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CAMPUS WEST CAR PARK, WELWYN GARDEN CITY

NOISE ASSESSMENT

On behalf of:

Brinson Staniland Partnership

Report No: P19-664-R01v1
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CAMPUS WEST CAR PARK, WELWYN GARDEN CITY

NOISE ASSESSMENT

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1.0 INTRODUCTION

1.1 Hepworth Acoustics Ltd was commissioned by Brinson Staniland Partnership to carry out a noise assessment in connection with a proposed new car park deck structure which is to be built over the existing Campus West Car Park in Welwyn Garden City.

1.2 Campus West car park is located north of Bridge Road and north-west of The Campus (B195) as shown in Figure 1. The car park serves the local area in general including the adjacent Cinema and Roller City recreational facilities. We understand that the capacity of the existing car park is 315 parking bays.

1.3 The proposals are to erect a new two-story deck structure above the existing open-air car park to form a 3-level car park with a total capacity of 690 parking bays. The proposed layouts for levels 0, 1 and 2 of the car park are shown in figures 2, 3 and 4 respectively.

1.4 The nearest dwellings to the car park are at Woodside House - Welwyn Garden City Housing Association indicated at Location 1 in Figure 1. There are also dwellings to the north of the site on Densley Close (Location 2) and to the south of the site on Bridge Road (Location 3).

1.5 The projected use of the car park extension used in our calculations has been based on the findings of a car park use survey (Ref: 20548 Welwyn Garden City) produced by Advanced Transport Research, dated 4 April 2019. This empirical dataset provides a robust basis for our calculations and assessment.

1.6 This noise assessment has included:

- An inspection of the site and surrounding area;
- Measurement of ambient noise levels at locations representative of the nearest dwellings during separate visits on two weekdays covering morning, afternoon and evening periods;
- Calculation of likely noise levels resulting from worst-case use of the car park extension based on April use data; and,
- Assessment of the potential noise impact from use of the car park extension on the nearest dwellings.

1.7 The various noise units and indices referred to in this report are described in Appendix I. All noise levels mentioned in the text have been rounded to the nearest decibel, as fractions of decibels are imperceptible.

2.0 AMBIENT NOISE SURVEYS

2.1 Ambient noise surveys were carried out to determine the existing ambient noise climate at locations representative of the nearest dwellings to the car park during the week.

2.2 The noise surveys were carried out at three locations shown in Figure 1 and described as follows:

- Location A: At the Woodside House boundary with the existing car park;
- Location B: At the southern end of Densley Close; and,
- Location C: On the south side of Bridge street.

2.3 The focus of the noise survey was at Location A to cover the noise climate at Woodside House, as these are the nearest dwellings to the proposed car park extension. Whilst Densley Close is significantly further from the proposed car park extension than Woodside House, measurements were also carried out at Location B, as the ambient noise climate here was noticeably quieter.

2.4 Some ancillary measurements were also carried out at Location C, representative of the dwellings on the south side of Bridge Street to demonstrate the significantly higher ambient noise climate here due to road traffic noise.

2.5 Three surveys were carried out on Wednesday 15 July 2020 covering a morning period, afternoon period and evening period and one survey was carried out on Thursday 16 July 2020 covering another morning period.

2.6 During the months preceding these noise surveys, the UK was under more stringent lockdown restrictions due to the COVID-19 pandemic. However, the most significant restrictions affecting travel had been lifted by the dates of the noise surveys and road traffic levels were noticeably closer to typical pre-lockdown levels.

2.7 Based on our observations; and given the main noise source affecting the ambient noise climate in the area is road traffic noise and the fact that there needs to be a significant change in traffic flow rates in order to see an appreciable reduction in road traffic noise levels, the pandemic is believed to have had a negligible effect of the ambient noise climate in the area during the noise surveys.

2.8 The noise measurements were taken at microphone heights of approximately 1.4m above the ground. Calibration checks were carried out both before and after the noise surveys with no variance in calibration level.

2.9 Weather conditions during the noise surveys were suitable for sound level measurements. Full details of the weather conditions and the equipment used can be seen in Appendix II.

2.10 The results of the ambient noise surveys can be seen in full in Appendix II and a summary is shown in Table 1.

Table 1: Summary of Measured Ambient Noise Levels (dB)

Location	Period	$L_{Amax,T}$		$L_{Aeq,T}$		$L_{A90,T}$	
		Range	Arithmetic Mean	Range	Logarithmic Mean	Range	Arithmetic Mean
A	Morning	60-75	66	47-52	50	44-47	45
	Afternoon	61-65	63	49-50	50	45-46	46
	Evening	58-66	62	44-49	47	35-43	39
B	Morning	57-63	60	42-48	46	39-44	41
	Afternoon	56-71	63	41-46	44	40-42	41
	Evening	61-63	62	47-48	48	42-44	43
C	Morning	82-83	82	66-67	66	48-48	48
	Afternoon	78-80	79	66-67	67	48-51	50
	Evening	85-85	85	64-64	64	44-44	44

2.11 Given the significantly higher noise levels at Location C and the greater distance back from the proposed extension compared to Location A, it is considered that no further investigation of the potential noise impact upon the Bridge Road dwellings is warranted.

2.12 The results of the ambient noise surveys have been taken into account in the assessment of the potential noise impact from the proposed car park extension. The noise assessment is described in Section 3.

