

**APPENDIX B  
SEWERAGE IMPACT ASSESSMENT REPORT**

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**Responses to Comments on  
Draft Sewerage Impact Assessment Report for S16 Planning Application  
(Intensification Scheme) (Issue 3)**

1. Environmental Protection Department, Water Policy Division, Sewerage Infrastructure Group, Regional Sewerage Infrastructure Planning Section (North West N.T.) [from Ms. WONG Sze Wing, Olivia via email dated 13 January 2023]..... 1
2. Housing Department, Development and Construction Division, Project Sub-division 3, Civil Engineering Section 2 [from Ms. Joyce Lee via email dated 13 December 2022]..... 2

1. Environmental Protection Department, Water Policy Division, Sewerage Infrastructure Group, Regional Sewerage Infrastructure Planning Section (North West N.T.) [from Ms. WONG Sze Wing, Olivia via email dated 13 January 2023]

<b>Comments</b>	<b>Responses</b>
<ul style="list-style-type: none"> <li>Table 2.1: the GFA of Car Parking is inconsistent with that in Appendix A1. also, the total GFA for non-domestic uses is not correct.</li> </ul>	Noted. Table 2.1 has been updated.
<ul style="list-style-type: none"> <li>Table 2.2 Note (1): please provide the reference for the household size. According to the 2021 Census, household size in Yuen Long is 2.8 instead of 2.7.</li> </ul>	As per the advice provided by Housing Department (HD), based on the latest average household size assumption agreed between HD and PlanD, “person per flat” of 2.7 should be adopted for public housing projects to be completed from 2028/29 to 2038/39.
<ul style="list-style-type: none"> <li>Table 4.1 and Appendix A1: Please be advised that UFF of 0.27 should usually be adopted for SSF units.</li> </ul>	Noted. UFF of 0.27 is adopted.
<ul style="list-style-type: none"> <li>Appendix A1: the UFF of 0.04 instead of 0.28 should be adopted for students according to the GESF</li> </ul>	Noted, the UFF of 0.04 is adopted for students.
<ul style="list-style-type: none"> <li>Table 5.2 and para 6.1.1: the total ADWF from the development is not consistent with previous sections of the report.</li> </ul>	Noted. The ADWF from the development has been updated in the whole report.
<ul style="list-style-type: none"> <li>Please provide the cover level of the connection point manhole C1 - C5 and O1, if any</li> </ul>	Please be advised that C1-C5 and O1 are plug-ends for subsequent connection for housing development, but not manholes. The approximate cover level of the connection points are shown in the drawings.
<ul style="list-style-type: none"> <li>Drawing 199086/BIN/SE/114 and Appendix A2: X1 of connection point C1 and A2 of manhole FMH-0074 shown in the drawing are not consistent with the invert level of sewerage pipe C1 to FMH-0074 in Appendix A2</li> </ul>	Drawing 199086/BIN/SE/114 and Appendix A2 have been updated for consistency.

<b>Comments</b>	<b>Responses</b>
<ul style="list-style-type: none"> <li>Drawing 199086/BIN/SE/101 and Appendix A2: please also check the invert level of manhole FMH-0001 and FMH-1001A which are not consistent with Appendix A2</li> </ul>	Drawing 199086/BIN/SE/101 and Appendix A2 have been updated for consistency.
<ul style="list-style-type: none"> <li>Appendix A2: noted that utilization of some pipe reaches 98%, suggest to use larger pipes to cater for overflow due to transient flow/ surge and make allowance for future developments in the region.</li> </ul>	The concerned sections FMH-0037 to FMH-0034 which reach 98% utilization have been reviewed and upgraded with a steeper gradient.

2. Housing Department, Development and Construction Division, Project Sub-division 3, Civil Engineering Section 2 [from Ms. Joyce Lee via email dated 13 December 2022]

<b>Comments</b>	<b>Responses</b>
Table 5.3 – It is observed that the target date of commencement of construction of sewerage works from housing site to Shun Tat Street is Nov 2022. Please update the status as appropriate.	Noted. Table 5.3 has been updated.



**Agreement No. CE 92/2017 (CE)**

**Site Formation and Infrastructure Works  
for Public Housing Development near Tan Kwai Tsuen,  
Yuen Long – Investigation, Design and Construction**

**DRAFT SEWERAGE IMPACT  
ASSESSMENT REPORT FOR  
S16 PLANNING  
APPLICATION  
(INTENSIFICATION SCHEME)**

199086/BIN/090/Issue 3  
NOVEMBER 2022



土木工程拓展署  
Civil Engineering and  
Development Department



**Agreement No. CE 92/2017 (CE)**

**Site Formation and Infrastructure Works for  
Public Housing Development near Tan Kwai  
Tsuen, Yuen Long - Investigation, Design and  
Construction**




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Draft Sewerage Impact Assessment  
Report for S16 Planning Application  
(Intensification Scheme)

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*199086/BIN/090/Issue 4*

February 2023

	Name	Signature	Date
Prepared	John Tong		February 2023
Reviewed	Tommy Chung		February 2023
Authorized	Edwin Lo		February 2023

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## **LIST OF APPENDICES**

Appendix A1	Development Parameters and Estimation of ADWF
Appendix A2	Design of Proposed New Sewers



## **1 INTRODUCTION**

### **1.1 General**

- 1.1.1 As a prevailing policy on land supply to meet the increasing housing demand in the short, medium and long terms in Hong Kong, the Government has identified potential sites in various districts to be developed for residential use. Amongst others, a site near Tan Kwai Tsuen (the Site), in Yuen Long has been identified for public housing development. The location of the Site is shown in **Drawing No. 199086/BIN/GEN/001**.
- 1.1.2 In view of the acute shortage of housing, the domestic PR of the Site is proposed to be intensified to 6.5 with an aim to increase flat production. The Site will provide a total of 7,420 public housing units with planned population intake from 2030 by phases.
- 1.1.3 Binnies Hong Kong Limited was requested by the Civil Engineering and Development Department (CEDD) to prepare necessary technical assessments of Section 16 (S16) planning application for minor relaxation of PR and building height restriction for the agreement of the Town Planning Board (TPB). In view of the above update, Binnies is responsible to update the Sewerage Impact Assessment before the construction stage of the Project.

### **1.2 Interfacing Projects**

- 1.2.1 Notable potential interfacing projects include:
- *CE 2/2011 (CE) - Hung Shui Kiu (HSK) New Development Area (NDA) Planning and Engineering Study*
  - *CE 19/2015 (TP) - Preliminary Land Use Study for Lam Tei Quarry and the Adjoining Areas – Feasibility Study*
  - *CE 35/2012 (CE) - Planning and Engineering Study for Housing Sites in Yuen Long South – Investigation*
  - *PWP Item 7259RS and 7279RS - Cycle Tracks connecting North West New Territories with North East New Territories*
  - *CE 46/2007 (DS) - Review of Drainage Master Plans (DMP) in Yuen Long and North Districts – Feasibility Study*
  - *PWP Item 4223DS - Yuen Long and Kam Tin sewerage treatment upgrade – Upgrading of San Wai Sewage Treatment Works*
  - *CE 42/2013 (CE) - Preliminary Feasibility Study on Development the New Territories North*

- *CE 26/2015 (CE) - Site Formation and infrastructural works for the Development at Long Bin, Yuen Long – Feasibility Study*
- *CE 56/2016 (CE) - HSK NDA Stage 1 Works – Design and Construction*
- *CE 39/2016 (CE) - HSK NDA Advance Works, Phases 1 & 2 – Design and Construction*
- *CE 42/2016 (CE) - Environmental Friendly Transport Services in HSK - NDA and Adjacent Areas – Feasibility Study*
- *CE 86/2017 (CE) - Fostering a Pedestrian and Bicycle-friendly environment in HSK NDA and YLS Development – Feasibility Study*
- *CE 41/2015 (GE) – Landslip Prevention and Mitigation Programme, 2015, Package G – Landslip Prevention and Mitigation Works and Provision of Emergency Works Services for Natural Terrain Landslides Occurring in Mainland West (North) – Investigation, Design and Construction*
- *CE 65/2016 (CE) – Further Study on Tuen Mun Western Bypass – Investigation*
- *CEDD’s project “Greening Master Plan”*
- *EDB/ ArchSD’s primary school projects*
- *Relocation of Existing Services Reservoirs to Cavern and Proposed Service Reservoirs in Cavern in Lam Tei – Feasibility Study by Project Management Division of WSD*
- *Holistic Review Study on the Use of Reclaimed Water in Northwest New Territories by West Development Office of CEDD*
- *Yuen Long South Development – Design and Construction*
- *CE 1/2020 (CE) - Hung Shui Kiu/Ha Tsuen New Development Area Package A Works for Second Phase Development - Design and Construction*
- *CE 11/2020 (CE) – Site Formation and Infrastructure Works for Proposed Public Housing Developments at Ping Shan South, Yuen Long, Lam Tei North and Nai Wai, Tuen Mun – Feasibility Study*
- *Other utilities supply to the Housing Development*
- *Other relevant projects of planned/committed developments as advised by PlanD, HKHA/ HD, CEDD and other Government B/Ds*
- *Any other relevant projects and assignments, which may arise during the course of the Assignment.*

### **1.3 Purposes of this Report**

1.3.1 As mentioned in Section 1.1.3, due to the update on the PR and number of flats to be provided of the Project, Binnies is responsible to update the Sewerage Impact Assessment before the construction stage of the Project.

### **1.4 Structure of this Report**

1.4.1 This report comprises the following sections after this introduction:

- Section 2 discusses the latest development layout and parameters of the Development;
- Section 3 provides the descriptions of the existing and planned sewerage infrastructure in the vicinity of the Development;
- Section 4 sets out the methodology and approach to carry out the SIA for the Development;
- Section 5 assesses the potential sewerage impacts arising from the Development; proposes appropriate mitigation measures and the optimal sewerage scheme for the Development; and
- Section 6 summarises the findings and recommendations of this report.

## 2 LATEST DEVELOPMENT PROPOSAL

### 2.1 Development Parameters

2.1.1 The latest development parameters including but not limited to the flat productions, provisions of non-domestic facilities and design populations of the Development are summarised in **Table 2.1** and **Table 2.2**.

**Table 2.1 – Major Development Parameters**

Domestic	
Total No. of Flats	7,420
Non-domestic	
GFA for Welfare Facilities (m <sup>2</sup> )	15,849
GFA for Retail Complex (m <sup>2</sup> )	5,912
GFA for Car Parking (m <sup>2</sup> )	36,850
GFA for Other Facilities <sup>(1)</sup> (m <sup>2</sup> )	1,098
Total GFA (m <sup>2</sup> )	59,709
Primary School	
No. of classrooms	30
Public Transport Interchange (PTI)	
GFA for PTI (m <sup>2</sup> )	6340

Notes:

- (1) Other Facilities include ancillary offices for domestic.
- (2) The Primary School is located to the west of the public housing site outside the application site boundary.

**Table 2.2 – Design Populations**

Domestic	
No. of Population	20,034 <sup>(1)</sup>
Retail, Welfare and Other Facilities	
No. of Employees <sup>(2)</sup>	800
Primary School and Kindergarten	
No. of students <sup>(3)</sup>	1,215
No. of teachers <sup>(4)</sup>	109

Notes:

- (1) Person per flat = 2.7
- (2) Worker densities of 3.5 workers (Retail Trade) and 3.3 workers (Community, Social & Personal Services) per 100m<sup>2</sup> GFA are adopted based on Table 8 of Commercial and Industrial Floor Space Utilization Survey published by Planning Department for the estimation of employees in retail and welfare / other facilities, respectively. No sewage generation at carpark is assumed. 30 no. of employees for the PTI is assumed.
- (3) 180 students per 6 classrooms kindergarten and 25.5 students per class for primary school are assumed based on Chapter 3 of Hong Kong Planning Standards and Guidelines.
- (4) Pupil-Teacher ratios of 8.6:1 (kindergarten) and 13.8:1 (primary school) are assumed based on Education Bureau's 2017/18 figures and statistics available on Education Bureau's website.



### 3 EXISTING AND PLANNED SEWERAGE INFRASTRUCTURE

#### 3.1 Existing Sewerage Facilities

3.1.1 The Site are presently unsewered. Existing public sewers, which is about 250m from the Site, is running along Shun Tat Street, Castle Peak Road (Hung Shui Kiu), Hung Shui Kiu Main Street and Shek Po Road. The public sewer collecting the sewage generated would discharge to Ha Tsuen Sewage Pumping Station (HTSPS) and then to San Wai Sewage Treatment Works (SWSTW) for treatment and disposal. **Figure Nos. 199086/BIN/SIA/001, 002 and 003** show the existing sewerage systems in the vicinity of the Site.

#### 3.2 Planned Sewerage Facilities

3.2.1 HTSPS is located at Ping Ha Road, to the west of Tin Ying Road. HTSPS currently has a design capacity of 193,100m<sup>3</sup>/day upon completion of expansion works in 2014 under PWP No. 4368DS - Yuen Long South Sewerage and Expansion of Ha Tsuen Sewage Pumping Station.

3.2.2 The Development lies within the catchment of SWSTW, which was completed under DSD's project "Upgrading of San Wai sewage treatment works – phase 1" under PWP No. 4411DS. SWSTW is located at Ha Tsuen Road. SWSTW has an existing design capacity of 200,000m<sup>3</sup>/day.

## 4 APPROACH FOR SEWERAGE IMPACT ASSESSMENT

### 4.1 Standards and Guidelines

4.1.1 This SIA has been undertaken in accordance with the following standards, Code of Practice and Design Manuals:-

- Environmental Protection Department (EPD)'s Report No. EPD/TP 1/05- "Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning" (GESF);
- Drainage Services Department (DSD)'s Sewerage Manual (Part 1) – Key Planning Issues and Gravity Collection System;
- DSD's Sewerage Manual (Part 2) – Pumping Stations and Rising Mains; and

### 4.2 Design Criteria

4.2.1 The proposed sewerage system is checked and designed to cater for the Development based on flows estimated from the predicted population and employment data. The proposed sewers are designed to provide sufficient capacities to accommodate peak flow without surcharge and fulfill the following criteria:

- Velocity – The sewers shall be sized to achieve a self-cleansing velocity of 1 m/s at full bore flow. The maximum velocity at full bore flow shall be limited to 3 m/s.
- Gradient – The sewers shall be laid to follow the ground profile wherever possible, but at all times a gradient steep enough to satisfy the minimum velocity criteria given above shall be maintained.
- Cover – A minimum pipe cover of 0.9 m and 0.45 m will be adopted for pipes in carriageway and footpath respectively and wherever practical.

### 4.3 Unit Flow Factors

4.3.1 Sewage generated from the Development is categorized into the following sources: residential, which consists of the sewage generated from the residents of the public housing developments; students and teachers of the proposed primary school and kindergartens; visitors and employees of the welfare facilities; and patrons and employees of retail facilities.

4.3.2 The unit flow factors are adopted in accordance with EPD's GESF. The adopted unit flow factors are summarised in **Table 4.1**.

**Table 4.1 – Adopted Unit Flow Factors**

Type	Recommended Unit Flow Factor (m <sup>3</sup> /unit/day)	Unit	Remarks
<b>Residential</b>			
Public Rental Housing (PRH)/ Subsidized Sale Flats (SSF) <sup>(1)</sup>	0.27	Person	Table T-1, EPD's GESF
<b>Retail, Welfare and Other Facilities</b>			
Job Type J11 (Community, Social & Personal Services)	0.28	Employee	Table T-2, EPD's GESF
Job Types J4 (Wholesale and Retail)	0.28	Employee	Table T-2, EPD's GESF
<b>School</b>			
Student	0.04	Person	Table T-2, EPD's GESF
Job Type J11 (Community, Social & Personal Services) for Teacher	0.28	Employee	Table T-2, EPD's GESF
<b>PTI</b>			
Job Type J3 (Transport, Storage & Communication)	0.18	Employee	Table T-2, EPD's GESF

Note:

(1) The development is classified as Domestic Private R1.

#### 4.4 Average Dry Weather Flow

4.4.1 The Average Dry Weather Flow (ADWF) and Peak Flow generated from the development sites is provided in **Table 4.2**, and the detailed breakdown is provided in **Appendix A1**.

**Table 4.2 – Average Dry Weather Flow and Peak Flow of Sewage from the Development**

	Flow Type	ADWF (m <sup>3</sup> /day)	Contributing Population	Total ADWF <sup>(1)</sup> (m <sup>3</sup> /day)	Peak Flow <sup>(1)</sup> (m <sup>3</sup> /day)
The Development (Tan Kwai Tsuen)	Residential	5409.18	21,146	5,709.3	17,127.9
	Retail, Welfare and Other Facilities	248.44			
	School	46.28			
	PTI	5.40			

Note:

(1) Peak factor is assumed to be 3.

4.4.2 Under the Sewerage Impact Assessment conducted under Investigation stage, the total ADWF generated of the previous development scenario was 4,960.4m<sup>3</sup>/day. Due to the update on the development parameters of Section 16 (S16) planning application, the total ADWF generated from the Development is 5,709.3m<sup>3</sup>/day, as shown in **Table 4.2**.

## 5 SEWERAGE IMPACT ASSESSMENT

### 5.1 Proposed Sewerage Arrangements

5.1.1 The Site is presently unsewered. It is proposed to provide new sewers to collect and convey the sewage generated from the Site and discharge the sewage to the existing sewerage. According to the feasibility study, the sewage generated from the Site will be conveyed to SWSTW for treatment.

5.1.2 As the existing sewers along Shun Tat Street, Castle Peak Road (Hung Shui Kiu), Hung Shui Kiu Main Street and Shek Po Road has no spare capacity to cater for the additional sewage arising from the Development, new gravity sewers are required to cater for the additional sewage flow from the Development.

5.1.3 With liaison with the concurrent housing developments in Ping Shan South (PSS) and Lam Tei North (LTN) under Agreement No. CE11/2020(CE), the sewage generated from PSS and LTN is planned to discharge to the proposed sewer under this Development. The ADWF generated from the interface sites estimated under CE11/2020(CE) were extracted in **Table 5.1**. While the sewerage impact assessment of PSS and LTN developments will be carried out separately under CE11/2020 (CE), the new sewer proposed under this development will cater for the sewage generated from PSS and LTN development.

**Table 5.1 – Average Dry Weather Flow from Interface Projects**

	ADWF (m <sup>3</sup> /day)	Contributing Population	Peak Flow <sup>(1)</sup> (m <sup>3</sup> /day)
Ping Shan South (PSS)	6,782	25,118	20,346
Lam Tei North (LTN)	4,152	15,378	12,456

Note:

(1) Peak factor is assumed to be 3.

5.1.4 The proposed sewerage works are shown on **Figure nos. 199086/BIN/SE/101 to 115**. The design of the sewerage works is shown in **Appendix A2**.

## 5.2 Potential Impacts on Sewage Treatment Works and Sewage Pumping Stations

### Sewage Pumping Stations

- 5.2.1 Sewage generated from the Development will be conveyed to HTSPS followed by SWSTW through the proposed gravity sewers along Shun Tat Street, Castle Peak Road (Hung Shui Kiu), Hung Shui Kiu Main Street and Shek Po Road.
- 5.2.2 HTSPS is located at Ping Ha Road, to the west of Tin Ying Road. HTSPS has an existing design capacity of 193,100m<sup>3</sup>/day upon completion of expansion works in 2014 under PWP No. 4368DS - Yuen Long South Sewerage and Expansion of Ha Tsuen Sewage Pumping Station. The current average daily treatment loading for HTSPS is 144,080 m<sup>3</sup>/day as suggested by DSD.

**Table 5.2 – Sewage Flow Conveyed to the Concerned Sewage Pumping Stations**

Sewage Pumping Station	Existing Design Capacity (m <sup>3</sup> /day)	Estimated Total ADWF from the Development (m <sup>3</sup> /day)
HTSPS	193,100	5,709.3

### Sewage Treatment Works

- 5.2.3 The SWSTW is located at Ha Tsuen Road. SWSTW has an existing design capacity of 200,000m<sup>3</sup>/day. The estimated total ADWF from the Development is 5,709.3m<sup>3</sup>/day. The sewage generated from the Development is about 2.96% of the design capacity of upgraded SWSTW.
- 5.2.4 As stated in Section 5.1.1, the existing SWSTW would have a confirmed reserve capacity for the sewage generated from the Site according to the feasibility study. In view that there is no increase in the estimated total ADWF from the Development compared with the results of the feasibility study, the existing SWSTW will have sufficient capacity and no adverse impact is anticipated to be imposed on the existing SWSTW by the Development.

## 5.3 Key Concern During Construction and Operation

### Land matters

- 5.3.1 The proposed strategy involves new gravity sewers along the proposed access road, Shun Tat Street, Castle Peak Road (Hung Shui Kiu), Hung Shui Kiu Main Street and Shek Po Road to cater for the additional sewage flow from the Development.
- 5.3.2 The full section of the new gravity sewers will run along government land and public road. It is not envisaged that requisition of private lot would be required for construction nor future operation. In summary, the proposed strategy is considered viable in terms of land.

### Environmental Impact

- 5.3.3 The proposed strategy involves discharge of the sewage from the Development to public sewerage via the new gravity sewers. All the above gravity sewers will have adequate capacities and will be laid underground.

5.3.4 Also, the sewage from the Site will be discharged to SWSTW for proper treatment before discharging to the existing Urmston Road Outfall for disposal. Therefore, no adverse environmental impact will be anticipated.

Construction

5.3.5 Construction of the new gravity sewers would mainly involve conventional technology such as cut and cover excavation and trenchless techniques. The details of the new gravity sewers along the proposed vehicular bridge over Hung Shui Kiu Main Nullah and the associated connection arrangement would be discussed with the relevant maintenance authorities and provided in the detailed design stage. There is no significant constraint in terms of complexity by a general civil works contractor.

