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

# Noise Impact Assessment Report (V1.0)

February 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.

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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 Noise Impact Assessment (NIA) to assess and envisage the potential noise impact generated from the proposed development and its surrounding. Effective mitigation measures and recommendations are proposed to mitigate the excessive noise level to achieve an acceptable compliance level under the proposed design.
- 1.1.3 This NIA is prepared to support the planning permission from the Town Planning Board (TPB) under Section 16 of the Town Planning Ordinance (CAP. 131) for a data centre with minor relaxation of plot ratio restriction from 9.5 to 11.4, and height restriction from 105mPD to 109.55mPD.

#### 2 DESCRIPTION OF THE ENVIRONMENT

#### 2.1 The Site

- 2.1.1 The Application Site (the "Site") is located in an industrial area in Kwai Chung, bordered by Wing Chong Road 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 Applicant proposes to redevelop the Application Site into a 17-storey data centre with a height of 109.55 mPD and plot ratio of 11.4. The tentative layout of the proposed development is shown in **Appendix 2-1**, with a planned completion date of 2029.
- 2.2.2 The proposed development is intended solely for data centre use. It will feature a central mechanical ventilation system and will not rely on openable windows for ventilation. Therefore, potential noise impacts from road traffic and nearby fixed equipment are not anticipated.
- 2.2.3 In the current design, noisy equipment such as data servers and water pumps will be housed in fully enclosed spaces. While the majority of the HVAC equipment will be located indoors, water-cooling towers and some outdoor air conditioning units will be situated on the rooftop.

### 2.3 Overview of Existing Environment in the Surroundings

#### **Surrounding Environment**

2.3.1 The Site is located in the industrial area of Kwai Chung, surrounded by various industrial buildings. In addition to these, a secondary school and residential development are situated ~194m & ~289m, respectively, at northeast of the Site. A 1-storey building is located ~110m at northwest of the Site.

#### Surrounding Environment – Road Traffic

2.3.2 The Site is bordered by Wing Kin Road on the east and Wing Chong Street on the west, which both roads are classified as local distributors. According to the Annual Traffic Census 2023 (ATC 2023) published by the Transport Department, the nearest major road is Tsuen Wan Road (Station 5604), an expressway located approximately 90 m to the northeast of the Site, with an Average Annual Daily Traffic (AADT) of 122,780. Therefore, the traffic in the vicinity of the Site is considered heavy.

#### 3 LEGISLATION, STANDARDS & GUIDELINES

#### 3.1 Construction Noise

- 3.1.1 Construction noise is governed by the Noise Control Ordinance (NCO) (Cap. 400) which prohibits the use of PME during the restricted hours (7 p.m. to 7 a.m. on Monday to Saturday and any time on a general holiday, including Sunday) without a valid Construction Noise Permit (CNP) issued by the Authority. The criteria and procedures for issuing the permit are specified in the "Technical Memorandum on Noise from Construction Works Other than Percussive Piling" (TM1).
- 3.1.2 For construction works other than percussive piling, although TM1 does not provide control over daytime construction activities, the noise limits are set out in the "Practice Note for Professional Persons Environmental Consultative Committee" (ProPECC) "Minimizing Noise from Construction Activities" (PN1/24).

#### 3.2 Road Traffic Noise

3.2.1 HKPSG provides guidance on acceptable road traffic noise levels at the openable windows of various types of noise sensitive buildings. The relevant criteria are shown in **Table 3-1**.

Table 3-1 HKPSG Road Traffic Noise Planning Criteria

Uses	Road Traffic Noise L <sub>10</sub> , (1hr) dB(A)
Domestic Premises	70
Hotel and Hostels	70
Offices	70
Educational institutions	65
Hospital & Clinics	55
Places of public worship and courts of law	65

Note: The above criteria apply to noise sensitive uses which rely on opened window for ventilation.

