Appendix 5

Sewerage Appraisal

SECTION 16 PLANNING APPLICATION FOR PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION (20% OF NON-DOMESTIC PLOT RATIO CONVERSION TO DOMESTIC PLOT RATIO. TOTAL PLOT RATIO REMAINS UNCHANGED) FOR MIXED USE DEVELOPMENT AT PLANNING AREA 28A AND AREA 28B, HUNG SHUI KIU

SEWERAGE APPRAISAL

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1. INTRODUCTION

1.1 Background and Objectives

1.1.1 Ramboll Hong Kong Limited (the Consultant) has been commissioned by the MTR Corporation Limited (hereafter refer to as the "MTRC") to conduct this Sewerage Appraisal (SA) in support of Section 16 planning application for the Proposed Minor Relaxation of Plot Ratio Restriction (20% of non-domestic plot ratio conversion to domestic plot ratio. Total plot ratio remains unchanged.) for Mixed Use Development (hereafter refer to as the "Proposed Development") at Hung Shui Kiu at Planning Areas 28A and 28B (hereafter refer to as the "Subject Sites").

1.1.2 Under the Approved Hung Shui Kiu and Ha Tsuen Outline Zoning Plan (OZP) No. S/HSK/2, the Proposed Development is located on the Planning Areas 28A and 28B. The location plan is shown in **Figure 1.1**.

1.1.3 With reference to the detailed future sewerage system design drawings for CE 1/2020 (CE) Hung Shui Kiu/ Ha Tsuen New Development Area Package A Works for Second Phase Development – Design and Construction (hereafter refer to as the "HSK NDA – Design and Construction"), The sewerage system design of the Proposed Development with peak flow of 505.8 litre/sec has been reported to CEDD on 11 March 2024 and agreed with CEDD and its Consultants, ARUP, during the tender stage of the future sewerage network of HSK NDA received on 12 December 2024. The email record with CEDD is attached in **Appendix 1.1**.

1.1.4 Under CEDD's HSK NDA Design and Construction, the site reference number of the Subject Sites are Sites 4-25a, Site 4-25b, Site 4-25c and Site 4-29. The OZP Planning Areas and Site Reference Number under CEDD's HSK NDA Design and Construction are shown in **Table 1.1**.

Table 1.1 OZP Planning Areas and Site Reference Number under CEDD's HSK NDA Design and Construction

OZP Planning Areas	Site Reference Number under CEDD's HSK NDA Design and Construction
28A	Site 4-29
28B	Sites 4-25a, Site 4-25b, Site 4-25c

1.1.5 The Proposed Development will be implemented in phases with expected earliest completion year of first phase by 2030 and last phase by 2037. There are 7 phases (3 on 28A and 4 on 28B) and the expected earliest completion years of each phase are summarized in **Table 1.2** for the purpose of the SA only. For clarity, the development scheme, including the expected earliest completion years and the phasing plan are indicative and non-binding.

Table 1.2 Earliest Completion Years of Each Phase of the Proposed Development

OZP Planning Areas	Phases [1]	Earliest Completion Years (Indicative)
28A	Site 28A-1	2032
	Site 28A-2	2034
	Site 28A-3	2037
28B	Site 28B-1	2030
	Site 28B-2	2031
	Site 28B-3	2033
	Site 28B-4	2034

Remark

[1] The locations of each phase are shown in **Appendix 2.1**.

1.1.6 This SA aims to compare the sewerage feasibility on the Proposed Development.

1.2 Subject Sites and their Environ

1.2.1 According to the Approved Hung Shui Kiu and Ha Tsuen Outline Zoning Plan (OZP) No. S/HSK/2, the Subject Sites are zoned as "Other Specified Uses" annotated "Mixed Use" "OU(MU)".

1.2.2 The Subject Sites have a total area of about 82,027 m^2, which are situated in the Hung Shui Kiu and Ha Tsuen area. **Figure 1.1** shows the location of the Subject Sites and their environ.

1.3 Assumed GFA Breakdown of the Sewerage Appraisal for the Base Case in Planning Areas 28A and 28B

1.3.1 The Development Parameters for Base Case consists of residential units, retail, F&B, office, Park-and-Ride facilities and public transport interchange (PTI), which is complying with the development parameter listed in the Outline Zoning Plan (OZP).

1.3.2 The assumed GFA breakdown of the Development Parameters for Sewerage System Design is shown in **Table 1.3**.

Table 1.3 Assumed GFA Breakdown of the Sewerage Appraisal for the Base Case in Planning Areas 28A and 28B

	GFA (m^2) [1]
Residential	369,121.5 [2]
Commercial (Retail)	86,781.75
F&B	86,781.75

Office	16,504
Park-and-Ride Facilities	52,500 [3][4]
PTI	15,000
Total	**574,189**

Remark:

[1] The GFA shown in the table is indicative only.

[2] GFA of 369,121.5 m^2 can provide 7,382 no. of residential units.

[3] Assumed no sewage generated from Park-and-Ride facilities. Therefore, the area for Park-and-Ride facilities is excluded in SA.

[4] GFA for Park-and-Ride Facilities in Base Case is exempted.

1.4 Assumed GFA Breakdown of the Sewerage Appraisal for the Proposed Development in Planning Areas 28A and 28B

1.4.1 The Proposed Development under this planning application amendment consists of residential units, retail, food and beverage (F&B), office, Park-and-ride facilities and public transport interchange (PTI).

1.4.2 The assumed GFA breakdown of the Proposed Development is shown in **Table 1.4**. Although there is conversion of 20% Non-Domestic GFA to be Domestic GFA, the total GFA of the Proposed Development would not exceed the the total GFA of the Base Case.

Table 1.4 Assumed GFA Breakdown of the Sewerage Appraisal for the Proposed Development in Planning Areas 28A and 28B

	GFA (m^2) [1]
Residential	410,135 [2]
Commercial (Retail)	40,025
Commercial (F&B)	40,025
Office	16,504
Park-and-Ride Facilities	52,500 [3]
PTI	15,000
Total	**574,189**

Remark:

[1] The GFA shown in the table is indicative only.

[2] GFA of 410,135 m^2 can provide 8,202 no. of residential units.

[3] Assumed no sewage generated from Park-and-Ride facilities. Therefore, the area for Park-and-Ride facilities is excluded in SA.

2. SEWERAGE APPRAISAL

2.1 Scope of Work

2.1.1 The aim of this SA is to assess whether the capacity of the sewerage network serving the Subject Sites are sufficient to cope with the sewage flow from the Proposed Development.

2.2 Assessment Criteria and Methodology

2.2.1 The Commercial and Industrial Floor Space Utilization Survey (CIFSUS) conducted by the Planning Department has been used to determine the worker density for various economic activities and planned usage types.

2.2.2 Environmental Protection Department's (EPD's) Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning, Version 1 (GESF) has been referred to for the purposes of estimating the quantity of the sewage generated from the Proposed Development and the existing catchment area. Sewage flow parameters and global peaking factors in this document have been adopted for this SA.

2.2.3 According to the GESF, the overall unit flow is composed of flows due to employees and the associated activities. The following unit flow factors have been adopted in the SA calculation in accordance with Tables T-1, T-2 and T-3 of the GESF:

- Residential housing: 0.27m^3/day (Private R2)
- Transport, Storage & Communication: 0.18m^3/day (Commercial Employee and J3 – Transport, Storage & Communication)
- Wholesale & Retail: 0.28m^3/day (Commercial Employee and J4 – Wholesale & Retail)
- Finance, Insurance, Real Estate & Business Services: 0.08m^3/day (Commercial Employee and J6 – Finance, Insurance, Real Estate & Business Services)
- Restaurant & Hotel: 1.58m^3/day (Commercial Employee and J10 – Restaurant & Hotel)
- Community, Social & Personal Services: 0.28m^3/day (Commercial Employee and J11 – Community, Social & Personal Services)

2.2.4 The catchment inflow factor, PCIF of 1.0 (Yuen Long), is adopted in catchment calculations.

2.2.5 The Colebrook-White equation of $V = -\sqrt{(8gDs)}\log(\frac{ks}{3.7D} + \frac{2.51v}{D\sqrt{(2gDs)}})$ is adopted.

2.3 Sewerage System under Construction by CEDD

2.3.1 With reference to the future sewerage system design drawings for HSK NDA – Design and Construction under Agreement No. CE 1/2020, there will have public sewers surrounded the Sites. According to the latest CEDD's sewerage network information, the sewage generated from the Subject Sites will be divided into different discharge points and will connect to the new public sewers. The discharge points (4 discharge points at Area 28A and 7 discharge points at Area 28B) and the future sewerage network based on the information provided by the CEDD's consultant received in Dec 2024 are shown in **Figure 2.1**. Some discharge points and pipes (i.e. LI-S4.25B-2 to FMH163A and LI-S4.25A-2 to FMH164_1) are assumed idle in this assessment and reserved for future use in case of any change in detail design of the proposed Development. Separated Sewage Impact Assessment will be submitted for approval if these reserved pipes and manholes are being used.

2.3.2 Also, with reference to EIA report of Agreement No. CE 2/2011 Hung Shui Kiu New Development Area Planning and Engineering Study – Investigation approved in December 2016, EIA report of Agreement No. CE 6/2019 (DS) Hung Shui Kiu Effluent Polishing Plant and Yuen Long South Effluent Polishing Plant – Investigation approved in October 2024 and Revised Final Report on Drainage and Sewerage Assessment Review (Submission Re. REP-031-07) of Agreement No. CE 1/2020 Hung Shui Kiu New Development Area Package A Works for Second Phase Development – Design and Construction, the Subject Sites are located within the HSK NDA which will be conveyed via Sewage Pumping Station No.1 and 2 (SPS 1 & SPS 2) to Hung Shui Kiu Effluent Polishing Plant (HSKEPP). The capacity of SPS 1, SPS 2 and the HSKEPP are summarized in **Table 2.1 and Appendix 2.2**.

Table 2.1 Capacity of Sewage Pumping Station No.1 and 2 and Hung Shui Kiu Effluent Polishing Plant in EIA report and Revised Final Report on DSIA under Agreement No. CE 1/2020 (CE)

	Capacity in EIA report (m^3/day)	**Capacity in Revised Final Report on DSIA (m^3/day)**
Sewage Pumping Station No.1 (SPS 1)	26,641	28,874
Sewage Pumping Station No.2 (SPS 2)	39,130	42,255
Hung Shui Kiu Effluent Polishing Plant (HSKEPP)	90,000	Phase 1: 60,000
		Phase 2: 30,000
		Total: 90,000

2.4 Wastewater Generated under Base Case

2.4.1 Detailed calculation of sewage generation from the Base Case following OZP compliance development parameter is given in **Table 2.2** below.

Table 2.2 Estimated Peak Flow Under Base Case

Calculation for Sewage Generation Rate under Base Case			
1.1. Residential			
Total number of residential units	=	7382	units
Total number of residents	=	20670	residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Yuen Long)
Design flow	=	270	litre/person/day -- (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	**5580.8**	m^3/day
1.2 Club House			
GFA	=	9228	m^2
Assumed floor area per employee	=	30.3	m^2 per employee -- (refer to Table 8 of CIFSUS – Community, Social & Personal Services)
Total number of employees	=	305	employees
Design flow	=	280	litre/employee/day – (refer to Table T-2 of GESF – J11 Community, Social, Personal Services)
Sewage generation rate	=	**85.3**	m^3/day
1.3 Indoor Swimming Pool			
Area of Swimming Pool	=	300	m^2 (Assume)
Depth of Swimming Pool	=	1.5	m
Volume of Swimming Pool (Ordinary Assumption)	=	450	m^3
Turnover Rate	=	4	hr (See Remark (1))
Required Surface Loading Rate of Filter	=	112.5	$m^3/m^2/hr$
Filter Areas required	=	1	m^2
Adopted Surface Loading Rate of Filter	=	50	$m^3/m^2/hr$
Adopted Filter Area	=	2.25	m^2
Backwash Duration	=	3	min/d
Backwash flow rate	=	30	$m^3/m^2/hr$
Design peak flow for Swimming Pool Backwashing	=	3.375	m^3/day
Design peak flow for Swimming Pool Backwashing	=	**18.8**	litre/sec
2. Commercial (Retail)			
GFA	=	86781.75	m^2
Assumed floor area per employee	=	28.6	m^2 per employee -- (refer to Table 8 of CIFSUS – Retail Trade)
Total number of employees	=	3037	employees
Design flow	=	280	litre/employee/day – (refer to Table T-2 of GESF – J4 Wholesale & Retail)
Sewage generation rate	=	**850.5**	m^3/day
3. Commercial (F&B)			
GFA	=	86781.75	m^2
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS – Restaurants)
Total number of employees	=	4426	employees
Design flow	=	1580	litre/employee/day – (refer to Table T-2 of GESF – J10 Restaurants & Hotels)
Sewage generation rate	=	**6992.9**	m^3/day
4. PTI			
GFA	=	15000	m^2
Assumed floor area per employee	=	26.3	m^2 per employee -- (refer to Table 8 of CIFSUS – Transport)
Total number of employees	=	570	employees
Design flow	=	180	litre/employee/day – (refer to Table T-2 of GESF – J3 Transport, Storage & Communication)
Sewage generation rate	=	**102.6**	m^3/day

5. Office			
GFA	=	16504	m^2
Assumed floor area per employee	=	18.2	m^2 per employee -- (refer to Table 8 of CIFSUS – Financial, Insurance, Real Estate & Business Services)
Total number of employees	=	908	employees
Design flow	=	80	litre/employee/day – (refer to Table T-2 of GESF – J6 Financial, Insurance, Real Estate & Business Services)
Sewage generation rate	=	**72.6**	m^3/day
Total Flow from the Base Case			
Flow rate	=	13684.6	m^3/day
Flow rate with P_{CIF}	=	13684.6	m^3/day (refer to Table T-4 of GESF – Yuen Long - 1.0)
Contributing population	=	50684	people (refer to Section 12 of GESF)
Peaking factor	=	4	(refer to Table T-5 of GESF for a population between >50000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**641.7**	litre/sec
Peak flow (with swimming pool)	=	**660.4**	litre/sec

Remarks:

(1) CAP 132, Section 42 Swimming Pools Regulation: Covered pool: Turnover rate = once every 4 hours, Open Air Pool: Turnover rate = once every 6 hours

2.5 Wastewater Generated by the Proposed Development

2.5.1 Detailed calculation of sewage generation from the Proposed Development is given in **Table 2.3** below.

Table 2.3 Estimated Peak Flow under Proposed Development

Calculation for Sewage Generation Rate of the Proposed Development			
1.1. Residential			
Total number of residential units	=	8202	units
Total number of residents	=	22966	residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Yuen Long)
Design flow	=	270	litre/person/day -- (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	**6200.7**	m^3/day
1.2 Club House			
GFA	=	10253	m^2
Assumed floor area per employee	=	30.3	m^2 per employee -- (refer to Table 8 of CIFSUS – Community, Social & Personal Services)
Total number of employees	=	338	employees
Design flow	=	280	litre/employee/day – (refer to Table T-2 of GESF – J11 Community, Social, Personal Services)
Sewage generation rate	=	**94.7**	m^3/day

1.3 Indoor Swimming Pool			
Area of Swimming Pool	=	300	m^2 (Assume)
Depth of Swimming Pool	=	1.5	m
Volume of Swimming Pool (Ordinary Assumption)	=	450	m^3
Turnover Rate	=	4	hr (See Remark (1))
Required Surface Loading Rate of Filter	=	112.5	$m^3/m^2/hr$
Filter Areas required	=	1	m^2
Adopted Surface Loading Rate of Filter	=	50	$m^3/m^2/hr$
Adopted Filter Area	=	2.25	m^2
Backwash Duration	=	3	min/d
Backwash flow rate	=	30	$m^3/m^2/hr$
Design flow for Swimming Pool Backwashing	=	3.375	m^3/day
Design flow for Swimming Pool Backwashing	=	**18.8**	litre/sec
2. Commercial (Retail)			
GFA	=	40025	m^2
Assumed floor area per employee	=	28.6	m^2 per employee -- (refer to Table 8 of CIFSUS – Retail Trade)
Total number of employees	=	1401	employees
Design flow	=	280	litre/employee/day – (refer to Table T-2 of GESF – J4 Wholesale & Retail)
Sewage generation rate	=	**392.2**	m^3/day
3. Commercial (F&B)			
GFA	=	40025	m^2
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS – Restaurants)
Total number of employees	=	2041	employees
Design flow	=	1580	litre/employee/day – (refer to Table T-2 of GESF – J10 Restaurants & Hotels)
Sewage generation rate	=	**3225.2**	m^3/day
4. PTI			
GFA	=	15000	m^2
Assumed floor area per employee	=	26.3	m^2 per employee -- (refer to Table 8 of CIFSUS – Transport)
Total number of employees	=	570	employees
Design flow	=	180	litre/employee/day – (refer to Table T-2 of GESF – J3 Transport, Storage & Communication)
Sewage generation rate	=	**102.6**	m^3/day
5. Office			
GFA	=	16504	m^2
Assumed floor area per employee	=	18.2	m^2 per employee -- (refer to Table 8 of CIFSUS – Financial, Insurance, Real Estate & Business Services)
Total number of employees	=	908	employees
Design flow	=	80	litre/employee/day – (refer to Table T-2 of GESF – J6 Financial, Insurance, Real Estate & Business Services)
Sewage generation rate	=	**72.6**	m^3/day

Total Flow from the Proposed Development			
Flow rate	=	**10088.1**	m^3/day
Flow rate with P_{CIF}	=	10088.1	m^3/day (refer to Table T-4 of GESF – Yuen Long - 1.0)
Contributing population	=	37363	people (refer to Section 12 of GESF)
Peaking factor	=	4	(refer to Table T-5 of GESF for a population between 10000-50000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**467.0**	litre/sec
Peak flow (with swimming pool)	=	**485.8**	litre/sec

Remarks:

(1) The Club House and Indoor Swimming Pool are included only as assumptions for the Sewerage Appraisal.
(2) CAP 132, Section 42 Swimming Pools Regulation: Covered pool: Turnover rate = once every 4 hours, Open Air Pool: Turnover rate = once every 6 hours

2.6 Assessment of Sewerage Impact

2.6.1 Sewage generated from the Proposed Development under Base Case and Proposed Development are summarized in **Table 2.4**.

Table 2.4 Sewage generated from the Sewerage System Design and Proposed Development

	Future Sewerage System Adopted by CEDD	Base Case	Proposed Development
Peak Flow with Swimming Pool (litre/sec)	505.8	660.4	485.8

2.7 Review of the Sewage Generate from Proposed Development to Future Public Sewer Network

2.7.1 As stated in **Section 1.1.2** and **Section 2.3.1**, the design of the future sewerage system is based on the peak flow of 505.8 litre/sec. The capacity of the future sewerage network has been designed in accordance with the peak flow of 505.8 litre/sec from the Proposed Development and the surrounding catchments. Also, the sewage peak flow from Proposed Development would lead to a decrease of about 174.6 litre/sec compared to that from Base Case, it can be deduced that the pipe capacity is enough for the sewage generated from Proposed Development. No upgrading work on the sewage system is required by the Proposed Development.

2.7.2 Detailed calculation of sewage generation and peak flow estimation under Base Case and Proposed Development can be referred to **Table 2.2 and Table 2.3** above. **Appendix 2.1** shows the estimated capacity of the sewers from the Proposed Development and the surrounding catchments.

2.7.3 Based on the assessment results in **Appendix 2.1**, there are sufficient capacity for the future pipe sewers to cater for the sewage generated from the Proposed Development and the nearby development catchments. No upgrading work on the sewerage system is required by the Proposed Development.

2.8 Comparison of Sewage Pumping Station and Hung Shui Kiu Effluent Polishing Plant from Proposed Development

2.8.1 The sewage generation from the Proposed Development and the capacity of the SPS1, SPS 2 and HSKEPP are summarized in **Table 2.5**.

