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Architectural & Environmental Acousticians

Noise & Vibration Engineers

DISCHARGE OF CONDITION 18

PHOENIX PLACE, LONDON

TAYLOR WIMPEY CENTRAL LONDON

RP01-17506

DISCHARGE OF CONDITION 18

PROJECT: PHOENIX PLACE, LONDON

CLIENT: TAYLOR WIMPEY CENTRAL LONDON

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DOCUMENT CONTROL:

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0	16 November 2017	Alex Clark, BEng AMIOA, Acoustics Consultant	Chris McNeillie, MSc CEng MIOA, Director	Initial issue
1	22 January 2019	Chris McNeillie, MSc CEng MIOA, Director	Chris McNeillie, MSc CEng MIOA, Director	Minor amendment

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1. INTRODUCTION

1.1 Cass Allen Associates has been instructed by Taylor Wimpey Central London to assess the acoustic design of the external facades of a new development at Phoenix Place, Mount Pleasant.

1.2 The assessment has been carried out in accordance with the requirements of Planning Condition 18 that has been imposed on the development. The condition is:

> *18 Sound Insulation (glazing)*
>
> *Condition: Prior to superstructure work commencing on the relevant Section, a scheme setting out the 'glazing sound insulation performance' for each octave band centre frequency, to demonstrate that 'good' to reasonable internal noise levels (BS8233) will be achieved shall be submitted to and discharged in writing by the Local Planning Authority. The assessment shall address predicted temporary and permanent noise levels generated from the sorting office and the Calthorpe Street development site.*

1.3 The assessment has also been carried out in accordance with an acoustic clause that was imposed by Royal Mail as part of the sale of the site to Taylor Wimpey Central London. The clause requires that facades facing the Royal Mail sorting facility on the other side of Phoenix Place are designed to achieve internal noise levels 10 dB lower than BS8233 recommended levels. The intent of this clause is to provide increased protection to future residents against noise from the sorting office in order to minimise the likelihood of disturbances or complaints. The clause is shown in full in Appendix 1.

1.4 This report contains technical terminology; a glossary of terms can be found at www.cassallen.co.uk/glossary.

2. DEVELOPMENT DESCRIPTION

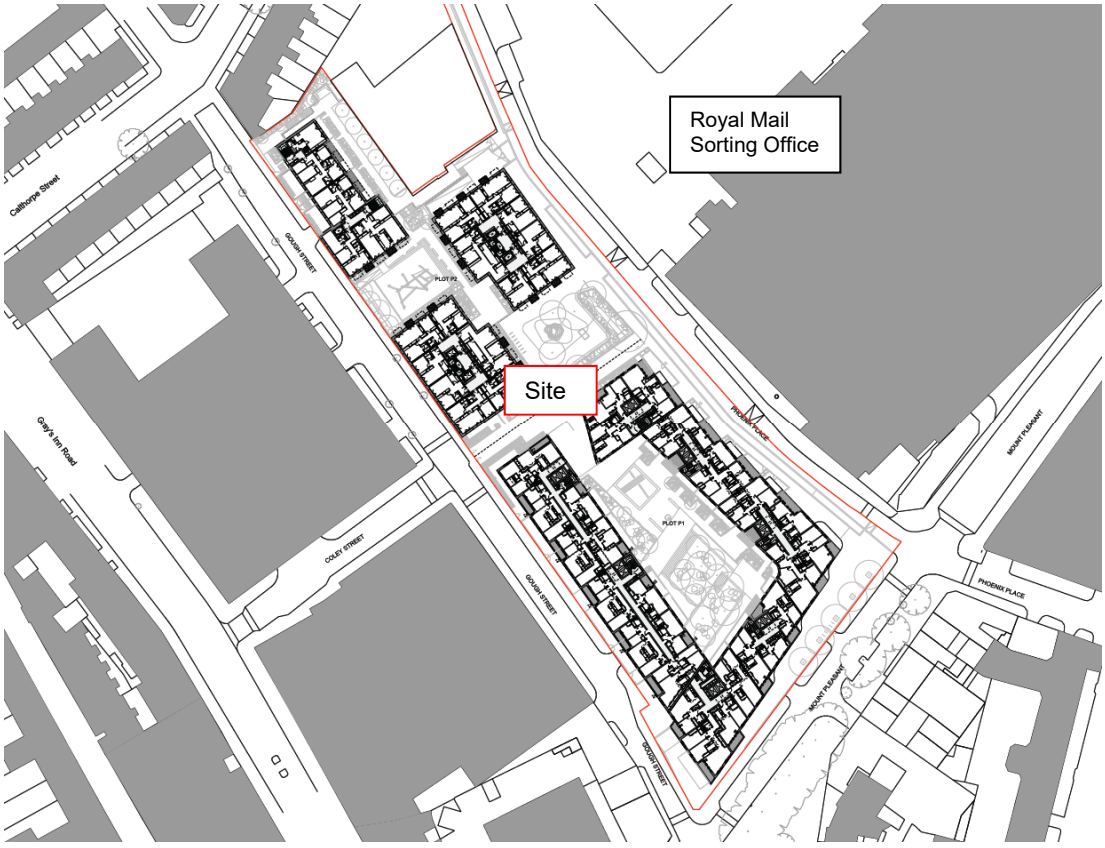
2.1 The site is located in a mixed-use area, and is bounded by Phoenix Place, Mount Pleasant and Gough Street. Directly to the east of the site on the opposite side of Phoenix Place is the Royal Mail Sorting office

2.2 The development comprises demolition of existing buildings to construct 4 new buildings ranging from 5 to 15 storeys to provide 345 residential dwellings with flexible retail and community floor space at lower levels along with an energy centre, waste and storage areas, residential car parking etc.

2.3 On the opposite side of Phoenix Place there is also a separate development of the Royal Mail sorting office (refer Islington planning & conservation area consent application reference numbers P2013/1423 & P2013/1435). This development involves the demolition of existing buildings to construct new 3 to 12 storey mixed-use buildings including residential, office and commercial areas. This development also includes the construction of an acoustic roof deck over the existing Royal Mail servicing yard.

