Attachment 3
Water Supply Impact Assessment

Proposed Data Centre at No. 7-11 Wing Kin Road, Kwai Chung (K.C.T.L. 145)

Water Supply Impact Assessment

(V2.0)

July 2025

Approved By _____

(Project Manager: K.S. Lee)

REMARKS:

The information supplied and contained within this report is, to the best of our knowledge, correct at the time of printing.

CINOTECH accepts no responsibility for changes made to this report by third parties.

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1 INTRODUCTION

1.1 Background

1.1.1 OXO YW Limited ("the Project Proponent") has proposed to develop a data centre located at No. 7-11 Wing Kin Road, Kwai Chung.

1.1.2 Cinotech Consultants Limited was commissioned by OXO YW Limited to carry out a Water Supply Impact Assessment (WSIA) to assess and envisage any potential water supply impact on the implementation of the Project and to recommend improvement / modification works on the existing water supply system.

2 DESCRIPTION OF THE ENVIRONMENT

2.1 Existing Environment

2.1.1 The Application Site (the "Site") is located in an industrial area in Kwai Chung, bordered by Wing Chong Street to the west, Wing Kin Road to the east, Global Trade Centre to the north, and Hou Feng Industrial Building to the south (see **Figure 2-1**). The Site and its surroundings fall within the industrial zone, as per the *Approved Kwai Chung Outline Zoning Plan No. S/KC/32* (see **Figure 2-2**).

2.1.2 The Site covers approximately 964 m² (about 929 m² excluding the additional area) and is currently occupied by a 2-storey industrial building. Planning applications have been submitted and approved with conditions in 2020 (Application No.: A/KC/457) and 2023 (Application No.: A/KC/496) for Offensive Trades use (Lard Boiling Factory) and Industrial use (Warehouse), respectively.

2.2 The Proposed Development

2.2.1 The Project Proponent proposes to redevelop the Application Site into a 17-storey data centre with a height of 109.55 mPD and a plot ratio of 11.4. The tentative section plan of the proposed development is shown in **Appendix I**, with a planned completion date of 2029.

2.2.2 It should be noted that the proposed development is intended for Data Processing Centre use, and its water consumption behavior will differ significantly from typical industrial and commercial uses.

2.2.3 The major water consumption sources for the proposed development include:

- Water usage by staff
    - The proposed development is expected to be unmanned and automated, with a limited number of staff. As advised by the project applicant, up to 25 staff members will be employed.
- Water consumption for the water cooling tower system

  - A water cooling tower system will be implemented to meet the significant cooling demand, which will predominantly influence the fresh water requirements.
- Irrigation of planters

2.2.4 On the other hand, no other water consumption activities within the proposed development are anticipated.

2.2.5 During operation, the bleed-off water from the water cooling tower system will be reused as much as practicable, with the expectation that all salt water demand for the proposed development will be met.

Development Parameters

2.2.6 This assessment is prepared based on the following development parameters (**Table 2-1**) of the notional design, which are subject to changes at detailed design stage:

Table 2-1 Development Parameters

	Existing	**Proposed Development**
Zoning	Industrial	
Site Area	About 964.2 m^2	
Use	Industrial	Data Processing Centre
Domestic GFA	0 m^2	0 m^2
Non-Domestic GFA (Industrial)	941.21 m^2	About 10,991.88 m^2
Building Height	60 mPD	109.55 mPD

Remarks: Development Parameters of the proposed development subject to detailed design.

3 WATER SUPPLY IMPACT ASSESSMENT – FRESH WATER

3.1 Existing Fresh Water Supply

3.1.1 The Application Site is currently served by the Lai Chi Kok Fresh Water Supply Reservoir (FWSR) (Capacity: 93,702 m³).

3.1.2 The Application Site is currently served by the 25 mm and 50 mm branches from the 300 mm fresh water main along Wing Kin Road, which originates from the 400 mm fresh water main along Kwai Hei Street.

3.1.3 The simplified fresh water mains records are illustrated in **Figures 3-1 and 3-2**. The Water Supplies Department (WSD) Fresh Water Mains Record Plan is provided in **Appendix II**.

3.2 Fresh Water Demand

3.2.1 The calculations of fresh water demand are generally following Departmental Instruction (DI) No. 1309 "Design Criteria,", which adopted a per person or per Site Area water consumption rate. The fresh water demand of the existing development is calculated in **Table 3-1** and detailed in **Table B of Appendix IV**.

Table 3-1 Fresh Water Demand of the Existing Development

	Category	Site Area (ha)	Unit Demand Fresh Water (m^3/ha/day)	Daily Demand Fresh Water (m^3/day)
Industrial (Tsuen Wan)	I	0.096	1600	153.986

3.2.2 As stated in **Section 2.2**, the water consumption behavior of the proposed development will differ significantly from typical industrial and commercial uses. Therefore, the water usage for staff, the water cooling tower system, and irrigation will be calculated separately, rather than using a GFA-based broad-brush estimation. Since the staff will not serve any customers, the water consumption figures for residents have been adopted.

3.2.3 The calculation for the fresh water demand of the proposed water cooling tower system, provided by the Project's building services engineer, aligns with the upcoming EMSD Fresh Water Cooling Towers Scheme (Form EMSD EE CT1A) submission. The estimated fresh water demand for the proposed system is summarized in **Table 3-2** and detailed in **Table C1 of Appendix IV.** The calculations from the Project's building services engineer are enclosed in **Appendix V**. Please note that the water cooling tower system and its calculations may undergo minor changes during the detailed design stage.

3.2.4 The fresh water demand of the proposed development is provided in **Table 3-3**, and detailed in **Tables C1 & C2 of Appendix IV**.

Table 3-2 Fresh Water Demand of the Proposed Water Cooling Tower System

		Unit
[A] Cooling tower water flow rate	971.0	L/s
[B] Evaporation loss	0.928%	
[C] Drift loss	0.005%	
[D] Cycle of concentration	6	
[E] Bleed-off rate	0.181%	
[F] Required make-up water flow rate	10.81	L/s
	934.22	m^3/day
[G] Required bleed off water flow rate	1.754	L/s
	151.51	m^3/day

Noted:
[1] Detailed calculation provided in **Table C1 of Appendix IV**.

Table 3-3 Fresh Water Demand of the Proposed Development

	Category	Population or/ GFA (ha)	Unit Demand Fresh Water (m^3/head/day) or (L/ m^2/day)	Daily Demand Fresh Water (m^3/day)
Staff	R	25 (Population)	0.35	8.750
Water Cooling Tower system	N/A	N/A	N/A	934.223
Planter	IRR	0.029 (GFA) [1]	7	2.025

Note:
[1] 30% of the Site area has been adopted for conservative assessment.