- 3.2.2 The following Practise Notes provide guideline to facilitate the project planning and design against road traffic noise impact.
  - "ProPECC PN3/23 Application of Sound Insulation in Residential Buildings to Reduce Noise Transmission Between Units" provides technical information on the design and application of sound insulation on partition walls and floors between residential units for better privacy protection and indoor sound environment.
  - "ProPECC PN4/23 Practice Note for the Planning of Residential Developments against Road Traffic Noise" recommends mitigation measures against road traffic noise in planning stage and promulgates self-assessment procedures to facilitate the planning approval.
  - "ProPECC PN5/23 Application of Innovative Noise Mitigation Designs in Planning Private Residential Developments against Road Traffic Noise Impact" provides guidance on technical information for innovative mitigation measures (Acoustic Window and Enhanced Acoustic Balcony) against road traffic noise.

#### 3.3 Fixed Noise

- 3.3.1 Fixed noise sources, such as the building services system, ventilation system, and the operation of the Project is controlled under the NCO and "Technical Memorandum for the Assessment of Noise from Places Other Than Domestic Premises, Public Places or Construction Sites" (IND-TM). According to the IND-TM, the Acceptable Noise Level (ANL) for a Noise Sensitive Receiver (NSR) is determined by the Area Sensitive Ratings (ASR); which classify a NSR based on the type of the area within, and the degree of the effect on the NSR of particular Influencing Factors (IFs). The different types of area containing the NSR are categorized into the rural area, low density residential area, urban area and other areas, with reference to Table 1 of the IND-TM. While the IFs, defined as industrial areas or area containing a number of factories or major road with an annual average daily traffic flow (AADT) in excess of 30,000, should be assessed for their influence on the NSR according to the degree of influence ("not affected", "indirectly affected" and "directly affected").
- 3.3.2 The HKPSG states that all planned fixed noise sources should be located and designed so that when assessed in accordance with the IND-TM, the level of the intruding noise at the façade of the nearest sensitive use should be at least 5 dB(A) below the appropriate ANL shown in Table 2 of the IND-TM or the background noise level, whichever is lower. When the prevailing background noise levels would be adopted as the assessment criteria, the prevailing background noise levels, L<sub>90</sub>(1-hour), at the relevant NSRs shall be measured during the typical operation hours of the fixed plant within daytime, evening and night times. The Acceptable Noise Levels (ANLs) for different Area Sensitivity Ratings (ASRs) are given in **Table 3-2**.

Table 3-2 Acceptable Noise Levels for Fixed Noise Impact (ANLs), dB(A), Leq, (30mins)

Time Period	ASR A	ASR B	ASR C	
Day (0700 to 1900 hours)	60	65	70	
Evening (1900 to 2300 hours)	60	05	70	
Night (2300 to 0700 hours)	50	55	60	

- 3.3.3 The Site is located in the urban area of Kwai Chung, surrounded by various industrial buildings. Tsuen Wan Road, with an AADT exceeding 30,000, is located to the northeast of the Site. The proposed development and its surroundings are directly affected by the industrial area and major road, and are therefore classified as 'ASR C'.
- 3.3.4 Given the industrial activity and heavy traffic in the vicinity, the prevailing background noise level is expected to be higher than ANL-5dB during both daytime and nighttime. The criteria for the planned fixed noise sources of the proposed development are 65 dB(A) for daytime and evening, and 55 dB(A) for nighttime. Additionally, since the proposed development does not rely on openable windows for ventilation, the criteria for existing fixed noise sources affecting the proposed development are not applicable.

