

GENERAL

- A minimum internal vertical clearance of 2.3m is needed inside the housing to the top of the walls.

Pressure Relief

- The enclosure must include some form of pressure relief mechanism in case of equipment failure. This will normally be incorporated by providing a GRP roof structure fixed in such a way that it lifts during any internal pressure build up. If an alternative traditional roof construction is required then two louvre vents positioned at the rear of the switchgear, one at low level, one at high level will act as pressure relief. Louvre details are shown on sheet 2 of 4.

DETAILED CONSTRUCTION REQUIREMENTS

Foundations

Floor Slab

- This shall comprise a 200mm reinforced concrete slab on a minimum 150mm thickness of compacted granular fill.
- Concrete shall be grade C32/40.
- The Developer must modify the foundation design to incorporate the necessary requirements for supporting the brick housing.
- Reinforcement shall be two layers of A193 steel mesh. Minimum reinforcement cover shall be 40mm.
- Vertical faces shall be formed using full depth plywood shuttering.
- Top surface shall be flat and even, finished with a metal trowel to give a smooth, tight surface.
- The top edges shall be finished with a 50mm chamfer.
- The granular fill shall comprise of crushed or uncrushed natural gravel, hard limestone, hard sandstone, granite material, or recycled crushed demolition waste. If preferred, the granular fill may be replaced with mass concrete.
- The base slab must extend to at least 750mm in front of the housing. This apron may be omitted if the area is hard landscaped with bitmac, paving slabs, setts, etc. Gravel or chippings is not an acceptable substitute.
- The slab reinforcement mesh must be bonded to the Substation Earth. The earth conductor must be mechanically secured to both mesh layers. A minimum length of two meters of earth conductor must project from the face of the concrete in to the cable pit area. The earth conductor must be a minimum of 70mm² hard drawn stranded copper conductor (not copper wire rope) and connections shall be non-ferrous (copper or brass) U bolt connectors.

Foundations shown are based on a minimum ground bearing pressure of 80kN/m²

Cable Pit

- Pit walls shall be at least 200mm thick, and may be constructed in situ concrete.
- Base slab shall be 200mm in situ concrete on either 50mm concrete blinding or 1 layer of 1000 gauge polythene sheeting.
- All in situ concrete shall be grade C32/40, reinforced with 1 layer of A193 steel mesh.
- The pit shall be covered using 50mm thick GRP gratings with an anti-slip top surface. The gratings shall be installed on completion of the floor construction - any cable cut-outs will be formed later following cable installation.
- Individual gratings may be no larger than 1.0 square metre.

Cable Ducts

- Unless drawings show otherwise, all cable ducts shall be 150mm internal diameter twin wall HDPE, complying with Energy Networks Association (ENA) Technical Specification 12-24, Plastic Ducts for Buried Electric Cables.
- All ducts must be sealed (at the time of installation) at the external end using a purpose made stop end. The use of rags, newspaper, timber boards, etc to seal the ducts is not acceptable.
- Draw ropes will be required for ducts runs > 3.0m in length.
- Ducts shall be surrounded by 100mm of selected granular material with a maximum particle size of 25mm. Compacted granular fill shall be used to fill the space between the duct surround and the underside of the foundation slab. Mass concrete may be used in place of granular fill.

Note:

- The Cable Pit is designed to act as a holding sump, in case of oil leakage from the transformer. It is essential therefore that all of the cable ducts be effectively sealed on completion of the cable installations. Expanding polyurethane foam shall be used to fill the pit end of the ducts, to a depth of 300mm. Where cables are present, these are to be centred in the duct before the foam is applied, measurements shall be taken to ensure that the cables are held in this position until the foam has cured sufficiently enough to carry the weight of the cable.
- Before all the cable ducts are sealed ensure any earth wires required are in position.
- The standard arrangement allows for 'front entry' of both HV and LV cables. In some circumstances cables may need to enter / exit via the side or rear of the foundation. This is acceptable providing a check is made on the space needed for bending and terminating the cables. In some instances the cable pit may need to be made deeper or wider (or both) to accommodate cables entering from the side or rear.

Housing

Masonry Walls

- Masonry to BS5628-3: 2005.
- The walls shall comprise an outer skin of facing brickwork or coursed stone to match adjacent properties, and an inner skin of solid fair-faced concrete blocks. If desired, bricks may also be used for the inner skin. Construction can be either a solid wall, minimum thickness 215mm, or cavity construction with inner and outer leaves of a minimum 100mm thickness.
- The minimum acceptable standard for belowground masonry will be High Density (HD) Category 1 Clay brickwork of minimum 75N/mm² mean compressive strength, 7.0% maximum moisture absorption and durability designation F2 S2 (ex "Engineering Class B" or quality equivalent)
- External masonry shall be clay-facing brickwork of minimum 9N/mm² mean compressive strength and durability designation F1 S2 or better.
- Inner and outer skins shall both be laid in stretcher bond, and tied with stainless steel wall ties. Maximum tie spacing: 450mm horizontally; 450mm vertically.
- The DPC (to both skins) shall comprise 2 courses of blue engineering bricks or proprietary DPC membrane such as 'Hyload'.
- Mortar shall be sand lime, mix 1:1:6.
- Door opening: shall be formed using a steel "T" lintel (with minimum 150mm end bearing). There shall be a soldier course of (external) brickwork immediately above the lintel.
- External mortar pointing to be 'bucket handle' finish. Other pointing styles, e.g. weather struck, recessed, etc may only be used where required to match adjacent buildings.
- Internal mortar pointing: bucket handle.

Ventilation

- Louvres shall be built into at least two opposing walls, at high and low level, giving a minimum total air passage of 0.15m² and providing a 'crossflow' of air.
- Louvres may also be provided as part of the door construction.
- 750mm x 350mm flanged ventilation units. Louvre blades inclined at 45° and mounted at 50mm centres. Bottom extended over outer frame to prevent water ingress. Units to be fitted with insect mesh. GRP ventilators to be built into brickwork using the pre-cast GRP fish tail wall ties. Steel ventilators to be fixed through flanges into masonry.

