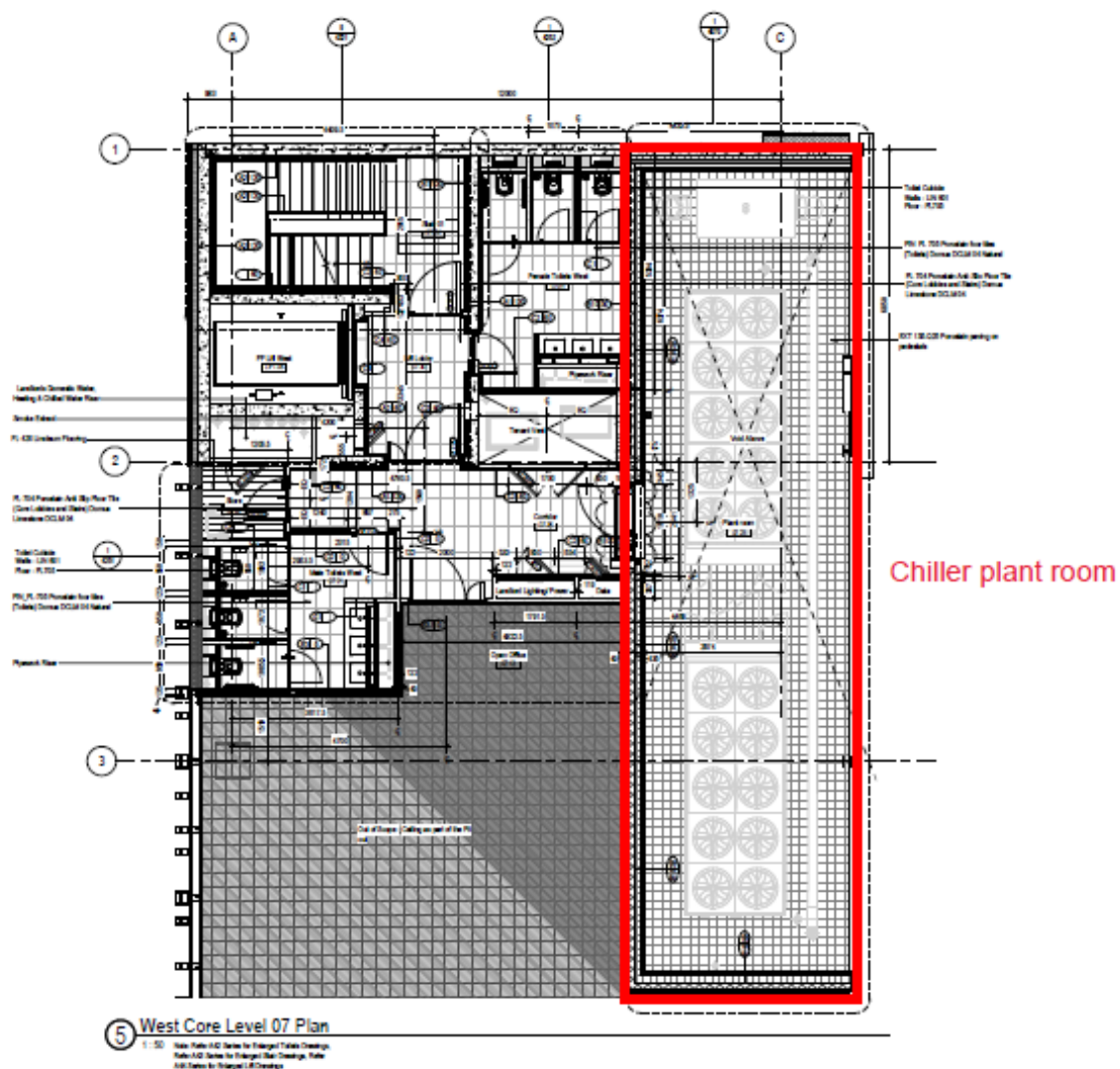


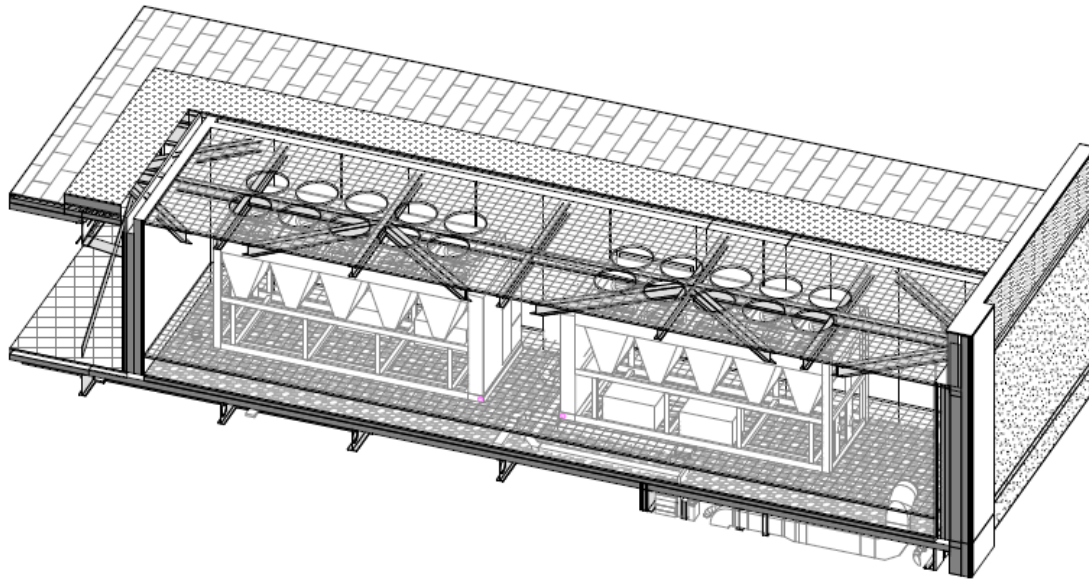


150 Holborn

Planning Condition 14



A section area for the enclosure is detailed below



Noise data for 1no. unit is set out below.

Acoustic information								
Sound pressure level at 1 m from the unit (ref. 2 x 10 ⁻⁵ Pa)								
63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	db(A)
70.0	67.0	67.0	70.0	64.0	60.0	52.0	45.0	70.0

Two assessments for peak and minimum operations for the chillers are as follows

Assessment One - Based on weekday operation from 7.00am to 7.00pm, Monday to Friday. This will be when the peak operation of the chiller plant is forecast. The assessment is for both chillers running.

Receiver	Distance	Lp
Brooke Street	44m	50dB(A)
Grays Inn Road	33m	52dB(A)

Assessment Two – Based on a night-time operation and may not apply as it is not expected for the building to be in use. This is purely an assessed load profile of circa 250kw and 15°C night-time ambient, for any background tenant and landlord usage. The assessment is for one chiller running one compressor only.

Receiver	Distance	Lp – with 1 chillers in operation at night load and ambient conditions
Brooke Street	44m	41dB(A)
Grays Inn Road	33m	43dB(A)

The above data is in line with noise criteria set in the below table

The Planning Conditions

Extract from attached report below:

3.1 Adopted acoustic design standards

The adopted acoustic design standards are detailed in Table 1.

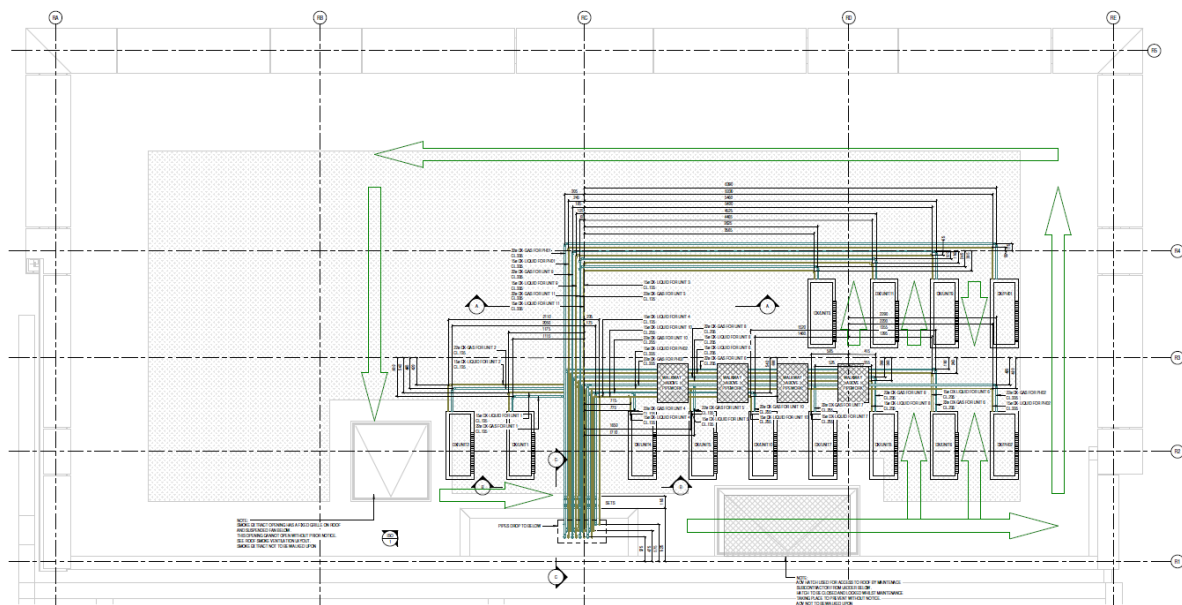
Table 1 Schedule of acoustic criteria

Acoustic consideration	Affected element	Acoustic criteria
ENVIRONMENTAL NOISE/PLANNING CONDITIONS		
Internal noise limits: <i>Appropriate internal noise limits must be applied to control noise break in from the external environment</i>	Building envelope to commercial units (including cladding, glazing and any other elements)	Office floors: $L_{Aeq,8 \text{ hours}}$ 35-40 dB Retail: $L_{Aeq,8 \text{ hours}}$ 50-55 dB Reception: $L_{Aeq,8 \text{ hours}}$ 45-55 dB
External noise limits: <i>Noise from building services plant etc needs to be limited to minimise disturbance to existing (and new) noise sensitive premises in the vicinity of the development, and new noise sensitive premises within the development</i>	Building services design	Weekday/Weekend: <ul style="list-style-type: none"> Daytime $L_{Aeq,T}$ (0700-1900) <ul style="list-style-type: none"> Brooke St - 50/46 dB Holborn - 57/53 dB Gray's Inn Rd - 56/53 dB Evening $L_{Aeq,T}$ (1900-2300) <ul style="list-style-type: none"> Brooke St - 49/45 dB Holborn - 56/53 dB Gray's Inn Rd - 54/53 dB Night $L_{Aeq,T}$ (2300-0700) <ul style="list-style-type: none"> Brooke St - 42/41 dB Holborn - 49/47 dB Gray's Inn Rd - 51/50 dB

