in octave bands is normalized to a reference amount of absorption.
$D_{n,e,w}$	Weighted, Normalised Element Level Difference. The normalised, weighted difference in sound level between a pair of rooms via a small element such as a trickle ventilator, stated as a single figure. The level difference in octave bands is normalized to a reference amount of absorption and then plotted against a set of reference curves to establish a single figure value.
C_{tr}	Spectrum Adaptation Term, a correction term applied to the sound insulation single-number values (R_w, D_w, and $D_{nT,w}$) in accordance with BS EN ISO 717-1. Applying the C_{tr} penalises a construction's performance if its low frequency performance is poor in relation its performance at higher frequencies.
Impact Sound	The noise generated by an impact on a structure. This is normally used to describe the noise created by people walking or moving furniture on a floor structure.
L_{nT}	Standardised Impact Sound Pressure Level, a frequency dependent measurement of impact sound insulation, calculated using the following formula: $L_{nT} = L_1 + 10\log(T/T_0)$ dB Where: L_1 is the mean sound pressure level due to the tapping machine measured in the receiving room using a sweep technique. T is the mean receiving room reverberation time (derived from T_{30} measured in seconds). T_0 is the reference reverberation time (0.5s for dwellings)
$L'_{nT,w}$	Weighted Standardised Impact Sound Pressure Level, a single-figure value (@ 500 Hz) of impact sound insulation, performance, derived according to BS EN ISO 717-2, based on the L_{nT} values at different frequencies (100Hz- 3150 Hz third octave bands).
Insertion Loss, IL	The reduction of noise level due to the presence of a noise control device such as an attenuator, excluding any regeneration noise created by its presence.
NR	The Noise Rating level. This is a single figure value derived by plotting a noise spectrum against a set of curves. The curve under which the spectrum fits is the resulting NR level.

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