#### 4 CONSTRUCTION NOISE IMPACT ASSESSMENT

#### 4.1 Potential Noise Impact and Proposed Mitigations

- 4.1.1 The use of powered mechanical equipment (PME) will generate construction noise impact to the nearby NSRs. The major noise emitting activities will be the demolition of existing structures and foundation works of future development.
- 4.1.2 As the Site is situated in a well-developed urban area, the number of PME that it can accommodate is limited, however, the noise from construction activities may still be an impact if the construction works are not planned and arranged properly.
- 4.1.3 ProPECC PN1/24 "Minimizing Noise from Construction Activities" provides construction noise requirements and recommendations on practices such as quieter construction methods and equipment to minimize construction noise.
- 4.1.4 To minimize noise generation, subject to detailed site works arrangement, the contractor shall consider the following mitigation measures, if necessary and applicable:
  - Use non-percussive equipment such as hydraulic crusher, sawing, coring machines for demolishing existing building and structure
  - Use non-percussive piling diving method such as hydraulic press-in method, vibration or jacking method for foundation work
  - Use Quality Powered Mechanical Equipment (QPME) recognized by the Environmental Protection Department (EPD). The QPME shall be registered with EPD, and valid label issued by EPD shall be affixed on the QPME all times.
  - Use Quieter Construction Methods<sup>1</sup> as far as practicable
  - Schedule work to minimize concurrent activity and duration of impact
  - Regular maintenance of equipment to prevent noise emission due to impairment
  - Adopt good site practice, such as throttle down or switch off equipment unused or intermittently used between works
  - Position mobile noisy equipment in locations away from nearby NSRs and point the noise sources to directions away from NSRs
  - Make good use of other structures for noise screening
  - Use of mobile noise barriers/enclosures along the path of noise propagation
- 4.1.5 Construction activities under the current design involves concrete removal works, demolition works, site formation/excavation works and superstructure works. Subject to detailed site works arrangement, the contractor shall consider the following mitigation measures, if necessary and applicable:

#### Concrete Removal Works / Demolition Works:

- Use of high-pressure water jetting instead of traditional jackhammers and drill hammers;
- Use of quieter type wire saws or diamond wire saws for cutting large areas and heavily reinforced concrete;

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Quieter Construction Methods: https://www.epd.gov.hk/epd/misc/construction\_noise/contents/index.php/en/home2/quieter-construction-methods.html.

- Use of quieter type blade saws utilizing diamond blades with higher speeds and smoother blades reduces excitation of vibration;
- Use of hydraulic crushers for concrete breaking instead of traditional excavatormounted breakers;
- Use of handheld concrete crushers instead of traditional jackhammers;
- Use of hydraulic splitters instead of traditional jackhammers and breakers.

#### Site Formation / Excavation Works:

- Use of silent piling by press-in method instead of traditional massive augering and piling machines or drop hammer for sheet piling / channel planking installation work;
- Use of a sheet piling noise reducer such as a suitable shock absorber to reduce collisions between sheet pile / channel planking and holding parts;
- Use of pile driving impact cushions to reduce noise generated by piling impact;
- Pre-augering/pre-trench/boring pile holes to remove underground obstruction for avoiding hard driving / soften the ground;
- Use of crack inducers instead of traditional percussive breakers.

## Superstructure Works:

- Use of prefabricated structure / sections to replace in-situ construction to reduce the amount of mechanical equipment used on site;
- Use of self-compacting concrete (without the aid of a vibrator e.g. poker for compaction) for in-situ concreting;
- Use of crack inducers instead of traditional percussive breakers.
- 4.1.6 With proper noise mitigation measures implemented during the construction phase, no adverse noise impact arising from the construction activities is expected.

#### 5 OPERATION NOISE IMPACT ASSESSMENT

## 5.1 Traffic Noise and Existing Fixed Noise Sources

5.1.1 Since the proposed development does not rely on openable windows for ventilation, potential impacts from traffic noise and existing fixed noise sources are not anticipated. Consequently, the criteria for these noise sources affecting the proposed development are not applicable.

#### **5.2** Planned Fixed Noise Sources

Representative Noise Sensitive Receivers during Operation Phase

5.2.1 Representative NSRs within 300m assessment boundary have been selected for the assessment as listed in **Table 5-1** and illustrated in **Figure 5-1**.

Table 5-1 Representative Noise Sensitive Receivers for Planned Fixed Noise Sources of the Proposed Development

NSR			Noise Crite	eria, dB(A)	Building	Nearest Horizontal Distance to Site Boundary (m)	
ID	Description	Use	Daytime Night & Evening Time		Height (mPD) [1]		
NSR01	Wing Hau Street Driving Test Centre	Office	65	55	25	109	
NSR02	Kwai Shing West Estate Block 8	Domestic Premise	65	55	125	289	
NSR03	CNEC Lee I Yao Memorial Secondary School	Educational Institution	65	55	50	194	

Note:

[1] Estimated values.

