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**Appendix D –  
Sewerage Impact Assessment**

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Issue No. : Issue 3  
Issue Date : April 2026  
Project No. : 1947



## **SEWERAGE IMPACT ASSESSMENT**

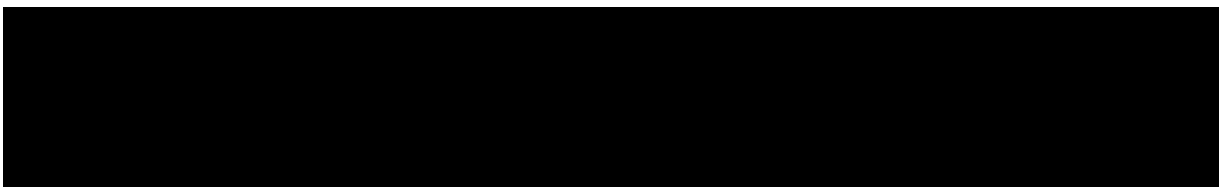
**FOR**

**SECTION 16 PLANNING  
APPLICATION FOR PROPOSED  
AMENDMENTS TO AN  
APPROVED SCHEME (UNDER  
APPLICATION NO. A/H6/91  
WITH MINOR RELAXATION OF  
PLOT RATIO RESTRICTION  
APPROVED) FOR PERMITTED  
FLAT USE AT 4, 4A, 4B AND 4C  
TAI HANG ROAD, HONG KONG**

Prepared by

Allied Environmental Consultants Limited

**COMMERCIAL-IN-CONFIDENCE**





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## 1. Introduction

- 1.1.1. A planning application No. A/H6/91 was submitted to the Town Planning Board (the Board) on 4 June 2021 under Section 16 of the Town Planning Ordinance for Proposed Minor Relaxation of Plot Ratio (PR) Restriction from 5 to 5.687 for Permitted Flat Use at 4, 4A, 4B and 4C Tai Hang Road, Hong Kong (Application Site). The application was approved with conditions by the Board on 14 January 2022. The previous Sewerage Impact Assessment (SIA) report (Issue 2) in support of the Approved Scheme was accepted by DSD and EPD.
- 1.1.2. Subsequent to the approval of the above planning application, the Applicant has been actively proceeding with the detailed design and implementation of the residential development. In response to the latest market trend and to address the continuous housing demand in Hong Kong, the Applicant hereby submits the current application to propose amendments to the Approved Scheme to increase the number of units from 61 to 176, with no change to other major development parameters including GFA, PR and number of storeys as compared with the Approved Scheme. Allied Environmental Consultants Limited (AEC) has been appointed to conduct the current SIA (Issue 3) for the current application.
- 1.1.3. The layout plan updates between approved Issue 2 and Issue 3 are summarized as shown in **Table 1-1**. In view of updates of the layout plan, 72 residential unit (R1 type), 90 residential unit (R2 type) and 14 residential unit (R3 type) were noted. Hence, this SIA report is updated to reflect the change.

**Table 1-1 Comparison of number of residential units in approved Issue 2 and Issue 3**

Residential Unit Category	Approved Issue 2	Issue 3	Remark
	Number of Unit		
R1 Type	0	72	The GFA of unit is <50 m <sup>2</sup>
R2 Type	12	90	The GFA of unit is >50 and <110m <sup>2</sup>
R3 Type	49	14	The GFA of unit is >110m <sup>2</sup>
<b>Total</b>	<b>61</b>	<b>176</b>	

## 2. Objectives

- 2.1.1. Main objectives of the study are to evaluate potential sewerage impacts based on estimated sewage generation, and to recommend appropriate options for sewage discharge from the Proposed Development.

## 3. Description of the Proposed Development

- 3.1.1. The Application Site is located within Inland Lot No. 7426 zoned Residential (Group B) (“R(B)”) on the Approved Causeway Bay Outline Zoning Plan No. S/H6/17, in the vicinity of the Application Site include Winway Court, Jolly Villa, Y.I. and Illumination Terrace on the lower Tai Hang Road, and Trafalgar Court and The Elegance on the upper Tai Hang Road. Its surrounding areas are zoned Residential (Group B) (“R(B)”), and Green Belt (“GB”). Location of the Application Site is shown in **Figure 3-1**.
- 3.1.2. The Proposed Development comprise of 1 no. residential tower, podium and 3 levels of carpark. The Proposed Development is expected to be operated in Year 2030.