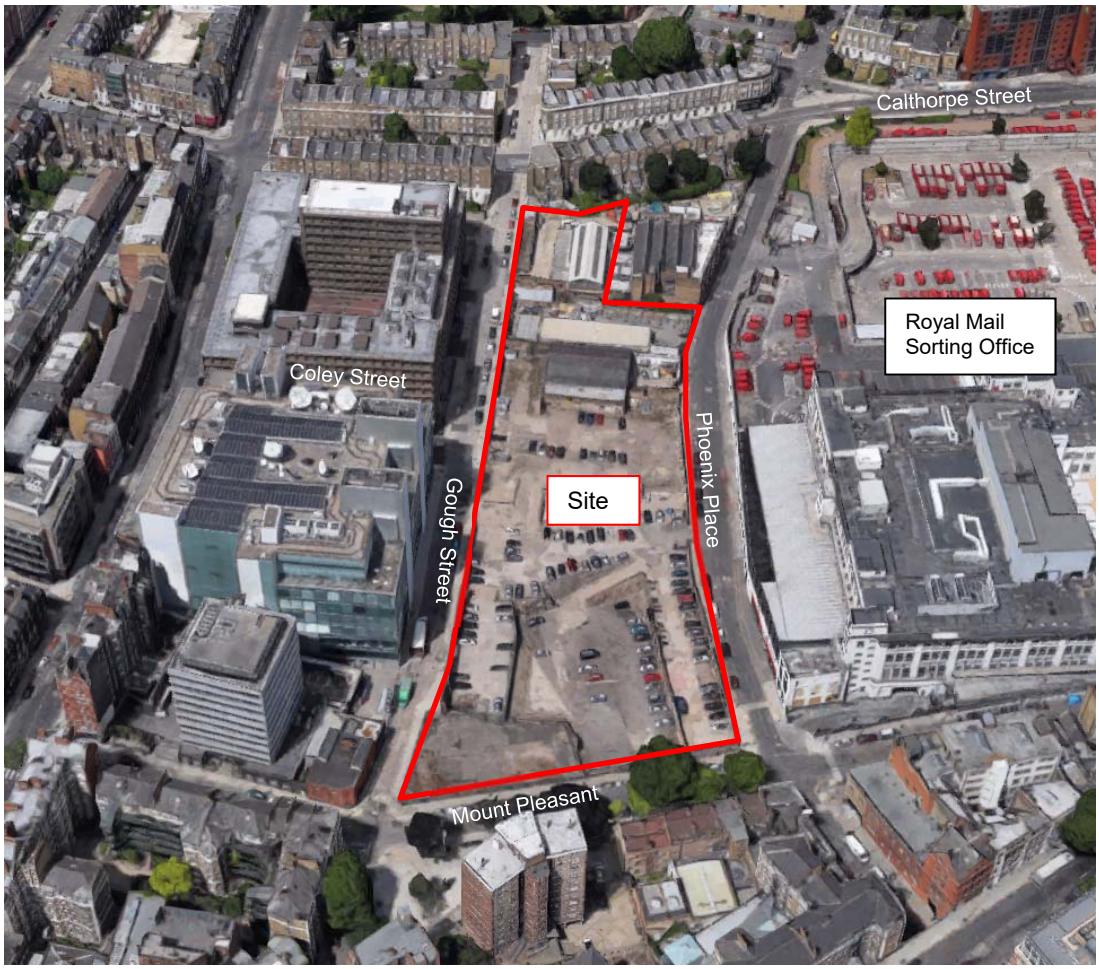
2.4 A current drawing of the proposed development layout is shown in Figure 1 below.

Figure 1 Site Layout



2.5 An annotated aerial photo of the site and surrounding area is shown in Figure 2 below.

Figure 2 Annotated Aerial Photo



2.6 To address the requirements of Planning Condition 18 and the Royal Mail acoustic clause, the noise levels affecting the habitable areas of the proposed development and associated facade design have been assessed and are discussed in the following sections of this report.

3. NOISE AFFECTING THE DEVELOPMENT

3.1 The noise levels that will exist within the habitable areas of the finished development have been predicted based on the existing noise environment at the site and details for the design of the development. The predicted noise levels have then been compared with appropriate design criteria. Suitable mitigation measures have been identified where necessary to achieve acceptable noise levels.

Design criteria – Internal noise levels

3.2 As mentioned in Planning Condition 18, appropriate design criteria for acceptable noise levels in acoustically sensitive areas of new developments are given in BS8233. Although it is not clear, it appears that the Planning Condition is based on the older version of BS8233:1999 '*Sound insulation and noise reduction for buildings — Code of practice*', whereas for the purposes of this report, the updated BS8233:2014 '*Guidance on sound insulation and noise reduction for buildings*' has been used and is hereby referred to as BS8233.

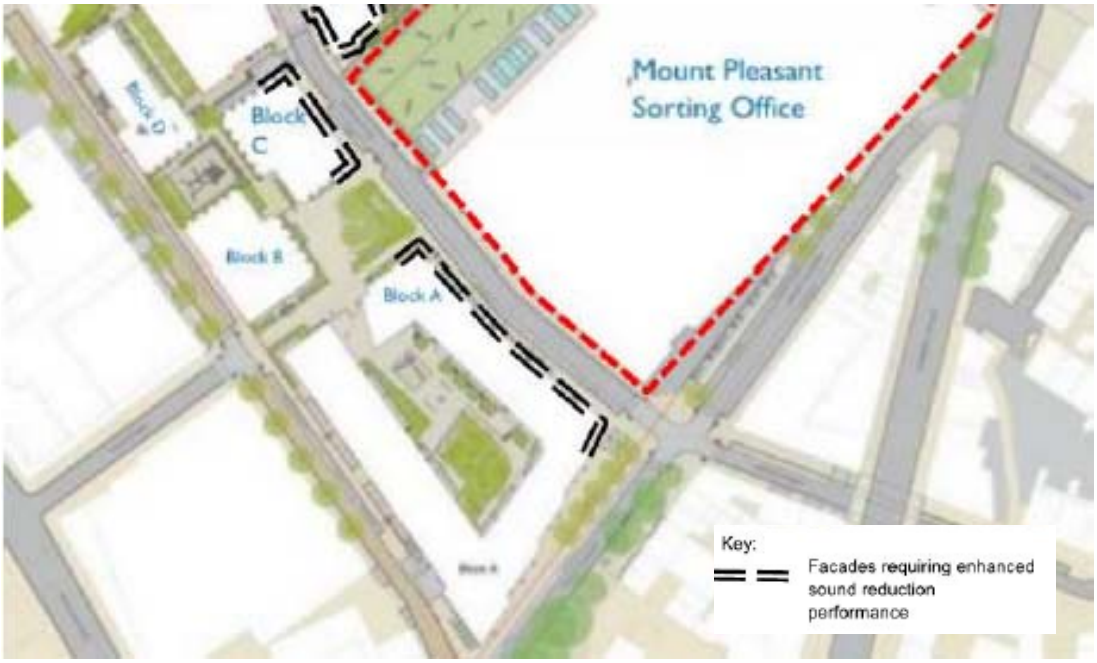
3.3 Relevant BS8233 design criteria are summarised in Table 1 below.

Table 1 BS8233:2014 Internal Noise Criteria

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB LAeq,16hour	-
Dining	Dining room/area	40 dB LAeq,16hour	-
Sleeping (daytime resting)	Bedroom	35 dB LAeq,16hour	30 dB LAeq,8hour

3.4 As per the Royal Mail clause, the façades closest to and potentially most affected by noise from the Royal Mail sorting office will be designed to achieve a 10 dB improvement on the BS8233 criteria above. The affected facades are shown in Figure 3 below.