#### Planned Fixed Noise Sources and Design Consideration

- 5.2.2 Potential noise impacts may arise from the equipment of the proposed development during the operation phase.
- 5.2.3 The equipment with potential noise impacts is identified including chiller plants and water-cooling towers. According to the current design, most HVAC equipment will be located indoors, while water-cooling towers and some outdoor air conditioning units will be situated on the rooftop.
- 5.2.4 Exposed equipment may directly impact nearby NSRs, while noise from indoor HVAC equipment will transmit through ventilation pipes and emit at duct exhausts.
- 5.2.5 The noisy equipment is located at the southern portion of the roof (109.55mPD; refer to roof layout in **Appendix 2-1**). The nearest NSR with a direct line of sight to the noise source is 289m to the northeast of the site, adverse noise impact is not anticipated.

- 5.2.6 To mitigate noise from indoor HVAC equipment, ventilation pipes will be equipped with silencers to reduce in-duct noise levels. Acoustic louvres will also be used, when necessary, to ensure compliance with the maximum allowable sound power level.
- 5.2.7 Other equipment, such as data servers, water pumps, and lift motors, will be housed in enclosed rooms, so no adverse noise impacts to the surroundings are anticipated.
- 5.2.8 To ensure that the noise sources of the proposed development comply with the relevant noise criteria stipulated in the HKPSG, the noisy equipment will be designed to adhere to the maximum allowable sound power level (SWL). The maximum allowable SWL has been further calculated as described in the following sections.

Assessment Methodology

5.2.9 The predicted fixed noise level at the NSR could be quantified by the following standard formula:

$$SPL = SWL - DC - BC + FC + TC$$

where,

• SPL: Sound Pressure Levels at receiver, in dB(A)

• SWL: Sound Power Levels of Fixed Noise Sources, in dB(A)

• DC: Distance Correction,  $DC = 20 \times log10$  (D) + 8, D is the slant distance between the NSR and noise source in meters. However, for simplicity and conservatism, horizontal distance has been adopted instead of slant distance

• FC: Façade Correction of 3dB(A)

• BC: Barrier Correction of 10dB(A) when direct line-of-sight is completely blocked by building

• TC: Tonality Correction of 3dB(A) is assumed

#### Maximum Allowable SWL at Site Boundary

- 5.2.10 The maximum allowable SWL at the site boundary has been calculated based on the horizontal distance between the nearest representative NSR (NSR01) and the site boundary. A 3 dB correction has been applied to account for tonal characteristics for assessment purposes. If the noise exhibits tonal, intermittent, or impulsive characteristics during operation, the maximum allowable SWLs of the fixed equipment should be adjusted according to the recommendations in Section 3.3 of the IND-TM. The maximum allowable SWL at the site boundary are summarized in **Table 5-2** and detailed in **Appendix 5-1**.
- 5.2.11 Although the layout is still in the early stages and detailed designs, such as the number of units and their noise levels, are not yet available, no adverse fixed noise impacts to the NSRs are anticipated if the choice of equipment, installation locations, and mitigation measures are properly designed.

