

*Appendix 9*  
Sewerage Impact Assessment

S.12A Planning Application  
on the Draft Mai Po & Fairview Park OZP No. S/YL-MP/7  
Rezoning from “Residential (Group D)” to “Residential (Group C) 1” Zone  
for a Proposed Residential Development  
at Various Lots in D.D. 104 and the Adjoining Government Land  
in Yuen Long, N.T.

## **Sewerage Impact Assessment Report**

**February 2025**

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# **1. Introduction**

## **1.1. Background**

- 1.1.1. AECOM Asia Company Limited (AECOM) has been commissioned by the Applicant to conduct a Sewerage Impact Assessment (SIA) in support of the S12A planning application to enable a medium-rise residential development on the Application Site.
- 1.1.2. The Application Site is bounded by Kam Pok Road to its immediate north and west, a village area and Ha Chuk Yuen Tsuen Road to its immediate east, and the existing Drainage Services Department (DSD) Chuk Yuen Floodwater Pumping Station (CYFPS) with its water retention pond to its immediate south. **Figure 1** presents the location of the Project.
- 1.1.3. The Application Site has been previously approved for a 2-storey house development (TPB Ref.: A/YL-MP/205 & 205-1). The current application aims to better utilize the land resource/development potential of the Site to increase flat supply without generating any insurmountable adverse impacts.

## **1.2. Objective of this Submission**

- 1.2.1. The current report outlines the assessment results of the potential sewerage impacts (if any) of a revised residential scheme at the same site. The main objectives of this assessment include the followings:
- (i) Indicate any increase in sewage flow due to the proposed development.
  - (ii) Review the existing sewerage condition of the Application Site based on available information.
  - (iii) Outline the methodology adopted in this assessment.
  - (iv) Assess any potential impact on the existing or planned sewerage facilities nearby due to the proposed development.
  - (v) Propose mitigation measures and/or improvement works to minimize any potential sewerage impact from the proposed development.

## 2. Development Proposal

2.1.1. The current scheme comprises mainly medium-rise residential development with a domestic plot ratio of 1.5 and non-domestic plot ratio of about 0.09. The site will accommodate 10 residential blocks with a height of 14 to 16 storeys, providing about 2,322 flats. Total domestic GFA is about 98,535m<sup>2</sup> and total commercial GFA of about 3,292m<sup>2</sup> planned for retail (about 2,363m<sup>2</sup>) and kindergarten (about 929m<sup>2</sup>). In addition, there will be a transport layby (not more than 2,400m<sup>2</sup>) and social welfare facilities including a neighbourhood elderly center (NEC) (about 328m<sup>2</sup> NOFA), as well as other residential ancillary facilities(e.g. a basement carpark, residents' clubhouse, swimming pool and landscape area) within the site. The general layout of the proposed development is shown in **Figure 2**.

## 3. Methodology of Sewerage Impact Assessment

### 3.1. Methodology

3.1.1. Capacity checking of the sewerage pipe, pumping station and effluent polishing plant is carried out to assess the adequacy of the proposed sewerage system. The design assumption and basis are shown in **Table 3-1**.

**Table 3-1: Design Assumption and Basis**

<b>Design Standard</b>	DSD Sewerage Design Manual, Part 1 & 2
<b>Flow Formula</b>	Colebrook White Formula
<b>Pipe Roughness (K<sub>s</sub>)</b>	1.5mm (Concrete, velocity approx. 1.2m/s, normal condition)
<b>Unit Flow Factor</b>	<p>EPD Guideline for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF): Table T-1 and Table T-2</p> <p><u>Proposed Development:</u></p> <p>0.19 m<sup>3</sup>/day/head (Domestic, housing type specific for Private (R1)),</p> <p>0.27 m<sup>3</sup>/day/head (Domestic, housing type specific for Private (R2)),</p> <p>0.37 m<sup>3</sup>/day/head (Domestic, housing type specific for Private (R3)),</p> <p>0.28 m<sup>3</sup>/day/head ("Commercial Employee" plus "Community, Social &amp; Personal Services" (J11))</p> <p>1.58 m<sup>3</sup>/day/head ("Commercial Employee" plus "Restaurants &amp; Hotels" (J10))</p> <p>0.04 m<sup>3</sup>/day/head ("School Students")</p>

<b>Contributing Population</b>	<p>EPD Guideline for Estimating Sewage Flows for Sewage Infrastructure Planning (Section 12.1):</p> <p><u>Contributing Population =</u></p> <p>Calculated total average flow/ 0.27</p>
<b>Peaking Factors</b>	<p>EPD Guideline for Estimating Sewage Flows for Sewage Infrastructure Planning: Table T-5</p>
<b>Catchment Inflow Factor</b>	<p>EPD Guideline for Estimating Sewage Flows for Sewage Infrastructure Planning: Table T-4</p> <p>Catchment Inflow Factors (PCIF): Yuen Long = 1.00</p>
<b>Intake Year</b>	<p>2031 (Tentatively)</p>
<p><b>Projected Sewage flow</b></p> <p><b>Based on EPD Initial Estimation</b></p>	<p>The size of the proposed gravity sewer should be large enough to serve other developments in the same area. Based on EPD initial estimation, such sewer needs to cater for a sewage flow of at least 15,500 m<sup>3</sup>/d.</p>

### 3.2. Estimation of Sewage Flow for Proposed Development

- 3.2.1. The estimation of sewage flow for the proposed development is in accordance with the EPD Guideline for Estimating Sewage Flows for Sewage Infrastructure Planning. The detailed calculation can be found in **Appendix 1**. The findings are summarized in **Table 3-2**.

**Table 3-2: Estimated Sewage Flow from Proposed Development**

<b>Application Site</b>			
<b>Population Type</b>	<b>No. of Person</b>	<b>Unit Flow Factor (m<sup>3</sup>/h/d)</b>	<b>Average Dry Weather Flow (m<sup>3</sup>/d)</b>
Residential <sup>1</sup>	6,502	0.27	1,755.54
Employee for Clubhouse (F&B)	53	1.58	83.74
Employee for Clubhouse (non F&B)	51	0.28	14.28
Employee for Retail (F&B)	36	1.58	56.88
Employee for Retail (non F&B)	35	0.28	9.80
Kindergarten (Student) <sup>2</sup>	180	0.04	7.20
Kindergarten (Teacher) <sup>2</sup>	22	0.28	6.16
NEC (Elderly)	8	0.28	2.24
NEC (Staff) <sup>3</sup>	11	0.28	3.08
Swimming Pool	-	-	33.84
<b>Sub-Total</b>	<b>6,878</b>	<b>-</b>	<b>1,973</b>

Notes:

- 1) A PPoF of 2.8 with reference to the average household size in Yuen Long District according to Statistics on Domestic Household Characteristics by District Council District in 2023.
- 2) According to Education Bureau Key Statistics on Kindergarten Pupil-Teacher Ratio of 8:1. The proposed kindergarten has 6 classrooms with an average class size of 30.
- 3) According to Social Welfare Department Notional Staffing Establishments Neighbourhood Elderly Centre (NEC), a NEC required 11 staff.

3.2.2. The estimated Average Dry Weather Flow (ADWF) from the proposed development is approximately 1,973m<sup>3</sup>/day.

## 4. Review of Existing and Planned Sewerage System

### 4.1. Existing & Planned Sewerage System

- 4.1.1. There is currently limited existing public sewerage system in vicinity of the proposed development as shown in **Figure 3**.
- 4.1.2. Nam Sang Wai Sewerage Pumping Station (NSWSPS) and the associated connection to Yuen Long Sewage Treatment Works (YLSTW) have already been completed in 2010 by DSD under PWP No. 4215DS, “Yuen Long and Kam Tin Sewerage and Sewage Disposal – Kam Tin Trunk Sewerage Stage 1 and Au Tau Trunk Sewers”.
- 4.1.3. According to the approved EIA report for “Yuen Long Effluent Polishing Plant – Investigation, Design and Construction” (EIA-259/2018), DSD proposed to upgrade existing YLSTW to Yuen Long Effluent Polishing Plant (YLEPP) to enhance its capacity and treatment level. The upgrade works would be carried out in 2 stages. Under Stage 1, YLSTW will be upgraded to YLEPP with treatment capacity of 100,000 m<sup>3</sup>/day. The project completion date of YLEPP - Stage 1 is mid 2027, which will be completed before the project completion of the proposed development in 2031. The following Stage 2 work planned to increase YLEPP treatment capacity to 180,000 m<sup>3</sup>/day by 2030 tentatively.
- 4.1.4. The designed capacity and the current average daily flow of Nam Sang Wai Sewerage Pumping Station is presented on **Table 4-1**.

**Table 4-1: Design Capacity and Current Average Daily Flow of Nam Sang Wai Sewerage Pumping Station**

Sewerage Facilities	Design Capacity (m <sup>3</sup> /day) <sup>(1)</sup>	Current Average Daily Flow (m <sup>3</sup> /day)	Spare Capacity (m <sup>3</sup> /day)
<b>NSWSPS</b>	42,921	3,900	39,021

Notes:

- 1) For NSWSPS the design capacity and current average daily flow comparison refer to ADWF.

### 4.2. Sewerage Impact to Existing and Planned Sewage System

- 4.2.1. Designed capacity, current average daily flow and estimated future flow of Nam Sang Wai Sewerage Pumping Station is presented in **Table 4-2** below.

**Table 4-2: Comparison of Additional Sewage Flow with Capacity of Public Sewerage**

Sewerage Facilities	Design Capacity (m <sup>3</sup> /day) <sup>(1)</sup>	Current Average Daily Flow (m <sup>3</sup> /day)	Estimated Future Flow <sup>(2)</sup> (m <sup>3</sup> /day)	Total Future Flow (m <sup>3</sup> /day)	Spare Capacity (m <sup>3</sup> /day)
<b>NSWSPS</b>	42,921	3,900	16,561	20,461	22,460

Notes:

- 1) For NSWSPS and YLEPP, the design capacity and current average daily flow comparison refer to ADWF.
- 2) The estimated future flow includes the EPD initial estimation for the communal gravity sewers (i.e., 15,500 m<sup>3</sup>/d) and the estimated sewage flow from light public housing (i.e., 1,061 m<sup>3</sup>/d). The estimated sewage flow from light public housing is based on the technical schedule of "Light Public Housing at Yau Pok Road, Yuen Long - Project Profile". **Appendix 3 and 4** refers.

4.2.2. The sewage from the Development (i.e. 1,973m<sup>3</sup>/day) merely occupies 5% of the design capacity of existing NSWSPS, 2% of the design capacity of existing YLEPP (phase I) and 1% of the design capacity of planned YLEPP (Phase II). Hence no adverse impact on the existing NSWSPS, existing YLEPP (Phase I) and planned YLEPP (Phase II) is envisaged. The assessment also shows that the existing and planned sewerage system would be sufficient to cater for the proposed development.

4.2.3. It is noted a light public housing site is located within the vicinity. The location of the light public housing site is as shown in **Figure 3**. The sewage (i.e. ADWF=1,061m<sup>3</sup>/day) generated will be conveyed to NSWSPS via exclusive sewage rising mains serving the public housing site only.

### 4.3. Proposed Sewerage System

4.3.1. The sewage generated from the proposed development will be conveyed to a private underground sewage pumping station (SPS) located at the western boundary of the site. It is proposed that twin 200mm dia. rising mains will lay along Kam Pok Road to convey the sewage to a proposed common conversion chamber at Pok Wai South Road. The conversion chamber connected to proposed communal gravity sewers downstream is designed to cater for other existing and planned developments within the area. The proposed communal gravity sewers and manholes also facilitate future discharge of sewage from other development in the vicinity. The proposed downstream communal gravity sewers and manholes are proposed public sewerage system serving multiple users. The sewer will be constructed to discharge the sewage from the proposed development to the existing NSWSPS and ultimately discharge to YLEPP. The proposed alignment of the rising mains and the gravity sewers is shown in **Figure 3**. The tentative location of the proposed private SPS is shown in **Figure 4**.

4.3.2. Hydraulic checking of the proposed rising mains has been conducted. It is found to be adequate to serve the proposed development, **Appendix 2** refers.

- 4.3.3. The longitudinal profile of the proposed rising mains is shown in **Appendix 2** to demonstrate feasibility. The design shall undergo further analysis and be submitted to the relevant departments for approval during the detailed design stage.
- 4.3.4. The proposed development would not have population intake before the sewerage infrastructure of the project is functionally connected to the existing public sewerage system.
- 4.3.5. In addition, discharge license under the Water Pollution Control Ordinance from EPD for the Food and Beverages facilities within the development would be obtained prior to its discharge into the SPS.

#### **4.4. Proposed Communal Gravity Sewer**

- 4.4.1. The size of the proposed communal gravity sewer should be large enough to serve other developments in the same area. Based on EPD initial estimation, such sewer needs to cater for a sewage flow of at least 15,500 m<sup>3</sup>/d. Relevant information is shown in **Appendix 4**.
- 4.4.2. Hence, at the downstream of the conversion chamber, twin 675mm diameter gravity sewers are proposed to serve other developments in the same area. The gravity sewers convey the sewage by gravity to an existing sewage manhole FSH1001886 at the entrance of Nam Sang Wai Sewage Pumping Station. The hydraulic assessment of proposed communal sewer is conducted in **Appendix 5** to demonstrate the feasibility in terms of proposed pipe size and gradient. The proposed alignment of the rising mains and the gravity sewers is shown in **Figure 3**.
- 4.4.3. It is noted that downstream sections of the communal gravity sewer, from manhole WKT009 to existing manhole FSH1001886, which connect along Pok Wai South Road from the junction with Pok Wai West Road to the existing sewage manhole connecting to Nam Sang Wai Sewage Pumping Station (NSWSPS), have been proposed by Approved Planning Application No. Y/YL-NSW/7. The proposed alignment of this downstream section of the communal gravity sewer are shown in **Appendix 6** and is illustrated in **Figure 6**.

## **5. Maintenance Responsibility**

### **Private Sewerage Facilities**

- 5.1.1. All sewers and sewerage facilities within the proposed development will be constructed, operated, and maintained by the proposed development.
- 5.1.2. The proposed external twin rising mains and conversion chamber will also be constructed and maintained by the proposed development.

### **Communal Gravity Sewer**

- 5.1.3. As mentioned in **Section 4.4.3**, downstream sections of the communal gravity sewer are also proposed under Approved Planning Application No. Y/YL-NSW/7. Therefore, there may be two scenarios:-

#### **Case 1 – The Proposed Development Proceeds to Construction of the Communal Gravity Sewer First**

- 5.1.4. If the proposed development proceeds to construction of the communal gravity sewer before the Approved Planning Application No. Y/YL-NSW/7, the proposed gravity sewer will be constructed by the proposed development.
- 5.1.5. For maintenance responsibility, the downstream communal gravity sewers are proposed to become a public sewage system serving multiple users and will be handed over to government for future maintenance.
- 5.1.6. The proposed construction and maintenance responsibilities are illustrated in **Figure 5**.

#### **Case 2 - Y/YL-NSW/7 Proceeds to Construction of the Communal Gravity Sewer First**

- 5.1.7. The downstream sections of the communal gravity sewer, from manhole WKT009 to existing manhole FSH1001886, which connect along Pok Wai South Road from the junction with Pok Wai West Road to the existing sewage manhole connecting to Nam Sang Wai Sewage Pumping Station (NSWSPS), have been proposed by the Approved Planning Application No. Y/YL-NSW/7. The proposed alignment of this downstream section of the communal gravity sewer are shown in **Appendix 6** and is illustrated in **Figure 6**.
- 5.1.8. If the applicant under Y/YL-NSW/7 proceeds to construction of the communal gravity sewer before this application, the downstream section of the communal gravity sewer will be constructed by Y/YL-NSW/7.
- 5.1.9. For maintenance responsibility, the applicant under Y/YL-NSW/7 proposes to hand over the downstream section of the communal gravity sewer to the DSD for future maintenance.