3.2.5 The fresh water demand for the site is expected to increase significantly from 153.986 m^3/day to 944.998 m^3/day, representing an increase of 791.012 m^3/day (or 0.791 MLD). The calculations for fresh water demand in both existing and proposed scenarios are summarized in **Table 3-4**.

Table 3-4 Summary of Fresh Water Demand

Daily Demand - Fresh Water (m^3/day)		
Existing	***Proposed***	***Net Increase***
153.986	944.998	791.012

3.3 Fresh Water Supply Impact - Fresh water service reservoir

3.3.1 As shown in **Table D of Appendix IV**, there is substantially greater spare capacity (63.1 MLD) in Lai Chi Kok FWSR. The expected increase in demand (0.811 MLD) can therefore be accommodated by the existing Fresh Water Service Reservoirs. No adverse impact to the fresh water service reservoirs is anticipated.

3.4 Fresh Water Supply Impact – Fresh Water Mains

3.4.1 The Application Site is currently served by the 25 mm and 50 mm branches from the 300 mm fresh water main along Wing Kin Road, which originates from the 400 mm fresh water main along Kwai Hei Street as shown in **Figures 3-1 & 3-2**.

3.4.2 According to Departmental Instruction (DI) No. 1309 "Design Criteria" (DI 1309), the peak flow rate in the distribution mains for fresh water should be three times the daily demand. However, the water consumption of the water cooling tower system is expected to be steady, and the consumption in **Table 3-2** is based on the worst-case scenario (maximum cooling load under hot weather). Thus, the peak factor of three is not applicable to the water consumption of the water cooling tower system. Consequently, the estimated peak daily fresh water demand for the proposed development is calculated as (8.750+2.025) × 3 + 934.223 = 966.547 m^3/day. Following the maximum sustained flow velocity suggested in DI 1309 (**Table A2 of Appendix IV**), the capacities of the 150 mm and 300 mm fresh water mains are determined to be 2,290 m^3/day and 9,161 m^3/day, respectively.

3.4.3 Taking into account the fresh water consumption of the proposed development, it has been determined that the existing 50 mm and 25 mm branches cannot meet the fresh water demand of the Site.

3.4.4 Therefore, a new 150 mm fresh water main connected to the existing 300 mm fresh water main along Wing Kin Road is proposed, as shown in **Figure 3-2**. Additionally, the existing 50 mm and 25 mm branches will be removed. The specific alignment and connection points of the proposed new water pipes will be determined during the detailed design phase of the development.

4 WATER SUPPLY IMPACT ASSESSMENT – SALT WATER

4.1 Existing Salt Water Supply

4.1.1 The Application Site is currently served by Tsuen Wan Salt Water Pumping Station (SWPS) (Design Pumping Capacity: 93 MLD).

4.1.2 The Application Site is currently served by a 25 mm branch from the 150 mm salt water main along Wing Kin Road.

4.1.3 The simplified salt water mains records are illustrated in **Figure 4-1**. The Water Supplies Department (WSD) Salt Water Mains Record Plan is provided in **Appendix III**, and detailed in **Table B of Appendix IV**.

4.2 Saltwater Supply Demand

4.2.1 The calculations of salt water demand are generally following Departmental Instruction (DI) No. 1309 "Design Criteria,", which adopted a per person or per Site Aera water consumption rate. The fresh water demand of the existing development is calculated in **Table 3-4**.

Table 4-1 Salt Water Demand of the Existing Development

	Category	Site Area (ha)	Unit Demand Salt Water (m^3/ha/day)	Daily Demand Salt Water (m^3/day)
Industrial (Tsuen Wan)	I	0.096	210	20.211

4.2.2 Similar to the calculation of fresh water demand for the proposed development, the salt water consumption figures for residents have been adopted for staff. It should be noted that there is no salt water demand from the water cooling tower system or irrigation. The salt water demand of the proposed development is provided in **Table 4-2**, and detailed in **Table C2 of Appendix IV**.

Table 4-2 Salt Water Demand of the Proposed Development

	Category	Population	Unit Demand Salt Water (m^3/head/day)	Daily Demand Salt Water (m^3/day)
Staff	R	25	0.110	2.750

4.2.3 The salt water demand for the site is expected to reduce from 20.211 m^3/day to 2.750 m^3/day, representing a decrease of 17.461 m^3/day (or 0.017 MLD). The calculations for salt water demand in both existing and proposed scenarios are summarized in **Table 4-3**.

Table 4-3 Summary of Salt Water Demand

Daily Demand - Salt Water (m^3/day)		
Existing	***Proposed***	***Net Increase***
20.211	2.750	-17.461

4.3 Saltwater Supply Impact – Salt Water Pumping Station

4.3.1 It should be noted that the existing daily consumption of the Tsuen Wan SWPS is close to its capacity. However, as shown in **Table 4-3**, the salt water demand is expected to decrease in the proposed development compared to the existing situation. Additionally, since the bleed-off water from the water cooling tower system will be reused as flushing water, no salt water demand is anticipated once the water reuse system of the cooling tower is properly implemented. No adverse impact to the salt water pumping station is anticipated.

4.4 Saltwater Supply Impact – Salt Water Mains

4.4.1 The Application Site is currently served by a 25 mm branch from the 150 mm salt water main along Wing Kin Road, as shown in **Figure 4-1**.

4.4.2 According to Departmental Instruction (DI) No. 1309 "Design Criteria," the peak flow rate in the distribution mains for salt water should be two times the daily demand. Based on this criterion, the estimated peak daily salt water demand for the proposed development is approximately 5.5 m^3/day. By following the maximum sustained flow velocity as suggested in Departmental Instruction (DI) No. 1309 "Design Criteria" (**Table A2 of Appendix IV**), the capacities of the 25 mm and 150 mm salt water mains are determined to be 64 m^3/day and 2,290 m^3/day, respectively.

4.4.3 Taking into consideration the reduced salt water consumption of the proposed development, it has been determined that the existing 25 mm salt water main can meet the salt water demand of the Site, even when the water reuse system of the cooling tower is out of order. Therefore, no modifications to the salt water mains are required.