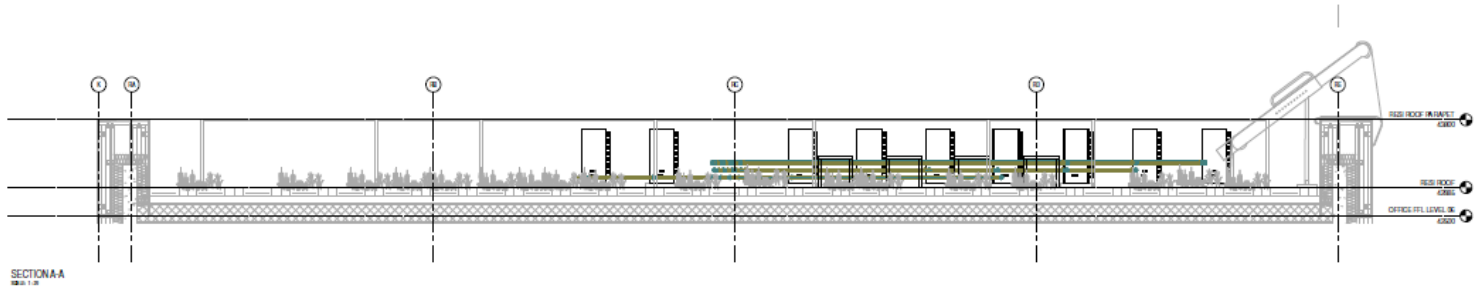
Residential

Located at roof Level of the development are 13no. Air source heat pump units. The location of which is detailed on the following drawing:

150-SRW-Z2-RF-DR-M-220-09 – Roof Heating Services Layout

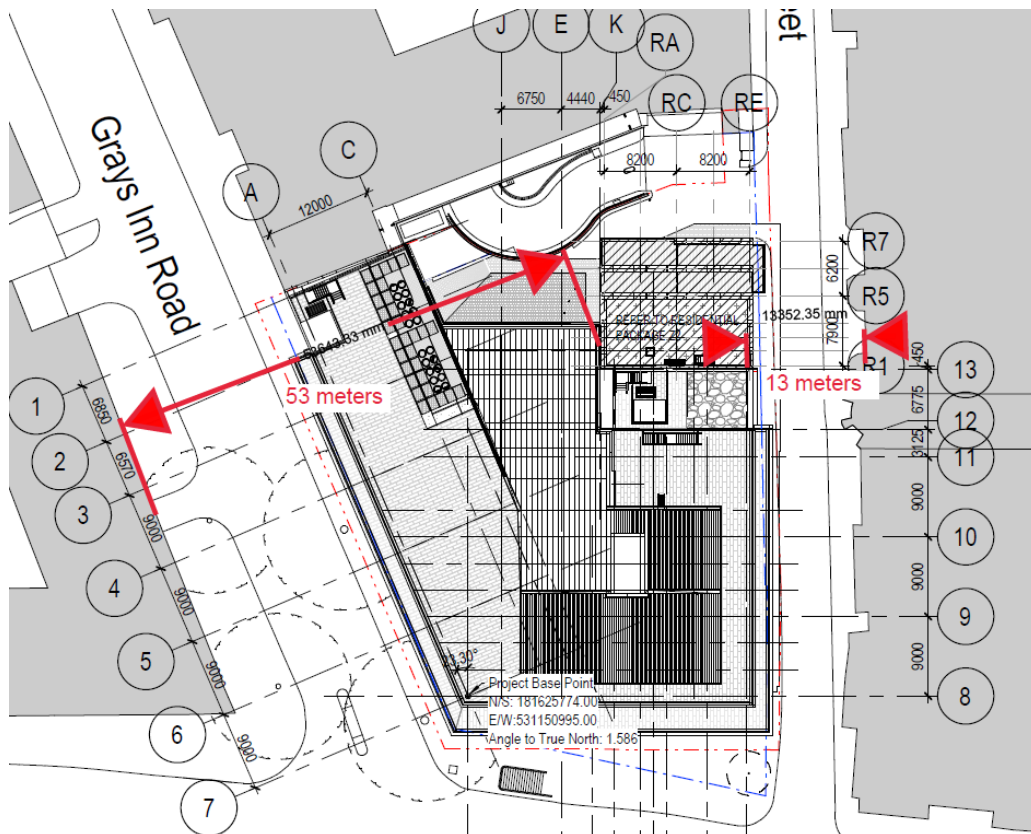


A section through of the roof also details the location of the units, the full drawing of which can be found in the appendices



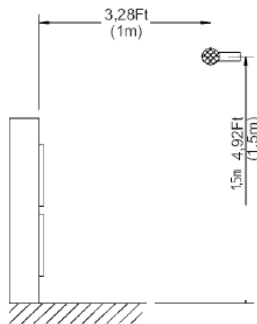
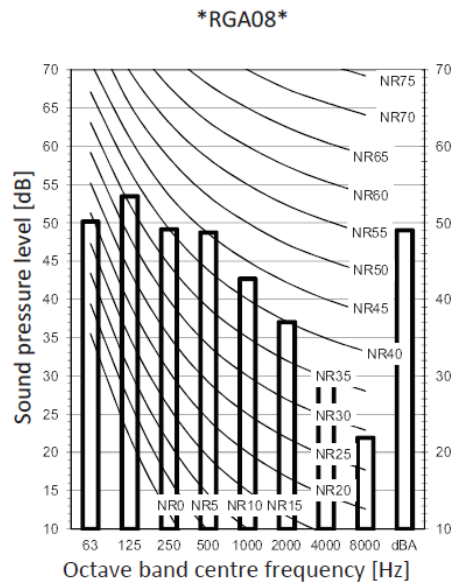
The units are located 53 and 13 metres from the two identified sensitive Fascades, Grays Inn Road and Brooke street.

150-PWA-Z1-XX-DR-A-0101– Location Plan



The Air Source Heat Pumps are a Daikin Altherma low temperature split ERGA-08DVA type, individual unit sound pressure information can be found below.

Daikin Altherma low temperature ERGA04-08DVA_Acoustic Data



The following table sets out the specification of Air Source Heat Pumps

PRODUCT NAME	ERGA04-08DV				
					ERGA08DAV3
Dimensions	Unit		Height	mm	740
			Width	mm	884
			Depth	mm	388
Weight	Unit			kg	58.5
Piping connections	Liquid		OD	mm	6.35
	Gas		OD	mm	15.9
	Drain		OD	mm	18
	Level difference	IU - OU	Max.	m	20.0
	Heat insulation				Both liquid and gas pipes
Sound power level	Heating		Nom.	dBA	62 (1)
	Cooling		Nom.	dBA	62 (1)
Sound pressure level	Heating		Nom.	dBA	49 (1)
	Cooling		Nom.	dBA	50 (1)
Refrigerant	Type				R-32
	GWP				675.0
	Charge			TCO2Eq	1.01
	Charge			kg	1.50

Power supply	Name				V3
	Phase				1N~
	Frequency			Hz	50
	Voltage			V	230
Current	Recommended fuses			A	25
Notes					(1) - Cooling Ta 35°C - LWE 18°C (DT = 5°C); Heating Ta DB/WB 7°C/6°C - LWC 35°C (DT = 5°C)

The below image is an image of the unit



The sound pressure level for 13 units working simultaneously were calculated for at Brooke Street (13 metres) as the following:

Distance correction $20 \log 1/22 = -22\text{dB}$

$55 - 22 = 33\text{dB(A)}$

Target acoustic criteria = 41dB(A) weekend/night

The sound pressure level for 13 units working simultaneously were calculated for at Grays In Road (53 metres) as the following:

Distance correction $20 \log 1/53 = -34\text{dB}$

$55 - 34 = 21\text{dB(A)}$

Target acoustic criteria = 50dB(A) weekend/night

The above data is in line with noise criteria set in the below table

The Planning Conditions

Extract from attached report below:

3.1 Adopted acoustic design standards

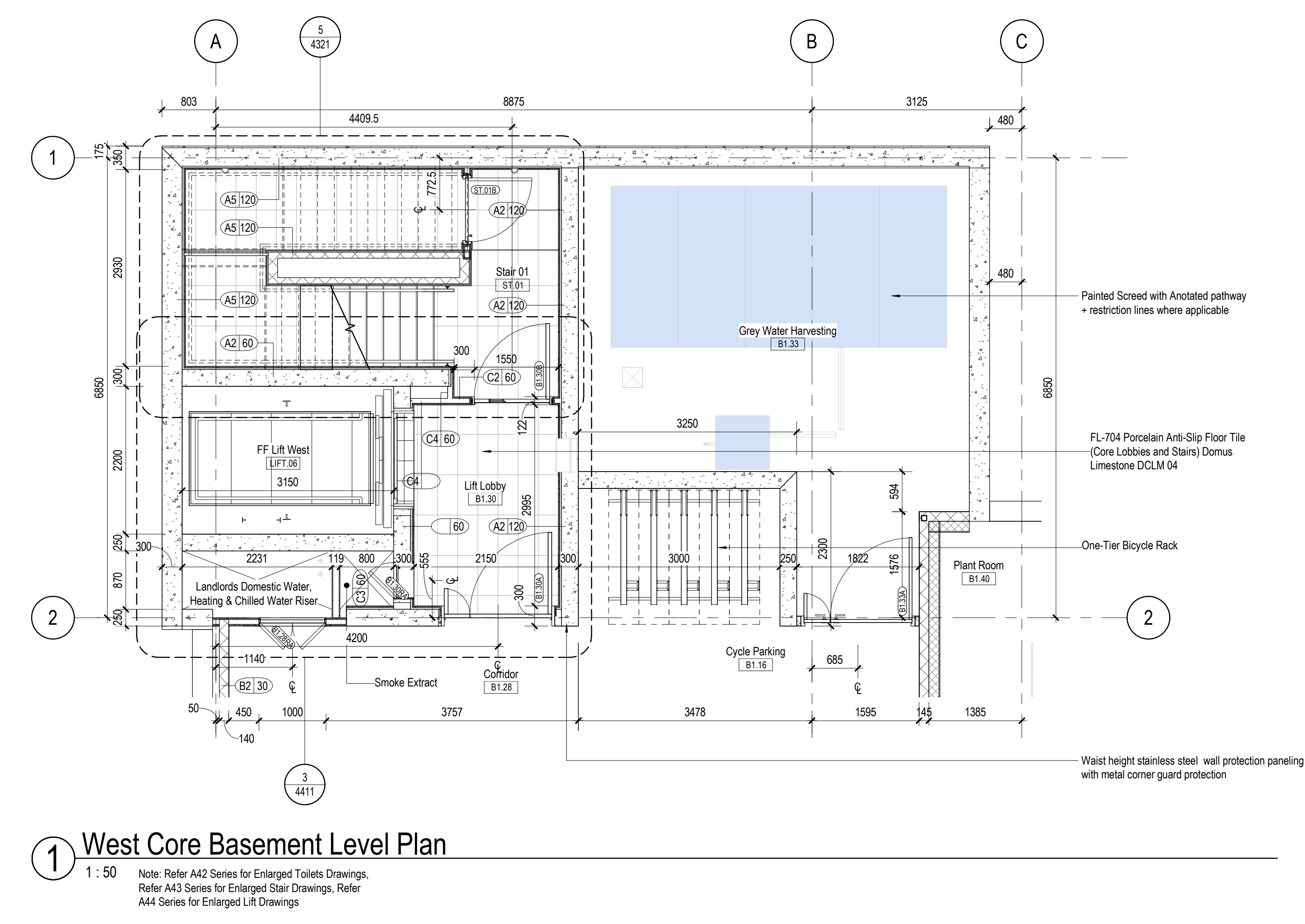
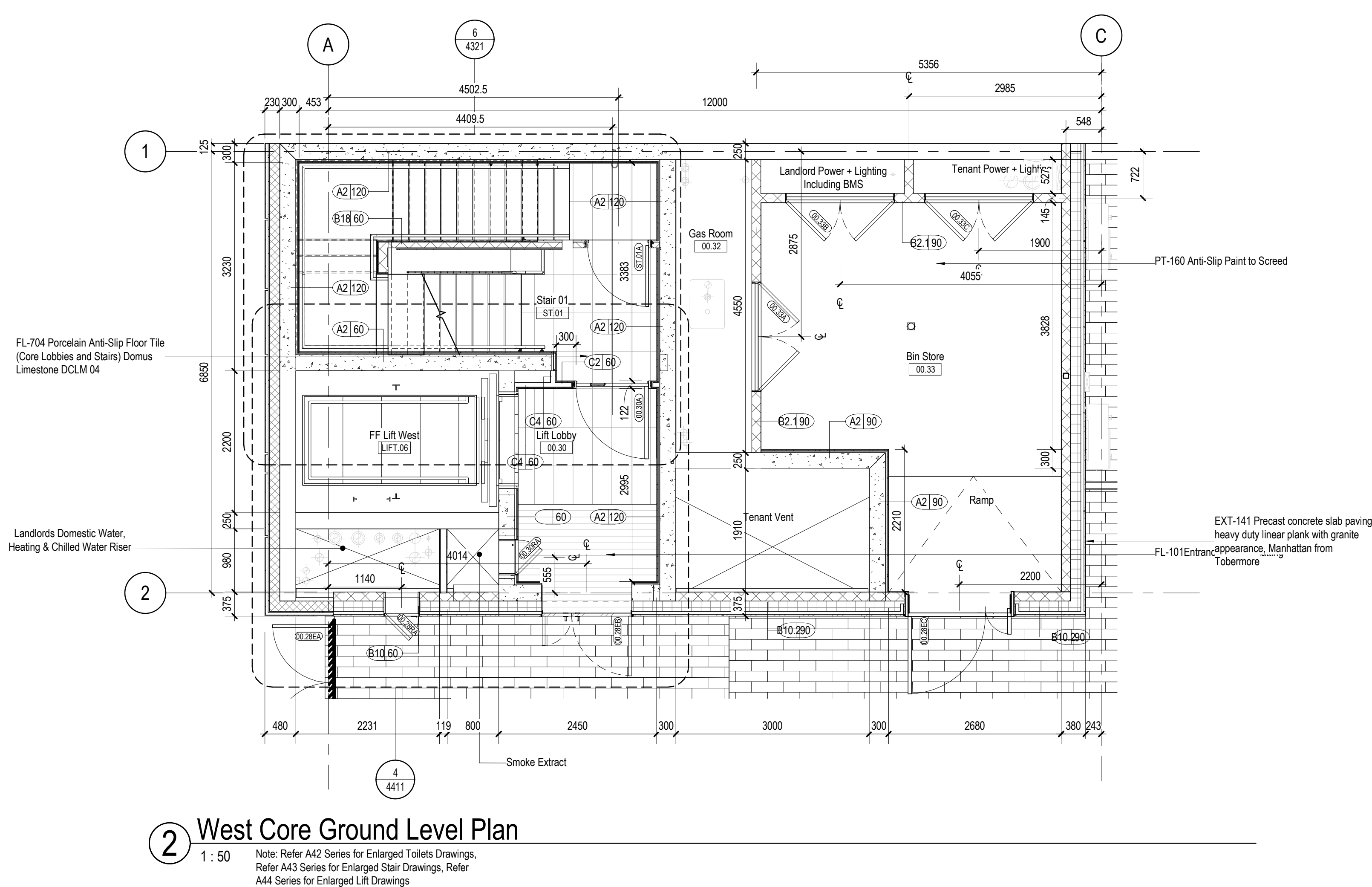
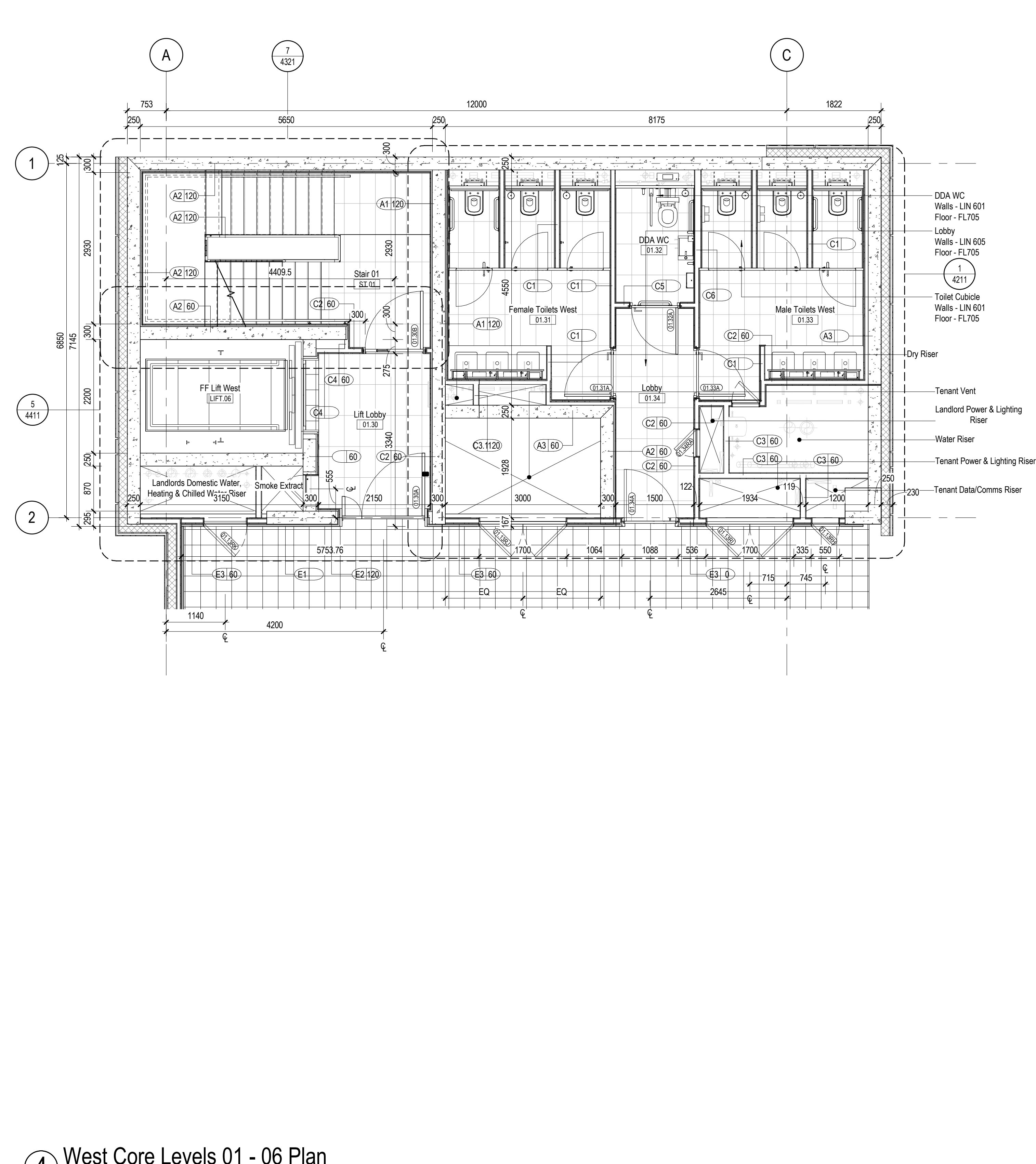
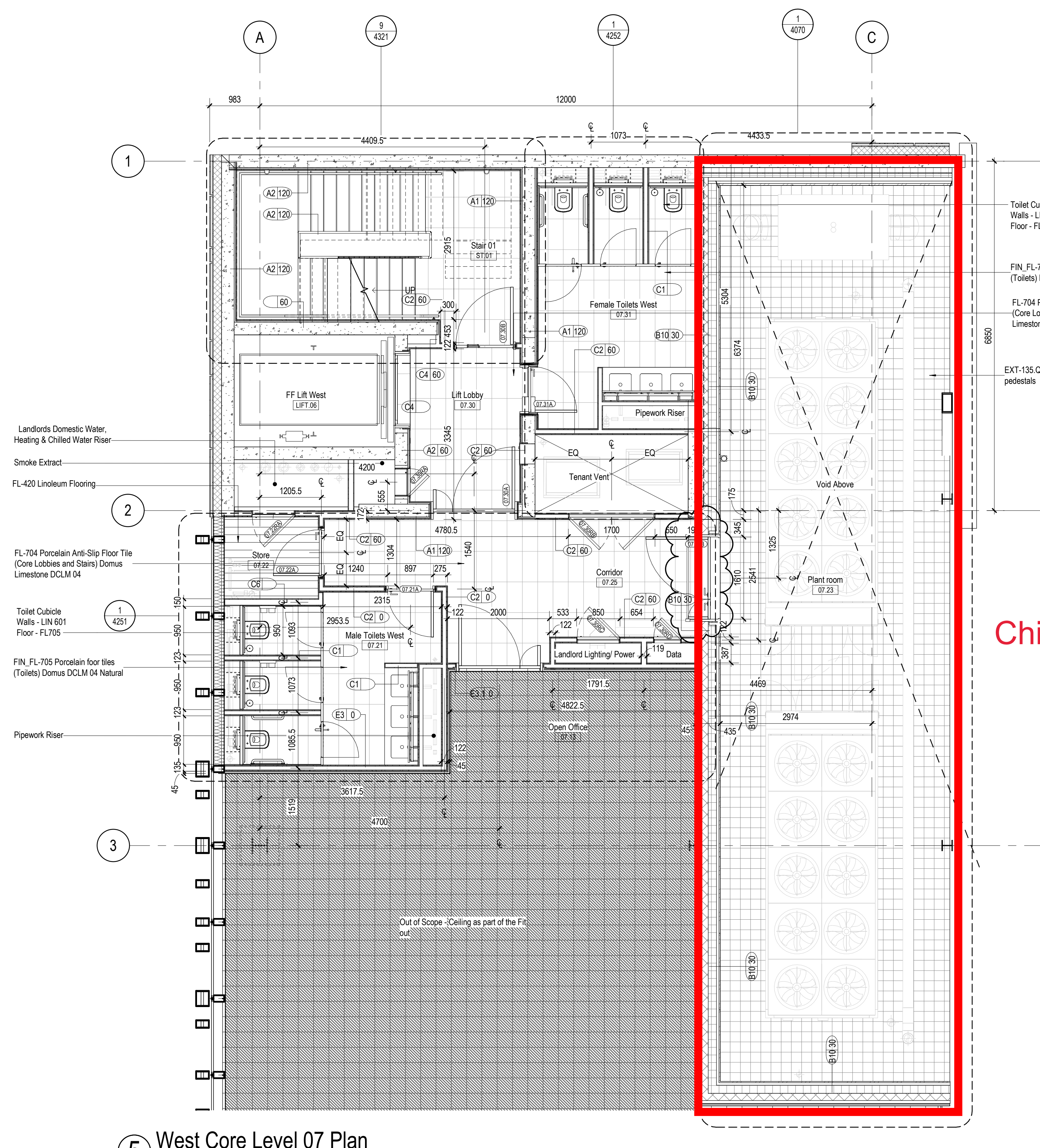
The adopted acoustic design standards are detailed in Table 1.

