Appendix B

Revised Water Supply Impact Assessment

Hong Kong International Innovation and Technology Hub Limited

S12A Planning Application for Proposed Innovation and Technology Hub at Various Lots in D.D. 82 and D.D. 86 and Adjoining Government Land, Man Kam To, New Territories

Water Supply Impact Assessment

Final | Feb 2025

Job number

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Contents

Appendices

1 Introduction

1.1 Background

1.1.1 The Applicant proposes amendments to the Approved Man Kam To Outline Zoning Plan No. S/NE-MKT/4 ("the OZP") by rezoning the Application Site from "Agriculture" ("AGR"), "Green Belt" ("GB") and "Government, Institution or Community" ("G/IC") to a tailor-made "Other Specified Uses" ("OU") annotated "Innovation and Technology Hub", with a maximum non-domestic gross floor area (GFA) of 365,180 m^2 and a maximum domestic GFA of 170,400 m^2 (including dormitory) and maximum building heights (BH) of 80, 90, 110 and 120 meters above principal datum (mPD) for four sub-areas respectively, to facilitate the development of the proposed Innovation and Technology (I&T) Hub.

1.1.2 Currently, the Application Site is largely vacant with vegetation and inactive farmland, and covers a portion of the access road from Lin Ma Hang Road leading to the existing River Ganges Pumping Station.

1.1.3 The Application Site, with a site area of about 125,863 m2, is located at Man Kam To in the North District. It is on a gentle sloping from site level of about 6mPD near Ping Yuen River to 25mPD near the eastern foot of Lo Shue Ling. The Application Site includes the Development Site (of an area about 102,461 m2) and remaining land parcels adjoining the development site for better rationalisation of boundary and land use zoning.

1.2 Purpose of this Report

1.2.1 The purpose of the Water Supply Impact Assessment (WSIA) Report is to:

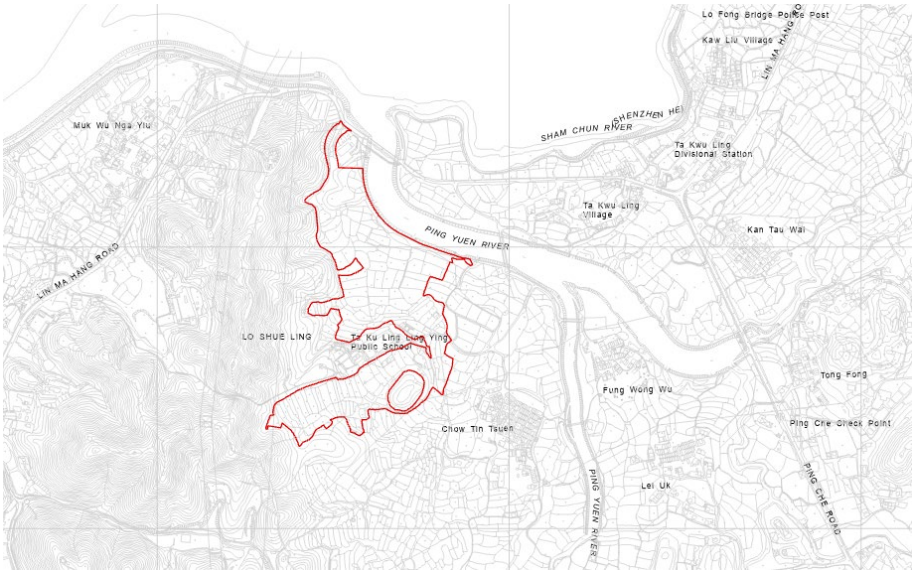
- Assess the potential impact of the proposed development on the existing water mains and installations maintained by WSD; and
- Provide recommendations for mitigation measures and other improvement works where necessary to address the potential impact identified.

2 Project Description

2.1 Site Area

2.1.1 The Development Site is located in Man Kam To, New Territory, bounded by Ping Yuen River to the northeast, Lo Shue Ling to the west and Chow Tin Tsuen to the east. There is an existing public school surrounded by the site, as shown in **Figure 2.1**. In the vicinity of the Site there are mainly scattered village houses and agricultural land. A master layout plan of the Indicative Scheme in the Development Site is enclosed in **Appendix A**.

Figure 2.1: Location Plan of the Development Site



2.1.2 The current zoning of the Site is "AGR", "GB", and "G/IC" under the approved Man Kam To Outline Zoning Plan (OZP) No. S/NE-MKT/4. The total area of the Development Site is approximately 102,461 m^2, and the total area of the Application Site is 125,863 m^2.

2.2 Development Parameters

2.2.1 The development parameters of the Indicative Scheme are presented in **Table 2.1**:

Table 2.1: Key Development Parameters Table

	Indicative Scheme
Application Site Area (1)	About 125,863 m^2
Development Site Area	About 102,461 m^2
Total Plot Ratio (2)	5.23
- Non-Domestic PR	3.57
- Domestic PR	1.66
Total Gross Floor Area	535,580 m^2
- **Non-Domestic GFA**	365,180 m^2

		Indicative Scheme
• *R&D Centre*		*268,780 m^2*
• *Data Centre*		*86,400 m^2*
• *Commercial Centre*		*9,276 m^2*
• *Kindergarten* [3]		*724 m^2*
• **Domestic GFA**		170,400 m^2
• *Ancillary Dormitories*		*63,900 m^2*
• *Other Residential Uses*		*106,500 m^2*
• **Clubhouse GFA** [4]		3,500 m^2
Building Height		
• *R&D Centre*	Building Height	83m
	mPD	90mPD
	No. of Storeys [5]	16
• *Data Centre*	Building Height	73m
	mPD	80mPD
	No. of Storeys [5]	12
• *Commercial Centre*	Building Height	30m
	mPD	37mPD
	No. of Storeys [5]	6
• *Ancillary Dormitories*	Building Height	99-102.15m
	mPD	110mPD
	No. of Storeys [6]	30-31
• *Other Residential Uses*	Building Height	99-105.3m
	mPD	120mPD
	No. of Storeys [6]	30-32
Anticipated No. of Working Population		6,207
• *R&D Centre* [7]		*5,375*
• *Data Centre* [8]		*432*
• *Commercial* [9]		*400*
No. of Units		3,712
• *Ancillary Dormitories*		*1,392*
• *Other Residential uses*		*2,320*
Average Flat Size [10]		35.5 m^2
Anticipated Population [11]		10,022
• *No. of Tenants of Ancillary Dormitories*		*3,758*
• *No. of Population of Other Residential Uses*		*6,264*
Local Open Space		Not less than 13,126 m^2
• For *Workers*		*Not less than 3,104 m^2*
• For *Residents*		*Not less than 10,022 m^2*
Target Completion Year		2028

Remarks:
[1] Application Site includes the Development Site and remaining land parcels adjoining the Development Site for better rationalisation of boundary and land use zoning.
[2] PR calculations are based on the area of Development Site. May not add up due to rounding.
[3] The kindergarten with 6-classroom of about 724m^2 GFA fulfils the minimum floor space requirement specified in the EBD's Operation Manual for Pre-primary Institute. Indicative only, subject to detailed design.

(4) According to APP-104, a maximum area of 3,500m^2 can be applied for GFA concession for a development with domestic GFA of >100,000m^2 to 125,000m^2. The clubhouse GFA (intended for use by residents of Other Residential Uses) is proposed to be exempted from GFA calculation.
(5) The no. of storeys excludes basement carparks.
(6) The no. of storeys excludes 1-storey lobby and basement carparks.
(7) An assumption of 50m^2 per worker is assumed for R&D Centre, with reference to Employment Density Guide (3rd Ed.) in the UK.
(8) An assumption of 200m^2 per worker is assumed for Data Centre, with reference to Employment Density Guide (3rd Ed.) in the UK.
(9) An assumption of 25m^2 per worker is assumed for commercial uses (retail, F&B), with reference to HKPSG Chapter 5.
(10) Average flat size is assumed as 35.5m^2 which has excluded area required for corridor, lift shaft, lobby, staircase, etc.
(11) A person per flat (PFF) ratio of 2.7 is assumed, according to the average household size of the Territory and North District in 2021 Census.

3 Water Supply Impact Assessment

3.1 Methodology and Design Criteria

Methodology

3.1.1 The following approach is adopted in carrying out the Water Supply Impact Assessment.

- Identify the scope of the development;
- Determine the water demand of the development;
- Identify the existing water supply system within and in the vicinity of the proposed development boundary;
- Examine the impact arising from new water demand from the proposed development on the existing source of supply and the system capacity; and
- Identify improvement and upgrading works.

Design Criteria

Unit Demands

3.1.2 The water demand for the proposed development has been estimated generally based on unit water demand in WSD's Departmental Instruction (DI) 1309 and the latest WSD planning standards.

3.1.3 The unit demands for some of the land uses used in the estimation of the freshwater and flushing water demands are obtained from EPD's "Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning" (GESF).

3.1.4 The following unit demands presented in **Table 3.1** below have been adopted for estimating the fresh and flushing water demands for the Proposed Development.

Table 3.1 Unit Water Demands

Development Type	Fresh Water	Flushing Water	Unit
R1[1]	230	104	litre/person/day
Service Trade[2]	40	/	litre/person/day
Commercial Employee	30	50	litre/employee/day
Schools[3]	25	25	litre/person/day

[1] Reference is made to WSD comments.
[2] Reference is made to WSD comments.
[3] Reference is made to WSD DI No.1309 Table 1.

