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Moonbeam Rochdale

Assessment of noise impact of the proposed
Jet Washes at 311 Kingsway, OL16 5BX

Prepared for:-

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1.0 SUMMARY

The general noise climate was dominated at all times by busy traffic on Kingsway. The site is also close to the Kingsway Retail Park with a KFC with drive thru right opposite, and a McDonalds with drive thru, Subway, Greggs and Costa very close by. During spells of lower traffic noise, some mechanical equipment associated with KFC was clearly audible.

Overall modelled levels are based on fairly extreme worst case assumptions of the busiest times of all the brand's other sites, assumed to occur at the quietest periods of the day and night. Even under these assumptions, the predicted noise below what a BS 4142 *initial estimate* would rate as *adverse impact depending on the context*, and at nearly all times below what it would rate as *low impact depending on the context*.

The general context is an established commercial area, with busy traffic and a retail park. The retail park includes a KFC with drive thru right opposite, and a McDonalds with drive thru, Subway, Greggs and Costa very close by. The application site itself also has current use as a car dealership, including workshop at the northern end closest to the most affected houses. We have also gone to significant lengths to make robust assumptions regarding the intensity of the activities and the background periods against which they are assessed.

Overall we would expect the impact to be low.



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P J Durell

2.0 INTRODUCTION

ADC was asked to carry out an independent assessment of the above site with regards to the impact of proposed mechanical equipment.

This report begins by summarising assessment standards and, where appropriate, discusses alternative interpretations.

After a brief statement of survey details we discuss basic results and the resulting assessment. The impact is discussed along with any recommendations for mitigation.

3.0 ASSESSMENT STANDARDS

3.1 NPPF, NPSE and NPPG

The National Planning Policy Framework (NPPF), the Noise Policy Statement for England (NPSE) and the National Planning Practice Guidance (NPPG) provide nothing in the way of quantitative criteria but instead provide general policy aims and statements and some guidance on how certain situations can be interpreted.

The NPPF's main statement on noise is to be found in paragraph 198:-

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 life⁷²;
 - 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.

Paragraph 200 is also relevant:-

200. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.

The NPPF refers to the NPSE which sets out the following aims:-

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

It also introduces the concepts of:

- *NOEL – No Observed Effect Level. 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.*

SOAEL is clearly something the policy seeks to avoid in aim 1. Aim 2 represents situations between SOAEL and LOAEL, and seeks to minimise and mitigate the effects.

The NPPG section on noise adds some further detail, much of it reproducing the NPPF and NPSE, but some useful qualitative guidance is provided Noise Exposure Hierarchy, as follows:-

Response	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

It also makes the point that the subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation, including the level of the noise in absolute terms and how it might compare with the underlying background noise, the impulsiveness or intermittence pattern of the noise, its spectral content, and the time of day. It discusses in very general terms the issues to consider when introducing noise sources to existing noise sensitive area, new residential development in areas affected by existing noise sources (most of which have their own specific guidance, such as BS 4142, BS 8233, etc.) and the potential impact on wildlife.

3.2 BS8233 and WHO

BS 8233 was updated in March 2014. Its guidance is primarily intended for new buildings, but the criteria are routinely referred to for putting general noise climates into context.

The criteria in Table 4 of BS 8233 are based on WHO guidance and give the desirable criteria for indoor ambient noise levels for dwellings as follows:-

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35 dB $L_{Aeq, 16 \text{ hour}}$	-
Dining	Dining Room	40 dB $L_{Aeq, 16 \text{ hour}}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq, 16 \text{ hour}}$	30 dB $L_{Aeq, 8 \text{ hour}}$

The standard does not explicitly state criteria for bedroom noise in terms of dB L_{Amax} but the WHO Guidelines for Community Noise (or similar) are widely used with a recommendation that the noise inside bedrooms should not typically exceed 45 dB L_{Amax} , for instance no more than 10 to 15 times a night.

BS 8233 goes on to state that, where necessary, the criteria can be relaxed by up to 5 dB and still achieve reasonable conditions.

Note that the standard accepts the widely used rule of thumb that, for a partly open window, the levels just outside will be 15dB higher than those just inside. Other more recent research suggests a difference of 13 dB. The latter brings us to an external equivalent of the above table, as follows:-

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	48 dB $L_{Aeq, 16 \text{ hour}}$	-
Dining	Dining Room	53 dB $L_{Aeq, 16 \text{ hour}}$	-
Sleeping (daytime resting)	Bedroom	48 dB $L_{Aeq, 16 \text{ hour}}$	43 dB $L_{Aeq, 8 \text{ hour}}$

Garden area criteria are 50 dB L_{Aeq} and 55 dB L_{Aeq} being considered desirable and reasonable respectively.

3.3 BS 4142

BS 4142 was updated in November 2014. The standard is very complicated but, basically, it describes methods for rating and assessing sound of an industrial and/or commercial nature, which includes:

- sound from industrial and manufacturing processes
- sound from fixed installations which comprise mechanical and electrical plant and equipment
- sound from the loading and unloading of goods and materials at industrial and/or commercial premises

- d) 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.

The methods described in this British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

Characteristics and Context

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, we need to add a character correction to the specific sound level to obtain the rating level.

These features can include tonality, impulsivity and intermittency with corrections typically ranging potentially from 0dB to 9 dB. Corrections at the higher end would represent characteristics which are highly perceptible in the context of the ambient noise as a whole. Corrections at the lower end would represent characteristics which are just perceptible in the presence of the ambient noise as a whole,

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.

Assessment

We obtain an *initial estimate* of the impact of the specific sound by subtracting the measured background sound level from the rating level and considering the following.

- 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.

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

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.

2) The character and level of the residual sound compared to the character and level of the specific sound.

We need to 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.

3) The sensitivity of the 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.

3.4 Local Authority

We are not aware of any other criteria associated with this project.

4.0 **BASIC APPROACH TO MODELLING**

We have used the well-established CadnaA modelling software which calculates noise propagation based on the processes of *ISO 9613 : Acoustics – Attenuation of sound during propagation outdoors*. Obviously, modelling software is reliant on the inputs and assumptions. The keys ones are:-

1. The ground is a mixture of absorptive and reflective (coefficient of 0.4 assumed).
2. Calculations are based on two orders of reflections.
3. The proposed site buildings and the surrounding buildings are assumed to be mainly reflective (0.5 dB loss on reflection assumed).
4. The surrounding trees and vegetation will provide a small degree of absorption but this has been neglected.
5. Where acoustic fences are used, they are also assumed to be reflective the same as the buildings, unless specified otherwise.
6. The source data for the Jet Washes is based on measurements from other similar sites and includes a full cycle, eg. pre-rinse, soap spray and jet rinse, etc. The jet washes are entered as point sources centrally within the splash screens and 1.2 m above the ground. Most of the noise is the water on the car body so the height and location will vary. However, the presence of a car will provide a some barrier effect but this has been ignored. We have found this to be a reliable approach on many past projects.
7. Vacuuming is also based on past measurements. The noise is almost entirely from the vacuum unit itself and is entered as a point source 0.75 m above the ground.
8. Where necessary, the durations of the activities are used to provide a 1 hour model.