Table 1 Schedule of acoustic criteria

Acoustic consideration	Affected element	Acoustic criteria
ENVIRONMENTAL NOISE/PLANNING CONDITIONS		
Internal noise limits: <i>Appropriate internal noise limits must be applied to control noise break in from the external environment</i>	Building envelope to commercial units (including cladding, glazing and any other elements)	Office floors: $L_{Aeq,8\text{ hours}}$ 35-40 dB Retail: $L_{Aeq,8\text{ hours}}$ 50-55 dB Reception: $L_{Aeq,8\text{ hours}}$ 45-55 dB
External noise limits: <i>Noise from building services plant etc needs to be limited to minimise disturbance to existing (and new) noise sensitive premises in the vicinity of the development, and new noise sensitive premises within the development</i>	Building services design	Weekday/Weekend: <ul style="list-style-type: none"> Daytime $L_{Aeq,T}$ (0700-1900) <ul style="list-style-type: none"> Brooke St - 50/46 dB Holborn - 57/53 dB Gray's Inn Rd - 56/53 dB Evening $L_{Aeq,T}$ (1900-2300) <ul style="list-style-type: none"> Brooke St - 49/45 dB Holborn - 56/53 dB Gray's Inn Rd - 54/53 dB Night $L_{Aeq,T}$ (2300-0700) <ul style="list-style-type: none"> Brooke St - 42/41 dB Holborn - 49/47 dB Gray's Inn Rd - 51/50 dB

Appendices – Drawings

1. 150-PWA-Z1-XX-DR-A-4110 – Enlarged Plans, West Core
2. 150-SRW-Z2-RF-DR-M-220-09 - Roof Heating Services Layout
3. 150-PWA-Z2-XX-DR-A-1301 – Residential Building Sections
4. SK-001 Skanska - Residential roof section drawing
5. Daikin Altherma low temperature ERGA04-08DVA_Acoustic Data
6. 150-PWA-Z1-XX-DR-A-0101– Location Plan



C03	STAGE 05	2019/03/29
C02	STAGE 05	2019/03/22
C01	STAGE 05	2019/02/22
PI.2	STAGE 04	2019/06/10
PI.1	STAGE 04	2019/07/27
WAK	000	DATE

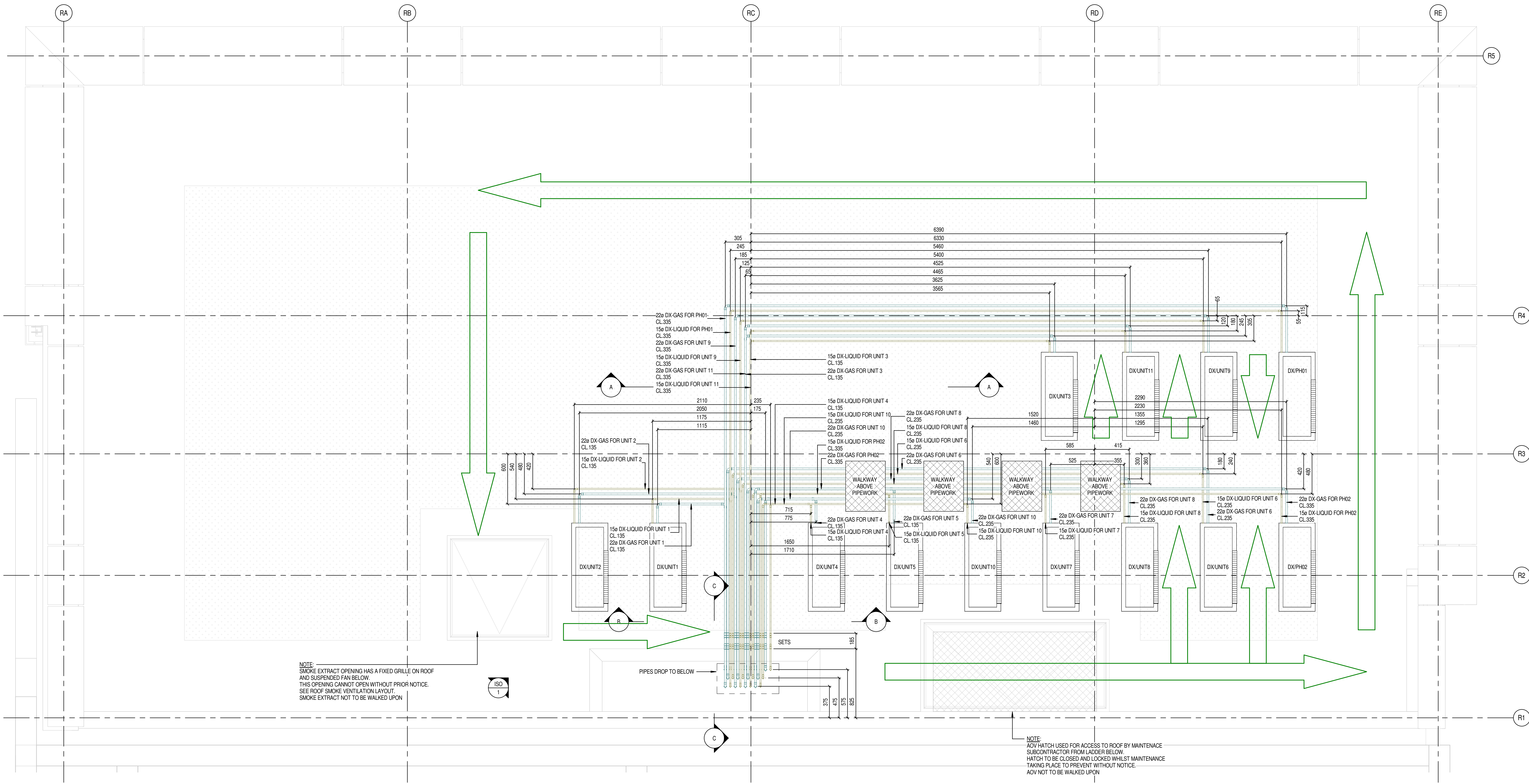
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Job Number	325424
Scale	1:50
Drawn	Author
Checked	Checker
Approved	Approver
	CDE STATUS

