

Prepared by

Ramboll Hong Kong Limited

REDEVELOPMENT OF MIDDLETON TOWERS AT POK FU LAM

WATER SUPPLY IMPACT ASSESSMENT

Date July 2026

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1. INTRODUCTION

1.1 Project Background

- 1.1.1 The Subject Site is mainly zoned as “Residential (Group C)” (“R(C)”) with minor portion zoned as “Green Belt” (“GB”) under the Approved Pok Fu Lam Outline Zoning Plan (OZP) (No. S/H10/23). It is generally surrounded by University Hall to the southeast, Woodbury Court to the southwest, and Alberose to the northwest.
- 1.1.2 Figure 1.1 shows the location of the Subject Site and its environment.
- 1.1.3 The Water Supply Impact Assessment (WSIA) is prepared as a technical supporting document to estimate the water demand arising from the Proposed use.

1.2 Proposed Use

- 1.2.1 It consists of student hostel. Development Parameters for the Proposed use is summarised below.

Table 1.1 Development Parameters for Proposed Use

	Parameters
Site Area (m ²)	8,900
No. of Student Hostel (Rooms)	900

- 1.2.2 The typical floor plans of the planning statement of the Proposed use are shown in Appendix 1.1
- 1.2.3 The tentative completion year for the Proposed use is 2028.

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 Subject Site is sufficient to cope with the water demands from the Proposed use. 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 Proposed use will be served by Pokfulam No.1 Fresh Water Service Reservoir and Pok Fu Lam Salt Water Service Reservoir (PSL SWSR), which has a capacity of 1,184m³ and 2,000m³ respectively. There is existing water main in the vicinity of the sites. The existing water supply network is shown in Appendix 2.1.

2.2.2 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.

2.2.3 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.

2.2.4 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 CIFUS has been also referenced for calculation of the population density where necessary.

2.2.5 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 use are included in Appendix 2.2.

2.3 Assessment of Water Demand

2.3.1 The water demand from the Existing use and Proposed use have been assessed in Table 2.1 below and detailed calculation is shown in Appendix 2.2.

Table 2.1 Water Demand from the Existing use and Proposed use

	Daily Water Demand (m ³ /day)	Peaking Factor	Peak Water Demand (m ³ /day)
Existing Use			
Freshwater ^(a) - for Tower 1,2 & 3	68.5 & 18.3	3 & 2	(205.5+36.6) 242.1
Flushing Water–For Tower 3 only	9.1	2	18.2
Proposed Use			
Freshwater	225	3	675

Flushing Water	90	2	180
Increased Water Demand (m ³ /day)			
Freshwater	432.9		
Flushing Water	161.8		

Remark:

(a) As confirm with HKU, the toilet flushing of the existing development Tower 1 & 2 were using fresh water main.

2.4 Fire-Fighting

2.4.1 Fire-fighting requirement for residential zone is 6,000m³/day with discharge pressure of 17m head. The fire hydrant should be of standard pattern with minimum output pressure of not less than 25 psi. With multiple hydrants operating at the same time, total output of not less than 4,000L/min shall last for 60 minutes. summarizes the fire-fighting requirements. Table 2.2 summarizes the fire-fighting requirements.

Table 2.2 Fire Fighting Requirements

Requirements	Minimum Values
Minimum fresh water supply	6,000 m ³ /day
Discharge pressure	17m
Minimum output not less than 25 psi	4,000 L/min (5,760m ³ /day) which lasts for an hour (i.e., 4,000x60 = 240,000L/hour/day or 240m ³ /hour/day)

2.5 Existing Water Supply System

2.5.1 Appendix 2.1 shows the existing fresh water and flushing water supply scheme.

2.5.2 Regarding the fresh water supply, there is an existing 100mm fresh water main located to the northwest of the Subject Site, which tees off from an existing 200mm fresh water main. The existing development currently utilizes approximately 17% of this 200mm main. While the fresh water main arrangement for the Proposed use will remain unchanged from the existing configuration, the Proposed Use is projected to utilize 66% of the existing 100mm fresh water main's capacity.

2.5.3 Regarding the flushing water supply, an existing 100mm flushing water main is located to the west of the Subject Site. The saltwater main arrangement for the Proposed Use will connect to this existing 100mm main. Approximately 18% of the existing 100mm saltwater main's capacity will be utilized by the Proposed Use.

