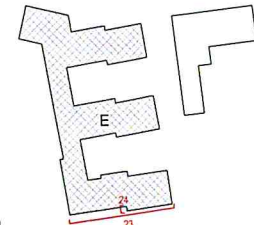
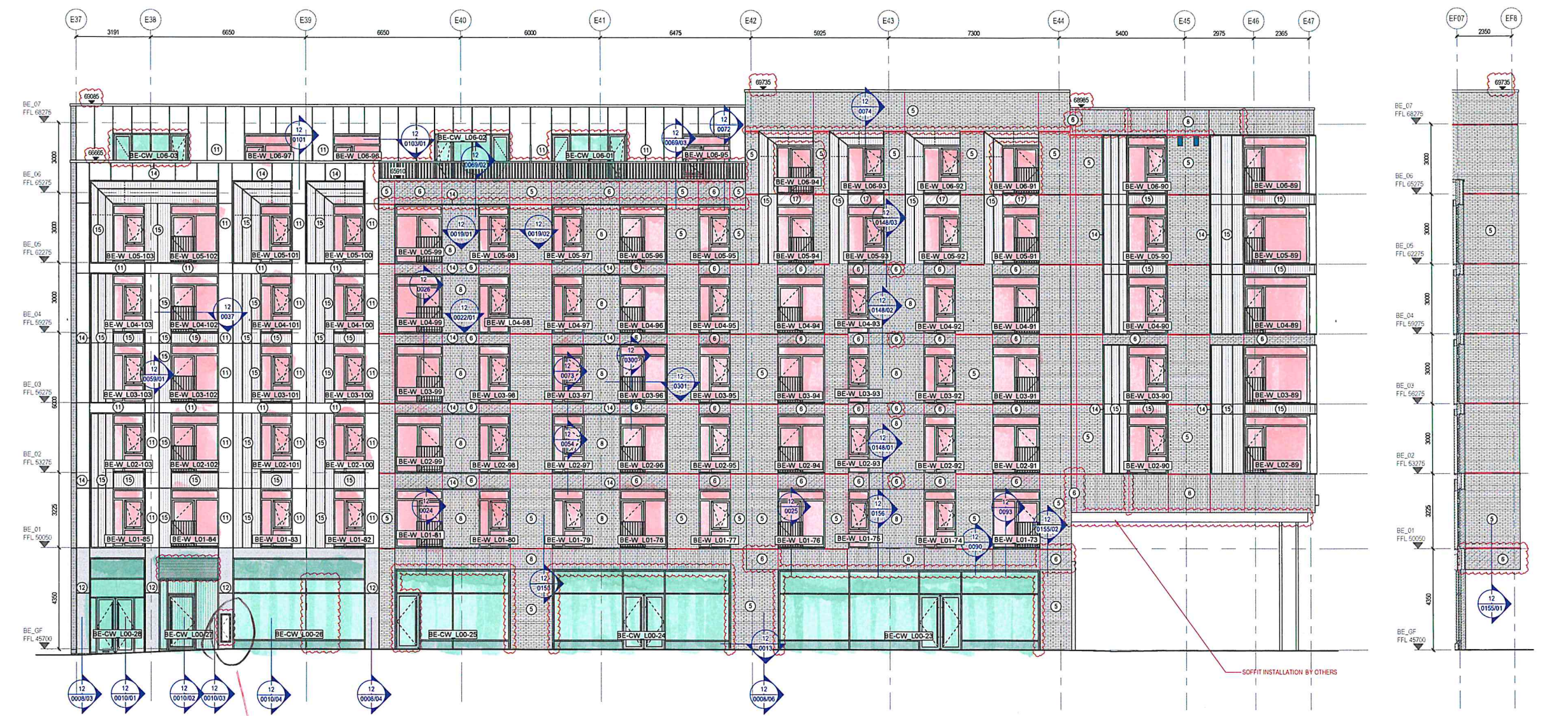


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23 Elevation 23 -Friar Street

24 Elevation 24 -Friar Street

RISER
BY ARK

- 10MM VERTICAL MOVEMENT JOINT
20MM VERTICAL MOVEMENT JOINT
30MM VERTICAL MOVEMENT JOINT
20MM HORIZONTAL MOVEMENT JOINT
30MM HORIZONTAL MOVEMENT JOINT
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 - BAT BOX - 1 FR SCHWEGLER BAT TUBE 200 mm(L)x475 mm (H)x125 mm (D)

- C02 MP 17.05.22 SB RISER AND LOUVRE ADDED / FACADE MATERIAL, WINDOWS, CURTAIN WALLS, BALUSTRADE HEIGHT, BALCONIES, JOINTS AND TOP OF COPING UPDATED
- C01 MP 07.09.21 SB BIRD & BAT BOXES ADDED / LEGEND UPDATED / WINDOWS AND PORTAL FRAMES GENERALLY UPDATED / CURTAIN WALLS UPDATED
- P03 MP 14.06.21 SB SECTIONS NUMBERS AND LEGENDS GENERALLY UPDATED / WINDOWS TYPES UPDATED / BALCONIES UPDATED / METAL CLADDING PANELS AND VERTICAL JOINTS ADDED / CW UPDATED
- P02 MP 07.05.21 SB JULIETTE AND BALCONY DOORS SWING DIRECTIONS GENERALLY UPDATED / VIEWS REARRANGEMENT
- P01 MP 28.04.21 SB FIRST ISSUE

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STATUS				

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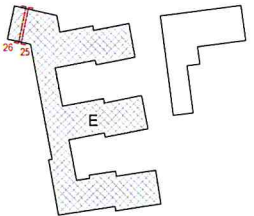
PROJECT
Station Hill, Reading

CLIENT
SH Reading (phase 1) Limited

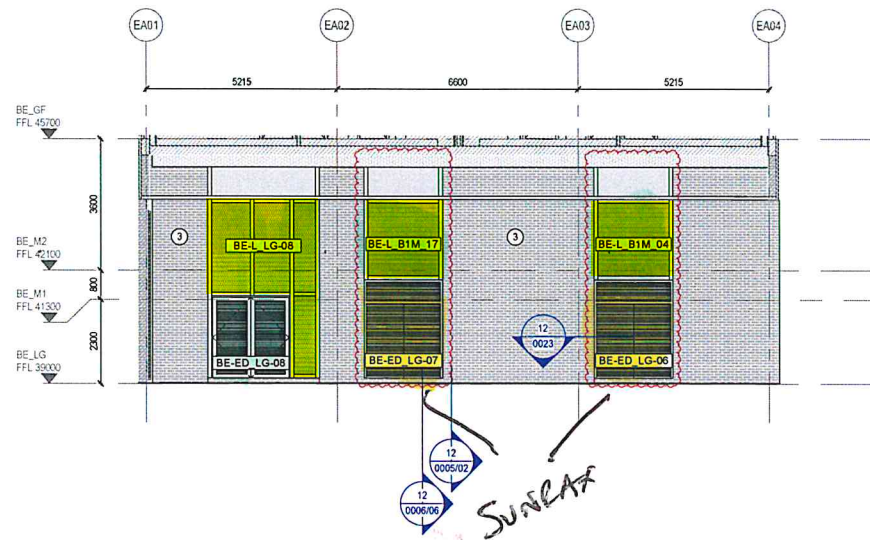
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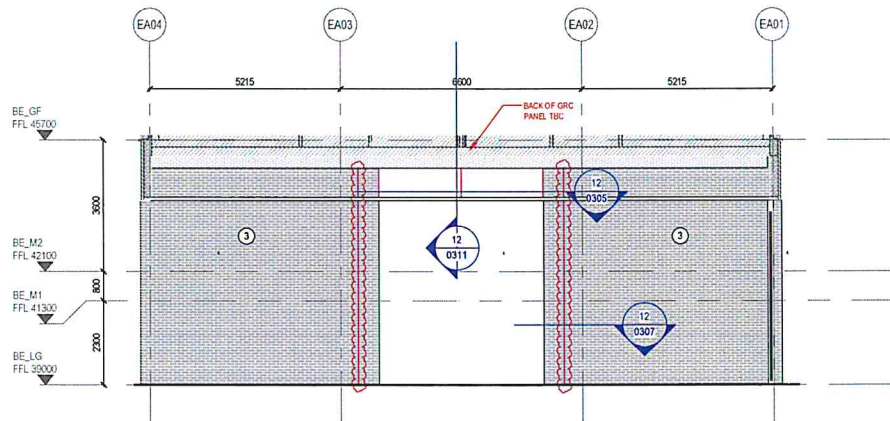
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25 Elevation 25 - Internal West Elevation 1



26 Elevation 26 - Internal West Elevation 2

C03 MP 17.05.22 SB LOUVRES, DOORS, JOINTS AND LEGEND UPDATED
C02 IM 03.12.21 SB LOUVRES UPDATED / CEILING ADDED / MATERIALS UPDATED
C01 MP 07.09.21 SB FIRST ISSUE

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Station Hill, Reading

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SH Reading (phase 1) Limited

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Elevations
Internal West Elevations

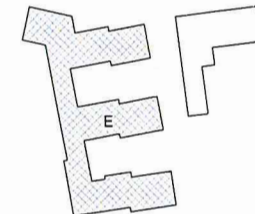
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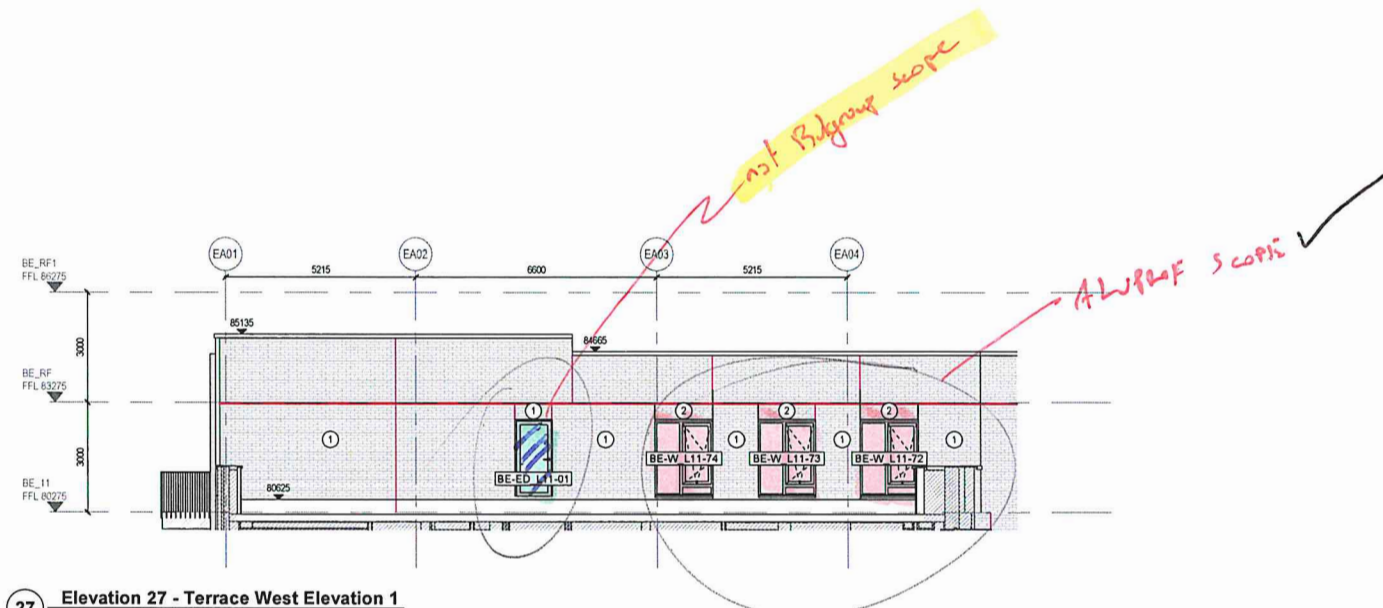


