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**Appendix H**

**Sewerage Impact Assessment**

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# Section 16 Planning Application for Proposed Commercial Use at Phase IIa Development of an Approved Master Layout Plan (MLP) with Minor Relaxation of Plot Ratio Restriction (Proposed Amendments to the Approved MLP for Comprehensive Residential, Commercial, Social Welfare Facility and Public Vehicle Park Development; with Minor Relaxation of Plot Ratio Restriction Approved at Phase III)

Sewerage Impact Assessment

May 2026

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# 1. Introduction

## 1.1 Background

- 1.1.1 AECOM Asia Company Limited (AECOM) was commissioned by the project proponent to act as the engineering consultant to conduct a Sewerage Impact Assessment (SIA) to support the Proposed Commercial Development to the south of Castle Peak Road, Yuen Long, New Territories.
- 1.1.2 This planning application is submitted for proposed commercial development in Phase IIa of a Comprehensive Commercial/Residential Development at the “Comprehensive Development Area” (“CDA”) to the immediate south of Castle Peak Road in Area 12, Yuen Long. The location plan is shown in **SIA/Figure 1**.
- 1.1.3 The Application Site is zoned “CDA” under the Draft Yuen Long Outline Zoning Plan (OZP) No. S/YL/28 and is the subject of various previously approved planning applications for comprehensive commercial/residential development between 1995 and 2023. Due to multiple ownership involved, a phased development approach has all along been adopted for the various development proposals approved therein.
- 1.1.4 According to the latest planning application No. A/YL/298 for proposed subsidized sale flats (SSF) and social welfare facility (SWF) development approved on 31.3.2023 (hereafter referred to as the “Approved CDA Development”) for the subject “CDA” site, the Approved CDA Development is divided into three phases, including Phase I (i.e. the completed commercial/residential development known as the completed YOHO Midtown at the northern and eastern portions), Phases IIa & IIb (i.e. the approved hotel and flats development at the northwestern portion), and Phase III (i.e. the proposed SSF and SWF under the approved application at the southwestern portion).
- 1.1.5 It should be emphasized that the subject matter of the current planning application is the proposed change in Phase IIa to commercial development only. No change is proposed for Phases I, IIb and III developments within the same “CDA” zone. Under the Approved CDA Development, Phase IIa was proposed for hotel development. However, in order to contribute to achieving home-job balance and creating a mixed-use neighbourhood in Yuen Long District, Phase IIa is now proposed to be a commercial/office development with supporting commercial/retail facilities.
- 1.1.6 This SIA report serves as a supporting document for the S16 Planning Application for amendments to an approved master layout plan. Since the SIA for the “CDA” had already been approved in July 2023 under planning application No. A/YL/298 with allowances made for sewage discharge from Phase IIa development, relevant comparisons will be made in this report.

## 1.2 Objective of this Submission

- 1.2.1 This report outlines the assessment results of the potential sewerage impacts caused by the Proposed Development at Phase IIa of the Application Site. The main objectives of this assessment include the following:
  - (i) Review the existing sewerage conditions;
  - (ii) Outline the methodology adopted in this assessment;
  - (iii) Identify any potential impacts on the current sewerage system due to the sewage discharge from the proposed development in Phase IIa and the existing developments nearby, and compare with the Previously Approved Scheme under planning application No. A/YL/298;
  - (iv) Propose sewerage mitigation measures where appropriate to mitigate the potential sewerage impacts.

## 1.3 Nomenclature

1.3.1 The following abbreviations and shortened expressions in **Table 1** are adopted in this report.

ADWF	Average Dry Weather Flow
AECOM	AECOM Asia Company Limited
DSD	Drainage Services Department
EPD	Environmental Protection Department
GESF	Guidelines for Estimating Sewage Flows for Sewerage Infrastructure Planning Version 1.0 (EPD)
GFA	Gross Floor Area
HKPSG	Hong Kong Planning Standards and Guidelines
mPD	Metres above Principal Datum
PlanD	Planning Department
SM(I)	Sewerage Manual Part 1 (3 <sup>rd</sup> Edition, DSD)
SIA	Sewerage Impact Assessment
UFF	Unit Flow Factor

**Table 1 – Nomenclature**

## 2. Development Proposal

### 2.1 The Proposed Development

- 2.1.1 The Phase IIa development site area is approximately 1,230m<sup>2</sup> with a proposed total non-domestic Gross Floor Area (GFA) of not more than 12,207m<sup>2</sup>, comprising a commercial/office space of about 11,607m<sup>2</sup> and commercial/retail area of about 600m<sup>2</sup>. The tentative intake year for the Phase IIa development is 2030.
- 2.1.2 The Master Layout Plan (MLP) of the Proposed Development is shown in **SIA/Figure 2** and the proposed development schedule is summarised in **Table 2** below.

Development Parameters <sup>(1)</sup>	Phase IIa
Development Site Area	About 1,230m <sup>2</sup>
Total Non-domestic GFA for Proposed Commercial Development <sup>(2)</sup>	Not more than 12,207m <sup>2</sup>
- Commercial/Office	About 11,607m <sup>2</sup>
- Commercial/Retail	About 600m <sup>2</sup>
Total Non-domestic Plot Ratio	About 9.93
Maximum Site Coverage	Not exceeding 24m: Not more than 92% Above 24m: Not more than 65%
Maximum Building Height (to the main roof)	Not more than 145mPD
Total No. of Storeys <sup>(3)</sup>	29 storeys
No. of Blocks	1

**Table 2 – Development Schedule**

Remarks:

- (1) Development parameters shown on this indicative development schedule are for Phase IIa development only (i.e. subject matter of the current planning application).
- (2) Including 'Office', 'Eating Place', 'Place of Entertainment', 'Place of Recreation, Sports or Culture', 'School' (kindergarten, nursery, language, computer, commercial and tutorial schools, art school, ballet and other types of schools providing interest / hobby related courses) and 'Shop and Services'.
- (3) Including 23 commercial / office storeys + 2 commercial / retail storeys (including M/F) + 4 storeys for E&M, carpark and entrance lobby; excluding 1 refuge floor and transfer plate.