5 CONSTRUCTION AND MAINTENANCE

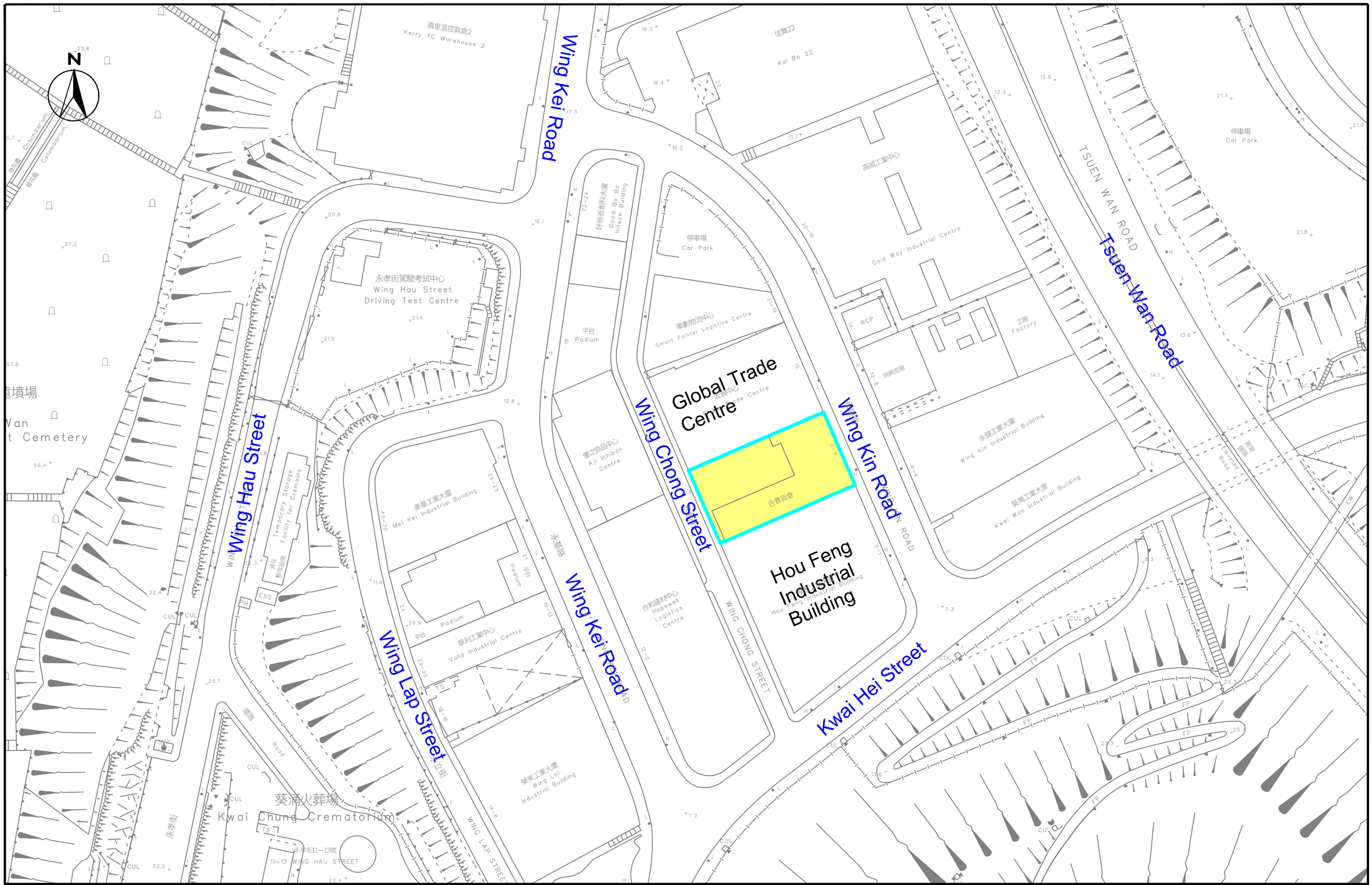
5.1.1 The detailed connection arrangements, responsibilities for the investigation, design, construction, repair and maintenance of the proposed modification to the fresh water mains system will be discussed among the Project Proponent and relevant Government departments in detailed design stage.

6 CONCLUSION

6.1.1 The potential water supply impact under the worst-case scenario of the proposed development has been reviewed. The assessment conducted concludes that no upgrading works on the water supply infrastructure will be required.

6.1.2 For the local water supply network, although the proposed development will result in additional fresh water demand, the increases can be accommodated by the existing main supply facilities and the proposed new pipes. Therefore, no adverse water supply impact is anticipated from the proposed development.

FIGURES



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Proposed Data Centre at No. 7-11 Wing Kin Road, Kwai Chung (K.C.T.L. 145)

Location of the Project Site

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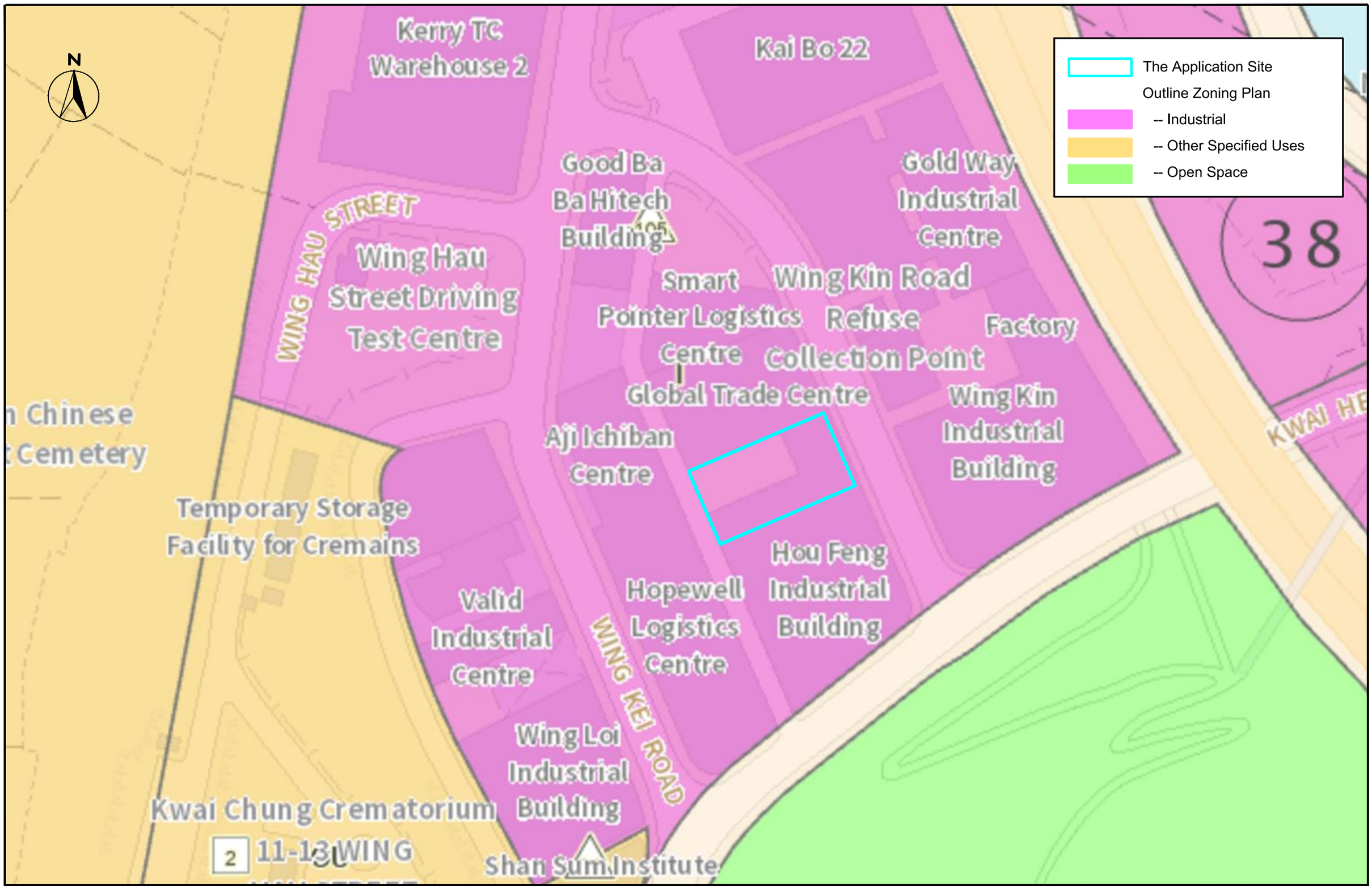

