

Noise Assessment

Report No: 2021 - R1 – Former New Wharf Pub, 52 Wakefield Road, Huddersfield, HD1 3AQ

Client: Khela (UK) Ltd

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1. Introduction

A noise assessment has been carried out over a typical 24-hour period in order to assess the impact of noise from external sources at the proposed development of residential accommodation at the site of the former New Wharf Public House, 52 Wakefield Road, Huddersfield. The survey was conducted at two monitoring positions covering a typical 24-hour period spanning Thursday 2nd May to Friday 3rd May 2013 with additional attended monitoring to assess an adjacent garage operation on Friday 3rd May 2013.

2. Scope

This report assesses the noise impact generated from existing sources, predominantly road traffic and potentially a tyre/garage operation, on the proposed development.

The scope for this assessment is as follows:

- a) A description of the sources of noise which the development site is likely to be subject to i.e. Passing Cars, pedestrians etc.
- b) An assessment of the impact which these sources have on the proposed development, including bedrooms, amenity areas and gardens, having regard to the following sources of guidance and assessment methodologies, where appropriate:
 - BS8233:1999 – Sound Insulation and Noise Reduction for Buildings.
 - World Health Organisation – Guidelines for Community Noise 1999.

BS8233:1999 Sound Insulation and Noise Reduction for Buildings.

BS8233 gives guidance for internal noise levels within buildings to achieve reasonable or good resting/sleeping conditions within residential properties as follows:

Room Type	Good dB L _{Aeq}	Reasonable dB L _{Aeq}
Living Rooms	30	40
Bedrooms	30	35

The above represents levels 'tending towards Good' for living areas and 'Good' indoor ambient noise criteria for bedrooms areas from BS8233:1999. The building envelope design will be considered to ensure that these internal criteria are met.

This guidance also suggests *"For a reasonable standard in bedrooms at night, individual noise events (measured with F time-weighting) should not normally exceed 45 dB L_{Amax}"*.

World Health Organisation – Guidelines for Community Noise 1999.

The World Health Organisation gives guidance for maximum recommended noise levels outside residential properties as follows:

Specific Environment	Critical health effect	dB L _{Aeq}	Time (hr)	dB L _{Amax}
Outdoor living area	Serious annoyance, daytime and evening	55	16	-
	Moderate annoyance, daytime and evening	50	16	-
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60

3. Site Description

The proposed development is currently a disused public house situated on the main A629 Wakefield Road at the junction with the B6432 Firth Street. It is understood the scheme includes for the demolition of the existing building and new build student accommodation erected on the site. The site is bounded by the main A629 Wakefield Road to the north with the B6432 Firth Road on the eastern boundary and a small access road (Sand Street) to the south and west. The site is currently of a mixed residential and commercial nature and is opposite existing student accommodation on Firth Street. The main Wakefield Road can be considered the dominant noise source affecting the site.

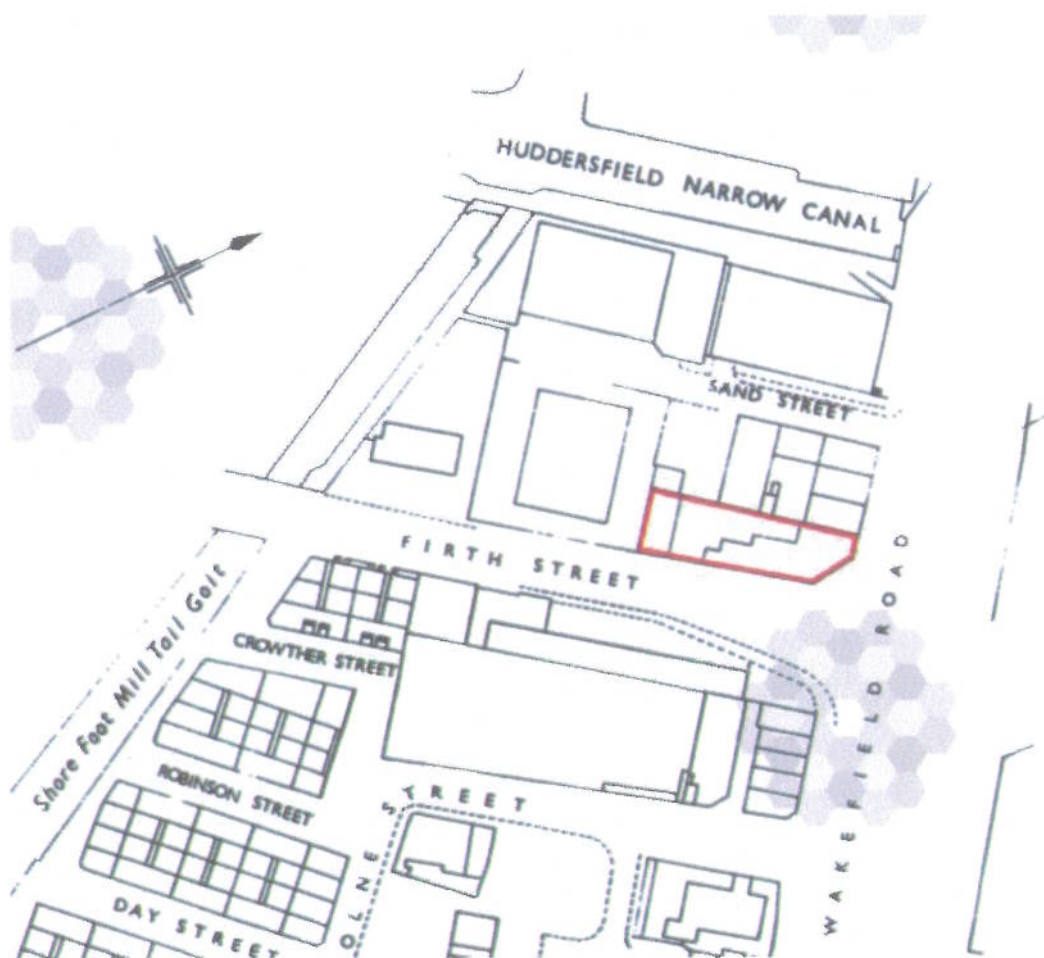


Figure 1: - Site Location.

Position of Monitoring Equipment

Monitoring Position 1 ● was mounted at the façade of the existing building along Wakefield Road. An appropriate façade correction has been applied.

Monitoring Position 2 ● was mounted at the façade of the existing building along Firth Street. An appropriate façade correction has been applied.

Monitoring Position 3 ● represents a period of attended monitoring to investigate the garage operation to the rear of site across Sand Street.



Figure 2 – Monitoring Positions

4. Survey

Measurement Instrumentation

The measurement instrumentation used on the survey was as follows:

Equipment Description	Manufacturer & Type	Serial Number
Sound Level Meter	Norsonic 118	30559
Sound Level Meter	Norsonic 118	28952
Acoustic Calibrator	Norsonic 1251	32856

The equipment was calibrated to comply with section 4.2 of BS7445:1-2003 before and after the surveys. The calibration was as follows:

Meter	Serial	Before	After
Norsonic 118	30559	113.8	113.8
Norsonic 118	28952	113.8	113.8

Measurements & Timescales

During the survey 5-minute measurements were made over a full 24-hour period between 2nd & 3rd May 2013. This was subsequently analysed into hourly periods with the appropriate façade correction. During the attended survey, 5 minute measurements were taken to assess the adjacent garage operation on the afternoon of Friday 3rd May 2013.