Table 2.5 Sewage Generation from the Proposed Development and the Capacity of the SPS1, SPS 2 and HSKEPP

Capacity of SPS 1 (m^3/day)	Capacity of SPS 2 (m^3/day)	Capacity of HSKEPP (m^3/day)	Sewage Generation from Proposed Development (m^3/day)
28,874	42,255	90,000	10,088.1

2.8.2 As shown in **Table 2.5**, the capacity of SPS 1, SPS 2 and HSKEPP are greater than the sewage generation from the Proposed Development. Also, the sewage peak flow from Proposed Development would lead to a decrease of about 174.6 litre/sec compared to that from Base Case. The capacity of SPS 1, SPS 2 and HSKEPP would, therefore, has enough capacity for the sewage generated from the Proposed Development. A meeting with CEDD/DSD/EPD was held and it is confirmed in the meeting that the capacities of both the currently proposed pipe works and sewage pumping stations (SPS1 and SPS2) were considered sufficient to cater the proposed total ADWF for Hung Shui Kiu Area 28A & 28B of 10088.1 m^3/day. The after-meeting email record is attached in **Appendix 2.3**.

2.8.3 The plan for the routing to SPS 1, SPS 2 and HSKEPP are shown in **Figure 2.3**.

2.8.4 Therefore, no upgrading work on the sewerage system, sewage pumping stations and effluent polishing plant are required for the Proposed Development.

3. OVERALL CONCLUSION

3.1.1 The potential sewerage impact arising from the Subject Site has been qualitatively assessed by comparing the future sewerage system capacity as agreed with CEDD, sewage generated from the Base Case and Proposed Development.

3.1.2 Based on the comparison results, the sewage generated from the Proposed Development (485.8 litre/sec) is less than that from Base Case (660.4 litre/sec). No upgrading of the sewerage network is required.

3.1.3 Calculation on sewage contribution due to the Proposed Development and surrounding catchment are also conducted. Based on the assessment results, there are sufficient capacity for the future pipe sewers to cater for the sewage generated from the Proposed Development and the nearby development catchments.

3.1.4 The capacity of Sewage Pumping Station 1, Sewage Pumping Station 2 and Hung Shui Kiu Effluent Polishing Plant were considered sufficient to cater the proposed total ADWF for Hung Shui Kiu Area 28A & 28B of 10088.1 m^3/day.

3.1.5 This SA confirms the feasibility of the Proposed Development in terms of its sewerage impact.

Figures

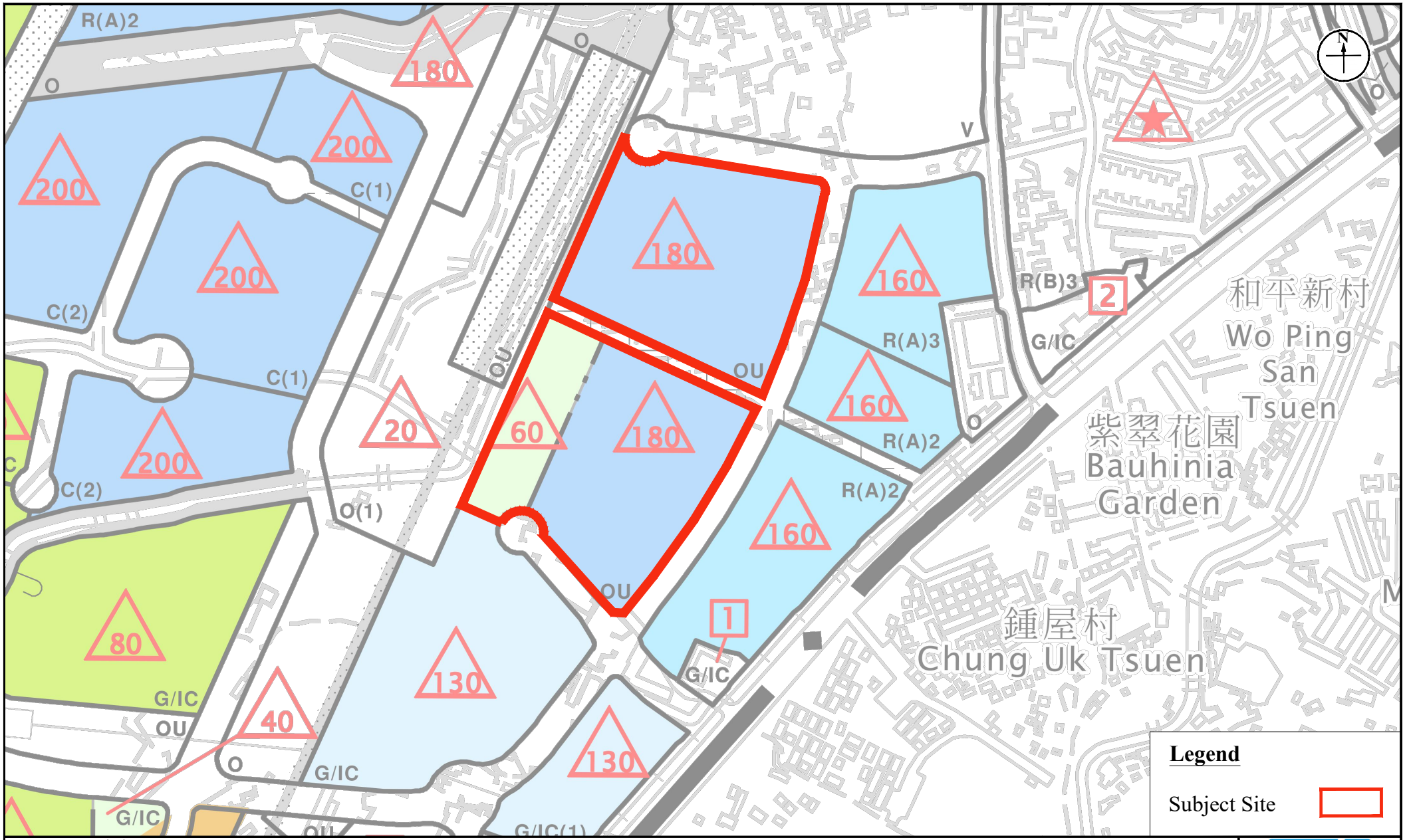

Figure: 1.1	RAMBOLL
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Project: Hung Shui Kiu Planning Areas 28A and 28B	Rev.: 1.0
	Date: Nov 2024

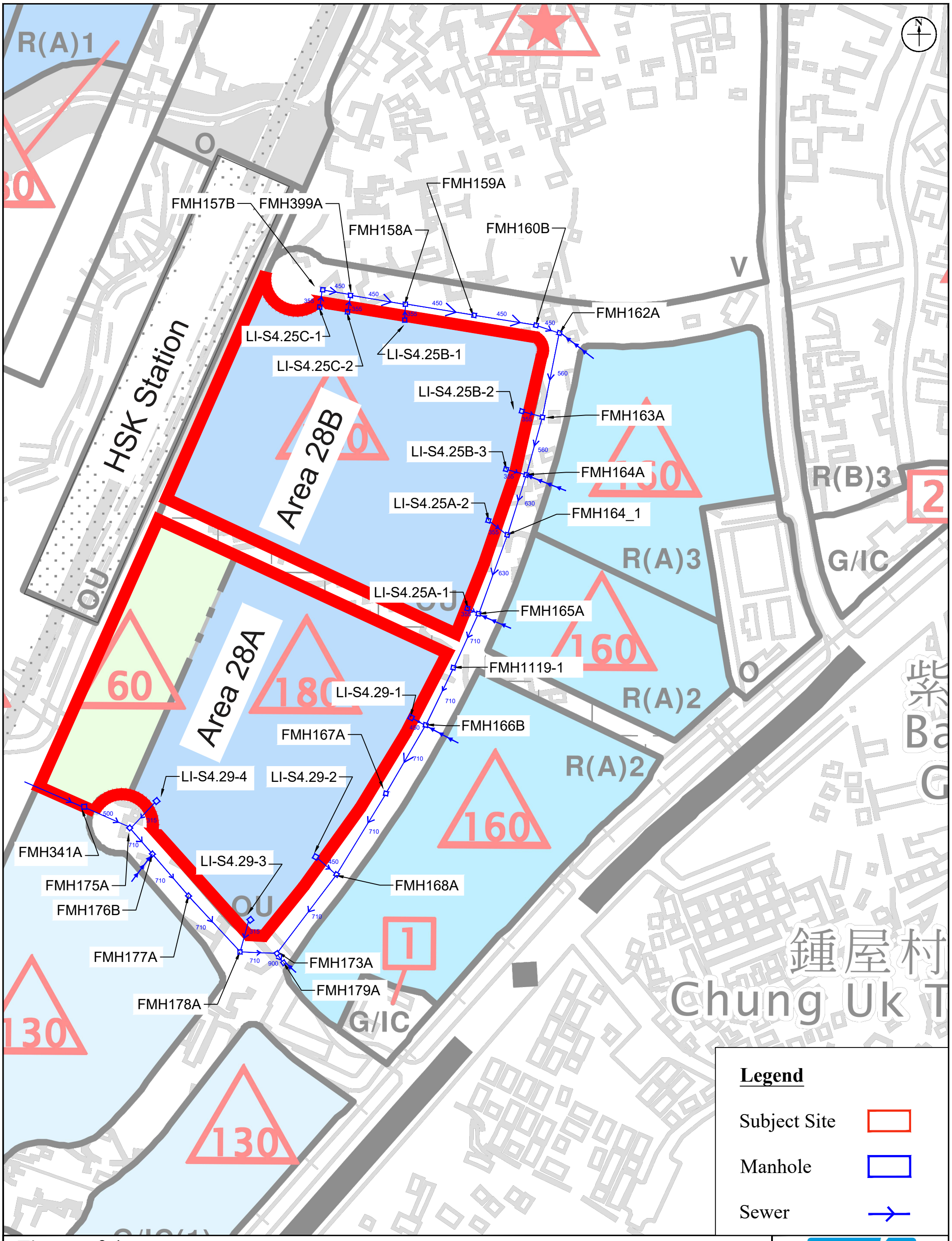

Figure: 2.1	RAMBOLL
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Project: Hung Shui Kiu Planning Areas 28A and 28B	Rev.: 1.2
	Date: May 2025

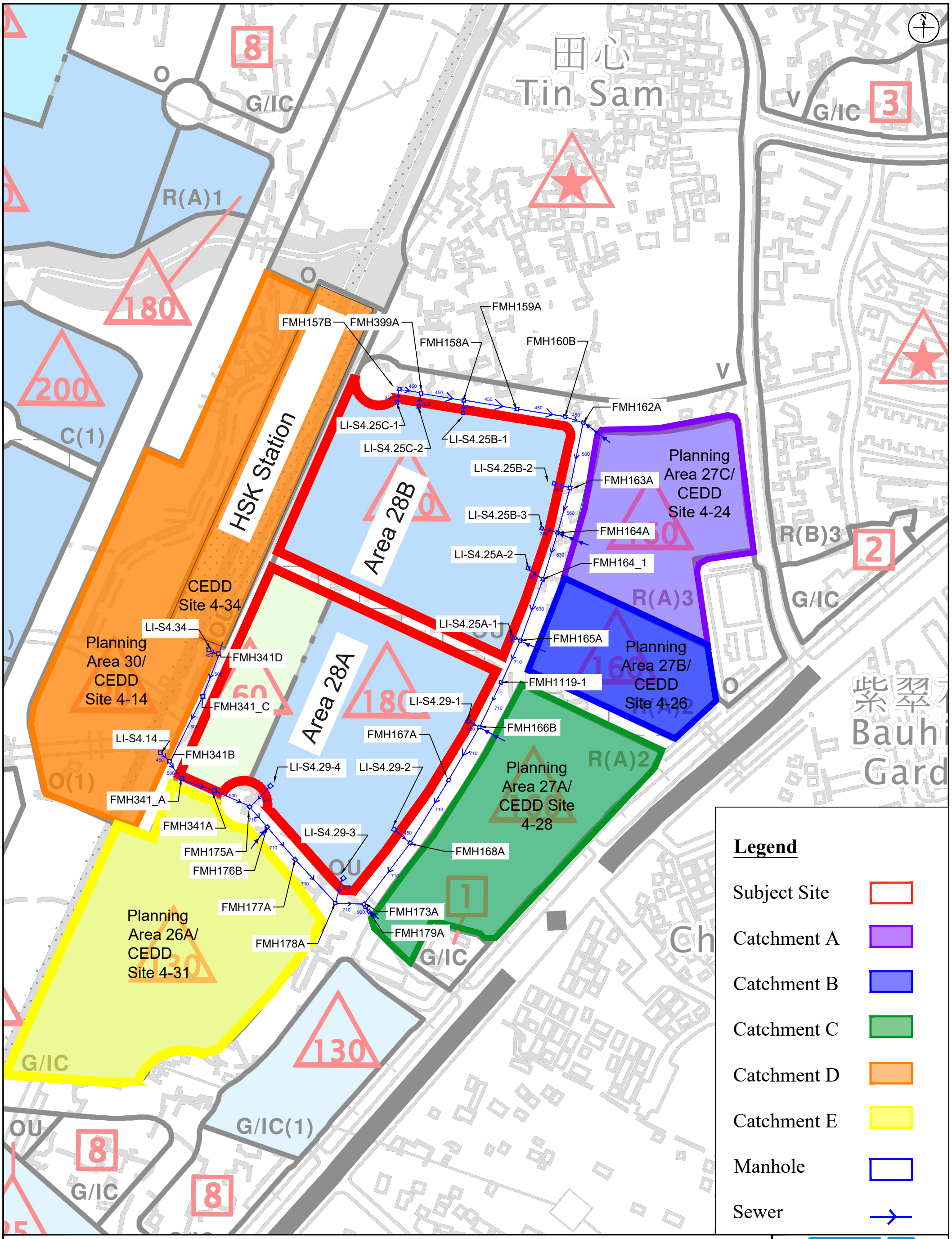


Figure:	2.2	RAMBOLL
Title:	Future Sewerage System and Catchment Areas in the Vicinity of the Subject Sites	Drawn by: SC Checked by: TC
Project:	Hung Shui Kiu Planning Areas 28A and 28B	Rev.: 1.1 Date: May 2025

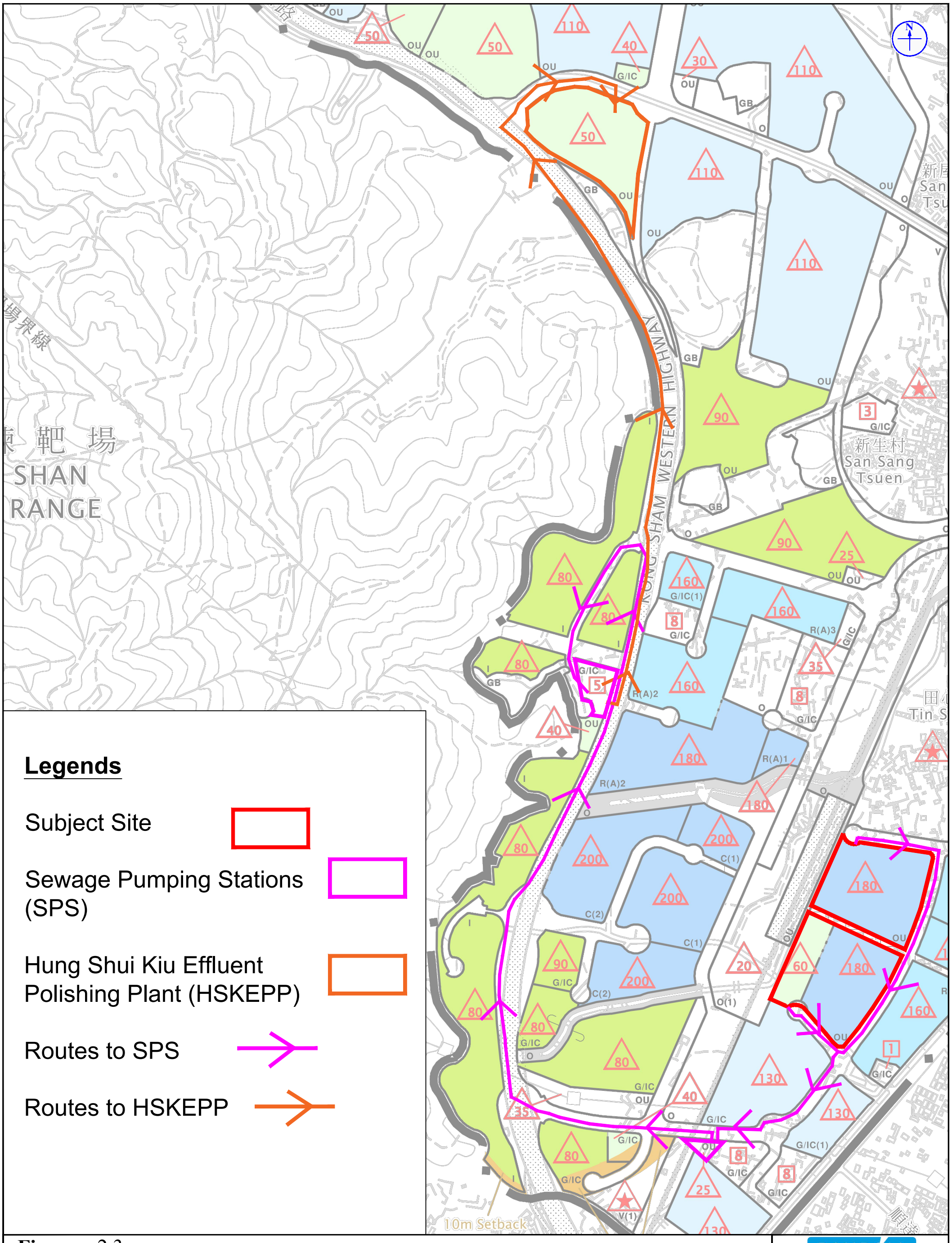


Figure: 2.3	RAMBOLL
Title: Sewage Routings Conveyed from the Subject Sites to SPS 1, SPS 2 & HSKEPP	Drawn by: SC Checked by: TC
Project: Hung Shui Kiu Planning Areas 28A and 28B	Rev.: 1.0 Date: Mar 2025

Appendix 1.1 Email Record with CEDD

App 1.1 Email Record with CEDD

Sally Chiu

From:	Sally Chiu
Sent:	Monday, 11 March 2024 2:16 pm
To:	sychong@cedd.gov.hk; edwin.Fung@arup.com
Cc:	Tony Cheng
Subject:	Comments on HSK infrastructure work contract : Stage 2 engineering infrastructure works - sewerage & drainage
Attachments:	DLNHSKSDEI00_0_0003L.24.pdf; SIA_Finding_240308.pdf; DIA_Finding_240308.pdf; SIte Location Plan.pdf

Dear Ms. Chong (CEDD) and Edwin (Arup),

We are the environmental consultant for a master design scheme study for our client, MTRC where the sites are next to the future Hung Shui Kiu West Rail Station.

On behalf of MTRC, we have the following comment on the sewerage and drainage plans which were received by MTRC on 17 January based on our checking and the latest development parameter/ phasing of the proposed development at Area 28A and 28B. The Site Location Plan is attached.

Sewerage Plan

1. Discrepancies on Pipe Size

- Discrepancies on the Pipe Size between the sewerage layout plan (figures) and manhole schedule (tables) are observed. Pipes that have discrepancies include: **from manhole FMH162A to manhole FMH173A**, from **manhole FMH447 to manhole FMH175A** and from **manhole FMH446** to **manhole FMH178A**.