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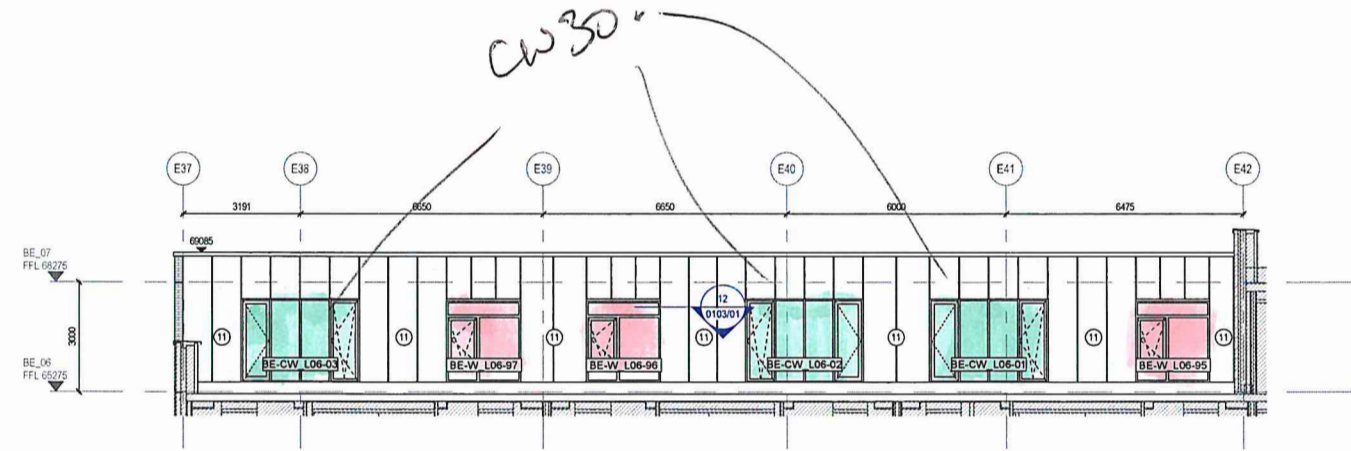
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27 Elevation 27 - Terrace West Elevation 1



28 Elevation 28 - Terrace Friars Street Elevation 1

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PROJECT				
Station Hill, Reading				
CLIENT				
SH Reading (phase 1) Limited				
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Block E				
Elevations				
Terrace Elevations				
DATE CREATED		DATE AMENDED		SCALE
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MP				SB
DRAWING NO & REVISION				
SHR-MDS-BE-ZZ-DR-A-11-0016 - C01				



Technical Submission

Mechanical Smoke Ventilation Car Park System

For
Station Hill, Reading

On behalf of

ARK Ltd

Revision	Comments.
V0.1	Draft for comment

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System Overview

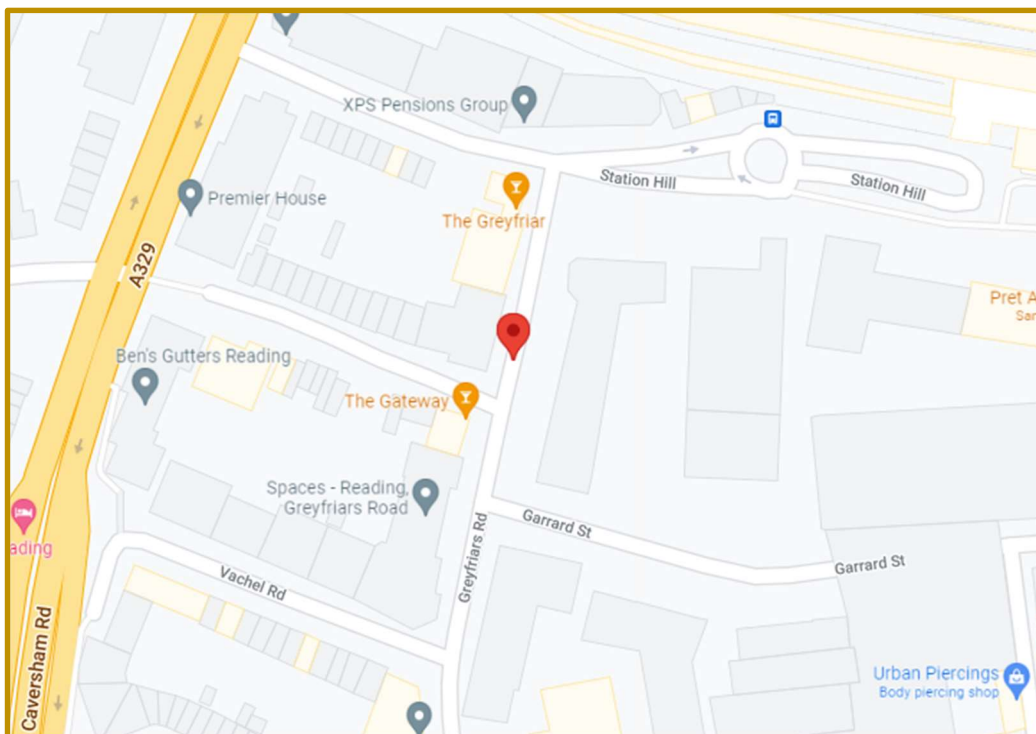
A Mechanically vented car park smoke and environmental ventilation system to a project at Station Hill, Reading.

This document relates to the multi-level car park located at the basement and lower ground level of Station hill, Reading. It details the ventilation system design.

The system design has been verified by CFD analysis.

Site Location

Station Hill Reading
42-62 Greyfriars Road
Reading RG1 1PE



Controls and Operational Strategy

The design of the smoke ventilation system which includes the mechanical extraction fans, induction fan locations and fresh air opening for the car parks ventilation system only.

The car parks will be provided with fresh air through the entry/exit which is assumed to be partly open for the purpose of the CFD modelling and provided with 50% free ventilation.

The ventilation system comprises of multiple induction fans to assist in maintaining the general flow towards the extract point. During a fire, the extract fans will meet 10 air changes per hour which is given as approximately 18m/s^2 . For day-to-day ventilation and pollution control system, the total extraction rate will meet 6 air changes per hour which is given as approximately 10.8m/s^2 .

The layout for the lower ground and basement level with the extract system and ventilation openings can be seen in the figure below:

- A User Interface (HMI) control panel will be installed (location to be confirmed), to allow monitor and control functions of the system.
- Manual Call Points (FES) will be provided (location to be confirmed) to allow operation control via key switch
- Carbon Monoxide sensors (CO) will be placed within the Car Park (locations to be confirmed) to monitor pollution, fans will be run at incremental levels to clear pollution.
- Signals from Fire Alarm system (by others). An interface will be required adjacent to the control panel for each floor level to enable automatic operation of the system if a fire is detected.
- Smoke Clearance - All fans on all levels will operate at full power when triggered either automatically via Fire Alarm signal or Manual Call Point.
- Pollution Control – Fans on the detected level will operate at low speed with incremental increase to move and remove pollution from stagnant areas.

0.45qm passive smoke vent, or 10ACH mech

Mechanical smoke ventilation shaft

Mechanical smoke vent damper, connected via a horizontal duct to smoke ventilation shaft at the end of the corridor on the level above.

0.45qm passive smoke vent, or 10ACH mech

MAIN EXTRACT

Up from Carport Street

Down to Carport Street

Up to / Down from Upper level

0.45qm passive smoke vent, or 10ACH mech

Mechanical smoke ventilation shaft

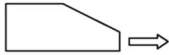
Legend:

- Blue box: Extended travel distance - Push/Pull smoke ventilation arrangement
- Pink line: Compliant travel distance - Single point of smoke ventilation
- Green line: Extended travel distance - Mechanical extract, passive inlet
- Yellow box: Compliant travel distances in two directions - Unventilated corridor, not adjoining a stair
- Orange box: Ventilated lobby, protected by 0.45qm passive vent or 10ACH

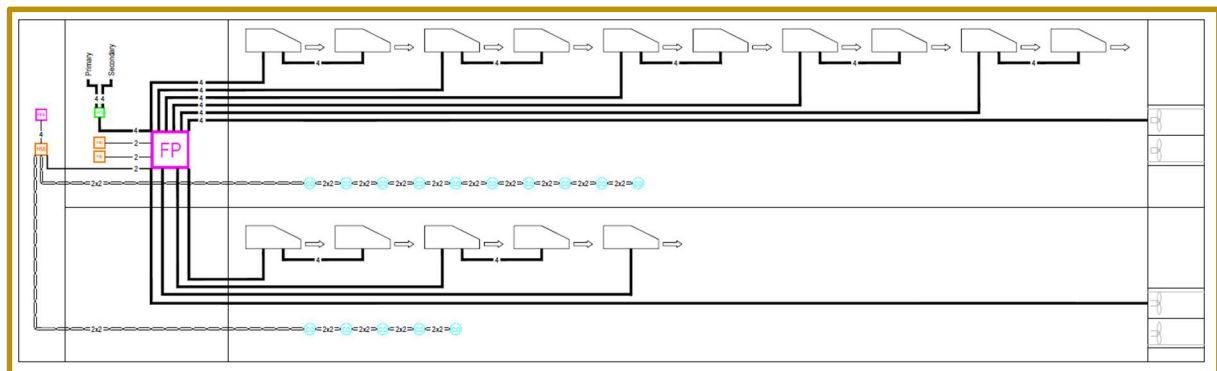
Schematics

Please see attached document for full schematic layout and key

Schematic Key

Automatic Transfer Switch		Induction Fan	
Fire Alarm Interface Module		Carbon Oxide Sensor	
Firefighter's Extract Override Switch		Fan Panel	
Extract Fan		Human Machine Interface	

Schematic Layout



Equipment Schedule.

<u>Equipment</u>	<u>Model</u>	<u>Lower Ground</u>	<u>Basement</u>	<u>Totals</u>
Extract Fan	LCS112F4-A6/25	2	0	2
Attenuator –	R02 5 (16.820m3/s)	4	0	4
Extract Fan	LCS090N4-A12/27	0	2	2
Attenuator –	R02 5 (9m3/s)	0	4	4
Induction Fan	JVC/F3B-50N-2-AI	10	5	15
HMI control panel	Sertus	1	0	1
Power Control Panel	Sertus BCP-R	1	0	1
CO Sensors	CBS-R CMS	10	5	5
ATS (Primary / Secondary supply)	Sertus 32.4 ATS-R	1	0	1
Firefighter's Smoke Vent Override Switch	CAS-R 3- Position Key Switch	1	1	2

Data Sheets.

GUI Control Panel

Technical Data Sheet –

Graphical User Interface (CAS-R | GUI)



The Sertus Graphical User Interface (CAS-R | GUI) comprises of a 15" resistive touch screen and 24V power supply unit within a hinged tamperproof lockable powder coated steel containment. The GUI receives, process and interprets signals from the addressable field devices and provides overall control of smoke and environmental ventilation within each address, zone, and group.

Specific Features

- Simple user interface with intuitive touch screen which provides firefighting override and control, and flexible engineer programming in smoke and environmental option.
- Fully addressable and provides overall control of each address, zone, and group in both smoke and environmental mode.
- Certified to BS EN 50130-4:2011 + A1:2014 Alarm systems. Electromagnetic compatibility. Product family standard: Immunity requirements for components of fire, intruder, hold up, CCTV, access control and social alarm systems.
- Designed in accordance with the standard ANSI/ISA-18.2-2009 Management of Alarm Systems and provides an extensive event and alarm log within its flash card memory.

Product Description

The Sertus Graphical User Interface (CAS-R | GUI) comprises of a 15" resistive touch screen and 24V power supply unit within a hinged tamperproof lockable powder coated steel containment. The GUI receives, process and interprets signals from the addressable field devices and provides overall control of smoke and environmental ventilation within each address, zone, and group. The GUI touch screen provides user status view and interrogation, firefighting override and control, alarm logging and engineer's access and is usually installed at the firefighter entrance lobby or the command and control centre.

The GUI screen displays essential site information including location and emergency contact details and provides access to site location plans and cabling schematics from a menu driven operating system. In steady mode the screen will display a home page and contact details, in environmental mode indications will display real time clock (RTS) schedule, fan speed, and addresses activated, and in fire mode indication will

Extract and Induction Fans

Two sets of Extract fans will be used for both environmental and smoke extract, venting to external.

Induction fans will be used across each level to direct pollution or smoke products towards Extract fans.

Fan Data sheets

Smoke fans to EN12101-3:2015 (2797-CPR-493001) suitable for once-only use at 300°C for 2 hours as well as continuous use at ambient (subject to ErP requirements). Motor Class H - TEAO - IP55. Construction: Casing - mild steel hot-dip galvanised; Impeller - aluminium.
Fans have been selected for operation in parallel with non-return dampers fitted to limit re-circulation.

