Appendix IV

Revised Sewerage Impact Assessment

Proposed Minor Relaxation of Building Height Restriction for a Permitted Residential Development in "Residential (Group) B" and "Residential (Group C) 4" Zones at 1 & 1A Kotewall Road and 64 Conduit Road, Mid-levels

Sewerage Impact Assessment

(V2.0)

August 2026

Approved By _____

(Project Manager: K.S. Lee)

REMARKS:

The information supplied and contained within this report is, to the best of our knowledge, correct at the time of printing.

CINOTECH accepts no responsibility for changes made to this report by third parties.

CINOTECH CONSULTANTS LIMITED

[redacted]

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1 INTRODUCTION

1.1 Background

1.1.1 The Project Proponents, Gainlong Limited and Honour Future Limited, has proposed a minor relaxation of the building height restriction for a permitted residential development in the "Residential (Group) B" and "Residential (Group C) 4" zones at 1 & 1A Kotewall Road and 64 Conduit Road, Mid-Levels.

1.1.2 Cinotech Consultants Limited has been commissioned by the Project Proponents, Gainlong Limited and Honour Future Limited to conduct a Sewerage Impact Assessment (SIA) to evaluate the sewerage impacts associated with the implementation of the Project and to recommend any necessary upgrades.

1.1.3 This SIA has been prepared to support the application for planning permission to the Town Planning Board (TPB) under Section 16 of the Town Planning Ordinance (Cap. 131) for the proposed residential development involving relaxation of height restrictions.

2 DESCRIPTION OF THE ENVIRONMENT

2.1 The Application Site

2.1.1 The Application Site (the Site) is located in the Mid-Levels on Hong Kong Island. It has a total site area of approximately 1,674.6m². The location of the Proposed Development is shown in **Figure 2-1**. The Site is surrounded by sloping terrain, with residential, G/IC, and open space zones in the vicinity, which tally with the Outline Zoning Plan (OZP) as shown in **Figure 2-2**.

2.2 The Proposed Development

2.2.1 The proposed residential development comprises two residential towers. The taller block ("Tower 1") with 31 storeys and the lower block ("Tower 2") with only 3 storeys. The major development parameters are summarised in **Table 2-1**.

2.2.2 The expected population intake year of the Proposed Development is 2029.

Table 2-1 Development Parameters of the Proposed Development

Major Development Parameters	
Total Site Area	About 1,674.6m^2
Domestic Plot Ratio	5
Domestic GFA	8,373m^2
No. of Unit	46
Average Flat Size	About 182m^2
Maximum Building Height	Tower 1: Not more than +220.70mPD
	Tower 2: Not more than +143.66mPD
No. of Storeys	Tower 1: 31
	Tower 2: 3
Site Coverage	Not more than 33.3%
No. of Block	2
Private Open Space	Not less than 1m^2 per person

3 SEWERAGE IMPACT ASSESSMENT

3.1 Methodology

3.1.1 "Guidelines for Estimating Sewage Flows for Infrastructure Planning" (GESF), version 1.0, March 2005, prepared by Environmental Protection Department (EPD) provides guidelines for the unit flow factor, catchment inflow factor and peaking factor. The daily sewage discharge and the peak sewage flow are estimated by population, unit flow factors and peaking factors.

3.1.2 "Sewerage Manual – Key Planning Issues and Gravity Collection System", third edition, May 2013, (hereafter called "the DSD Manual") prepared by Drainage Services Department (DSD) provides guidelines for the design of the drainage system. The capacities of the public sewers are calculated by Colebrook-White Equation.

3.2 Sewage Discharge from the Site

3.2.1 According to the 2021 Population Census [1], the average domestic household size in the University area (location of the Site) is 3.3 persons. As the flats in the Proposed Development are significantly larger than typical flats in urban areas, a conservative assumption of 6.6 persons per flat (i.e., 2 × 3.3) has been adopted.

3.2.2 According to Figure 9 of the "Commercial and Industrial Floor Space Utilization Survey" report published by the Planning Department, the staff density for Community, Social & Personal Services is 3.3 persons per 100 m².

3.2.3 The population calculation for the Project is summarised in **Table 3-1**.

Table 3-1 Estimation of Population

	Number of Units	Population Density [1][2]	Population (Residential)
Residential Flat	46	6.6	304
	GFA (m^2) [3]	**Staff Density (per 100m^2) [4]**	**No. of Employees**
Club House & Lobby	418.7	3.3	14

Note:
[1] The average domestic household size is 3.3 persons for Central and Western - (A05) University District according to Population By-census 2021.
[2] As the flats in the Proposed Development is significantly larger than that of typical flat in urban area, 6.6 (2 x 3.3) persons per flat has been applied for conservative assessment.
[3] Area of club house and lobby are estimated as per the GFA concession for recreational facilities stipulated in PNAP APP-104.
[4] According to figure of Commercial and Industrial Floor Space Utilization Survey by Planning Department, the staff density is: -
-- 3.3 staff per 100m^2 GFA for G/IC (Community, Social & Personal Services)
[5] No swimming pool will be provided.

[1] 2021 Population Census - District Profiles - https://www.census2021.gov.hk/en/district_profiles.html

3.2.4 The Site is located at Mid-Levels West and the Catchment Inflow Factor for Central (P_{cif} = 1.0) has been adopted. The estimated sewage flow rates from the Site are summarised in **Table 3-2**. Taking the P_{cif} into account, the total Average Dry Weather Flow (ADWF) is 116.4 m^3/day.

