Appendix 8

Drainage Impact Assessment

Prepared for

Free Ocean Investments Limited

Prepared by

Ramboll Hong Kong Limited

S16 PLANNING APPLICATION PROPOSED MINOR RELAXATION OF PLOT RATIO AND BUILDING HEIGHT RESTRICTIONS FOR THE PROPOSED RESIDENTIAL DEVELOPMENT (FLAT) WITH SHOP AND SERVICES USE AT LOTS 531 RP, 532 S.D. RP AND 532 RP IN DD 130 AND THE ADJOINING GOVERNMENT LAND, LAM TEI TUEN MUN

DRAINAGE IMPACT ASSESSMENT

Date	**November 2025**
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1. INTRODUCTION

1.1 Background

1.1.1 This Planning Application is prepared and submitted on behalf of Free Ocean Investments Limited ("the Applicant") to seek approval from the Town Planning Board ("TPB") under Section 16 of the Town Planning Ordinance for the Proposed Minor Relaxation of Plot Ratio and Building Height Restriction for the Residential Development with Shop and Services at Lots 531 RP, 532 S.D. RP and 532 RP in DD 130 and adjoining Government Land in Lam Tei ("Application Site"/the "Site"). The Application Site falls within "Commercial" ("C") zone and area shown as Road on the Draft Lam Tei and Yick Yuen Outline Zoning Plan ("Draft OZP") No. S/TM-LTYY/13.

1.1.2 TPB approved a similar application for minor relaxation of Plot Ratio and Building Height Restrictions for a proposed residential development with shop and services at the Site (TPB Ref.: A/TM-LTYY/426) on 24 June 2022. In order to support the planning application, a Drainage Impact Assessment Report (the Approved DIA Report) has been submitted and approved by Drainage Services Department. Subsequent to the approval of the aforementioned planning application, the Applicant has lodged the land exchange application to the Lands Department to kick-start the approved development. For better management of the residual unmanned land near the Site, and as negotiated with the Lands Department, the Application Site has been modified to include the unmanned land and road works in relation to the proposed run in/out for the Proposed Residential Development. Whilst the resultant development scheme involves material changes to the approved scheme, a fresh Section 16 Planning Application is therefore required.

1.1.3 Ramboll Hong Kong Limited is commissioned to conduct a Drainage Impact Assessment (DIA) for the support of the planning application.

1.2 The Application Site and Its Environs

1.2.1 The Application Site is currently vacant and situated at San Hing Tsuen, Lam Tei bounded by Castle Peak Road – Lam Tei Section to the southeast, WRL viaduct and LRT tracks to the northwest. To the north is the existing residential development, Lingrade Garden separated by an open space. Some temporary carpark, open storage and the village houses are located to the west of the Site separated by a nullah. The Site area is about 2,200m^2.

1.2.2 **Figure 1.1** shows the location of the Application Site and its environment.

1.3 The Proposed Development

1.3.1 The Proposed Development will consist of one residential tower, ancillary residential facilities (e.g. clubhouse), shop and car parking facilities.

1.3.2 Greenery area will be provided which covers a minimum of about 20% of the site area as required in PNAP APP-152.

1.3.3 It is tentatively completed in 2030. The Master Layout Plan (MLP) of the Proposed Development is included in **Appendix 1.1**.

2. DRAINAGE IMPACT ASSESSMENT

2.1 Scope of Work

2.1.1 The aim of this DIA is to assess whether the capacity of the existing drainage network serving the Application Site is sufficient to cope with the stormwater runoff from the Proposed Development. Drainage Record Plans were referred to the Geoinfo Map for the purpose of this DIA.

2.2 Assessment Criteria and Methodology

2.2.1 The assessment standard complies with DSD Stormwater Drainage Manual (SDM) (2018 Edition) and Corrigendum No. 1/2022 where applicable. The Application Site is situated in an area served by urban drainage branch system, therefore, a 1 in 50 year return storm has been adopted for the DIA.

2.2.2 The catchment runoff has been calculated using the "Rational Method", as outlined in the DSD SDM:

$$Q = 0.278\ C\ i\ A$$

Where	Q	=	peak runoff in m^3/s
	C	=	runoff coefficient (dimensionless)
	i	=	rainfall intensity in mm/hr
	A	=	catchment area in km

2.2.3 According to surface characteristics of the catchments, the runoff coefficient for paved area is 0.95, and for unpaved area is 0.15 of flat.

2.2.4 The rainfall intensity parameter "i" is dependent on the return period, rainfall duration and the time of concentration of the catchment under consideration. Runoff calculations are included in **Appendix 2.1.**

2.2.5 Apart from the surface runoff, an on-site Sewerage Treatment Plant (STP) is proposed to cater the sewage generation arising from the Proposed Development. Treated effluent would be discharged to the existing drainage system. As such, the contribution from the treated effluent of the proposed on-site STP is considered in the assessment. The calculation of the treated effluent from the Proposed Development is detailed in the Sewerage Impact Assessment Report.

2.3 Existing Drainage Condition

2.3.1 According to Geoinfo Map, a series of public drainage system is located to the west of the Application Site as indicated in **Figure 2.1**.

2.3.2 There are Ø450mm underground pipe eventually connected to the 1.5m nullah located to the further west of the Application Site.

2.4 Proposed Drainage System

2.4.1 It is recommended that the drainage system of the Proposed Development is to be connected and discharged through the nearby pipe as shown in **Figure 2.1**. A new Ø375mm underground pipe connecting the site's terminal manhole (T1) to existing manhole (D1) is proposed to discharge the surface runoff from the Application Site.

2.4.2 A peripheral channel will be proposed along the Development Boundary to cater the uphill catchment from the site.

2.4.3 **Figure 2.2** shows the catchment area related to the drainage network serving the Application Site. The surface runoff from the Application Site and surrounding

catchment areas have been estimated and presented in **Appendix 2.1**. The surface runoff after development is summarized below in **Table 2.1** .

Table 2.1 Summary of Surface Runoff

Catchment	Area (m^2)	Runoff (m^3/s) under 1 in 50 years scenario
S1 (Application Site)	2,200	0.115
STP	-	0.018
A1	884	0.056
Total		0.189

2.4.4 The treated effluent from the proposed on-site STP of 18.4 L/s (i.e. 0.018m^3/s) has been considered in this DIA. The total discharge volume of Application Site (i.e. future surface runoff + effluent from proposed on-site STP) is considered to be 0.134m^3/s.

