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65-69 HOLMES ROAD, LONDON

DEMOLTION AND CONSTRUCTION NOISE AND VIBRATION ASSESSMENT

Technical Report: R6718-1 Rev 1

Date: 16th February 2017

For: Hallmark Property Group
46 Great Marlborough Street
London
W1F 7JW

24 Acoustics Document Control Sheet

Project Title: 65-69 Holmes Road, London – Demolition and Construction Noise and Vibration Assessment

Report Ref: R6718-1 Rev 1

Date: 16th February 2017

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Document Status and Approval Schedule

Revision	Description	Prepared By	Approved By
0	Approved for issue	Neil McLeod	Stephen Gosling
1	Approved for issue	Neil McLeod	Stephen Gosling

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1.0 INTRODUCTION

1.1 24 Acoustics Ltd has been retained by Hallmark Property Group to undertake an assessment of the potential noise and vibration impact from the demolition and construction works associated with the development of new student accommodation (with ancillary facilities, warehouse and coffee shop) at 65-69 Holmes Road, NW5.

1.2 A desktop assessment has been undertaken, following a review of the site plans and proposals provided by Hallmark Property Group, relating to the proposed phases of demolition and construction.

1.3 All sound pressure levels quoted in this report are in dB relative to 20 µPa. All sound power levels are quoted in dB relative to 10-12 Watts. A glossary of the acoustic terminology used in this report is provided in Appendix A.

2.0 CRITERIA

2.1 The development has planning permission and clause 4.1 of the Section 106 agreement requires the provision of a construction management plan. Camden Council's Minimum Requirements for Building Construction and Demolition Sites (PN11, July 2016) confirms that the following information is required in relation to noise and vibration:

- Confirmation of prevailing ambient noise levels;
- Prediction of actual likely (not worst case) noise and vibration levels throughout the proposed works;
- Details of arrangements for noise and vibration prevention, suppression and monitoring;
- Action to be taken in case of exceedances

2.2 The document also sets out limiting operational hours for noisy activities and discusses noise abatement techniques and monitoring requirements.

3.0 SITE DESCRIPTION AND PROPOSED WORKS

3.1 Figure 1 provides an aerial image of the site and surroundings and the proposed development.

3.2 The nearest potential receptors likely to be affected by noise and vibration associated with activities on site include:

- College Français Bilingue de Londres (87 Holmes Road);
- Residential properties on Azania Mews;
- Residential properties in 55-57 Holmes Road.

3.3 The development comprises. For simplicity the construction works have been divided into three phases, with reference to the project's construction programme (see Appendix B), as described in Table 1.

Construction Stage	**Description**	**Approximate Duration**	**Typical Activities**
0 Demolition and Site Preparation	Demolition	2 weeks	Demolition
1 Sheet / CFA Piling, Excavation and Concrete Structure	Piling	6 weeks	Sheet/CFA Piling, HGV movements, excavators, dumper, roller, generator
	Concrete Structure	18 weeks	HGV movements, excavator, dump truck, concrete pump, mobile crane
2 Steel Structure and Fit-Out	Steel Structure and POD Installation	11 weeks	HGV movements, forklift truck, mobile crane
	External Cladding Mechanical and Power	33 weeks	HGV movements, forklift truck, mobile crane, portable generators
	Fit-Out and Landscaping	17 weeks	HGV movements, dump truck, vibratory roller/ wacker plate

Table 1 - Summary of Construction Phases

3.4 In accordance with Camden Council's requirements, construction working hours will, where practicable, be between 08:00 and 18:00 hours Monday to Friday and 08:00 to 13:00 hours on Saturdays. There will be no works on Sundays or Public Holidays.

3.5 Internal fit out works may take place outside of the standard working hours listed above providing they are not measurable beyond the site boundary, and so as not to disturb local residents.

3.6 There may be occasions when certain activities which are measurable beyond the site boundary need to take place out of hours. This situation will typically only occur if required for safety reasons i.e. the activity would present an unacceptable level of risk to site operatives/public if undertaken during core hours. These instances are expected to be rare and the Contractor will ensure that notification will be provided to Camden and residents ahead of such works.

4.0 CRITERIA

British Standard 5228 Part 1: Noise

4.1 BS 5228 Part 1 [Reference 1] provides guidance on the control of noise from construction and open sites. The standard provides recommendations for basic methods of noise control relating to construction and open sites where work activities/ operations generate significant noise levels. The standard also, in Annex E provides means of assessing the significance of noise effects.

4.2 It is proposed to compare predicted noise levels with the threshold of significant effect at the nearest dwellings using a fixed level of 75 dB $L_{Aeq,\ 10hour}$ (Monday to Friday) and 75 dB $L_{Aeq,\ 5\ hours}$ (Saturday) , as described in 5228 Part 1.

BS5228 Part 2: Vibration

4.3 Advice on assessing vibration from construction activities is given in BS 5228:2014 'Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration'. The standard provides an empirical method for predicting ground-borne vibration from construction works. Table B.1 of the standard provides guidance on the potential effects of vibration and is reproduced below as Table 2.

Vibration Level	Effect
0.14 mm/s	Vibration might just be perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3 mm/s	Vibration might be just perceptible in residential environments.
1.0 mm/s	It is likely that vibration of this level in residential developments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents.
10 mm/s	Vibration is likely to be intolerable for any more than a very brief exposure to this level.

Table 2 - Guidance on effects of Vibration Levels

4.4 An upper trigger value of 1mm/s at or within neighbouring properties is considered appropriate.

5.0 ENVIRONMENTAL NOISE MEASUREMENTS

Methodology

5.1 The following instrumentation was set up between 5th and 12th October 2016 to assess the existing ambient noise levels:

3 no. Rion precision sound level meter	Type NL32
Brüel & Kjær acoustic calibrator	Type 4231

5.2 Measurements were undertaken at three locations, as shown in Figure 1. The prevailing source of noise at the site is road traffic on Holmes Road and construction noise from the adjacent building site (south east boundary).