## 3. Assessment Methodology

### 3.1 Overview of Methodology

- 3.1.1 The estimation of non-domestic sewage flow for the proposed development is in accordance with “*Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning Version 1.0*” (GESF) published by the Environmental Protection Department (EPD). The sewage design is in accordance with the Sewerage Manual published by Drainage Services Department (DSD). The sewage estimation is presented in **Appendix 2**.
- 3.1.2 The estimation of non-domestic population for the proposed development is in accordance with the Hong Kong Planning Standards and Guidelines (HKPSG) published by the Planning Department (PlanD).
- 3.1.3 According to GESF Table T-4, Catchment Inflow Factor (PCIF) of 1.0 for Yuen Long District Catchment is adopted for this design.

### 3.2 Unit Flow Factors

- 3.2.1 The adopted sewage unit flow factors for sewage estimation and calculation are summarized in **Table 3**.

Development Type	Flow Type	Unit Flow Factor (UFF) (m <sup>3</sup> /head/day)
Commercial / Office	General	0.28
Retail (non-F&B)	J4	0.28
Food and Beverage (F&B)	J10	1.58

**Table 3 – Unit Flow Factors adopted in Sewerage Impact Assessment**

### 3.3 Design Population

- 3.3.1 For the non-domestic population, the worker density adopted for business use is made reference to HKPSG Chapter 5 Table 2. A summary of the Phase IIa’s design population can be found in **Table 4** below.

Development Type	GFA (m <sup>2</sup> )	Worker Density (m <sup>2</sup> GFA per worker)	Total no. of Workers
Commercial / Office	11,607	25	465
Retail (non-F&B)	300 <sup>(1)</sup>	25	12
F&B	300 <sup>(1)</sup>	25	12

**Table 4 – Total Workers for Phase IIa Development**

Remarks:

- (1) Assume commercial/retail GFA comprises of 50% F&B and 50% non-F&B.

## 4. Sewerage Impact Assessment

### 4.1 Site Description

4.1.1 Phase IIa of the Application Site is bounded by Castle Peak Road – Yuen Long to the North and Yau Tin East Road to the South.

### 4.2 Existing and Planned Sewerage System

4.2.1 According to the GeoInfo Map, there is an existing 450mm diameter sewer along Yau Tin East Road discharging sewage to a downstream 600mm sewer at Castle Peak Road. There is also an existing 600mm diameter sewer along Castle Peak Road to be discharged to Au Tau Sewage Pumping Station. The existing sewerage network in the proximity of Phase IIa is shown in **SIA/Figure 3**.

4.2.2 With reference to the approved SIA under planning application No. A/YL/298, the existing 450mm sewers between existing manholes FMH1019178, and FMH1018501 would be upgraded to 525mm (inner diameter) PE sewers under Phase III development to cater for the additional sewage generation from Phases IIa & IIb and III development. The proposed sewerage system under Phase III development is extracted in **Appendix 2**. Phase III development is expected to complete by 2030, which matches the tentative intake year of Phase IIa.

### 4.3 Sewage Estimation for the Proposed Development

4.3.1 By adopting the aforementioned design parameters, the average dry weather flow (ADWF) generated from the proposed commercial development of Phase IIa is estimated to be about 152.5 m<sup>3</sup>/day. The summary table is presented in **Table 5**. Detailed sewage flow estimations refer to **Appendix 1**.

<b>Commercial / Office</b>	
Employees	465
Unit Flow Factor for Commercial / Office (General)	0.28
<b>Sewage Flow from Commercial / Office (m<sup>3</sup>/day)</b>	<b>130.2</b>
<b>Retail (non-F&amp;B)</b>	
Employees	12
Unit Flow Factor for Retail (J4)	0.28
<b>Sewage Flow from Retail (m<sup>3</sup>/day)</b>	<b>3.4</b>
<b>Food and Beverage (F&amp;B)</b>	
Employees	12
Unit Flow Factor for F&B (J10)	1.58
<b>Sewage Flow from F&amp;B (m<sup>3</sup>/day)</b>	<b>19.0</b>
<b>Overall Phase IIa Development</b>	
<b>Total Average Dry Daily Flow (ADWF) (m<sup>3</sup>/day)</b>	<b>152.5</b>
<b>Peak Flow (L/s)</b>	<b>10.60</b>

**Table 5 – Sewage Estimation for the Proposed Development**

- 4.3.2 The adopted peaking factor in accordance with GESF Table T-5 is 6 (population range less than 1,000). The peak flow generated from the proposed development is presented in **Table 5**.

## 5. Potential Sewerage Impacts and Mitigation Measures

### 5.1 Potential Sewerage Impacts

- 5.1.1 The sewage generated from Phase IIa is proposed to be discharged to the existing sewerage system to the South at Yau Tin East Road.
- 5.1.2 According to the approved SIA under planning application No. A/YL/298, in the assessment of the combined effect of Phase IIa, IIb and III development to the public sewers along Yau Tin East Road, a sewage generation of 153.3m<sup>3</sup>/day is reserved for Phase IIa development. Extract of the sewage estimation in approved SIA refers to **Appendix 2**.
- 5.1.3 The estimated ADWF for the current proposed commercial development is 152.5m<sup>3</sup>/day, which is less than the ADWF estimated for Phase IIa under the approved SIA mentioned in Section 5.1.2 (i.e. 153.3m<sup>3</sup>/day). Since there is a net reduction in sewage generation under this planning application, by relying on the proposed sewerage system and mitigation measures stated in the approved SIA of Phase III, no adverse impact to the public sewerage system from Phase IIa is envisaged.

### 5.2 Proposed Mitigation Measures

- 5.2.1 As mentioned in the previous sections, with the mitigation measures to be carried out by Phase III development, which is expected to be completed by 2030, no additional mitigation measure is necessary.
- 5.2.2 However, it is noted that the sewage mitigation measures of Phase III development under planning application No. A/YL/298 as extracted in **Appendix 2** is subject to further review under approval conditions and has yet to be finalised. The development of Phase IIa intended to discharge sewage to the existing sewer at Yau Tin East Road between existing manholes FMH1019170 and FMH1019177, following the approved SIA sewerage arrangement under planning application No. A/YL/298 without further mitigation / upgrading works. In case Phase III mitigation measures do not proceed, or completion timeframe do not match the target OP, the development would propose an alternative discharge route.
- 5.2.3 The development discharge could alternatively be conveyed to the existing manhole FMH1039606 at Castle Peak Road. The proposed sewerage arrangement is presented in **SIA/Figure 4**. Based on the hydraulic assessment in **Appendix 3 and 4**, the downstream public sewers have sufficient capacity to cater for the development discharge. Therefore, no adverse impact is envisaged.
- 5.2.4 The exact alignment of the proposed internal sewer and the relevant design shall be further reviewed during the detailed design stage and will be submitted to the relevant government departments (e.g. DSD) for approval.