- Figures: Please refer to ***Discrepancies on Pipe Size in SIA Finding***

2. Additional Lead-in

- Based on the latest development parameter and phasing, the proposed development at Area 28A and 28B will be divided into 7 phases, and as such individual lead-in(s) to each phase would be required. Based on the latest phasing plan, the proposed lead-in(s) to each phase is attached for your information and incorporation into the detailed design.

- Figure: Please refer to ***Additional Lead-in(s) in SIA Finding***

3. Potential Upgrading Sewer Segment

- Based on the latest development parameter, there is a marginally exceedance of the pipe between manhole FMH178A to FMH173A. It is recommended to increase its pipe size from 400mm to 500mm.

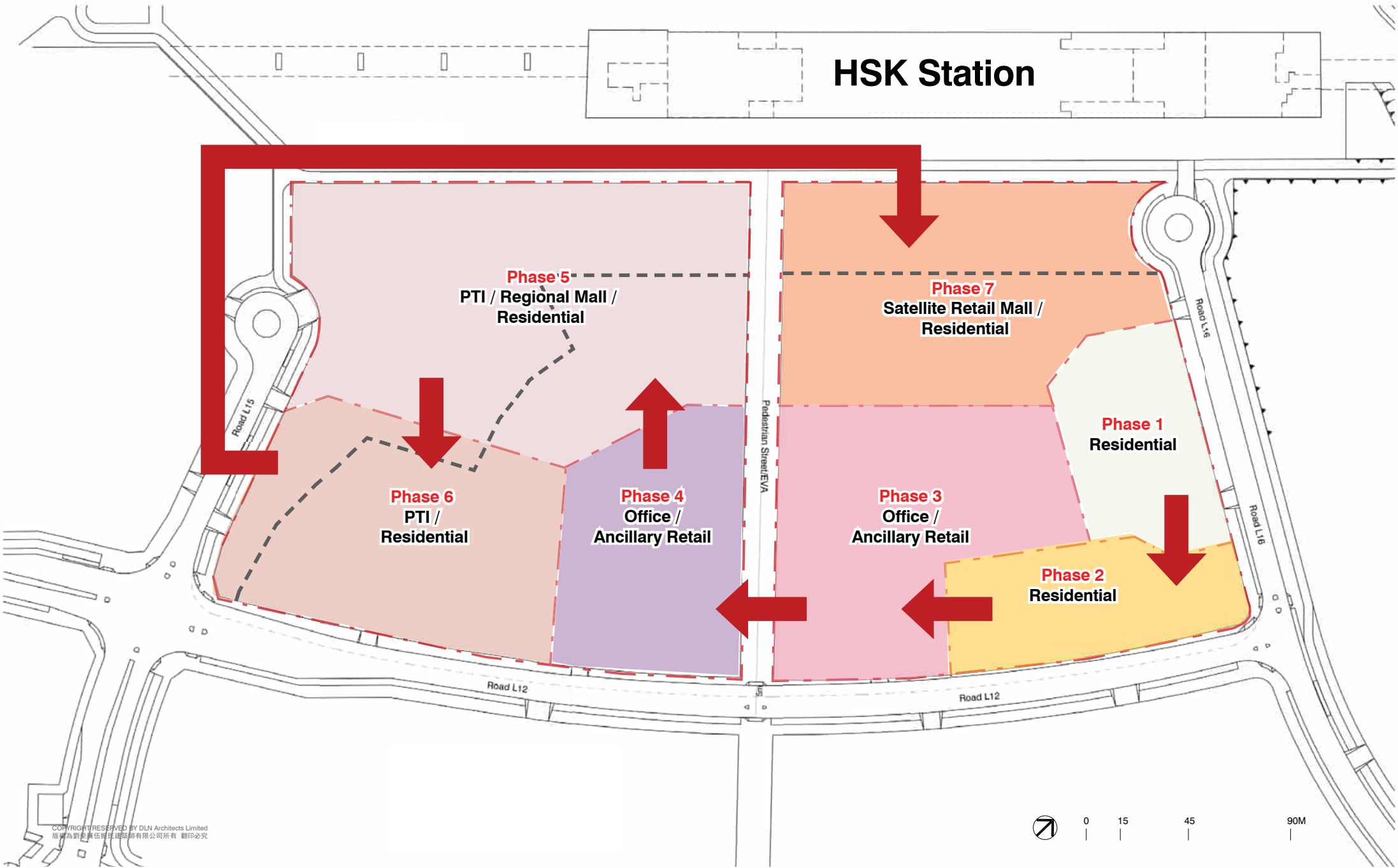
- Figure: Please refer to ***Proposed upgrading Sewer Segment in SIA Finding***

SIA Finding

Area 28A and 28B Development Phasing

DLN
Master Scheme Design
for Hung Shui Kiu Property Dvelopment
N3306-H

5.1 PHASING STRATEGY



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SIA Calculation

Table 1 Calculation for Sewage Generation Rate of the Proposed Development

MTR (28A)

Phase 4

1. Non-Domestic (Retail)

GFA	=	2500	m^2
Assumed floor area per employee	=	28.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Retail Trade)
Total number of employees	=	88	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J4 Wholesale & Retail)
Sewage generation rate	=	**24.5**	m^3/day

2. Non-Domestic (F&B)

GFA	=	2500	m^2
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Restaurants)
Total number of employees	=	128	employees
Design flow	=	1580	litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	**201.5**	m^3/day

3. Residential

Total number of residential units	=	1240	units
Total number of residents	=	3472	residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Yuen Long)
Design flow	=	270	litre/person/day -- (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	**937.4**	m^3/day

2. Club House

Assumed area	=	1362.6	m^2 (Assume)
Assumed floor area per employee	=	30.3	m^2 per employee -- (refer to Table 8 of CIFSUS - Community, Social & Personal Services)
Total number of employees	=	45	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J11 Community, Social, Personal Services)
Sewage generation rate	=	**12.6**	m^3/day

3. Proposed Swimming Pool (Indoor)

Area of Swimming Pool	=	50	m^2 (Assume)
Depth of Water pool	=	1.5	m
Volume of Swimming Pool (Ordinary Assumption)	=	75	m^3
Turnover Rate	=	4	hr
Required Surface Loading Rate of Filter	=	18.75	$m^3/m^2/hr$
Filter Areas required	=	1	m^2
Adopted Surface Loading Rate of Filter	=	50	$m^3/m^2/hr$
Adopted Filter Area	=	0.38	m^2
Backwash Duration	=	3	min/d
Backwash flow rate	=	30	$m^3/m^2/hr$
Design flow for Swimming Pool Backwashing	=	0.5625	m^3/day
Design flow for Swimming Pool Backwashing	=	**3.1**	litre/sec

Total Flow from the Proposed Development (Phase 4)

Flow rate	=	1176.0	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	1176.0	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	4355	people (refer to Section 12 of GESF -- Contributing population is the Flow rate with PCIF ÷ 0.27, while 0.27 is the average unit flow factor of all typical residents plus employees)
Peaking factor	=	6	(refer to Table T-5 of GESF for a population between 1000-5000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**81.7**	litre/sec
Peak flow (with swimming pool)	=	**84.8**	litre/sec

Phase 5

1. Residential

Total number of residential units	=	1800	units
Total number of residents	=	5040	residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Yuen Long)
Design flow	=	270	litre/person/day -- (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	**1360.8**	m^3/day

2. Non-Domestic (Retail)

GFA	=	19000	m^2
Assumed floor area per employee	=	28.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Retail Trade)
Total number of employees	=	665	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J4 Wholesale & Retail)
Sewage generation rate	=	**186.2**	m^3/day

3. Non-Domestic (F&B)

GFA	=	19000	m^2
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Restaurants)
Total number of employees	=	969	employees
Design flow	=	1580	litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	**1531.0**	m^3/day

4. PTI

Assumed area	=	3000	m^2
Assumed floor area per employee	=	26.3	m^2 per employee -- (refer to Table 8 of CIFSUS - Transport)
Total number of employees	=	114	employees
Design flow	=	180	litre/employee/day -- (refer to Table T-2 of GESF - J3 Transport, Storage & Communiccation)
Sewage generation rate	=	**20.5**	m^3/day

5. Club House

Assumed area	=	2363	m^2 (Assume)
Assumed floor area per employee	=	30.3	m^2 per employee -- (refer to Table 8 of CIFSUS - Community, Social & Personal Services)
Total number of employees	=	78	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J11 Community, Social, Personal Services)
Sewage generation rate	=	**21.8**	m^3/day

6. Proposed Swimming Pool (Indoor)

Area of Swimming Pool	=	50	m^2 (Assume)
Depth of Water pool	=	1.5	m
Volume of Swimming Pool (Ordinary Assumption)	=	75	m^3
Turnover Rate	=	4	hr
Required Surface Loading Rate of Filter	=	18.75	$m^3/m^2/hr$
Filter Areas required	=	1	m^2
Adopted Surface Loading Rate of Filter	=	50	$m^3/m^2/hr$
Adopted Filter Area	=	0.38	m^2
Backwash Duration	=	3	min/d
Backwash flow rate	=	30	$m^3/m^2/hr$
Design flow for Swimming Pool Backwashing	=	0.5625	m^3/day
Design flow for Swimming Pool Backwashing	=	**3.1**	litre/sec

Total Flow from the Proposed Development (Phase 5 - PTI)

Flow rate	=	20.5	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	20.5	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	76	people (refer to
Peaking factor	=	8	(refer to Table T-5 of GESF for a population between <1,000 incl. stormwater allowance)
Peak flow	=	**1.9**	litre/sec

Total Flow from the Proposed Development (Phase 5)

Flow rate	=	3120.4	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	3120.4	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	11557	people (refer to Section 12 of GESF -- Contributing population is the Flow rate with PCIF ÷ 0.27, while 0.27 is the average unit flow factor of all typical residents plus employees)
Peaking factor	=	4	(refer to Table T-5 of GESF for a population <10000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**144.5**	litre/sec
Peak flow (with swimming pool)	=	**147.6**	litre/sec

Phase 6

1. Residential

Total number of residential units	=	1920	units
Total number of residents	=	5376	residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Yuen Long)
Design flow	=	270	litre/person/day -- (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	**1451.5**	m^3/day

2. Non-Domestic (PTI)

Assumed area	=	7000	m^2
Assumed floor area per employee	=	26.3	m^2 per employee -- (refer to Table 8 of CIFSUS - Transport)
Total number of employees	=	266	employees
Design flow	=	180	litre/employee/day -- (refer to Table T-2 of GESF - J3 Transport, Storage & Communiccation)
Sewage generation rate	=	**47.9**	m^3/day

3. Club House

Assumed area	=	2474	m^2 (Assume)
Assumed floor area per employee	=	30.3	m^2 per employee -- (refer to Table 8 of CIFSUS - Community, Social & Personal Services)
Total number of employees	=	82	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J11 Community, Social, Personal Services)
Sewage generation rate	=	**22.9**	m^3/day

4. Proposed Swimming Pool (Indoor)

Area of Swimming Pool	=	50	m^2 (Assume)
Depth of Water pool	=	1.5	m
Volume of Swimming Pool (Ordinary Assumption)	=	75	m^3
Turnover Rate	=	4	hr
Required Surface Loading Rate of Filter	=	18.75	$m^3/m^2/hr$
Filter Areas required	=	1	m^2
Adopted Surface Loading Rate of Filter	=	50	$m^3/m^2/hr$
Adopted Filter Area	=	0.38	m^2
Backwash Duration	=	3	min/d
Backwash flow rate	=	30	$m^3/m^2/hr$
Design flow for Swimming Pool Backwashing	=	0.5625	m^3/day
Design flow for Swimming Pool Backwashing	=	**3.1**	litre/sec

Total Flow from the Proposed Development (Phase 6 PTI)

Flow rate	=	47.9	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	47.9	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	177	people (refer to Section 12 of GESF -- Contributing population is the Flow rate with PCIF ÷ 0.27, while 0.27 is the average unit flow factor of all typical residents plus employees)
Peaking factor	=	8	(refer to Table T-5 of GESF for a population between <1000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**4.4**	litre/sec

Total Flow from the Proposed Development (Phase 6 except PTI)

Flow rate	=	1474.4	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	1474.4	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	5461	people (refer to Section 12 of GESF -- Contributing population is the Flow rate with PCIF ÷ 0.27, while 0.27 is the average unit flow factor of all typical residents plus employees)
Peaking factor	=	5	(refer to Table T-5 of GESF for a population between 5000-10000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**85.3**	litre/sec
Peak flow (with swimming pool)	=	**88.4**	litre/sec

Total Flow from the Proposed Development (Phase 6)

Flow rate	=	1522.3	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	1522.3	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	5638	people (refer to Section 12 of GESF -- Contributing population is the Flow rate with PCIF ÷ 0.27, while 0.27 is the average unit flow factor of all typical residents plus employees)
Peaking factor	=	5	(refer to Table T-5 of GESF for a population between 5000-10000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**88.1**	litre/sec
Peak flow (with swimming pool)	=	**91.2**	litre/sec

App 1.1 Email Record with CEDD

Total Flow from the Proposed Development (Phase 1 + Phase 2 + Phase 3 + Phase 4 + Phase 7)

Flow rate	=	5877.1	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	5877.1	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	21767	people (rerer to Section 12 of GESF
Peaking factor	=	4	(refer to Table T-5 of GESF for a population between 10000-50000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**272.1**	litre/sec
Peak flow (with swimming pool)	=	**284.6**	litre/sec

Total Flow from the Proposed Development (Phase 1 + Phase 2 + Phase 3 + Phase 4 + Phase 6 (except PTI) + Phase 7)

Flow rate	=	7351.5	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	7351.5	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	27228	people (refer to Section 12 of GESF -- Contributing population is the Flow rate with PCIF ÷ 0.27, while 0.27 is the average unit flow factor of all typical residents plus employees)
Peaking factor	=	4	(refer to Table T-5 of GESF for a population between 10000-50000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**340.3**	litre/sec
Peak flow (with swimming pool)	=	**356.0**	litre/sec

Total Flow from the Proposed Development (Phase 5 + P6 (PTI))

Flow rate	=	3168.3	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	3168.3	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	11734	people (refer to Section 12 of GESF -- Contributing population is the Flow rate with PCIF ÷ 0.27, while 0.27 is the average unit flow factor of all typical residents plus employees)
Peaking factor	=	4	(refer to Table T-5 of GESF for a population between 5000-100000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**146.7**	litre/sec
Peak flow (with swimming pool)	=	**149.8**	litre/sec

Total Flow from the Proposed Development (Phase 1 + Phase 2 + Phase 3 + Phase 4 + Phase 5 + Phase 6 + Phase 7)

Flow rate	=	10519.8	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	10519.8	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	38962	people (refer to Section 12 of GESF -- Contributing population is the Flow rate with PCIF ÷ 0.27, while 0.27 is the average unit flow factor of all typical residents plus employees)
Peaking factor	=	4	(refer to Table T-5 of GESF for a population between 10000-50000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**487.0**	litre/sec
Peak flow (with swimming pool)	=	**505.8**	litre/sec

Peak flow from the Proposed Development Reported to CEDD

MTR (28B)

Phase 1

1. Residential

Total number of residential units	=	1120	units
Total number of residents	=	3136	residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Yuen Long)
Design flow	=	270	litre/person/day -- (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	**846.7**	m^3/day

2. Club House

Assumed area	=	1312	m^2 (Assume)
Assumed floor area per employee	=	30.3	m^2 per employee -- (refer to Table 8 of CIFSUS - Community, Social & Personal Services)
Total number of employees	=	43	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J11 Community, Social, Personal Services)
Sewage generation rate	=	**12.1**	m^3/day

3. Proposed Swimming Pool (Indoor)

Area of Swimming Pool	=	37.5	m^2 (Assume)
Depth of Water pool	=	1.5	m
Volume of Swimming Pool (Ordinary Assumption)	=	56.25	m^3
Turnover Rate	=	4	hr
Required Surface Loading Rate of Filter	=	14.0625	$m^3/m^2/hr$
Filter Areas required	=	1	m^2
Adopted Surface Loading Rate of Filter	=	50	$m^3/m^2/hr$
Adopted Filter Area	=	0.28	m^2
Backwash Duration	=	3	min/d
Backwash flow rate	=	30	$m^3/m^2/hr$
Design flow for Swimming Pool Backwashing	=	0.421875	m^3/day
Design flow for Swimming Pool Backwashing	=	**2.3**	litre/sec

Total Flow from the Proposed Development (Phase 1)

Flow rate	=	858.8	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	858.8	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	3181	people (refer to Section 12 of GESF -- Contributing population is the Flow rate with PCIF ÷ 0.27, while 0.27 is the average unit flow factor of all typical residents plus employees)
Peaking factor	=	6	(refer to Table T-5 of GESF for a population between 1000-5000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**59.6**	litre/sec
Peak flow (with swimming pool)	=	**62.0**	litre/sec

Phase 2

1. Residential

Total number of residential units	=	1120	units
Total number of residents	=	3136	residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Yuen Long)
Design flow	=	270	litre/person/day -- (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	**846.7**	m^3/day

2. Club House

Assumed area	=	1312	m^2 (Assume)
Assumed floor area per employee	=	30.3	m^2 per employee -- (refer to Table 8 of CIFSUS - Community, Social & Personal Services)
Total number of employees	=	43	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J11 Community, Social, Personal Services)
Sewage generation rate	=	**12.1**	m^3/day

3. Proposed Swimming Pool (Indoor)

Area of Swimming Pool	=	37.5	m^2 (Assume)
Depth of Water pool	=	1.5	m
Volume of Swimming Pool (Ordinary Assumption)	=	56.25	m^3
Turnover Rate	=	4	hr
Required Surface Loading Rate of Filter	=	14.0625	$m^3/m^2/hr$
Filter Areas required	=	1	m^2
Adopted Surface Loading Rate of Filter	=	50	$m^3/m^2/hr$
Adopted Filter Area	=	0.28	m^2
Backwash Duration	=	3	min/d
Backwash flow rate	=	30	$m^3/m^2/hr$
Design flow for Swimming Pool Backwashing	=	0.421875	m^3/day
Design flow for Swimming Pool Backwashing	=	**2.3**	litre/sec

Total Flow from the Proposed Development (Phase 2)

Flow rate	=	858.8	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	858.8	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	3181	people (refer to Section 12 of GESF -- Contributing population is the Flow rate with PCIF ÷ 0.27, while 0.27 is the average unit flow factor of all typical residents plus employees)
Peaking factor	=	6	(refer to Table T-5 of GESF for a population between 1000-5000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**59.6**	litre/sec
Peak flow (with swimming pool)	=	**62.0**	litre/sec

Phase 3

1. Non-Domestic (Retail)

GFA	=	2500	m^2
Assumed floor area per employee	=	28.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Retail Trade)
Total number of employees	=	88	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J4 Wholesale & Retail)
Sewage generation rate	=	**24.5**	m^3/day

2. Non-Domestic (F&B)

GFA	=	2500	m^2
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Restaurants)
Total number of employees	=	128	employees
Design flow	=	1580	litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	**201.5**	m^3/day

3. Residential

Total number of residential units	=	1234	units
Total number of residents	=	3455	residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Yuen Long)
Design flow	=	270	litre/person/day -- (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	**932.9**	m^3/day

4. Club House

Assumed area	=	1711	m^2 (Assume)
Assumed floor area per employee	=	30.3	m^2 per employee -- (refer to Table 8 of CIFSUS - Community, Social & Personal Services)
Total number of employees	=	56	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J11 Community, Social, Personal Services)
Sewage generation rate	=	**15.8**	m^3/day