5.3 The instrumentation was configured to record 5-minute measurements of the A-weighted statistical parameters including L_{Aeq}, L_{A90} and L_{Amax} (all measured on fast response). The surveys were undertaken in general accordance with BS 7445: 1991 "Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use.

5.4 The calibration of all instrumentation was verified before and after the tests and no significant signal variation occurred. Calibration of 24 Acoustics' equipment is traceable to National Standards. The instrumentation was fitted with an environmental weather shield during the survey.

Results

5.5 The noise measurements are shown graphically in Appendix C and summarised in Tables 4 and 5.

Date January 2017	Measured Sound Pressure Level, dB $L_{Aeq, 10hr}$ (07:00 to 19:00 hours)		
	Location 1 (Holmes Road)	Location 2 (Azania Mews)	Location 3 SW Boundary
Friday 6th	73	56	52*
Saturday 7th	63	50	46**
Sunday 8th	64	50	47
Monday 9th	66	54	63*
Tuesday 10th	67	65	70*
Wednesday 11th	65	54	63*
Thursday 12th	70	63	68*
Friday 13th	66	56	66*
Representative	**67 (Weekdays) 64 (Saturday am)**	**56 (Weekdays) 50 (Saturday am)**	**47 (Weekdays) 47 (Saturday am)**

Table 3 - Measured Background Noise Levels

*Background noise levels determined by activity on the adjacent building site

**Shortened measurement (14:00 to 19:00 hours) to exclude noise from the building site

6.0 CALCULATIONS AND ASSESSMENT

6.1 24 Acoustics has liaised with the project engineering team to establish the likely duration and dates of the works together with the likely plant to be used during the works. This information has been used to undertake predictions of likely noise levels from the works at the nearest residential properties;

6.2 An assessment of the likely noise impact has been undertaken in accordance with the guidance of BS 5228 and noise levels from construction activities have been calculated at a number of differing distances to quantify the likely range of noise levels that the receptors could be exposed to.

Noise Assessment

6.3 Calculations of the potential noise levels generated by the demolition and construction works have been carried out using the guidance of BS 5228. The level of noise generated by the infrastructure construction activities will depend upon a range of factors, which include plant to be used, distance between source and receptor and % on-time for each item of plant.

6.4 Calculations have been undertaken for each of the identified phases and for the typical and minimum distance between each work site and the nearest receptors. Precise details relating to the construction methodology are not available so reasonable assumptions have been made with reference to the demolition and construction contractors' management plans.

6.5 Source-term noise data for the plant has been taken from the database contained in BS 5228 and also from measurements of similar plant previously undertaken by 24 Acoustics.

6.6 Example calculations are provided in Appendix B and the results summarised in Table 5.

Construction Stage	**Description**	**Approximate Duration**	**Typical Noise Levels at Receptors, dB $L_{Aeq, 12\ hour}$**
0 - Demolition and Site Preparation	Demolition	2 weeks	63 to 74
1 - Sheet / CFA Piling, Excavation and Concrete Structure	Piling	6 weeks	64 to 74
	Concrete Structure	18 weeks	66 to 75
2 - Steel Structure and Fit-Out	Steel Structure and POD Installation	11 weeks	58 to 66
	External Cladding Mechanical and Power	33 weeks	59 to 66
	Fit-Out and Landscaping	17 weeks	68 to 72

Table 4 - Summary of Predicted Noise Levels

6.7 Given the close proximity of nearby residents, there is a risk that the above noise levels could be exceeded, hence it will be necessary to ensure high quality monitoring is undertaken.

Vibration Assessment

6.8 Consideration has been given to vibration levels due to construction operations and the primary activities with the potential to produce significant levels of vibration are demolition and piling.

6.9 In order to reduce noise and vibration at adjacent residential properties, the contractor has proposed an hydraulic powered, static load method of sheet piling (non-vibratory) and an area of Continuous Flight Auger (CFA) piling (See Figure 2). The piling works comprise:

- Sheet piles around the entire site perimeter.
- 16 Continuous Flight Auger (CFA) piles in the centre of the site.

6.10 As described in BS5228 , The levels of vibration associated with continuous flight auger and pressed-in piling are minimal, as the processes do not involve rapid acceleration or deceleration of tools in contact with the ground but rely to a large extent on steady motions.

6.11 It is considered therefore, that vibration levels from CFA piling, subject to correct operation and no ground obstructions, are not likely to exceed 1 mm/s at the nearest residential properties.

7.0 MITIGATION

Communication and Best Practicable Means

7.1 Due to the anticipated noise levels at nearby receptors, it will be necessary to ensure regular communication with residents and businesses, as stated in BS 5225-1:

7.2 Best Practicable Means (as defined in Section 72 of Control of Pollution Act 1974) shall be used. Embassy Demolition Contractors Ltd has committed to employing BPM throughout the demolition phase (Page 48 of the Demolition Management Plan) and Designated Contractors Ltd is committed to employing BPM throughout the demolition and construction phases.

7.3 It is recommended that perimeter hoarding be provided along the residential site boundaries.

7.4 Comprehensive noise and vibration monitoring will be undertaken throughout the project. The monitoring system will be configured to record both noise and vibration levels in high resolution samples in addition to real time noise and vibration data, allowing intelligent trigger alerts to be generated and interrogated.

7.5 A minimum of two noise and vibration monitoring locations are recommended: to the rear of 55-57 Holmes Road and the rear of Azania Mews. The exact locations are to be agreed with London Borough of Camden Environmental Health.