The following measurements are reported: $L_{Aeq,1hour}$, $L_{Aeq,5min}$, $L_{Aeq,8hour}$, $L_{Aeq,16hour}$, $L_{Amax,5min}$

The measurements and their interpretation shall be in accordance with BS 7445: Parts 1 and 2. All sound pressure levels are in dB (re 20µPa).

Meteorology

During the survey visits the weather was considered to be dry and warm with no discernible wind speed.

5. Results

Summary

The reported results represent the free field sound pressure levels at the façade of the proposed development.

Monitoring Position 1 –Wakefield Road				
Measurement	Daytime	Hour Ending/ Period	Night-time	Hour Ending/ Period
Maximum dB $L_{Aeq,1hr}$	68	08:00	64	07:00
Minimum dB $L_{Aeq,1hr}$	63	23:00	54	03:00
Highest Night dB $L_{Amax,5Min}$ ¹	—	—	78	01:00
Average dB $L_{Aeq,16hr}/L_{Aeq,8hr}$	66	07:00 – 23:00	59	23:00 – 07:00

¹ The 10th highest LAMAX has been selected as in line with good sleep conditions identified in "The Guidelines for Community Noise" Section 3.4 Sleep Disturbance.

Monitoring Position 1 – Wakefield Road

The daytime hourly equivalent continuous sound pressure levels at the proposed façade fronting Wakefield Road ranged between 63dB $L_{Aeq,1hr}$ and 68dB $L_{Aeq,1hr}$ with an average level during the daytime period of 66dB $L_{Aeq,16hr}$.

The night-time hourly equivalent continuous sound pressure levels at the proposed façade fronting Wakefield Road ranged between 54dB $L_{Aeq,1hr}$ and 64dB $L_{Aeq,1hr}$ with an average level during the night-time period of 59dB $L_{Aeq,8hr}$. The 10th highest night-time individual noise event between the hours of 23:00 and 07:00 was 78dB $L_{Amax,5min}$.

Monitoring Position 2 – Firth Street				
Measurement	Daytime	Hour Ending/ Period	Night-time	Hour Ending/ Period
Maximum dB $L_{Aeq,1hr}$	58	12:00	55	07:00
Minimum dB $L_{Aeq,1hr}$	51	23:00	43	03:00
Highest Night dB $L_{Amax,5min}$ ²	—	—	66	05:00
Average dB $L_{Aeq,16hr}/L_{Aeq,8hr}$	56	07:00 – 23:00	49	23:00 – 07:00

Monitoring Position 2 – Firth Street

The daytime hourly equivalent continuous sound pressure levels at the proposed façade fronting Firth Street ranged between 51dB $L_{Aeq,1hr}$ and 58dB $L_{Aeq,1hr}$ with an average level during the daytime period of 56dB $L_{Aeq,16hr}$.

The night-time hourly equivalent continuous sound pressure levels at the proposed façade fronting Firth Street ranged between 43dB $L_{Aeq,1hr}$ and 55dB $L_{Aeq,1hr}$ with an average level during the night-time period of 49dB $L_{Aeq,8hr}$. The 10th highest night-time individual noise event between the hours of 23:00 and 07:00 was 66dB $L_{Amax,5min}$.

Monitoring Position 3 – Sand Street/Firth Street attended:

Subjectively, the noise climate was dominated by road traffic. It was not possible to differentiate garage activity from the ambient noise climate. Levels of 55dBA recorded are broadly in line with the average results for Firth Street. We would therefore consider that road traffic noise is dominant.

Monitoring Position 3 – Sand Street/Firth Street				
Run ID	Date	Duration	L_{Aeq}	L_{Amax}
1	03/05/2013	(0:5:00.0)	54	66
2	03/05/2013	(0:5:00.0)	54	67
3	03/05/2013	(0:5:00.0)	53	66
4	03/05/2013	(0:5:00.0)	55	74
5	03/05/2013	(0:5:00.0)	55	68

² As above

6. Design Criteria

Internal Design Criteria

The internal design criteria requirements are in line with the 'Good' recommended indoor ambient noise levels in spaces when they are unoccupied as per guidance taken from BS8233:1999.

Area	Internal Level, dB(A)
Bedrooms (23:00 – 07:00)	30dB
Living Rooms (07:00 – 23:00)	35dB ³

The follow section gives recommendations in achieving the internal design criteria.

³ 35dB(A) in Living Areas is 'Tending Towards Good', BS8233:1999 recommends 30dB(A) as good and 40dB(A) as reasonable internal levels.

7. Mitigation

Glazing Design

The internal design criteria can be achieved through a glazing performance requirement. The following tables summarise the recorded levels on site and show the glazing performance requirement to achieve the criteria. This uses the simple calculation method from BS8233:1999. Standard forms of construction are assumed therefore it is likely the glazing will be the lowest performing façade element.

Monitoring Position 1 – Wakefield Road	Living Room Areas	Bedroom Areas
Average Case Levels	66 dB $L_{Aeq,16hr}$	59 dB $L_{Aeq,8hr}$
Internal Design Criteria	35 dB(A)	30 dB(A)
Glazing Performance Requirement	31 dB R_{TRA}	29 dB R_{TRA}

The glazing performance requirement is based on the road traffic corrected sound reduction index R_{TRA} .

BS8233 further advises:

“For a reasonable standard in bedrooms at night, individual noise events (measured with F time-weighting) should not normally exceed 45 dB L_{Amax} ”.

Further WHO guidance advises in Para 3.4

“For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dB L_{Amax} more than 10-15 times per night (Vallet & Vernet 1991)”

This criterion is examined below.

Monitoring Position 1 – Wakefield Road		Bedroom Areas
10 th Highest Level		78 dB L_{Amax}^4
Internal Design Criteria		45 dB L_{Amax}
Glazing Performance Requirement		33 dB R_{TRA}

It can be seen from the above table that the L_{Amax} criterion is greater than the L_{Aeq} criterion and as such this will be used in the specification of glazing units.

⁴ Appendix presents the ordered L_{Amax} data

Monitoring Position 2 – Firth Street	Living Room Areas	Bedroom Areas
Average Case Levels	56 dB $L_{Aeq,16hr}$	49 dB $L_{Aeq,8hr}$
Internal Design Criteria	35 dB(A)	30 dB(A)
Glazing Performance Requirement	21 dB R_{TRA}	19 dB R_{TRA}

BS8233 further advises:

"For a reasonable standard in bedrooms at night, individual noise events (measured with F time-weighting) should not normally exceed 45 dB L_{Amax} ".

Further WHO guidance advises in Para 3.4

"For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dB L_{Amax} more than 10-15 times per night (Vallet & Vernet 1991)"

This criterion is examined below.

Monitoring Position 2 – Firth Street		Bedroom Areas
10 th Highest Level		66 dB L_{Amax}^5
Internal Design Criteria		45 dB L_{Amax}
Glazing Performance Requirement		21 dB R_{TRA}

It can be seen from the above table that the L_{Amax} criterion is greater than the L_{Aeq} criterion and as such this will be used in the specification of glazing units.