Location Designation	Item 1	Item 2	Induction Fans
Catalogue Code	LCS090N4-A12/27	LCS112F4-A6/25	JVC/F3B-50N-2-AI (4 Pole speed)
Description	Long-Cased Smoke	Long-Cased Smoke	Induction Fan
Nominal Diameter (mm)	900	1120	790
Hub Size (mm)	251	352	-
Impeller	Axial, Aluminium	Axial, Aluminium	Centrifugal
Notes			
Volume (m³/s)	9.00	16.83	0.00
Static Pressure (Pa)	300	300	0.00
ABS/LL Power (kW)	6.58 / 6.63	13.02 / 13.07	0.00 / 0.00
Fan Speed (r/min)	1440	1460	1440
FMEG/SFP	47/0.81	48/0.85	0/0.00
Sound Pressure (dB(A))	81 @ 3m	80 @ 3m	64 @ 3m
Fan Weight (kg)	147.9	264.2	113.0
Motor Power	9.00kW (AOM)	13.20kW (AOM)	1.38kW
Electrical Supply	400V 3ph 50Hz	400V 3ph 50Hz	400V 3ph 50Hz
FLC/Start (A)	16.56 / 117.71 (DOL)	24.96 / 157.46 (DOL)	3.40 / 16.01 (DOL)
Motor Frame	132M	160M	90S
Motor Type	F300 (IE3)	F300 (IE3)	
Motor Speed	4 pole	4 pole	4 pole
Number off	2	2	15

LCS090N4-A12/27

Technical Data - Fan Model LCS090N4-A12/27

Location: Item 1

Designation:

Performance - Required

Air Flow: 9.00 m³/s
 Static Pressure: 300 Pa
 Selection Pressure: 336 Pa
 Installation Type: TYPE D
 Air Density: 1.204 kg/m³
 - Atmos. Temp: 20 °C
 - Altitude: 0 m
 - Humidity: 0.0 %

Actual

Air Flow: 9.12 m³/s
 Static Pressure: 346 Pa
 Total Pressure: 469 Pa

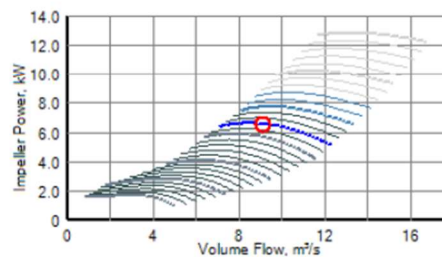
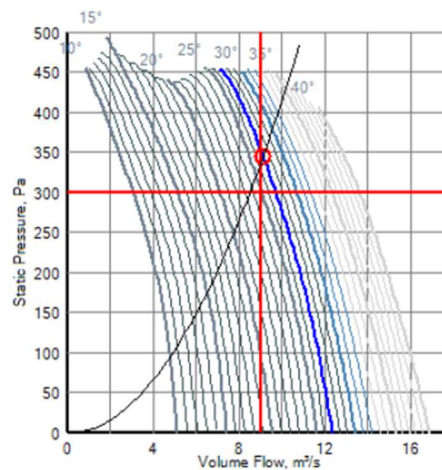
Fan Data

Catalogue Code: LCS090N4-A12/27
 (LCS090-717-IE3-132-7.5-4-251-38-RA12)
 Description: Long-Cased Smoke

Diameter: 900 mm Hub: 251 mm
 Impeller Type: Axial Pitch: 27°
 Blade Material: Aluminium Blades: 12
 Speed: 1440 r/min @50 Hz Form: B
 Power, Abs: 6.58 kW Peak: 6.63 kW
 Input Power: 7.26 kW
 Efficiency Total: 65.1% Static: 47.9%
 SFP: 0.81

Motor Data (at STP)

Motor Type: F300 (IE3)
 Electrical Supply: 400V 3ph 50Hz
 Motor Frame: 132M
 Motor Power: 9.00kW (AOM) (7.50kW IEC)
 FLC/Start (DOL): 16.56A (AOM) / 117.71A (13.80A FL IEC)
 Motor Speed: 4 pole
 Motor Efficiency: 90.6%



Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	91	83	90	94	98	95	90	84	102	81
Outlet (dB):	92	85	88	95	100	95	91	85	103	82

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.

Technical Data - Fan Model LCS090N4-A12/27

Location: Item 1

Designation:

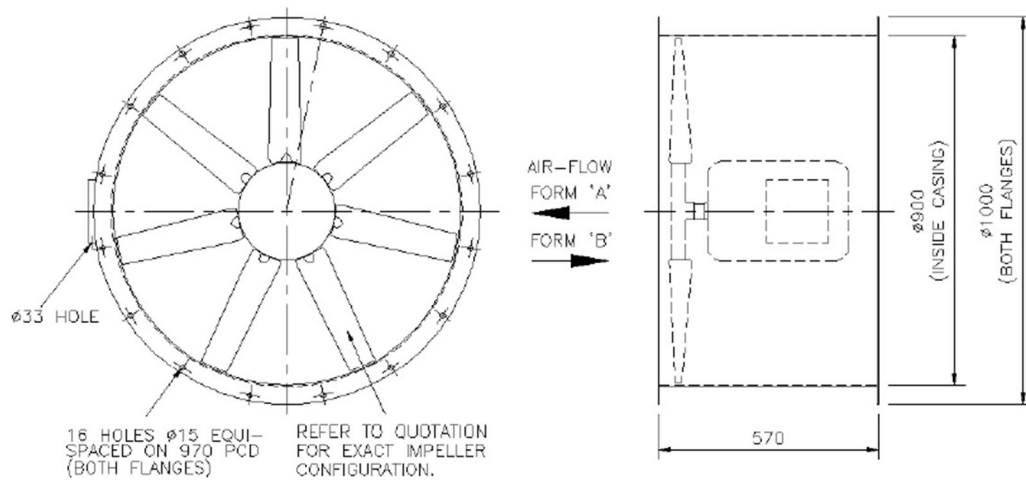
Energy Related Product Data

Overall Efficiency: 46.2%
 Measurement Category: C
 Efficiency Category: Static
 FMEG: 47
 Specific Ratio: 1

At Maximum Efficiency Point

Input Power: 7.21 kW
 Air Flow: 7.62 m³/s
 Pressure: 437 Pa
 Speed: 1440 r/min

Drawing for Fan Model LCS090N4-A12/27



LCS112F4-A6/25

Technical Data - Fan Model LCS112F4-A6/25

Location: Item 2

Designation:

Performance - Required

Air Flow: 16.83 m³/s
 Static Pressure: 300 Pa
 Selection Pressure: 353 Pa
 Installation Type: TYPE D
 Air Density: 1.204 kg/m³
 - Atmos. Temp: 20 °C
 - Altitude: 0 m
 - Humidity: 0.0 %

Actual

Air Flow: 17.08 m³/s
 Static Pressure: 363 Pa
 Total Pressure: 544 Pa

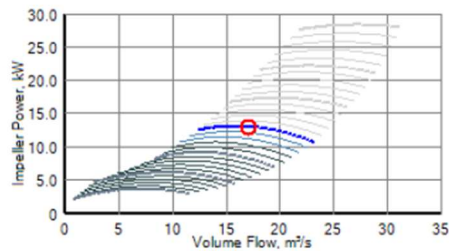
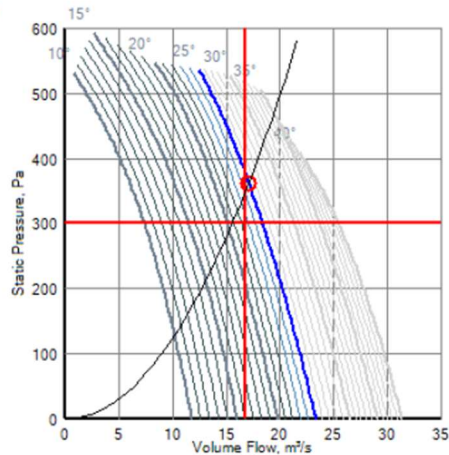
Fan Data

Catalogue Code: LCS112F4-A6/25
 (LCS112-717-IE3-160-11-4-352-42-RA6)
 Description: Long-Cased Smoke

Diameter: 1120 mm Hub: 352 mm
 Impeller Type: Axial Pitch: 25°
 Blade Material: Aluminium Blades: 6
 Speed: 1460 r/min @50 Hz Form: B
 Power, Abs: 13.02 kW Peak: 13.07 kW
 Input Power: 14.30 kW
 Efficiency Total: 71.4% Static: 47.6%
 SFP: 0.85
 Fan Weight: 264.2 kg

Motor Data (at STP)

Motor Type: F300 (IE3)
 Electrical Supply: 400V 3ph 50Hz
 Motor Frame: 160M
 Motor Power: 13.20kW (AOM) (11.00kW IEC)
 FLC/Start (DOL): 24.96A (AOM) / 157.46A (20.80A FL IEC)
 Motor Speed: 4 pole
 Motor Efficiency: 91.0%



Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	99	101	98	98	95	94	91	86	106	80
Outlet (dB):	99	102	97	96	94	93	90	87	106	79

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.

Technical Data - Fan Model LCS112F4-A6/25

Location: Item 2

Designation:

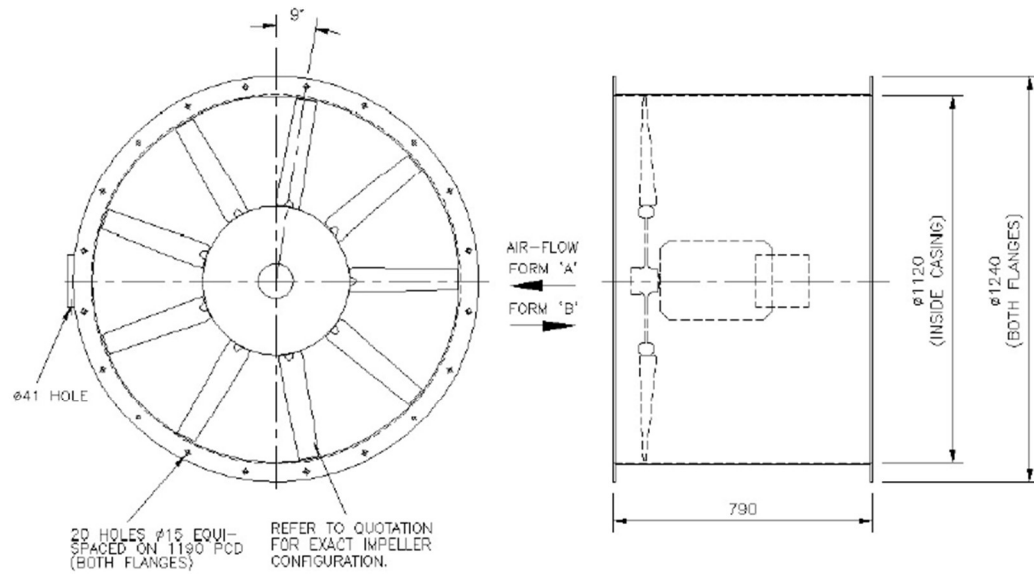
Energy Related Product Data

Overall Efficiency: 48.6%
 Measurement Category: C
 Efficiency Category: Static
 FMEG: 48
 Specific Ratio: 1

At Maximum Efficiency Point

Input Power: 13.80 kW
 Air Flow: 13 m³/s
 Pressure: 531 Pa
 Speed: 1460 r/min

Drawing for Fan Model LCS112F4-A6/25



JVC/F3B-50N-2-AI

Technical Data - Fan Model JVC/F3B-50N-2-AI (4 Pole speed)

Location: Induction Fans

Designation:

Please Note: Data shown is nominal - enter more criteria for accurate detail.

Performance - Required

Air Flow : 0.00 m³/s
 Static Pressure : 0 Pa
 Selection Pressure: 0 Pa
 Installation Type: n/a
 Air Density: 1.204 kg/m³
 - Atmos. Temp: 20 °C
 - Altitude: 0 m
 - Humidity: 0.0 %

Actual

Air Flow: 0.00 m³/s
 Static Pressure: 0 Pa
 Total Pressure: 0 Pa

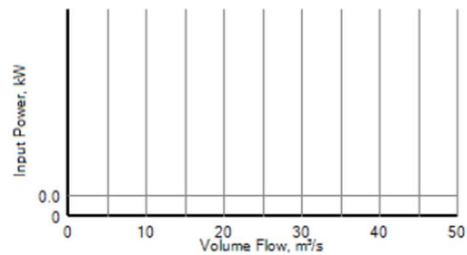
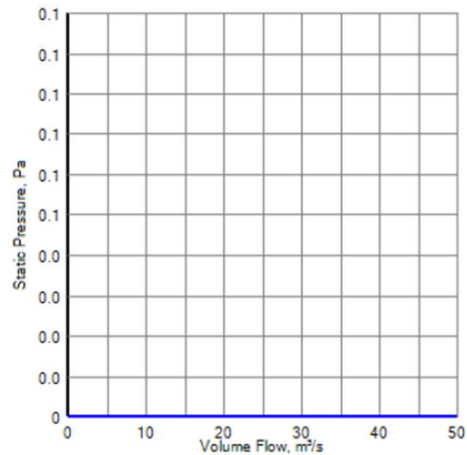
Fan Data

Catalogue Code: JVC/F3B-50N-2-AI (4 Pole speed)
 Description: Induction Fan

Diameter: 790 mm
 Impeller Type: Centrifugal
 Blade Material: -
 Speed: 1440 r/min @50 Hz
 Power, Abs: - Peak: -
 Input Power: -
 Efficiency Total: - Static: -
 SFP: -
 Fan Weight: 113.0 kg

Motor Data (at STP)

Motor Type:
 Electrical Supply: 400V 3ph 50Hz
 Motor Frame: 90S
 Motor Power: 1.38kW
 FLC/Start (DOL): 3.40A / 16.01A
 Motor Speed: 4 pole
 Motor Efficiency: -



Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	76	85	83	83	79	77	73	65	90	64

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.