Figure 3 Extent of Enhanced Sound Reduction Performance (Block A & C Only)



3.5 Compliance with the Royal Mail clause is considered to be sufficient to comply with the requirement of Planning Condition 18 that the acoustic design of the development considers the potential impact of noise from temporary and permanent activities associated with the Royal Mail development.

3.6 The following acoustic design criteria have therefore been adopted for the development:

- Average noise levels in living rooms and dining rooms during the day should not exceed 35 dB LAeq,0700-2300hrs and 40 dB LAeq,0700-2300hrs respectively;
- Average noise levels in bedrooms should not exceed 35 dB LAeq,0700-2300hrs during the day and 30 dB LAeq,2300-0700hrs during the night; and
- For rooms closest to the Royal Mail sorting office, as shown in Figure 3, average noise levels in living rooms, dining rooms and bedrooms should not exceed 10 dB below the above criteria during the day and night.

Existing site noise levels

3.7 A noise survey was carried out at the site between 6th and 10th October 2017 to assess existing noise levels in the area. The full methodology and results of the noise survey are provided in Appendix 2.

3.8 Average and maximum noise levels across the site were generally dictated by road traffic on Phoenix Place and Mount Pleasant. Average noise levels at the western edge of the site were also affected by vehicle movements on Gough Street.

3.9 Background noise levels (LA90) across the site were dictated by road traffic noise from the surrounding road network.

3.10 Noise was also identified from aircraft movements however noise from aircraft was generally insignificant when compared with noise from road traffic.

3.11 Based on the results of the site noise survey, a 3D computer noise model was developed to predict and assess the noise levels that will exist across the entire development.

3.12 The 3D noise model was developed using Cadna/A v2017 environmental noise modelling software. Cadna/A incorporates the calculation methodology outlined in the Department of Transport Welsh Office - *Calculation of Road Traffic Noise* (CRTN) for the assessment of road traffic noise propagation.

3.13 The layout of the development and surrounding area was input into the model. To calculate the spread of noise levels around the site, day-time average noise levels were input for the surrounding roads (i.e. Phoenix Place and Mount Pleasant) and calibrated to the results of the on-site noise measurements. Although noise levels from vehicle movements on Gough Street were found to be significantly lower than from the above roads, noise levels on Gough Street were modelled to be the same as Mount Pleasant in order to produce a robust 'worst-case' assessment.

3.14 It should be noted that the measured noise levels on Phoenix Place were input to the 3D noise model as measured, however, by the time this development is complete, the Royal Mail sorting office will be enclosed by an acoustic roof deck over the existing servicing yard and is therefore

expected to emit lower noise levels. This is considered to produce a robust 'worst-case' assessment.

3.15 The methodology and results of the noise modelling are provided in Appendix 3. It can be seen from the modelling results that road traffic noise levels will be highest on facades of the development facing Phoenix Place and Mount Pleasant.

Internal noise levels in noise-sensitive rooms

3.16 The external walls of the development will be constructed using a masonry construction comprising facing brick, an insulated cavity and 2x12.5mm plasterboard. Consequently, internal noise levels will be dictated by external noise ingress via glazing and ventilators.

3.17 The ventilation scheme for the project is Mechanical Ventilation with Heat Recovery (MVHR) i.e. System 4 from Building Regulations Part F. Therefore, there will be no background ventilators in the external façades (e.g. trickle ventilators etc) and noise ingress will be dictated by the sound insulation performance of the glazing.

3.18 The MVHR system will be selected to ensure that noise from air supply and extract ductwork does not exceed acceptable levels within habitable rooms. Appropriate specifications for noise levels from the MVHR system (operating at typical maximum duty) would be as follows:

- Bedrooms and living rooms – 30 dB LAeq,T at 1.5m from any ventilation aperture; and,
- Other habitable areas – 35 dB LAeq,T at 1.5m from any ventilation aperture.

3.19 The residential units facing Phoenix Place will also be provided with comfort cooling via a suitable air conditioning system. The comfort cooling will allow residents to keep their windows closed at all times without the units overheating, which is acoustically beneficial as it will remove the reliance on openable windows for the control of thermal comfort in warmer months.

3.20 Calculations were carried out using façade modelling software in accordance with the methodology given in BS8233:2014 to calculate the sound insulation performance required of the glazing to achieve the nominated internal noise criteria in the habitable rooms of the development. The calculations were carried out based on the dimensions/details for facade elements taken from project drawings.

3.21 The calculations are shown in Appendix 4 and are summarised in Table 2 below.

Table 2 Acoustic Requirements for all Habitable Rooms

Location	Glazing Performance Requirements (inc. Frames)
All habitable rooms requiring enhanced sound reduction performance, as shown in Figure 2	36 dB Rw+Ctr
All habitable rooms throughout the rest of the development	27 dB Rw+Ctr

3.22 The required sound insulation performance values in Table 2 could typically be achieved by the glazing types shown in

3.23 Table 3.

Table 3 Typical Glazing Acoustic Performances

Glazing (in Good Quality Sealed Frames)		Typical Weighted Sound Reduction (Rw + Ctr)
4-16-4	(standard thermal double glazing)	27
10-16-8.8	(acoustically upgraded double glazing)	37

3.24 A detailed specification showing the glazing requirements for all facades has been prepared and is given in Appendix 5.

3.25 The glazing will be selected to achieve the specification in Appendix 5 and therefore internal noise levels compliant with Planning Condition 18 and the Royal Mail clause are predicted to be achieved within all habitable rooms of the development.

3.26 It should be noted that the specification contains single figure Rw+Ctr values, not octave band figures as required in Planning Condition 18. This is to aid in the tendering of the glazing and is technically acceptable as the dominant noise source at the site is road traffic.

4. CONCLUSIONS

4.1 Cass Allen Associates was instructed by Taylor Wimpey Central London assess the acoustic design of the external facades of the development as required by Planning Condition 18 and the Royal Mail acoustics clause.

4.2 A noise survey was carried out at the site and used to inform a 3D noise model of the development. The 3D noise model was used to calculate the spread of noise levels around the site and calculate an acoustic specification for external glazing to achieve BS8233 recommended internal noise levels, including an enhanced specification for glazing to habitable rooms facing the Royal Mail site as per the requirements of the Royal Mail acoustics clause. The specification is given in Appendix 5.

4.3 The glazing will be selected to achieve the specification in Appendix 5and therefore internal noise levels that comply with Planning Condition 18 and the Royal Mail clause are predicted to be achieved within all habitable rooms of the development.

4.4 It is our view that this report contains the information required to discharge Planning Condition 18 on the development.