2.5 Discussion

2.5.1 The surface runoff will be conveyed to the existing catchpit (SCH1009249) from the site terminal manhole via the new Ø375mm drainage pipe.

2.5.2 The potential drainage impact due to the Proposed Development has been quantitatively addressed.

2.5.3 It is noted that the Proposed Development will be equipped with proposed on-site STP to treat the effluent before discharging to the proposed drainage system. The estimated flow from the proposed on-site STP of Application Site would have a peak discharge rate of 18.4 L/s (i.e. 0.018m^3/s).

2.5.4 Hence, the total discharge volume (i.e. future surface runoff + effluent from proposed on-site STP) of Application Site after development is 0.134m^3/s.

2.5.5 According to Table 4a of **Appendix 2.1**, regarding the surface runoff from the Proposed Development and surrounding catchment areas (**Figure 2.2**), the drainage system will have adequate capacity to cater the surface runoff from the Proposed Development and nearby catchment.

2.5.6 The Project Proponent will be responsible for the design, construction, repair and maintenance of the proposed internal drainage facilities and connection to the main drainage system(s) to the satisfaction of relevant Government Departments. The maintenance party of the existing drainage facilities outside the development boundary would remain unchanged.

2.5.7 With the proposed new connection in place, the drainage system will have adequate capacity to cater the surface runoff from the Proposed Development and nearby catchments.

3. OVERALL SUMMARY

3.1 Conclusion

3.1.1 A residential development is proposed at Lam Tei, Tuen Mun. The potential drainage impact is quantitatively addressed.

3.1.2 Given that there is no public sewerage network in the surrounding, proposed on-site sewage treatment plant (STP) is proposed for the Application Site. The treated effluent (i.e. 18.4L/s) will be discharged through the proposed drainage system.

3.1.3 The total discharge volume will be 0.134m^3/s (with the treated effluent from the proposed on-site STP included).

3.1.4 New Ø375mm drainage pipe is proposed and eventually connected to the existing Ø450mm pipe downstream of it.

3.1.5 With the proposed drainage pipes in place, no adverse drainage impact due to the Proposed Development is anticipated.

Figure

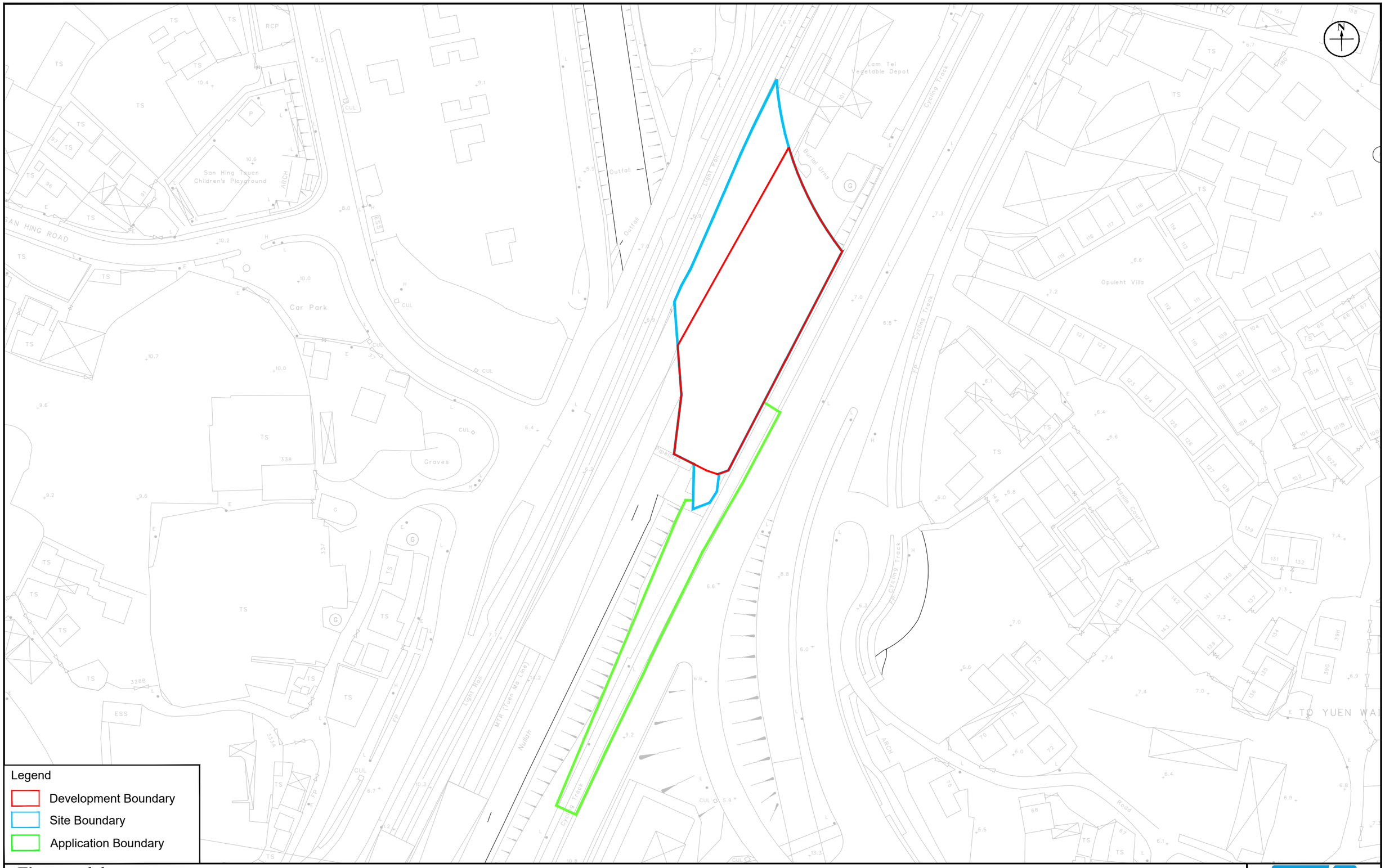

Figure: 1.1

Title: Location of the Application Site and Its Environs

Project: S16 Planning Application Proposed Minor Relaxation of Plot Ratio and Building Height Restrictions for the Proposed Residential Development (Flat) with Shop and Services Use at Lots 531 RP, 532 S.D. RP and 532 RP in DD 130 and the Adjoining Government Land, Lam Tei Tuen Mun

