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Noise Assessment Report

Report Ref: 211COMP
Client: Torrian Construction
Site Location: George Street
Barnsley S70 1BA
Date of Issue: 26th July 2017
Date of Assessment: Tuesday 25th July – Wednesday 26th July 2017



Picture 1: Compass House. This measurement location is labelled ML1 at the front of the building.

Executive Summary

The front of Compass House bordering Morrisons and facing Castlereagh Street (ML1) has a daytime level of L_{Aeq} (16 hour) 51dB and a night time L_{Aeq} (8 hour) of 46dB. LAF_{mx} reached 75dB during the night.

The side of Compass House bordering George Street (ML2) has a daytime level of L_{Aeq} (16 hour) 45dB a night time L_{Aeq} (8 hour) of 41dB. LAF_{mx} reached 57dB during the night.

In relation to BS8233:2014 and WHO (2009) these levels are too high and have to be actively reduced in order to ensure that internal noise levels for each dwelling does meet the guidelines.

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However reduction of the external noise to acceptable levels internally is achievable. This can be done by using windows, doors and ventilation that has the $R_{w}(C;Ctr)$ specified herein for the respective rooms.

The WHO (2009) recommendation for L_{AFmax} of 60dB and an $L_{Aeq}(8 \text{ hour})$ of 45dB outside bedrooms may be achieved at ML2 but not ML1. However the development should not be prohibited if the planners deem the development as desirable in the circumstances as acknowledged in BS8233:2014.

Application of the sound reduction recommendations in this report will meet the standards for internal noise levels required by the national planning policy framework guidelines. If users of the property keep external windows and doors closed, they will be at a low risk of adverse noise impact.

Uncertainty in the measurement is $\pm 5\text{dB}$

Objective:

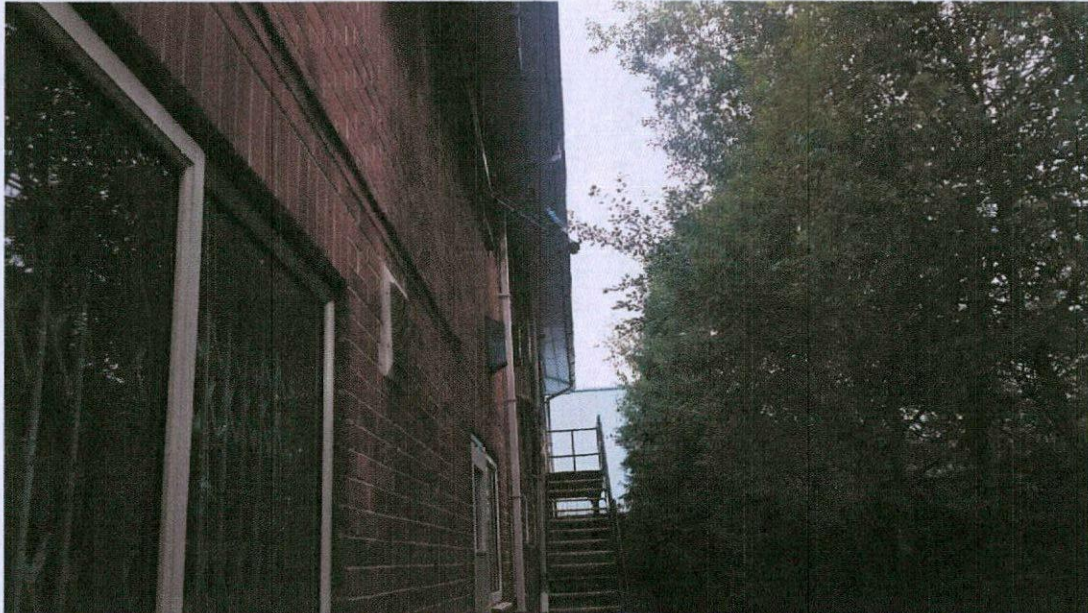
The property known as Compass House off George Street Barnsley S70 1BA was a building used as offices. The Client proposes to convert the existing building into residential flats to the ground and first floor.