## 4. Description of Sewerage System

- 4.1.1. Drainage record plans were obtained from the drawing office of the Drainage Services Department (“DSD”) and the Application Site is indicated on the drainage record plans as shown in **Figure 3-1**. Concerned sewerage network was identified for succeeding estimation of the potential sewerage impact to the downstream sewers associated with the Proposed Development.
- 4.1.2. The sewerage network of existing gravity sewers along Tai Hang Road collects sewage generated from the Proposed Development, via the public sewage manholes FMH7013366 and FMH7013365. The sewage discharged from the Proposed Development is conveyed to North Point Preliminary Treatment Works, and discharged to Stonecutter Island Sewage Treatment Works (SCISTW) for further treatment and ultimate disposal.

## 5. Legislation, Standards and Guidelines

- 5.1.1. Water quality in Hong Kong is legislated by the provisions of the Water Pollution Control Ordinance (Cap 358), 1980 (WPCO). Territorial Water has been subdivided into ten Water Control Zones (WCZ) and four supplementary water control zones. A Technical Memorandum on Standards for Effluents discharged into Drainage and Sewerage Systems, Inland and Coastal Water (TMES) has been issued, which requires licensing of all discharges into all public sewers and drains. The water quality standards will have to be met during the operation stage.
- 5.1.2. Besides as stipulated in the Building (Standards of Sanitary Fitments, Plumbing, Drainage Works and Latrines) Regulations 41(1), 40(2), 41(1), 90 and recap in ProPECC PN 1/23, domestic sewage should be discharged to a foul water sewer and surface water should be discharged via rainwater pipes to stormwater drains during operation phase.
- 5.1.3. The following standards and guidelines are adopted for estimation, assessment and evaluation of sewerage implication of the Proposed Development:
- “Hong Kong Planning Standards and Guidelines” issued by the Planning Department;
  - “Sewerage Manual Part 1” published by DSD; and

- “Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning Version 1.0 (Report No.: EPD/TP1/05)” (“GESF”) published by Environmental Protection Department (“EPD”).

## 6. Estimation of Sewage Flow and Peak Discharge

### 6.1. Methodology for Estimation of Average Dry Weather Flow

6.1.1. With reference to the GESF, the Unit Flow Factors (“UFF”) for different types of population as shown in **Table 6-1** have been used in calculation of sewerage flow from the Proposed Development.

**Table 6-1 Global Unit Flow Factors**

Development Type	Unit	UFF (m <sup>3</sup> /day)
<b>Domestic Flow</b> <sup>[1]</sup> <sup>[2]</sup>		
Residential R1	Person	0.19
Residential R2	Person	0.27
Residential R3	Person	0.37
<b>Commercial Flow</b> <sup>[2]</sup>		
Job Type J11, Community, Social & Personal Services	Employee	0.28

Notes:

[1] Initial flat size assumptions in are based on Table 8 in Chapter 2 of “Hong Kong Planning Standards and Guidelines”. Assumption values under the category of Hong Kong & Kowloon is selected.

[2] UFFs for various occupancy types are adopted according to Table T-1 and Table T-2 of the GESF.

### 6.2. Estimation of Sewage Flow from Proposed Development

6.2.1. With reference to **Table 6-2**, the total estimated Average Dry Weather Flow (“ADWF”) from the Proposed Development is 112.9m<sup>3</sup>/day. The population estimated ADWF of Proposed Development are summarized in **Appendix 6-1**.

**Table 6-2 Sewage Flow Estimation for the Proposed Development**

Type of Occupancy <sup>[1]</sup>	Population <sup>[1]</sup>	Category <sup>[3]</sup>	UFF (m <sup>3</sup> /day)	ADWF (m <sup>3</sup> /day)
Proposed Development (Domestic) <sup>[4]</sup>	187 Persons <sup>[2]</sup>	Domestic Private R1	0.19	35.6
	234 Persons <sup>[2]</sup>	Domestic Private R2	0.27	63.2
	36 Persons <sup>[2]</sup>	Domestic Private R3	0.37	13.5

