

## **Sewerage Impact Assessment (SIA)**

**To Amend the Notes of the “Comprehensive Development  
to include Wetland Restoration Area” Zone for a Proposed  
Comprehensive Development at Wo Shang Wai, Yuen  
Long, Lots 77 and 50 S.A in DD101**

**Date: 15 September 2025**

**Revision 4**

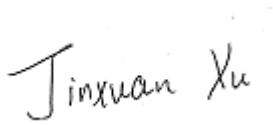


# Quality Management

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## 1 INTRODUCTION

- 1.1 WSP (Asia) Limited was commissioned by Profit Point Enterprises Ltd to conduct a Sewerage Impact Assessment (SIA) for a Comprehensive Development to include Wetland Restoration Area at Wo Shang Wai, Yuen Long, Lots 77 and 50 S.A in DD101 (thereafter referred to as “the Application Site”) by assessing the impact of the sewage generated due to the proposed comprehensive residential development.
- 1.2 The purpose of this application is to propose amendments to the previously approved application No. A/YL-MP/344.
- 1.3 This application is made under section 12A of the Town Planning Ordinance, to rezone the Application Site on the draft Mai Po and Fairview Park Outline Zoning Plan (“OZP”) No. S/YL-MP/8. The rezoning application aims to increase the plot ratio (“PR”) from 0.4 (i.e. maximum permissible PR on the OZP) to 1.3, with a maximum building height (“BH”) adjusted to not more than 10-storeys and not exceeding +42mPD by amending the Notes of the current “Other Specified Uses (Comprehensive Development to include Wetland Restoration Area)” (“OU(CDWRA)”) zone.
- 1.4 The Applicant, Profit Point Enterprises Limited, proposes to increase the development intensity, and revise the layout and form of the housing developments in the Application Site, in response to the drastic changes in the development site context and planning circumstances of the area.
- 1.5 The Application Site is located at Wo Shang Wai, Yuen Long. It is generally bounded by Castle Peak Road – Mai Po and San Tin Highway to the east, fishponds to the north, residential developments, namely Royal Palms and Palm Springs to the south, and Wo Shang Wai Village to the southeast, as shown in **Figure 1**.
- 1.6 The proposed development consists of a mix of 3 storeys detached and semi-detached house and 6, 8 and 10 storey residential tower. 48,716 m<sup>2</sup> of land are reserved for landscaping purpose as open greenery area.
- 1.7 The proposed development consists of 3,562 housing unit in total with a plot ratio of 1.28 and an average unit gross floor area of 74.7 m<sup>2</sup>.
- 1.8 The application site includes a residential care home for elderly (RCHE). The RCHE would consist of 100 beds and 15 staff. For assessment in this report, the land use is considered hospital, and the staff are assumed to be non-residential.

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## **2 OUTLINE OF APPLICATION SITE AND PLANNED SEWERAGE CONDITIONS**

- 2.1 The Application Site is classified as unsewered area with respect to the Yuen Long and Kam Tin Sewerage Master Plan (YLKT SMP).
- 2.2 According to the approved EIA report for the Project “Agreement No. CE 20/2021 (CE) First Phase Development of The New Territories North–San Tin / Lok Ma Chau Development Node – Investigation” (EIA-302/2023), a new tertiary effluent polishing plant, namely San Tin Effluent Polishing Plant (San Tin EPP) is expected to be constructed with a capacity to treat ADWF up to 65,000 m<sup>3</sup>/day by 2031, and 125,000 m<sup>3</sup>/day by 2035. The San Tin EPP is less than 500m northeast to the Application Site, and has plan to collect sewage from nearby developments and villages in Yuen Long.
- 2.3 The proposed development will be completed in 2031, thus, the population in-take for the Application Site would be likely after the commissioning of the San Tin EPP and the associated sewerage facilities. The sewerage system within the Application Site will be designed to facilitate the future connection to the San Tin EPP.
- 2.4 In case of mismatching with the implementation program of San Tin EPP, two alternative sewerage discharge options are proposed for the proposed development:
  - Alternative Option 1: Construct a temporary onsite Sewage Treatment Plant (STP) and discharge treated effluent from the STP to Mai Po Tributary as a temporary measure before the operation of the San Tin EPP.
  - Alternative Option 2: Convey the sewage from the Application Site to Yuen Long Sewage Treatment Works (YLSTW) via Nam Sang Wai sewage pumping station (SPS) by proposed twin rising mains / sewers.

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### 3 ASSESSMENT METHODOLOGY

- 3.1 The assessment has been carried out in accordance with the guidelines set out in EPD Report No. EPD/TP 1/05 Guidelines for Estimating Sewage Flows (GESF) for Sewerage Infrastructure Planning Version 1.0 (“GESF”).
- 3.2 The projected demand for the sewerage system was identified to estimate the potential sewerage impact on the San Tin EPP, YLSTW, Nam Sang Wai SPS and the proposed temporary sewerage system serving the Application Site.
- 3.3 With reference to Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF), the Global Unit Flow Factors indicated in **Table 3-1** and the Global Peaking factors shown in **Table 3-2** are adopted for estimation of population and sewage flow generated from the Application Site.