5. Proposed Swimming Pool (Indoor)

Area of Swimming Pool	=	37.5	m^2 (Assume)
Depth of Water pool	=	1.5	m
Volume of Swimming Pool (Ordinary Assumption)	=	56.25	m^3
Turnover Rate	=	4	hr
Required Surface Loading Rate of Filter	=	14.0625	$m^3/m^2/hr$
Filter Areas required	=	1	m^2
Adopted Surface Loading Rate of Filter	=	50	$m^3/m^2/hr$
Adopted Filter Area	=	0.28	m^2
Backwash Duration	=	3	min/d
Backwash flow rate	=	30	$m^3/m^2/hr$
Design flow for Swimming Pool Backwashing	=	0.421875	m^3/day
Design flow for Swimming Pool Backwashing	=	**2.3**	litre/sec

Total Flow from the Proposed Development (Phase 3)

Flow rate	=	1174.7	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	1174.7	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	4351	people (refer to Section 12 of GESF -- Contributing population is the Flow rate with PCIF ÷ 0.27, while 0.27 is the average unit flow factor of all typical residents plus employees)
Peaking factor	=	6	(refer to Table T-5 of GESF for a population between 1000-5000 incl. stormwater allowance)
Peak flow	=	**81.6**	litre/sec
Peak flow (with swimming pool)	=	**83.9**	litre/sec

Phase 7

1. Residential

Total number of residential units	=	1650	units
Total number of residents	=	4620	residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Yuen Long)
Design flow	=	270	litre/person/day -- (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	**1247.4**	m^3/day

2. Non-Domestic (Retail)

GFA	=	6000	m^2
Assumed floor area per employee	=	28.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Retail Trade)
Total number of employees	=	210	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J4 Wholesale & Retail)
Sewage generation rate	=	**58.8**	m^3/day

3. Non-Domestic (F&B)

GFA	=	6000	m^2
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Restaurants)
Total number of employees	=	306	employees
Design flow	=	1580	litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	**483.5**	m^3/day

4. Club House

Assumed area	=	2070	m^2 (Assume)
Assumed floor area per employee	=	30.3	m^2 per employee -- (refer to Table 8 of CIFSUS - Community, Social & Personal Services)
Total number of employees	=	68	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J11 Community, Social, Personal Services)
Sewage generation rate	=	**19.1**	m^3/day

5. Proposed Swimming Pool (Indoor)

Area of Swimming Pool	=	37.5	m^2 (Assume)
Depth of Water pool	=	1.5	m
Volume of Swimming Pool (Ordinary Assumption)	=	56.25	m^3
Turnover Rate	=	4	hr
Required Surface Loading Rate of Filter	=	14.0625	$m^3/m^2/hr$
Filter Areas required	=	1	m^2
Adopted Surface Loading Rate of Filter	=	50	$m^3/m^2/hr$
Adopted Filter Area	=	0.28	m^2
Backwash Duration	=	3	min/d
Backwash flow rate	=	30	$m^3/m^2/hr$
Design flow for Swimming Pool Backwashing	=	0.421875	m^3/day
Design flow for Swimming Pool Backwashing	=	**2.3**	litre/sec

Total Flow from the Proposed Development (Phase 7)

Flow rate	=	1808.8	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	1808.8	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	6699	people (refer to Section 12 of GESF -- Contributing population is the Flow rate with PCIF ÷ 0.27, while 0.27 is the average unit flow factor of all typical residents plus employees)
Peaking factor	=	5	(refer to Table T-5 of GESF for a population between 5000-10000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**104.7**	litre/sec
Peak flow (with swimming pool)	=	**107.0**	litre/sec

App 1.1 Email Record with CEDD

Total Flow from the Proposed Development (Phase 1 + Phase 7)

Flow rate	=	2667.6	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	2667.6	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	9880	people (refer to Section 12 of GESF -- Contributing population is the Flow rate with PCIF ÷ 0.27, while 0.27 is the average unit flow factor of all typical residents plus employees)
Peaking factor	=	5	(refer to Table T-5 of GESF for a population between 5000-10000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**154.4**	litre/sec
Peak flow (with swimming pool)	=	**159.1**	litre/sec

Total Flow from the Proposed Development (Phase 1 + Phase 2 + Phase 7)

Flow rate	=	3526.5	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	3526.5	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	13061	people (refer to Section 12 of GESF -- Contributing population is the Flow rate with PCIF ÷ 0.27, while 0.27 is the average unit flow factor of all typical residents plus employees)
Peaking factor	=	4	(refer to Table T-5 of GESF for a population between 10000-50000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**163.3**	litre/sec
Peak flow (with swimming pool)	=	**170.3**	litre/sec

Total Flow from the Proposed Development (Phase 1 + Phase 2 + Phase 3 + Phase 7)

Flow rate	=	4701.2	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	4701.2	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	17412	people (refer to Section 12
Peaking factor	=	4	(refer to Table T-5 of GESF for a population between 10000-50000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**217.6**	litre/sec
Peak flow (with swimming pool)	=	**227.0**	litre/sec

App 1.1 Email Record with CEDD

Sally Chiu

From:	Peter Yu <peter.yu@arup.com>
Sent:	Thursday, 12 December 2024 8:04 pm
To:	Sally Chiu
Cc:	sychong@cedd.gov.hk; nlchan; Ken Chan; Erica Hui; Tony Cheng
Subject:	RE: Comments on HSK infrastructure work contract : Stage 2 engineering infrastructure works - sewerage & drainage
Follow Up Flag:	Follow up
Flag Status:	Flagged

Dear Sally

Please find the relevant drawings for your reference from the path below.

Download Link

Regards
Peter Yu

Arup
Level 5, Festival Walk, 80 Tat Chee Avenue
Kowloon Tong, Kowloon, Hong Kong
d +852 2908 4567
t +852 2528 3031
arup.com

Follow Arup on LinkedIn X Instagram YouTube Facebook WeChat Weibo

App 1.1 Email Record with CEDD

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816900 E
817000 E
817100 E
832600 N
832500 N
832400 N

MATCH LINE
FOR CONTINUATION
SEE DRG 278463/C3/SEW/1113

MATCH LINE
FOR CONTINUATION
SEE DRG 278463/C3/SEW/1114

MATCH LINE
FOR CONTINUATION
SEE DRG 278463/C3/SEW/1115

MATCH LINE
FOR CONTINUATION
SEE DRG 278463/C3/SEW/1117

MATCH LINE
FOR CONTINUATION
SEE DRG 278463/C3/SEW/1119

MATCH LINE
FOR CONTINUATION
SEE DRG 278463/C3/SEW/1120

TIN SAM TSUEN

PROPOSED TUEN MA LINE
HUNG SHUI KIU STATION
(BY OTHERS)

SITE 4-25c
(COMMERCIAL & RESIDENTIAL DEVELOPMENT)

SITE 4-25b
(COMMERCIAL & RESIDENTIAL DEVELOPMENT)

SITE 4-25a
(COMMERCIAL & RESIDENTIAL DEVELOPMENT)

SITE 4-29
(COMMERCIAL & RESIDENTIAL DEVELOPMENT)

SITE 4-24
(PUBLIC HOUSING)

SITE 4-26
(RESIDENTIAL)

ROAD L16
ROAD L12

FMH157b
FMH399a
FMH158a
FMH159a
FMH160b
FMH162a
FMH163a
FMH164a
FMH165a
FMH166a

NS450
NS500
NS560
NS630
NS400
NS355

LI-S4.25c-1
LI-S4.25c-2
LI-S4.25b-1
LI-S4.25b-2
LI-S4.25b-3
LI-S4.25a-1
LI-S4.24-2
LI-S4.25a-4

CPE6
CPE7
300 UPVC
EXISTING HIP

0 5 10 15 20 25
METRES
1 : 500

N

TIN SHUI WAI
YUEN LONG
YUEN TAU SHAN

KEY PLAN

NOTES

1. FOR GENERAL NOTES AND LEGEND, REFER TO DRAWING NO. 278463/C3/SEW/1001.

Rev	Description	By	Date
01	TENDER ADDENDUM NO. 1	EF	04/24
00	TENDER ISSUE	EF	03/24

Consultant
ARUP

Project Title
Contract No. YL/2023/03
Hung Shui Kiu/Ha Tsuen
New Development Area
Second Phase Development - Contract 3 -
Site Formation and Engineering
Infrastructure Works

Drawing title
SEWERAGE LAYOUT PLAN
(SHEET 16)

Drawing no.			Rev.
278463/C3/SEW/1116			01
Drawn	Date	Checked	Approved
DT	03/24	EF	DL
Scale		Status	
1:500 @ A1		TENDER	

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Civil Engineering and Development Department

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817200 E | 817300 E | 817400 E

832600 N | 832500 N | 832400 N

N

EXISTING 500 DIA. SEWER TO BE ABANDONED

DIVERTED 500 DIA. SEWER

MATCH LINE
FOR CONTINUATION SEE DRG 278463/C3/SEW/1114

EXISTING 500 DIA. SEWER TO BE REMOVED

DIVERTED 500 DIA. SEWER

NS560

FMH2

FMH1

HUNG LEONG ROAD

HUNG KEI ROAD

TIN HA ROAD

ROAD L10

NS450

FMH159a

FMH160b

FMH162a

FMH161a

NS900

NS400

LI-S4.24-1

NS560

SITE 4-25b
(COMMERCIAL & RESIDENTIAL DEVELOPMENT)

LI-S4.25b-2

NS450

FMH163a

SITE 4-24
(PUBLIC HOUSING)

LI-S4.25b-3

NS450

FMH164a

ROAD L12

NS400

LI-S4.24-2

NS560

NS630

FMH164_1

NS630

SITE 4-26
(RESIDENTIAL)

MATCH LINE
FOR CONTINUATION SEE DRG 278463/C3/SEW/1117

LI-S4.25a-1

NS450

FMH165a

NS450

LI-S4.26-1

MATCH LINE
FOR CONTINUATION SEE DRG 278463/C3/SEW/1120

EXISTING CHURCH OF JESUS CHRIS OF LATIER - DAY SAINTS

EXISTING TIN HA ROAD PLAYGROUND TO BE RETAINED
田廈路遊樂場
Tin Ha Road Playground

足球場 Football Field

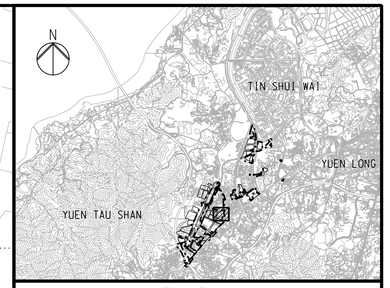
籃球場 Basketball Court

FP Cycling Track

那穌基督後期聖徒教會

樂天園 | 李方園 | 恒安園 | 瑞恩園

METRES 0 5 10 15 20 25
1 : 500



KEY PLAN

NOTES

1. FOR GENERAL NOTES AND LEGEND, REFER TO DRAWING NO. 278463/C3/SEW/1001.

Rev	Description	By	Date
00	TENDER ISSUE	EF	03/24

Consultant

ARUP

Project Title

Contract No. YL/2023/03
Hung Shui Kiu/Ha Tsuen
New Development Area
Second Phase Development - Contract 3 -
Site Formation and Engineering
Infrastructure Works

Drawing title

SEWERAGE LAYOUT PLAN
(SHEET 17)

Drawing no.	Rev.
278463/C3/SEW/1117	00

Drawn	Date	Checked	Approved
DT	03/24	EF	DL

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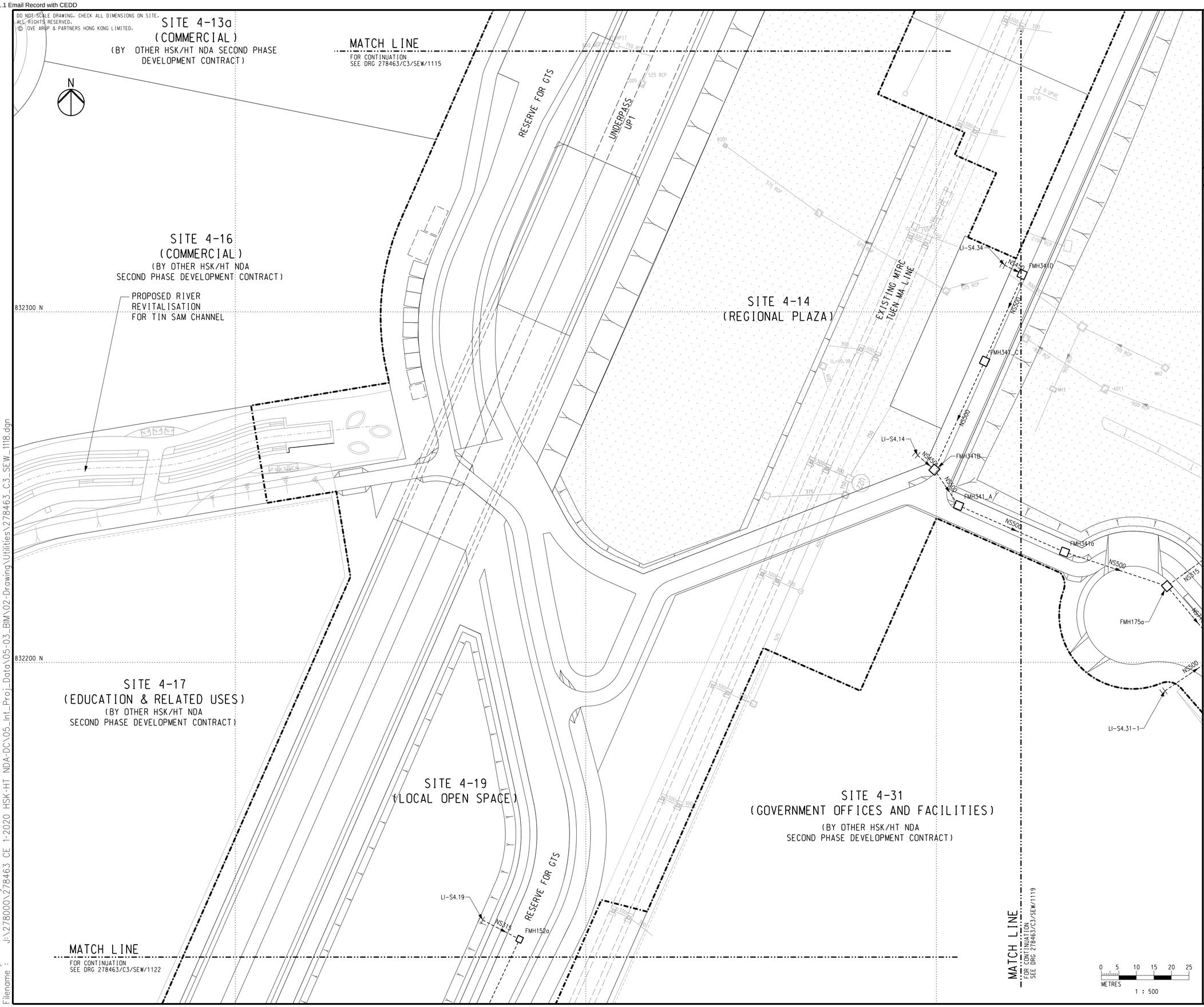

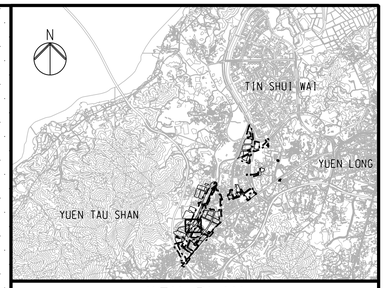

KEY PLAN

NOTES

1. FOR GENERAL NOTES AND LEGEND, REFER TO DRAWING NO. 278463/C3/SEW/1001.

Rev	Description	By	Date
00	TENDER ISSUE	EF	03/24

Consultant

ARUP

Project Title

Contract No. YL/2023/03
Hung Shui Kiu/Ha Tsuen
New Development Area
Second Phase Development - Contract 3 -
Site Formation and Engineering
Infrastructure Works

Drawing title

SEWERAGE LAYOUT PLAN
(SHEET 18)

Drawing no.			Rev.
278463/C3/SEW/1118			00
Drawn DT	Date 03/24	Checked EF	Approved DL
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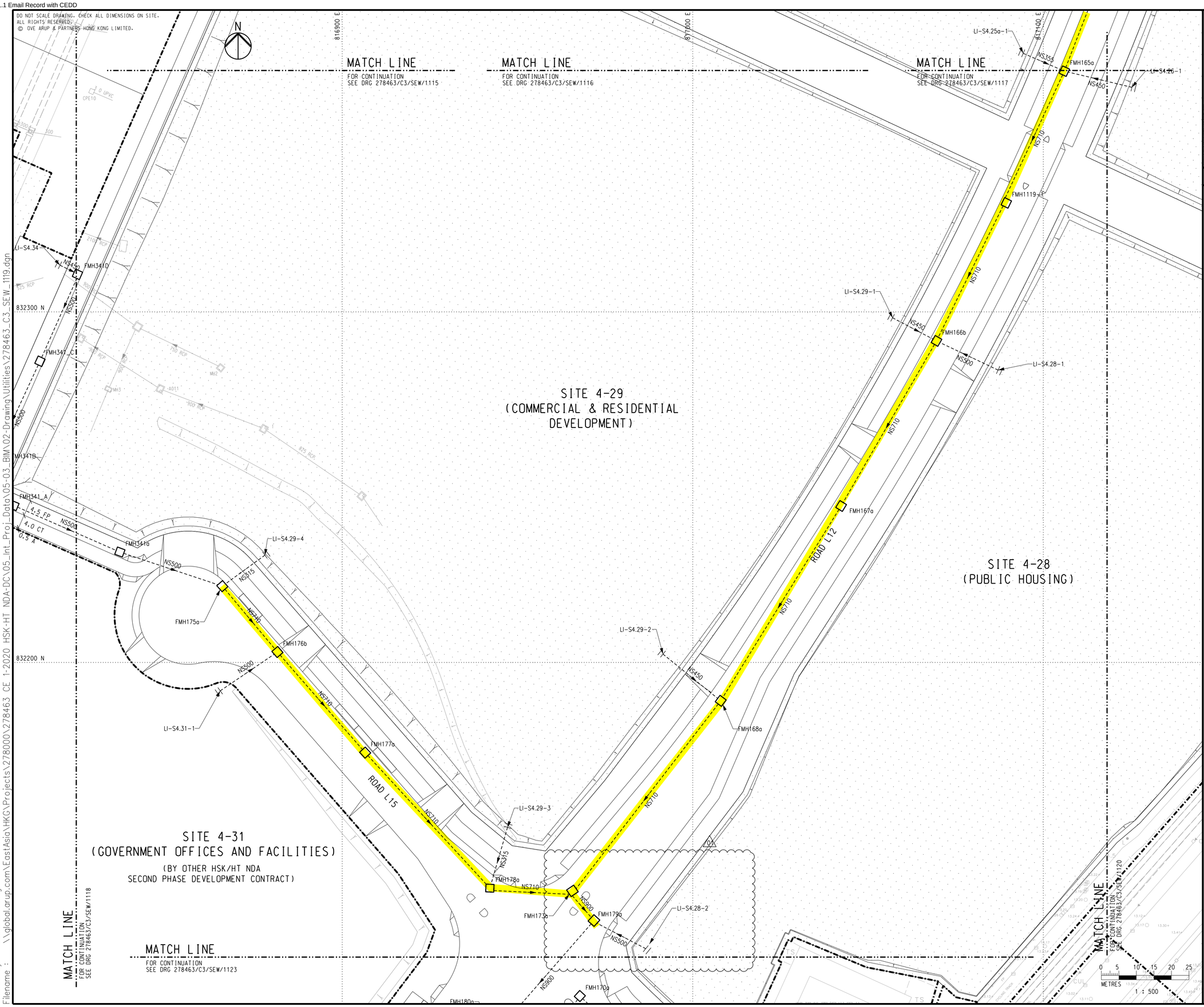