Noise and Vibration Trigger Levels

7.6 It is proposed to adopt a maximum construction noise level of 75 dB $L_{Aeq,\ 10\ hour}$. The following two stage alert strategy is recommended to regulate noise levels at the nearest residential properties.

Measured Noise Level at the Façade of the Receiver	Recommended Action
> 75 dB $L_{Aeq,\ 1hr}$	Amber alert issued to the lead contractor and actions taken as appropriate to control noise levels over the 10 hour daytime period
> 80 dB $L_{Aeq,\ 1hr}$	Red alert issued to the lead contractor who will take immediate action to reduce noise levels.

Table 5 - Recommended Two-Stage Alert for Construction Noise

7.7 The following two stage alert is recommended to regulate vibration levels at the nearest residential properties.

Measured Vibration Level at the Façade of the Receiver	Recommended Action
> 1 mm/s	Amber alert issued to the lead contractor. Trigger review and, where appropriate, action taken.
> 4 mm/s	Red alert issued to the lead contractor who will take immediate action to reduce vibration levels.

Table 6 - Recommended Two-Stage Alert for Construction Vibration

Trigger Actions

7.8 Noise monitoring with a look-ahead trigger algorithm will be used to communicate to key construction staff who in turn can take action to limit operations on site.

7.9 Where a trigger event is considered to be genuine (determined by reviewing live noise and vibration measurement data and recorded audio), the contractor will identify the source of the noise or vibration that triggered the alert. The Contractor will undertake a risk assessment to determine the likelihood that the activity that generated the alert might generate further noise or vibration.

7.10 If a risk of increasing noise levels from the activity is identified, the Contractor will review the working method and machinery to determine whether alternatives are available that reduce the risk. The Contractor's Expert may be consulted for an external view on whether the best practicable means to minimise noise and vibration have been proposed and adopted;

7.11 In any event, noise and / or vibration levels will be kept under close scrutiny as the activity continues until such time as the risk of exceedance becomes negligible.

7.12 All noise monitoring equipment will comply with the Class 1 specification of BS EN 61672-1 (IEC 61672-1). All vibration measurements will be undertaken in terms of Peak particle Velocity (PPV) with the dominant frequency also noted. The measured PPVs will be assessed in accordance with guideline levels defined in BS 5228-2:2009. Any maintenance issues will rectified promptly so as to ensure any periods where monitoring is not taking place is as short as possible.

8.0 CONCLUSIONS

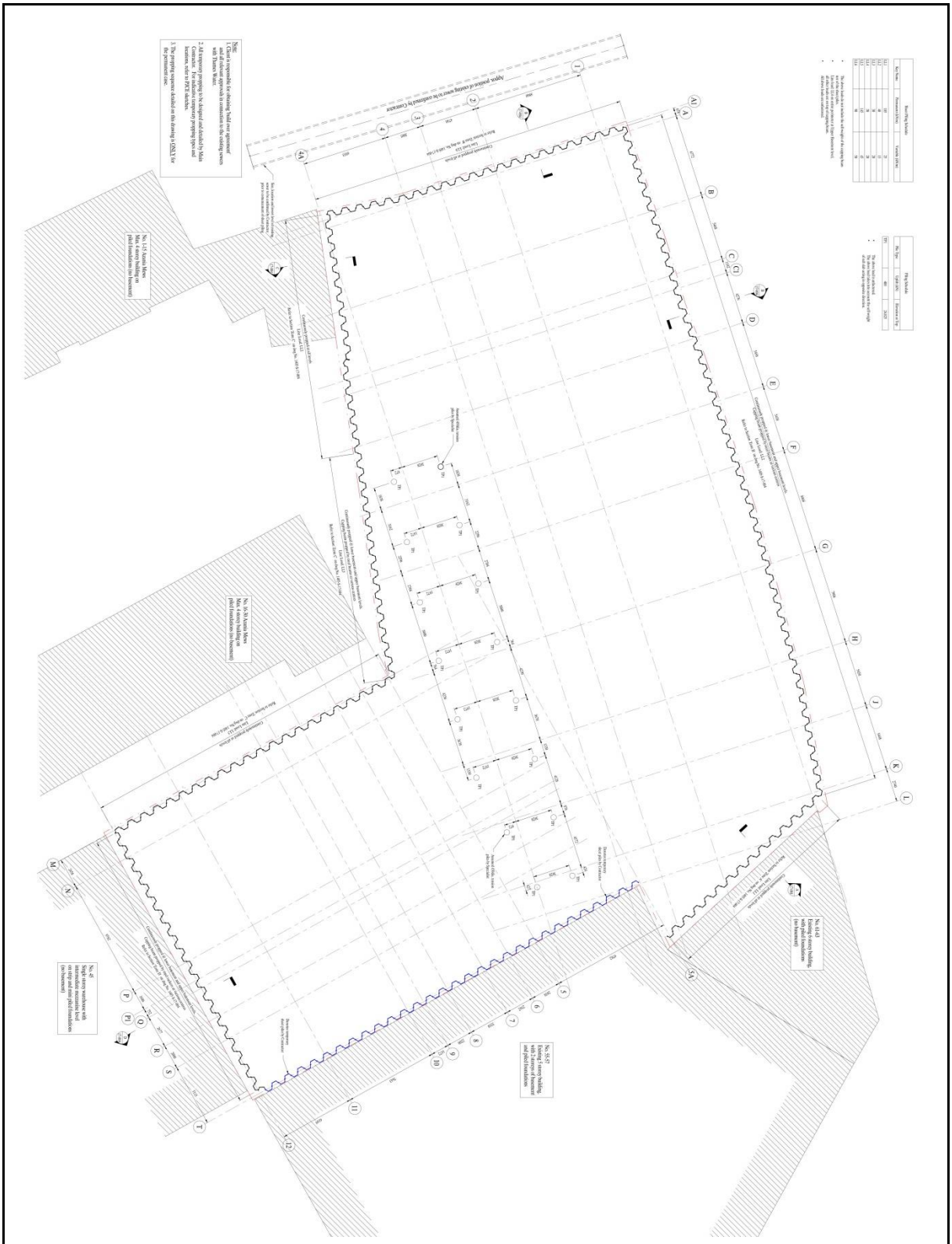
8.1 The demolition and construction noise and vibration assessment predicts high levels at the nearest residential properties, indicating that complaints are considered likely. Mitigation measures have been put in place and it will be necessary to ensure close and effective communication with residents.