**Table 5-2** Maximum Allowable Sound Power Level for the Building Service Equipment of the Proposed Development

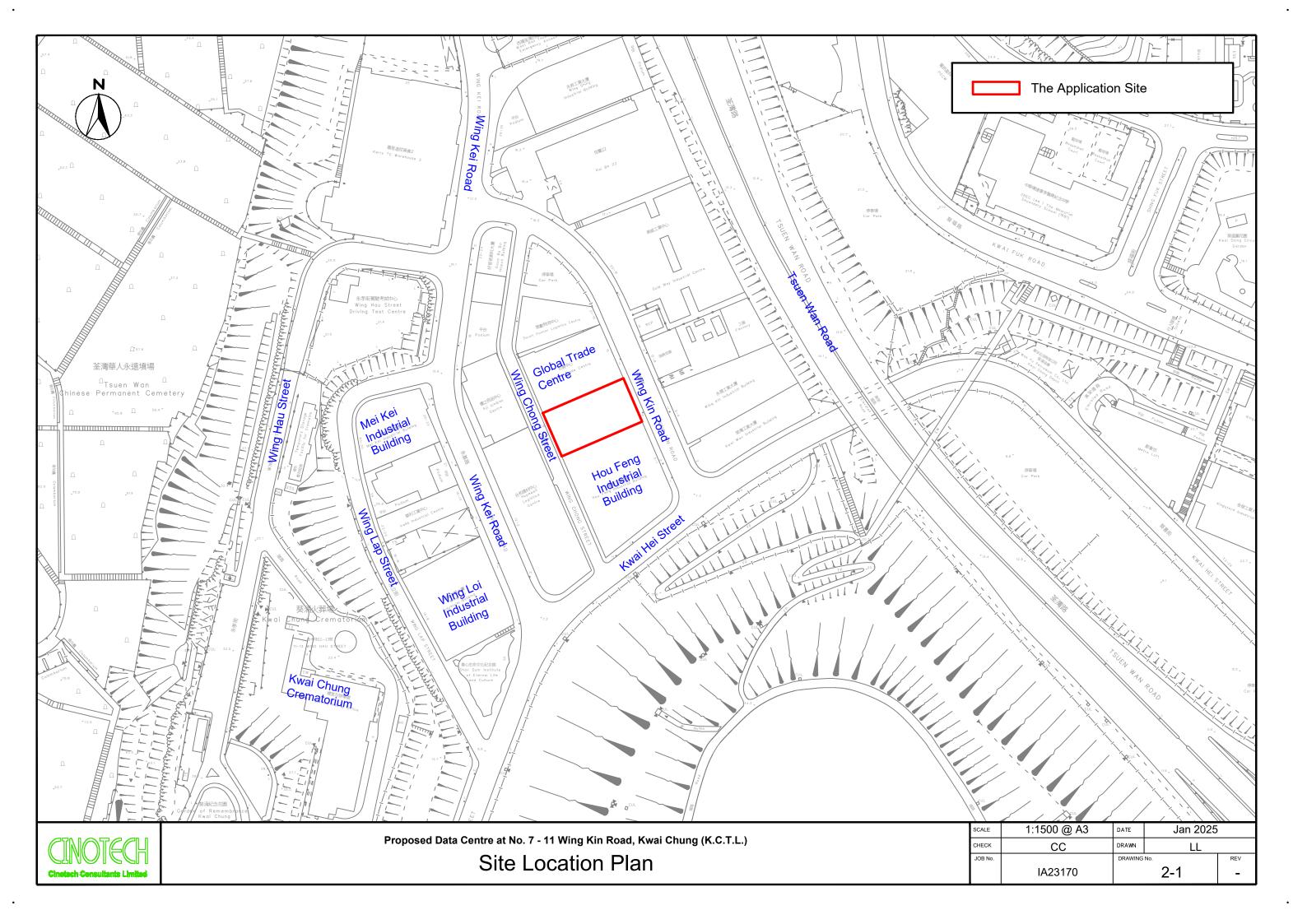
Time Period	Maximum Allowable SPL at the NSR (NSR01), dB(A)	Horizontal Distance from the Project Site Boundary to the worst NSR, m	Correction, dB(A) [1]		Allowable Sound Power Level at Source, dB(A) [2]	
			Distance	Facade	Tonality	
Day and Evening Time (07:00-23:00)	65	109	-49	3	3	107
Night Time (23:00 – 07:00)	55	109	-49	3	3	97