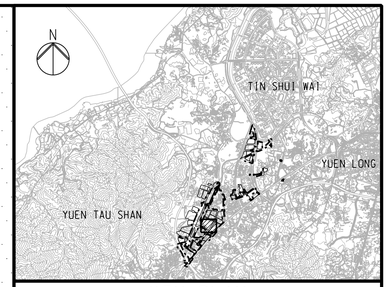

KEY PLAN

NOTES

1. FOR GENERAL NOTES AND LEGEND, REFER TO DRAWING NO. 278463/C3/SEW/1001.

Rev	Description	By	Date
01	TENDER ADDENDUM NO. 3	EF	05/24
00	TENDER ISSUE	EF	03/24

Consultant

ARUP

Project Title

Contract No. YL/2023/03
Hung Shui Kiu/Ha Tsuen
New Development Area
Second Phase Development - Contract 3 -
Site Formation and Engineering
Infrastructure Works

Drawing title

SEWERAGE LAYOUT PLAN
(SHEET 19)

Drawing no.			Rev.
278463/C3/SEW/1119			01
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SEWERAGE MANHOLE SCHEDULE

UPSTREAM STRUCTURE	DOWNSTREAM STRUCTURE	PIPE LENGTH (m)	UPSTREAM MH/CP TYPE	DOWNSTREAM MH/CP TYPE	PIPE OUTSIDE DIAMETER (mm)	UPSTREAM FINISHED GROUND LEVEL (mPD)	DOWNSTREAM FINISHED GROUND LEVEL (mPD)	UPSTREAM INVERT LEVEL (mPD)	DOWNSTREAM INVERT LEVEL (mPD)	PIPE GRADIENT (1 in X)	PIPE MATERIAL	STANDARD DIMENSIONAL RATIO
Ex.FMH1024425	FMH1.01	23.33	OF-D1c	L	1279	-0.07	4.97	-1.26	-1.33	328	Precast Con.	-
FMH2.03	FMH2.04	74.07	J	J	2506	5.19	4.93	1.67	1.64	2258	Precast Con.	-
FMH2.02	FMH2.03	7.75	J	J	2506	6.09	5.19	1.68	1.67	2487	Precast Con.	-
FMH2.01	FMH2.02	50.7	J	J	2506	6.33	6.09	1.7	1.68	2346	Precast Con.	-
FMH1.03	FMH1.04	39.81	SP-L	SP-L	1605	6.03	6.22	-1.57	-1.7	328	Precast Con.	-
FMH1.02	FMH1.03	14.96	SP-L	SP-L	1605	5.12	6.03	-1.52	-1.57	323	Precast Con.	-
FMH1.01	FMH1.02	61.23	L	SP-L	1605	4.97	5.12	-1.33	-1.52	337	Precast Con.	-
LI-S5.21	FMH231a	21.66	TP	L	280	6.50	6.74	3.60	3.52	268	HDPE	SDR17
FMH231a	FMH232a	38.55	L	F1	280	6.74	6.29	3.52	3.32	199	HDPE	SDR17
FMH232a	FMH233a	49.09	F1	F1	280	6.29	5.78	3.32	3.08	214	HDPE	SDR17
FMH233a	FMH234a	32.00	F1	F1	280	5.78	4.95	3.08	2.90	182	HDPE	SDR17
FMH234a	FMH235a	61.05	F1	F1	280	4.95	5.02	2.90	2.59	200	HDPE	SDR17
FMH235a	FMH236a	73.19	F1	F1	280	5.02	4.90	2.59	2.22	199	HDPE	SDR17
FMH236a	FMH237a	43.41	F1	F1	280	4.90	4.79	2.22	1.99	195	HDPE	SDR17
FMH237a	TP08	32.59	F1	TP	280	4.79	4.80	1.99	1.87	282	HDPE	SDR17
LI-S5.19	FMH233a	12.03	TP	F1	280	6.50	5.78	3.14	3.10	309	HDPE	SDR17
LI-S5.1	FMH242a	16.11	TP	E1	355	7.20	5.89	3.86	3.59	62	HDPE	SDR17
FMH242a	FMH243a	30.22	E1	E1	355	5.89	5.10	3.59	3.09	63	HDPE	SDR17
FMH243a	FMH244a	63.97	E1	E1	355	5.10	4.57	3.09	2.57	124	HDPE	SDR17
FMH244a	FMH245a	66.12	E1	E1	355	4.57	4.90	2.57	2.49	855	HDPE	SDR17
FMH245a	FMH246a	70.68	E1	E1	355	4.90	4.41	2.49	2.41	868	HDPE	SDR17
FMH246a	FMH247a	52.95	E1	E1	355	4.41	3.94	2.41	2.30	499	HDPE	SDR17
FMH247a	FMH248a	10.59	E1	E1	355	3.94	3.71	1.94	1.91	342	HDPE	SDR17
FMH248a	Ex.FMH1008959	15.03	E1	OF-D1c	355	3.71	3.70	1.91	1.86	349	HDPE	SDR17
FMH1	FMH2	9.00	F1	F1	560	10.77	10.87	7.53	7.43	111	HDPE	SDR17
FMH2	FMH3	53.22	F1	F1	560	10.87	10.53	7.43	6.96	116	HDPE	SDR17
FMH3	FMH4	29.43	F1	F1	560	10.53	10.33	6.96	6.68	115	HDPE	SDR17
FMH4	FMH5	24.59	F1	F1	560	10.33	10.15	6.68	6.46	115	HDPE	SDR17
FMH5	FMH6	35.07	F1	L	560	10.15	9.94	6.46	6.14	115	HDPE	SDR17
FMH6	FMH7	47.62	L	L	560	9.94	9.68	6.14	5.71	115	HDPE	SDR17
FMH7	FMH8	46.43	L	L	560	9.68	9.36	5.71	5.29	115	HDPE	SDR17
FMH8	FMH9	39.56	L	L	710	9.36	9.21	5.29	4.93	117	HDPE	SDR17
FMH9	FMH10	15.92	L	L	710	9.21	9.18	4.93	4.78	114	HDPE	SDR17
FMH10	FMH11	14.22	L	L	710	9.18	9.00	4.78	4.64	119	HDPE	SDR17
FMH11	FMH12	24.78	L	L	710	9.00	8.73	4.64	4.41	114	HDPE	SDR17
FMH12	FMH13	39.45	L	L	710	8.73	8.26	4.41	4.06	116	HDPE	SDR17
FMH13	FMH14	49.20	L	L	710	8.26	7.79	4.06	3.61	115	HDPE	SDR17
FMH14	FMH15	34.87	L	L	710	7.79	7.52	3.61	3.30	115	HDPE	SDR17
FMH15	FMH16	15.12	L	L	710	7.52	7.44	3.30	3.15	114	HDPE	SDR17
FMH16	FMH17	21.00	L	L	710	7.44	7.30	3.15	2.96	118	HDPE	SDR17
FMH17	Ex.FMH1026421	17.90	L	OF-D1c	710	7.30	7.30	2.96	2.85	184	HDPE	SDR17
LI-S5.32	Ex.FMH1026622	28.72	TP	OF-D1c	450	11.40	8.20	7.75	7.43	90	HDPE	SDR17
CP01L5	SMH01L5	4.62	CP-B	E1	225	6.78	6.65	4.94	4.89	104.00	HDPE	SDR17
SMH01L5	SMH02L5	10.91	E1	E1	375	6.65	6.73	4.07	3.99	147.00	HDPE	SDR17
SMH02L5	SMH03L5	16.29	E1	E1	375	6.73	6.81	3.99	3.87	149.00	HDPE	SDR17
SMH03L5	SMH04L5	30.29	E1	E1	375	6.81	6.45	3.87	3.66	148.00	HDPE	SDR17
SMH04L5	SMH05L5	31.62	E1	H	450	6.45	6.11	3.66	3.44	150.00	HDPE	SDR17
SMH05L5	SMH06L5	24.04	H	H	900	6.11	5.85	3.44	3.30	172.00	HDPE	SDR17
SMH06L5	SMH07L5	29.59	H	H/D	900	5.85	5.12	3.30	3.04	120.00	HDPE	SDR17
SMH07L5	D-Ex.BC	8.15	H/D	OF-1	900	5.12	4.14	3.04	3.00	189.00	HDPE	SDR17
LI-S5.21-1	SMH04L5	13.00	TP	E1	600	5.87	6.45	3.80	3.66	93.00	HDPE	SDR17
LI-S5.21-2	SMH05L5	12.34	TP	F1	600	5.2	6.11	3.60	3.44	79.00	HDPE	SDR17
LI-S5.19-1	SMH06L5	12.75	TP	F1	525	4.14	5.85	3.45	3.30	86.00	HDPE	SDR17

UPSTREAM STRUCTURE	DOWNSTREAM STRUCTURE	PIPE LENGTH (m)	UPSTREAM MH/CP TYPE	DOWNSTREAM MH/CP TYPE	PIPE OUTSIDE DIAMETER (mm)	UPSTREAM FINISHED GROUND LEVEL (mPD)	DOWNSTREAM FINISHED GROUND LEVEL (mPD)	UPSTREAM INVERT LEVEL (mPD)	DOWNSTREAM INVERT LEVEL (mPD)	PIPE GRADIENT (1 in X)	PIPE MATERIAL	STANDARD DIMENSIONAL RATIO
FMH157b	FMH399a	17.12	F1	F1	450	10.35	9.84	7.57	7.43	132	HDPE	SDR17
FMH399a	FMH158a	37.07	F1	E1	450	9.84	9.57	7.70	7.47	167	HDPE	SDR17
FMH158a	FMH159a	46.79	E1	F1	450	9.57	10.04	7.47	7.24	209	HDPE	SDR17
FMH159a	FMH160b	41.95	F1	F1	450	10.04	10.52	7.24	6.99	173	HDPE	SDR17
FMH160b	FMH162a	15.02	F1	F1	450	10.52	10.44	6.99	6.79	85	HDPE	SDR17
LI-S4.25c-1	FMH157b	11.63	TP	F1	355	11.00	10.35	9.14	9.07	177	HDPE	SDR17
LI-S4.25c-2	FMH399a	12.43	TP	F1	355	11.00	10.30	9.14	9.07	190	HDPE	SDR17
LI-S4.25b-1	FMH158a	11.44	TP	F1	355	11.00	10.30	7.51	7.47	306	HDPE	SDR17
FMH161a	FMH162a	34.20	F1	F1	500	10.01	10.44	7.18	7.00	198	HDPE	SDR17
LI-S4.24-1	FMH161a	11.46	TP	E1	400	10.50	10.01	7.30	7.18	98	HDPE	SDR17
FMH162a	FMH163a	57.45	L	L	560	10.44	10.78	6.84	6.59	236	HDPE	SDR17
FMH163a	FMH164a	39.66	L	L	560	10.78	10.98	6.59	6.35	167	HDPE	SDR17
FMH164a	FMH164_1	47.98	L	L	630	10.98	11.49	6.32	5.97	142	HDPE	SDR17
FMH164_1	FMH165a	49.77	L	L	630	11.49	11.57	5.97	5.81	322	HDPE	SDR17
FMH165a	FMH1119-1	39.24	L	L	710	11.57	11.85	5.85	5.73	341	HDPE	SDR17
FMH1119_1	FMH166b	42.32	L	L	710	11.85	12.30	5.73	5.60	335	HDPE	SDR17
FMH166b	FMH167a	52.59	L	L	710	12.30	12.85	5.47	5.23	227	HDPE	SDR11
FMH167a	FMH168a	63.54	L	L	710	12.85	12.61	5.36	5.06	218	HDPE	SDR11
FMH168a	FMH173a	66.99	L	SP-L	710	12.61	12.76	4.93	4.70	300	HDPE	SDR11
LI-S4.25b-2	FMH163a	12.79	TP	F1	355	11.60	10.78	9.14	9.08	231	HDPE	SDR17
LI-S4.25b-3	FMH164a	12.77	TP	L	355	12.15	10.98	9.40	9.33	197	HDPE	SDR17
LI-S4.24-2	FMH164a	18.00	TP	L	400	11.40	10.98	7.30	7.10	92	HDPE	SDR17
LI-S4.25a-2	FMH164_1	13.80	TP	L	355	11.50	11.49	5.85	5.73	116	HDPE	SDR17
LI-S4.25a-1	FMH165a	11.59	TP	F1	355	12.50	11.57	9.14	9.10	320	HDPE	SDR17
LI-S4.26-1	FMH165a	19.36	TP	F1	450	12.80	11.57	9.10	9.03	283	HDPE	SDR17
LI-S4.29-1	FMH166b	12.96	TP	L	450	13.50	12.30	5.53	5.47	236	HDPE	SDR11
LI-S4.28-1	FMH166b	18.99	TP	L	500	13.00	12.30	6.84	6.74	194	HDPE	SDR17
LI-S4.29-2	FMH168a	19.99	TP	L	450	13.50	12.61	5.01	4.93	265	HDPE	SDR11
LI-S4.28-2	FMH179a	27.21	TP	L	500	13.00	12.65	8.66	8.59	398	HDPE	SDR17
FMH341D	FMH341_C	25.65	L	L	500	11.05	10.96	6.75	6.49	104	HDPE	SDR17
FMH341_C	FMH341B	32.27	L	L	500	10.96	11.34	6.49	6.25	142	HDPE	SDR17

UPSTREAM STRUCTURE	DOWNSTREAM STRUCTURE	PIPE LENGTH (m)	UPSTREAM MH/CP TYPE	DOWNSTREAM MH/CP TYPE	PIPE OUTSIDE DIAMETER (mm)	UPSTREAM FINISHED GROUND LEVEL (mPD)	DOWNSTREAM FINISHED GROUND LEVEL (mPD)	UPSTREAM INVERT LEVEL (mPD)	DOWNSTREAM INVERT LEVEL (mPD)	PIPE GRADIENT (1 in X)	PIPE MATERIAL	STANDARD DIMENSIONAL RATIO
FMH341B	FMH341_A	11.36	L	L	500	11.34	11.24	6.25	6.16	137	HDPE	SDR17
FMH341_A	FMH341a	31.21	L	SP-L	500	11.24	12.11	6.16	5.90	127	HDPE	SDR17
FMH341a	FMH175a	28.92	SP-L	L	500	12.11	11.85	5.90	5.70	154	HDPE	SDR11
FMH175a	FMH176b	22.69	L	L	710	11.85	11.42	5.70	5.53	144	HDPE	SDR17
FMH176b	FMH177a	36.28	L	SP-L	710	11.42	11.07	5.53	5.25	136	HDPE	SDR17
FMH177a	FMH178a	50.49	SP-L	SP-L	710	11.07	12.26	5.25	4.88	142	HDPE	SDR17
FMH178a	FMH173a	20.97	SP-L	SP-L	710	12.26	12.76	4.88	4.70	123	HDPE	SDR11
LI-S4.34	FMH341D	4.94	TP	L	450	11.05	11.05	6.79	6.75	148	HDPE	SDR17
LI-S4.14	FMH341B	5.26	TP	L	450	14.00	11.34	6.31	6.25	105	HDPE	SDR17
LI-S4.29-4	FMH175a	14.58	TP	L	315	13.50	11.85	9.12	9.06	250	HDPE	SDR17
LI-S4.31-1	FMH176b	18.66	TP	F1	500	11.30	11.42	9.12	9.06	329	HDPE	SDR17
LI-S4.29-3	FMH178a	17.58	TP	SP-L	315	13.50	12.26	8.52	8.46	301	HDPE	SDR17
FMH173a	FMH179a	7.67	SP-L	SP-L	900	12.76	12.65	4.70	4.51	52	HDPE	SDR11
FMH179a	FMH180a	43.45	SP-L	SP-L	900	12.65	12.45	4.51	4.43	553	HDPE	SDR11
FMH180a	FMH181a	54.96	SP-L	SP-L	900	12.45	11.64	4.45	4.19	217	HDPE	SDR11
FMH181a	FMH182a	44.80	SP-L	SP-L	900	11.64	11.05	4.19	3.93	179	HDPE	SDR11
FMH182a	FMH183a	52.52	SP-L	SP-L	900	11.05	11.74	3.98	3.79	278	HDPE	SDR11
FMH183a	FMH188a	36.77	SP-L	SP-L	900	11.74	11.81	3.79	3.64	264	HDPE	SDR11
LI-S4.32-1	FMH182a	16.24	TP	SP-L	450	11.80	11.05	9.10	9.00	174	HDPE	SDR17
FMH169a	FMH170a	44.11	L	L	450	12.59	12.58	8.97	8.80	271	HDPE	SDR17
FMH170a	FMH421	11.41	L	L	450	12.58	12.36	8.80	8.76	341	HDPE	SDR17
FMH421	FMH180a	15.36	L	SP-L	450	12.36	12.45	8.76	8.71	349	HDPE	SDR17
LI-S4.30-1	FMH169a	14.77	TP	L	450	13.20	12.59	8.80	8.75	317	HDPE	SDR17
FMH422	FMH423	14.21	E1	E1	450	11.69	11.79	7.79	7.72	205	HDPE	SDR17
FMH423	FMH185a	19.81	E1	E1	450	11.79	11.83	7.72	7.61	198	HDPE	SDR17
FMH185a	FMH166_a	43.12	E1	E1	500	11.83	11.28	7.61	7.38	198	HDPE	SDR17
FMH166_a	FMH187a	32.81	E1	E1	500	11.28	11.28	7.38	7.21	203	HDPE	SDR17
FMH187a	FMH188a	29.10	E1	SP-L	500	11.28	11.81	7.21	7.06	199	HDPE	SDR17
FMH424	FMH185a	21.05	E1	E1	500	12.15	11.83	7.72	7.61	207	HDPE	SDR17
LI-S4.22-2	FMH422	15.13	TP	E1	450	12.00	11.69	7.87	7.79	196	HDPE	SDR17
LI-S4.22-1	FMH423	17.37	TP	E1	450	12.00	11.79	8.59	8.50	196	HDPE	SDR17
LI-S4.36-1	FMH424	8.61	TP	E1	500	11.90	12.15	7.76	7.72	204	HDPE	SDR17
LI-S4.33-1	FMH166_a	13.36	TP	E1	500	11.30	11.28	7.44	7.38	233	HDPE	SDR17
FMH188a	FMH189a	36.25	SP-L	L	1200	11.81	11.73	3.64	3.48	234	HDPE	SDR11
FMH189a	FMH190a	51.16	L	SP-L	1200	11.73	11.05	3.48	3.24	223	HDPE	SDR11
FMH190a	FMH191a	70.73	SP-L	SP-L	1400	11.05	10.57	3.24	2.92	226	HDPE	SDR11
FMH191a	FMH156b	1.85	SP-L	SP-L	1400	10.57	10.54	7.57	7.56	400	HDPE	SDR17
FMH191a	SPS01-1	17.63	SP-L	TP	1400	10.57	4.09	2.92	2.70	81	HDPE	SDR17
LI-S4.36-2	FMH189a	26.32	TP	L	500	11.90	11.73	9.14	9.07	379	HDPE	SDR17
LI-S4.31-2	FMH190a	24.21	TP	SP-L	500	11.20	11.05	9.34	9.25	285	HDPE	SDR17
FMH134a	FMH135a	48.64	SP-L	SP-L	1000	17.76	14.65	6.35	6.20	337	HDPE	SDR11
FMH135a	FMH136a	42.45	SP-L	SP-L	1000	14.65	13.51	5.90	5.74	278	HDPE	SDR11
FMH136a	FMH137a	57.73	SP-L	SP-L	1000	13.51	12.96	5.74	5.61	459	HDPE	SDR11
FMH137a	FMH144a	49.43	SP-L	SP-L	1000	12.96	11.74	5.02	4.85	302	HDPE	SDR11
FMH144a	FMH155a	69.45	SP-L	SP-L	1200	11.74	10.45	4.25	4.01	297	HDPE	SDR11
FMH155a	FMH156b	16.08	SP-L	SP-L	1400	10.45	10.54	3.41	3.35	285	HDPE	SDR11
FMH156b	SPS01-2	17.58	SP-L	TP	1400	10.54	4.09	2.75	2.70	357	HDPE	SDR17
TPD8	FMH134a	22.15	TP	SP-L	1000	18.00	17.76	6.78	6.70	282	HDPE	SDR11
LI-S4.18-1	FMH134a	25.01	TP	SP-L	500	17.00	17.76	12.60	12.34	102	HDPE	SDR17
FMH329a	FMH138a	19.69	L	E1	355	11.46	11.29	8.15	8.04	196	HDPE	SDR17
FMH138a	FMH139a	73.28	E1	E1	400	11.29	11.34	8.02	7.72	249	HDPE	SDR17
FMH139a	FMH140a	45.05	E1	L	400	11.34	11.66	7.72	7.41	147	HDPE	SDR17
FMH140a	FMH141a	34.94	L	L	450	11.66	11.82	7.64	7.55	409	HDPE	SDR17
FMH141a	FMH142a	35.12	L	L	450	11.82	11.79	7.55	7.21	109	HDPE	SDR17
FMH142a	FMH144a	22.38	L	SP-L	450	11.79	11.74	7.21	7.15	408	HDPE	SDR17
LI-S4.21-1	FMH329a	4.74	TP	L	355	12.00	11.46	8.18	8.15	170	HDPE	SDR17
LI-S4.21-2	FMH139a	26.28	TP	E1	355	12.00	11.34	7.70	7.47	119	HDPE	SDR17
LI-S4.37-1	FMH140a	27.96	TP	L	315	11.20	11.66	7.65	7.57	355	HDPE	SDR17
FMH152a	FMH156c	11.44	E1	E1	315	10.62	10.44	8.06	7.89	73	HDPE	SDR17
FMH156c	FMH155a	26.59	E1	SP-L	315	10.44	10.45	7.58	7.48	280	HDPE	SDR17
LI-S4.19	FMH152a	9.05	TP	E1	315	8.41	10.62	8.10	8.06	247	HDPE	SDR17
FMH4.20.4a	FMH4.20.4b	5.31	E1	E1	355	10.43	10.76	8.43	8.39	150	HDPE	SDR17
FMH4.20.4b	FMH4.20.4c	4.22	E1	E1	355	10.76	11.00	8.39	8.37	150	HDPE	SDR17
FMH4.20.4c	FMH4.20.4d	12.14	E1	E1	355	11.00	11.00	8.37	8.29	150	HDPE	SDR17
FMH4.20.4d	FMH4.20.4e	2.67	E1	E1	355	11.00	10.95	8.29	8.27	150	HDPE	SDR17
FMH4.20.4e	FMH4.20.4f	5.07	E1	E1	355	10.95	10.80	8.27	8.23	150	HDPE	SDR17
FMH4.20.4f	FMH4.20.4g	5.07	E1	E1	355	10.80	10.76	8.23	8.20	150	HDPE	SDR17
FMH4.20.4g	FMH4.20.4	15.92	E1	E1	355	10.76	9.48	8.20	8.09	150	HDPE	SDR17
FMH4.20.0	FMH4.20.1	9.76	E1	E1	355	11.2	10.07	8.35	8.28	150	HDPE	SDR17
FMH4.20.1	FMH4.20.2	12.12	E1	E1	355	10.07	9.93	8.28	8.20	150	HDPE	SDR17
FMH4.20.2	FMH4.20.3	10.61	E1	E1	355	9.93	9.77	8.20	8.13	150	HDPE	SDR17
FMH4.20.3	FMH4.20.4	20.27	E1	E1	355	9.77	9.48	8.13	7.46	30	HDPE	SDR17
FMH4.20.4	FMH4.20.5	13.49	E1	E1	355	9.48	9.19	7.46	6.96	27	HDPE	SDR17
FMH4.20.2a	FMH4.20.2b	3.64	E1	E1	355	10.30	11.05	8.30	8.28	150	HDPE	SDR17
FMH4.20.2b	FMH4.20.2	11.01	E1	E1	355	11.05	9.93	8.28	8.20	150	HDPE	SDR17
Ex.FMH4.01a	FMH4.20.5	20.19	TP	E1	355	9.20	9.19	7.30	6.96	60	HDPE	SDR17
FMH4.20.5	Ex.FMH4.05	32.59	E1	TP	355	9.19	9.20	6.96	6.42	61	HDPE	SDR17