Doors

- Double doors shall have a minimum structural opening of 2545mm wide x 2175mm high.
- Doors shall be constructed from GRP to WPD specification.
- Frame/masonry joints shall be sealed using suitably coloured 1 part polyurethane gun applied mastic. Min. depth 20mm.

Roof Construction

With a brick housing there are two roof types:

- Provide the GRP roof and install the switchgear before installing the roof.
- Construct a standard housing with fixed roof and allow for the switchgear to be installed through the normal door opening.
- The roof shall normally comprise a one-piece GRP structure.
- Unless otherwise specified by the manufacturer, the roof structure shall be secured to 100 x 75 softwood wall plates. The wall plates shall be connected to the masonry using 50 x 3 galvanised mild steel flats, with M6 x 50mm galvanised coach screw fixings 2, 4 & 6 courses down from top of wall. There shall be a minimum of 3No equally spaced flats per wall plate.
- The roof shall be fixed to the wall plate with an approved method such that 'pressure relief' ventilation is provided.
- External roof finish - as required to match adjacent buildings.
- Wall plate timber shall be pressure treated to BS5268 part 5:1989.
- Where an alternative roof construction is proposed, then details shall be provided for UK Power Solutions consideration.

Rain Water Goods

- Gutters to be 100mm Ø half round or equivalent 'square section' uPVC.
- Downpipes to be 63mm Ø, or equivalent 'square section' uPVC, discharging (via gulleys) to soakaways or adjacent surface water drainage system.
- Gutters, downpipes and fixings to be black, unless required otherwise to match adjacent buildings.

APPENDIX 1

Approved Suppliers

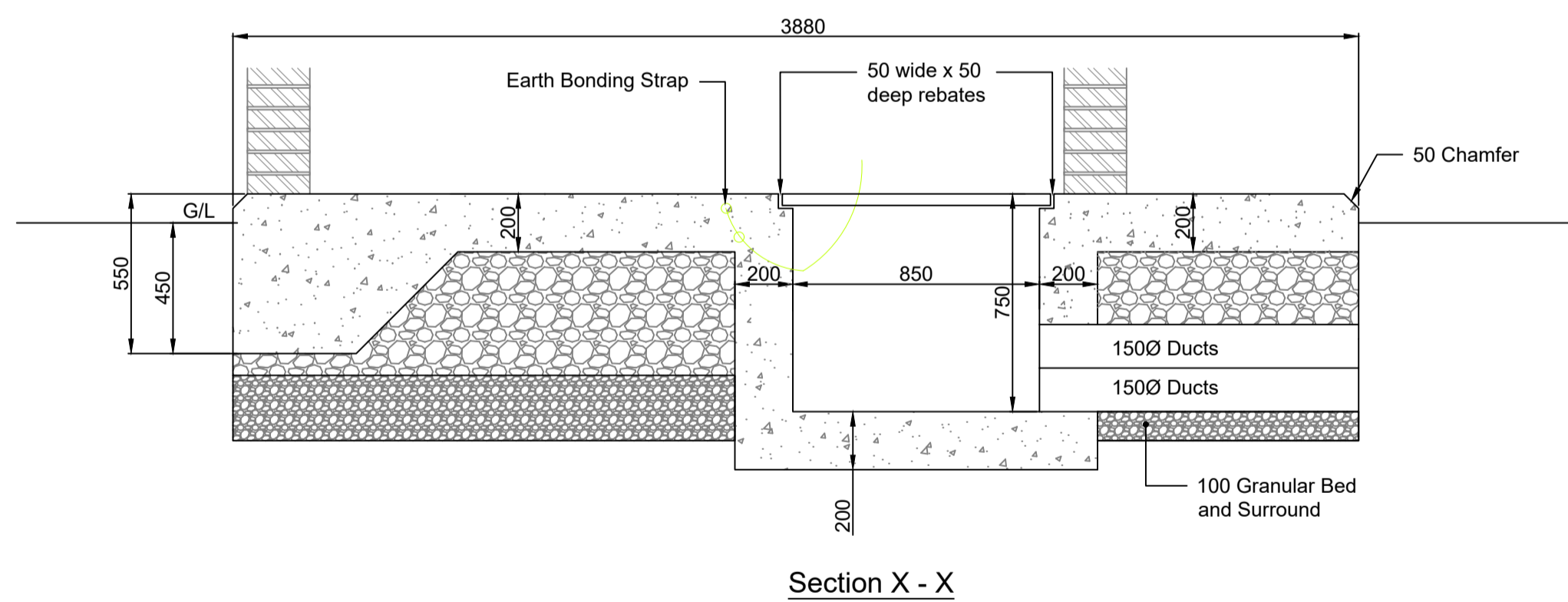
- Specialist construction materials meeting Last Mile requirements may be obtained from the following suppliers. Materials may be sourced from other suppliers, in which case full details must be submitted to UKPS for technical approval.

GRP Roofs and Doors:

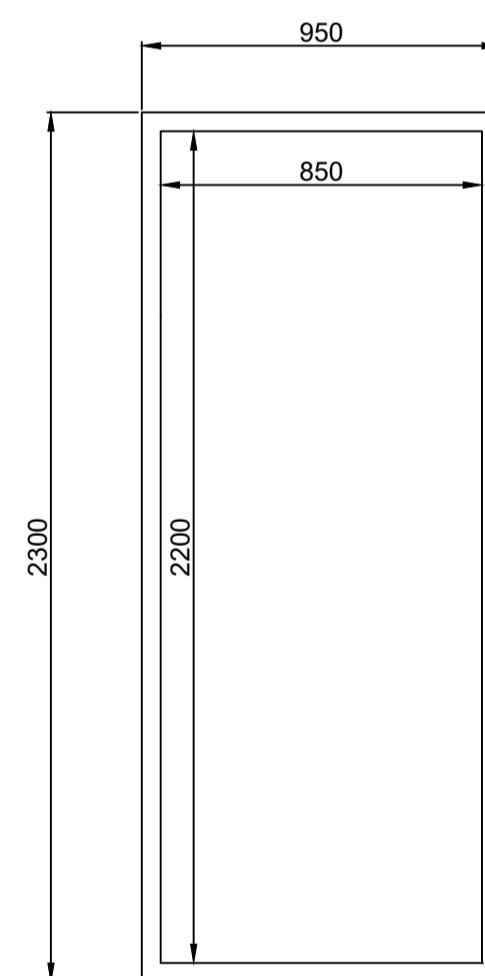
- Stormking, Amington Point, Sandy Way, Tamworth, B77 4ED
Tel 01827 311100.