RAMBOLL

Drawn by: MW

Checked by: BF

Rev.: 1.0

Date: Oct 2025

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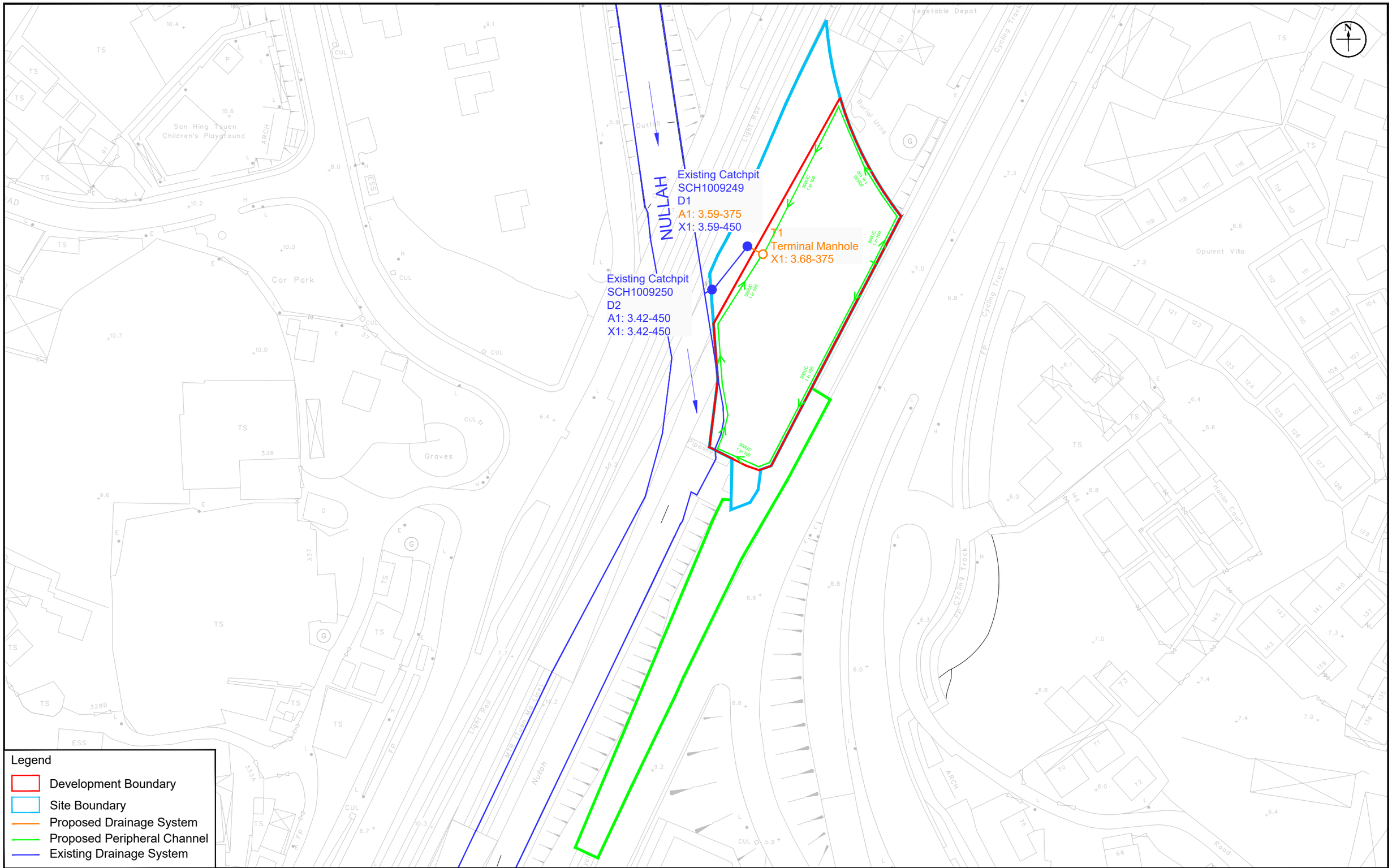

Figure: 2.1	RAMBOLL
Title: Existing Drainage System in the Vicinity of the Application Site and Proposed Drainage System	Drawn by: MW Checked by: BF
Project: S16 Planning Application Proposed Minor Relaxation of Plot Ratio and Building Height Restrictions for the Proposed Residential Development (Flat) with Shop and Services Use at Lots 531 RP, 532 S.D. RP and 532 RP in DD 130 and the Adjoining Goverment Land, Lam Tei Tuen Mun	Rev.: 1.0 Date: Oct 2025