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Proposed Data Centre at No. 7-11 Wing Kin Road, Kwai Chung (K.C.T.L. 145)

Zoning in the Vicinity of the Project Site

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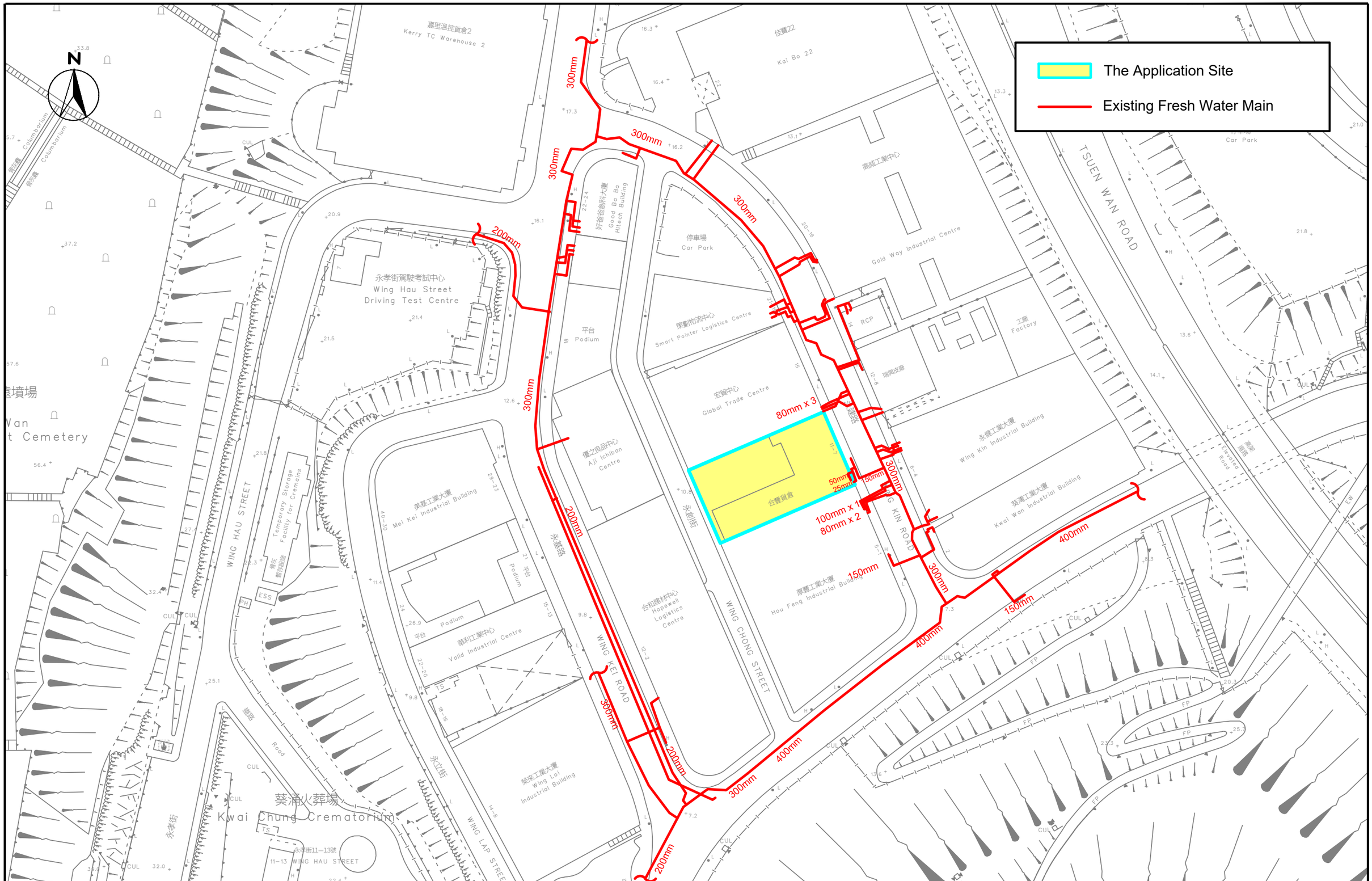
JOB No.	IA23170	DRAWING No.	2-2
		REV	-



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Proposed Data Centre at No. 7-11 Wing Kin Road, Kwai Chung (K.C.T.L. 145)