5.0 SURVEY DETAILS

5.1 Site Times and Personnel

The site surveys were carried out by Mark Pickering of ADC Acoustics. Times were from shortly before 08:00 to shortly after 11:00 on the morning of Sunday 1st February 2026, and from shortly before 20:00 to shortly after 23:00 on the evening of Monday 2nd February 2026.

Note that right from the start of 2026, it has been extremely difficult to find opportunities to carry out site survey work due to the weather, but these periods should be representative of the quieter times of background noise.

5.2 Instrumentation

Instrumentation used was a Rion NL-52. This is a Class I sound level meter which holds a current calibration certificate and which was field-calibrated as necessary. The meter was set up to measure continuous 5 minute samples of the noise climate.

All measurements have been gathered in terms of $\text{dB } L_{\text{eq}}$, $\text{dB } L_{\text{max}}$ and $\text{dB } L_{90}$ in overall A-weighted terms, and in octave bands across the frequency range. See Definition of Acoustic Terms in Appendix 1.

5.3 Measurement Positions

The main measurement position was as shown by the yellow star on the following plan.



The position was chosen to represent the surrounding residential property.

The microphone was 1.3 m above ground and well away from other reflecting surfaces.

5.4 Survey Conditions

Weather conditions were as follows :-

Rain : none, damp roads
Cloud : 90 to 100%
Temperature : 7 to 7 Celsius
Wind : negligible

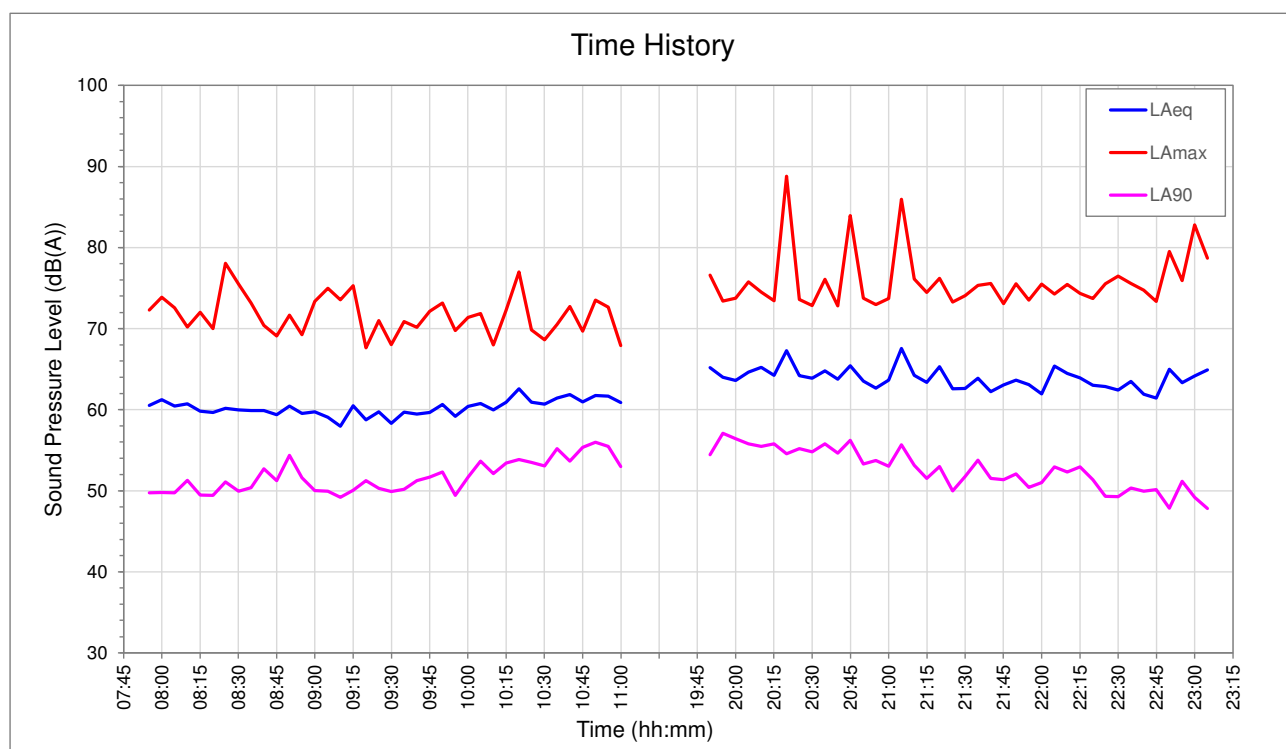
The general noise climate appeared to be normal and representative.

6.0 RESULTS AND DISCUSSIONS

6.1 Background Sound Levels

The general noise climate was dominated at all times by busy traffic on Kingsway. The site is also close to the Kingsway Retail Park with a KFC with drive thru right opposite, and a McDonalds with drive thru, Subway, Greggs and Costa very close by. During spells of lower traffic noise, some mechanical equipment associated with KFC was clearly audible.

Full results are shown in Appendix 2. They are summarised graphically below.



We have used the lowest 15 minute periods for various times for the assessments. Very importantly, BS 4142 does not require us to use the lowest periods but it is a means mitigating against potential uncertainty of varying conditions, for instance on different days of the week. The levels for these periods are as follows:-

<i>Lowest 15 minutes</i>	<i>Index</i>	<i>dB(A)</i>
Sunday to 09:00	Leq	61
	Lmax	72
	L90	50
Sunday 09:00 to 10:00	Leq	59
	Lmax	74
	L90	50
Sunday from 10:00	Leq	61
	Lmax	73
	L90	53

<i>Lowest 15 Minutes</i>	<i>Index</i>	<i>dB(A)</i>
Mid Evening to 21:00	Leq	63
	Lmax	73
	L90	53
Evening 21:00 to 22:00	Leq	63
	Lmax	75
	L90	51
Late Evening to 23:00	Leq	63
	Lmax	77
	L90	49

6.2 Source Levels

Jet Washes

Figures for jet washes with splash screens have been gathered from previous projects. See point 6 in section 4 above. The levels are entered as point sources with the following sound power levels.

<i>Frequency Band (Hz)</i>	A	63	125	250	500	1k	2k	4k	8k
Sound Power Level (dB)	94	92	92	90	86	84	84	89	88

We have gathered estimates of the number of uses per hour for different periods. This is combined with a typical duration of 4 minutes per use.