**5.4 Implementation Strategy of Proposed Sewerage Scheme**

Implementation Programme of Proposed Sewerage Works

5.4.1 The implementation programme of proposed sewerage works is summarized in **Table 5.3**.

**Table 5.3 – Implementation Programme**

Activity	Target Date
Commencement of Construction of Sewerage Works from Housing Site to Shun Tat Street	December 2022
Commencement of Construction of Sewerage Works from Housing Site to HTSPS	April 2023

Construction and Maintenance Matrix for Proposed Sewerage Works

5.4.2 The parties responsible for constructing and maintaining the proposed sewerage works are listed in **Table 5.4**.

**Table 5.4 – Construction and Maintenance Matrix**

Description of Proposed Sewerage Works	Construction Party	Maintenance Party
Proposed new sewerage	CEDD	DSD
Internal sewerage for the proposed housing site	HD	HD
Internal sewerage for the proposed school sites	ArchSD	EDB

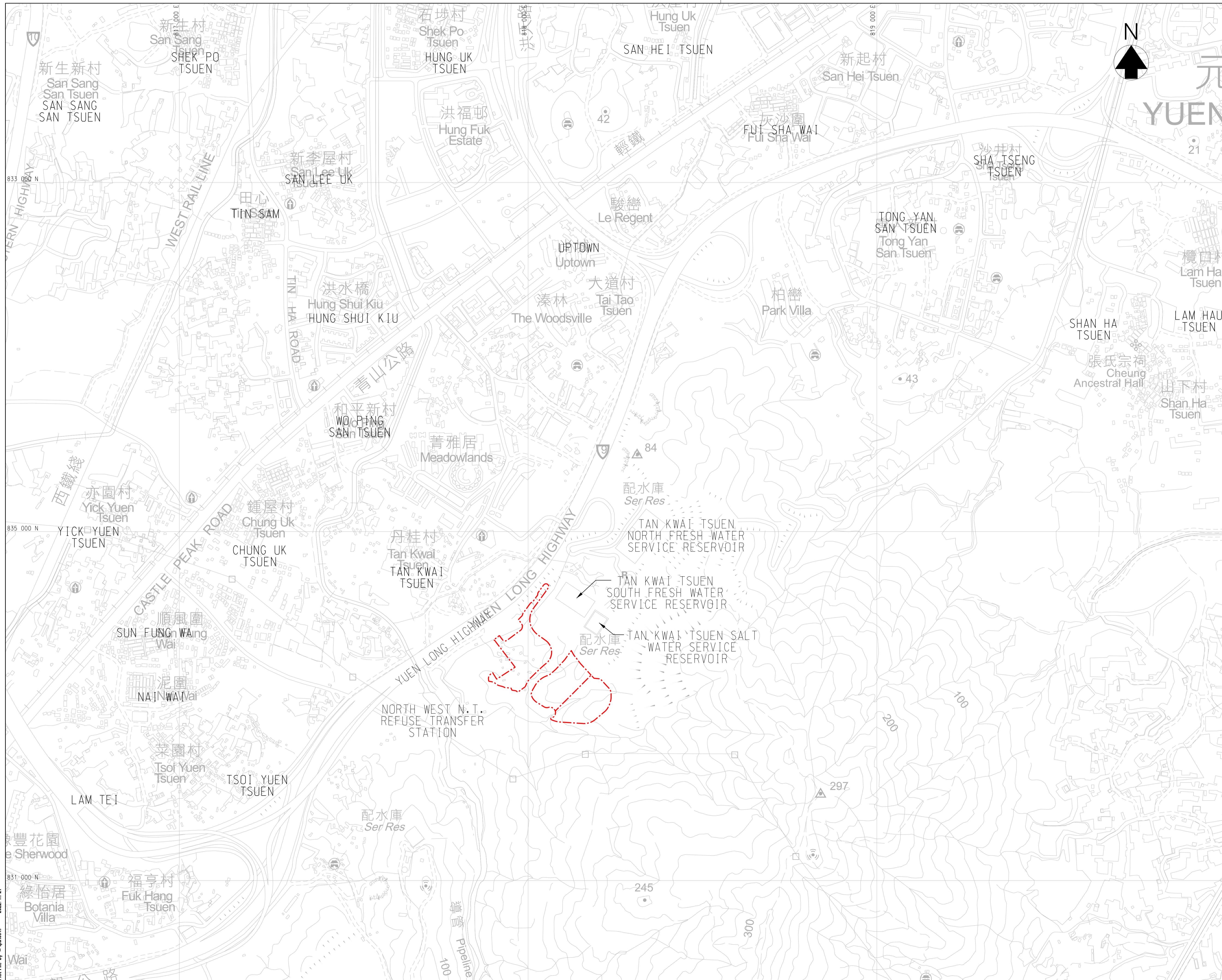
## **6 CONCLUSION AND RECOMMENDATION**

- 6.1.1 The Development lies within the catchment of the SWSTW. The estimated sewage generated from the Development is 5,709.3m<sup>3</sup>/day (ADWF) with the detailed breakdown in **Table 4.2**.
- 6.1.2 The sewage disposal for the sewage generated from the Site is to HTSPS and then to SWSTW.
- 6.1.3 New gravity sewers will be provided between the Site and the existing sewerage at HTSPS.
- 6.1.4 The proposed sewerage works are considered feasible in terms of regional sewerage strategy, land, and environmental impact and construction considerations. The Development is considered sustainable in terms of sewerage.

***END OF TEXT***

# **DRAWINGS**





**LEGEND:**  
 PROPOSED SITE FOR PUBLIC HOUSING DEVELOPMENT AND ASSOCIATED G/I FACILITIES

Revision	Date	Description	Initial
	Designed	Checked	Drawn
Initial	TCL	WLC	SZ
Date	04/22	04/22	04/22
Approved			

Agreement no. CE 92/2017 (CE)

Title  
 SITE FORMATION AND INFRASTRUCTURE WORKS FOR PUBLIC HOUSING DEVELOPMENT NEAR TAN KWAI TSUEN, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

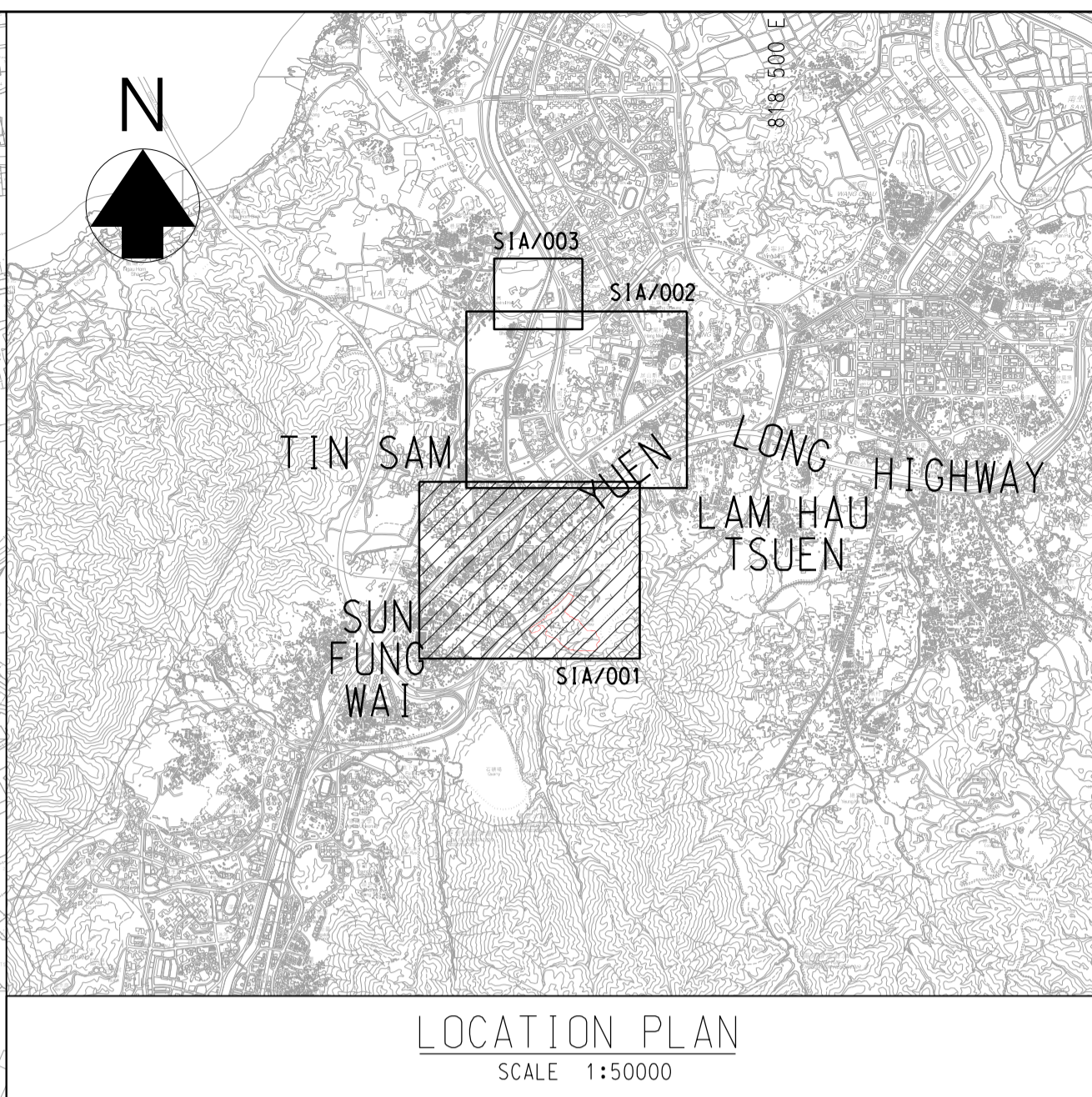
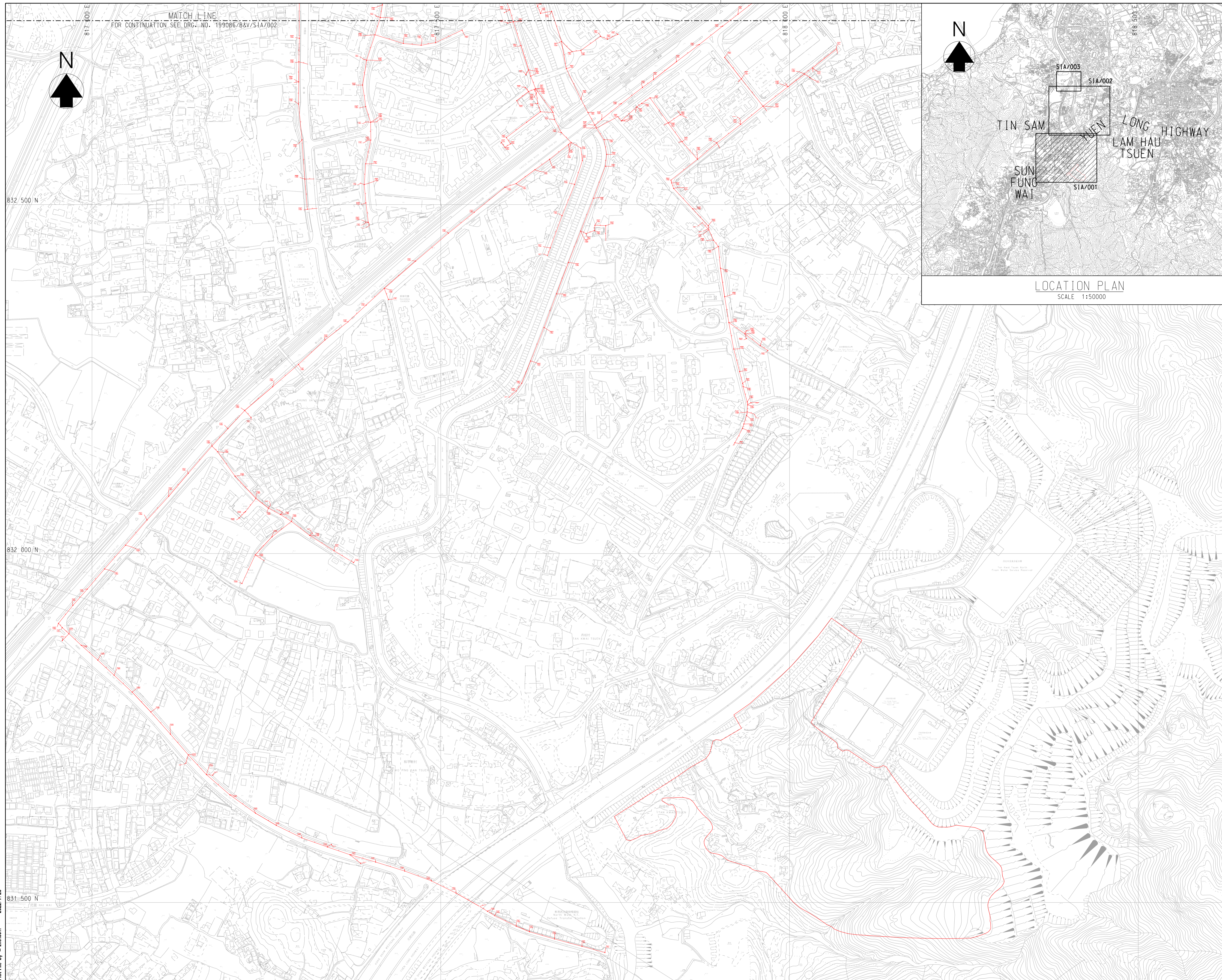
Drawing Title  
 PROJECT LAYOUT PLAN

Drawing No.	Scale
199086/BIN/GEN/001	1 : 5000 (A1) 1 : 10000 (A3)

土木工程拓展署  
**CEDD** Civil Engineering and Development Department

  
 BINNIES HONG KONG LIMITED  
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LEGEND:  
 PROPOSED PUBLIC HOUSING DEVELOPMENT SITE  
 EXISTING SEWERAGE SYSTEM

Revision	Date	Description			Initial
	Designed	Checked	Drawn	Checked	
Initial	KWM	LCH	SZ	LCH	
Date	09/18	09/18	09/18	09/18	09/18

Approved

Agreement no. CE 92/2017 (CE)

Title  
 SITE FORMATION AND INFRASTRUCTURE WORKS FOR PUBLIC HOUSING DEVELOPMENT NEAR TAN KWAI TSUEN, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

Drawing Title  
 EXISTING SEWERAGE SYSTEM  
 (SHEET 1 OF 3)

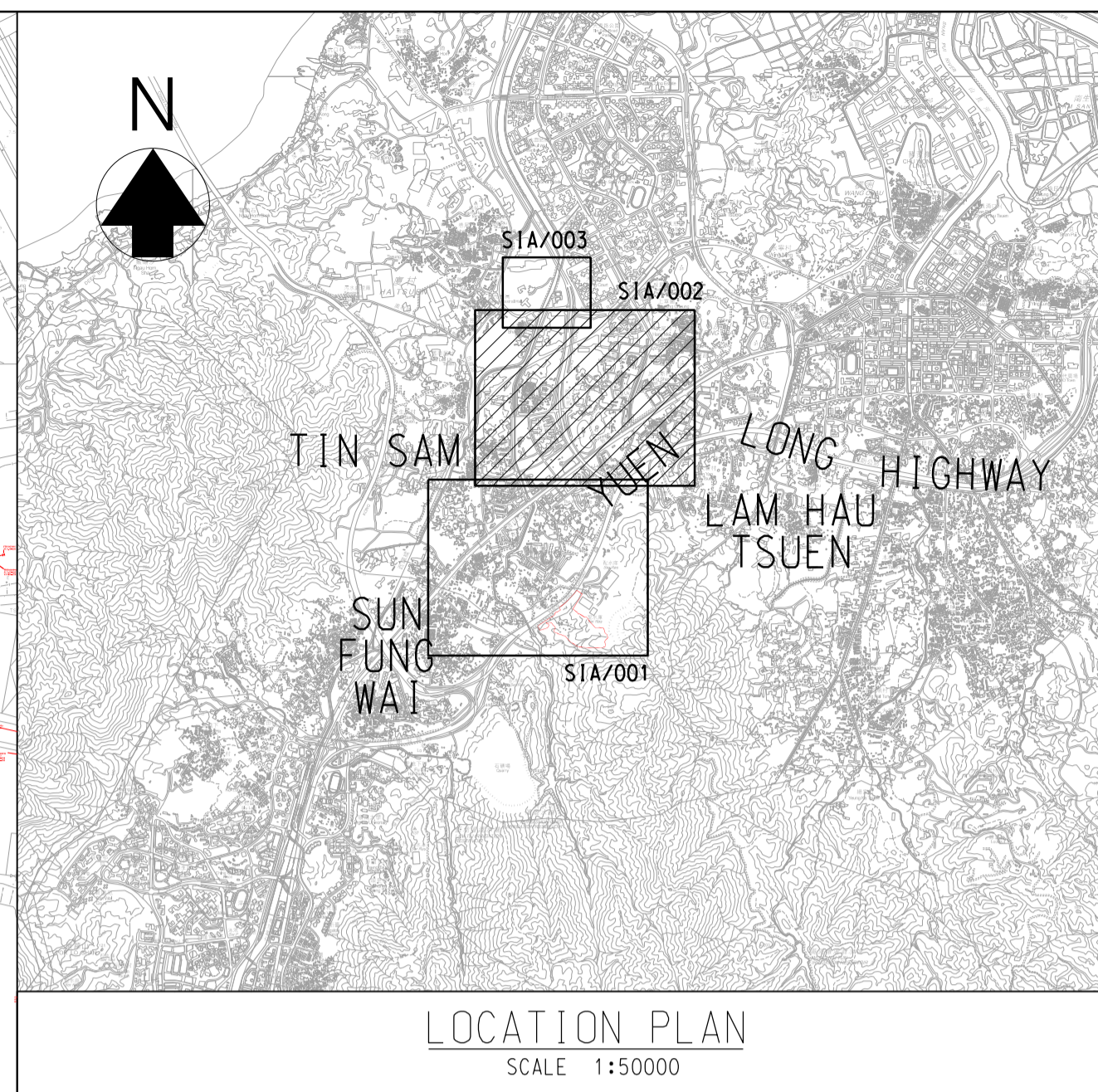
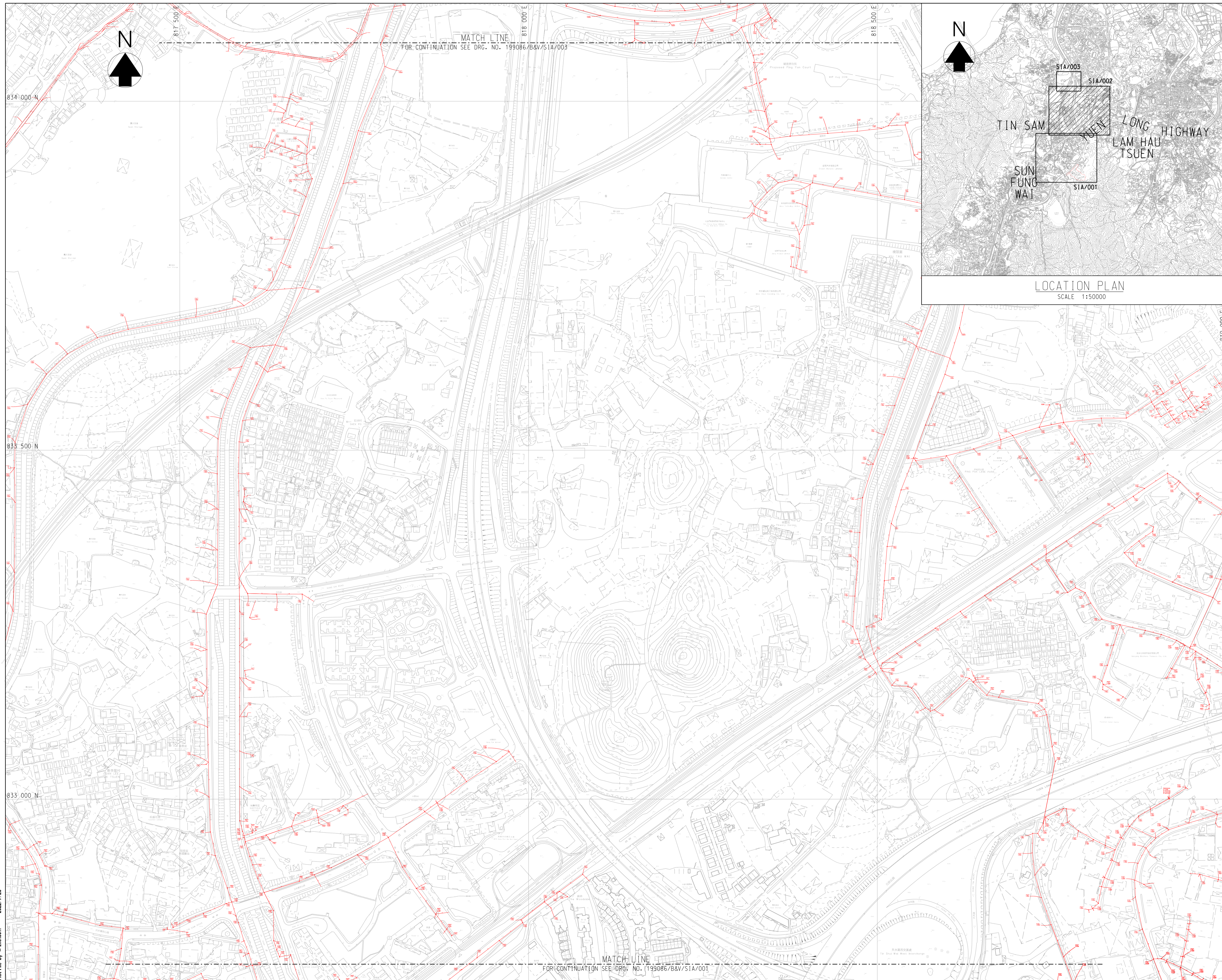
Drawing No. 199086/BIN/S1A/001	Scale 1 : 2500 (A1) 1 : 5000 (A3)
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Plot File by = zhu16811  
 2022/7/26





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- LEGEND:
- PROPOSED PUBLIC HOUSING DEVELOPMENT SITE
  - EXISTING SEWERAGE SYSTEM

Revision	Date	Description			Initial
		Designed	Checked	Drawn	Checked
Initial	09/18	KWM	LCH	SZ	LCH
Date	09/18	09/18	09/18	09/18	09/18

Approved

Agreement no. CE 92/2017 (CE)

Title  
SITE FORMATION AND INFRASTRUCTURE WORKS FOR PUBLIC HOUSING DEVELOPMENT NEAR TAN KWAI TSUEN, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

Drawing Title  
EXISTING SEWERAGE SYSTEM

(SHEET 2 OF 3)