Appendix 1 Enhanced Acoustic Performance Clause

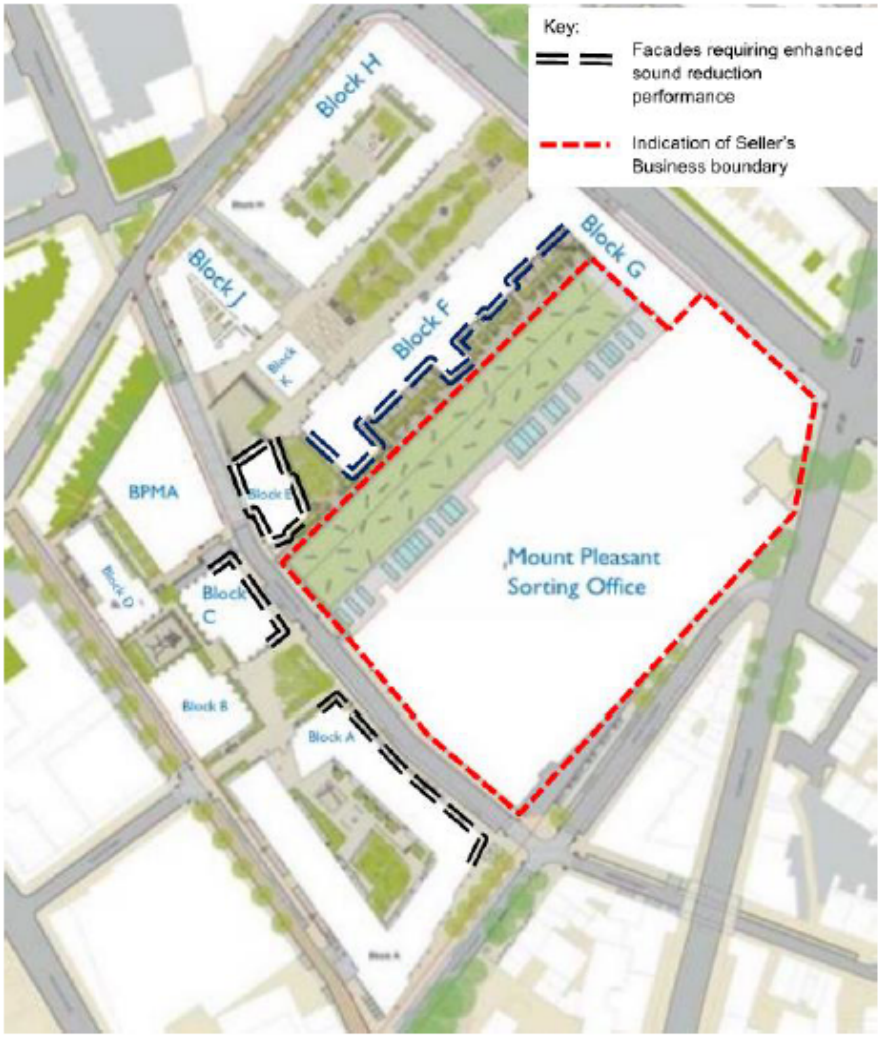
ACOUSTICS

Mount Pleasant Residential facade sound reduction

Revised Acoustic Design clause

"Acoustic Design" measures shall be incorporated into Blocks A, C, E and F, as indicated in Figure 1, by way of design development prepared by the Buyer's Acoustic Consultant in conjunction with the remainder of the Buyer's Professional Team to ensure that, in addition to controlling the effect of general ambient city noise, any residual operational sound emanating from the Seller's Business would be reduced to at least 10 dB better than the residential design standards set out in BS8233 for rest and sleep, as defined in Clause 7.7.2 Table 4 inside the habitable rooms of future residential buildings".

Figure 1. Facades requiring enhanced sound reduction performance to mitigate risk of residual noise emissions from Seller's Business impacting upon future residential buildings



Appendix 2 Survey Result

Survey Summary:

The survey comprised short-term operator attended noise measurements and longer-term unattended noise monitoring at the site. Noise levels at the site were generally dictated by road traffic on surrounding roads and noise from train passes on the adjacent railway. Vibration levels at the site were very low.

Survey Period:

06/10/2017 to 10/10/2017

Survey Objectives:

- To identify noise sources that contribute to ambient noise levels at the site;
- To measure noise and vibration levels around the site over a typical day and night-time period.

Equipment Used (Appendix 2, Table 1):

Type	Manufacturer	Model	Serial Number
Sound level meter[1]	Bruel & Kjaer	2250 (G4)	3007539
Calibrator	Bruel & Kjaer	4231	2115551
Sound level meter[1] (noise logger)	Rion	NL-32	00530374
Sound level meter[1] (noise logger)	Rion	NL-32	01182950

Note 1: All sound level meters were calibrated before and after measurement periods and no significant drift in calibration was found to have occurred. The results of the measurements are therefore considered to be representative.

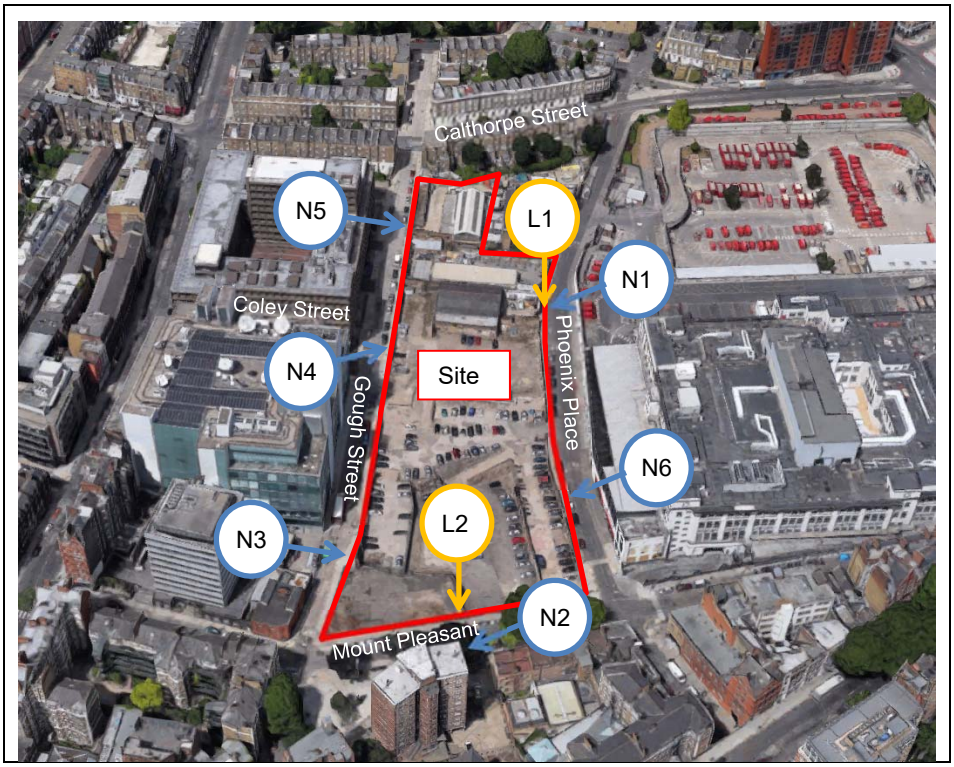
Weather Conditions:

The observed weather conditions were acceptable for acoustic measurement throughout the attended survey periods (low-medium wind speeds and no rain). Weather records for the area confirmed that weather conditions were also generally acceptable for acoustic measurement during the unattended monitoring.