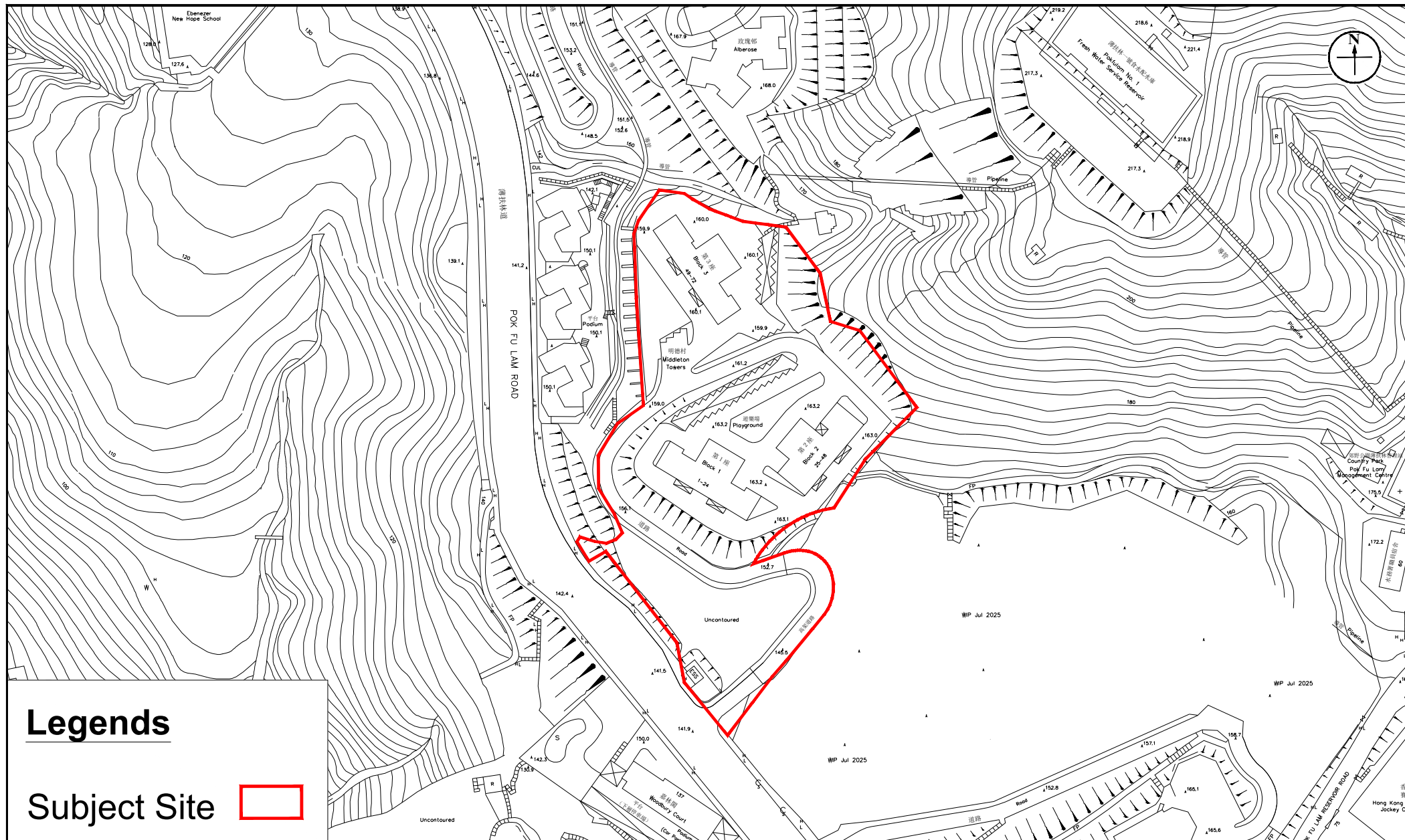
2.6 Construction and Maintenance

2.6.1 The responsibility for operation and maintenance of the 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 use. The assessment results show that the peak freshwater and flushing water demand for the Proposed use is 675 m³/day and 180 m³/day.
- 3.1.2 Connections of the existing water mains to serve the Proposed use will remain unchanged as the existing development. Based on the assessment, the existing water main are adequate to serve the Proposed use. No upgrading works of the existing pumping stations, service reservoirs and water mains are recommended.
- 3.1.3 The responsibility for operation and maintenance of the proposed waterworks will be discussed and agreed with WSD and relevant departments during detailed design stage.
- 3.1.4 It is concluded that the Proposed use can be implemented without insurmountable water supply impacts.