## 6. Conclusion

- 6.1.1. This report aims to assess the sewerage impact arising from the proposed residential development to the existing and planned public sewerage network under PWP Nos. 4215DS respectively. The Application Site is designated for residential use by the government under the current Mai Po and Fairview Park OZP and has been previously approved for housing development (A/YL-MP/193, 205 & 205-1). The Applicant currently proposes to increase the domestic plot ratio of the site in line with the prevailed government's housing policy, which calls for utilizing the development potential of undeveloped housing sites to increase the flat supply for the Territory.
- 6.1.2. The sewage generated from the proposed residential development will be conveyed to a private sewage pumping station (SPS) located at the western edge of the site near Kam Pok Road. It is proposed that twin 200mm dia. rising mains will lay along Kam Pok Road to convey the sewage to a proposed common conversion chamber at Pok Wai South Road. The conversion chamber connected to proposed twin 675mm gravity sewers downstream is designed to cater for other existing and planned developments within the area. The proposed twin 675mm diameter gravity sewers and manholes are proposed public sewerage system serving multiple users. The sewer will be constructed to discharge the sewage from the proposed development to the existing NSWSPS and ultimately discharge to YLEPP.
- 6.1.3. The proposed development will not have population intake before the sewage infrastructure of the project is functionally connected to the government sewerage network.
- 6.1.4. Hydraulic analysis shows that the public sewerage collection system in the area has adequate spare capacity to convey the additional sewage from the proposed development. The capacity of the YLEPP is also capable to cater for the additional flow generated from the proposed development and neighbouring sites.

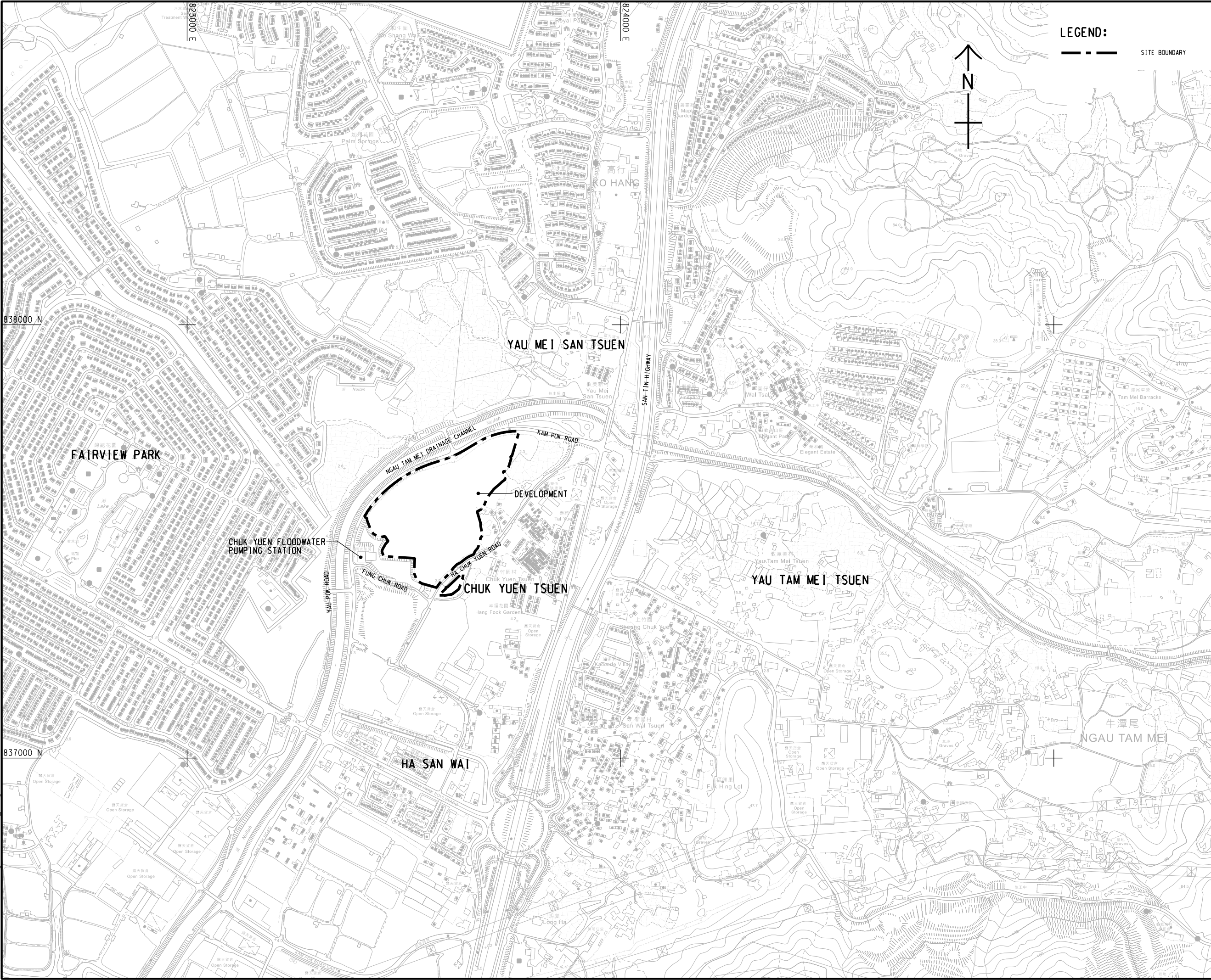
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## Figures

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LEGEND:  
--- SITE BOUNDARY

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REZONING FROM "RESIDENTIAL  
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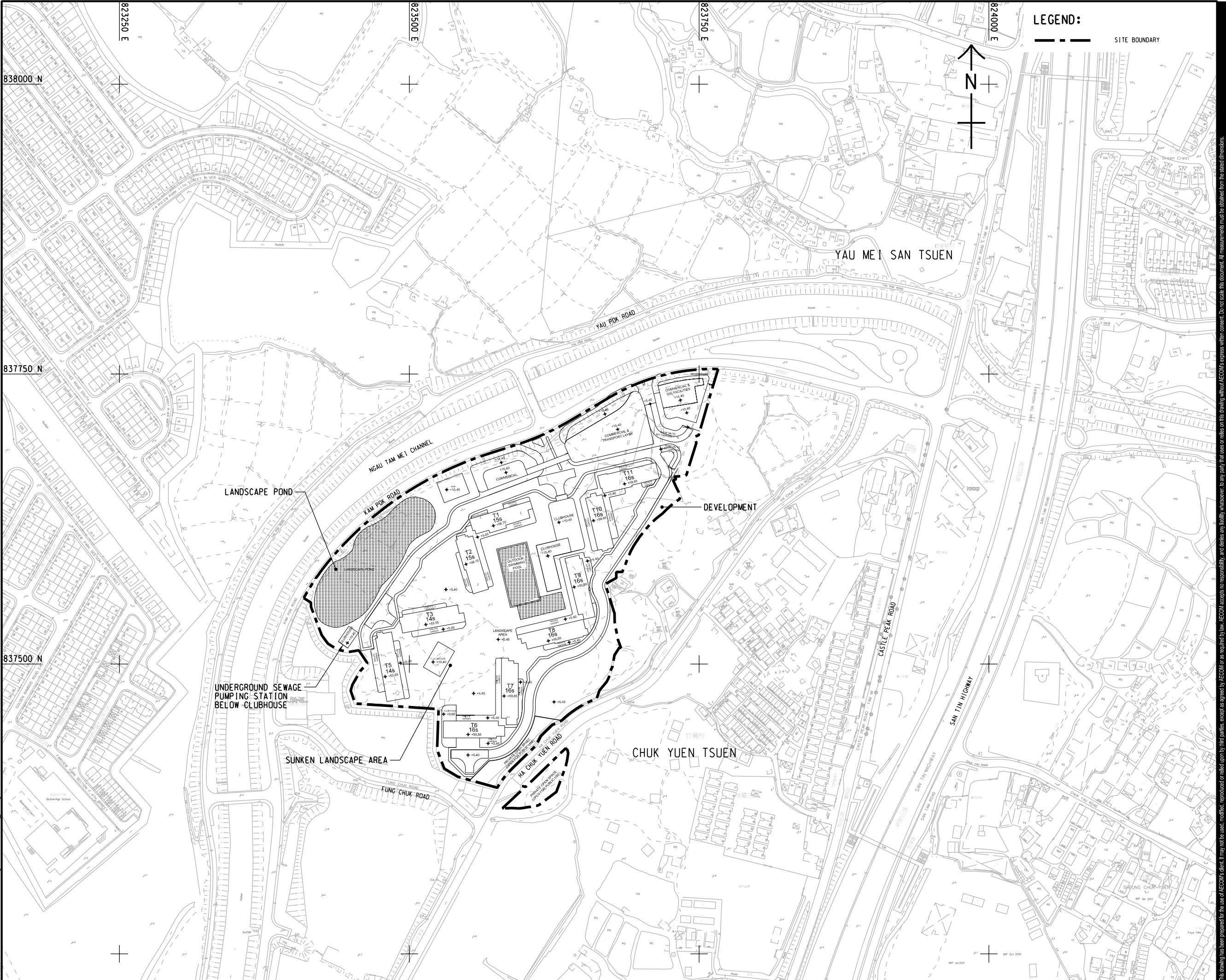
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LOCATION PLAN

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## PROJECT NO.

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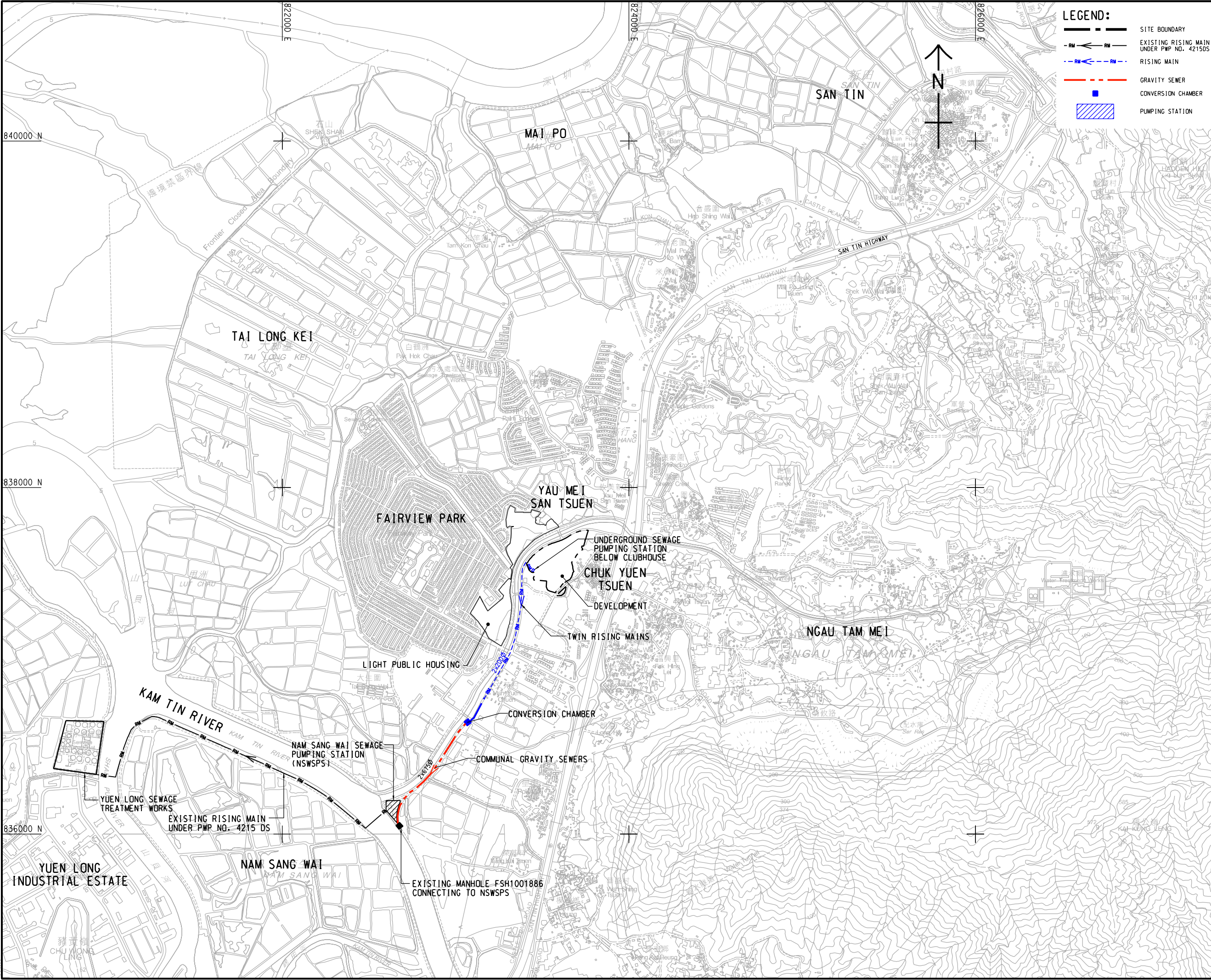
MASTER LAYOUT PLAN