Measurement Positions (Appendix 2, Table 2):

Position (refer plan below)	Description
N1	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to Phoenix Place
N2	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to Mount Pleasant
N3	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to Gough Street and delivery gate opposite
N4	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to Coley Street and Gough Street
N5	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to Gough Street and car park opposite
N6	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to Phoenix Place
L1	Unattended noise logging position. 3.7m above ground level. Free-field. Direct line of sight to Phoenix Place
L2	Unattended noise logging position. 4.2m above ground level. Free-field. Direct line of sight to Mount Pleasant

Site Plan showing Measurement Positions (Appendix 2, Figure 4):



Attended Noise Monitoring Results (Appendix 2, Table 3):

Date	Position	Time	Meas. Length	LAeq, dB	LAmax, dB	LA90, dB	Observations
06.10.17	N1	12:00	10 mins	62	77	51	Noise dictated by road traffic from Phoenix Place including Royal Mail vans
06.10.17	N2	12:14	5 mins	68	82	56	Noise dictated by road traffic from Mount Pleasant
06.10.17	N2	12:21	5 mins	63	74	55	Noise dictated by road traffic from Mount Pleasant
06.10.17	N3	12:28	10 mins	64	83	52	Noise dictated by road traffic on Gough Street and idle engines towards the south of the road (opposite measurement position)
06.10.17	N4	12:40	5 mins	60	74	53	Noise dictated by vehicles travelling from Coley Street to Gough Street
06.10.17	N5	12:46	5 mins	51	65	49	Noise dictated by road traffic from Calthorpe Street, Coley Street and Gough Street. No noise from car park opposite
06.10.17	N2	12:55	5 mins	65	78	56	Noise dictated by road traffic from Mount Pleasant
06.10.17	N6	13:03	5 mins	66	87	53	Noise dictated by road traffic from Phoenix Place including Royal Mail vans

Unattended Noise Monitoring Results Appendix 2, Table 4):

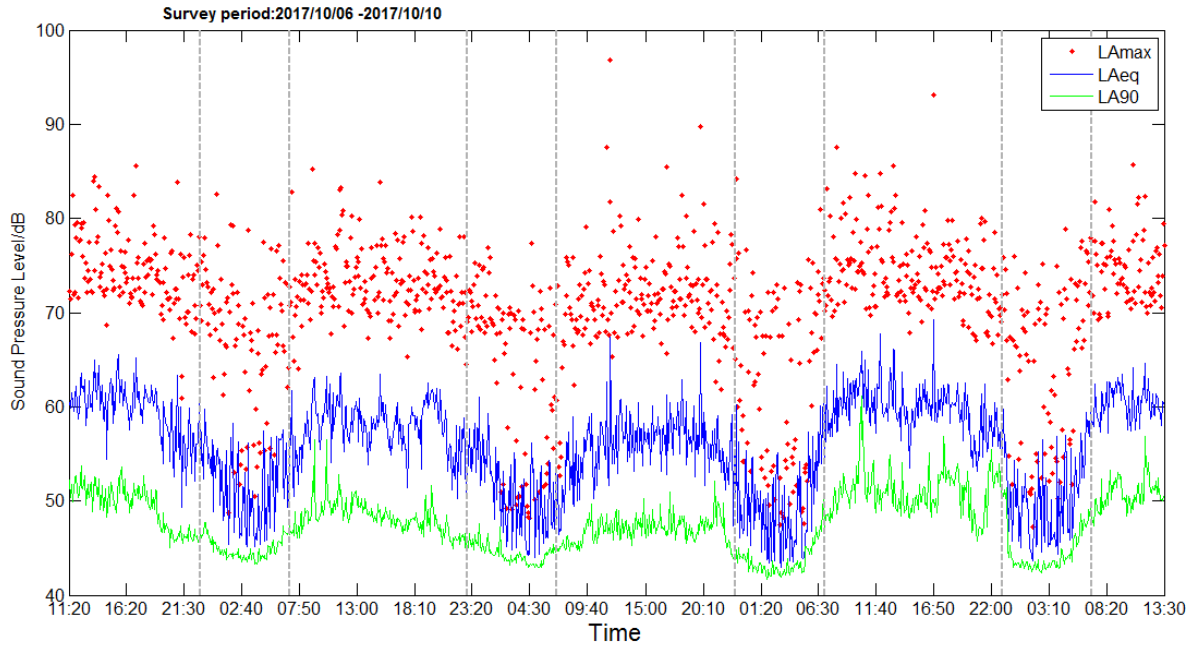
Meas. Period	Position	Daytime (0700-2300hrs)		Night-time (2300-0700hrs)		
		LAeq,16hr, dB	LA90,1hr dB[1]	LAeq,8hr, dB	LA90,5mins, dB[1]	LAmax, dB[2]
06.10.17 to 10.10.17	L1	61	49	53	44	74
06.10.17 to 10.10.17	L2	60	49	53	46	72

Note 1: Typical lowest measured during the period shown.

Note 2: Highest typical maximum noise level during the night-time (not exceeded more than 10-15 times per night).

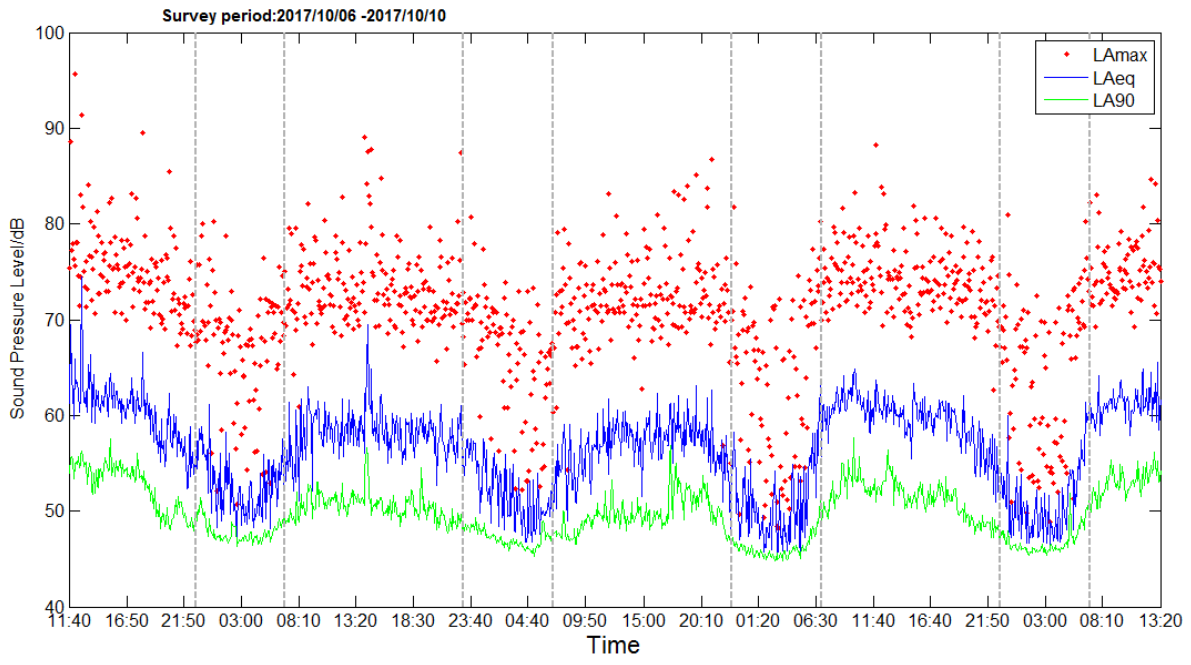
Unattended Noise Monitoring Results (Appendix 2, Figure 5):