STAGE 05 - FOR CONSTRUCTION
TITLE

Enlarged Plans - West Core

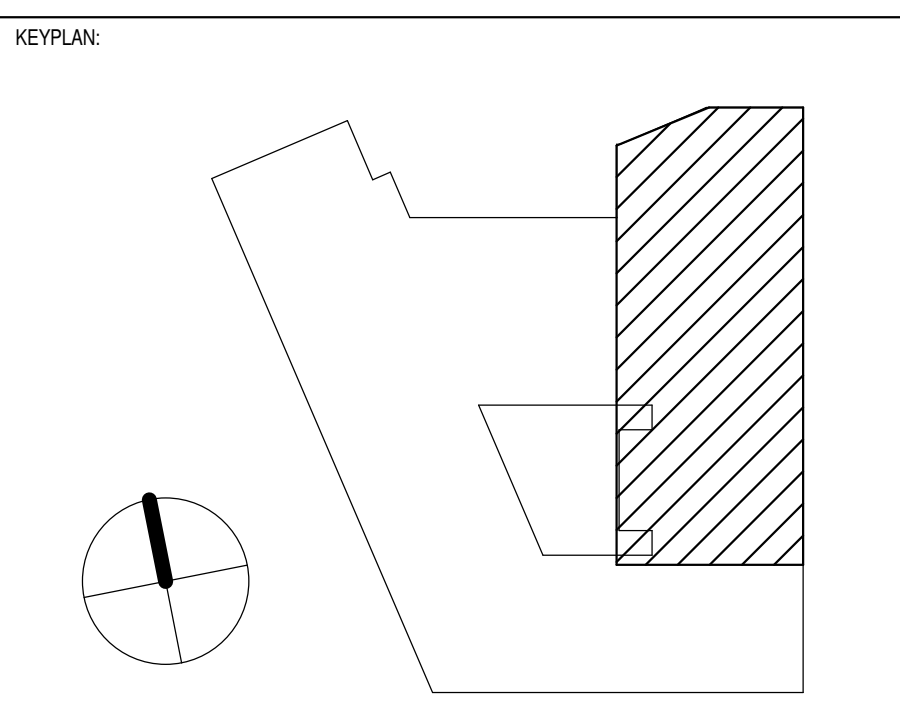
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150-PWA-Z1-XX-DR-A-411						
PROJECT	AUTHOR	VOLUME	LEVEL	TYPE	ROLE	NUMBER
CDE STATUS CODE				REVISION		
A2				C03		



NOTE:
SMOKE EXTRACT OPENING HAS A FIXED GRILLE ON ROOF
AND SUSPENDED FAN BELOW.
THIS OPENING CANNOT OPEN WITHOUT PRIOR NOTICE.
SEE ROOF SMOKE VENTILATION LAYOUT.
SMOKE EXTRACT NOT TO BE WALKED UPON

NOTE:
ADV HATCH USED FOR ACCESS TO ROOF BY MAINTENANCE
SUBCONTRACTOR FROM LADDER BELOW.
HATCH TO BE CLOSED AND LOCKED WHILST MAINTENANCE
TAKING PLACE TO PREVENT WITHOUT NOTICE
ADV NOT TO BE WALKED UPON



- NOTES
- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ARCHITECT'S LAYOUTS, STRUCTURAL, ELECTRICAL, MECHANICAL AND PUBLIC HEALTH DRAWINGS AND SPECIFICATIONS AND ESS TECHNICAL SUBMITTALS.
 - THIS DRAWING IS NOT TO BE SCALED.
 - ALL DIMENSIONS IN MILLIMETRES UNLESS STATED OTHERWISE.
 - ALL DIMENSIONS TO BE CHECKED ON SITE PRIOR TO INSTALLATION.
 - INSULATION HIDDEN FOR DRAWING CLARITY.
 - FOR PIPEWORK INSULATION THICKNESS REFER TO TABLE.
 - AIR VENTS & DRAINS TO BE INSTALLED TO HL AND UL POINTS THROUGHOUT.
 - REFER TO ARCHITECTS DETAIL FOR MAINTENANCE ACCESS REQUIREMENTS.
 - ADV TO BE CLOSED DURING MAINTENANCE FOR VENT DETAILS REFER TO CONTRACTOR TECHNICAL SUBMITTAL.
 - GUARD RAIL TO BE FITTED ON THREE SIDES OF THE ADV.

ABBREVIATIONS LEGEND:

CHWF	- CHILLED WATER FLOW
CHWR	- CHILLED WATER RETURN
COND DR	- CONDENSATE DRAINAGE
CL	- CENTER LINE OF PIPEWORK ABOVE REFERENCE LEVEL
F/A	- FROM ABOVE
F/B	- FROM BELOW
FFL	- FINISHED FLOOR LEVEL
FCU	- FAN COIL UNIT
HL	- HIGH LEVEL
IV	- ISOLATING VALVE
LL	- LOW LEVEL
LTHWF	- LOW TEMPERATURE HOT WATER FLOW
LTHWR	- LOW TEMPERATURE HOT WATER RETURN
NRV	- NON RETURN VALVE
PR	- PRIMARY SYSTEM
SEC	- SECONDARY SYSTEM
S/D	- SET DOWN
SU	- SET UP
SSL	- STRUCTURAL SLAB LEVEL
T/A	- TO ABOVE
T/B	- TO BELOW

ALL PIPES, DUCTS, TRAYS ELEVATIONS MEASURED FROM COMMON DATUM LEVEL OF
SEVENTH FLOOR FFL: +42.885

PIPEWORK INSULATION THICKNESSES TABLE

COPPER PIPE SIZE	15	22	28	32	42	54	67	76	108	(mm)
LTHW	30	40	40	40	40	40	50	50	50	(mm)
SERVICE	CHW	25	30	30	30	40	40	40	40	(mm)

PIPEWORK INSULATION THICKNESSES TABLE

STEEL PIPE SIZE	15	20	25	30	40	50	65	80	100	>125	(mm)
LTHW	30	40	40	40	40	40	50	50	50	50	(mm)
SERVICE	CHW	25	30	30	30	40	40	40	40	40	(mm)

02	19/10/2020	RE-ISSUED FOR CONSTRUCTION	MMVTA	JF [SRW]
03	25/09/2020	ISSUED FOR CONSTRUCTION	PPVTA	JF [SRW]
04	25/09/2020	ISSUED FOR CONSTRUCTION	PPVTA	JF [SRW]
05	19/10/2020	ISSUED FOR APPROVAL	PPVTA	JF [SRW]
REV	DATE	DESCRIPTION	APP	CHKD

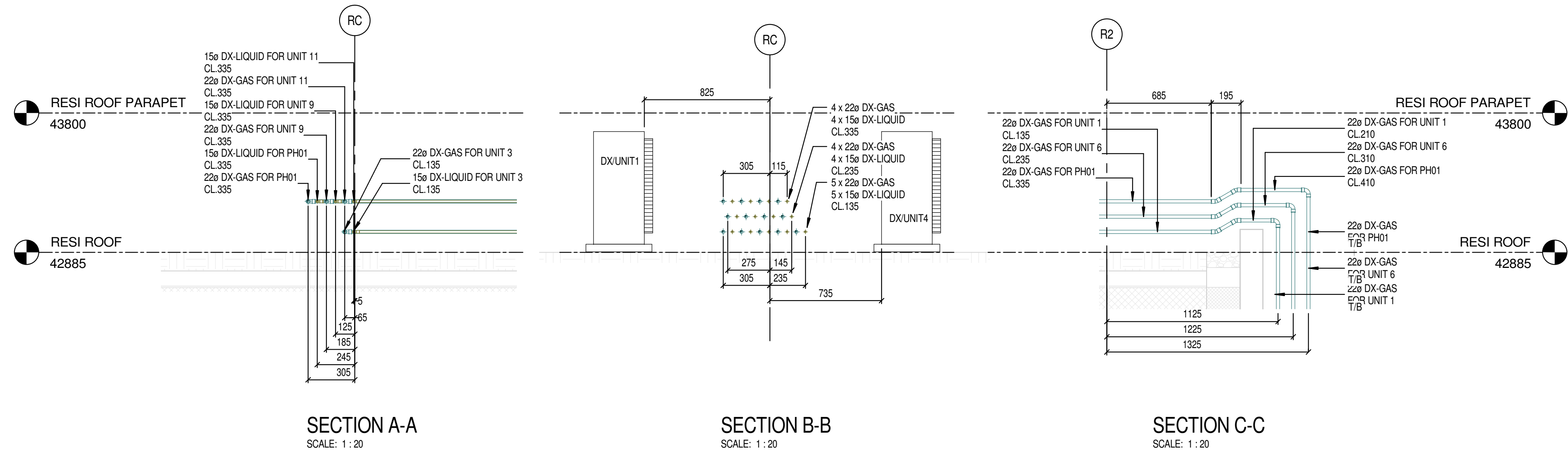
CONSULTANTS:
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HULLEY & KIRKWOOD
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CONTRACT:
150 HOLBORN
LONDON

