

Prepared by

Ramboll Hong Kong Limited

**SECTION 16 PLANNING APPLICATION FOR PROPOSED
RELIGIOUS INSTITUTION AND COLUMBARIUM (PARTIAL
REDEVELOPMENT OF PRAJNA DHYANA TEMPLE)**

WATER SUPPLY IMPACT ASSESSMENT

Date **December 2025**

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Assistant Environmental Consultant

Signed 

Approved by **Tony Cheng**
Senior Manager

Signed 

Project Reference **TPCTCSMKEI00**

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1. INTRODUCTION

1.1 Project Background

- 1.1.1 The Subject Site is located at No. 100 Shek Mun Kap, Tung Chung as Prajna Dhyana Temple ("the Temple"). The subject site is zoned as "Government, Institution or Community" and "Green Belt" ("GB") zone on the approved Tung Chung Town Centre Area OZP No. S/I-TCTC/24 (Subject OZP).
- 1.1.2 The Water Supply Impact Assessment (WSIA) is prepared as a technical supporting document to estimate the water demand arising from the Proposed Development.

1.2 The Application Site and Its Environs

- 1.2.1 The Subject Site is located at No. 100 Shek Mun Kap, Tung Chung, which is surrounded by Tung Chung Road and associated slope to the east, Shek Mun Kap Road and Area 46 of Tung Chung West New Town Extension Area (which is currently under construction) to the south, Area 43 (green belt) and Area 95c (open uses for river park) of Tung Chung West New Town Extension Area (which is currently under construction) to the west and slopes to the north of the Site.
- 1.2.2 **Figure 1.1** shows the location of the Application Site and its environment.

1.3 Proposed Development

- 1.3.1 According to the latest development scheme, the Application Site consists of 3 main building blocks as shown in **Table 1.1** and other facilities not built in the abovementioned 3 buildings (i.e. Eco-furnace, Bell Tower, Garden of Remembrance, Bell Tower and Lotus Pond) The existing ex. Columbarium located at east of Application Site are kept. The temple located to next to ex. columbarium are proposed to be renovated. New amenity block and new religious columbarium block are located at southeast and west of the Application Site. The proposed master layout plan is shown in **Appendix 1.1**.

Table 1.1 Development Parameters of the Proposed Development

	New Renovated Temple + Ex. Columbarium + Religious Room	Amenity Block	New Religious Columbarium Block
Location	East of Application Site	Southeast of Application Site	West of Application Site
Facilities	Columbarium (Ex. & part of new portion), Religious Room + Newly Renovated Temple	Chamber, E&M, Canteen, Kitchen, Function Room, etc	Religious Use and Columbarium
Building Height	3.8 - 12 mPD	13.3 mPD	9.3 mPD
Number of Storey	1 Storey	3-storeys over 1-storey basement	2-storeys over 1-storey basement

2. WATER SUPPLY IMPACT ASSESSMENT

2.1 Scope of Work

- 2.1.1 The aim of this study is to assess whether the capacity of the existing water supply facilities serving the Application Site is sufficient to cope with the water demands from the Proposed Development. Data and record plans from Water Supplies Department (WSD) were obtained to facilitate the WSIA.

2.2 Assessment Criteria and Methodology

- 2.2.1 The freshwater and the salt water of the Proposed Development is supplied by Tung Chung Fresh Water Service Reservoir and Tung Chung No.2 Fresh Water Service Reservoir.
- 2.2.2 The capacities of Tung Chung Fresh Water Service Reservoir and Tung Chung No.2 Fresh Water Service Reservoir are summarized in **Table 2-1**.

Table 2-1 Capacity of Tung Chung Fresh Water Service Reservoir and Tung Chung No.2 Fresh Water Service Reservoir

	Tung Chung Fresh Water Service Reservoir	Tung Chung No.2 Fresh Water Service Reservoir
Capacity (m ³)	41,695	40,000

- 2.2.3 The existing fresh water supply network are provided in **Appendix 2.1**.
- 2.2.4 Reference has been made to the Water Supplies Department's Departmental Instruction 1309 (WSD DI 1309), as well as Environmental Protection Department's (EPD's) Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF). In addition, Planning Department's (PlanD) Commercial and Industrial Floor Space Utilization Survey (CIFUS) have also been used.
- 2.2.5 WSD DI 1309 sets out the design criteria for water supplies in Hong Kong and includes unit water demands for various classes of consumer. Apart from the above, EPD's GESF includes unit sewage flow factors for various residential development.
- 2.2.6 For this WSIA, WSD's data from DI 1309 has been referenced to provide unit water demands for the various population categories with the relevant EPD GESF unit sewage flow factors to determine overall unit water demand factors. PlanD's CIFSUS has been also referenced for calculation of the population density where necessary.
- 2.2.7 The unit water demand has been combined with the relevant development parameters to assess the future water demands, from which the potential impacts have been assessed. Calculations for the water demands of the Proposed Development are included in **Appendix 2.2**.

2.3 Assessment of Water Demand

- 2.3.1 The water demand from the West and East Portions of the Proposed Development have been assessed in **Table 2-2** below and detailed calculation is shown in **Appendix 2.2**.

Table 2-2 Water Demand from the Proposed Development

	Daily Water Demand (without swimming pool)	Peaking Factor	Peak Water Demand (without swimming pool)
	m ³ /day		m ³ /day
Freshwater	370.8	3	112.5
Flushing Water	112.9	2	225.9
TOTAL			1338.4

[1] Assume both fresh water and flushing water are provided from Tung Chung No.2 Fresh Water Service Reservoir.

2.3.2 According to **Table 2-2**, the Proposed Development will be taking 3.3% of the freshwater reservoirs capacities.

2.3.3 Given that the contribution is not significant, the Proposed Development would unlikely pose any adverse impact to existing service reservoir capacity.

2.4 Existing and Proposed Water Supply System

2.4.1 The existing water supply system is provided in **Appendix 2.1**.

2.4.2 100mm freshwater mains are proposed to connect the Proposed Development and the existing freshwater main for freshwater and flushing water supply. The alignment of the existing and proposed freshwater mains is shown in **Figure 2.1**.

2.5 Construction and Maintenance

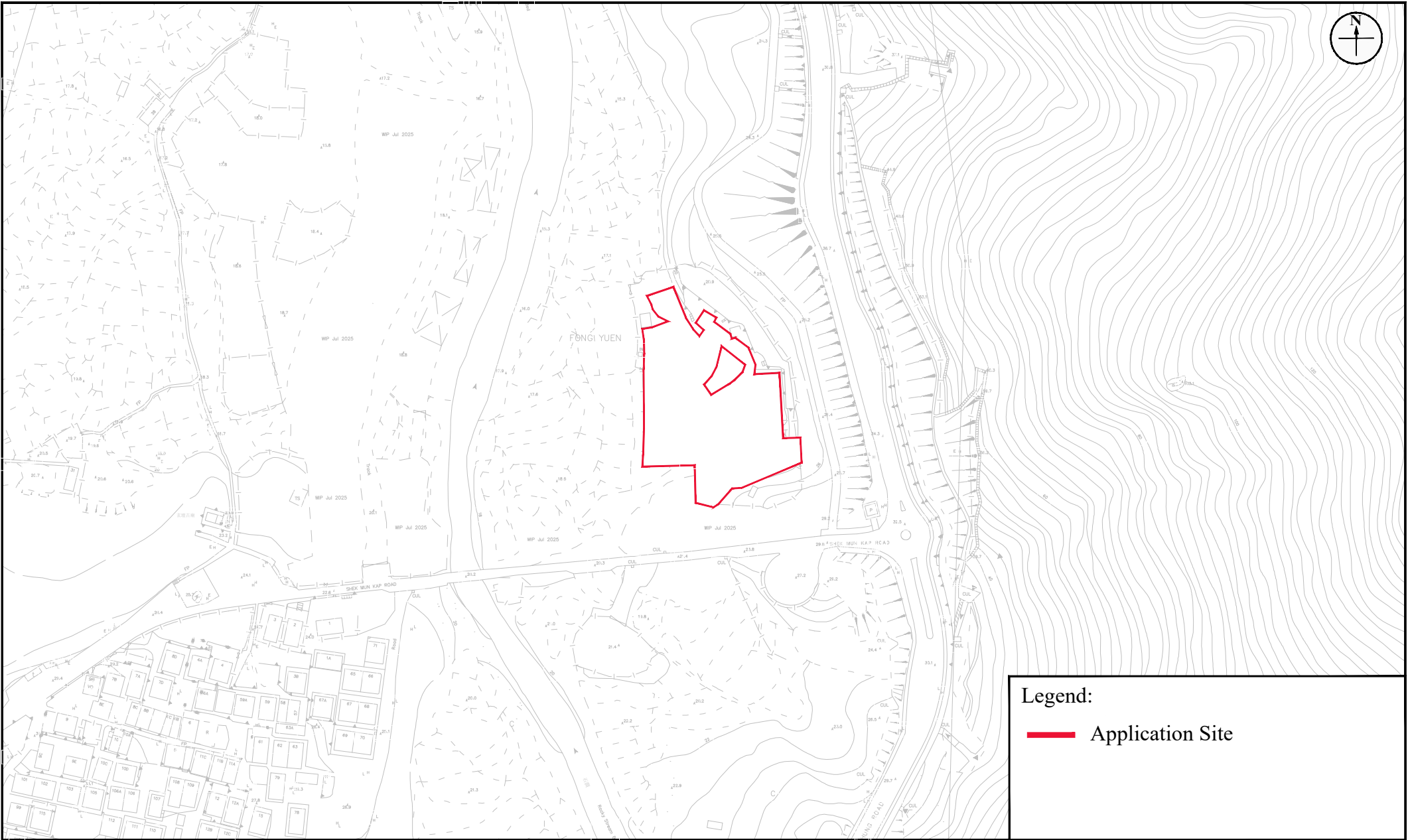
2.5.1 The Project Proponent will take up the design and construction cost for the future water main connection. The detailed design and assessment will be submitted for comments/approval at detailed design stage.

2.5.2 The responsibility for operation and maintenance of the proposed waterworks will be discussed and agreed with WSD and relevant departments during detailed design stage.

3. CONCLUSION

- 3.1.1 The water supply impact assessment has been carried out for the Proposed Development. The assessment results show that the peak water demand from the Proposed Development are 1338.4m³/day which only accounts for the existing Tung Chung No.2 Fresh Water Service Reservoirs of 3.3%.
- 3.1.2 Given that the contribution is not significant, the Proposed Development would unlikely pose any adverse impact to existing freshwater supply system.