⁵ Appendix presents the ordered L_{Amax} data

Glazing Configurations – Wakefield Road

The following is a summary of the typical performance of Pilkington glazed units as detailed in *Pilkington Design Guide "Glass & Noise Control" – Technical Bulletin May 1997*. Glazing from any other manufacturer can be used providing it can be shown that it will achieve the Glazing Performance Requirements above.

Pilkington Configurations	dB R _{TRA}	Position A	
		Living	Bed
4.12.4	25		
6.12.6	26		
6.12.6-4p ⁶	27		
10.12.4	29		
10.12.6	32	✓	
10.12.6-4p ⁶	34	✓	✓
6.100.4 Secondary	37	✓	✓
6.150.4 Secondary	39	✓	✓
10.200.6 Secondary	45	✓	✓

Monitoring Position 1 – The minimum Pilkington glazing configuration to achieve 31dB R_{TRA} within living areas is 10.12.6 double glazing. The minimum Pilkington glazing configuration to achieve 33dB R_{TRA} within bedroom areas is 10.12.6-4 p⁶ double glazing. Alternative manufacturers may be selected as long as the selected glazing unit acoustic performance achieves the specified dB R_{TRA} requirement.

Glazing Configurations – Firth Street

The following is a summary of the typical performance of Pilkington glazed units as detailed in *Pilkington Design Guide "Glass & Noise Control" – Technical Bulletin May 1997*. Glazing from any other manufacturer can be used providing it can be shown that it will achieve the Glazing Performance Requirements above.

Pilkington Configurations	dB R _{TRA}	Position A	
		Living	Bed
4.12.4	25	✓	✓
6.12.6	26	✓	✓
6.12.6-4p ⁷	27	✓	✓
10.12.4	29	✓	✓
10.12.6	32	✓	✓
10.12.6-4p ⁶	34	✓	✓
6.100.4 Secondary	37	✓	✓
6.150.4 Secondary	39	✓	✓
10.200.6 Secondary	45	✓	✓

Monitoring Position 1 – The minimum Pilkington glazing configuration to achieve 21dB R_{TRA} within living areas is 4.12.4 double glazing. The minimum Pilkington glazing configuration to achieve 21dB R_{TRA} within bedroom areas is 4.12.4 double glazing. Alternative manufacturers may be selected as long as the selected glazing unit acoustic performance achieves the specified dB R_{TRA} requirement.

⁶ PVB laminated glass - polyvinyl butyrate.

⁷ As Above.

World Health Organisation – Guidelines for Community Noise 1999.

The World Health Organisation gives guidance for maximum recommended noise levels outside residential properties as follows:

Specific Environment	Critical health effect	dB L_{Aeq}	Time (hr)	dB L_{Amax}
Outdoor living area	Serious annoyance, daytime and evening	55	16	-
	Moderate annoyance, daytime and evening	50	16	-
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60

It is noted that the levels shown are above the criterion for outdoor living spaces however discussions with the client regarding the proposed layout suggests this criteria would not be applicable in this case. In our experience the identified “windows open” L_{Amax} criterion is rarely achievable in a city centre location and as in this case internal levels can be achieved only with windows closed. Care should be taken to ensure the specification of ventilation does not compromise the performance of the glazing specified.

8. Conclusions

The site has been surveyed in line with the recommendations in BS7445:1 – 2003 and BS7445:2 – 1991. This report has shown that ‘Good’ internal ambient levels from the guidance in BS8233:1999 can be achieved by using the correct glazing specification.

Consideration and recommendations have been made regarding the noise climate impacting the development. It has been shown that a glazing solution can allow the development to achieve the internal levels identified in BS8233.

Monitoring Position 1 – Wakefield Road

In living areas to tend towards the ‘Good’ internal ambient levels from the guidance in BS8233:1999 a glazing specification with a performance of 31dB R_{TRA} is required. Based on the Pilkington Design Guide performance tables, the glazing configuration that will achieve a performance of 31dB R_{TRA} is 10.12.6 double glazing.

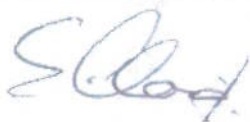
In bedroom areas to achieve the ‘Good’ internal ambient levels from the guidance in BS8233:1999 a glazing specification with a performance of 33dB R_{TRA} is required. Based on the Pilkington Design Guide performance tables, the glazing configuration that will achieve a performance of 33dB R_{TRA} is 10.12.6-4pvb double glazing.

Monitoring Position 2 – Firth Street

In living areas to tend towards the ‘Good’ internal ambient levels from the guidance in BS8233:1999 a glazing specification with a performance of 21dB R_{TRA} is required. Based on the Pilkington Design Guide performance tables, the glazing configuration that will achieve a performance of 21dB R_{TRA} is 4.12.4 double glazing.

In bedroom areas to achieve the 'Good' internal ambient levels from the guidance in BS8233:1999 a glazing specification with a performance of 21dB R_{TRA} is required. Based on the Pilkington Design Guide performance tables, the glazing configuration that will achieve a performance of 21dB R_{TRA} is 4.12.4 double glazing.

Care should be taken with regard to selection of ventilation so it shall not compromise the glazing specification.