3.0 NOISE ASSESSMENT

3.1 There are no specific standards or guidelines available for assessing noise from a car park.

3.2 The National Planning Policy Framework (NPPF) 2019 provides some general guidance to local authorities on taking noise into account in planning policies and decisions. This includes guidance that local authorities should '*aim to avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development*'. However, there is as yet no specific guidance on acoustic assessment/design criteria relevant to this development provided in the NPPF, nor in the more recently issued Planning Practice Guidance 'Noise'.

3.3 Also, whilst there is a general British Standard on noise (BS 8233:2014) and there are specific standards or guidelines for construction noise (BS 5228), industrial/commercial noise (BS 4142), road traffic noise (Noise Insulation Regulation/CRTN), etc. none of these are relevant for the proposed car park extension.

3.4 Therefore, a pragmatic approach must be adopted taking into account calculation of likely noise levels from use of the car park, the context of the prevailing noise climate, the times and likely pattern of use.

3.5 Cars manoeuvring at slow speeds within car parks do not generate significant levels of noise, but higher noise levels are produced, albeit briefly, by closing of car doors and car engines starting up and vehicles initially pulling off.

3.6 We have undertaken calculations based on typical noise levels from car doors being closed and car engines being started with the vehicle in higher rpm when pulling off (i.e. L_{AE} values measured at a distance of 10 metres) that we have measured elsewhere.

3.7 It is necessary to evaluate this noise over an appropriate time period. Daytime noise is usually assessed over the whole daytime period (i.e. 07:00-23:00) and night-time noise over the whole night period (i.e. 23:00-07:00) or typically over the proposed hours of use, or for an hourly period. For a 'worst case' assessment we have used an hourly period.

Propagation of Sound Underneath a Car Park Deck

3.8 Generally, the most significant factor in calculating distance attenuation of sound is the geometrical spreading of the acoustic energy. This distribution of the acoustic energy over the notional surface area of the propagating wavefront is the basis for distance attenuation calculations in acoustics.

3.9 Noise from single sources such as a car door being closed, generally propagates outward from the door in a roughly hemispherical distribution of acoustic energy, as the ground is usually the only significant surface creating reflections and restricting the spread of energy in the downward direction.

3.10 In the proposed scenario where a car park deck is to be built above the existing car park, the geometry of the propagating wavefront will be restricted by the deck above. In other words, rather than the acoustic energy being spread out over a large hemispherical area, the same amount of acoustic energy will be spread out over a smaller surface area as it propagates underneath the deck.

3.11 Taking into account the height of the source from the ground (h_s), the standard case for sound propagation over a reflective floor as a function of the distance from the source (r) is based on the following equation for the surface area over which the acoustic energy is spread:

$$S_0 = 4\pi r^2 - 2\pi r(r - h_s)$$

Where S_0 is the surface area over which the acoustic energy is distributed in a standard hemispherical case, r is the distance from the source and h_s is the height of the source.

3.12 The following formula which we have derived gives the notional surface area over which the sound is spread when propagating underneath a deck. It is given as a function of the distance the sound has travelled from the source underneath the deck (r), the height of the source (h_s) and the height between the floor and the deck soffit (h_d). The formula is as follows:

$$S_d = 4\pi r^2 - 2\pi r(r - (h_d - h_s)) - 2\pi r(r - h_s)$$

Where S_r is the surface area over which the acoustic energy is distributed whilst propagating underneath the deck, r is the distance from the source underneath the deck, h_s is the height of the source and h_d is the height between the floor and the deck soffit.

3.13 The logarithmic ratio between these two notional surface areas (i.e. $10Log_{10}(S_d/S_0)$) provides a correction factor for the reduced distance attenuation of the sound as it propagates underneath the deck.

3.14 This correction factor can then be applied in conjunction with the standard sound attenuation correction for a point source (i.e. $20Log_{10}(r_2/r_1)$) where the distance from the side of the deck is large enough.

3.15 Although it should be noted that the ratio changes with the distance the wave has travelled underneath the deck (r); and r should be calculated for both surfaces areas (S_d and S_0) based on the distance the wave has travelled under the deck, not the total distance to the nearest dwelling.

3.16 This correction factor was tested against empirical data to establish its predictive capability. Measurements of car doors being closed were taken at an existing multi-story car park. The measurements were taken at a reference distance of 10m. The measurements were taken in a mid-level with a deck above the car and on the top level which was open to the air (i.e. no roof).

3.17 The measurements were repeated and an average obtained. The average of the peak noise levels at a distance of 10m, on the top level open to the air was 66.2 dB L_{Amax}. Using the derived geometrical correction described above, we calculate that the level at 10m underneath the deck should be 73.2 dB L_{Amax}.