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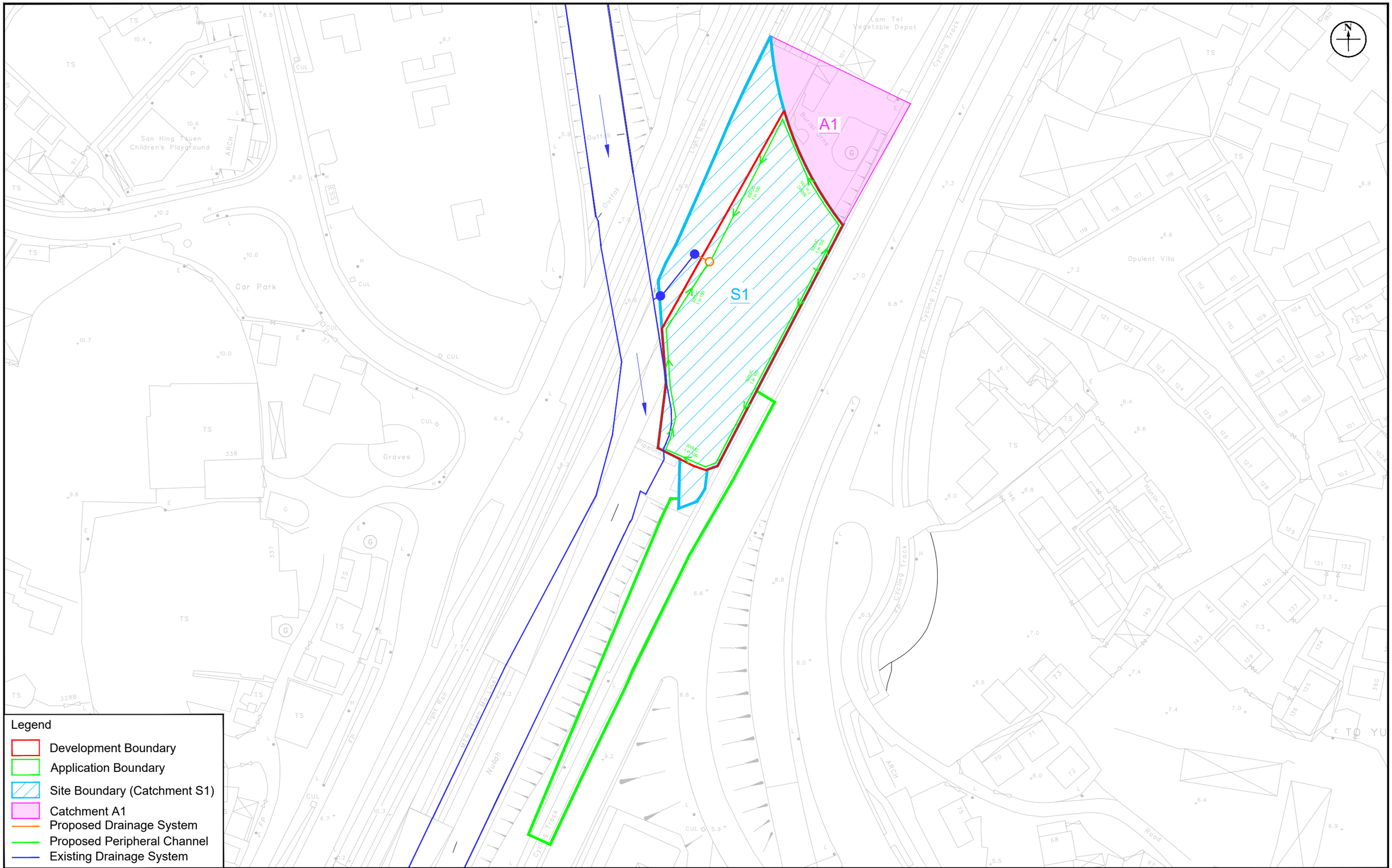

Figure: 2.2

Title: Catchment Area in the Vicinity of the Application Site

Project: S16 Planning Application Proposed Minor Relaxation of Plot Ratio and Building Height Restrictions for the Purposed Residential Development (Flat) with Shop and Services at Lots 531 RP, 532 S.D. RP and 532 RP in DD 130 and the Adjoining Goverment Land, Lam Tei Tuen Mum

RAMBOLL

Drawn by:	MW
Checked by:	BF
Rev.:	1.0
Date:	Oct 2025

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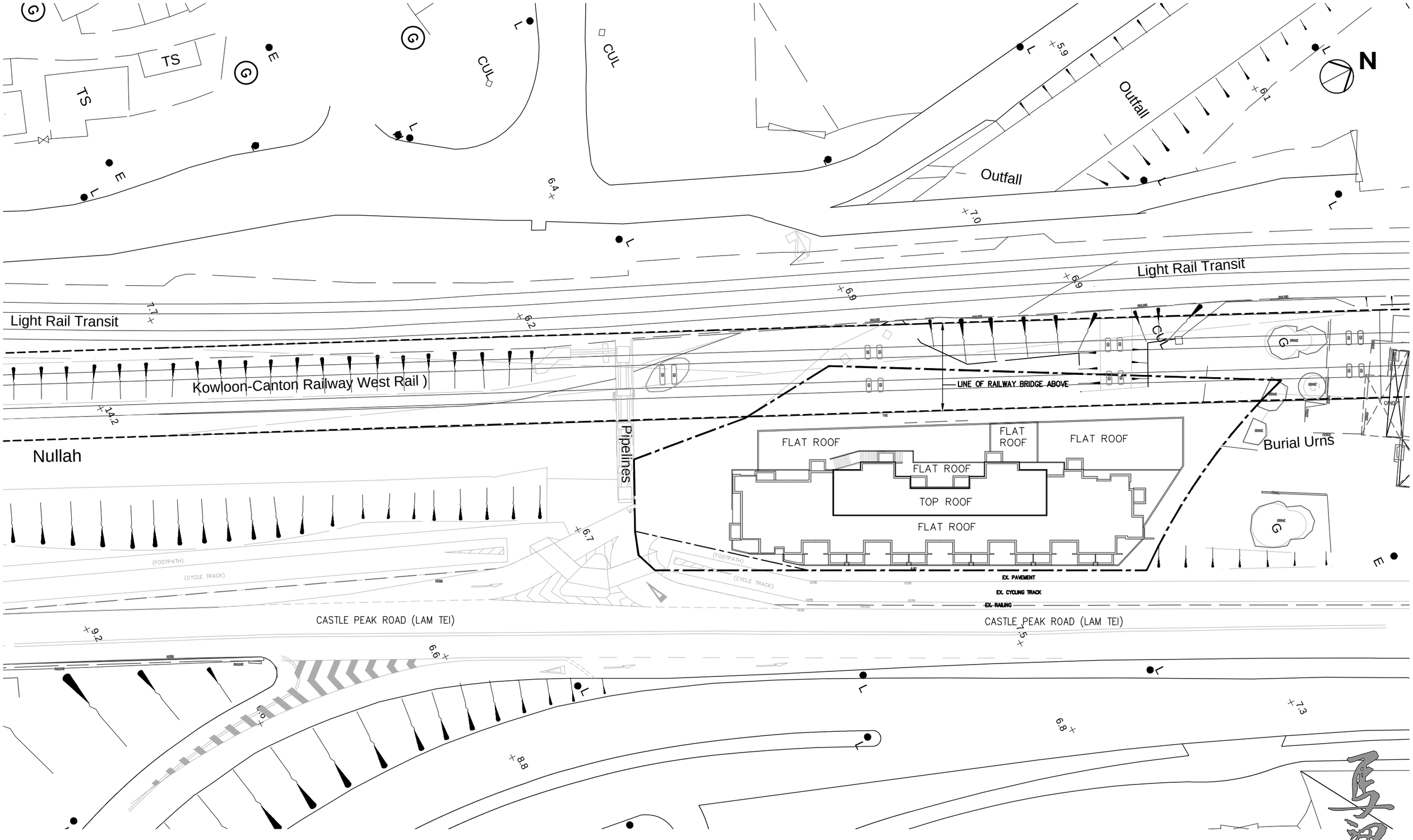
Appendix 1.1 Master Layout Plan (MLP)