Figures



Legend:
Application Site

Figure: 1.1	RAMBOLL	
	Drawn by:	CL
	Checked by:	TC
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Title: Location of Application Site and Its Environ		Date: Dec 2025
Project: Proposed Partial Redevelopment of Prajna Dhyana Temple, Tung Chung		

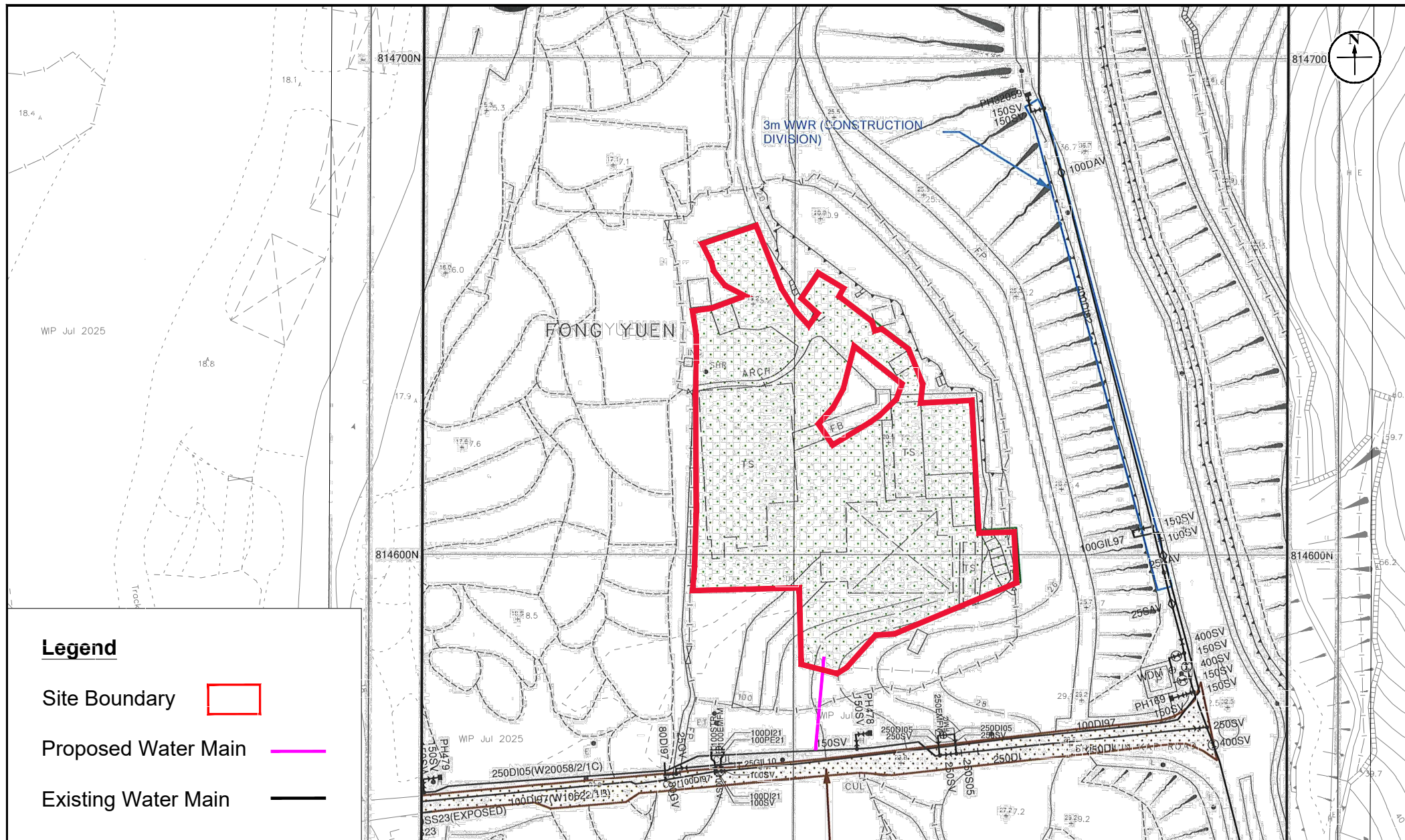


Figure: 2.1

Title: Existing and Proposed Freshwater Supply System for Proposed Development

Project: Proposed Partial Redevelopment of Prajna Dhyana Temple with Ancillary Columbarium, Tung Chung

RAMBOLL

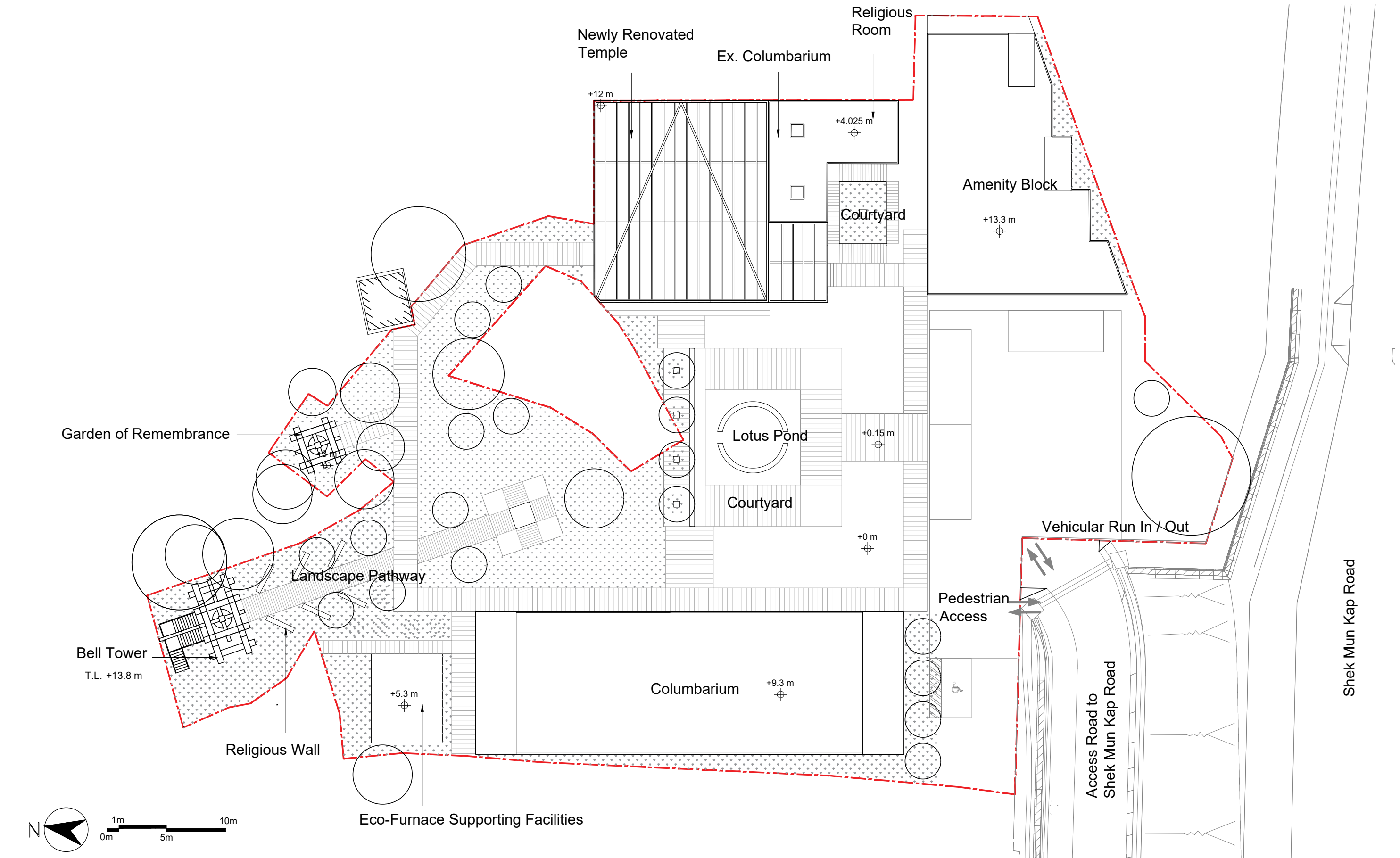
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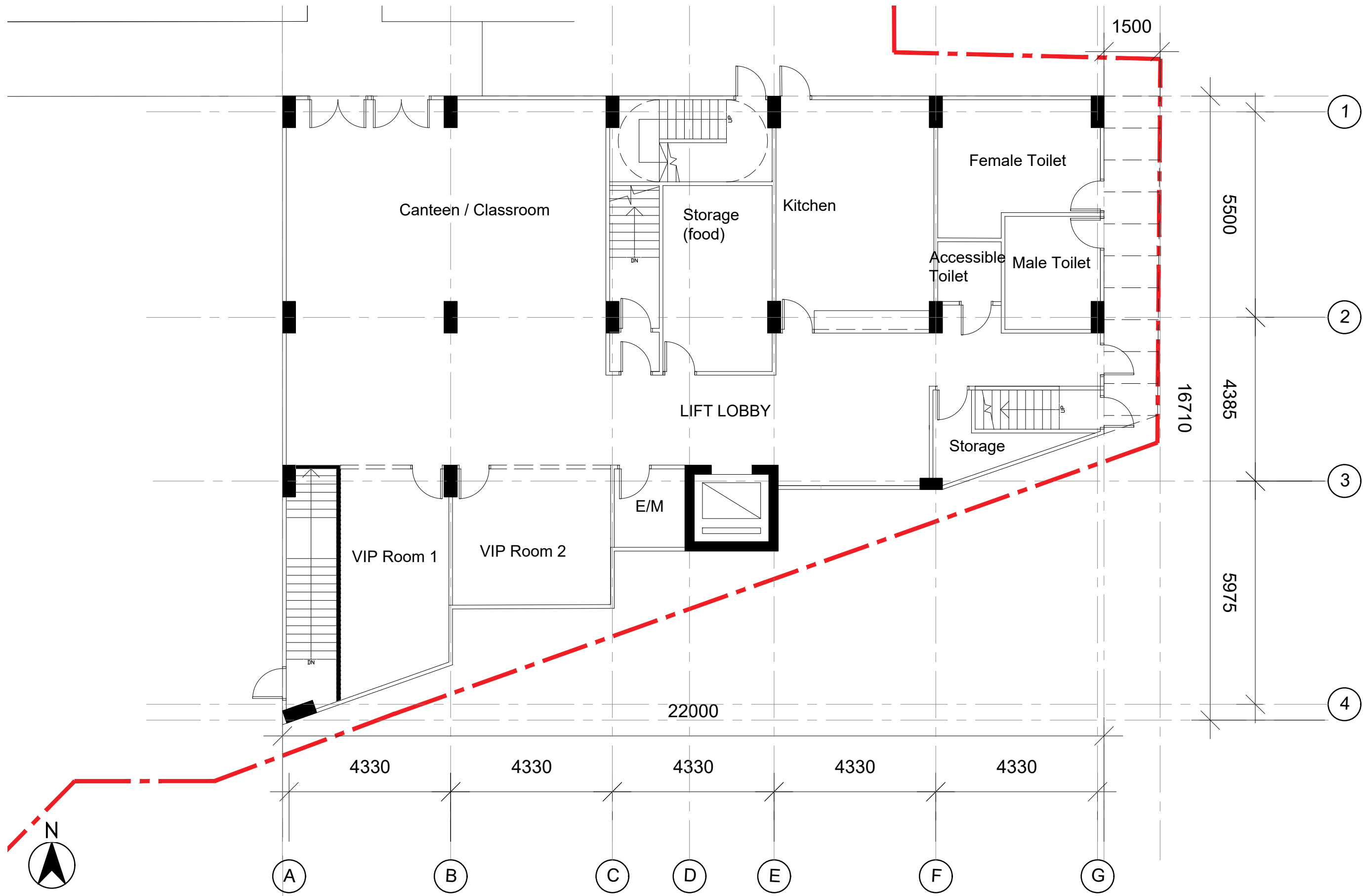
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Appendix 1.1 Master Layout Plan