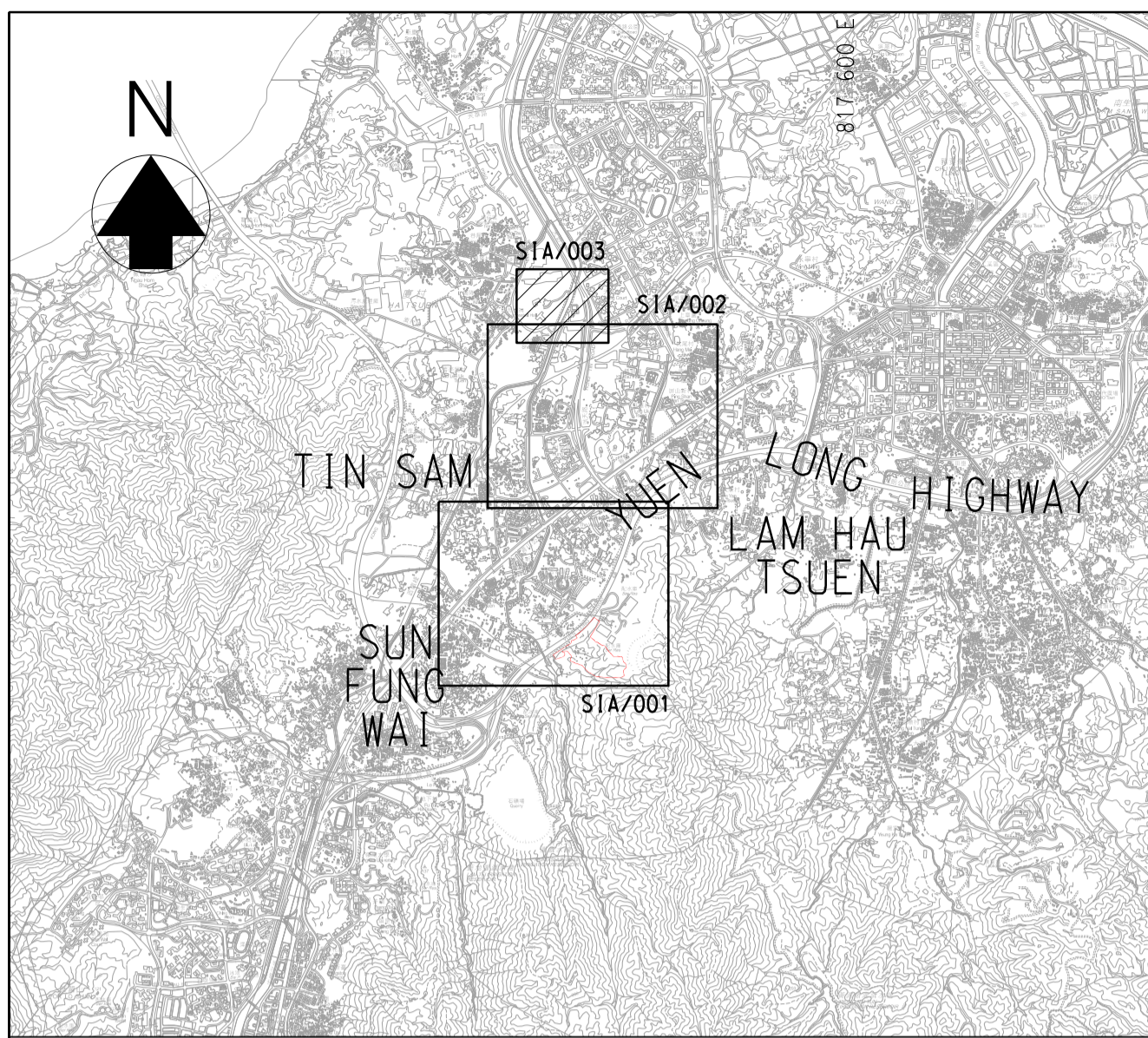
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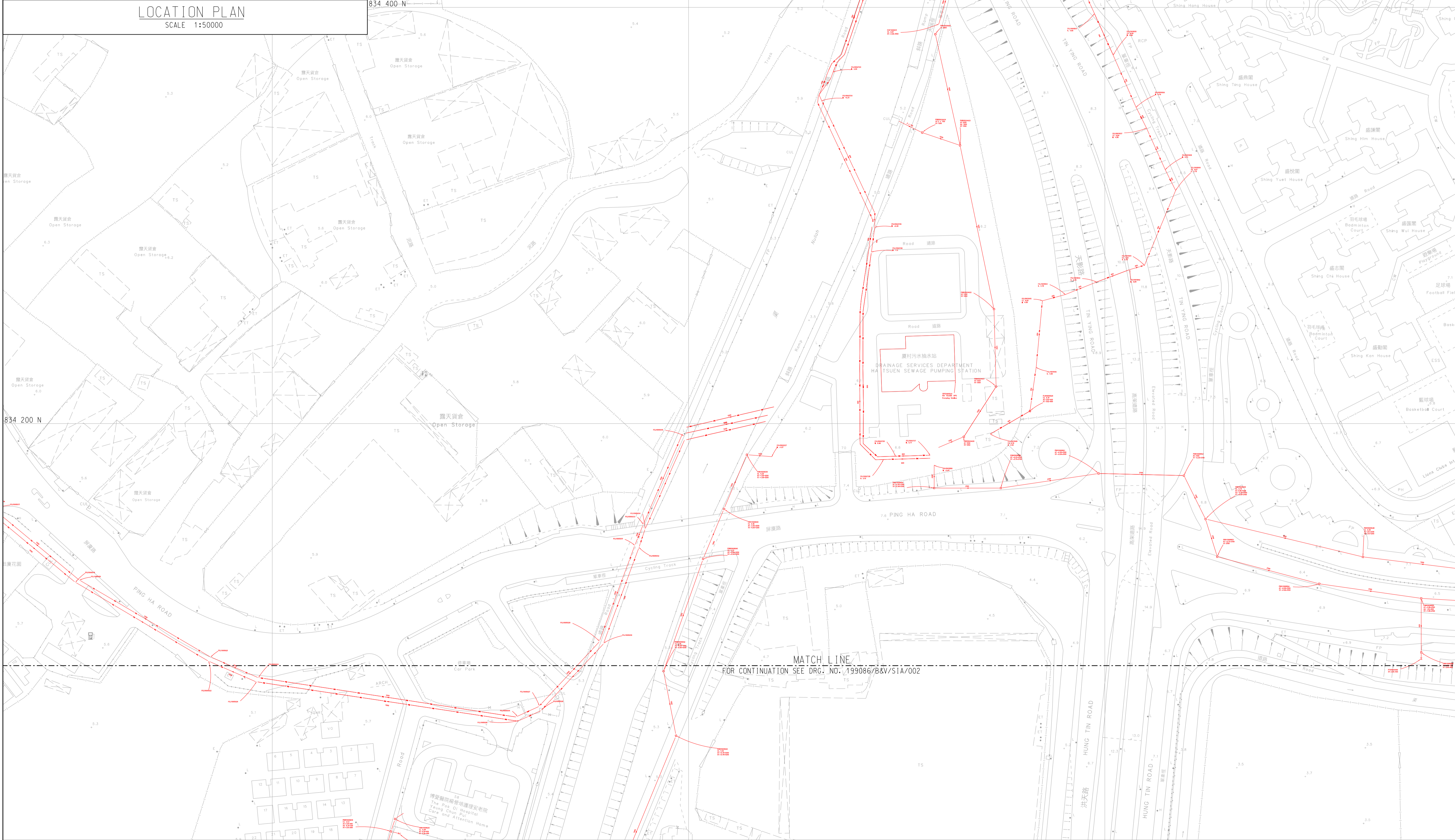
  
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LOCATION PLAN  
SCALE 1:50000



MATCH LINE  
FOR CONTINUATION SEE DRG. NO. 199086/B&V/S1A/002

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LEGEND:  
 PROPOSED PUBLIC HOUSING DEVELOPMENT SITE  
 EXISTING SEWERAGE SYSTEM

Revision	Date	Description			Initial
		Designed	Checked	Drawn	Checked
Initial		KWM	LCH	SZ	LCH
Date	09/18	09/18	09/18	09/18	09/18

Approved

Agreement no. CE 92/2017 (CE)

Title  
SITE FORMATION AND INFRASTRUCTURE WORKS FOR PUBLIC HOUSING DEVELOPMENT NEAR TAN KWAI TSUEN, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

Drawing Title  
EXISTING SEWERAGE SYSTEM (SHEET 3 OF 3)

Drawing No.	Scale
199086/BIN/SIA/003	1 : 1000 (A1) 1 : 2000 (A3)

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2022/7/26



**NOTES:**

1. ALL CO-ORDINATES REFER TO HONG KONG GEODETIC DATUM 1980 AND IN METRES.
2. DIMENSIONS IN MILLIMETERS.
3. ALL LEVELS REFER TO PRINCIPAL DATUM AND IN METRES.
4. LOCATIONS OF PROPOSED SEWER MANHOLES AND SEWERS ARE INDICATIVE ONLY. EXACT LOCATIONS SHALL BE AGREED WITH THE PROJECT MANAGER ON SITE.
5. UNLESS OTHERWISE STATED ON THE DRAWINGS OR AS INSTRUCTED BY THE PROJECT MANAGER, ALL PROPOSED SEWERAGE WORKS ARE TO BE CONSTRUCTED BY OPEN TRENCH METHOD.

**LEGEND:**

- LIMIT OF WORKS AREA
- PROPOSED SEWER
- PROPOSED SEWER MANHOLE
- EXISTING SEWER
- EXISTING SEWER MANHOLE
- PROPOSED SEWERAGE PIPE CONSTRUCTED BY TRENCHLESS METHOD

Revision	Date	Description	Initial
	Designed	Checked	Drawn
Initial	TCL	WLC	SZ
Date	04/22	04/22	04/22
Approved			

Agreement no. CE 92/2017 (CE)

Title  
SITE FORMATION AND INFRASTRUCTURE WORKS FOR PUBLIC HOUSING DEVELOPMENT NEAR TAN KWAI TSUEN, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

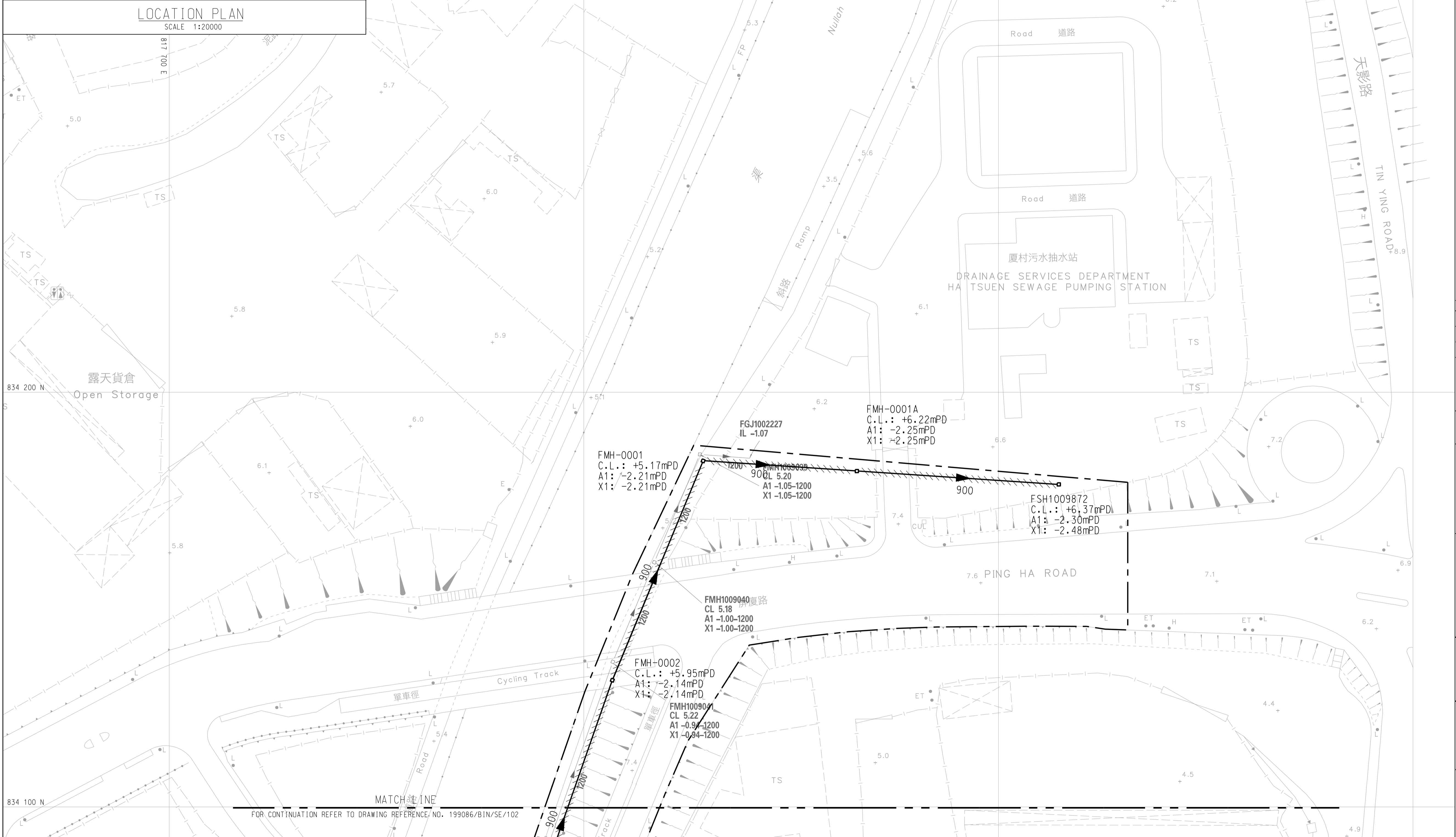
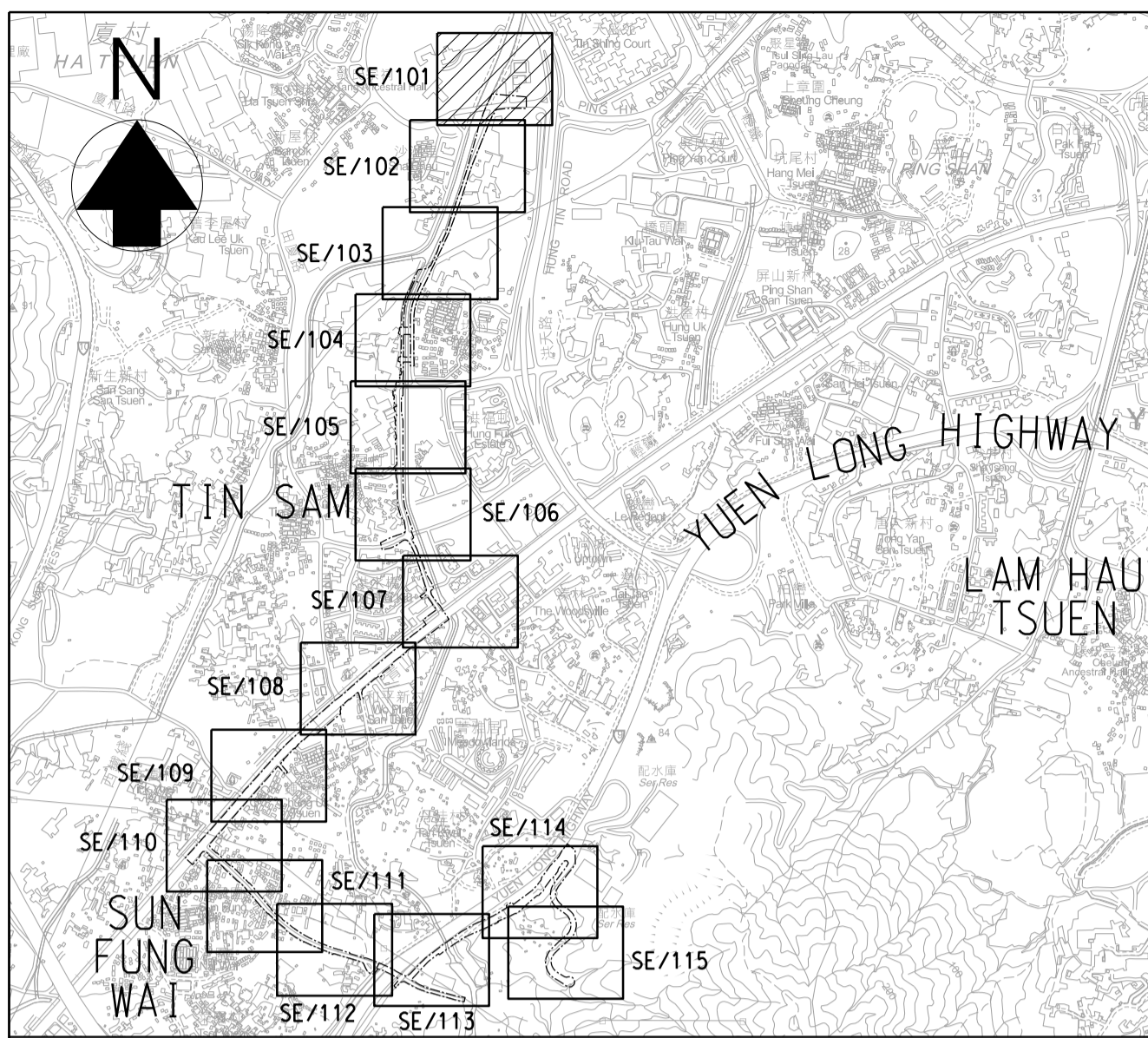
Drawing Title  
GENERAL LAYOUT PLAN FOR SEWERAGE WORKS

(SHEET 1 OF 15)

Drawing No.	Scale
199086/BIN/SE/101	1 : 500 (A1) 1 : 1000 (A3)

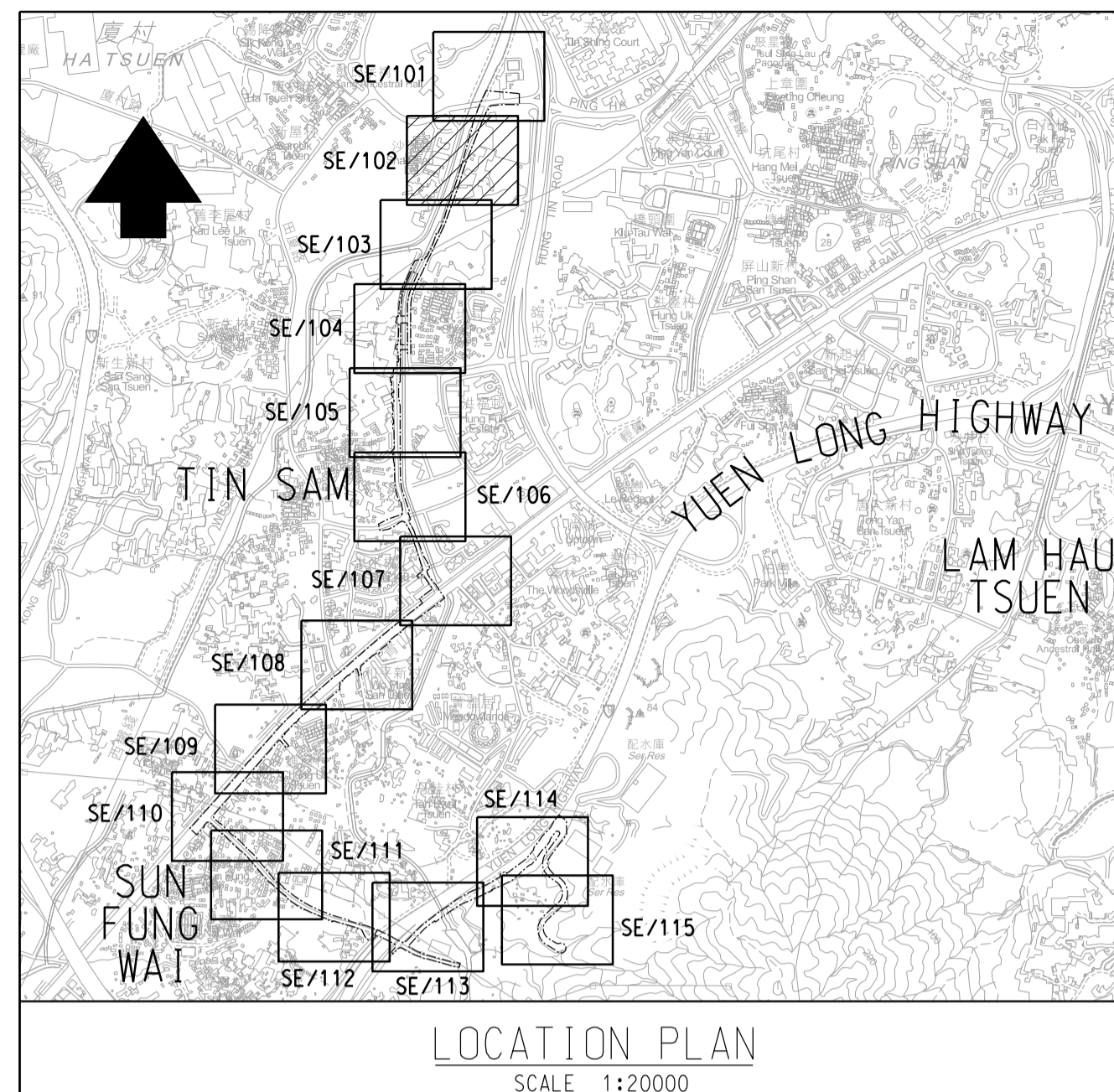
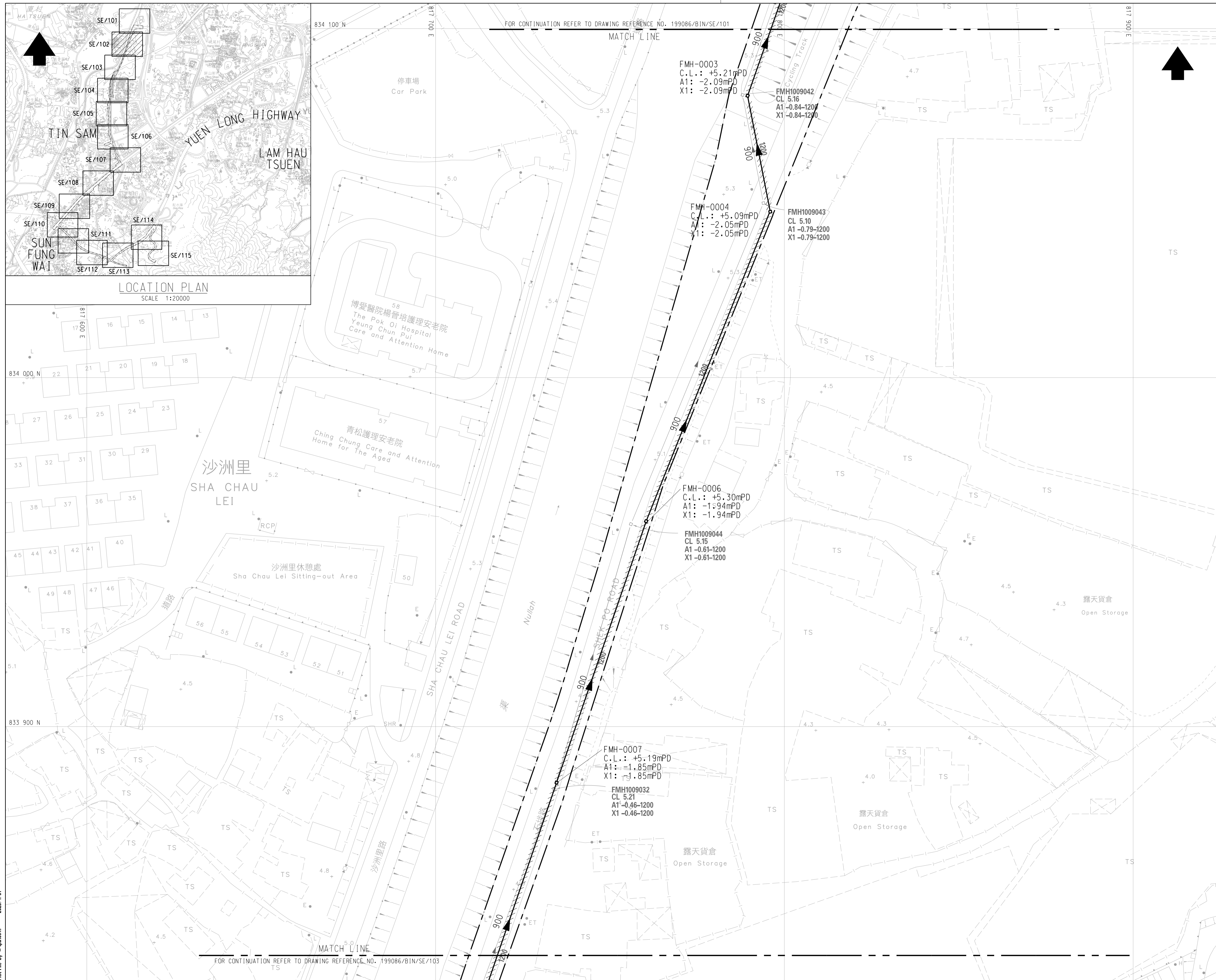
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MATCH LINE FOR CONTINUATION REFER TO DRAWING REFERENCE NO. 199086/BIN/SE/102



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- NOTES:**
1. ALL CO-ORDINATES REFER TO HONG KONG GEODETIC DATUM 1980 AND IN METRES.
  2. DIMENSIONS IN MILLIMETERS.
  3. ALL LEVELS REFER TO PRINCIPAL DATUM AND IN METRES.
  4. LOCATIONS OF PROPOSED SEWERAGE MANHOLES AND SEWERS ARE INDICATIVE ONLY. EXACT LOCATIONS SHALL BE AGREED WITH THE PROJECT MANAGER ON SITE.
  5. UNLESS OTHERWISE STATED ON THE DRAWINGS OR AS INSTRUCTED BY THE PROJECT MANAGER, ALL PROPOSED SEWERAGE WORKS ARE TO BE CONSTRUCTED BY OPEN TRENCH METHOD.