Ventilators and Grating:

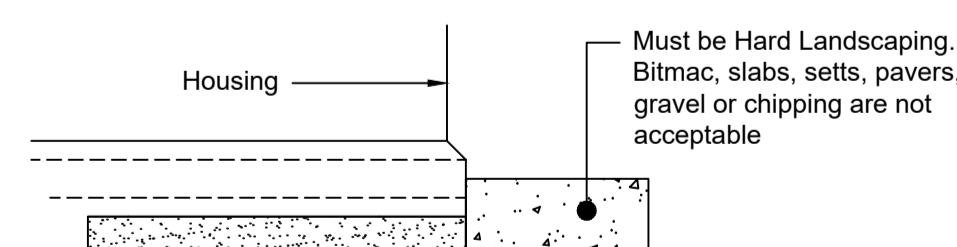
- Sunray Engineering, Kingsworth Ind Est, Wotton Road, Ashford, TN23 6LL.
Tel: 01233 639 039.



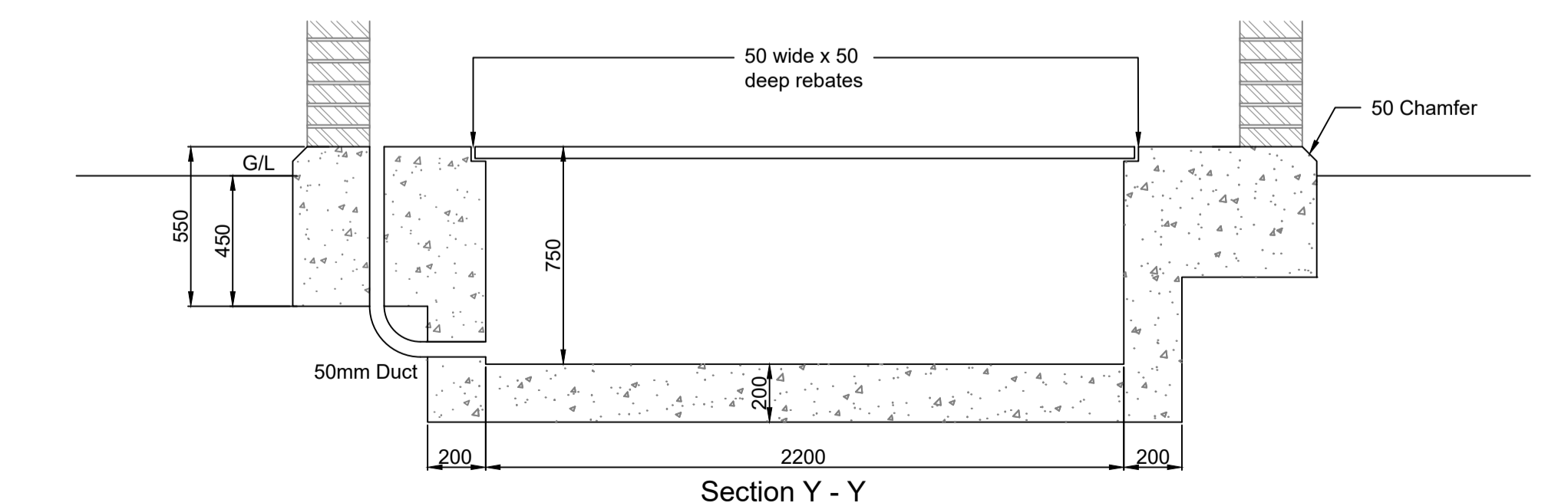
Section X - X



Pit Detail



Alternative Apron Detail for use in hard landscaped areas



Section Y - Y

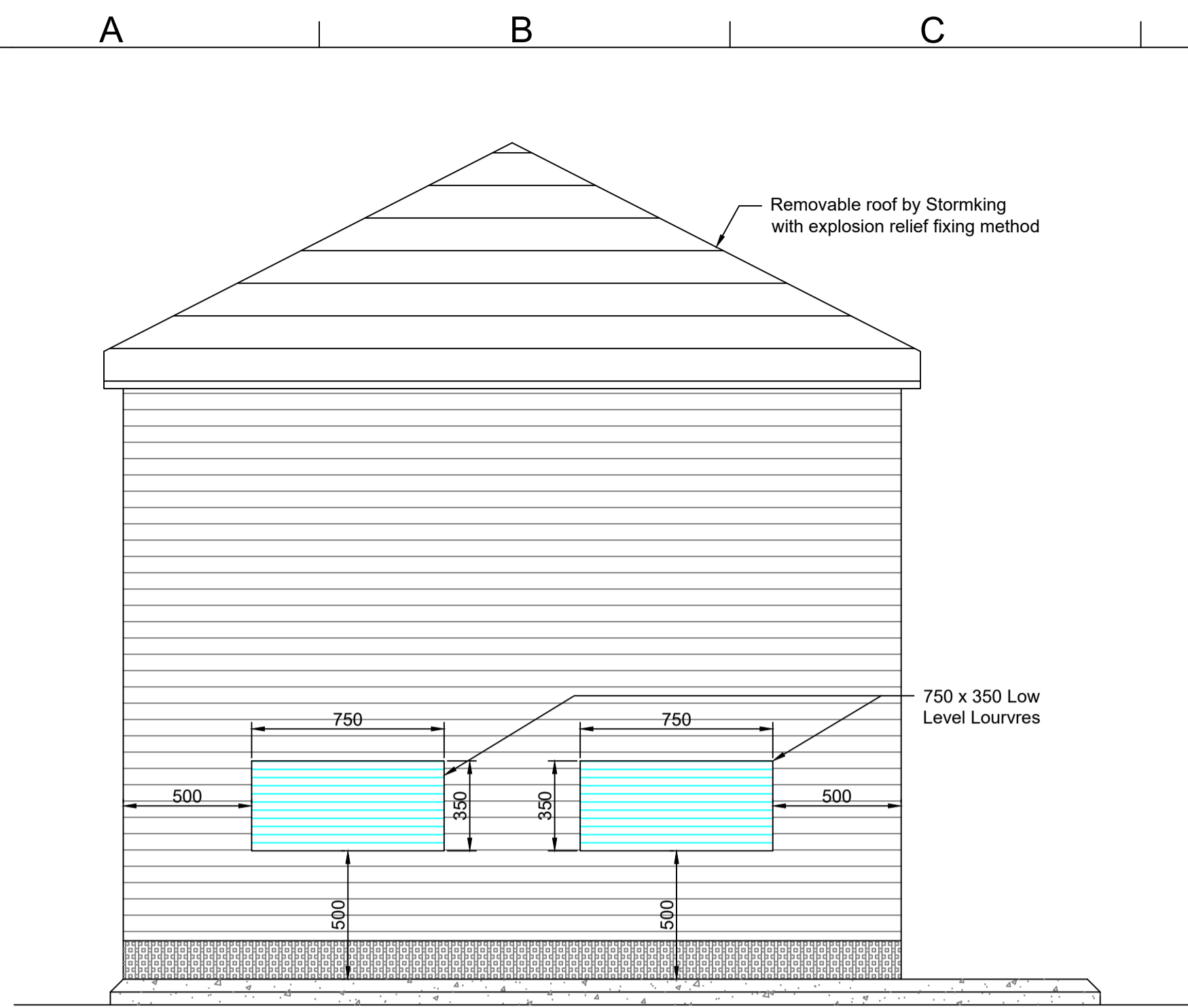