Development Type	Fresh Water	Flushing Water	Unit
Irrigation[4]	7	/	litre/m^2/day

Water Treatment Works (WTW):

3.1.5 1.2 times mean daily demand (MDD) for mean daily demand > 100 Million Litre per Day (MLD);

Fresh Water Service Reservoir (FWSR) Capacity:

3.1.6 In accordance with DI 1309, 75% of MDD shall be designed for storage capacity of FWSR in interconnected supply zones.

Peaking Factors for Trunk and Distribution Mains:

3.1.7 The peaking factors will be in accordance with WSD's DI No. 1309 and are summarised below:

- Peak flow rates in freshwater trunk main supplying a single service reservoir – 1.5 times mean daily demand;
- Peak flow rates in distribution mains for fresh water – 3 times mean daily demand
- Peak flow rates in distribution mains for flush water – 2 times mean daily demand

Residual Head:

3.1.8 The residual head for the fresh water supply system will be assessed with the following design scenario:

- Fresh Water System – 20m.

3.2 Existing Water Supply System

3.2.1 The development falls within supply zone of Ping Che Fresh Water Service Reservoir (FWSR). Ping Che FWSR has a design storage capacity of 20,000 m^3 with Top Water Level (TWL) as 87.0mPD. The application site is located approximately 3,200m from Ping Che FWSR.

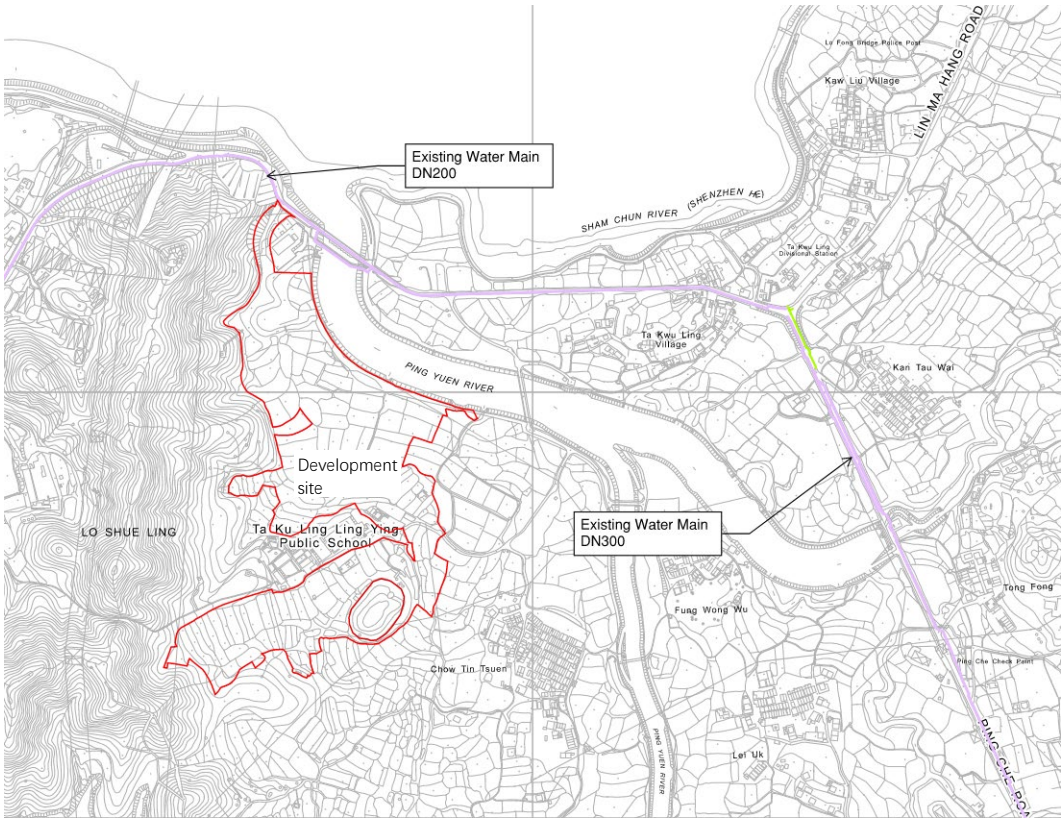
3.2.2 There is no salt water or reclaimed water system in the vicinity of the Development Site.

3.2.3 According to the received WSD water main record plans (**Appendix B**), a section of the existing DN300 freshwater main is identified about 600m east from the application site along Ping Che

[4] Reference is made to Table 3-4 of WSD's Technical Specifications on Grey Water Reuse and Rainwater Harvesting.

Road and a DN200 water main along Lin Ma Hang Road, as illustrated in **Figure 3.1**.

Figure 3.1: Existing Fresh Water Mains in the Vicinity of the Site



3.3 Water Demand Estimation

3.3.1 Water demand arising from the Proposed Development has been estimated based on WSD's DI No. 1309 and EPD's GESF as stipulated in **Section 3.1**.

3.3.2 The proposed development will generate a total fresh and flushing water demand approximately 2,977 m^3/day and 2,337 m^3/day respectively. The water demand estimation for the proposed development is shown in **Appendix C.**

3.3.3 According to Section 3.1.7, peak flow rate of fresh and flushing water of the site is 3 times water demand which are 8,931 m^3/day and 7,011 m^3/day.

3.4 Potential Impact to Existing and Planned Waterworks Facilities

3.4.1 As per the Water Main Record Plans provided by WSD (**Appendix B**), there is a DN300 water main with a capacity of 10,992m^3/day (under average velocity of 1.8m/s) was laid on the east side of the site. The total water demand from application site is 27.1% of

capacity of distribution main. Considering the land use nature and the development status of the adjacent area, the potential impact of the application site to the distribution main is severe.

3.4.2 The proposed development is located in existing supply zone of Ping Che Fresh Water Service Reservoir (PC FWSR) which has no spare capacity to serve the development.

3.4.3 There is another FWSR close to the proposed development, which is Table Hill Fresh Water Service Reservoir (TBH FWSR). TBH FWSR has a design storage capacity of 27,450 m^3 with Top Water Level (TWL) as 106.0mPD. The application site is located approximately 3,200m away. According to WSD recording, THB has spare capacity for the development.

3.4.4 According to the communication with WSD, Table Hill No.2 Fresh Water Service Reservoir is now used as a Reclaimed Water Service Reservoir, which will possibly have the capacity for the development.

3.4.5 Hydraulic analysis is made in order to evaluation the residual head from the TBH FWSR and TBH Reclaimed Water Service Reservoir. Two different scenarios are included for the fresh water supply system:

(a) Peak Flow with 3 x Mean Daily Demand;

(b) Fire-fighting Scenario with l x Mean Daily Demand.

For reclaimed water supply system, one scenario is included:

(c) Peak Flow with 2 x Mean Daily Demand;

3.4.6 For fresh water supply system, only the worse case scenario as scenario (a) is reviewed. The total headloss for scenario (a) is calculated to be 33.61m. As the highest Ground Level of the Development Site is approximately 24mPD and the Invert Level of TBH FWSR is 100mPD, the residual head for the worse case (scenario a) is 42.39m, which should be sufficient for the Development Site.

3.4.7 For reclaimed water supply system, total headloss for scenario (c) is calculated to be 7.97m. The Invert Level of TBH RWSR is 70mPD, the residual head is 38.03m, which is sufficient for the Development Site.

3.4.8 Hydraulic calculation can be referred to **Appendix D**.

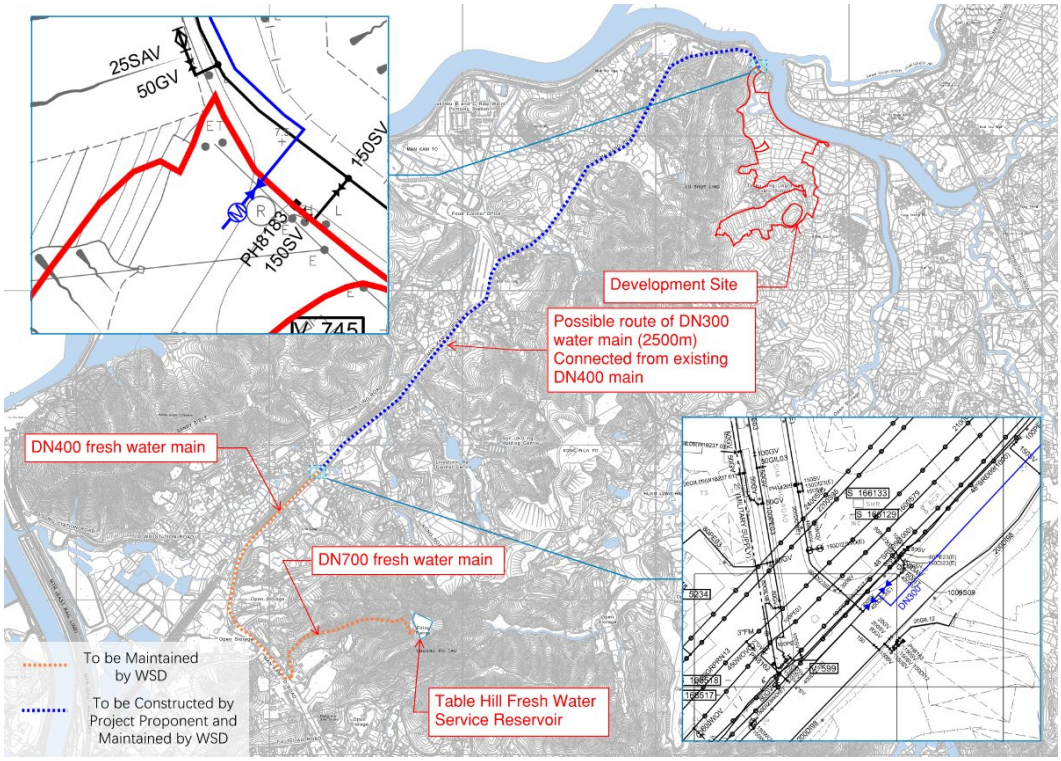
3.5 Proposed Water Supply System

3.5.1 It is noted that the site is nearby the study boundary of the Remaining Phase Development of the New Territories North (NTN) - Planning and Engineering Study for NTN New Town and

Man Kam To – Investigation, CE 21/2021(CE) under CEDD. Since new waterworks infrastructures are required for the CE 21/2021(CE) Study for the long-term land supply in NTN New Town and Man Kam To, it is suggested to switch the water source from TBH FWSR to the new water supply infrastructure. Preliminary communication is started and further liaise is necessary during the development of both project.