- LEGEND:**
- LIMIT OF WORKS AREA
  - PROPOSED SEWER
  - PROPOSED SEWER MANHOLE
  - EXISTING SEWER
  - EXISTING SEWER MANHOLE
  - PROPOSED SEWAGE PIPE CONSTRUCTED BY TRENCHLESS METHOD

Revision	Date	Description			Initial
	Designed	Checked	Drawn	Checked	
Initial	TCL	WLC	SZ	LCH	
Date	04/22	04/22	04/22	04/22	

Approved

Agreement no. CE 92/2017 (CE)

Title

SITE FORMATION AND INFRASTRUCTURE WORKS FOR PUBLIC HOUSING DEVELOPMENT NEAR TAN KWAI TSUEN, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

Drawing Title

GENERAL LAYOUT PLAN FOR SEWERAGE WORKS

(SHEET 2 OF 15)

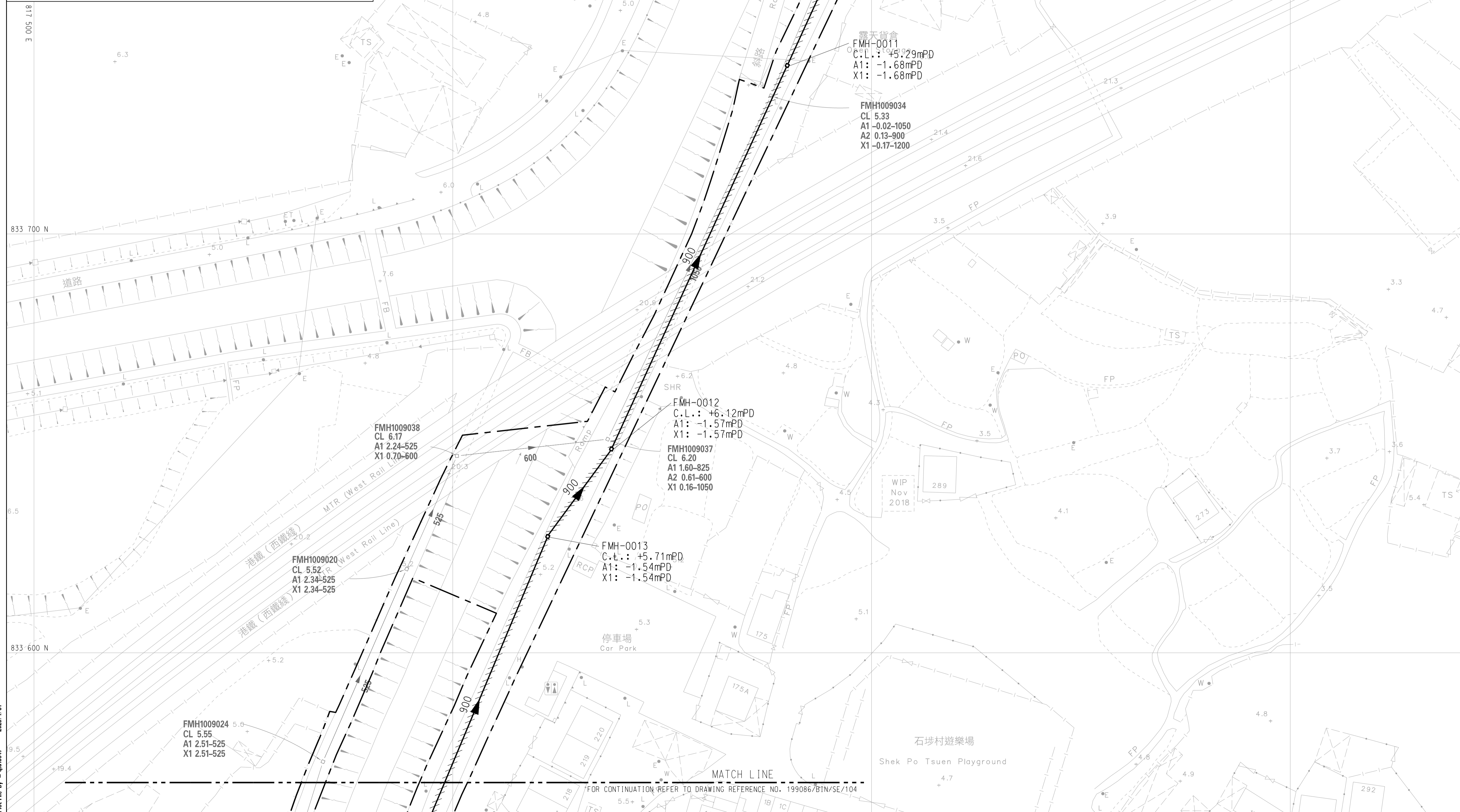
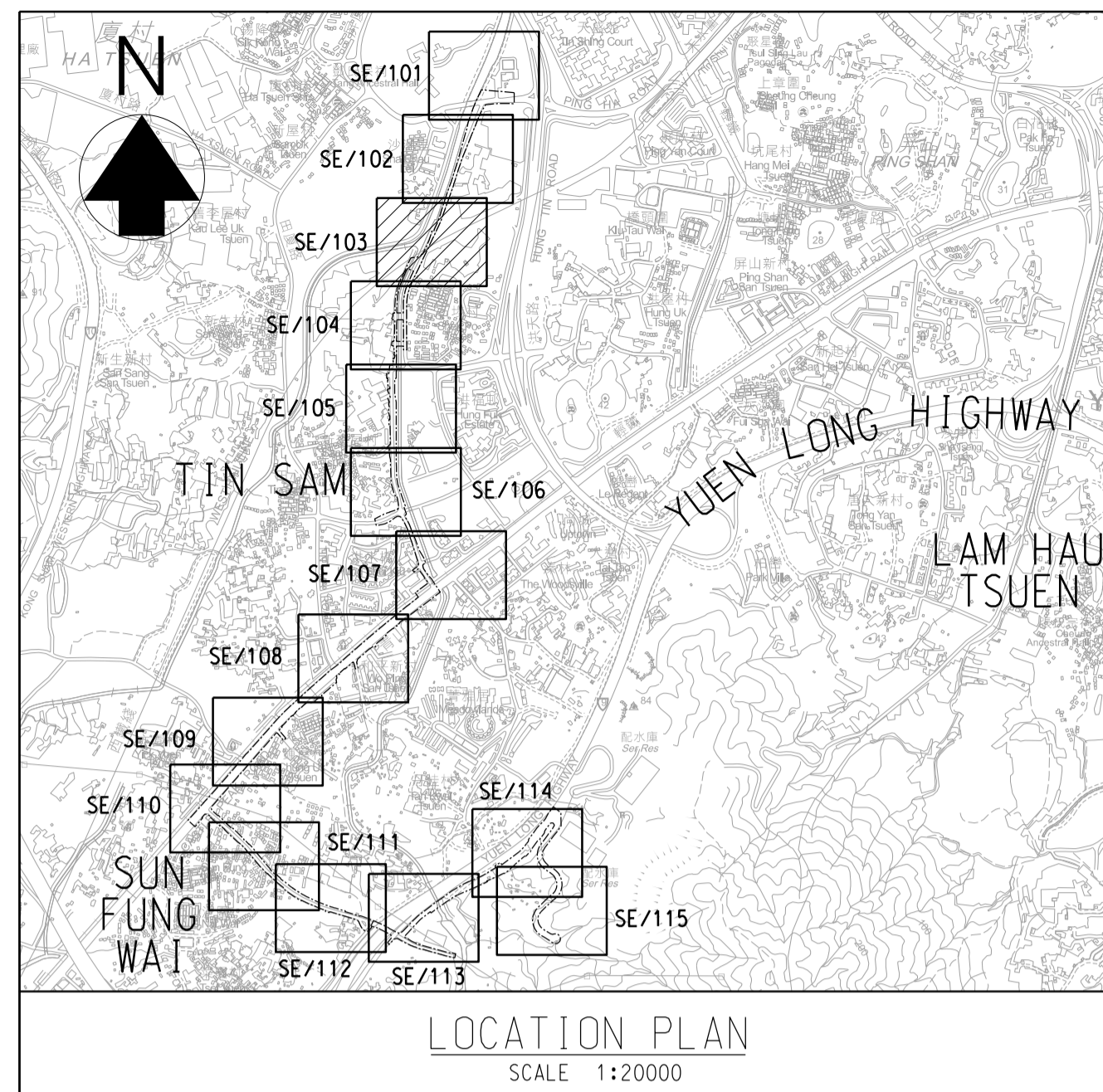
Drawing No. 199086/BIN/SE/102

Scale 1 : 500 (A1)  
1 : 1000 (A3)

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**NOTES:**

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**LEGEND:**

- [Dashed line] LIMIT OF WORKS AREA
- [Solid line with arrow] PROPOSED SEWER
- [Circle] PROPOSED SEWER MANHOLE
- [Dashed line with arrow] EXISTING SEWER
- [Square] EXISTING SEWER MANHOLE
- [Hatched line] PROPOSED SEWAGE PIPE CONSTRUCTED BY TRENCHLESS METHOD

Revision	Date	Description	Initial
	Designed	Checked	Drawn
Initial	TCL	WLC	SZ
Date	04/22	04/22	04/22
Approved			

Agreement no. CE 92/2017 (CE)

Title  
SITE FORMATION AND INFRASTRUCTURE WORKS FOR PUBLIC HOUSING DEVELOPMENT NEAR TAN KWAI TSUEN, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

Drawing Title  
GENERAL LAYOUT PLAN FOR SEWERAGE WORKS

(SHEET 3 OF 15)

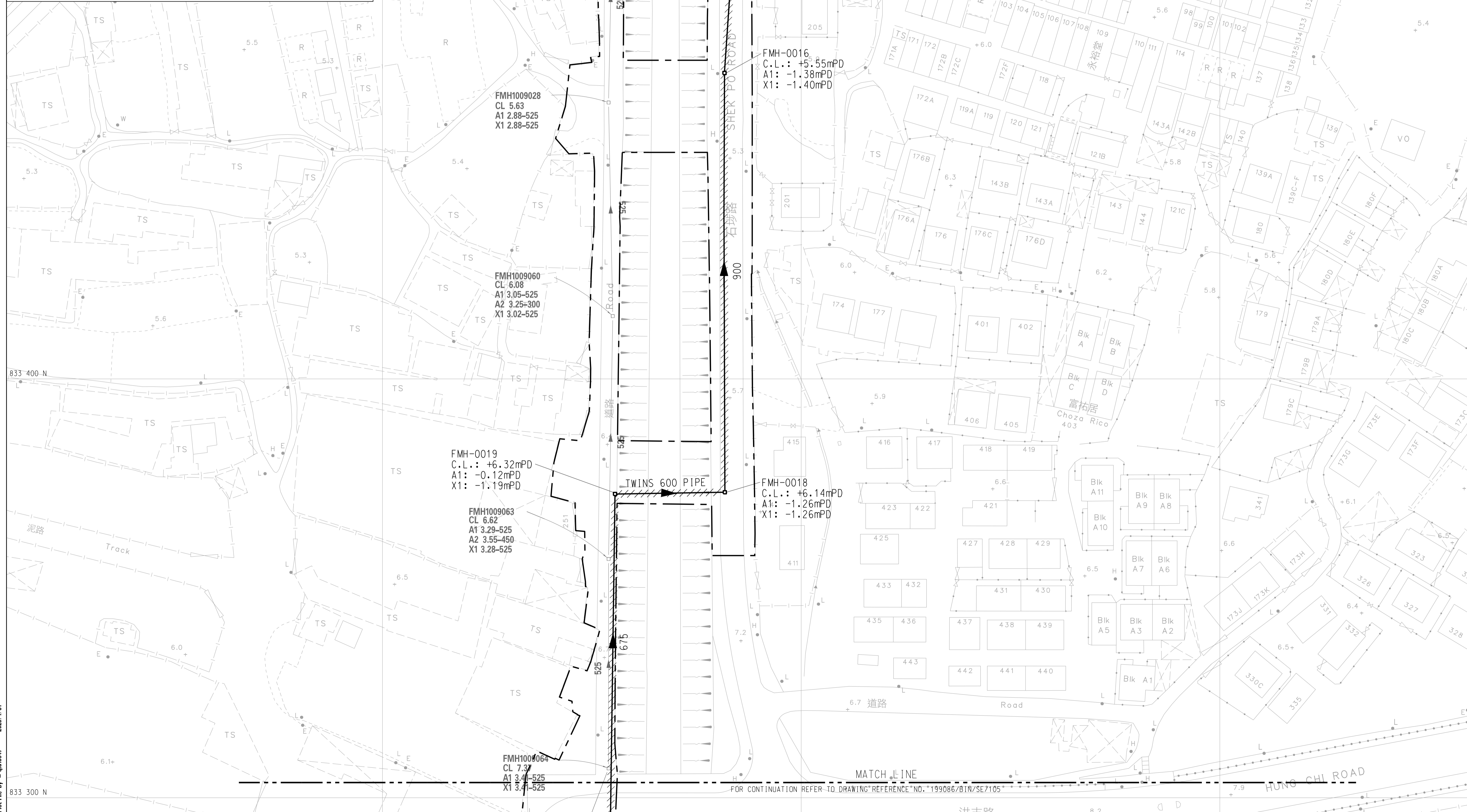
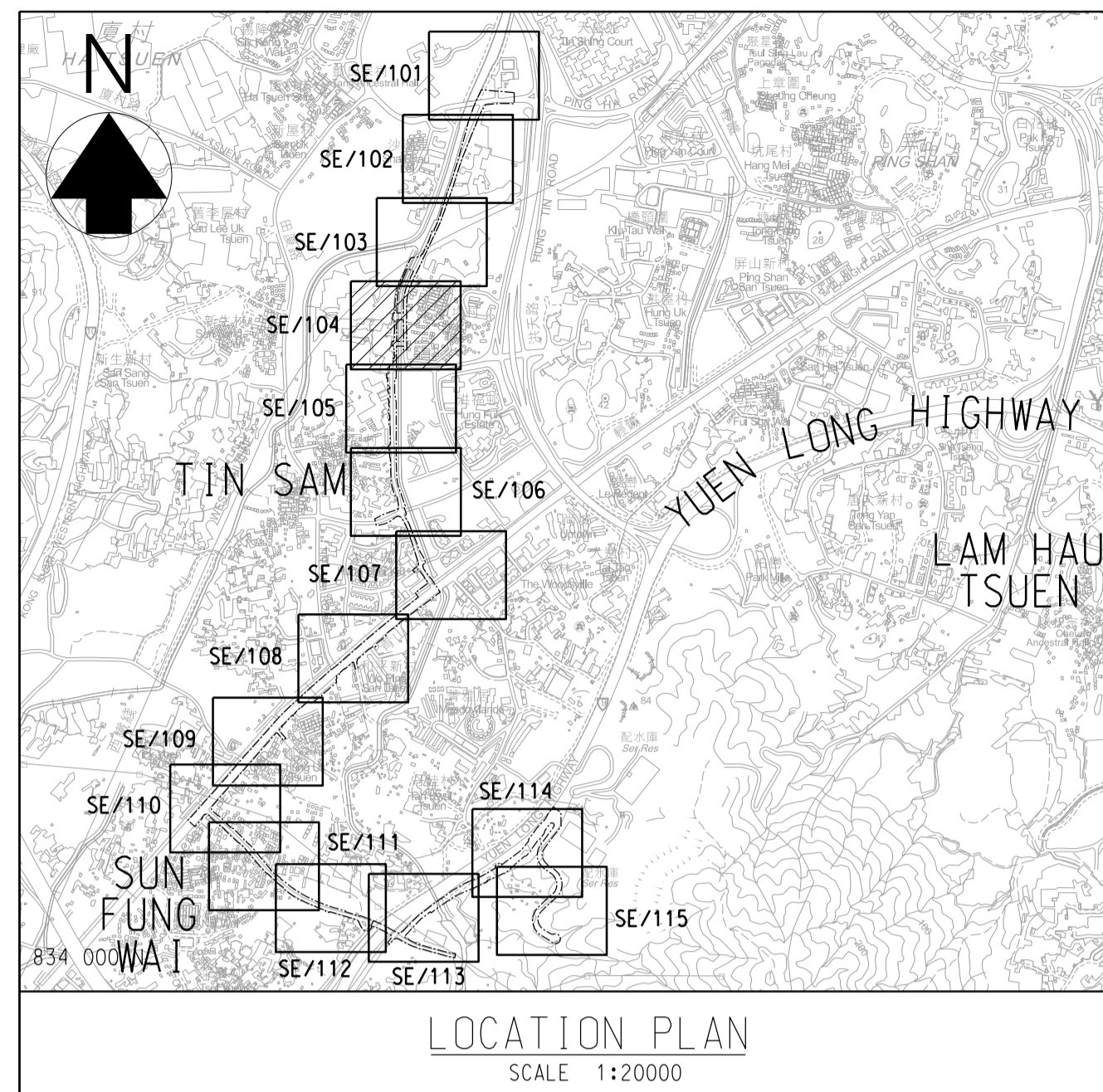
Drawing No.	Scale
199086/BIN/SE/103	1: 500 (A1) 1: 1000 (A3)

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- NOTES:**
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  3. ALL LEVELS REFER TO PRINCIPAL DATUM AND IN METRES.
  4. LOCATIONS OF PROPOSED SEWERAGE MANHOLES AND SEWERS ARE INDICATIVE ONLY. EXACT LOCATIONS SHALL BE AGREED WITH THE PROJECT MANAGER ON SITE.
  5. UNLESS OTHERWISE STATED ON THE DRAWINGS OR AS INSTRUCTED BY THE PROJECT MANAGER, ALL PROPOSED SEWERAGE WORKS ARE TO BE CONSTRUCTED BY OPEN TRENCH METHOD.

- LEGEND:**
- [---] LIMIT OF WORKS AREA
  - [---] PROPOSED SEWER
  - [□] PROPOSED SEWER MANHOLE
  - [---] EXISTING SEWER
  - [□] EXISTING SEWER MANHOLE
  - [---] PROPOSED SEWERAGE PIPE CONSTRUCTED BY TRENCHLESS METHOD

Revision	Date	Description	Initial
Initial	Designed	Checked	Drawn
Initial	TCL	WLC	SZ
Date	04/22	04/22	04/22
Approved			

Agreement no. CE 92/2017 (CE)

Title  
SITE FORMATION AND INFRASTRUCTURE WORKS FOR PUBLIC HOUSING DEVELOPMENT NEAR TAN KWAI TSUEN, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

Drawing Title  
GENERAL LAYOUT PLAN FOR SEWERAGE WORKS

(SHEET 4 OF 15)  
Drawing No. 199086/BIN/SE/104  
Scale 1: 500 (A1)  
1: 1000 (A3)

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**NOTES:**

1. ALL CO-ORDINATES REFER TO HONG KONG GEODETIC DATUM 1980 AND IN METRES.
2. DIMENSIONS IN MILLIMETERS.
3. ALL LEVELS REFER TO PRINCIPAL DATUM AND IN METRES.
4. LOCATIONS OF PROPOSED SEWERAGE MANHOLES AND SEWERS ARE INDICATIVE ONLY. EXACT LOCATIONS SHALL BE AGREED WITH THE PROJECT MANAGER ON SITE.
5. UNLESS OTHERWISE STATED ON THE DRAWINGS OR AS INSTRUCTED BY THE PROJECT MANAGER, ALL PROPOSED SEWERAGE WORKS ARE TO BE CONSTRUCTED BY OPEN TRENCH METHOD.

**LEGEND:**

- LIMIT OF WORKS AREA
- PROPOSED SEWER
- PROPOSED SEWER MANHOLE
- EXISTING SEWER
- EXISTING SEWER MANHOLE
- PROPOSED SEWAGE PIPE CONSTRUCTED BY TRENCHLESS METHOD

Revision	Date	Description	Initial
Initial	Designed	Checked	Drawn
Initial	TCL	WLC	SZ
Date	04/22	04/22	04/22
Approved			

Agreement no. CE 92/2017 (CE)

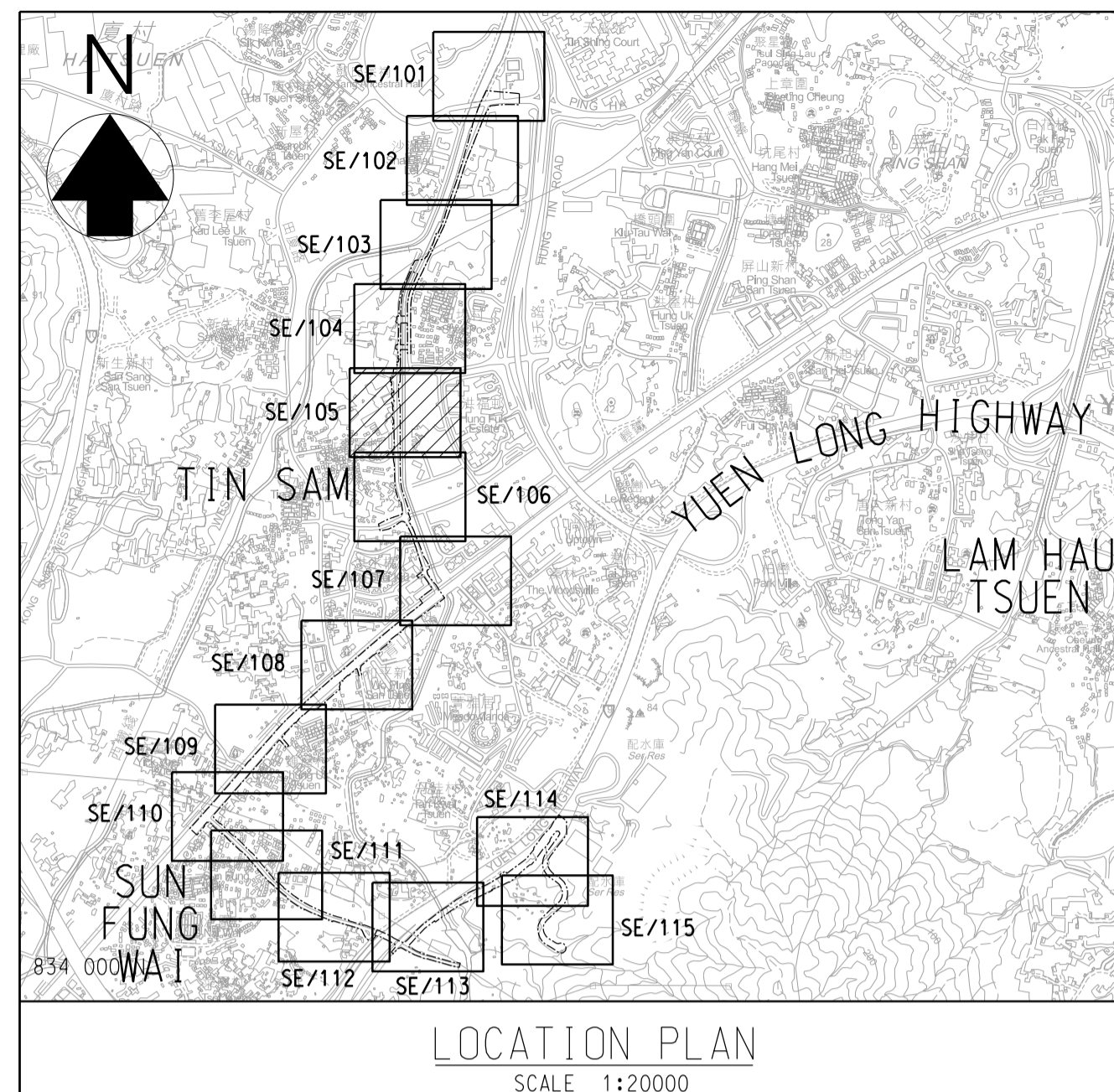
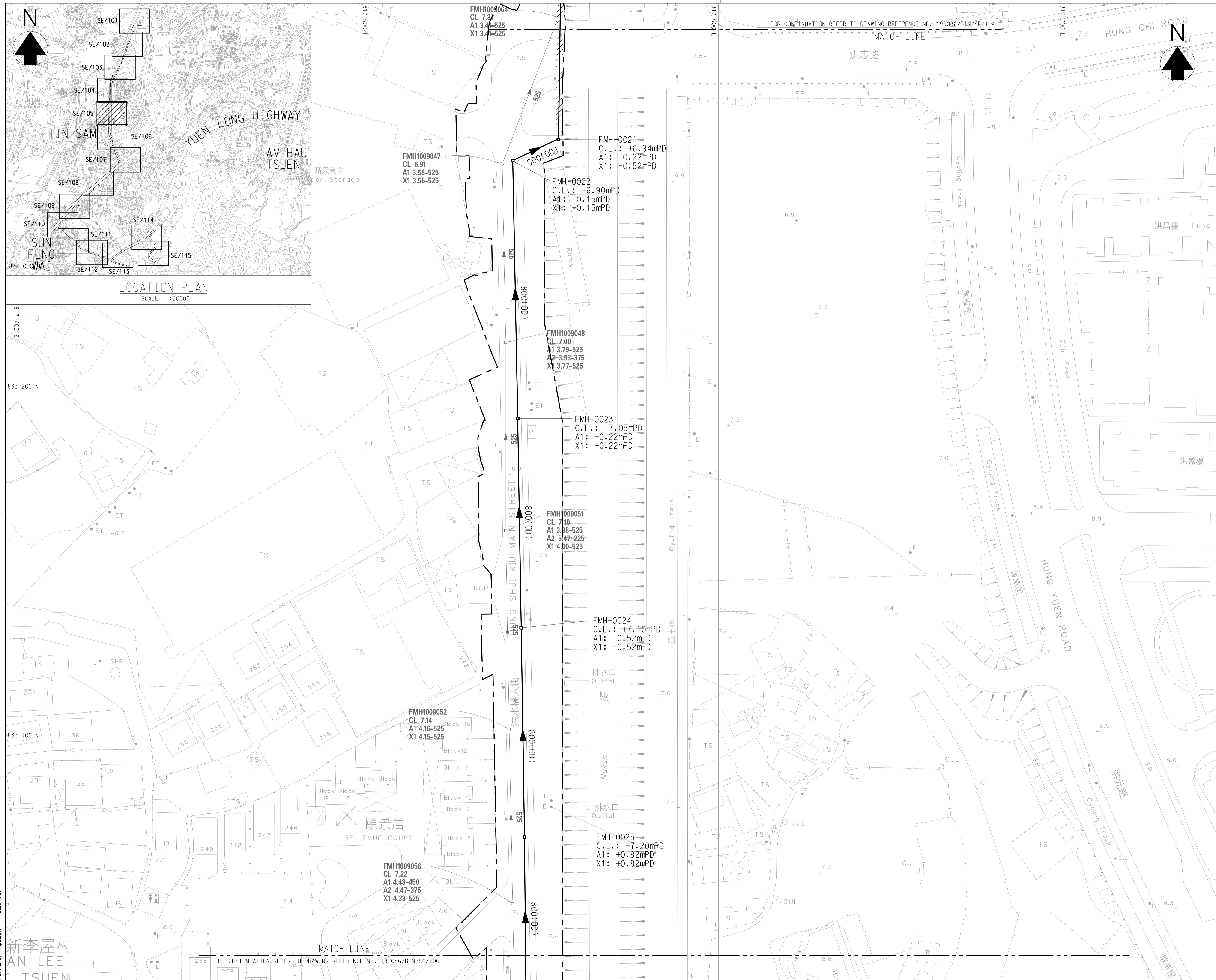
Title  
SITE FORMATION AND INFRASTRUCTURE WORKS FOR PUBLIC HOUSING DEVELOPMENT NEAR TAN KWAI TSUEN, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

Drawing Title  
GENERAL LAYOUT PLAN FOR SEWERAGE WORKS

(SHEET 5 OF 15)  
Drawing No. 199086/BIN/SE/105  
Scale 1 : 500 (A1)  
1 : 1000 (A3)

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**NOTES:**

1. ALL CO-ORDINATES REFER TO HONG KONG GEODETIC DATUM 1980 AND IN METRES.
2. DIMENSIONS IN MILLIMETERS.
3. ALL LEVELS REFER TO PRINCIPAL DATUM AND IN METRES.
4. LOCATIONS OF PROPOSED SEWERAGE MANHOLES AND SEWERS ARE INDICATIVE ONLY. EXACT LOCATIONS SHALL BE AGREED WITH THE PROJECT MANAGER ON SITE.
5. UNLESS OTHERWISE STATED ON THE DRAWINGS OR AS INSTRUCTED BY THE PROJECT MANAGER, ALL PROPOSED SEWERAGE WORKS ARE TO BE CONSTRUCTED BY OPEN TRENCH METHOD.