The figures have been provided by the applicant based on a detailed analysis of all other Moonbeam sites, which we have further analysed and presented in Appendix 2. We have also compared these figures with a similar analysis of the traffic figures provided by DTP, the Transport Consultants, also presented in Appendix 2. A summary of the number of uses per hour at different times is as follows:-

<i>Time Range</i>	<i>Moonbeam</i>			<i>DTP</i>		
	<i>Min</i>	<i>Avg</i>	<i>Max</i>	<i>Min</i>	<i>Avg</i>	<i>Max</i>
05:00 - 07:00	1	1	2	-	-	-
07:00 - 13:00	3	6	10	1	10	15
13:00 - 17:00	9	17	29	11	14	17
17:00 - 21:00	4	7	12	2	6	12
21:00 - 05:00	1	1	2	-	-	-

We have used the Moonbeam Max column to derive the source data for 1 hour periods. This is significantly robust for a number of reasons.

- The Max column is derived from the highest figures for 9 other Moonbeam sites.
- In almost all cases, these are higher than the DTP figures.
- The peak hour is assumed to persist across each period. These are 60% to 100% higher than the averages.
- It is assumed that figures for one bay are directly proportional to the number of bays. In fact most of the time this is not the case as a higher number of bays is only necessary for peak periods.

Vacuumping

Figures for vacuuming have also been gathered from previous projects. See point 7 in section 4 above. The levels are entered into the modelling as a point source with the following sound power levels.

<i>Frequency Band (Hz)</i>	A	63	125	250	500	1k	2k	4k	8k
Sound Power Level (dB)	90	92	85	89	85	87	82	77	72

It is assumed that the vacuuming is used 20 minutes per hour throughout.

Plant Room

This is treated a nominal source, based on unattenuated jet wash compressors inside a lightweight building. The levels can easily be controlled by a condition requiring details to be submitted and approved. The source in the modelling is effectively area sources over the entire surface totalling the following sound power level.

<i>Frequency Band (Hz)</i>	A	63	125	250	500	1k	2k	4k	8k
Sound Power Level (dB)	74	71	73	69	71	71	65	50	41

It is assumed to run continuously.

Other Activities

The dog wash, launderette and vending machines are likely to have negligible impact. We are unable to provide robust figures and instead we rely on discussion as follows.

For the dog wash, noise data is sparse but the operation is essentially a shower for most of the cycle, ie. negligible noise generation, with an optional blow dry at the end. The blow drying is generally around 5 minutes. Indicative levels we have found are around 66 dB(A) at 4 m in front of the semi-enclosed units. The following sound power level is entered as an area source over the entire open face of the dog wash, to give 66 dB(A) at 4 m in front.

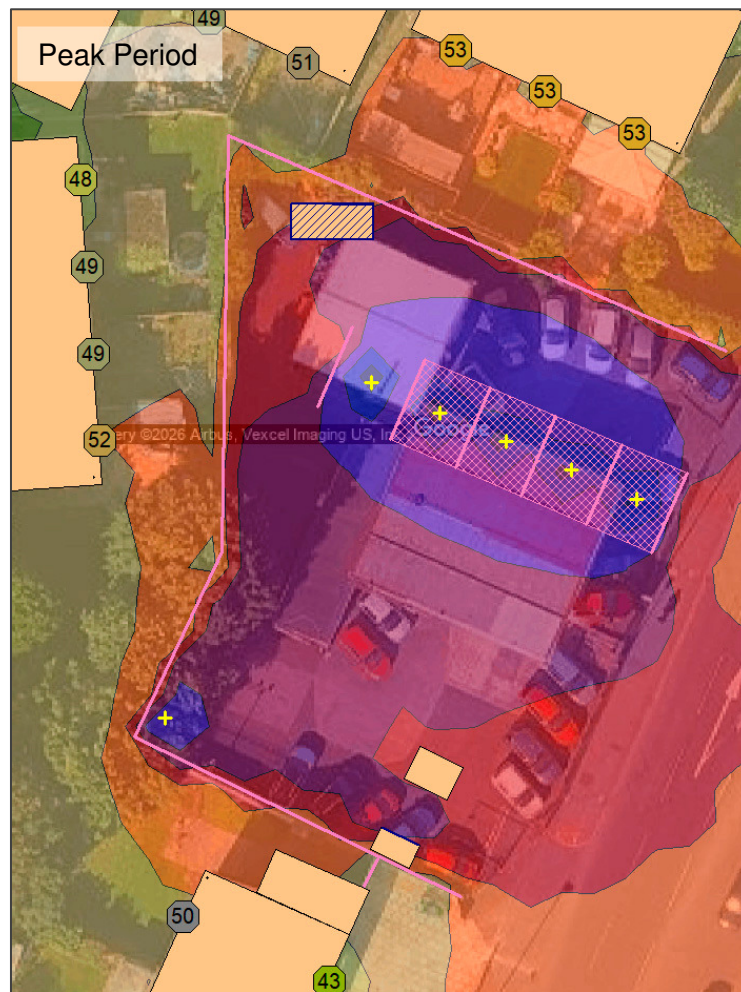
<i>Frequency Band (Hz)</i>	A	63	125	250	500	1k	2k	4k	8k
Sound Power Level (dB)	76	53	59	63	67	71	70	68	63

If we assume up to 4 washes an hour, each with the blow dry option, then a very robust estimate of the duration for the blow drying phase is 20 minutes per hour.

The launderette and vending machine are unlikely to have any significant impact at all. The launderette should be no different from any domestic facility and the vending machine will have a small pump which will run from time to time. These activities are not included as sources in the modelling.

6.3 Results of Modelling

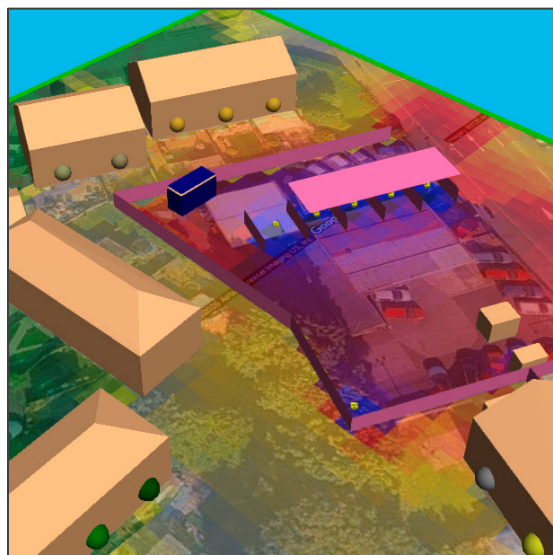
The result of the modelling for the peak period is as follows:-



Note that:-

- The beige shapes are surrounding buildings.
- The magenta lines are fences.
- The yellow crosses are point sources
- The area sources are shown as dark blue hatched areas. For vertical area sources these are just thin blue lines which are easier to see in the 3D view.
- The coloured octagons show the noise levels at the residential facades.
- Note that the noise contours are shown for guidance as to how the noise propagates. The contours are at a height of 1.7 m.