Table 3-2 Calculation of Sewage Discharge

Occupant Type	Unit Flow Factors (m^3/day/person) [1]	No. of Occupants / Employees	ADWF (m^3/day)
Residential Flat	0.37	304	112.5
Club House & Lobby	0.28	14	3.9
Total ADWF (m^3/day) with P_{cif}			**116.4**

Notes:
[1] According to EPD's Guidelines for Estimating Sewage Flows for Infrastructure Planning, the Unit Flow Factor are:
-- 0.37 m3/day/person for Residential flat (R3);
-- 0.28 m3/day/staff for Clubhouse & Lobby, Retail as well as G/IC;
[2] The Site is located at Mid-Levels West and the Catchment Inflow Factor for Central (P_{cif} = 1.0) has been adopted.

3.3 Sewage Discharge from the Vicinity

3.3.1 The existing sewerage system and the sewerage catchments in the vicinity are illustrated in **Figures 3-1 & 3-2** and summarised in **Table 3-3**. The detailed calculations are presented in **Appendix 3-1**.

Table 3-3 Sewage Discharge from Surrounding Catchments

Catchment ID	Building	Total ADWF for each Catchment with P_{cif} (m^3/day)
A	Richmond Court (Robinson Road 111-113) & Robinson Road 109c	33.3
B	Fairview Mansion (Robinson Road 84)	29.6

[1] The calculation is detailed in **Appendix 3-1**.

3.4 Review of Existing Downstream Sewers

3.4.1 As the Project may induce sewerage impact on the existing public sewage system, the utilization of the downstream sewers has been checked. It should be noted that the invert levels of some downstream sewers were not available from the Geoinfo Map or other available drainage record plans during the early stage of the Project. Therefore, a manhole survey was carried out in August 2022 to obtain the missing information. During the survey, the manhole cover of FMH7046601 could not be opened, and assumptions had to be made for the assessment. A summary of the manhole survey and photo records is presented in **Appendix 3-4**.

3.4.2 The capacities of the existing downstream sewer pipe sections (PS01 to PS08, see **Figure 3-2**) have been calculated using the Colebrook-White Equation. The calculated capacities are

summarised in **Table 3-4**, and the detailed calculations can be found in **Table A of Appendix 3-2**.

Table 3-4 Capacity of Existing Foul Sewers

Pipe Section	Upstream Manhole	Downstream Manhole	Full Capacity (L/s)
Existing Downstream Sewer			
PS01	FMH7031810	FMH7031813	54.2
PS02	FMH7031813	FMH7046603	105.6
PS03	FMH7046603	FMH7046604	78.8
PS04	FMH7046604	FMH7046601	88.4
PS05	FMH7046601	FGJ7005172	88.4
PS06	FGJ7005172	FMH7031815	95.2
PS07	FMH7031815	FMH7031877	95.2
PS08	FMH7031877	FMH7031826	33.5

Note:
[1] The calculation is detailed in **Table A of Appendix 3-2**.

3.4.3 A summary of the utilization of the downstream sewers is shown in **Table 3-5**. Detailed calculations are provided in **Table B of Appendix 3-2**. The results indicate that the existing downstream sewers are far from fully utilized under the expected sewage flow. Therefore, upgrading works for the existing downstream sewers are not considered necessary.

Table 3-5 Proportion of Peak Flow to Full Capacity (Existing Pipes and New Proposed Manhole)

Pipe Section	Full Capacity (L/s)	Peak Flow (L/s)	Utilization
Existing Downstream Sewer			
PS01	54.2	10.8	20%
PS02	105.6	13.9	13%
PS03	78.8	13.9	18%
PS04	88.4	13.9	16%
PS05	88.4	13.9	16%
PS06	95.2	13.9	15%
PS07	95.2	13.9	15%
PS08	33.5	13.9	41%

Note:
[1] The calculation is detailed in **Table B of Appendix 3-2**.

3.5 Terminal Manhole and Discharge Pipe of the Site

3.5.1 Sewage discharge from the Site is proposed to be collected by terminal manhole T-FWMH-01 and discharged via the proposed pipe PP01 with 225 mm. This pipe will be connected to the existing sewer manhole FMH7031810, as shown in **Figure 3-3**.

3.5.2 Details of the proposed new pipe are presented in **Table 3-6** below. The exact location of the new manhole and the invert levels will be determined during detailed design. The proposed new pipe will be able to cater for the expected peak sewage flow from the Site. Therefore, no adverse sewerage impact arising from the Proposed Development is anticipated.

Table 3-6 Proportion of Peak Flow to Full Capacity (Proposed New Sewers)

Pipe Section	Upstream Manhole	Downstream Manhole	Material	Outside Diameter (mm)	Full Capacity (L/s)	Peak Flow (L/s)	Utilization
PP01	T-FWMH-01	FMH7031810	PE	225	53.8	10.8	20%

Note:
[1] PE pipe with SDR17 has been adopted in the calculation.