**LEGEND:**

- LIMIT OF WORKS AREA
- PROPOSED SEWER
- PROPOSED SEWER MANHOLE
- EXISTING SEWER
- EXISTING SEWER MANHOLE
- PROPOSED SEWERAGE PIPE CONSTRUCTED BY TRENCHLESS METHOD

Revision	Date	Description			Initial
Initial	Designed	Checked	Drawn	Checked	
	TCL	WLC	SZ	LCH	
Date	04/22	04/22	04/22	04/22	04/22
Approved					

Agreement no. CE 92/2017 (CE)

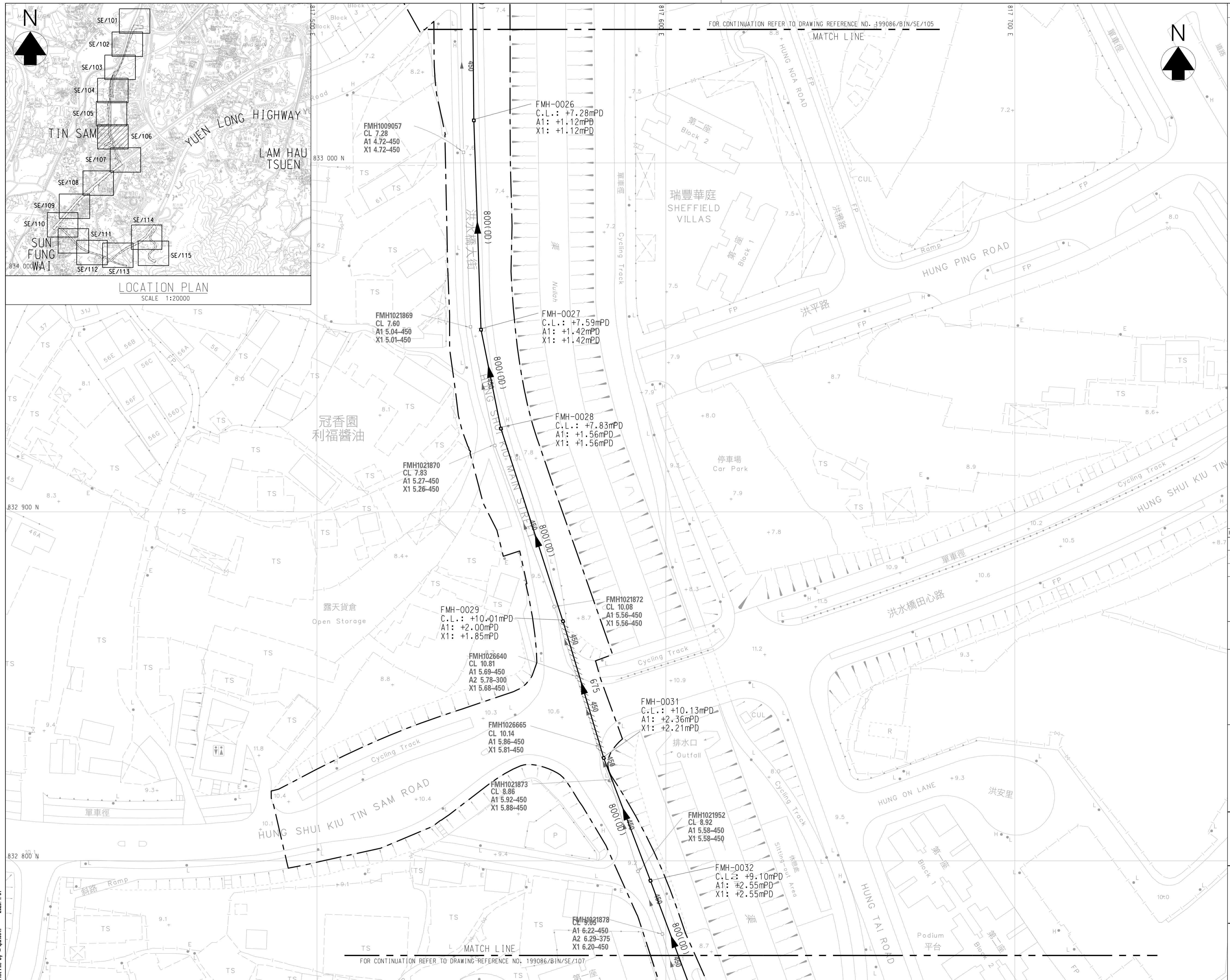
Title  
SITE FORMATION AND INFRASTRUCTURE WORKS FOR PUBLIC HOUSING DEVELOPMENT NEAR TAN KWAI TSUEN, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

Drawing Title  
GENERAL LAYOUT PLAN FOR SEWERAGE WORKS

(SHEET 6 OF 15)  
Drawing No. 199086/BIN/SE/106  
Scale 1 : 500 (A1)  
1 : 1000 (A3)

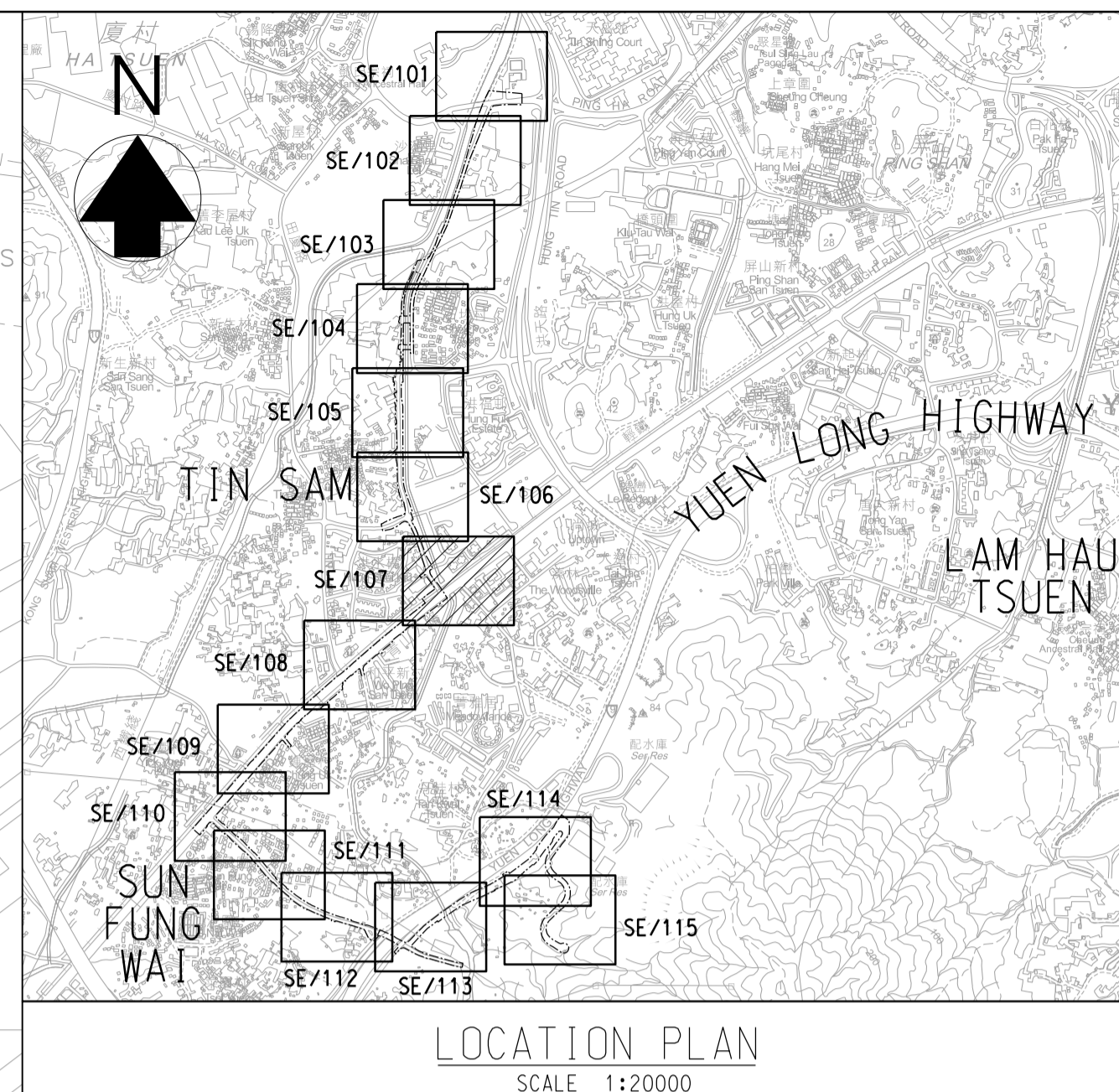
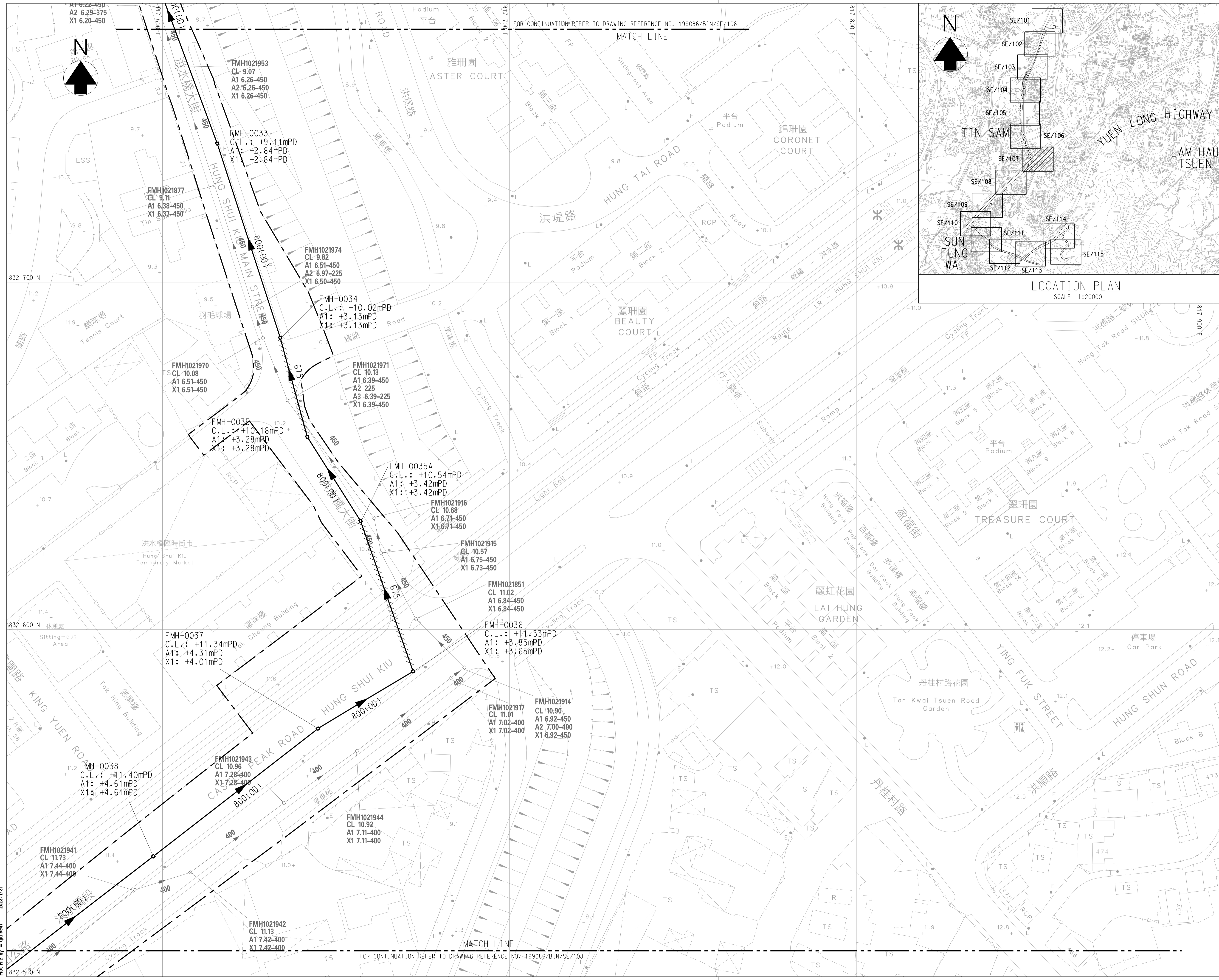
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- NOTES:**
1. ALL CO-ORDINATES REFER TO HONG KONG GEODETIC DATUM 1980 AND IN METRES.
  2. DIMENSIONS IN MILLIMETERS.
  3. ALL LEVELS REFER TO PRINCIPAL DATUM AND IN METRES.
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- LEGEND:**
- [Dashed line] LIMIT OF WORKS AREA
  - [Solid line with arrow] PROPOSED SEWER
  - [Square] PROPOSED SEWER MANHOLE
  - [Dashed line with arrow] EXISTING SEWER
  - [Square] EXISTING SEWER MANHOLE
  - [Line with cross-hatch] PROPOSED SEWAGE PIPE CONSTRUCTED BY TRENCHLESS METHOD

Revision	Date	Description	Initial
Initial	Designed	Checked	Drawn
Initial	TCL	WLC	SZ
Date	04/22	04/22	04/22
Approved			

Agreement no. CE 92/2017 (CE)

Title  
SITE FORMATION AND INFRASTRUCTURE WORKS FOR PUBLIC HOUSING DEVELOPMENT NEAR TAN KWAI TSUEN, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

Drawing Title  
GENERAL LAYOUT PLAN FOR SEWERAGE WORKS

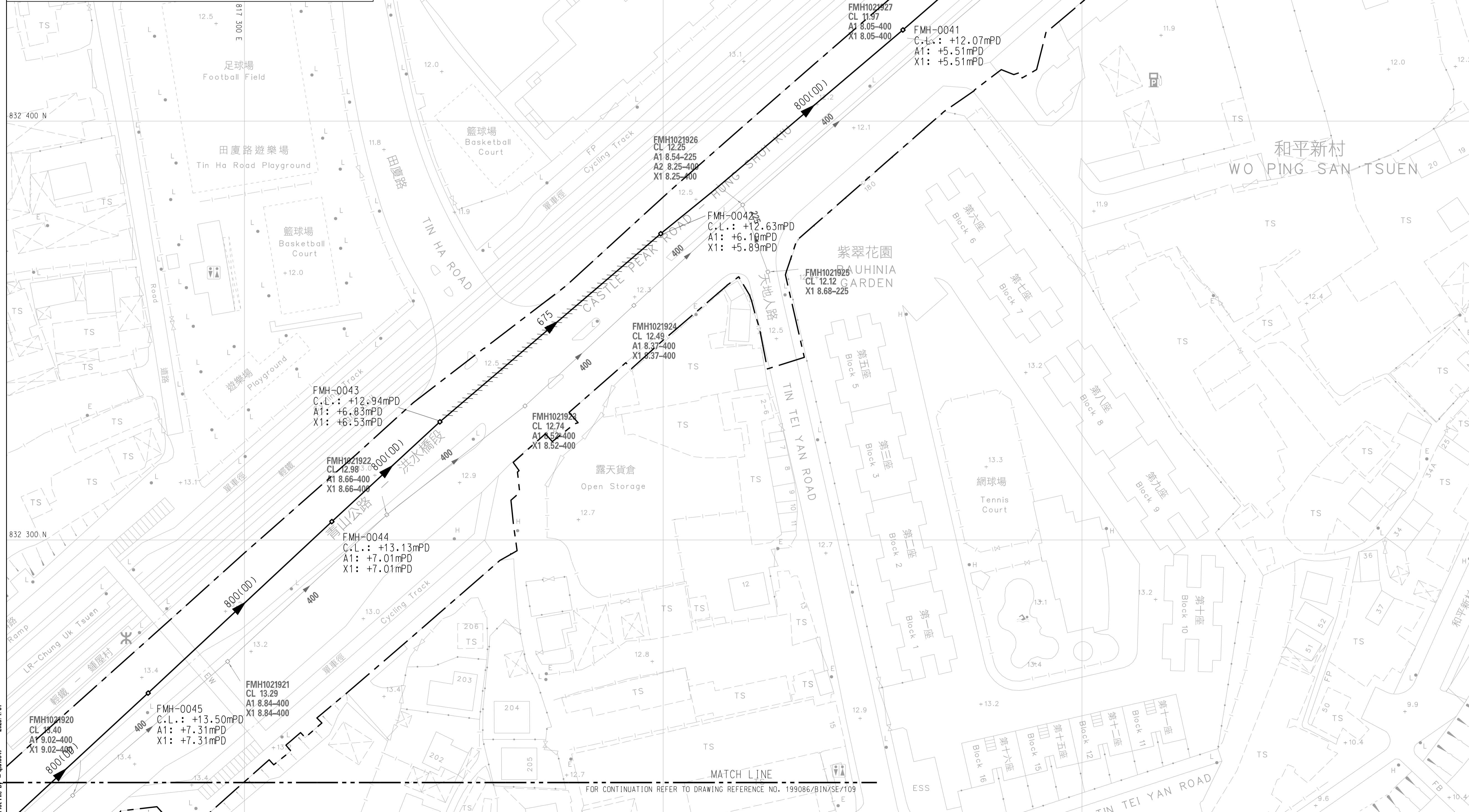
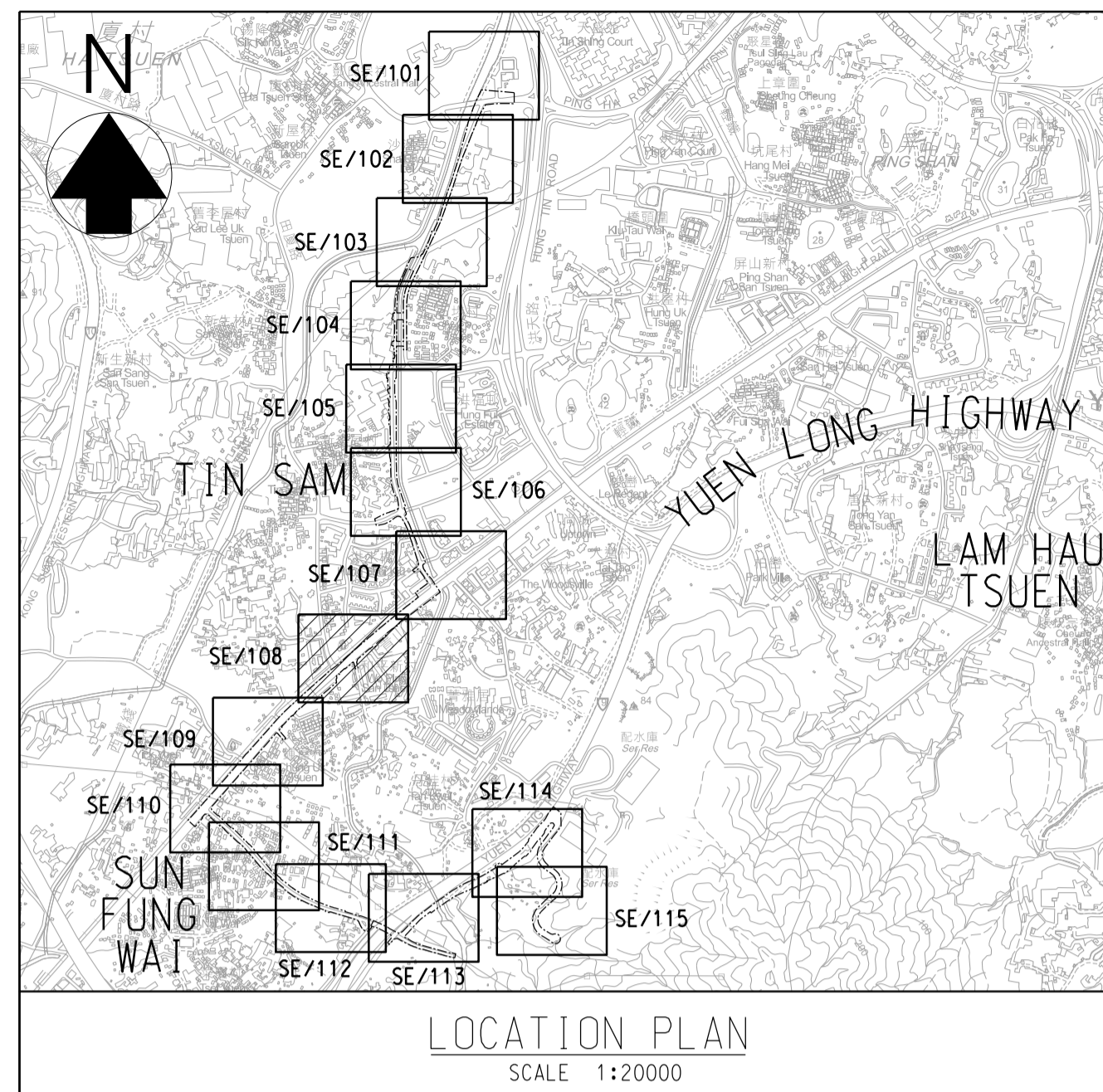
Drawing No.	Scale
199086/BIN/SE/107	1 : 500 (A1) 1 : 1000 (A3)