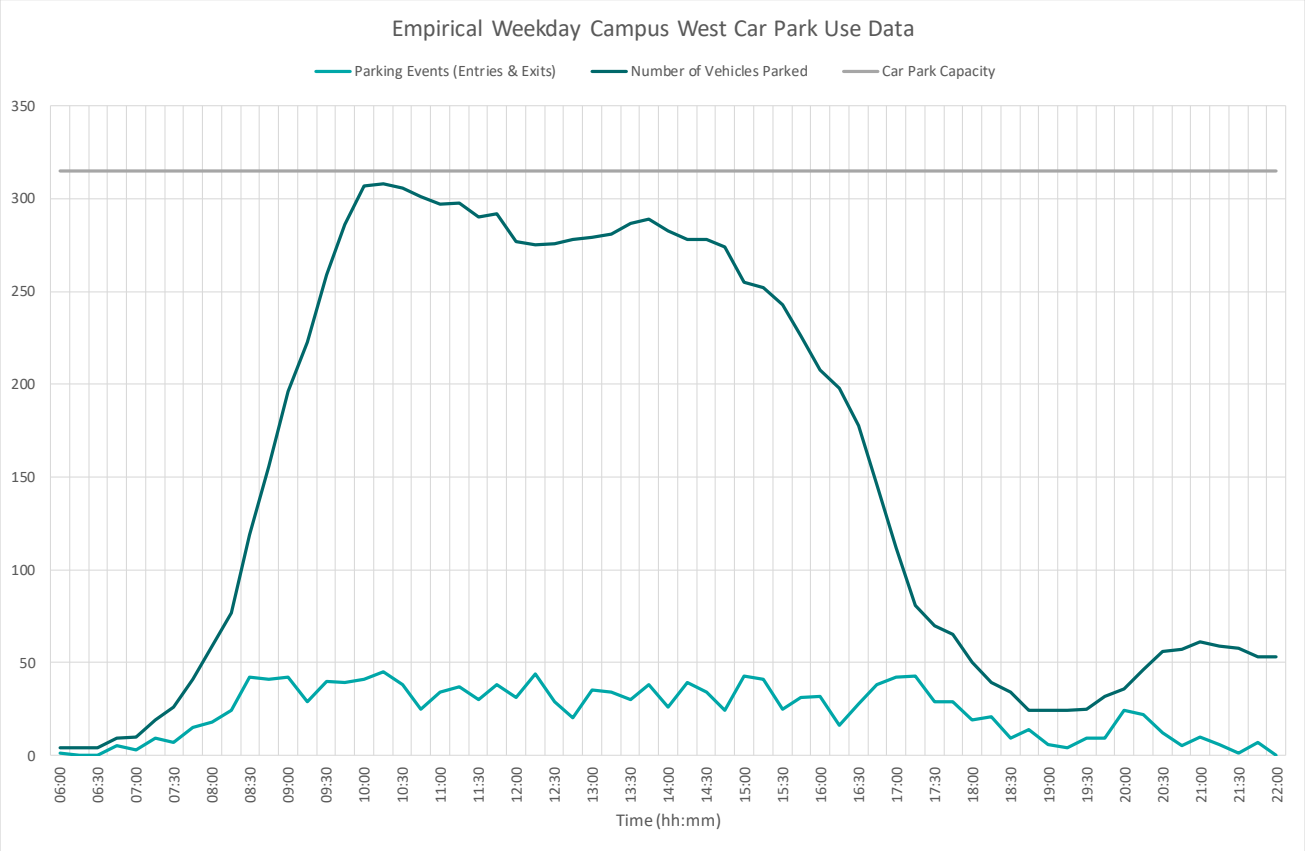
3.18 The actual average of the peak levels measured underneath the deck was 74.3 dB L_{Amax}, meaning that the correction factor provided a prediction within an accuracy of 1.1dB - a difference, which is imperceptible. Given other potential factors that may have contributed to the difference in levels such as reflections from pillars or possible variations in the force with which the door was closed, an accuracy of 1dB for the prediction of propagation underneath the deck is acceptable.

3.19 This correction has therefore been applied to our calculations of noise from the car park for parking events taking place on Level 0 and Level 1 for spaces underneath the decks.

Calculation of Car Park Noise

3.20 The data provided by Advanced Transport Research is based on a survey carried out on Thursday 4 April 2019. Data is also available for the Christmas period; however, the April data is considered a more representative dataset for how the car park will generally operate throughout the year.

3.21 The data includes both the total number of car parking spaces occupied over 15-minute periods throughout the day as well as the number of vehicle entries and exits to and from the car park during the day. A graph of the data is shown overleaf.



3.22 As can be seen in the graph above the car park has two main peaks in the car park spaces being taken up; in the morning around 09:30-10:00 and in the afternoon around 14:00.

3.23 The spikes in the number of parking events (which are more relevant to the noise assessment) are less prominent but clearly distributed generally between these two periods.

3.24 Table 2 overleaf shows the parking events that take place throughout the day broken down into 1-hour periods.

3.25 The peak number of events that take place within 1-hour periods during different parts of the day are: 150 between 09:00-10:00 in the morning, 143 between 17:00-18:00 in the afternoon and 63 between 20:00-21:00 in the evening.

3.26 These numbers have been adopted for the basis of our assessment during these separate periods of the day. For our assessment of the potential impact during the night-time, we have adopted 6 events as our basis, which is the lowest number that occurs during the daytime. Nevertheless, it would still likely be an overestimate of the number of parking events that would take place during a 1-hour period in the night-time.

3.27 As the number of total spaces is set to increase with the extension, we have used these peak values from the current parking data, based on their percentage of the total existing capacity and applied this to the new higher total capacity in our calculations.

3.28 For example, the number of events between 09:00-10:00 is 150, which is 47.6% of the total current capacity, therefore we have used 329 events in our assessment of the proposals during the morning, as it is 47.6% of the proposed total capacity.