The purposes of this noise assessment is to determine the level of environmental noise likely to impact the building and the type and level of sound reduction required from external windows, doors and ventilation that is required to satisfy the guidelines in BS8233:2014 and WHO(2009).

Source under Assessment

To the front of the property is Castlereagh Street (ML1) characterized by road traffic and pedestrian noise. The property shares a boundary with Morrisons Supermarket. Road traffic noise from the A628 West Way can be heard at the proposed development. To the rear and side of the property is George Street (ML2). The building is located in a predominantly residential but a mixed use area.

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Picture 2: Measurements at the first floor level of Compass House to the rear of the building. This measurement location is labelled ML2.

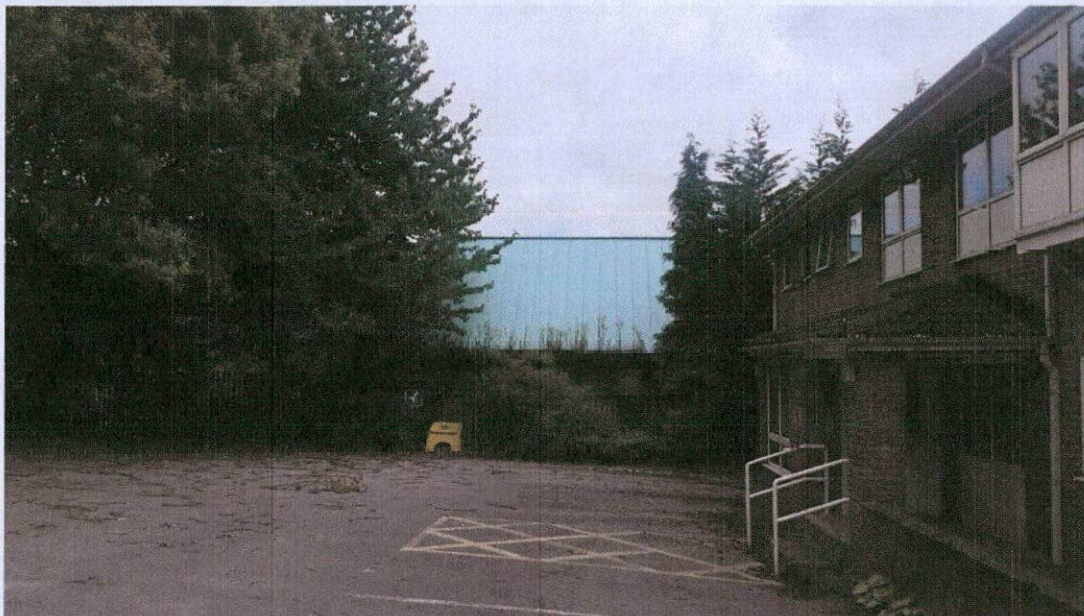
Methodology

Measurements were taken at two locations including the front and rear of the building. Two Casella Cel-490 type 1 sound level meters were used to take measurements of residual noise levels. The meters were calibrated and placed at the front and rear of Compass House at first floor level. The meters were calibrated before and after the measurements successfully.

Façade Correction

Façade measurements occur when the meter is in front of a large reflective surface at a distance of less than 3.5m away from the reflective surface. In order to convert measurements to free field equivalents, a façade correction is required. This is done by reducing the measured levels by up to 3dB. In this instance a façade correction is required for both measurements ML1 and ML2.