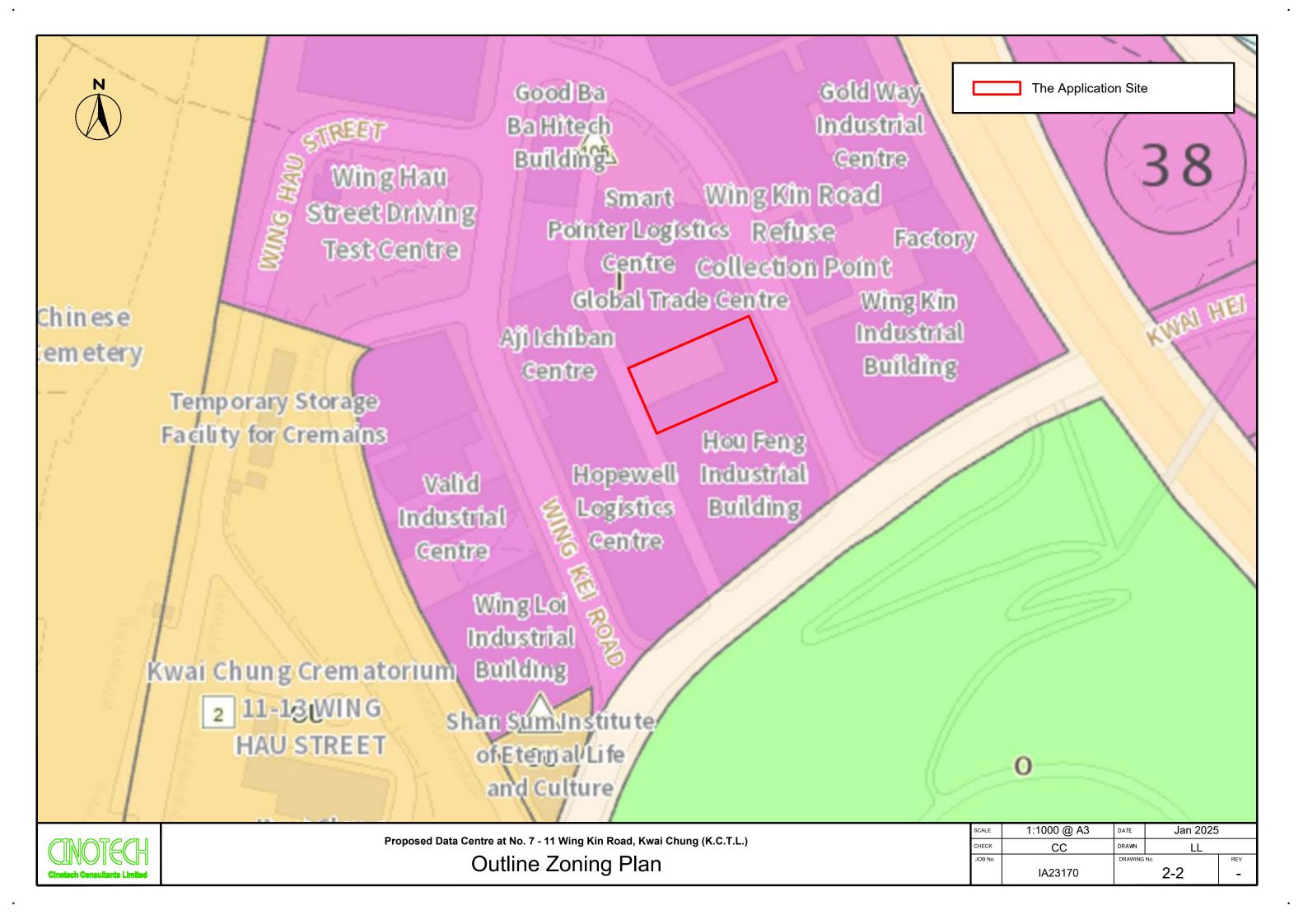
For assessment purpose, a 3 dB of tonality has been adopted.
The Maximum Allowable Sound Power Level at Source should be corrected by the tonality, intermittency, & impulsiveness correction of the selected equipment, according to Section 3.3 of the IND-TM. [1] [2]