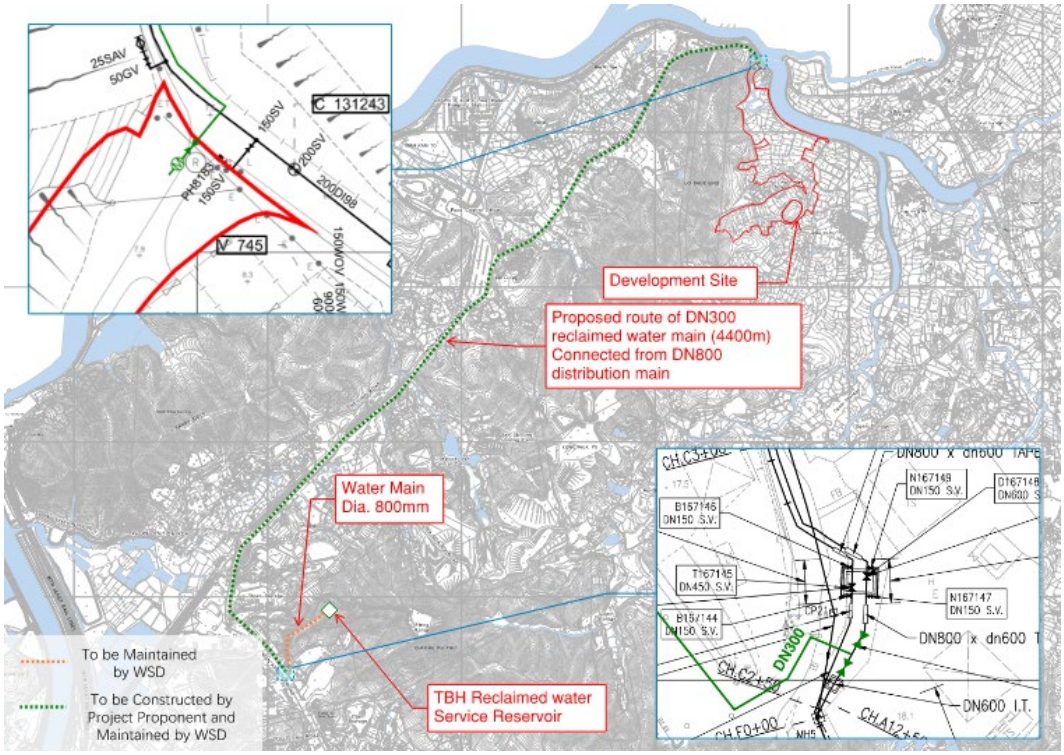
3.5.2 For temporary measure, a DN300 water main is proposed to be laid from the development to the distribution main of existing TBH FWSR close to Man Kam To Road and Sha Lin Road. Possible route and the connection point of the new water main is shown in **Figure 3.2**. Water meter is proposed within the site boundary of Development Site. The proposed fresh water main will be constructed by Project Proponent and handle over to WSD for future maintenance.

Figure 3.2: Indicative Fresh Water Supply Connection to Application Site



3.5.3 A DN300 reclaimed water main connecting from existing Table Hill Reclaimed Water Service Reservoir is proposed for flushing use as shown in **Figure 3.3**. Water meter is proposed within the site boundary of Development Site. The proposed reclaimed water main will be constructed by Project Proponent and handle over to WSD for future maintenance.

Figure 3.3: Indicative Reclaimed Water Supply Connection to Application Site



4 Conclusion

4.1.1 The Indicative Scheme will generate a total freshwater demand of 4,913 m^3/day, which includes temporary main fresh (TMF) 2,337 m^3/day.

4.1.2 For temporary measure, Table Hill Fresh Water Service Reservoir has the spare capacity for the site. But for the long term, new water infrastructure from CE21/2021 is suggested for future development.

4.1.3 This WSIA has proposed temporary measures of water supply for the Proposed Development to make up for the capacity of the water supply infrastructure in the existing supply zone. Detailed design on the proposed water supply scheme for the Proposed Development will be carried out at detailed design/ GBP submission stage should this application for plan amendment be approved.

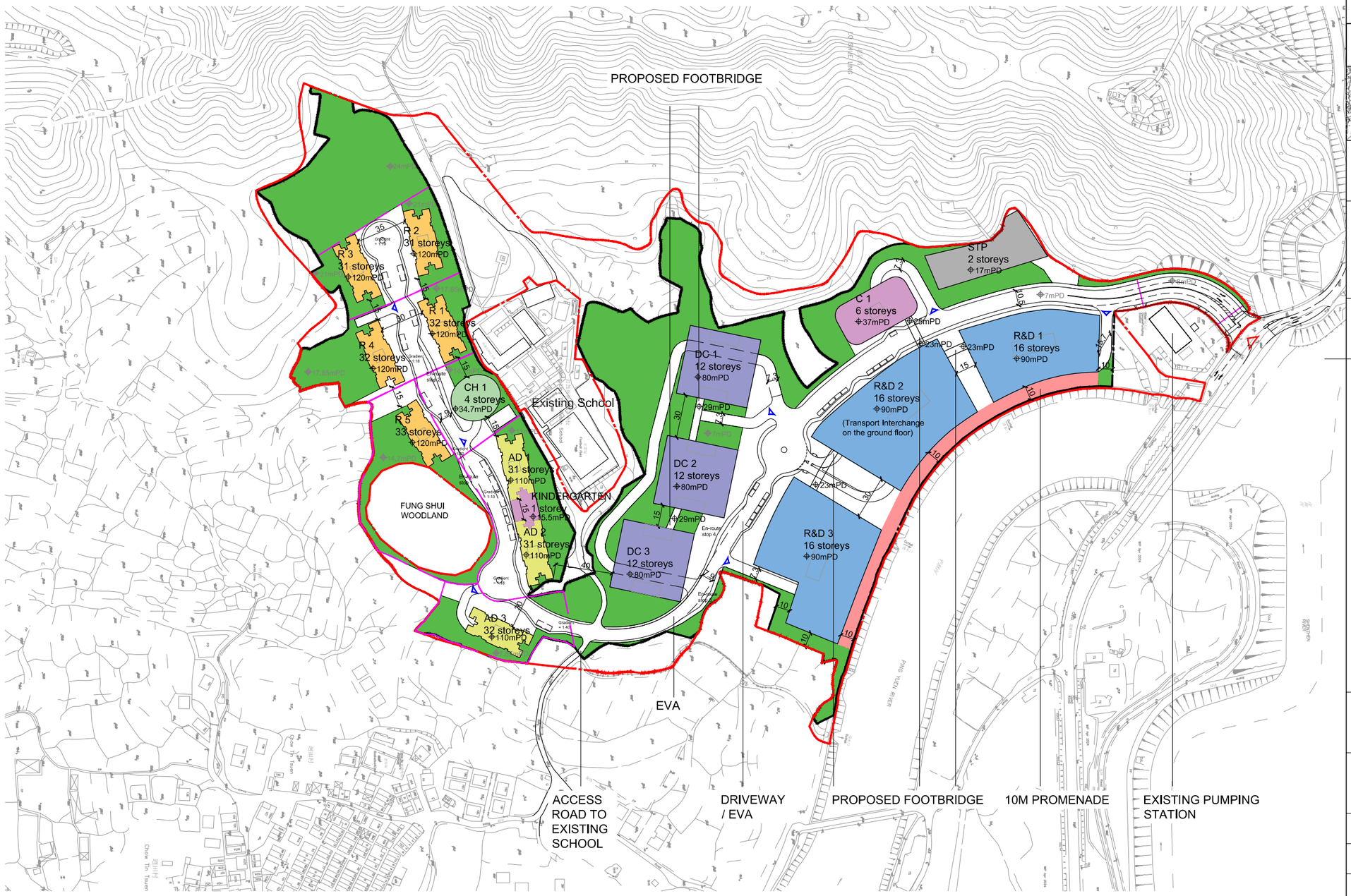
Appendix A

Master Layout Plan

LEGEND

- APPLICATION SITE BOUNDARY
- DEVELOPMENT SITE BOUNDARY
- SITE FORMATION LEVEL
- SITE RUN-IN/OUT
- ACCESS TO BASEMENT CARPARK
- R&D CENTRE
- DATA CENTRE
- RESIDENTIAL
- COMMERCIAL
- ANCILLARY DORMITORIES
- CLUBHOUSE
- LANDSCAPE AREA
- SEWAGE TREATMENT PLANT
- PROMENADE

N



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11/F Skyway House, 3 Sham Mong Road, Hong Kong
T +852 2893 3000 wcwp@deloitte.com.hk

Rev.	Date	Description

Notes
1. Do not scale drawings. Dimensions govern.
2. Verify dimensions in field. Notify WCWP of discrepancies.
3. Dimensions in mm unless otherwise noted.
4. Not for construction unless expressly certified.