4 CONCLUSION

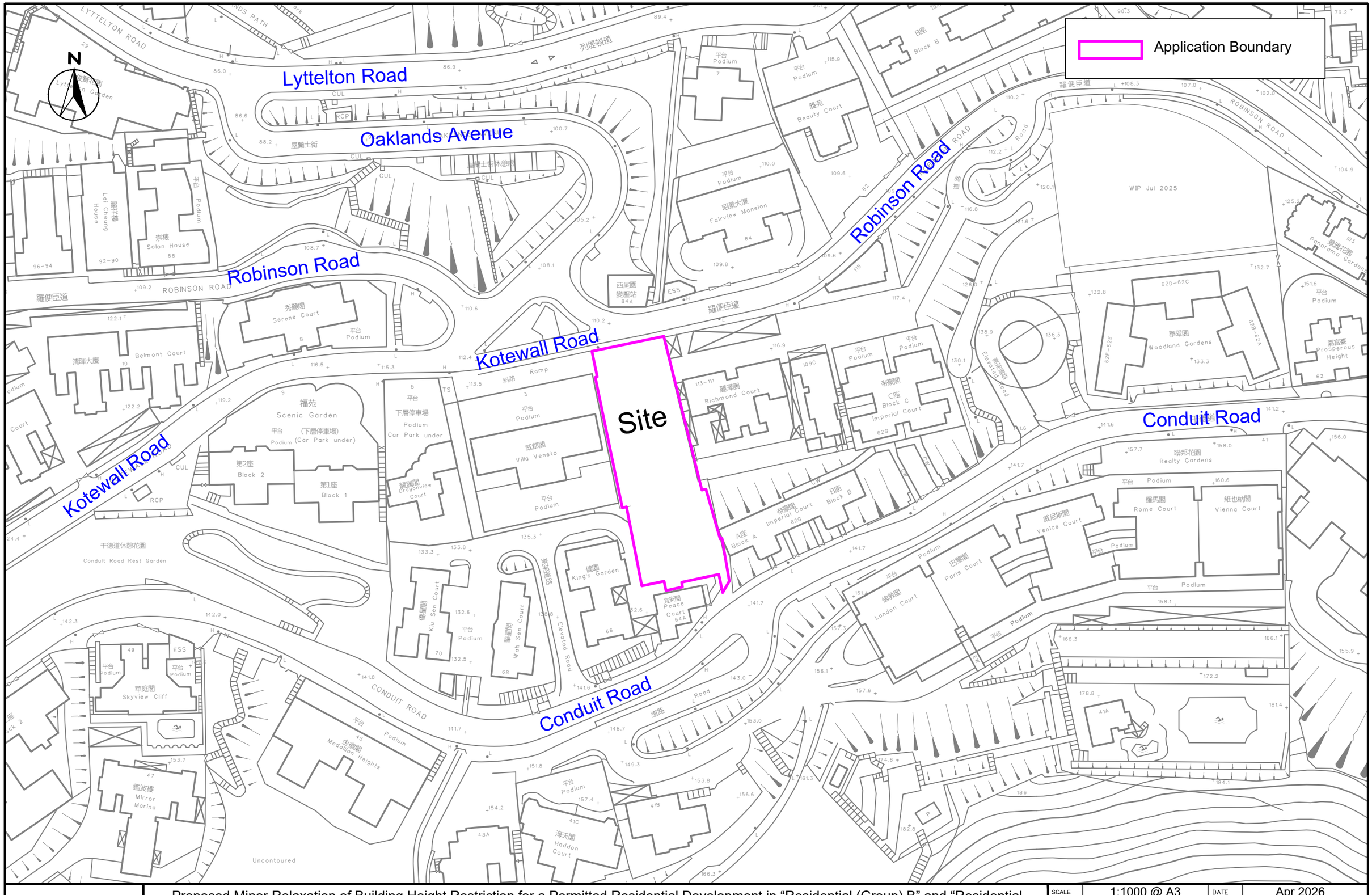
4.1.1 This Sewerage Impact Assessment has been undertaken to assess the potential sewerage impact of the Proposed Development and to serve as a supporting document for the S.16 application to the Town Planning Board (TPB) for consideration.

4.1.2 The results indicate that the existing sewers are able to cater for the expected sewage flow.

4.1.3 Sewage discharge from the Site is proposed to be collected by terminal manhole T-FWMH-01 and discharged via the proposed pipe PP01, which has a diameter of 225 mm. This pipe will be connected to the existing sewer manhole FMH7031810.

4.1.4 Both the existing and proposed sewers will be able to cater for the expected peak sewage flow. Therefore, no adverse sewerage impact arising from the Proposed Development is anticipated.