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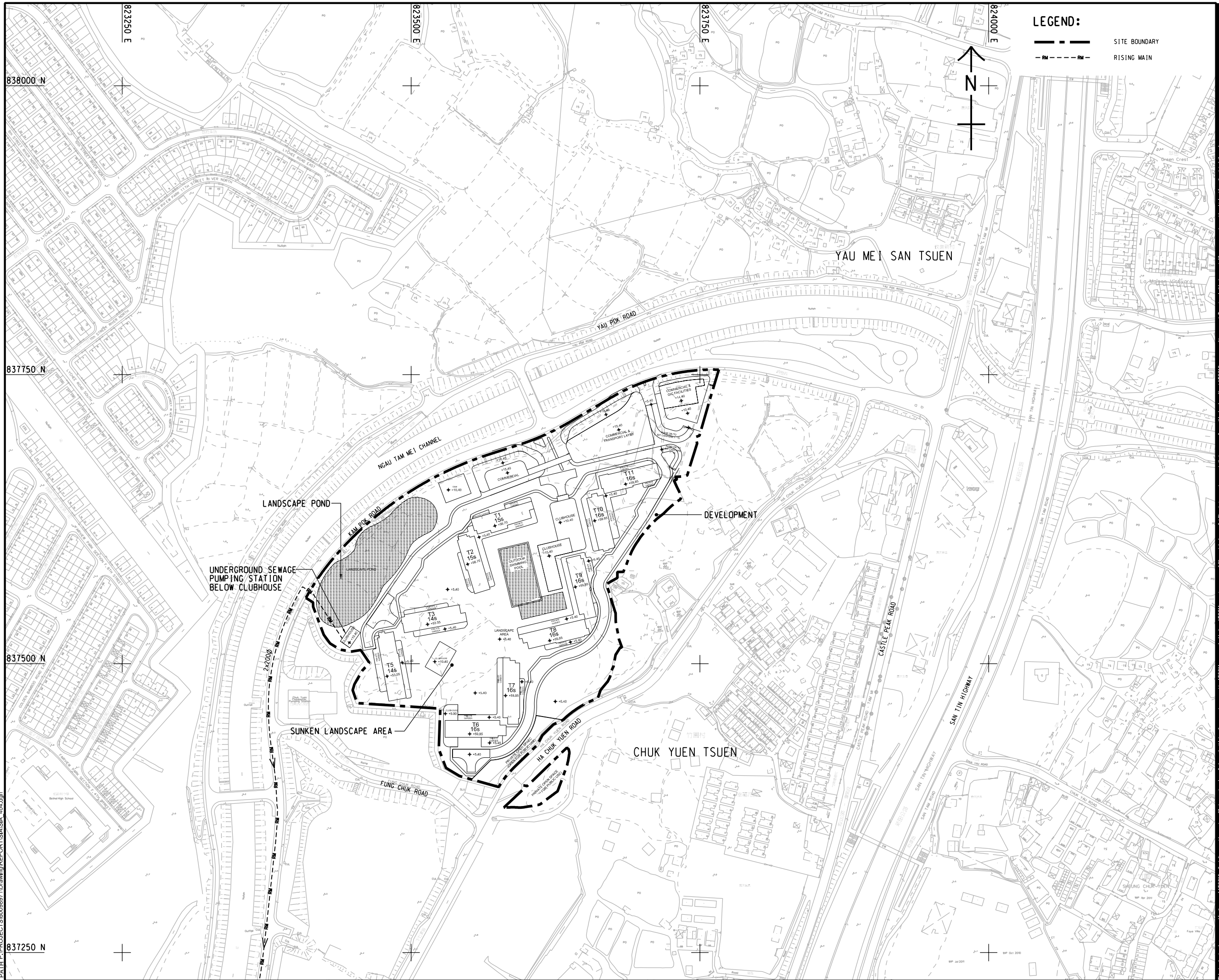
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EXISTING AND PLANNED SEWERAGE NETWORK PLAN	
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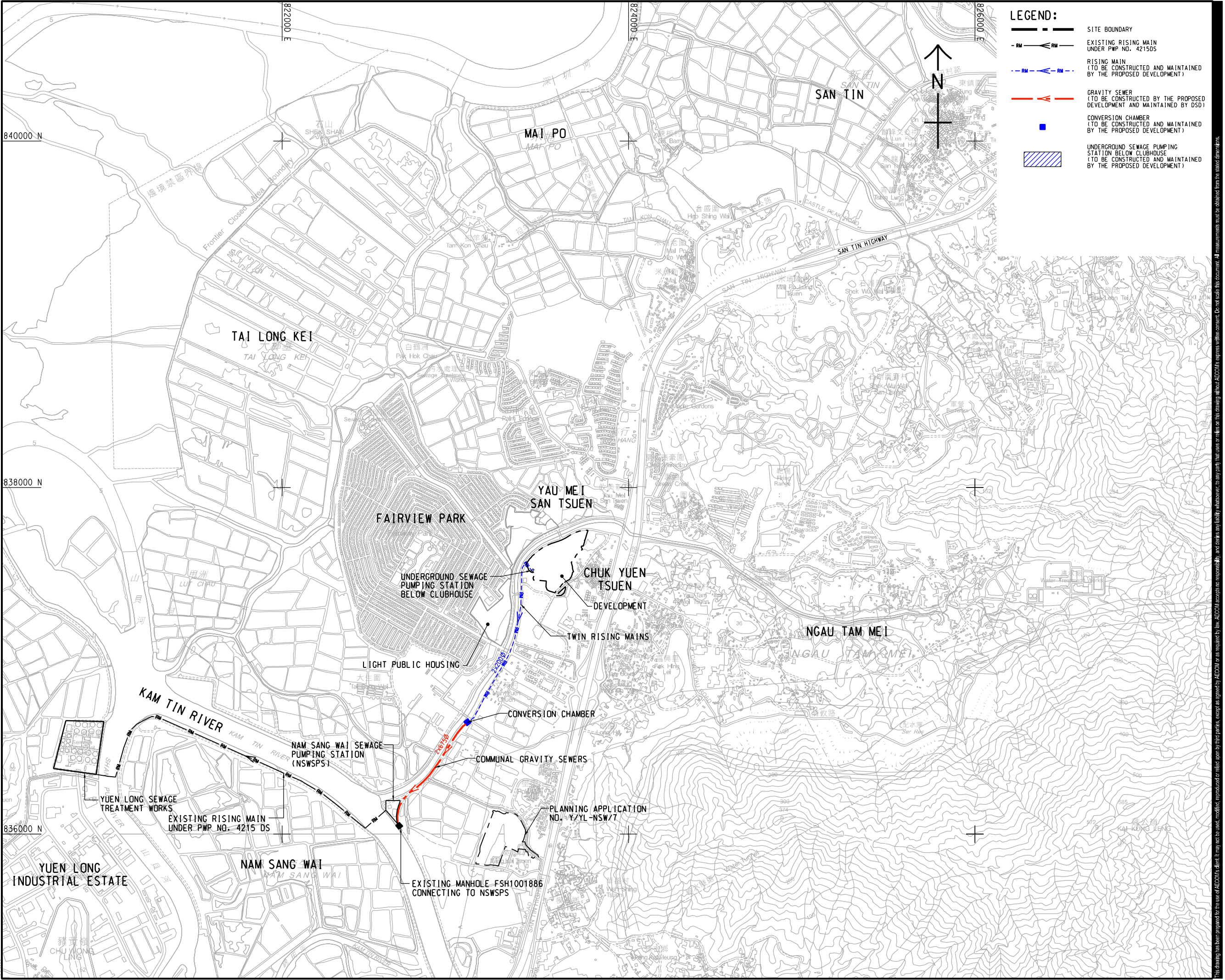




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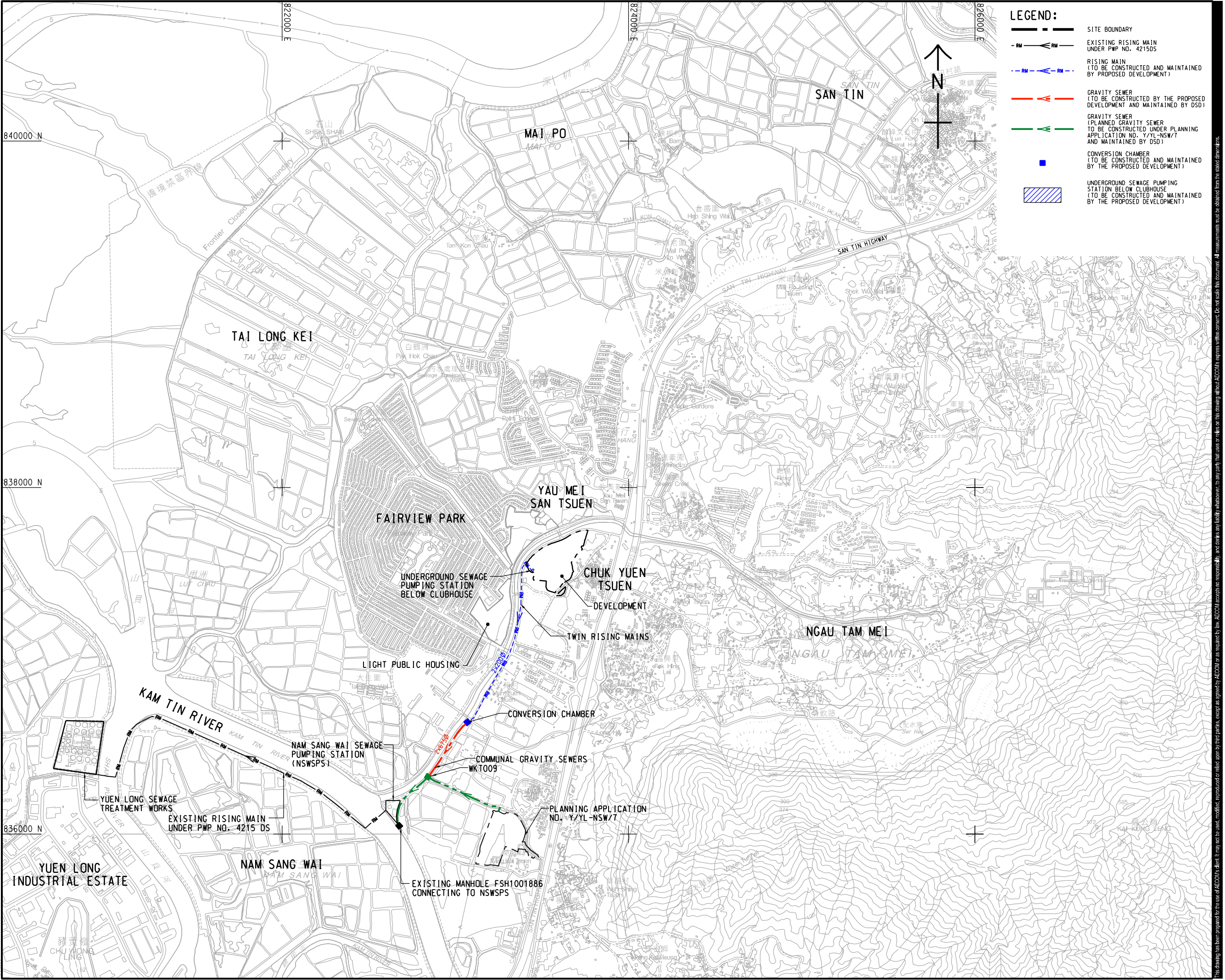
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圖紙名稱  
MAINTENANCE RESPONSIBILITY  
PLAN CASE 1

**SHEET NUMBER**  
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**LEGEND:**

- SITE BOUNDARY
- EXISTING RISING MAIN UNDER PWP NO. 4215DS
- RISING MAIN (TO BE CONSTRUCTED AND MAINTAINED BY PROPOSED DEVELOPMENT)
- GRAVITY SEWER (TO BE CONSTRUCTED BY THE PROPOSED DEVELOPMENT AND MAINTAINED BY DSD)
- GRAVITY SEWER (PLANNED GRAVITY SEWER TO BE CONSTRUCTED UNDER PLANNING APPLICATION NO. Y/YL-NSW/7 AND MAINTAINED BY DSD)
- CONVERSION CHAMBER (TO BE CONSTRUCTED AND MAINTAINED BY THE PROPOSED DEVELOPMENT)
- UNDERGROUND SEWAGE PUMPING STATION BELOW CLUBHOUSE (TO BE CONSTRUCTED AND MAINTAINED BY THE PROPOSED DEVELOPMENT)

# AECOM

**PROJECT**  
S.12A PLANNING APPLICATION ON THE DRAFT MAI PO & FAIRVIEW PARK OZP NO. S/YL-MP/7 REZONING FROM "RESIDENTIAL (GROUP D)" TO "RESIDENTIAL (GROUP C) 1" ZONE FOR A PROPOSED RESIDENTIAL DEVELOPMENT AT VARIOUS LOTS IN D.D. 104 AND THE ADJOINING GOVERNMENT LAND IN YUEN LONG, N.T.

**CLIENT**  
業主

**CONSULTANT**  
工程顧問公司  
AECOM Asia Company Ltd.  
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**SUB-CONSULTANTS**  
分承工程顧問公司

ISSUE/REVISION			
Issue			
I/R	DATE	DESCRIPTION	CHK.
Issue	Date	Description	Check

**STATUS**  
現狀

**SCALE**  
1:10000

**KEY PLAN**  
附圖

**DIMENSION UNIT**  
尺/米

METRES

**PROJECT NO.**  
S.12A/001

**AGREEMENT NO.**  
S.12A/001

60098971

**SHEET TITLE**  
附圖名稱

MAINTENANCE RESPONSIBILITY PLAN CASE 2

**SHEET NUMBER**  
圖紙編號

60098971/SIA/FIGURE 10

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## **Appendix 1**

### **Estimation of Sewage Generation from Proposed Development**

---

## Estimation of Sewage Generation from Proposed Development

Estimated Sewage Flow from the Development		
Residential Unit (no.)	=	2,322
Person per Unit <sup>(1)</sup>	=	2.8
Residential Population (person)	=	6,502
Unit Flow Factor (m <sup>3</sup> /d/head)	=	0.27
DWF (m <sup>3</sup> /day)	=	1,755.54
DWF (l/s)	=	20.319
Clubhouse GFA (m <sup>2</sup> )	=	3,448.71
Clubhouse F&B GFA (m <sup>2</sup> )	=	1,034.61
Assumed Worker Density (workers per GFA (in 100 m <sup>2</sup> ))	=	5.10
Restaurant staff (no.)	=	53
Unit Flow Factor (m <sup>3</sup> /d/head)	=	1.58
DWF (m <sup>3</sup> /day)	=	83.74
DWF (l/s)	=	0.969
Clubhouse non-F&B GFA (m <sup>2</sup> )	=	2,414.10
Assumed Worker Density (workers per GFA (in 100 m <sup>2</sup> ))	=	2.10
Non-restaurant staff (no.)	=	51
Unit Flow Factor (m <sup>3</sup> /d/head)	=	0.28
DWF (m <sup>3</sup> /day)	=	14.28
DWF (l/s)	=	0.165
Retail GFA (m <sup>2</sup> )	=	2,363.00
Retail F&B GFA (m <sup>2</sup> )	=	708.90
Assumed Worker Density (workers per GFA (in 100 m <sup>2</sup> ))	=	5.10
Restaurant staff (no.)	=	36
Unit Flow Factor (m <sup>3</sup> /d/head)	=	1.58
DWF (m <sup>3</sup> /day)	=	56.88
DWF (l/s)	=	0.658
Retail non-F&B GFA (m <sup>2</sup> )	=	1,654.10
Assumed Worker Density (workers per GFA (in 100 m <sup>2</sup> ))	=	2.10
Non-restaurant staff (no.)	=	35
Unit Flow Factor (m <sup>3</sup> /d/head)	=	0.28
DWF (m <sup>3</sup> /day)	=	9.80
DWF (l/s)	=	0.113
Kindergarten GFA (m <sup>2</sup> )	=	929.00
Student (no.)	=	180
Teacher (no.)	=	22
Unit Flow Factor (Student) (m <sup>3</sup> /d/head)	=	0.04
Unit Flow Factor (Staff) (m <sup>3</sup> /d/head)	=	0.28
DWF (m <sup>3</sup> /day)	=	13.36
DWF (l/s)	=	0.155
NEC NOFA (m <sup>2</sup> )	=	328.00
Elderly(no.)	=	8
Unit Flow Factor (m <sup>3</sup> /d/head)	=	0.28
DWF (m <sup>3</sup> /day)	=	2
DWF (l/s)	=	0.03
Staff (no.)	=	11
Unit Flow Factor (m <sup>3</sup> /d/head)	=	0.28
DWF (m <sup>3</sup> /day)	=	3.080
DWF (l/s)	=	0.036

(1)

(2)

(Refer to Table 8 of CIFSUS - Restaurants)

(2)

(Refer to Table 8 of CIFSUS - Retail Trade)

(2)

(Refer to Table 8 of CIFSUS - Restaurants)

(2)

(Refer to Table 8 of CIFSUS - Retail Trade)

(3)

(3)

(4)

Swimming Pool Volume (m <sup>3</sup> )	=	2,707.50	* Outdoor Swimming Pool
Turnover rate (hours)	=	6	
Assumed Surface Loading Rate of Filter (m <sup>3</sup> /m <sup>2</sup> /hr)	=	20	
Filter Area Required (m <sup>2</sup> )	=	22.6	
Duration of Backwash (min/day)	=	3	
Assumed Backwash Flowrate (m <sup>3</sup> /m <sup>2</sup> /hr)	=	30	
Volume of Backwash (m <sup>3</sup> )	=	33.84	
Assumed Discharge Duration (min)	=	3	
Discharge Flow Rate (m <sup>3</sup> /min)	=	11.28	
Discharge Flow Rate (m <sup>3</sup> /s)	=	0.19	
Total DWF (m <sup>3</sup> /day)	=	1,972.76	
Total DWF (l/s)	=	22.83	

\* Pool depth is assumed to be 1.5m and the size of the pool is around 1,805m<sup>2</sup>

Notes:

- 1 A PPoF of 2.8 with reference to the average household size in Yuen Long District according to Statistics on Domestic Household Characteristics by District Council District in 2023.
- 2 The clubhouse GFA and retail GFA is assumed 30% F&B and 70% non F&B.
- 3 According to Education Bureau Key Statistics on Kindergarten Pupil-Teacher Ratio of 8:1. The proposed kindergarten has 6 classrooms with an average class size of 30.
- 4 According to Social Welfare Department Notional Staffing Establishments Neighbourhood Elderly Centre (NEC), a NEC required 11 staff.