Figures



Legends

Subject Site



Figure: 1.1

Title: Location of Subject Site and its Environs

Project: Redevelopment of Middleton Towers at Pok Fu Lam

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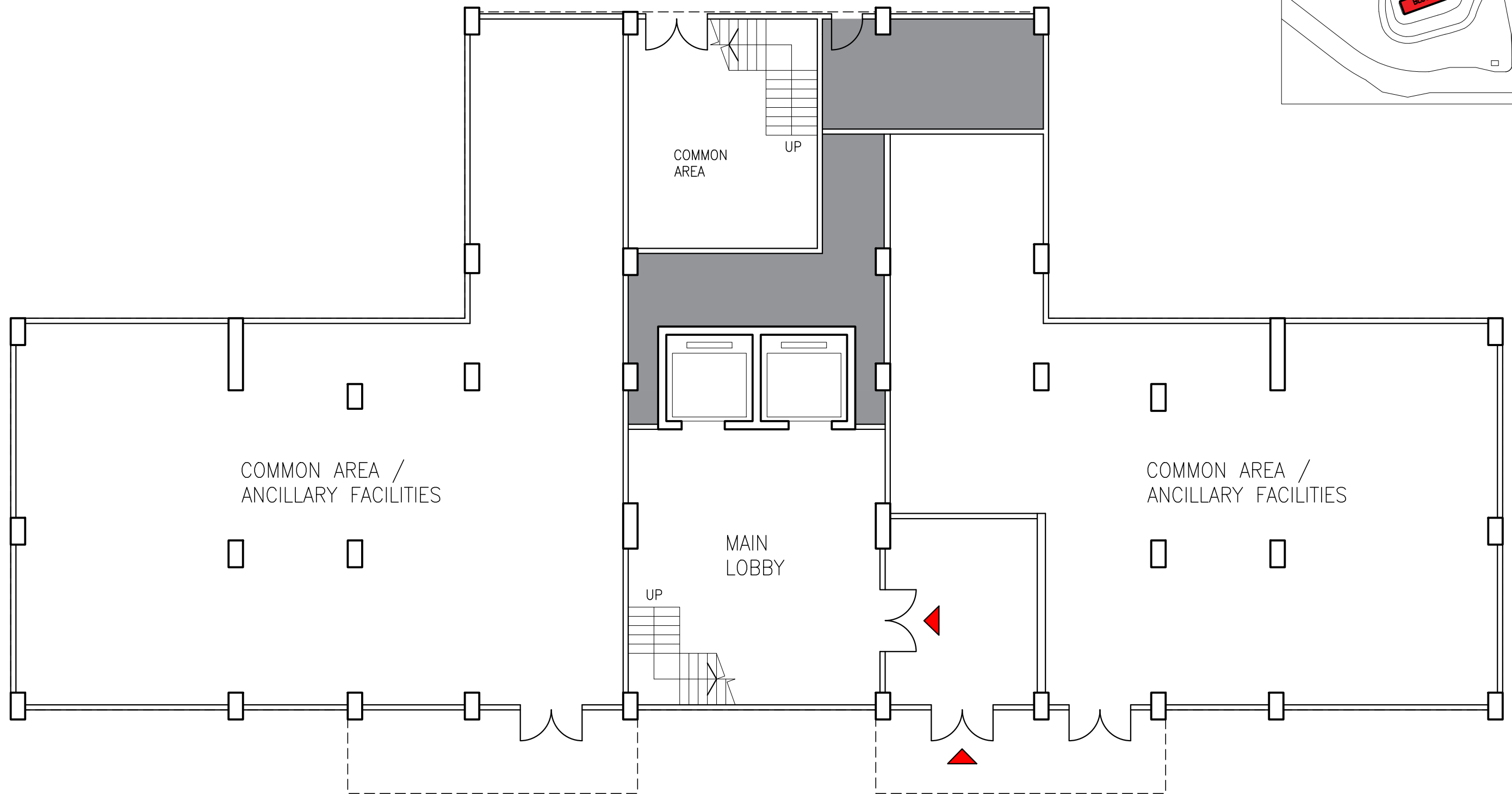
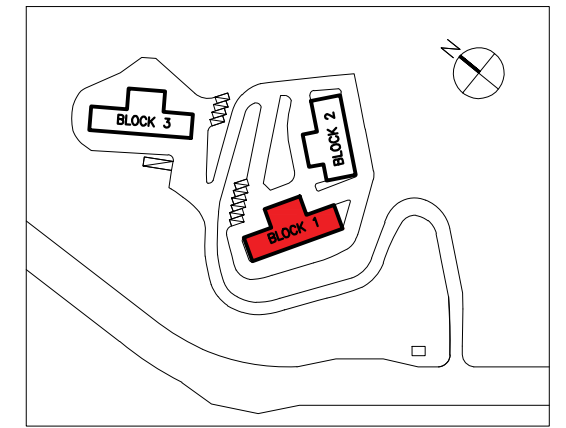
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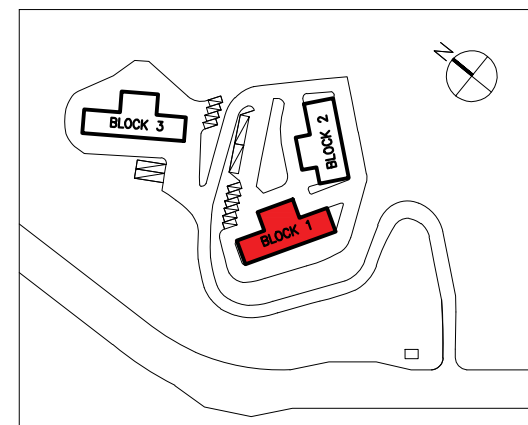
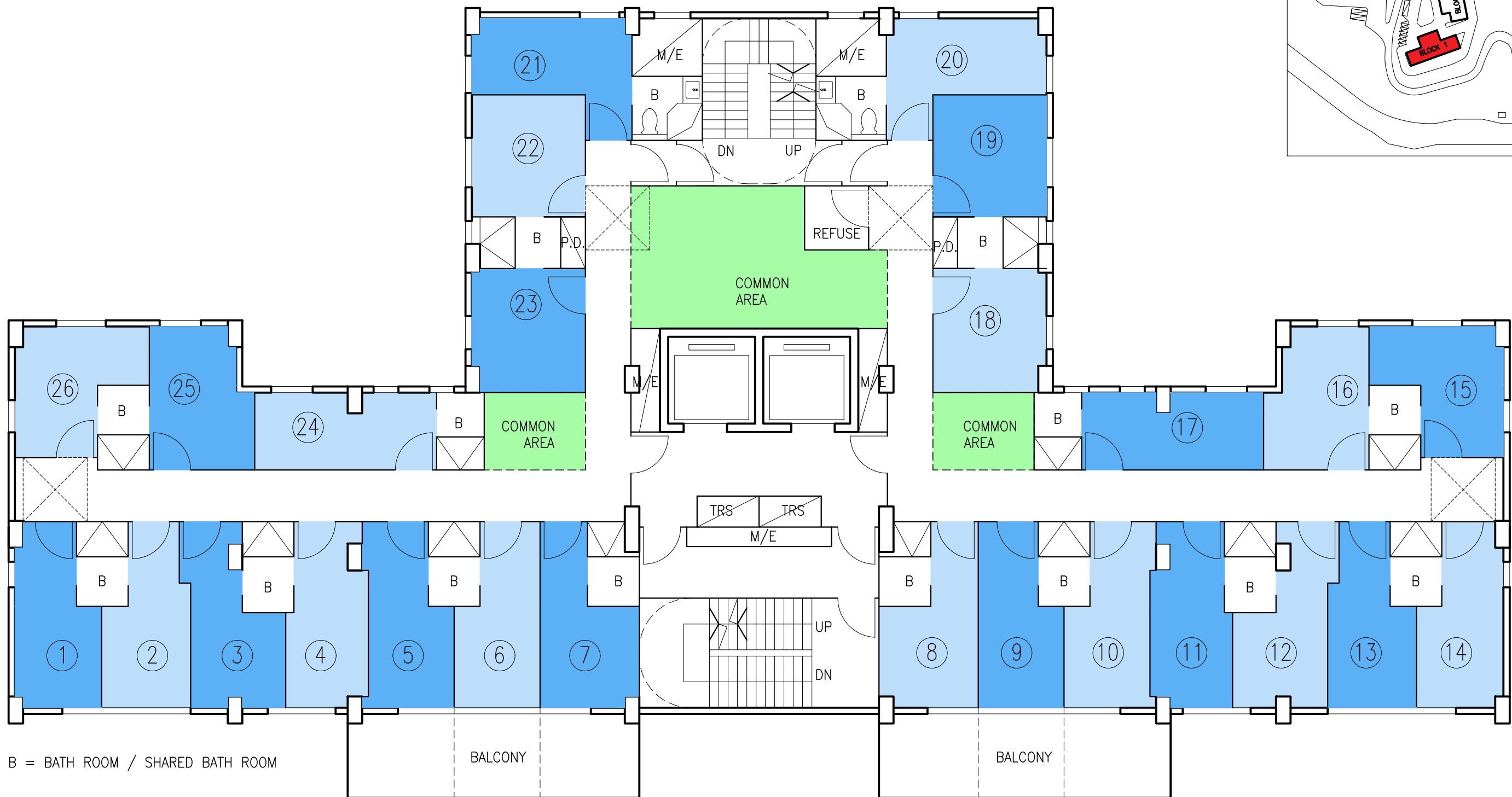
Date: Feb 2026