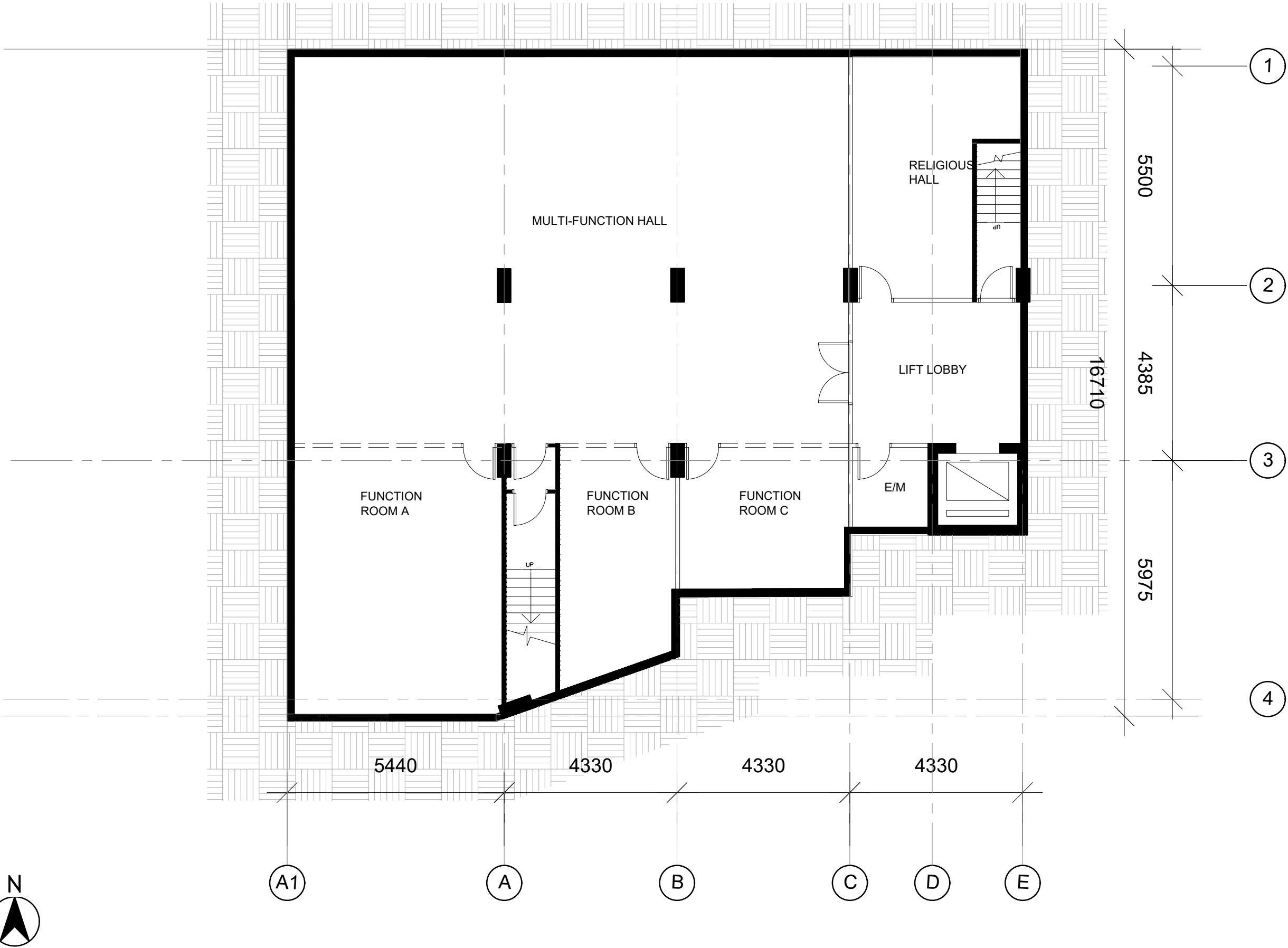
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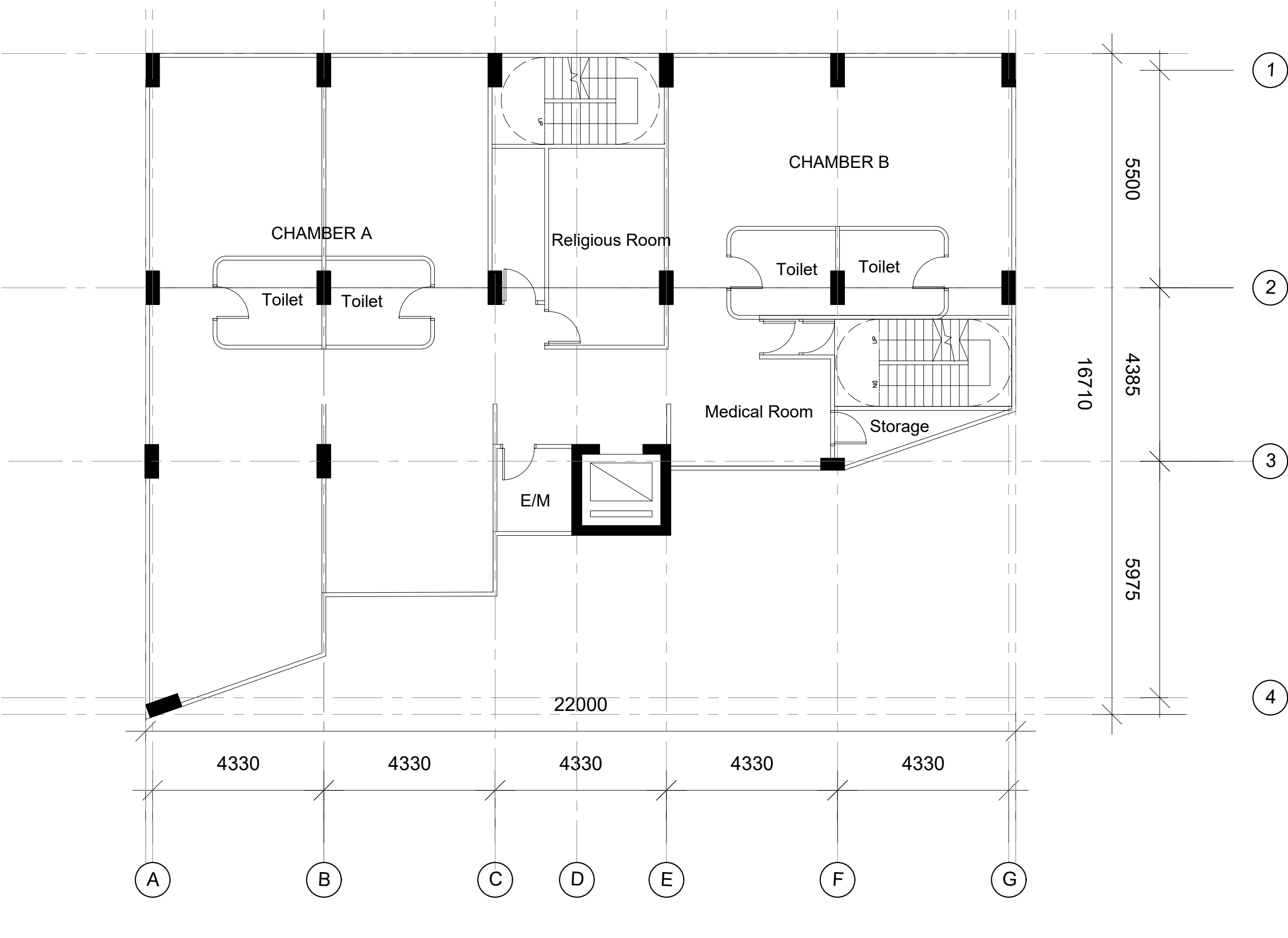
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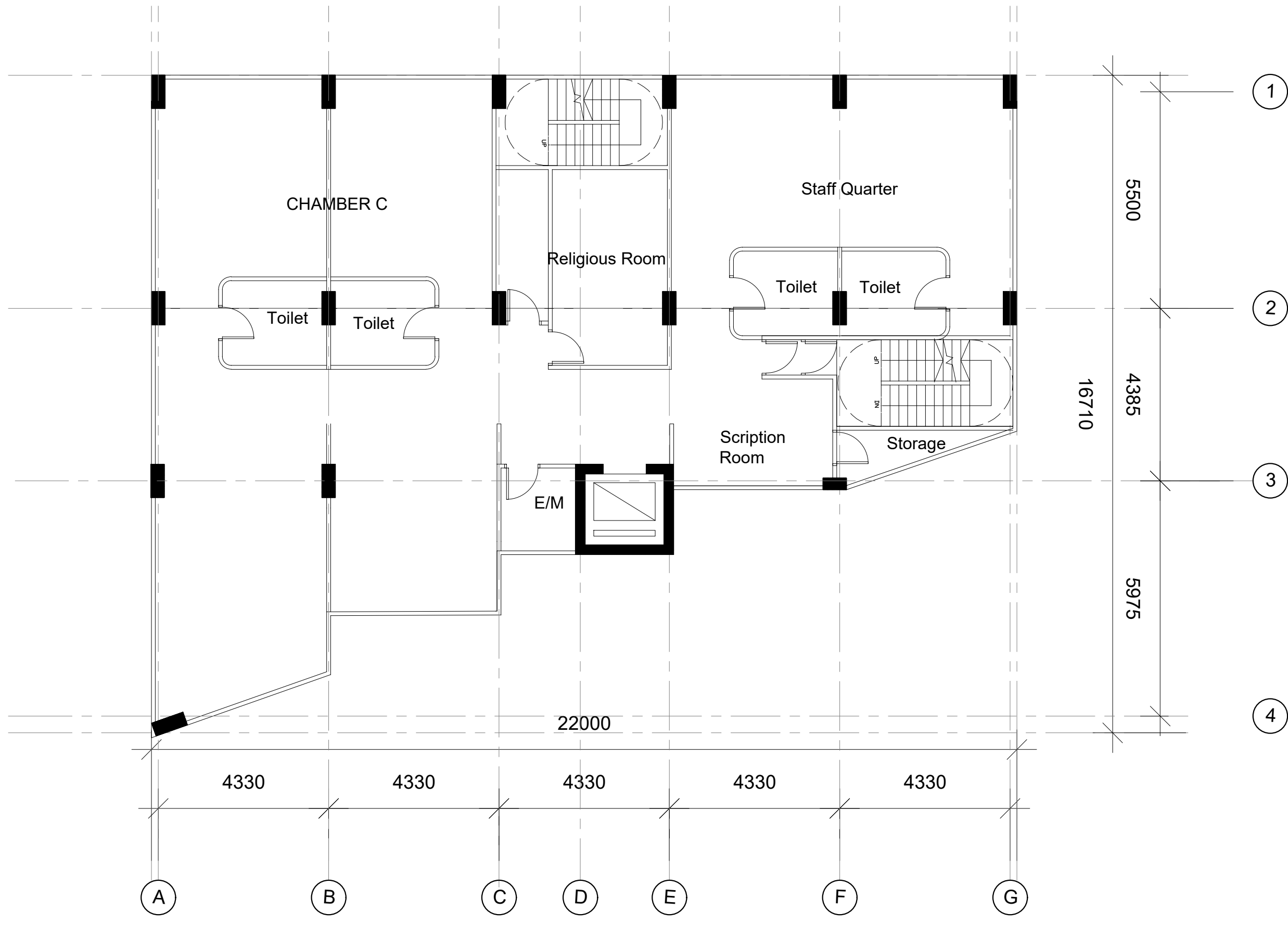
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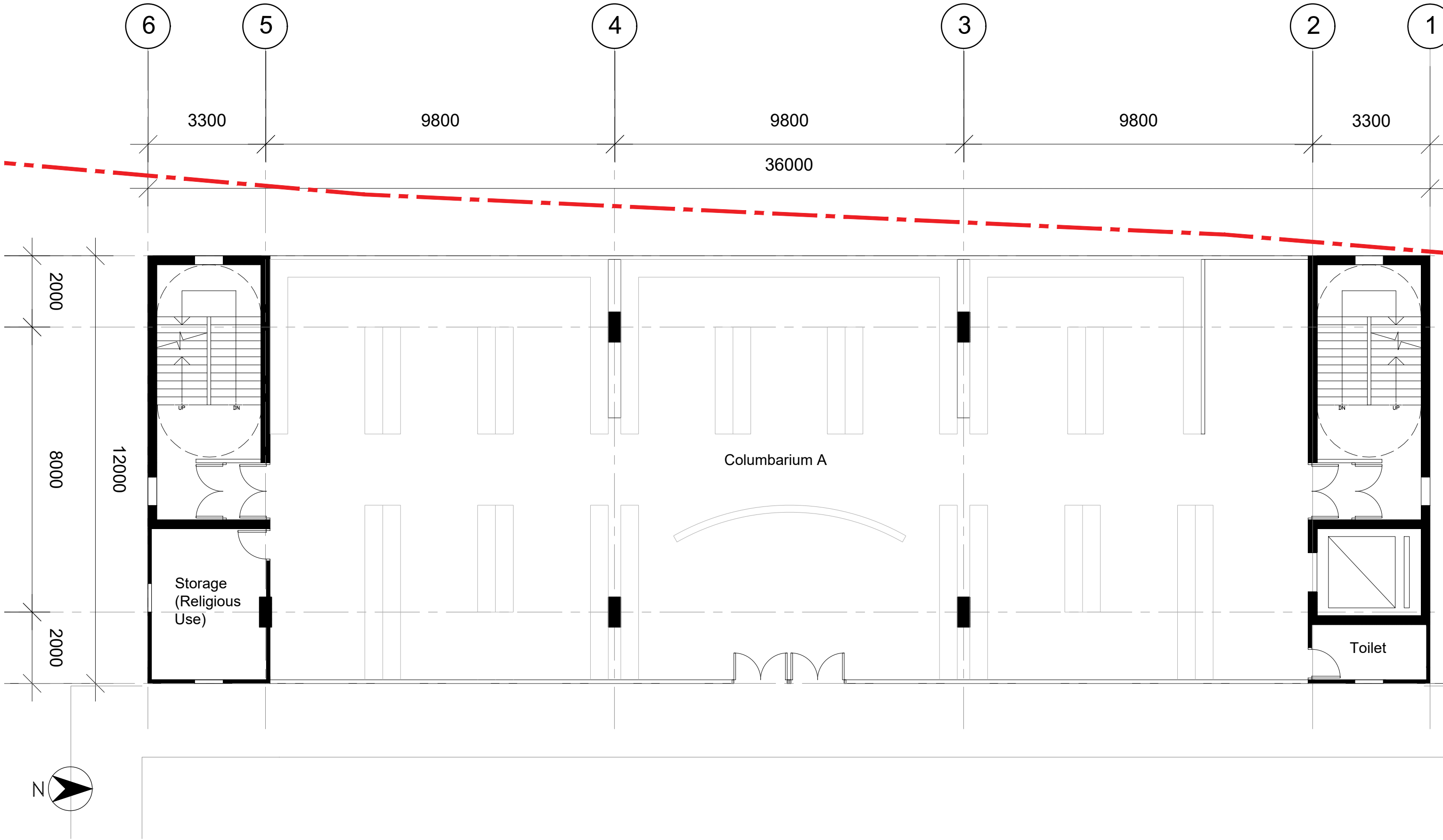
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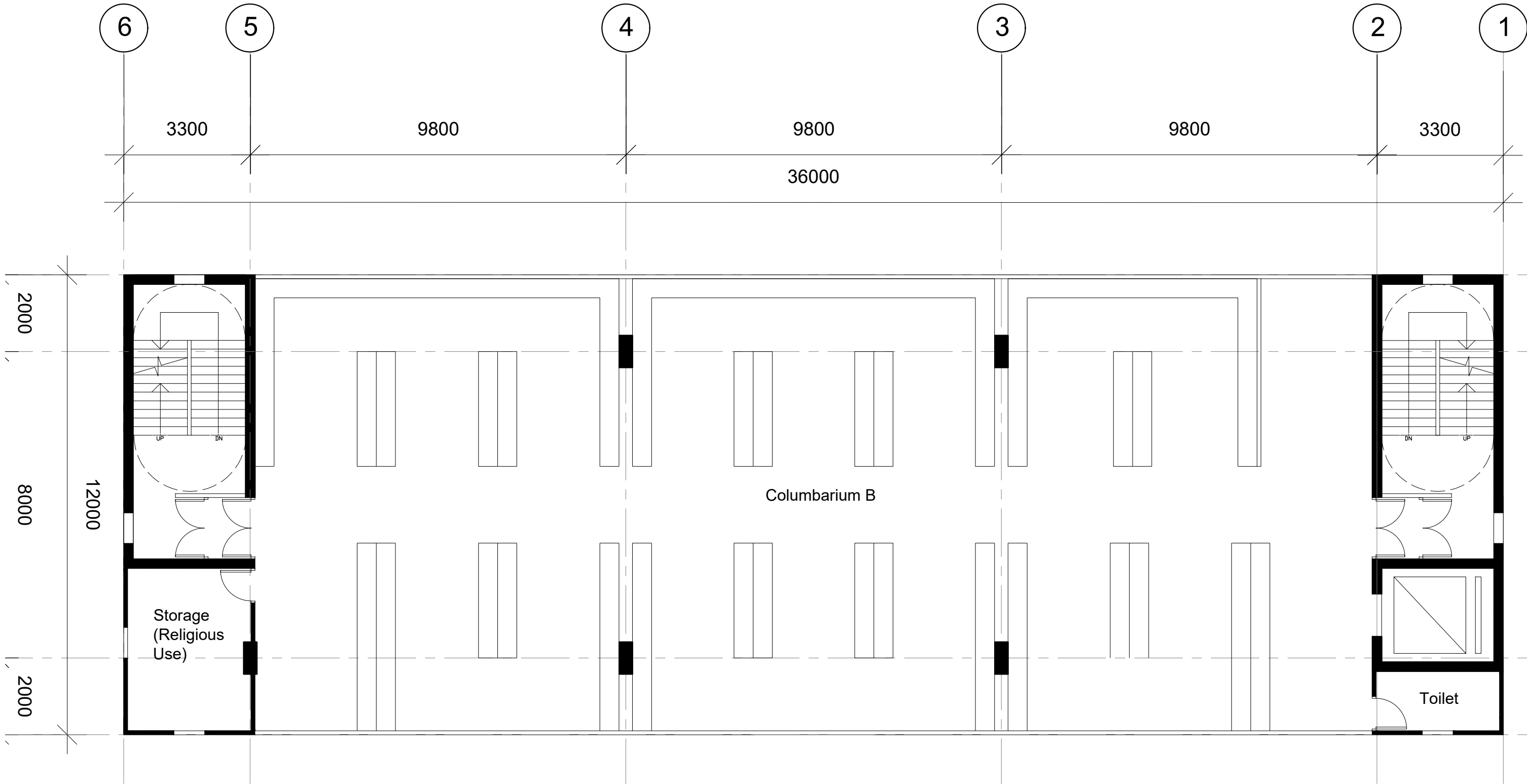