NOTES

1. FOR GENERAL NOTES AND LEGEND REFER TO DRAWING NO. 278463/C3/SEW/1001.
2. FOR DETAILS OF MANHOLES TYPES E1, F1 AND BACKDROP MANHOLE TYPE 3 REFER TO LATEST DSD STANDARD DRAWINGS DS 1080 AND 1081.
3. FOR DETAILS OF MANHOLE TYPE S1 AND S2, REFER TO DRAWING NO. 278463/C3/SEW/1301 AND 1302.
4. FOR EXISTING MANHOLES TO BE RAISED TO SUIT FINISHED ROAD/GROUND LEVEL, REFER TO DRAWING NO. 278463/C3/SEW/1304.
5. THE COVER LEVELS SHOWN FOR MANHOLES ARE APPROXIMATE ONLY. THE FINAL COVER LEVELS SHALL BE VERIFIED ON SITE TO MATCH WITH THE FINISHED ROAD/GROUND LEVELS.

Rev	Description	By	Date
02	TENDER ADDENDUM NO. 3	EF	05/24
01	TENDER ADDENDUM NO. 2	EF	05/24
00	TENDER ISSUE	EF	03/24

Consultant

ARUP

Project Title

Contract No. YL/2023/03
Hung Shui Kiu/Ha Tsuen
New Development Area
Second Phase Development - Contract 3 -
Site Formation and Engineering
Infrastructure Works

Drawing title

SEWERAGE
MANHOLE SCHEDULE
(SHEET 1)

Drawing no.	Rev.
278463/C3/SEW/1151	02

Drawn	Date	Checked	Approved
DT	03/24	EF	DL

Scale: N.T.S. @ A1
Status: TENDER

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Appendix 2.1 Detailed Sewerage Appraisal Calculations

DLN

Master Scheme Design
for Hung Shui Kiu Property Dvelopment
N3306-H

Phasing Strategy (Proposed Scheme)

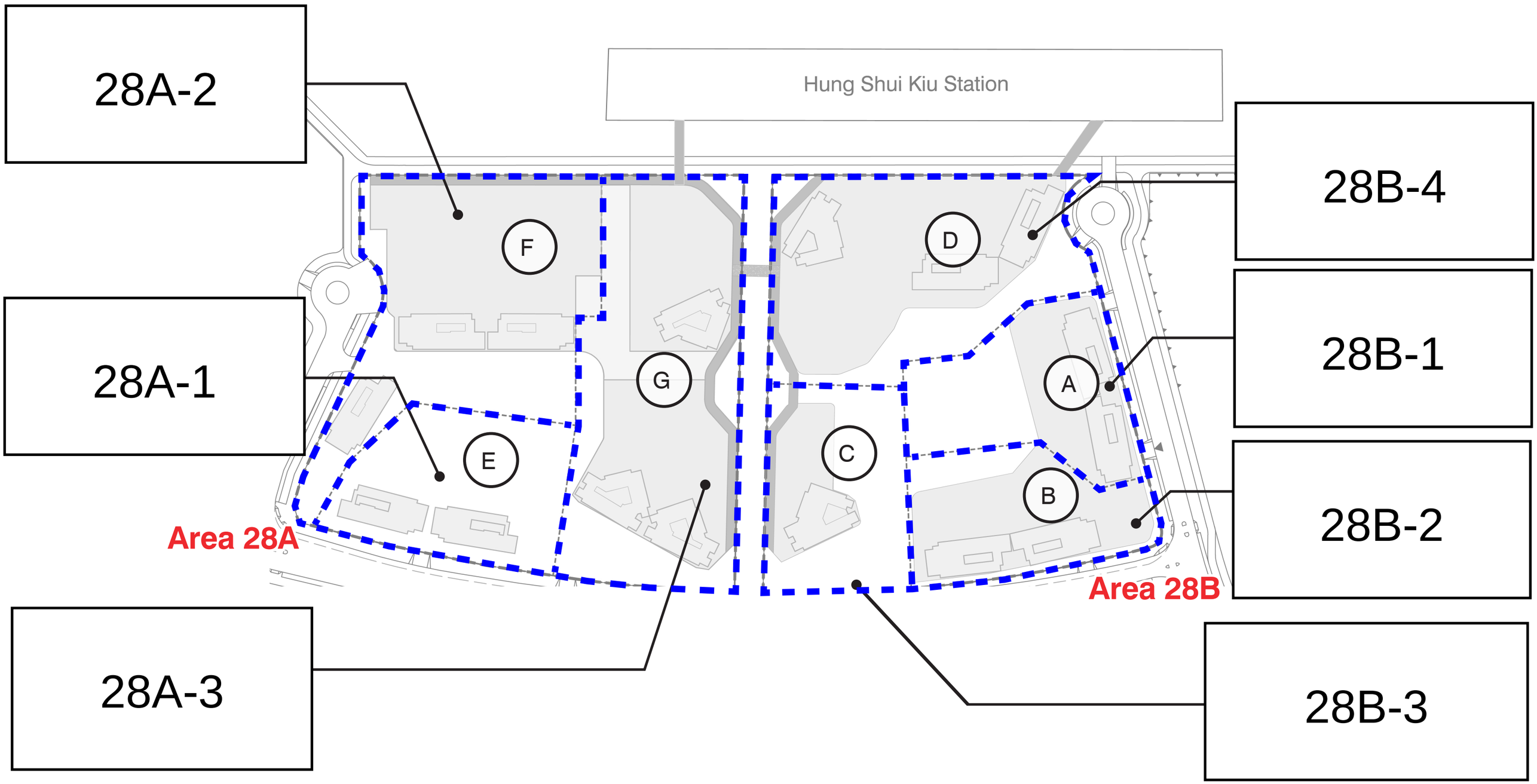

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Table 1 Calculation for Sewage Generation Rate under Base Case

1.1 Residential Unit			
Total number of residential units	=	7382	units
Total number of residents	=	20670	residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Yuen Long)
Design flow	=	270	litre/person/day -- (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	**5580.8**	m^3/day
1.2 Club House			
GFA	=	9228	m^2 (Assume 2.5% of residential area)
Assumed floor area per employee	=	30.3	m^2 per employee -- (refer to Table 8 of CIFSUS - Community, Social & Personal Services)
Total number of employees	=	305	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J11 Community, Social, Personal Services)
Sewage generation rate	=	**85.3**	m^3/day
1.3 Indoor Swimming Pool			
Area of Swimming Pool	=	300	m^2 (Assume)
Depth of Swimming Pool	=	1.5	m
Volume of Swimming Pool (Ordinary Assumption)	=	450	m^3
Turnover Rate	=	4	hr
Required Surface Loading Rate of Filter	=	112.5	$m^3/m^2/hr$
Filter Areas required	=	1	m^2
Adopted Surface Loading Rate of Filter	=	50	$m^3/m^2/hr$
Adopted Filter Area	=	2.25	m^2
Backwash Duration	=	3	min/d
Backwash flow rate	=	30	$m^3/m^2/hr$
Design peak flow for Swimming Pool Backwashing	=	3.375	m^3/day
Design peak flow for Swimming Pool Backwashing	=	**18.8**	litre/sec
2. Commercial (Retail)			
GFA	=	86781.75	m^2
Assumed floor area per employee	=	28.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Retail Trade)
Total number of employees	=	3037	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J4 Wholesale & Retail)
Sewage generation rate	=	**850.5**	m^3/day
3. Commercial (F&B)			
GFA	=	86781.75	m^2
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Restaurants)
Total number of employees	=	4426	employees
Design flow	=	1580	litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	**6992.9**	m^3/day
4. PTI			
Assumed area	=	15000	m^2
Assumed floor area per employee	=	26.3	m^2 per employee -- (refer to Table 8 of CIFSUS - Transport)
Total number of employees	=	570	employees
Design flow	=	180	litre/employee/day -- (refer to Table T-2 of GESF - J3 Transport, Storage & Communication)
Sewage generation rate	=	**102.6**	m^3/day
5. Office			
Assumed area	=	16504	m^2
Assumed floor area per employee	=	18.2	m^2 per employee -- (refer to Table 8 of CIFSUS - Financial, Insurance, Real Estate & Business Services)
Total number of employees	=	908	employees
Design flow	=	80	litre/employee/day -- (refer to Table T-2 of GESF - J6 Finance, Insurance, Real Estate & Business Services)
Sewage generation rate	=	**72.6**	m^3/day
Total Flow from the Proposed Development under Base Case			
Flow rate	=	13684.6	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	13684.6	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	50684	people
Peaking factor	=	4	(refer to Table T-5 of GESF for a population between >50000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**641.7**	litre/sec
Peak flow (with swimming pool)	=	**660.4**	litre/sec

Remark: The Proposed Development will have phasing based on indicative preliminary deisgn. This calculation is prepared base on 7 phasing (3 on Site 28A and 4 on Site 28B), serving only as an assumption for the Sewerage Appraisal.

Table 2 Calculation for Sewage Generation Rate of the Proposed Development (Overall)

1.1 Residential Unit			
Total number of residential units	=	8202	units
Total number of residents	=	22966	residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Yuen Long)
Design flow	=	270	litre/person/day -- (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	**6200.7**	m^3/day
1.2 Club House			
GFA	=	10253	m^2 (Assume 2.5% of residential area)
Assumed floor area per employee	=	30.3	m^2 per employee -- (refer to Table 8 of CIFSUS - Community, Social & Personal Services)
Total number of employees	=	338	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J11 Community, Social, Personal Services)
Sewage generation rate	=	**94.7**	m^3/day
1.3 Indoor Swimming Pool			
Area of Swimming Pool	=	300	m^2 (Assume)
Depth of Swimming Pool	=	1.5	m
Volume of Swimming Pool (Ordinary Assumption)	=	450	m^3
Turnover Rate	=	4	hr
Required Surface Loading Rate of Filter	=	112.5	$m^3/m^2/hr$
Filter Areas required	=	1	m^2
Adopted Surface Loading Rate of Filter	=	50	$m^3/m^2/hr$
Adopted Filter Area	=	2.25	m^2
Backwash Duration	=	3	min/d
Backwash flow rate	=	30	$m^3/m^2/hr$
Design peak flow for Swimming Pool Backwashing	=	3.375	m^3/day
Design peak flow for Swimming Pool Backwashing	=	**18.8**	litre/sec
2. Commercial (Retail)			
GFA	=	40025	m^2
Assumed floor area per employee	=	28.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Retail Trade)
Total number of employees	=	1401	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J4 Wholesale & Retail)
Sewage generation rate	=	**392.2**	m^3/day
3. Commercial (F&B)			
GFA	=	40025	m^2
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Restaurants)
Total number of employees	=	2041	employees
Design flow	=	1580	litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	**3225.2**	m^3/day
4. PTI			
Assumed area	=	15000	m^2
Assumed floor area per employee	=	26.3	m^2 per employee -- (refer to Table 8 of CIFSUS - Transport)
Total number of employees	=	570	employees
Design flow	=	180	litre/employee/day -- (refer to Table T-2 of GESF - J3 Transport, Storage & Communication)
Sewage generation rate	=	**102.6**	m^3/day
5. Office			
Assumed area	=	16504	m^2
Assumed floor area per employee	=	18.2	m^2 per employee -- (refer to Table 8 of CIFSUS - Financial, Insurance, Real Estate & Business Services)
Total number of employees	=	908	employees
Design flow	=	80	litre/employee/day -- (refer to Table T-2 of GESF - J6 Finance, Insurance, Real Estate & Business Services)
Sewage generation rate	=	**72.6**	m^3/day
Total Flow from the Proposed Development			
Flow rate	=	10088.1	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	10088.1	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	37363	people
Peaking factor	=	4	(refer to Table T-5 of GESF for a population between 10000-50000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**467.0**	litre/sec
Peak flow (with swimming pool)	=	**485.8**	litre/sec

Remark: The Proposed Development will have phasing based on indicative preliminary deisgn. This calculation is prepared base on 7 phasing (3 on Site 28A and 4 on Site 28B), serving only as an assumption for the Sewerage Appraisal.

Table 3 Calculation for Sewage Generation Rate of the Proposed Development (By Site)

Subject Site 28A

Site 28A-1

1. Residential

Total number of residential units	=	1148	units
Total number of residents	=	3214	residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Hung Shui Kiu)
Design flow	=	270	litre/person/day -- (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	**867.9**	m^3/day

2. Club House

Assumed area	=	1435.3	m^2 (Assume 2.5% of residential GFA)
Assumed floor area per employee	=	30.3	m^2 per employee -- (refer to Table 8 of CIFSUS - Community, Social & Personal Services)
Total number of employees	=	47	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J11 Community, Social, Personal Services)
Sewage generation rate	=	**13.3**	m^3/day

3. Proposed Swimming Pool (Indoor)

Area of Swimming Pool	=	50	m^2 (Assume)
Depth of Swimming Pool	=	1.5	m
Volume of Swimming Pool (Ordinary Assumption	=	75	m^3
Turnover Rate	=	4	hr
Required Surface Loading Rate of Filter	=	18.75	$m^3/m^2/hr$
Filter Areas required	=	1	m^2
Adopted Surface Loading Rate of Filter	=	50	$m^3/m^2/hr$
Adopted Filter Area	=	0.38	m^2
Backwash Duration	=	3	min/d
Backwash flow rate	=	30	$m^3/m^2/hr$
Design flow for Swimming Pool Backwashing	=	0.5625	m^3/day
Design flow for Swimming Pool Backwashing	=	**3.1**	litre/sec

Total Flow from the Proposed Development (Site 28A-1)

Flow rate	=	881.2	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	881.2	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	3264	people (refer to Section 12 of GESF)
Peaking factor	=	6	(refer to Table T-5 of GESF for a population between 1000-5000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**61.2**	litre/sec
Peak flow (with swimming pool)	=	**64.3**	litre/sec

Site 28A-2

1. Residential

Total number of residential units	=	1535	units
Total number of residents	=	4298	residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Hung Shui Kiu)
Design flow	=	270	litre/person/day -- (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	**1160.5**	m^3/day

2. Club House

Assumed area	=	1918	m^2 (Assume 2.5% of residential GFA)
Assumed floor area per employee	=	30.3	m^2 per employee -- (refer to Table 8 of CIFSUS - Community, Social & Personal Services)
Total number of employees	=	63	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J11 Community, Social, Personal Services)
Sewage generation rate	=	**17.7**	m^3/day

3. Proposed Swimming Pool (Indoor)

Area of Swimming Pool	=	50	m^2 (Assume)
Depth of Swimming Pool	=	1.5	m
Volume of Swimming Pool (Ordinary Assumption	=	75	m^3
Turnover Rate	=	4	hr
Required Surface Loading Rate of Filter	=	18.75	$m^3/m^2/hr$
Filter Areas required	=	1	m^2
Adopted Surface Loading Rate of Filter	=	50	$m^3/m^2/hr$
Adopted Filter Area	=	0.38	m^2
Backwash Duration	=	3	min/d
Backwash flow rate	=	30	$m^3/m^2/hr$
Design flow for Swimming Pool Backwashing	=	0.5625	m^3/day
Design flow for Swimming Pool Backwashing	=	**3.1**	litre/sec

4. Commercial (Retail)

GFA	=	1000	m^2
Assumed floor area per employee	=	28.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Retail Trade)
Total number of employees	=	35	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J4 Wholesale & Retail)
Sewage generation rate	=	**9.8**	m^3/day

5. Commercial (F&B)

GFA	=	1000	m^2
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Restaurants)
Total number of employees	=	51	employees
Design flow	=	1580	litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	**80.6**	m^3/day