Appendix 1.1 The Typical Floor Plans of the Planning Statement



BLOCK 1 – G/F LAYOUT

SCALE 1:100

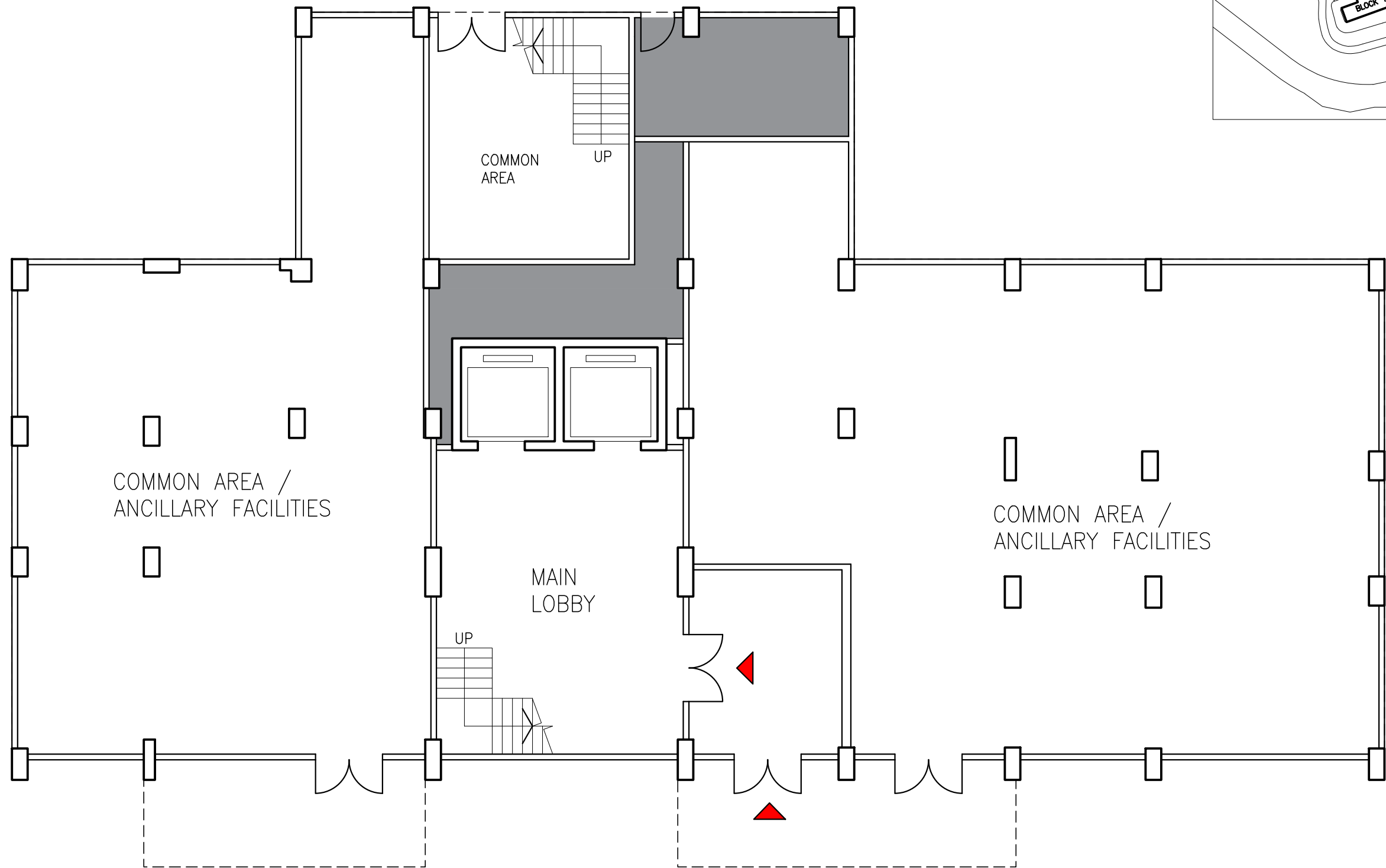
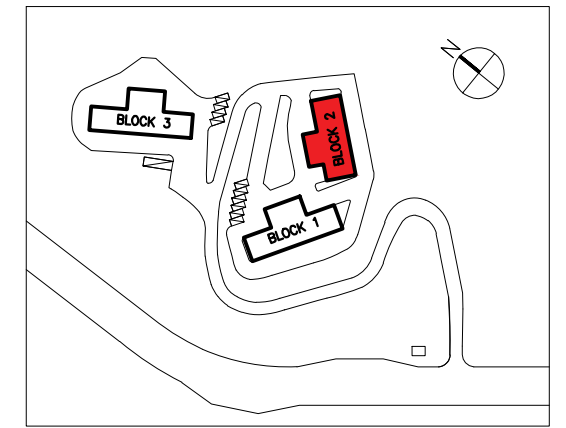