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Acoustic Consultant

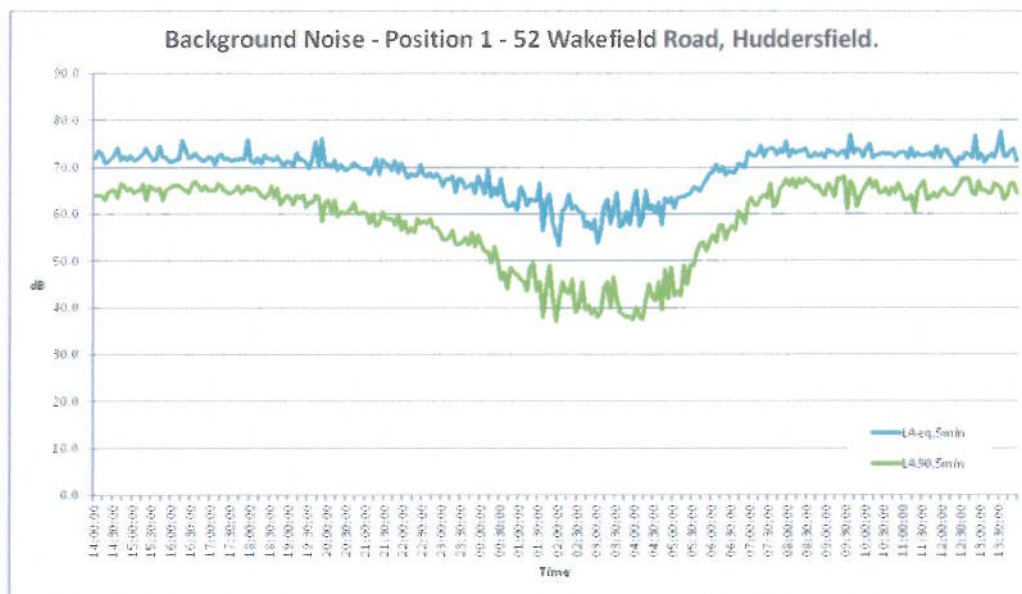
9. Appendix

				Site: Position 1 - 52 Wakefield Road, Huddersfield. Table: 1 Report: 2021-R1 Start Date: 02/05/2013 End Date: 03/05/2013											
Time	LAeq	LA90	LAmax	Time	LAeq	LA90	LAmax	Time	LAeq	LA90	LAmax	Time	LAeq	LA90	LAmax
14:00	65.9	58.0	77.5	18:50	64.3	57.0	77.4	23:40	60.0	47.5	72.7	04:30	54.2	35.5	71.1
14:05	67.5	58.0	79.7	18:55	65.3	58.0	74.5	23:45	60.5	50.0	75.1	04:35	56.5	39.5	72.8
14:10	67.0	58.0	86.1	19:00	65.1	57.5	76.5	23:50	58.4	47.0	75.0	04:40	51.7	33.5	67.3
14:15	65.0	57.0	76.5	19:05	64.3	56.0	72.4	23:55	62.1	49.5	76.3	04:45	57.4	42.0	73.2
14:20	65.2	58.5	74.2	19:10	67.1	58.0	82.4	00:00	60.2	47.5	78.3	04:50	56.4	36.0	73.7
14:25	65.8	59.0	79.7	19:15	65.6	57.5	83.4	00:05	58.3	46.0	71.9	04:55	57.5	42.5	75.4
14:30	66.7	59.0	83.7	19:20	65.6	58.0	78.5	00:10	63.3	46.0	84.4	05:00	55.2	36.5	70.9
14:35	68.1	57.5	86.9	19:25	65.0	55.5	76.9	00:15	57.6	43.5	71.7	05:05	57.4	37.5	78.0
14:40	65.6	60.5	77.9	19:30	63.8	56.5	74.3	00:20	59.6	47.0	73.1	05:10	57.6	36.5	77.0
14:45	66.3	60.0	78.7	19:35	65.9	54.5	82.8	00:25	58.1	44.0	71.0	05:15	57.7	43.0	71.2
14:50	65.6	59.0	80.6	19:40	69.4	58.0	87.4	00:30	61.5	40.0	81.8	05:20	58.1	39.0	71.1
14:55	66.5	59.5	81.4	19:45	64.2	57.5	72.9	00:35	57.3	41.5	74.4	05:25	58.3	43.0	72.8
15:00	65.5	58.5	79.4	19:50	70.1	52.5	92.9	00:40	55.7	38.0	68.9	05:30	59.7	43.0	71.9
15:05	65.6	59.0	74.1	19:55	64.7	56.5	75.5	00:45	55.8	42.5	71.2	05:35	59.5	46.0	72.7
15:10	66.2	59.0	83.2	20:00	64.7	57.0	75.1	00:50	56.5	41.5	72.2	05:40	58.9	47.5	73.0
15:15	66.9	60.5	76.7	20:05	64.1	54.0	75.7	00:55	54.8	41.0	69.9	05:45	60.2	48.0	69.7
15:20	68.1	57.0	88.2	20:10	65.6	57.0	77.7	01:00	59.8	40.0	78.5	05:50	61.3	46.0	79.2
15:25	66.7	60.0	78.3	20:15	63.4	53.5	79.2	01:05	58.5	39.5	71.7	05:55	62.6	48.0	73.8
15:30	65.5	59.5	78.8	20:20	64.6	54.5	75.6	01:10	55.8	37.5	73.7	06:00	63.0	49.5	75.1
15:35	65.8	59.0	77.1	20:25	63.5	54.0	75.3	01:15	57.2	42.5	70.1	06:05	64.6	48.0	86.8
15:40	68.5	59.5	82.7	20:30	63.3	54.5	73.5	01:20	56.9	43.5	70.1	06:10	63.0	51.5	76.9
15:45	66.2	57.0	82.6	20:35	64.1	55.0	79.3	01:25	56.8	37.5	72.0	06:15	64.1	51.5	77.3
15:50	66.2	59.0	81.2	20:40	64.9	56.5	78.0	01:30	60.6	39.5	78.5	06:20	62.3	48.5	73.5
15:55	65.3	59.5	79.4	20:45	64.4	54.0	81.6	01:35	50.5	32.0	68.5	06:25	63.2	50.5	75.3
16:00	65.3	60.0	78.3	20:50	63.9	54.0	78.4	01:40	56.8	38.0	71.7	06:30	62.9	51.5	74.2
16:05	65.6	60.0	75.3	20:55	63.5	54.5	78.6	01:45	58.3	43.0	78.0	06:35	62.8	50.5	74.6
16:10	65.8	60.0	76.7	21:00	63.8	54.0	75.4	01:50	52.1	36.0	70.4	06:40	64.8	54.5	77.0
16:15	69.7	59.5	91.0	21:05	62.5	52.0	72.3	01:55	49.7	31.0	65.1	06:45	64.4	53.5	75.3
16:20	67.8	59.0	83.6	21:10	63.9	54.0	76.0	02:00	47.3	35.5	59.0	06:50	63.9	52.0	73.8
16:25	66.0	58.5	81.1	21:15	65.9	51.5	86.4	02:05	54.7	39.5	72.3	06:55	67.3	56.5	81.8
16:30	66.3	60.5	78.5	21:20	62.5	52.0	73.0	02:10	55.4	37.5	75.7	07:00	66.8	57.5	79.2
16:35	67.0	61.0	81.1	21:25	65.7	54.5	84.0	02:15	58.2	37.0	74.5	07:05	66.3	56.0	77.7
16:40	66.1	60.0	77.7	21:30	64.7	53.0	79.3	02:20	55.0	40.0	71.6	07:10	66.8	56.0	81.7
16:45	65.5	59.0	79.5	21:35	64.5	53.0	83.3	02:25	55.7	33.0	72.2	07:15	68.6	57.5	87.4
16:50	65.5	60.0	78.1	21:40	63.3	53.0	76.0	02:30	54.5	34.5	71.7	07:20	66.2	58.0	76.1
16:55	66.2	59.0	79.0	21:45	65.4	51.5	84.7	02:35	54.4	39.5	69.7	07:25	67.7	57.5	80.6
17:00	66.1	59.0	77.2	21:50	62.8	54.0	74.0	02:40	51.2	33.5	68.5	07:30	68.0	60.5	82.0
17:05	64.6	59.0	73.4	21:55	64.9	50.5	83.9	02:45	52.2	34.5	64.6	07:35	68.0	55.5	80.8
17:10	66.4	60.5	88.1	22:00	63.3	52.5	81.6	02:50	50.7	32.5	68.2	07:40	66.6	56.5	76.4
17:15	66.8	60.0	84.2	22:05	61.7	50.0	75.1	02:55	52.8	33.5	71.6	07:45	67.8	59.5	78.6
17:20	65.7	59.0	76.9	22:10	62.6	51.0	74.7	03:00	47.8	32.0	64.8	07:50	67.1	60.0	77.4
17:25	66.0	58.5	79.7	22:15	62.1	50.0	80.9	03:05	50.4	33.0	67.2	07:55	69.6	61.5	83.6
17:30	65.4	58.5	81.8	22:20	62.3	53.0	71.8	03:10	55.6	38.0	73.9	08:00	66.2	60.0	75.5
17:35	65.6	59.0	75.9	22:25	64.5	52.0	83.1	03:15	57.2	39.5	74.7	08:05	67.7	61.5	79.1
17:40	65.7	60.0	76.0	22:30	62.5	52.5	74.4	03:20	52.0	34.0	67.2	08:10	66.9	59.5	79.6
17:45	65.9	58.5	77.6	22:35	62.0	52.0	74.7	03:25	54.8	40.5	67.4	08:15	67.6	61.5	80.6
17:50	65.8	59.0	77.2	22:40	62.8	53.0	74.4	03:30	58.6	36.0	76.9	08:20	67.4	60.5	83.1
17:55	69.8	60.0	89.2	22:45	61.8	51.0	73.1	03:35	51.3	33.0	66.0	08:25	68.0	61.5	85.0
18:00	65.5	59.0	79.9	22:50	62.6	51.0	72.7	03:40	51.9	32.5	72.9	08:30	66.3	61.0	74.7
18:05	64.9	59.5	71.9	22:55	61.7	50.0	75.7	03:45	54.5	32.0	71.8	08:35	66.1	60.5	78.3
18:10	66.0	59.0	81.5	23:00	59.9	48.5	73.6	03:50	51.8	32.0	66.7	08:40	67.0	59.5	78.0
18:15	64.8	58.0	78.6	23:05	61.5	48.5	74.6	03:55	55.5	31.5	77.3	08:45	66.4	60.0	74.4
18:20	66.6	57.5	84.1	23:10	61.4	49.0	73.1	04:00	59.0	34.0	79.7	08:50	66.9	58.5	83.6
18:25	65.9	58.0	84.9	23:15	62.1	50.5	78.4	04:05	51.4	32.0	69.1	08:55	65.9	58.0	76.0
18:30	65.8	60.0	78.9	23:20	58.6	47.5	69.9	04:10	53.0	31.5	69.7	09:00	67.7	60.5	84.6
18:35	65.4	57.5	75.1	23:25	61.6	47.5	75.8	04:15	59.0	35.5	80.2	09:05	67.2	59.5	81.4
18:40	66.3	59.5	81.6	23:30	61.3	48.0	72.2	04:20	55.0	39.0	78.4	09:10	67.1	57.5	83.6
18:45	65.3	56.0	76.1	23:35	59.5	49.0	74.0	04:25	55.9	36.5	72.9	09:15	66.4	61.5	75.6