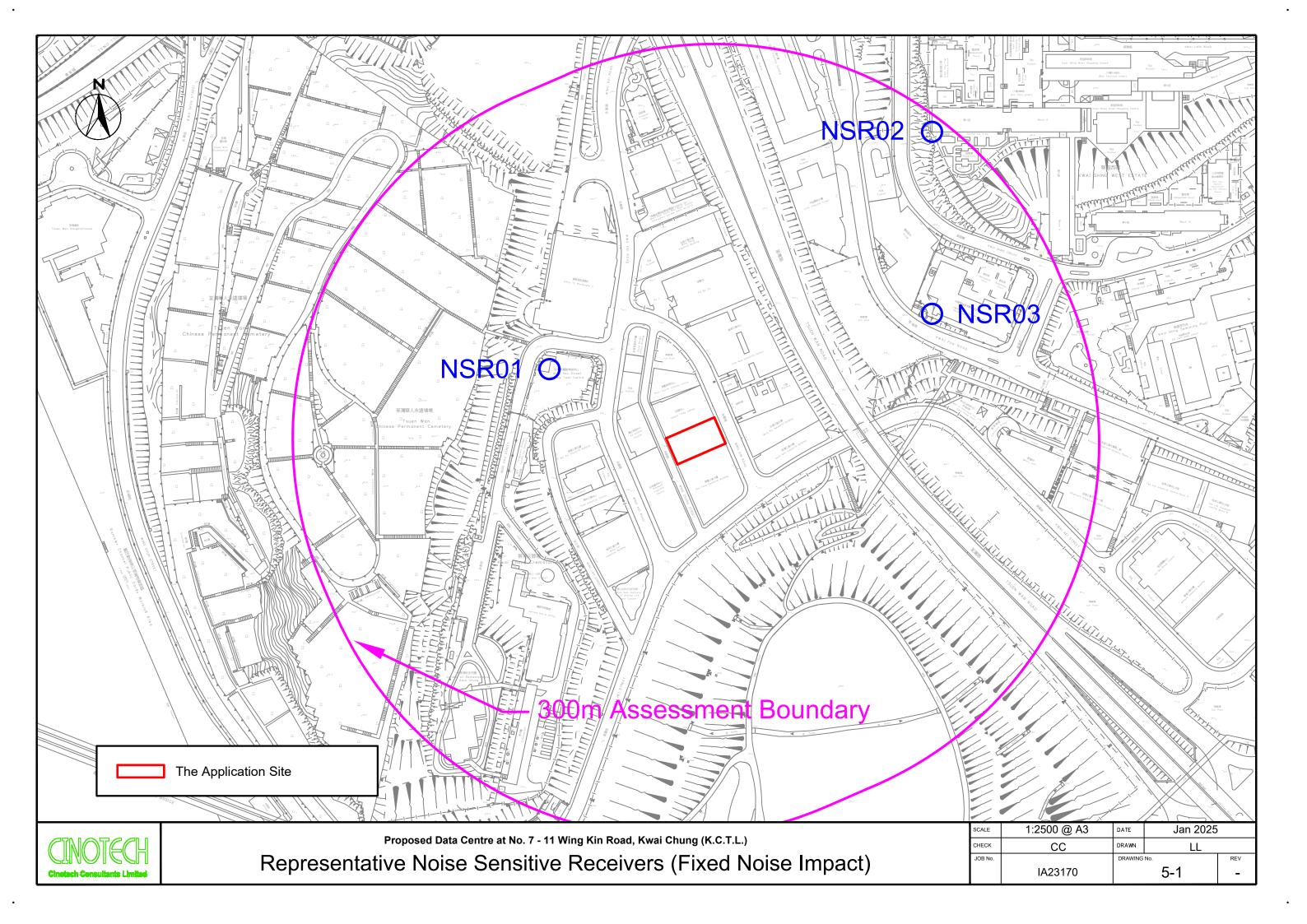
#### 6 CONCLUSION

- 6.1.1 The potential noise impacts from the construction and operation of the proposed development have been assessed.
- 6.1.2 The overall noise impact during the construction phase is considered insignificant. Depending on the detailed site work arrangements, mitigation measures will be implemented as necessary and applicable, in accordance with ProPECC PN 1/24, to minimize construction noise impacts on nearby NSRs.
- 6.1.3 The provision of openable windows for ventilation is not anticipated. Therefore, potential noise impacts from road traffic and existing fixed noise sources on the proposed development are not expected.
- 6.1.4 The planned fixed noise sources of the proposed development should not cause any adverse noise impacts if the maximum allowable SWLs are properly implemented. Thus, no planned fixed noise impacts are anticipated.