Table 2: Summary of Car Parking Events

Period	Entries	Exits	Total Parking Events
06:00-07:00	6	0	6
07:00-08:00	33	1	34
08:00-09:00	120	5	125
09:00-10:00	140	10	150
10:00-11:00	82	67	149
11:00-12:00	65	74	139
12:00-13:00	55	69	124
13:00-14:00	74	63	137
14:00-15:00	54	69	123
15:00-16:00	46	94	140
16:00-17:00	17	97	114
17:00-18:00	31	112	143
18:00-19:00	11	52	63
19:00-20:00	18	10	28
20:00-21:00	44	19	63
21:00-22:00	10	14	24

3.29 Based on the proposed car park layouts, we have determined the distances from the proposed parking spaces in the car park extension to the dwellings at locations A and B.

3.30 Using a measured L_{AE} value of 59 dB @ 10m for car doors being closed (free-field) and 57 dB(A) @ 10m for a car engine being started and driving off (free-field), which combined is 61 dB(A) @ 10m, the calculation formula is as follows:

$$L_{Aeq,1\ hour} = L_{AE} + 10\log_{10}\left(\frac{N}{T_s}\right)$$

Where N is the number of events over the 1-hour period and T_s is the number of seconds in an hour.

3.31 We have used the distances from the nearest car parking spaces across all three levels to each of the dwellings in order to ensure that our assessment represents a robust worst-case scenario, in practice it is extremely unlikely that the nearest car parking spaces to the dwellings would be the ones used and of course this could not happen simultaneously for the different dwellings.

3.32 On this basis, and taking into account only nominal acoustic screening corrections, we calculate the following noise levels at the dwellings as shown in Table 3 below, along with a comparison to the existing ambient noise levels during those periods.

Table 3: Summary of Results

Assessment Location	Period	Calculated Parking Activity Noise Level	Existing Ambient Noise Level	Difference
A: Woodside House	Morning	36	50	-14
	Afternoon	36	50	-14
	Evening	34	47	-13
B: Densley close	Morning	35	46	-11
	Afternoon	35	44	-9
	Evening	28	39	-11

3.33 The findings in Table 3 show that the likely car park extension noise levels would be low levels of noise, which are significantly lower than the existing residual noise levels in the area during all periods of the daytime.

3.34 The low levels of activity likely during the night-time means that any $L_{Aeq,T}$ noise levels corrected for assessment over a 1-hour period would be negligible. However, peaks of noise measured in terms of L_{Amax}, could have an effect depending on the levels at the dwellings and the number of events.

3.35 We have calculated that the likely range of L_{Amax} levels at the nearest dwellings from use of the car park would be 45-62 dB L_{Amax} at Woodside House and 41-56 dB L_{Amax} at Densley Close.

3.36 Based on the range of possible calculated L_{Amax} levels and taking into account a nominal sound level difference of a partially open window (-15dB); the range of possible peak noise levels would be 30-47 at Woodside House and 26-41 at Densley Close.

3.37 These ranges are calculated based on the door closing events taking place at the proposed parking bays nearest to the respective dwellings.

3.38 Suitable targets for controlling peak noise events inside dwellings are generally accepted to be controlling peaks within 45 dB L_{Amax}; and for this level to be exceeded typically no more than 10-15 times per night. This is based in WHO 'Guidelines for community noise' (1999) research.

3.39 On this basis, any peak noise events at Densley Close would be within 45 dB $L_{Amax,}$ as well as the majority of the peak levels at Woodside House - the highest only exceeding 45 dB L_{Amax} by 2dB.

3.40 Given how unlikely it is like vehicles would consistently use the spaces closest to the dwellings during the night-time and that the number of events during the night-time is likely to be very low, noise impact from the car park during the night-time is unlikely to cause any adverse impact.

3.41 Nevertheless, if desirable the spaces closest to the nearest dwellings could be demarcated for daytime use only.

4.0 SUMMARY & CONCLUSION

4.1 Hepworth Acoustics Ltd was commissioned by Brinson Staniland Partnership to carry out a noise assessment in connection with a proposed new car park deck structure which is to be built over the existing Campus West Car Park in Welwyn Garden City.

4.2 The potential noise impact from use of the proposed car park extension has been assessed at the nearest dwellings.

4.3 The assessment has included carrying out noise surveys of the prevailing noise climate in the area, calculations of likely noise levels resulting from use of the car park extension, and evaluation of the likely noise impact.

4.4 The predicted noise levels from use of the car park extension are low in absolute terms and within the prevailing noise climate and character of the area.

4.5 On this basis, it is concluded that use of the proposed car park extension would not result in an adverse noise impact on the amenity of people living nearby.