BLOCK PLAN

ARCHITECTS (HK) LTD
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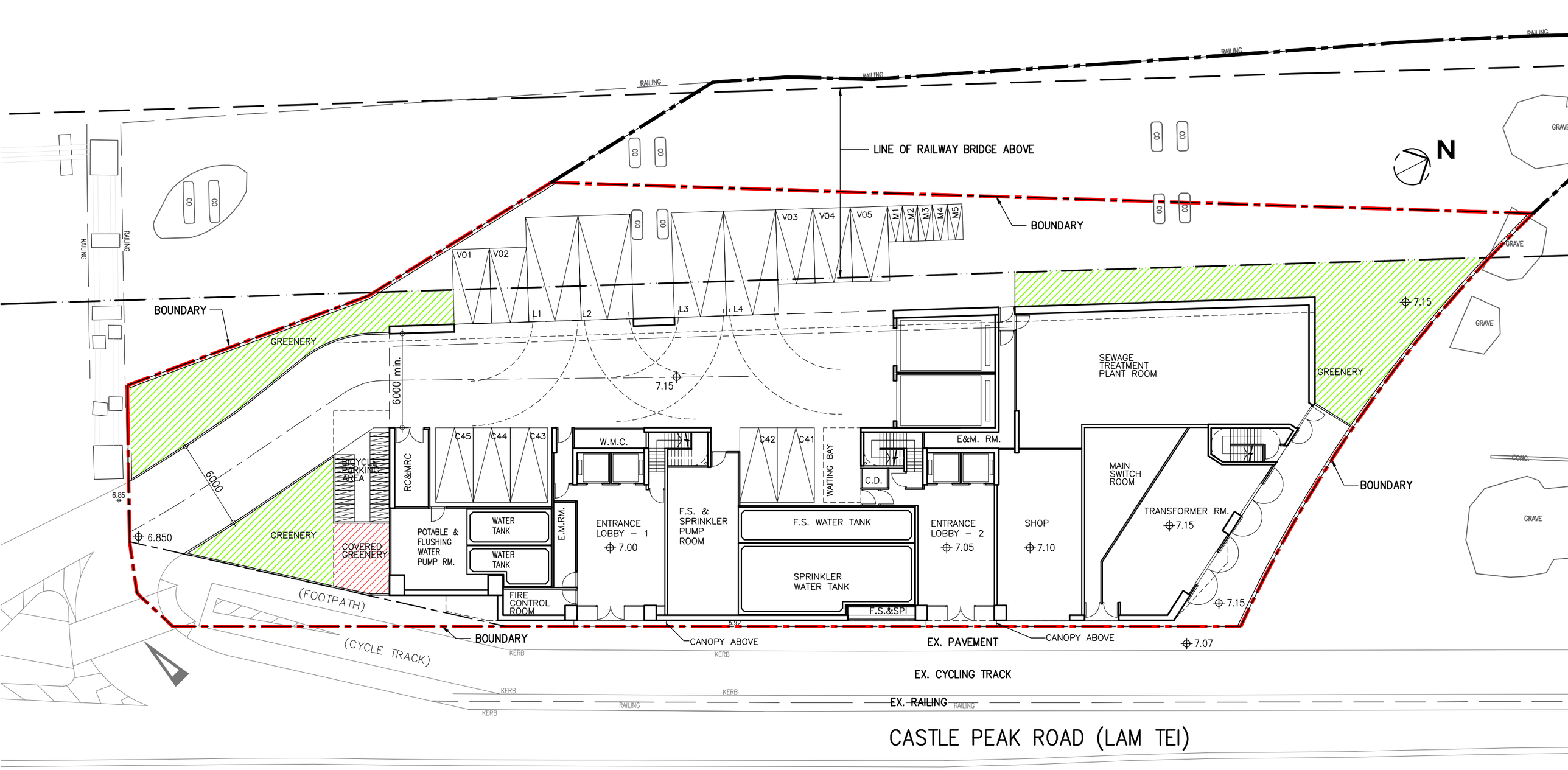
Proposed Minor Relaxation of Plot Ratio and Building Height Restriction for the Residential Development with Shop and Services at Lots 531 RP, 532 S.D. RP and 532 RP in DD 130 and adjoining Government Land in Lam Tei

SCALE 1 : 500 (A3)

SP-43-03

11-2025



GROUND FLOOR PLAN

NOS. OF LORRY PARKING = 4
NOS. OF PRIVATE CAR PARKING = 5 NOS.
NOS. OF MOTOR–CYCLE PARKING = 5 NOS.
NOS. OF VISITOR'S CARPARK = 5

