Ref: PJB8492/18253

Date: 21 August 2018

Christopher Gilligan
Child Graddon Lewis
Studio 1, 155 Commercial Street
London E1 6BJ

Dear Chris

UNIT 3, 86-88 DELANCEY STREET, NW1 7SA

Further to your instruction, Spectrum have investigated the acoustic issues associated with the above property and assessed the requirements of two noise-related planning conditions associated with the building. Our findings are described in this technical letter.

1. BACKGROUND

86-88 Delancey Street is a newly-built, mixed use development located on the junction of Delancey Street and Parkway, Camden. Unit 3 is a wholly detached B1 unit on two storeys, ground and first floor, which is currently developed to a shell specification, having no internal fitting out.

Permission was granted by London Borough of Camden (ref. 2017/4792/P) for the development, described as:

Change of use of the existing B1 office space to flexible B1 office / D2 gym and ancillary juice bar at ground floor level within the main building and ground and first floor levels of the two storey building at the rear. Erection of a single storey cycle parking storage area at the ground floor rear elevation of the main building.

This permission includes two noise-related planning conditions, 5 and 7, which state:

5 *No music shall be played on the premises in such a way as to be audible within any adjoining premises or on the adjoining highway.*

7 *Prior to commencement of the development, details shall be submitted to and approved in writing by the Council, of the sound insulation of the floor/ ceiling/ walls separating the commercial part(s) of the premises from residential dwellings. Details shall demonstrate that the sound insulation value DnT,w and L'nT,w is enhanced by at least 10dB above the Building Regulations value and, where necessary, additional mitigation measures are implemented to contain commercial noise within the commercial premises and to achieve the 'Good' criteria of BS8233:2014 within the residential dwellings. Approved details shall be implemented prior to occupation of the development and thereafter be permanently retained.*

2. TECHNICAL REQUIREMENTS OF THE PLANNING CONDITIONS

In respect of Condition 5, 'inaudible' is a subjective term which depends upon many factors, several of which vary between listeners, times of day, the level and character of a noise, and so on. Even so, a reasonable approximation to inaudibility can be achieved by a level of noise from the commercial unit which is 10 dB below the prevailing ambient noise level both overall (dBA) and in all 1/3rd octave bands.

As regards Condition 7, a degree of interpretation of the wording is required in order to apply a set of meaningful criteria / limits to the development.

The Building Regulations Approved Document E (ADE) provides numerical sound insulation values that must be achieved between residences and between common areas and residences to prevent disturbance from the noise of normal domestic activities. However, it also states that a higher standard of sound insulation may be required between spaces used for normal domestic purposes and communal or non-domestic purposes. In these situations the appropriate level of sound insulation will depend on the noise generated in the communal or non-domestic space. ADE states that specialist advice may be needed to establish whether a higher standard of sound insulation is required, and if so, to determine the appropriate level.

The ADE sound insulation requirements between new-build residences is:

Separating Construction	Airborne Sound Insulation $D_{nT,w} + C_{tr}$ (dB)	Impact Sound Isolation L'_{nTw} (dB)
Walls	⩾45	-
Floors	⩾45	⩽62

Table 1: Sound insulation requirements for separating constructions in new build houses and flats.

ADE's requirement E1 applies to the sound insulation between two spaces where there is at least some shared area of separating wall or floor. However, in this case, Unit 3 is wholly detached and there is no common area of separating / external wall or floor between the two spaces.

Further, ADE precludes testing to a corridor or stair, and the layout of the residence closest to Unit 3, has its stairway immediately adjacent to this unit. There is a WC at ground floor level immediately adjacent to the corner of Unit 3. Sound insulation testing in WC's and stairwells is normally not conducted due to the specific requirements of the testing procedure and characteristics of tests in this type of space falling outside of the parameters of these standards.

Notwithstanding this, in order to help indicate compliance with Condition 7, sound insulation tests were carried out, albeit that these are indicative rather than definitive.

Separately *BS 8233:2014 Guidance on sound insulation and noise reduction for buildings* provides numerical limits for steady state noise inside residential properties for noise that does not have a specific character (for example, road traffic noise). This is shown below:

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq,16hour}$	—
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	—
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

This standard superseded BS8233:1999 which specified 'good' and 'reasonable' levels of noise ingress in the equivalent table. These distinctions are no longer present in the current standard. Even so, the latest version of BS8233 does indicate at Note 7 "the internal target levels may be relaxed by up to 5 dB and

reasonable internal conditions still achieved". Accordingly, the levels in the figure above are taken to be the ones intended to be used by Condition 7.

3. AMBIENT NOISE MEASUREMENT SURVEY

Spectrum have conducted an ambient noise measurement survey at the subject site over the period 7th to 9th August, 2018. The survey consisted of long-term, unattended noise measurements at one location on site. A site location plan and photograph of the location are shown in Attachment 1.

The measurement location was within the year courtyard area, on the small first floor flat roof in front of residential unit 2, between Unit 3 and the residence. This site was selected to obtain representative ambient noise data specifically of the prevailing levels that currently occur outside the residence.

The following equipment was used during the survey:

- Bruel & Kjaer Type 2250 Sound Level Meter s/n 2739650
- Bruel & Kjaer Type 4189 Microphone s/n 2983518
- Bruel & Kjaer Type 4231 Acoustic Calibrator s/n 3018719
- Bruel & Kjaer Type UA 1404 Outdoor microphone attachment, and
- Bruel &Kjaer Type AO 0441 10m microphone extension cable

Before and after the survey, the sound level meter was field-calibrated in accordance with the manufacturer's guidelines. Drift was less than 0.2 dB and therefore acceptable. The meter, microphone and field calibrator are laboratory calibrated biennially in accordance with UKAS procedures or to traceable National Standards.

Weather conditions during the surveys were monitored and considered acceptable for the type of measurements undertaken.

Measurements have been summarised into contiguous 5 minute periods to present the noise profile throughout the monitoring period. Noise metrics consisted of equivalent continuous (L_{Aeq}) noise levels and maximum (L_{AFmax}) noise levels as well as statistical noise levels (termed L_n, where n is the percentage of time the level is exceeded during the measurement period) including L_{A90} levels (the noise level exceeded for 90% of the individual measurement period) which is taken to be the background noise level. Overall A-weighted and octave band measurements were stored for later analysis.

The results of the measurements are shown graphically in Attachment 2.

A summary of measured noise levels for the consented operating period for Unit 3 (07:00 to 22:00 hours) are set out in the following table.

Location	Measured level (dB)
$L_{Aeq,15hr}$	51
$L_{AFmax,typ}$	77
$L_{A90,day}$	44
Lowest $L_{Aeq,\ 5\ min}$	45
Lowest $L_{A90,5min}$	42

Table 2: Summary of noise measurements

4. AIRBORNE SOUND INSULATION TESTS

Separating wall airborne sound insulation tests consisted of 30-second measurements taken using the manually moving microphone method for both source and receiver locations for one speaker location in general accordance with the procedures in BS EN ISO 140-4:1998.

Background noise levels in the receiver rooms were determined from a single measurement of 30-seconds duration using the manually moving microphone method.

Reverberation time measurements were taken in the receiver rooms at 3 static locations for each of two speaker locations.

The equipment used for these measurements was:

Item	Serial No.	Calibration Expiry	Calibration Certificate no.
Bruel & Kjaer Type 2260 Sound Level Meter	2311704	18/01/2019	09687
Bruel & Kjaer Type 4189 Microphone	2733049	N/A	N/A
Bruel & Kjaer Type 4231 Acoustic Calibrator	2688672	10/01/2019	09670
Bruel & Kjaer Type ZC 0026 Preamplifier		18/01/2019	09687
JBL EON 515XT Amplified Loudspeaker	P0349-23974	N/A	N/A

Table 2: Instrumentation used

As described previously, in carrying out these measurements, it was not always possible to maintain the full requirements of the measurement standards (e.g. room size and geometry, distance to surfaces, etc.). However, the measurements were conducted out as far as possible in accordance with the standards.

Layout plans for the 3 levels of the residence are shown in Attachment 3.

In general, the main mechanism of sound transfer was observed to be noise breakout through the external doors of Unit 3 (especially the bike store door) re-entering the residence through the external door and windows. Little structure-borne noise transmission was noted. The results of the airborne sound insulation tests are as shown in the table below. The higher the $D_{nT,w}+C_{tr}$ value, the better the airborne sound insulation.

Source room	Receiver room	$D_{nT,w}+C_{tr}$(dB)	Requirement (dB)	Shortfall (dB)
Unit 3 ground floor	Unit 2, lower ground stairwell	59	55	-
Unit 3 ground floor	Unit 2, ground floor WC	54	55	1
Unit 3 ground floor	Unit 2, first floor stairwell	53	55	2

Table 3: Airborne sound insulation test results

These results are discussed later within this document.

5. IMPACT SOUND INSULATION TESTS

For the impact sound insulation tests, the tapping machine was set in five separate locations within Unit 3, near to residential unit 2, including on ground floor, first floor and stair half-landing. For each tapping machine location, one measurement was taken in each of the receiver locations using the manually moving microphone method. Each individual measurement was of 30 seconds duration. The tapping machine was located on bare concrete as Unit 3 currently includes no floor finishes.

The background and reverberation time measurements described for the airborne tests were re-used within the analysis of impact sound insulation.

Impact noise from the tapping machine was faintly audible in the residence and no component of airborne noise was noted.

The results of the impact sound insulation tests are as shown in the table below. The lower the $L'_{nT,w}$ value, the better the impact sound insulation.

Source room	Receiver room	$L'_{nT,w}$(dB)	Limit (dB)	Excess (dB)
Unit 3 ground floor, half landing and first floor	Unit 2, lower ground stairwell	25	52	-
Unit 3 ground floor, half landing and first floor	Unit 2, Ground floor WC	26	52	-
Unit 3 ground floor, half landing and first floor	Unit 2, first floor stairwell	25	52	-

Table 4: Impact sound insulation test results

These results are discussed later within this document.

6. AMPLIFIED SOUND NOISE BREAKOUT TESTS

The equipment described in Table 2 was again used to generate a high-level, broad band sound (pink noise) within Unit 3. Sound level measurements were then taken inside and outside various façade elements. These measurements were conducted with all doors and windows normally closed, but window-mounted trickle vents open. In addition, measurements were undertaken outside the residential façade immediately opposite the external wall of Unit 3.

The purpose of these measurements was to rank the various façade components (glazing, doors, walls, etc.) in order of significance for noise breakout.

Measurements were undertaken in 1/3rd octave bands and overall as $L_{eq,T}$ levels. Attachment 4 shows the overall level difference for each of the façade elements. Attachment 5 includes the raw measurement data.

The bike store door appears to be a temporary installation, with poor perimeter seals. Hence, this was the most significant source of sound leakage. Second to this in significance were the glazed personnel doors, with the large glazing and spandrel panel also a significant noise breakout path. The masonry external walls were not a significant breakout path.

7. CURRENT AND PROPOSED CONSTRUCTION OF UNIT 3

At present, Unit 3 has external walls and glazing in place. The saw-toothed roof to the first floor has glazing on the vertical elements and there is a sloping rooflight at the rear of the ground floor. However, there is no finished floor, no internal partitions (other than the first floor slab) and no internal linings to the external walls or roof. Photos indicating this are shown in Attachment 6.