## **Appendix 2**

### **Hydraulic Checking of Proposed Twin Rising Mains**

---

## Hydraulic Assessment of Proposed Twin Rising Mains

Total DWF (m <sup>3</sup> /day)	=	1,971.12	
Total DWF (l/s)	=	22.81	
Contributing population	=	7,300	(1)
Peaking Factor	=	3	(2)
Catchment Inflow Factor	=	1.00	(3)
Peak Flow (m <sup>3</sup> /day)	=	5,913.37	
Peak Flow (l/s)	=	68.44	

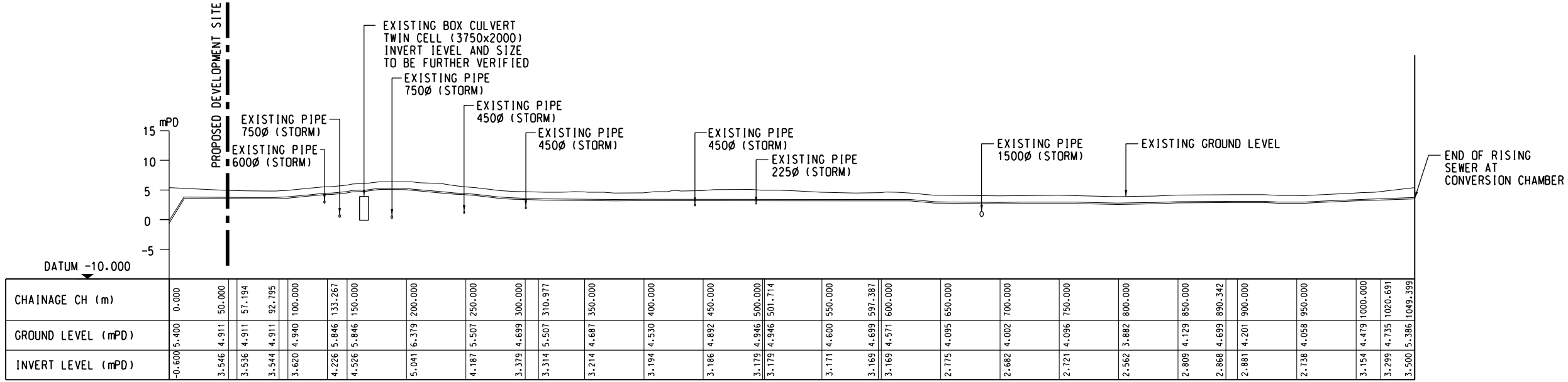
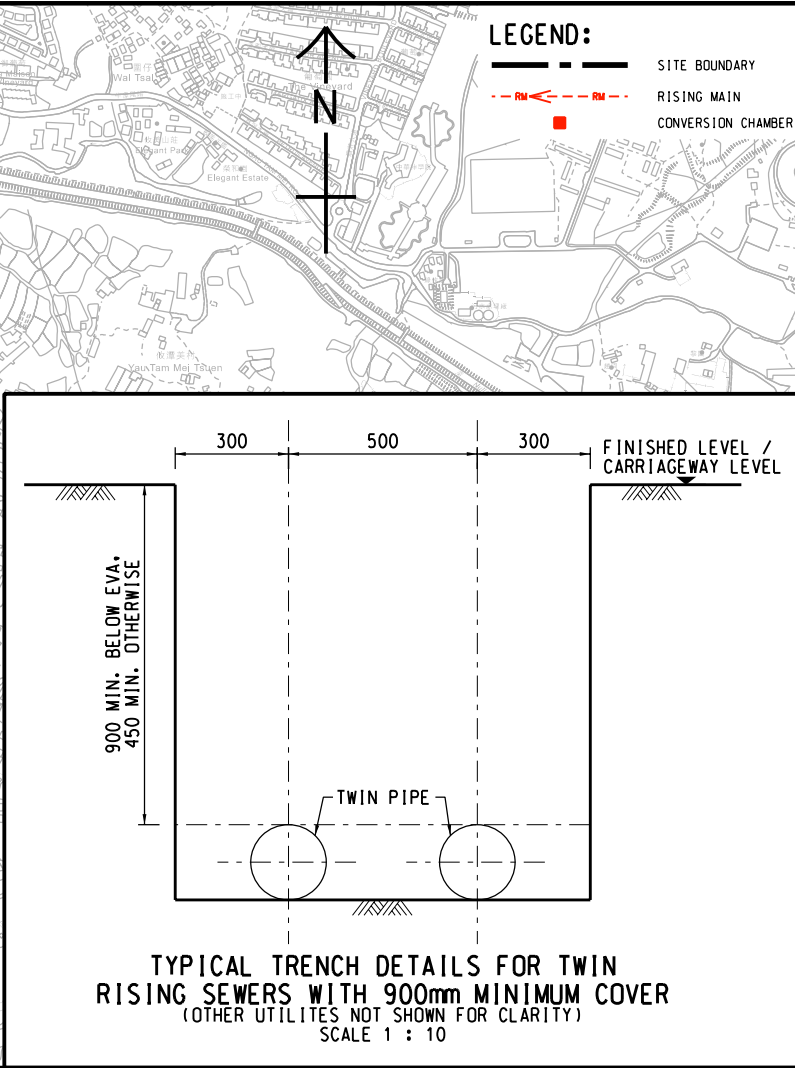
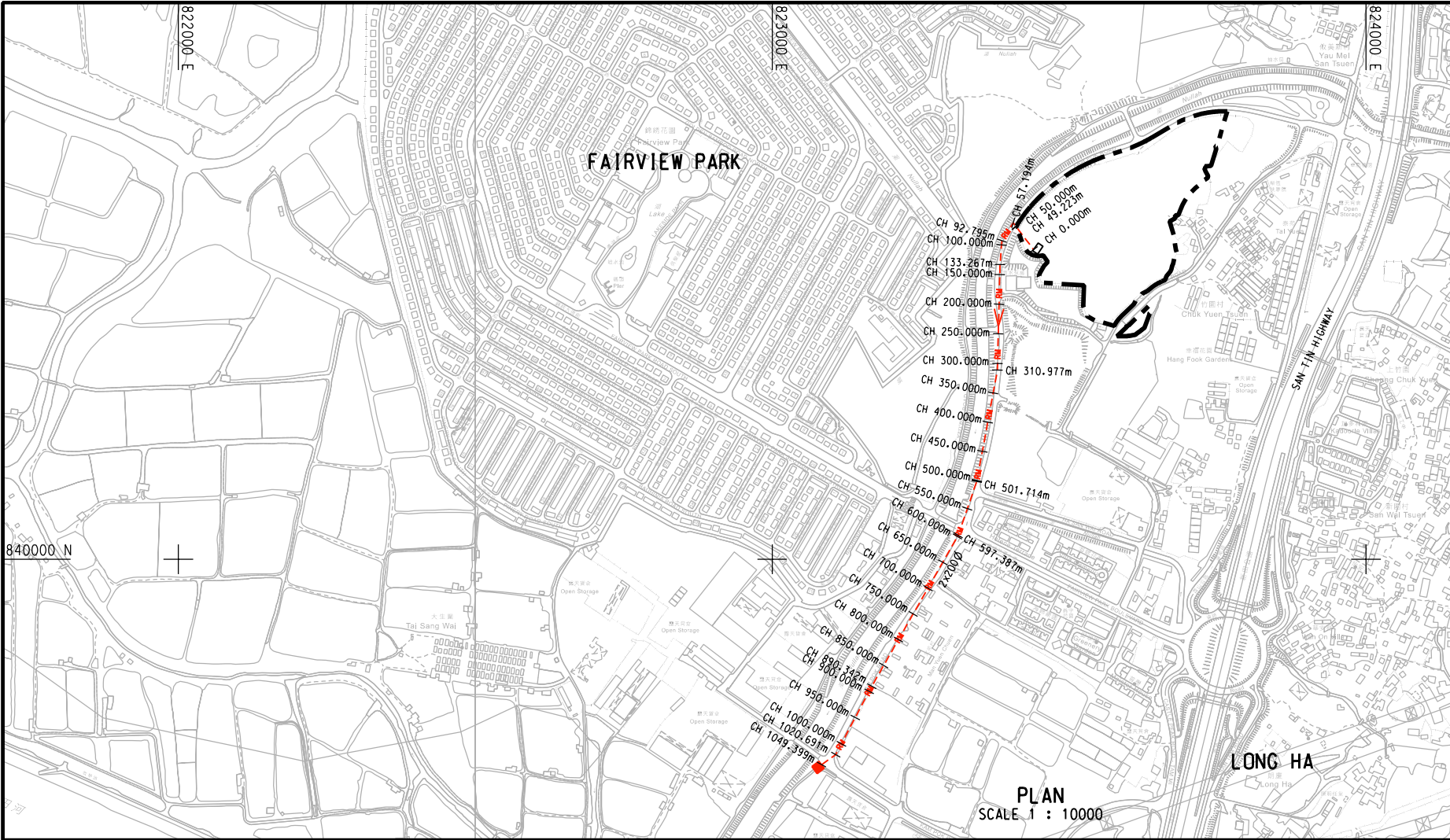
## Calculation of Twin Rising Mains

Diameter (mm)	Area (m <sup>2</sup> )	Max. Discharge (m <sup>3</sup> /s)	Maximum Velocity (m/s)	
200	0.031	0.034	1.09	< 3 m/s (4)

## Notes:

- Contributing population = Projected Flow (ADWF in m<sup>3</sup>/day) / 0.27 (m<sup>3</sup>/person/day)
- According to Table T-5(b) of GESF, the new pumping station and new rising main with new upstream sewerage, peaking factor 3 has been adopted
- Catchment Inflow Factor for Yuen Long, 1.00 is adopted
- According to Sewerage Manual (Part 2), the maximum velocity of rising mains should not exceed 3 m/s. The desirable range of velocity should be 1 m/s to 2 m/s, therefore the diameter of the proposed rising main for the development is found to be acceptable.

ISO A1 594mm x 841mm  
Approved:  
Checked:  
Designer:  
Project Management Initials:  
Plot File by: haiquan.zhao 11/20/2024  
PATH P:\PROJECTS\60098971\Drawing\SKETCH\SK4001.dgn



CHAINAGE CH (m)	0.000		50.000		57.194		92.795		100.000				133.267		150.000		200.000				250.000				300.000																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													</
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RISING MAIN LONGITUDINAL SECTION (CHS 0.000m TO 1049.399m)  
 SCALE HORIZONTAL 1 : 2000  
 VERTICAL 1 : 10000

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PROJECT  
S.12A PLANNING APPLICATION  
ON THE APPROVED MAI PO &  
FAIRVIEW PARK OZP  
NO. S/YL-MP/6  
REZONING FROM "RESIDENTIAL  
(GROUP D)" TO "RESIDENTIAL  
(GROUP C) 1" ZONE FOR A  
PROPOSED RESIDENTIAL  
DEVELOPMENT AT VARIOUS  
LOTS IN D.D. 104 AND THE  
ADJOINING GOVERNMENT LAND  
IN YUEN LONG, N.T.

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ISSUE/REVISION  
设计

I/R	DATE	DESCRIPTION	CHK.
01	11/20/2024	Initial Design	HA

STATUS  
待批

SCALE  
比例  
AS SHOWN  
DIMENSION UNIT  
尺寸单位  
METRES

KEY PLAN  
索引图

PROJECT NO.  
项目编号  
60098971

AGREEMENT NO.  
协议编号

SHEET TITLE  
图名  
RISING MAIN LONGITUDINAL  
PROFILE

SHEET NUMBER  
图号  
60098971/SK4001

## **Appendix 3**

### **Sewage Flow Estimation of Light Public Housing**

---

# Sewage Flow Estimation of Light Public Housing

Estimated Sewage Flow from Light Public Housing		
Residential Population (person)	=	5,500 (1), (2)
Unit Flow Factor (m <sup>3</sup> /d/head)	=	0.19
DWF (m <sup>3</sup> /day)	=	1,045.00
DWF (l/s)	=	12.095
Non-domestic GFA (m <sup>2</sup> )	=	1,075.00 (1)
Community Facilities GFA (m <sup>2</sup> )	=	537.50 (3)
Retail GFA (m <sup>2</sup> )	=	537.50 (3)
Community Facilities GFA (m <sup>2</sup> )	=	537.50
Assumed Worker Density (workers per GFA (in 100 m <sup>2</sup> ))	=	3.30 (5)
Staff (no.)	=	18
Unit Flow Factor (m <sup>3</sup> /d/head)	=	0.28
DWF (m <sup>3</sup> /day)	=	5.04
DWF (l/s)	=	0.058
Retail F&B GFA (m <sup>2</sup> )	=	161.25 (4)
Assumed Worker Density (workers per GFA (in 100 m <sup>2</sup> ))	=	5.10 (6)
Restaurant staff (no.)	=	8
Unit Flow Factor (m <sup>3</sup> /d/head)	=	1.58
DWF (m <sup>3</sup> /day)	=	12.64
DWF (l/s)	=	0.146
Retail non-F&B GFA (m <sup>2</sup> )	=	376.25 (4)
Assumed Worker Density (workers per GFA (in 100 m <sup>2</sup> ))	=	3.50 (7)
Non-restaurant staff (no.)	=	13
Unit Flow Factor (m <sup>3</sup> /d/head)	=	0.28
DWF (m <sup>3</sup> /day)	=	3.64
DWF (l/s)	=	0.042
Total DWF (m <sup>3</sup> /day)	=	1,061.28
Total DWF (l/s)	=	12.28

- Information extracted from "Light Public Housing at Yau Pok Road, Yuen Long - Project Profile".
- For conservative approach, 5,500 of maximum design population was is adopted.
- The non-domestic GFA is assumed 50% Retail and 50% Community Facilities.
- The retail GFA is assumed 30% F&B and 70% non-F&B.
- Refer to Table 8 of CIFSUS - Community, Social & Personal Services.
- Refer to Table 8 of CIFSUS - Restaurants.
- Refer to Table 8 of CIFSUS - Retail Trade.



## **Appendix 4**

### **EPD Estimation on Sewage Flow of the Proposed Gravity Sewer**

---

## Wan, Willie

---

**From:** sftsang@epd.gov.hk  
**Sent:** Monday, December 5, 2022 3:50 PM  
**To:** Dai, Yuki  
**Cc:** sftsang@epd.gov.hk; jackson@epd.gov.hk; kmtang@dsd.gov.hk; khcheng@dsd.gov.hk; Wan, Willie  
**Subject:** Fw: Planning Application Y/YL-MP/6

### This Message Is From an External Sender

This message came from outside your organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Report Suspicious

Dear Yuki

Referring to the discussion between AECOM, DSD and EPD on 18.11.2022, we have no objection to the your proposal from sewerage planning perspective subject to the following conditions:

1. The size of the proposed gravity sewer should be large enough to serve other developments in the same area. Based on our initial estimation, such sewer needs to cater for a sewage flow of at least 15,500 m<sup>3</sup>/d.
2. There remains sufficient unoccupied space under Kam Pok Road to accommodate two additional rising mains (say, 900mm in diameter) which will be constructed together with the proposed new Ngau Tam Mei SPS.