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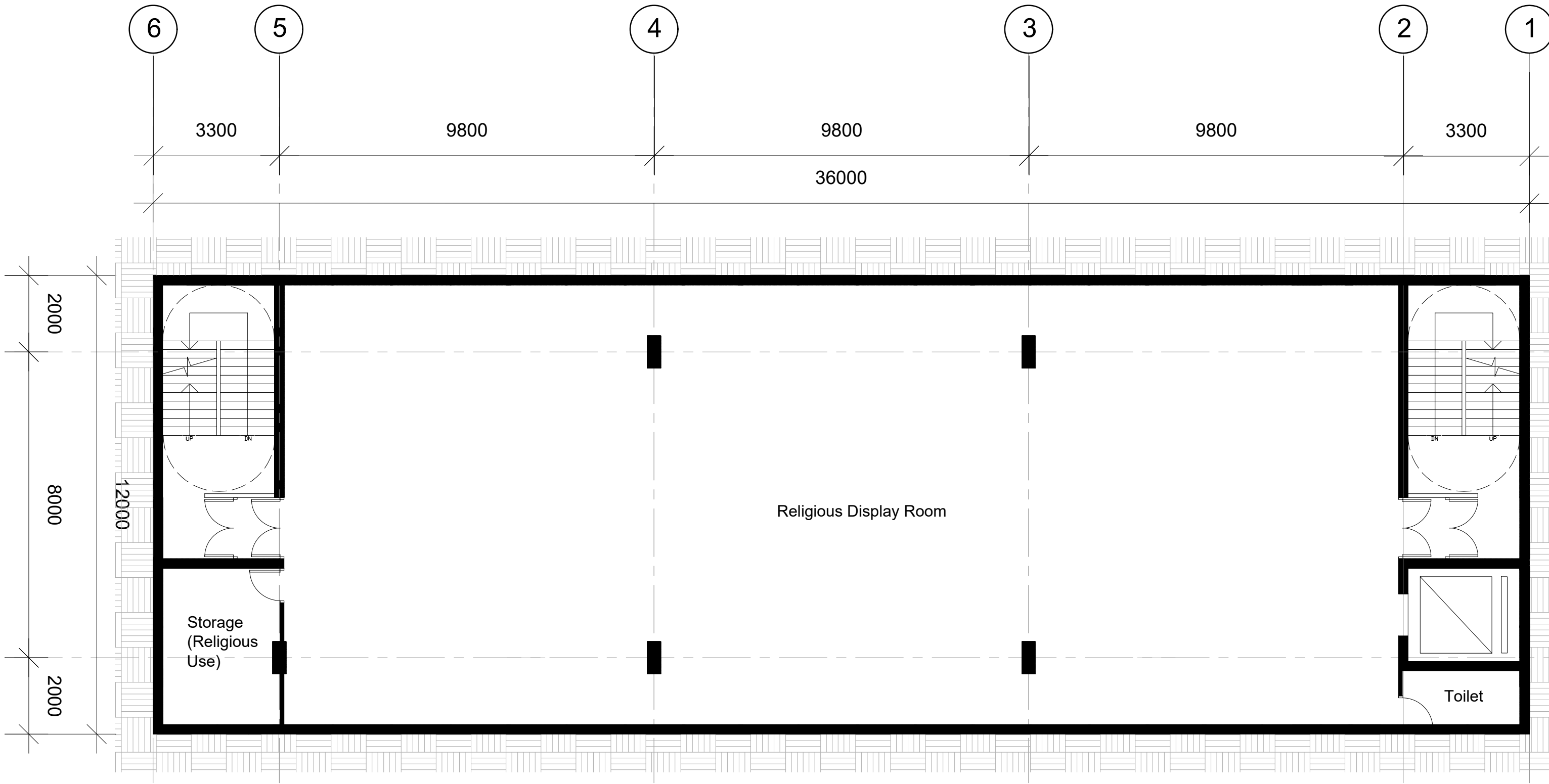
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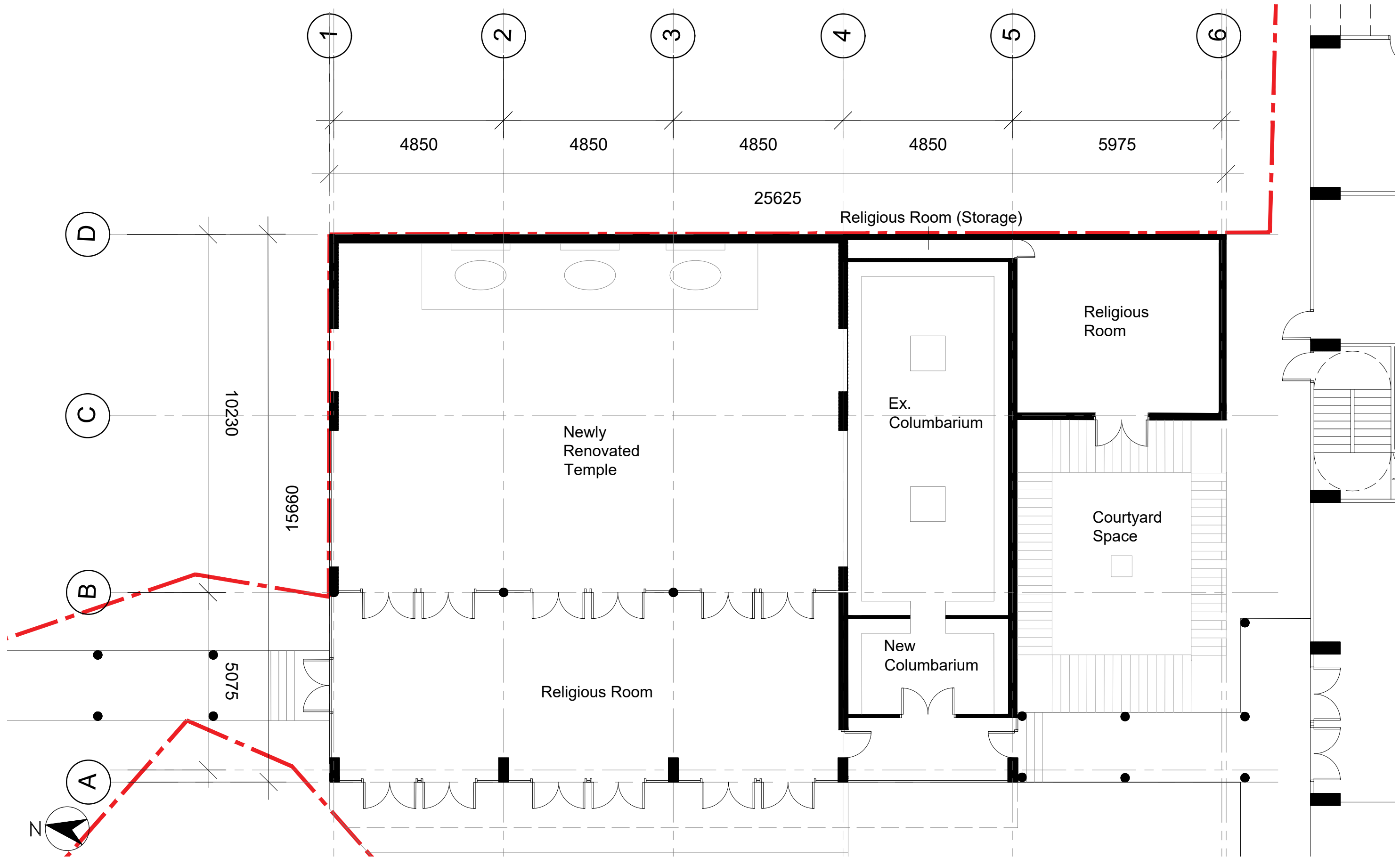
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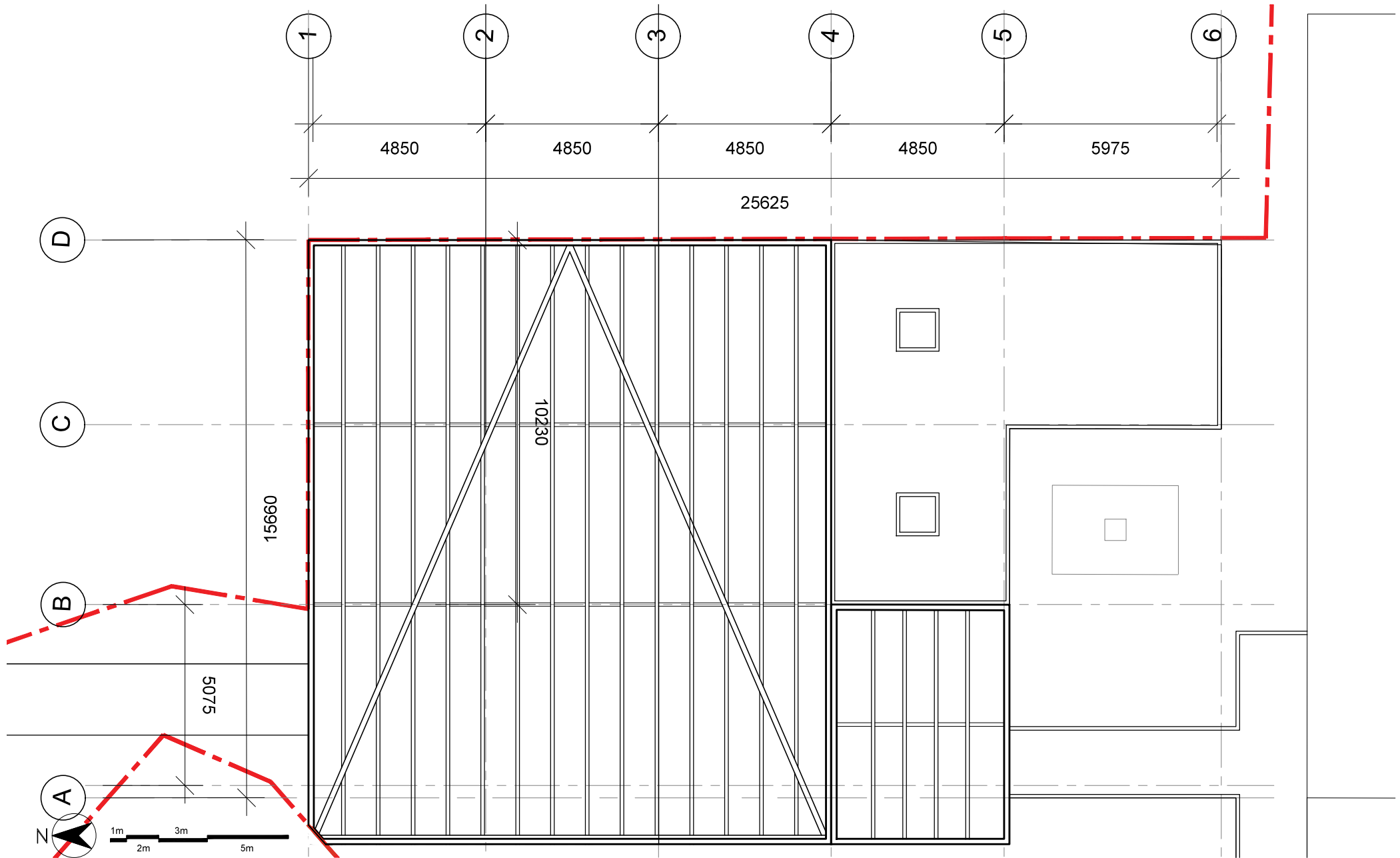
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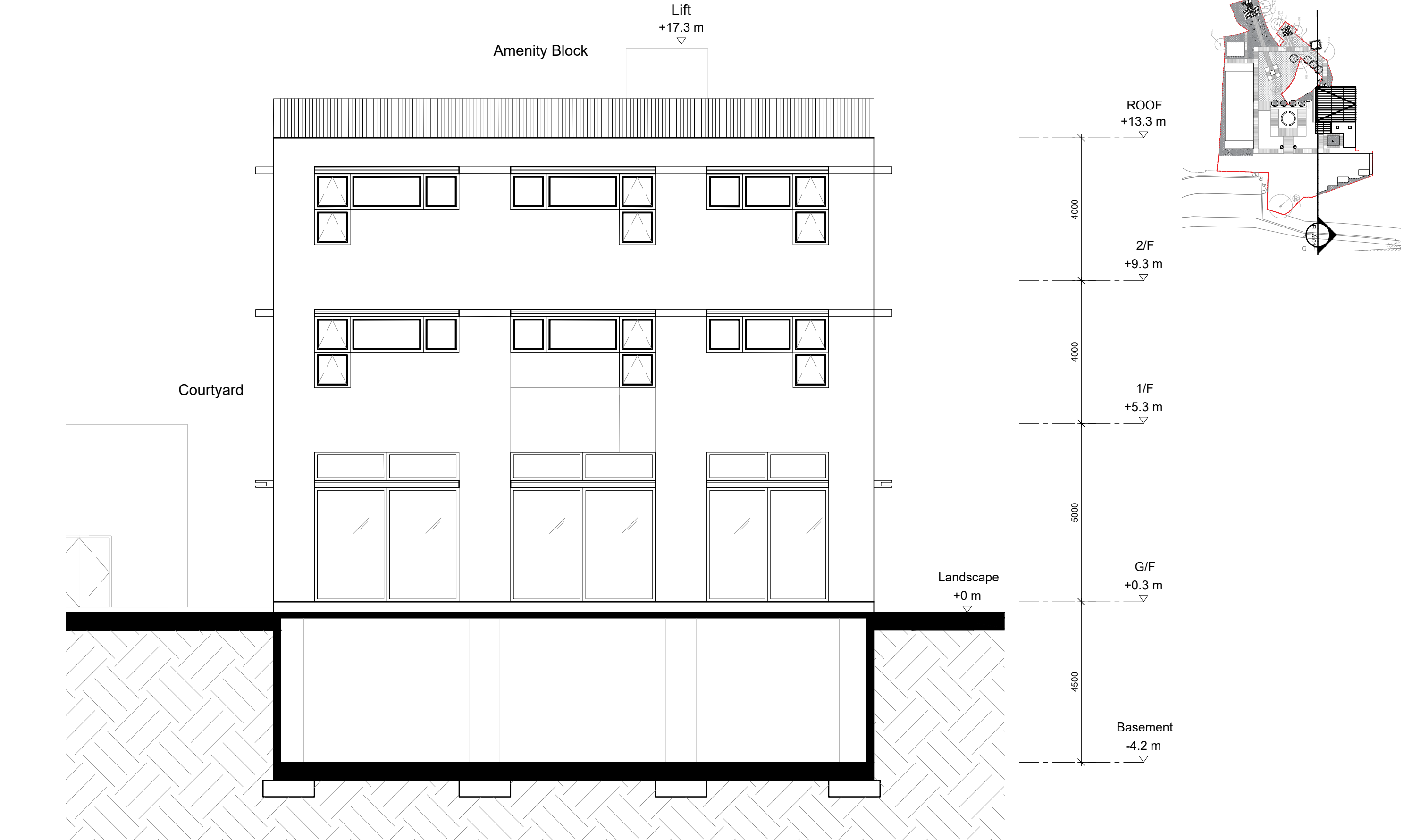
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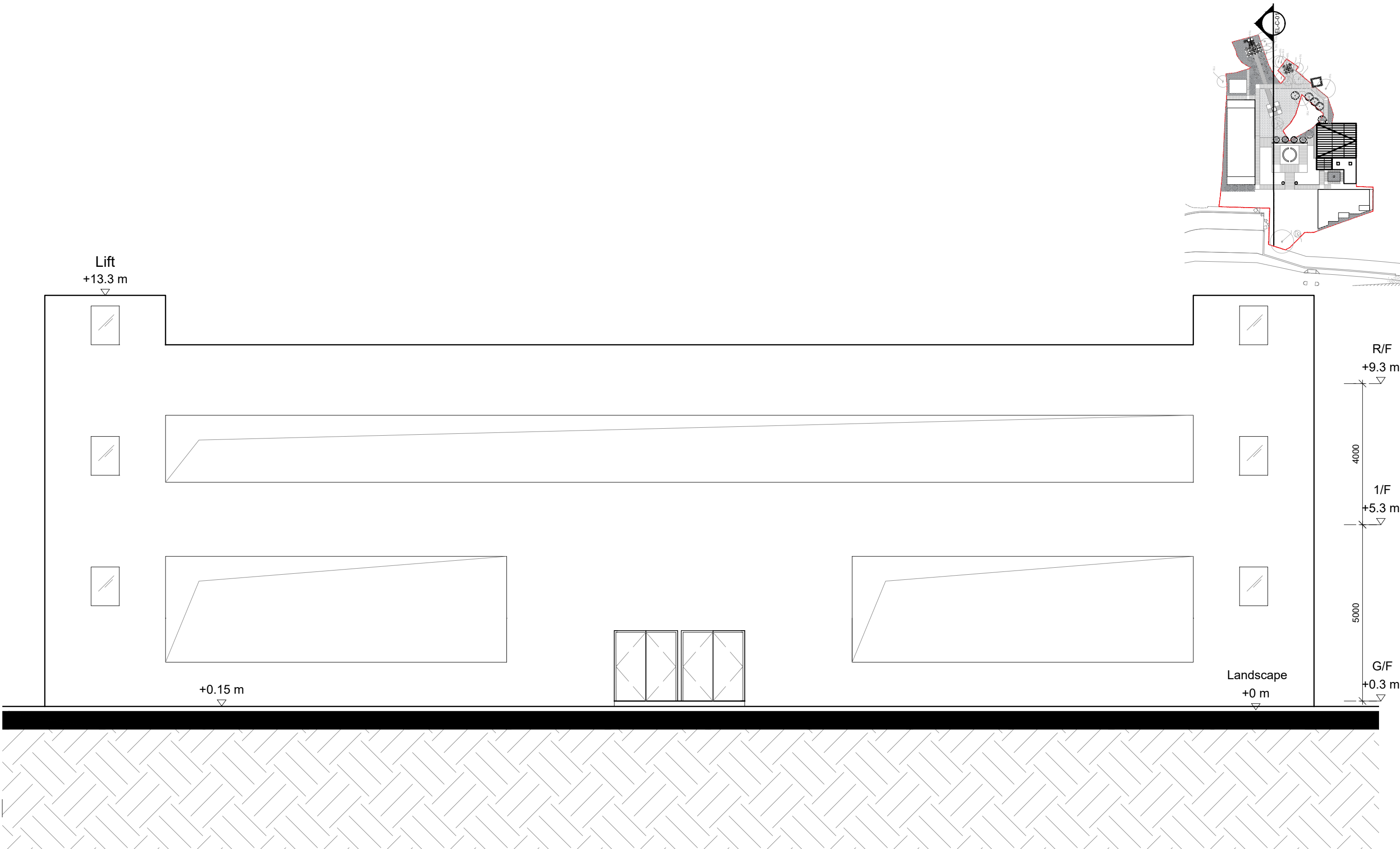