*Facade Correction Applied

Position 1 Data

Hourly Summary			
Hour End	LAeq 1Hour	Min LA90, 5min	Max LAmax, 5min
00:00	60.7	47.0	79.1
01:00	59.0	38.0	84.4
02:00	57.1	31.0	78.5
03:00	54.3	32.5	75.7
04:00	54.4	31.5	77.3
05:00	56.2	31.5	80.2
06:00	59.3	36.5	79.2
07:00	64.1	48.0	86.8
08:00	67.6	55.5	87.4
09:00	66.9	58.0	85.0
10:00	67.5	56.0	91.0
11:00	67.0	58.0	88.4
12:00	66.8	54.5	86.6
13:00	66.9	58.0	89.9
14:00	67.4	57.0	92.9
15:00	66.4	57.0	86.9
16:00	66.5	57.0	88.2
17:00	66.6	58.5	91.0
18:00	66.4	58.5	89.2
19:00	65.6	56.0	84.9
20:00	66.4	52.5	92.9
21:00	64.2	53.5	81.6
22:00	64.3	50.5	86.4
23:00	62.6	50.0	83.1



Position 1 Summary

Rank	Time	LA Max	Rank	Time	LA Max	Rank	Time	LA Max
1	06:05:00	86.8	62	00:15:00	71.7			
2	00:10:00	84.4	63	01:05:00	71.7			
3	00:30:00	81.8	64	01:40:00	71.7			
4	06:55:00	81.8	65	02:30:00	71.7			
5	04:15:00	80.2	66	02:20:00	71.6			
6	04:00:00	79.7	67	02:55:00	71.6			
7	05:50:00	79.2	68	00:45:00	71.2			
8	07:00:00	79.2	69	05:15:00	71.2			
9	23:10:00	79.1	70	04:30:00	71.1			
10	01:00:00	78.5	71	05:20:00	71.1			
11	01:30:00	78.5	72	00:25:00	71			
12	23:15:00	78.4	73	05:00:00	70.9			
13	00:00:00	78.3	74	01:50:00	70.4			
14	01:45:00	78.0	75	04:20:00	70.4			
15	05:05:00	78.0	76	01:15:00	70.1			
16	03:55:00	77.3	77	01:20:00	70.1			
17	06:15:00	77.3	78	23:20:00	69.9			
18	05:10:00	77.0	79	00:55:00	69.9			
19	06:40:00	77.0	80	02:35:00	69.7			
20	03:30:00	76.9	81	04:10:00	69.7			
21	06:10:00	76.9	82	05:45:00	69.7			
22	23:55:00	76.3	83	04:05:00	69.1			
23	23:25:00	75.8	84	00:40:00	68.9			
24	02:10:00	75.7	85	01:35:00	68.5			
25	04:55:00	75.4	86	02:40:00	68.5			
26	06:25:00	75.3	87	02:50:00	68.2			
27	06:45:00	75.3	88	03:25:00	67.4			
28	23:45:00	75.1	89	04:40:00	67.3			
29	06:00:00	75.1	90	03:05:00	67.2			
30	23:50:00	75.0	91	03:20:00	67.2			
31	03:15:00	74.7	92	03:50:00	66.7			
32	23:05:00	74.6	93	03:35:00	66			
33	06:35:00	74.6	94	01:55:00	65.1			
34	02:15:00	74.5	95	03:00:00	64.8			
35	00:35:00	74.4	96	02:45:00	64.6			
36	06:30:00	74.2	97	02:00:00	59			
37	23:35:00	74.0						
38	03:10:00	73.9						
39	05:55:00	73.8						
40	06:50:00	73.8						
41	01:10:00	73.7						
42	04:50:00	73.7						
43	23:00:00	73.6						
44	06:20:00	73.5						
45	04:45:00	73.2						
46	00:20:00	73.1						
47	05:40:00	73.0						
48	03:40:00	72.9						
49	04:25:00	72.9						
50	04:35:00	72.8						
51	05:25:00	72.8						
52	23:40:00	72.7						
53	05:35:00	72.7						
54	02:05:00	72.3						
55	23:30:00	72.2						
56	00:50:00	72.2						
57	02:25:00	72.2						
58	01:25:00	72.0						
59	00:05:00	71.9						
60	05:30:00	71.9						
61	03:45:00	71.8						