Noise reduction

The extract fans will be installed with attenuation units before and after the fan unit.

To Attention Project Title Quote Ref. Date Prepared by Page				Technical Data This quotation is valid for acceptance for 30 days and is subject to Acoustica Products Limited terms and conditions of sale. The products described below have parameters of recommended use and may be required to be positioned in certain configurations in relation to other equipment. Detailed specifications and installation & Maintenance instructions are available on request, if in doubt we will be pleased to furnish the relevant data.				 2 Condor Way, Whitehall Industrial Estate Essex, CO2 8JN Tel 01206 848245 Fax 01206 700234 Email Btaylor@acoustica.co					
Reference	Model	Air Flow Vol. m ³ /s	Pressure Drop (Pa)	Weight	Melinex	Static Insertion Loss (dB) at Octave Band Centre Frequency							
						63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Basement Inlet	R02 5-1500	9.000	49	301 kg	No	7	11	23	37	45	45	32	22
Basement Outlet	R02 5-1500	9.000	49	301 kg	No	7	11	23	37	45	45	32	22
Lower Ground Inlet	R02 5-2500	16.830	56	993 kg	No	12	21	36	50	50	50	50	34
Lower Ground Outlet	R02 5-2500	16.830	56	993 kg	No	12	21	36	50	50	50	50	34

Notes

In order to achieve optimum performance, the ideal location of attenuators is inside the plantroom, adjacent to the penetration of the plant room structure. This ensures that noise breaking into the duct between the fan and the penetration is attenuated and also those noise levels in the ductwork outside the plantroom are at a minimum so that noise breakout is controlled. Where fans are not situated within a plantroom, attenuators should be fitted as close to the fan as possible, whilst allowing a suitable plenum space, in order to minimise noise breakout from the ductwork.

Fire Rated Duct Work

Flo-vent Ltd propose to use a ductwork system designed and licenced by Firemac Ltd, this allows our specialist to custom design and manufacturer the ductwork required with independent inspection and certification of the finished product.

The system meets BS EN 1366pt1/pt8

Extract from Firemac Ltd

FIREMAC FM FIRE DUCT SYSTEMS

Building Regulations require that new buildings must be divided into fire compartments and provide means of escape in order that the spread of fire in the building is contained. Obvious areas of weakness include doors, building services, and ventilation ductwork passing from one compartment to another. In particular, the standard ventilation ductwork system offers little or no protection against fire spread, and to overcome this fire resistant ductwork is used.

Firemac FM Fire Duct systems gives ductworkers complete control of both fabrication and installation of fire resistant ducts where required in commercial developments.

This means that the full system is manufactured under strict factory controls to Firemac's required technical standards. All manufacturers of Firemac FM Duct systems are re-trained and audited annually by qualified ISO Internal Auditors.

FM Fire Duct systems have been designed around the needs of ductworkers, enabling them to manufacture fire resistant ductwork in their own factories without the need for third party suppliers.

Using FM Fire Duct systems puts all elements of a contract in the hands of the ductworker, and allows entry into a specialist market segment, without the need to develop highly expensive in-house systems.

Full training in the fabrication of fire resistant ductwork is given, and as part of Firemac's service commitment we work alongside our customers as the ductworker's technical support department. Firemac can deal directly with specifiers and consultants on any queries relating to fire protection, whether at the tender, fabrication, install or sign-off stage.

Firemac FM Fire Ducts are suitable for ventilation, smoke extract, kitchen extract, and pressurisation ductwork systems, offering up to 240min fire resistance when tested to BS 476: Part 24: 1987 (ISO 6944: 1985). Firemac FM Fire Ducts have passed the required flammability, smoke and toxicity tests required for use in underground metro projects.

FIREMAC FM FIRE DUCT SYSTEM TEST SUMMARY

TEST STANDARD: EN 1366-1

	ORIENTATION		DUCT TYPE		FIRE RESISTANCE			
	Horizontal Orientation	Vertical Orientation	Duct Type A	Duct Type B	Mechanical Stability	Integrity	Insulation	Smoke Leakage
Firemac FM120 Fire Duct System (EN)	X	X	X	X	X	X		

EN 1366-1 outlines the method for determination of the fire resistance of ventilation ductwork. This standard exposes the duct to a cellulosic heat curve. This procedure entails testing duct type A (for fire outside) and duct type B (for fire inside and outside) in horizontal and vertical orientation, giving consideration to the following performance criterion:

This is the time in completed minutes for which the test specimen continues to maintain its separating function during the test without:

- Ignition of the cotton pad applied, as defined within EN 1363-1.
- Permitting the penetration of a gap gauge, as defined within EN 1363-1.
- Resulting in sustained flaming, as defined within EN 1363-1.
- the volume flow rate measured in duct A exceeds $15 \text{ m}^3 / (\text{m}^2 \text{ h})$, related to 20°C and 1013 mbar, related to the internal surface area of the duct inside the furnace.

Smoke Leakage: Failure of this criterion shall have occurred if the flow rate in duct A during the test exceeds $10 \text{ m}^3 / (\text{m}^2 \text{ h})$, related to 20°C and 1013 mbar, related to the internal surface area of the duct inside the furnace.

Please note that where the duct is located 500mm or more from personnel or combustible materials – the approval authority may accept a relaxation upon the insulation requirement.



FIREMAC FM FIRE DUCT SYSTEM TEST SUMMARY

TEST STANDARD: EN 1366-8

	ORIENTATION		DUCT TYPE		FIRE RESISTANCE			
	Horizontal Orientation	Vertical Orientation	Duct Type A	Duct Type B	Stability	Integrity	Insulation	Smoke Extract
Firemac FM 120S Fire Duct System (EN)	X	X	X	X	X	X		X

EN 1366-8 outlines the method for determination of the fire resistance of smoke control ductwork. This standard exposes the duct to a cellulosic heat curve. This procedure entails testing duct type C, giving consideration to the following performance criterion:

Leakage: The duct shall not have a leakage exceeding 10 m³/h per 1 m² of internal surface area. This shall be related to the surface area of the duct from the perforated plate to the end of the duct by the inlet nozzles.

Integrity:

This is the time in completed minutes for which the test specimen continues to maintain its separating function during the test without:

- Ignition of the cotton pad applied, as defined within EN 1363-1.
- Permitting the penetration of a gap gauge, as defined within EN 1363-1.
- Resulting in sustained flaming, as defined within EN 1363-1.
- the volume flow rate measured in duct A exceeds 15 m³ / (m² h), related to 20°C and 1013 mbar, related to the internal surface area of the duct inside the furnace.

Reduction in cross-section: The internal dimensions (width and height for rectangular ducts, diameter for circular duct) of the smoke extracting ductwork shall not decrease by more than 10 % during the test. This shall be by the measurements taken in accordance with 10.3.6 and 10.3.7.

Mechanical stability: If the duct inside the furnace collapses, so that it can be judged as not being able to maintain its smoke extraction or fire resistance function, this shall be regarded as failure under the criterion of mechanical stability.

Please note that where the duct is located 500mm or more from personnel or combustible materials – the approval authority may accept a relaxation upon the insulation requirement.



FIREMAC FM FIRE DUCT SYSTEM TEST SUMMARY

TEST STANDARD: BS 476: PART 24: 1987

	ORIENTATION		DUCT TYPE		FIRE RESISTANCE			
	Horizontal Orientation	Vertical Orientation	Duct Type A	Duct Type B	Stability	Integrity	Insulation	Smoke Extract
Firemac FM 60 Fire Duct	X	X	X	X	X	X		
Firemac FM 60i Fire Duct	X	X	X	X	X	X	X	
Firemac FM 60S Fire Duct	X	X	X	X	X	X		X
Firemac FM 60Si Fire Duct	X	X	X	X	X	X	X	X
Firemac FM 120 Fire Duct	X	X	X	X	X	X		
Firemac FM 120i Fire Duct	X	X	X	X	X	X	X	
Firemac FM 120S Fire Duct	X	X	X	X	X	X		X
Firemac FM 120Si Fire Duct	X	X	X	X	X	X	X	X
Firemac FM 240 Fire Duct	X	X	X	X	X	X		

BS 476: Part 24: 1987 outlines the method for determination of the fire resistance of ventilation ductwork. This standard exposes the duct to a cellulosic fire curve. This procedure entails testing duct type A (for fire outside) and duct type B (for fire inside and outside), evaluating their performance in horizontal and vertical orientation, giving consideration to the following performance criteria:

Stability: Stability failure shall be deemed to have occurred in duct A within the furnace, and in ducts A and B outside the furnace when the duct collapses in such a manner that the duct no longer fulfils its intended function.

Integrity: The presence and formation in the test specimen of cracks, holes or other openings outside the furnace through which flames or hot gases can pass shall constitute integrity failure. Integrity failure shall also be deemed to have occurred when the cotton pad referred to in ISO 834 subclause 6.2.3.1 is ignited.

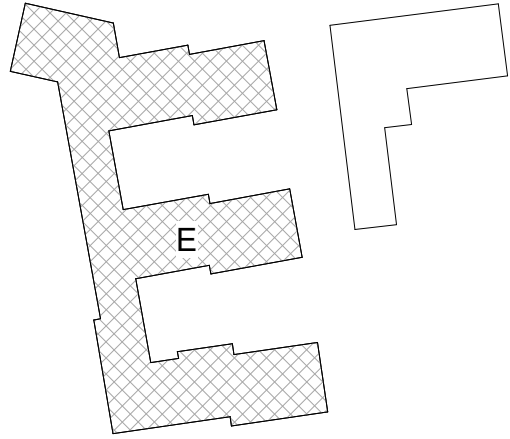
Insulation: Insulation failure shall be deemed to have occurred when the temperature rise above initial ambient temperature in the laboratory on the unexposed surface of the test specimen outside the furnace exceeds either 140°C as an average value (see 5.1.4); or 180°C as a maximum value read by any surface thermocouple.

Please note that where the duct is located 500mm or more from personnel or combustible materials – the approval authority may accept a relaxation on the insulation requirement.

The annex to the test standard includes guidance which considers that a duct is required to extract smoke in the event of a fire must maintain over 75% of its cross sectional area when exposed to a fully developed fire. The annex also includes guidance for kitchen extract ducts, with consideration given to an additional performance criterion intended to prevent the ignition of grease inside the duct when there is a fire outside the kitchen compartment. It must, however, be noted that as kitchens are normally within a fire-resisting compartment, the fire entering the kitchen from a duct is unlikely to spread further than the kitchen – and so most approval authority's may accept that the main risk is a fire starting within the kitchen, entering the duct and passing to other compartments. In such a situation, there is a less onerous requirement with regards to the kitchen extract criterion.



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SUFFIX_B: REFERS TO BRONZE ALUMINIUM WINDOWS FRAMES (RAL 7006)
SUFFIX_G: REFERS TO GREY ALUMINIUM WINDOWS FRAMES (RAL 7022)

LEGEND

ALUMINIUM RAL 7006

LOUVRE MATERIALS TBC

C04	MT	23.09.22	DM	LOUVRE DIMENSION UPDATED
C03	MP	16.05.22	SB	LOUVRES DIMENSIONS UPDATED
C02	IM	14.01.22	SB	TYPE 04 OMITTED / LOUVRES REMOVED / DIMENSION UPDATED
C01	IM	05.11.21	SB	LOUVRE UPDATED
P01	IM	21.09.21	SB	FIRST ISSUE