8.2 The proposed measures will provide a means to regulate noise and vibration levels. Construction monitoring will be provided and the recommended trigger alerts and real-time noise reporting would allow the contractor can react quickly to reduce noise levels in the event of a complaint or trigger level being exceeded. Accordingly, two-stage trigger levels have been recommended to regulate noise and vibration levels at residential properties.

REFERENCES

1. British Standards Institution. British Standard 5228: Code of practice for noise and vibration control on construction and open sites. Parts 1 & 2, 2009.

Project: Holmes Road, Kentish Town	**Title:** Site plan and noise survey locations	
DWG No: Figure 1	**Scale:** N.T.S.	**Rev:** A
Date: January 2017	**Drawn By:** NM	**Job No:** 6718



Project: Holmes Road, Kentish Town	**Title:** Piling plan	
DWG No: Figure 1	**Scale:** N.T.S.	**Rev:** A
Date: January 2017	**Drawn By:** NM	**Job No:** 6718

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APPENDIX A: ACOUSTIC TERMINOLOGY

Noise Levels

Noise is defined as unwanted sound. The range of audible sound is from 0 to 140 dB. The frequency response of the ear is usually taken to be around 18 Hz (number of oscillations per second) to 18000 Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than the lower and higher frequencies and because of this, the low and high frequency components of a sound are reduced in important by applying a weighting (filtering) circuit to the noise measuring instrument. The weighting which is most widely used and which correlates best with subjective response to noise is the dBA weighting. This is an internationally accepted standard for noise measurements.

For variable sources, such as traffic, a difference of 3 dBA is just distinguishable. In addition, a doubling of traffic flow will increase the overall noise by 3 dBA. The 'loudness' of a noise is a purely subjective parameter, but it is generally accepted that an increase/ decrease of 10 dBA corresponds to a doubling/ halving in perceived loudness.

External noise levels are rarely steady, but rise and fall according to activities within an area. In attempt to produce a figure that relates this variable noise level to subjective response, a number of noise indices have been developed. These include:

i) The L_{Amax} noise level

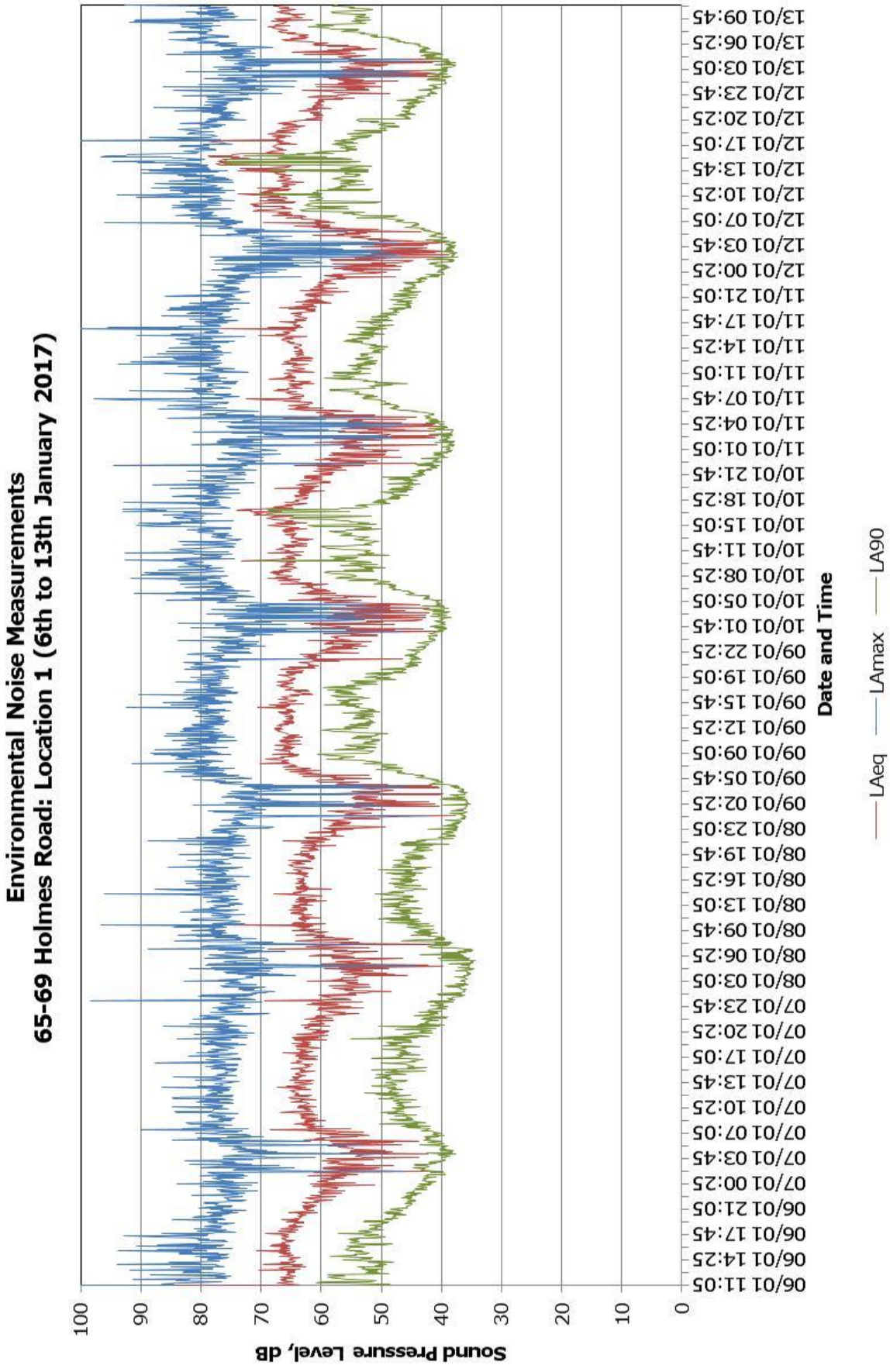
This is the maximum noise level recorded over the measurement period.