FIGURES

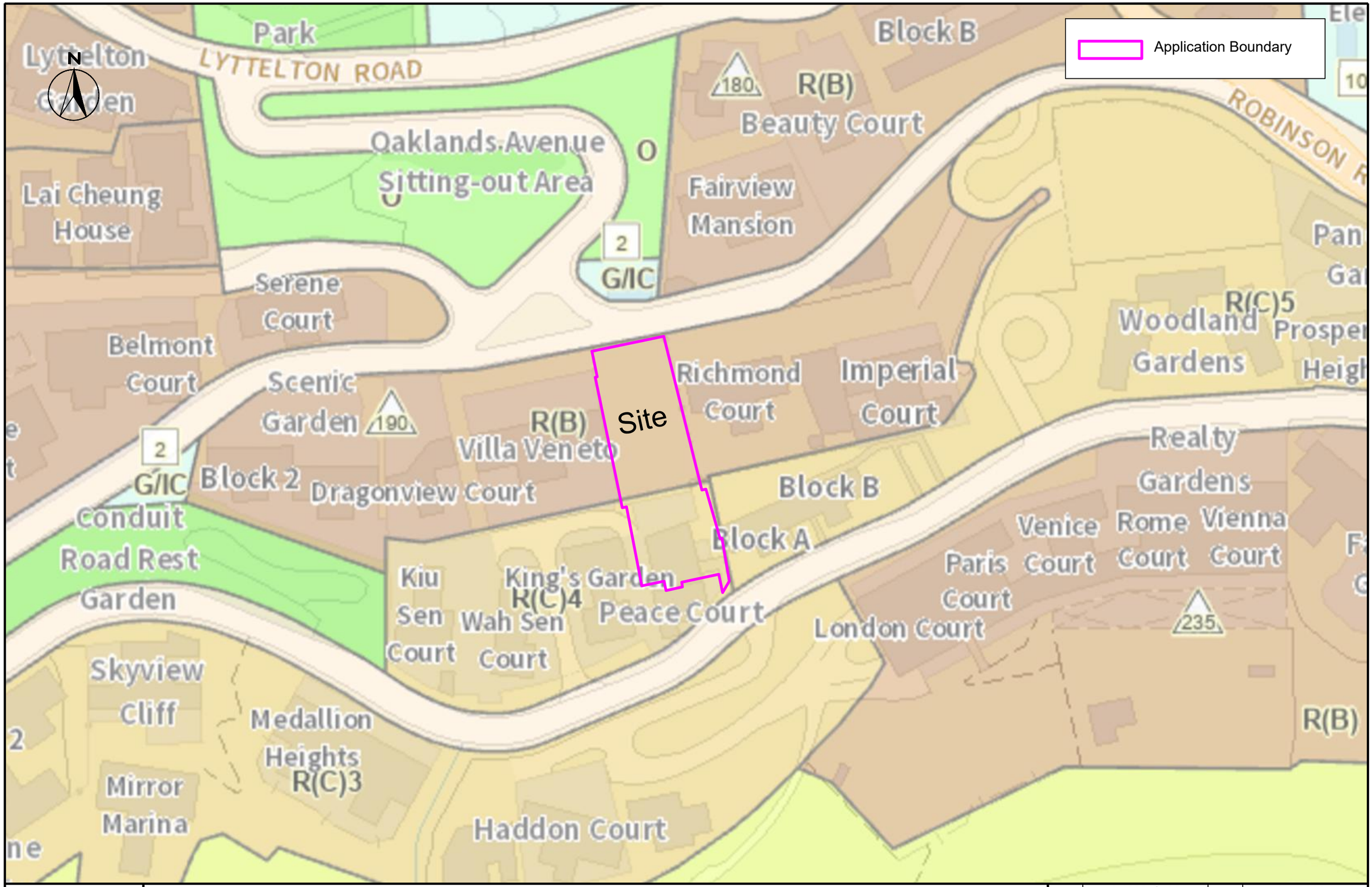


CINOTECH
Cinotech Consultants Limited

Proposed Minor Relaxation of Building Height Restriction for a Permitted Residential Development in “Residential (Group) B” and “Residential (Group C) 4” Zones at 1 & 1A Kotewall Road and 64 Conduit Road, Mid-levels