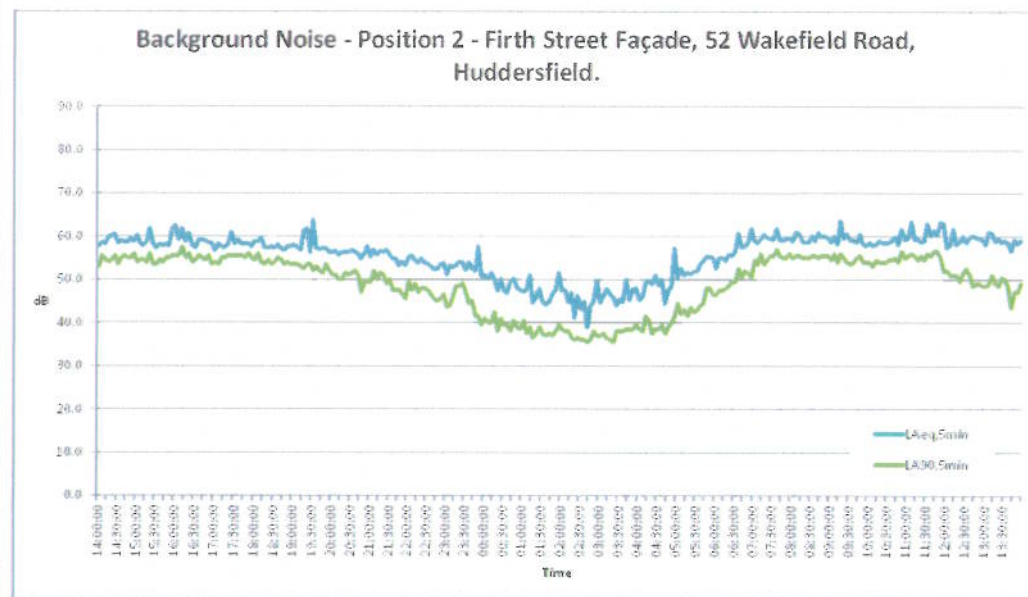
Position 1 Summary LAMax Ordered

				Site: Position 2 - Firth Street Façade, 52 Wakefield Road, Huddersfield. Table: 2 Report: 2021-R1 Start Date: 02/05/2013 End Date: 03/05/2013											
Time	LAeq	LA90	LAmax	Time	LAeq	LA90	LAmax	Time	LAeq	LA90	LAmax	Time	LAeq	LA90	LAmax
14:00	54.8	50.0	64.1	18:50	54.6	51.0	65.9	23:40	49.6	42.0	64.6	04:30	45.7	35.5	60.0
14:05	55.5	52.5	67.2	18:55	54.7	50.5	69.0	23:45	49.0	38.5	61.9	04:35	47.1	36.5	58.3
14:10	55.3	51.5	68.0	19:00	55.0	50.5	69.5	23:50	54.6	38.5	76.2	04:40	41.5	34.5	54.0
14:15	56.9	51.0	75.2	19:05	54.4	50.5	66.3	23:55	47.7	36.5	58.2	04:45	44.4	36.0	58.0
14:20	57.1	51.5	66.0	19:10	53.8	50.0	63.2	00:00	48.0	38.0	60.5	04:50	45.6	37.0	58.4
14:25	57.6	52.5	68.4	19:15	58.3	49.5	80.2	00:05	47.2	37.0	57.5	04:55	54.2	38.5	75.4
14:30	55.4	50.5	67.8	19:20	58.7	50.5	77.5	00:10	48.6	37.0	63.7	05:00	47.2	41.5	57.7
14:35	56.0	52.0	67.1	19:25	53.3	50.5	66.4	00:15	47.2	39.5	56.5	05:05	49.6	39.0	65.6
14:40	55.7	52.5	67.9	19:30	60.7	49.0	81.5	00:20	44.4	35.0	56.2	05:10	48.1	40.0	59.4
14:45	55.6	52.0	67.8	19:35	54.3	50.0	62.6	00:25	47.1	38.0	60.4	05:15	48.6	38.5	60.6
14:50	56.5	52.0	69.2	19:40	54.0	49.0	71.7	00:30	44.3	36.5	55.1	05:20	48.2	40.5	59.6
14:55	55.8	50.0	68.7	19:45	54.2	48.5	71.7	00:35	43.9	36.5	54.4	05:25	48.9	39.5	59.4
15:00	57.2	51.0	72.0	19:50	54.2	50.5	60.8	00:40	46.5	35.0	58.9	05:30	48.9	40.0	63.6
15:05	55.3	51.5	64.6	19:55	53.3	49.0	63.2	00:45	47.2	37.5	60.9	05:35	50.6	41.0	59.9
15:10	54.8	51.5	67.3	20:00	53.3	48.0	66.1	00:50	45.1	36.0	60.4	05:40	51.4	41.5	65.9
15:15	55.6	51.0	66.6	20:05	53.6	48.0	62.5	00:55	44.6	35.5	53.4	05:45	52.3	45.0	71.1
15:20	58.9	53.0	73.3	20:10	52.7	47.0	63.6	01:00	44.1	37.5	53.2	05:50	52.3	45.0	63.9
15:25	55.4	50.5	66.3	20:15	53.2	47.0	63.6	01:05	44.7	34.5	61.9	05:55	52.1	43.5	63.9
15:30	54.3	50.5	63.6	20:20	53.4	48.5	62.4	01:10	48.0	36.0	61.7	06:00	49.6	43.5	58.5
15:35	55.2	51.5	65.5	20:25	53.4	48.0	62.4	01:15	41.6	33.5	54.0	06:05	52.0	44.5	58.5
15:40	54.8	51.0	63.2	20:30	53.7	48.5	62.4	01:20	42.9	34.5	55.7	06:10	52.0	44.5	64.9
15:45	55.1	52.0	63.3	20:35	53.4	49.0	62.7	01:25	44.9	36.0	57.6	06:15	51.4	45.0	58.8
15:50	54.8	52.0	68.5	20:40	53.0	48.0	64.6	01:30	41.7	34.5	55.7	06:20	52.8	45.5	61.7
15:55	58.9	52.5	75.3	20:45	51.8	44.0	63.9	01:35	41.3	34.0	57.2	06:25	52.5	46.5	59.3
16:00	59.5	52.5	71.3	20:50	53.0	46.5	62.6	01:40	41.8	34.5	53.4	06:30	53.4	46.5	64.0
16:05	56.1	52.5	76.2	20:55	54.7	46.5	71.8	01:45	43.7	34.0	56.1	06:35	57.8	49.5	74.0
16:10	58.9	54.5	72.1	21:00	52.2	46.5	59.7	01:50	44.6	35.0	58.0	06:40	54.6	47.5	63.0
16:15	55.8	52.0	68.0	21:05	53.9	49.0	70.3	01:55	48.6	36.5	62.1	06:45	54.7	49.0	64.1
16:20	57.8	53.0	70.0	21:10	52.7	47.0	65.0	02:00	44.5	35.5	57.7	06:50	55.5	48.5	66.4
16:25	54.9	51.0	64.6	21:15	53.6	48.5	67.5	02:05	44.5	35.0	58.1	06:55	58.9	47.5	79.6
16:30	54.3	51.5	62.5	21:20	53.4	48.0	64.3	02:10	41.7	35.0	58.6	07:00	56.0	51.5	68.3
16:35	56.2	52.5	66.0	21:25	53.8	46.0	67.6	02:15	43.8	33.5	58.0	07:05	55.5	50.5	67.0
16:40	56.2	52.0	71.7	21:30	52.7	47.0	62.8	02:20	38.2	33.0	51.0	07:10	56.4	53.0	66.2
16:45	55.9	51.5	64.3	21:35	51.8	44.5	65.8	02:25	43.3	33.5	58.6	07:15	57.4	50.5	70.6
16:50	55.5	52.5	62.9	21:40	51.7	44.5	64.8	02:30	40.1	33.0	53.9	07:20	56.7	51.5	69.0
16:55	55.4	50.5	67.4	21:45	50.2	44.5	61.0	02:35	42.0	33.0	59.7	07:25	56.6	52.5	65.0
17:00	53.7	51.0	66.6	21:50	51.1	43.5	59.3	02:40	36.0	32.5	48.2	07:30	56.3	52.5	63.1
17:05	55.2	50.5	70.0	21:55	50.2	42.5	60.7	02:45	40.8	33.0	56.5	07:35	58.8	54.0	73.9
17:10	54.6	52.0	64.2	22:00	52.0	46.5	60.9	02:50	42.0	35.0	54.7	07:40	56.1	52.5	66.2
17:15	54.4	52.0	62.1	22:05	52.6	44.5	64.0	02:55	46.8	34.0	63.1	07:45	56.2	52.0	68.2
17:20	55.1	52.5	63.1	22:10	51.4	46.0	64.2	03:00	41.6	34.0	53.3	07:50	56.3	52.0	74.3
17:25	57.9	52.5	77.1	22:15	50.8	44.0	60.7	03:05	43.2	34.5	57.9	07:55	56.7	53.0	65.1
17:30	55.3	52.5	65.2	22:20	51.9	45.0	60.6	03:10	44.8	33.5	58.1	08:00	55.9	52.0	62.3
17:35	56.2	52.5	71.5	22:25	50.9	45.0	62.3	03:15	43.7	33.0	58.3	08:05	57.9	52.5	73.4
17:40	55.2	52.5	63.3	22:30	50.6	44.5	57.9	03:20	42.8	32.5	57.2	08:10	57.5	52.5	70.3
17:45	55.3	52.0	66.4	22:35	50.1	43.5	60.7	03:25	41.0	35.0	52.8	08:15	55.7	52.0	63.3
17:50	55.4	53.0	64.6	22:40	49.4	42.5	59.7	03:30	42.5	35.0	58.0	08:20	55.6	52.0	65.9
17:55	54.6	52.0	62.5	22:45	49.4	42.0	61.7	03:35	41.9	35.0	56.4	08:25	55.7	52.0	64.6
18:00	55.8	51.5	63.9	22:50	50.4	42.5	62.3	03:40	46.9	35.5	65.8	08:30	57.0	52.5	70.0
18:05	55.8	53.0	64.1	22:55	50.0	43.5	60.3	03:45	42.3	35.5	60.1	08:35	56.0	52.5	66.7
18:10	56.6	51.0	65.9	23:00	48.1	40.5	64.7	03:50	44.7	35.5	58.0	08:40	57.9	52.0	72.0
18:15	54.5	50.5	65.1	23:05	50.2	41.0	63.1	03:55	44.9	36.5	57.8	08:45	56.9	52.5	65.5
18:20	54.3	51.5	61.6	23:10	49.9	43.0	58.3	04:00	42.3	35.5	55.3	08:50	57.0	52.5	69.3
18:25	54.6	50.5	67.7	23:15	50.3	45.5	63.9	04:05	43.0	35.0	55.0	08:55	56.6	52.5	65.4
18:30	54.2	51.0	66.3	23:20	51.1	45.5	60.4	04:10	46.3	38.5	59.9	09:00	55.6	51.5	63.9
18:35	55.0	52.0	66.6	23:25	50.9	46.0	64.3	04:15	46.7	37.5	56.4	09:05	57.0	53.0	72.7
18:40	54.2	51.5	63.5	23:30	49.1	44.0	60.2	04:20	46.0	34.5	58.5	09:10	55.1	51.0	63.6
18:45	53.8	50.5	59.3	23:35	51.0	41.5	65.1	04:25	48.0	35.5	65.2	09:15	60.6	53.0	75.1
* Façade Correction Applied															