**Table 3-1 Global Unit Flow Factor (UFF)**

Type	Units Flow Factors (m <sup>3</sup> /person/day)
Private Housing (R3)	0.37 (Planning)
Staff of Housing (General)	0.28
Domestic (Institutional and special class)	0.19
Staff of RCHE (Commercial J11)	0.28

**Table 3-2 Global Peaking Factor**

Population	Global Peaking Factor (excluding stormwater allowance)
More than 50000	$\text{Max}(\frac{6}{N^{0.175}}, 1.6)$
10,000 – 50,000	3
5,000 – 10,000	4
1,000 – 5,000	5
Less than 1,000	6

## 4 POPULATION AND SEWAGE FLOW PROJECTION

4.1 The expected amount of sewage generated from the amended comprehensive residential development of this application is tabulated in **Table 4-1** as follow:

**Table 4-1 Comparison of Flow Projection Between the Last Approved Scheme and the Amended Scheme of This Application**

Scenario	Design Population		Unit Flow Factor <sup>(i)</sup> (m <sup>3</sup> /head/day)	ADWF (m <sup>3</sup> /day)	Total ADWF (m <sup>3</sup> /day)	Peaking Factor	Peak Flow (m <sup>3</sup> /day)
Approved Scheme in 2024	Resident	2210 <sup>(ii)</sup>	0.37	817.7	830.3	4	3291.8
	Staff	10	0.28	2.8		4	
	Pool <sup>(iii)</sup>			9.8 <sup>(iii)</sup>		N/A	
Amended Scheme of this Application	Resident of Housing	9974 <sup>(iv)</sup>	0.37	3690.38	3779.16	3	11251.12
	Staff of Housing	80	0.28	22.4		3	
	Pools <sup>(iii)</sup>			43.18 <sup>(iii) (v)</sup>		N/A	
	Resident of RCHE	100	0.19	19		3	
	Staff of RCHE	15	0.28	4.2		3	

Note:

- (i) The Unit Flow Factor for the resident and staff are extracted from GESF. The Unit Flow Factor for commercial activities type J11, community, social & personal services are adopted for estimating the flow generated by the staff.
- (ii) Assumes 2.8 family members in each of the 789 houses in the approved scheme in 2024 based on the 2021 population census for Yuen Long District.
- (iii) The sewage flow generated from the pools in clubhouse and individual houses is estimated to be 9.8 m<sup>3</sup>/day in the last approved scheme, and 43.18 m<sup>3</sup>/day in the amended scheme of this application. The estimation of the sewage flow from pools in the amended scheme of this application is attached in **Appendix A**.
- (iv) Assumes 2.8 family members in each of the 3562 houses in the amended scheme of this application based on the 2021 population census for Yuen Long District.
- (v) Flow from the pools is considered as peak flow.

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## 5 SEWERAGE IMPACT ASSESSMENT for SAN TIN EPP

- 5.1 It is proposed that sewage generated from the Application Site will be discharged to proposed San Tin EPP, which is less than 500m northeast to the Application Site, via a proposed sewer. The proposed possible sewage disposal scheme inside and outside the Application Site is shown in **Figure 2**.
- 5.2 According to the approved EIA “Agreement No. CE 20/2021 (CE) First Phase Development of The New Territories North–San Tin / Lok Ma Chau Development Node – Investigation”, a new tertiary effluent polishing plant, namely San Tin Lok Ma Chau Effluent Polishing Plant (San Tin EPP) is expected to be constructed with a capacity to treat ADWF up to 65,000 m<sup>3</sup>/day by 2031, and 125,000 m<sup>3</sup>/day by 2035. The San Tin EPP has plan to collect sewerage from nearby developments.
- 5.3 Although San Tin EPP is designed for the project of San Tin / Lok Ma Chau Development Node, it still has flexibility of 26,377 m<sup>3</sup>/day ADWF for receiving additional sewage flow from developments, existing villages, reject water from Water Reclamation Plant and centrate from Food-Waste Pre-treatment Facilities, as stated in the approved EIA “Agreement No. CE 20/2021 (CE) First Phase Development of The New Territories North–San Tin / Lok Ma Chau Development Node – Investigation”.
- 5.4 As such, the San Tin EPP have sufficient capacity to cater for the additional flow of 3,779.16 m<sup>3</sup>/day ADWF from the Application Site. There will not be any adverse impact on the existing and planned sewerage system due to the Application Site.
- 5.5 Currently, there is no information indicating the depth and exact location of proposed connection point to the San Tin EPP, because the San Tin EPP is at very early design stage. Therefore, the type, length, slope and size of the sewerage system from the Application Site to the San Tin EPP cannot be determined at this stage. Meanwhile, area for an internal sewerage pumping station has been reserved, if a twin rising mains is needed in the future, as shown in **Figure 2**. The proposed internal sewerage pumping station will be constructed and maintained by the applicant.
- 5.6 An updated SIA will be submitted to the satisfaction of EPD assessing the potential sewerage impact to the San Tin Technopole sewerage system for conducting the hydraulic assessment and verifying the assumptions adopted in the current assessment when San Tin Technopole sewerage system is confirmed and becomes available.