Regards

Matthew TSANG  
E(SI)72  
SIG/EPD  
3107 8417

----- Forwarded by SF TSANG/EPD/HKSARG on 15/11/2022 10:06 -----

**From:** "Dai, Yuki" <yuki.dai@aecom.com>  
**To:** "sftsang@epd.gov.hk" <sftsang@epd.gov.hk>, "jackson@epd.gov.hk" <jackson@epd.gov.hk>, "kmtang@dsd.gov.hk" <kmtang@dsd.gov.hk>, "khcheng@dsd.gov.hk" <khcheng@dsd.gov.hk>  
**Cc:** "Wan, Willie" <Willie.Wan@aecom.com>  
**Date:** 09/11/2022 12:27  
**Subject:** RE: Planning Application Y/YL-MP/6

Dear all,

Further to the email below, a meeting regarding the captioned subject has been arranged with details as follows:-

Date : 11 November 2022 (Friday)

Time : 3 pm

Please find the link below for the meeting:-

## Microsoft Teams meeting

Join on your computer, mobile app or room device

[Click here to join the meeting](#)

Wan, Willie

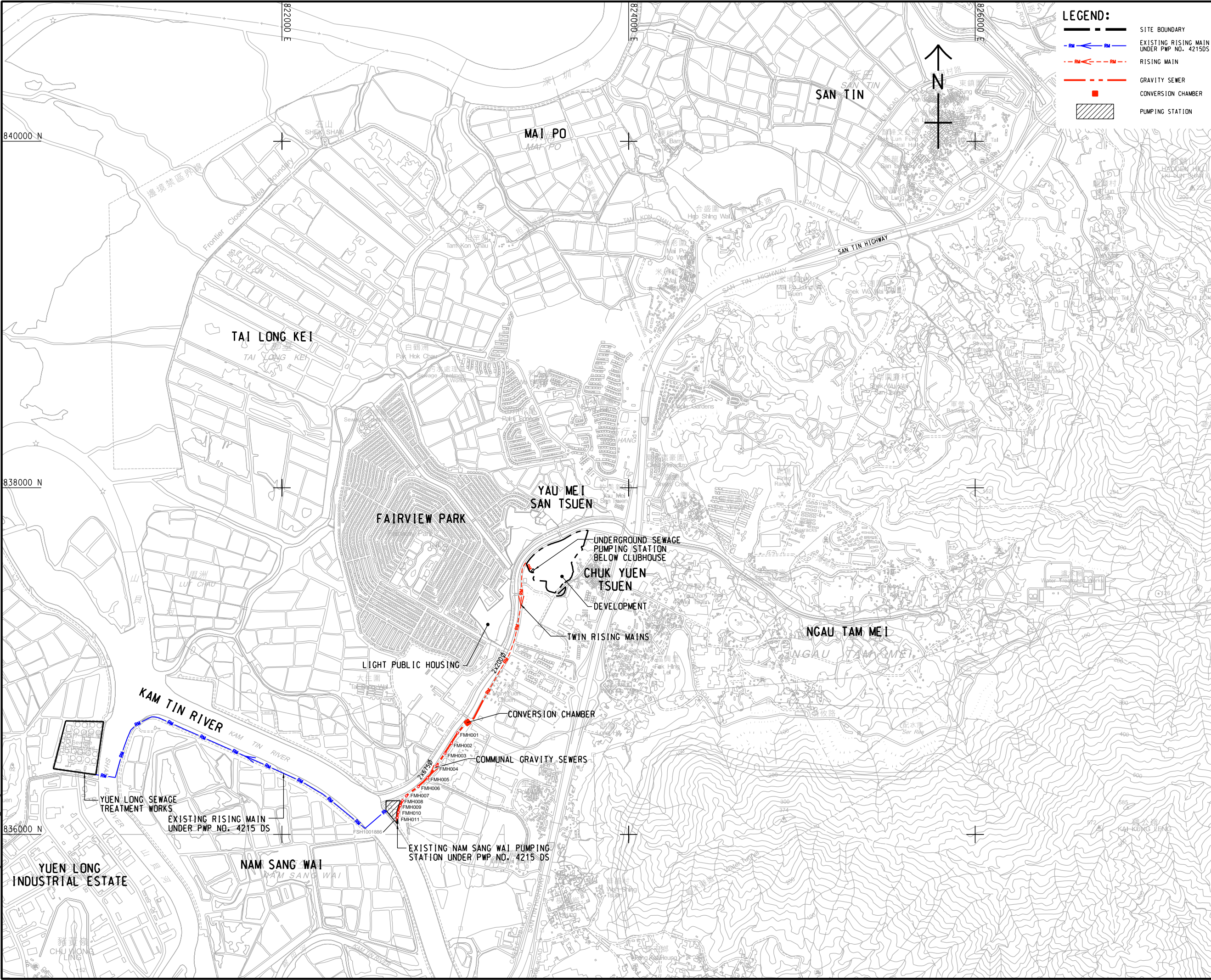
## **Appendix 5**

### **Hydraulic Assessment of Proposed Communal Sewer**

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ISO A1 594mm x 841mm  
Approved:  
Checked:  
Designer:  
Project Management Initials:



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**PROJECT**  
S.12A PLANNING APPLICATION  
ON THE DRAFT MAI PO &  
FAIRVIEW PARK OZP  
NO. S/YL-MP/7  
REZONING FROM "RESIDENTIAL  
(GROUP D)" TO "RESIDENTIAL  
(GROUP C) 1" ZONE FOR A  
PROPOSED RESIDENTIAL  
DEVELOPMENT AT VARIOUS  
LOTS IN D.D. 104 AND THE  
ADJOINING GOVERNMENT LAND  
IN YUEN LONG, N.T.

**CLIENT**  
英千

**CONSULTANT**  
1 利有限公司  
AECOM Asia Company Ltd.  
www.aecom.com

**SUB-CONSULTANTS**  
分列工程顧問公司

ISSUE/REVISION			
設計			
I/R	DATE	DESCRIPTION	CHK.
設計	日期	修改描述	校核

**STATUS**  
10/12

SCALE	DIMENSION UNIT
比例	尺寸單位
A3 1 : 20000	METRES

**KEY PLAN**  
索引圖

PROJECT NO.	AGREEMENT NO.
12/11 0009	12/11 0009

60098971

**SHEET TITLE**  
圖紙名稱

EXISTING AND PLANNED  
SEWERAGE NETWORK PLAN

SHEET NUMBER
圖紙編號

60098971/SIA/FIGURE 3

V:\BAKU\US5-BAKC\SWP\p1dtdrv\Create PH file\new\CSWP-75\color\p1  
Plot File by: WangNB 2024/10/22  
PATH P:\PROJECTS\60098971\Drawing\REPORT\SIA\SIA\_403.dgn



V of water = 0.000001 m<sup>2</sup>/s 20°C

Manhle No.		Pipe																	
		Cover Level		Invert Level		Nominal Outside Diameter (OD)	Nominal Diameter (DN)	Length	Flow Area	Pipe Gradient	Pipe Velocity	Capacity (Twin Pipe)	Roughness <sup>(4)</sup>	Accumulated ADWF <sup>(5)</sup>	Contributing Population	Peaking Factor <sup>(6)</sup>	Estimated Peak Discharge	Capacity Check	Remark
		U/S	D/S	U/S	D/S														
U/S	D/S	mPD	mPD	mPD	mPD	mm	mm	m	m <sup>2</sup>	(1 in )	m/s	m <sup>3</sup> /s	mm	m <sup>3</sup> /d			m <sup>3</sup> /s	%	
Conversion Chamber	FMH001	4.50	4.50	-2.68	-2.87	800	675	75.0	0.36	400	1.09	0.78	1.5	15,500	57,408	3.98	0.713	91	
FMH001	FMH002	4.50	4.55	-2.87	-3.04	800	675	70.0	0.36	400	1.09	0.78	1.5	15,500	57,408	3.98	0.713	91	
FMH002	FMH003	4.55	4.60	-3.04	-3.22	800	675	70.0	0.36	400	1.09	0.78	1.5	15,500	57,408	3.98	0.713	91	
FMH003	FMH004	4.60	4.65	-3.22	-3.41	800	675	75.0	0.36	400	1.09	0.78	1.5	15,500	57,408	3.98	0.713	91	
FMH004	FMH005	4.65	4.20	-3.41	-3.61	800	675	80.0	0.36	400	1.09	0.78	1.5	15,500	57,408	3.98	0.713	91	
FMH005	FMH006	4.20	4.00	-3.61	-3.81	800	675	80.0	0.36	400	1.09	0.78	1.5	15,500	57,408	3.98	0.713	91	
FMH006	FMH007	4.00	4.15	-3.81	-4.01	800	675	80.0	0.36	400	1.09	0.78	1.5	15,500	57,408	3.98	0.713	91	
FMH007	FMH008	4.15	4.20	-4.01	-4.12	800	675	45.0	0.36	400	1.09	0.78	1.5	15,500	57,408	3.98	0.713	91	
FMH008	FMH009	4.20	4.15	-4.12	-4.21	800	675	35.0	0.36	400	1.09	0.78	1.5	15,500	57,408	3.98	0.713	91	
FMH009	FMH010	4.15	4.10	-4.21	-4.28	800	675	30.0	0.36	400	1.09	0.78	1.5	15,500	57,408	3.98	0.713	91	
FMH010	FMH011	4.10	4.05	-4.28	-4.34	800	675	25.0	0.36	400	1.09	0.78	1.5	15,500	57,408	3.98	0.713	91	
FMH011	FSH1001886	4.05	5.35	-4.34	-4.38	800	675	15.0	0.36	400	1.09	0.78	1.5	15,500	57,408	3.98	0.713	91	

Note:

1. Contributing population = Projected Flow + Flow from Development (ADWF in m<sup>3</sup>/day) / 0.27 (m<sup>3</sup>/person/day).
2. Peaking factor with stormwater allowance is adopted.
3. The proposed gravity sewer shall be constructed to discharge the sewage to from the both R(D) and REC Development and other residential development which has similar sewerage arrangement in the vicinity to the existing NSWSPS and ultimately to YLEPP.
4. Concrete sewers slimed to about half depth; velocity, when flowing half full, approximately 1.2 m/s, normal condition is assumed.
5. Base on EPD initial estimation, the commual gravity sewer need to cater for design sewage flow of at least 15,500 m<sup>3</sup>/d.
6. The communal gravity sewer is subject to detailed design, the hydraulic calculation demonstrate the feasibility in terms of proposed pipe size and gradient

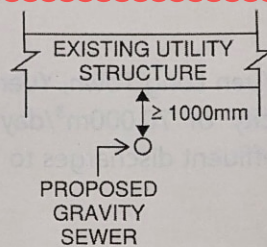
## **Appendix 6**

**Planned Communal Gravity Sewers under Approved Application No. Y/YL-NSW/7**

with necessary manholes will be constructed from the Proposed Development and connect to the existing NSWSPS. No private land will be affected for making such connection.

- 4.1.3 As per EPD request, the proposed gravity sewers have taken account the sewage flow from other sites in the vicinity leading to NSWSPS via Pok Wai South Road. The proposed sewage disposal scheme, proposed sewer longitudinal profile and calculations of design flow and manhole schedule are shown in **Figure 2**, **Figure 3** and **Annex 4** respectively. Clearance of not less than 1000mm will be maintained between the proposed sewers and existing utility structures (i.e. 2 cells 4000x2950 Box Culvert at J/O Kam Pok Road and Pok Wai West Road and 4 cells 2500x2000 trunk box culvert at Pok Wai South Road near Pok Wai West Road).

planned communal gravity sewers under Approved Planning Application No. Y/YL-NSW/7



Section showing the interface between existing utility structure and proposed gravity sewer

- 4.1.4 The design capacity of NSWSPS is 42,921m<sup>3</sup>/day in ADWF and the average daily flow recorded in December 2021 is around 3,600m<sup>3</sup>/day (see **Annex 3**). Based on the calculations shown in **Table 2**, the estimated sewage to be generated from the Proposed Development is 1,565m<sup>3</sup>/day, which is only equivalent to 3.6% of existing NSWSPS design capacity and 2.2% of existing YLSTW design capacity. Therefore, it is considered that sewage generated by the Proposed Development would not overload NSWSPS and YLSTW.

- 4.1.5 A matrix for different type of proposed sewerage system is provided in **Table 3** to summarize the construction and maintenance responsibilities.

**Table 3 – Matrix of construction and maintenance responsibilities**

Element	Location	Construction Responsibility	Maintenance Responsibility
Proposed Sewage Pumping Station	Within Development Boundary	The Developer	The Developer
Proposed Rising Mains	Within Development Boundary	The Developer	The Developer
Proposed Terminal Manhole	Within Development Boundary	The Developer	The Developer
Proposed Sewers and Manholes	Outside Development Boundary	The Developer	DSD

## 5. EVALUATION OF THE STRATEGY AND RECOMMENDATIONS

### 5.1 Regional sewerage strategy

Matrix of construction and maintenance responsibilities under the Approved Application Y/YL-NSW/7

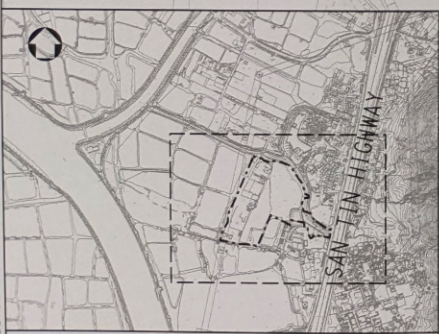


Planing communal gravity  
sewers under the  
Approved Application  
Y/YL-NSW/7

NAM SANG WAI  
SEWAGE PUMPING  
STATION (NSWSPS)

FWD1050573  
DIAMETER 1200(mm)  
UPSTREAM INVERT LEVEL -4.4(mPD)

FSH1001886  
CL 5.35  
A1-3.70-1200  
A2-4.38-700  
X1-4.40-1200  
SP M/H



KEY PLAN  
1 : 30000

- LEGEND:
- REZONING SITE
  - DEVELOPMENT BOUNDARY
  - PROPOSED ALIGNMENT OF GRAVITY SEWERS AND MANHOLE
  - PROPOSED ALIGNMENT OF TWIN RISING MAIN
  - PROPOSED LAST MANHOLE

<p>Title</p> <p>PROPOSED SEWAGE DISPOSAL SCHEME</p>	<p>Figure no.</p> <p>FIGURE 2</p>	
	<p>Prepared</p> <p>SYW</p>	<p>Checked</p> <p>CYW</p>
	<p>Date</p> <p>04/22</p>	<p>Scale</p> <p>A3 1:3000</p>

PROPOSED REZONING FROM "QUICDWRA1" TO "QUICDWRA11" FOR COMPREHENSIVE RESIDENTIAL DEVELOPMENT WITH WETLAND RESTORATION AREA AT VARIOUS LOTS IN DD104 AND ADJOINING GOVERNMENT LAND, WING KEI TSUEN, NAM SANG WAI, YUEN LONG - S12A AMENDMENT OF PLAN APPLICATION



Plot date : 8/3/2022



## Annex 4

### Calculations of Design Flow and Manhole Schedule



**PROPOSED MANHOLE SCHEDULE FOR WING KEI TSUEN**

MANHOLE NO.	MANHOLE TYPE	COVER LEVEL (mPD)	INLET		OUTLET			Pipe material	Type of Bedding	Remarks
			INVERT LEVEL (mPD)	PIPE SIZE (mm) OD	INVERT LEVEL (mPD)	PIPE SIZE (mm) OD	TO MANHOLE			
WKT000	L	4.70	-0.27	400	-0.36	400	WKT001	HDPE	TYPE B BEDDING	-
WKT001	L	4.60	-0.36	560	-0.50	560	WKT002	HDPE	TYPE B BEDDING	-
WKT002	L	4.90	-0.50	560	-0.56	560	WKT003	HDPE	TYPE B BEDDING	-
WKT003	L	4.85	-0.56	560	-0.63	560	WKT004	HDPE	TYPE B BEDDING	-
WKT004	L	4.80	-0.63	560	-0.90	560	WKT005	HDPE	TYPE B BEDDING	-
WKT005	L	4.75	-0.90	560	-1.16	560	WKT006	HDPE	TYPE B BEDDING	-
WKT006	L	4.70	-1.16	560	-1.43	560	WKT007	HDPE	TYPE B BEDDING	-
WKT007	L	4.50	-1.43	560	-1.70	560	WKT008	HDPE	TYPE B BEDDING	-
WKT008	Special Type 1	4.70	-1.70	560	-1.85	560	WKT009	HDPE	TYPE B BEDDING	-
WKT009	L	4.20	-1.85	710	-2.11	710	WKT010	HDPE	TYPE B BEDDING	-
WKT010	L	4.00	-2.11	710	-2.38	710	WKT011	HDPE	TYPE B BEDDING	-
WKT011	Special Type 1	4.15	-2.38	710	-2.53	710	WKT012	HDPE	TYPE B BEDDING	-
WKT012	Special Type 1	4.20	-2.53	710	-2.65	710	WKT013	HDPE	TYPE B BEDDING	-
WKT013	Special Type 1	4.15	-2.65	710	-2.75	710	WKT014	HDPE	TYPE B BEDDING	-
WKT014	Special Type 1	4.10	-2.75	710	-2.83	710	WKT015	HDPE	TYPE B BEDDING	-
WKT015	Special Type 1	4.05	-2.83	710	-2.88	710	Existing	HDPE	TYPE B BEDDING	-

\*Remarks: Special Type Manhole details will be provided in detailed design stage.