Fresh Water Mains in the Vicinity

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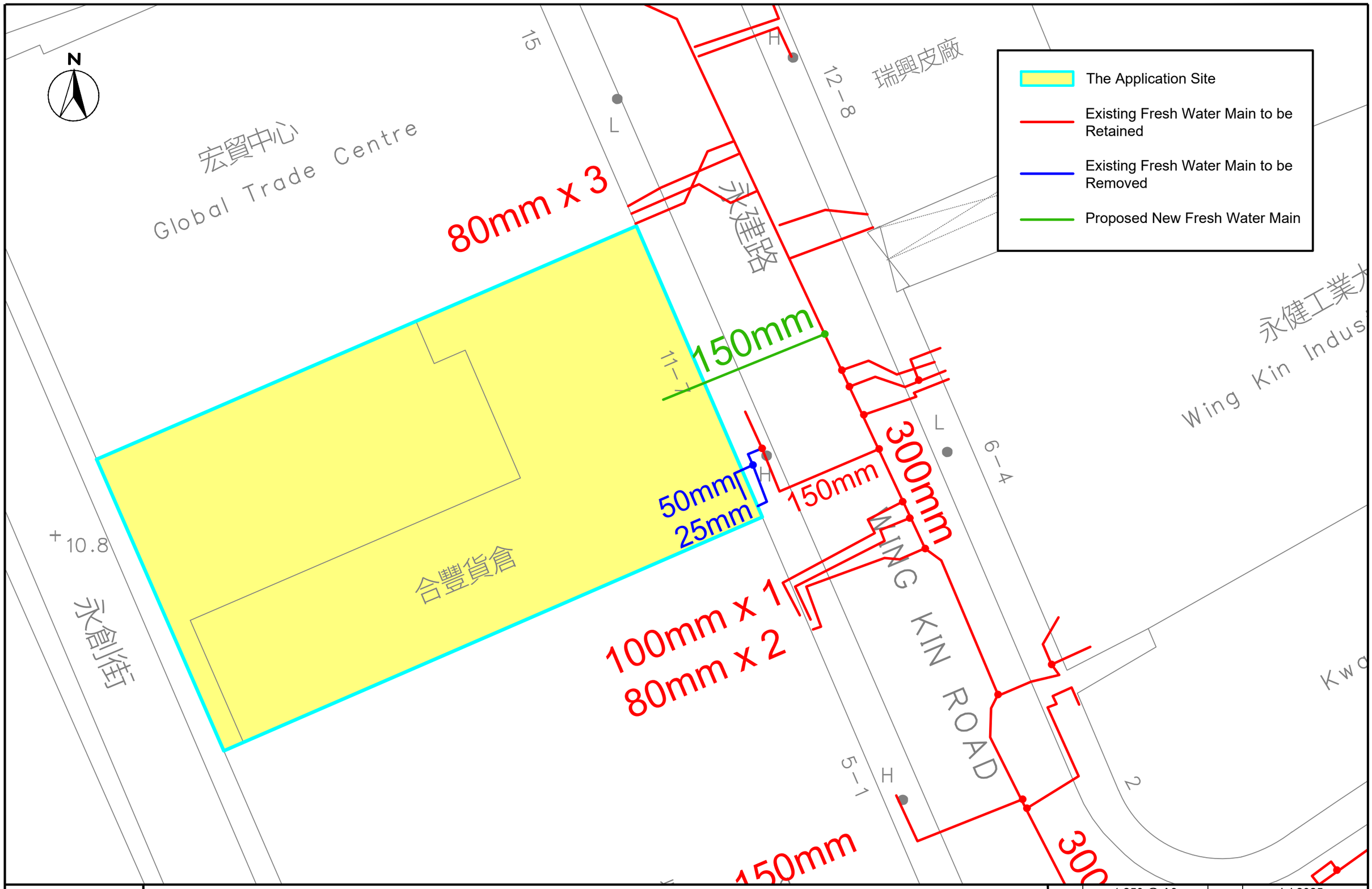

CINOTECH
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Proposed Data Centre at No. 7-11 Wing Kin Road, Kwai Chung (K.C.T.L. 145)

Proposed Modification of Fresh Water Mains

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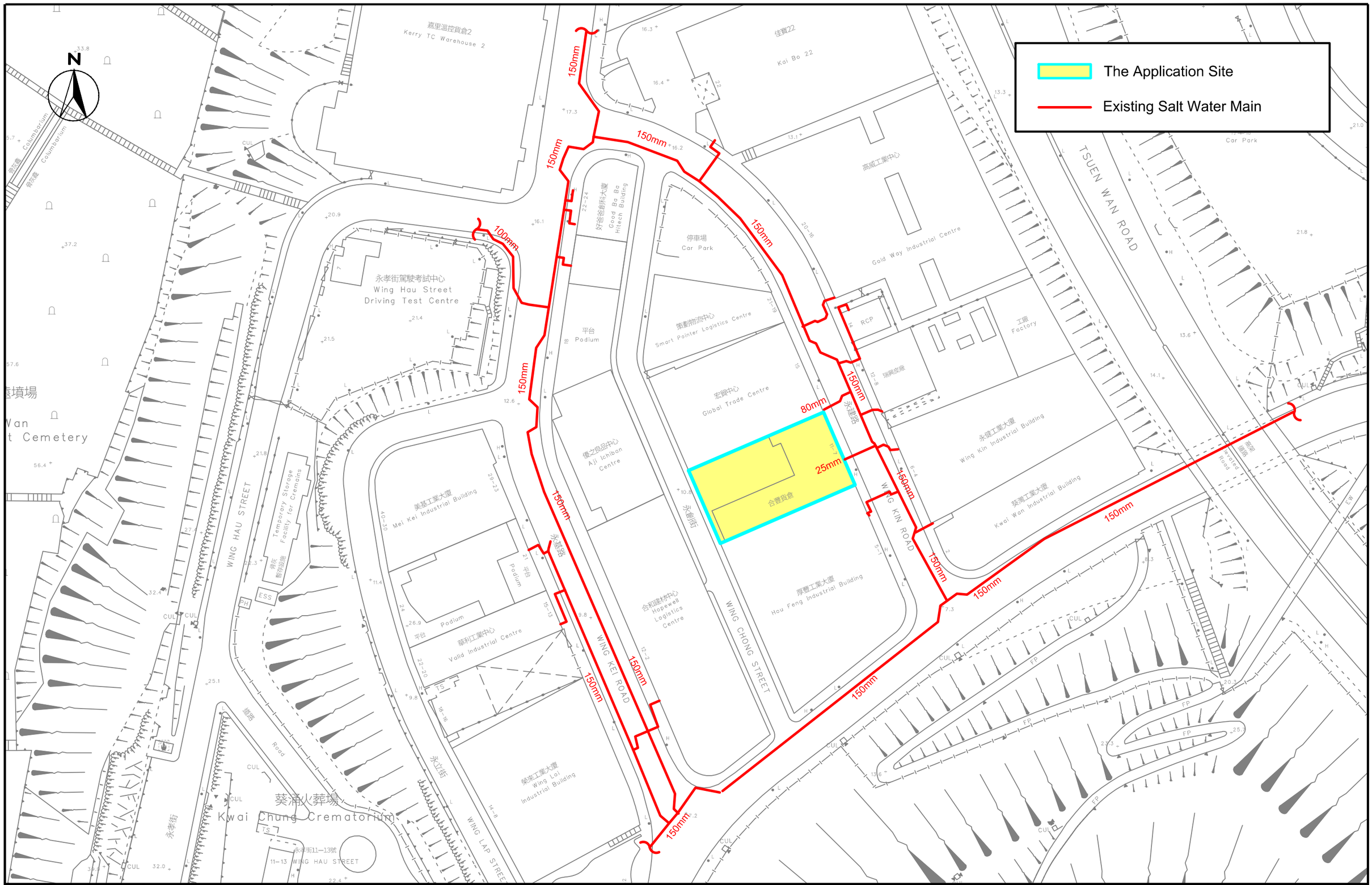