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**LEGEND:**

- LIMIT OF WORKS AREA
- PROPOSED SEWER
- PROPOSED SEWER MANHOLE
- EXISTING SEWER
- EXISTING SEWER MANHOLE
- PROPOSED SEWAGE PIPE CONSTRUCTED BY TRENCHLESS METHOD

Revision	Date	Description	Initial
Initial	Designed	Checked	Drawn
	TCL	WLC	SZ
Date	04/22	04/22	04/22
Approved			

Agreement no. CE 92/2017 (CE)

Title  
SITE FORMATION AND INFRASTRUCTURE WORKS FOR PUBLIC HOUSING DEVELOPMENT NEAR TAN KWAI TSUEN, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

Drawing Title  
GENERAL LAYOUT PLAN FOR SEWERAGE WORKS

(SHEET 8 OF 15)

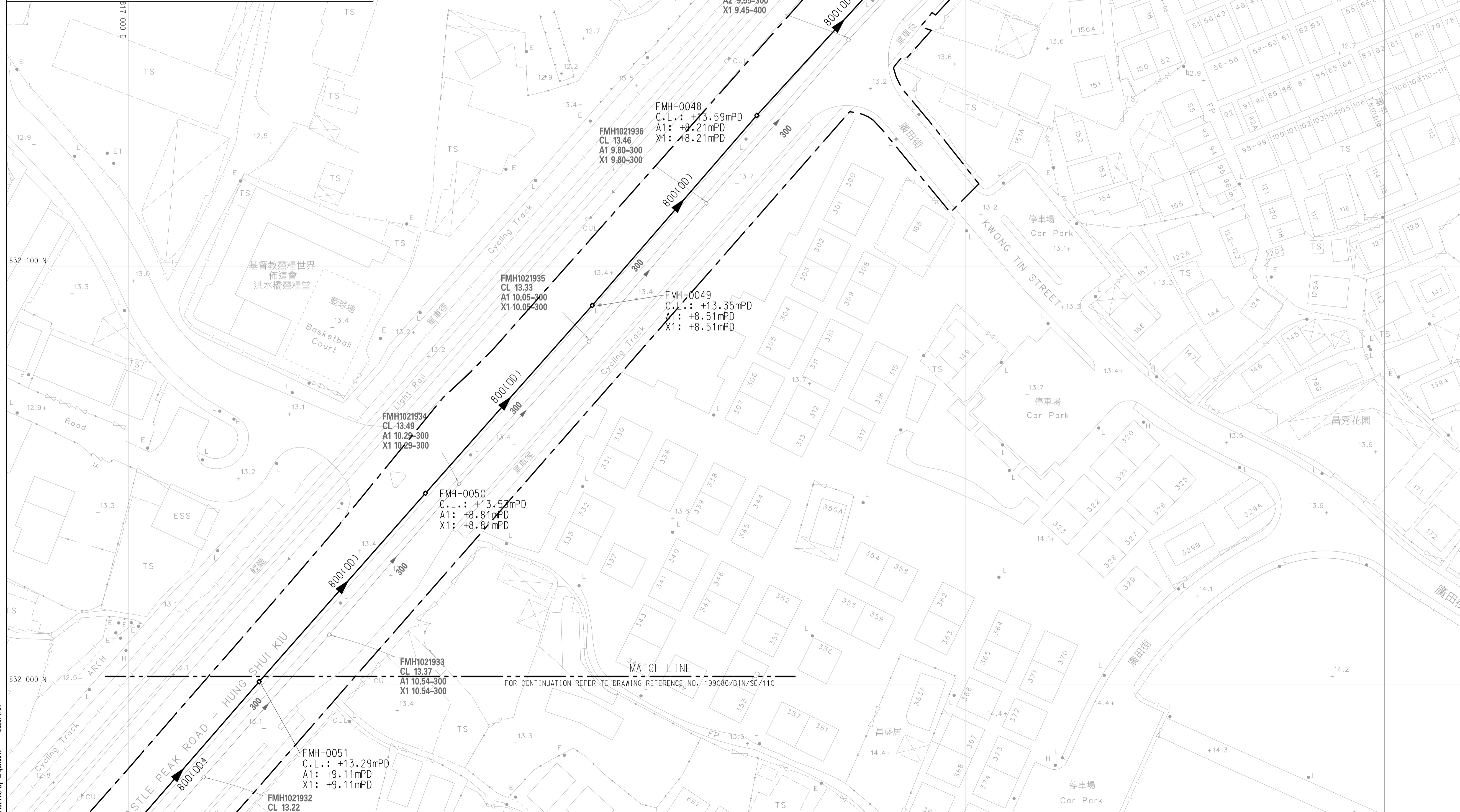
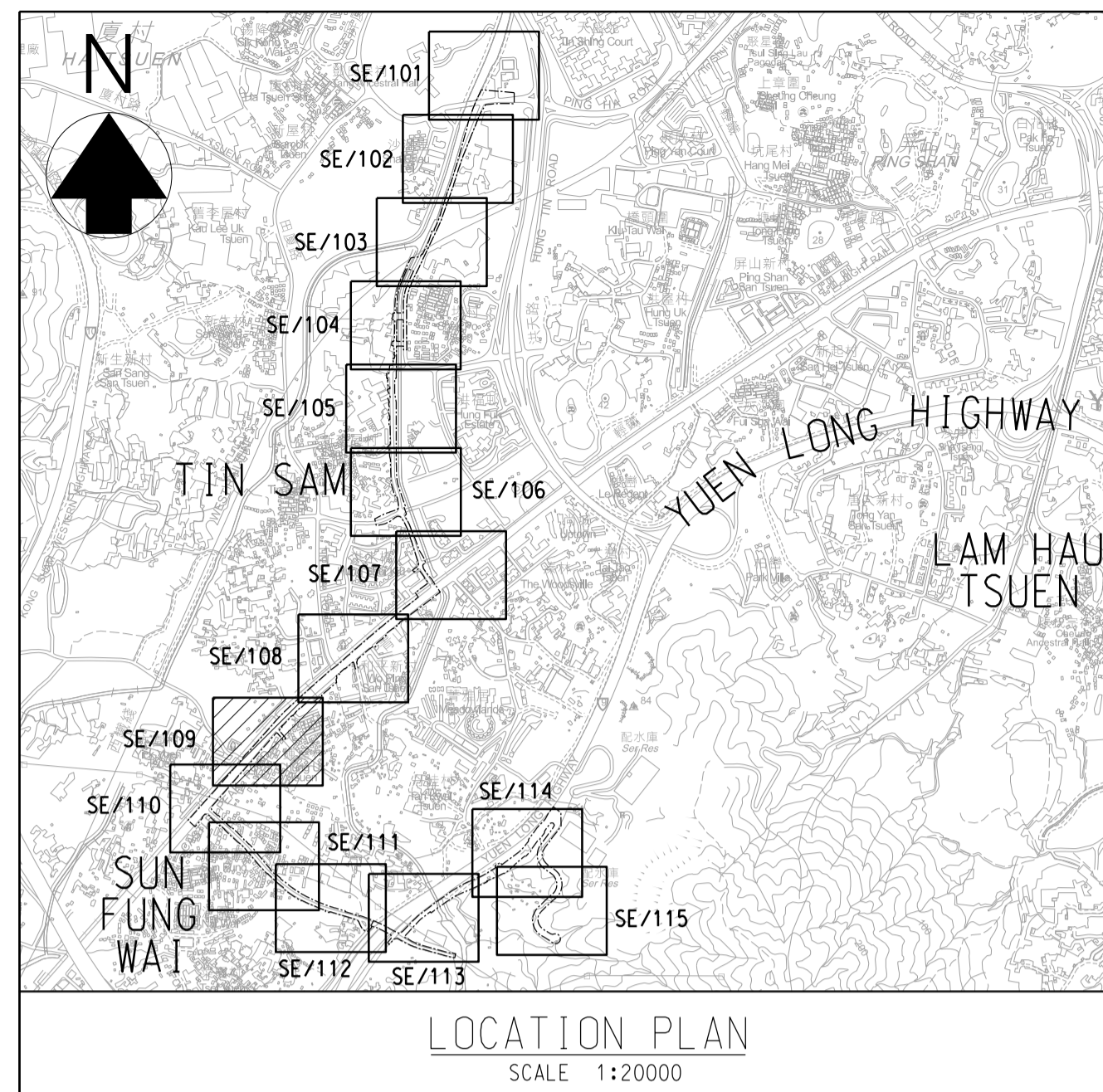
Drawing No.	Scale
199086/BIN/SE/108	1 : 500 (A1) 1 : 1000 (A3)

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**LEGEND:**

- LIMIT OF WORKS AREA
- PROPOSED SEWER
- PROPOSED SEWER MANHOLE
- EXISTING SEWER
- EXISTING SEWER MANHOLE
- PROPOSED SEWAGE PIPE CONSTRUCTED BY TRENCHLESS METHOD

Revision	Date	Description	Initial
Initial	Designed	Checked	Drawn
Initial	TCL	WLC	SZ
Date	04/22	04/22	04/22
Approved			

Agreement no. CE 92/2017 (CE)

Title  
SITE FORMATION AND INFRASTRUCTURE WORKS FOR PUBLIC HOUSING DEVELOPMENT NEAR TAN KWAI TSUEN, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

Drawing Title  
GENERAL LAYOUT PLAN FOR SEWERAGE WORKS

(SHEET 9 OF 15)

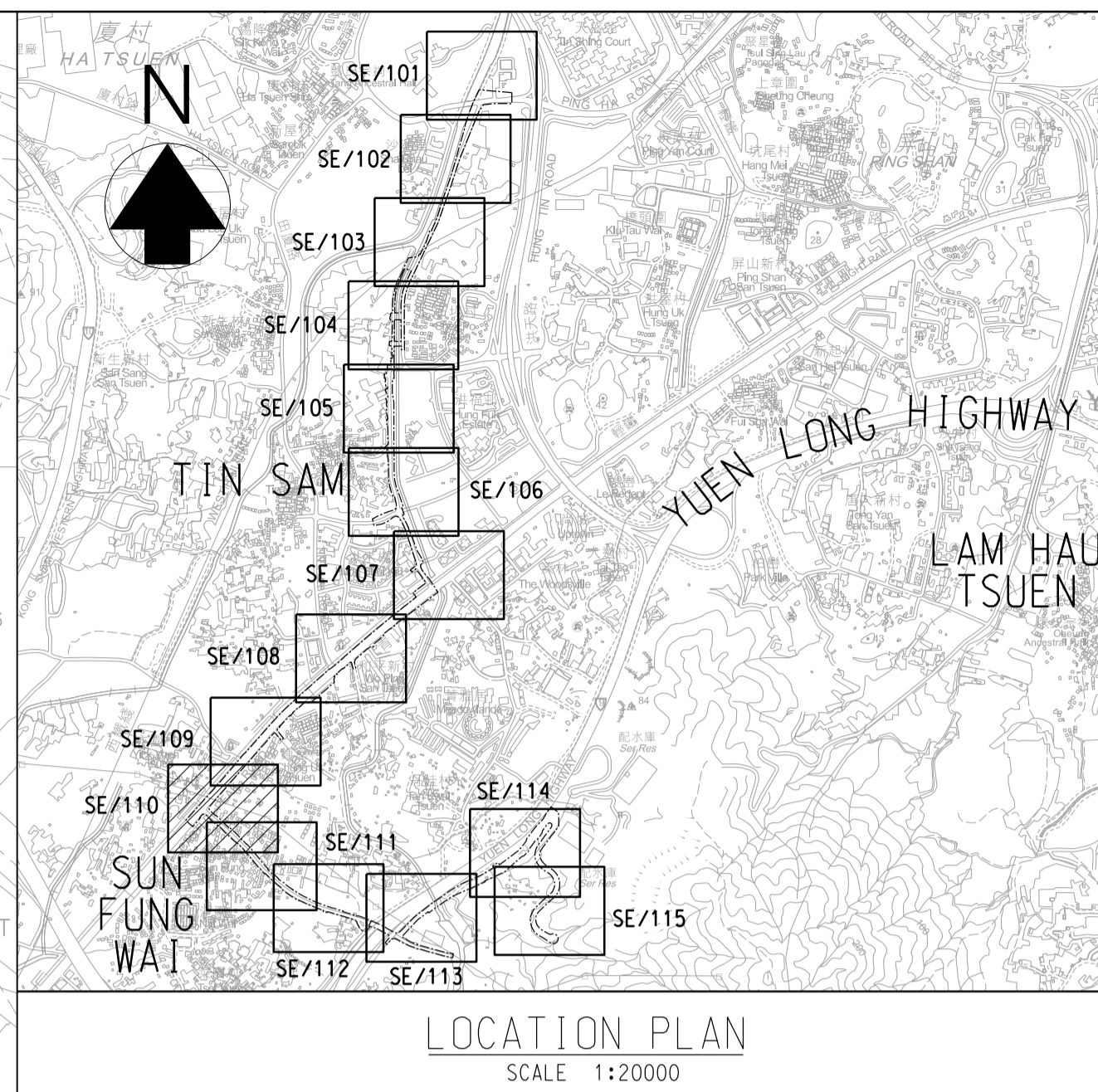
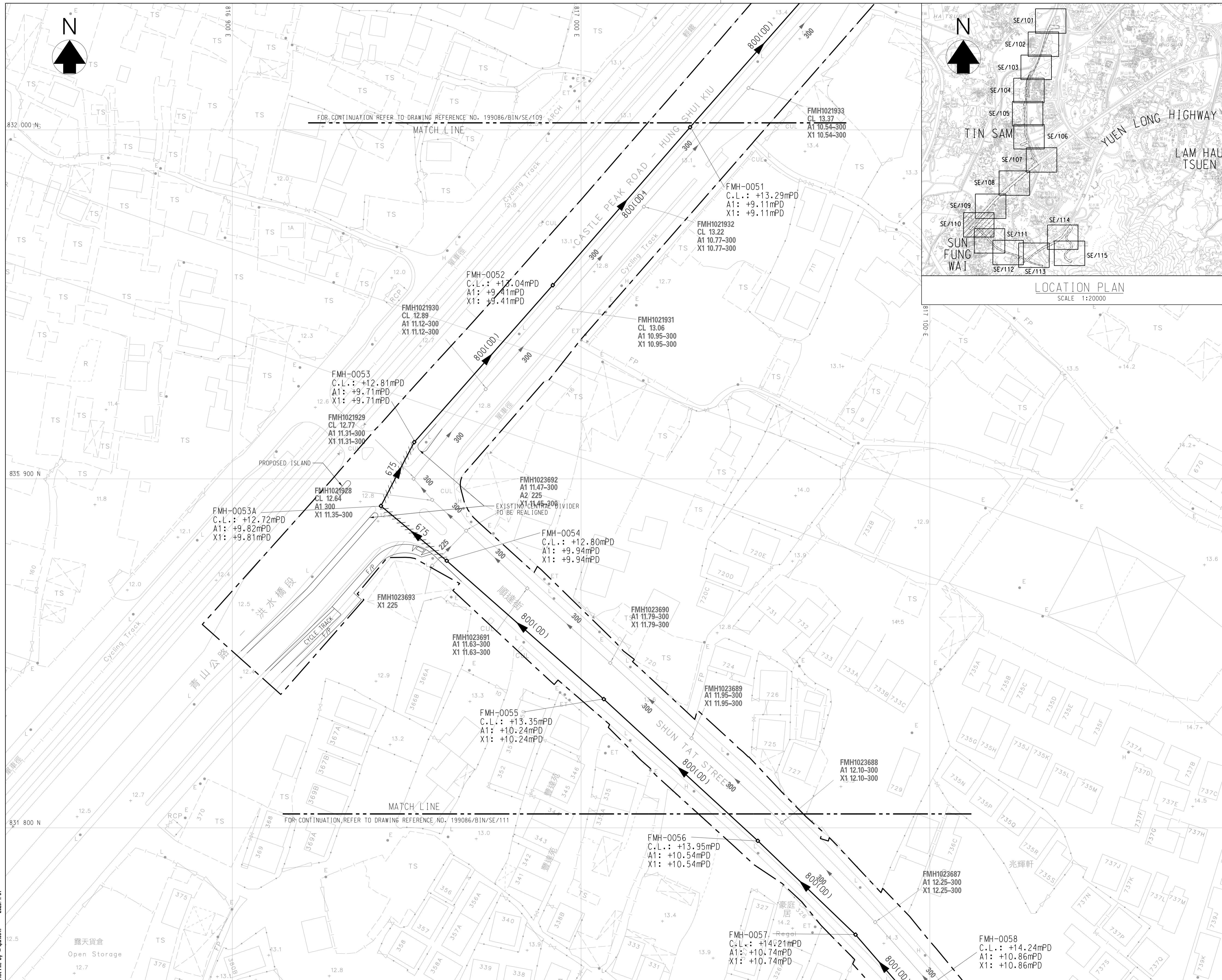
Drawing No. 199086/BIN/SE/109	Scale 1 : 500 (A1) 1 : 1000 (A3)
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**NOTES:**

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3. ALL LEVELS REFER TO PRINCIPAL DATUM AND IN METRES.
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**LEGEND:**

- LIMIT OF WORKS AREA
- PROPOSED SEWER
- PROPOSED SEWER MANHOLE
- EXISTING SEWER
- EXISTING SEWER MANHOLE
- PROPOSED SEWAGE PIPE CONSTRUCTED BY TRENCHLESS METHOD

Revision	Date	Description	Initial
Initial	Designed	Checked	Drawn
	TCL	WLC	SZ
Date	04/22	04/22	04/22
Approved			

Agreement no. CE 92/2017 (CE)

Title  
SITE FORMATION AND INFRASTRUCTURE WORKS FOR PUBLIC HOUSING DEVELOPMENT NEAR TAN KWAI TSUEN, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

Drawing Title  
GENERAL LAYOUT PLAN FOR SEWERAGE WORKS

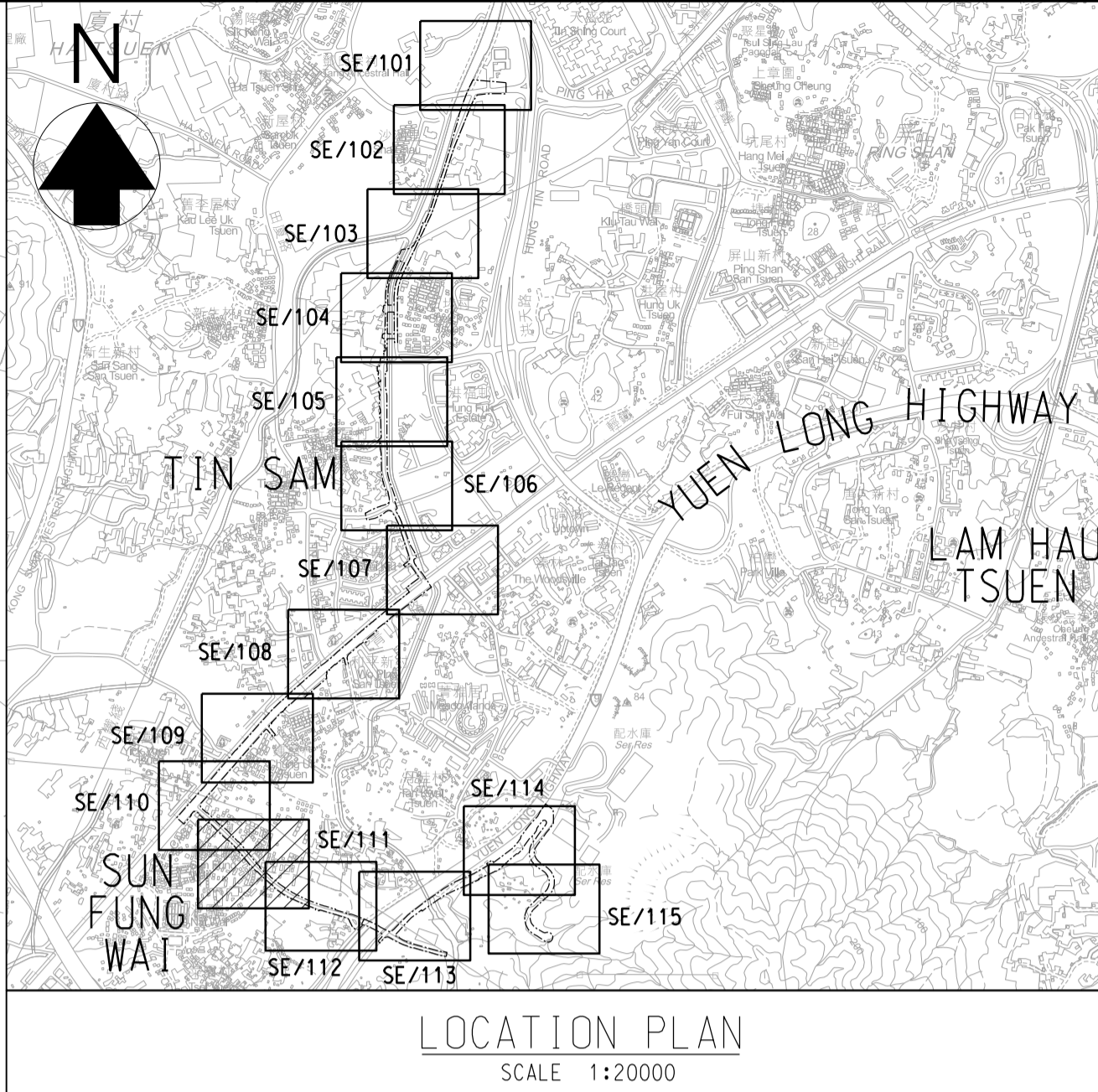
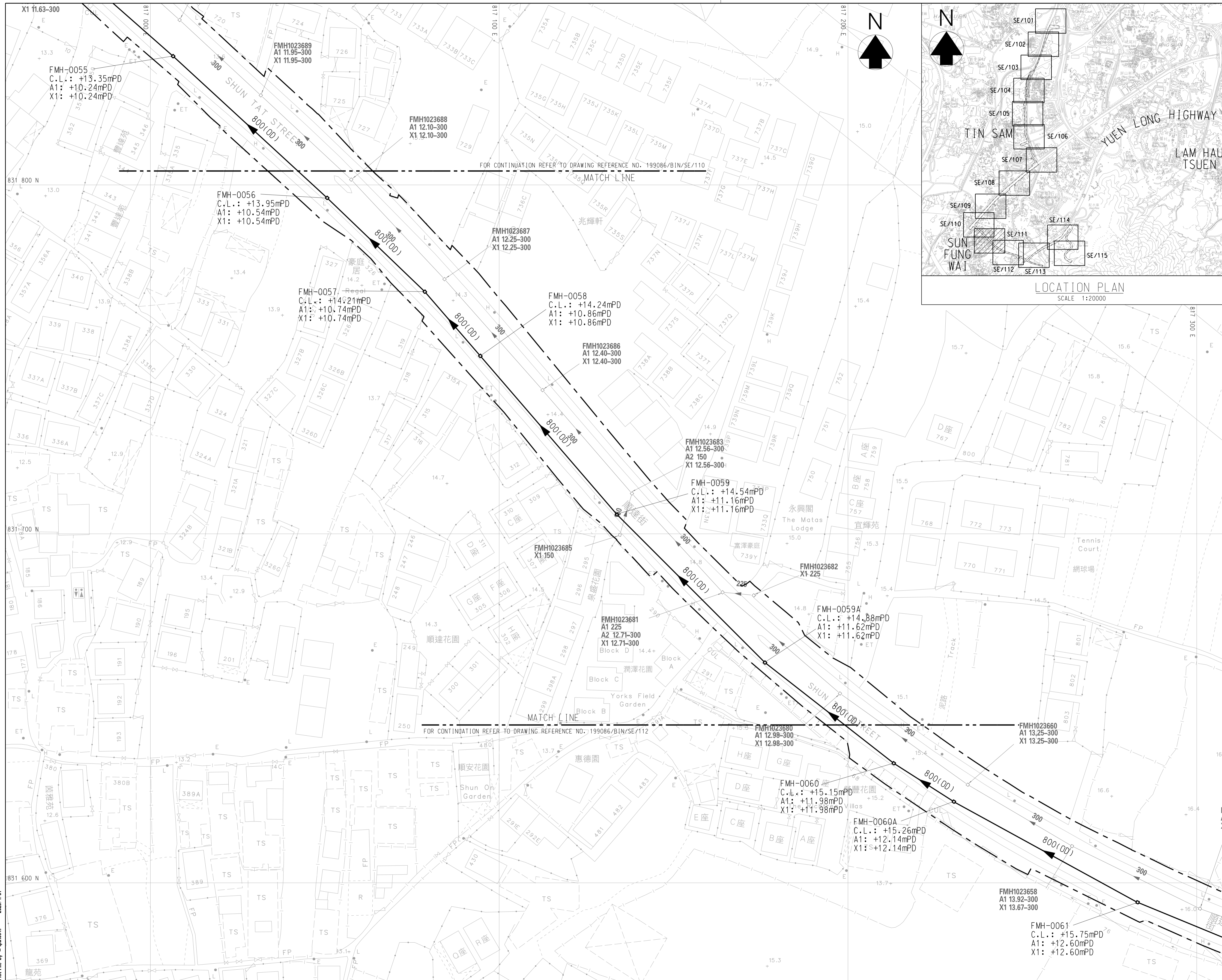
(SHEET 10 OF 15)  
Drawing No. 199086/BIN/SE/110  
Scale 1 : 500 (A1)  
1 : 1000 (A3)

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- NOTES:**
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  2. DIMENSIONS IN MILLIMETERS.
  3. ALL LEVELS REFER TO PRINCIPAL DATUM AND IN METRES.
  4. LOCATIONS OF PROPOSED SEWERAGE MANHOLES AND SEWERS ARE INDICATIVE ONLY. EXACT LOCATIONS SHALL BE AGREED WITH THE PROJECT MANAGER ON SITE.
  5. UNLESS OTHERWISE STATED ON THE DRAWINGS OR AS INSTRUCTED BY THE PROJECT MANAGER, ALL PROPOSED SEWERAGE WORKS ARE TO BE CONSTRUCTED BY OPEN TRENCH METHOD.