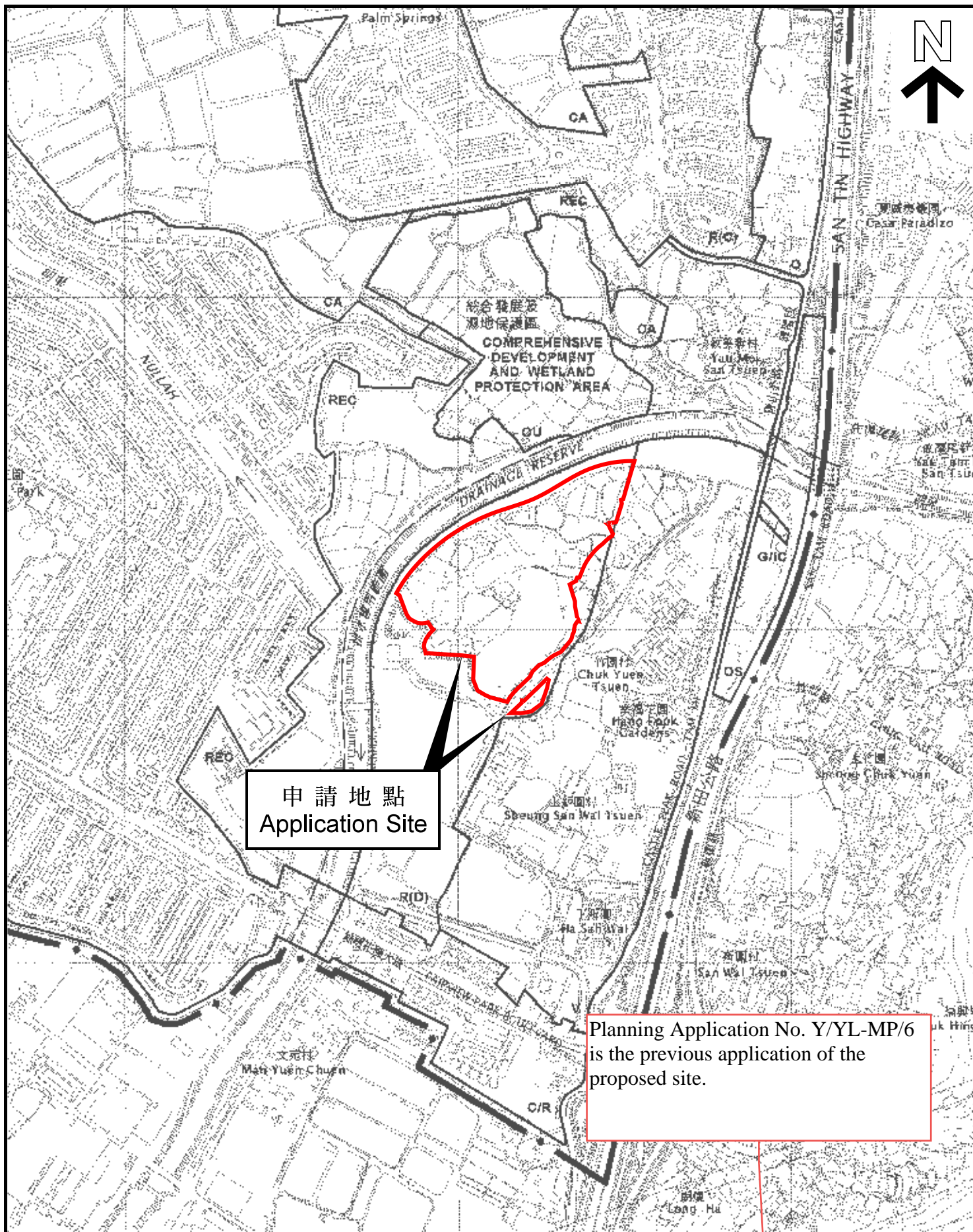
**Design Flow Calculation**

Nearby Potential Development	ADWF (m <sup>3</sup> /day)	Contributing Population
Planning Application No. Y/YL-MP/6	2472.65	9158
Planning Application No. Y/YL-MP/7	986.84	3655
Planning Application No. Y/YL-MP/8	975.26	3613
Planning Application No. Y/YL-ST/1	3229	11960
Planning Application No. Y/YL-NSW/7	1565	5797

Potential flow from the Approved Application No. Y/YL-MP/6 with ADWF of **2472.65 m<sup>3</sup>/day** has been taken into account, which is larger than current ADWF of **1973 m<sup>3</sup>/day**.

Section	Contributing Development	Total ADWF (m <sup>3</sup> /day)	Total Contributing Population	Peaking Factor	Design Peak Flow (m <sup>3</sup> /day)	Design Peak Flow (m <sup>3</sup> /s)
WKT000 - WKT001	Planning Application No. Y/YL-NSW/7	1565	5797	4	6260	0.072
WKT001 - WKT009	Planning Application No. Y/YL-ST/1	4794	17757	3	14382	0.166
WKT009 - WKT015	Planning Application No. Y/YL-NSW/7 Planning Application No. Y/YL-MP/6 Planning Application No. Y/YL-MP/7 Planning Application No. Y/YL-MP/8 Planning Application No. Y/YL-ST/1 Planning Application No. Y/YL-NSW/7	9228.75	34183	3	27686.25	0.320





申請地點  
Application Site

Planning Application No. Y/YL-MP/6  
is the previous application of the  
proposed site.

# 位置圖 LOCATION PLAN

本摘要圖於2021年11月24日擬備，  
所根據的資料為於2005年2月1日  
核准的分區計劃大綱圖編號 S/YL-MP/6  
EXTRACT PLAN PREPARED ON 24.11.2021  
BASED ON OUTLINE ZONING PLAN No.  
S/YL-MP/6 APPROVED ON 1.2.2005

SCALE 1 : 7 500 比例尺  
米 100 0 100 200 300 米  
METRES

申請地點界線只作識別用  
APPLICATION SITE BOUNDARY  
FOR IDENTIFICATION PURPOSE ONLY

參考編號  
REFERENCE No.  
Y/YL-MP/6



**PROPOSED REZONING FROM "OU(CDWRA)" TO "OU(CDWRA)1"**  
**FOR COMPREHENSIVE RESIDENTIAL DEVELOPMENT WITH WETLAND RESTORATION AREA**  
**AT VARIOUS LOTS IN DD104 AND ADJOINING GOVERNMENT LAND,**  
**WING KEI TSUEN, NAM SANG WAI, YUEN LONG – S12A AMENDMENT OF PLAN APPLICATION**

**Manhole Schedule - Wing Kei Tsuen**

Manhole No.	Manhole type	Backdrop manhole required	Manhole type (Combine)	To Manhole	From Manhole	Ground Level (mPD)	PIPE IN			PIPE OUT			
							Invert Level (mPD)	Pipe Size (mm) DN	Pipe Size (mm) OD	Invert Level (mPD)	IL Check	Pipe Size (mm) DN	Pipe Size (mm) OD
WKT000	L	-	L	WKT001	WKT000	4.70	-0.27	351.35	400.00	-0.36	OK	351.35	400.00
WKT001	L	No	L	WKT002	WKT001	4.60	-0.36	491.85	560.00	-0.50	OK	491.85	560.00
WKT002	L	No	L	WKT003	WKT002	4.90	-0.50	491.85	560.00	-0.56	OK	491.85	560.00
WKT003	L	No	L	WKT004	WKT003	4.85	-0.56	491.85	560.00	-0.63	OK	491.85	560.00
WKT004	L	No	L	WKT005	WKT004	4.80	-0.63	491.85	560.00	-0.90	OK	491.85	560.00
WKT005	L	No	L	WKT006	WKT005	4.75	-0.90	491.85	560.00	-1.16	OK	491.85	560.00
WKT006	L	No	L	WKT007	WKT006	4.70	-1.16	491.85	560.00	-1.43	OK	491.85	560.00
WKT007	L	No	L	WKT008	WKT007	4.50	-1.43	491.85	560.00	-1.70	OK	491.85	560.00
WKT008	Special Type 1	No	Special Type 1	WKT009	WKT008	4.70	-1.70	491.85	560.00	-1.85	OK	491.85	560.00
WKT009	L	No	L	WKT010	WKT009	4.20	-1.85	623.60	710.00	-2.11	OK	623.60	710.00
WKT010	L	No	L	WKT011	WKT010	4.00	-2.11	623.60	710.00	-2.38	OK	623.60	710.00
WKT011	Special Type 1	No	Special Type 1	WKT012	WKT011	4.15	-2.38	623.60	710.00	-2.53	OK	623.60	710.00
WKT012	Special Type 1	No	Special Type 1	WKT013	WKT012	4.20	-2.53	623.60	710.00	-2.65	OK	623.60	710.00
WKT013	Special Type 1	No	Special Type 1	WKT014	WKT013	4.15	-2.65	623.60	710.00	-2.75	OK	623.60	710.00
WKT014	Special Type 1	No	Special Type 1	WKT015	WKT014	4.10	-2.75	623.60	710.00	-2.83	OK	623.60	710.00
WKT015	Special Type 1	No	Special Type 1	Existing	WKT015	4.05	-2.83	623.60	710.00	-2.88	OK	623.60	710.00

Manhole No.	Material of pipe	Velocity (m/s)	Velocity check	Cumulative Design Flow (m3/s)	Full Bore Capacity (m3/s)	Full Bore Capacity with 10% reduction (m3/s)	Usage percentage (%)	Capacity check	TYPE OF BEDDING
WKT000	HDPE	1.22	OK	0.072	0.118	0.107	67.98	OK	TYPE B BEDDING
WKT001	HDPE	1.51	OK	0.166	0.287	0.258	64.46	OK	TYPE B BEDDING
WKT002	HDPE	1.51	OK	0.166	0.287	0.258	64.46	OK	TYPE B BEDDING
WKT003	HDPE	1.51	OK	0.166	0.287	0.258	64.46	OK	TYPE B BEDDING
WKT004	HDPE	1.51	OK	0.166	0.287	0.258	64.46	OK	TYPE B BEDDING
WKT005	HDPE	1.51	OK	0.166	0.287	0.258	64.46	OK	TYPE B BEDDING
WKT006	HDPE	1.51	OK	0.166	0.287	0.258	64.46	OK	TYPE B BEDDING
WKT007	HDPE	1.51	OK	0.166	0.287	0.258	64.46	OK	TYPE B BEDDING
WKT008	HDPE	1.51	OK	0.166	0.287	0.258	64.46	OK	TYPE B BEDDING
WKT009	HDPE	1.75	OK	0.320	0.535	0.481	66.56	OK	TYPE B BEDDING
WKT010	HDPE	1.75	OK	0.320	0.535	0.481	66.56	OK	TYPE B BEDDING
WKT011	HDPE	1.75	OK	0.320	0.535	0.481	66.56	OK	TYPE B BEDDING
WKT012	HDPE	1.75	OK	0.320	0.535	0.481	66.56	OK	TYPE B BEDDING
WKT013	HDPE	1.75	OK	0.320	0.535	0.481	66.56	OK	TYPE B BEDDING
WKT014	HDPE	1.75	OK	0.320	0.535	0.481	66.56	OK	TYPE B BEDDING
WKT015	HDPE	1.75	OK	0.320	0.535	0.481	66.56	OK	TYPE B BEDDING

Details of the planned communal gravity sewers under the Approved Application No. Y/YL-NSW/7

*Appendix 10*  
Water Supply Impact Assessment

S.12A Planning Application  
on the Draft Mai Po & Fairview Park OZP No. S/YL-MP/7  
Rezoning from “Residential (Group D)” to “Residential (Group C) 1” Zone  
for a Proposed Residential Development  
at Various Lots in D.D. 104 and the Adjoining Government Land  
in Yuen Long, N.T.

**Water Supply Impact Assessment Report**

**December 2024**

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Figure 4      Fresh Water Distribution Layout

## **List of Appendices**

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underneath San Tam Road



## **1. Introduction**

### **1.1. Background**

- 1.1.1. AECOM Asia Company Limited (AECOM) has been commissioned by the Applicant to conduct a Water Supply Impact Assessment (WSIA) in support of the S12A planning application to enable a medium-rise residential development on the Application Site.
- 1.1.2. The Application Site is bounded by Kam Pok Road to its immediate north and west, a village area and Ha Chuk Yuen Tsuen Road to its immediate east, and the existing Drainage Services Department (DSD) Chuk Yuen Floodwater Pumping Station (CYFPS) with its water retention pond to its immediate south. **Figure 1** presents the location of the Project.
- 1.1.3. The Application Site has been previously approved for a 2-storey house development (TPB Ref.: A/YL-MP/205 & 205-1). The current application aims to better utilise the land resource/development potential of the Site to increase flat supply without generating any insurmountable adverse impacts.

### **1.2. Objective of this Submission**

- 1.2.1. The main objectives of this WSIA are as follows:
  - (i) Determine the water demand arising from the proposed development;
  - (ii) Assess the impact of the water demand arisen from the proposed development to the existing water supply system; and
  - (iii) Propose any appropriate mitigation measures, if required.

## 2. Development Proposal

2.1.1. The current scheme comprises mainly medium-rise residential development with a domestic plot ratio of 1.5 and non-domestic plot ratio of about 0.09. The site will accommodate 10 residential blocks with a height of 14 to 16 storeys, providing about 2,322 flats. Total domestic GFA is about 98,535m<sup>2</sup> and total commercial GFA of about 3,292m<sup>2</sup> planned for retail (about 2,363m<sup>2</sup>) and kindergarten (about 929m<sup>2</sup>). In addition, there will be a transport layby (not more than 2,400m<sup>2</sup>) and social welfare facilities including a neighbourhood elderly center (NEC) (about 328m<sup>2</sup> NOFA), as well as other residential ancillary facilities(e.g. a basement carpark, residents' clubhouse, swimming pool and landscape area) within the site.