The following 3D view should help to visualise the model.



Other periods are shown in the next two images.



6.4 Assessments

For the assessment of proposed noise, BS 4142 requires us to assess the predicted commercial noise against the *background sound level*, which is the noise climate without development described in terms of the underlying dB L_{A90} index. This gives us the *initial estimate*. This must then be considered in terms of *context* to arrive at the final assessment.

Note that the levels are set against the lowest 15 minutes of the comparable periods of background:-

<i>Assessment Inputs</i>	<i>Peak Period</i>	<i>Morn/Eve</i>	<i>Late Eve</i>
Specific Sound Level	53 dB L _{Aeq}	46 dB L _{Aeq}	45 dB L _{Aeq}
Feature Corrections ¹			
tonality	0 dB	0 dB	0 dB
impulsivity	0 dB	0 dB	0 dB
intermittency	3 dB	3 dB	3 dB
other	0 dB	0 dB	0 dB
Rating Level	56 dB L _{Ar}	49 dB L _{Ar}	48 dB L _{Ar}
Background Sound Level	53 dB L _{A90}	50 dB L _{A90}	49 dB L _{A90}
Rating Level Excess re. Background	3 dB	-1 dB	-1 dB

The peak period appears to be above what a BS 4142 “*Initial estimate*” rates as “*low impact depending on the context*” but below what it rates as “*adverse impact depending on the context*”.

The other periods are below what a BS 4142 “*Initial estimate*” rates as “*low impact depending on the context*”.

Context

The general context is an established commercial area, with busy traffic and a retail park. The retail park includes a KFC with drive thru right opposite, and a McDonalds with drive thru, Subway, Greggs and Costa very close by. The application site itself also has current use as a car dealership, including workshop at the northern end closest to the most affected houses.

Particularly crucial here is that we have taken the busiest of all the estimated data which is 60% to 100% more than the average figures and effectively assumed that this is going to be normal at all times and on all days of the week. In the case of the peak period, the only thing

¹ The activities are unlikely to be tonal or impulsive. They will be intermittent at source but, at the receiver positions, the intermittency is far less certain. For a penalty to be added, the intermittency needs to be “*readily distinctive against the residual acoustic environment*”, as BS 4142 describes it. This is probably the correct assumption during quieter periods, but the peak period effectively has 2 bays running almost 100% of the time. It is doubtful that there will be a readily distinctive intermittency against the traffic other activities, but we have included an intermittency penalty so as to be robust.

that takes the Rating Level over the background level is the use of the intermittency correction of +3 dB. It is not certain that such a penalty is justified, but it is included nonetheless. See footnote¹ above.

Overall we would expect the impact to be low.

6.5 Mitigation

The above modelling assumes 2 m fencing along all boundaries, apart from the southwest stretch where 1.8 m is assumed.

Note that the fences are only relied upon to reduce the noise by up to 8 dB and so do not need to be specialist or bespoke acoustic fences. Theoretically, a barrier which is required to provide a 10 dB reduction only needs a density of 3 kg/m² which would be equivalent to around 6 mm thick timber. Of course the fence would be far thicker than this for structural purposes. The important point is that there are no gaps, including allowance for shrinkage and warping. An overlapping 15 to 18 mm fence would be a typical example of a simple acoustic fence.

A condition requiring details to be submitted and approved would be an adequate control.

The plant room and vacuuming assumptions are described in 6.2. These can easily be controlled by a condition requiring details to be submitted and approved

6.6 Discussion of Uncertainty

BS 4142 requires us to

“Consider the level of uncertainty in the data and associated calculations. Where the level of uncertainty could affect the conclusion, take reasonably practicable steps to reduce the level of uncertainty”.

The measurements of Background/Residual Sound were taken at times regarded as representing what are likely to be the worst case (quietest) time of the day or night. We have no reason to believe that the conditions were anything other than representative of normal conditions. BS 4142 does not state what would be a representative background noise but there is certainly no suggestion that it should be lowest and practices vary widely. However, in order to allow for the possibility of variation in levels, we have used the lowest respective periods.

Source data is taken from other similar projects. We have used significantly robust assumptions in terms of usage and, for fixed items such as vacuuming and plant room, these can be controlled by conditions.

Calculations are based on the processes of *ISO 9613 : Acoustics – Attenuation of sound during propagation outdoors*. We know of no concerns within our industry as to the basic reliability of these methods and it is cited in BS 4142 as “a validated method of calculating sound

levels". The CadnaA software uses this standard and the input assumptions err on the side of caution and are stated in Section 4.

Varying meteorological conditions are unlikely to have a significant impact on results as the distances involved are small.

7.0 CONCLUSIONS/RECOMMENDATIONS

Overall modelled levels are based on fairly extreme worst case assumptions of the busiest times of all the brand's other sites, assumed to occur at the quietest periods of the day and night. Even under these assumptions, the predicted noise below what a BS 4142 *initial estimate* would rate as *adverse impact depending on the context*, and at nearly all times below what it would rate as *low impact depending on the context*.

The general context is an established commercial area, with busy traffic and a retail park. The retail park includes a KFC with drive thru right opposite, and a McDonalds with drive thru, Subway, Greggs and Costa very close by. The application site itself also has current use as a car dealership, including workshop at the northern end closest to the most affected houses. We have also gone to significant lengths to make robust assumptions regarding the intensity of the activities and the background periods against which they are assessed.

Overall we would expect the impact to be low.

Simple acoustic fencing will be required along the main boundaries but these to do need to be specialist or bespoke acoustic fences.

We recommend that you issue this report to planners and that Officers are encouraged to contact us directly with any queries.

Appendix 1

Definition of Acoustic Terms

The Decibel

The decibel is the basic unit of noise measurement and is denoted dB. Technically, it is a means of expressing the difference in noise level between the measured noise and a standard level of noise. Most often the threshold of human hearing is used as the standard reference but it really should be stated. The threshold of human hearing is a sound pressure of 20 μ Pa or a sound power of 1pW.

A sound pressure level or SPL should be expressed in dB(re. 20 μ Pa). A sound power level or SWL should be expressed in dB(re. 1pW). If the reference levels are omitted, it will often (but not always) be safe to assume that they are referenced to the threshold of human hearing.