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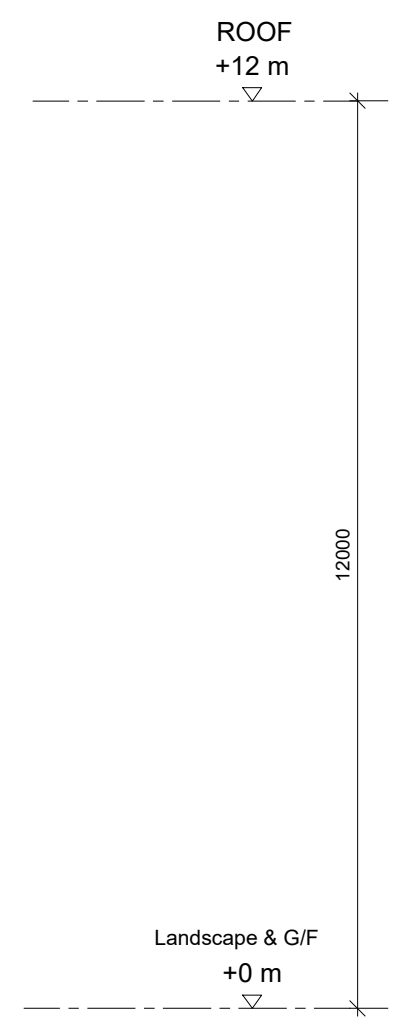
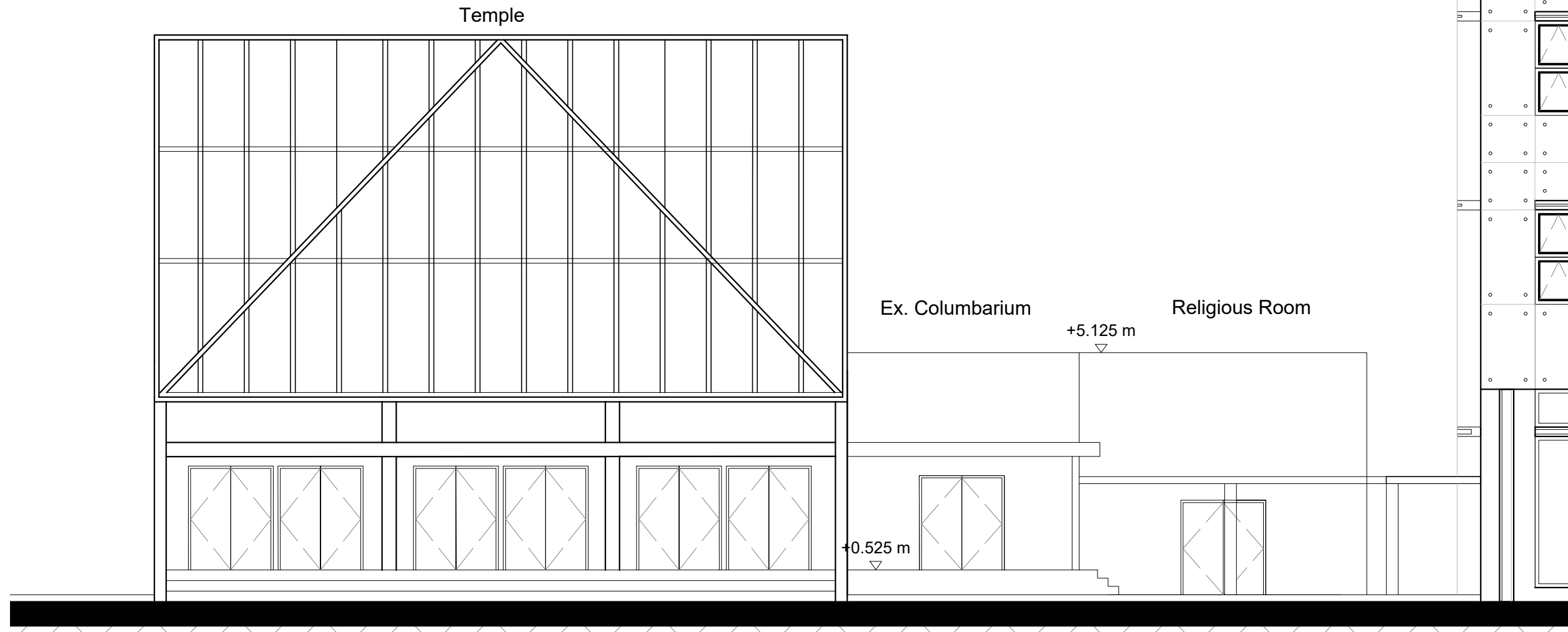
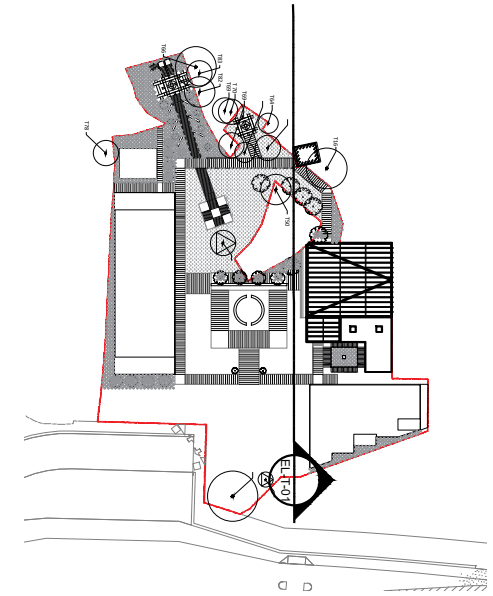
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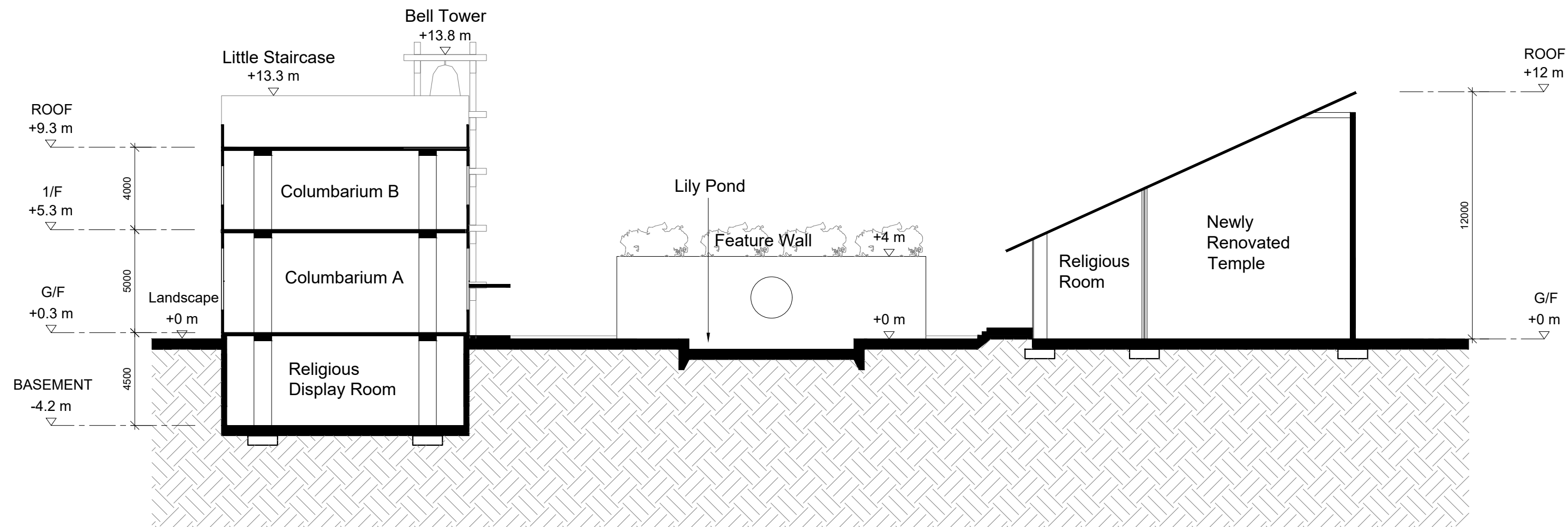
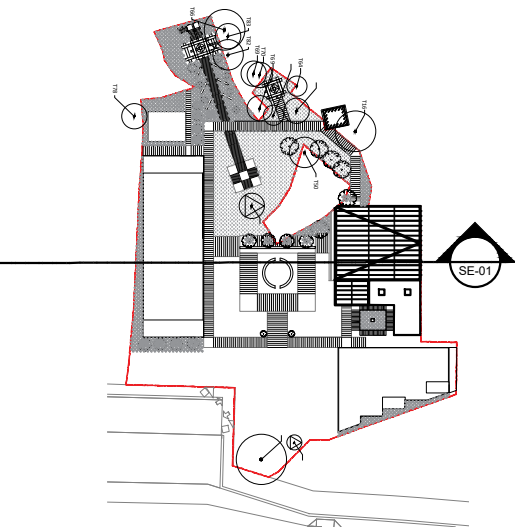
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Appendix 2.1 Records Obtained from Water Supplies Department