REV	BY	DATE	CHK	DESCRIPTION

FOR CONSTRUCTION

CONTRACTOR

MIDGARD LTD

PROJECT

Station Hill, Reading

CLIENT

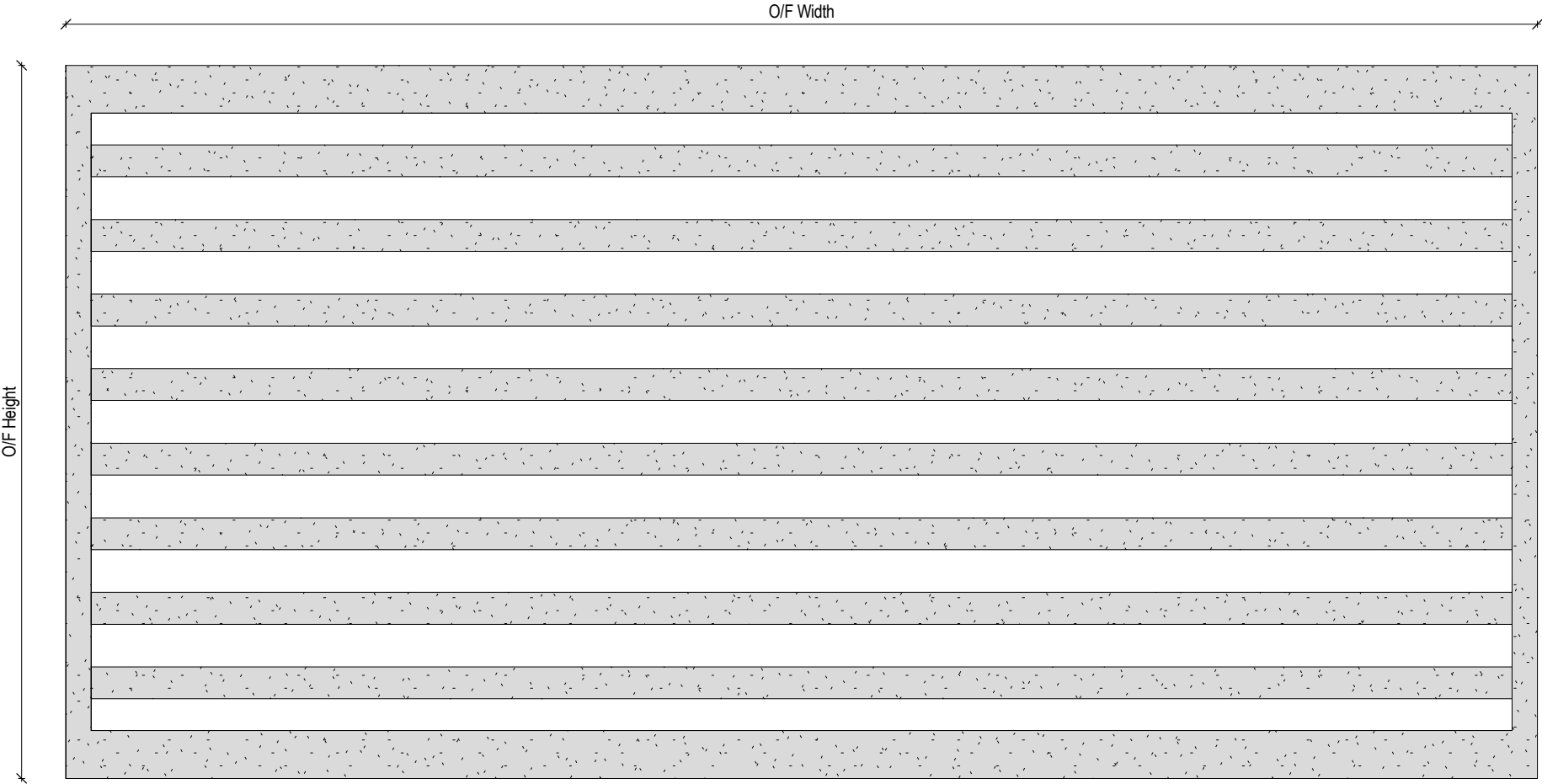
SH Reading (phase 1) Limited

DRAWING TITLE

Block E
Louvre Types
Sheet 1

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DRAWN BY IM	AMENDED BY MT	CHECKED DM

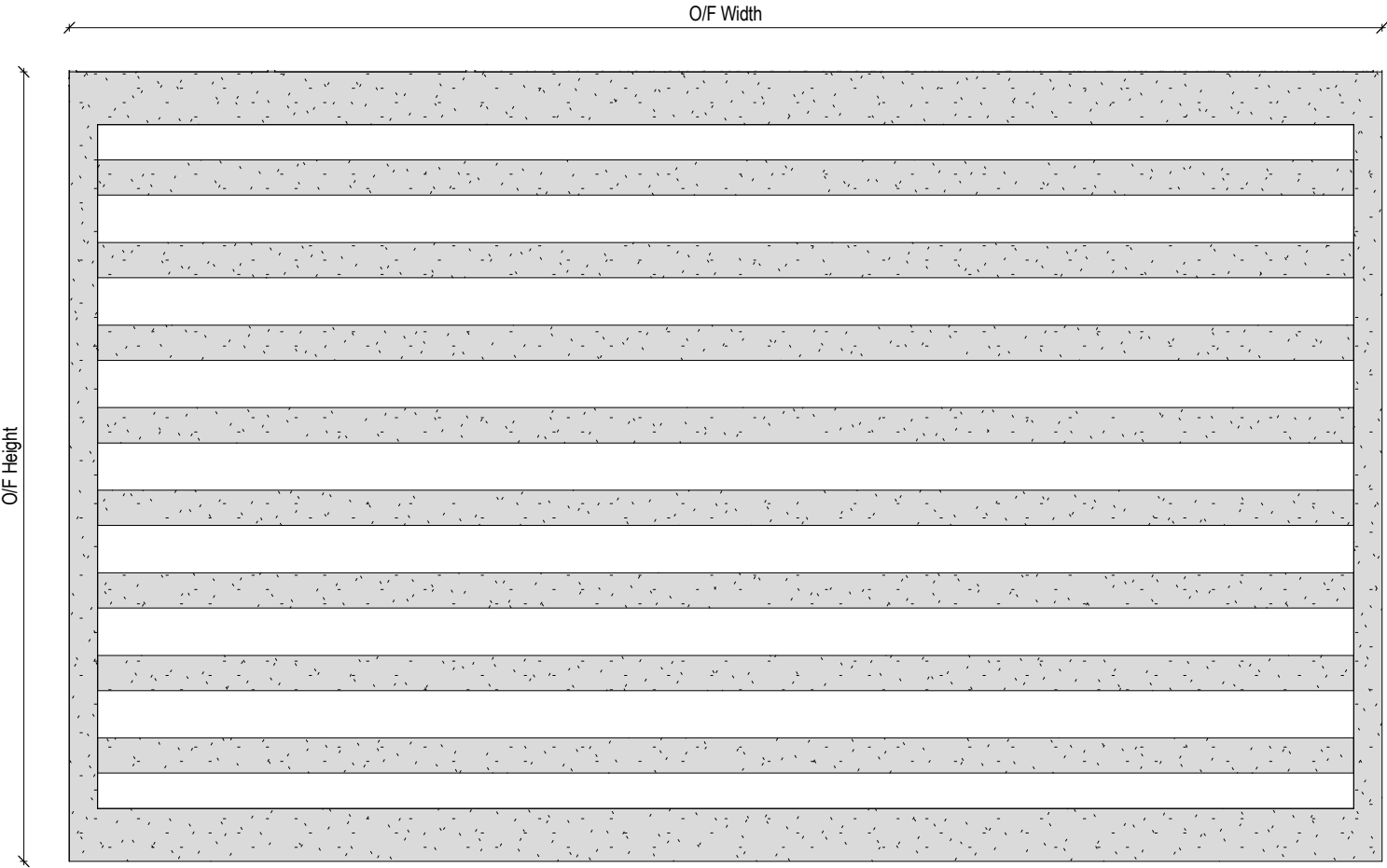
DRAWING NO & REVISION
SHR-MDS-BE-ZZ-DR-A-17-0032 - C04



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E-LOU-01

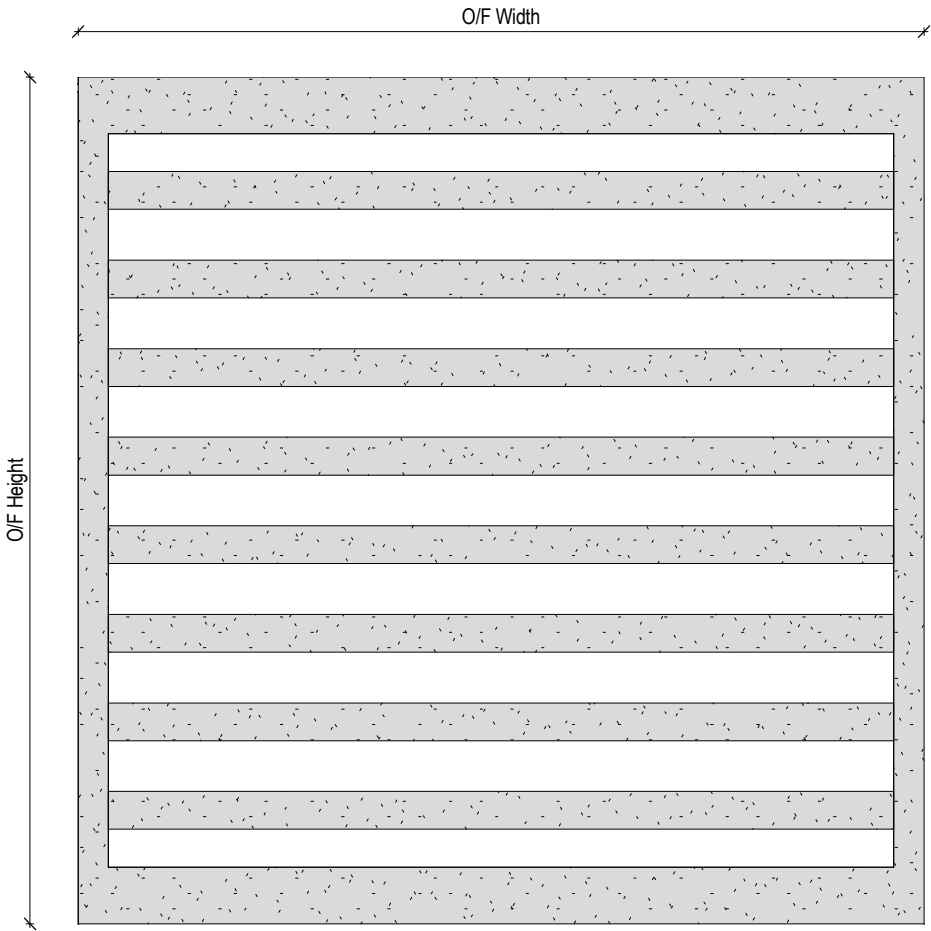
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E-LOU-02

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E-LOU-03

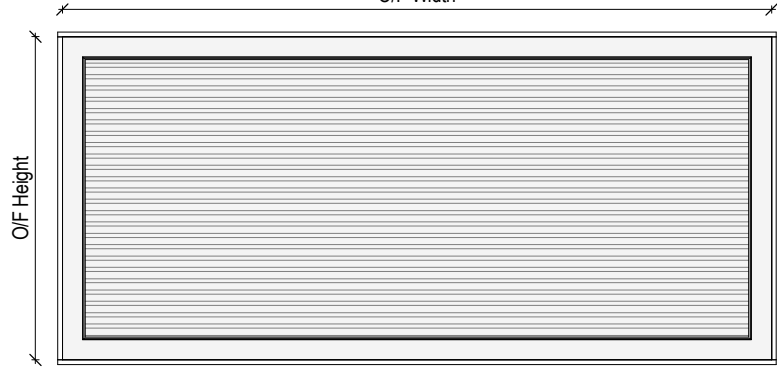
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E-LOU-05

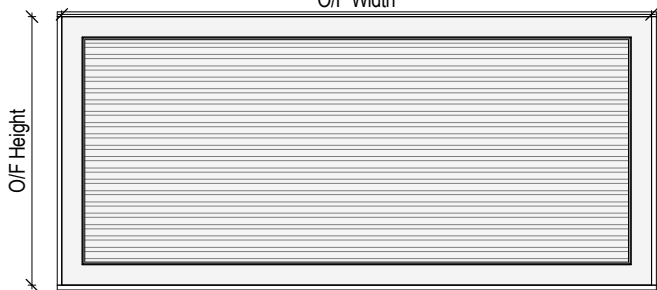
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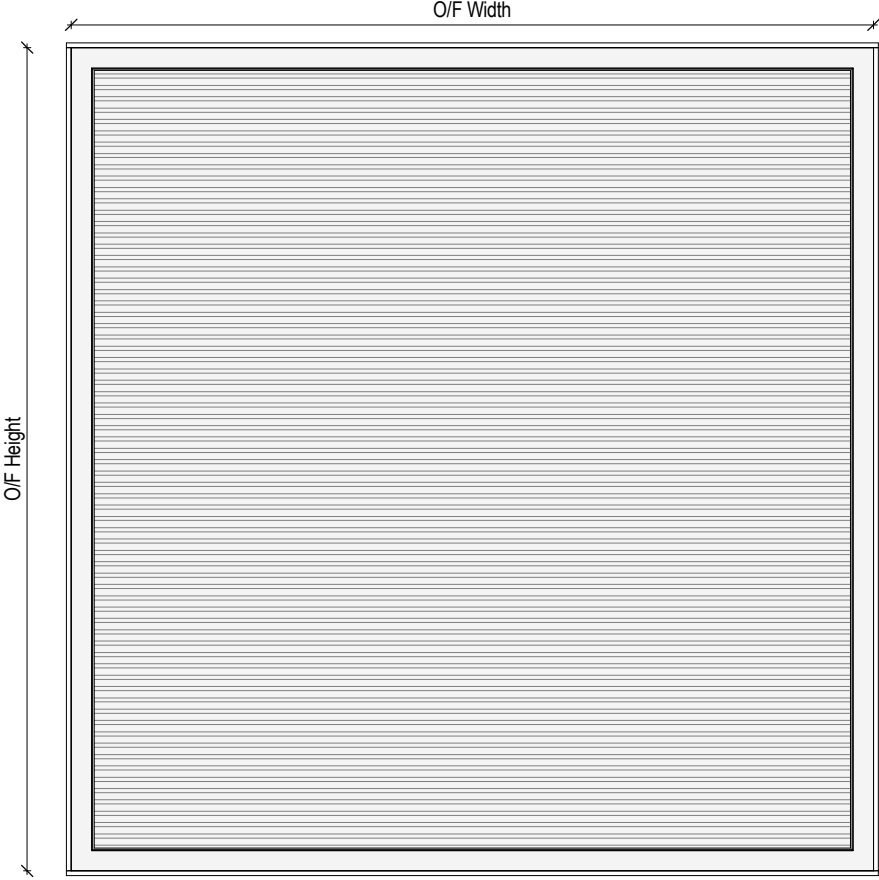
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E-LOU-07