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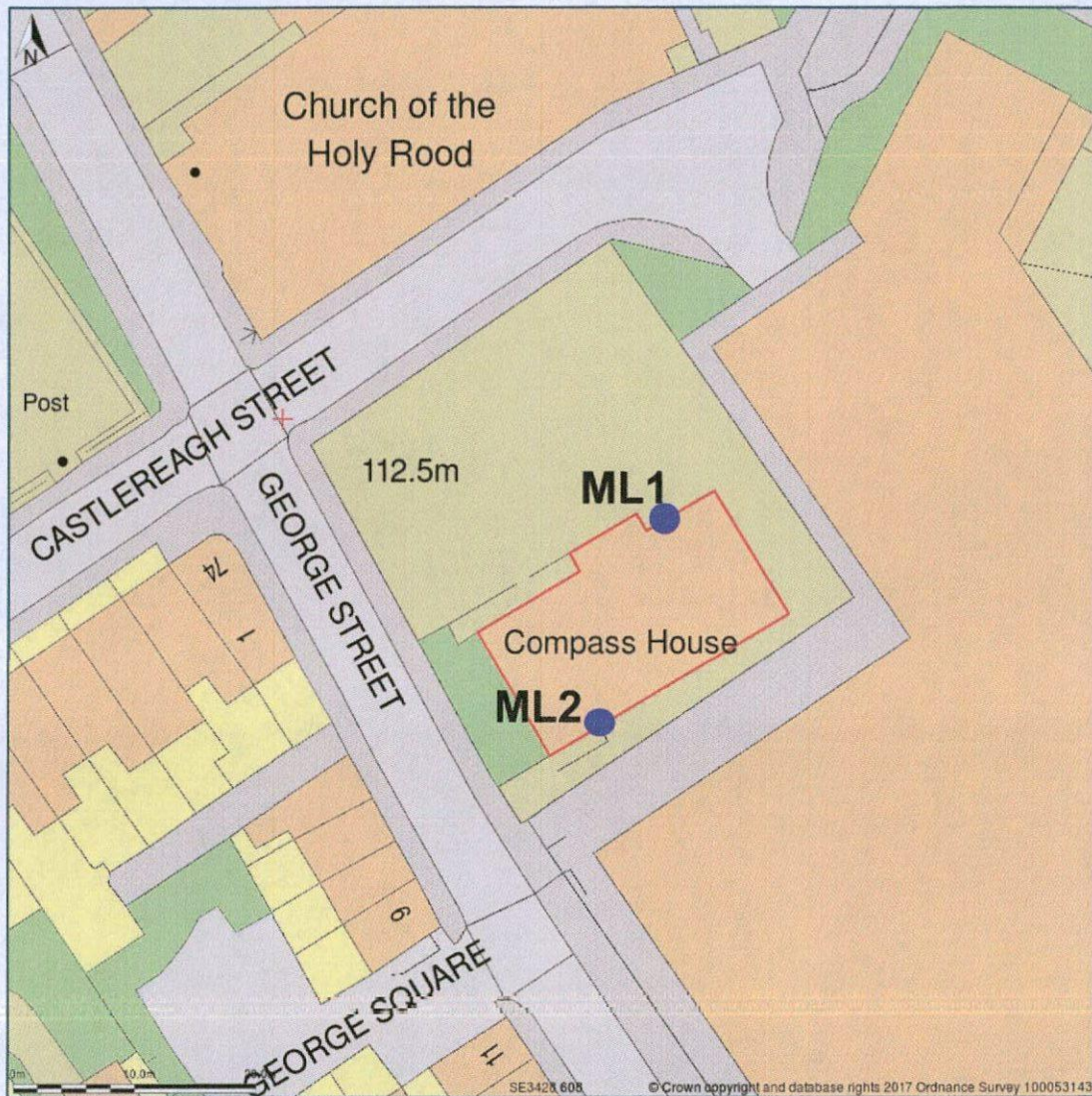
Picture 3: The building roof at the back of the picture is Morrisons.



Picture 4: George Street runs parallel with the building, in this picture it is the street after the gate.

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Site and Measurement Locations



Site plan 1: This is a site location plan purchased and cropped from the website <https://www.buyaplan.co.uk> on 26th July 2017 at 15:00. The full site plan is attached as part of this report in the Appendix. The red border indicates Compass House. The blue circles show measurement locations 1 and 2 respectively.