6. PTI

Assumed area	=	15000	m^2
Assumed floor area per employee	=	26.3	m^2 per employee -- (refer to Table 8 of CIFSUS - Transport)
Total number of employees	=	570	employees
Design flow	=	180	litre/employee/day -- (refer to Table T-2 of GESF - J3 Transport, Storage & Communiccation)
Sewage generation rate	=	**102.6**	m^3/day

Total Flow from the Proposed Development (Site 28A-2 - PTI)

Flow rate	=	102.6	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	102.6	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	380	people (refer to Section 12 of GESF)
Peaking factor	=	8	(refer to Table T-5 of GESF for a population between <1,000 incl. stormwater allowance)
Peak flow	=	**9.5**	litre/sec

Total Flow from the Proposed Development (Site 28A-2 - exclude PTI)

Flow rate	=	1268.6	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	1268.6	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	4698	people (refer to Section 12 of GESF)
Peaking factor	=	6	(refer to Table T-5 of GESF for a population between <1,000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**88.1**	litre/sec
Peak flow (with swimming pool)	=	**91.2**	litre/sec

Total Flow from the Proposed Development (Site 28A-2)

Flow rate	=	1371.2	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	1371.2	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	5078	people
Peaking factor	=	5	(refer to Table T-5 of GESF for a population 5000-10000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**79.3**	litre/sec
Peak flow (with swimming pool)	=	**82.5**	litre/sec

Site 28A-3

1. Residential

Total number of residential units	=	1617	units
Total number of residents	=	4528	residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Hung Shui Kiu)
Design flow	=	270	litre/person/day -- (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	**1222.5**	m^3/day

2. Club House

Assumed area	=	2021	m^2 (Assume 2.5% of residential GFA)
Assumed floor area per employee	=	30.3	m^2 per employee -- (refer to Table 8 of CIFSUS - Community, Social & Personal Services)
Total number of employees	=	67	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J11 Community, Social, Personal Services)
Sewage generation rate	=	**18.7**	m^3/day

3. Proposed Swimming Pool (Indoor)

Area of Swimming Pool	=	50	m^2 (Assume)
Depth of Swimming Pool	=	1.5	m
Volume of Swimming Pool (Ordinary Assumption	=	75	m^3
Turnover Rate	=	4	hr
Required Surface Loading Rate of Filter	=	18.75	$m^3/m^2/hr$
Filter Areas required	=	1	m^2
Adopted Surface Loading Rate of Filter	=	50	$m^3/m^2/hr$
Adopted Filter Area	=	0.38	m^2
Backwash Duration	=	3	min/d
Backwash flow rate	=	30	$m^3/m^2/hr$
Design flow for Swimming Pool Backwashing	=	0.5625	m^3/day
Design flow for Swimming Pool Backwashing	=	**3.1**	litre/sec

4. Commercial (Retail)

GFA	=	21851	m^2
Assumed floor area per employee	=	28.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Retail Trade)
Total number of employees	=	765	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J4 Wholesale & Retail)
Sewage generation rate	=	**214.1**	m^3/day

5. Commercial (F&B)

GFA	=	21851	m^2
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Restaurants)
Total number of employees	=	1114	employees
Design flow	=	1580	litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	**1760.8**	m^3/day

Total Flow from the Proposed Development (Site 28A-3)

Flow rate	=	3216.0	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	3216.0	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	11911	people (refer to Section 12 of GESF)
Peaking factor	=	4	(refer to Table T-5 of GESF for a population between 10000-50000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**148.9**	litre/sec
Peak flow (with swimming pool)	=	**152.0**	litre/sec

Remark: The Proposed Development will have phasing based on indicative preliminary deisgn. This calculation is prepared base on 7 phasing (3 on Site 28A and 4 on Site 28B), serving only as an assumption for the Sewerage Appraisal.

Subject Site 28B

Site 28B-1

1. Residential

Total number of residential units	=	958	units
Total number of residents	=	2682	residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Hung Shui Kiu)
Design flow	=	270	litre/person/day -- (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	**724.2**	m^3/day

2. Club House

Assumed area	=	1198	m^2 (Assume 2.5% of residential GFA)
Assumed floor area per employee	=	30.3	m^2 per employee -- (refer to Table 8 of CIFSUS - Community, Social & Personal Services)
Total number of employees	=	40	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J11 Community, Social, Personal Services)
Sewage generation rate	=	**11.1**	m^3/day

3. Proposed Swimming Pool (Indoor)

Area of Swimming Pool	=	37.5	m^2 (Assume)
Depth of Swimming Pool	=	1.5	m
Volume of Swimming Pool (Ordinary Assumption)	=	56.25	m^3
Turnover Rate	=	4	hr
Required Surface Loading Rate of Filter	=	14.0625	$m^3/m^2/hr$
Filter Areas required	=	1	m^2
Adopted Surface Loading Rate of Filter	=	50	$m^3/m^2/hr$
Adopted Filter Area	=	0.28	m^2
Backwash Duration	=	3	min/d
Backwash flow rate	=	30	$m^3/m^2/hr$
Design flow for Swimming Pool Backwashing	=	0.421875	m^3/day
Design flow for Swimming Pool Backwashing	=	**2.3**	litre/sec

Total Flow from the Proposed Development (Site 28B-1)

Flow rate	=	735.3	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	735.3	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	2723	people (refer to Section 12 of GESF)
Peaking factor	=	6	(refer to Table T-5 of GESF for a population between 1000-5000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**51.1**	litre/sec
Peak flow (with swimming pool)	=	**53.4**	litre/sec

Site 28B-2

1. Residential

Total number of residential units	=	958	units
Total number of residents	=	2682	residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Hung Shui Kiu)
Design flow	=	270	litre/person/day -- (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	**724.2**	m^3/day

2. Club House

Assumed area	=	1198	m^2 (Assume 2.5% of residential GFA)
Assumed floor area per employee	=	30.3	m^2 per employee -- (refer to Table 8 of CIFSUS - Community, Social & Personal Services)
Total number of employees	=	40	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J11 Community, Social, Personal Services)
Sewage generation rate	=	**11.1**	m^3/day

3. Proposed Swimming Pool (Indoor)

Area of Swimming Pool	=	37.5	m^2 (Assume)
Depth of Swimming Pool	=	1.5	m
Volume of Swimming Pool (Ordinary Assumption)	=	56.25	m^3
Turnover Rate	=	4	hr
Required Surface Loading Rate of Filter	=	14.0625	$m^3/m^2/hr$
Filter Areas required	=	1	m^2
Adopted Surface Loading Rate of Filter	=	50	$m^3/m^2/hr$
Adopted Filter Area	=	0.28	m^2
Backwash Duration	=	3	min/d
Backwash flow rate	=	30	$m^3/m^2/hr$
Design flow for Swimming Pool Backwashing	=	0.421875	m^3/day
Design flow for Swimming Pool Backwashing	=	**2.3**	litre/sec

Total Flow from the Proposed Development (Site 28B-2)

Flow rate	=	735.3	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	735.3	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	2723	people (refer to Section 12 of GESF)
Peaking factor	=	6	(refer to Table T-5 of GESF for a population between 1000-5000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**51.1**	litre/sec
Peak flow (with swimming pool)	=	**53.4**	litre/sec

Site 28B-3

1. Residential

Total number of residential units	=	500	units
Total number of residents	=	1400	residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Hung Shui Kiu)
Design flow	=	270	litre/person/day -- (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	**378.0**	m^3/day

2. Club House

Assumed area	=	625	m^2 (Assume 2.5% of residential GFA)
Assumed floor area per employee	=	30.3	m^2 per employee -- (refer to Table 8 of CIFSUS - Community, Social & Personal Services)
Total number of employees	=	21	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J11 Community, Social, Personal Services)
Sewage generation rate	=	**5.8**	m^3/day

3. Proposed Swimming Pool (Indoor)

Area of Swimming Pool	=	37.5	m^2 (Assume)
Depth of Swimming Pool	=	1.5	m
Volume of Swimming Pool (Ordinary Assumption)	=	56.25	m^3
Turnover Rate	=	4	hr
Required Surface Loading Rate of Filter	=	14.0625	$m^3/m^2/hr$
Filter Areas required	=	1	m^2
Adopted Surface Loading Rate of Filter	=	50	$m^3/m^2/hr$
Adopted Filter Area	=	0.28	m^2
Backwash Duration	=	3	min/d
Backwash flow rate	=	30	$m^3/m^2/hr$
Design flow for Swimming Pool Backwashing	=	0.421875	m^3/day
Design flow for Swimming Pool Backwashing	=	**2.3**	litre/sec

4. Commercial (Retail)

GFA	=	700	m^2
Assumed floor area per employee	=	28.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Retail Trade)
Total number of employees	=	25	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J4 Wholesale & Retail)
Sewage generation rate	=	**6.9**	m^3/day

5. Commercial (F&B)

GFA	=	700	m^2
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Restaurants)
Total number of employees	=	36	employees
Design flow	=	1580	litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	**56.4**	m^3/day

6. Office

GFA	=	16504	m^2
Assumed floor area per employee	=	18.2	m^2 per employee -- (refer to Table 8 of CIFSUS - Financial, Insurance, Real Estate & Business Services)
Total number of employees	=	908	employees
Design flow	=	0.08	m^3/employee/day -- (refer to Table T-2 of GESF - J6 Finance, Insurance, Real Estate & Business Services)
Sewage generation rate	=	**72.6**	m^3/day

Total Flow from the Proposed Development (Site 28B-3)

Flow rate	=	519.7	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	519.7	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	1925	people (refer to Section 12 of GESF)
Peaking factor	=	6	(refer to Table T-5 of GESF for a population between 1000-5000 incl. stormwater allowance)
Peak flow	=	**36.1**	litre/sec
Peak flow (with swimming pool)	=	**38.4**	litre/sec

Site 28B-4

1. Residential

Total number of residential units	=	1486	units
Total number of residents	=	4161	residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Hung Shui Kiu)
Design flow	=	270	litre/person/day -- (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	**1123.4**	m^3/day

2. Club House

Assumed area	=	1857	m^2 (Assume 2.5% of residential GFA)
Assumed floor area per employee	=	30.3	m^2 per employee -- (refer to Table 8 of CIFSUS - Community, Social & Personal Services)
Total number of employees	=	61	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J11 Community, Social, Personal Services)
Sewage generation rate	=	**17.2**	m^3/day

3. Proposed Swimming Pool (Indoor)

Area of Swimming Pool	=	37.5	m^2 (Assume)
Depth of Swimming Pool	=	1.5	m
Volume of Swimming Pool (Ordinary Assumption)	=	56.25	m^3
Turnover Rate	=	4	hr
Required Surface Loading Rate of Filter	=	14.0625	$m^3/m^2/hr$
Filter Areas required	=	1	m^2
Adopted Surface Loading Rate of Filter	=	50	$m^3/m^2/hr$
Adopted Filter Area	=	0.28	m^2
Backwash Duration	=	3	min/d
Backwash flow rate	=	30	$m^3/m^2/hr$
Design flow for Swimming Pool Backwashing	=	0.421875	m^3/day
Design flow for Swimming Pool Backwashing	=	**2.3**	litre/sec

4. Commercial (Retail)

GFA	=	16474	m^2
Assumed floor area per employee	=	28.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Retail Trade)
Total number of employees	=	577	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J4 Wholesale & Retail)
Sewage generation rate	=	**161.4**	m^3/day

5. Commercial (F&B)

GFA	=	16474	m^2
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Restaurants)
Total number of employees	=	840	employees
Design flow	=	1580	litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	**1327.5**	m^3/day

Total Flow from the Proposed Development (Site 28B-4)

Flow rate	=	2629.5	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	2629.5	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	9739	people (refer to Section 12 of GESF)
Peaking factor	=	5	(refer to Table T-5 of GESF for a population between 5000-10000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**152.2**	litre/sec
Peak flow (with swimming pool)	=	**154.5**	litre/sec

Remark: The Proposed Development will have phasing based on indicative preliminary deisgn. This calculation is prepared base on 7 phasing (3 on Site 28A and 4 on Site 28B), serving only as an assumption for the Sewerage Appraisal.

Total Flow from the Proposed Development (Site 28B-1 + Site 28B-4)

Flow rate	=	3364.8	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	3364.8	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	12462	people (refer to Section 12 of GESF)
Peaking factor	=	4	(refer to Table T-5 of GESF for a population between 10000-50000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**155.8**	litre/sec
Peak flow (with swimming pool)	=	**160.5**	litre/sec

Total Flow from the Proposed Development (Site 28B-1 + Site 28B-2 + Site 28B-4)

Flow rate	=	4100.1	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	4100.1	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	15186	people (refer to Section 12 of GESF)
Peaking factor	=	4	(refer to Table T-5 of GESF for a population between 10000-50000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**189.8**	litre/sec
Peak flow (with swimming pool)	=	**196.9**	litre/sec

Total Flow from the Proposed Development (Site 28B-1 + Site 28B-2 + Site 28B-3 + Site 28B-4)

Flow rate	=	4619.8	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	4619.8	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	17110	people (refer to Section 12 of GESF)
Peaking factor	=	4	(refer to Table T-5 of GESF for a population between 10000-50000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**213.9**	litre/sec
Peak flow (with swimming pool)	=	**223.3**	litre/sec

Total Flow from the Proposed Development (Site 28B-1 + Site 28B-2 + Site 28B-3 + Site 28B-4 + Site 28A-3)

Flow rate	=	7835.8	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	7835.8	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	29022	people (refer to Section 12 of GESF)
Peaking factor	=	4	(refer to Table T-5 of GESF for a population between 10000-50000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**362.8**	litre/sec
Peak flow (with swimming pool)	=	**375.3**	litre/sec

Total Flow from the Proposed Development (Site 28B-1 + Site 28B-2 + Site 28B-3 + Site 28B-4 + Site 28A-3 + Site 28A-1)

Flow rate	=	8717.0	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	8717.0	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	32285	people (refer to Section 12 of GESF)
Peaking factor	=	4	(refer to Table T-5 of GESF for a population between 10000-50000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**403.6**	litre/sec
Peak flow (with swimming pool)	=	**419.2**	litre/sec

Total Flow from the Proposed Development (Site 28B-1 + Site 28B-2 + Site 28B-3 + Site 28B-4 + Site 28A-1 + Site 28A-2 + Site 28A-3)

Flow rate	=	10088.1	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	10088.1	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	37363	people (refer to Section 12 of GESF)
Peaking factor	=	4	(refer to Table T-5 of GESF for a population between 10000-50000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**467.0**	litre/sec
Peak flow (with swimming pool)	=	**485.8**	litre/sec

Remark: The Proposed Development will have phasing based on indicative preliminary deisgn. This calculation is prepared base on 7 phasing (3 on Site 28A and 4 on Site 28B), serving as an assumption for the Sewerage Appraisal.

Table 4 Calculation for Sewage generation rate of the Surrounding Catchment

Catchment A
Planning Area 27C/ CEDD Site 4-24
Sewage generation rate = **2227.0** m^3/day (From CEDD Revised Final Report on Drainage and Sewerage Assessment Review (Submission Re. REP-031-07))

Total Flow of Catchment A = 2,227.0 m^3/day

Catchment B
Planning Area 27B/ CEDD Site 4-26
Sewage generation rate = **1204.4** m^3/day (From CEDD Revised Final Report on Drainage and Sewerage Assessment Review (Submission Re. REP-031-07))

Total Flow of Catchment B = 1,204.4 m^3/day

Catchment C
Planning Area 27A/ CEDD Site 4-28
Sewage generation rate = **2048.5** m^3/day (From CEDD Revised Final Report on Drainage and Sewerage Assessment Review (Submission Re. REP-031-07))

Flow from Catchment C (only 50%) = 1,024.3 m^3/day (Assume 50% of sewage from Catchment C will be discharged to FMH166B and the remaining 50% sewage from Catchment C will be discharged to FMH179a)

Catchment D
Planning Area 30/ CEDD Site 4-14
Sewage generation rate = **26.3** m^3/day (From CEDD Revised Final Report on Drainage and Sewerage Assessment Review (Submission Re. REP-031-07))

CEDD Site 4-34 (HSK MTR Station)*
Peak Flow Rate = **20.7** Litre/sec (From Hung Shui Kiu Station Consultancy Agreement No. C1801 - 9.9I Reference Design Sewerage Impact Assessment (Rev. E)

Flow rate from Catchment D (without HSK MTR Station)*	=	26.3	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0) (without HSK MTR Station)*	=	26.3	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	97	people (refer to Section 12 of GESF)
Peaking factor	=	8	(refer to Table T-5 of GESF for a population between <1000 incl. stormwater allowance)
Peak flow (without HSK MTR Station)	=	**2.4**	litre/sec
Peak flow (with HSK MTR Station)*	=	**23.1**	litre/sec

****Sewage generated from CEDD Site 4-34 (HSK MTR Station) comes from Sanitary Fitment, so it shall be added in the peak flow directly without applying peaking factor.***

Catchment E
Planning Area 26A/ CEDD Site 4-31
Sewage generation rate = **1,242.6** m^3/day (From CEDD Revised Final Report on Drainage and Sewerage Assessment Review (Submission Re. REP-031-07))

Total Flow of Catchment E = 1,242.6 m^3/day

Table 4 Calculation for Sewage generation rate of the Surrounding Catchment

Sub-total

Site 28B-4+Site 28B-1+ Catchment A

Flow rate	=	5591.8	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	5591.8	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	20710	people (refer to Section 12 of GESF)
Peaking factor	=	4	(refer to Table T-5 of GESF for a population between 10000-50000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**258.9**	litre/sec
Peak flow (with swimming pool)	=	**263.6**	litre/sec

Site 28B-4+Site 28B-1+ Catchment A + Site 28B-2

Flow rate	=	6327.1	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	6327.1	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	23434	people (refer to Section 12 of GESF)
Peaking factor	=	4	(refer to Table T-5 of GESF for a population between 10000-50000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**292.9**	litre/sec
Peak flow (with swimming pool)	=	**300.0**	litre/sec

Site 28B-4 + Site 28B-1+ Catchment A + Site 28B-2 + Site 28B-3 + Catchment B

Flow rate	=	8051.2	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	8051.2	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	29819	people (refer to Section 12 of GESF)
Peaking factor	=	4	(refer to Table T-5 of GESF for a population between 10000-50000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**372.7**	litre/sec
Peak flow (with swimming pool)	=	**382.1**	litre/sec

Site 28B-4 + Site 28B-1 + Catchment A + Site 28B-2 + Site 28B-3 + Catchment B + Site 28A-3 + Half of Catchment C

Flow rate	=	12291.5	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	12291.5	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	45524	people (refer to Section 12 of GESF)
Peaking factor	=	4	(refer to Table T-5 of GESF for a population between 10000-50000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**569.0**	litre/sec
Peak flow (with swimming pool)	=	**581.5**	litre/sec

Site 28B-4 + Site 28B-1 + Catchment A + Site 28B-2 + Site 28B-3 + Catchment B + Site 28A-3 + Half of Catchment C + Site 28A-1

Flow rate	=	13172.6	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	13172.6	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	48787	people (refer to Section 12 of GESF)
Peaking factor	=	4	(refer to Table T-5 of GESF for a population between 10000-50000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**609.8**	litre/sec
Peak flow (with swimming pool)	=	**625.5**	litre/sec

Catchment D

Flow rate	=	26.3	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	26.3	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	97	people (refer to Section 12 of GESF)
Peaking factor	=	8	(refer to Table T-5 of GESF for a population between 10000-50000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**2.4**	litre/sec
Peak flow (with swimming pool)	=	**2.4**	litre/sec (No swimming pool in Catchment D)
Peak flow (with swimming pool and CEDD Site 4-34)	=	**23.1**	litre/sec

Half of Site 28A-2 + Catchment D

Flow rate	=	711.9	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	711.9	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	2637	people (refer to Section 12 of GESF)
Peaking factor	=	6	(refer to Table T-5 of GESF for a population between 1000-5000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**49.4**	litre/sec
Peak flow (with swimming pool)	=	**52.6**	litre/sec
Peak flow (with swimming pool and CEDD Site 4-34)	=	**73.2**	litre/sec

Half of Site 28A-2 + Catchment D + Catchment E

Flow rate	=	1954.5	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	1954.5	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	7239	people (refer to Section 12 of GESF)
Peaking factor	=	5	(refer to Table T-5 of GESF for a population between 1000-5000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**113.1**	litre/sec
Peak flow (with swimming pool)	=	**116.2**	litre/sec
Peak flow (with swimming pool and CEDD Site 4-34)	=	**136.9**	litre/sec

Site 28A-2 + Catchment D + Catchment E

Flow rate	=	2640.1	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	2640.1	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	9778	people (refer to Section 12 of GESF)
Peaking factor	=	5	(refer to Table T-5 of GESF for a population between 5000-10000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**152.8**	litre/sec
Peak flow (with swimming pool)	=	**155.9**	litre/sec
Peak flow (with swimming pool and CEDD Site 4-34)	=	**176.6**	litre/sec

Site 28B-1 + Site 28B-2 + Site 28B-3 + Site 28A-1 + Site 28A-2 + Site 28A-3 + Site 28B-4 + Catchment A + Catchment B + Half of Catchment C + Catchment D + Catchment E

Flow rate	=	15812.7	m^3/day
Flow rate with P_{CIF} (Yuen Long - 1.0)	=	15812.7	m^3/day (refer to Table T-4 of GESF - Yuen Long - 1.0)
Contributing population	=	58565	people (refer to Section 12 of GESF)
Peaking factor	=	4	(refer to Table T-5 of GESF for a population between 10000-50000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	**725.6**	litre/sec
Peak flow (with swimming pool)	=	**744.3**	litre/sec
Peak flow (with swimming pool and CEDD Site 4-34)	=	**765.0**	litre/sec

Remark: The Proposed Development will have phasing based on indicative preliminary deisgn. This calculation is prepared base on 7 phasing (3 on Site 28A and 4 on Site 28B), serving only as an assumption for the Sewerage Appraisal.