2.1.2. The Master Layout Plan (MLP) of the Proposed Development is illustrated in **Figure 2**. The details of the proposed development schedule are summarised in **Table 2-1** below:

**Table 2-1: Development Schedule**

Site Area	About 65,690 m <sup>2</sup>
Domestic GFA	About 98,535 m <sup>2</sup>
Commercial GFA <sup>(1)</sup>	About 3,292 m <sup>2</sup>
Clubhouse GFA	About 3,449 m <sup>2</sup>
No. of Units	2,322 Units
Anticipated Population <sup>(2)</sup>	6,502

Notes:

- (1) Commercial GFA include commercial uses (2,363 m<sup>2</sup>) and a 6-classroom kindergarten (929 m<sup>2</sup>);
- (2) A PPOF of 2.8 with reference to the average household size in Yuen Long District according to Statistics on Domestic Household Characteristics by District Council District in 2023.

### 3. Fire-Fighting Requirements

- 3.1.1. Water supply for fire-fighting service has been considered in this WSIA. Fire-fighting requirement for residential zone is 6,000m<sup>3</sup>/day with discharge pressure of 17m head. The fire hydrant should be of standard pattern with minimum output pressure not less than 25 psi. With multiple hydrants operating at the same time, total output of not less than 4,000L/min shall last for 60 minutes. The fire-fighting requirements are summarized in **Table 3-1**.

**Table 3-1 Fire-Fighting Requirements**

Requirements	Minimum Values
Minimum Fresh Water Supply	6,000m <sup>3</sup> /day
Discharge pressure	17m
Minimum output not less than 25 psi.	4,000L/min (5,760m <sup>3</sup> /day) which lasts for an hour (i.e., 4,000×60 = 240,000L/ hour/day or 240m <sup>3</sup> /hour/day)

### 4. Existing Water Supply System

#### 4.1. Fresh Water Supply System

- 4.1.1. The layout plan showing the existing water distribution system in the vicinity of the Application Site is shown in **Figure 3**. According to Water Supplies Department's (WSD) record plan, an existing 200mm dia. fresh water main underneath Kam Pok Road and another existing 600mm dia. fresh water main underneath San Tam Road is available for connection to serve the subject proposed development, about 380m away from the development. According to WSD's water distribution layout, the fresh water in the vicinity of the site would be supplied by the Ngau Tam Mei Fresh Water Primary Service Reservoir.
- 4.1.2. There is an existing 50mm dia. fresh water main spanning across the Application Site from the east to west direction. The water main is connected to an existing 200mm dia. fresh water main underneath Kam Pok road at the western end and an existing 100mm dia. fresh water main underneath Ha Chuk Yuen Road at the eastern end.

#### 4.2. Salt Water Supply System

- 4.2.1. According to WSD record, there is no existing salt water supply system in the vicinity of the Application Site.

## 5. Assessment Methodology

### 5.1. Assessment Assumptions

5.1.1. The mean daily unit demands for various classes of consumer given in WSD Departmental Instruction No.1309 are adopted for this assessment. A summary table of the mean daily unit demands used for different development types is shown in **Table 5-1**.

**Table 5-1: Mean Daily Unit Demands**

Development Type	Fresh Water (L/Head/Day)	Flushing Water (L/Head/Day)
Residential R2 <sup>(1)</sup>	300	70
Service Trade - Yuen Long <sup>(2)</sup>	40	-
Kindergarten <sup>(3)</sup>	25	25
Development Type	Fresh Water (L/bed/Day)	Flushing Water (L/Head/Day)

The figures are based on WSD DI No. 1309.

- (1) “Residential: R2 – All areas”
- (2) “Service Trade - Yuen Long”
- (3) “School Student”

### 5.2. Water Demand of Proposed Development

5.2.1. Upon completion of the proposed development, the Application Site will accommodate about 2,322 flats with expected average occupancy rate of 2.8 persons / unit. **Table 5-2** below shows the estimation of the population of the proposed development.

**Table 5-2: Summary of the Proposed Residential Development**

Residential	
No. of flats	2,322
Occupancy Rate	2.8 / unit
Residential Population <sup>1</sup>	6,502
Kindergarten Student <sup>2</sup>	160
NEC Employee <sup>3</sup>	Service Trade

Notes:

1. A PPoF of 2.8 with reference to the average household size in Yuen Long District according to Statistics on Domestic Household Characteristics by District Council District in 2023.
2. The proposed kindergarten has 8 classrooms with an average class size of 20.
3. The no. of employee for NEC is included in service trade use.

5.2.2. Estimated total water demands for the proposed development is summarized in **Table 5-3**.

**Table 5-3: Estimated Water Demand**

Accommodation Type	Data	Remark
<b>Residential</b>		
Residential Population	6,502	
Fresh Water Unit Demand (l/head/day)	340	Table 1 & 2, DI No. 1309; Included Service Trade <sup>2</sup>
Fresh Water Mean Daily Demand	2,211	m <sup>3</sup> /day
Flushing Water Unit Demand (l/head/day)	70	Table 1, DI No. 1309
Flushing Water Mean Daily Demand	455	m <sup>3</sup> /day
<b>Kindergarten</b>		
Student	160	
Fresh Water Unit Demand (l/head/day)	25	Table 1, DI No. 1309
Fresh Water Mean Daily Demand	4.0	m <sup>3</sup> /day
Flushing Water Unit Demand (l/head/day)	25	Table 1, DI No. 1309
Flushing Water Mean Daily Demand	4.0	m <sup>3</sup> /day
<b>NEC (Employee)</b>	-	Has been included in Service Trade <sup>2</sup>
Total Estimated Water Consumption of the Proposed Development	<u>2,674</u>	m <sup>3</sup> /day
<b>Fire-Fighting</b>		
Fire-Fighting	6,000 m <sup>3</sup> /day <sup>1</sup>	

Note:

1. Daily water demand does not include water demand for fire-fighting.
2. Service Trade takes into account of all non-domestic water demand, excluding the school students. The water demand of NEC has been considered in Service Trade.

### 5.3. Impact of Existing Water Supply System

5.3.1. Since no existing salt water supply system is available in the vicinity of the development, the water supply for flushing would be counted on the fresh water demands.

5.3.2. The daily treatment rate of Ngau Tam Mei Fresh Water Treatment Works (NTMFWTW) is approximately 230,000m<sup>3</sup>/day and the estimated water consumption of the proposed

development is approximately 2,674m<sup>3</sup>/day, which is merely 1.16% of NTMFWTW's capacity. Therefore, the proposed development would not post a critical impact to the existing water treatment works.

- 5.3.3. Currently, the existing 200mm dia. water main along Kam Pok Road is not servicing any major developments, but according to WSD, it is reserved for firefighting service for the surrounding development. Alternative water supply source would be required to cater the proposed development. Another feasible water supply source is an existing 600mm dia. fresh water main underneath San Tam Road, about 380m away from the proposed development. The detailed calculation is shown in **Appendix 1**.
- 5.3.4. It is proposed that a section of an existing 50mm dia. fresh water main spanning across the proposed development would be abandoned and the ends of the water main would be capped to ensure service outside the development would be maintained.

## 6. Proposed Water Supply System

- 6.1.1. As there is no salt water supply available in the vicinity of the Proposed Development, the demand for flushing water would be met by using fresh water. Temporary fresh water main for flushing (TMF) is applied for the development. It is recommended that connection of salt water supply system is to be made to the Development when becomes available.
- 6.1.2. The existing 200mm dia. fresh water main along Kam Pok Road serves the surrounding development as firefighting purpose. The combined water demand for firefighting and the proposed development would exceed the capacity of the existing 200mm dia. water main.
- 6.1.3. Alternative water supply source from the existing 600mm dia. fresh water main underneath San Tam Road, about 380m away from the proposed development.
- 6.1.4. A new 300mm dia. water main is proposed along Kam Pok Road, tee-off from the existing 600mm dia. water main from San Tam Road, for water supply to the proposed development. The proposed 300mm dia. water main will serve both fresh and flushing water demand, a 200mm dia. lead-in proposed for fresh water and a separate 100mm dia. lead-in proposed for flushing water. According to results in **Appendix 1**, the water demand of the proposed development will utilize about 11% capacity of the existing 600mm dia. water main.
- 6.1.5. Therefore, the fresh and flushing water supply for the proposed development will be supplied by an existing 600mm dia. fresh water main underneath San Tam Road, about 380m away from the proposed development.
- 6.1.6. The current scheme comprises mainly medium-rise residential development with a domestic plot ratio of 1.5 and non-domestic plot ratio of about 0.078. The site will accommodate 10 residential blocks with a height of 14 to 16 storeys, providing about

2,322 flats with retail facilities. Total domestic GFA is about 98,535m<sup>2</sup> and total commercial GFA of about 3,292m<sup>2</sup> planned for retail (about 2,363m<sup>2</sup>) and kindergarten (about 929m<sup>2</sup>). In addition, there will be a transport layby and social welfare facilities including a neighbourhood elderly center (NEC) (about 666m<sup>2</sup>), **as well as other residential ancillary facilities**(e.g. a basement carpark, residents' clubhouse, swimming pool and landscape area) within the site. The general layout of the proposed development is shown in Figure 2.

The proposed alignment of the water mains is presented in **Figure 4**. The hydraulic calculation has confirmed the adequacy of the proposed water mains and the detailed calculation is shown in **Appendix 1**.

- 6.1.7. As previously mentioned, the existing 50mm dia. fresh water main within the proposed development would be properly abandoned and the ends of the water main would be capped to ensure services outside the development remains unaffected.
- 6.1.8. Connection of salt water supply system will be made to the development when available in future so as to minimize the fresh water demand.
- 6.1.9. The connection arrangement of the proposed water works will be confirmed with WSD in the detail design stage.

## **7. Proposed Fire-Fighting System**

- 7.1.1. The size of the proposed water main for the fire-fighting system and associated fittings will be further developed in the detailed design stage.
- 7.1.2. The provision of fire hydrants and fire mains is in accordance with the relevant stipulations in "Technical Circular No. 4/2010: Fire Mains and Hydrants on New Trunk Roads and Elevated Highway Structures" published by Highway Department (HyD). The average spacing of fire hydrants to at-grade trunk road shall be at a distance of 100m. The detailed arrangement will be submitted to Fire Services Department (FSD) for approval during detailed design stage.
- 7.1.3. The provision of fire-fighting requirements are mentioned in **Section 3**. The water supply with discharge pressure of 1.7bar (17m head) and flow of 4,000L/min that lasts for one hour will be provided.
- 7.1.4. Hydraulic checking of the proposed pipe for fire-fighting demand is checked in **Appendix 1**.

## **8. Conclusions**

- 8.1.1. According to WSD record, there is no existing salt water supply system in the vicinity of the Application Site.
- 8.1.2. As there is no salt water supply available in the vicinity of the Proposed Development, the demand for flushing water would be met by using fresh water. Temporary fresh water main for flushing (TMF) is applied for the development. It is recommended that connection of salt water supply system is to be made to the Development when becomes available.
- 8.1.3. The existing 200mm dia. fresh water main along Kam Pok Road serves the surrounding development as firefighting purpose. The combined water demand for firefighting and the proposed development would exceed the capacity of the existing 200mm dia. water main.
- 8.1.4. Alternative water supply source from the existing 600mm dia. fresh water main underneath San Tam Road, about 380m away from the proposed development.
- 8.1.5. A new 300mm dia. water main is proposed along Kam Pok Road, tee-off from the existing 600mm dia. water main from San Tam Road, for water supply to the proposed development. The proposed 300mm dia. water main will serve both fresh and flushing water demand, a 200mm dia. lead-in proposed for fresh water and a separate 100mm dia. lead-in proposed for flushing water.
- 8.1.6. Therefore, the fresh and flushing water supply for the proposed development will be supplied by an existing 600mm dia. fresh water main underneath San Tam Road, about 380m away from the proposed development.

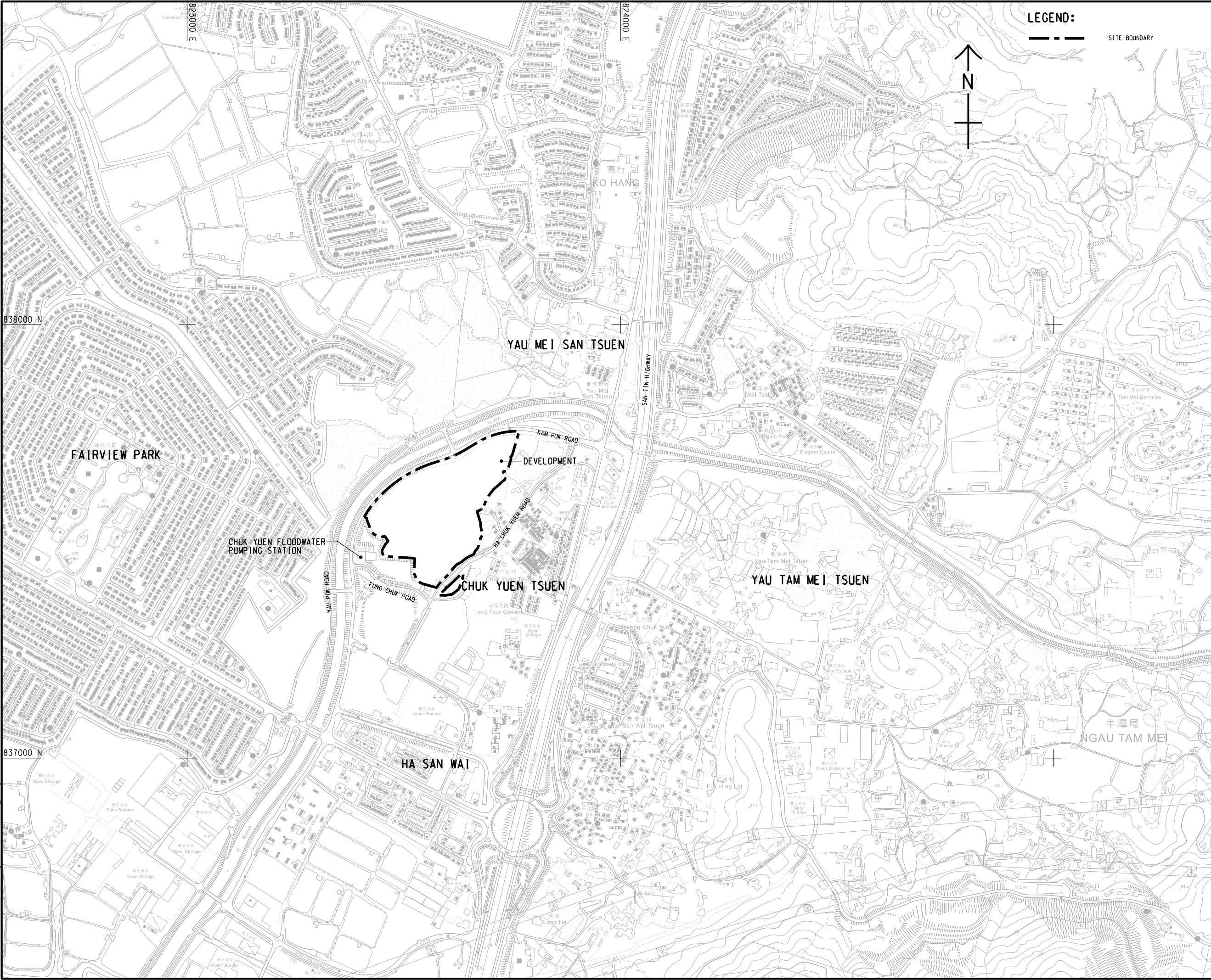


## Drawings

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S.12A PLANNING APPLICATION  
ON THE DRAFT MAI PO &  
FAIRVIEW PARK OZP  
NO. S/YL-MP/7  
REZONING FROM "RESIDENTIAL  
(GROUP D)" TO "RESIDENTIAL  
(GROUP C) 1" ZONE FOR A  
PROPOSED RESIDENTIAL  
DEVELOPMENT AT VARIOUS  
LOTS IN D.D. 104 AND THE  
ADJOINING GOVERNMENT LAND  
IN YUEN LONG, N.T.