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0	Preliminary Issue	27/01/23	TEK
REV	AMENDMENT	DATE	BY



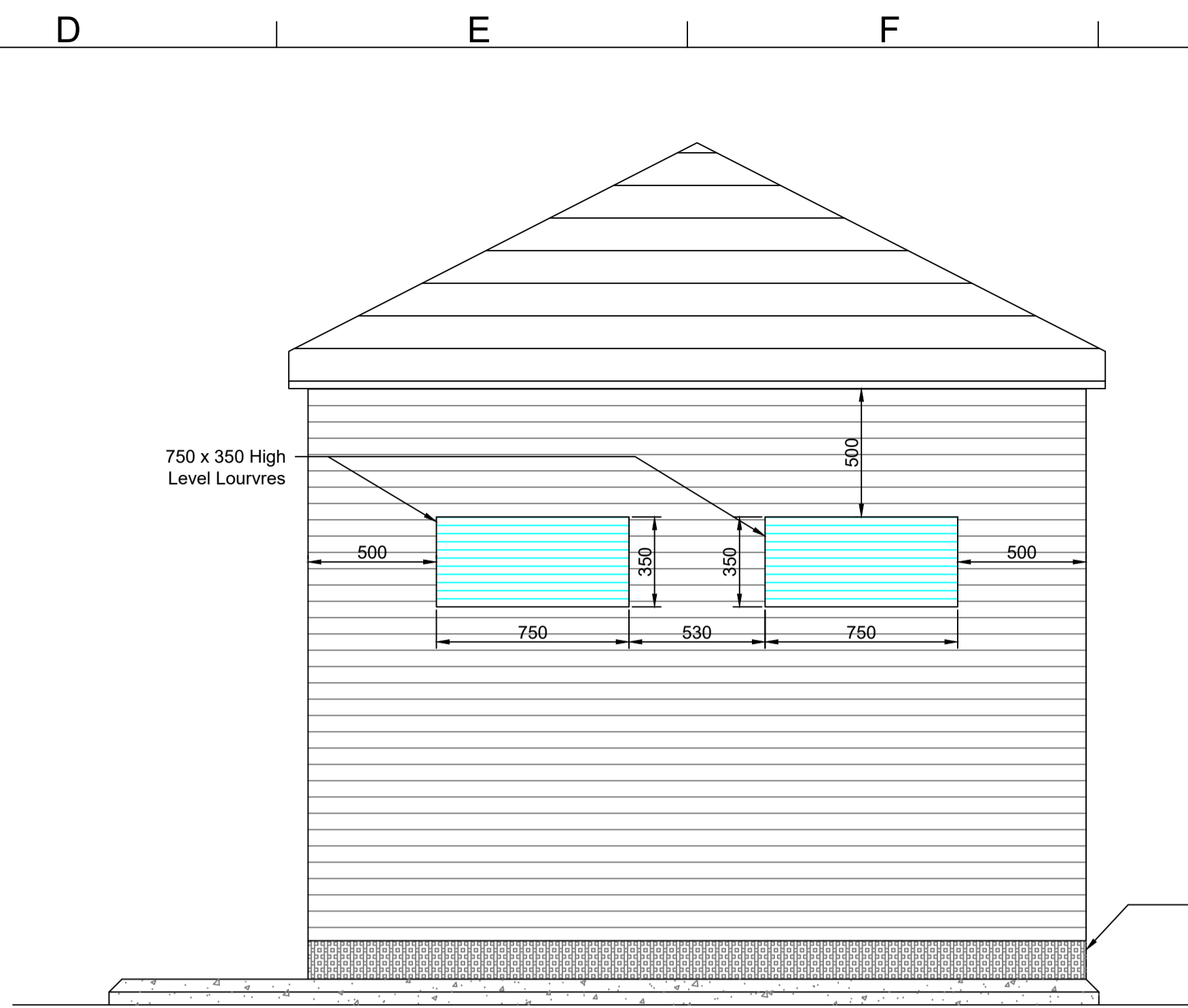
The Utility Connection Company

River View House, Bonds Mill Estate, Bristol Road, Stonehouse, Gloucestershire, GL10 3RF
Ealing Cross, 2nd Floor, 85 Uxbridge Road, Ealing, London, W5 5TH
Suite 36, Genesis Centre, Birchwood, Warrington, WA3 7BH
ukpowersolutions.co.uk