ii) The L_{Aeq} noise level

This is "equivalent continuous A-weighted sound pressure level, in decibels" and is defined in British Standard BS 7445 as the "value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time internal, T, has the same mean square sound pressure as a sound under consideration whose level varies with time".

It is a unit commonly used to describe construction noise and noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise. In more straightforward terms, it is a measure of energy within the varying noise.

APPENDIX B: ENVIRONMENTAL NOISE MEASUREMENTS


Environmental Noise Measurements
65-69 Holmes Road: Location 1 (6th to 13th January 2017)
Sound Pressure Level, dB
100
90
80
70
60
50
40
30
20
10
0
Date and Time
06/01 11:05
06/01 14:25
06/01 17:45
06/01 21:05
07/01 00:25
07/01 03:45
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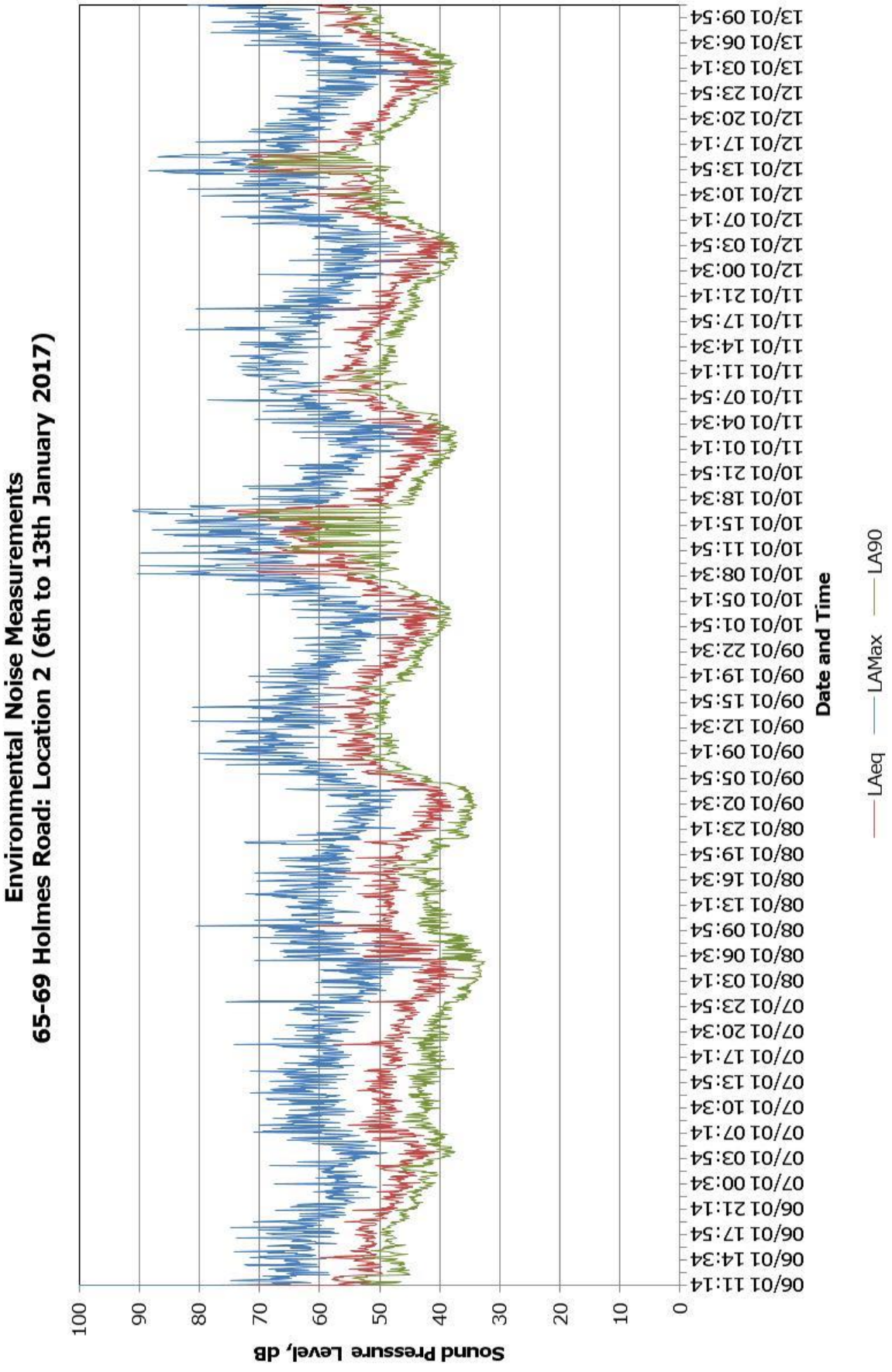
Environmental Noise Measurements
65-69 Holmes Road: Location 2 (6th to 13th January 2017)
Sound Pressure Level, dB
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70
60
50
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30
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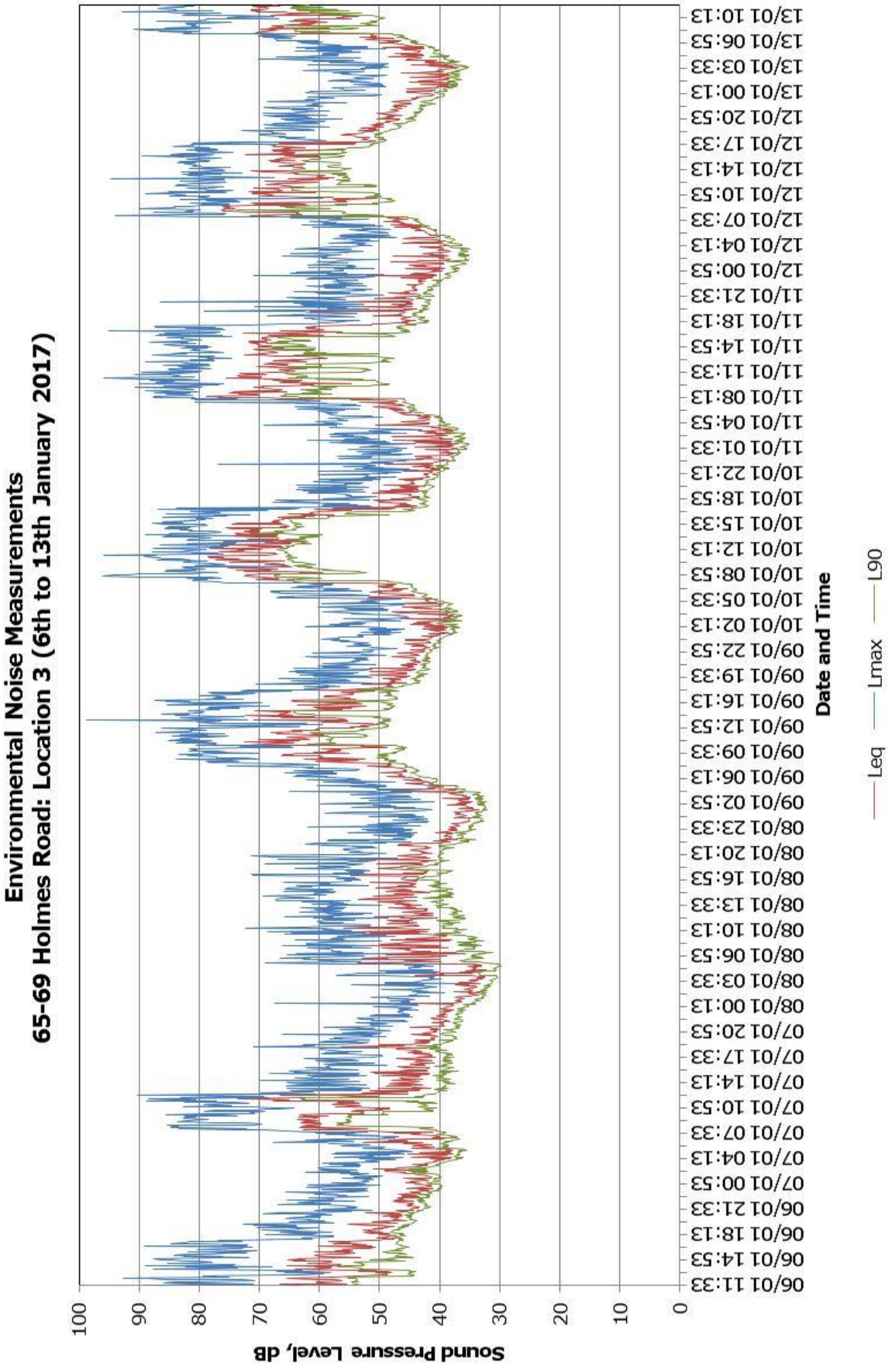
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90
80
70
60
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13/01 00:13
13/01 03:33
13/01 06:53
13/01 10:13
Leq
Lmax
L90