Position 2 Data

* Façade Correction Applied

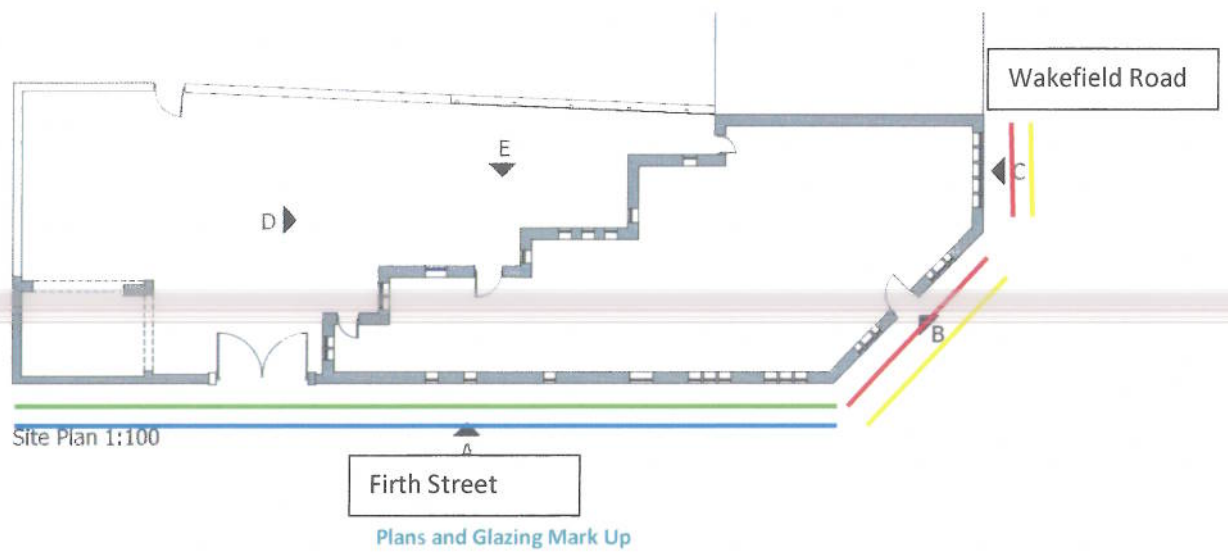
Hourly Summary			
Hour End	L _{Aeq} 1Hour	Min L _{A90} 5min	Max L _{Amax} 5min
00:00	50.5	36.5	76.2
01:00	46.4	35.0	63.7
02:00	44.7	33.5	62.1
03:00	42.8	32.5	63.1
04:00	43.7	32.5	65.8
05:00	47.4	34.5	75.4
06:00	50.2	38.5	71.1
07:00	54.6	43.5	79.6
08:00	56.7	50.5	74.3
09:00	56.7	52.0	73.4
10:00	56.8	50.5	75.1
11:00	56.0	50.0	76.3
12:00	58.2	49.0	85.5
13:00	56.4	45.5	79.3
14:00	56.1	40.5	73.6
15:00	56.1	50.0	75.2
16:00	56.2	50.5	75.3
17:00	56.7	50.5	76.2
18:00	55.4	50.5	77.1
19:00	54.9	50.5	69.0
20:00	56.1	48.5	81.5
21:00	53.3	44.0	71.8
22:00	52.4	42.5	70.3
23:00	51.0	42.0	64.2