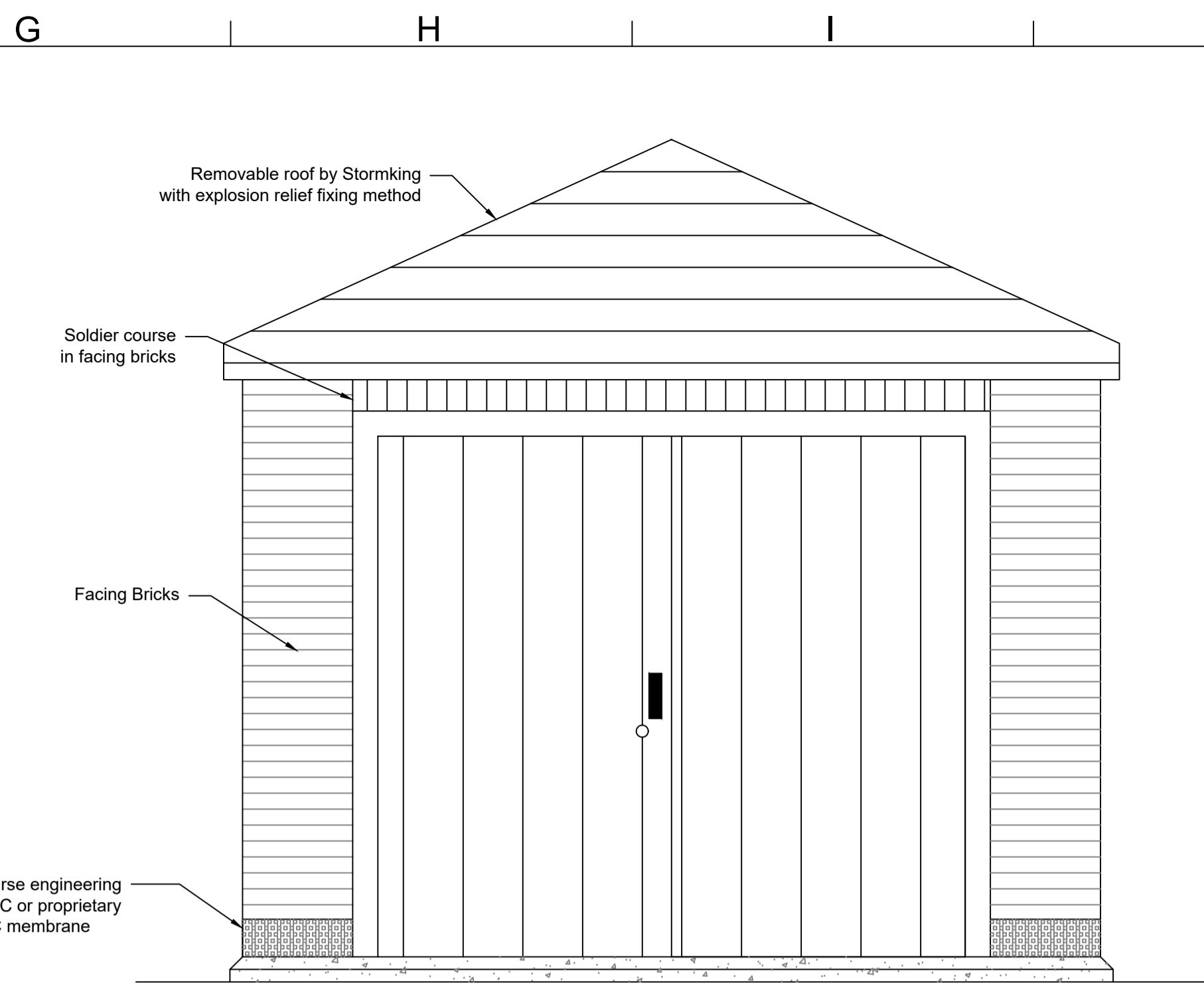
Client	Morganstone Ltd		
Project	Former Olchfa School Site		
Title	Construction Details - Substation		
Design & Planning Engineer	Taiya Kahwema	Contact No.	08452 577 105
Project Manager	TBC	Contact No.	TBC
Drawn By	JW	Checked By	PS
Date	09/08/22		
Scale	As Shown	Sheet No.	1 / 4
Original Size	A1		
Drawing No.	UKP11709 - DWG100		Rev
Client Ref.	--		1
Drawing Status	Approved for Construction		