Site Location Plan

SCALE	1:1000 @ A3	DATE	Apr 2026
CHECK	LL	DRAWN	CC
JOB No.	IA26032	DRAWING No.	2-1
		REV	-

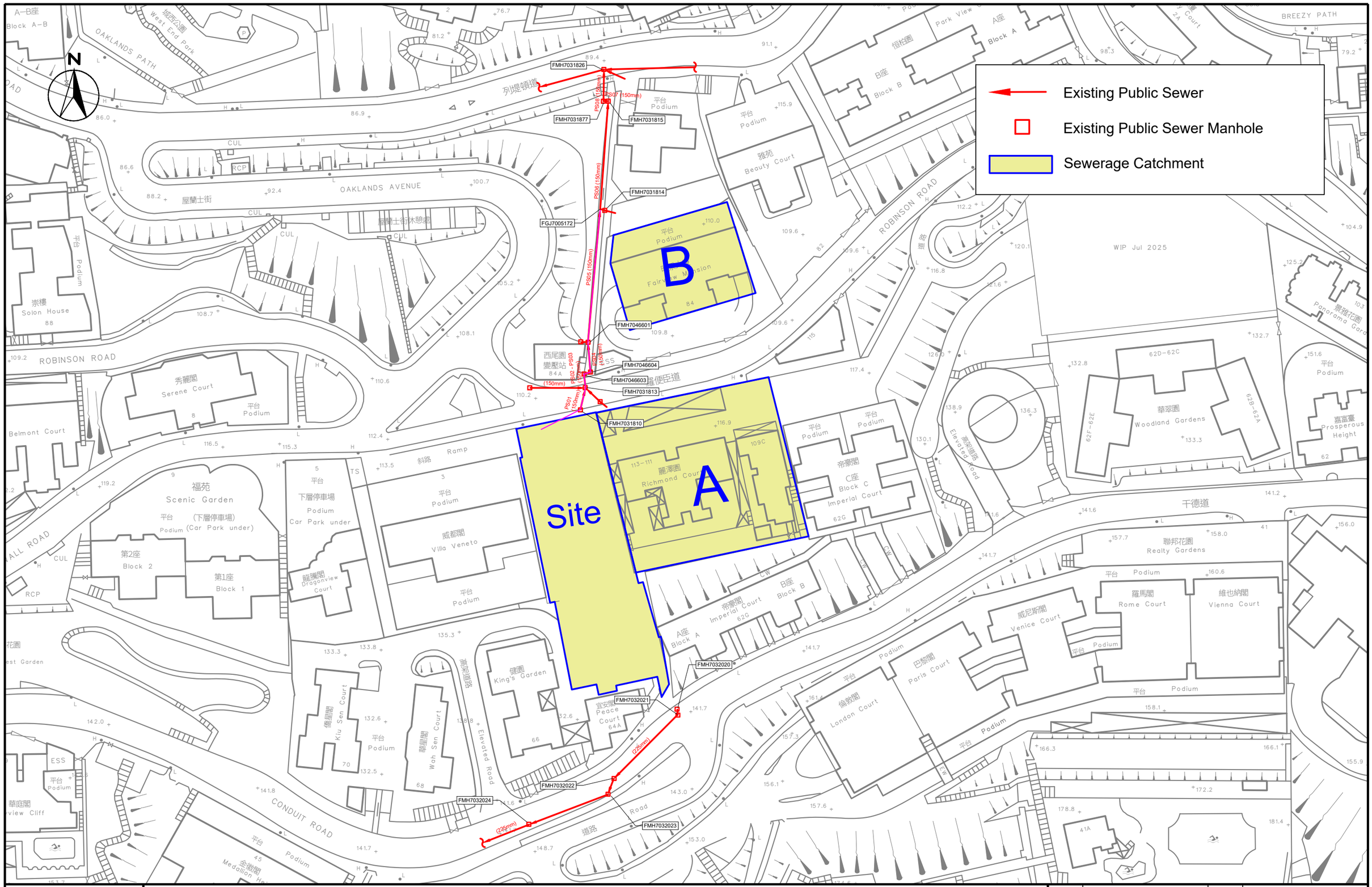


CINOTECH
Cinotech Consultants Limited

Proposed Minor Relaxation of Building Height Restriction for a Permitted Residential Development in "Residential (Group) B" and "Residential (Group C) 4" Zones at 1 & 1A Kotewall Road and 64 Conduit Road, Mid-levels