## 6. Maintenance Responsibility

### 6.1 Proposed Sewage Terminal Manholes

- 6.1.1 The development will be responsible for the construction and maintenance of all sewerage facilities within the Phase IIa Site Boundary, including all internal sewers and the sewage terminal manhole.

### 6.2 Proposed External Sewer and Manhole

- 6.2.1 The development is responsible for the construction of the proposed sewerage manholes with the associated sewers. Upon completion, the proposed external sewerage system (including the sewer between terminal manhole and public manhole) will be handed over to DSD for future maintenance.

## 7. Conclusion

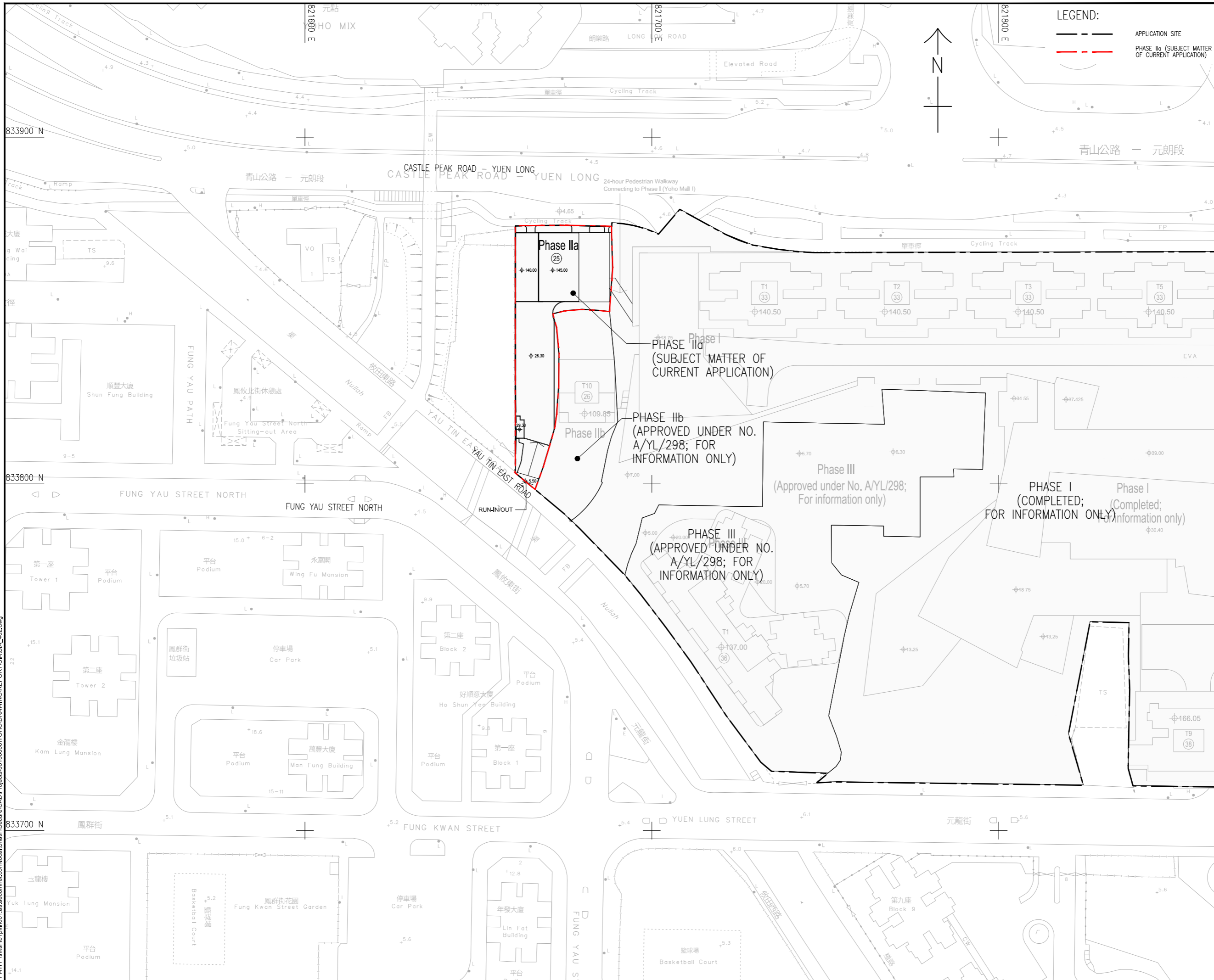
- 7.1.1 The SIA for the Application Site was previously approved under planning application No. A/YL/298. Under this planning application, the MLP for Phase IIa is amended, and the sewerage impacts arising from Phase IIa development is assessed under this SIA.
- 7.1.2 Approximately 152.5m<sup>3</sup>/day of sewage in ADWF would be generated from Phase IIa and conveyed to the existing sewerage system along Yau Tin East Road.
- 7.1.3 The sewage flow (ADWF) of the Proposed Commercial Development (current scheme) is reduced compared to the approved SIA under Application No. A/YL/298 and the proposed upgrading works by Phase III will be completed by 2030, i.e. same as the tentative completion year for the proposed commercial development.
- 7.1.4 The SIA had also considered in the event that the sewerage mitigation measures by Phase III are not carried out or do not match the development programme of Phase IIa under this application, discharge from the Proposed Commercial Development could be alternatively conveyed to the existing manhole FMH1039606 at Castle Peak Road. Based on the hydraulic assessment conducted under the SIA, the downstream sewers have sufficient capacity to cater for the development discharge with this alternative measure.
- 7.1.5 Taking into account the above considerations, the Proposed Commercial Development is therefore acceptable in sewerage terms.