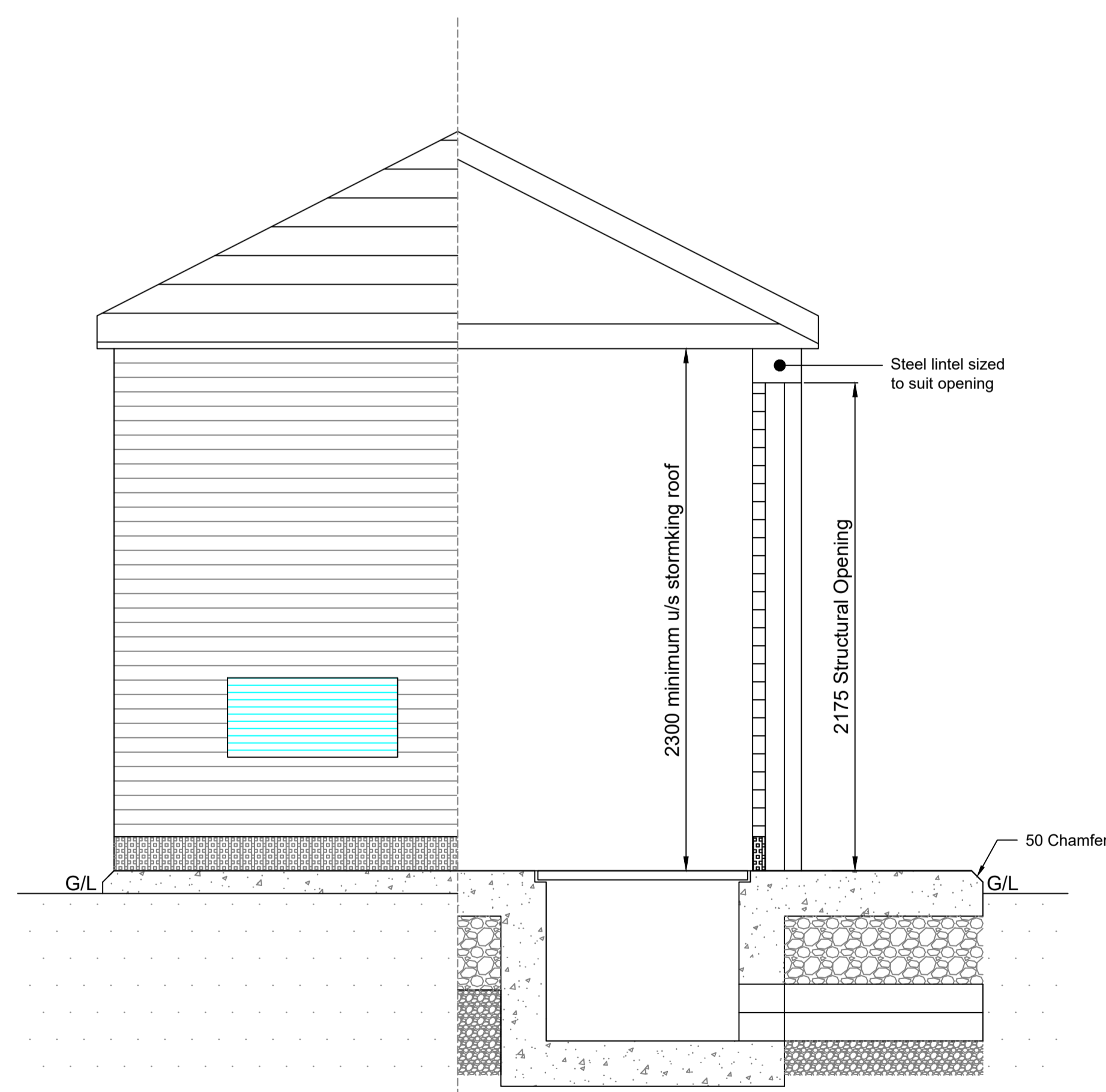
Side Elevation



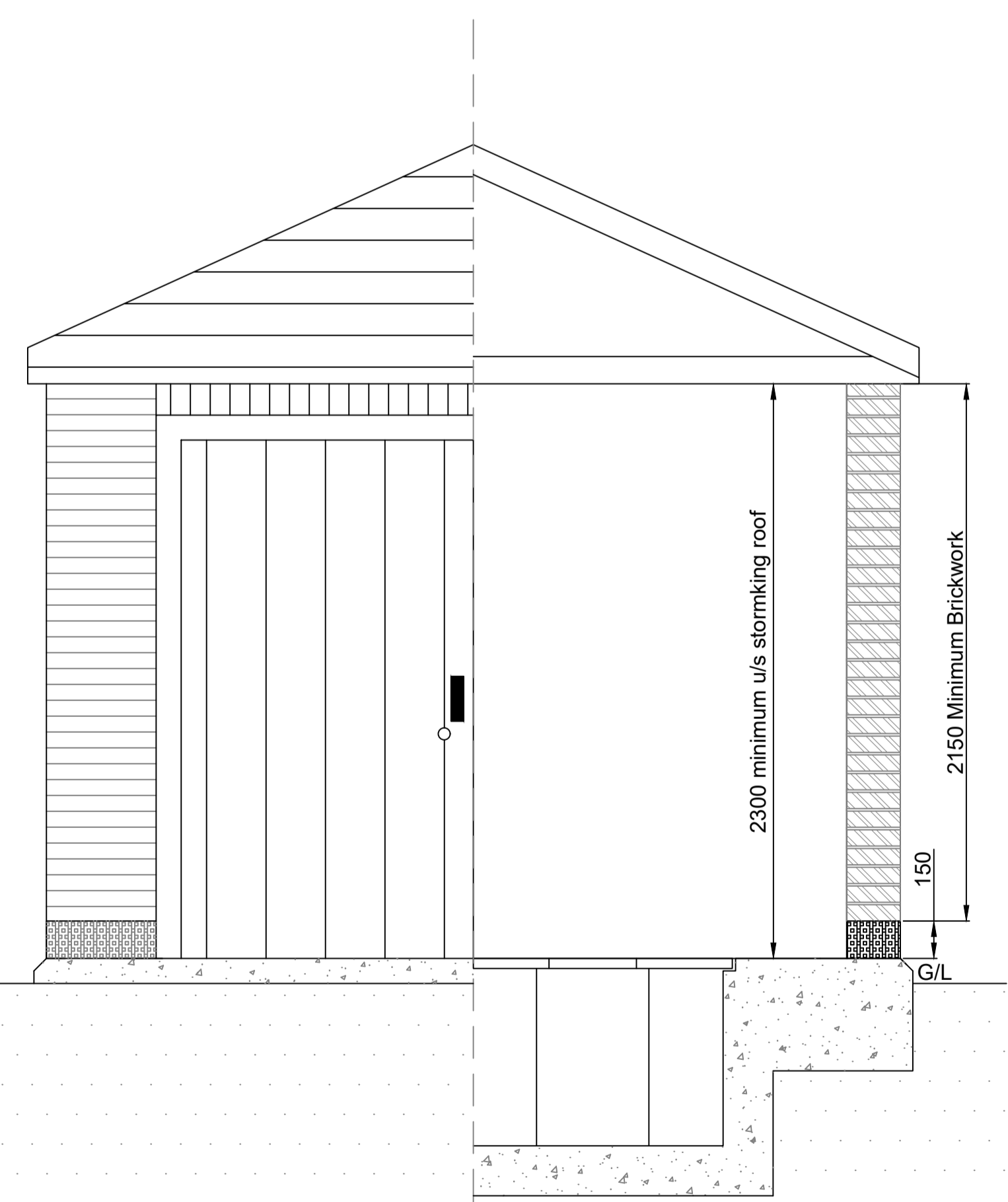