Date and Time of Measurements

Tuesday 25th July – Wednesday 26th July 2017 (Compass House)

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Measuring Equipment & Calibration

The sound level meters used at ML1 and ML2 were Casella Cel-490, a class 1 meter laboratory calibrated traceable to UKAS standards serial number 230643 and 240790. At the beginning and at the end of measurements the meter was calibrated with an acoustic calibrator before and after the measurements with negligible deviation ($\leq 0.4\text{dB}$). The meters all calibrated successfully before and after measurements.

Noise Levels

ML1 Noise Levels (Front facing Castleleagh Street) A façade correction of -3dB has been applied to these results.

Day L_{Aeq} (16 hour) = 51 dB Night L_{Aeq} (8 hour) 45.6dB L_{AFmx} 72dB

ML2 Noise Levels (Rear next to George Street). A façade correction of -3dB has been applied to these results.

Day L_{Aeq} (16 hour) 45.4dB Night L_{Aeq} (8 hour) 41dB L_{AFmx} 57dB

(see measurement data in the Appendix). The noise levels exceed the BS8233:2014 guidelines and require mitigation.

BS8233:2014 Criteria

Table 1 below is taken from BS8233:2014. It shows the guide lines for internal ambient noise levels. The guidelines in BS8233:2014 are also advised by WHO (2009).

Activity	Location	Day (07:00 -23:00)	Night (23:00 – 07:00)
Resting	Living Room	35 L_{Aeq} (16 hour)	-
Dining	Dining room/area	40 L_{Aeq} (16 hour)	-
Sleeping(daytime resting)	Bedroom	35 L_{Aeq} (16 hour)	30 L_{Aeq} (16 hour)

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Table 1: BS8233:2014 noise level for internal habitable rooms.

In addition the WHO (2009) has guidance for outdoor living areas such as gardens for day time noise of 50 – 55dB L_{Aeq} (16 hour). It has a L_{AFmax} of 45dB inside bedrooms and a L_{AFmax} of 60dB outside bedrooms, (see table 2 below).

Specific Environment	L_{Aeq} dB	Time base (hours)	L_{AFmax} dB
Outdoor living area (day)	55	16	
Outdoor living area (evening)	50	16	
Inside bedrooms (sleeping)	30	8	45
Outside bedrooms	45	8	60

Table 2: WHO (2009) guidelines

Recommendations for Dwelling facing ML1 (Front to Castlereagh or next to Morrisons)

- Living rooms should have windows, external doors, external walling and ventilation with a sound reduction of $R_w(c;ctr)$ 21dB. The sound reduction is set to account for some uncertainty ± 5 dB (see uncertainty section below).
- Dining rooms should have windows, external doors, external walling and ventilation with a sound reduction of $R_w(c;ctr)$ 16dB. The sound reduction is set to account for some uncertainty ± 5 dB (see uncertainty section below).
- Bed rooms should have windows, external doors, external walling and ventilation with a sound reduction of $R_w(c;ctr)$ 35dB. The sound reduction is set to account for some for WHO (2009) recommendations of L_{AFmx} night of 45dB inside bedrooms and to allow for some uncertainty.

Recommendations for Dwelling facing ML2 (Front to or next to George Street)

- Living rooms should have windows, external doors, external walling and ventilation with a sound reduction of $R_w(c;ctr)$ 15dB. The sound reduction is set to account for some uncertainty ± 5 dB (see uncertainty section below).

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- Dining rooms should have windows, external doors, external walling and ventilation with a sound reduction of $R_w(c;ctr)$ 10dB. The sound reduction is set to account for some uncertainty ± 5 dB (see uncertainty section below).
- Bed rooms should have windows, external doors, external walling and ventilation with a sound reduction of $R_w(c;ctr)$ 17dB. The sound reduction is set to account for some for WHO (2009) recommendations of LAFmx night of 45dB inside bedrooms and to allow for some uncertainty.

It should be noted that the development relies on windows being closed to achieve internal noise level guidelines. As a result acoustic ventilation must be provided that does not require windows to be open. Acoustic ventilation in bedrooms, dining rooms and living rooms must achieve the minimum sound reduction stated for that room.