Key Plan

Client
Hong Kong International Innovation Tech Hub

Consultants

Issue
Planning Application

BD Ref: BD 2/9188/10 (PT. II)
FSD Ref: FP 8/9584/VII <131>

Authorized Person

Project
The Nexus

Project Number	Date
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Scale	Drawn/Approved
1:3000 at A3	CL/TL

Title
Master Layout Plan

Number	Revision
MLP-001	-

Appendix B

Existing WSD Water Main Record Plans

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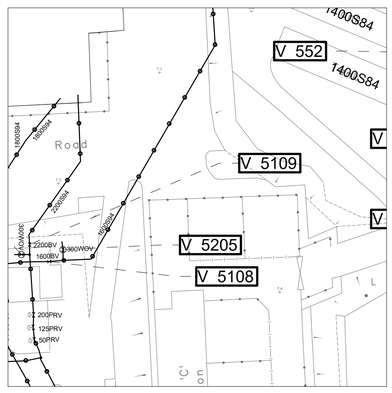					

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3-NW-11D

3-NW-12D

3-NW-17A

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Basemap Date Updated On: 30/04/2019

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FRESH WATER MAINS RECORD PLAN

MUK WU 'B' F.W. P/S, MUK WU

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W67880/ 3-NW-12C

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HONG KONG

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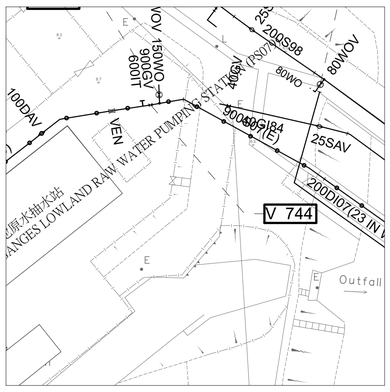

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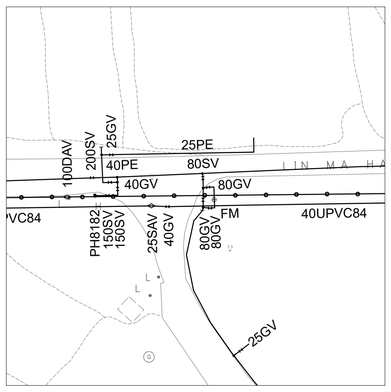

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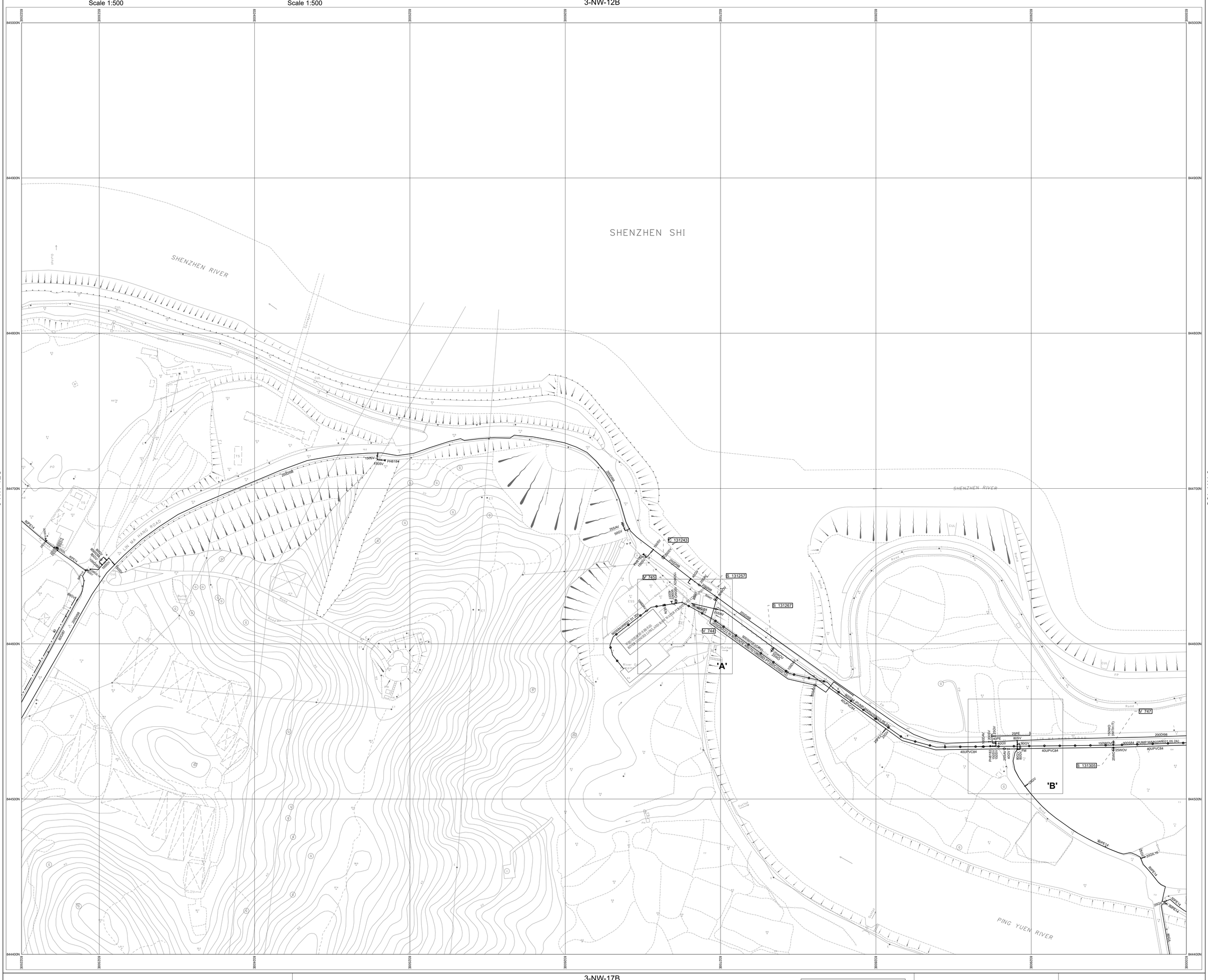

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RIVER GANGES F.W. P/S

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3-NW-16C

3-NW-17C

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FRESH WATER MAINS RECORD PLAN

MAN KAM TO ROAD, SHA LING

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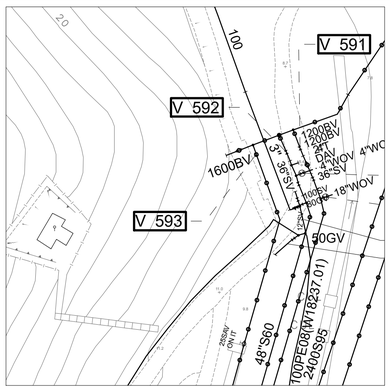					

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FRESH WATER MAINS RECORD PLAN

J/O MAN KAM TO ROAD & LIN MA HANG ROAD

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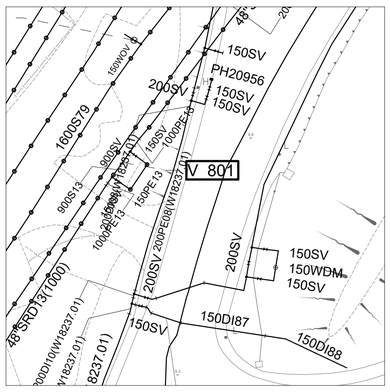	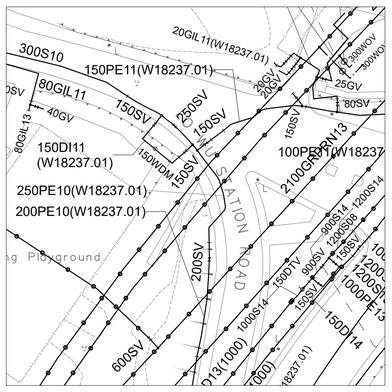				