**End of Report**

# Figures



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**PROJECT**  
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**ISSUE/REVISION**

NO.	DATE	DESCRIPTION

**STATUS**

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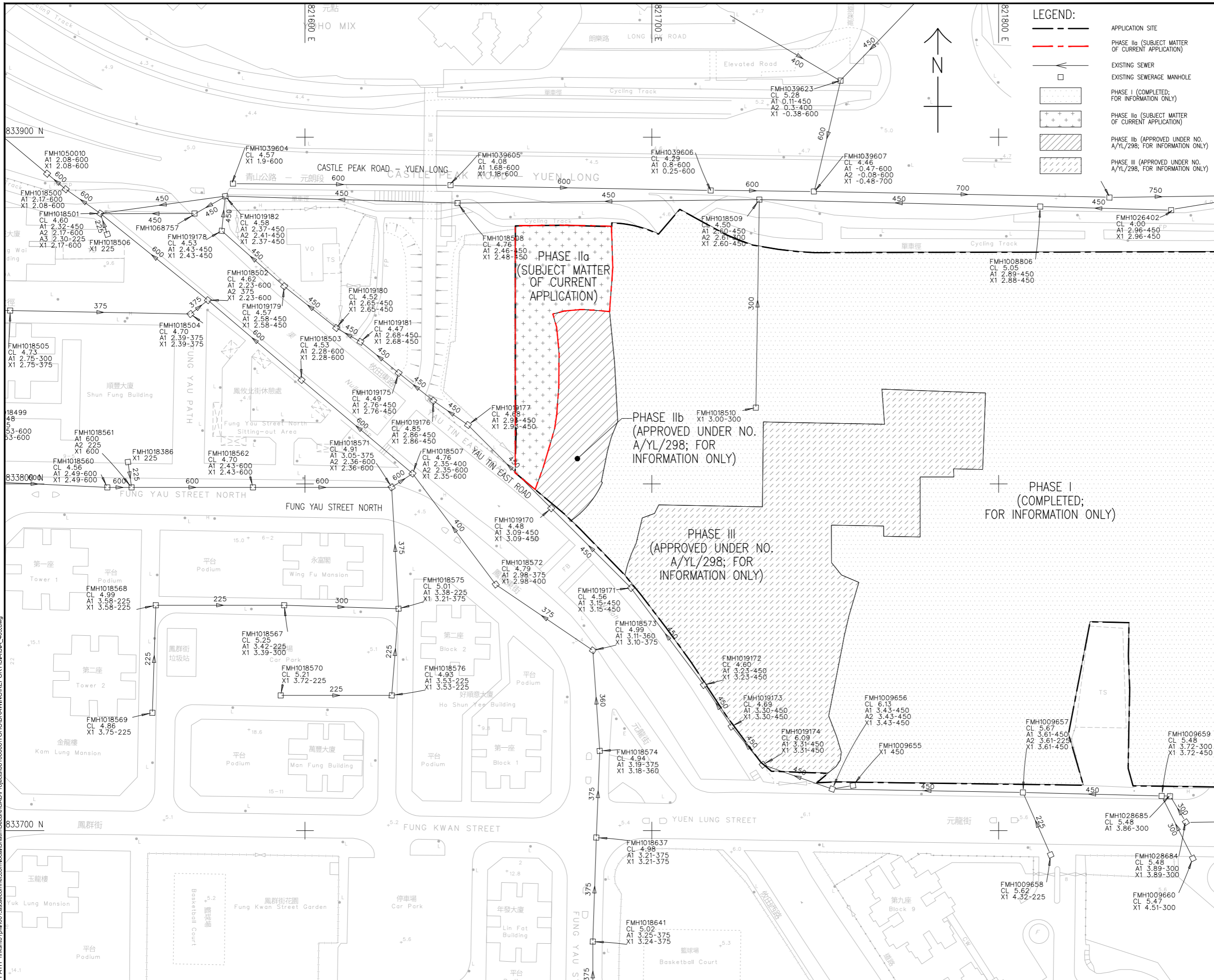
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 MASTER LAYOUT PLAN

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**LEGEND:**

- APPLICATION SITE
- PHASE IIa (SUBJECT MATTER OF CURRENT APPLICATION)
- EXISTING SEWER
- EXISTING SEWERAGE MANHOLE
- PHASE I (COMPLETED; FOR INFORMATION ONLY)
- PHASE IIa (SUBJECT MATTER OF CURRENT APPLICATION)
- PHASE IIb (APPROVED UNDER NO. A/YL/298; FOR INFORMATION ONLY)
- PHASE III (APPROVED UNDER NO. A/YL/298; FOR INFORMATION ONLY)

**AECOM**

**PROJECT**  
SECTION 16 PLANNING APPLICATION FOR PROPOSED COMMERCIAL USE AT PHASE IIA DEVELOPMENT OF AN APPROVED MASTER LAYOUT PLAN (MLP) WITH MINOR RELAXATION OF PLOT RATIO RESTRICTION (PROPOSED AMENDMENTS TO THE APPROVED MLP FOR COMPREHENSIVE RESIDENTIAL, COMMERCIAL, SOCIAL WELFARE FACILITY AND PUBLIC VEHICLE PARK DEVELOPMENT; WITH MINOR RELAXATION OF PLOT RATIO RESTRICTION APPROVED AT PHASE III)