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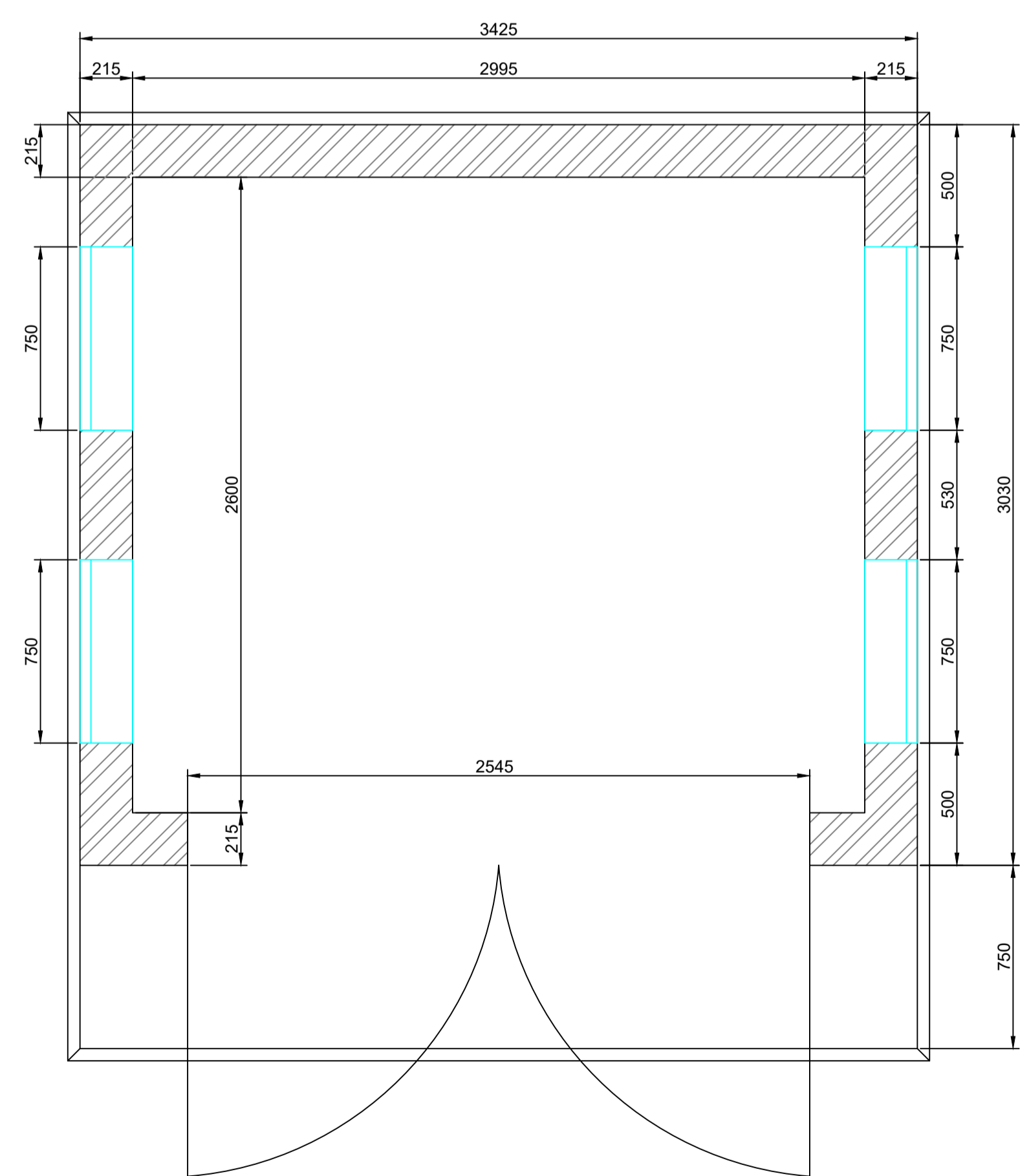
Front Elevation