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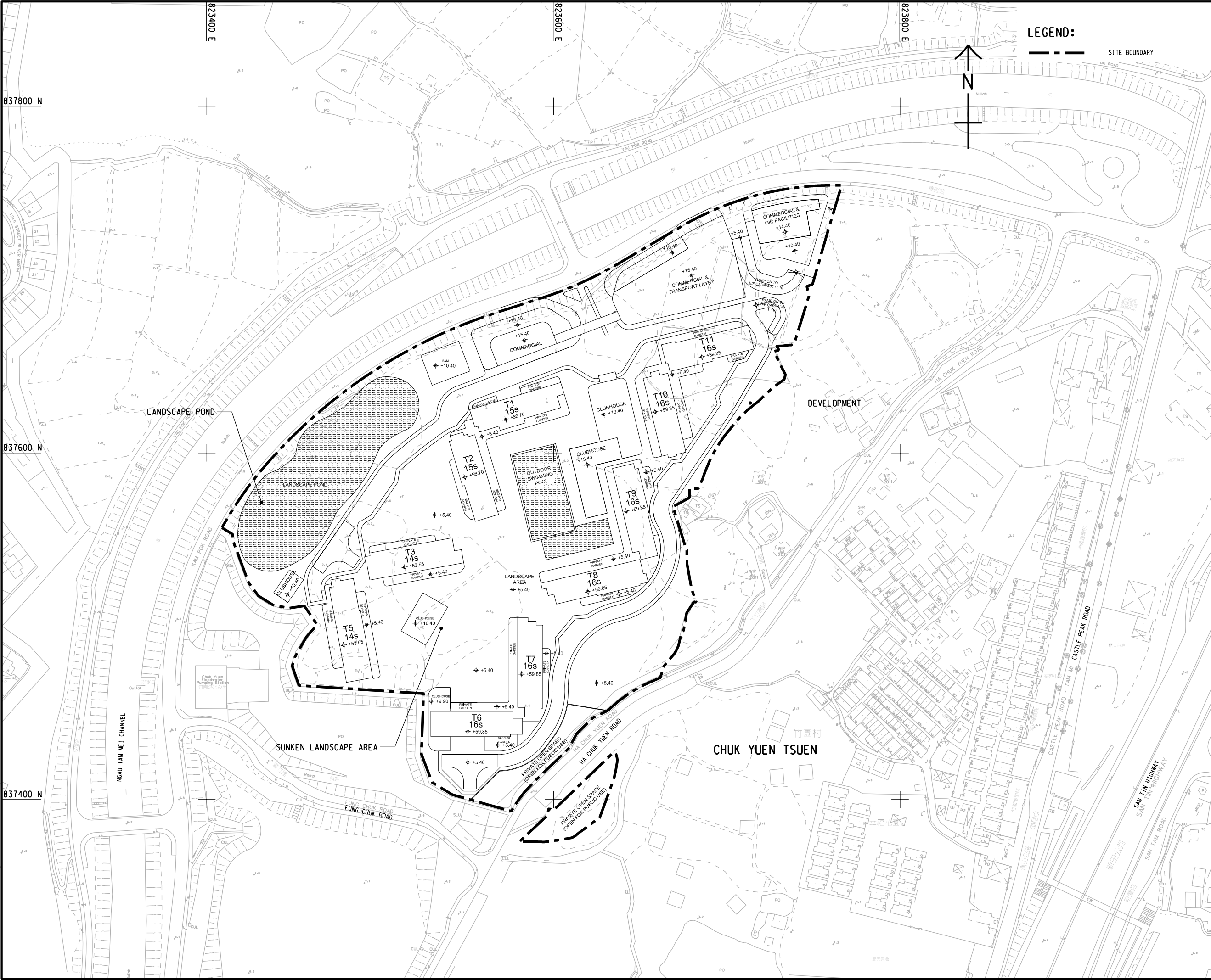
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60098971/WSIA/FIGURE 1

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**PROJECT**  
項目

S.12A PLANNING APPLICATION  
ON THE DRAFT MAI PO &  
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NO. S/YL-MP/7  
REZONING FROM "RESIDENTIAL  
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DEVELOPMENT AT VARIOUS  
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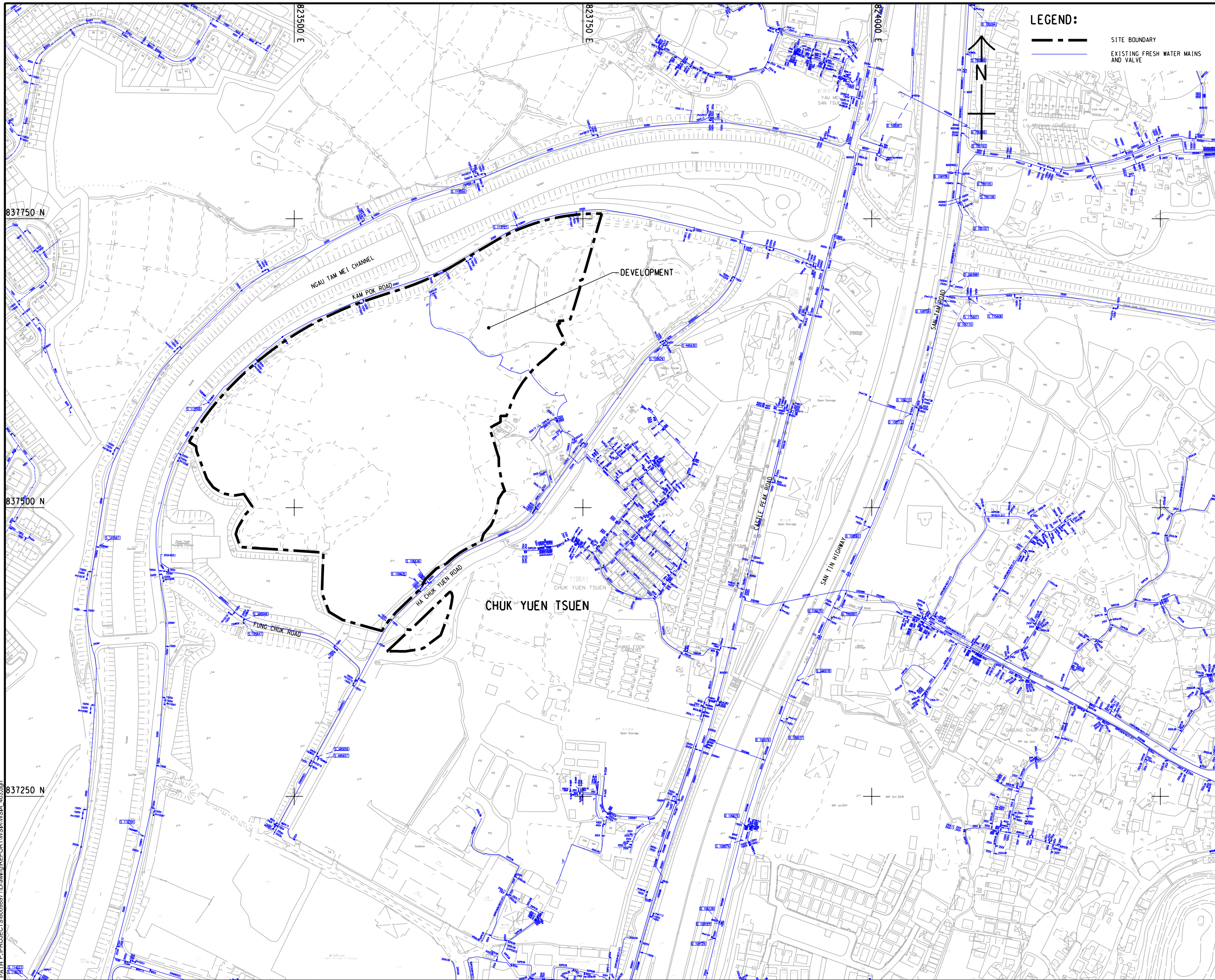
MASTER LAYOUT PLAN

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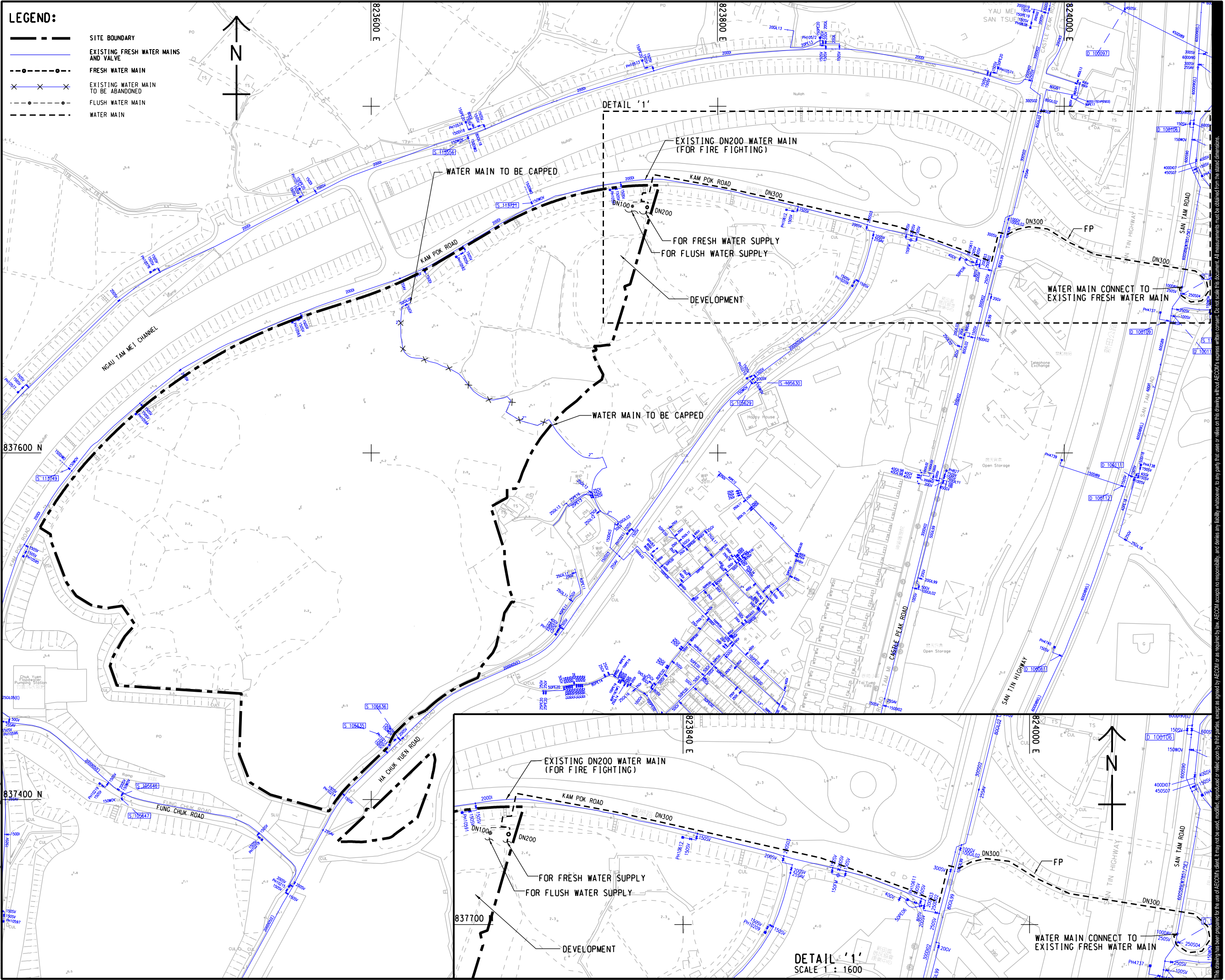




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LEGEND:

- SITE BOUNDARY
- EXISTING FRESH WATER MAINS AND VALVE
- FRESH WATER MAIN
- EXISTING WATER MAIN TO BE ABANDONED
- FLUSH WATER MAIN
- WATER MAIN



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協議編號

**SHEET TITLE**  
圖紙名稱  
FRESH WATER  
DISTRIBUTION LAYOUT PLAN

**SHEET NUMBER**  
圖紙編號  
60098971/WIA/FIGURE 4

SHEET 1 OF 2

## Appendix 1

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## **Appendix 1**

### **Hydraulic Calculation For Existing and Proposed water mains underneath San Tam Road**

**Estimated Fresh and Flush Water Demands for Entire Development Site** 2673.82 m<sup>3</sup>/day

#### **Hydraulic Calculation for Existing Fresh Water Supply System to Entire Development**

The required flow rate,  $Q_t$  for the entire development is: 2,674 m<sup>3</sup>/day  
0.031 m<sup>3</sup>/s

With reference to WSD's Departmental Instruction No. 1309, the peak factor for fresh water distribution mains is 3.

Hence, the required peak flow rate for the development  $Q_{tp}$  is: 0.093 m<sup>3</sup>/s

Internal diameter of existing DN600 water main 586 mm  
Cross Section Area 0.270 m<sup>2</sup>

It was assumed that the velocity of the existing water main is: 3 m/s

The flow rate of the existing water main is 0.80911 m<sup>3</sup>/s

Hence, the percentage of the existing water main occupied by the development site is: 11 %

#### **Hydraulic Calculation for Proposed Fresh and Flush Water Supply System to Entire Development**

The required flow rate,  $Q_t$  for the entire development is: 2,674 m<sup>3</sup>/day  
0.031 m<sup>3</sup>/s

With reference to WSD's Departmental Instruction No. 1309, the peak factor for fresh water distribution mains is 3.

Hence, the required peak flow rate for the development  $Q_{tp}$  is: 0.093 m<sup>3</sup>/s

Internal diameter of proposed DN300 water main 282 mm  
Cross Section Area 0.062 m<sup>2</sup>

The peak velocity of the proposed water main is: 1.486 m/s

#### **Notes:**

1. According to Manual of Mainlaying Practice 2012 Edition, the maximum flow velocity under peak flow for both pumping mains and distribution mains should be less than 3 m/s.



**Appendix 1****Hydraulic Calculation For Existing and Proposed water mains underneath San Tam Road (Fire Fighting Condition)**

Fire Fighting Requirement		6000.00 m <sup>3</sup> /day
Mean Daily Demand	X 1	2673.82 m <sup>3</sup> /day
<b>Total</b>		<b>8673.82 m<sup>3</sup>/day</b>

**Existing Fresh Water Supply System**

The required flow rate, $Q_t$ for the entire development is:	8,674 m <sup>3</sup> /day 0.100 m <sup>3</sup> /s
Internal diameter of existing DN600 water main	586 mm
Cross Section Area	0.270 m <sup>2</sup>
It was assumed that the velocity of the existing water main is:	3 m/s
The flow rate of the existing water main is	0.80911 m <sup>3</sup> /s
Hence, the percentage of the existing water main occupied by the development site is:	12 %

**Proposed Water Supply System**

The required flow rate, $Q_t$ for the entire development is:	8,674 m <sup>3</sup> /day 0.100 m <sup>3</sup> /s
Internal diameter of proposed DN300 water main	282 mm
Cross Section Area	0.062 m <sup>2</sup>
The peak velocity of the proposed water main is:	1.607 m/s

**Notes:**

1. According to Manual of Mainlaying Practice 2012 Edition, the maximum flow velocity under peak flow for both pumping mains and distribution mains should be less than 3 m/s.