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NO.	DATE	DESCRIPTION

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**KEY PLAN**

**PROJECT NO.**  
YOHO

**AGREEMENT NO.**  
SIASA

**SHEET TITLE**  
EXISTING SEWERAGE LAYOUT PLAN

**SHEET NUMBER**  
YOHO/SIA/FIGURE 3

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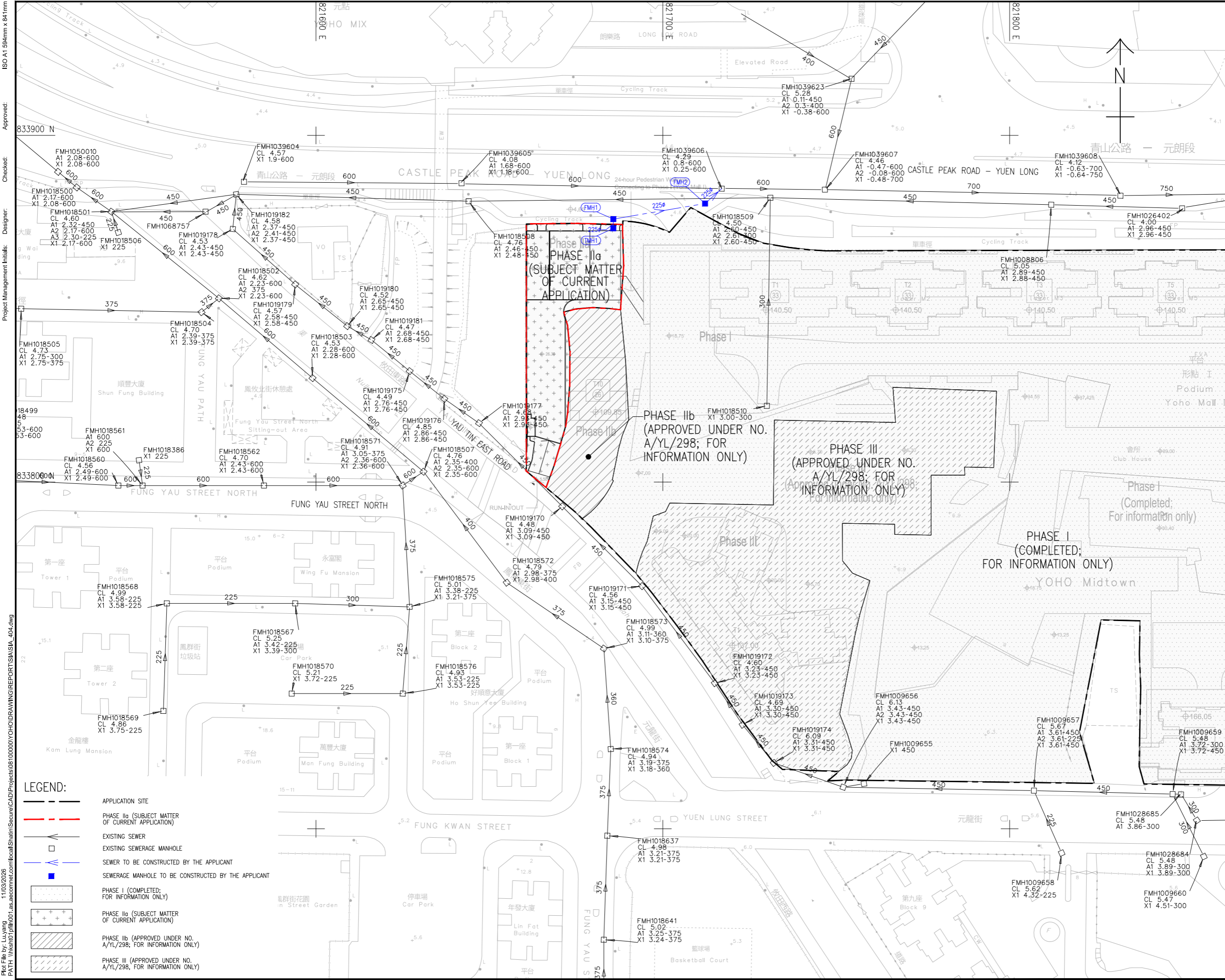
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**SHEET NUMBER**  
YHOH/SIA/FIGURE 4



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**LEGEND:**

- APPLICATION SITE
- PHASE Iia (SUBJECT MATTER OF CURRENT APPLICATION)
- EXISTING SEWER
- EXISTING SEWERAGE MANHOLE
- SEWER TO BE CONSTRUCTED BY THE APPLICANT
- SEWERAGE MANHOLE TO BE CONSTRUCTED BY THE APPLICANT
- PHASE I (COMPLETED; FOR INFORMATION ONLY)
- PHASE Iia (SUBJECT MATTER OF CURRENT APPLICATION)
- PHASE Iib (APPROVED UNDER NO. A/YL/298; FOR INFORMATION ONLY)
- PHASE III (APPROVED UNDER NO. A/YL/298; FOR INFORMATION ONLY)

# Appendix 1

## Sewage Estimation of Phase IIa Development

**Estimation of Sewage of Phase IIa Development**

Type	GFA	Worker Density	Employee	Unit Flow Factor	Flow in ADWF
	(m <sup>2</sup> )	(m <sup>2</sup> per employee)		(m <sup>3</sup> /day/p)	(m <sup>3</sup> /day)
Commercial / Office	11607.0	25	465	0.28	130.2
Retail Non-F&B (J4)	300.0	25	12	0.28	3.4
F&B (J10)*	300.0	25	12	1.58	19.0
				<b>Total Phase IIa</b>	<b>152.5</b>

\*Assume 50% of Commercial/Retail GFA is F&B

# Appendix 2

## Extract from the Approved SIA under Planning Application No. A/YL/298



Table 1 Calculation for Sewage Generation Rate of the Proposed SSF Development

Type of Use		Residential					Recreational facilities (for residents only)			G/IC					ADWF (m <sup>3</sup> /day)									
Remarks		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)					
Catchment	Discharge Manhole (S)	Number of Residential Flats	Average Household Size	Population	Domestic Type	UFF (m <sup>3</sup> /person/day)	GFA	Number of Employee	UFF (m <sup>3</sup> /employee/day)	GFA	Number of Employee	UFF (m <sup>3</sup> /employee/day)	Number of Beds	Domestic Type	UFF (m <sup>3</sup> /person/day)	Residential	Recreational facilities (for residents only)	G/IC	Sub-total	Catchment Total	Catchment Total with P <sub>CF</sub> = 1.0 (Yuen Long)	Cumulative Total		
<b>Phase III Development Site (Subject Matter) (Phase III)</b>	SS																				570.0	570.0	570.0	
residential SSF		720	2.8	2016	R2	0.27	513	17	0.28							544.3	4.7			549.1				
Small Group Home for Mildly Mentally Handicapped Children										1200	22	0.28	32	R2	0.27					14.8	14.8			
District Elderly Community Centre										1200	22	0.28								6.2	6.2			

**Total**  
Phase III Development Contributing Population = 2111  
  
**Gravity sewer for connection to public sewer**  
Peaking Factor = 6 (6)  
Total Peak Flow = 39.6 litre/sec

Remarks:

- (1) For private residential developments, Person-per-flat ratio of 2.6 as per the assumption under 2021 Population Census - Average Household Size in (M04)Yuen Lung is adopted. For Proposed SSF Development in Phase III, person-per-flat ratio of 2.8 is adopted as per the average household size for subsidized sale flats in Housing in Figures 2022 by the Housing Bureau.
- (2) PR: Public rental, TV: Traditional village, MV: Modern village, IS: Institutional and special class, TN: Temporary and non-domestic, MR: Mobile residents
- (3) Residential UFF = 0.19 m<sup>3</sup>/person/day is adopted for PR, R1, IS and MS. UFF = 0.27 m<sup>3</sup>/person/day is adopted for R2 and MV. UFF = 0.37 m<sup>3</sup>/person/day is adopted for R3 and R4. UFF = 0.15 m<sup>3</sup>/person/day is adopted for TV and TN (refer to Table T-1 of GESF)
- (4) Assumed floor area per Recreational facilities employee = 30.3 m<sup>2</sup> per worker (refer to Table 8 of CIFSUS - Community & Social Services)
- (5) Recreational facilities (for residents only) / G/IC employee UFF = 0.28 m<sup>3</sup>/employee/day (refer to Table T-2 of GESF - J11 Community, Social & Personal Services)
- (6) Refer to Table T-5 of GESF for population 1,000-5,000 incl. stormwater allowance
- (7) Number of staff as per advised by Social Welfare Department

Table 3 Calculation for Sewage Generation Rate of the Existing Surrounding Building

**Catchment A (S5)**

**1. Yoho Town**

Total number of units	=	2200 units
Total number of residents	=	5720 people -- (2021 Population Census: Average Household Size of 2.6 in Yuen Lung)
Design flow	=	0.27 m <sup>3</sup> /person/day -- (Private R2 in Table T-1 of GESF)
Sewage Generation rate	=	<b>1544.4 m<sup>3</sup>/day</b>

Recreational facilities

Assumed Area	=	2139 m <sup>2</sup>
Assumed floor area per employee	=	30.3 m <sup>2</sup> per employee -- (refer to Table 8 of CIFSUS - Community & Social Services)
Total number of employees	=	71 employees
Design flow for commercial employee	=	0.28 m <sup>3</sup> /employee/day -- (refer to Table T-2 of GESF - J11)
Sewage Generation rate	=	<b>19.8 m<sup>3</sup>/day</b>

**2. Kwong Ming Ying Loi School**

Total number of teachers & staff	=	67 teachers & staff (from the website)
Design flow for teachers & staff	=	0.28 m <sup>3</sup> /person/day (refer to Table T-2, Commercial Employee)
Total number of students	=	1121 students (from the website)
Design flow for students	=	0.04 m <sup>3</sup> /person/day (refer to Table T-2, School Student)
Sewage Generation rate	=	<b>63.6 m<sup>3</sup>/day</b>

**3. Yoho Midtown (Approved Phase I Development under Planning Application No. A/YL/205) (Tower 7 - 9)**

Total number of units	=	693 units
Total number of residents	=	1802 people -- (2021 Population Census: Average Household Size of 2.6 in Yuen Lung)
Design flow	=	0.27 m <sup>3</sup> /person/day -- (Private R2 in Table T-1 of GESF)
Sewage Generation rate	=	<b>486.5 m<sup>3</sup>/day</b>

Recreational facilities

Assumed Area	=	2561.7 m <sup>2</sup>
Assumed floor area per employee	=	30.3 m <sup>2</sup> per employee -- (refer to Table 8 of CIFSUS - Community & Social Services)
Total number of employees	=	85 employees
Design flow for commercial employee	=	0.28 m <sup>3</sup> /employee/day -- (refer to Table T-2 of GESF - J11)
Sewage Generation rate	=	<b>23.7 m<sup>3</sup>/day</b>

**4. Tutor Time International Nursery & Kindergarten**

Total number of teachers & staff	=	10 teachers & staff (Profile of Kindergartens and Kindergarten-cum-Child Care Centres, <a href="https://kqp2022.azurewebsites.net/edb/">https://kqp2022.azurewebsites.net/edb/</a> )
Design flow for teachers & staff	=	0.28 m <sup>3</sup> /person/day (refer to Table T-2, Commercial Employee)
Total number of students	=	71 students (Profile of Kindergartens and Kindergarten-cum-Child Care Centres, <a href="https://kqp2022.azurewebsites.net/edb/">https://kqp2022.azurewebsites.net/edb/</a> )
Design flow for students	=	0.04 m <sup>3</sup> /person/day (refer to Table T-2, School Student)
Sewage Generation rate	=	<b>5.6 m<sup>3</sup>/day</b>

**5. Yoho Mall I**

Retail

Assumed Area	=	24391 m <sup>2</sup>
Assumed floor area per employee	=	28.6 m <sup>2</sup> per employee -- (refer to Table 8 of CIFSUS -Retail Trade)
Total number of employees	=	854 employees
Design flow for commercial employee	=	0.28 m <sup>3</sup> /employee/day -- (refer to Table T-2 of GESF - J4)
Sewage Generation rate	=	<b>239.0 m<sup>3</sup>/day</b>

F&B

Assumed Area	=	1807 m <sup>2</sup>
Assumed floor area per employee	=	19.6 m <sup>2</sup> per employee -- (refer to Table 8 of CIFSUS - Restaurant)
Total number of employees	=	92 employees
Design flow for commercial employee	=	1.58 m <sup>3</sup> /employee/day -- (refer to Table T-2 of GESF - J10)
Sewage Generation rate	=	<b>145.6 m<sup>3</sup>/day</b>

Overall Catchment A

Flow Rate (without Catchment Inflow Factor)	=	2528.2 m <sup>3</sup> /day
Catchment Inflow Factor	=	1.0 Catchment Inflow Factor for Yuen Long in Table T-4 of GEFS
Flow Rate (with Catchment Inflow Factor)	=	<b>2528.2 m<sup>3</sup>/day</b>

**Catchment A1 (S6)**

**1. Approved Phase II Development under Planning Application No. A/YL/205**

Total number of units	=	156 units
Total number of residents	=	406 people -- (2021 Population Census: Average Household Size of 2.6 in Yuen Lung)
Design flow	=	0.27 m <sup>3</sup> /person/day -- (Private R2 in Table T-1 of GESF)
Sewage Generation rate	=	<b>109.5 m<sup>3</sup>/day</b>

Hotel

Staff

2a. No. of Hotel Room	=	324 Room
2b. Assumed number of employees	=	97 employees (assumed 3 employees for every 10 rooms)
2c. Design flow for commercial activities	=	1.58 m <sup>3</sup> /employee/day -- (refer to Table T-2 of GESF Job Type J10)
2d. Sewage generation rate	=	<b>153.3 m<sup>3</sup>/day</b>