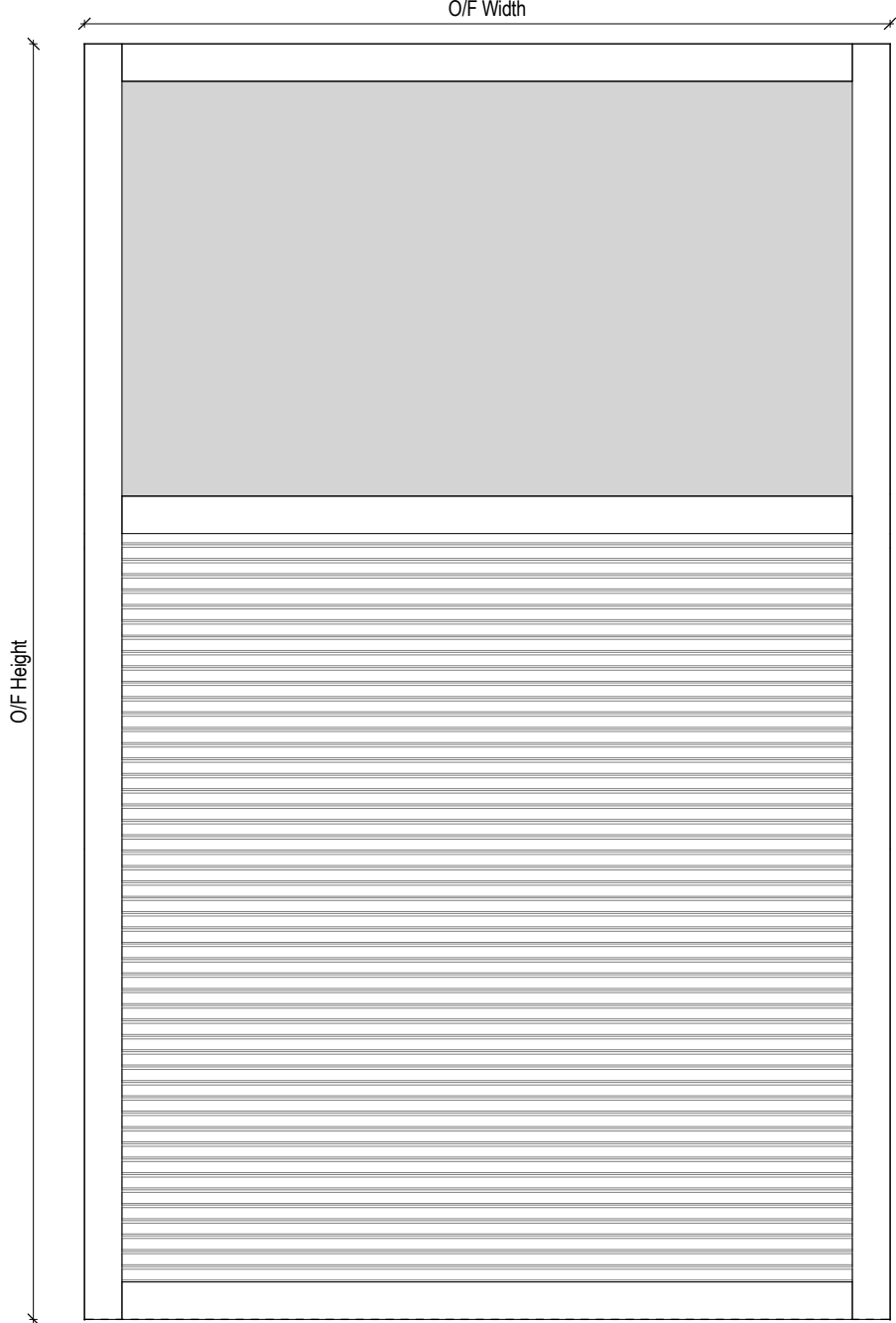
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E-LOU-08

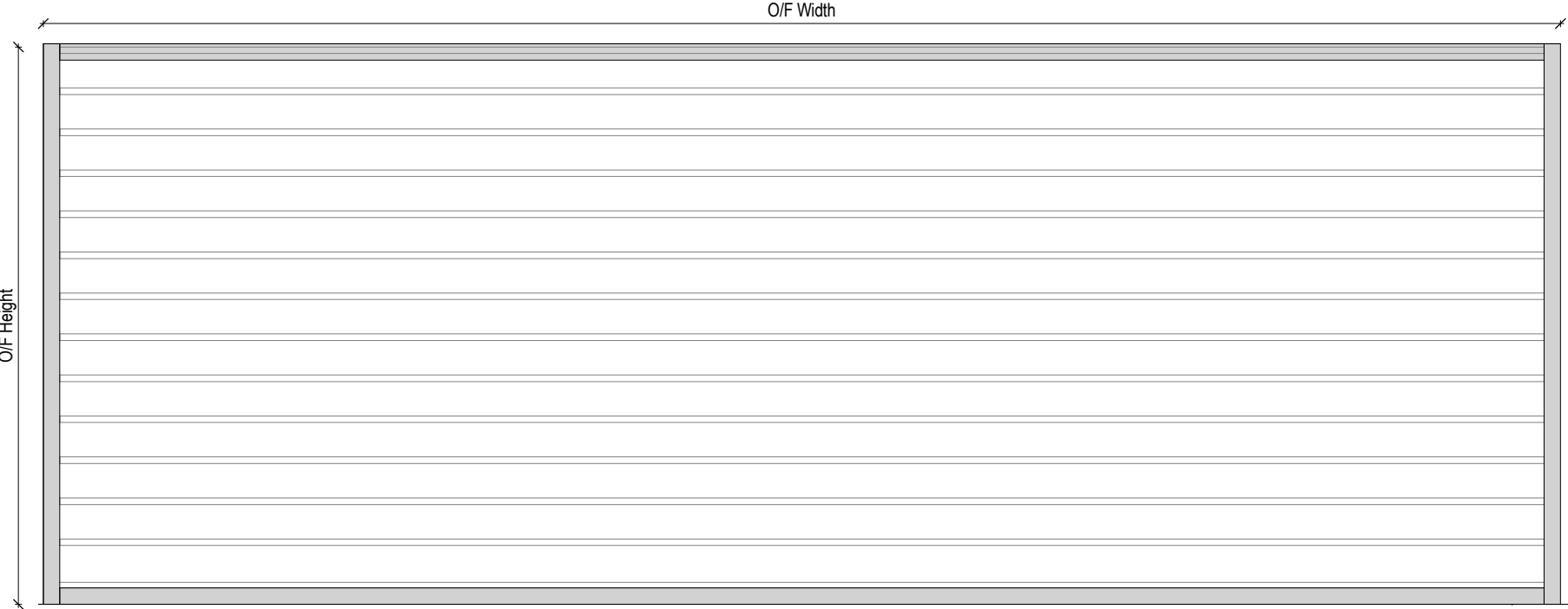
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E-LOU-09

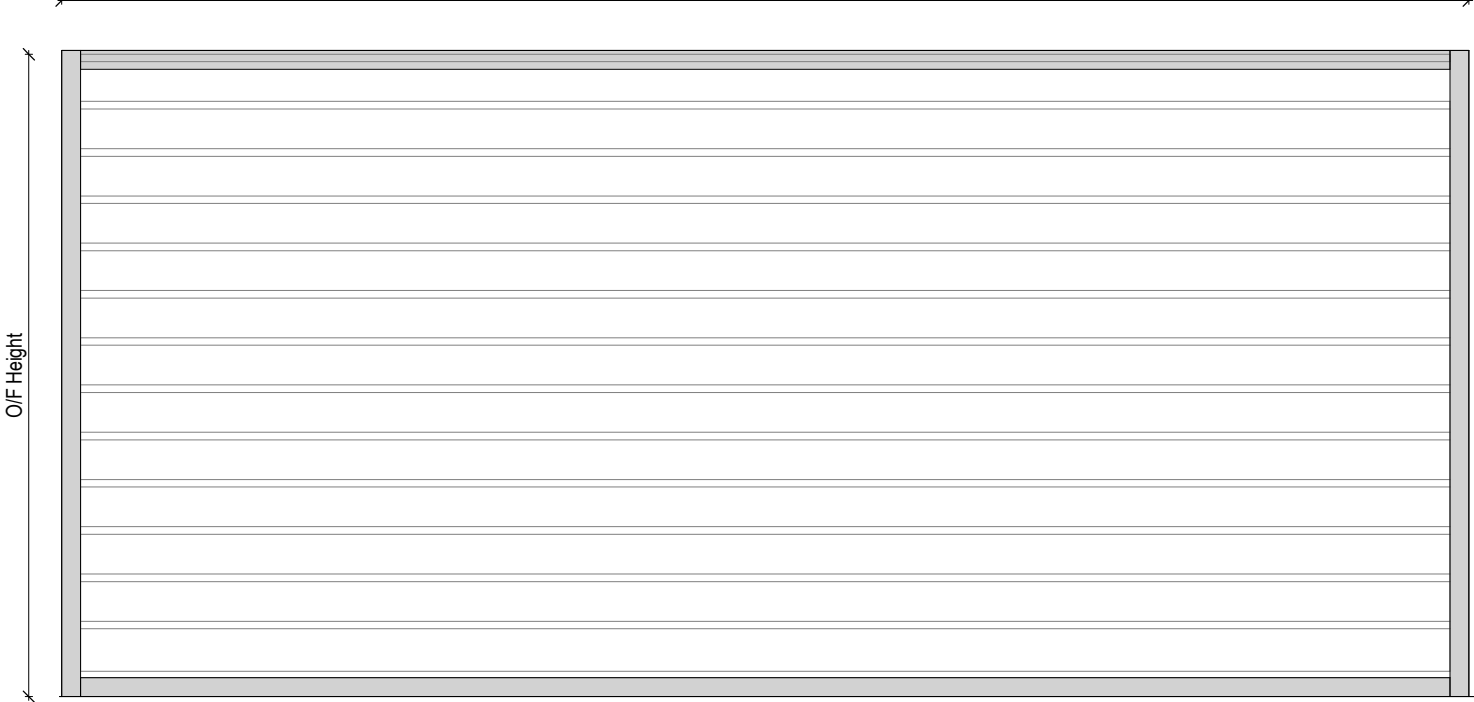
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TYPE Internal Garrard Street E-LOU-10

E-LOU-10

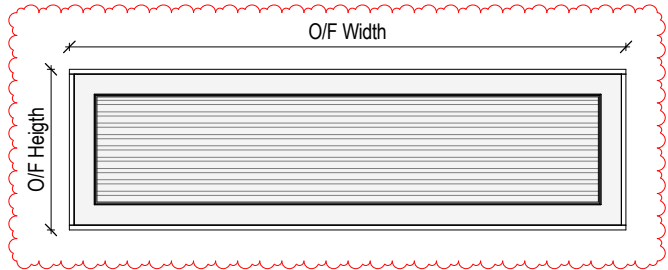
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TYPE Internal Garrard Street E-LOU-11

E-LOU-11

Type	O/F Height	O/F Width	Count
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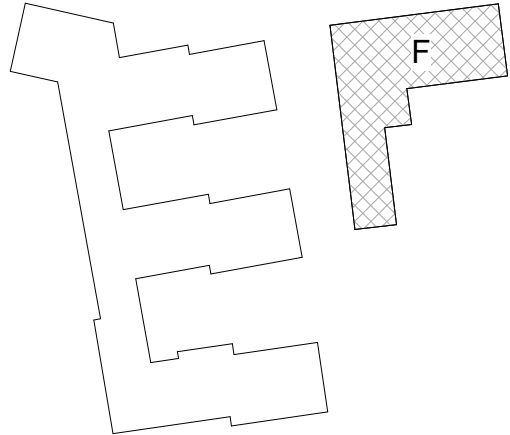


TYPE West Elevation E-LOU-12

E-LOU-12

Type	O/F Height	O/F Width	Count
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SUFFIX_G: REFERS TO GREY ALUMINIUM WINDOWS FRAMES (RAL 7022)