BLOCK 1 TYPICAL (1/F – 12/F ; 12 STOREYS)
SCALE 1:100

BLOCK A TYPICAL FLOOR = 26 UNITS APPROX.

BLOCK 1 TO 3

TOTAL PROPOSED UNITS = 900 UNITS
 BLOCK 1 TYP = 26 APPROX.
 BLOCK 2 TYP = 23 APPROX.
 BLOCK 3 TYP = 26 APPROX.
 SUBJECT TO FUTURE DETAIL DESIGN



BLOCK 2 – G/F LAYOUT

SCALE 1:100



BLOCK 2 TYPICAL (1/F – 12/F ; 12 STOREYS)

SCALE 1:100

BLOCK B TYPICAL FLOOR = 23 UNITS APPROX.

BLOCK 1 TO 3

TOTAL PROPOSED UNITS	=	900 UNITS
BLOCK 1 TYP	=	26 APPROX.
BLOCK 2 TYP	=	23 APPROX.
BLOCK 3 TYP	=	26 APPROX.
SUBJECT TO FUTURE DETAIL DESIGN		

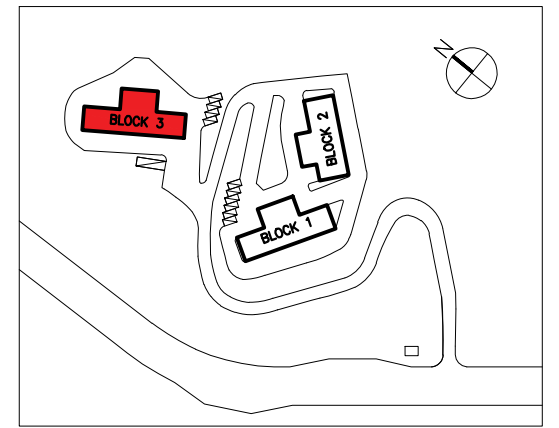
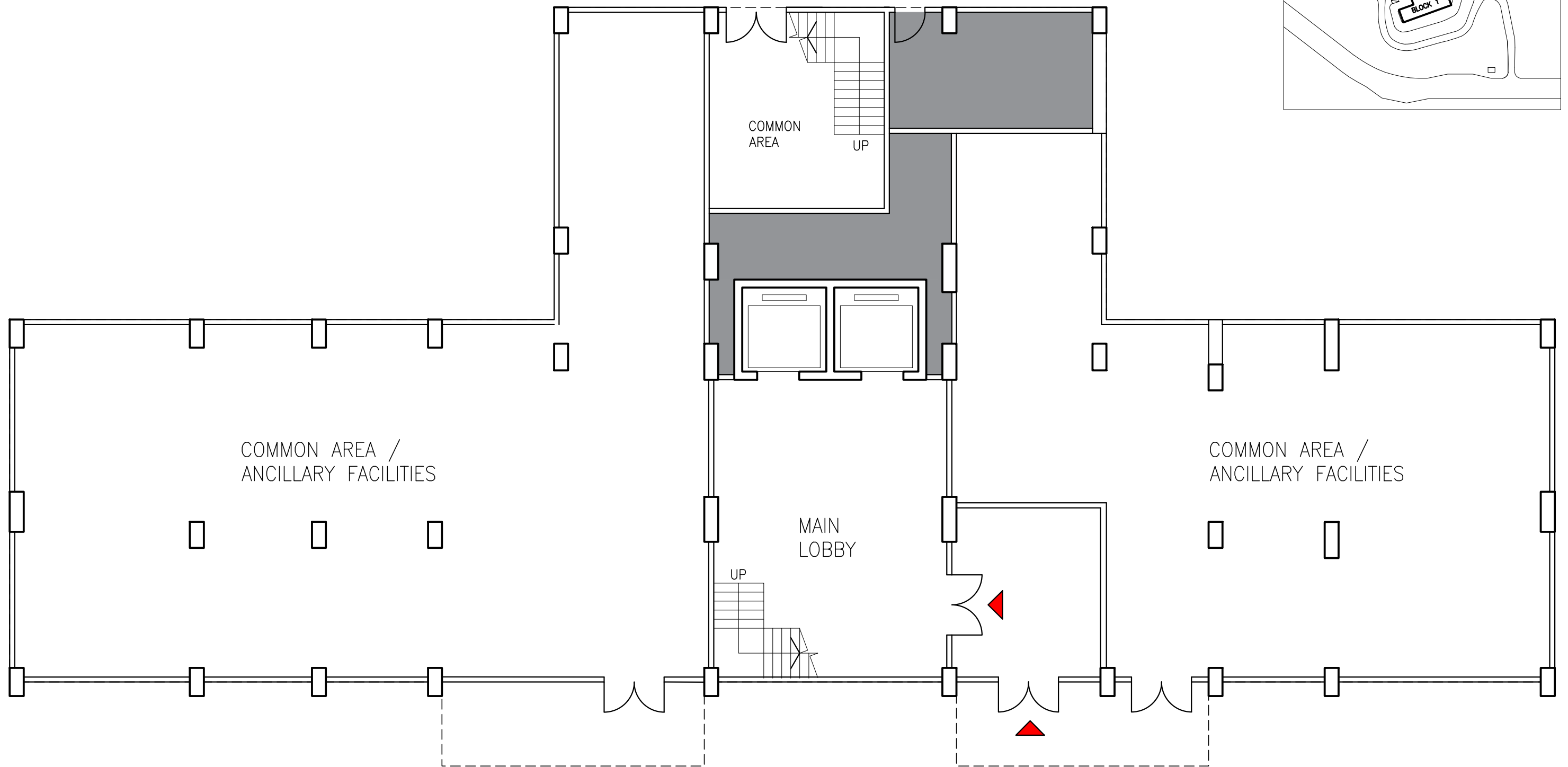