Type of Occupancy <sup>[1]</sup>	Population <sup>[1]</sup>	Category <sup>[3]</sup>	UFF (m <sup>3</sup> /day)	ADWF (m <sup>3</sup> /day)
Clubhouse (Non-Domestic) <sup>[5,6]</sup>	2 Employees	Job Type J11, Community, Social & Personal Services	0.28	0.6
			Total	112.9 (m <sup>3</sup> /day)

## Notes:

[1] Based on the latest layout plan, the design flat mix for the Proposed Development are 72 flats with GFA less than 50m<sup>2</sup>(i.e. "Domestic Private R1"), 90 flats with GFA between 50m<sup>2</sup> to 110m<sup>2</sup>(i.e. "Domestic Private R2"), and 14 flats of GFA of larger than 110m<sup>2</sup> (i.e. "Domestic Private R3").

[2] According to the Projections of Population Distribution 2023-2031 published by Planning Department, the population growth of Wan Chai in 2023 is -1.3%. For conservative approach, population growth of 0% is adopted.

[3] Categories of UFFs are selected according to Table T-1 and Table T-2 in GESF.

[4] For floor area less than 50m<sup>2</sup>, UFF of "Domestic Private R1" is deployed (i.e. 0.19 m<sup>3</sup>/day); for floor area between 50m<sup>2</sup> and 110m<sup>2</sup>, UFF of "Domestic Private R2" is deployed (i.e. 0.27 m<sup>3</sup>/day); while, for floor area larger than 110m<sup>2</sup>, UFF of "Domestic Private R3" is deployed (i.e. 0.37 m<sup>3</sup>/day).

[5] UFF of "Job Type J11 Community, Social & Personal Services" is adopted. UFF for each employee is the sum of UFF of "Commercial Employee" (i.e. 0.08m<sup>3</sup>/day) and UFF of "Job Type J11 Community, Social & Personal Services" (i.e. 0.20m<sup>3</sup>/day).

[6] As advised by Project team.

### 6.3. Estimation of Peak Discharge

- 6.3.1. Catchment inflow factor ("P<sub>cif</sub>") caters for the net overall ingress of wastewater to the sewerage system. They are catchment-dependent and applicable to major sewerage facilities of a catchment.
- 6.3.2. As mentioned in **Section 4.1.2**, sewage discharged from concerned catchments is conveyed to North Point Preliminary Treatment Works, and discharged to the SCISTW. In accordance with Table T-4 and Annex 1 of Appendix VII - Part 1 of the GESF, the P<sub>cif</sub> of 1.0 is adopted for existing sewerage because concerned sewerage system is identified in North Point.
- 6.3.3. Revised average dry weather flow ("revised ADWF") is determined by production of average dry weather flow and catchment inflow factor. Contributing population is then calculated by dividing the revised ADWF by 0.27. The calculated contributing population is finally used for selection of peaking factors.
- 6.3.4. Based on **Table 6-3** which is also presented in Table T-5 in GESF, the peaking factors for each sewer are chosen in the hydraulic calculation for peak flow estimation.

**Table 6-3 Peaking Factors**

Population Range for Sewers <sup>[1] [2]</sup>	Peaking Factor (including storm water allowance) for facility with existing upstream sewerage	Peaking Factor (excluding storm water allowance) for facility with new upstream sewerage
< 1000	8	6
1000 - 5000	6	5
5000 - 10000	5	4
10000 - 50000	4	3
> 50000	Max (7.3 / N <sup>0.15</sup> , 2.4)	Max (6 / N <sup>0.175</sup> , 1.6)

Notes:

[1] N is the contributing population in thousands.

[2] According to Section 12.1 of GESF, Contributing Population = Calculated Total Average Flow (m<sup>3</sup>/day) ÷ 0.27 (m<sup>3</sup>/person/day)

#### 6.4. Peak Discharge from Proposed Development

6.4.1. Flow rates of peak discharge from the Proposed Development is estimated in accordance with the DSD's "Sewerage Manual Part 1". Peak flows from Proposed Development at the study area under future condition are summarized in **Table 6-4**.