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Key:
Illustrative development location
Noise survey locations
Noise sensitive locations
N
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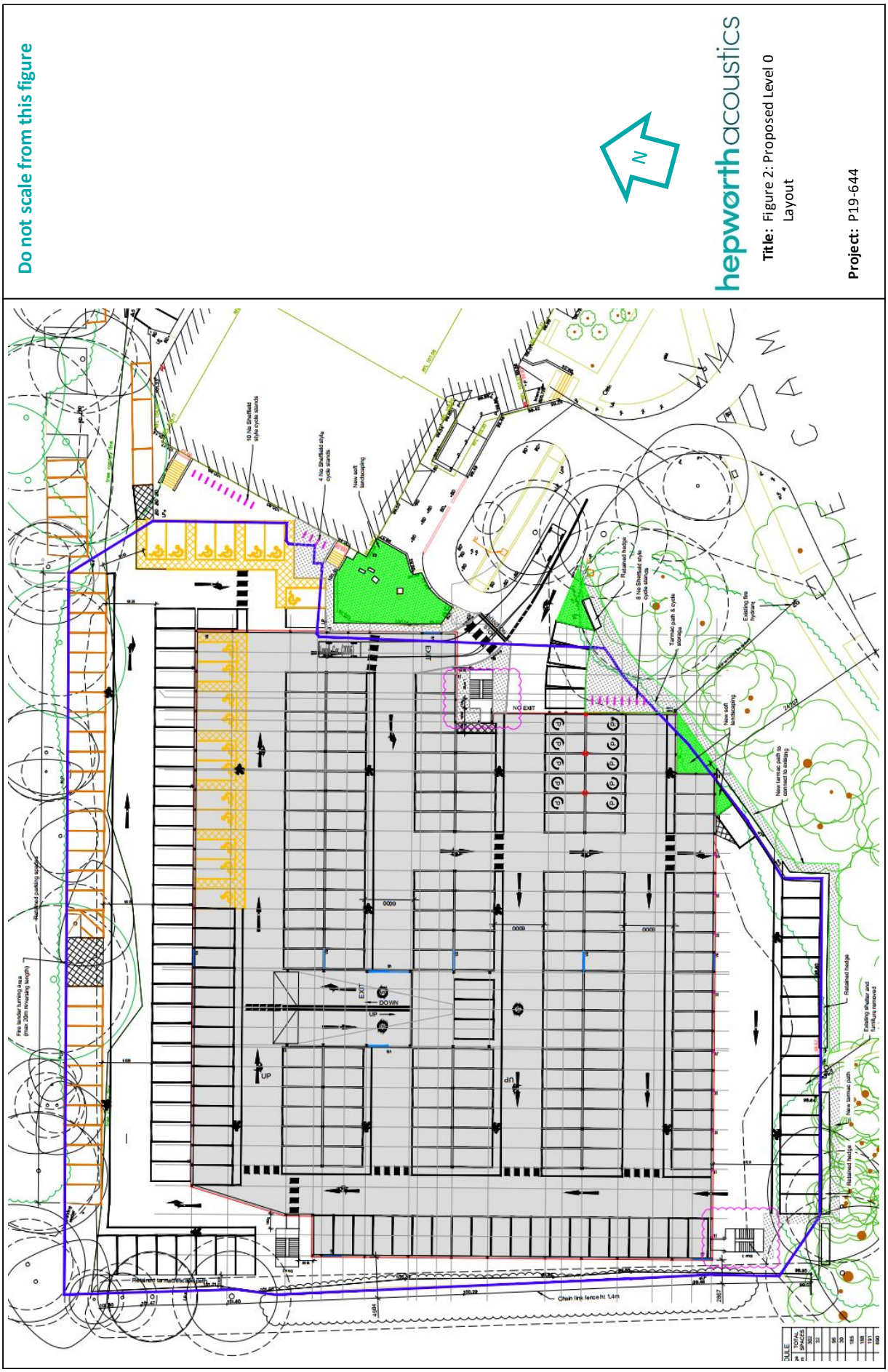
Title: Figure 1: Development Location & Noise survey Locations
Project: P19-644
The Campus
Bridge Road
A
B
C
1
2
3
Google Earth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hepworthacoustics
Title: Figure 2: Proposed Level 0 Layout
Project: P19-644
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4 No Sheffield style cycle stands
New soft landscaping
Retained hedge
8 No Sheffield style cycle stands
Tarmac path & cycle stands
Existing fire hydrant
NO EXIT
EXIT
New soft landscaping
New tarmac path to connect to existing
Retained hedge
Existing shelter and furniture removed
New tarmac path
Retained hedge
Fire tender turning area (max 20m manoeuvring length)
Retained parking spaces
UP
DOWN
Chain link fence ht 1.4m