CINOTECH
Cinotech Consultants Limited

Proposed Data Centre at No. 7-11 Wing Kin Road, Kwai Chung (K.C.T.L. 145)

Salt Water Mains in the Vicinity

SCALE	1:1000 @ A3	DATE	May 2025
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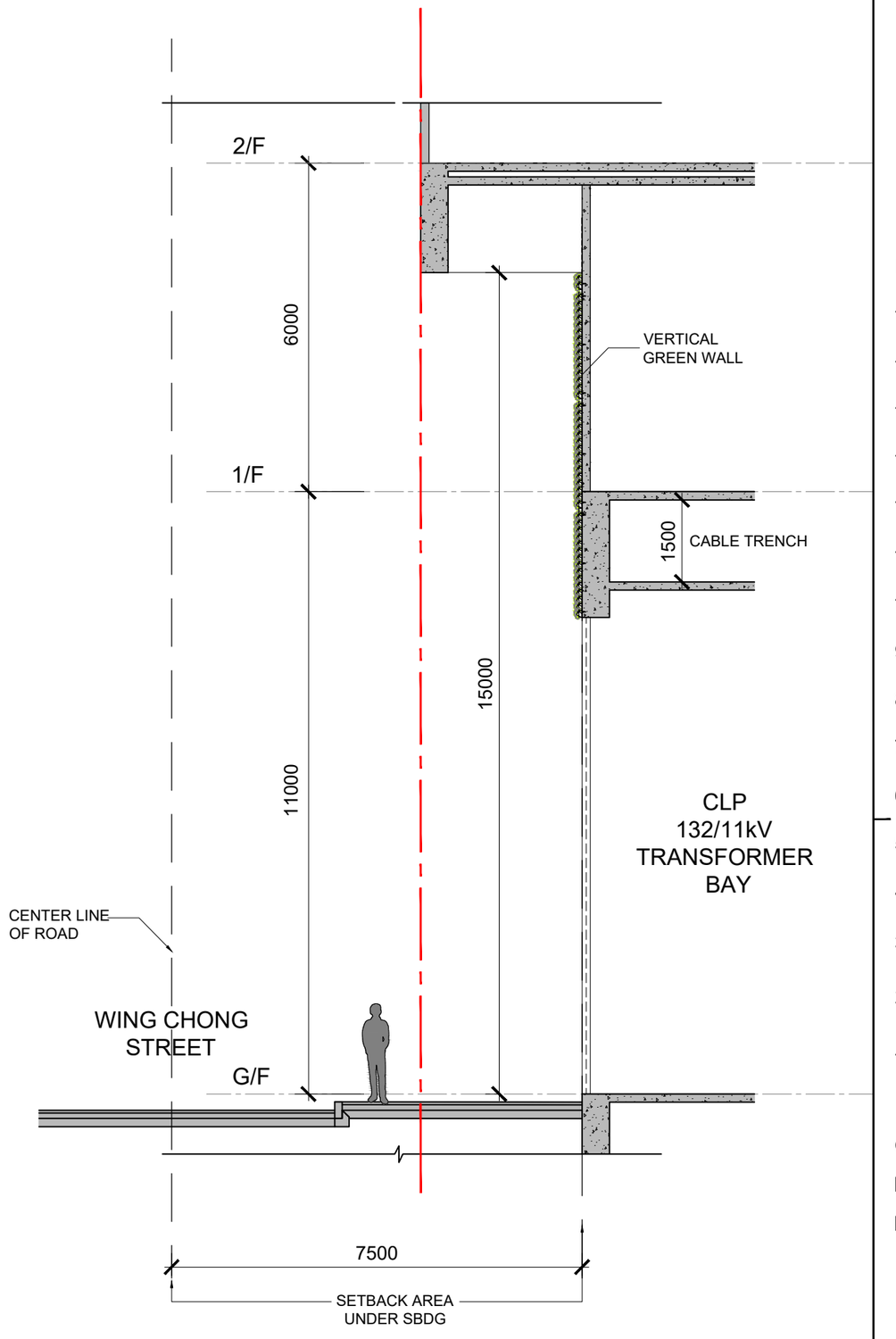
APPENDIX I
TENTATIVE SECTION PLAN



SECTION OF VERTICAL GREEN WALL

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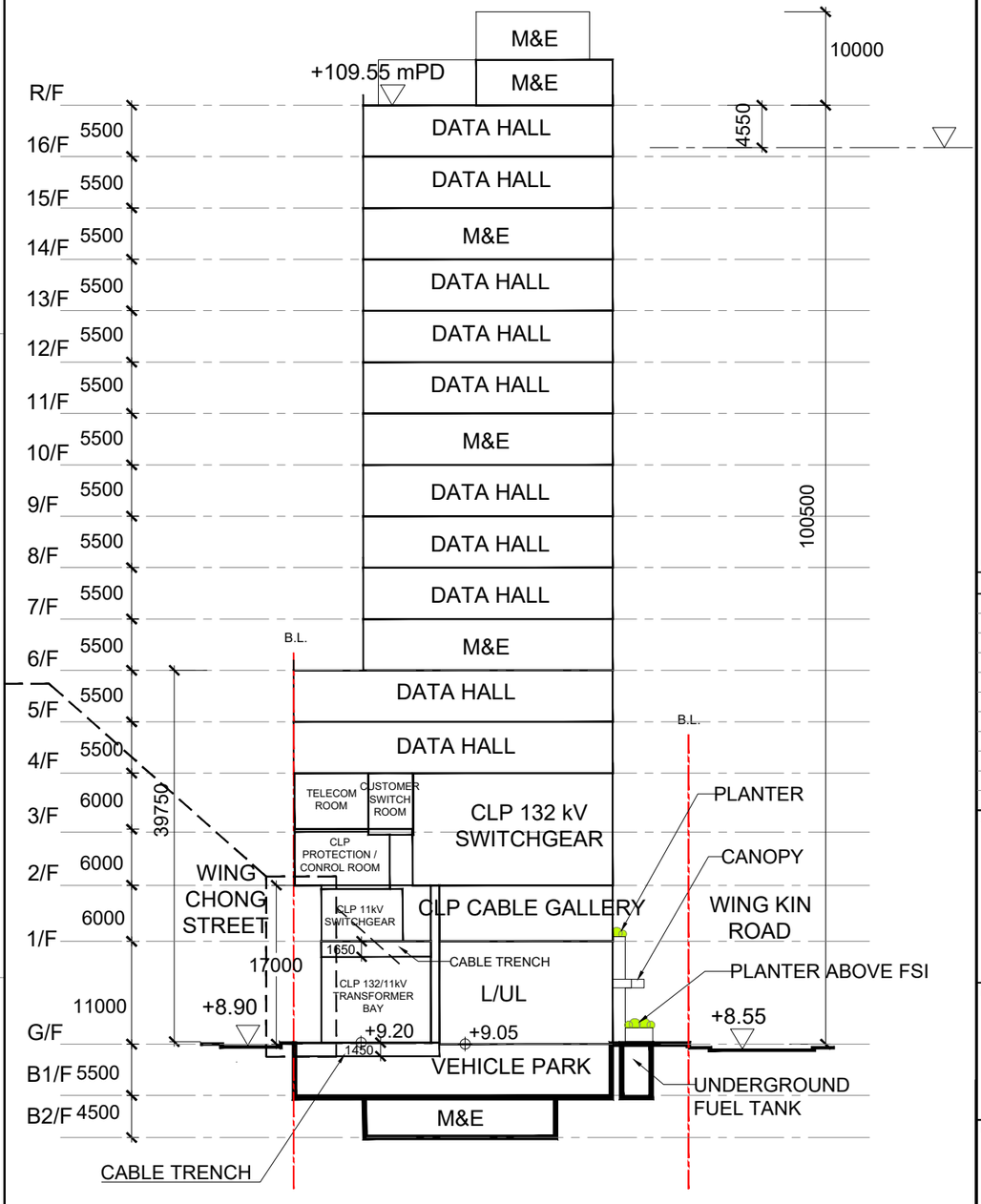