WHO (2009) has an external LAFmx night of 60dB outside bedrooms. This is achieved at ML2 next to George Street where LAFmx reached 57dBA at night. However this is not achievable at ML1 next to Morrisons and fronting Castlereagh Street because LAFmx night is 75dBA .

A data sheet from Pilkington glass has been attached showing glazing that achieves the sound reductions index of $R_w(c;ctr)$ 35dB as recommended in this report.

Pilkington provides glazing. Huet provides acoustic doors that achieve the required $R_w(c;ctr)$ Greenwoods acoustic ventilation provides ventilation that would be suitable. Data sheets have been attached as part of this report to assist the Client in achieving the required sound insulation. The client does not have to source these products from the suppliers mentioned in this report. The suppliers mentioned herein are for example purposes only.

No special acoustic measures are required for hallways, bathrooms and kitchens unless they form part of a Dining room, Living room or bedroom.

The day time noise levels are within the recommended LAeq (16 hour) 50 – 55dB for outside living space.

Achieving the sound reduction as stated in this report will meet the standards for day and night time levels in the specified rooms.

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Context of the Noise Environment

WHO (2009) provides guidance of night time $L_{Aeq(8 \text{ hour})}$ of 45dB outside bedrooms. Adverse health effects arise from sleep disturbance when the window to the bedroom is left open. This means that persons sleeping with the window open are likely to have disturbed sleep if outside noise levels are greater than night time $L_{Aeq(8 \text{ hour})}$ 45dB. For this reason the WHO (2009) guidelines recommend noise levels outside bedrooms to be $L_{Aeq(8 \text{ hour})}$ 45dB or lower. This requirement is met at ML2 (41dBA) but not ML1 (46dBA) because of road traffic noise.

LAFmx 45dB Inside Bedrooms

The SRI of the windows, external doors and ventilation has been calculated to reduce internal LAFmx to 45dB and to also achieve the day time $L_{Aeq(16 \text{ hour})}$ of 35dB and the night time $L_{Aeq(8 \text{ hour})}$ of 30dB.

National Planning Policy Framework (NPPF) and Litchfield District Local Plan Strategy 2015 Policy BE1 'High Quality Development'

The national policy framework states at paragraph 109 new and existing developments should be prevented;

“from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability..”

At paragraph 123 the NPPF states;

“Planning policies and decisions should aim to avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development..”

The proposed development is within an elevated noise environment where LAFmax reached 75dB during the night at ML1. The area has a daytime level of $L_{Aeq(16 \text{ hour})}$ 51dB and a night time $L_{Aeq(8 \text{ hour})}$ of 46dB at ML1.

At ML2 LAFmax reached 57dB night and has a daytime level of $L_{Aeq(16 \text{ hour})}$ 45dB and a night time $L_{Aeq(8 \text{ hour})}$ of 41dB.

Achieving the weighted sound reduction index for windows, doors and ventilation as specified in this report will satisfy the main standards for internal habitable rooms and should fulfill the requirements of the national planning policy framework.

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It should be noted that users of the proposed dwellings are at risk of adverse noise impact when external doors and windows are left open.

BS8233:2014 accepts that external noise level guidelines may not be attainable but in certain circumstances development is acceptable, see section 7.7.2 and 7.7.3.2 of BS8233:2014 reproduced below.

Section 7.7.2 Internal Ambient Noise Levels for Dwellings of BS8233:2014 states

Note 4: Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or L_{AFMAX} depending on the character and number of events per night. Sporadic noise events could require separate values.

Note 5: If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level.

Note 7: Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

Section 7.7.3.2 Design Criteria for External Noise of BS8233:2014 states

“For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50dB $L_{Aeq,T}$ with an upper guideline of 55dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited,” (BS8233:2014).

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Uncertainty

The noise levels were obtained by direct onsite measurements. The sound level meter was fitted with a wind shield and maintained on a tripod throughout the measurement period. Once readings were started, the sound level meter was free from human interference. This was done to minimize uncertainty in the readings.