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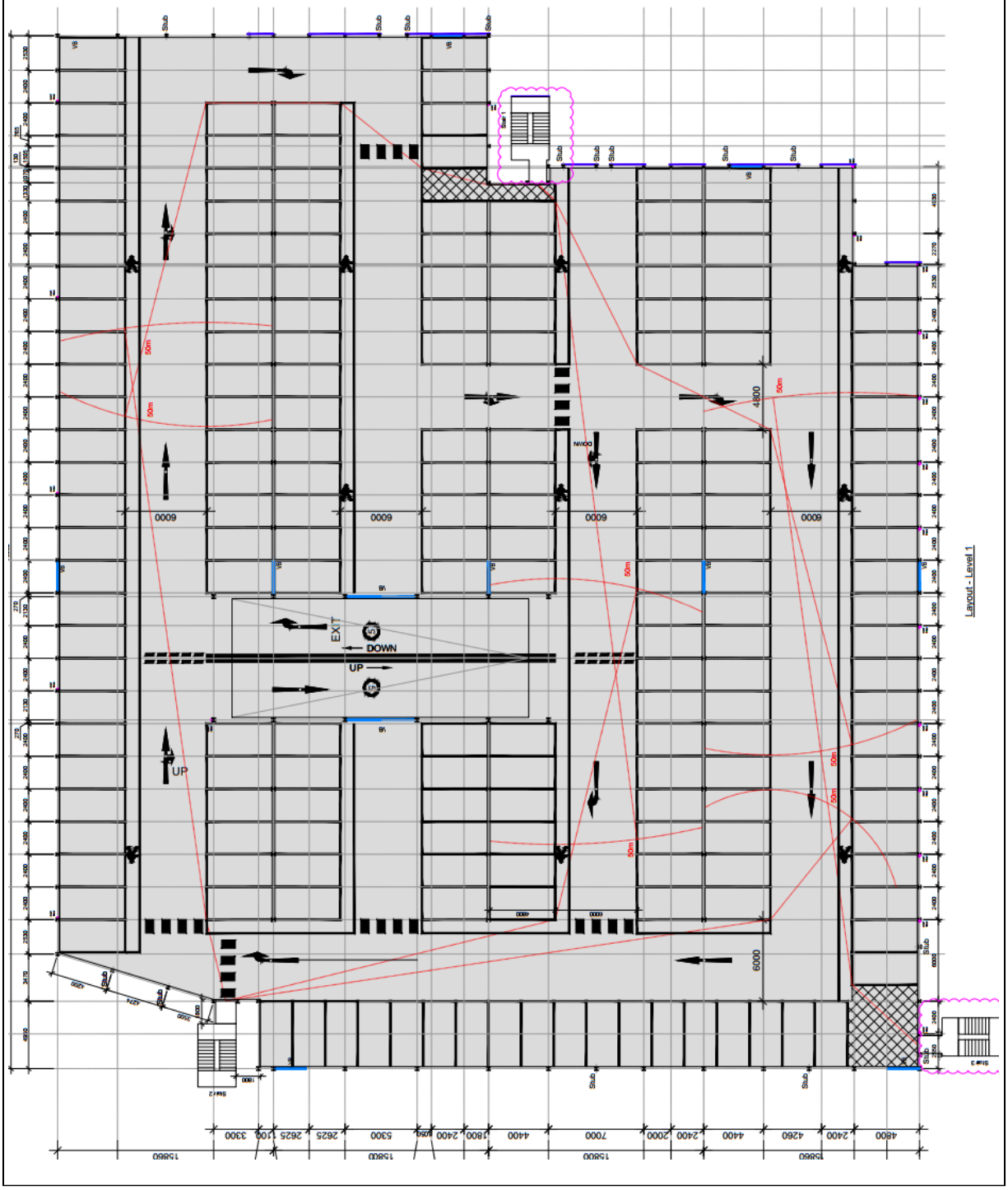
Title: Figure 3: Proposed Level 1 Layout

Project: P19-644



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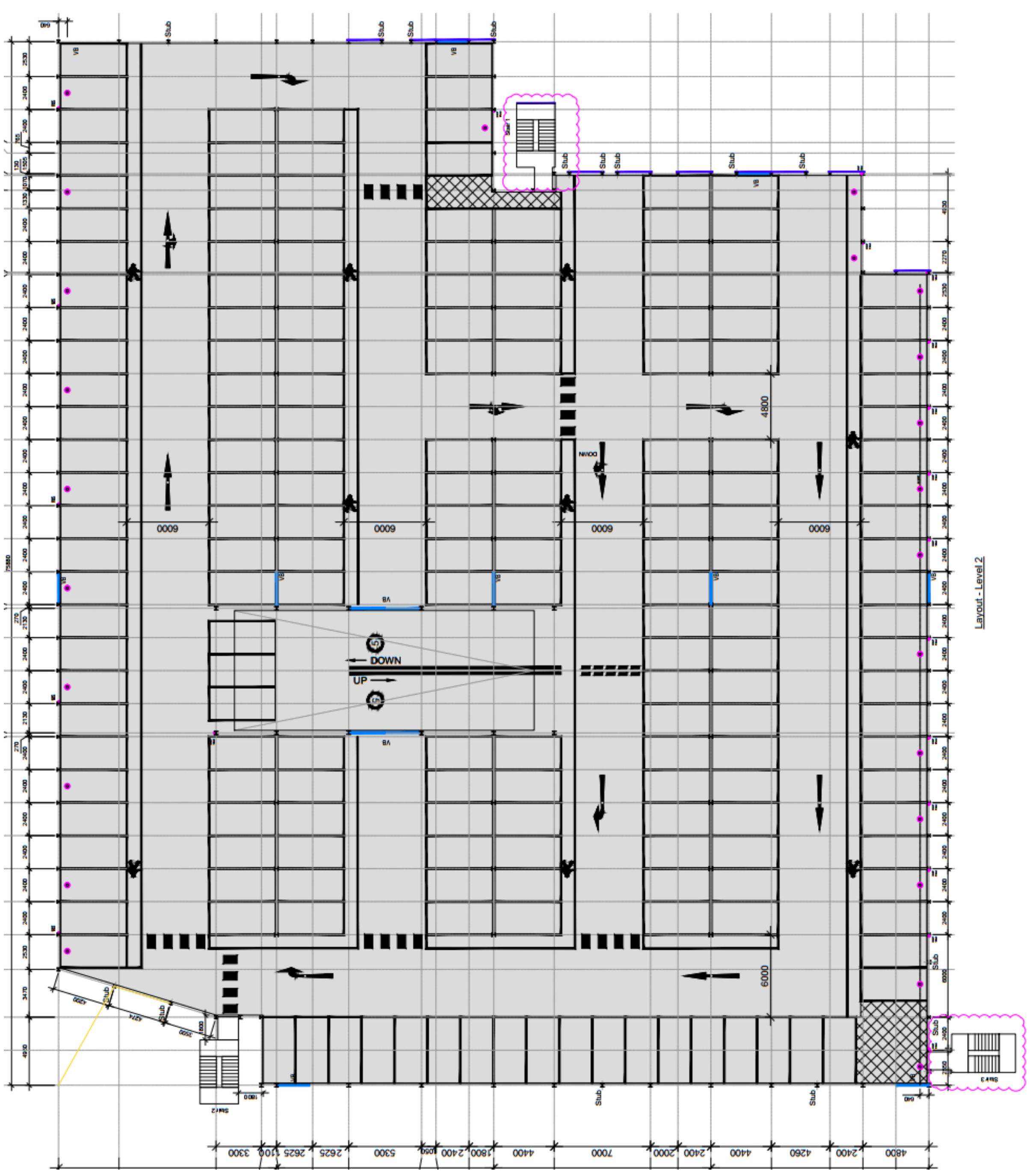
Title: Figure 4: Proposed Level 2 Layout