- LEGEND:**
- [Dashed line] LIMIT OF WORKS AREA
  - [Solid line with arrows] PROPOSED SEWER
  - [Square with dot] PROPOSED SEWER MANHOLE
  - [Line with arrow] EXISTING SEWER
  - [Square] EXISTING SEWER MANHOLE

Revision	Date	Description	Initial
Initial	Designed	Checked	Drawn
Initial	TCL	WLC	SZ
Date	04/22	04/22	04/22
Approved			

Agreement no. CE 92/2017 (CE)

Title  
SITE FORMATION AND INFRASTRUCTURE WORKS FOR PUBLIC HOUSING DEVELOPMENT NEAR TAN KWAI TSUEN, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

Drawing Title  
GENERAL LAYOUT PLAN FOR SEWERAGE WORKS

(SHEET 11 OF 15)  
Drawing No. 199086/BIN/SE/111  
Scale 1: 500 (A1)  
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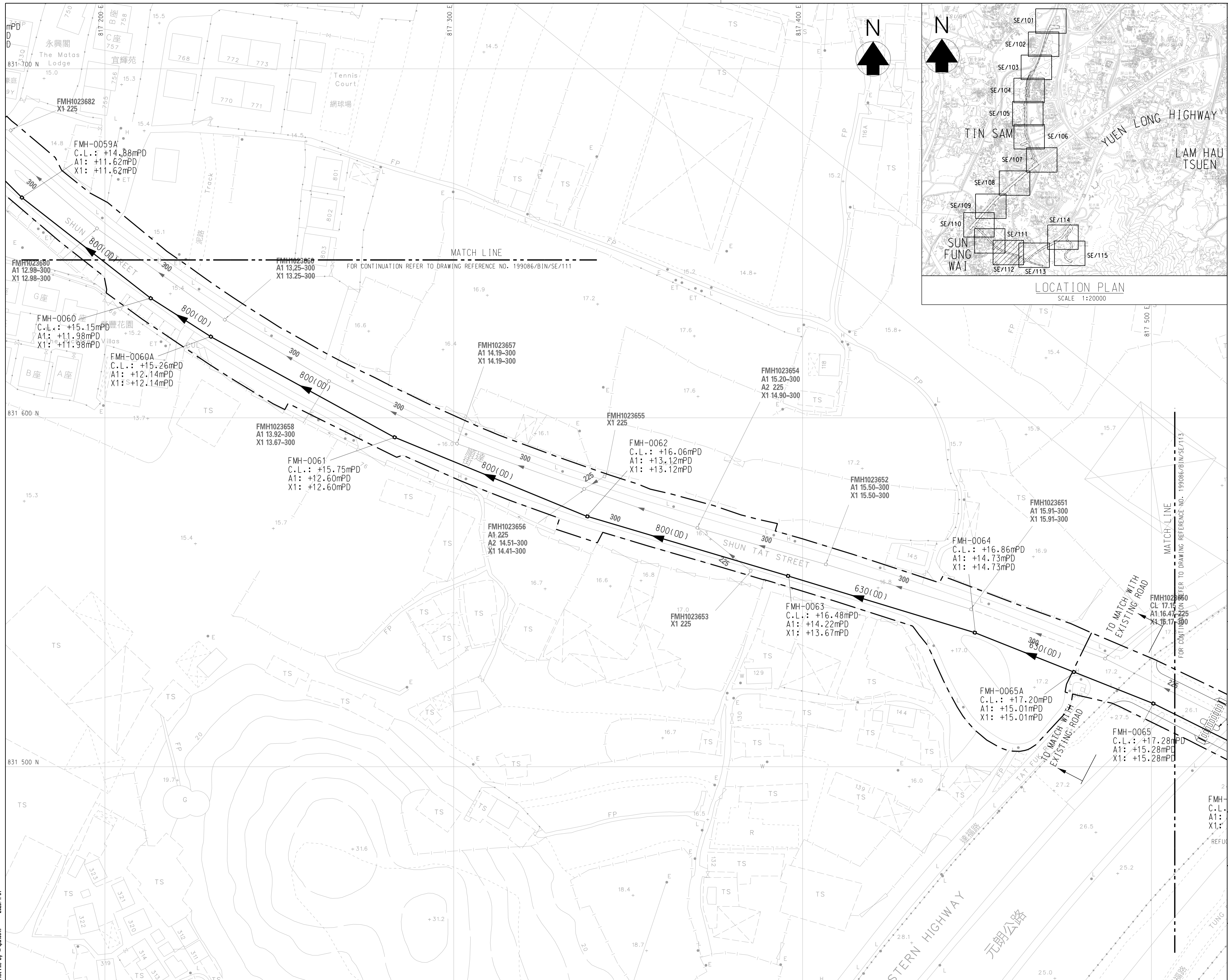
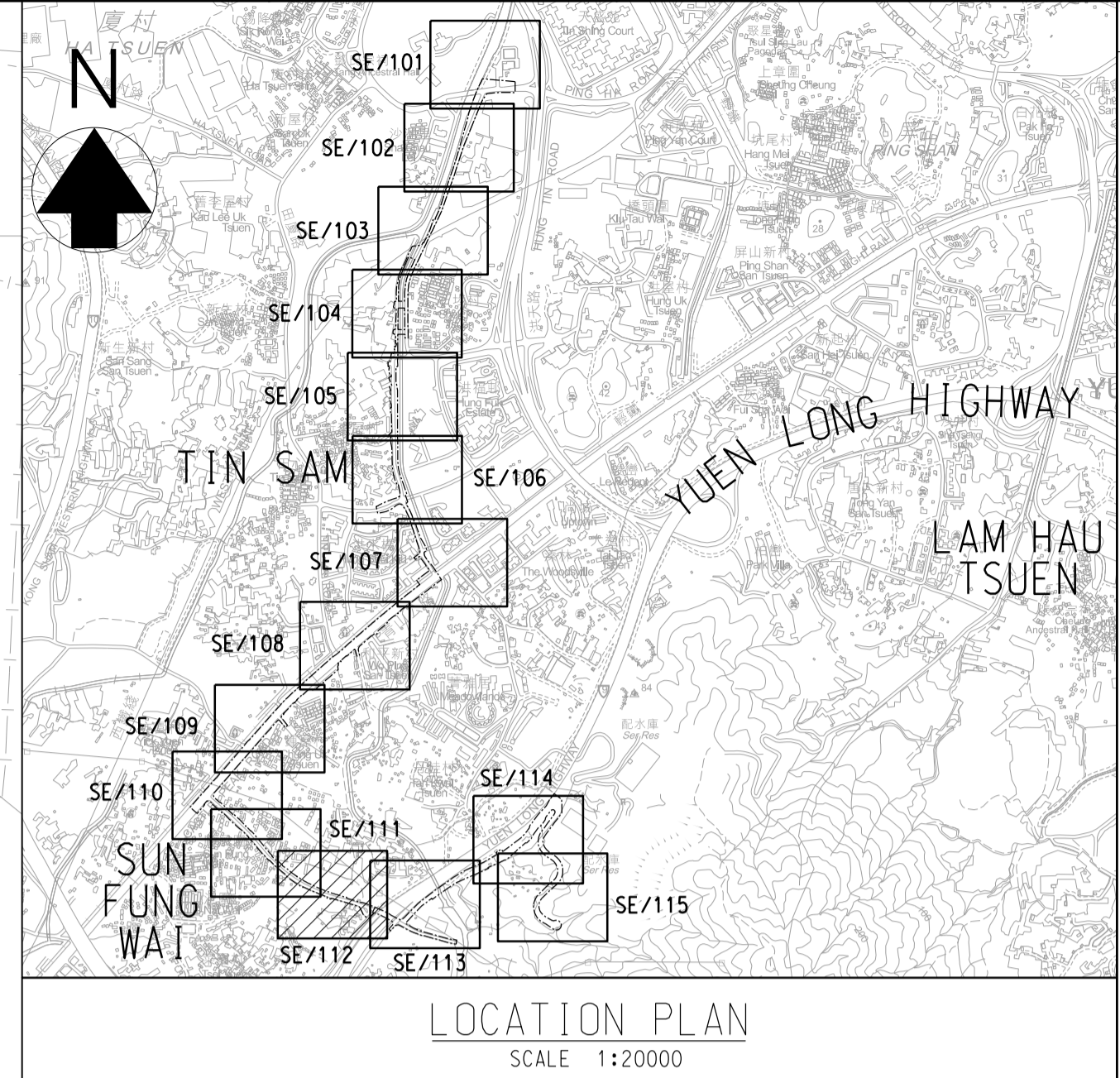


**NOTES:**

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**LEGEND:**

- LIMIT OF WORKS AREA
- PROPOSED SEWER
- PROPOSED SEWER MANHOLE
- EXISTING SEWER
- EXISTING SEWER MANHOLE
- PLANNED SEWER TO BE CONSTRUCTED UNDER SEPARATE CONTRACT
- PLANNED SEWER MANHOLE TO BE CONSTRUCTED UNDER SEPARATE CONTRACT



Revision	Date	Description	Initial
Initial	Designed	Checked	Drawn
Initial	TCL	WLC	SZ
Date	04/22	04/22	04/22

Approved	
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Agreement no.	CE 92/2017 (CE)
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Title  
 SITE FORMATION AND INFRASTRUCTURE WORKS FOR PUBLIC HOUSING DEVELOPMENT NEAR TAN KWAI TSUEN, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

Drawing Title  
 GENERAL LAYOUT PLAN FOR SEWERAGE WORKS

Drawing No.	199086/BIN/SE/112
Scale	1 : 500 (A1) 1 : 1000 (A3)

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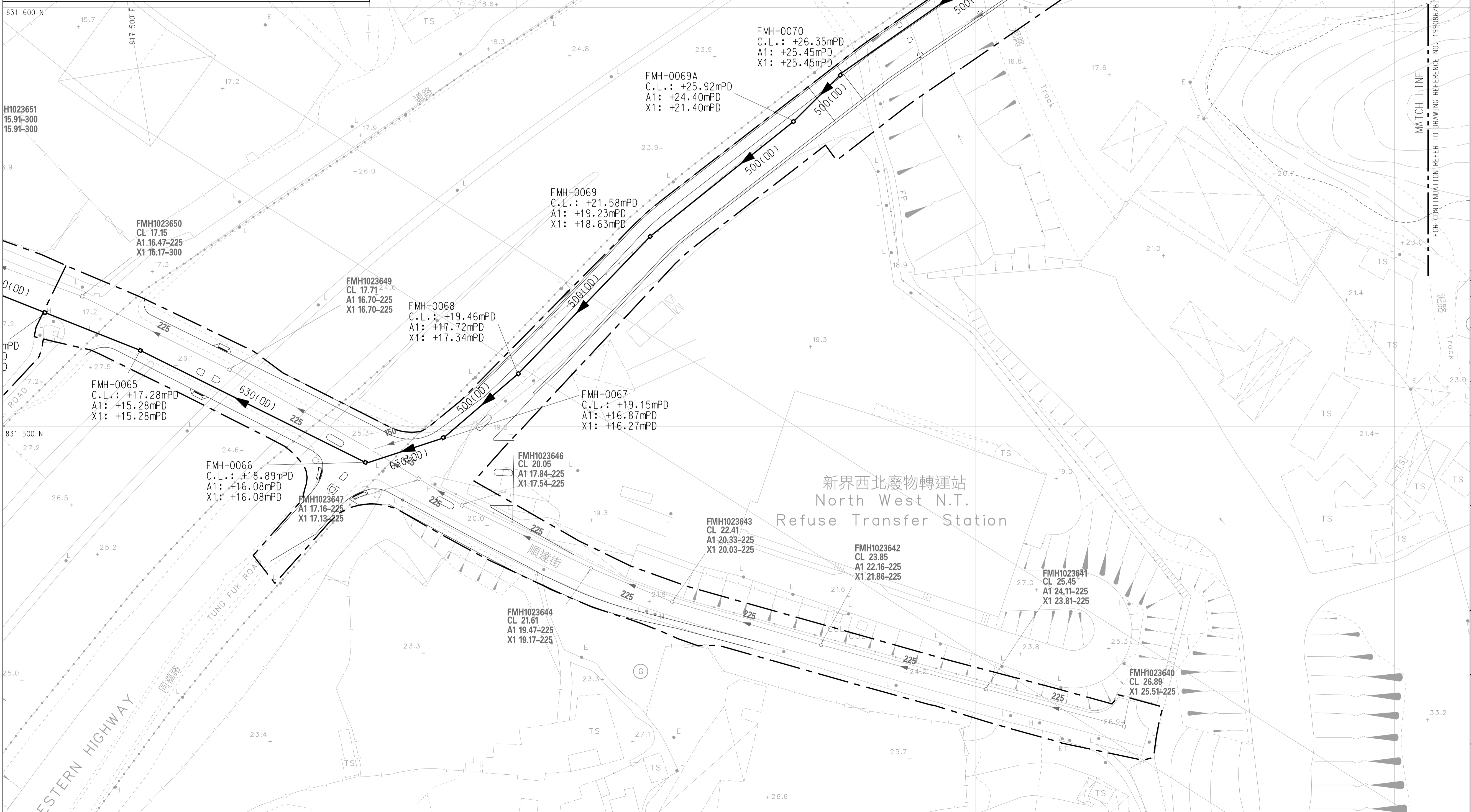
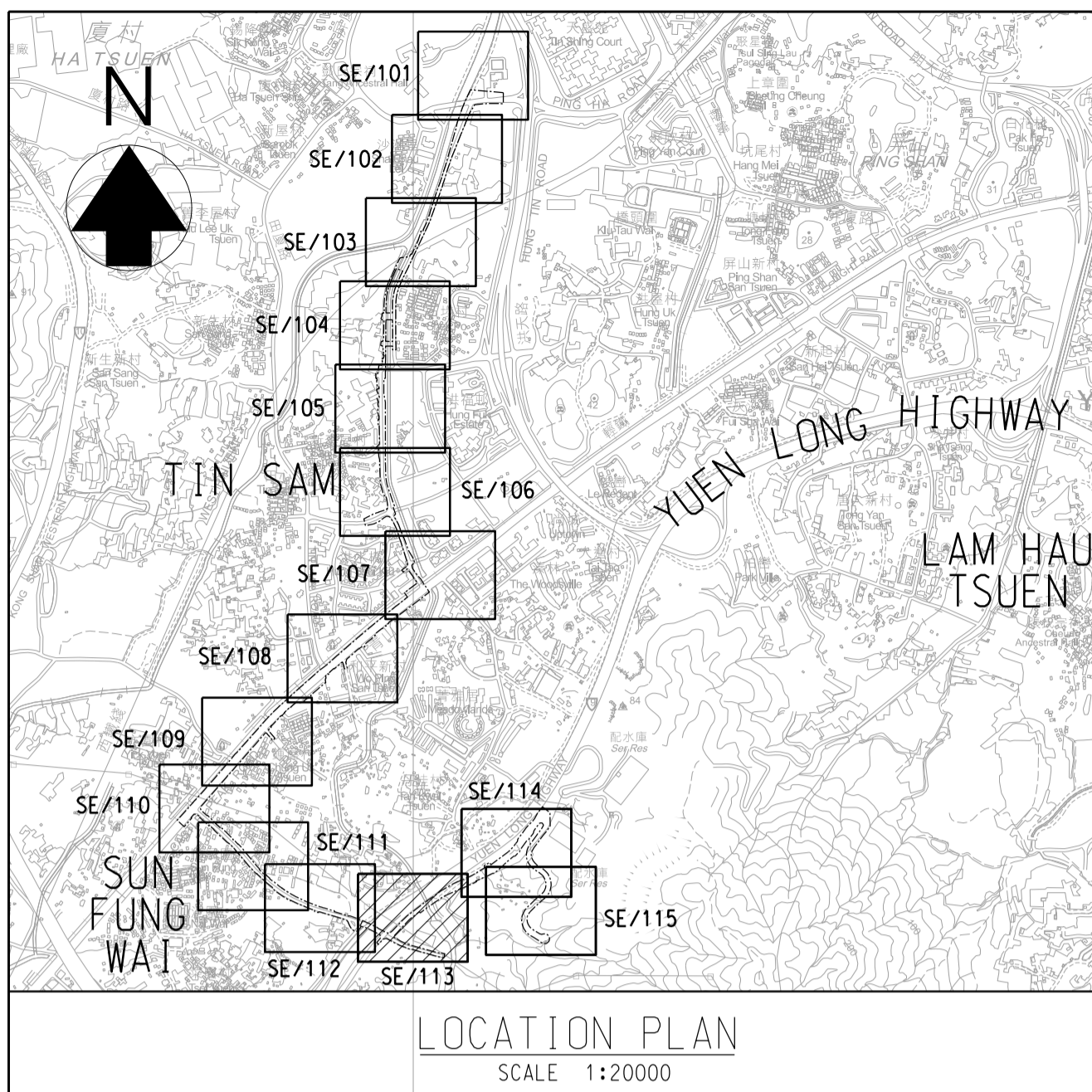


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**LEGEND:**

- LIMIT OF WORKS AREA
- PROPOSED SEWER
- PROPOSED SEWER MANHOLE
- EXISTING SEWER
- EXISTING SEWER MANHOLE
- PLANNED SEWER TO BE CONSTRUCTED UNDER SEPARATE CONTRACT



Revision	Date	Description	Initial
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Drawing Title: GENERAL LAYOUT PLAN FOR SEWERAGE WORKS

(SHEET 13 OF 15)	
Drawing No. 199086/BIN/SE/113	Scale 1: 500 (A1) 1: 1000 (A3)

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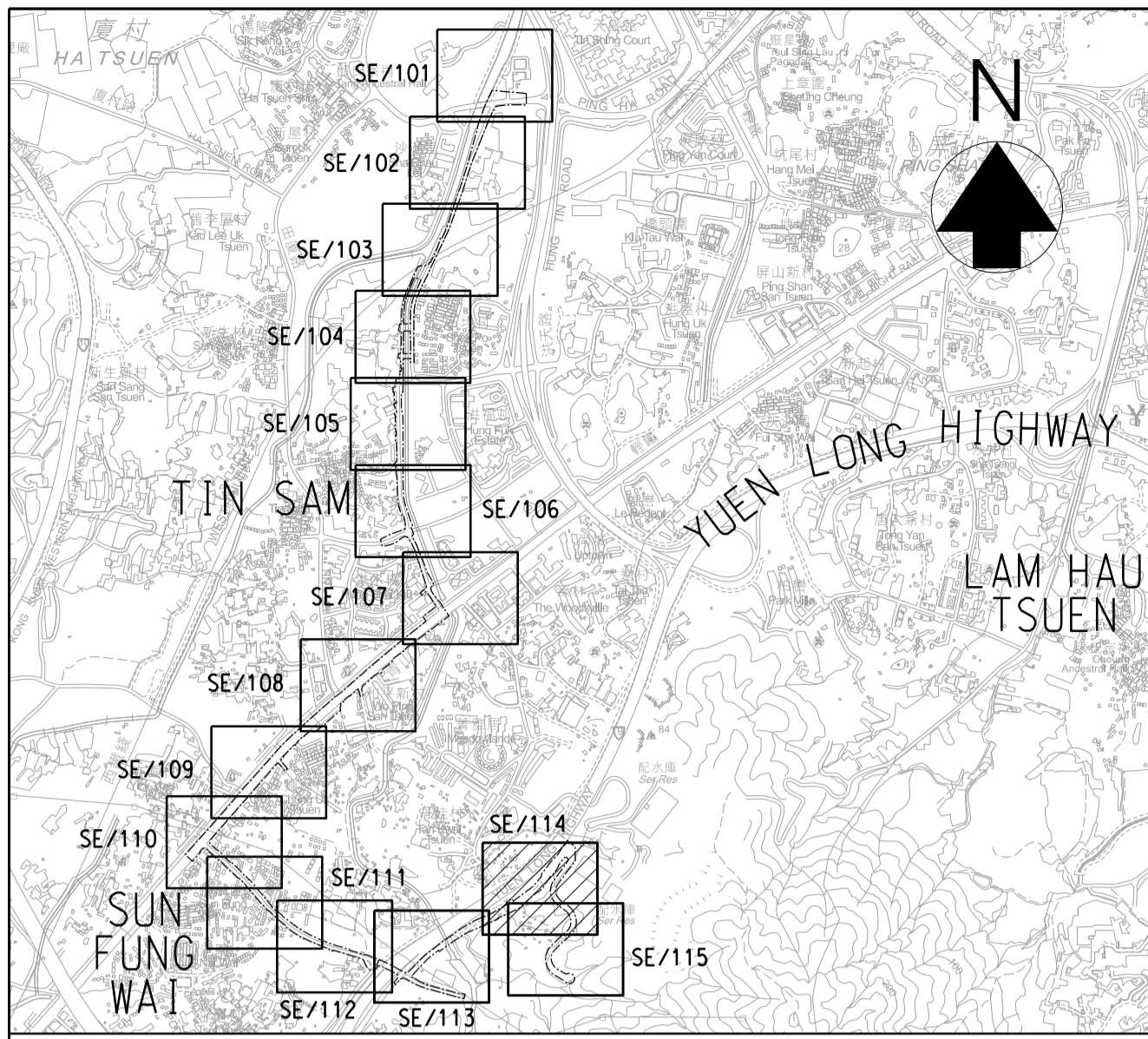