APPENDIX C: CONSTRUCTION NOISE CALCULATIONS

Demolition (nearest) Azania and Holmes Road

Plant Details Type	PWL	distance , m	% soft ground	Adjustments, dB(A) distance	screening	reflection	Resultant LAeq, cycle	Activity duration %	Correct. dB	Activity LAeq
30T Pulverizer	104	5	50	20	5	0	79	20	-6.99	72
Excavator	105	10	50	27	5	0	73	20	-6.99	66
Dump Truck	104	10	50	27	5	0	72	20	-6.99	65
on-site HGV	98	15	50	31	5	0	62	20	-6.99	55

Total 10h Leq due to plant = 74

Demolition (nearest) College Français

Plant Details Type	PWL	distance , m	% soft ground	Adjustments, dB(A) distance	screening	reflection	Resultant LAeq, cycle	Activity duration %	Correct. dB	Activity LAeq
30T Pulverizer	104	5	50	20	5	0	79	20	-6.99	72
Excavator	105	10	50	27	5	0	73	20	-6.99	66
Dump Truck	104	10	50	27	5	0	72	20	-6.99	65
on-site HGV	98	15	50	31	5	0	62	20	-6.99	55

Total 10h Leq due to plant = 74

Demolition: Azania and Holmes Road (average)

Plant Details Type	PWL	distance , m	% soft ground	Adjustments, dB(A) distance	screening	reflection	Resultant LAeq, cycle	Activity duration %	Correct. dB	Activity LAeq
30T Pulverizer	108	15	50	31	5	0	72	20	-6.99	65
Excavator	105	15	50	31	5	0	69	20	-6.99	62
Dump Truck	104	15	50	31	5	0	68	20	-6.99	61
on-site HGV	98	20	50	34	5	0	59	20	-6.99	52