Outline Zoning Plan

SCALE	1:1000 @ A3	DATE	Apr 2026
CHECK	LL	DRAWN	CC
JOB No.	IA26032	DRAWING No. 2-2	REV -

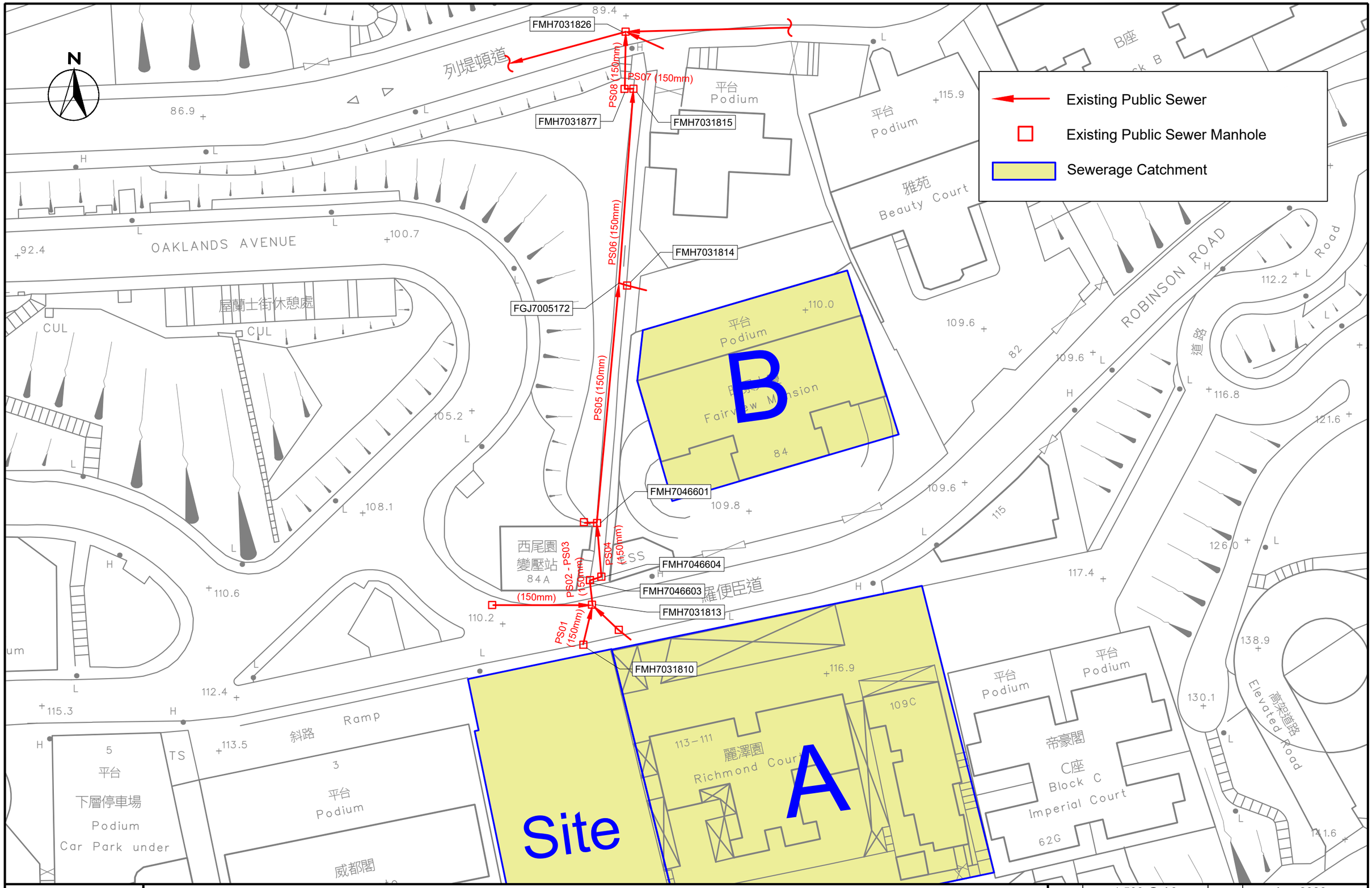


CINOTECH
Cinotech Consultants Limited

Proposed Minor Relaxation of Building Height Restriction for a Permitted Residential Development in “Residential (Group) B” and “Residential (Group C) 4” Zones at 1 & 1A Kotewall Road and 64 Conduit Road, Mid-levels

Sewerage Catchments and Existing Public Sewers in the Vicinity (Overview)

SCALE	1:800 @ A3	DATE	Aug 2026
CHECK	LL	DRAWN	CC
JOB No.	IA26032	DRAWING No.	3-1
		REV	-

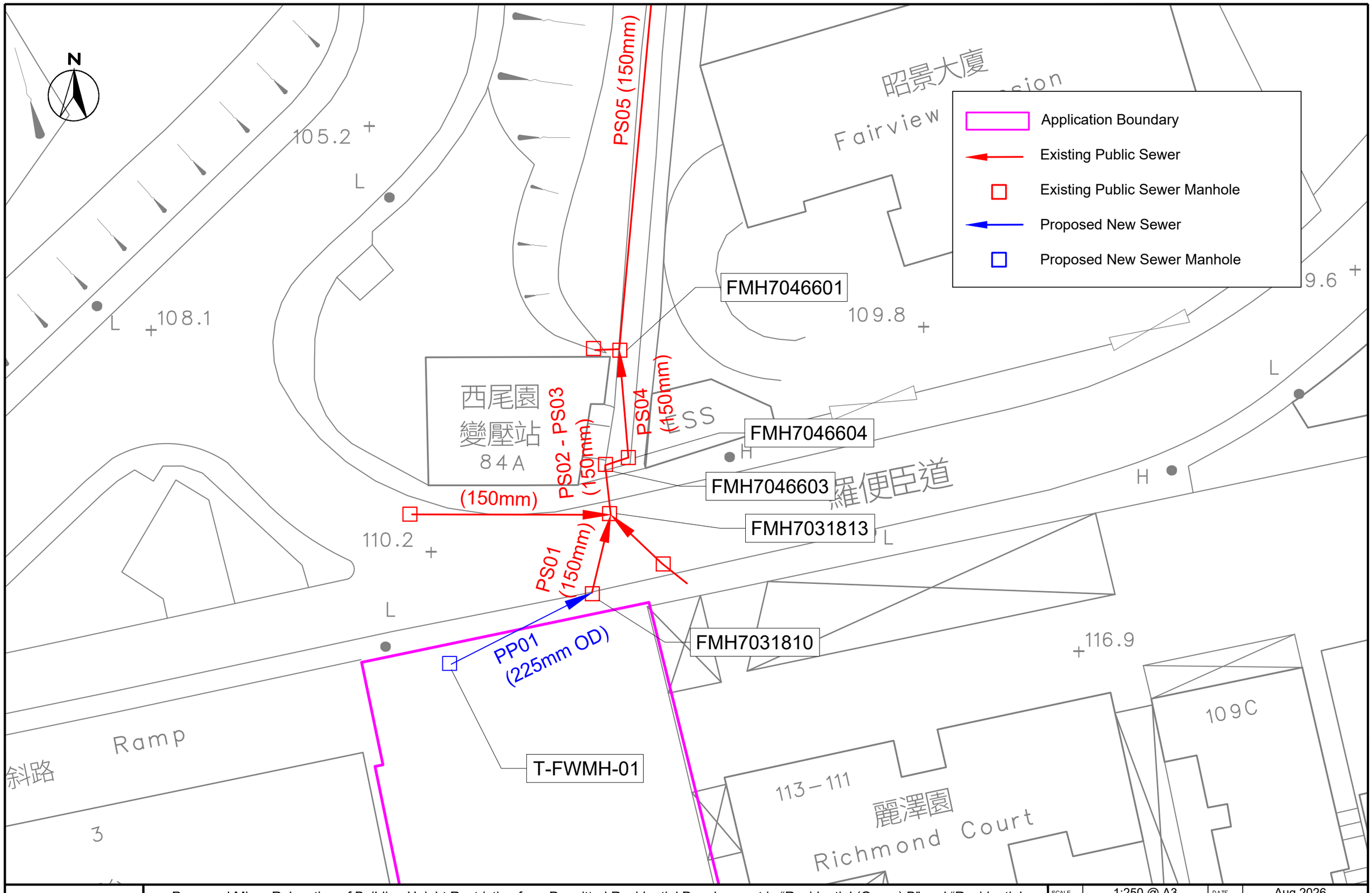


CINOTECH
Cinotech Consultants Limited

Proposed Minor Relaxation of Building Height Restriction for a Permitted Residential Development in "Residential (Group) B" and "Residential (Group C) 4" Zones at 1 & 1A Kotewall Road and 64 Conduit Road, Mid-levels