BLOCK 2 WITH ACCESSIBLE ROOM SCALE 1:100

BLOCK B TYPICAL FLOOR = 23 UNITS APPROX.

BLOCK 1 TO 3

TOTAL PROPOSED UNITS = 900 UNITS
 BLOCK 1 TYP = 26 APPROX.
 BLOCK 2 TYP = 23 APPROX.
 BLOCK 3 TYP = 26 APPROX.
 SUBJECT TO FUTURE DETAIL DESIGN



BLOCK 3 – G/F LAYOUT

SCALE 1:100



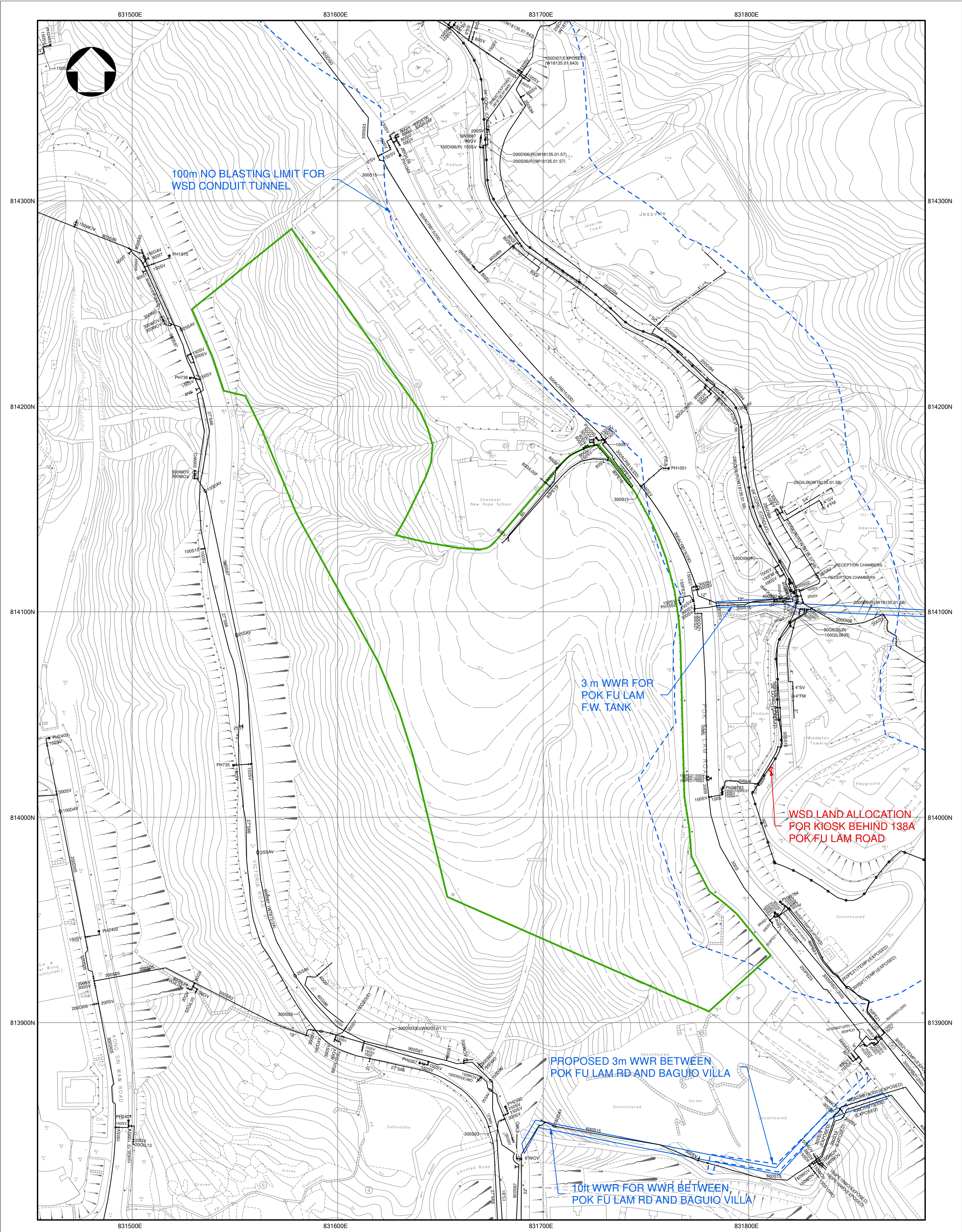
BLOCK 3 TYP (1/F – 12/F ; 12 STOREYS)
SCALE 1:100

BLOCK C TYPICAL FLOOR = 26 UNITS APPROX.