Meas. Period	Position
06.10.17 to 10.10.17	L1



Unattended Noise Monitoring Results (Appendix 2, Figure 6):

Meas. Period	Position
06.10.17 to 10.10.17	L2

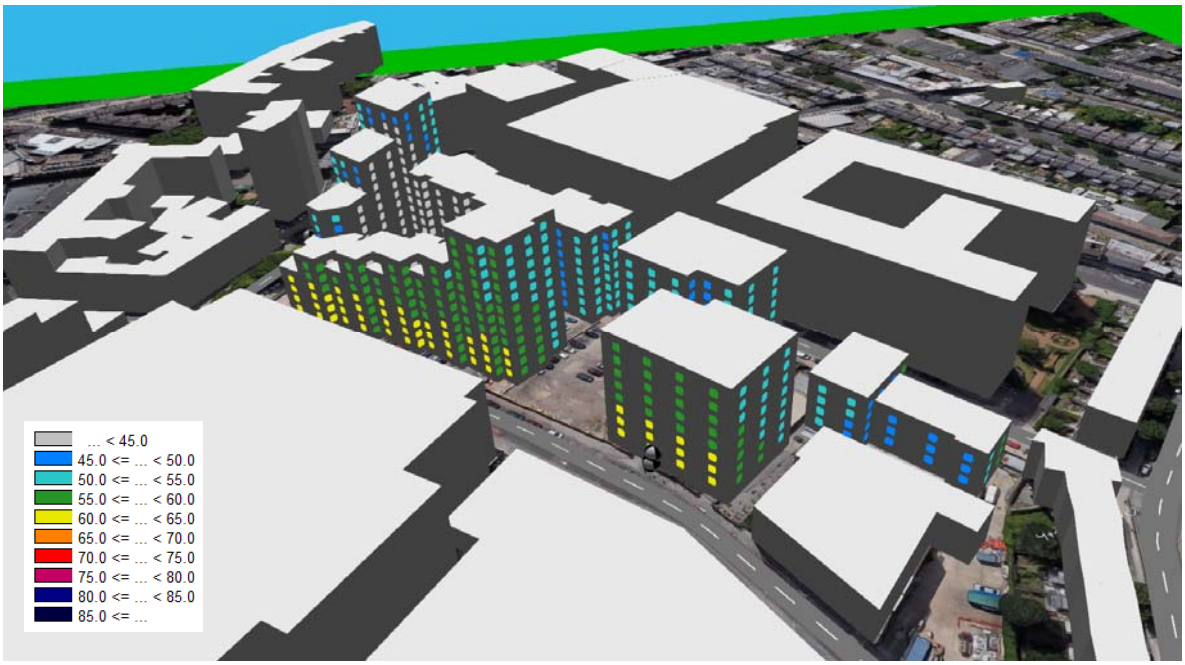


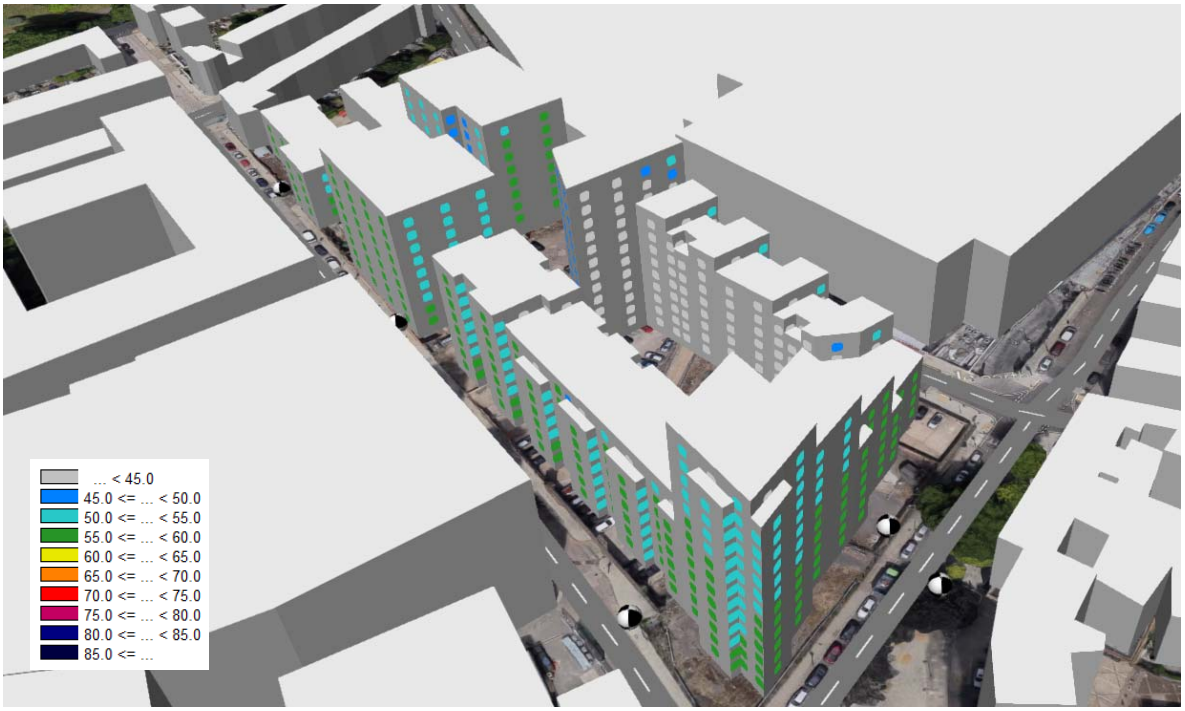
Appendix 3 Modelling Results

Modelling Software:	CADNA/A Version 2017
Modelled Scenarios:	Day and night-time average noise levels across the site
Data inputs:	• Noise survey results • Topographical data for the site • Development layout
Calculation Algorithms Used:	• Calculation of Road Traffic Noise 1988 – Department of Transport • ISO 9613-1:1993 Acoustics-Attenuation of sound during propagation outdoors – Part 1: Calculation of the absorption of sound by the atmosphere • ISO 9613-2:1996 Acoustics-Attenuation of sound during propagation outdoors – Part 2: General method of calculation