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## 6 SEWERAGE IMPACT ASSESSMENT FOR FALLBACK OPTION 1

- 6.1 The proposed development will be completed in 2031, thus, the population in-take for the Application Site would be likely after the commissioning of the San Tin EPP and the associated sewerage facilities. In case of mismatching with the implementation program of San Tin EPP, alternative schemes are proposed.
- 6.2 Fallback Option 1 is the provision of a temporary on-site sewage treatment facility with tertiary treatment technology as an interim measure to handle the sewage generated from the WSW Development before the availability of San Tin EPP. The treated effluents will be discharged to Mai Po Tributary. The proposed possible sewage disposal scheme is shown in **Figure 3**.

### Standards and Regulations on Water Quality

- 6.3 Water quality in Hong Kong is subject to 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. The Application Site is located in the Deep Bay Control Zone. As such, the sewage disposal scheme would have to comply with the Zero Discharge Policy in accordance to Town Planning Board Guidelines (i.e. TPB PG-No. 12C) that there will be no net increase in the pollution loads into the Deep Bay Water Control Zone.
- 6.4 However, “Zero discharge into Deep Bay Control Zone” was an administrative long-term approach and for this temporary sewage treatment plant, it was not applicable. Besides designing the temporary onsite STP to Group C Inland Waters’ discharge standards as a minimum requirement, the design of temporary onsite STP will also follow the below tertiary effluent standards.

**Table 6-1 Water Quality Standards of Treated Sewage Effluent to Deep Bay**

Parameter	Unit	Tertiary Effluent Standards (Upper Limit)
BOD <sub>5</sub>	mg/L	10
TSS	mg/L	10
TN	mg/L	20
TP	mg/L	2

Ammonia-N <sup>(1)</sup>	mg/L	5
<i>E. coli</i>	count/100mL	100 <sup>(2)</sup>

Note:

(1) Ammonia-N standard is applicable for discharge to be made into inland waters of Deep Bay.

(2) *E. coli* standards are set based on the Water Pollution Control Ordinance-Technical Memorandum and receiving water body.

#### Temporary Onsite STP

- 6.5 Membrane bio-reactor wastewater treatment technology will be adopted for the temporary with capacity of 3,779.16 m<sup>3</sup>/day. The treated effluent will be discharged to the Mai Po Tributary.
- 6.6 The MBR plant is a combined system of biological treatment and microfiltration process, which is capable of generating high quality effluent. The MBR process operates at a higher biomass concentration than conventional activated sludge system. The pores on the membrane surface have a diameter of 0.04 micrometres, separating bacteria, solid and *E. Coli* in accordance with tertiary effluent standards. The MBR process will be operated at optimum conditions with sufficient retention time in order to reduce BOD<sub>5</sub> and ammonia nitrogen to the tertiary effluent standards.
- 6.7 Furthermore, operation conditions and quality of the effluent will also be real-time monitored. Immediate maintenance will be carried out if any parameter is found to approach or exceed its pre-set limits. Samples of effluent will also be taken regularly and tested to ensure compliance with the tertiary effluent standards.
- 6.8 This temporary on-site MBR plant shall be designed with the excess flow (PDWF – capacity of temporary onsite STP, i.e., **excess flow** = 7,471.96 m<sup>3</sup>/day) being equalized in an equalization tank of adequate volume to store up at least such flow for 2 hours (i.e. 622.66 m<sup>3</sup>).
- 6.9 The production of sludge is estimated to be 56.15 m<sup>3</sup>/day for solid content of 1% w/w. The sludge will be screened and dewatered, with a minimum solid content of 30%. The dewatered sludge will be collected by a licensed collector at regular intervals and disposed at the landfill. As an alternative, the dewatered sludge could also be transferred to nearby Government's Sewerage Treatment Works for off-site treatment

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due to its small quantity.

- 6.10 The quantity of treated effluent to discharged to Mai Po Tributary is estimated to be  $3,779.16 - 56.15 = 3,723.01 \text{ m}^3/\text{day}$ .



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## **7 SEWERAGE IMPACT ASSESSMENT FOR FALLBACK OPTION 2**

- 7.1 In terms of Option 2, it is proposed that the sewage generated from the proposed development will be collected at the proposed internal sewage pumping station and then pump through a proposed twin rising main / sewers to Nam Sang Wai SPS for disposal at YLSTW. The proposed possible sewage disposal scheme is shown in **Figure 4**.
- 7.2 In general, within the Application Site, manholes will be located at various points along the sewers either to accept a connection from individual building or at a change of horizontal or vertical alignment. The manholes will provide access for cleaning and maintenance purposes. The sewer will be designed in accordance with the Sewerage Manual published by Drainage Services Department (DSD) and the Building Ordinance.
- 7.3 An updated SIA will be submitted to the satisfaction of EPD if Option 2 is pursued.