In addition, the readings were taken during suitable weather conditions. Each measurement was conducted for a duration sufficient to provide a representation of $L_{Aeq,(8 \text{ hour})}$ for night time and $L_{Aeq,(16 \text{ hour})}$ for day time.

The calibration of the sound level meter at the beginning and end of the readings showed a maximum drift of 0.4 dB at the start and end of the reading. This is considered normal.

Laboratory calibration uncertainty of the sound level meter is $\pm 1 \text{ dB}$

The nature of the road traffic noise may vary from time to time depending on but not limited to the number of vehicles, type of vehicles and the speed at which they are travelling. An uncertainty factor of $\pm 5 \text{ dB}$ has been added to account for variations that can occur day to day.

$$u = \sqrt{a^2 + b^2 + c^2 \dots etc}$$

$$U = \sqrt{1 + 5^2}$$

$$U = \pm 5 \text{ dB}$$

Uncertainty in the measurement is $\pm 4 \text{ dB}$

Conclusion

The front of Compass House bordering Morrisons and facing Castlereagh Street (ML1) has a daytime level of $L_{Aeq,(16 \text{ hour})}$ 51dB and a night time $L_{Aeq,(8 \text{ hour})}$ of 46dB. LAFmx reached 75dB during the night.

The side of Compass House bordering George Street (ML2) has a daytime level of $L_{Aeq,(16 \text{ hour})}$ 45dB a night time $L_{Aeq,(8 \text{ hour})}$ of 41dB. LAFmx reached 57dB during the night.

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In relation to BS8233:2014 and WHO (2009) these levels are too high and have to be actively reduced in order to ensure that internal noise levels for each dwelling does meet the guidelines. However reduction of the external noise to acceptable levels internally is achievable. This can be done by using windows, doors and ventilation that has the $R_{w}(C;Ctr)$ specified herein for the respective rooms.

The WHO (2009) recommendation for L_{AFmax} of 60dB and an L_{Aeq} (8 hour) of 45dB outside bedrooms may be achieved at ML2 but not ML1. However the development should not be prohibited if the planners deem the development as desirable in the circumstances as acknowledged in BS8233:2014.

Application of the sound reduction recommendations in this report will meet the standards for internal noise levels required by the national planning policy framework guidelines. If users of the property keep external windows and doors closed, they will be at a low risk of adverse noise impact.

Uncertainty in the measurement is ± 5 dB

Signed:

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Noise Consultant

Noise Survey Ltd

BIBLIOGRAPHY

British Standards Institution (2014) BS EN 8233:2014 **Guidance on Sound Insulation and Noise Reduction for Buildings**. London. BSI

World Health Organization Europe (2009) **Night Noise Guidelines for Europe**. Copenhagen WHO

Department for Communities and Local Government (2012) **National Planning Policy Framework**. Crown London

APPENDIX A

Measuring Equipment

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Casella Cel-490 sound level meter type 1 laboratory calibrated traceable to UKAS standards serial number 240790 last calibration date April 2016. Used at ML1.

Casella Cel-490 sound level meter type 1 laboratory calibrated traceable to UKAS standards serial number 230643 last calibration date November 2016. Used at ML3.

Casella Cel 284/2 type 1 field acoustic calibrator serial no. 4/01021674 laboratory calibrated traceable to UKAS standards August 2015.

Kane May Thermostat model KM330 serial: 723858 calibrated 19/05/2015 by Stroma Technology certificate: 723858-150519

Kaindl Electronic model: Windtronic 2 Anemometer.

Weather Conditions

Wind speeds were below 5m/s. There was light precipitation on Wednesday 26th July from 08:00 till measurements were completed however this is not thought to adversely affect the results. Cloud cover ranged from 10% - 90% during the measurement duration. The temperature ranged from 7°C to 19°C during the measurement period. All measurements were conducted during suitable weather conditions.