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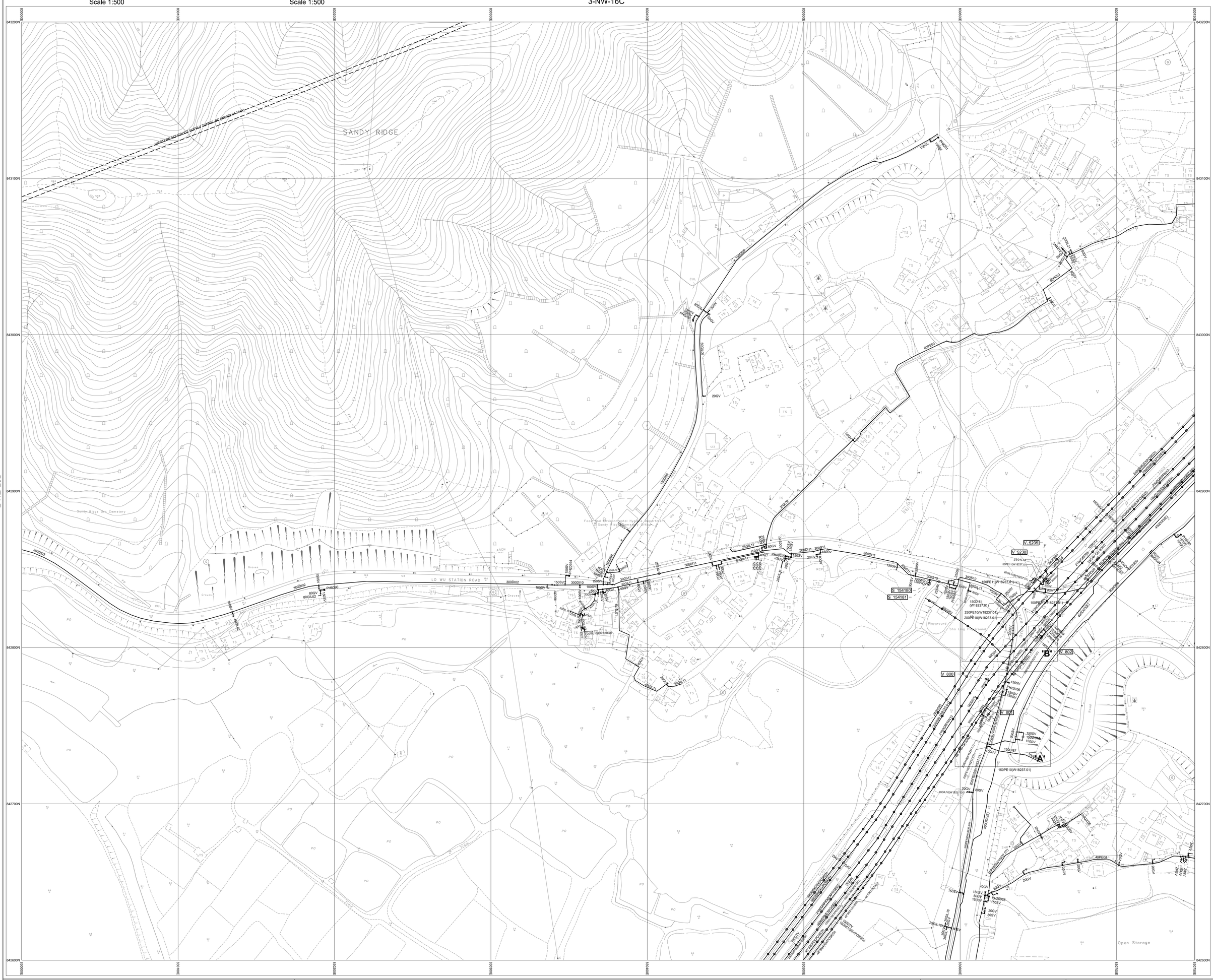

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FRESH WATER MAINS RECORD PLAN

J/O LO WU STATION ROAD & MAN KAM TO ROAD

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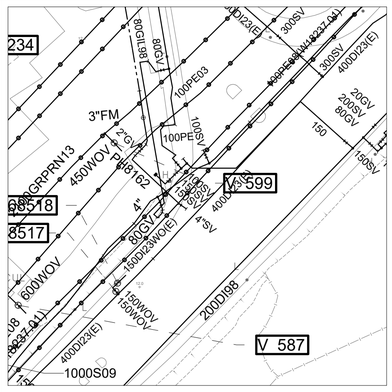					

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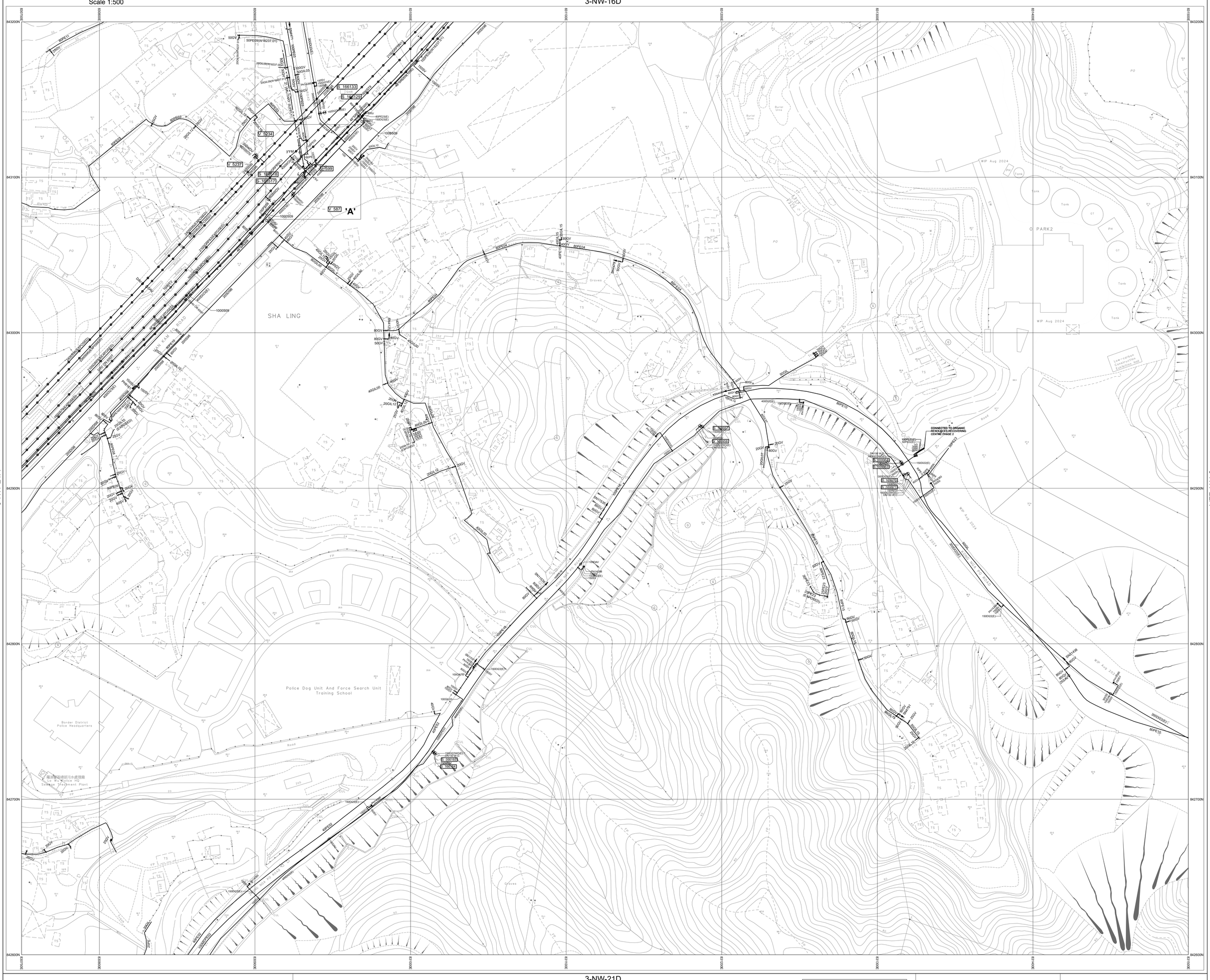

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3. ALL LEVELS ARE IN METRES ABOVE PRINCIPAL DATUM.

Basemap Date Updated On: 23/12/2024

SCALE 1:1 000

METRES 20 10 0 20 40 60 80 100 METRES

FRESH WATER MAINS RECORD PLAN

MAN KAM TO ROAD, SHA LING

THIS IS A COMPUTER PRINTOUT, NO SIGNATURE IS REQUIRED.

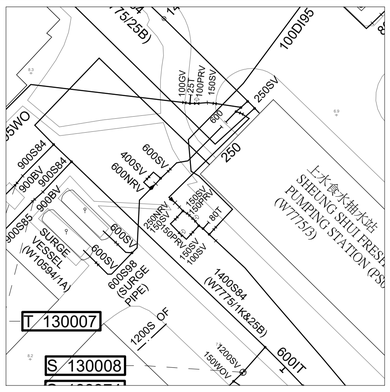
DATE REVISED : 02/01/2025

SIGNED
C.S. CHIN
CE/MNE
DATE: 09/11/1998

DRAWING NO.

W67880/ 3-NW-21B

Water Supplies Department
HONG KONG

INSET 'A'	INSET 'B'	INSET 'C'	INSET 'D'	INSET 'E'	INSET 'F'
					

Scale 1:500

3-NW-21A

NOTES:

1. FOR MAINS RECORDS SIGN CONVENTIONS AND DESIGNATIONS SEE SKETCH NO.3988.
2. DIMENSIONS OF MAINS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
3. ALL LEVELS ARE IN METRES ABOVE PRINCIPAL DATUM.

Basemap Date Updated On: 23/12/2024

SCALE 1:1 000

METRES 20 10 0 20 40 60 80 100 METRES

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FRESH WATER MAINS RECORD PLAN

SHEUNG SHUI T/W, SHEUNG SHUI

DATE REVISED : 02/01/2025

DRAWING NO.