Position 2 Data

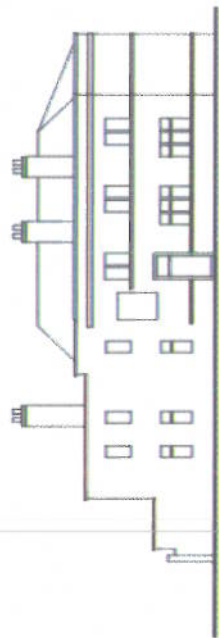
Rank	Time	LA Max	Rank	Time	LA Max	Rank	Time	LA Max
1	06:55:00	79.6	61	23:55:00	58.2			
2	23:50:00	76.2	62	02:05:00	58.1			
3	04:55:00	75.4	63	03:10:00	58.1			
4	06:35:00	74.0	64	02:15:00	58			
5	05:45:00	71.1	65	03:30:00	58			
6	07:00:00	68.3	66	04:45:00	58			
7	06:50:00	66.4	67	03:05:00	57.9			
8	05:40:00	65.9	68	03:55:00	57.8			
9	03:40:00	65.8	69	02:00:00	57.7			
10	05:05:00	65.6	70	05:00:00	57.7			
11	04:25:00	65.2	71	01:25:00	57.6			
12	23:35:00	65.1	72	00:05:00	57.5			
13	06:10:00	64.9	73	01:35:00	57.2			
14	23:00:00	64.7	74	03:20:00	57.2			
15	23:40:00	64.6	75	00:15:00	56.5			
16	23:25:00	64.3	76	02:45:00	56.5			
17	06:45:00	64.1	77	03:35:00	56.4			
18	06:30:00	64.0	78	04:15:00	56.4			
19	23:15:00	63.9	79	00:20:00	56.2			
20	05:50:00	63.9	80	01:45:00	56.1			
21	05:55:00	63.9	81	01:20:00	55.7			
22	00:10:00	63.7	82	01:30:00	55.7			
23	05:30:00	63.6	83	04:00:00	55.3			
24	23:05:00	63.1	84	00:30:00	55.1			
25	02:55:00	63.1	85	04:05:00	55			
26	06:40:00	63.0	86	02:50:00	54.7			
27	01:55:00	62.1	87	00:35:00	54.4			
28	23:45:00	61.9	88	01:15:00	54			
29	01:05:00	61.9	89	04:40:00	54			
30	01:10:00	61.7	90	02:30:00	53.9			
31	06:20:00	61.7	91	00:55:00	53.4			
32	00:45:00	60.9	92	01:40:00	53.4			
33	05:15:00	60.6	93	03:00:00	53.3			
34	00:00:00	60.5	94	01:00:00	53.2			
35	23:20:00	60.4	95	03:25:00	52.8			
36	00:25:00	60.4	96	02:20:00	51			
37	00:50:00	60.4	97	02:40:00	48.2			
38	23:30:00	60.2						
39	03:45:00	60.1						
40	04:30:00	60.0						
41	04:10:00	59.9						
42	05:35:00	59.9						
43	02:35:00	59.7						
44	05:20:00	59.6						
45	05:10:00	59.4						
46	05:25:00	59.4						
47	06:25:00	59.3						
48	00:40:00	58.9						
49	01:50:00	58.8						
50	03:50:00	58.8						
51	06:15:00	58.8						
52	02:10:00	58.6						
53	02:25:00	58.6						
54	04:20:00	58.5						
55	06:00:00	58.5						
56	06:05:00	58.5						
57	04:50:00	58.4						
58	23:10:00	58.3						
59	03:15:00	58.3						
60	04:35:00	58.3						
61	23:55:00	58.2						

Position 2 Summary LAMax Ordered

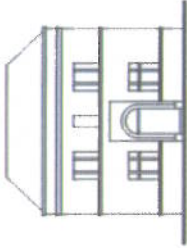


- Living Areas – 31dB R_{TRA} 10.12.6 double glazing
- Bedroom Areas - 33dB R_{TRA} 10.12.6-4pnb double glazing
- Living Areas - 21dB R_{TRA} 4.12.4 double glazing
- Bedroom Areas - 21dB R_{TRA} 4.12.4 double glazing
- All other areas 4.12.4 double glazing

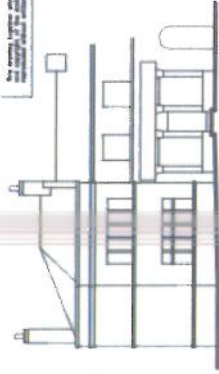
For further information, please contact the architect or the planning department.



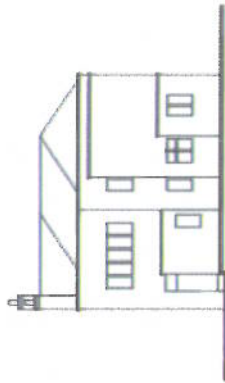
Elevation A



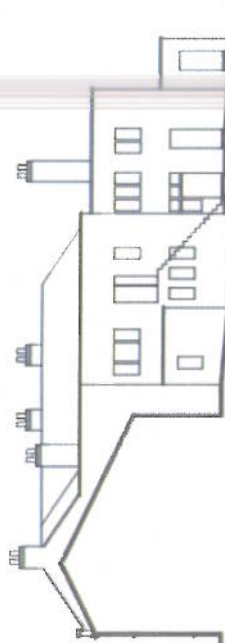
Elevation B



Elevation C



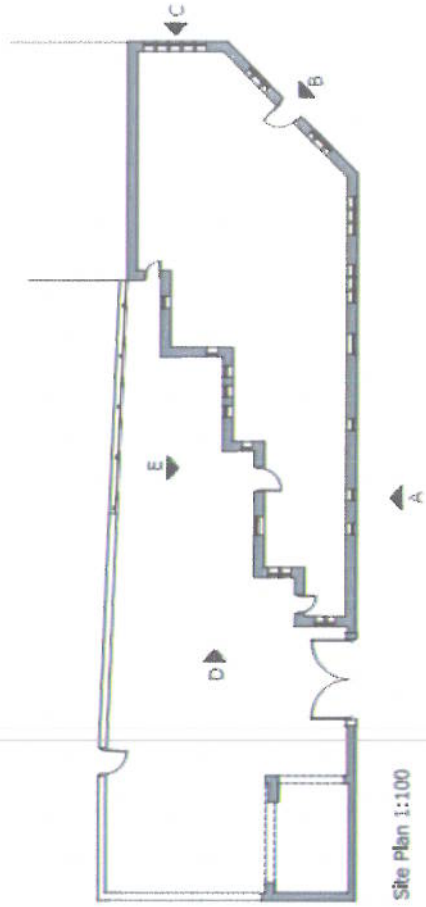
Elevation D



Elevation E



Location Plan 1:500



Site Plan 1:100

Architect BOUNCE Architects & Planners 100-102, 104-106, 108-110, 112-114, 116-118, 120-122, 124-126, 128-130, 132-134, 136-138, 140-142, 144-146, 148-150, 152-154, 156-158, 160-162, 164-166, 168-170, 172-174, 176-178, 180-182, 184-186, 188-190, 192-194, 196-198, 200-202, 204-206, 208-210, 212-214, 216-218, 220-222, 224-226, 228-230, 232-234, 236-238, 240-242, 244-246, 248-250, 252-254, 256-258, 260-262, 264-266, 268-270, 272-274, 276-278, 280-282, 284-286, 288-290, 292-294, 296-298, 300-302, 304-306, 308-310, 312-314, 316-318, 320-322, 324-326, 328-330, 332-334, 336-338, 340-342, 344-346, 348-350, 352-354, 356-358, 360-362, 364-366, 368-370, 372-374, 376-378, 380-382, 384-386, 388-390, 392-394, 396-398, 400-402, 404-406, 408-410, 412-414, 416-418, 420-422, 424-426, 428-430, 432-434, 436-438, 440-442, 444-446, 448-450, 452-454, 456-458, 460-462, 464-466, 468-470, 472-474, 476-478, 480-482, 484-486, 488-490, 492-494, 496-498, 500-502, 504-506, 508-510, 512-514, 516-518, 520-522, 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