The currently proposed layout for the prospective tenant is shown in Attachment 7. This includes:

- Separation of the bike store from the Unit 3 stairwell by internal wall partitions.
- Separation of the stairwell from the ground floor occupied areas by internal wall partitions.
- Separating of the ground floor foyer / reception area from the studio space by a door.
- Location of WC/ changing areas near the external wall closest to residential unit 2 at ground floor level.
- Location of the office areas near the external wall closest to residential unit 2 at first floor level.

A standard fit out would include the installation of linings direct to the inner leaves of external walls, internal partitions, finished floor, ceilings, services etc. These measures, by themselves, will improve the sound insulation of the external façade by:

- Improving the sound insulation of external wall / roof elements, and
- Limiting the extent of internal areas where loud amplified sound may occur.

These issues are discussed later within this technical letter.

8. ASSESSMENT OF EXISTING SITUATION

Concurrent measurements of the test signal outside of the residences opposite Unit 3 as well as inside Unit 3 provide a sound level difference between these two locations. It is then possible to determine the allowable sound level inside Unit 3, in order for the residential receptor level to be 10dB below the ambient level in each 1/3rd octave band. The process is as follows:

- Starting with the 'background' 1/3rd octave band ambient noise levels outside the residence, subtract 10 dB
- Add the 1/3rd octave band level difference to this level
- Convert to octave band / overall levels to obtain the allowable indoor noise sound level in Unit 3.

Separately, a similar exercise can be carried out in terms of the internal noise level inside residential unit 2, using the measurements taken for the sound insulation tests. The allowable overall and octave band sound level determined in this way is shown in Table 5, below.

Receptor location at which these Unit 3 indoor levels apply	dB(A)	Octave Band Centre Frequency (Hz)								
		31	63	125	250	500	1k	2k	4k	8k
Outside residence opposite	70	-	73	68	66	67	66	63	54	45
Inside residential unit 2	75	-	74	62	69	69	72	66	69	70

Table 5: Allowable indoor sound levels for the current Unit 3 before fitting out.

70 dBA is a low level of sound and similar to the level one would experience in a restaurant or bar where there is background recorded amplified music.

Separately, as regards Condition 7, there is a small shortfall in the required level of sound insulation ($D_{nT,w}+C_{tr}$) to the adjoining residence for the current, 'before fit-out', situation, although the impact sound insulation performance meets the criterion by a very wide margin.

BS8233 'good' levels of noise ingress would be achieved, providing that external noise levels from Unit 3 are no more than $L_{Aeq,T}$ 35 dB inside or 47 dB outside (applying a standard 12dB insertion loss for an open window). Providing the limits in Table 5 are complied with inside Unit 3, this requirement would be automatically met, as the overall noise level outside the residences would be ≤ 35dBA (i.e. background minus 10 dB). Inside residential unit 2, the noise ingress levels would be 10 dB below background, or around 17dB and, therefore, acceptable.

9. ASSESSMENT OF THE STANDARD FIT-OUT SITUATION

The fit-out described in Section 7 above would improve the building envelope sound insulation of Unit 3, so that a higher level of amplified sound would be acceptable indoors, while still meeting the requirements of Conditions 5 and 7.

Analysis has been undertaken to estimate these effects. The resulting allowable indoor sound level in the studio areas of Unit 3 would then be:

Receptor location at which these Unit 3 indoor levels apply	dB(A)	Octave Band Centre Frequency (Hz) 31	63	125	250	500	1k	2k	4k	8k
Outside residence opposite	80	-	82	76	74	77	76	73	66	60
Inside residential unit 2	87	-	83	70	77	79	82	76	80	80

Table 6: Allowable indoor sound levels for a standard fit-out of Unit 3.

Table 6 shows that, with a standard fit-out, the allowable internal noise level would increase to around 80 dB. There would still be a significant area of external glazing which becomes the main sound leakage path. The sound insulation of the windows would not be improved by a standard fit-out. N.B. this analysis assumes that all external doors / windows etc. would be fully shut, with only the trickle vents open.

80 dBA is still a relatively low level of amplified sound, largely equivalent to a pub juke box level. In general, it would not be as loud as Spectrum have measured in a broad range of fitness training sessions.

10. ASSESSMENT OF AN ENHANCED FIT-OUT

Although there are currently no detailed proposals to do so, a significantly higher indoor sound level would be possible with a fit-out which includes specific building envelope sound insulation measures. These measures would only relate to indoor studio areas, where amplified sound would occur. An outline of the measures which could be included in an enhanced fit-out is:

- Fully independent wall linings to external walls with deep wall cavities incorporating additional mineral fibre insulation and heavy double boarded linings.
- Secondary glazing to the external windows mounted within the independent inner leaf of the external wall.
- Heavy double boarded ceiling to the first floor studio on a resilient suspension system with deep insulation within the cavity.
- Where roof lights are to be maintained, a horizontal secondary glazing panel in line with the ceiling below the roof lights, would be required.
- Mechanical ventilation, detailed to prevent excessive plant noise and to prevent amplified music breakout.
- All internal doors achieving at least R_w 35 dB and closed when amplified music is played.

With these measures in place, we would expect that the allowable indoor amplified sound level to increase to around 90 dBA and still comply with the requirements of Condition 5 and 7. This is closer to the typical sound levels we would expect to occur in most fitness training sessions. The precise level would depend upon the details of the enhanced fit-out and the limiting level would need to be determined from further survey work at the completion of the fit-out.

11. CONCLUSION

Analysis of the acoustic conditions at Unit 3, 86-88 Delancey Street have been investigated in order to determine the requirements for compliance with Condition 5 and 7 of planning permission 2017/4792/P. Measurements of the ambient noise environment, building sound insulation and noise break-out from Unit 3 have been undertaken. Analysis of the results have been used to determine the allowable sound level from amplified music within Unit 3 in order to comply with the conditions.

Unit 3 is not currently fitted out and, at present, the airborne sound insulation to the adjoining unit does not meet the sound insulation requirement of $D_{nT,w}+C_{tr}$ 55 dB. Also, the allowable sound level would be limited

to 70 dBA to meet Condition 5's requirements. Meeting this limit would automatically meet the BS8233 requirement of Condition 7.

With a standard fit-out of Unit 3, not including any specific measures to up-rate the acoustic performance, the airborne and impact sound insulation requirement would be met and the allowable amplified sound level within studio areas would increase to 80 dBA. While significantly louder, this is still not as loud as many fitness training sessions and may not be sufficient for a tenant occupying the premises. The BS8233 requirement of Condition 7 would still be met.

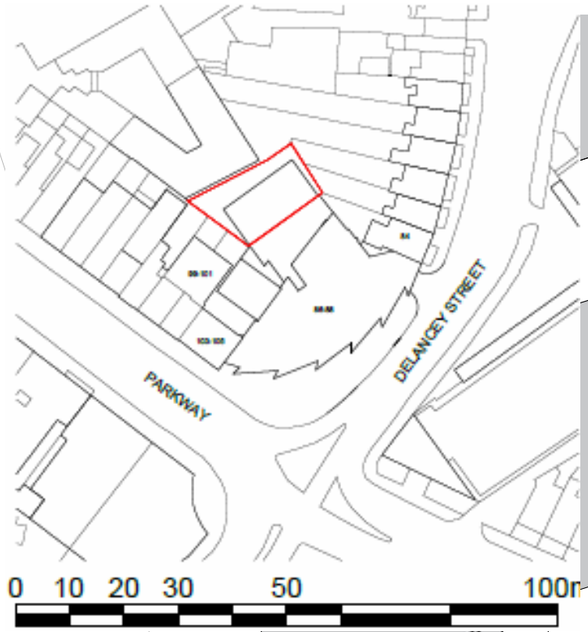
Outline measures are described for an enhanced acoustic fit-out which would allow much higher sound levels to occur in Unit 3 while still meeting the requirements of Conditions 5 and 7. The precise sound level limit would need to be determined at completion stage by a direct measurement survey.

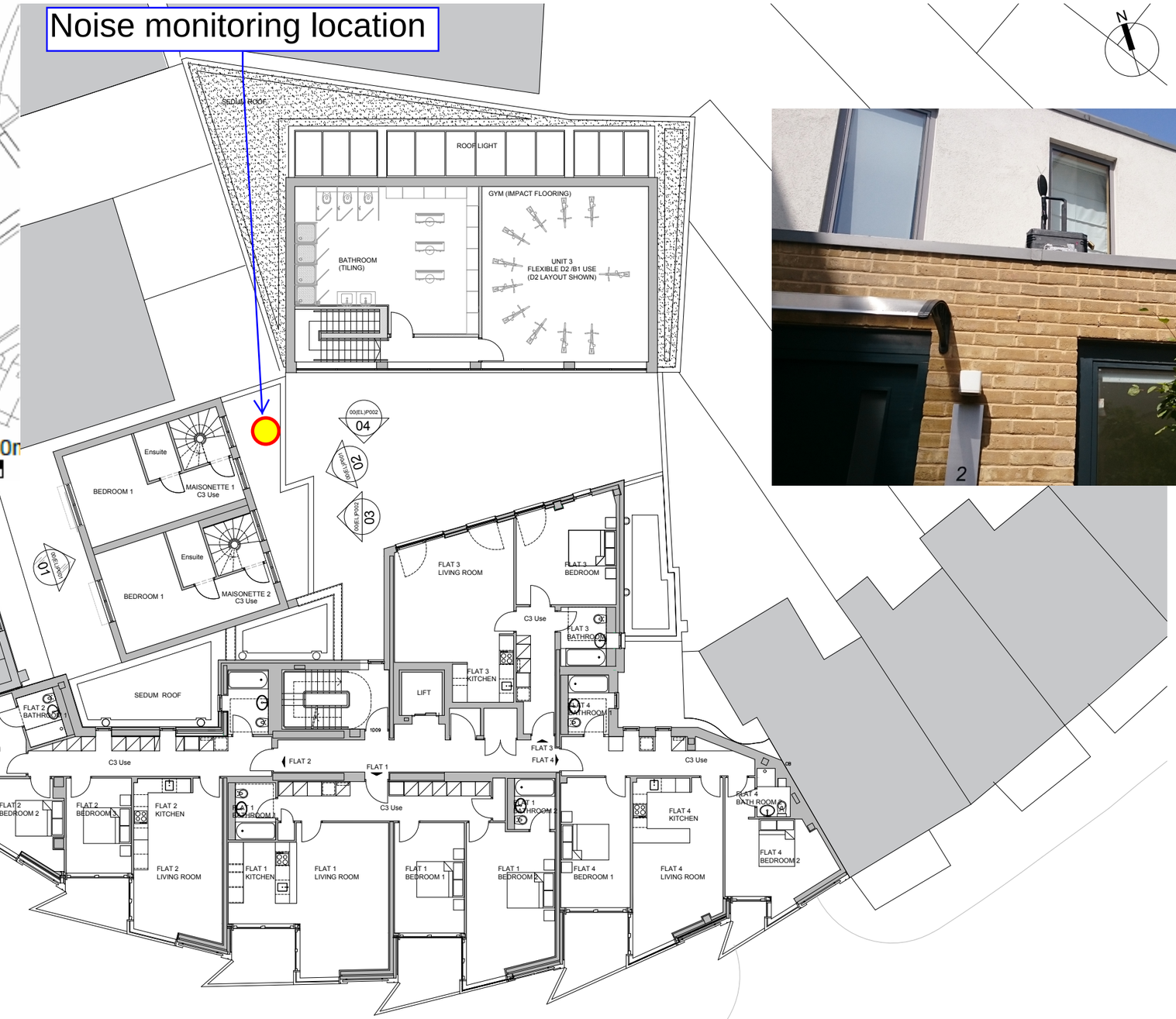
We would recommend that a copy of this technical letter be forwarded to Camden Council toward discharging the relevant condition.