NOTES:

DO NOT SCALE DRAWINGS.

ALL DIMENSIONS MUST BE VERIFIED AT THE WORK BY THE CONTRACTOR.

REVISION

NO	DATE	DESCRIPTION

ARCHITECT

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STUDIO | RAYMOND CHAU | ARCHITECTURE | LIMITED

PROJECT NAME

PROPOSED DATA CENTRE
7-11 WING KIN ROAD
KWAI CHUNG, N.T.

DRAWING TITLE

SECTION A-A

DRAWN BY	CHECKED BY
TK	RC
SCALE	DATE
1:750	2025.06.18
JOB No.	DRAWING No.
2208	A-14

APPENDIX II
FRESH WATER MAINS RECORD PLAN

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. ALL LEVELS ARE IN METRES ABOVE PRINCIPAL DATUM.
3. INFORMATION ON ALIGNMENT OF MAINS IS OF INDICATIVE VALUE ONLY. WHERE POSITIONAL ACCURACY MAY BE OF IMPORTANCE, DETAILS SHOULD BE SITE CHECKED.
4. FOR MAINS RECORDS SIGN CONVENTIONS AND DESIGNATIONS SEE SKETCH NO. 3988.
5. NO PROPOSED WATER MAINS IN THE VICINITY OF THE SITE.
6. NO EXISTING WSD CABLE IN THE VICNITY OF THE SITE.
7. NO PROPOSED WSD CABLE IN THE VICNITY OF THE SITE.
8. THE SITE IS NOT WITHIN WSD GATHERING GROUNDS.
9. NO WSD LAND ALLOCATION / WWR WITHIN THE SITE AREA.
10. NO WSD SLOPES ARE AFFECTED IN THE VICINITY OF THE SITE.
11. ASBESTOS CEMENT / UNKNOWN MATERIALS MAINS WAS FOUND IN THE VICINITY OF THE SITE.
12. NO CATHODIC PROTECTION MAINS ON THE VICINITY OF THE SITE.

SUBJECT SITE

PART COPY OF FRESH WATER MAINS RECORD PLAN(S)

W67880/7-SW-21A & 21C

FILE REF: A/KC/510

REF. CODE: 18W25M	SHEET 1 OF 1	SCALE 1:800

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Water Supplies Department

APPENDIX III
SALT WATER MAINS RECORD PLAN

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. ALL LEVELS ARE IN METRES ABOVE PRINCIPAL DATUM.
3. INFORMATION ON ALIGNMENT OF MAINS IS OF INDICATIVE VALUE ONLY. WHERE POSITIONAL ACCURACY MAY BE OF IMPORTANCE, DETAILS SHOULD BE SITE CHECKED.
4. FOR MAINS RECORDS SIGN CONVENTIONS AND DESIGNATIONS SEE SKETCH NO. 3988.
5. NO PROPOSED WATER MAINS IN THE VICINITY OF THE SITE.
6. NO EXISTING WSD CABLE IN THE VICNITY OF THE SITE.
7. NO PROPOSED WSD CABLE IN THE VICNITY OF THE SITE.
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9. NO WSD LAND ALLOCATION / WWR WITHIN THE SITE AREA.
10. NO WSD SLOPES ARE AFFECTED IN THE VICINITY OF THE SITE.
11. ASBESTOS CEMENT / UNKNOWN MATERIALS MAINS WAS FOUND IN THE VICINITY OF THE SITE.
12. NO CATHODIC PROTECTION MAINS ON THE VICINITY OF THE SITE.

SUBJECT SITE

PART COPY OF SALT WATER MAINS RECORD PLAN(S)

W67881/7-SW-21A & 21C

FILE REF: A/KC/510

REF. CODE: 18W25M	SHEET 1 OF 1	SCALE 1:800

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Water Supplies Department

APPENDIX IV
DETAILED WATER DEMAND CALCULATION

Table A1 - Unit Daily Demand

Zone Type		Unit Demand Fresh Water [1]	Unit Demand Salt Water [2]	(unit)
Staff	R	0.35	0.11	m^3/head/day
Industrial (Tsuen Wan)	I	1600	210	m^3/ha/day
Planter (Irrigation)	IRR	7	0	L/m^2/day

[1] Unit Demand Fresh Water*:*

- Residential - 0.35 m^3/head/day, including service trade allowance, has been adopted for Staff.
- Industrial (Tsuen Wan) - 1600 m^3/ha/day.
- Irrigation Area - 7 litre / sq. meters of irrigation area / day.

[2] Unit Demand Salt Water*:*

- Residential - 0.11 m^3/head/day, including service trade allowance, has been adopted for Staff.
- Industrial (Tsuen Wan) - 210 m^3/ha/day.