**Table 6-4 Population and Sewage Flow Estimation of Proposed Development**

Connected Manhole	Revised ADWF (m <sup>3</sup> /day) <sup>[1]</sup>	Contributing Population <sup>[2]</sup>	Peaking Factor <sup>[3]</sup>	Total Peak Discharge (m <sup>3</sup> /s)
FMH7013366	112.8	418	8.0	0.010

Notes:

[1] Revised ADWF (m<sup>3</sup>/day) = ADWF (m<sup>3</sup>/day) × Catchment Inflow Factor

[2] According to Section 12.1 of GESF,

Contributing Population = Calculated Total Average Flow (m<sup>3</sup>/day) ÷ 0.27 (m<sup>3</sup>/person/day)

[3] According to Table T-5 of GESF

## 7. Sewer Capability

- 7.1.1. The Colebrook White's equation is adopted for hydraulic analysis of the sewerage system. Various roughness coefficients,  $k_s$ , are adopted in accordance with Table 5 of DSD's "Sewerage Manual Part 1".
- 7.1.2. Occupancy rate by sewage generated from Proposed Development and capacity the foul sewer is tabulated in **Table 7-1**. The detailed calculation of occupancy rate of sewerage system is given in **Appendix 7-1**.

**Table 7-1 Occupancy Rate of Foul Sewers by Sewage Generated from Proposed Development**

From	To	Total Peak Discharge (m <sup>3</sup> /s)	Maximum Capacity (m <sup>3</sup> /s)	Occupancy Rate (%) <sup>[1]</sup>
FMH7013366	FMH7013365	0.010	0.119	8.8
FMH7013365	FMH7013351	0.010	0.576	1.8

Notes:

[1] Occupancy Rate = Peak Discharge (m<sup>3</sup>/s) ÷ Maximum Capacity (m<sup>3</sup>/s)

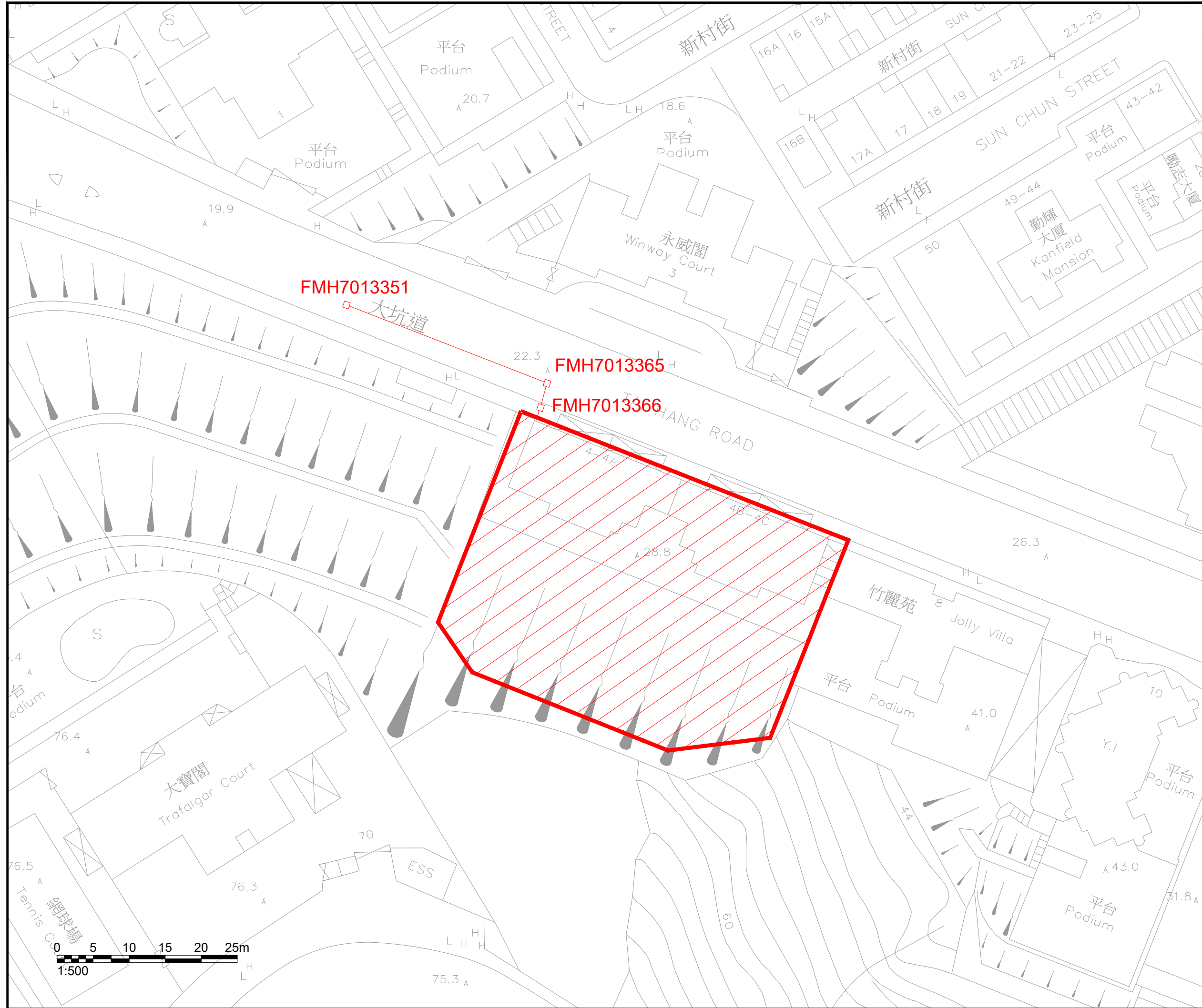
- 7.1.3. Calculation results summarized in **Appendix 6-1** indicated that the peak discharge from the Proposed Development discharged is 0.010m<sup>3</sup>/s, which occupies approximately 8.8% of the capacity between FMH7013366 and FMH7013365 and 1.8 % of the capacity between FMH7013365 to FMH7013351 respectively. It is demonstrated the contribution of sewage generation from Proposed Development to the existing sewerage system is insignificant.
- 7.1.4. According to the *Drainage Services Department in Brief 2024-25*, the treatment capacity of the SCISTW is 2,450,000m<sup>3</sup>/day. The sewage loading from the Proposed Development takes up 0.005% in capacity of the SCISTW, which remains with generous capacity to cater for the increase in sewage generated by the Proposed Development.
- 7.1.5. Owing to the insignificant contribution of sewage generation from Proposed Development to the existing sewerage system, and to the capacity of SCISTW, no adverse impact to public sewerage system associated with the Proposed Development is expected.