Measurement Data

Compass House Front (ML1 facing High Street) meter serial no. 230643

Period number	Compass House Front					
	Date	Start Time	LAFmx dB	LAeq dB	LAF10.0 dB	LAF90.0 dB
1	25/07/2017	12:02:05	75.8	54.2	56.5	48.5
2	25/07/2017	13:02:05	69.2	53.6	56	47.5
3	25/07/2017	14:02:05	70.5	53.8	56.5	48
4	25/07/2017	15:02:05	66.3	53.3	56	47
5	25/07/2017	16:02:05	77.7	54.5	56	47.5
6	25/07/2017	17:02:05	68.2	53.5	56	48
7	25/07/2017	18:02:05	72.9	54.3	56.5	48
8	25/07/2017	19:02:05	83.7	54.5	56.5	48
9	25/07/2017	20:02:05	67.6	53.2	56	47
10	25/07/2017	21:02:05	72.3	52.5	55	46
11	25/07/2017	22:02:05	70.3	51	54	43.5
12	25/07/2017	23:02:05	70.6	49.3	52.5	41.5
13	26/07/2017	00:02:05	64.1	46.3	50	39
14	26/07/2017	01:02:05	64	44.5	47.5	37
15	26/07/2017	02:02:05	63.3	42.8	47	36

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16	26/07/2017	03:02:05	59.9	44.8	48.5	36.5
17	26/07/2017	04:02:05	74.8	47.2	50	37.5
18	26/07/2017	05:02:05	66.4	50.8	54.5	41
19	26/07/2017	06:02:05	66.2	52.8	56	45
20	26/07/2017	07:02:05	63.6	53.6	56.5	48.5
21	26/07/2017	08:02:05	66.1	54.4	57	50
22	26/07/2017	09:02:05	73.4	54.9	57	50
23	26/07/2017	10:02:05	74.6	56	58	52.5
24	26/07/2017	11:02:05	66.9	55.3	57.5	51.5

Table 3: Measurements at ML1. The gray highlight are night time. A façade correction has not been applied to these results which show LAeq(16 hour) 54dB and LAeq(8 hour) 48.6dB. LAFmx reached 75dB at night.

Hoyland Town Hall Side (ML2 rear next to George Street meter serial no. 240790)