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## **8 MAINTENANCE RESPONSIBILITIES**

- 8.1 The sewerage system within and outside the development site will be constructed by the applicant. The system within the site will be maintained by the applicant. For sewers outside the application site boundary, maintenance responsibilities are proposed to be transferred to DSD after construction completion, subject to DSD's agreement.

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## 9 CONCLUSION

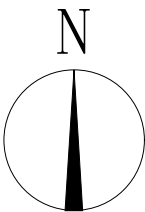
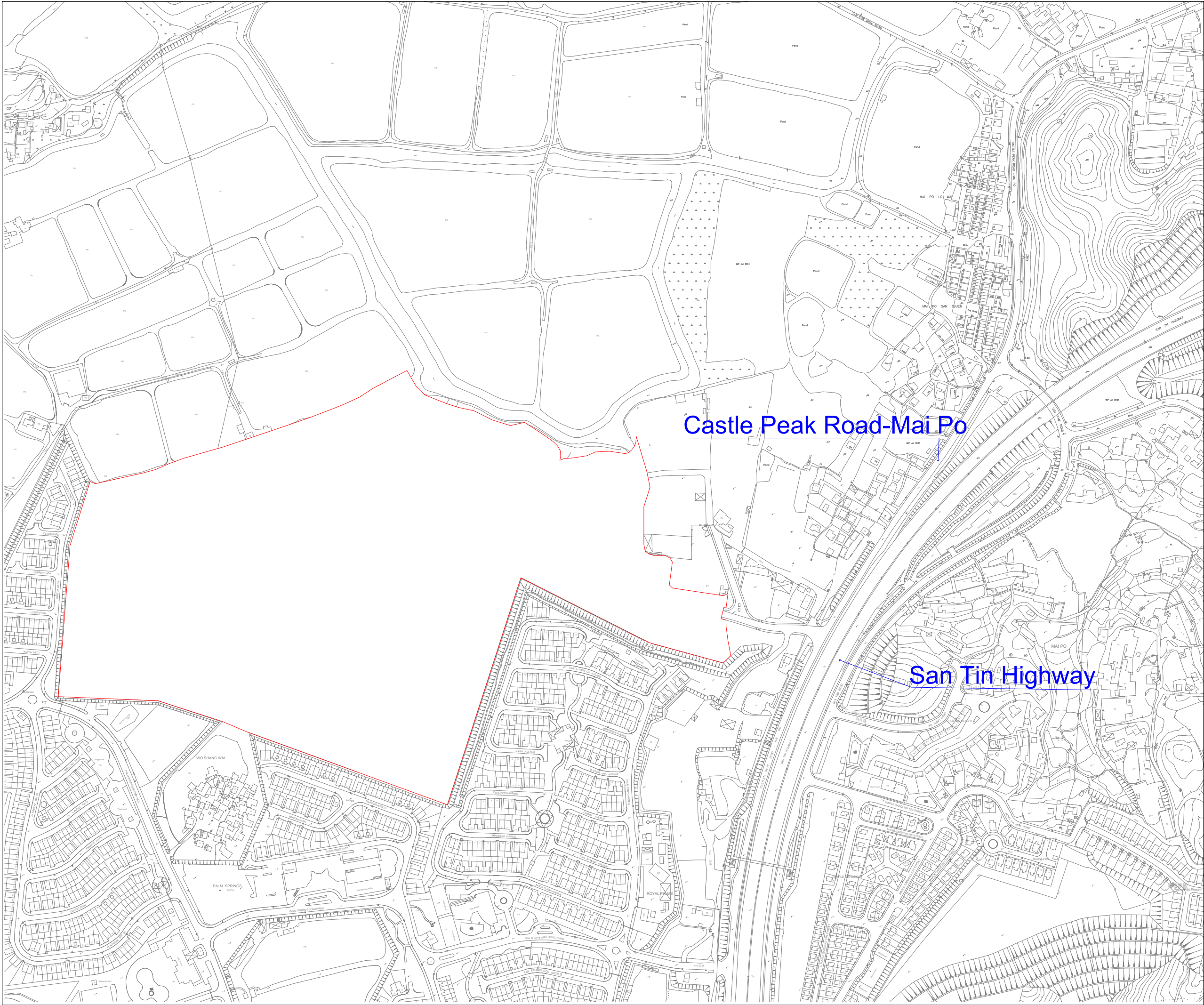
- 9.1 A sewerage impact assessment has been conducted for the comprehensive residential development at Wo Shang Wai to confirm that the proposed San Tin EPP is adequately able to take up the sewerage discharge of the Application Site.
- 9.2 However, the implementation program of San Tin EPP may be postponed and cannot meet the anticipated first population intake of the proposed development in 2031. Two alternative proposed sewerage schemes for the comprehensive residential development at Wo Shang Wai were also proposed and assessed.
- 9.3 For alternative Option 1, a temporary on-site sewage treatment facility with the tertiary treatment process of MBR will treat the 3,779.16 m<sup>3</sup>/day sewage from the development to achieve effluent quality meeting tertiary effluent standards before discharge to Mai Po Tributary. Since “Zero discharge into Deep Bay Control Zone” was an administrative long-term approach, it was not applicable in this temporary sewage treatment plant.
- 9.4 For alternative Option 2, it is proposed that the sewage generated from the proposed development will be collected at the proposed internal sewage pumping station and then pump through a proposed twin rising main / sewers to Nam Sang Wai SPS for disposal at YLSTW.
- 9.5 The Application Site is located at the unsewered area, so the applicant will be responsible for the construction of new sewerage systems within the Application Site and outside the Application Site to San Tin EPP or the Nam Sang Wai SPS.
- 9.6 New sewers constructed outside site boundary connecting to the San Tin EPP or the Nam Sang Wai SPS will be transferred to DSD after construction completion, subject to DSD’s agreement.
- 9.7 An updated SIA report for the selected sewage disposal arrangement will be submitted to the satisfaction of EPD. The updated SIA will assess the potential sewerage impact to the STT sewerage system based on the latest STT sewerage scheme for conducting the hydraulic assessment and verifying the assumptions adopted in the current assessment.
- 9.8 If Fallback Option 2 is pursued, an updated SIA will be submitted to the satisfaction of EPD, assessing the impact to the existing and planned public sewerage system as well as the sizing of the new rising mains / sewers, and subject to further discussions