水務署
Water Supplies Department

香港及離島分署 Hong Kong and Islands Regional Office

香港北角英皇道 611 號水務署香港區大樓

WSD Hong Kong Regional Building, 611 King's Road, North Point, Hong Kong

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12 NOV 2025

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By Post

本署檔號 : (10) in WSD (HK) 1585 /(6) /25
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Your ref.

電話 : 2880 2558
Tel.
傳真 : 2811 8152
Fax.

11 November 2025

Ramboll Hong Kong Ltd.

21 st Floor,
BEA Harbour View Centre,
56 Gloucester Road,
Wanchai, Hong Kong.

(Attn: Ms. Carman Lee)

Dear Sir,

Proposed Development in Tung Chung - WSIA

I refer to your email dated 27 October 2025.

I enclose one copy of our mains record plans with the alignment of the existing and proposed water mains in the area of your concerns. You are requested to note that the alignment of water mains shown is indicative only. Although it is our intention to provide you with the most up to date information, we cannot guarantee that all recently laid mains have been incorporated in our central records and hence in the returned plans.

Ramboll Hong Kong Ltd.

Project:	TPCTCSMKE100		
Maconomy no.:			
Circulation:	Read	Action	
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The exact lines and levels of the water mains should be established by hand dug trial holes on site if they are of significance to your works. Please take all necessary steps to avoid causing damage to the water mains for which you will be held responsible.