Yours sincerely

Phill Banks
Principal Consultant

Noise monitoring location





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NOTES
-Do not scale from this drawing, except for planning purposes.
-Check all dimensions on site.
-Subject to survey.
-Subject to site inspection.
-Site boundary lines are indicative only.

Rev	Date	By	Description
E	07.03.2018	CG	Proposals updated
D	16.10.2017	CG	Scale bar updated
C	13.07.2017	EF	Layout updated
B	05.01.2017	CG	Key updated
A	05.01.2017	CG	Proposals amended

Revision Schedule

project
86-88 DELANCEY STREET
LONDON NW1 7SA
-
-

title
PROPOSED FIRST
FLOOR PLAN
B1/D2/C3 USE

drawing status
PLANNING

contract no. -	scale 1:100 @ A1 1:200 @ A3
client ref. -	date NOV 2016
drawn by AF	checked by CG

project no.	drawing number	revision
P15-341	23(01)P001	E

Attachment 1 - 1 page

23(01)P001
01

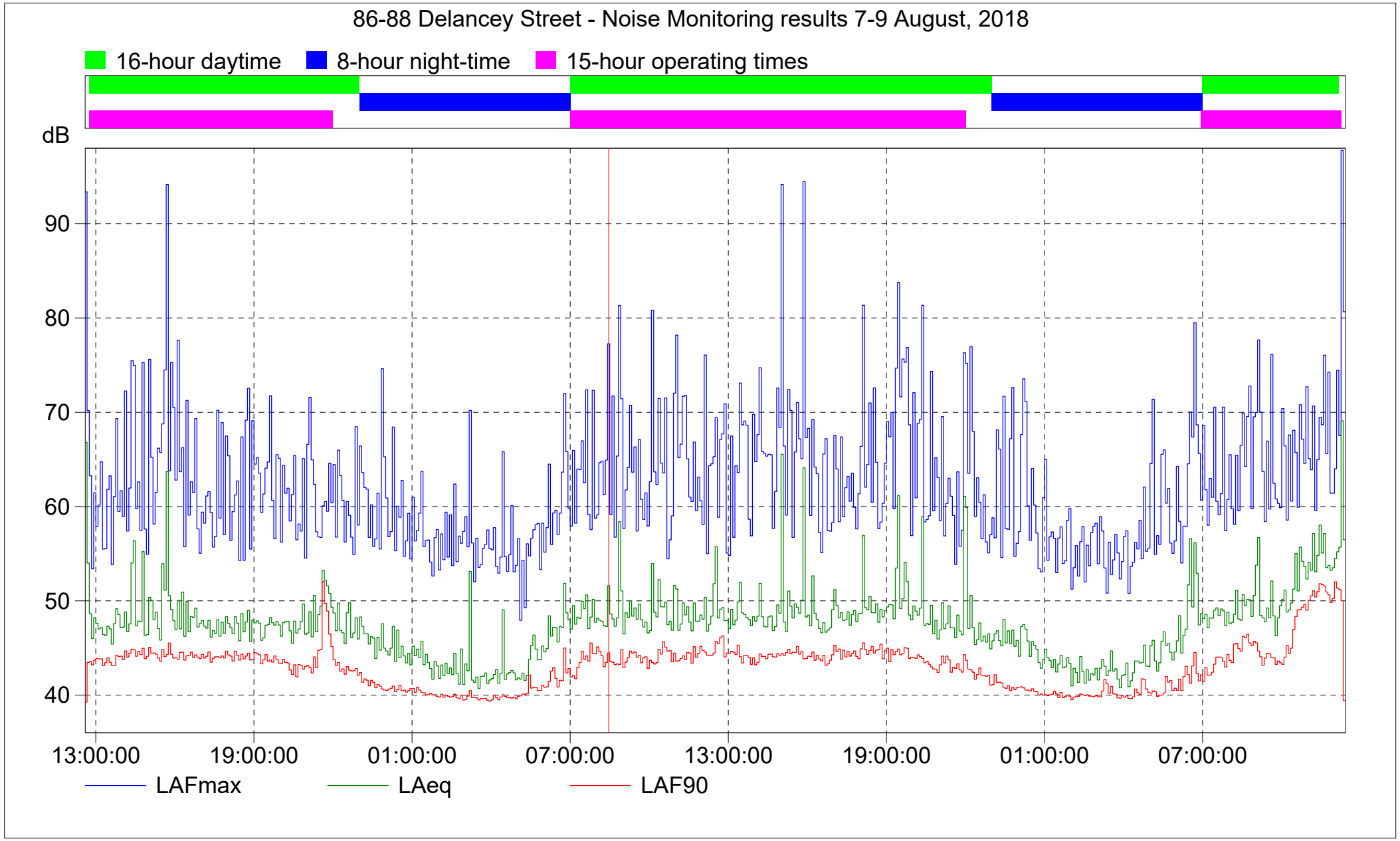
Proposed First Floor Plan

0 1 2 3 5 10m

Child Graddon Lewis
architects & designers

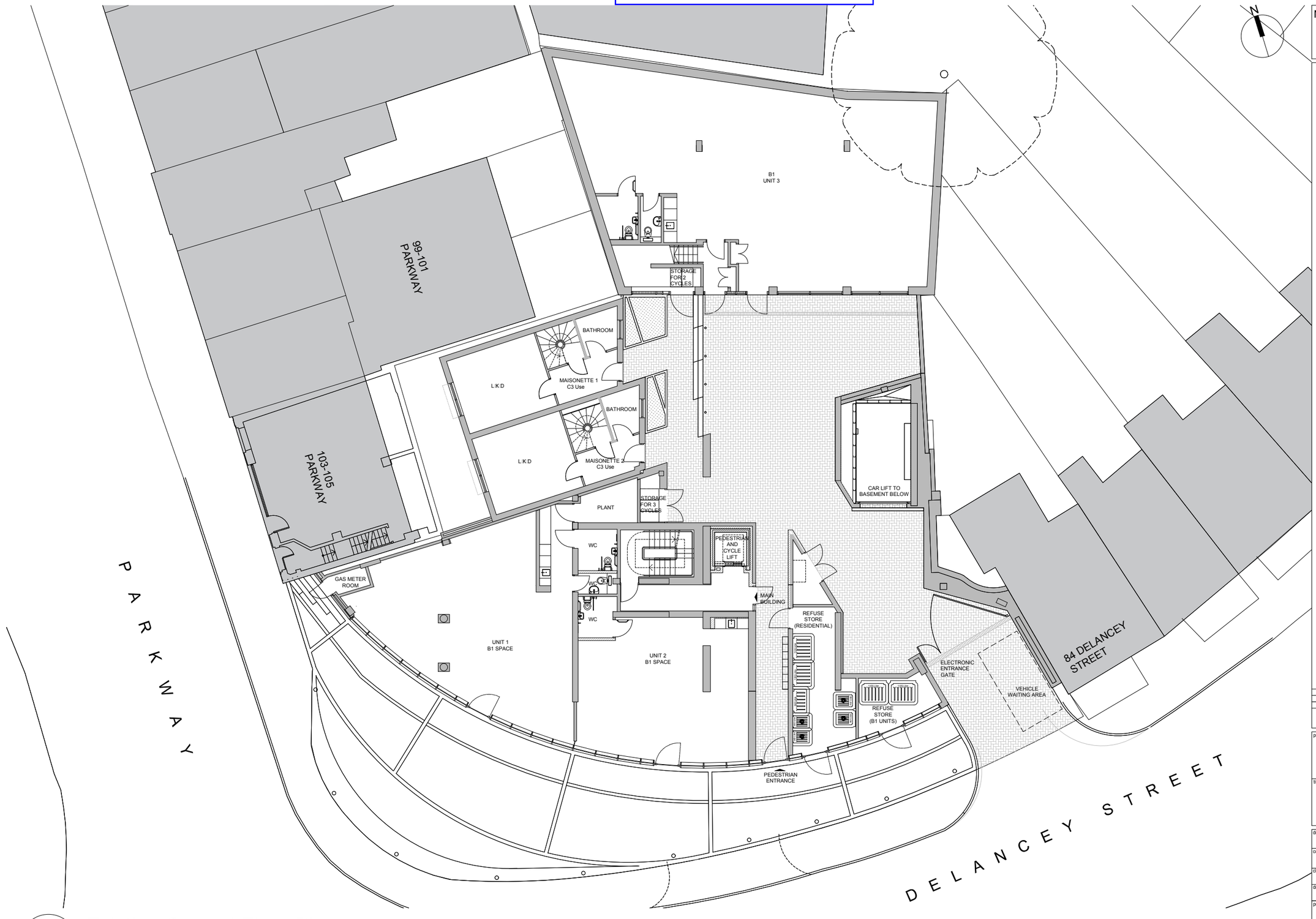
Studio1
155 Commercial Street
Spitalfields
London E1 6BJ

T: +44 (0) 20 7539 1200
F: +44 (0) 20 7539 1201
E: hq@cgluk.com
www.cgluk.com



Attachment 2 - 1 page

Attachment 3 - 2 pages



NOTES

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Rev	Date	By	Description
B	13.07.17	CG	Drawing updated
A	08.12.15	CG	Demise updated