Modelling Printout (Appendix 3, Figure 1):

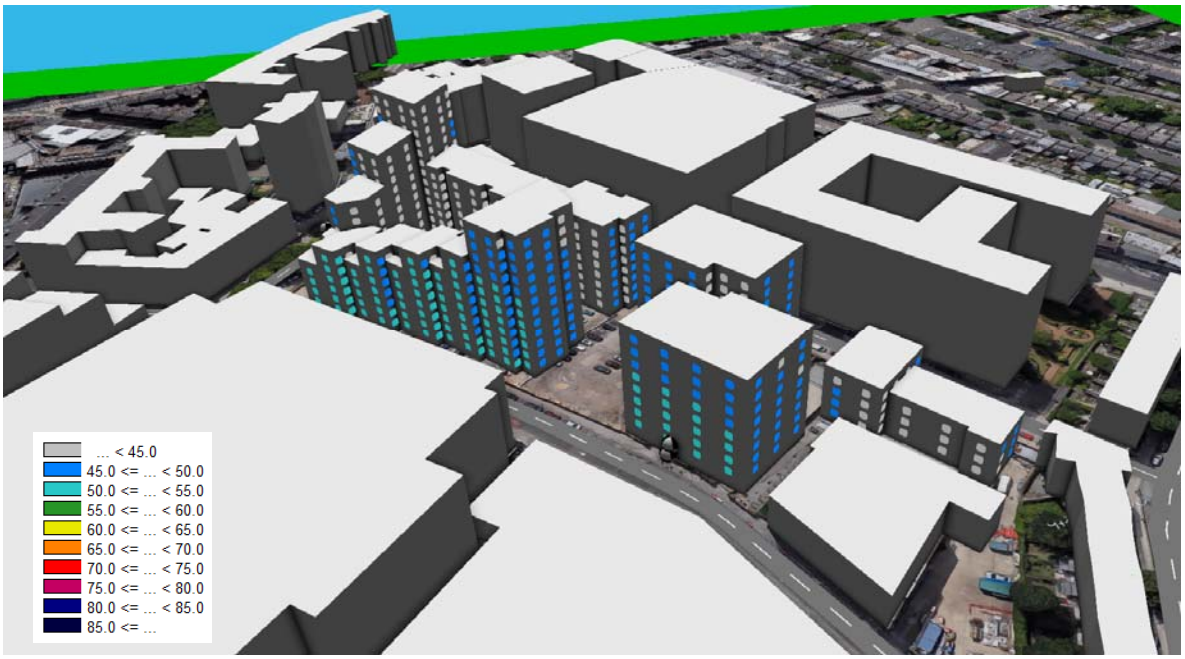
Scenario	Daytime noise levels (LAeq,16hr)





Modelling Printout (Appendix 3, Figure 2):

Scenario	Night-time noise levels (LAeq,8hr)



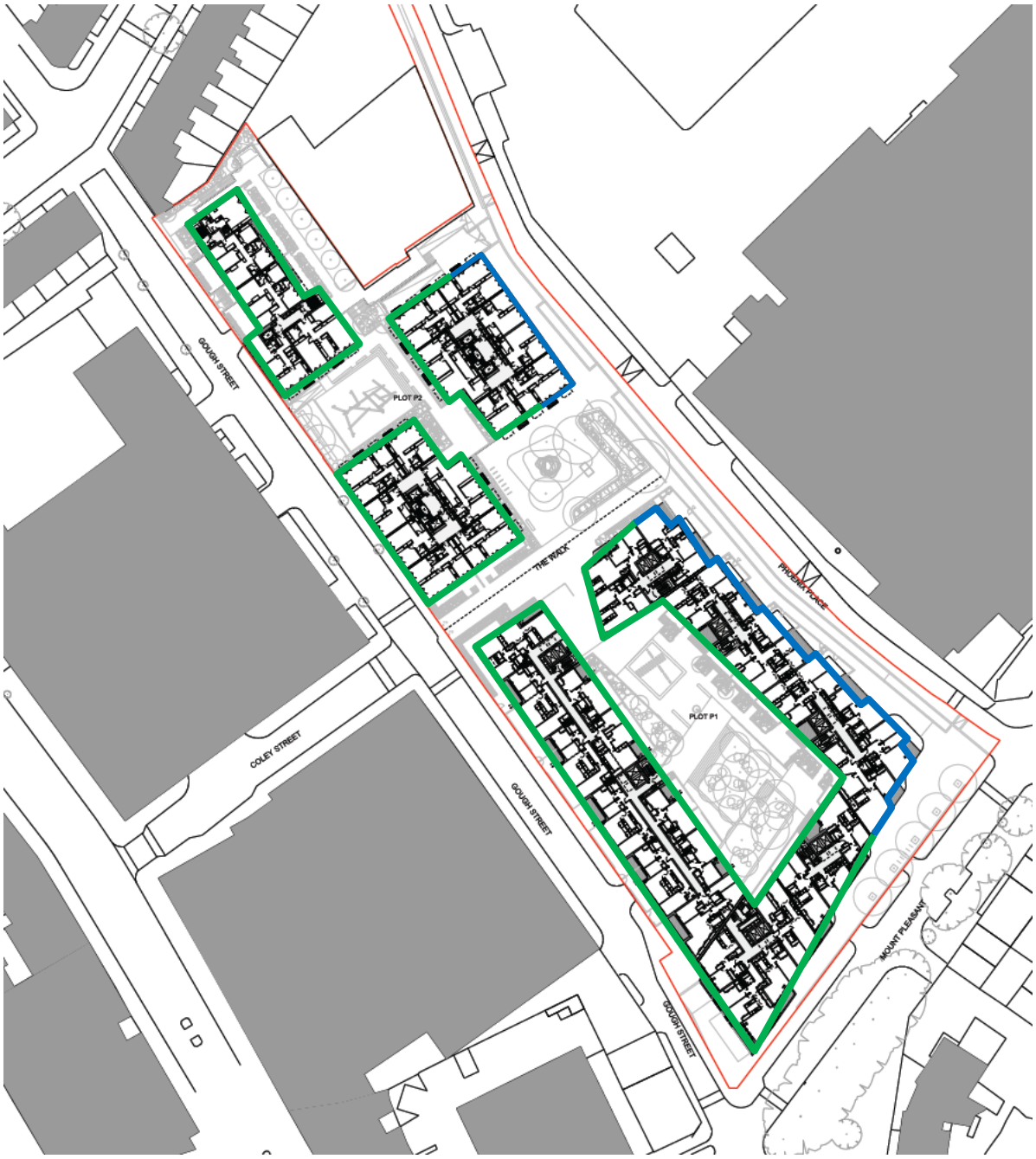
Appendix 4 FACSIM Facade Calculations

Appendix 5 Acoustic Facade Specification

Reference	Colour	Glazing Specification
FC01		36 dB Rw+Ctr
FC02		27 dB Rw+Ctr

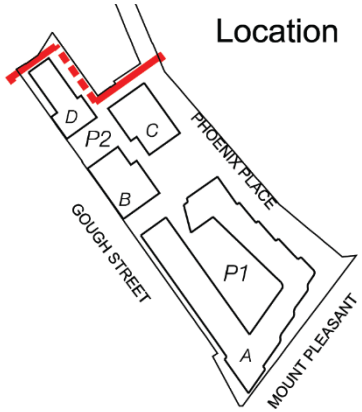
NOTES: Values must include the Ctr correction. Manufacturers or suppliers should provide laboratory test data demonstrating that the proposed systems are capable of achieving the values given. Windows should be tested as complete systems (rather than just the glazing in isolation).