TITLE:
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RESIDENTIAL**

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SRW Engineering Services
Hollywood House, Church Street East
Woking, Surrey GU21 6HJ
TEL: 01932 722700 Fax: 01932 722702
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DRAWING NUMBER:
150-SRW-Z2-RF-DR-M-220-09_C2

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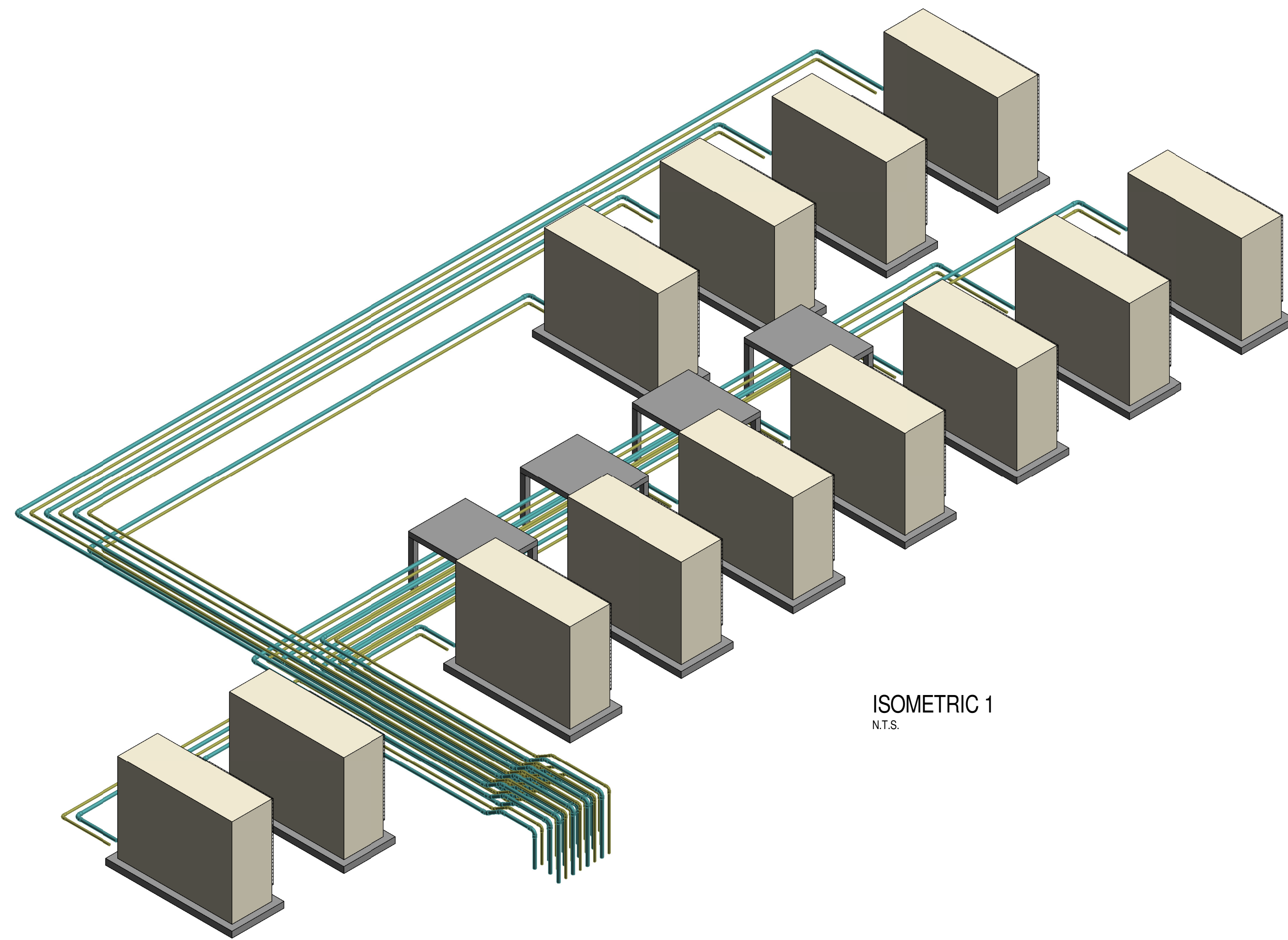
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SCALE: 1:20

SECTION B-B
SCALE: 1:20

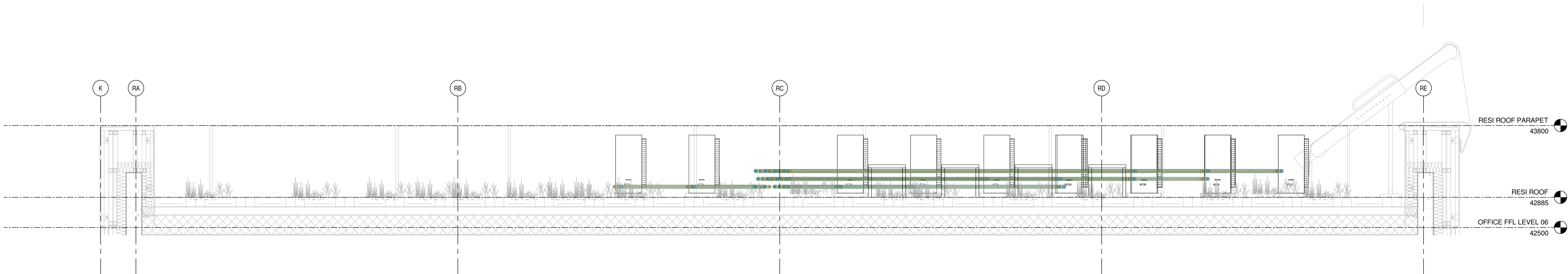
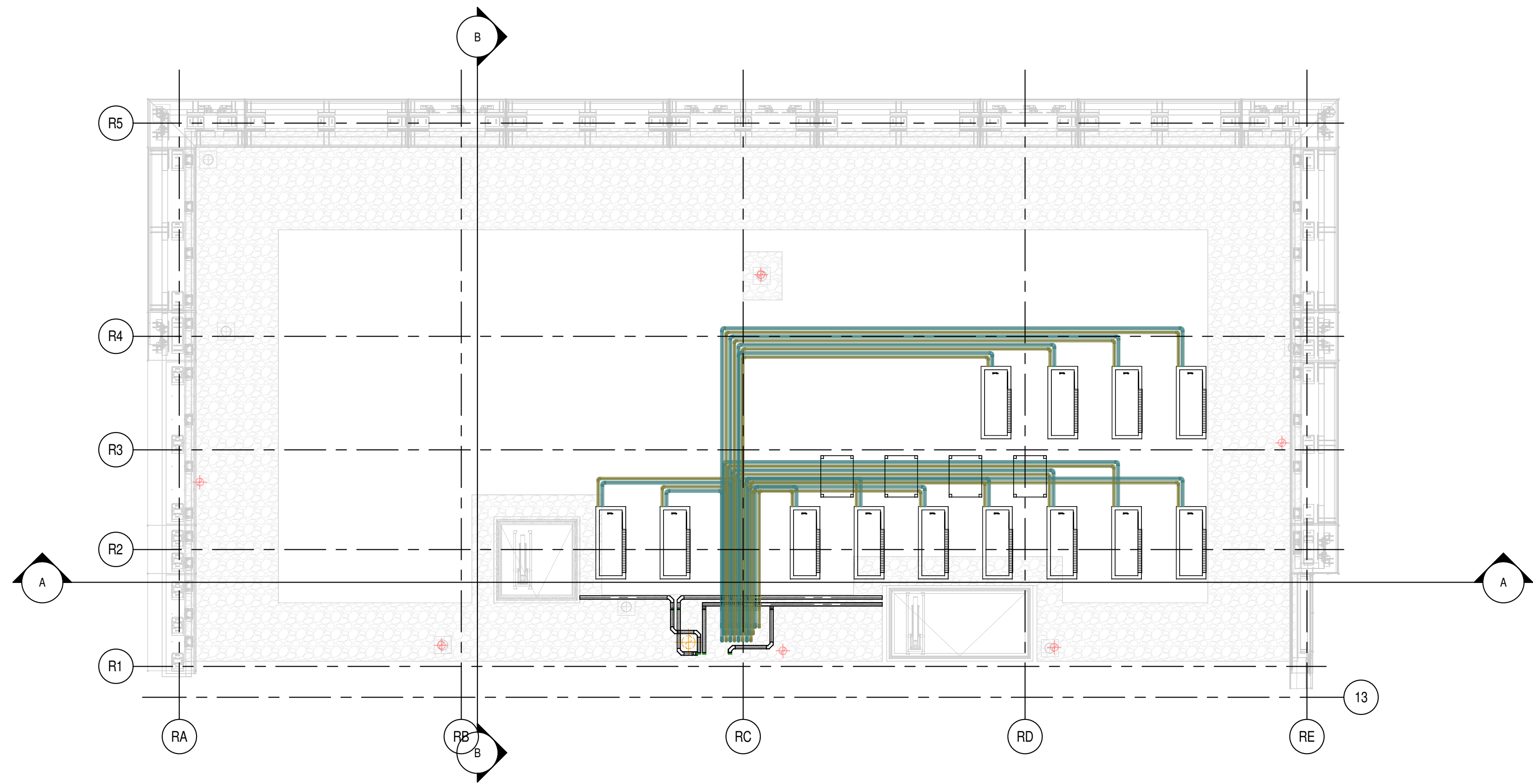
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DRAWING REFERENCE TABLE