BLOCK 1 TO 3

TOTAL PROPOSED UNITS = 900 UNITS
 BLOCK 1 TYP = 26 APPROX.
 BLOCK 2 TYP = 23 APPROX.
 BLOCK 3 TYP = 26 APPROX.
 SUBJECT TO FUTURE DETAIL DESIGN

Appendix 2.1 Water Main Records



- 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 PROPOSED WATER MAINS IN THE VICINITY OF THE SITE.
 6. THE SITE IS NOT WITHIN WSD GATHERING GROUNDS.

SUBJECT SITE


PART COPY OF FRESH WATER MAINS RECORD PLAN(S)

W67880/11-SW-16B & 17A

FILE REF: (3) IN WSD/M/SP 3055/41S/25 PT.1

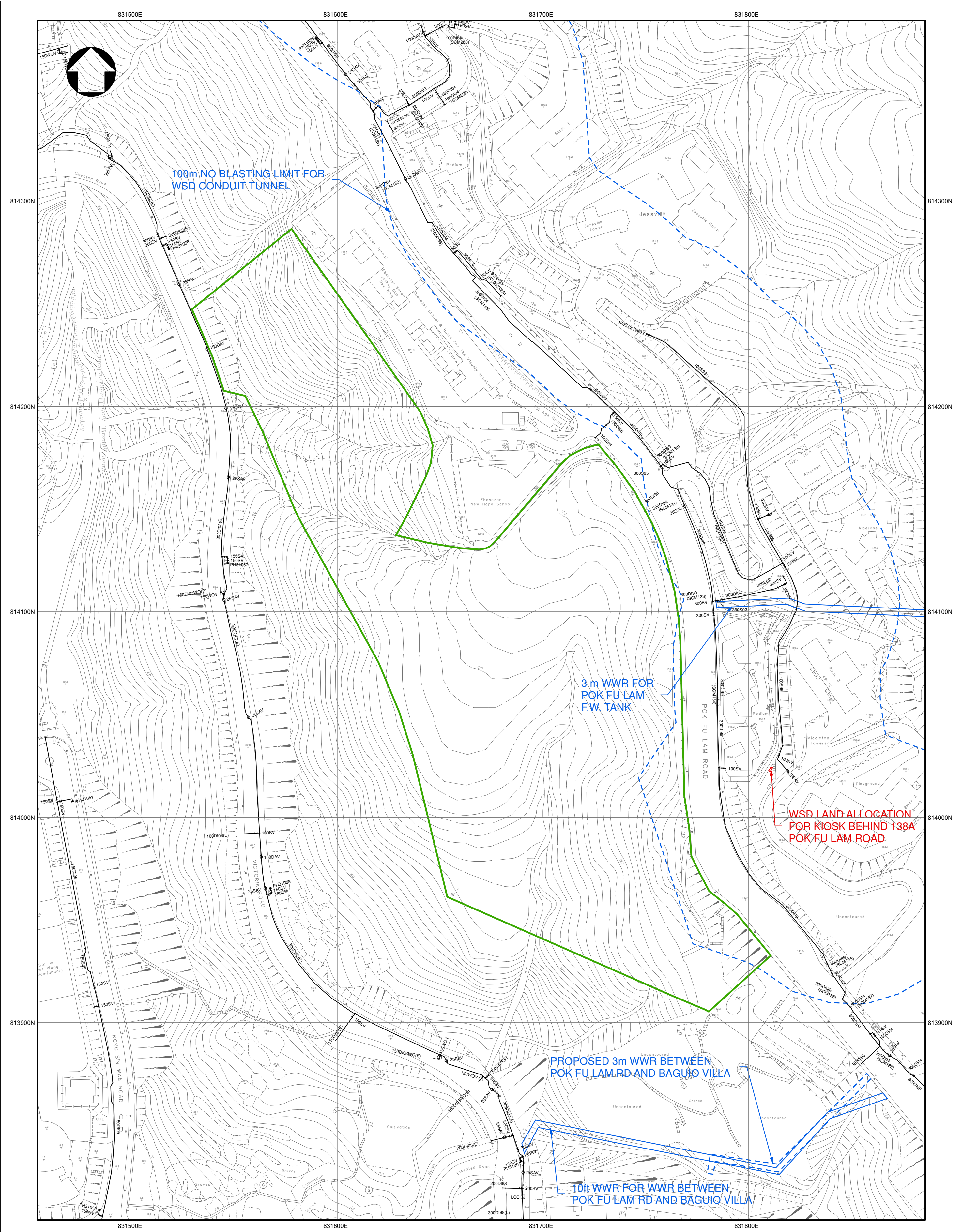
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SHEET 1 OF 1

SCALE 1:1200



水務署
Water Supplies Department



- NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
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 4. FOR MAINS RECORDS SIGN CONVENTIONS AND DESIGNATIONS SEE SKETCH NO. 3988.
 5. NO PROPOSED WATER MAINS IN THE VICINITY OF THE SITE.
 6. THE SITE IS NOT WITHIN WSD GATHERING GROUNDS.