Project: P19-644



Appendix I: Noise Units & Indices

Sound and the decibel

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that human hearing also responds to sound in an approximately logarithmic fashion. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120dB (threshold of pain).

Due to the logarithmic nature of decibels, when two noises of the same level are combined together, the total noise level is (under normal circumstances) 3 dB(A) higher than each of the individual noise levels e.g. 60 dB(A) plus 60 dB(A) = 63 dB(A). In terms of perceived 'loudness', a 3 dB(A) variation in noise level is a relatively small (but nevertheless just noticeable) change. An increase in noise level of 10 dB(A) generally corresponds to a doubling of perceived loudness. Likewise, a reduction in noise level of 10 dB(A) generally corresponds to a halving of perceived loudness.

The ear is not equally sensitive to sound at all frequencies. It is less sensitive to sound at low and very high frequencies, compared with the frequencies in between. Therefore, when measuring a sound made up of different frequencies, it is often useful to 'weight' each frequency appropriately, so that the measurement correlates better with what a person would actually hear. This is usually achieved by using an electronic filter called the 'A' weighting, which is built into sound level meters. Noise levels measured using the 'A' weighting are denoted dB(A) or dBA.

Frequency and Hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kiloHertz (kHz), where 1 kHz = 1000 Hz.

Young people with normal hearing can hear frequencies in the range 20 Hz to 20 kHz. However, the upper frequency limit gradually reduces as a person gets older.

Glossary of Terms

When a noise level is constant and does not fluctuate, it can be described adequately by measuring the dB(A) level. However, when the noise level varies with time, the measured dB(A) level will vary as well. In this case it is therefore not possible to represent the noise climate with a simple dB(A) value. In order to describe noise where the level is continuously varying, a number of other indices can be used. The indices used in this report are described below.

L_{Aeq} This is the A–weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period. In other words, LAeq is the level of a continuous noise which has the same total (A–weighted) energy as the real fluctuating noise, measured over the same time period. It is increasingly being used as the preferred parameter for all forms of environmental noise.

L_{Amax} This is the maximum A–weighted noise level that was recorded during the monitoring period.

L_{A90} This is the A–weighted noise level exceeded for 90% of the time period. L_{A90} is used as a measure of background noise.

L_W This is the Sound Power Level and is a Logarithmic measure of the sound power as a relation to the threshold of hearing.

L_{WA} This is the A-weighted 'Sound Power Level' and is a Logarithmic measure of the sound power as a relation to the threshold of hearing.

L_{AE} This is the A–weighted 'Sound Exposure Level' which is used for measuring discrete noise events. Essentially it is a measure of the sound energy of the whole noise event normalised to a period of 1 second. The L_{AE} value can be used to calculate the actual L_{Aeq} value for a given time period if the number of noise events is known.

Appendix II: Noise Survey Results

Date:	Morning: Wednesday 15 & Thursday 16 July 2020 Daytime & Evening: Wednesday 15 July 2020
Equipment:	Brüel & Kjær 2260 'Type 1' sound level meter (S/N: 2467014) with field calibrator and tripod
Weather:	Wednesday Morning: Dry, ~16°C with low winds <3m/s and moderate/high cloud coverage Wednesday Afternoon: Dry, ~18°C with low winds <3m/s and moderate/high cloud coverage Wednesday Evening: Dry, ~15°C with low winds <4m/s and overcast Thursday Morning: Dry, ~14°C with low winds <3m/s and overcast

Please see the results of the noise surveys in the tables below and overleaf.

Location A - Wednesday Morning

Time		Measured Noise Levels (dB)			Comments
Start	End	L_{Amax}	L_{Aeq}	L_{A90}	
10:00	10:15	60.4	47.4	43.6	Distant road traffic noise. Only occasional low levels of noise from the car park. Some distant construction works. Occasional distant aircraft noise. Some bird noise.
10:15	10:30	75.2	50.0	43.6	Distant road traffic noise. Only occasional low levels of noise from the car park. Some distant construction works. Occasional distant aircraft noise. Some bird noise. Some dog barking (LAmax).
11:35	11:50	60.3	48.6	45.4	Distant road traffic noise. Only occasional low levels of noise from the car park. Some distant grass cutting noise. Occasional distant aircraft noise. Some bird noise.
11:50	12:05	67.6	50.6	44.4	Distant road traffic noise. Only occasional low levels of noise from the car park. Occasional distant aircraft noise. Some bird noise.

Location B - Wednesday Morning

Time		Measured Noise Levels (dB)			Comments
Start	End	L_{Amax}	L_{Aeq}	L_{A90}	
10:56	11:11	60.8	43.2	39.0	Very distant road traffic noise. Some bird noise. Occasional distant aircraft noise. Some distant dog barking.
11:11	11:26	56.8	41.7	39.2	Very distant road traffic noise. Some bird noise. Occasional distant aircraft noise. Some distant lawn mowing noise.