Revision Schedule

project
86-88 DELANCEY STREET
LONDON NW1 7SA
-
-

title
EXISTING GROUND FLOOR PLAN
-

drawing status
PLANNING

contract no.	scale
-	1:100 @ A1 1:200 @ A3
client ref.	date
-	JUL 2016
drawn by	checked by
AF	CG

project no.	drawing number	revision
P15-341	23(00)E001	B

23(00)E001
01

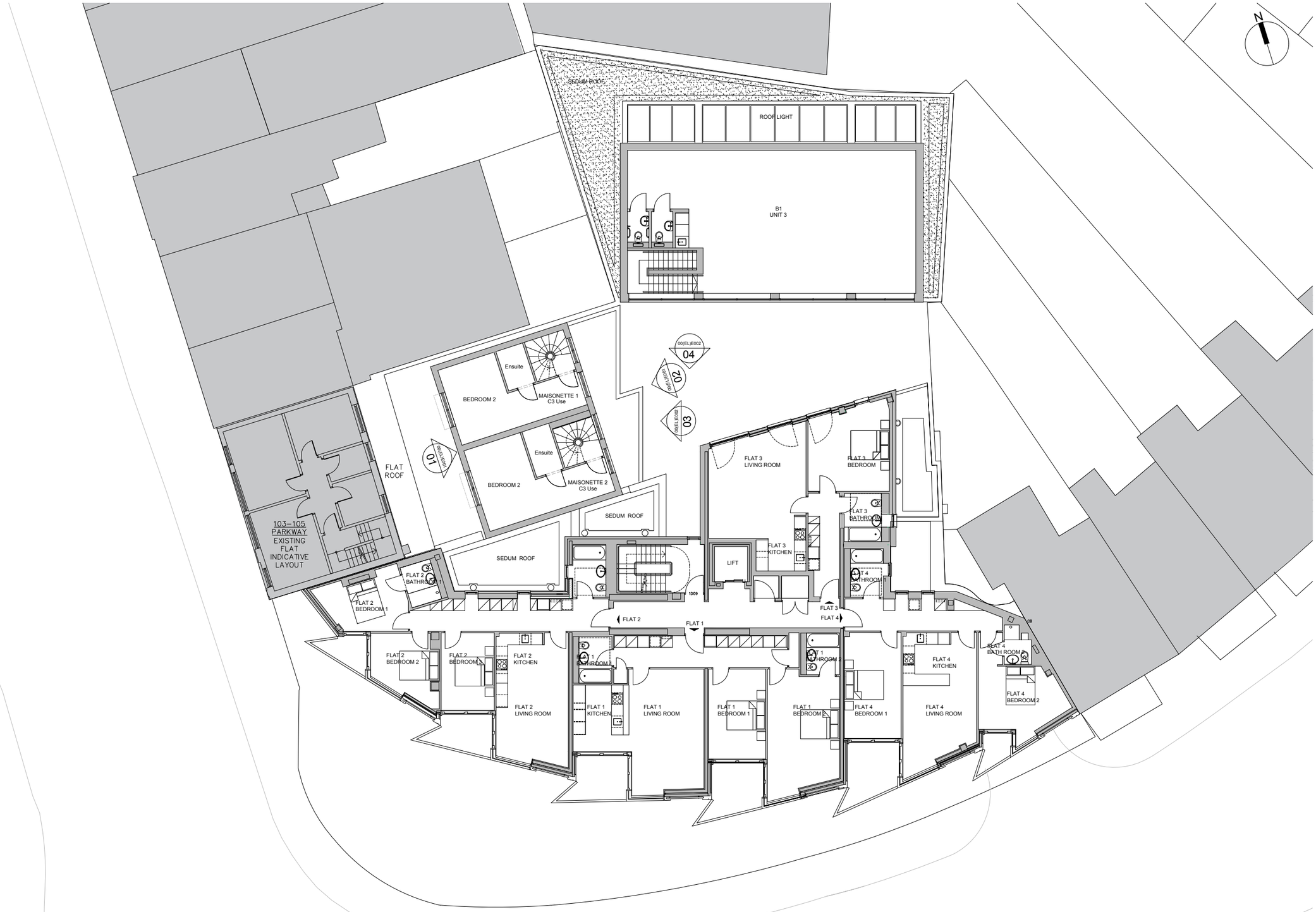
Existing Ground Floor Plan

0 2 4 6 10 20m
Scale 1:200

Child Graddon Lewis
architects & designers

Studio1
155 Commercial Street
Spitalfields
London E1 6BJ

T: +44 (0) 20 7539 1200
F: +44 (0) 20 7539 1201
E: hq@cgluk.com
www.cgluk.com



23(01)E001
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Exisitng First Floor Plan

0 1 2 3 5 10m

NOTES

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Rev	Date	By	Description
C	16.10.2017	CG	Scale bar updated
B	13.07.17	CG	Drawing updated
A	08.12.15	CG	Demise updated

Revision Schedule

project
86-88 DELANCEY STREET
LONDON NW1 7SA
-
-

title
EXISTING FIRST
FLOOR PLAN
-

drawing status
PLANNING

contract no. -	scale 1:100 @ A1 1:200 @ A3
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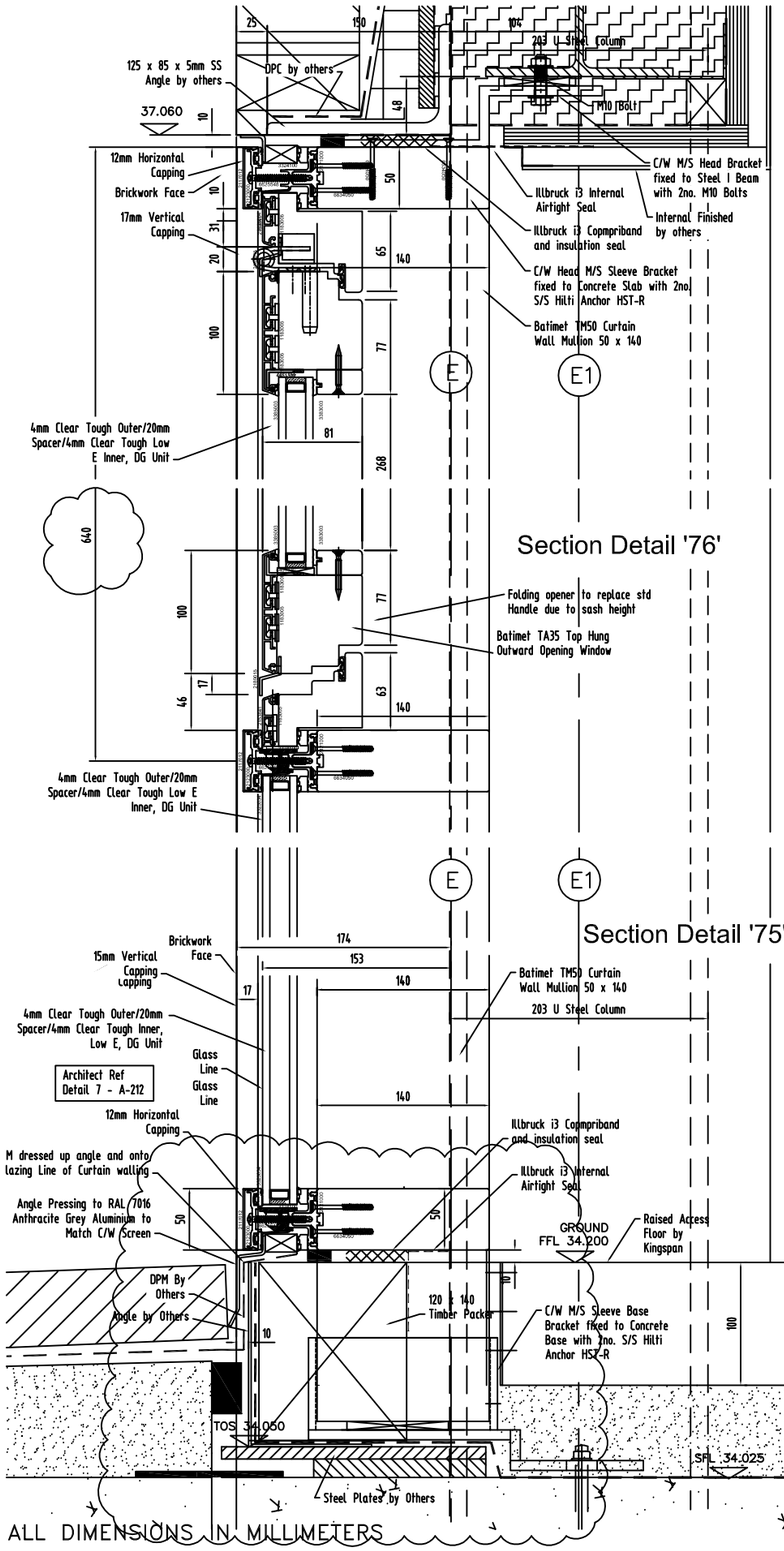
P15-341	23(01)E001	C