## **8. Liability**


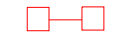
- 8.1.1. The project proponent will be responsible for construction of the proposed sewers and manholes, for future connection to public sewage system via the public sewage manholes FMH7013366 and FMH7013365, while future maintenance of the sewers outside the Application Site boundary will be carried out by the DSD.
- 8.1.2. During operation phase, regular inspection of the sewers within the Application Site should be conducted by the property management office to ensure proper performance. Regular maintenance should also be carried out in accordance with standard practices stated in the DSD's *"Sewerage Manual Part 1"*.

## **9. Conclusions**

- 9.1.1. Sewerage impact assessment has been conducted for the Proposed Development. The result showed that 0.010m<sup>3</sup>/s of peak sewage discharge is expected to be generated from the Proposed Development upon full occupancy.
- 9.1.2. Owing to the insignificant contribution of sewage generation from Proposed Development to the existing sewerage system, no adverse impact to public sewerage system associated with the Proposed Development is expected.



**NOTES:**

-  Application Site
-  Sewerage Connection

Consultant



**Allied Environmental Consultants Limited**

Project No. : 1947

Drawn By : ZX

Project :  
 Section 16 Planning Application for Proposed Amendments to an Approved Scheme (under Application No. A/H6/91 with Minor Relaxation of Plot Ratio Restriction Approved) for Permitted Flat Use at 4, 4A, 4B and 4C Tai Hang Road, Hong Kong

Drawing Title :  
 Application Site Location

Drawing No : Figure 3-1      Revision : 0

Scale : As Shown      Date : April 2026

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**Appendix 6-1**

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*Estimation of Sewage Flow from the Proposed Development*

**Appendix 6-1 : Estimation of Sewage Flow from the Proposed Development**

**Proposed Development**

Type of Occupancy	Number of Unit [2]	Household Size [5]	Population Growth Rate [1]	No. of Occupancy [2]	Unit Flow Factor		Total Average Sewage Discharge (m <sup>3</sup> /day) [4]	Remark
					Category[3]	m <sup>3</sup> /day		
Residential	72	2.6	0.0%	187	T1, Domestic (private permanent housing R1)	0.19	35.6	The GFA of unit is <50 m2. Therefore, Type R1 is adopted.
Residential	90	2.6	0.0%	234	T1, Domestic (private permanent housing R2)	0.27	63.2	The GFA of unit is >50 and <110m2. Therefore, Type R2 is adopted.
Residential	14	2.6	0.0%	36	T1, Domestic (private permanent housing R3)	0.37	13.5	The GFA of unit is >110m2. Therefore, Type R3 is adopted.
Clubhouse	-	N/A	-	2 [6]	Community, Social & Personal Services	0.28	0.6	-