Side Elevation



Front Elevation



Setting Out Plan

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Client: Morganstone Ltd

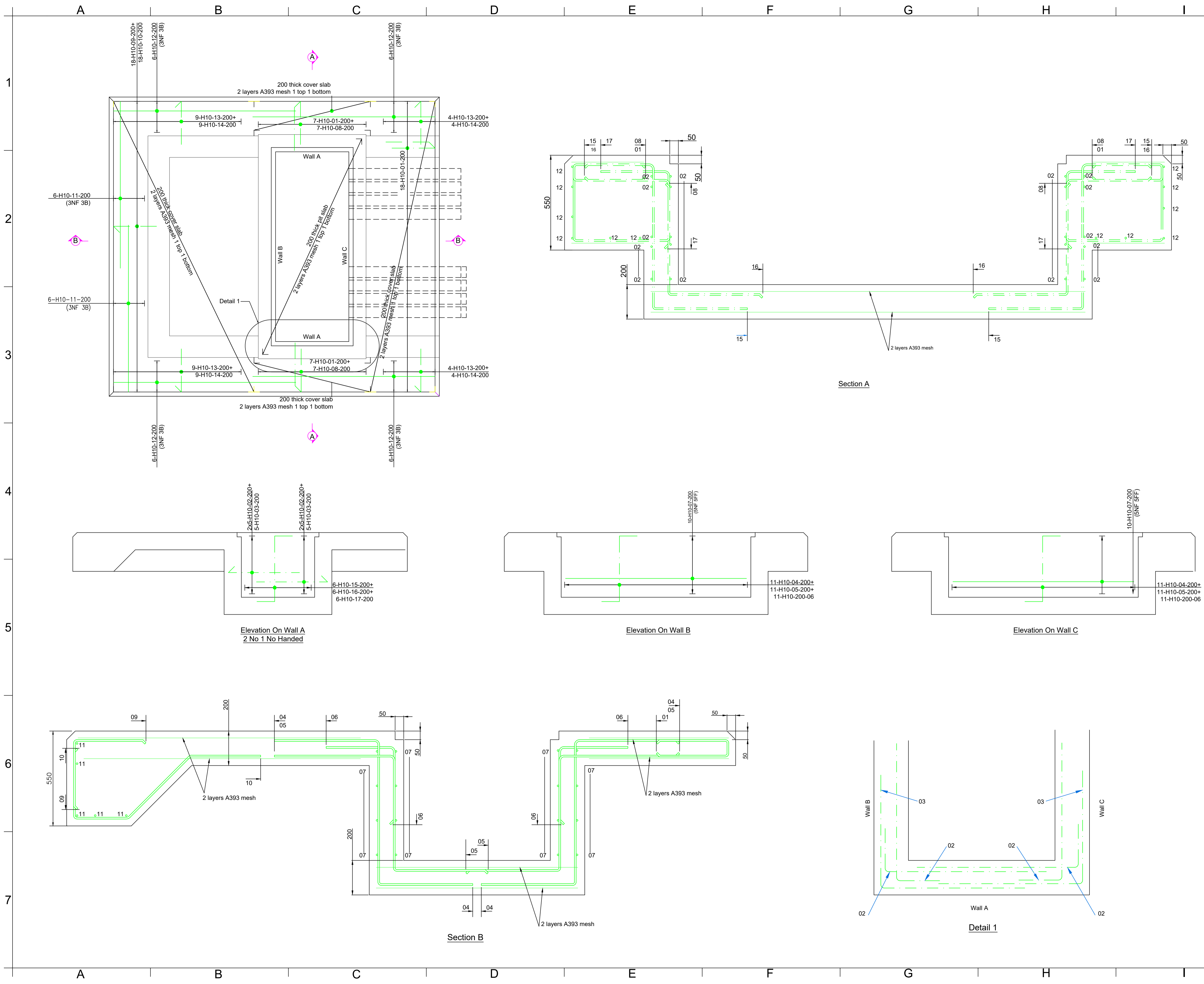
Project: Former Olchfa School Site

Title: Construction Details - Substation

Design & Planning Engineer Tauya Kahwema	Contact No. 08452 577 105
Project Manager TBC	Contact No. TBC

Drawn By JW	Checked By PS	Date 09/08/22
Scale As Shown	Sheet No. 2 / 4	Original Size A1

Drawing No. UKP11709 - DWG100	Rev 1
Client Ref. --	
Drawing Status Approved for Construction	



Notes:

- All dimensions are in millimeters unless noted otherwise.
- Concrete grade to be c32/40 (20mm aggregate)

Reinforcement

- Reinforcement is listed on bar bending schedule no. 101-01.
- Minimum cover to reinforcement to be 40mm top, sides and bottom u.n.o.
- Reinforcement to be hot rolled high yield bars type 2 deformed bars to bs 4449:2005 (designated h) u.n.o.
- Chairs and spacers to support or locate reinforcement have not been detailed or scheduled and shall be provided by the contractor.
- Mesh is not scheduled and shall be provided by the contractor. all mesh reinforcement to be bs 4483.
- Minimum reinforcement lap lengths to be 40 x bar diameter. minimum laps of reinforcement to be as follows: unless noted otherwise

Bar Dia	10
LAP (Min)	400

- Bars shown in plans and sections are often offset for clarity; in reality all bars shall be aligned.
- Reinforcement called up thus:-

No of bars	H of bar	Type of bar	Bar Dia	Bar mark	Spacing	Location
46	H	12	01	150	NF	

Abbreviations:

EF-Each Face	NF-Near Face
FF-Far Face	SF-Side Face
B-Bottom	AB-Alternate Bars
T-Top	EW-Each Way

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Scale	As Shown	Sheet No.	3 / 4	Original Size	A1
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Client Ref.	--				
Drawing Status	Approved for Construction				

A B C D E F G H I J

1
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Project Title Last Mile SUBSTATION PLINTH											Bar schedule 101/01		Revision 1	
											Prep. by TL	Checked MJ		
											Date 23-02-17	Rev. Date		
											Job No. N17135			
Member	Bar mark	Type & Size	No. of mbrs	No. of bars in each	Total no.	Length of each bar ! mm	Shape code	A*	B*	C*	D*	E/R*	Rev.	
SLAB	01	H10	1	32	32	1075	21	500	110	500			2	
	08	H10		14	14	1625	31	400	420	525	335		2	
	09	H10		18	18	825	11	420	420				2	
	10	H10		18	18	1700	34	400	520	365	370	420	2	
	11	H10		12	12	1975	00	1975					2	
	12	H10		24	24	2125	00	2125					2	
	13	H10		26	26	800	11	410	410				2	
	14	H10		26	26	1675	34	400	520	365	370	410	2	
	WALL A	02	H10	2	20	40	925	11	300	635				2
		03	H10		10	20	1425	11	800	635				2
		15	H10		6	12	1775	23	450	820	550			2
		16	H10		6	12	1725	23	495	700	550			2
		17	H10		6	12	850	11	400	450				2
	WALL B	04	H10	1	11	11	1850	23	500	820	550			2
05		H10		11	11	1825	23	600	700	550			2	
06		H10		11	11	850	11	400	450				2	
07		H10		10	10	2100	00	2100					2	
WALL C	04	H10	1	11	11	1850	23	500	820	550			2	
	05	H10		11	11	1825	23	600	700	550			2	
	06	H10		11	11	850	11	400	450				2	
	07	H10		10	10	2100	00	2100					2	

This schedule complies with BS 8666
 *Specified in multiples of 5mm. !Specified in multiples of 25mm.

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