Child Graddon Lewis
architects & designers

Studio1
155 Commercial Street
Spitalfields
London E1 6BJ

T: +44 (0) 20 7539 1200
F: +44 (0) 20 7539 1201
E: hq@cgluk.com
www.cgluk.com

Attachment 4 - 2 pages



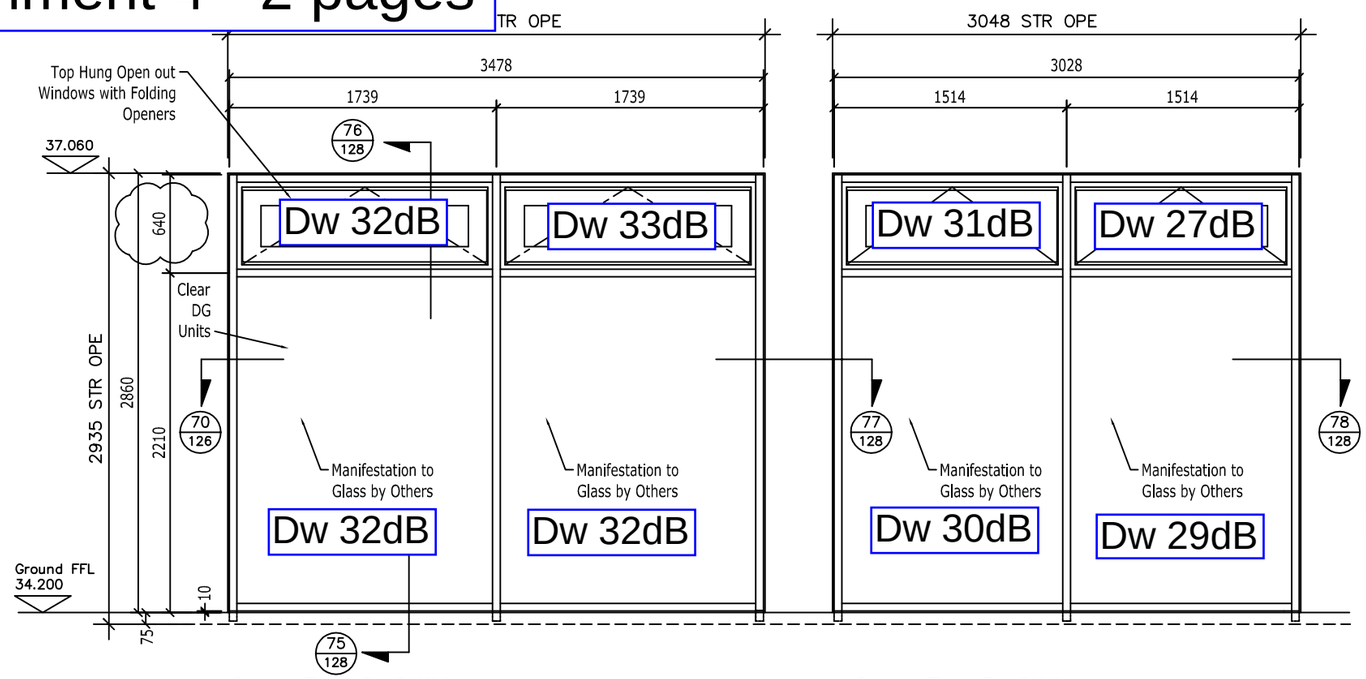
Screen Specification

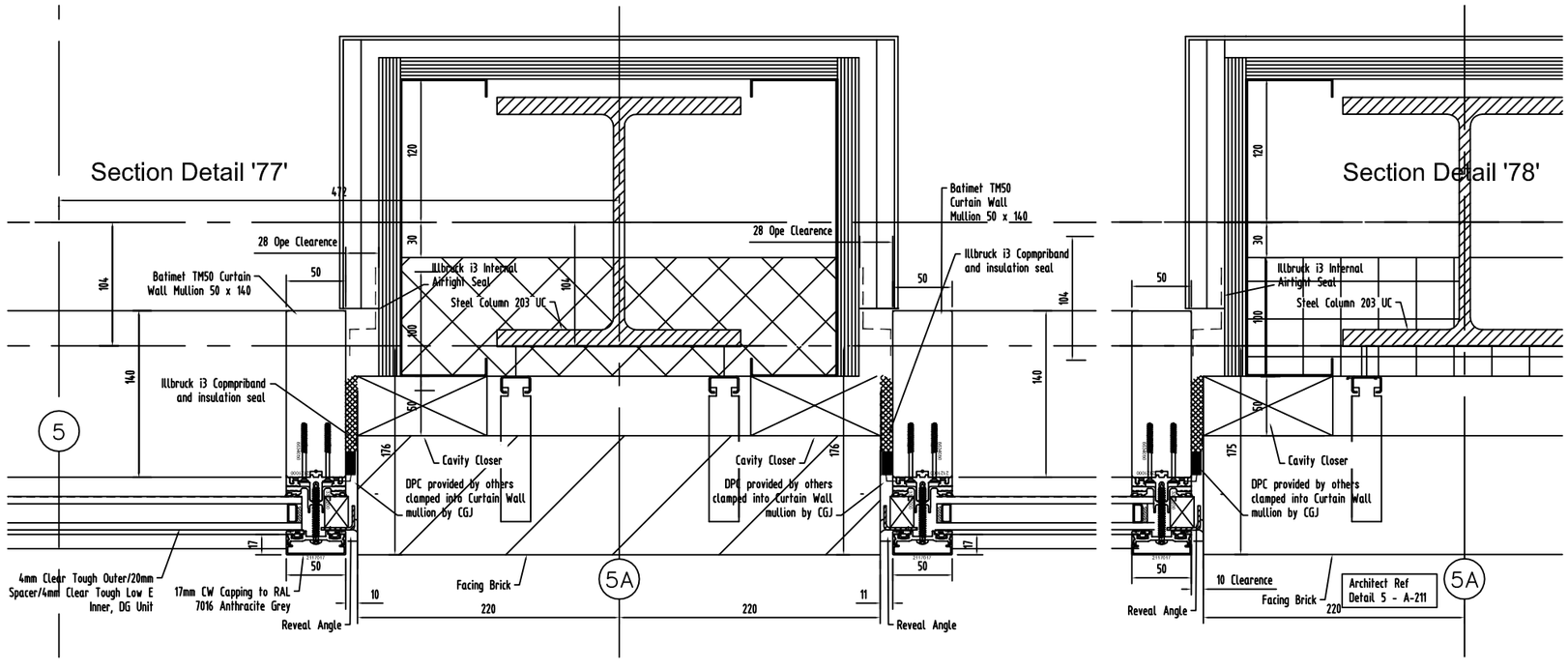
Batimet TM50 Curtain wall Section
Batimet TA35 DS Door Section
Batimet TA35 Opening Out Section
Internal Timber - Engineered Softwood
Internal Finish - Clear Lacquer
External - Aluminium Capping 17mm and 12mm
External Finish - RAL 7016 Anthracite Grey

Glass Specifiications:

Low E Double Glazed Units to U Value 1.1W/m²K

Ceramic Double Glazed Units
RAL 7016 Anthracite Grey to Surface 4



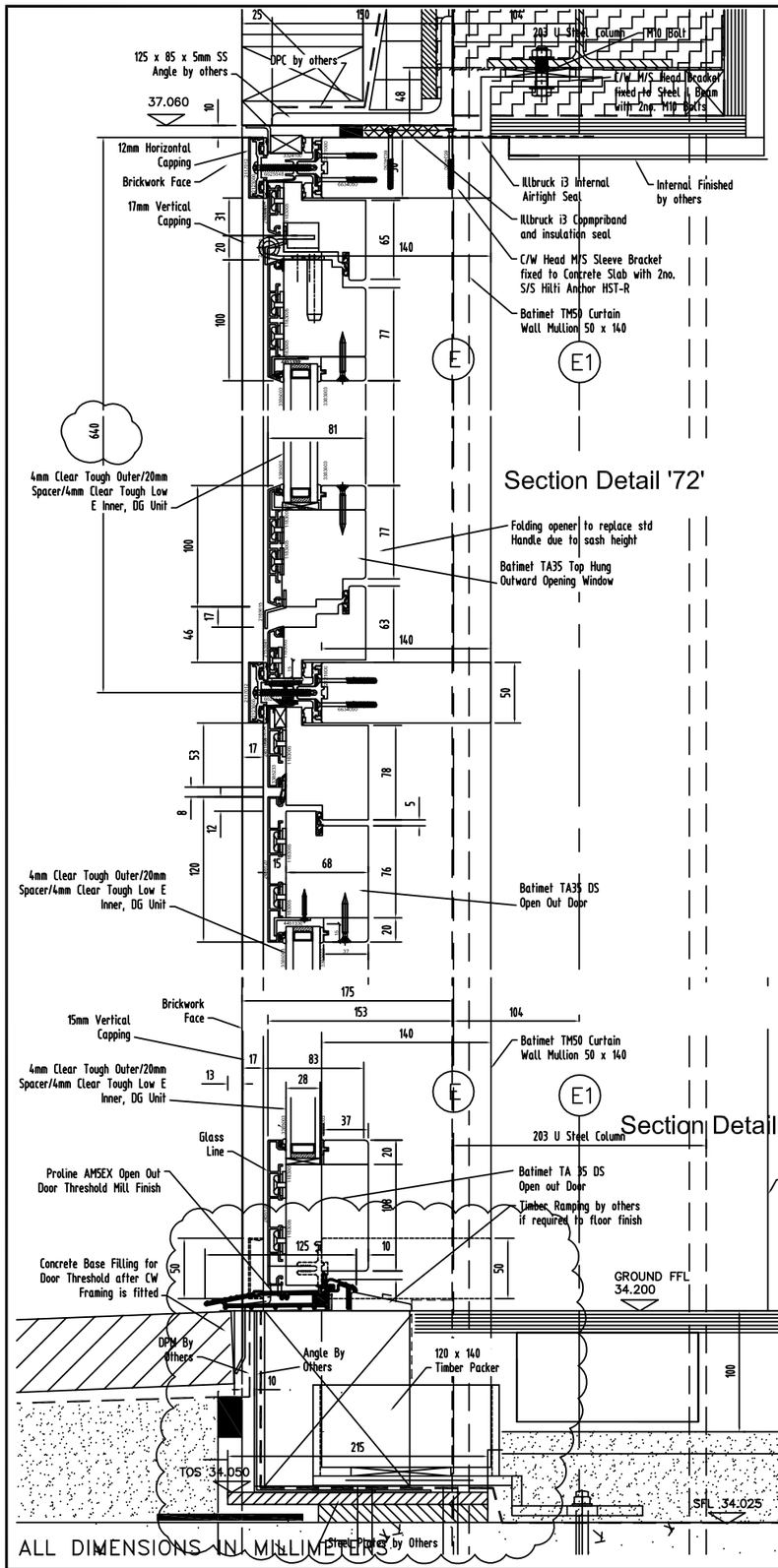


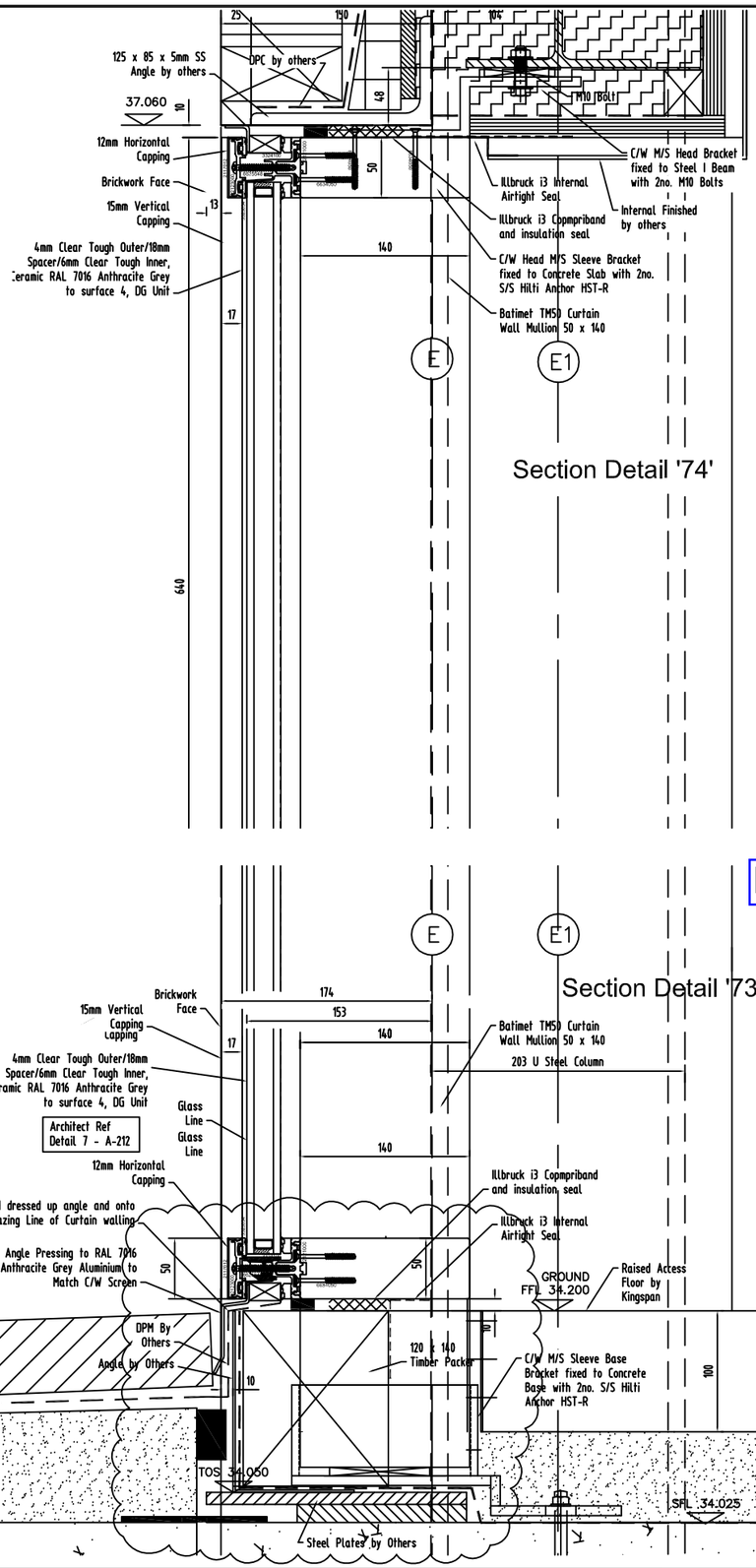
Carey Glass Joinery NENAGH, CO. TIPPERARY. IRELAND. TEL. (067) 50700. FAX. (067) 33398. www.careyglassjoinery.com	PROJECT: 86–88 Delancey Street CUSTOMER: J Murphy & Sons	DRAWING DESCRIPTION: Unit 3 Screen Details DATE : 4th Sept 2013 — CAD Ref: U:\do\13\P\JM&S.. DWG No. DS-13-128 — SCALE: NTS — DRAWN BY : Liam Gillespie © CAREY GLASS IRELAND 2012