Sewerage Catchments and Existing Public Sewers in the Vicinity (Downstream)

SCALE	1:500 @ A3	DATE	Aug 2026
CHECK	LL	DRAWN	CC
JOB No.	IA26032	DRAWING No.	3-2
		REV	-



CINOTECH
Cinotech Consultants Limited

Proposed Minor Relaxation of Building Height Restriction for a Permitted Residential Development in “Residential (Group) B” and “Residential (Group C) 4” Zones at 1 & 1A Kotewall Road and 64 Conduit Road, Mid-levels

Proposed Sewer and Manhole

SCALE	1:250 @ A3	DATE	Aug 2026
CHECK	LL	DRAWN	CC
JOB No.	IA26032	DRAWING No.	3-3
		REV	-

APPENDIX 3-1
SEWAGE DISCHARGE FROM SURROUNDING CATCHMENTS

Appendix 3-1: Sewage Discharge from Surrounding Catchments

Catchment ID	Building	No. of Flats	Population / No. of Occupants	Flowrate (m^3/day) [3]	Total ADWF for each catchment with P_{ciF} (m^3/day) [4]	Reference
			Residential [2]	Residential UFF = 0.37		
A	Richmond Court (Robinson Road 111-113) & Robinson Road 109c	27	90	33.3	33.3	Centaline Property [1]
B	Fairview Mansion (Robinson Road 84)	24	80	29.6	29.6	Centaline Property [1]

Notes:

[1] Number of flats are reference to Centaline Property (https://hk.centanet.com/estate/).

[2] The average domestic household size is 3.3 persons for Central and Western - (A05) University District according to Population By-census 2021. Source from (https://www.census2021.gov.hk/en/district_profiles.html).

[3] The Unit Flow Factor is 0.37 m^3/person/day for Residential flat (R3).

[4] The Site is located at Mid-Levels West and the Catchment Inflow Factor for Central (P_{cif} = 1.0) has been adopted.

APPENDIX 3-2
DETAILED CALCULATION OF EXISTING SEWERS

Appendix 3-2: Detailed Calculation of Existing Sewers

Table A: Calculation of Existing Sewers Capacity

Sewer	Upstream Manhole	Downstream Manhole	Upstream Invert Level (mPD)	Downstream Invert Level (mPD)	Length (m)	Diameter (mm)	Diameter (m)	Area (m^2)	Hydraulic Radius (m)	Slope	Kinematic Viscosity (m^2/s)	Pipe material	Hydraulic Pipeline Roughness (m) [1]	Velocity (m/s)	Full Capacity (l/s)
Existing Downstream Sewer															
PS01	FMH7031810	FMH7031813	108.69	108.16	5.8	150	0.15	0.018	0.0375	0.0919	0.00000114	Vitrified Clay	0.0006	3.07	54.2
PS02	FMH7031813	FMH7046603	108.16	106.92	3.6	150	0.15	0.018	0.0375	0.3463	0.00000114	Vitrified Clay	0.0006	5.97	105.6
PS03	FMH7046603	FMH7046604	106.92	106.58	1.8	150	0.15	0.018	0.0375	0.1933	0.00000114	Vitrified Clay	0.0006	4.46	78.8
PS04	FMH7046604	FMH7046601	106.58	104.68	7.8	150	0.15	0.018	0.0375	0.2432	0.00000114	Vitrified Clay	0.0006	5.00	88.4
PS05	FMH7046601	FGJ7005172	104.68	96.28	34.5	150	0.15	0.018	0.0375	0.2432	0.00000114	Vitrified Clay	0.0006	5.00	88.4
PS06	FGJ7005172	FMH7031815	96.28	88.40	28.0	150	0.15	0.018	0.0375	0.2816	0.00000114	Vitrified Clay	0.0006	5.39	95.2
PS07	FMH7031815	FMH7031877	88.40	88.05	1.2	150	0.15	0.018	0.0375	0.2816	0.00000114	Vitrified Clay	0.0006	5.39	95.2
PS08	FMH7031877	FMH7031826	88.05	87.76	8.2	150	0.15	0.018	0.0375	0.0353	0.00000114	Vitrified Clay	0.0006	1.90	33.5

Note:

[1] The roughness coefficient for slimed vitrified clay under poor condition has been adopted; the ks values are 0.6mm for velocities greater than 1.2m/s, otherwise 3mm.

[2] The invert levels are based on the measurement values from manhole survey.