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with Authorities at the detailed design stage.

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## Figures



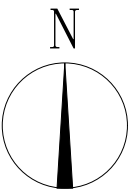
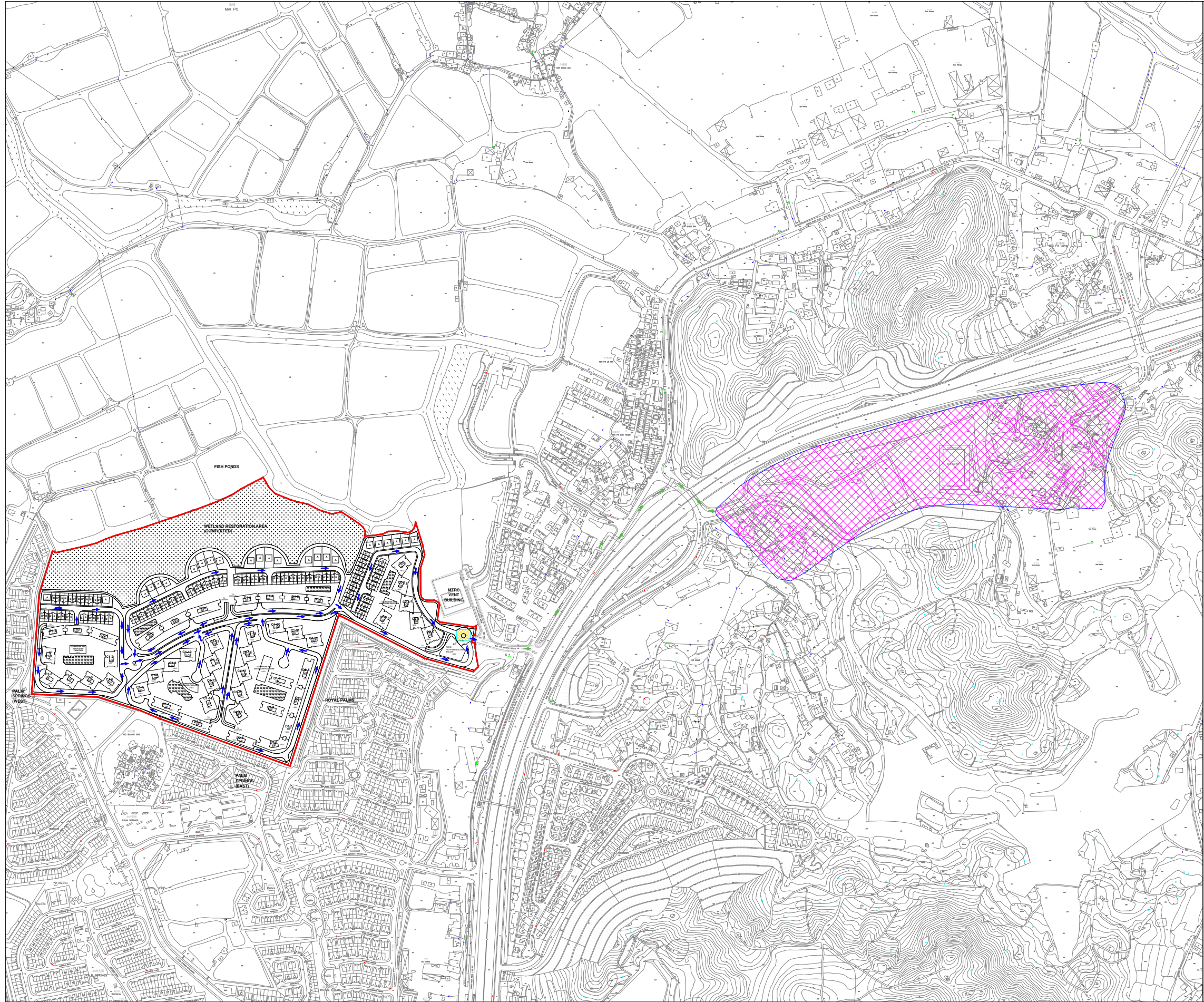
LOCATION PLAN