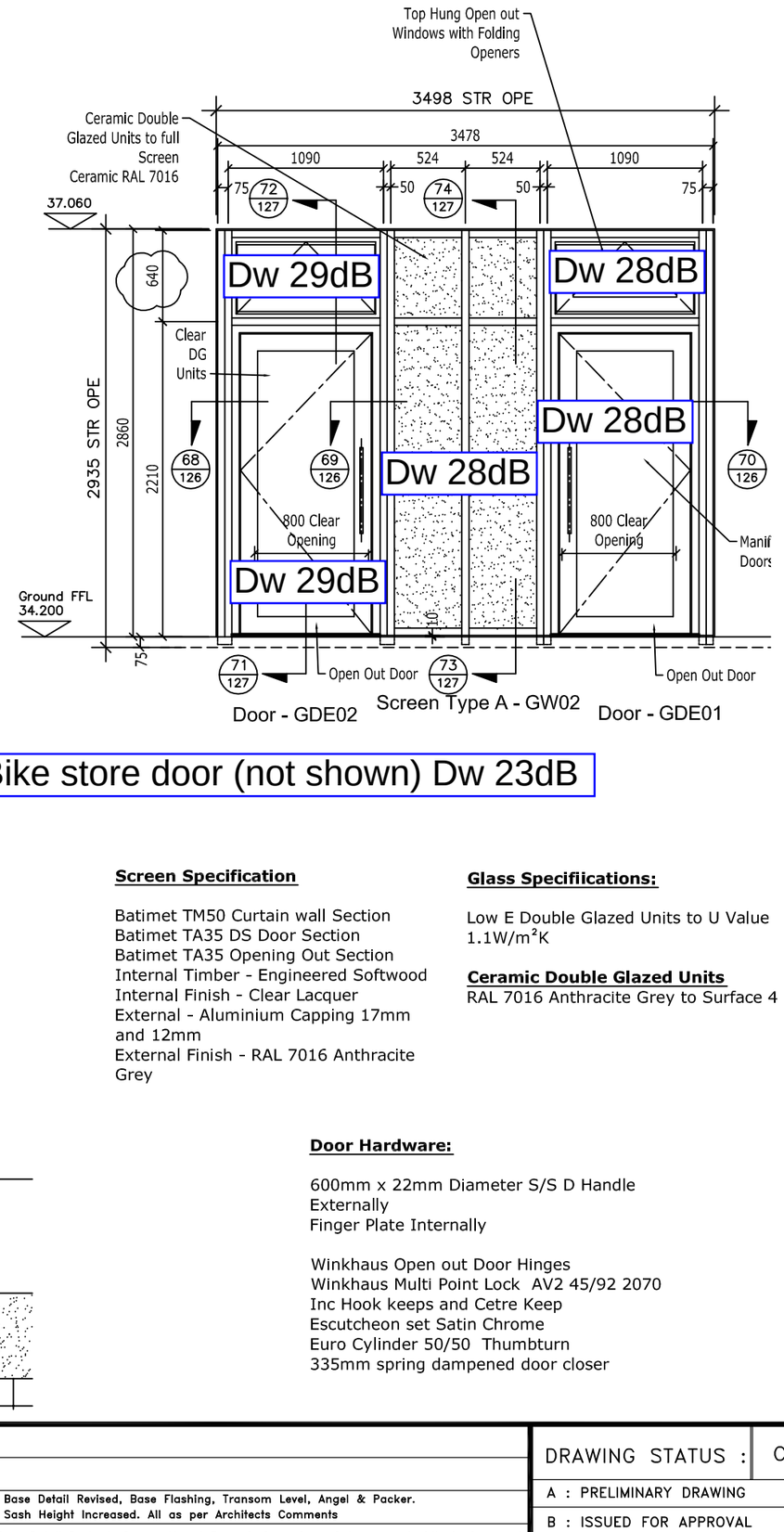
REVISION	DATE	DESCRIPTION
B	10-10-13	Base Detail Revised, Base Flashing, Transom Level, Angel & Packer. Sash Height Increased. All as per Architects Comments
A	02-10-13	Base Detail Revised, Screen Moved Foward, Sash Open Out as per Architects Comments

DRAWING STATUS : C

A : PRELIMINARY DRAWING
B : ISSUED FOR APPROVAL
C : ISSUED FOR CONSTRUCTION
D : AS BUILT DRAWING







Bike store door (not shown) Dw 23dB

Screen Specification

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Batimet TA35 DS Door Section
Batimet TA35 Opening Out Section
Internal Timber - Engineered Softwood
Internal Finish - Clear Lacquer
External - Aluminium Capping 17mm and 12mm
External Finish - RAL 7016 Anthracite Grey

Glass Specifiications:

Low E Double Glazed Units to U Value 1.1W/m^{2}K

Ceramic Double Glazed Units

RAL 7016 Anthracite Grey to Surface 4

Door Hardware:

600mm x 22mm Diameter S/S D Handle Externally
Finger Plate Internally

Winkhaus Open out Door Hinges
Winkhaus Multi Point Lock AV2 45/92 2070
Inc Hook keeps and Cetre Keep
Escutcheon set Satin Chrome
Euro Cylinder 50/50 Thumbturn
335mm spring dampened door closer

ALL DIMENSIONS IN MILLIMETERS

Carey Glass Joinery
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PROJECT: 86–88 Delancey Street

CUSTOMER: J Murphy & Sons

DRAWING DESCRIPTION: Unit 3 Screen Details

DATE : 4th Sept 2013

CAD Ref: U:\do\13\P\JM&S..

DWG No. DS-13-127

SCALE: NTS

DRAWN BY : Liam Gillespie

REVISION	DATE	DESCRIPTION
B	10-10-13	Base Detail Revised, Base Flashing, Transom Level, Angel & Packer. Sash Height Increased. All as per Architects Comments
A	02-10-13	Base Detail Revised, Screen Moved Foward, Sasg Open Out as per Architects Comments