A-Weighting and dB(A)

The human hearing system responds differently to different frequencies. The A-weighting system takes account of this by emphasising mid and high frequencies more than low frequencies to give an overall level. An A-Weighted noise level, therefore, reflects the way normal, healthy hearing would perceive the overall level of the noise. The basic unit is dB(A), although other systems of expressing an A-weighted levels are discussed below.

Other weighting systems, such as C-Weighting, denoted dB(C), reflect the human hearing system's response at higher noise levels.

NR and NC Levels

NR curves and NC curves are a series of curves representing noise levels across the frequency range. A given noise climate has an NR level or NC level if it equals a point on the curve at any frequency. They are particularly, although by no means exclusively, used as a means of specifying noise limits in an indoor environment, for instance from mechanical services or traffic noise break-in from the outside. They are typically expressed as NR or NC followed by a number, e.g. NR40, NC55, etc.

Equivalent Continuous Sound Level, L_{eq}

This can be simplistically described as a way of expressing the average noise level.

The unit is dB L_{eq} . For A-weighted levels the unit is dB(A) L_{eq} or, in more modern units, dB L_{Aeq} .

Maximum Level, $L_{\max}$

This is the maximum level reached (usually for a fraction of a second) in the measurement period.

The unit is dB $L_{\max}$. For A-weighted levels the unit is dB(A) $L_{\max}$ or, in more modern units, dB $L_{A\max}$.

Statistical (Percentile) Levels, L_n

During a measurement of fluctuating noise, it is often useful to establish the levels exceeded for a percentage of the time. L_n is the index representing the level exceeded for $n\%$ of the measurement period.

The unit is dB L_n . For A-weighted levels, the unit is dB(A) L_n or, in more modern units, dB L_{An} .

Common examples are as follows :-

dB L_{A90} is the A-weighted level exceeded for 90% of the time and is often used to describe the underlying background noise.

dB L_{A50} is the A-weighted level exceeded for 50% of the time. Mathematically, it is the median, another kind of average.

dB L_{A10} is the A-weighted level exceeded for 10% of the time and has traditionally been used to describe the intermittent highs in the noise climate such as passing cars or aircraft.

Frequency Analysis

Here the audible frequency range is divided up into bands and the noise level is expressed in each frequency band from low pitches to high pitches.

Octave Band analysis is where the frequency range is divided into 8 bands from 63 Hz to 8kHz, or sometimes into 10 bands from 31.5 Hz to 16kHz.

1/3 Octave Band analysis provides more detailed subdivision into 24 bands from 50 Hz to 10kHz, or sometimes into 30 bands from 20Hz to 20kHz.

Narrow Band analysis takes this further with the possibility of many thousands of bands, possibly only 1Hz wide, or even less.

In all types of frequency analysis, the level in each band can be expressed in terms of L_{eq} , $L_{\max}$, L_n , etc. as defined above.

Sound Insulation

Sound insulation is best expressed across the frequency range in octave bands or third octave bands. Often, however, in known environments such as domestic sound insulation and speech privacy, it is simpler to express the sound insulation as a single figure. A higher value means better sound insulation.

The most common ways are $\text{dB } D_{nTw}$, $\text{dB } R_w$ and $\text{dB}_{(\text{mean } 100-3150\text{Hz})}$. The first two are ways of expressing average sound insulation, weighted to account for speech frequencies. The third is simply an un-weighted mean value.

The Building Regulations Approved Document E (ADE) routinely refer to $D_{nTw} + C_{tr}$. The C_{tr} term is a negative number which is used to modify the D_{nTw} value for the insulation properties at lower frequencies.

ADE also uses the L_{nTw} index for impact sound transmission. It is a measure of the level of noise in the room below a room in which a standard tapping machine is being used. It represents the impact sound transfer such as footfall noise, scraping chairs, washing machines, etc. A lower value means better insulation.

Reverberation Time

The most common measure of Reverberation Time is, effectively the time taken for sound from a steady source to decay by 60 dB after it has been abruptly cut off. In practice it is often difficult to measure a 60 dB decay and so decays of 30 dB, 20 dB, or even 10 dB are often used and adjusted pro rata, although the exact measure is not quite the same.

Reverberation Time is generally expressed as RT in seconds. We may, if we are being precise, add subscripts 60, 30, etc to show whether the basis of the measure is 60 dB decay, 30 dB decay, etc. E.g. the $RT_{60} = 0.52\text{s}$, the $RT_{30} = 0.49\text{s}$, etc.

RT can be expressed in octave bands or 1/3 octave bands across the frequency range, or at central frequencies such as 500 Hz or 1kHz.

Appendix 2

Measurements in full

<i>Time Period</i>	<i>Index</i>	<i>dB(A)</i>	63	125	250	500	1k	2k	4k	8k
07:55	Leq	60	61	55	54	53	57	54	49	41
	Lmax	72	74	67	63	62	67	64	68	58
	L90	50	53	48	47	45	47	42	33	21
08:00	Leq	61	64	54	55	53	57	56	50	39
	Lmax	74	85	66	65	63	66	70	64	55
	L90	50	54	49	47	45	47	42	32	21
08:05	Leq	60	60	55	56	54	57	54	47	39
	Lmax	73	72	69	71	69	67	66	62	56
	L90	50	54	48	46	43	47	42	31	19
08:10	Leq	61	63	55	55	54	58	55	47	39
	Lmax	70	75	67	65	63	67	64	59	52
	L90	51	55	49	49	46	48	44	34	23
08:15	Leq	60	63	62	56	54	56	53	47	38
	Lmax	72	76	79	66	66	68	65	60	52
	L90	49	55	50	48	45	47	40	33	21
08:20	Leq	60	61	54	53	52	56	54	48	40
	Lmax	70	73	67	63	63	66	64	61	54
	L90	49	54	48	47	44	47	42	33	21
08:25	Leq	60	63	56	55	54	57	54	48	47
	Lmax	78	78	72	68	71	73	72	69	70
	L90	51	56	49	48	46	48	43	33	21
08:30	Leq	60	62	57	56	54	56	54	49	44
	Lmax	75	77	68	65	70	66	72	67	60
	L90	50	56	49	48	46	47	41	32	24
08:35	Leq	60	61	55	54	53	56	53	48	44
	Lmax	73	73	74	65	64	69	66	64	66
	L90	50	55	49	47	46	48	42	34	23
08:40	Leq	60	63	57	55	54	57	53	47	43
	Lmax	70	75	76	63	64	64	61	63	64
	L90	53	56	51	49	48	50	45	35	23
08:45	Leq	59	63	57	55	54	56	52	45	37
	Lmax	69	78	70	67	66	65	60	55	57
	L90	51	54	49	48	47	48	43	33	20
08:50	Leq	60	62	57	56	55	57	54	46	37
	Lmax	72	77	71	69	66	67	65	61	57
	L90	54	55	50	50	49	52	46	31	18
08:55	Leq	60	61	55	55	54	56	53	45	39
	Lmax	69	76	72	66	64	65	61	59	57
	L90	52	55	49	48	48	49	43	32	19