All floors:

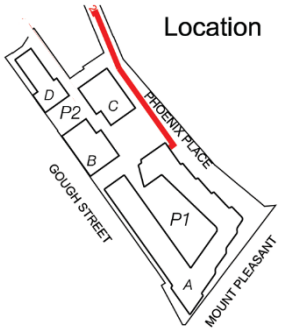


See below for marked up elevations.

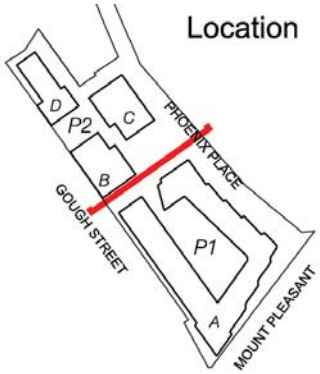
Reference	Colour	Glazing Specification
FC01		36 dB Rw+Ctr
FC02		27 dB Rw+Ctr



Reference	Colour	Glazing Specification
FC01		36 dB Rw+Ctr
FC02		27 dB Rw+Ctr

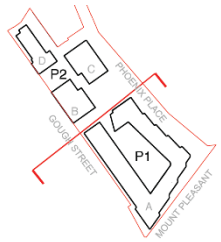


Reference	Colour	Glazing Specification
FC01		36 dB Rw+Ctr
FC02		27 dB Rw+Ctr

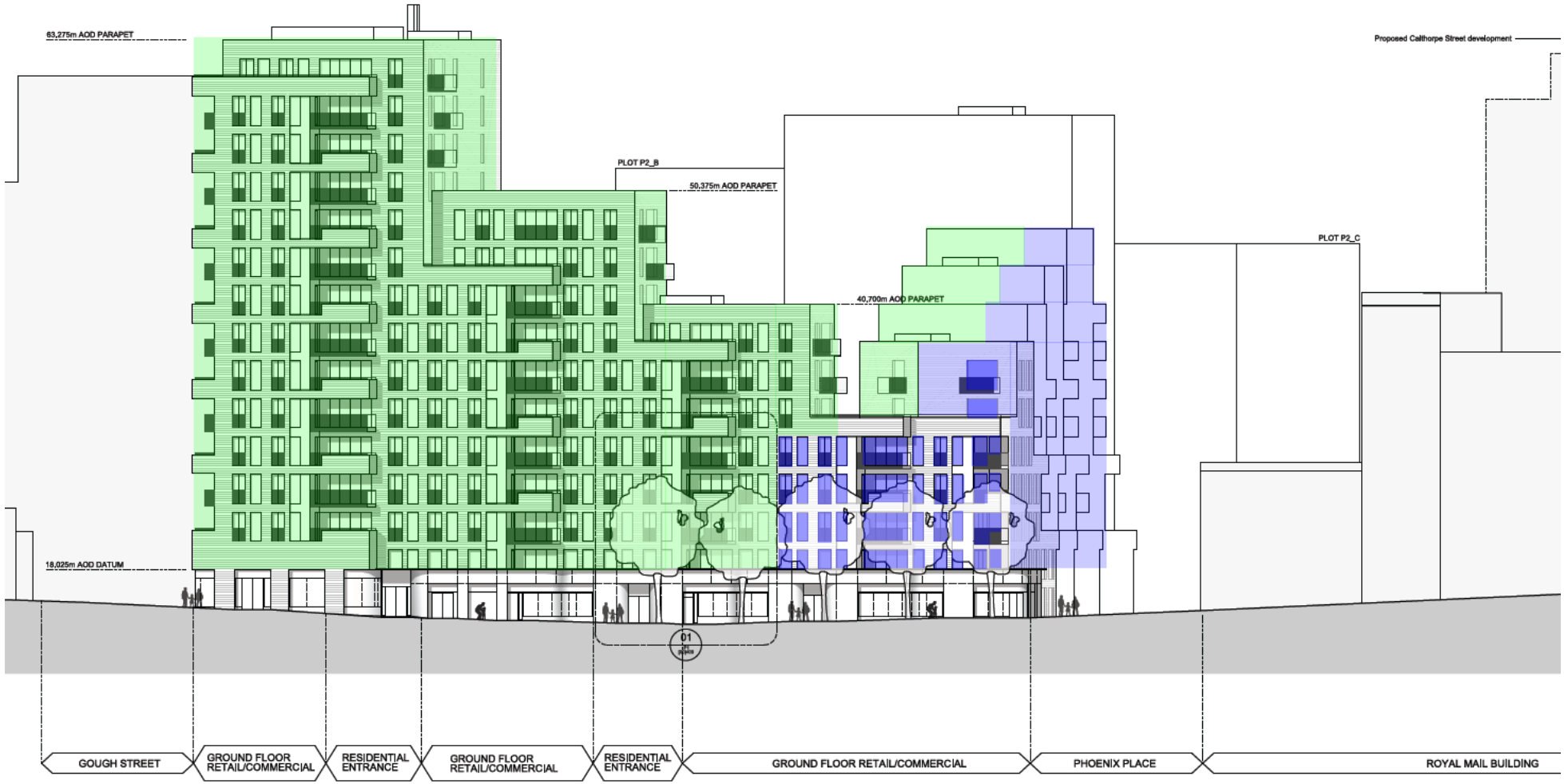


Reference	Colour	Glazing Specification
FC01		36 dB Rw+Ctr
FC02		27 dB Rw+Ctr

LOCATION

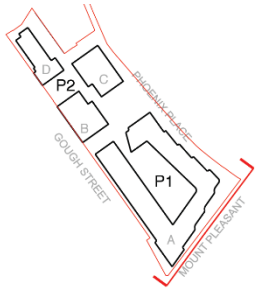


Reference	Colour	Glazing Specification
FC01		36 dB Rw+Ctr
FC02		27 dB Rw+Ctr



Reference	Colour	Glazing Specification
FC01		36 dB Rw+Ctr
FC02		27 dB Rw+Ctr

LOCATION



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