Total 10h Leq due to plant = 68

Demolition College Français (average)

Plant Details Type	PWL	distance , m	% soft ground	Adjustments, dB(A) distance	screening	reflection	Resultant LAeq, cycle	Activity duration %	Correct. dB	Activity LAeq
Breaker	108	25	50	36	5	0	67	20	-6.99	60
Excavator	105	25	50	36	5	0	64	20	-6.99	57
Dump Truck	104	25	50	36	5	0	63	20	-6.99	56
on-site HGV	98	30	50	38	5	0	55	20	-6.99	48

Total 10h Leq due to plant = 63

Plant Details Type	PWL	distance , m	% soft ground	Adjustments, dB(A) distance	screening	reflection	Resultant LAeq, cycle	Activity duration %	Correct. dB	Activity LAeq
Hydraulic Piling	91	5	50	20	5	0	66	30	-5.23	61
CFA Piling	107	10	50	27	5	0	75	30	-5.23	70
Excavator	105	15	50	31	5	0	69	20	-6.99	62
Dump Truck	104	10	50	27	5	0	72	30	-5.23	67
Concrete pump	102	10	50	27	5	0	70	50	-3.01	67
on-site HGV	98	15	50	31	5	0	62	33	-4.81	57

Total 10h Leq due to plant =	74

Piling: College Français (nearest)

Plant Details Type	PWL	distance , m	% soft ground	Adjustments, dB(A) distance	screening	reflection	Resultant LAeq, cycle	Activity duration %	Correct. dB	Activity LAeq
Hydraulic Piling	91	5	50	20	5	0	66	30	-5.23	61
Excavator	105	10	50	27	5	0	73	20	-6.99	66
CFA Piling	107	10	50	27	5	0	75	30	-5.23	70
Dump Truck	104	10	50	27	5	0	72	30	-5.23	67
Concrete pump	102	10	50	27	5	0	70	50	-3.01	67
on-site HGV	98	15	50	31	5	0	62	33	-4.81	57

Total 10h Leq due to plant =	74

Piling: Azania and Holmes Road (average)

Plant Details Type	PWL	distance , m	% soft ground	Adjustments, dB(A) distance	screening	reflection	Resultant LAeq, cycle	Activity duration %	Correct. dB	Activity LAeq
Hydraulic Piling	91	15	50	31	5	0	55	30	-5.23	50
CFA Piling	105	15	50	31	5	0	69	20	-6.99	62
Excavator	107	15	50	31	5	0	71	30	-5.23	66
Dump Truck	104	15	50	31	5	0	68	30	-5.23	63
Concrete pump	102	15	50	31	5	0	66	50	-3.01	63
on-site HGV	98	20	50	34	5	0	59	33	-4.81	54

Total 10h Leq due to plant =	70

Piling: College Français (average)

Plant Details Type	PWL	distance , m	% soft ground	Adjustments, dB(A) distance	screening	reflection	Resultant LAeq, cycle	Activity duration %	Correct. dB	Activity LAeq
Hydraulic Piling	91	25	50	36	5	0	50	30	-5.23	45
Excavator	105	25	50	36	5	0	64	20	-6.99	57
CFA Piling	107	25	50	36	5	0	66	30	-5.23	61
Dump Truck	104	25	50	36	5	0	63	30	-5.23	58
Concrete pump	102	25	50	36	5	0	61	50	-3.01	58
on-site HGV	98	30	50	38	5	0	55	33	-4.81	50

Total 10h Leq due to plant =	65

Concrete Structure: Azania and Holmes Road (nearest)

Plant Details Type	PWL	distance , m	% soft ground	Adjustments, dB(A) distance	screening	reflection	Resultant LAeq, cycle	Activity duration %	Correct. dB	Activity LAeq
Cutting concrete	119	10	50	27	5	0	87	5	-13.01	74
Dump Truck	104	10	50	27	5	0	72	25	-6.02	66
Concrete mixer truck	103	10	50	27	5	0	71	25	-6.02	65
on-site HGV	98	15	50	31	5	0	62	25	-6.02	56
							Total 10h Leq due to plant =			75

Concrete Structure: College Français (nearest)

Plant Details Type	PWL	distance , m	% soft ground	Adjustments, dB(A) distance	screening	reflection	Resultant LAeq, cycle	Activity duration %	Correct. dB	Activity LAeq
Cutting concrete	119	10	50	27	5	0	87	5	-13.01	74
Dump Truck	104	10	50	27	5	0	72	25	-6.02	66
Concrete mixer truck	103	10	50	27	5	0	71	25	-6.02	65
on-site HGV	98	15	50	31	5	0	62	25	-6.02	56
							Total 10h Leq due to plant =			75

Concrete Structure: Azania and Holmes Road (average)

Plant Details Type	PWL	distance , m	% soft ground	Adjustments, dB(A) distance	screening	reflection	Resultant LAeq, cycle	Activity duration %	Correct. dB	Activity LAeq
Cutting concrete	119	15	50	31	5	0	83	5	-13.01	70
Dump Truck	104	15	50	31	5	0	68	25	-6.02	62
Concrete mixer truck	103	15	50	31	5	0	67	25	-6.02	61
on-site HGV	98	20	50	34	5	0	59	25	-6.02	53
							Total 10h Leq due to plant =			71

Concrete Structure: College Français (average)