DRAWING STATUS : C

A : PRELIMINARY DRAWING
B : ISSUED FOR APPROVAL
C : ISSUED FOR CONSTRUCTION
D : AS BUILT DRAWING

Attachment 5 - 1 page

Location	LZeq 12.5Hz	LZeq 16Hz	LZeq 20Hz	LZeq 25Hz	LZeq 31.5Hz	LZeq 40Hz	LZeq 50Hz	LZeq 63Hz	LZeq 80Hz	LZeq 100Hz	LZeq 125Hz	LZeq 160Hz	LZeq 200Hz	LZeq 250Hz	LZeq 315Hz	LZeq 400Hz	LZeq 500Hz	LZeq 630Hz	LZeq 800Hz	LZeq 1kHz	LZeq 1.25kHz	LZeq 1.6kHz	LZeq 2kHz	LZeq 2.5kHz	LZeq 3.15kHz	LZeq 4kHz	LZeq 5kHz	LZeq 6.3kHz	LZeq 8kHz	LZeq 10kHz	LZeq 12.5kHz	LZeq 16kHz	LZeq 20kHz
Noise Source On																																	
Inside Window 1	62.8	62.5	62.9	64.0	67.2	75.3	87.1	94.3	98.0	96.8	95.1	90.5	85.2	85.1	86.2	86.9	88.0	87.3	84.7	83.1	81.3	83.2	86.3	86.0	82.3	80.0	79.6	78.8	75.2	73.3	70.8	67.2	53.2
Inside Fanlight 1	55.4	57.3	62.6	63.1	65.9	74.9	88.1	94.6	96.6	100.7	96.2	92.0	86.1	86.3	86.1	86.8	89.0	86.8	87.0	83.6	81.6	84.5	88.2	87.6	84.1	82.2	82.0	81.5	78.5	76.9	75.0	71.6	57.6
Inside Window 2	52.1	57.2	57.7	57.7	71.7	81.0	93.0	97.9	97.2	98.3	95.7	89.8	87.3	85.9	87.5	88.0	89.1	89.0	86.2	84.9	82.6	85.1	88.0	87.5	84.4	81.7	81.8	80.7	77.9	76.3	74.2	71.3	58.0
Inside Fanlight 2	53.1	56.3	58.3	57.6	70.9	80.2	90.7	91.5	95.4	102.0	96.6	89.5	87.2	86.1	85.9	88.2	90.3	91.4	88.2	85.3	82.7	85.8	88.4	88.5	84.9	82.8	82.6	81.9	79.2	77.4	75.6	72.3	59.2
Inside Window 3	57.0	58.2	57.1	61.7	74.6	82.2	91.1	94.7	95.1	97.8	95.2	91.9	92.8	89.0	90.2	90.5	91.8	90.4	88.8	89.2	87.1	88.9	91.3	90.7	87.9	85.4	85.3	84.8	82.1	80.6	78.8	75.9	64.1
Inside Fanlight 3	59.8	61.6	58.3	61.5	75.2	82.4	88.6	95.4	99.4	101.5	98.0	93.5	92.1	88.7	89.6	89.3	90.3	92.5	92.0	89.8	85.3	88.8	91.4	90.7	88.1	85.3	85.4	84.9	82.0	80.6	78.7	76.1	64.1
Inside Window 4	54.6	56.9	59.7	66.0	74.9	80.9	91.4	95.2	98.0	100.1	95.9	93.3	93.1	90.6	90.4	90.8	92.5	90.7	88.6	90.3	88.8	89.8	91.9	91.2	88.2	85.8	86.0	85.0	82.4	80.9	79.3	76.7	65.2
Inside Fanlight 4	57.4	56.3	58.7	64.8	74.3	80.0	89.1	96.6	97.6	102.9	96.4	95.9	95.8	90.5	90.1	89.0	91.5	91.8	92.4	89.9	86.8	90.1	91.9	91.6	88.3	85.7	85.9	85.4	82.5	81.0	79.8	77.7	66.8
Inside RHS personnel door	53.3	53.4	60.7	66.0	70.7	81.6	92.1	95.6	94.5	101.1	99.6	92.1	90.6	89.2	92.6	94.6	93.9	92.0	91.1	91.6	90.2	90.6	93.1	92.9	89.8	87.7	87.9	87.1	84.1	83.1	81.5	79.7	68.4
Inside RHS personnel door fanlight	58.9	59.1	60.8	66.4	71.0	82.3	92.2	97.8	98.8	102.6	99.8	92.4	91.8	88.2	89.4	91.7	93.1	92.3	92.7	91.4	87.6	90.3	93.1	93.0	89.9	87.4	87.2	86.7	83.7	82.7	81.2	79.2	67.3
Inside Spandrel panel	52.1	52.7	57.7	64.1	70.5	82.4	93.3	95.0	96.1	103.1	98.9	94.9	91.5	89.6	88.8	89.4	91.0	89.3	87.9	87.6	84.3	87.2	89.6	88.9	85.6	83.1	82.7	82.0	79.1	77.7	75.5	73.1	59.2
Inside LHS personnel door	60.1	58.3	57.1	61.0	69.2	82.4	92.7	93.1	94.5	100.5	100.2	93.4	92.3	90.6	90.8	92.7	91.6	90.5	88.9	89.2	86.6	88.2	90.4	90.4	87.1	84.6	84.5	83.7	81.4	80.3	78.3	76.5	62.5
Inside LHS personnel door fanlight	51.7	53.3	57.3	63.1	69.3	81.6	92.6	96.3	99.9	103.3	99.2	93.2	91.2	88.7	88.7	89.2	92.2	92.3	90.8	88.7	85.0	87.8	90.9	90.3	87.9	84.9	85.1	84.4	81.9	80.5	79.0	76.9	63.1
Inside Bike store door	52.0	51.2	56.3	58.0	69.6	77.4	88.9	92.3	97.8	103.0	98.0	92.3	89.7	84.8	86.8	88.7	89.5	88.3	86.3	87.3	84.0	86.1	88.8	88.5	85.1	82.8	82.7	81.8	79.1	77.8	75.9	73.7	58.8
Noise Source On																																	
Outside Window 1	53.5	54.9	58.0	63.2	57.3	66.0	72.8	73.8	78.9	78.2	75.8	73.0	69.9	65.4	63.9	61.2	60.9	57.5	54.2	53.1	52.2	54.1	57.5	59.2	55.1	51.9	50.7	45.7	40.8	35.6	32.6	28.8	17.4
Outside Fanlight 1	55.4	53.8	55.6	58.8	52.6	61.9	70.3	74.0	77.1	76.6	73.6	69.6	67.8	64.6	62.4	62.6	63.4	60.0	57.7	56.6	56.3	59.2	61.0	63.4	60.9	56.7	55.4	50.7	45.0	41.2	39.3	34.7	20.3
Outside Window 2	51.1	52.3	55.6	58.5	54.0	63.1	70.0	73.7	77.2	76.0	76.1	73.9	70.4	64.9	63.5	61.0	60.8	57.7	53.8	52.6	50.6	52.7	57.2	57.4	52.8	49.6	48.8	45.4	40.6	35.2	31.1	27.3	15.6
Outside Fanlight 2	51.9	53.4	54.9	57.7	52.7	60.1	67.2	70.5	71.0	73.6	73.3	68.8	67.8	64.9	62.7	60.9	62.0	58.6	55.3	54.4	52.2	53.1	56.8	56.8	53.0	49.6	49.0	46.2	41.9	36.8	32.8	28.2	13.2
Outside Window 3	54.8	56.0	57.1	56.4	60.0	64.5	70.3	76.0	77.8	79.3	75.5	72.2	71.1	67.1	65.4	63.2	61.8	58.1	54.3	54.0	51.9	53.3	58.4	57.9	52.6	48.4	47.5	44.3	40.0	34.2	31.2	26.6	15.2
Outside Fanlight 3	56.0	55.7	52.6	52.9	57.7	60.9	65.1	72.1	76.5	76.9	74.4	70.7	69.3	65.2	62.7	61.7	61.5	58.9	55.7	55.3	53.5	53.8	57.9	57.7	52.9	48.8	48.2	45.3	41.2	35.7	31.3	28.2	14.0
Outside Window 4	64.7	59.9	58.0	58.9	61.7	63.7	72.1	75.4	74.7	78.6	75.3	74.2	74.1	70.2	66.4	64.8	63.5	59.3	56.1	55.9	54.1	54.3	59.4	58.6	53.8	50.0	48.8	45.7	41.2	35.9	31.6	29.4	18.6
Outside Fanlight 4	54.5	55.2	54.9	57.8	59.7	60.8	68.0	72.8	74.0	77.5	74.0	72.5	73.2	67.4	64.2	62.5	61.6	58.5	55.9	58.3	56.2	54.9	59.4	58.3	54.1	50.2	49.2	46.0	41.9	36.7	32.6	29.4	21.8
Outside RHS personnel door	57.9	55.7	56.7	59.9	61.6	63.1	69.8	75.3	76.5	79.6	79.3	75.5	74.2	69.8	69.0	68.3	70.0	63.9	60.7	62.6	62.4	59.9	62.7	63.9	66.1	63.4	63.0	58.2	53.7	45.7	42.3	41.5	30.9
Outside RHS personnel door fanlight	52.4	49.5	54.7	58.2	60.7	57.9	66.8	70.8	74.4	78.5	74.7	70.8	73.5	65.4	65.6	67.4	67.5	62.0	61.9	63.2	61.4	62.5	64.4	66.7	68.1	64.0	61.8	55.5	56.9	49.8	44.2	42.8	30.8
Outside Spandrel panel	57.6	55.5	56.0	59.2	60.3	64.3	72.5	75.2	74.8	80.9	79.1	76.7	75.2	68.6	69.1	65.6	64.4	61.7	59.2	59.1	56.6	56.8	60.0	59.4	57.7	54.7	53.9	50.4	47.0	41.2	37.1	34.2	19.5
Outside LHS personnel door	58.1	58.2	57.6	59.8	59.0	67.7	76.4	77.6	75.3	81.8	80.0	75.6	73.2	69.3	67.4	66.7	65.4	62.2	59.6	59.2	56.5	56.7	59.6	60.3	58.0	55.0	54.5	51.6	49.1	43.8	39.7	37.0	20.5
Outside LHS personnel door fanlight	53.5	50.4	53.9	59.1	57.1	64.5	72.3	74.3	76.7	80.0	75.6	72.7	73.1	68.3	66.0	66.1	62.6	60.2	58.4	59.0	56.9	56.5	60.1	60.1	57.5	54.1	53.2	50.8	48.1	44.4	40.6	38.4	22.8
Outside Bike store door	56.2	57.9	56.8	60.7	60.9	66.7	75.6	78.5	76.6	82.4	78.8	75.0	72.3	66.8	67.6	69.4	68.1	65.7	63.0	62.5	59.3	61.7	66.6	67.7	64.8	60.8	60.8	59.2	56.5	54.5	52.1	50.6	34.7
Noise Source On																																	
Outside LHS Outside residence opposite	56.6	56.7	51.3	50.9	51.7	61.2	67.3	61.5	67.7	68.7	67.2	64.4	60.8	57.1	56.5	57.9	59.1	54.3	50.6	49.6	47.9	50.1	52.3	53.7	51.2	48.0	46.4	44.3	40.0	35.3	30.4	27.2	12.4
Outside MID Outside residence opposite	55.2	54.8	49.3	53.0	54.3	59.9	65.6	70.5	67.0	69.8	67.7	63.2	64.2	61.7	60.3	56.6	57.3	53.5	50.5	51.2	49.4	49.1	52.3	53.4	51.6	47.7	46.9	44.5	40.4	36.6	31.5	27.8	14.0
Outside RHS Outside residence opposite	56.6	55.4	50.4	51.9	54.1	56.6	64.7	67.5	68.0	70.0	68.9	65.3	63.4	58.5	59.5	56.4	56.5	53.9	50.2	49.9	50.5	49.3	52.8	54.5	53.0	50.5	48.8	45.7	41.7	36.1	32.4	29.5	15.3
Noise Source Off (background)																																	
Outside Window 1	58.9	58.4	59.3	61.8	58.8	61.3	62.4	55.9	56.6	51.6	53.1	55.8	52.2	47.7	46.2	41.5	37.2	37.4	38.6	38.4	36.4	36.9	37.6	35.8	34.7	30.2	26.9	25.6	19.1	17.1	16.1	17.7	14.9
Outside Fanlight 1	54.7	55.1	56.7	57.9	52.3	56.7	62.7	52.4	54.4	54.0	55.1	53.5	50.8	49.7	46.3	43.3	40.1	41.6	43.1	43.5	41.4	41.2	38.9	36.9	33.4	31.7	27.6	24.3	19.8	15.5	13.2	10.0	10.4
Outside Window 2	58.4	57.7	58.2	58.9	56.4	59.8	62.4	56.4	56.9	51.3	51.2	51.9	49.1	48.1	45.5	43.2	39.7	39.0	39.6	37.8	37.3	37.4	37.6	36.4	33.5	30.3	27.1	24.3	26.7	18.1	18.2	13.9	12.7
Outside Fanlight 2	54.0	55.2	57.4	58.8	53.5	59.4	57.8	52.5	54.6	52.7	52.0	50.7	48.8	48.1	45.4	42.1	37.1	37.7	39.4	39.0	36.8	37.2	36.8	35.5	32.6	29.9	26.8	22.3	17.9	14.4	11.9	9.8	9.6
Outside Window 3	57.7	57.7	55.6	54.1	56.0	59.7	60.8	56.7	55.4	51.7	51.3	52.3	50.2	49.6	46.8	43.4	40.6	43.8	45.5	44.2	44.1	43.9	42.2	39.8	35.9	32.7	28.5	24.9	20.8	17.5	15.1	14.1	12.4
Outside Fanlight 3	54.6	53.6	54.2	56.2	53.7	58.2	59.1	57.7	53.4	51.7	51.4	52.6	50.0	48.7	47.3	42.9	41.9	40.1	40.4	39.6	39.0	39.4	38.8	37.5	35.1	32.7	29.3	25.1	20.3	16.8	12.5	9.5	9.8
Outside Window 4	52.2	51.2	53.8	56.7	63.3	60.2	58.8	57.1	52.1	50.2	50.6	52.9	50.5	47.1	43.3	42.2	40.3	40.6	41.6	38.8	38.6	39.4	38.2	37.1	34.6	31.6	27.9	23.9	19.5	16.1	13.1	11.1	10.9
Outside Fanlight 4	55.5	55.7	54.2	56.5	58.3	55.0	55.2	53.2	53.3	53.7	57.9	53.8	51.4	49.0	46.4	42.8	40.9	42.1	44.8	44.4	42.2	42.3	40.4	39.0	36.4	32.6	29.5	25.4	21.5	16.9	11.8	9.4	9.5
Outside RHS personnel door	57.7	56.4	58.2	60.3	64.6	59.4	61.6	55.9	54.6	62.2	51.8	51.8	51.7	48.3	44.1	42.5	40.0	40.6	40.9	40.1	38.7	38.6	37.1	36.4	33.5	30.0	27.2	22.7	18.4	14.6	12.1	10.2	10.3
Outside RHS personnel door fanlight	53.7	50.3	55.0	60.2	60.9	52.3	55.0	53.6	55.5	49.1	49.5	51.6	49.2	45.4	42.6	42.1	38.3	39.6	40.5	38.3	37.2	38.0	36.6	36.1	33.5	29.6	26.6	22.3	18.2	14.1	10.4	8.8	9.4
Outside Spandrel panel	54.7	52.3	56.9	60.1	59.1	57.1	61.1	56.0	53.3	51.7	51.4	52.0	49.3	46.3	43.4	42.2	38.4	39.5	42.8	41.8	39.8	38.8	37.3	35.9	33.2	29.9	26.3	21.9	17.9	14.1	11.2	9.8	10.2
Outside LHS personnel door	53.4	54.2	55.8	58.8	57.2	55.3	61.2	55.7	53.2	52.0	51.5	52.1	51.3	47.4	43.7	42.9	41.3	41.1	43.5	44.1	42.1	40.8	39.4	36.6	34.6	30.6	26.6	22.5	19.3	16.1	14.0	10.6	11.4
Outside LHS personnel door fanlight	56.6	55.5	58.5	58.4	64.8	59.8	59.9	56.3	52.9	51.2	50.0	51.5	50.1	47.0	43.4	41.9	40.7	41.3	43.0	39.9	39.8	39.0	37.6	35.9	33.6	29.2	25.9	21.6	17.3	13.7	10.8	9.2	9.8
Outside Bike store door	56.4	54.0	55.0	60.1	61.0	55.5	58.4	59.1	59.4	55.3	53.3	51.1	48.3	45.9	42.6	40.3	37.0	37.0	39.2	38.9	36.5	34.3	32.1	29.3	26.2	23.0	19.4	15.8	13.1	11.0	9.8	8.9	9.6
Noise Source Off (background)																																	
Outside LHS Outside residence opposite	59.8	57.7	52.1	50.8	54.2	55.8	57.0	56.9	57.0	51.6	50.3	47.8	45.2	46.6	46.4	46.2	39.3	37.2	37.0	35.0	32.6	32.9	33.0	30.1	28.3	24.3	21.1	17.1	13.8	13.0	9.1	8.1	9.2
Outside MID Outside residence opposite	58.7	58.6	50.8	58.1	53.6	53.2	56.5	54.2	51.9	49.8	45.3	45.4	43.1	42.9	42.4	42.2	37.5	36.3	36.1	35.4	34.0	35.0	34.2	31.0	31.7	27.6	23.2	19.0	14.9	11.3	10.1	8.1	9.2
Outside RHS Outside residence opposite	55.8	53.3	53.6	53.5	56.5	56.6	58.5	59.4	52.6	47.5	45.5	45.4	44.0	41.8	41.0	40.3	37.4	36.6	37.2	36.7	35.7	35.7	34.3	31.9	29.1	25.5	22.3	18.8	16.2	12.3	12.4	12.9	9.4