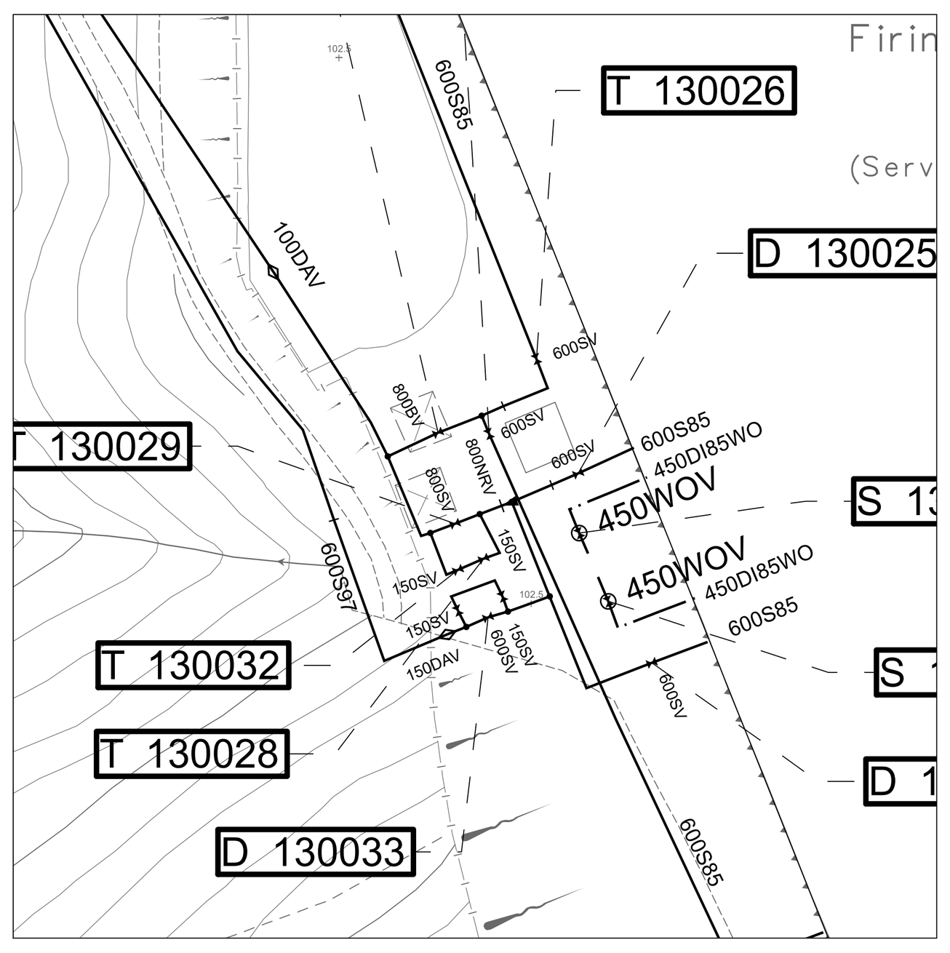
W67880/ 3-NW-21C

SIGNED

C.S. CHIN
CE/MNE

DATE: 09/11/1998

Water Supplies Department
HONG KONG

INSET 'A'	INSET 'B'	INSET 'C'	INSET 'D'	INSET 'E'	INSET 'F'
					

Scale 1:500

3-NW-21B

3-NW-21C

3-NW-22C

3-SW-1B

NOTES:

1. FOR MAINS RECORDS SIGN CONVENTIONS AND DESIGNATIONS SEE SKETCH NO.3988.
2. DIMENSIONS OF MAINS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
3. ALL LEVELS ARE IN METRES ABOVE PRINCIPAL DATUM.

Basemap Date Updated On: 23/12/2024

SCALE 1:1 000

METRES 20 10 0 20 40 60 80 100 METRES

FRESH WATER MAINS RECORD PLAN

TABLE HILL F.W. S/R, CHEUNG PO TAU

THIS IS A COMPUTER PRINTOUT, NO SIGNATURE IS REQUIRED.

DATE REVISED : 02/01/2025

DRAWING NO.

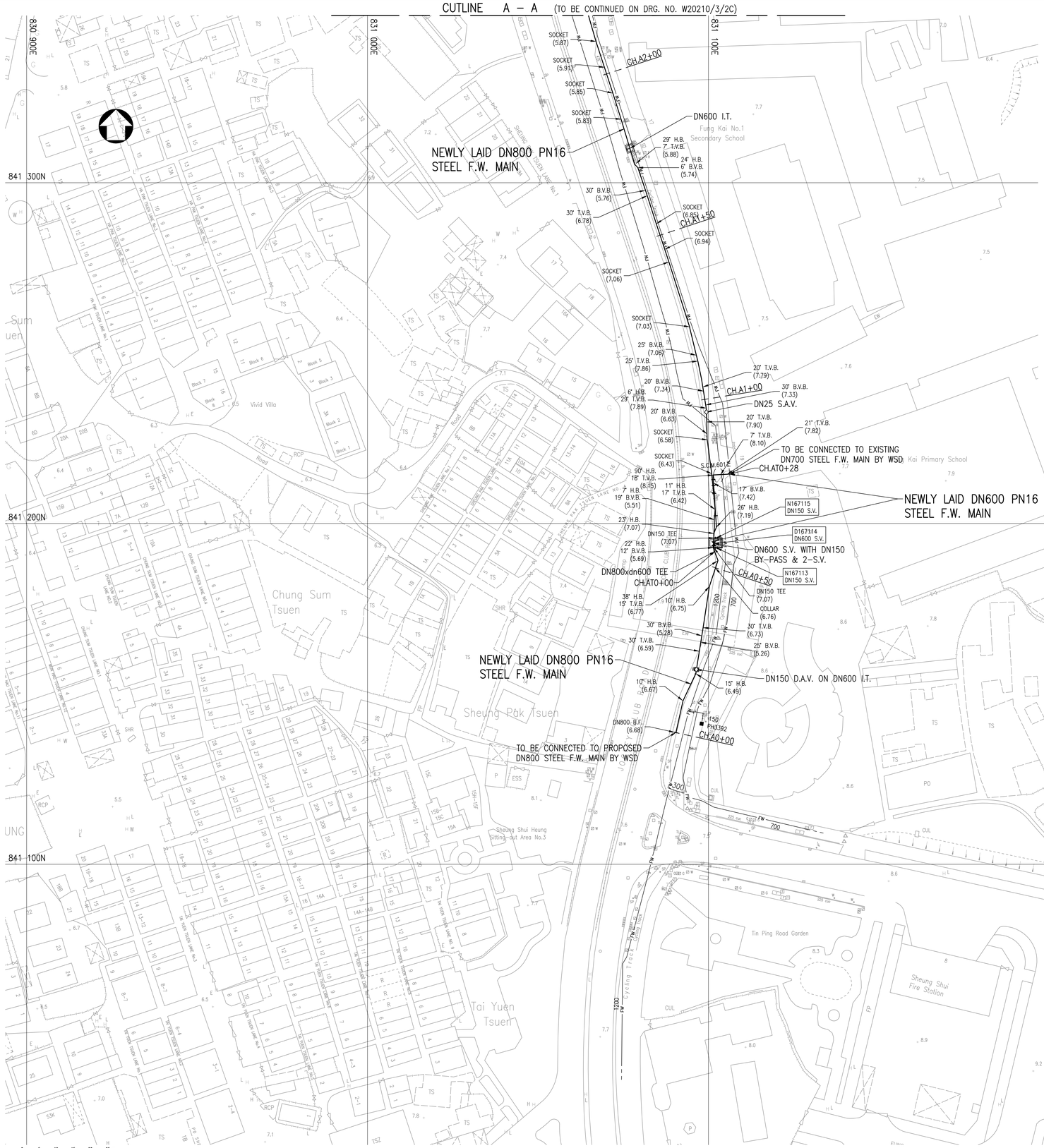
W67880/ 3-NW-21D

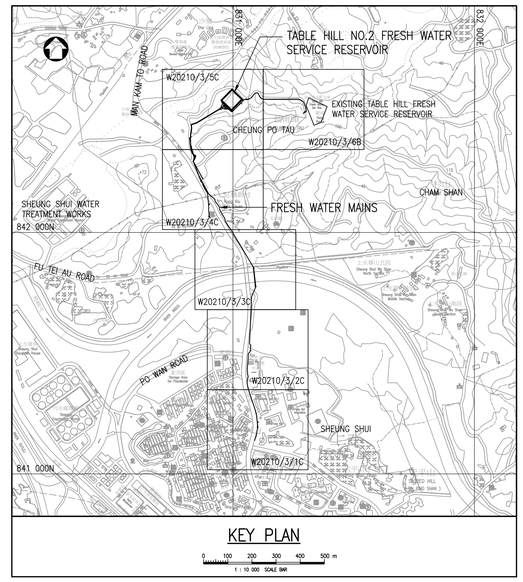
SIGNED C.S. CHIN CE/MNE

DATE: 09/11/1998

Water Supplies Department
HONG KONG

CUTLINE A – A (TO BE CONTINUED ON DRG. NO. W20210/3/2C)





KEY PLAN

0 100 200 300 400 500 m
1 : 10 000 SCALE BAR

LEGEND :

- NEWLY LAID FRESH WATER MAIN
- SLUICE VALVE
- NON-RETURN VALVE
- TAPER / REDUCER
- INSPECTION TEE
- DOUBLE AIR VALVE ON INSPECTION TEE
- SLUICE VALVE WITH BY-PASS
- FLOWMETER
- DOUBLE / SINGLE AIR VALVE
- END CAP / BLANK FLANGE
- DRAIN PIPE
- UC — COVERED U-CHANNEL
- SAFETY BARRIERS
- FW — EXISTING FRESH WATER MAIN
- EXISTING PEDESTAL FIRE HYRANT
- MH — MANHOLE
- CATCHPIT
- 1:64 — STRUCTURAL FLOOR LEVEL
- MAN KAM TO EGRETRY
- (12.34) — CROWN LEVEL
- (S.C.M.) — SHALLOW COVERED MAINS

ABBREVIATIONS :