Table A2 - Flow Velocity Limit

Pipe Diameter	Fresh Water Distribution Mains	(unit)
> DN700	≤ 3	m/s
DN700 - DN525	≤ 2.5	m/s
DN450 - DN375	≤ 2	m/s
DN300 - DN200	≤ 1.5	m/s
< DN200	≤ 1.5	m/s
Pipe Diameter	**Salt Water Distribution Mains**	**(unit)**
≥ DN1000	≤ 3.0	m/s
DN900 - DN800	≤ 2.5	m/s
DN700 - DN525	≤ 2	m/s
DN450 - DN300	≤ 1.5	m/s
< DN300	≤ 1.5	m/s

[1] Refer to ***WSD Departmental Instruction 1309***

Table B - Existing Water Demands

Non-Residential Area

	Category	Site Area (ha)	Unit Demand Fresh Water (m^3/ha/day)	Unit Demand Salt Water (m^3/ha/day)	Daily Demand Fresh Water (m^3/day)	Daily Demand Salt Water (m^3/day)
Industrial (Tsuen Wan) (I)	I	0.096	1600.000	210.000	153.986	20.211

Summary

	Daily Demand Fresh Water (m^3/day)	Daily Demand Salt Water (m^3/day)
Total	**153.986**	**20.211**

Table C1 - Water Demands of Water Cooling Tower System

		Unit	Remark
System Information			
Total chiller capacity	16940	kW	
Chiller COP	5.0		
Cooling tower heat Rejection	20328	kW	Note [1]
[T_{in}] Entering condensing water (T_{in})	32	°C	
[T_{out}] Leaving condensing water temp. (T_{out})	37	°C	
Working hour	24	hour/day	
Water Consumption Calculation			
[A] Cooling tower water flow rate	971.0	L/s	Notes [2] & [6]
[B] Evaporation loss	0.928%		Notes [3] & [7]
[C] Drift loss	0.005%		Note [4]
[D] Cycle of concentration	6		
[E] Bleed-off rate	0.181%		= [B - (D-1) x C] / ((D-1) Note [5]
[F] Required make-up water flow rate	**10.81**	L/s	= (B+C+E) x A
	934.22	m^3/day	
[G] Required bleed off water flow rate	1.754	L/s	= E x A
	151.51	m^3/day	

Notes:

[1] Chiller capacity + chiller power consumption

[2] Cooling Tower Flow Rate = Cooling Tower Heat Rejection / [Specific Heat Capacity of Water x (T_{out} - T_{in})]

[3] Evaporation loss = Specific Heat Capacity of Water * (Tout - Tin) / Vaporization Heat of Water

[4] According to section 3.6.5 of the COP (part 1) by EMSD

[5] According to the equation in section 3.4.3.1 of the COP (part 3) of EMSD

[6] Specific Heat Capacity of Water = 4.187 J/g°C

[7] Vaporization Heat of Water = 2256 KJ/kg

Table C2 - Proposed Water Demands

Staff

	Category	Population	Unit Demand Fresh Water (m^3/head/day)	Unit Demand Salt Water (m^3/head/day)	Daily Demand Fresh Water (m^3/day)	Daily Demand Salt Water (m^3/day)
Staff	R	25	0.350	0.110	8.750	2.750

Water Cooling Tower System

	Category	GFA (ha)	Unit Demand Fresh Water (m^3/ha/day)	Unit Demand Salt Water (m^3/ha/day)	Daily Demand Fresh Water (m^3/day)	Daily Demand Salt Water (m^3/day)
Water Cooling Tower System	N/A	N/A	N/A	N/A	934.223	0.0

Public Open Space

	Category	Area (m^2) [1]	Unit Demand Fresh Water (L/m^2/day)	Unit Demand Salt Water (m^3/ha/day)	Daily Demand Fresh Water (m^3/day)	Daily Demand Salt Water (m^3/day)
Planter (IRR)	IRR	289.260	7.000	0.000	2.025	0.0

Summary [3]

	Daily Demand Fresh Water (m^3/day)	Daily Demand Salt Water (m^3/day)
Total	**944.998**	**2.750**

Note:
[1] 30% of the Site area has been adopted for conservative assessment.

Table D - Summary of Water Demands

Fresh Water Demand

	Daily Demand - Fresh Water (m^3/d)		
	Existing	Proposed	Net Increase
Total	**153.986**	**944.998**	**791.012**

Salt Water Demand

	Daily Demand - Salt Water (m^3/d)		
	Existing	Proposed	Net Increase
Total	**20.211**	**2.750**	**-17.461**

Fresh Water Reservoir Capacity

Reservoir	Capacity (x 1,000 m^3)	Supply Capacity @ Capacity Factor = 0.8 (MLD) [1]	Existing Daily Consumption (MLD) [2]	Spare Capacity (MLD)	Remarks
Lai Chi Kok FWSR	93.702	117.13	54	**63.1**	The spare capacity of 63.1 MLD >> net increase of 0.8 MLD from the

Salt Water Pumping Capacity

Pumping Station	Design Pumping Capacity (MLD)	Existing Daily Consumption (MLD) [2]	Spare Capacity (MLD)	Remarks
Tsuen Wan SWPS	93.0	93.0	**0.0**	The salt water demend of the Proposed Development will be reduced

[1] For interconnected supply zone with critical consumers, the capacity of the Reservior should be (75% + 5%) = 80% of the mean daily demend.
[2] Average daily Consumptions provided by WSD in May 2025.

APPENDIX V
WATER DEMAND CALCULATION FOR WATER COOLING TOWER SYSTEM FROM PROJECTS BUILDING SERVICES ENGINEER

Project No.: 25-0005252
Project Name: Proposed Data Centre at No. 7-11 Wing Kin Road,Kwai Chung (K.C.T.L. 145)
Rev.: 1
Date: 07/28/2025

Cooling Tower Make Up and Bleed Off Water Flow Rate Calculation Sheet

Total chiller capacity		**16940.0**	kW		**Chiller COP**	**5.0**	
Cooling tower heat		**20328.0**	**kW**	(Chiller capacity + chiller power consumption)			
Entering condensing water	(T_{in})	**32**	**°C**	**Leaving condensing water temp.**	(T_{out})	**37.0**	**°C**

A **Cooling tower water flow rate** **971.0 L/s**

B **Evaporation loss** **= [Water Specific Heat Capacity * (T_{out} - T_{in}) / Water Vaporization Heat]*100**
= 0.928 %

C **Drift**
= 0.005 %
Note: according to section 3.6.5 of the COP (part 1) by EMSD

D **Cycle of concentration =** **6.0**
Note: Cycle of concentration shall be maintained at 6 for fresh water type cooling tower and

E **Bleed-off rate = {Evaporation loss-[(Cycle of concentration-1)xDrift loss]} / (Cycle of concentration-1)**
= 0.181 %
Note: according to the equation in section 3.4.3.1 of the COP (part 3) of EMSD

F **Required make-up water flow rate = (B+C+E)*A**
= 10.81 litre/sec
= 934.22 m^3/day

G **Required bleed off water flow rate = E*A**
= 1.75 litre/sec
= 151.51 m^3/day

H **Make-up water tank storage for** **24** **hours operation**

I **Required effective volume for make-up water tank = F**
= 934.22 m^3