LOUVRE MATERIALS TBC

C02 MT 23.09.22 DM LOUVRES ADDED / LOUVRE REMOVED
C01 MP 11.05.22 SB ISSUED FOR CONSTRUCTION
P01 MP 01.10.21 SB FIRST ISSUE

REV BY DATE CHK DESCRIPTION
STATUS

FOR CONSTRUCTION

CONTRACTOR

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PROJECT

Station Hill, Reading

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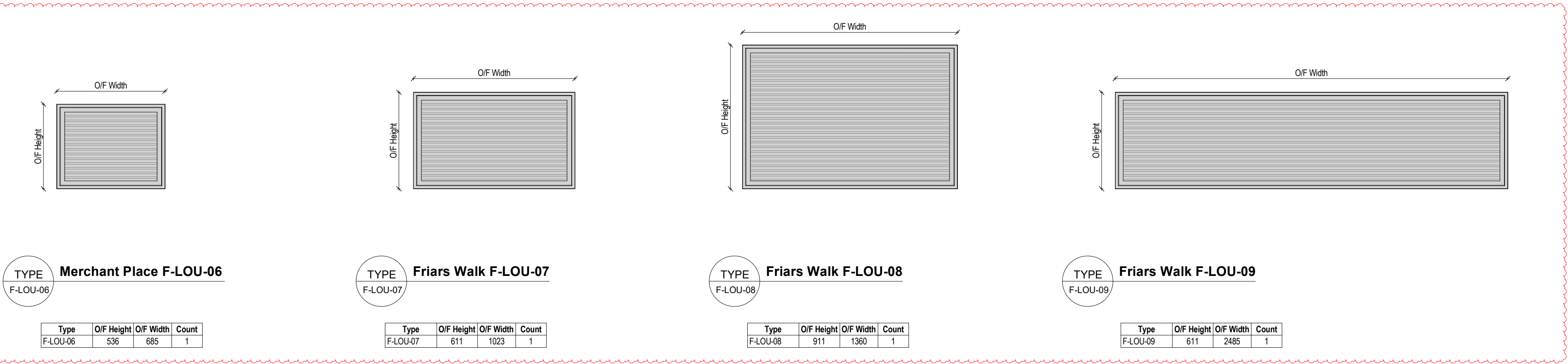
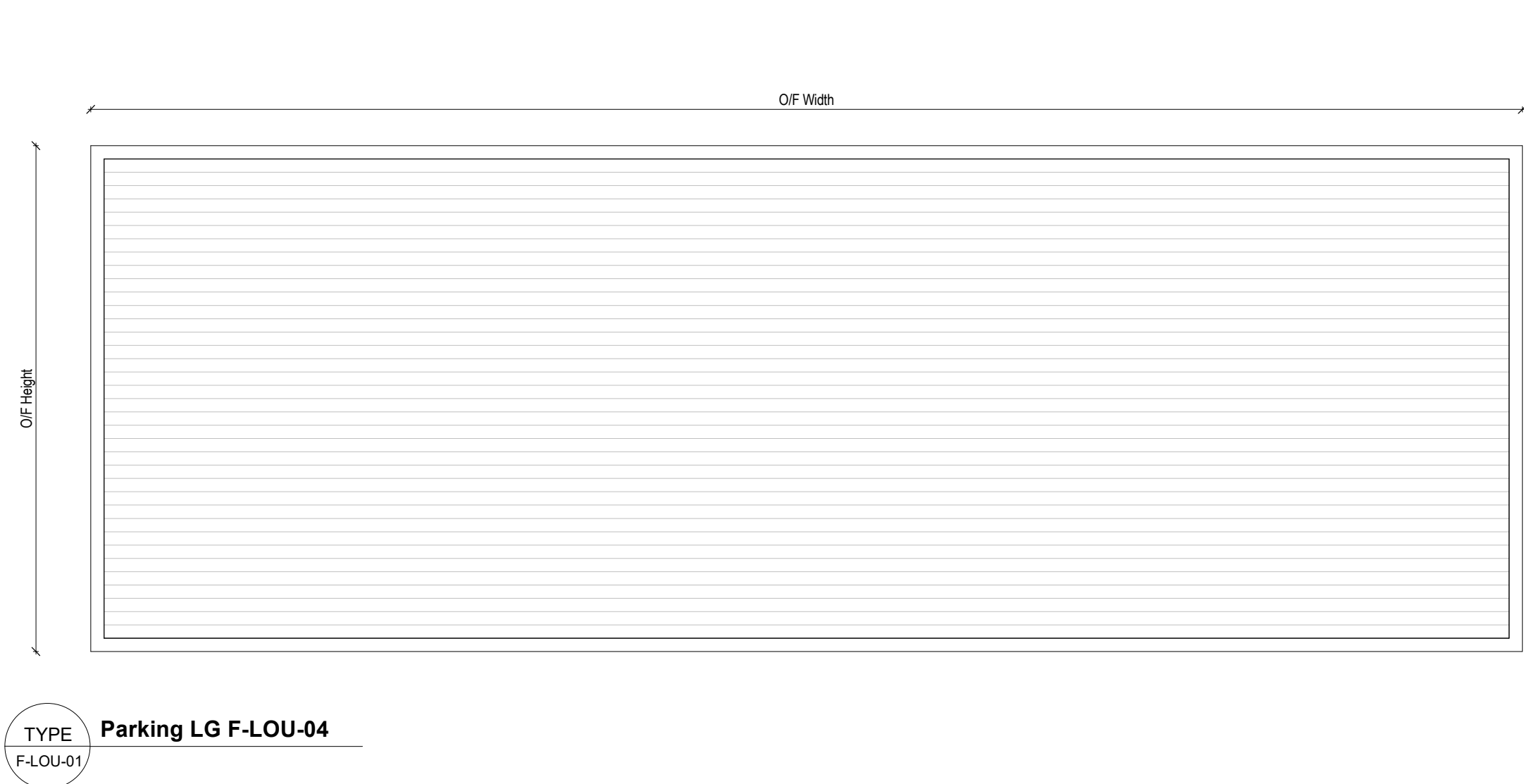
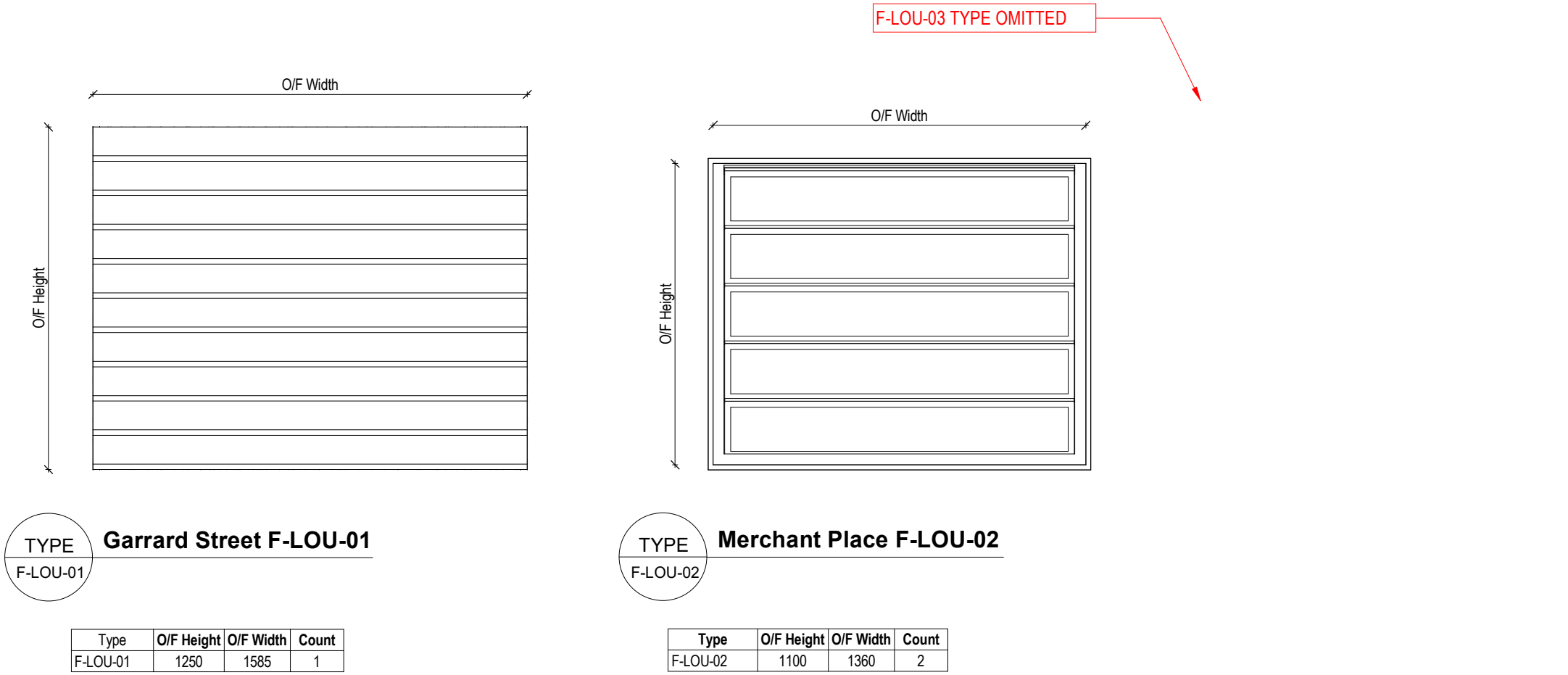
SH Reading (phase 1) Limited

DRAWING TITLE

Block F
Louvre Types
Sheet 1

DATE CREATED 01.10.21 DATE AMENDED 23.09.22 SCALE 1 : 20 @A1
DRAWN BY MP AMENDED BY MT CHECKED DM

DRAWING NO & REVISION
SHR-MDS-BF-ZZ-SH-A-17-0027 - C02



Block E Louvre Schedule							
Number	Louvre Type	O/F Height	O/F Width	Secured by Design	Comments	Description	Count
BE_LG							
BE-L_LG-01	E-LOU-08	2178	2123	N/A			1
BE-L_LG-02	E-LOU-06	855	1876	N/A			1
BE-L_LG_04	E-LOU-05	750	2200	N/A			1
BE-L_LG_05	E-LOU-05	750	2200	N/A			1
BE-L_LG_06	E-LOU-05	750	2200	N/A			1
BE-L_LG_07	E-LOU-05	750	2200	N/A			1
BE-L_LG-08	E-LOU-13	3047	6100	N/A		Generator room	1
BE-L_LG-09	E-LOU-14	750	1538	N/A			1
BE-L_LG-10	E-LOU-15	2700	913	N/A			1
BE_B1M							
BE-L_B1M_01	E-LOU-01	2240	4623	N/A			1
BE-L_B1M_02	E-LOU-02	2240	3723	N/A			1
BE-L_B1M_03	E-LOU-03	2240	2237	N/A			1
BE-L_B1M_04	E-LOU-09	2148	3400	N/A		Substation	1
BE-L_B1M_05	E-LOU-06	855	1876	N/A			1
BE-L_B1M_06	E-LOU-05	750	2200	N/A			1
BE-L_B1M_07	E-LOU-05	750	2200	N/A			1
BE-L_B1M_08	E-LOU-05	750	2200	N/A			1
BE-L_B1M_09	E-LOU-05	750	2200	N/A			1
BE-L_B1M_10	E-LOU-05	750	2200	N/A			1
BE-L_B1M_11	E-LOU-05	750	2200	N/A			1
BE-L_B1M_12	E-LOU-05	750	2200	N/A			1
BE-L_B1M_13	E-LOU-05	750	2200	N/A			1
BE-L_B1M_14	E-LOU-05	750	2200	N/A			1
BE-L_B1M_15	E-LOU-10	4623	1710	N/A			1
BE-L_B1M_16	E-LOU-11	3723	1710	N/A		Substation	1
BE-L_B1M_17	E-LOU-09	2148	3400	N/A			1
BE_GF							
BE-L_L00_01	E-LOU-07	710	1560	N/A			1
BE-L_L00_02	E-LOU-12	400	1448	N/A			1

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ACOUSTIC STANDARDS AND THERMAL REQUIREMENTS
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-ALL ENTRANCES TO HAVE AN ACCESSIBLE
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SUFFIX_B: REFERS TO BRONZE ALUMINIUM WINDOWS
FRAMES (RAL 7006)
SUFFIX_G: REFERS TO GREY ALUMINIUM WINDOWS
FRAMES (RAL 7022)

C05 MT 23.09.22 DM LOUVRE DIMENSION UPDATED
C04 MP 16.05.22 SB LOUVRES DIMENSIONS UPDATED
C03 MP 11.05.22 SB LOUVRE ADDED / LOUVRE UPDATED
C02 IM 14.01.22 SB TYPE 04 OMITTED / LOUVRES REMOVED
/ DIMENSION UPDATED
C01 IM 05.11.21 SB LOUVRE UPDATED
P01 IM 21.09.21 SB FIRST ISSUE

REV	BY	DATE	CHK	DESCRIPTION
STATUS				

FOR CONSTRUCTION

CONTRACTOR
MIDGARD LTD

PROJECT
Station Hill, Reading

CLIENT
SH Reading (phase 1) Limited

DRAWING TITLE		
Block E		
External Louvre Schedule		
Levels LG to GF		
DATE CREATED	DATE AMENDED	SCALE
21.09.21	23.09.22	1 : 100 @A3
DRAWN BY	AMENDED BY	CHECKED
IM	MT	DM
DRAWING NO & REVISION		
SHR-MDS-BE-ZZ-SH-A-17-0033 - C05		



Block F External Louvre Schedule							
Number	Louvre Type	O/F Height	O/F Width	Secured by Design	Comments	Description	Count
BF_LG							
BF-L_LG_01	F-LOU-01	1250	1585	N/A			1
BF-L_LG_02	F-LOU-04	1900	5375	N/A		Internal Louvre	1
BF_B1M							
BF-L_B1M_01	F-LOU-05	2200	5375	N/A		Internal Louvre	1
BF-L_B1M-02	F-LOU-08	911	1360	N/A			1
BF-L_B1M-03	F-LOU-09	611	2485	N/A			1
BF-L_B1M-04	F-LOU-06	536	685	N/A			1
BF-L_B1M-05	F-LOU-07	611	1023	N/A			1
BF_GF							
BF-L_L00_01	F-LOU-02	1100	1360	N/A			1
BF_L01							
BF-L_L01_01	F-LOU-02	1100	1360	N/A			1

F-LOU-03 TYPE OMITTED

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GENERAL ARRANGEMENT PLANS, SERIES 11
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DESIGN OFFICER AND COUNTER TERRORISM ADVISOR.