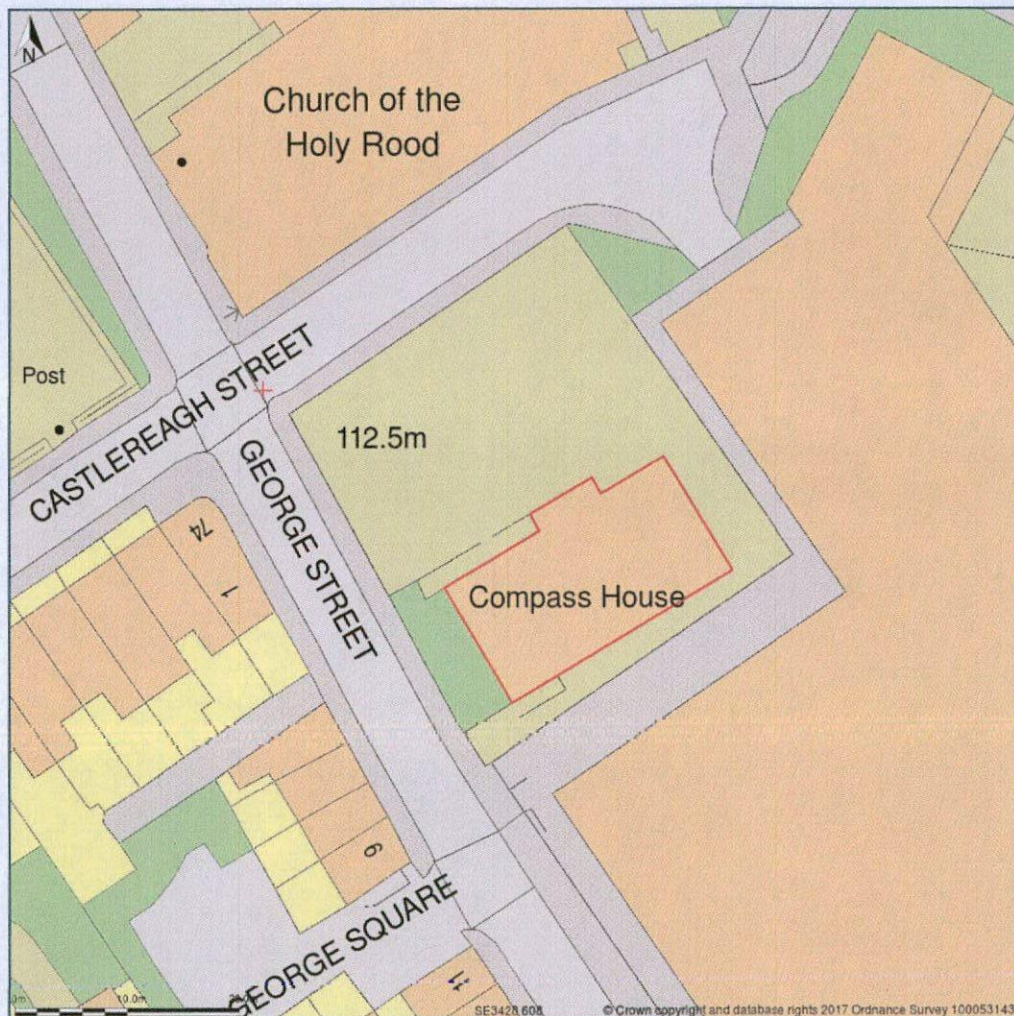
Period number	Date	Time	LAFmx dB	LAeq dB	LAF10.0 dB	LAF90.0 dB
1	25/07/2017	12:21:40	81.4	49.7	50	45.5
2	25/07/2017	13:21:40	67.8	46.9	48	45.5
3	25/07/2017	14:21:40	66.4	47.8	49	45.5
4	25/07/2017	15:21:40	69.8	48.5	50.5	45.5
5	25/07/2017	16:21:40	62.2	47.7	49	46
6	25/07/2017	17:21:40	61.5	47.9	49	46
7	25/07/2017	18:21:40	60.8	47.7	49	46
8	25/07/2017	19:21:40	60.6	47.9	48.5	46
9	25/07/2017	20:21:40	63.8	48.1	49	45.5
10	25/07/2017	21:21:40	64.8	47.1	48	44.5
11	25/07/2017	22:21:40	61.4	45.5	47	43
12	26/07/2017	23:21:40	59.7	44.4	46.5	41.5
13	26/07/2017	00:21:40	59.4	42.6	43.5	41
14	26/07/2017	01:21:40	47.5	41.9	43	40.5
15	26/07/2017	02:21:40	52.4	41.9	43	40.5
16	26/07/2017	03:21:40	52.3	42.9	44	41.5
17	26/07/2017	04:21:40	57.6	44.1	45.5	42.5
18	26/07/2017	05:21:40	56.5	46.3	47.5	44.5
19	26/07/2017	06:21:40	53.6	46.9	47.5	46
20	26/07/2017	07:21:40	62.4	48	49	46.5
21	26/07/2017	08:21:40	70	49.3	51	46.5
22	26/07/2017	09:21:40	65.3	49.7	52	47
23	26/07/2017	10:21:40	69.1	52.6	55	48.5

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Table 4: Measurements at ML2. The gray highlight are night time. A façade correction has not been applied to these results which show LAeq(16 hour) 48.4dB and LAeq (8 hour) 44.2dB. LAFmx reached 59.7dB at night.



Barnsley Mbc Private Car Park Compass House George Street Barnsley S70 1BA



Block Plan shows area bounded by: 434239.23, 406039.11 434329.23, 406129.11 (at a scale of 1:500), OSGridRef: SE3428 608. The representation of a road, track or path is no evidence of a right of way. The representation of features as lines is no evidence of a property boundary.

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