<i>Time Period</i>	<i>Index</i>	<i>dB(A)</i>	63	125	250	500	1k	2k	4k	8k
09:00	Leq	60	61	57	56	54	56	53	47	44
	Lmax	73	75	73	70	69	64	61	65	70
	L90	50	55	51	48	45	48	41	30	19
09:05	Leq	59	61	56	55	53	56	52	45	39
	Lmax	75	72	67	65	67	72	68	61	57
	L90	50	56	50	48	45	47	42	31	19
09:10	Leq	58	61	53	52	51	54	50	50	43
	Lmax	74	73	66	62	60	65	59	71	63
	L90	49	54	49	47	44	47	40	31	19
09:15	Leq	60	62	60	57	54	57	54	46	39
	Lmax	75	72	82	77	68	65	71	61	60
	L90	50	56	50	47	45	47	42	33	20
09:20	Leq	59	62	55	54	52	56	52	45	40
	Lmax	68	75	66	68	60	63	60	58	56
	L90	51	55	50	48	46	49	43	35	23
09:25	Leq	60	67	58	56	54	56	53	46	38
	Lmax	71	81	75	73	64	66	62	58	55
	L90	50	56	50	48	45	47	43	33	21
09:30	Leq	58	64	57	55	52	55	52	43	33
	Lmax	68	77	73	70	61	64	60	52	47
	L90	50	55	50	48	44	47	42	32	20
09:35	Leq	60	63	59	55	54	56	53	45	38
	Lmax	71	83	77	70	66	66	61	60	53
	L90	50	55	50	48	44	47	43	33	21
09:40	Leq	59	64	56	56	53	56	53	45	38
	Lmax	70	82	69	71	63	66	62	57	52
	L90	51	56	50	48	46	48	44	34	22
09:45	Leq	60	66	58	57	54	56	53	46	38
	Lmax	72	83	71	68	70	68	64	58	57
	L90	52	57	50	49	46	48	45	35	24
09:50	Leq	61	64	57	56	54	57	54	45	37
	Lmax	73	76	74	67	65	68	69	57	57
	L90	52	57	51	50	47	49	45	35	23
09:55	Leq	59	64	58	55	53	56	52	45	39
	Lmax	70	77	74	64	60	65	62	62	61
	L90	49	56	49	47	44	46	42	32	20
10:00	Leq	60	64	56	56	54	57	54	48	42
	Lmax	71	77	67	66	62	65	62	66	64
	L90	52	56	51	50	46	49	44	35	24
10:05	Leq	61	66	62	58	55	57	54	47	41
	Lmax	72	82	80	73	64	65	64	61	60
	L90	54	60	53	51	49	51	46	37	26
10:10	Leq	60	65	57	56	54	57	53	46	39
	Lmax	68	74	70	65	61	64	61	56	54
	L90	52	58	51	50	47	49	45	37	28
10:15	Leq	61	66	60	57	54	58	54	47	45
	Lmax	72	79	79	72	63	66	63	65	63
	L90	53	58	51	50	47	50	46	38	29
10:20	Leq	63	66	61	61	59	59	55	48	42
	Lmax	77	80	79	80	77	67	63	60	60
	L90	54	58	52	51	48	51	47	37	26
10:25	Leq	61	65	58	57	54	58	54	46	38
	Lmax	70	77	74	69	63	65	63	59	55
	L90	53	59	51	50	48	50	47	38	26
10:30	Leq	61	64	56	56	54	58	54	46	39
	Lmax	69	77	68	65	61	65	62	56	52
	L90	53	58	51	50	47	50	46	37	25
10:35	Leq	61	65	57	56	55	58	55	47	41
	Lmax	71	76	67	64	62	66	64	62	60
	L90	55	59	51	51	49	52	49	40	29
10:40	Leq	62	66	58	57	55	59	55	48	43
	Lmax	73	76	68	75	64	67	64	66	60
	L90	54	58	52	50	48	51	47	37	29
10:45	Leq	61	66	57	57	55	58	54	46	41
	Lmax	70	80	68	64	64	66	62	57	61
	L90	55	59	53	52	49	53	48	40	30
10:50	Leq	62	68	64	60	55	58	55	47	41
	Lmax	73	84	83	79	63	65	62	57	57
	L90	56	60	52	52	50	53	49	38	27
10:55	Leq	62	68	60	59	56	59	55	46	38
	Lmax	73	81	75	75	69	67	63	59	56
	L90	55	61	54	52	50	53	48	37	25
11:00	Leq	61	67	59	57	55	58	54	45	35
	Lmax	68	77	71	65	62	64	61	55	46
	L90	53	60	54	51	47	50	46	36	24

<i>Time Period</i>	<i>Index</i>	<i>dB(A)</i>	63	125	250	500	1k	2k	4k	8k
19:50	Leq	65	65	61	60	59	63	58	50	41
	Lmax	77	75	76	72	73	73	70	62	55
	L90	54	57	53	52	49	52	46	36	23
19:55	Leq	64	64	60	59	57	61	57	49	38
	Lmax	73	80	72	68	66	70	67	59	46
	L90	57	58	53	53	51	55	50	39	25
20:00	Leq	64	63	58	58	57	61	57	48	38
	Lmax	74	76	72	68	66	72	66	56	52
	L90	56	57	53	53	51	54	49	39	26
20:05	Leq	65	65	61	59	57	62	58	50	41
	Lmax	76	83	79	67	68	73	68	61	58
	L90	56	57	52	52	49	53	48	37	24
20:10	Leq	65	62	58	58	58	63	59	51	42
	Lmax	75	74	71	68	69	71	67	65	59
	L90	55	56	51	51	49	53	48	37	23
20:15	Leq	64	65	59	58	57	62	57	50	41
	Lmax	73	82	74	67	66	70	65	58	65
	L90	56	57	52	52	50	53	48	38	26
20:20	Leq	67	63	62	64	66	63	58	50	42
	Lmax	89	75	83	87	90	81	74	66	57
	L90	55	55	52	52	49	52	46	37	23
20:25	Leq	64	62	59	58	57	62	57	50	42
	Lmax	74	74	75	68	66	71	67	60	56
	L90	55	56	52	52	49	53	48	37	24
20:30	Leq	64	61	58	57	57	61	57	51	43
	Lmax	73	74	72	68	66	70	65	60	54
	L90	55	57	52	51	49	52	47	37	24
20:35	Leq	65	63	59	58	57	62	58	52	45
	Lmax	76	80	71	68	67	74	69	62	55
	L90	56	57	53	51	49	53	48	38	26
20:40	Leq	64	63	58	58	57	61	57	51	43
	Lmax	73	77	72	69	66	70	66	59	54
	L90	55	58	52	51	48	52	47	37	24
20:45	Leq	65	64	58	58	56	62	60	53	43
	Lmax	84	80	69	66	65	77	81	72	54
	L90	56	57	52	52	50	54	49	39	26
20:50	Leq	64	61	57	57	56	61	57	50	43
	Lmax	74	74	69	69	67	71	66	60	55
	L90	53	54	50	49	47	51	45	34	21
20:55	Leq	63	61	56	56	55	60	56	49	41
	Lmax	73	76	69	66	64	70	67	59	53
	L90	54	55	51	50	47	51	46	35	22