Table 5a Hydraulic Capacity of the Lead-in for Each Site

Manhole Reference	Manhole Reference	Proposed Pipe Dia. (mm)	Proposed Pipe Length (m)	Invert Level 1 (mPD)	Invert Level 2 (mPD)	g (m/s^2)	k_s (m)	s	v (m^2/s)	V (m/s)	Area (m^2)	Q (m^3/s)	Estimated Capacity (L/s)	Site
LI-S4.25b-1	FMH158a	355	11.4	7.51	7.47	9.81	0.0003	0.0035	0.000001	1.11	0.099	0.1	110.06	Site 28B-1
LI-S4.25b-3	FMH164a	355	12.8	9.40	9.33	9.81	0.0003	0.0055	0.000001	1.40	0.099	0.1	138.38	Site 28B-2
LI-S4.25a-1	FMH165a	355	11.6	9.14	9.10	9.81	0.0003	0.0035	0.000001	1.10	0.099	0.1	109.33	Site 28B-3
LI-S4.25c-1	FMH157b	355	11.6	9.14	9.07	9.81	0.0003	0.0060	0.000001	1.47	0.099	0.1	145.11	Half of Site 28B-4
LI-S4.25c-2	FMH399a	355	12.4	9.14	9.07	9.81	0.0003	0.0056	0.000001	1.42	0.099	0.1	140.29	Half of Site 28B-4
LI-S4.29-2	FMH168a	450	20.0	5.01	4.93	9.81	0.0003	0.0040	0.000001	1.38	0.159	0.2	219.92	Site 28A-1
LI-S4.29-3	FMH178A	315	17.6	8.52	8.46	9.81	0.0003	0.0034	0.000001	1.02	0.078	0.1	79.35	Half of Site 28A-2
LI-S4.29-4	FMH175a	315	14.6	9.12	9.06	9.81	0.0003	0.0041	0.000001	1.12	0.078	0.1	87.31	Half of Site 28A-2
LI-S4.29-1	FMH166b	450	13.0	5.53	5.47	9.81	0.0003	0.0041	0.000001	1.40	0.159	0.2	223.06	Site 28A-3

Table 5b Hydraulic Capacity of Public Sewers

Manhole Reference	Manhole Reference	Pipe Dia. (mm)	Pipe Length (m)	Invert Level 1 (mPD)	Invert Level 2 (mPD)	g (m/s^2)	k_s (m)	s	v (m^2/s)	v (m/s)	Area (m^2)	Q (m^3/s)	Estimated Capacity (L/s)
LI-S4.25c-1	FMH157b	355	11.6	9.14	9.07	9.81	0.0003	0.0060	0.000001	1.47	0.099	0.1	145.11
FMH157b	FMH399a	450	17.1	7.57	7.43	9.81	0.0003	0.0082	0.000001	1.99	0.159	0.3	315.98
LI-S4.25c-2	FMH399a	355	12.4	9.14	9.07	9.81	0.0003	0.0056	0.000001	1.42	0.099	0.1	140.29
FMH399a	FMH158a	450	37.1	7.70	7.47	9.81	0.0003	0.0062	0.000001	1.73	0.159	0.3	274.74
FMH158a	FMH159a	450	46.8	7.47	7.24	9.81	0.0003	0.0049	0.000001	1.53	0.159	0.2	244.13
FMH159a	FMH160b	450	42.0	7.24	6.99	9.81	0.0003	0.0060	0.000001	1.69	0.159	0.3	269.18
FMH160b	FMH162a	450	15.0	6.99	6.79	9.81	0.0003	0.0133	0.000001	2.54	0.159	0.4	404.27
FMH162a	FMH163a	560	57.5	6.84	6.59	9.81	0.0003	0.0044	0.000001	1.65	0.246	0.4	407.34
FMH163a	FMH164a	560	39.7	6.59	6.35	9.81	0.0003	0.0061	0.000001	1.95	0.246	0.5	481.41
FMH164a	FMH164_1	630	48.0	6.32	5.97	9.81	0.0003	0.0073	0.000001	2.31	0.312	0.7	720.34
FMH164_1	FMH165a	630	49.8	5.97	5.81	9.81	0.0003	0.0032	0.000001	1.53	0.312	0.5	475.71
FMH165a	FMH1119-1	710	39.2	5.85	5.73	9.81	0.0003	0.0031	0.000001	1.60	0.396	0.6	634.39
FMH1119-1	FMH166b	710	42.3	5.73	5.60	9.81	0.0003	0.0031	0.000001	1.61	0.396	0.6	635.83
FMH166b	FMH167a	710	52.6	5.47	5.23	9.81	0.0003	0.0046	0.000001	1.96	0.396	0.8	777.05
FMH167a	FMH168a	710	63.5	5.36	5.06	9.81	0.0003	0.0047	0.000001	2.00	0.396	0.8	790.53
FMH168a	FMH173a	710	67.0	4.93	4.70	9.81	0.0003	0.0034	0.000001	1.70	0.396	0.7	672.74
FMH341A	FMH175a	500	28.9	5.90	5.70	9.81	0.0003	0.0069	0.000001	1.95	0.196	0.4	382.68
FMH175a	FMH176b	710	22.7	5.70	5.53	9.81	0.0003	0.0075	0.000001	2.52	0.396	1.0	998.34
FMH176b	FMH177a	710	36.3	5.53	5.25	9.81	0.0003	0.0077	0.000001	2.56	0.396	1.0	1013.39
FMH177a	FMH178a	710	50.5	5.25	4.88	9.81	0.0003	0.0073	0.000001	2.49	0.396	1.0	987.23
FMH178a	FMH173a	710	21.0	4.88	4.70	9.81	0.0003	0.0086	0.000001	2.70	0.396	1.1	1069.26
FMH173a	FMH179a	900	7.7	4.70	4.51	9.81	0.0003	0.0248	0.000001	5.32	0.636	3.4	3387.43

Remark

(1) g=gravitational acceleration; k_s=equivalent sand roughness; s=gradient; v=kinematic viscosity of water; V=mean velocity

(2) The values of ks = 0.3mm and 0.3mm is used for the calculation of slimed UPVC sewer, poor condition (based on Table 5: Recommended Roughness Values in Sewerage Manual)

(3) The value of velocity (V) is referred to the Tables for the hydraulic design of pipes, sewers and channels (8th edition)

(4) Equation used: $V=-\sqrt{(8gDs)}\log\left(\frac{k_s}{3.7D}+\frac{2.51v}{D\sqrt{(2gDs)}}\right)$

(5) The Proposed Development will have phasing based on indicative preliminary deisgn. This calculation is prepared base on 7 phasing (3 on Site 28A and 4 on Site 28B), serving only as an assumption for the Sewerage Appraisal.

Table 6a Comparison of the Hydraulic Capacity of the Lead-in for Each Site

Hydraulic Capacity of Future Sewers

Manhole Reference	Manhole Reference	Proposed Pipe Dia. (mm)	Proposed Pipe Length (m)	Gradient	Estimated Capacity (L/s)	Peak Flow from the Proposed Development (L/s)	Contribution from the Proposed Development (%)	Status	Included Catchment
LI-S4.25b-1	FMH158a	355	11.4	0.0035	110	53.4	48.5%	OK	Site 28B-1
LI-S4.25b-3	FMH164a	355	12.8	0.0055	138	53.4	38.6%	OK	Site 28B-2
LI-S4.25a-1	FMH165a	355	11.6	0.0035	109	38.4	35.2%	OK	Site 28B-3
LI-S4.25c-1	FMH157b	355	11.6	0.0060	145	77.3	53.2%	OK	Half of Site 28B-4
LI-S4.25c-2	FMH399a	355	12.4	0.0056	140	77.3	55.1%	OK	Half of Site 28B-4
LI-S4.29-2	FMH168a	450	20.0	0.0040	220	64.3	29.2%	OK	Site 28A-1
LI-S4.29-3	FMH178A	315	17.6	0.0034	79	41.2	52.0%	OK	Half of Site 28A-2
LI-S4.29-4	FMH175a	315	14.6	0.0041	87	41.2	47.2%	OK	Half of Site 28A-2
LI-S4.29-1	FMH166b	450	13.0	0.0041	223	152.0	68.2%	OK	Site 28A-3

Table 6b Comparison of the Public Sewers for Sewerage generated from the Proposed Development and Surrounding Catchment Areas

Manhole Reference	Manhole Reference	Pipe Dia. (mm)	Pipe Length (m)	Gradient	Estimated Capacity (L/s)	Peak Flow from the Proposed Development and Surrounding Catchment (L/s)	Contribution from the S16 Proposed Development and Surrounding Catchment (%)	Status	Catchment included/ to be included
LI-S4.25c-1	FMH157b	355	11.6	0.006	145.11	77.3	53.2%	OK	Half of Site 28B-4
FMH157b	FMH399a	450	17.1	0.008	315.98	77.3	24.5%	OK	Half of Site 28B-4
LI-S4.25c-2	FMH399a	355	12.4	0.006	140.29	77.3	55.1%	OK	Half of Site 28B-4
FMH399a	FMH158a	450	37.1	0.006	274.74	154.5	56.2%	OK	Site 28B-4 (whole)
FMH158a	FMH159a	450	46.8	0.005	244.13	160.5	65.7%	OK	Site 28B-4 + Site 28B-1
FMH159a	FMH160b	450	42.0	0.006	269.18	160.5	59.6%	OK	Site 28B-4 + Site 28B-1
FMH160b	FMH162a	450	15.0	0.013	404.27	160.5	39.7%	OK	Site 28B-4 + Site 28B-1
FMH162a	FMH163a	560	57.5	0.004	407.34	263.6	64.7%	OK	Site 28B-4 + Site 28B-1 + Catchment A
FMH163a	FMH164a	560	39.7	0.006	481.41	263.6	54.7%	OK	Site 28B-4 + Site 28B-1 + Catchment A
FMH164a	FMH164_1	630	48.0	0.007	720.34	300.0	41.6%	OK	Site 28B-4 + Site 28B-1 + Catchment A + Site 28B-2
FMH164_1	FMH165a	630	49.8	0.003	475.71	300.0	63.1%	OK	Site 28B-4 + Site 28B-1 + Catchment A + Site 28B-2
FMH165a	FMH1119-1	710	39.2	0.003	634.39	382.1	60.2%	OK	Site 28B-4 + Site 28B-1+ Catchment A + Site 28B-2 + Site 28B-3 + Catchment B
FMH1119-1	FMH166b	710	42.3	0.003	635.83	382.1	60.1%	OK	Site 28B-4 + Site 28B-1+ Catchment A + Site 28B-2 + Site 28B-3 + Catchment B
FMH166b	FMH167a	710	52.6	0.005	777.05	581.5	74.8%	OK	Site 28B-4 + Site 28B-1 + Catchment A + Site 28B-2 + Site 28B-3 + Catchment B + Site 28A-3 + Half of Catchment C
FMH167a	FMH168a	710	63.5	0.005	790.53	581.5	73.6%	OK	Site 28B-4 + Site 28B-1 + Catchment A + Site 28B-2 + Site 28B-3 + Catchment B + Site 28A-3 + Half of Catchment C
FMH168a	FMH173a	710	67.0	0.003	672.74	625.5	93.0%	OK	Site 28B-4 + Site 28B-1 + Catchment A + Site 28B-2 + Site 28B-3 + Catchment B + Site 28A-3 + Half of Catchment C + Site 28A-1
FMH341A	FMH175a	500	28.9	0.007	383	23.1	6.0%	OK	Catchment D
FMH175a	FMH176b	710	22.7	0.007	998.34	73.2	7.3%	OK	Half of Site 28A-2 + Catchment D
FMH176b	FMH177a	710	36.3	0.008	1013.39	136.9	13.5%	OK	Half of Site 28A-2 + Catchment D + Catchment E
FMH177a	FMH178a	710	50.5	0.007	987.23	136.9	13.9%	OK	Half of Site 28A-2 + Catchment D + Catchment E
FMH178a	FMH173a	710	21.0	0.009	1069.26	176.6	16.5%	OK	Site 28A-2 + Catchment D + Catchment E
FMH173a	FMH179a	900	7.7	0.025	3387.43	765.0	22.6%	OK	Site 28B-1 + Site 28B-2 + Site 28B-3 + Site 28B-4 + Site 28A-1 + Site 28A-2 + Site 28A-3 + Catchment A + Catchment B + Half of Catchment C + Catchment D + Catchment E

Remark: The Proposed Development will have phasing based on indicative preliminary deisgn. This calculation is prepared base on 7 phasing (3 on Site 28A and 4 on Site 28B), serving only as an assumption for the Sewerage Appraisal.

Appendix 2.2 Capacity of SPS 1, SPS 2 and HSKEPP from the Government

Sally Chiu

From: sychong@cedd.gov.hk
Sent: Thursday, 9 January 2025 1:42 pm
To: Tony Cheng
Cc: Erica Hui; Ken Chan; nlchan@cedd.gov.hk; Peter Yu; Sally Chiu; calvincmwong@cedd.gov.hk
Subject: RE: Comments on HSK infrastructure work contract : Stage 2 engineering infrastructure works - sewerage & drainage

Follow Up Flag: Follow up
Flag Status: Flagged

Dear Tony,

1) Please find our latest DSIA fyi:
20250108 DSIA

2) Please find my reply in blue.

Thank you.

Regards,
Ice CHONG
E/21(W), WDO, CEDD
Tel.: 2158 5661

CEDD 土木工程拓展署 Civil Engineering and Development Department | 20th ANNIVERSARY

Tony Cheng ---18/12/2024 15:15:22---Dear Pete, Thank you for the information.

From: Tony Cheng <tcheng@ramboll.com>
To: Peter Yu <peter.yu@arup.com>
Cc: "sychong@cedd.gov.hk" <sychong@cedd.gov.hk>, nlchan <nlchan@cedd.gov.hk>, Ken Chan <ken.chan@arup.com>, Erica Hui <erica.hui@arup.com>, Sally Chiu <SHLCHIU@ramboll.com>
Date: 18/12/2024 15:15
Subject: RE: Comments on HSK infrastructure work contract : Stage 2 engineering infrastructure works - sewerage & drainage

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Dear Pete,

Thank you for the information.

Could you please also advise the latest design capacity of the following sewerage facilities?

1. Hung Shui Kiu Sewage Pumping Station 1;
2. Hung Shui Kiu Sewage Pumping Station 2; and
3. Hung Shui Kiu Effluent Polishing Plant

Items 1 and 2

App 2.2 Capacity of SPS 1, SPS 2 and HSKEPP from the Government

SPS1 and 2 design capacities below, extracted from the latest DSIA.

Table 3.13 Design Cumulative ADWF (by SPS)

Sewage Pumping Station	Design ADWF (m3/day)	Design Cumulative ADWF (m3/day)
HTSPS	36,518	42,515
SPS1	28,170	28,874
SPS2	1,445	42,255
SPS3	11,610	11,900
SPS4	23,873	69,104

Notes:

1. Cumulative ADWF for:

Items 3 - You may like to double check with DSD (Mr Bob CHEUNG at tel. 2159 3414, ylcheung@dsd.gov.hk).

HSKEPP Phase 1 Works - 60,000m3/day (2031/32).

HSKEPP Ultimate - 90,000m3/day (2031/32).

Kind regards
Tony Cheng
Senior Manager

D 3465 2822
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Appendix 2.3 After-meeting email record

Sally Chiu

From: Gary Yuen
Sent: Tuesday, 1 April 2025 4:02 pm
To: jackycktsang@epd.gov.hk; khcheng@dsd.gov.hk; ykchan06@dsd.gov.hk; calvincmwong@cedd.gov.hk; jackson@epd.gov.hk; otchow@dsd.gov.hk
Cc: CHAN Phoebe Mui Ling (陳玫陵); LEE KS Kong Sing (李港星); WONG WK Wai Keung (PCD) (黃偉強); LAU Brian Cheuk Kiu (劉卓翹); Tony Cheng; Wendy Tin
Subject: [S16 Submission of Hung Shui Kiu Area 28A & 28B] Wrap-up of Collaboration Meeting Regarding Sewerage Issues
Attachments: 250401_RAM_MTRC_CEDD_DSD_EPD_Sufficient_v3.pptx

Dear all,

Thank you for joining the meeting this morning with the presence of MTRCL, CEDD, DSD and EPD. We enclose the presentation file for your record.

According to the discussion during the meeting, all parties have reviewed:-

1) The proposed total ADWF for Hung Shui Kiu Area 28A & 28B of 10088.1 m3/day, which has been presented in the S16 SIA Appraisal submission; and
2) The sewerage pipesworks design drawings in December 2024 and the DSIA report in January 2025 for HSK NDA prepared by CEDD.

The capacities of both the current proposed pipeworks and sewerage pumping stations (SPS1 and SPS2) are considered sufficient to cater the proposed total ADWF for Hung Shui Kiu Area 28A & 28B of 10088.1 m3/day.

Furthermore, to accommodate the possible sewerage discharge increment of the entire HSK NDA in future, i.e. including Site 28A & 28B and other development sites, CEDD agreed to follow up the latest development parameters and information of other development sites within the HSK NDA area and keep reviewing the capacities of current proposed SPS1 and SPS2, and to advise any upgrading works of the SPSs is needed in future.

For upcoming Response to Comments on our DRAFT S16 submission, we will state the following statement in our response to ease the concerns of all parties so that S16 submission of Area 28A and 28B will be not jeopardised.

“Meeting was held with the presence of CEDD/DSD/EPD on 1 April, 2025. The capacities of both the currently proposed pipeworks and sewerage pumping stations (SPS1 and SPS2) were considered sufficient to cater the proposed total ADWF for Hung Shui Kiu Area 28A & 28B of 10088.1 m3/day.”

Kind regards
Gary Yuen

D +852 34652885

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