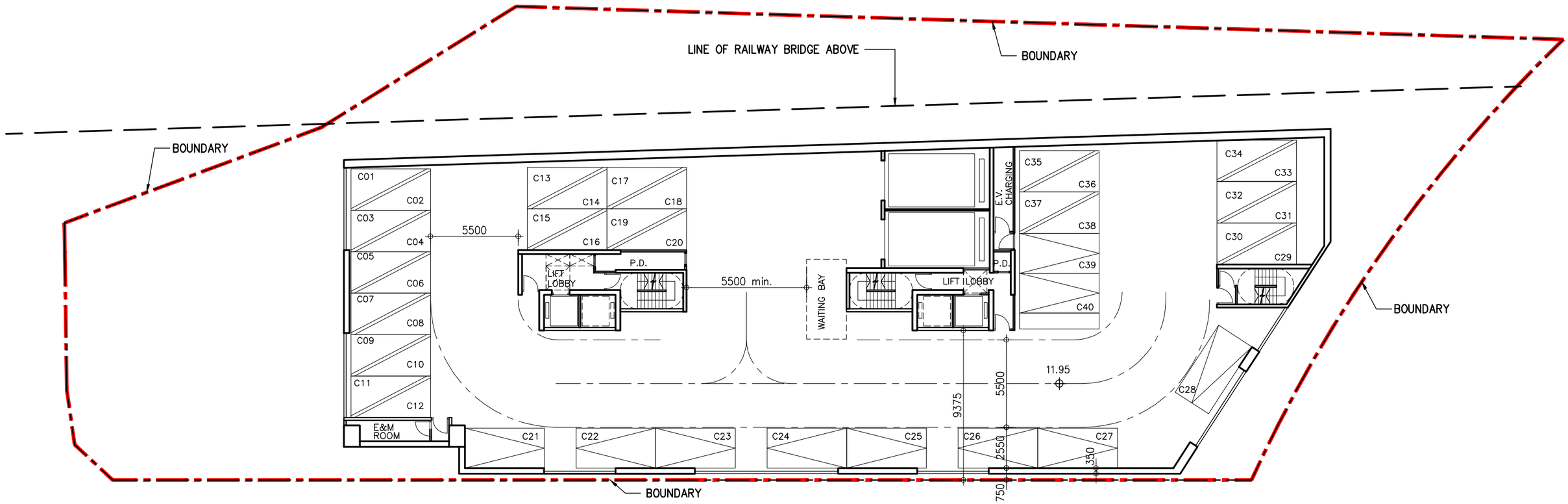
- GREENERY
- COVERED GREENERY
- DOUBLE DECK CAR PARKING
- BICYCLE PARKING SPACE

ARCHITECTS (HK) LTD
馬梁建築師事務所(香港)有限公司

Proposed Minor Relaxation of Plot Ratio and Building Height Restriction for the Residential Development with Shop and Services at Lots 531 RP, 532 S.D. RP and 532 RP in DD 130 and adjoining Government Land in Lam Tei

SCALE 1 : 250 (A3)

SP–43–04
11–2025



1st FLOOR PLAN

NOS. OF PRIVATE CAR PARKING = 40 NOS.

PRIVATE CAR PARKING

DOUBLE DECK CAR PARKING

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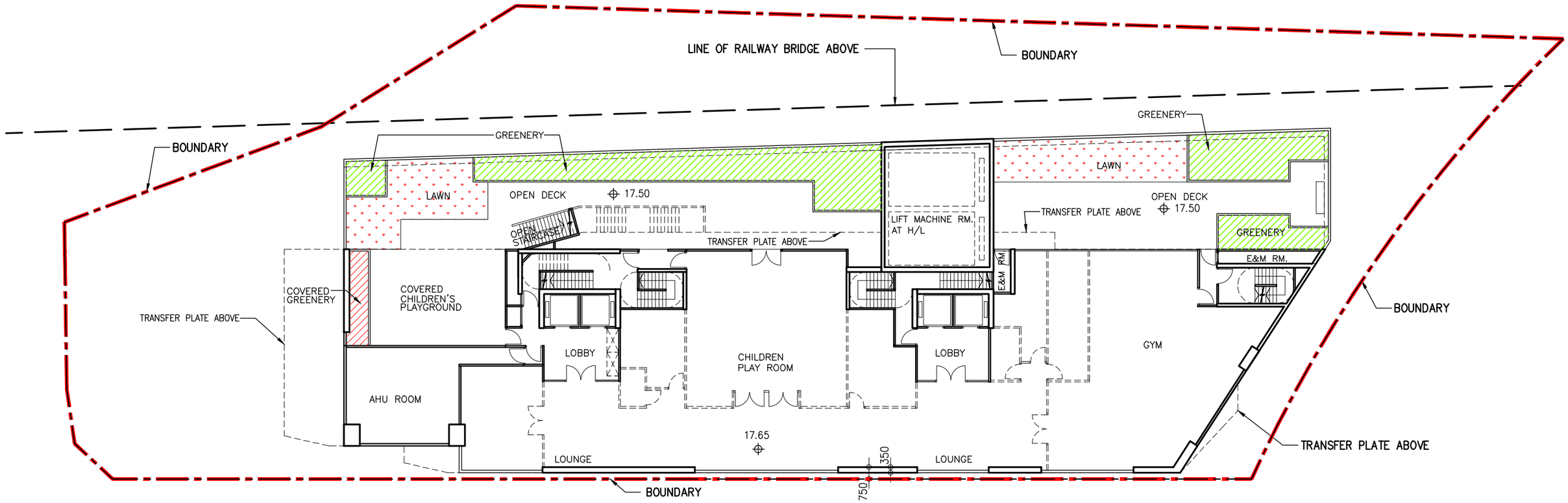
Proposed Minor Relaxation of Plot Ratio and Building Height Restriction for the Residential Development with Shop and Services at Lots 531 RP, 532 S.D. RP and 532 RP in DD 130 and adjoining Government Land in Lam Tei

SCALE 1 : 250 (A3)

SP–43–05

11–2025



2nd FLOOR PLAN (RESIDENTIAL RECREATIONAL FACILITIES)

RECREATIONAL FACILITIES AREA = 10800.00 x 5% = 540.00 s.m.