Overall Catchment A1

Flow Rate (without Catchment Inflow Factor)	=	262.8 m <sup>3</sup> /day
Catchment Inflow Factor	=	1.0 Catchment Inflow Factor for Yuen Long in Table T-4 of GEFS
Flow Rate (with Catchment Inflow Factor)	=	<b>262.8 m<sup>3</sup>/day</b>

**ADWF of Phase IIa**

**Table 4a Comparison of the Hydraulic Capacity of Existing Sewers for Sewage generated from the Proposed Development and Existing & Planned Surrounding Catchment Areas**

Segment	Pipe Dia. (mm)	Pipe Length (m)	Gradient	Estimated Capacity (L/s)	ADWF (m <sup>3</sup> /day)	Contributing Population	Peaking Factor	Swimming Pool/Public Toilet (L/s)	Peak Flow from the Proposed Development and Catchment Areas (L/s)	Contribution from the Proposed Development and the Surrounding Catchment Areas (%)	Status
S5 - S6	450	31.8	0.002	112	3098.2	11475	4	0.0	143.4	128%	Spill
S6 - S7	450	33.1	0.005	224	3361.0	12448	4	0.0	155.6	69%	OK
S7 - S8	450	11.4	0.006	253	3361.0	12448	4	0.0	155.6	62%	OK
S8 - S9	450	11.7	0.009	299	3361.0	12448	4	0.0	155.6	52%	OK
S9 - S10	450	13.0	0.006	253	3361.0	12448	4	0.0	155.6	61%	OK
S10 - S11	450	7.1	0.004	209	3361.0	12448	4	0.0	155.6	74%	OK
S11 - S12	450	18.2	0.004	200	3361.0	12448	4	0.0	155.6	78%	OK
S12 - S13	450	23.2	0.006	260	3361.0	12448	4	0.0	155.6	60%	OK
S13 - S14	450	9.3	0.002	120	3361.0	12448	4	0.0	155.6	130%	Spill
S14 - S15	450	35.5	0.001	97	6016.2	22282	4	0.0	278.5	287%	Spill
S15 - S16	600	17.2	0.005	497	9839.7	36443	4	0.0	455.5	92%	OK

**Table 4b Comparison of the Hydraulic Capacity of Upgraded Sewers for Sewerage generated from the Proposed Development and Surrounding Catchment Areas**

Segment	Pipe Dia. (mm)	Pipe Length (m)	Gradient	Estimated Capacity (L/s)	ADWF (m <sup>3</sup> /day)	Contributing Population	Peaking Factor	Swimming Pool/Public Toilet (L/s)	Peak Flow from the Proposed Development and Catchment Areas (L/s)	Contribution from the Proposed Development and the Surrounding Catchment Areas (%)	Status
S5 - S6	450	31.8	0.002	112	3098.2	11475	4	0.0	143.4	76%	OK
	375	31.8	0.002	77							
S6 - S7	450	33.1	0.005	224	3361.0	12448	4	0.0	155.6	69%	OK
S7 - S8	450	11.4	0.006	253	3361.0	12448	4	0.0	155.6	62%	OK
S8 - S9	450	11.7	0.009	299	3361.0	12448	4	0.0	155.6	52%	OK
S9 - S10	450	13.0	0.006	253	3361.0	12448	4	0.0	155.6	61%	OK
S10 - S11	450	7.1	0.004	209	3361.0	12448	4	0.0	155.6	74%	OK
S11 - S12	450	18.2	0.004	200	3361.0	12448	4	0.0	155.6	78%	OK
S12 - S13	450	23.2	0.006	260	3361.0	12448	4	0.0	155.6	60%	OK
S13 - S14	525	9.3	0.002	211	3361.0	12448	4	0.0	155.6	74%	OK
S14 - S15	525	35.5	0.006	392	6016.2	22282	4	0.0	278.5	71%	OK
S15 - S16	600	17.2	0.005	497	9839.7	36443	4	0.0	455.5	92%	OK

**Table 4c Comparison of the Hydraulic Capacity of Existing Sewers connecting the Proposed Development and Public Sewers for Sewage generated from the Proposed Development**

Segment	Pipe Dia. (mm)	Pipe Length (m)	Gradient	Estimated Capacity (L/s)	ADWF (m <sup>3</sup> /day)	Contributing Population	Peaking Factor	Swimming Pool/Public Toilet (L/s)	Peak Flow from the Proposed Development and Catchment Areas (L/s)	Contribution from the Proposed Development and the Surrounding Catchment Areas (%)	Status
T1 - S5	450	2.0	0.015	396	570.0	2111	6	0.0	39.6	10%	OK

Remarks: (1) The value of peaking factor = 4 is used for population 10,000-50,000 incl. stormwater allowance (refers to Table T-5 of GESF)  
(2) The value of peaking factor = 6 is used for population 1,000 – 5,000 incl. stormwater allowance (refers to Table T-5 of GESF)

including 153.3m<sup>3</sup>/day from Phase IIa

# Appendix 3

## Sewage Estimation for Existing and Planned Developments

### Shap Pat Heung Rural Committee

Assumed building footprint	=	139.0 m <sup>2</sup>
No. of floors	=	2
Total floor area	=	278.0 m <sup>2</sup>
Worker density	=	25 m <sup>2</sup> /employee
No. of Employees	=	12 persons
Unit Flow Factor (J11)	=	0.28 m <sup>3</sup> /d/p
ADWF	=	3.36 m <sup>3</sup> /d

*Notes: Building footprint referenced from GeoInfo.*

### Sheng Kung Hui Social Welfare Service Complex cum Youth Hostel

Total Occupants	=	530 persons
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*Note: Assuming 160 single and double rooms, 150-bed residential care home, 60 places for special care centre extracted from:  
<https://echo.hkskh.org/issue.aspx?lang=1&id=2295&nid=3989>*

Unit Flow Factor (Institutional and special class)	=	0.19 m <sup>3</sup> /d/p
ADWF (residents)	=	100.7 m <sup>3</sup> /d

#### 160 single and double rooms youth hostel (conservatively assume 320 occupants)

Notional Staffing Establishment for 15 places boys hostel by SWD:

Non-cook employees	=	4.2
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*Multiply by 320/15 to project employees for 320 occupants:*

Non-cook employees	=	89.6
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#### 150 bed residential care home for elderly

Notional Staffing Establishment for 200 places care and attention home by SWD:

Cooks	=	5
Non-cook employees	=	79.5

*Multiply by 150/200 to project employees for 150 occupants:*

Cooks	=	3.8
Non-cook employees	=	59.6

#### 60 places for children with medim to serious mental and physical disability

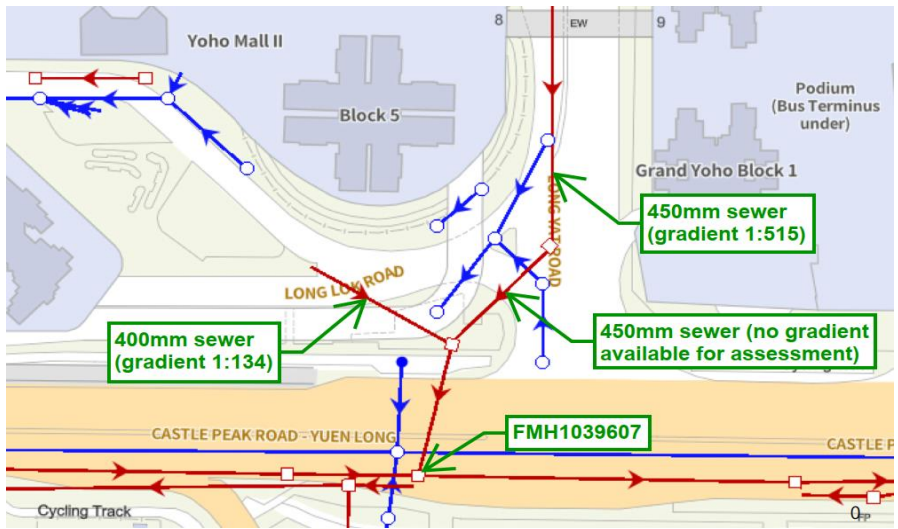
Notional Staffing Establishment for 50 places hostel for severely mentally / physically handicapped persons by SWD:

Cooks	=	2
Non-cook employees	=	36.2

*Multiply by 60/50 to project employees for 60 occupants:*

Cooks	=	2.4
Non-cook employees	=	43.4
Total cooks	=	6.2
Unit Flow Factor (J10)	=	1.58 m <sup>3</sup> /d/p
ADWF (Cooks)	=	9.7 m <sup>3</sup> /d
Total non-cook employees	=	192.6
Unit Flow Factor (J11)	=	0.28 m <sup>3</sup> /d/p
ADWF (non-cook employees)	=	53.9 m <sup>3</sup> /d
Total ADWF (occupants + employees)	=	<u>164.4</u> m <sup>3</sup> /d

**Flow from branch sewer at Long Yat Road to FMH1039607**



Contribution from 400mm sewer (conservatively assuming full-bore):

Pipe size	=	400 mm
Gradient	1 in	134
ks	=	3 mm
V	=	1.30 m/s
Full-bore capacity	=	0.163 m <sup>3</sup> /s

Contribution from 450mm sewer (conservatively assuming full-bore):

Pipe size	=	450 mm
Gradient	1 in	515
ks	=	6 mm
V	=	0.64 m/s
Full-bore capacity	=	0.102 m <sup>3</sup> /s

Total flow from branch sewer to FMH1039607

Peak Flow	=	0.265 m <sup>3</sup> /s
Peaking factor	=	4
ADWF	=	5724.3 m <sup>3</sup> /d
Contributing Population	=	21201 persons

# Appendix 4

## Hydraulic Calculations

**Hydraulic Calculation of Proposed Sewerage System**

U/S MH	D/S MH	U/S I.L.	D/S I.L.	Pipe diameter	Pipe Length	Gradient	$k_s^{(1)}$	R	V	Area	Capacity	ADWF	Contributing Population	Peaking Factor <sup>(2)</sup>	Peak Flow	Utilisation	Remarks
		mPD	mPD				mm									m	
TMH1	FMH1	3.38	3.35	225	2.7	100	0.3	0.05625	1.42	0.040	0.057	152.5	565	6	0.011	18.7%	152.5m <sup>3</sup> /d (ADWF) from Phase IIa Development
FMH1	FMH2	3.35	3.07	225	27.9	100	0.3	0.05625	1.42	0.040	0.057	152.5	565	6	0.011	18.7%	
FMH2	FMH1039606	1.27	1.22	225	5.4	100	0.3	0.05625	1.42	0.040	0.057	152.5	565	6	0.011	18.7%	
FMH1039606	FMH1039607	0.25	-0.08	600	29.7	90	3	0.15	2.07	0.283	0.586	320.2	1186	6	0.022	3.8%	3.36m <sup>3</sup> /d (ADWF) from Shap Pat Heung Rural Committee and 164.4m <sup>3</sup> /d (ADWF) from Sheng Kung Hui Social Welfare Service Complex cum Youth Hostel
FMH1039607	FMH1039608	-0.48	-0.63	700	85.2	568	5.46	0.175	0.83	0.385	0.320	320.2	22387	4	0.280	87.5%	0.265m <sup>3</sup> /s peak flow from Long Yat Road with a contributing population of 21,201
FMH1039608	FMH1039609	-0.64	-0.73	750	38.1	423	3.93	0.1875	1.06	0.442	0.468	320.2	22387	4	0.280	59.7%	
FMH1039609	FMH1039610	-0.75	-0.85	750	45.4	454	4.26	0.1875	1.01	0.442	0.447	320.2	22387	4	0.280	62.6%	
FMH1039610	FMH1039611	-0.85	-0.91	750	26.9	448	4.2	0.1875	1.02	0.442	0.451	320.2	22387	4	0.280	62.1%	

$$g = 9.81\text{m/s}^2$$

$$v = 10^{-6}\text{m}^2/\text{s}$$

## Notes:

<sup>(1)</sup>  $k_s = 6.0\text{-}3.0\text{mm}$  is adopted for existing slimed concrete sewer for velocities equal to 0.75m/s and 1.2m/s respectively.

<sup>(2)</sup> Stormwater allowance is included for existing sewers. No stormwater allowance is considered for the proposed sewer from Phase II to the existing sewer.