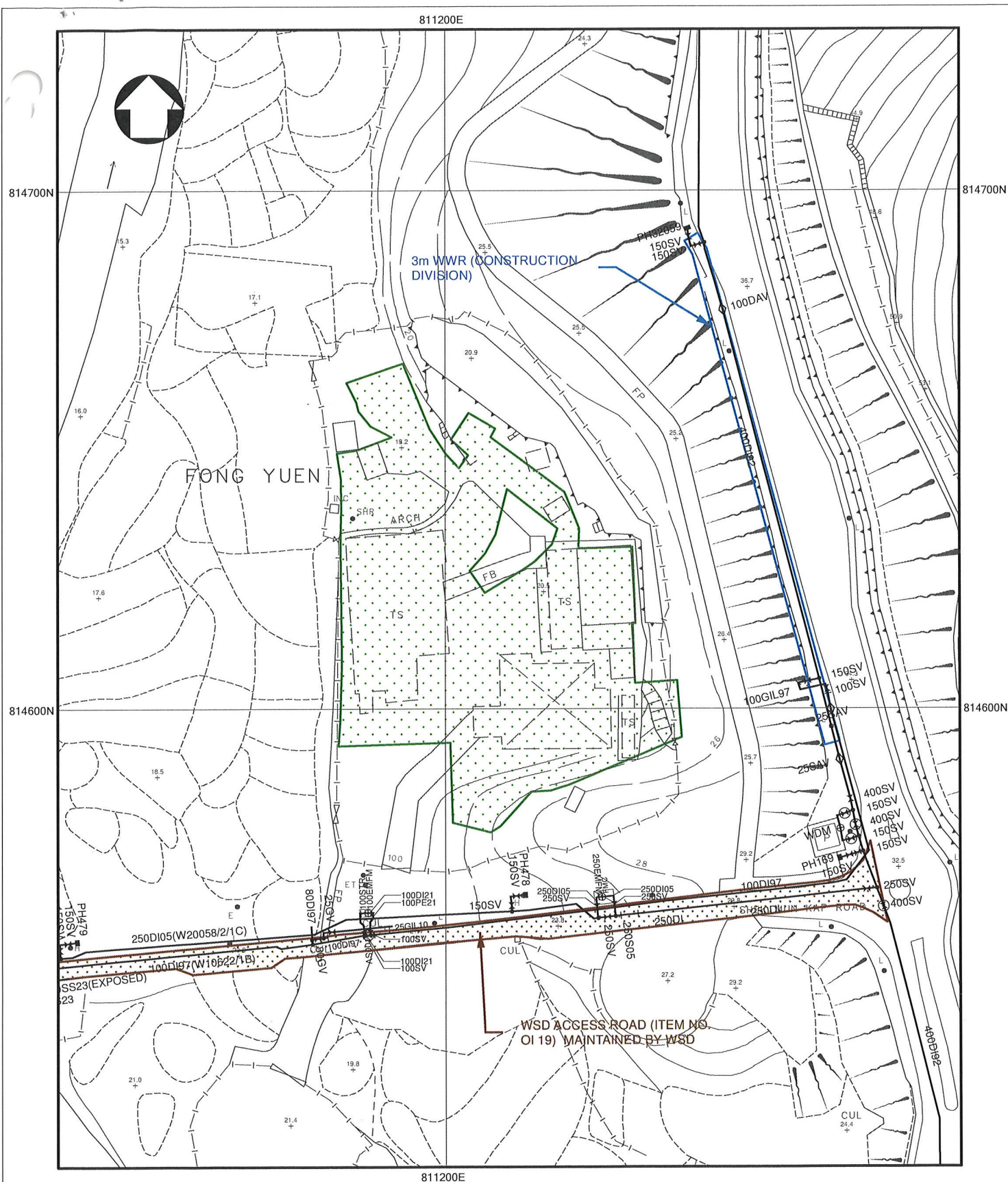
I attach a copy of the Conditions of Working in the Vicinity of Waterworks Installations for your necessary action.

Yours faithfully,



(Musa HS TSANG)
for Chief Engineer/Hong Kong & Islands
Water Supplies Department

Encl.



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. ALL LEVELS ARE IN METRES ABOVE PRINCIPAL DATUM.
3. INFORMATION ON ALIGNMENT OF MAINS IS OF INDICATIVE VALUE ONLY. WHERE POSITIONAL ACCURACY MAY BE OF IMPORTANCE, DETAILS SHOULD BE SITE CHECKED.
4. FOR MAINS RECORDS SIGN CONVENTIONS AND DESIGNATIONS SEE SKETCH NO. 3988.
5. NO EXISTING SALT WATER MAINS IN THE VICINITY OF THE SITE.
6. NO EXISTING WSD CABLE IN THE VICINITY OF THE SITE.
7. NO PROPOSED WSD CABLE IN THE VICINITY OF THE SITE.
8. THE SITE IS NOT WITHIN WSD GATHERING GROUNDS.
9. NO WSD SLOPES ARE AFFECTED IN THE VICINITY OF THE SITE.
10. NO CATHODIC PROTECTION MAINS ON THE VICINITY OF THE SITE.

SUBJECT SITE



PART COPY OF FRESH WATER MAINS RECORD PLAN(S)

W67880/9-SE-13C & 13D

FILE REF: (9) IN WSD(HK) 1585/(6)/25

REF. CODE: 44W25M

SHEET 1 OF 1

SCALE 1:1000



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Water Supplies Department

SIGN CONVENTIONS		ABBREVIATIONS																					
<p>MAINS</p> <p>FRESH / SALT WATER MAINS</p> <p>RAW / UNTREATED WATER MAINS / CONDUIT</p> <p>WASHOUT PIPE / OVERFLOW PIPE</p> <p>SLUDGE PIPE</p> <p>TREATED EFFLUENT MAINS</p> <p>WATER MAINS REQUIRE REGULAR FLUSHING</p> <p>PIPE LAID IN SLEEVE</p> <p>PIPE LAID IN TROUGH</p> <p>PIPE LAID INSIDE TUNNEL</p> <p>BEING LAID MAINS</p> <p>WATER TUNNEL</p> <p>PROPOSED MAINS</p> <p>PRIVATE MAINS (SEE NOTE 2)</p> <p>MAINS OF OTHER DEPARTMENTS (SEE NOTE 3)</p> <p>FIRE SERVICE</p> <p>PEDESTAL FIRE HYDRANT</p> <p>GROUND FIRE HYDRANT</p> <p>HEAVY DRAW-OFF FIRE HYDRANT</p> <p>SWAN NECK FIRE HYDRANT</p> <p>TWIN OUTLET SWAN NECK FIRE HYDRANT</p> <p>VALVE</p> <p>VALVE (SEE ABBREVIATIONS)</p> <p>NORMALLY CLOSED VALVE</p> <p>FLAP VALVE</p> <p>FLOW REGULATING VALVE</p> <p>NON RETURN / REFLUX VALVE</p> <p>PRESSURE CONTROL / REDUCING / RELIEF VALVE</p> <p>AIR VALVE</p> <p>AIR VALVE (SEE ABBREVIATIONS)</p> <p>AIR VALVE ON INSPECTION TEE (SEE ABBREVIATIONS)</p> <p>METER</p> <p>METER (SEE ABBREVIATIONS)</p> <p>VENTURI TUBE</p> <p>CRITICAL PRESSURE POINT</p> <p>OTHERS</p> <p>CHANGE IN PIPE</p> <p>BLANK FLANGE / END CAP</p> <p>EXTENTS SHOWING FEATURES OF WATER MAINS</p> <p>INSPECTION TEE (SEE ABBREVIATIONS)</p> <p>PIPES CONNECTED</p> <p>STANDPIPE</p> <p>STRAINER</p> <p>CATHODIC PROTECTION INSTALLATION (SEE ABBREVIATIONS)</p> <p>LEAK NOISE CORRELATION POINT</p> <p>LEAKAGE COLLECTION CHAMBER</p> <p>FLOW MEASUREMENT CHAMBER</p> <p>INSPECTION MANHOLE</p> <p>MULTI - PURPOSE INSERTION CHAMBER</p> <p>ESSENTIAL VALVE REFERENCE NUMBER (ALPHABET SEE ABBREVIATIONS)</p> <p>PIPES CROSS OVER</p>	<p style="text-align: center;">LEGEND</p>	<p>PIPE MATERIAL</p> <p>AC ASBESTOS CEMENT</p> <p>CI CAST IRON</p> <p>CONC CONCRETE</p> <p>COPP COPPER ALLOY</p> <p>DI DUCTILE IRON</p> <p>GI GALVANIZED IRON</p> <p>GIL LINED GALVANIZED IRON</p> <p>GMS GALVANIZED MILD STEEL</p> <p>GRP GLASS FIBRE REINFORCED PLASTIC</p> <p>MDPE MEDIUM DENSITY POLYETHYLENE</p> <p>MS MILD STEEL</p> <p>PE POLYETHYLENE</p> <p>S STEEL</p> <p>SS STAINLESS STEEL</p> <p>UPVC UNPLASTICISED POLYVINYL CHLORIDE</p> <p>REHABILITATION METHOD</p> <p>RA CURED IN PLACE PIPE</p> <p>RB CLOSED FIT (FOLD AND FORM SYSTEM)</p> <p>RD SLIP LINING / SLIP INSERTION</p> <p>RE CLOSE FIT (SWAGELINING SYSTEM)</p> <p>RF FIBRE REINFORCED PLASTIC SYSTEM</p> <p>RG INTERNAL LINING REPAIRED</p> <p>RH EXTERNAL COATING REPAIRED</p> <p>RK COMBINATION OF INTERNAL LINING REPAIRED AND EXTERNAL COATING REPAIRED</p> <p>RL PIPE BURSTING</p> <p>RM EXTERNAL FIBRE REINFORCED PLASTIC (FRP) SYSTEM</p> <p>RN JOINT SEALANT WORKS</p> <p>RP PRIMUS LINE</p> <p>RS SPRAY POLYURETHANE SYSTEM</p> <p>MAINS TYPE</p> <p>F FIRE SERVICE MAINS</p> <p>OF OVERFLOW PIPE</p> <p>WO WASHOUT PIPE</p> <p>INSPECTION TEE</p> <p>IT INSPECTION TEE</p> <p>MIT MULTI - PURPOSE INSPECTION TEE</p> <p>ADDITIONAL PIPE INFORMATION</p> <p>(400) OUTSIDE DIAMETER OF THE INSERTED PE PIPE FOR SPECIFIED REHABILITATED MAINS</p> <p>(CPS10) CATHODIC PROTECTION SYSTEM NO. 10</p> <p>(DRY) DRY MAINS</p> <p>(E) MAINS LAID UNDER ENTRUSTMENT WORKS</p> <p>(EXPOSED) EXPOSED PIPE</p> <p>(IRRIGATION) IRRIGATION PIPE</p> <p>(L) MAINS WITH LEAKAGE COLLECTION SYSTEM</p> <p>(PC) PENDING COMMISSIONED MAINS</p> <p>(SCM100) SHALLOW COVERED MAINS NO. 100</p> <p>(SUBMARINE) SUBMARINE PIPE</p> <p>(TE) TREATED EFFLUENT MAINS</p> <p>(TMF) TEMPORARY MAINS FOR FLUSHING</p> <p>(W20163) DRAWING REFERENCE</p> <p>(WSD 437/...) WSD FILE REFERENCE</p>	<p>METER</p> <p>EMFM ELECTROMAGNETIC FLOWMETER</p> <p>FM FLOWMETER</p> <p>WDM WASTE DETECTION METER</p> <p>DM DISTRICT METER</p> <p>VALVE</p> <p>BV BUTTERFLY VALVE</p> <p>GV GATE VALVE</p> <p>SC STOP COCK</p> <p>SV SLUICE VALVE</p> <p>V GENERIC VALVE</p> <p>WOV WASHOUT VALVE</p> <p>AIR VALVE</p> <p>AV GENERIC AIR VALVE</p> <p>SAV SINGLE AIR VALVE</p> <p>DAV DOUBLE AIR VALVE</p> <p>MDAV MULTI - PURPOSE DOUBLE AIR VALVE</p> <p>ATV GENERIC AIR VALVE ON INSPECTION TEE</p> <p>STV SINGLE AIR VALVE ON INSPECTION TEE</p> <p>DTV DOUBLE AIR VALVE ON INSPECTION TEE</p> <p>ALPHABET OF ESSENTIAL VALVE REFERENCE NUMBER</p> <p>FRESH WATER NETWORK SYSTEM</p> <p>B CONTROL VALVES OF DIRECT TEEING OFF TO SUPPLY FROM FRESH WATER TRUNK MAINS</p> <p>C CUT- LINE VALVES</p> <p>D ALL OTHER ESSENTIAL VALVES</p> <p>M DISTRICT BOUNDARY VALVES FOR DISTRICT METERING AREAS AND PRESSURE MANAGEMENT AREAS</p> <p>S SCOUR VALVES</p> <p>T TRUNK MAIN VALVES INCLUDING THOSE AT TEES</p> <p>V VALVES UNDER CHINA WATER SCHEME, HIGH ISLAND WATER SCHEME AND PLOVER COVE WATER SCHEME</p> <p>SALT WATER NETWORK SYSTEM</p> <p>X ESSENTIAL VALVES</p> <p>CATHODIC PROTECTION INSTALLATION</p> <p>TS1 TEST STATION NO.1</p> <p>HA2(1) HORIZONTAL ANODE NO. 2 (1 GROUP OF ANODE)</p> <p>VA3(2) VERTICAL ANODE NO. 3 (2 GROUPS OF ANODE)</p>																				
<p>DESIGNATIONS</p> <p>DIAMETER OF MAINS</p> <p>REHABILITATED METHOD (SEE ABBREVIATIONS)</p> <p>MAINS TYPE (SEE ABBREVIATIONS)</p> <p>ADDITIONAL PIPE INFORMATION (SEE ABBREVIATIONS)</p> <p>COMPLETION YEAR OF MAINS</p> <p>PIPE MATERIAL (SEE ABBREVIATIONS)</p> <p>450ACRB12XX(YYY)</p>		<p>COPYRIGHT RESERVED</p> <p>This print may not be copied, traced or exhibited without permission of Water Supplies Department.</p> <p>NOTES</p> <p>1. WSD MAINS INCLUDE:</p> <p>(a) MAINS LAID AND MAINTAINED BY WSD.</p> <p>(b) MAINS LAID BY OTHER DEPARTMENTS OR PRIVATE PARTIES BUT MAINTAINED BY WSD AT WSD'S COST.</p> <p>2. PRIVATE MAINS INCLUDE MAINS IN PRIVATE ROADS, PRIVATE HOUSING ESTATES, ETC. NOT MAINTAINED BY WSD.</p> <p>3. MAINS OF OTHER DEPARTMENTS INCLUDE MAINS LAID BY OTHER GOVERNMENT DEPARTMENTS NOT MAINTAINED BY WSD.</p>																					
<p>圖則名稱 drawing title</p> <p>MAINS RECORDS SIGN CONVENTIONS AND DESIGNATIONS</p>		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;">C</td> <td style="width: 10%; text-align: center;">6/12/19</td> <td style="width: 60%; text-align: center;">GENERAL REVISION</td> <td style="width: 20%; text-align: center;">SE/PGIS</td> </tr> <tr> <td style="text-align: center;">B</td> <td style="text-align: center;">11/02/11</td> <td style="text-align: center;">GENERAL REVISION</td> <td style="text-align: center;">(Signed) L.H. LAM SE/Dev(SD)</td> </tr> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">16/06/05</td> <td style="text-align: center;">GENERAL REVISION</td> <td style="text-align: center;">(Signed) K.T. CHAN SE/AM</td> </tr> <tr> <td style="text-align: center;">編號 no.</td> <td style="text-align: center;">日期 date</td> <td style="text-align: center;">摘要 description</td> <td style="text-align: center;">簽署 Initial</td> </tr> <tr> <td colspan="4" style="text-align: center;">修訂 REVISION</td> </tr> </table>		C	6/12/19	GENERAL REVISION	SE/PGIS	B	11/02/11	GENERAL REVISION	(Signed) L.H. LAM SE/Dev(SD)	A	16/06/05	GENERAL REVISION	(Signed) K.T. CHAN SE/AM	編號 no.	日期 date	摘要 description	簽署 Initial	修訂 REVISION			
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<p>圖則編號 drawing no.</p> <p>SK 3988C</p>		<p>比例 scale</p> <p>NOT APPLICABLE</p>																					
<p>水務署</p> <p>Water Supplies Department</p>		<p>CAD REF. SK3988C.DWG</p> <p>PLOTTING SCALE 1:1</p>																					