Time Period	Index	dB(A)	63	125	250	500	1k	2k	4k	8k
21:00	Leq	64	60	57	57	57	61	57	50	43
	Lmax	74	74	69	70	67	71	67	60	58
	L90	53	53	50	49	47	51	45	33	20
21:05	Leq	68	63	63	65	64	63	59	57	53
	Lmax	86	76	83	87	84	77	77	76	76
	L90	56	55	51	51	49	53	49	38	24
21:10	Leq	64	61	57	57	57	62	58	51	44
	Lmax	76	78	72	71	67	73	69	64	59
	L90	53	53	49	48	46	51	45	35	22
21:15	Leq	63	62	57	57	56	60	57	52	47
	Lmax	74	76	72	66	66	70	65	61	70
	L90	52	55	50	49	46	49	43	34	22
21:20	Leq	65	61	58	58	57	62	59	55	48
	Lmax	76	72	70	67	67	74	68	65	64
	L90	53	54	50	50	47	51	45	35	24
21:25	Leq	63	58	55	55	54	59	56	53	46
	Lmax	73	72	67	69	64	70	66	64	57
	L90	50	53	48	48	44	48	41	32	21
21:30	Leq	63	61	61	58	55	59	56	52	45
	Lmax	74	73	78	76	68	69	65	63	57
	L90	52	54	50	49	46	49	44	35	23
21:35	Leq	64	59	56	56	56	60	58	54	46
	Lmax	75	72	72	71	70	71	69	65	58
	L90	54	54	50	49	47	51	47	37	25
21:40	Leq	62	58	54	54	54	59	56	53	45
	Lmax	76	69	66	66	66	73	68	64	57
	L90	52	53	49	48	45	49	44	34	23
21:45	Leq	63	58	54	55	55	60	57	54	46
	Lmax	73	70	66	63	64	70	66	64	58
	L90	51	51	49	48	45	49	43	34	23
21:50	Leq	64	58	56	56	55	60	57	54	47
	Lmax	76	70	69	67	67	73	69	65	59
	L90	52	52	48	48	46	50	44	35	23
21:55	Leq	63	58	55	55	55	60	57	54	46
	Lmax	74	72	67	64	65	70	67	64	58
	L90	50	53	48	48	44	48	42	34	23
22:00	Leq	62	57	54	54	54	58	56	53	45
	Lmax	75	71	68	67	68	72	68	66	60
	L90	51	51	49	48	45	49	43	34	23
22:05	Leq	65	61	56	57	57	62	59	56	49
	Lmax	74	77	67	67	65	71	68	65	59
	L90	53	54	50	49	46	50	46	37	25
22:10	Leq	64	60	55	56	56	61	58	56	48
	Lmax	75	76	69	66	67	72	69	67	59
	L90	52	53	50	49	46	50	45	36	24
22:15	Leq	64	60	59	56	56	60	58	55	48
	Lmax	74	74	78	65	67	70	67	65	61
	L90	53	53	49	49	46	51	45	36	24
22:20	Leq	63	61	54	54	54	59	57	54	47
	Lmax	74	80	66	63	65	70	67	65	58
	L90	51	52	49	48	45	49	44	36	24
22:25	Leq	63	59	54	54	54	59	57	54	47
	Lmax	76	72	66	66	66	72	70	67	60
	L90	49	53	48	47	44	47	39	32	23
22:30	Leq	62	56	53	54	54	59	56	54	47
	Lmax	76	68	68	67	64	73	70	69	64
	L90	49	51	48	47	44	47	41	33	22
22:35	Leq	63	60	55	55	55	60	57	55	47
	Lmax	76	75	69	68	69	73	67	65	58
	L90	50	52	48	48	44	48	43	35	24
22:40	Leq	62	61	57	55	54	58	56	53	46
	Lmax	75	79	76	67	65	72	67	66	61
	L90	50	54	48	47	44	47	42	34	23
22:45	Leq	61	60	54	53	53	58	55	52	45
	Lmax	73	73	70	64	66	70	67	65	59
	L90	50	52	49	48	44	48	42	34	23
22:50	Leq	65	64	59	56	57	61	59	57	50
	Lmax	80	80	81	72	73	75	73	71	65
	L90	48	51	48	47	43	45	39	32	23
22:55	Leq	63	59	60	56	55	60	57	54	46
	Lmax	76	73	80	68	66	73	68	66	60
	L90	51	52	49	48	46	49	43	34	24
23:00	Leq	64	60	55	55	55	61	58	55	48
	Lmax	83	78	73	66	68	80	73	77	64
	L90	49	51	48	47	44	46	40	33	23
23:05	Leq	65	62	57	60	57	61	58	57	50
	Lmax	79	82	74	81	72	74	71	68	65
	L90	48	51	48	47	42	45	40	31	22

<i>Lowest 15 minutes</i>	<i>Index</i>	<i>dB(A)</i>	<i>63</i>	<i>125</i>	<i>250</i>	<i>500</i>	<i>1k</i>	<i>2k</i>	<i>4k</i>	<i>8k</i>
Sunday to 09:00	Leq	61	62	55	55	54	57	55	48	39
	Lmax	72	81	67	68	66	67	68	62	55
	L90	50	54	48	47	45	47	43	33	21
Sunday 09:00 to 10:00	Leq	59	61	56	55	53	55	52	48	42
	Lmax	74	73	70	67	67	69	65	68	66
	L90	50	55	50	48	45	47	41	31	19
Sunday from 10:00	Leq	61	65	59	59	56	58	54	47	40
	Lmax	73	78	76	76	72	66	63	58	57
	L90	53	58	51	50	48	50	46	37	26