GREENERY / LAWN

COVERED GREENERY

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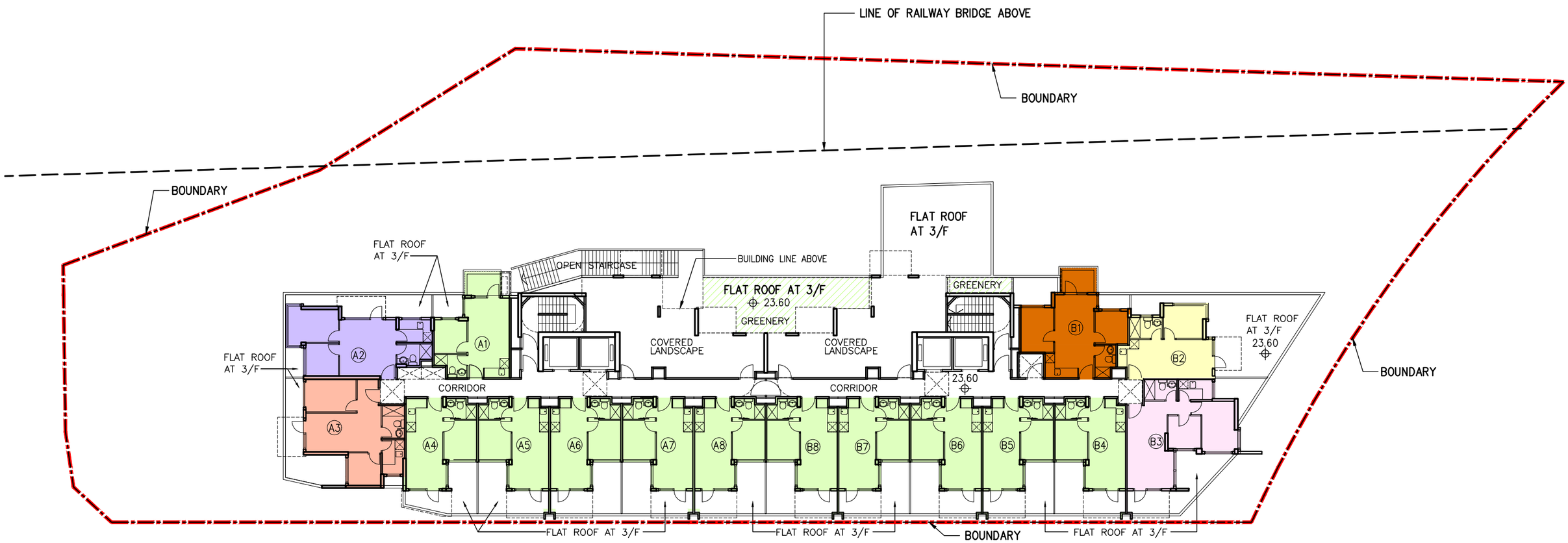
Proposed Minor Relaxation of Plot Ratio and Building Height Restriction for the Residential Development with Shop and Services at Lots 531 RP, 532 S.D. RP and 532 RP in DD 130 and adjoining Government Land in Lam Tei

SCALE 1 : 250 (A3)

SP-43-06

11-2025



3rd FLOOR PLAN (1 STOREY)
(16 UNITS)

GREENERY

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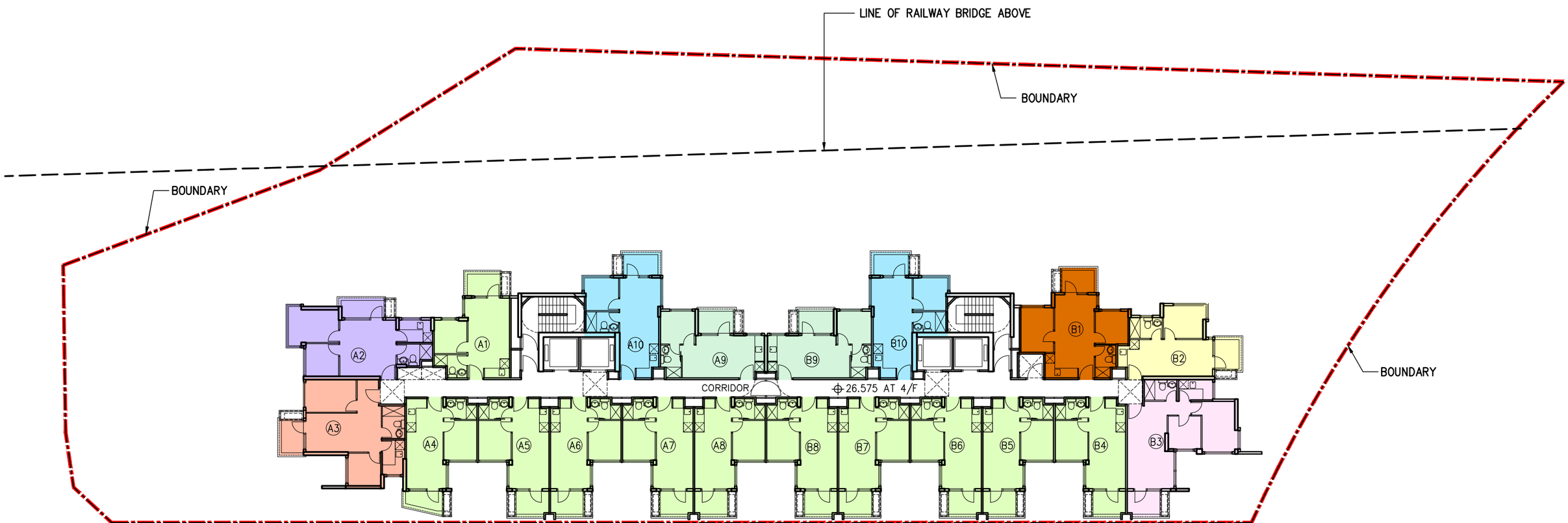
Proposed Minor Relaxation of Plot Ratio and Building Height Restriction for the Residential Development
with Shop and Services at Lots 531 RP, 532 S.D. RP and 532 RP in DD 130 and adjoining Government Land in Lam Tei

SCALE 1 : 250 (A3)

SP-43-07
11-2025



4th TO 19th FLOOR PLAN (16 STOREYS)
(20 UNITS)

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Proposed Minor Relaxation of Plot Ratio and Building Height Restriction for the Residential Development
with Shop and Services at Lots 531 RP, 532 S.D. RP and 532 RP in DD 130 and adjoining Government Land in Lam Tei

SCALE 1 : 250 (A3)

SP–43–08
11–2025

Appendix 2.1 Detailed Drainage Impact Assessment Calculations

S16 Planning Application Proposed Minor Relaxation of Plot Ratio and Building Height Restrictions for the Proposed Residential Development (Flat) with Shop and Services Use at Lots 531 RP, 532 S.D. RP and 532 RP in DD 130 and the Adjoining Government Land, Lam Tei Tuen Mun
Table 1 - Proposed Catchment Areas and Run-off (1 in 50 year)

$$Q_p = 0.278\ C\ i\ A$$

where Q_p = peak runoff in m^3/s
C = runoff coefficient (dimensionless)
i = rainfall intensity in mm/hr
A = catchment area in km^2

Notes:
Site Area 2,200 m^2

Catchments are small, so Rational Method is appropriate

1 in 50-year (according to Table 3 of DSD Manual)
a= 505.5
b= 3.29
c= 0.355

Surface Characteristics	*Runoff coefficient, C**
Asphalt	0.70 - 0.95
Concrete	0.80 - 0.95
Brick	0.70 - 0.85
Grassland (heavy soil**)	
Flat	0.13 - 0.25
Steep	0.25 - 0.35
Grassland (sandy soil)	
Flat	0.05 - 0.15
Steep	0.15 - 0.20