Conditions of Working in the Vicinity of Waterworks Installations

Water Mains

1. No water mains or their support shall be interfered with or buried without the prior approval of WSD.
2. The Contractor shall check the location of water mains and cables and other services by hand dug trial holes and take precautionary measures to protect them.
3. Free access shall be maintained at all times for the staff of WSD, their contractors and vehicles to go into and/or through the site to carry out installation, inspection, operation, maintenance or repair works.
4. No additional filling material is to be deposited over a water main without the approval of WSD.
5. No structures shall be erected or materials stored within 3 metres from the centre line of mains of 900mm diameter or under, and 5 metres for mains exceeding 900mm in diameter.
6. No cable, pipe or duct shall be laid over, in parallel to, or within the Waterworks Reserve or 300mm around, the water mains without prior written approval from WSD. No trees or shrubs with penetrating roots shall be planted within the Waterworks Reserve or within 2.5m from the edge of the water mains. No planting or obstruction of any kind except surfacing shall be permitted within the space of 1.5m around the cover of any WSD valve or within a distance of 1m from any hydrant outlet.
7. No footing shall be constructed above any existing water mains. Isolated footings shall be constructed instead of continuous footing for installation of the hoarding in the vicinity of the existing water mains. A minimum clearance of 300mm between the footing and the existing water mains shall be maintained.
8. Full details of any proposed temporary works affecting waterworks installations and of any temporary support or protective measure to mains shall be submitted to the Client Department where appropriate for approval and to WSD for information. Work shall not commence until approval is given by the Client Department.
9. Diversion of WSD mains, other than those already shown on the contract drawings, shall only be considered when all other options such as protection of the mains or modification of design have been considered and found to be impracticable.
10. The programme for laying or diversion of all WSD mains shall be agreed with WSD in advance. A 14-day notice shall be served to WSD to confirm site availability for the commencement of any agreed diversion. WSD shall also be notified of any change required in the agreed programme as soon as possible.

11. All excavation works within 1.5m of water mains exceeding 900 mm in diameter shall be carried out by hand. No excavation shall be carried out within lines 45° below the centre line of such mains or 45° below the edges of the foundation of their supports without approved ground support. If the support is in the form of steel sheets, they shall be left in place after works. Removal of support from underneath the mains is not permitted. In general, the maximum acceptable differential settlement of existing pipe is as follows unless otherwise specified –

Pipe material	AC	DI	GI	PVC	MS
Maximum acceptable differential settlement	1 in 400	1 in 200	1 in 200	1 in 400	1 in 200

12. No earth fill ramps are to be used to form temporary crossings of the large diameter mains. Temporary ramps/bridges in steel, timber, or concrete shall be used with the deck and support piers clear of the mains so that no loading is imposed on the mains.
13. All temporary works near the large diameter water mains shall be kept to at least 1 metre away from the edge of the mains and the length of mains affected shall be well protected by a temporary timber cover raised 250 mm clear of the mains to ensure no impact damage.

Blasting, Drilling and Piling near Waterworks Installations

14. No blasting, drilling, or pile driving (including sheet piling) within a distance of 60m from waterworks tunnels shall be carried out. Furthermore, blasting within 50m from any water retaining structure other than watermains; 6m from watermains of 600mm diameter and above; and 6m from any non-water-retaining structure shall not be carried out without the prior approval of WSD.
15. The maximum particle velocity and amplitude of ground movements due to blasting or pile driving as measured at the nearest waterworks tunnel or other water retaining structures shall not exceed 13mm/sec. and 0.1mm respectively.
16. The maximum particle velocity and amplitude of ground movements due to blasting or pile driving as measured at the nearest water mains shall not exceed 25mm/sec. and 0.2mm respectively.
17. The size of charge, pattern and timing of detonation etc. will be decided by the Commissioner of Mines after carrying out test firing at site.
18. The movement of mains and structures shall be monitored by surveys jointly attended by WSD, the project Department and the Contractor. One week's notice shall be given to WSD for any survey request.
19. Vibration from blasting, piling or other causing activities shall be monitored by means of agreed vibrograph readings. The vibrograph shall comply with the Specification below and shall be provided free by the Contractor.

20. The results of monitoring of the vibration and any movement of water mains and waterworks structures shall be submitted to WSD for record purpose. If the aforementioned vibration limits are exceeded or movement in excess of 5mm is detected, works shall be suspended until approved remedial works are completed. Full details of the proposed works shall be approved by WSD before any work commences.

Specification for Vibrograph

- (a) The machine shall be a direct reading type peak particle velocity vibrograph.
- (b) It shall have 3 channels, recording in 3 mutually perpendicular directions.
- (c) It must be able to record particle velocity and amplitude, although not necessarily at the same time.
- (d) It must produce a permanent trace on paper, preferably by using ultra-violet light.
- (e) The recording paper must be easily obtainable locally.
- (f) The instrument must be portable and battery operated (or else a generator must be supplied free).
- (g) Operating instructions must be in English.

Excavation near Waterworks Installations

- 21. Excavation shall not be permitted within lines drawn at 45° downwards from a point 6m away from the foundation lines of any waterworks structures.
- 22. No excavation should be carried out within 60 metres, horizontally of any tunnel and no excavation or well driving shall be carried out above any tunnel.
- 23. No quarrying operations shall be carried out above and/or within 150 metres horizontally from any waterworks tunnel.

Prevention of Pollution of Waterworks Catchments

- 24. Site formation, construction and drainage plans shall be submitted to WSD for approval prior to commencement of work.
- 25. Protective measures shall be taken by the Contractor to prevent pollution or siltation to the catchment area. Any bulk excavation within the catchment shall be provided with silt traps to prevent any particular matter from entering streams or intakes. The details of silt traps shall be submitted to WSD for approval. Silt traps shall be cleared out regularly and in particular after any rainstorm.

26. The storage and discharge of pesticides, toxicant, flammable or toxic solvents, petroleum oil, diesel, tar or other toxic substances are strictly prohibited within the gathering grounds.
27. No labour lines shall be allowed within waterworks catchment area.
28. Only dry-type portable toilet facility with regular desludging schedules is allowed during the construction period. The sludge must be disposed of properly outside the gathering grounds. Portable toilets shall be kerbed on all sides, located, at least 30 metres away from the streams and desludged on a regularly basis.
29. The Contractor shall be responsible for cleaning frequently any waterworks roads and associated drainage works of mud and debris.
30. Should pollution be detected in future due to the development, immediate remedial actions to clear the pollution must be taken by the Contractor.

Waterworks Installations (e.g. Treatment Works) Nearby

31. The Contractor will not be permitted access to any adjacent waterworks installations.
32. An unimpeded free vehicular access shall be maintained at all times to and from the adjacent waterworks installations in the vicinity.

Special provisions

33. WSD may impose further conditions as deemed necessary for the protection of waterworks that may be adversely affected by the proposed works including but not limited to the appointment of independent checking engineer and specialists at the expense of the project.

Subways/ Underpasses Nearby

34. The contractors to check if the proposed works in the vicinity of waterworks are located in the vicinity of subway(s)/underpass(es) in the presence of water mains that may flood the tunnel or subway in case of water mains burst; and
35. If affirmative, carry out an assessment of the impact of water mains burst on the nearby subway(s)/underpass(es) and submit to HyD and WSD for approval before commencement of the works, including the proposed precautionary or mitigating measures to protect the affected water mains/underpass(es)/subway(s) and the public using the facilities.

- End -

Appendix 2.2 Detailed Water Supply Impact Assessment Calculations

Table 1 - Population Estimation for Proposed Development

Staff and Visitors	No. Staff and Visitors	=	1605	people	(30 Staff + 1575 visitors)
Canteen	Total GFA	=	84	m ²	

Table 2 - Daily Water Demands Calculation for Proposed Development

Type	Population (head)	Freshwater		Flushing Water	
		Daily Unit Demand (l/head/day)	Daily Demand (l/day)	Daily Unit Demand (l/head/day)	Daily Demand (l/day)
Village Type Development - Redevelopment/ Modern Type [1]	1,605	230	369150	70	112350
Type	GFA (m ²)	Freshwater		Flushing Water	
		Daily Unit Demand (m ³ /m ² /day)	Daily Demand (m ³ /day)	Daily Unit Demand (m ³ /m ² /day)	Daily Demand (m ³ /day)
Canteen	84	0.020	1.68	0.007	0.59
Total for Proposed Development (m3/day)			370.8		112.9

[1] Aas Temple has low density, it is assumed as Village Type Development for Calculation

Table 3- Mains Capacity Calculation for Proposed Development

Site Demand	Mean Daily Demand	Peak Factor	Peak Flow	
	m ³ /day	-	m ³ /day	
Fresh Water	370.8	3	1112.5	
Flushing Water	112.9	2	225.9	
Total* =			1338.4	

* Assume both fresh water and flushing water are provided from Tung Chung No .2 Fresh Water Service Reservoir

Table 4- Mains Capacity Calculation for Proposed Development

(A) Proposed Main Capacity

Pipe Designation	Diameter	Area	Total Peak Flow	Velocity	Peak Flow within 0.9 to 3.0m/s ?
	mm	sqm	m3/day	m/s	
New Fresh Water	100	0.007854	1338.4	1.9723	yes