Location C - Wednesday Morning

Time		Measured Noise Levels (dB)			Comments
Start	End	L_{Amax}	L_{Aeq}	L_{A90}	
10:34	10:49	82.0	66.2	48.0	Road traffic noise from Bridge Road. Some bird noise.

Location A - Wednesday Afternoon

Time		Measured Noise Levels (dB)			Comments
Start	End	L_{Amax}	L_{Aeq}	L_{A90}	
13:00	13:15	61.3	49.0	44.8	Distant road traffic noise. Only occasional low levels of noise from the car park. Occasional distant aircraft noise. Some bird noise.
13:15	13:30	64.2	50.2	45.4	Distant road traffic noise. Only occasional low levels of noise from the car park. Occasional distant aircraft noise. Some bird noise.
14:33	14:48	65.2	50.3	46.4	Distant road traffic noise. Only occasional low levels of noise from the car park. Occasional distant aircraft noise. Some bird noise. Some noise from skateboarders at the other end of the car park. Some distant grass cutting noise.
14:52	15:07	62.3	48.5	44.8	Distant road traffic noise. Only occasional low levels of noise from the car park. Occasional distant aircraft noise. Some bird noise. Some distant grass cutting noise.
16:21	16:36	61.6	50.0	46.4	Distant road traffic noise. Only occasional low levels of noise from the car park. Some bird noise.
16:36	16:51	64.1	50.1	46.4	Distant road traffic noise. Only occasional low levels of noise from the car park. Some bird noise.

Location B - Wednesday Afternoon

Time		Measured Noise Levels (dB)			Comments
Start	End	L_{Amax}	L_{Aeq}	L_{A90}	
13:57	14:12	56.0	43.4	41.2	Very distant road traffic noise. Some bird noise. Occasional distant aircraft noise.
14:12	14:27	70.9	46.3	42.2	Very distant road traffic noise. Some bird noise. Brief noise from passing vehicle.
15:35	15:59	63.9	44.3	40.6	Very distant road traffic noise. Some bird noise. Brief noise from passing vehicle.
15:59	16:14	60.1	41.3	39.8	Very distant road traffic noise. Some bird noise. Brief noise from front door closing.

Location C - Wednesday Afternoon

Time		Measured Noise Levels (dB)			Comments
Start	End	L_{Amax}	L_{Aeq}	L_{A90}	
13:33	13:48	79.6	66.0	47.8	Road traffic noise from Bridge Road. Some bird noise. Some occasional distant aircraft noise.
15:11	15:26	78.1	67.1	51.2	Road traffic noise from Bridge Road. Some bird noise.

Location A - Wednesday Evening

Time		Measured Noise Levels (dB)			Comments
Start	End	L_{Amax}	L_{Aeq}	L_{A90}	
19:50	20:05	63.7	49.1	42.8	Distant road traffic noise. Only occasional low levels of noise from the car park. Some bird noise.
20:05	20:20	61.4	48.5	42.2	Distant road traffic noise. Only occasional low levels of noise from the car park. Some bird noise.
21:25	21:40	66.2	44.7	35.2	Distant road traffic noise. Some bird noise.
21:41	21:56	57.7	44.1	37.2	Distant road traffic noise. Some bird noise.

Location B - Wednesday Evening

Time		Measured Noise Levels (dB)			Comments
Start	End	L_{Amax}	L_{Aeq}	L_{A90}	
20:45	21:00	51.0	38.7	36.0	Very distant road traffic noise. Some bird noise. Occasional distant aircraft noise.
21:01	21:16	53.8	39.3	35.0	Very distant road traffic noise. Some bird noise.

Location C - Wednesday Evening

Time		Measured Noise Levels (dB)			Comments
Start	End	L_{Amax}	L_{Aeq}	L_{A90}	
20:23	20:38	84.7	64.0	43.6	Road traffic noise from Bridge Road. Some bird noise.

Location A - Thursday Morning

Time		Measured Noise Levels (dB)			Comments
Start	End	L_{Amax}	L_{Aeq}	L_{A90}	
07:30	07:45	63.4	50.6	45.2	Distant road traffic noise. Some bird noise.
07:45	08:00	62.3	50.9	46.8	Distant road traffic noise. Only occasional low levels of noise from the car park. Some bird noise.
09:03	09:18	70.2	51.8	45.8	Distant road traffic noise. Only occasional low levels of noise from the car park. Some occasional aircraft noise. Some bird noise.
09:19	09:34	68.2	50.9	44.6	Distant road traffic noise. Only occasional low levels of noise from the car park. Some occasional aircraft noise. Some bird noise.

Location B - Thursday Morning

Time		Measured Noise Levels (dB)			Comments
Start	End	L_{Amax}	L_{Aeq}	L_{A90}	
08:26	08:41	60.5	46.5	42.2	Very distant road traffic noise. Some bird noise.
08:41	08:56	63.2	48.4	43.8	Very distant road traffic noise. Some bird noise. Some distant hammering noise.

Location C - Thursday Morning

Time		Measured Noise Levels (dB)			Comments
Start	End	L_{Amax}	L_{Aeq}	L_{A90}	
08:04	08:19	82.8	66.6	48.0	Road traffic noise from Bridge Road. Some bird noise.