176

**112.9**

Notes:

[1] According to the Projections of Population Distribution 2023-2031 published by Planning Department, the population growth of Wan Chai in 2023 is -1.3%. For conservative approach, population growth of 0% is adopted.

[2] Information provided by Applicant, the design flat mix for the Proposed Development are 72 flats with floor areas less than 50m2 (i.e. "Domestic Private R1"), 90 flats with floor areas between 50m2 to 110m2 (i.e. "Domestic Private R2"), and 14 flats of floor area of larger than 110m2 (i.e. "Domestic Private R3").

[3] The unit flow factor is made reference to "Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (Version 1.0)", published by EPD.

[4] The presented value of Average Dry Weather Flow would be slightly different to the value from manual calculation due to numerical round-off.

[5] According to 2021 Population Census, the average Household Size in Wan Chai is 2.6 persons.

[6] As advised by Project team.

**Appendix 7-1**

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*Calculation of Occupancy Rate of Sewerage System*

Appendix 7-1 Calculation of Occupancy Rate of Sewerage System

Sewer No.			Internal Diameter (m) [a]	Cross-section Area (m <sup>2</sup> )	Length (m) [a]	Inlet mPD (m) [a]	Outlet mPD (m) [a]	Hydraulic pipeline roughness (m) [b]	Hydraulic Gradient	Mean Velocity (m/s) [c]	Max Capacity of Sewer (m <sup>3</sup> /s)	Total Average Dry Weather Flow	Catchment Inflow Factor	Revised Total Average Dry Weather Flow	Contributing Population	Peaking Factor	Peak Discharge through Manhole (m <sup>3</sup> /s)	Percentage of capacity	Remark	
ID	From	ID	To	D	A	I			s	V		m <sup>3</sup> /day	[f]	m <sup>3</sup> /day	[d]	[e]				
1	FMH7013366	2	FMH7013365	0.150	0.0177	2.6	21.66	20.52	0.0006	0.43846	6.7	0.119	113	1.0	113	418	8.0	0.010	8.8%	<u>Proposed Development</u>
2	FMH7013365	3	FMH7013351	0.450	0.1590	29.1	20.52	19.6	0.0006	0.03162	3.6	0.576	113	1.0	113	418	8.0	0.010	1.8%	Proposed Development

Note:

[a] Information from Drainage Layout Plan

[b] According to information available in Common Spatial Data Infrastructure Portal (<https://portal.csd.gov.hk/geoportal/#mapPanel>), the sewerage pipe material is vitrified clay. With reference from Table 5 - Recommended Roughness Values in Sewerage Manual, roughness value, ks=0.6mm for slined of clayware @ 1.2m/s in "Poor" condition is adopted for existing sewer.

[c] The velocity is calculated using the Colebrook-White Formula:

$$V = -2(2gDS)^{0.5} \log \left( \frac{k}{3.7D} + \frac{2.5\nu}{D(2gDS)^{0.5}} \right)$$

where

k = Colebrook-White roughness coefficient, in meter

V = mean velocity (m/s)

D = circular cross-section pipe, inside diameter (m)

S = slope, in meters per meter

ν = kinematic viscosity of water, in meter per second (0.000001306 m/s)

g = gravitational acceleration (m/s<sup>2</sup>) (9.807m/s<sup>2</sup>)

[d] The Contributing Population is defined as:

$$\text{Contributing Population} = \frac{\text{Calculated total average flow (m}^3\text{/day)}}{0.27 \text{ (m}^3\text{/person/day)}}$$

[e] Reference from Table T-5 (a) of Guidelines for Estimating Sewage Flows for Sewerage Infrastructure Planning

[f] Reference from Table T-4 of Guidelines for Estimating Sewage Flows for Sewerage Infrastructure Planning, Catchment inflow factor of North Point is adopted.