Attachment 6 - 1 page

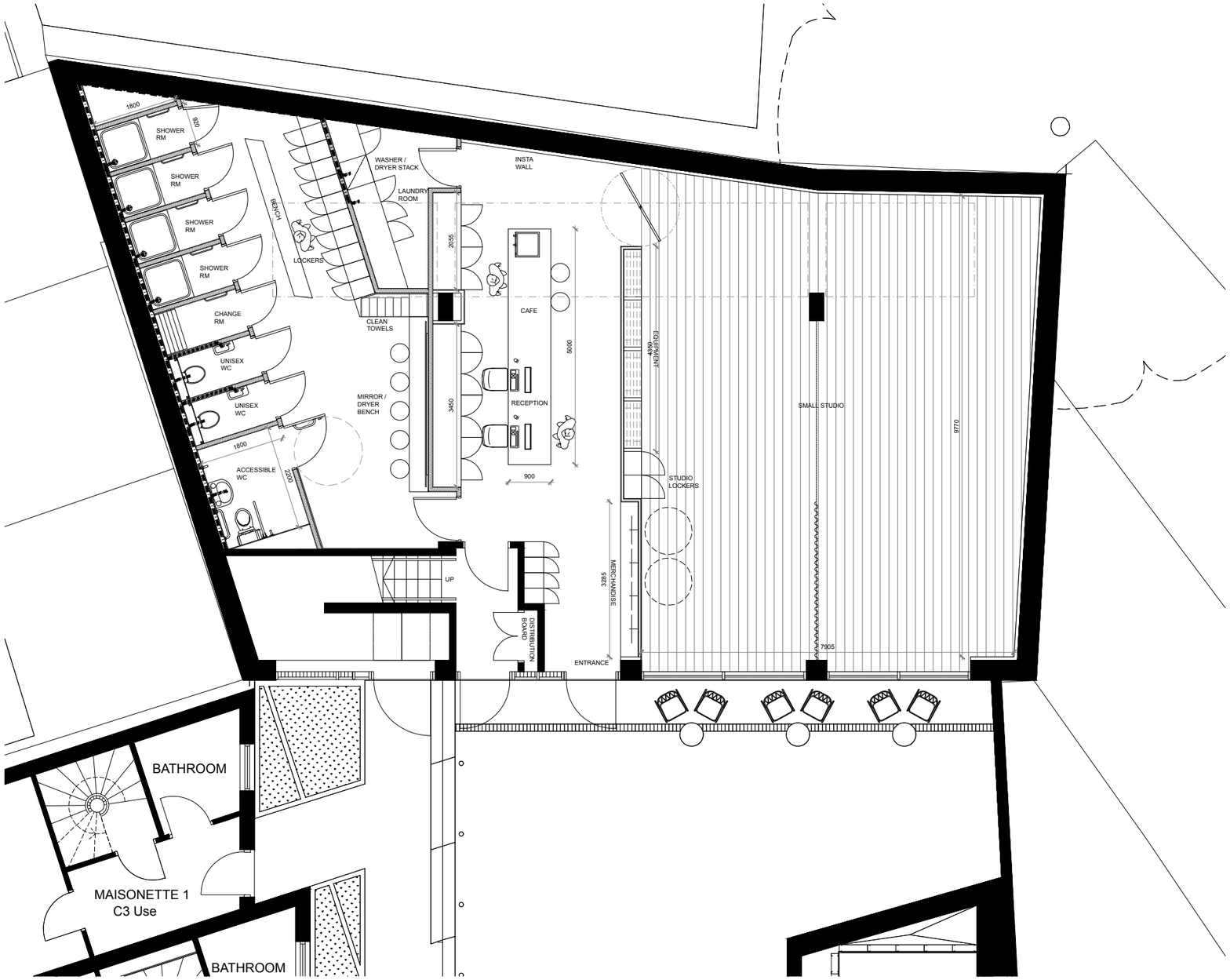
First floor level showing roof lights

Ground floor roof lights

Current bike store door

Stairwell at first floor level

Attachment 7 - 2 pages



01 GROUND FLOOR
SCALE 1:50 @ A1

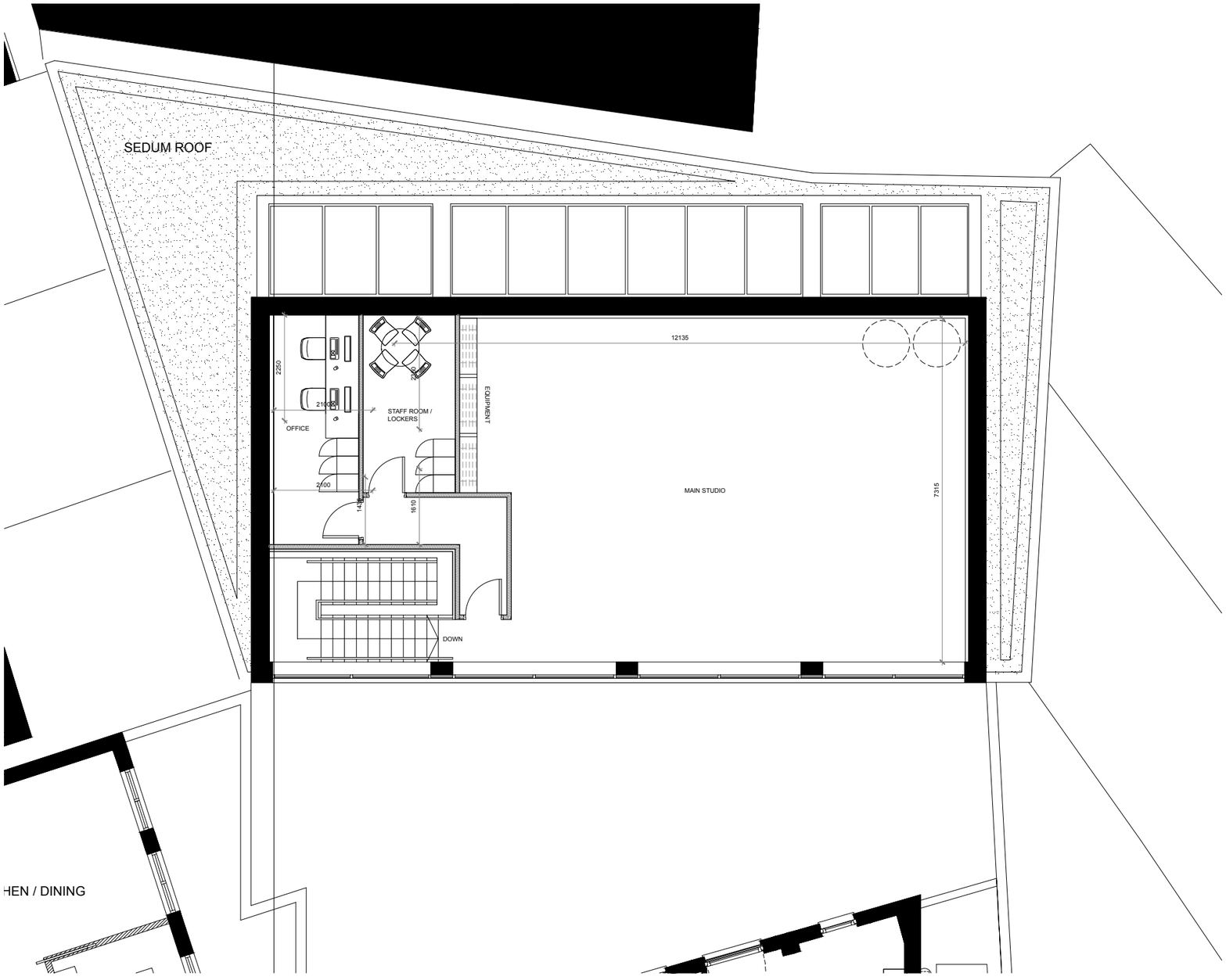
INFORMATION

DISCLAIMER
DO NOT SCALE FROM THIS DRAWING. ALL DRAWINGS / DIMENSIONS TO BE CHECKED ON SITE PRIOR TO CONSTRUCTION
ALL DISCREPANCIES AND OMISSIONS ON SITE MUST BE REPORTED TO DESIGNER FOR COMMENT / APPROVAL PRIOR TO COMMENCING WORK DESIGNS ARE SUBJECT TO APPROVAL BY STATUTORY AUTHORITIES AND ANY NECESSARY ALTERATIONS SHOULD BE MADE IF REQUIRED TO COMPLY WITH STATUTORY REQUIREMENTS

REV	DATE	COMMENT
-	-	-

3Stories.
CONTACT@3STORIES.CO.UK
WWW.3STORIES.CO.UK

PROJECT	BODY BY SIMONE
TITLE	GROUND FLOOR GA
DRAWING NO.	BBS001_101_01
SCALE	1:50 @ A1
DATE	20/06/18
DRAWN BY	JL



01 FIRST FLOOR
SCALE 1:50 @ A1

INFORMATION

DISCLAIMER
DO NOT SCALE FROM THIS DRAWING. ALL DRAWINGS / DIMENSIONS TO BE CHECKED ON SITE PRIOR TO CONSTRUCTION
ALL DISCREPANCIES AND OMISSIONS ON SITE MUST BE REPORTED TO DESIGNER FOR COMMENT / APPROVAL PRIOR TO COMMENCING WORK DESIGNS ARE SUBJECT TO APPROVAL BY STATUTORY AUTHORITIES AND ANY NECESSARY ALTERATIONS SHOULD BE MADE IF REQUIRED TO COMPLY WITH STATUTORY REQUIREMENTS

REV	DATE	COMMENT
-	-	-

3Stories.
CONTACT@3STORIES.CO.UK
WWW.3STORIES.CO.UK

PROJECT	BODY BY SIMONE
TITLE	FIRST FLOOR GA
DRAWING NO.	BBS001_101_02
SCALE	1:50 @ A1
DATE	20/06/18
DRAWN BY	JL