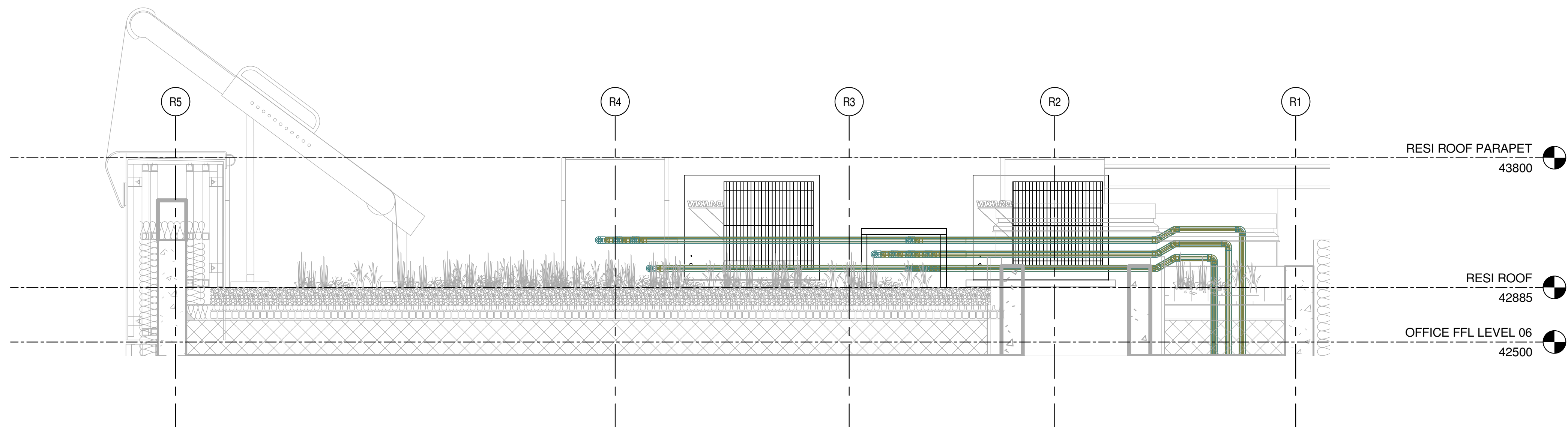
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150-PWA-ZZ-ZZ-MB-A-0003_C33	3D ARCHITECTURAL MODEL - RESIDENTIAL
150-SEV-ZB-ZZ-MB-X-0001_P15	3D STRUCTURAL MODEL



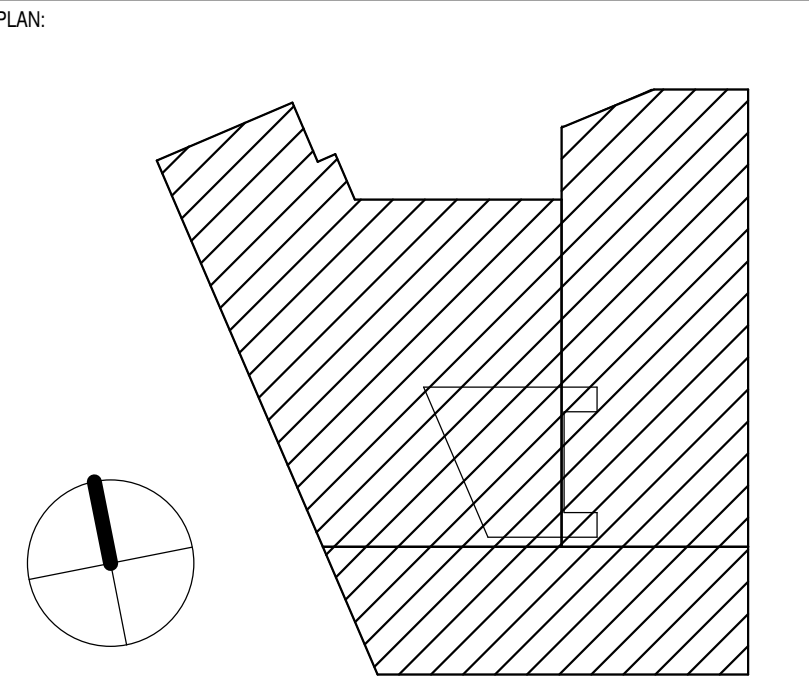
ISOMETRIC 1
N.T.S.



SECTION A-A
SCALE: 1:20



SECTION B-B
SCALE: 1:20



REV	DATE	DESCRIPTION	DRN	CHKD
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CONTRACT:
130 HOLBORN
LONDON

TITLE:
ASHP

SKANSKA

SRW Engineering Services
Hollywood House, Church Street East
Woking, Surrey GU21 9HJ
TEL: 01932 722700 Fax: 01932 722702

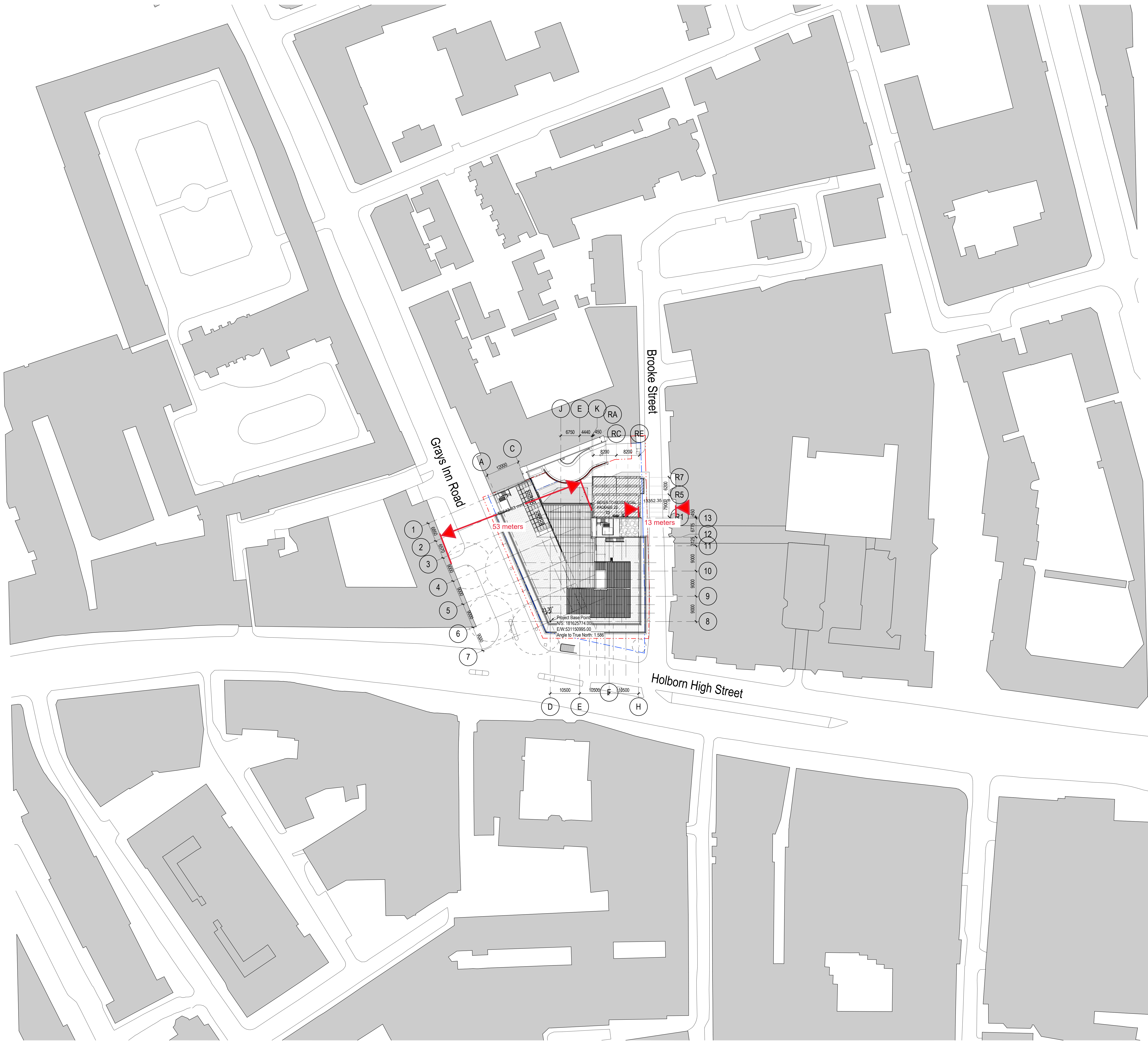
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As indicated	AD	JF [SRW]	JF [SRW]	JF [SRW]