	Catchment	Discharge Manhole	Paved	Unpaved	Run-off at	Area	Levels (mPD)		Fall	Overland, L	Fall, H	Overland t_c	t_0	Total t_f[1]	Total t_c[2]	Intensity	Weighted Runoff Coefficient	Run-off
						(m^2)	Upstream	Downstream	(m)	(m)	(m/100m)	(min)	(min)	(min)	(min)	(mm/h)		(m^3/s)
Future	**Subject Site**																	
	S1	T1	80%	20%	T1	2,200							5.0	0.00	5.00	239	0.79	0.115
					D1									0.00	5.00	239	0.79	0.115
					D2									0.00	5.00	239	0.79	0.115
Future	**Surrounding Catchments**																	
	A1	U1	100%	0%	U1	884							5.0	0.00	5.00	239	0.95	0.056
					T1									0.00	5.00	239	0.95	0.056
					D1									0.00	5.00	239	0.95	0.056
					D2									0.00	5.00	239	0.95	0.056
					Overall	**3,085**												0.171

Remarks:
1. Assumed Time of Concentration through stream flow
2. Assumed Time of Concentration

S16 Planning Application Proposed Minor Relaxation of Plot Ratio and Building Height Restrictions for the Proposed Residential Development (Flat) with Shop and Services Use at Lots 531 RP, 532 S.D. RP and 532 RP in DD 130 and the Adjoining Government Land, Lam Tei Tuen Mun

Hydraulic Calculations of Existing and Proposed Drainage System

Table 2a - 1 in 50 year Runoff of Future Catchments (m^3/s)

Runoff at	Catchment			
	A1	S1	STP	Total
U1	0.056			**0.056**
T1	0.056	0.115	0.018	**0.189**
D1	0.056	0.115	0.018	**0.189**
D2	0.056	0.115	0.018	**0.189**

Table 2b -Treated Effluent from the proposed on-site STP

Estimated Peak Sewage Generation Rate,m^3/s	Estimated Peak Effluent from the proposed on-site STP, m^3/s
0.018	0.018

Table 3a - Hydraulic Capacities for Existing Drainage System

Segment	Manhole Reference	Manhole Reference	Type of Channel	Pipe Dia.	Pipe Length	Invert Level 1	Invert Level 2	g	k_s	s	Gradient	v	V	Area	Q	Q_{silt} [1]
				mm	m	mPD	mPD	m/s^2	m		1 in	m^2/s	m/s	m^2	m^3/s	m^3/s
D1 - D2	SCH1009249	SCH1009250	Circular	450	14.0	3.59	3.42	9.81	0.0006	0.012	82	0.000001	2.24	0.16	0.36	0.32

Table 3b - Hydraulic Capacities for Proposed Drainage System (Circular pipe)

Segment	Manhole Reference	Manhole Reference	Type of Channel	Pipe Dia.	Pipe Length	Invert Level 1	Invert Level 2	g	k_s	s	Gradient	v	V	Area	Q	Q_{silt} [1]
				mm	m	mPD	mPD	m/s^2	m		1 in	m^2/s	m/s	m^2	m^3/s	m^3/s
T1 - D1	-	SCH1009249	Circular	375	4.4	3.68	3.59	9.81	0.0003	0.020	49	0.000001	2.82	0.11	0.31	0.28

Table 3c - Hydraulic Capacities for Proposed Drainage System (U-Channel)

Segment	Inlet	Outlet	Type of Channel	Pipe Dia. (D)	Depth (H)	Design Slope	Design Minimum Gradient	Manning's roughness coefficient	Cross Section Area	Wetted Perimeter	Hydraulic Radius (R)	V	Q
				m	m		1 in		m^2	m	m	m/s	m^3/s
U1 - D1	U1	D1	U-channel	0.3	0.300	0.010	100	0.016	0.080	0.771	0.104	1.38	0.11

Table 4a - Comparison of Runoff from Proposed Catchments and Hydraulic Capacities of Existing Drainage System

Segment	Manhole Reference	Manhole Reference	Pipe Dia.	Q_{silt} [1]	Catchment Involved	Runoff	Occupancy	Sufficient Capacity?	Runoff [2]	Occupancy	Sufficient Capacity?	Runoff [3]	Occupancy	Sufficient Capacity?	Runoff [4]	Occupancy	Sufficient Capacity?
			mm	m^3/s		m^3/s			m^3/s			m^3/s			m^3/s		
D1 - D2	SCH1009249	SCH1009250	450	0.32	S1, STP, A1	0.19	59.0%	YES	0.21	65.6%	YES	0.22	68.5%	YES	0.25	76.8%	YES

Table 4b - Comparison of Runoff from Proposed Catchments and Hydraulic Capcities of Proposed Drainage System

Segment	Manhole Reference	Manhole Reference	Pipe Dia.	Q_{silt} [1]	Catchment Involved	Runoff	Occupancy	Sufficient Capacity?	Runoff [2]	Occupancy	Sufficient Capacity?	Runoff [3]	Occupancy	Sufficient Capacity?	Runoff [4]	Occupancy	Sufficient Capacity?
			mm	m^3/s		m^3/s			m^3/s			m^3/s			m^3/s		
T1 - D1	-	SCH1009249	375	0.28	S1, STP, A1	0.19	67.6%	YES	0.21	75.1%	YES	0.22	78.4%	YES	0.25	87.9%	YES
U1 - D1	-	SCH1009249	300	0.11	A1	0.06	50.1%	YES	0.06	55.6%	YES	0.06	58.1%	YES	0.07	65.2%	YES

Remarks:

1. Qsilt: 10% reduction in flow for gradient is not greater than 1 in 25, 5% reduction in flow for gradient greater than 1 in 25.
2. Cross Section Area of Circular Pipe: D^2 × PI / 4
3. Perimeter of Circular Pipe: (D × 2 × PI) / 2

Runoff [2] represents the situation in Mid 21st Century of 11.1%

Runoff [3] represents the situation in Late 21st Century of 16.0%

Runoff [4] represents the situation in Late 21st Century due to design allowance with additional runoff of 12.1%