[3] The invert level of FMH7046601 and FMH7031815 is unknown. Average slope along its upstream and downstream pipe is used to estimate the invert level. (highlighted)

Appendix 3-2: Detailed Calculation of Existing Sewers

Table B: Calculation of Existing Sewers Utilization

Sewer	Upstream Manhole	Downstream Manhole	Full Capacity (L/s)	Catchment	Total ADWF with P_{cif} (m^3/day)	Contributing Population[1]	Peaking Factor[2]	Total Peak Flow (L/s)	% of full capacity
Existing Downstream Sewer									
PS01	FMH7031810	FMH7031813	54.2	Site	116.4	431	8	10.8	20%
PS02	FMH7031813	FMH7046603	105.6	Site + Catchment A	149.7	554	8	13.9	13%
PS03	FMH7046603	FMH7046604	78.8	Site + Catchment A	149.7	554	8	13.9	18%
PS04	FMH7046604	FMH7046601	88.4	Site + Catchment A	149.7	554	8	13.9	16%
PS05	FMH7046601	FGJ7005172	88.4	Site + Catchment A	149.7	554	8	13.9	16%
PS06	FGJ7005172	FMH7031815	95.2	Site + Catchment A, B	149.7	554	8	13.9	15%
PS07	FMH7031815	FMH7031877	95.2	Site + Catchment A, B	149.7	554	8	13.9	15%
PS08	FMH7031877	FMH7031826	33.5	Site + Catchment A, B	149.7	554	8	13.9	41%

Note:

[1] The contributing population = total catchment discharge (m^3/day) / 0.27(m^3/day/person)

[2] Peaking Factor of 8 for contribution population <1,000, 6 for contribution population of 1000 - 5000, 5 for contribution population of 5000 - 10000, 4 for contribution population of 10000 - 50000.

[3] Peak Flow = Daily average dry weather flow × Peaking Factor (including stormwater allowance) × Catchment Inflow Factor / 24 / 3600, the operation hour is assumed to be 24 hours.

APPENDIX 3-3
DETAILED CALCULATION OF PROPOSED SEWERS

Appendix 3-3: Detailed Calculation of Proposed Sewers

Table A: Calculation of Proposed Sewer Capacity

Sewer	Upstream Manhole	Downstream Manhole	Upstream Invert Level (mPD)	Downstream Invert Level (mPD)	Length (m)	Diameter (mm) [3]	Area (m^2) [4]	Hydraulic Radius (m)	Slope	Kinematic Viscosity (m^2/s)	Pipe material	Hydraulic Pipeline Roughness (m) [1]	Velocity (m/s)	Full Capacity (l/s)
Proposed New Sewer														
PP01	T-FWMH-01	FMH7031810	108.90	108.71	11.3	225	0.031	0.05	0.0168	0.00000114	PE	0.0003	1.71	53.8

Note:

[1] The roughness coefficient for Slimed uPVC sewer under poor condition has been adopted for PE sewer; the ks values are 0.3mm for velocities greater than 1.2m/s, otherwise 1.5mm.

[2] All proposed new sewer manhole and pipes are subject to change during detail design stage.

[3] Outside diameter for PE pipe

[4] Internal diameter of PE pipe with SDR17 has been adopted in the calculation.

Appendix 3-3: Detailed Calculation of Proposed Sewers

Table B: Calculation of Propsoed Sewer Utilization

Sewer	Upstream Manhole	Downstream Manhole	Full Capacity (L/s)	Catchment	Total ADWF with P_{cif} (Exclude Upstream Sewers) (m^3/day)	Contributing Population[1]	Peaking Factor[2]	Total Peak Flow (L/s)	% of full capacity
Proposed New Sewer									
PP01	T-FWMH-01	FMH7031810	53.8	Project	116.4	431	8	10.8	20%

Note:

[1] The contributing population = total catchment discharge (m^3/day) / 0.27(m^3/day/person)

[2] Peaking Factor of 8 for contribution population <1,000, 6 for contribution population of 1000 - 5000, 5 for contribution population of 5000 - 10000, 4 for contribution population of 10000 - 50000.

[3] Peak Flow = Daily average dry weather flow × Peaking Factor (including stormwater allowance) × Catchment Inflow Factor / 24 / 3600, the operation hour is assumed to be 24 hours.

APPENDIX 3-4
SUMMARY OF THE MANHOLE SURVEY
(AUG 2022)

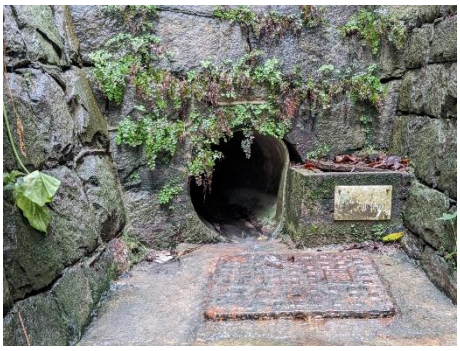
Appendix - Summary Table for Manhole

Manhole Ref.	Cover Level (mPD)	Depth (m)	Invert Level (mPD)
FMH7031810	109.74	1.05	108.69
FMH7031813	109.58	1.42	108.16
FMH7046603	107.44	0.52	106.92
FMH7046604	107.07	0.49	106.58
FMH7046602	-	/	/
FMH7046601	104.32	/	/
FMH7031814	96.86	0.58	96.28
FMH7031815	88.65	/	/
FMH7031877	89.21	1.16	88.05
FMH7031826	89.16	1.4	87.76

FMH7031810

FMH7031813

FMH7046603



FMH7046604

FMH7046601

FMH7031814

FMH7031815

FMH7031877

FMH7031826

FMH7031826 (cont.)

FMH7031826 (cont.)