- REFER TO SERIES 36 FOR FURTHER DETAILS ON
JULIETTE AND BALCONY BALUSTRADES.

SUFFIX_B: REFERS TO BRONZE ALUMINIUM WINDOWS
FRAMES (RAL 7006)
SUFFIX_G: REFERS TO GREY ALUMINIUM WINDOWS
FRAMES (RAL 7022)

C02 MT 23.09.22 DM LOUVRES ADDED / LOUVRE REMOVED
C01 MP 11.05.22 SB ISSUED FOR CONSTRUCTION
P01 MP 01.10.21 SB FIRST ISSUE

REV	BY	DATE	CHK	DESCRIPTION
STATUS				

FOR CONSTRUCTION

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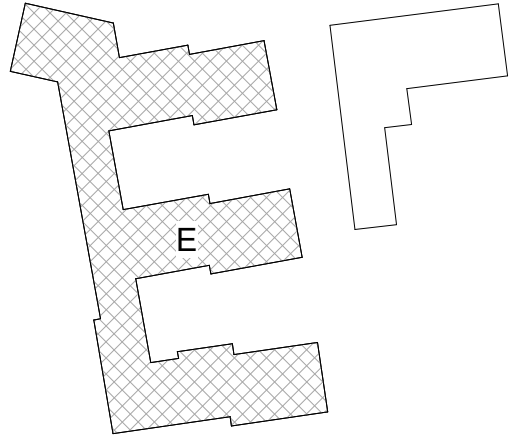
PROJECT
Station Hill, Reading

CLIENT
SH Reading (phase 1) Limited

DRAWING TITLE Block F External Louvre Schedule Levels LG to 01		
DATE CREATED 01.10.21	DATE AMENDED 23.09.22	SCALE 1 : 100 @A3
DRAWN BY MP	AMENDED BY MT	CHECKED DM
DRAWING NO & REVISION SHR-MDS-BF-ZZ-SH-A-17-0028 - C02		



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SUFFIX_B: REFERS TO BRONZE ALUMINIUM WINDOWS FRAMES (RAL 7006)
SUFFIX_G: REFERS TO GREY ALUMINIUM WINDOWS FRAMES (RAL 7022)

LEGEND

 ALUMINIUM RAL 7006

LOUVRE MATERIALS TBC

C02 MP 11.05.22 SB LOUVRE ADDED
C01 MP 14.01.22 SB FIRST ISSUE FOR CONSTRUCTION

REV BY DATE CHK DESCRIPTION
STATUS

FOR CONSTRUCTION

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PROJECT

Station Hill, Reading

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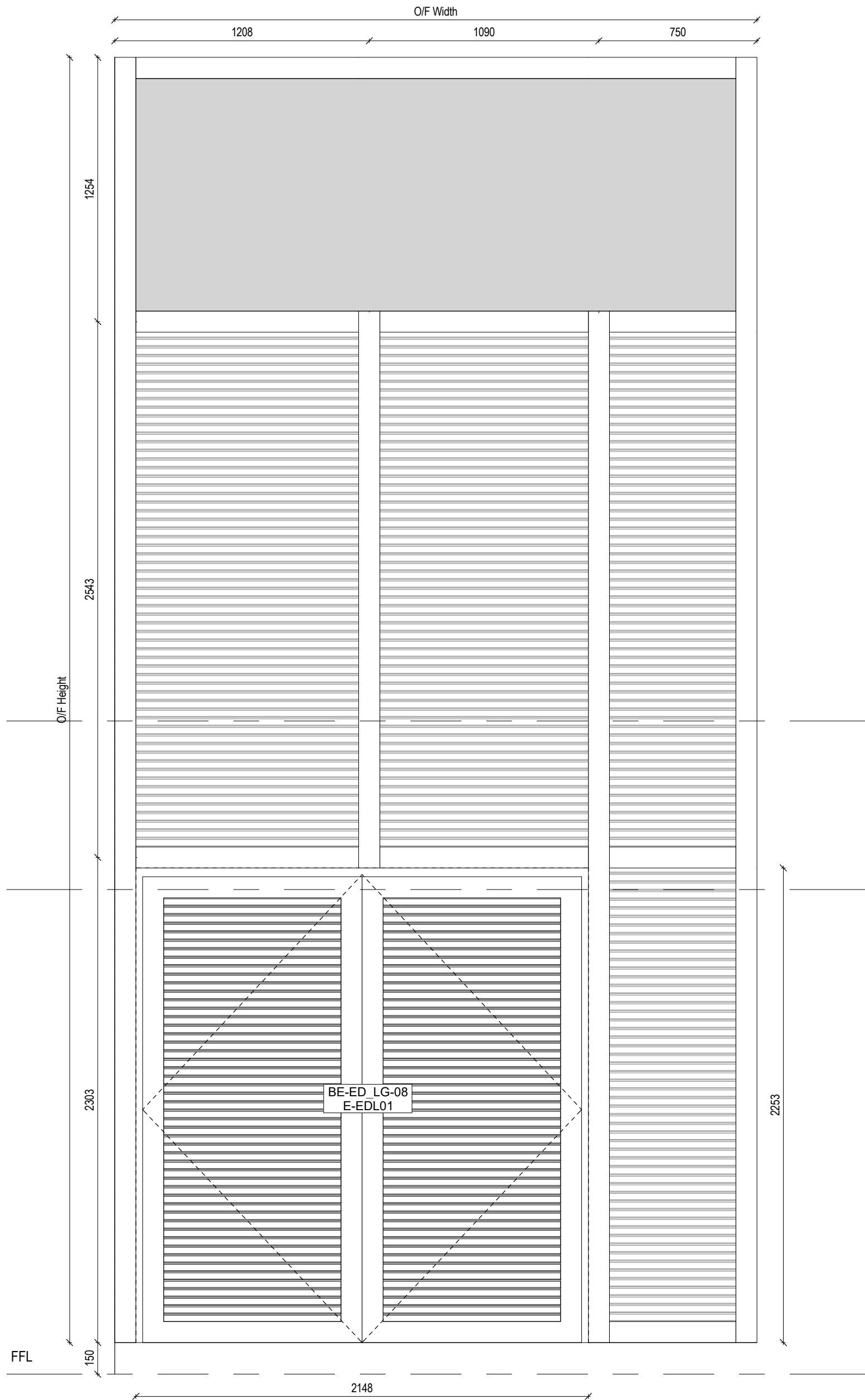
SH Reading (phase 1) Limited

DRAWING TITLE

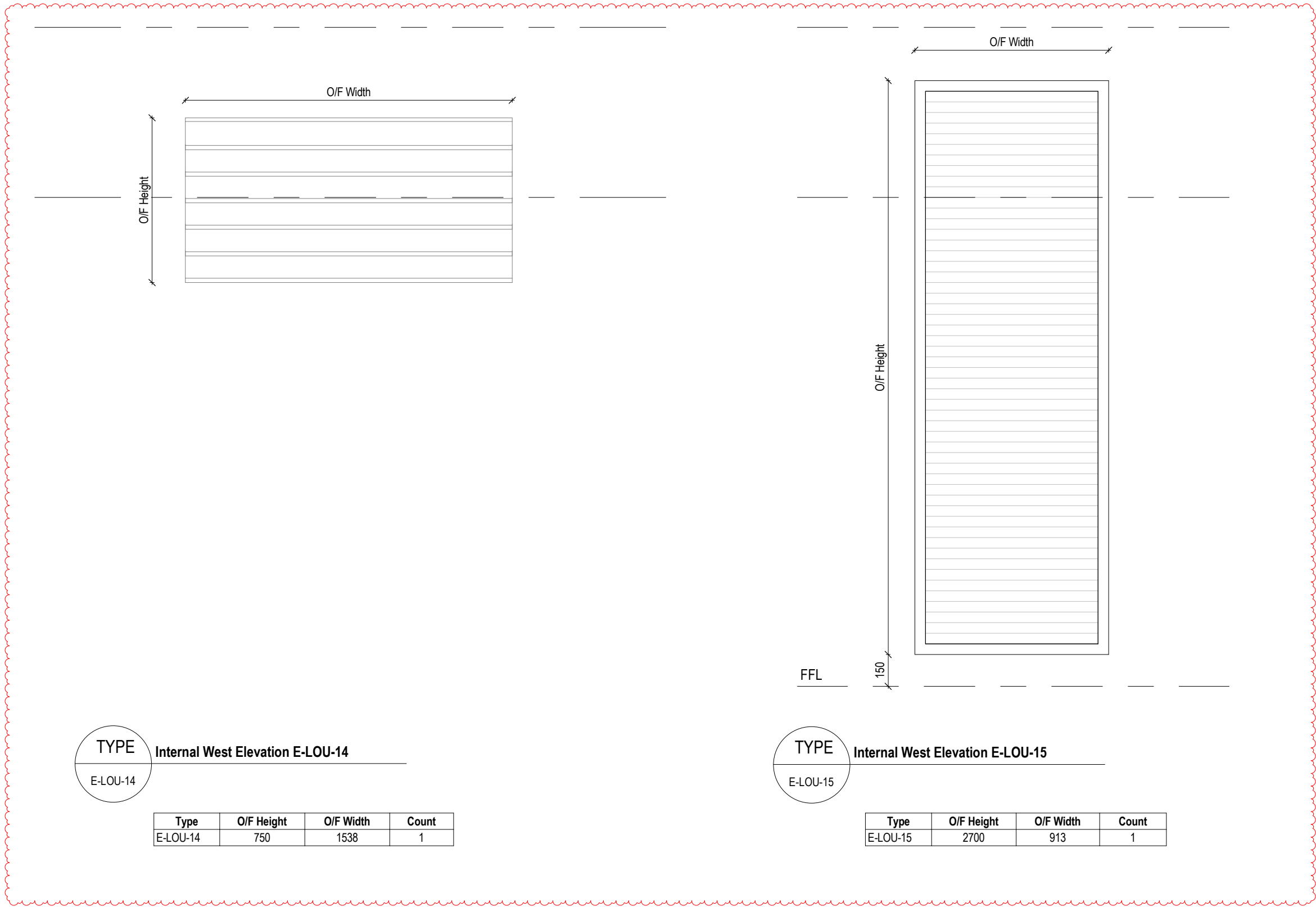
Block E
Louvre Types
Sheet 2

DATE CREATED 14.01.22	DATE AMENDED 11.05.22	SCALE 1 : 20 @A1
DRAWN BY MP	AMENDED BY MP	CHECKED SB

DRAWING NO & REVISION
SHR-MDS-BE-ZZ-DR-A-17-0035 - C02



Internal West Elevation E-LOU-13			
REFER TO DOOR TYPE E-EDL01, NUMBER BE-ED_LG-08			
Type	O/F Height	O/F Width	Count
E-LOU-13	6100	3047	1



Internal West Elevation E-LOU-14			
Type	O/F Height	O/F Width	Count
E-LOU-14	750	1538	1

Internal West Elevation E-LOU-15			
Type	O/F Height	O/F Width	Count
E-LOU-15	2730	913	1