Plant Details Type	PWL	distance , m	% soft ground	Adjustments, dB(A) distance	screening	reflection	Resultant LAeq, cycle	Activity duration %	Correct. dB	Activity LAeq
Cutting concrete	119	25	50	36	5	0	78	5	-13.01	65
Dump Truck	104	25	50	36	5	0	63	25	-6.02	57
Concrete mixer truck	103	25	50	36	5	0	62	25	-6.02	56
on-site HGV	98	30	50	38	5	0	55	25	-6.02	49
							Total 10h Leq due to plant =			66

Steel Structure: Azania and Holmes Road (nearest)

Plant Details Type	PWL	distance , m	% soft ground	Adjustments, dB(A) distance	screening	reflection	Resultant LAeq, cycle	Activity duration %	Correct. dB	Activity LAeq
Mobile Crane	98	10	50	27	5	0	66	25	-6.02	60
Mobile Crane	98	15	50	31	5	0	62	25	-6.02	56
Welding	101	10	50	27	5	0	69	25	-6.02	63
on-site HGV	98	15	50	34	5	0	59	25	-6.02	53
Gas Cutter	96	10	50	27	5	0	64	25	-6.02	58

Total 10h Leq due to plant =	66

Steel Structure: College Français (nearest)

Plant Details Type	PWL	distance , m	% soft ground	Adjustments, dB(A) distance	screening	reflection	Resultant LAeq, cycle	Activity duration %	Correct. dB	Activity LAeq
Mobile Crane	98	10	50	27	5	0	66	25	-6.02	60
Mobile Crane	98	15	50	31	5	0	62	25	-6.02	56
Welding	101	10	50	27	5	0	69	25	-6.02	63
on-site HGV	98	15	50	34	5	0	59	25	-6.02	53
Gas Cutter	96	10	50	27	5	0	64	25	-6.02	58

Total 10h Leq due to plant =	66

Steel Structure: Azania and Holmes Road (average)

Plant Details Type	PWL	distance , m	% soft ground	Adjustments, dB(A) distance	screening	reflection	Resultant LAeq, cycle	Activity duration %	Correct. dB	Activity LAeq
Mobile Crane	98	15	50	31	5	0	62	25	-6.02	56
Mobile Crane	98	15	50	31	5	0	62	25	-6.02	56
Welding	101	15	50	31	5	0	65	25	-6.02	59
on-site HGV	98	30	50	34	5	0	59	25	-6.02	53
Gas Cutter	96	20	50	34	5	0	57	25	-6.02	51

Total 10h Leq due to plant =	63

Steel Structure: College Français (average)

Plant Details Type	PWL	distance , m	% soft ground	Adjustments, dB(A) distance	screening	reflection	Resultant LAeq, cycle	Activity duration %	Correct. dB	Activity LAeq
Mobile Crane	98	25	50	36	5	0	57	25	-6.02	51
Mobile Crane	98	25	50	36	5	0	57	25	-6.02	51
Welding	101	25	50	36	5	0	60	25	-6.02	54
on-site HGV	98	30	50	34	5	0	59	25	-6.02	53
Gas Cutter	96	20	50	34	5	0	57	25	-6.02	51

Total 10h Leq due to plant =	59

Fit-Out and Landcaping: Azania and Holmes Road (nearest)

Plant Details Type	PWL	distance , m	% soft ground	Adjustments, dB(A) distance	screening	reflection	Resultant LAeq, cycle	Activity duration %	Correct. dB	Activity LAeq
Vibrator plate	108	10	50	27	5	0	76	10	-10.00	66
Dump Truck	104	15	50	31	5	0	68	25	-6.02	62
Concrete mixer truck	103	15	50	31	5	0	67	25	-6.02	61
on-site HGV	98	15	50	34	5	0	59	25	-6.02	53
Cutting concrete	119	15	50	31	5	0	83	5	-13.01	70
							Total 10h Leq due to plant =			72

Fit-Out and Landcaping: College Français (nearest)

Plant Details Type	PWL	distance , m	% soft ground	Adjustments, dB(A) distance	screening	reflection	Resultant LAeq, cycle	Activity duration %	Correct. dB	Activity LAeq
Vibrator plate	108	10	50	27	5	0	76	10	-10.00	66
Dump Truck	104	15	50	31	5	0	68	25	-6.02	62
Concrete mixer truck	103	15	50	31	5	0	67	25	-6.02	61
on-site HGV	98	15	50	34	5	0	59	25	-6.02	53
Cutting concrete	119	15	50	31	5	0	83	5	-13.01	70
							Total 10h Leq due to plant =			72

Fit-Out and Landcaping: Azania and Holmes Road (average)

Plant Details Type	PWL	distance , m	% soft ground	Adjustments, dB(A) distance	screening	reflection	Resultant LAeq, cycle	Activity duration %	Correct. dB	Activity LAeq
Vibrator plate	108	15	50	31	5	0	72	10	-10.00	62
Dump Truck	104	15	50	31	5	0	68	25	-6.02	62
Concrete mixer truck	103	15	50	31	5	0	67	25	-6.02	61
on-site HGV	98	30	50	34	5	0	59	25	-6.02	53
Cutting concrete	119	20	50	34	5	0	80	5	-13.01	67
							Total 10h Leq due to plant =			70

Fit-Out and Landcaping: College Français (average)

Plant Details Type	PWL	distance , m	% soft ground	Adjustments, dB(A) distance	screening	reflection	Resultant LAeq, cycle	Activity duration %	Correct. dB	Activity LAeq
Vibrator plate	108	25	50	36	5	0	67	10	-10.00	57
Dump Truck	104	25	50	36	5	0	63	25	-6.02	57
Concrete mixer truck	103	25	50	36	5	0	62	25	-6.02	56
on-site HGV	98	30	50	34	5	0	59	25	-6.02	53
Cutting concrete	119	20	50	34	5	0	80	5	-13.01	67
							Total 10h Leq due to plant =			68