A.P.D.	ABOVE PRINCIPAL DATUM
APPROX.	APPROXIMATE
C.I.	CAST IRON
CAP.	CAPACITY
CONC.	CONCRETE
D.I.	DUCTILE IRON
DN,dn	NOMINAL DIAMETER
F.G.L.	FINISHED GROUND LEVEL
F.W.	FRESH WATER
I.L.	INVERT LEVEL
MAX.	MAXIMUM
MIN.	MINIMUM
NO./NOS.	NUMBER/NUMBERS
O.D.	OUTSIDE DIAMETER
R.S.J.	ROLLED STEEL JOIST
S.F.L.	STRUCTURAL FLOOR LEVEL
S.S.	STAINLESS STEEL
S.V.	SLUICE VALVE
SQ.	SQUARE
T.W.L.	TOP WATER LEVEL
THK.	THICK
W.O.	WASHOUT
W.O.V.	WASHOUT VALVE
ø	DIAMETER
E.G.L.	EXISTING GROUND LEVEL
DRG	DRAWING
WSD	WATER SUPPLIES DEPARTMENT
G.M.S.	GALVANIZED MILD STEEL
PVC	POLYVINYL CHLORIDE
UPVC	UNPLASTICISED POLYVINYL CHLORIDE
DP.	DEEP
D.A.V.	DOUBLE AIR VALVE
S.A.V.	SINGLE AIR VALVE
PH3392	FIRE HYDRANT NUMBER
CH.	CHAINAGE
E.F.M.	ELECTROMAGNETIC FLOWMETER
M.B.V.	MOTORIZED BUTTERFLY VALVE
I.T.	INSPECTION TEE
N.R.V.	NON-RETURN VALVE
H.B.	HORIZONTAL BEND
T.V.B.	TOP VERTICAL BEND
B.V.B.	BOTTOM VERTICAL BEND

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. ALL LEVELS ARE IN METRES ABOVE PRINCIPAL DATUM.
3. THIS BASE PLAN IS EXTRACTED FROM SURVEY SHEET NO. 3-SW-1D AND DRAWING NO. WS1130/T/15 OF SURVEY SECTION, WSD.
4. FOR DETAILS OF SINGLE AIR VALVE CHAMBER REFER TO DRAWING NO. WSD 1.8.
5. FOR DETAILS OF DOUBLE AIR VALVE CHAMBER REFER TO DRAWING NO. WSD 1.9.
6. FOR DETAILS OF HORIZONTAL SLUICE VALVE CHAMBER REFER TO DRAWING NO. WSD 1.11 & 1.12.
7. FOR DETAILS OF INSPECTION TEE CHAMBER REFER TO DRAWING NO. WSD 1.15 & 1.16.
8. FOR DETAILS OF PERMANENT REINSTATEMENT OF PAVEMENT REFER TO DRAWING NO. WSD 1.2.
9. FOR DETAILS OF TOP TREATMENT TO COVER OF MANHOLES/VALVES CHAMBERS IN CARRIAGEWAY AND FOOTWAY REFER TO DRAWING NO. WSD 1.24.
10. FOR DETAILS OF INTERNAL S.S. CAT-LADDER REFER TO DRAWING NO. WSD 7.3.
11. THE MATERIAL USED FOR THE CONSTRUCTION OF CAT-LADDER EXTENSION AND CONNECTIONS SHALL BE STAINLESS STEEL OF STEEL NO. 1.4401 TO BS EN 10088.
12. FOR DETAILS OF S.S. TUBULAR HANDRAIL REFER TO DRAWING NO. WSD 7.6.
13. STAINLESS STEEL SURFACE SHALL BE MILL FINISHED.
14. UNLESS OTHERWISE SPECIFIED, ALL STEEL WORKS SHALL BE GRADE 316 STAINLESS STEEL COMPLYING WITH BS 970 : PART 1.
15. ALL STEEL WORKS, EXCEPT STAINLESS STEEL SHALL BE HOP DIP GALVANIZED TO BS EN ISO 1461.
16. UNLESS OTHERWISE SPECIFIED, ALL WELDING SHALL BE 5mm FILLET WELD COMPLYING WITH BS 2633 AND BS 4515.
17. WELDS SHALL BE CHIPPED, GROUNDED SMOOTH AND BRUSHED TO REMOVE SLAG.
18. CAST IRON SHALL BE CONFORMED TO GRADE EN-GJL-150 OF BS EN 1561.
19. FOR DETAILS OF 600 SQ. D.I. MANHOLE COVER REFER TO DRAWING NO. WSD 7.43 AND 7.48.
20. FOR DETAILS OF 300 SQ. D.I. SURFACE BOX REFER TO DRAWING NO. WSD 7.47.
21. FOR DETAILS OF C.I. GRATING FOR 450 SQ. PUMP SUMP REFER TO DRAWING NO. WSD 1.19.
22. DRAIN HOLE AND HESSIAN BAG SHALL BE INSTALLED WHEN THE ESTIMATED HIGHEST GROUND WATER LEVEL IS BELOW THE FORMATION LEVEL OF VALVE CHAMBER.
23. FOR DETAILS OF JOINT SEALANT FOR PRECAST CONCRETE COVER REFER TO DRAWING NO. WSD 1.11.
24. FOR DETAILS OF EXTENSION KEYS AND CLAMPS REFER TO DRAWING NO. WSD 7.7.
25. THE STEEL FLANGES SHOULD BE CONFORMED TO PN16 FLANGES OF BS EN 1092.
26. FOR DETAILS OF IDENTIFICATION TAPES FOR WATER MAINS REFER TO DRAWING NO. WSD 1.31.
27. THE INTERNAL LINING FOR NEWLY LAID STEEL(S) PIPE IS "EPOXY COATING", DUCTILE IRON(D.I.) PIPE IS "EPOXY COATING OVER CEMENT MORTAR LINING" UNLESS OTHERWISE SPECIFIED.

編號 no.	日期 date	摘要 description	簽署 initial
C	/ /	AS CONSTRUCTED	E/C(11) ZHONG PEI QI
B	/ /	THIS AS-CONSTRUCTED DRAWING IS PREPARED BY VASTEAM CONSTRUCTION LIMITED	CONTRACTOR'S REPRESENTATIVE ANDREE LAU
A	16/1/17	GENERAL REVISION	E/Dwt(12) (SIGNED) W. Y. WAN

修訂 REVISION

	姓名 name	簽署 initial	日期 date
設計 designed	W. Y. WAN	(SIGNED)	13/12/16
繪製 drawn	W. S. FUNG	(SIGNED)	13/12/16
核對 checked	W. Y. WAN	(SIGNED)	13/12/16
加簽 endorsed	W. C. KWOK	(SIGNED)	13/12/16
核准 approved	(SIGNED) S. K. YEUNG CE/Design		13/12/16

合約編號 contract no. 4/WSD/16
檔案編號 file no. WSD 7497/0/10/14 PT.5
工務編號 PWP no. 9350WF
合約 contract

IMPROVEMENT OF WATER SUPPLY TO SHEUNG SHUI AND FANLING

圖則名稱 drawing title
MAINLAYING –
ALIGNMENT PLAN
(SHEET 1 OF 6)

圖則編號 drawing no. W 20210/3/1C
比例 scale 1 : 500 OR AS SHOWN

E/C(11) ZHONG PEI QI
WORKS AS EXECUTED – APR., 2020

水務署 Water Supplies Department

THIS DRAWING IS GENERATED FROM AUTOCAD CIVIL 3D

0 5 10 15 20 25 m
1 : 500 SCALE BAR

B1 1000 x 707

CAD REF. 04WSD16-WSD-SS_WS-ML-FW_WM-M3_A-001.dwg PLOTTING SCALE 1 = 1

CUTLINE D – D (TO BE CONTINUED ON DRG. NO. W20210/3/5C)

NEWLY LAID DN450 PN16 STEEL F.W. MAIN

DN450 S.V. WITH DN150 BY-PASS & 2-S.V.

DN600 x dn450 TAPER

NEWLY LAID DN600 D.I. OVERFLOW PIPE

NEWLY LAID DN600 PN16 STEEL F.W. MAIN

DN600 x dn450 TAPER

DN800 x dn600 TAPER

DN600 S.V. WITH DN150 BY-PASS & 2-S.V.

NEWLY LAID DN600 PN16 STEEL F.W. MAIN

DN600 I.T.

NEWLY LAID DN800 PN16 STEEL F.W. MAIN

NEWLY LAID ø750 PRECAST CONCRETE DRAIN PIPE BY PIPE JACKING

TERMINAL MANHOLE

ø750 PRECAST CONCRETE DRAIN PIPE DISCHARGE TO EXISTING DSD MANHOLE NO. SMH1042605 WITH OUTLET PIPE I.L. 10.18mPD

WASHOUT PUMP PIT

DN25 S.A.V. ON DN600 I.T.

DN25 S.A.V.

DN300 W.O.V.

DN300 W.O.V.

NEWLY LAID DN800 PN16 STEEL F.W. MAIN

DN600 I.T.

NEWLY LAID DN600 PN16 STEEL F.W. MAIN

NEWLY LAID DN800 PN16 STEEL F.W. MAIN

TO BE CONNECTED TO EXISTING DN1200 STEEL F.W. MAIN BY WSD

DN600 S.V. WITH DN150 BY-PASS & 2-S.V.

NEWLY LAID DN600 PN16 STEEL F.W. MAIN

DN600 S.V. WITH DN150 BY-PASS & 2-S.V.

TO BE CONNECTED BY OTHERS

NEWLY LAID DN800 PN16 STEEL F.W. MAIN

DN150 D.A.V.

NEWLY LAID DN800 PN16 STEEL F.W. MAIN

DN600 I.T.

CUTLINE C – C (TO BE CONTINUED FROM DRG. NO. W20210/3/3C)

DETAIL '3'
SCALE 1 : 200

DN800 x dn600 TAPER
DN600 x dn450 TAPER
DN600 I.T.