LEGENDS:

 PROJECT SITE BOUNDARY

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Drawing title PROJECT SITE LOCATION AND ITS SURROUNDINGS			
Drawing no. Figure 1			Rev. 0
Drawn JX	Date MARCH2023	Checked -	Approved -
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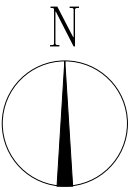
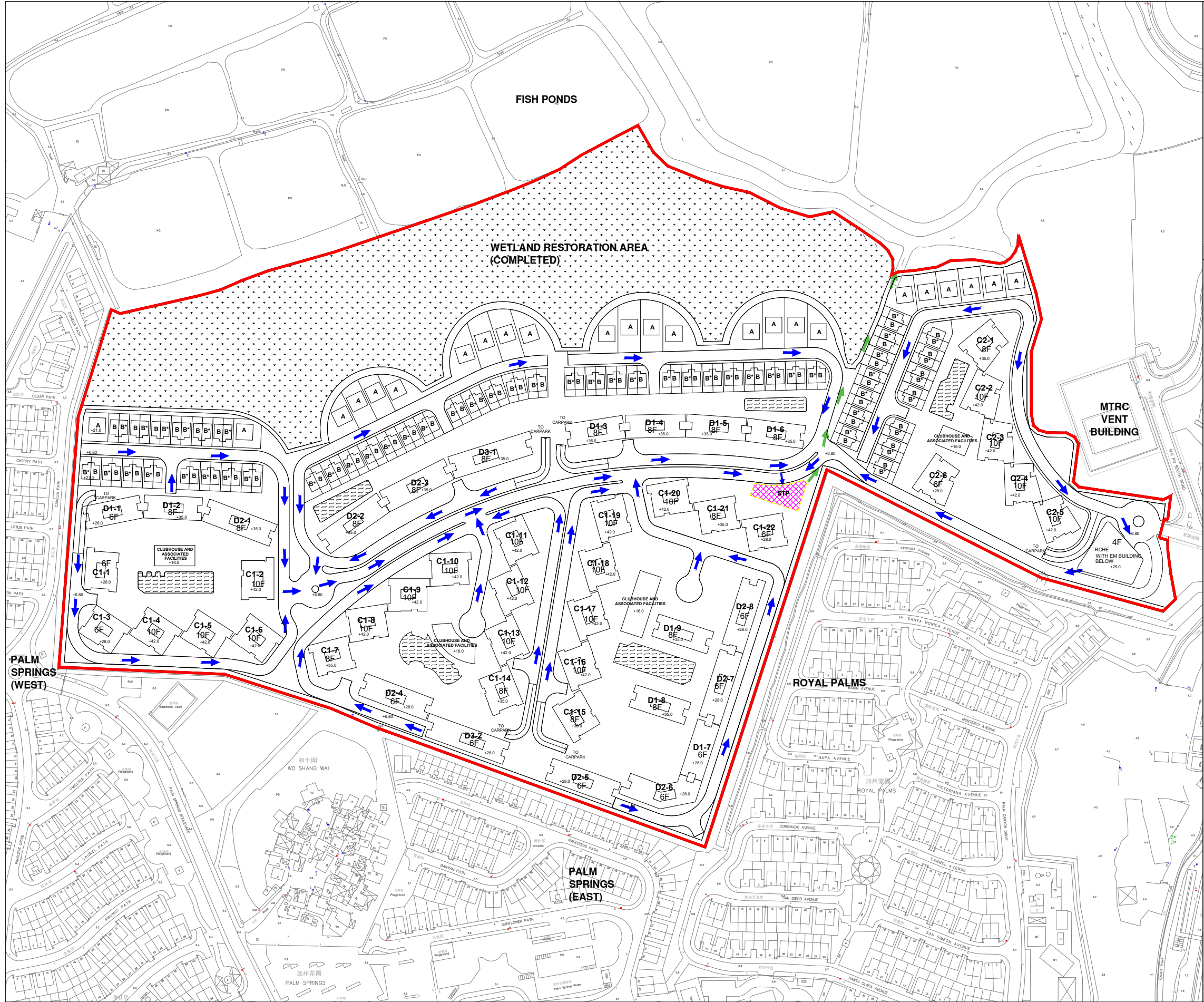
LOCATION PLAN

LEGENDS:

- APPLICATION SITE BOUNDARY
- PROPOSED LOCATION OF San Tin Lok Ma Chau Effluent Polishing Plant (San Tin EPP)
- PROPOSED INTERNAL FOUL SEWERAGE
- PROPOSED PUBLIC FOUL SEWERAGE SYSTEM
- RESERVED FOR UNDERGROUND INTERNAL SEWAGE PUMPING STATION

Rev	Description	By	Date
Consultant			
Project title			
SEWERAGE IMPACT ASSESSMENT			
To Amend the Notes of the "Comprehensive Development to include Wetland Restoration Area" Zone for a Proposed Comprehensive Development at Wo Shang Wai, Yuen Long, Lots 77 and 50 S.A. in DD101			
Drawing title			
LAYOUT PLAN OF PRELIMINARY DESIGNED INTERNAL SEWERAGE SYSTEM AND SEWERAGE SYSTEM OUTSIDE APPLICATION SITE TO SAN TIN EPP			
Drawing no. Figure 2			Rev. —
Drawn JX	Date SEP2025	Checked —	Approved —
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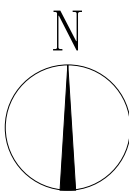
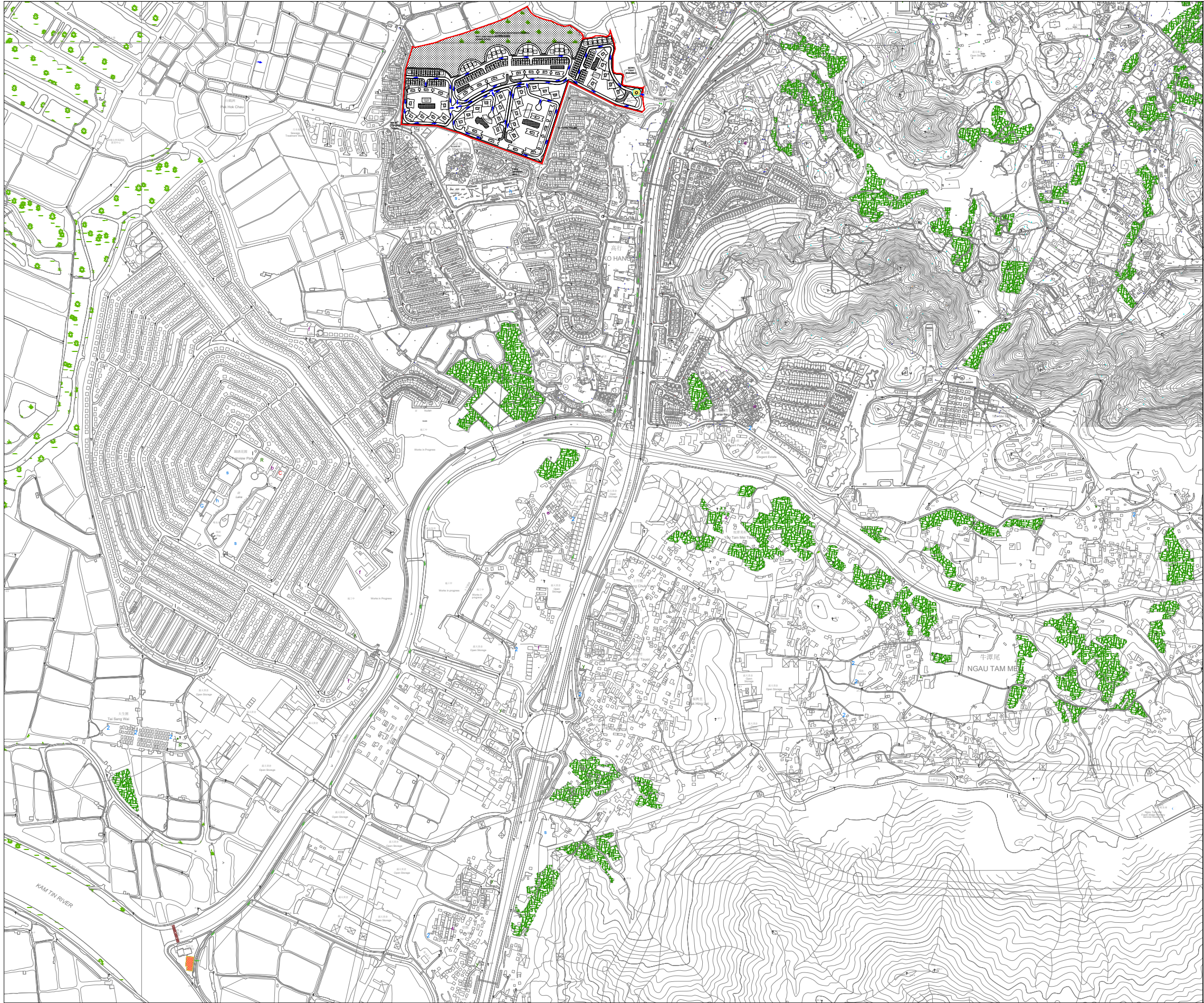
LOCATION PLAN

LEGENDS:

- APPLICATION SITE BOUNDARY
- LOCATION of PROPOSED TEMPORARY ONSITE SEWAGE TREATMENT PLANT
- PROPOSED FOUL SEWERAGE
- PROPOSED TREATED EFFLUENT DISCHARGE PATH






Rev	Description	By	Date
Consultant			
Project title			
SEWERAGE IMPACT ASSESSMENT			
To Amend the Notes of the "Comprehensive Development to include Wetland Restoration Area" Zone for a Proposed Comprehensive Development at Wo Shang Wai, Yuen Long, Lots 77 and 50 S.A in DD101			
Drawing title			
LAYOUT PLAN OF PRELIMINARY DESIGNED INTERNAL SEWERAGE SYSTEM AND TREATED EFFLUENT DISCHARGE SYSTEM			
Drawing no. Figure 3		Rev. —	
Drawn JX	Date SEP2025	Checked —	Approved —
Scale 1:1200	Status		





LOCATION PLAN

LEGENDS:

-  APPLICATION SITE BOUNDARY
-  PROPOSED INTERNAL UNDERGROUND SEWAGE PUMPING STATION
-  PROPOSED INTERNAL FOUL SEWERAGE
-  PROPOSED FOUL SEWERAGE OUTSIDE APPLICATION SITE
-  NAM SANG WAI SEWAGE PUMPING STATION

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Project title			
SEWERAGE IMPACT ASSESSMENT			
To Amend the Notes of the "Comprehensive Development to include Wetland Restoration Area" Zone for a Proposed Comprehensive Development at Wo Shang Wai, Yuen Long, Lots 77 and 50 S.A in DD101			
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Drawing no. Figure 4			Rev. —
Drawn JX	Date SEP2025	Checked —	Approved —
Scale —	Status		



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## **Appendices**

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## **Appendix A**

### **Estimation of Sewage Flow from Swimming Pool**

**Appendix A - Estimation of Sewage Flow From Swimming Pool and Water Features**

<b>Flow from Swimming Pool</b>			
Pool (Phase1)		Pool (Phase2)	
Pool area	712.17 m <sup>2</sup>	Pool area	418.14 m <sup>2</sup>
Pool depth	1.2 m	Pool depth	1.2 m
Pool volume	854.60374 m <sup>3</sup>	Pool volume	501.76255 m <sup>3</sup>
Turn over rate	6 hr	Turn over rate	6 hr
Flow Rate	39.56 L/s	Flow Rate	23.23 L/s
Duration of Backwash fr	3 min/day	Duration of Backwash fr	3 min/day
Volume of backwash	7.1216978 m <sup>3</sup> /day	Volume of backwash	4.1813546 m <sup>3</sup> /day
No. of pool	1 nos	No. of pool	1 nos
Total Pool (house)	7.1216978 m <sup>3</sup> /day	Total Pool (house)	4.1813546 m <sup>3</sup> /day
Pool (Phase3)		Pool (Phase4)	
Pool area	377.12 m <sup>2</sup>	Pool area	490.55 m <sup>2</sup>
Pool depth	1.2 m	Pool depth	1.2 m
Pool volume	452.5396 m <sup>3</sup>	Pool volume	588.66438 m <sup>3</sup>
Turn over rate	6 hr	Turn over rate	6 hr
Flow Rate	20.95 L/s	Flow Rate	27.25 L/s
Duration of Backwash fr	3 min/day	Duration of Backwash fr	3 min/day
Volume of backwash	3.77 m <sup>3</sup> /day	Volume of backwash	4.91 m <sup>3</sup> /day
No. of pool	1 nos	No. of pool	1 nos
Total Pool	3.77 m <sup>3</sup> /day	Total Pool	4.91 m <sup>3</sup> /day
Pool (Phase5)		Pool (Phase6)	
Pool area	666.41 m <sup>2</sup>	Pool area	868.90 m <sup>2</sup>
Pool depth	1.2 m	Pool depth	1.2 m
Pool volume	799.69 m <sup>3</sup>	Pool volume	1042.68 m <sup>3</sup>
Turn over rate	6 hr	Turn over rate	6 hr
Flow Rate	37.02 L/s	Flow Rate	48.27 L/s
Duration of Backwash fr	3 min/day	Duration of Backwash fr	3 min/day
Volume of backwash	6.66 m <sup>3</sup> /day	Volume of backwash	8.69 m <sup>3</sup> /day
No. of pool	1 nos	No. of pool	1 nos
Total Pool (house)	6.66 m <sup>3</sup> /day	Total Pool	8.69 m <sup>3</sup> /day
Water Features			
Pool area	1569.78 m <sup>2</sup>		
Pool depth	0.6 m		
Pool volume	941.86719 m <sup>3</sup>		
Turn over rate	6 hr		
Flow Rate	43.60 L/s		
Duration of Backwash fr	3 min/day		
Volume of backwash	7.85 m <sup>3</sup> /day		
No. of pool	1 nos		
Total Pool	7.85 m <sup>3</sup> /day		
		<b>All Pools</b>	<b>43.2 m<sup>3</sup>/day</b>