50m
20
10
0m

SCALE BAR 1:50



1 Location Plan
1 : 500

STATUTORY LINES LEGEND

FOR BOUNDARY LINES LOCATIONS REFER TO DRAWINGS SERIES A01 - SITE PLANS

SYMBOL	DESCRIPTION
	SITE OWNERSHIP LINE
	SITE PLANNING APPLICATION LINE

PERKINS + WILL

The White Chapel Building
10 Whitechapel High Street,
London, E1 9QS
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NOTES

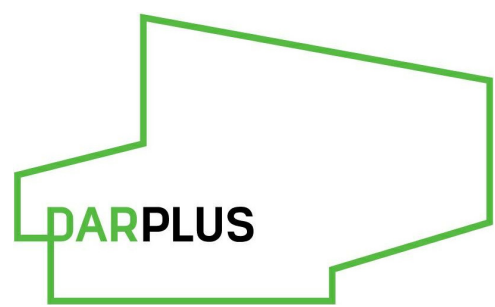
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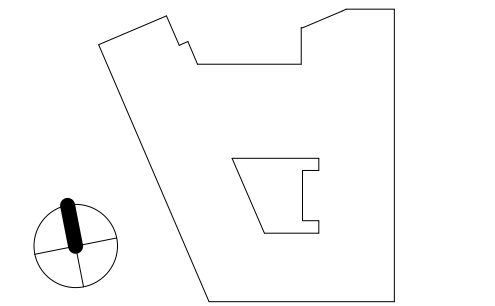
PROJECT

150 Holborn



DAR
WIGMORE STREET
LONDON W1

KEYPLAN



ISSUE CHART

C01	STAGE 05	2019/06/20
P1.3	STAGE 05	2019/01/25
P1.2	STAGE 04	2018/07/27
P1.1	STAGE 03	2017/06/25
WAK1	000	DATE

Date	07/27/18
Job Number	325424
Scale	As indicated
Drawn	Author
Checked	Checker
Approved	Approver
CDE STATUS	

STAGE 05 - FOR CONSTRUCTION
TITLE

Location Plan

SHEET NUMBER

150 PWA Z1 XX DR A 0101

PROJECT | AUTHOR | VOLUME | LEVEL | TYPE | SCALE | NUMBER
CDE STATUS CODE
A2
REVISION
C01

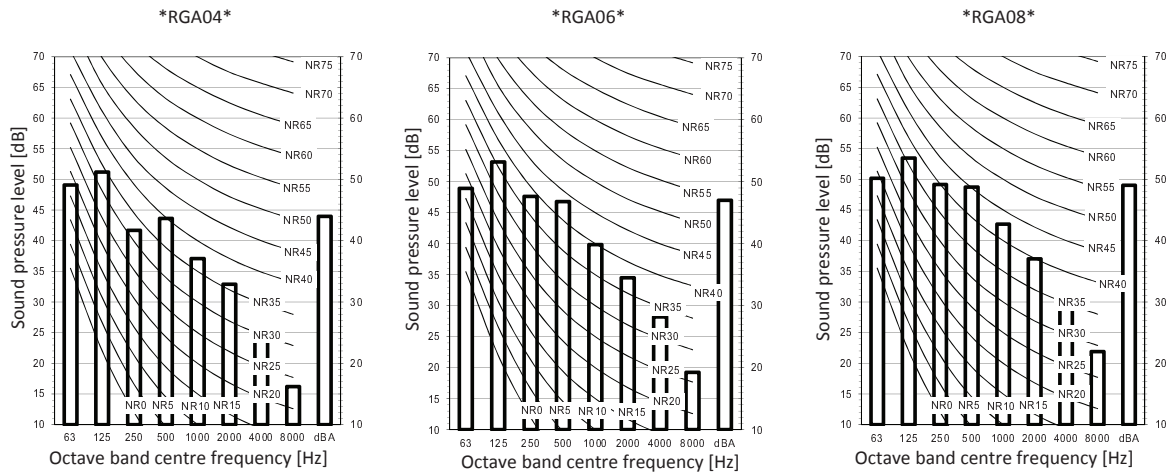
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9 Sound data

9 - 2 Sound Pressure Spectrum - Heating

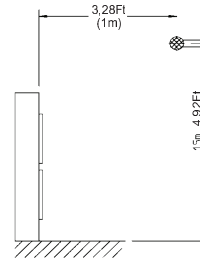
ERGA04-08DVA

Heating



Notes

1. Data is valid at free field condition.
Measured in a semi-anechoic chamber
2. Data is valid at nominal operation condition.
3. dBA = A-weighted sound pressure level (A scale according to IEC).
4. Reference acoustic pressure 0 dB = 20 μ Pa
5. If the sound is measured under actual installation conditions, the measured value will be higher due to environmental noise and sound reflections.



Measuring location (discharge side)

3D111594A

C04	STAGE 05	2020/07/08
C03	STAGE 05	2020/05/04
C02	STAGE 05	2019/03/22
C01	STAGE 05 and Section 106 Change to Ground Floor FFL	2019/03/01
P1 5	STAGE 04	2019/07/27
P1 4	STAGE 03	2019/02/06
P1 3	STAGE 03	2017/09/08
P1 2	STAGE 03	2017/06/25
P1 1	ISSUED FOR PRELIM COSTING	2016/09/16
W001	DATE	DATE
Date	07/27/18	
Job Number	325424	
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Drawn	Author	
Checked	Checker	
Approved	Approver	
CDE STATUS		

STAGE 05 - FOR CONSTRUCTION

TITLE

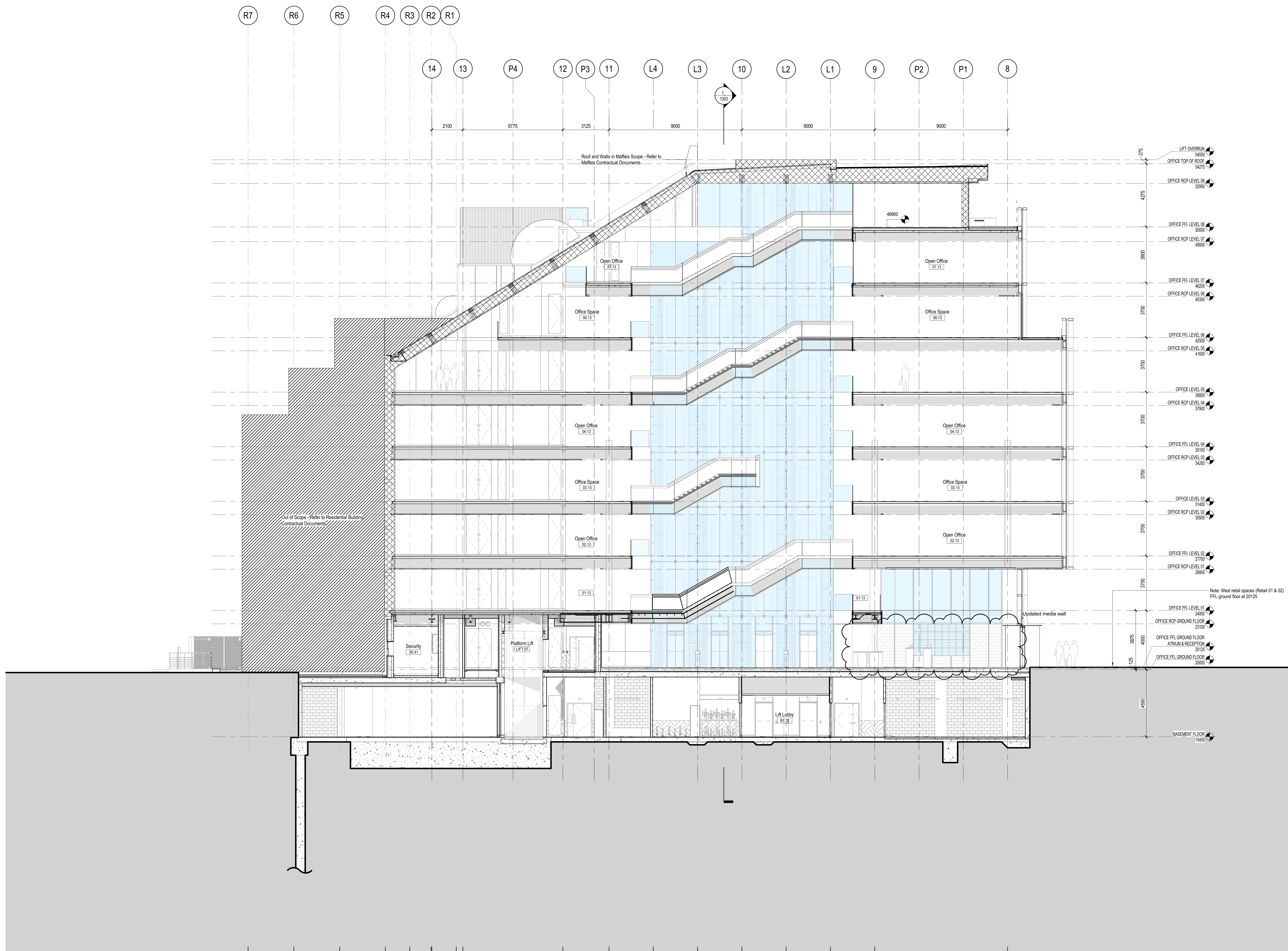
North South Building
Section Through Atrium

SHEET NUMBER

150 PWA Z1 XX DR A 1301

PROJECT | AUTHOR | VOLUME | LEVEL | TYPE | SCALE | REVISION
CDE STATUS CODE
A2
REVISION
C04

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1 North/ South Building Section Through Atrium

1 : 100 Referencing View: 1/ A11B0