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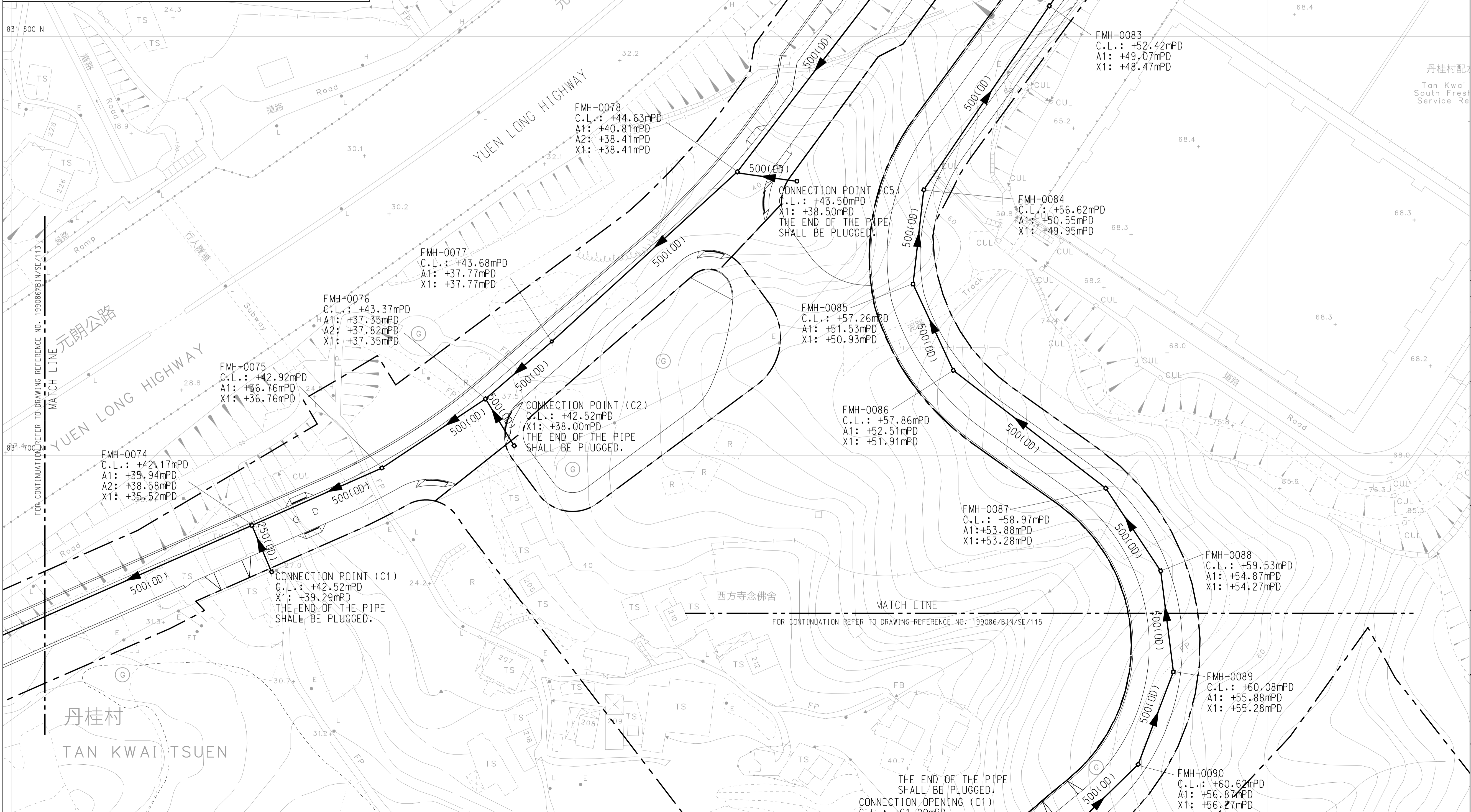
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**LEGEND:**

- LIMIT OF WORKS AREA
- HA SITE BOUNDARY
- PROPOSED SEWER
- PROPOSED SEWER MANHOLE
- EXISTING SEWER
- EXISTING SEWER MANHOLE



LOCATION PLAN  
SCALE 1:20000



Revision	Date	Description	Initial
Initial	Designed	Checked	Drawn
Initial	TCL	WLC	SZ
Date	04/22	04/22	04/22
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Title  
SITE FORMATION AND INFRASTRUCTURE WORKS FOR PUBLIC HOUSING DEVELOPMENT NEAR TAN KWAI TSUEN, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

Drawing Title  
GENERAL LAYOUT PLAN FOR SEWERAGE WORKS

(SHEET 14 OF 15)  
Drawing No. 199086/BIN/SE/114  
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LEGEND:

- [Dashed Line] LIMIT OF WORKS AREA
- [Dotted Line] HA SITE BOUNDARY
- [Solid Line] PROPOSED SEWER
- [Square with 'X'] PROPOSED SEWER MANHOLE
- [Dashed Line with Arrow] EXISTING SEWER
- [Square] EXISTING SEWER MANHOLE

Revision	Date	Description			Initial	
		Designed	Checked	Drawn	Checked	
Initial		TCL	WLC	SZ	LCH	
Date	04/22	04/22	04/22	04/22	04/22	
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SITE FORMATION AND INFRASTRUCTURE WORKS FOR PUBLIC HOUSING DEVELOPMENT NEAR TAN KWAI TSUEN, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

Drawing Title  
GENERAL LAYOUT PLAN FOR SEWERAGE WORKS

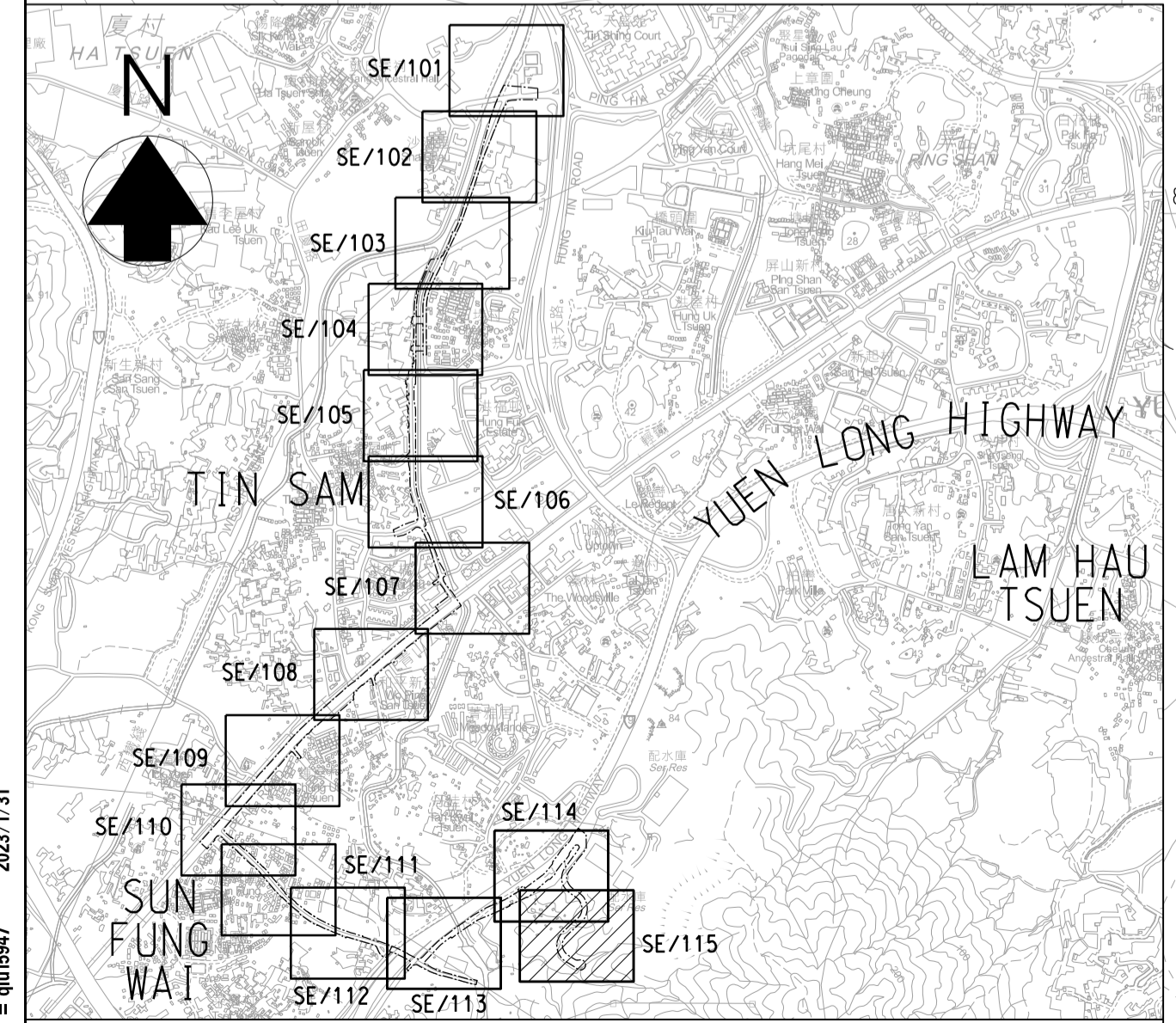
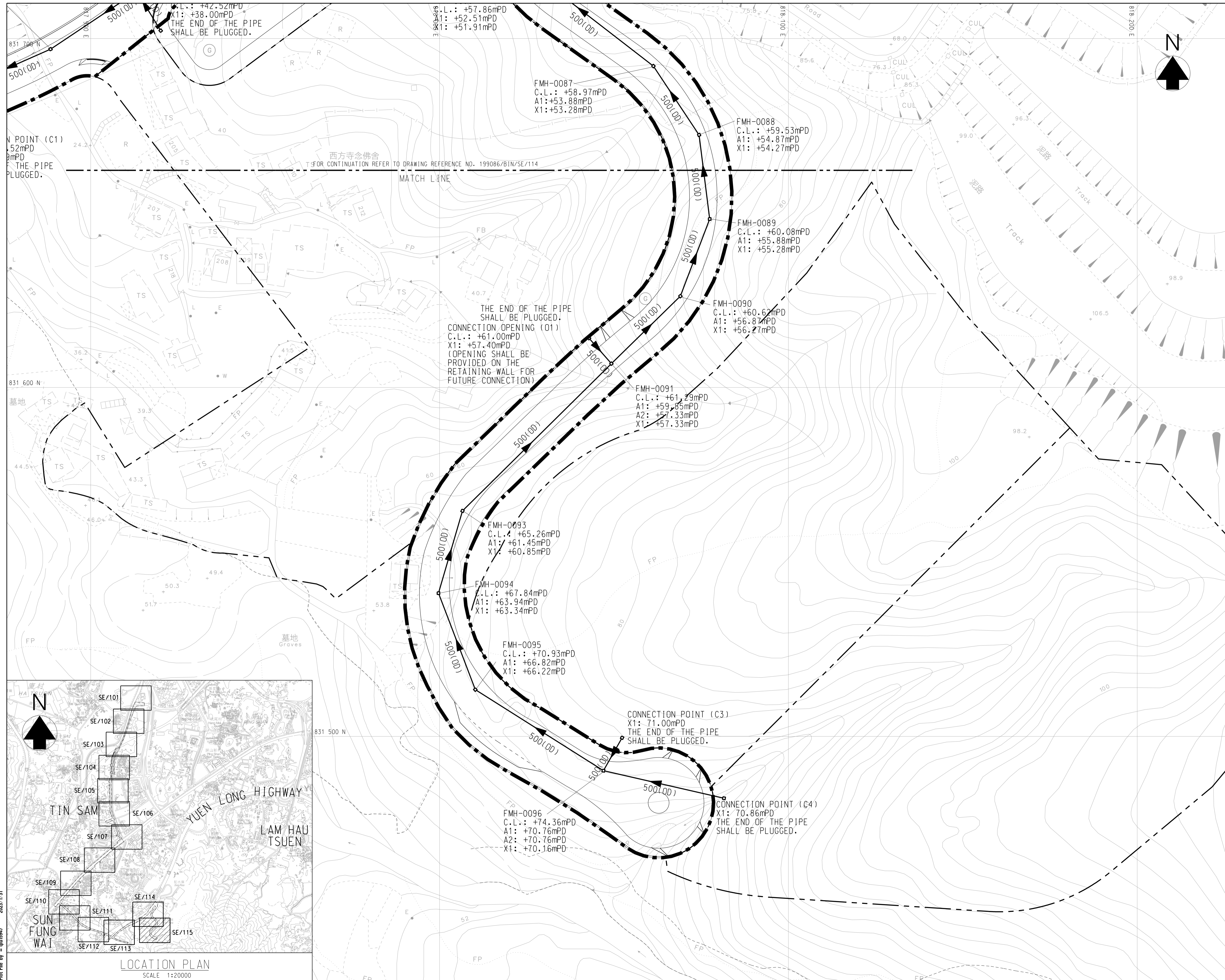
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Drawing No. 199086/BIN/SE/115

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## **APPENDIX A1**

# **Development Parameters and Estimation of ADWF**

Appendix A1 - Development Parameters and Estimation of ADWF

Housing Site Phase 1 to Connection Point (C4)					
GFA		Population		Recommended Unit Flow Factor	ADWF (m <sup>3</sup> /day)
Domestic					
Total No. of Flats (Phase 1)	1,970	No. of Population(1) (Phase 1)	5319	0.27	1436.1
Total site area (m2) (Phase 1)	14,151				
Non-domestic (Phase 1)					
GFA for Welfare Facilities (m2)	4,594	No. of Employees(2)	152	0.28	42.6
GFA for Retail Complex (m2)	0	No. of Employees(2)	0	0.28	0.0
GFA for Car Parking (m2)	13,860	-	-	-	-
GFA for Other Facilities (m2)	318	No. of Employees(2)	11	0.28	3.1
No. of Kindergarten (8 No. of classrooms)	1	No. of students(3)	240	0.04	9.6
		No. of teachers(4)	28	0.28	7.8
		<b>Total No. of Population</b>	<b>431</b>	<b>ADWF (Non-domestic)</b>	<b>63.1</b>
				<b>ADWF (Total)</b>	<b>1499.2</b>

Housing Site Phase 2 to Connection Point (C3)					
GFA		Population		Recommended Unit Flow Factor	ADWF (m <sup>3</sup> /day)
Domestic					
Total No. of Flats (Phase 2)	2,400	No. of Population(1) (Phase 2)	6480	0.27	1749.6
Total site area (m2) (Phase 2)	14,147				
Non-domestic (Phase 2)					
GFA for Welfare Facilities (m2)	4,598	No. of Employees(2)	152	0.28	42.6
GFA for Retail Complex (m2)	3,128	No. of Employees(2)	110	0.28	30.8
GFA for Car Parking (m2)	11,230	-	-	-	-
GFA for Other Facilities (m2)	710	No. of Employees(2)	24	0.28	6.7
No. of Kindergarten (7 No. of classrooms)	1	No. of students(3)	210	0.04	8.4
		No. of teachers(4)	25	0.28	7.0
		<b>Total No. of Population</b>	<b>521</b>	<b>ADWF (Non-domestic)</b>	<b>95.5</b>
				<b>ADWF (Total)</b>	<b>1845.1</b>

Housing Site Phase 3 to both Connection Points (O1) & (C5)					
GFA		Population		Recommended Unit Flow Factor	ADWF (m3/day)
Domestic					
Total No. of Flats (Phase 3)	3050	No. of Population(1) (Phase 3)	8235	0.27	2223.5
Total site area (m2) (Phase 3)	20,490				
Non-domestic (Phase 3)					
GFA for Welfare Facilities (m2)	6657	No. of Employees(2)	220	0.28	61.6
GFA for Retail Complex (m2)	2784	No. of Employees(2)	98	0.28	27.4
GFA for Car Parking (m2)	11760	-	-	-	-
GFA for Other Facilities (m2)	70	No. of Employees(2)	3	0.28	0.8
		<b>Total No. of Population</b>	<b>321</b>	<b>ADWF (Non-domestic)</b>	<b>89.9</b>
				<b>ADWF (Total)</b>	<b>2313.3</b>

Note: For conservative purpose, all ADWF is designed to discharge to the upstream Connection Point (O1) in the hydraulic calculation.

Primary School Site to Connection Point (C1)					
GFA		Population		Recommended Unit Flow Factor	ADWF (m3/day)
Primary School					
No. of classrooms	30	No. of students(3)	765	0.04	30.6
		No. of teachers(4)	56	0.28	15.7
Total GFA (m2)	6200	<b>Total No. of Population</b>	<b>821</b>	<b>Total ADWF</b>	<b>46.3</b>

PTI to Connection Point (C2)					
GFA		Population		Recommended Unit Flow Factor	ADWF (m3/day)
PTI					
GFA for PTI (m2)	6340	No. of employee	30	0.18	5.4
Total GFA (m2)	6340	<b>Total No. of Population</b>	<b>30</b>	<b>Total ADWF</b>	<b>5.4</b>

# **APPENDIX A2**

## **DESIGN OF PROPOSED NEW SEWERS**





## Appendix A2 - Design of Proposed Sewers

### Assumption

1.) 10% of the pipe cross section area is allowed for siltation

### Reference

1.) Colebrook-White's equation is adopted for full-bore pipe velocity calculation

Sewerage Pipe	D	IL1	IL2	L	S = L / (IL1 - IL2)	Hydraulic Radius (m)	Ks (PE in poor condition) (mm)	Tan Kwai Tsuen			Ping Shan South			Lam Tei North			Downstream Peak Flow (m³/s)	Vc = $-(\sqrt{8gD/S}) \cdot \log[Ks/(3.7D) + 2.51v/(D \cdot 2gD/S)]$ (m/s)	Qc = $pD^{2/4} \cdot Vc$ (m³/s)	90% Full bore Capacity, Qc (m³/s)	Pipe Utilisation	Pipe Capacity Check
								Q (m³/day)	P = Qd / 0.27	p	Q (m³/day)	P = Qd / 0.27	p	Q (m³/day)	P = Qd / 0.27	p						
FMH-0064 to FMH-0063	525	14.73	14.22	55.68	110	0.13	0.60	5709.3	21,146	3					0.198	2.135	0.462	0.416	48%	OK		
FMH-0065A to FMH-0064	525	15.01	14.73	28.32	100	0.13	0.60	5709.3	21,146	3					0.198	2.240	0.485	0.436	45%	OK		
FMH-0065 to FMH-0065A	525	15.28	15.01	26.75	100	0.13	0.60	5709.3	21,146	3					0.198	2.240	0.485	0.436	45%	OK		
FMH-0066 to FMH-0065	525	16.08	15.28	60.00	75	0.13	0.60	5709.3	21,146	3					0.198	2.589	0.560	0.504	39%	OK		
FMH-0067 to FMH-0066	525	16.27	16.08	19.28	100	0.13	0.60	5709.3	21,146	3					0.198	2.240	0.485	0.436	45%	OK		
FMH-0068 to FMH-0067	450	17.34	16.87	23.55	50	0.11	0.60	5709.3	21,146	3					0.198	2.881	0.458	0.412	48%	OK		
FMH-0069 to FMH-0068	450	18.63	17.72	45.43	50	0.11	0.60	5709.3	21,146	3					0.198	2.881	0.458	0.412	48%	OK		
FMH-0069A to FMH-0069	450	21.40	19.23	43.49	20	0.11	0.60	5709.3	21,146	3					0.198	4.562	0.726	0.653	30%	OK		
FMH-0070 to FMH-0069A	450	25.45	24.40	15.73	15	0.11	0.60	5709.3	21,146	3					0.198	5.270	0.838	0.754	26%	OK		
FMH-0071 to FMH-0070	450	29.72	25.45	53.40	13	0.11	0.60	5709.3	21,146	3					0.198	5.774	0.918	0.827	24%	OK		
FMH-0072 to FMH-0071	450	32.29	29.72	51.39	20	0.11	0.60	5709.3	21,146	3					0.198	4.562	0.726	0.653	30%	OK		
FMH-0073 to FMH-0072	450	33.72	32.89	41.34	50	0.11	0.60	5709.3	21,146	3					0.198	2.881	0.458	0.412	48%	OK		
FMH-0074 to FMH-0073	450	35.52	34.32	60.00	50	0.11	0.60	5709.3	21,146	3					0.198	2.881	0.458	0.412	48%	OK		
FMH-0075 to FMH-0074	450	36.76	35.94	40.80	50	0.11	0.60	5663.0	20,974	3					0.197	2.881	0.458	0.412	48%	OK		
C1 to FMH-0074	225	39.29	38.58	14.16	20	0.06	0.60	46.3	171	5					0.003	2.939	0.117	0.105	3%	OK		
FMH-0076 to FMH-0075	450	37.35	36.76	29.71	50	0.11	0.60	5663.0	20,974	3					0.197	2.881	0.458	0.412	48%	OK		
FMH-0077 to FMH-0076	450	37.77	37.35	20.99	50	0.11	0.60	5657.6	20,954	3					0.196	2.881	0.458	0.412	48%	OK		
C2 to FMH-0076	450	38.00	37.82	15.89	90	0.11	0.60	5.4	20	5					0.000	2.144	0.341	0.307	0%	OK		
FMH-0078 to FMH-0077	450	38.41	37.77	60.00	94	0.11	0.60	5657.6	20,954	3					0.196	2.097	0.334	0.300	65%	OK		
FMH-0079 to FMH-0078	450	41.72	40.81	60.00	66	0.11	0.60	5657.6	20,954	3					0.196	2.506	0.398	0.359	55%	OK		
C5 to FMH-0078	450	38.50	38.41	13.75	150	0.11	0.60	5657.6	20,954	3					0.196	1.658	0.264	0.237	83%	OK		
FMH-0080 to FMH-0079	450	45.40	44.40	60.00	60	0.11	0.60	5657.6	20,954	3					0.196	2.629	0.418	0.376	52%	OK		
FMH-0081 to FMH-0080	450	46.52	46.00	30.77	60	0.11	0.60	5657.6	20,954	3					0.196	2.629	0.418	0.376	52%	OK		
FMH-0082 to FMH-0081	450	47.26	47.12	8.68	60	0.11	0.60	5657.6	20,954	3					0.196	2.629	0.418	0.376	52%	OK		
FMH-0083 to FMH-0082	450	48.47	47.86	36.28	60	0.11	0.60	5657.6	20,954	3					0.196	2.629	0.418	0.376	52%	OK		
FMH-0084 to FMH-0083	450	49.95	49.07	53.18	60	0.11	0.60	5657.6	20,954	3					0.196	2.629	0.418	0.376	52%	OK		
FMH-0085 to FMH-0084	450	50.93	50.55	22.66	60	0.11	0.60	5657.6	20,954	3					0.196	2.629	0.418	0.376	52%	OK		
FMH-0086 to FMH-0085	450	51.91	51.53	22.75	60	0.11	0.60	5657.6	20,954	3					0.196	2.629	0.418	0.376	52%	OK		
FMH-0087 to FMH-0086	450	53.28	52.51	46.01	60	0.11	0.60	5657.6	20,954	3					0.196	2.629	0.418	0.376	52%	OK		
FMH-0088 to FMH-0087	450	54.27	53.88	23.68	60	0.11	0.60	5657.6	20,954	3					0.196	2.629	0.418	0.376	52%	OK		
FMH-0089 to FMH-0088	450	55.28	54.87	24.29	60	0.11	0.60	5657.6	20,954	3					0.196	2.629	0.418	0.376	52%	OK		
FMH-0090 to FMH-0089	450	56.27	55.88	23.65	60	0.11	0.60	5657.6	20,954	3					0.196	2.629	0.418	0.376	52%	OK		
FMH-0091 to FMH-0090	450	57.33	56.87	27.67	60	0.11	0.60	5657.6	20,954	3					0.196	2.629	0.418	0.376	52%	OK		
FMH-0093 to FMH-0091	450	60.85	59.85	60.00	60	0.11	0.60	3344.3	12,386	3					0.116	2.629	0.418	0.376	31%	OK		
O1 to FMH-0091	450	57.40	57.33	10.99	150	0.11	0.60	2313.3	8,568	4					0.107	1.658	0.264	0.237	45%	OK		
FMH-0094 to FMH-0093	450	63.34	61.45	24.57	13	0.11	0.60	3344.3	12,386	3					0.116	5.662	0.900	0.810	14%	OK		
FMH-0095 to FMH-0094	450	66.22	63.94	29.60	13	0.11	0.60	3344.3	12,386	3					0.116	5.662	0.900	0.810	14%	OK		
FMH-0096 to FMH-0095	450	70.16	66.82	43.46	13	0.11	0.60	3344.3	12,386	3					0.116	5.662	0.900	0.810	14%	OK		
C3 to FMH-0096	450	71.00	70.76	35.46	150	0.11	0.60	1845.1	6,834	4					0.085	1.658	0.264	0.237	36%	OK		
C4 to FMH-0096	450	70.86	70.76	10.84	110	0.11	0.60	1499.2	5,553	4					0.069	1.938	0.308	0.277	25%	OK		