<i>Lowest 15 minutes</i>	<i>Index</i>	<i>dB(A)</i>	<i>63</i>	<i>125</i>	<i>250</i>	<i>500</i>	<i>1k</i>	<i>2k</i>	<i>4k</i>	<i>8k</i>
Mid Evening to 21:00	Leq	63	61	57	57	56	61	57	50	42
	Lmax	73	75	69	68	66	71	66	59	56
	L90	53	54	50	49	47	51	45	34	21
Evening 21:00 to 22:00	Leq	63	58	55	55	55	59	57	54	46
	Lmax	75	71	68	66	67	72	68	65	59
	L90	51	52	48	48	45	49	43	35	23
Late Evening to 23:00	Leq	63	62	57	55	55	59	57	55	47
	Lmax	77	78	78	69	69	73	70	68	62
	L90	49	52	48	47	44	47	41	33	23

Appendix 3

Jet Wash Usage

Moonbeam Figures

Uses Per Bay Per Day (Inc Weekend Peak)

<i>Moonshine Site</i>	<i>05:00-07:00</i>	<i>07:00-13:00</i>	<i>13:00-17:00</i>	<i>17:00-21:00</i>	<i>After 21:00</i>	<i>Total (24 hrs)</i>
Site 1	0.51	11.20	22.50	9.40	1.76	45.37
Site 2	0.18	5.10	9.60	3.90	0.51	19.29
Site 3	0.42	8.70	17.80	7.60	1.44	35.96
Site 4	0.17	9.80	19.40	8.10	1.63	39.10
Site 5	0.19	4.60	8.90	3.20	0.56	17.45
Site 6	0.38	10.40	21.00	8.70	1.52	42.00
Site 7	0.15	3.90	7.60	2.80	0.71	15.16
Site 8	0.12	3.20	7.10	2.60	1.12	14.14
Site 9	0.13	3.60	8.20	3.10	1.58	16.61
Lowest	0.12	3.20	7.10	2.60	0.51	14.14
Mean	0.25	6.72	13.57	5.49	1.20	27.23
Highest	0.51	11.20	22.50	9.40	1.76	45.37

Uses per Bay per Hour

<i>Moonshine Site</i>	<i>05:00-07:00</i>	<i>07:00-13:00</i>	<i>13:00-17:00</i>	<i>17:00-21:00</i>	<i>After 21:00</i>	<i>Total (24 hrs)</i>
Lowest	0.06	0.53	1.78	0.65	0.06	0.59
Mean	0.13	1.12	3.39	1.37	0.15	1.13
Highest	0.26	1.87	5.63	2.35	0.22	1.89

Number of Bays 5

Total Uses per Hour, Rounded Up

<i>Moonshine Site</i>	<i>05:00-07:00</i>	<i>07:00-13:00</i>	<i>13:00-17:00</i>	<i>17:00-21:00</i>	<i>After 21:00</i>	<i>Total (24 hrs)</i>
Lowest	1	3	9	4	1	3
Mean	1	6	17	7	1	6
Highest	2	10	29	12	2	10

Correction for Numbers - all Bays

<i>Correction for Numbers</i>	<i>05:00-07:00</i>	<i>07:00-13:00</i>	<i>13:00-17:00</i>	<i>17:00-21:00</i>	<i>After 21:00</i>	<i>Total (24 hrs)</i>
Rounded Up Lowest	0 dB	5 dB	10 dB	6 dB	0 dB	5 dB
Rounded Up Mean	0 dB	8 dB	12 dB	8 dB	0 dB	8 dB
Rounded Up Highest	3 dB	10 dB	15 dB	11 dB	3 dB	10 dB

Duration 4 mins
Correction for 1 hour -12 dB

Total Correction - all Bays

<i>Correction for Numbers</i>	<i>05:00-07:00</i>	<i>07:00-13:00</i>	<i>13:00-17:00</i>	<i>17:00-21:00</i>	<i>After 21:00</i>	<i>Total (24 hrs)</i>
Lowest	-12 dB	-7 dB	-2 dB	-6 dB	-12 dB	-7 dB
Mean	-12 dB	-4 dB	1 dB	-3 dB	-12 dB	-4 dB
Highest	-9 dB	-2 dB	3 dB	-1 dB	-9 dB	-2 dB

DTP Figures

Trip Rate per Bay

Time Range	Arr	Dep	Total
05:00 to 07:00	0.167	0.033	0.200
08:00-09:00	0.733	0.500	1.233
09:00-10:00	2.000	1.700	3.700
10:00-11:00	2.667	2.467	5.134
11:00-12:00	2.433	2.533	4.966
12:00-13:00	3.133	2.933	6.066
13:00-14:00	2.467	2.667	5.134
14:00-15:00	3.133	3.400	6.533
15:00-16:00	2.267	2.067	4.334
16:00-17:00	2.467	2.333	4.800
17:00-18:00	1.100	1.600	2.700
18:00-19:00	0.467	0.700	1.167
19:00-20:00	0.111	0.444	0.555

Number of Bays 5

Total Uses

Time Range	Arr	Dep	Total	Uses*	Min	Mean**	Max
07:00-08:00	1	0	1	1	1	10	15
08:00-09:00	4	3	6	3			
09:00-10:00	10	9	19	10			
10:00-11:00	13	12	26	13			
11:00-12:00	12	13	25	13			
12:00-13:00	16	15	30	15	11	14	17
13:00-14:00	12	13	26	13			
14:00-15:00	16	17	33	17			
15:00-16:00	11	10	22	11			
16:00-17:00	12	12	24	12			
17:00-18:00	6	8	14	7	2	6	12
18:00-19:00	2	4	6	3			
19:00-20:00	1	2	3	2			

* Total ÷ 2, rounded up

** Mean Uses per hour, rounded up

Correction for Numbers

Time Range	Uses*	Min	Mean**	Max
07:00-08:00	0 dB	0 dB	10 dB	12 dB
08:00-09:00	5 dB			
09:00-10:00	10 dB			
10:00-11:00	11 dB			
11:00-12:00	11 dB			
12:00-13:00	12 dB	10 dB	11 dB	12 dB
13:00-14:00	11 dB			
14:00-15:00	12 dB			
15:00-16:00	10 dB			
16:00-17:00	11 dB			
17:00-18:00	8 dB	3 dB	8 dB	11 dB
18:00-19:00	5 dB			
19:00-20:00	3 dB			

Duration 4 mins
Correction for 1 hour -12 dB

Total Correction

Time Range	Uses*	Min	Mean**	Max
07:00-08:00	-12 dB	-12 dB	-2 dB	0 dB
08:00-09:00	-7 dB			
09:00-10:00	-2 dB			
10:00-11:00	-1 dB			
11:00-12:00	-1 dB			
12:00-13:00	0 dB	-1 dB	0 dB	1 dB
13:00-14:00	-1 dB			
14:00-15:00	1 dB			
15:00-16:00	-1 dB			
16:00-17:00	-1 dB			
17:00-18:00	-3 dB	-9 dB	-4 dB	-1 dB
18:00-19:00	-7 dB			
19:00-20:00	-9 dB			