SUBJECT SITE

PART COPY OF SALT WATER MAINS RECORD PLAN(S)

W67881/11-SW-16B & 17A

FILE REF: (3) IN WSD/M/SP 3055/41S/25 PT.1

REF. CODE: 02W26M

SHEET 1 OF 1

SCALE 1:1200



水務署
Water Supplies Department

Appendix 2.2 Detailed Water Supply Impact Assessment Calculations

Table 1 - Population Estimation

Future Condition	Student Hall (Block 1)		
	Total number of residents (students)	=	300 people
	Student Hostel (Block 2)		
	Total number of residents (students)	=	300 people
	Student Hostel (Block 3)		
Existing Condition	Total number of residents (students)	=	300 people
	Total Employee =		0 people
	Total A+B+C =		900 people
	Student Hall (Tower 1-3)		
	Total number of residents (students) - Tower 1 &2	=	183 people
Existing Condition	Total number of residents (students)- Tower 3	=	91 people
	Total number of staff (living on site)	=	14 people
	Total Employee =		14 people
	Total Residents =		274 people

Table 2a - Existing Daily Water Demands Calculation

Type	Population (head)	Freshwater		Flushing Water	
		Daily Unit Demand (m ³ /head/day)	Daily Demand (m ³ /day)	Daily Unit Demand (m ³ /head/day)	Daily Demand (m ³ /day)
Housing R1 -Tower 1 &2	183	0.250	45.8	0.100	18.3
Housing R1- Tower 3	91	0.250	22.8	0.100	9.1
TOTAL			68.5		27.4

Total Freshwater Demand (m³/day) = **86.8 m³/day**

Total Flushing water Demand (m³/day) = **9.1 m³/day**

Note:

1. As confirm with HKU, the toilet flushing of the existing development Tower 1 &2 were using fresh water main.

Table 2a - Future Daily Water Demands Calculation

Type	Population (head)	Freshwater		Flushing Water	
		Daily Unit Demand (m ³ /head/day)	Daily Demand (m ³ /day)	Daily Unit Demand (m ³ /head/day)	Daily Demand (m ³ /day)
Housing R1 (Tower 1+2+3)	900	0.250	225.00	0.100	90.00
TOTAL			225.0		90.0

Total Freshwater Demand (m³/day) = **225.0 m³/day**

Total Flushing water Demand (m³/day) = **90.0 m³/day**

Note:

1. For Domestic and Service Trade uses, the Daily Unit Demand Rate refer to WSD Departmental Instruction 1309 (DI 1309)

2. Service Trade (Pok Fu Lam Supply Zone) of 0.02 m³/day is adopted for fresh water demand

Water Main Assessment of the Proposed Water Supply Systems

Table 3a Hydraulic Capacity of the Existing Fresh Water Main

Type	Portion ⁽⁴⁾	Diameter (mm)	Peak factor ⁽¹⁾	Fresh Water Demand, Q (cu. m/day) ⁽³⁾	Area (m ²)	Peak factor ⁽¹⁾	Saltwater Demand, Q (cu. m/day)	Factored Q (cu. m/s)	Velocity of Water Main (m/s) ⁽²⁾	Flow Rate of Water Main (m ³ /s)	% of water main occupied by the Proposed Site
Existing Use- Tower 1,2,3	100 GIL	100	3	45.8	0.008	-	-	0.007	1.50	0.012	56%
				22.8		2	18.30				

Table 3b Hydraulic Capacity of the Flushing Water Main for Future Scanario

Type	Portion	Diameter (mm)	Peak factor ⁽¹⁾	Demand, Q (cu. m/day)	Area (m ²)	Factored Q (cu. m/s)	Velocity of Water Main (m/s) ⁽²⁾	Flow Rate of Water Main (m ³ /s)	% of water main occupied by the Proposed Site
Existing Use- Tower 3	100 GIL	100	2	9.1	0.008	0.000	1.50	0.012	2%

Table 3c Hydraulic Capacity of Fresh Water Main for Future Condition

Type	Portion	Diameter (mm)	Peak factor ⁽¹⁾	Fresh Water Demand, Q (cu. m/day)	Area (m ²)	Factored Q (cu. m/s)	Velocity of Water Main (m/s) ⁽²⁾	Flow Rate of Water Main (m ³ /s)	% of water main occupied by the Proposed Site
Block 1+2+3	100 GIL	100	3	225.0	0.008	0.008	1.50	0.012	66%

Type	Portion	Diameter (mm) ⁽³⁾	Peak factor ⁽¹⁾	Fresh Water Demand, Q (cu. m/day)	Area (m ²)	Factored Q (cu. m/s)	Velocity of Water Main (m/s) ⁽²⁾	Flow Rate of Water Main (m ³ /s)	% of water main occupied by the Proposed Site
Block 1+2+3	200 SV	200	3	225.0	0.031	0.008	1.50	0.047	17%

⁽¹⁾ Peak factor for distribution mains refers to Departmental Instruction No. 1309 from WSD

⁽²⁾ Velocity of 1.5m/s is assumed

Table 3d Hydraulic Capacity of the Flushing Water Main for Future Scanario

Type	Portion	Diameter (mm)	Peak factor ⁽¹⁾	Demand, Q (cu. m/day)	Area (m ²)	Factored Q (cu. m/s)	Velocity of Water Main (m/s) ⁽²⁾	Flow Rate of Water Main (m ³ /s)	% of water main occupied by the Proposed Site
Block 1+2+3	100SV	100	2	90.0	0.008	0.002	1.50	0.012	18%

⁽¹⁾ Peak factor for distribution mains refers to Departmental Instruction No. 1309 from WSD

⁽²⁾ Velocity of 1.5m/s is assumed