WORKS AS EXECUTED – APR., 2020
E/C(11) ZHONG PEI QI

THIS DRAWING IS GENERATED FROM AUTOCAD CIVIL 3D

NOTES:

1. FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS REFER TO DRAWING NO. W20210/3/1C.
2. THE BASE MAP IS EXTRACT FROM SURVEY SHEET NOS. 3-NW-21C & 21D AND DRAWING NOS. WS1130/T/11, 12 & 22 OF SURVEY SECTION, WSD.

no.	date	description	initial
C	/ /	AS CONSTRUCTED	E/C(11) ZHONG PEI QI CONTRACTOR'S REPRESENTATIVE
B	/ /	THIS AS-CONSTRUCTED DRAWING IS PREPARED BY VASTEAM CONSTRUCTION LIMITED	ANDREE LAU
A	16/1/17	GENERAL REVISION	E/Des(12) (SIGNED) W. Y. WAN

修訂 REVISION

	name	initial	date
設計 designed	W. Y. WAN	(SIGNED)	13/12/16
繪製 drawn	W. S. FUNG	(SIGNED)	13/12/16
核對 checked	W. Y. WAN	(SIGNED)	13/12/16
認簽 endorsed	W. C. KWOK	(SIGNED)	13/12/16
核准 approved	(SIGNED) S. K. YEUNG CE/Design		13/12/16

合約編號 contract no. 4/WSD/16
檔案編號 file no. WSD 7497/0/10/14 PT.5
工務編號 PWP no. 9350WF
合約 contract

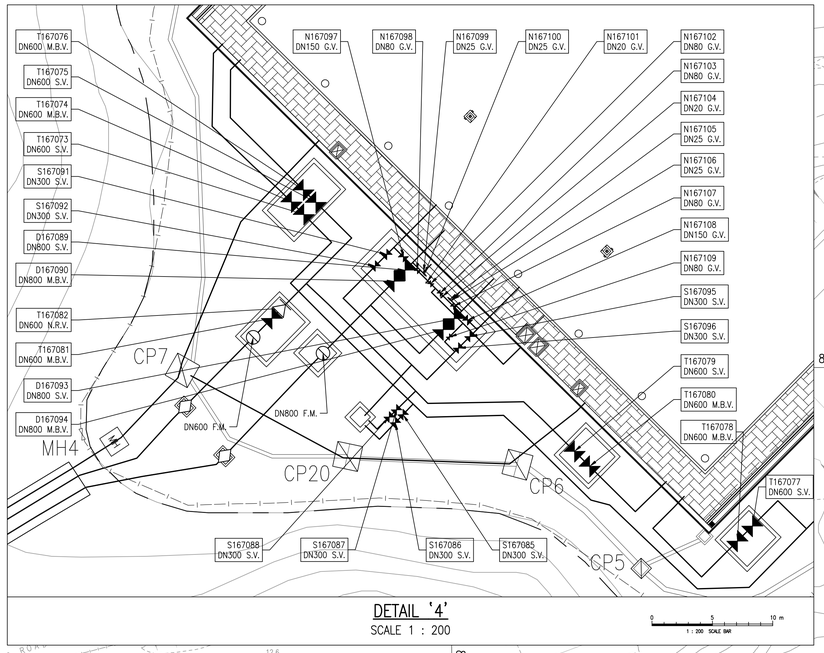
IMPROVEMENT OF WATER SUPPLY TO SHEUNG SHUI AND FANLING

圖則名稱 drawing title
MAINLAYING –

ALIGNMENT PLAN (SHEET 4 OF 6)

圖則編號 drawing no. W 20210/3/4C
比例 scale 1 : 500 OR AS SHOWN

水務署 Water Supplies Department



DETAIL '4'
SCALE 1 : 200

NOTES:

1. FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS REFER TO DRAWING NO. W20210/3/1C.
2. THE BASE MAP IS EXTRACT FROM SURVEY SHEET NOS. 3-NW-21A, 21B, 21C & 21D AND DRAWING NOS. WS1130/T/10, 11 & 22 OF SURVEY SECTION, WSD.
3. REFER TO DRAWING NO. W20210/3/6B FOR DETAIL 5.

編號 no.	日期 date	修訂 REVISION	簽署 initial
C	/ /	AS CONSTRUCTED	E/C(11) ZHONG PEI QI
B	/ /	THIS AS-CONSTRUCTED DRAWING IS PREPARED BY VASTEAM CONSTRUCTION LIMITED	CONTRACTOR'S REPRESENTATIVE ANDREE LAU
A	16/1/17	GENERAL REVISION	E/Des(12) (SIGNED) W. Y. WAN

	姓名 name	簽署 initial	日期 date
設計 designed	W. Y. WAN	(SIGNED)	13/12/16
繪製 drawn	W. S. FUNG	(SIGNED)	13/12/16
核對 checked	W. Y. WAN	(SIGNED)	13/12/16
加簽 endorsed	W. C. KWOK	(SIGNED)	13/12/16
核准 approved	(SIGNED) S. K. YEUNG CE/Design		13/12/16

合約編號 contract no. 4/WSD/16

檔案編號 file no. WSD 7497/0/10/14 PT.5

工務編號 PWP no. 9350WF

合約 contract

IMPROVEMENT OF WATER SUPPLY TO SHEUNG SHUI AND FANLING

圖則名稱 drawing title
MAINLAYING –

ALIGNMENT PLAN
(SHEET 5 OF 6)

圖則編號 drawing no. W 20210/3/5C

比例 scale 1 : 500 OR AS SHOWN

水務署 Water Supplies Department

Appendix C

Water Demand Estimation

Appendix C : Water Demand Estimation from Proposed Development at Various Lots in D.D. 82 and D.D. 86, Man Kam To, New Territories

		GFAs (m^2)	Population (nos.)	Type	Fresh Water Demand			Flusing Water Demand		Total Water Demand
					UD (l/h/day)	Units	Demand (m^3/day)	UD (l/h/day)	Water Demand (m^3/day)	(m^3/d)
Residential	Ancillary Dormitories	63,900	3,758	R1	230	(l/h/day)	864	104	391	1,255
	Other Residential Uses	106,500	6,264	R1	230	(l/h/day)	1,441	104	651	2,092
			10,022	Service Trade	40	(l/h/day)	401			
Non-residential	Data Centre employee	86,400	432	Commercial Employee	30	(l/h/day)	13	50	22	35
	Data Centre Cooling Water								1,000	1,000
	R&D Centre employee	268,780	5,375	Commercial Employee	30	(l/h/day)	161	50	269	430
	Kindergarten Pupil	724	180	Schools	25	(l/h/day)	5	25	5	9
	Irrigation	13,126			7	(l/m^2/day)	92			92
	Total Water Demand (m^3/day)						**2,977**		**2,337**	**4,913**

NOTES:
(1) UD for Ancillary Dormitories as per WSD (DI)1309 Table 1 "R1" & Table 2 "other rural areas".
(2) UD for Other Residential Uses as per WSD (DI)1309 Table 1 "R1" & Table 2 "other rural areas".
(3) Water demand of service trade is adopted for commercial associated with the residential development.
(4) UD for Data Centre employee as per GESF Table T-2 Commercial Employee.
(5) UD for R&D Centre as per GESF Table T-2 Commercial Employee.
(6) UD for Kindergarten Pupils Uses as per WSD (DI) 1309 Table 1 "Schools".

Appendix D

Hydraulic Calculation

Appendix D - Hydraulic Calculation

Assumptions:

Kinematic viscosity of liquid in pipe	v	**1.01E-06**	**m^2/s**

v for water at 20°c 1.01E-06

Check conditions

For the calculations to be accurate (within 1%), the below criteria must be met. These are checked automatically in the "Check" columns, ensure all "Check" cells read "TRUE".

		Lower bound	Upper bound
Roughness Coeffient	k (mm)	0.001	10
Reynolds Number (Turbulent)	R	4000	1.00E+08
Reynolds Number (Laminar)	R		2300

Calculation Table

Reference	DESIGN FLOW	Pipework Description					Fitting Loss Co-eff.	Area	Velocity	Reynolds Number	Reynolds number check	Flow Type	Friction factor using Swamee-Jain		friction factor	Pipeline Headloss	velocity head	Fitting Headloss	Total Headloss
	Q	Internal Diameter	Material	k (major)	k (major)	Length	k (minor)	A	V	R	T/F	N/A	laminar	turbulant	f	h_{fp}	$v^2/2g$	h_{ff}	H_L
	L/s	mm		mm	check	m		m^2	m/s							m	m	m	m
TBH FWSR Scenario (a)	103	300	DI	0.03	TRUE	2500	27.00	0.071	1.462	4.34E+05	TRUE	turbulent	1.473E-04	1.471E-02	0.0147	13.36	0.11	2.94	**16.304**
	255	400	DI	0.03	TRUE	720	27.00	0.126	2.029	8.04E+05	TRUE	turbulent	7.964E-05	1.341E-02	0.0134	5.07	0.21	5.67	**10.731**
	705	700	DI	0.03	TRUE	655	27.00	0.385	1.832	1.27E+06	TRUE	turbulent	5.041E-05	1.222E-02	0.0122	1.96	0.17	4.62	**6.574**
																		Total	**33.610**
TBH RWSR Scenario (c)	54	300	DI	0.03	TRUE	4480	27.00	0.071	0.765	2.27E+05	TRUE	turbulent	2.815E-04	1.607E-02	0.0161	7.16	0.03	0.81	**7.970**