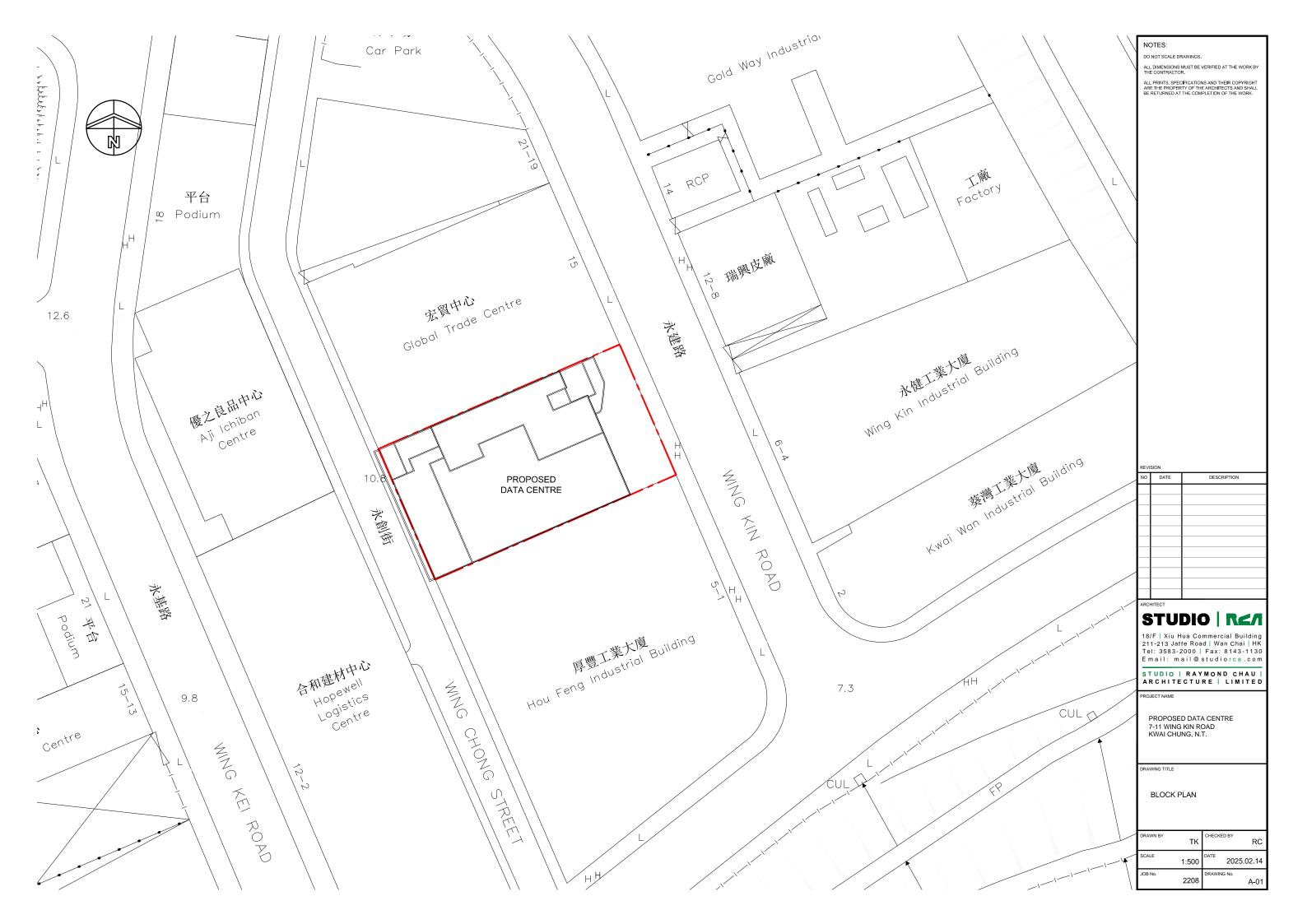
## **FIGURES**







## APPENDIX 2-1 LAYOUT OF THE PROPOSED DEVELOPMENT





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STUDIO | RAYMOND CHAU | ARCHITECTURE | LIMITED

PROJECT NAME

4

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

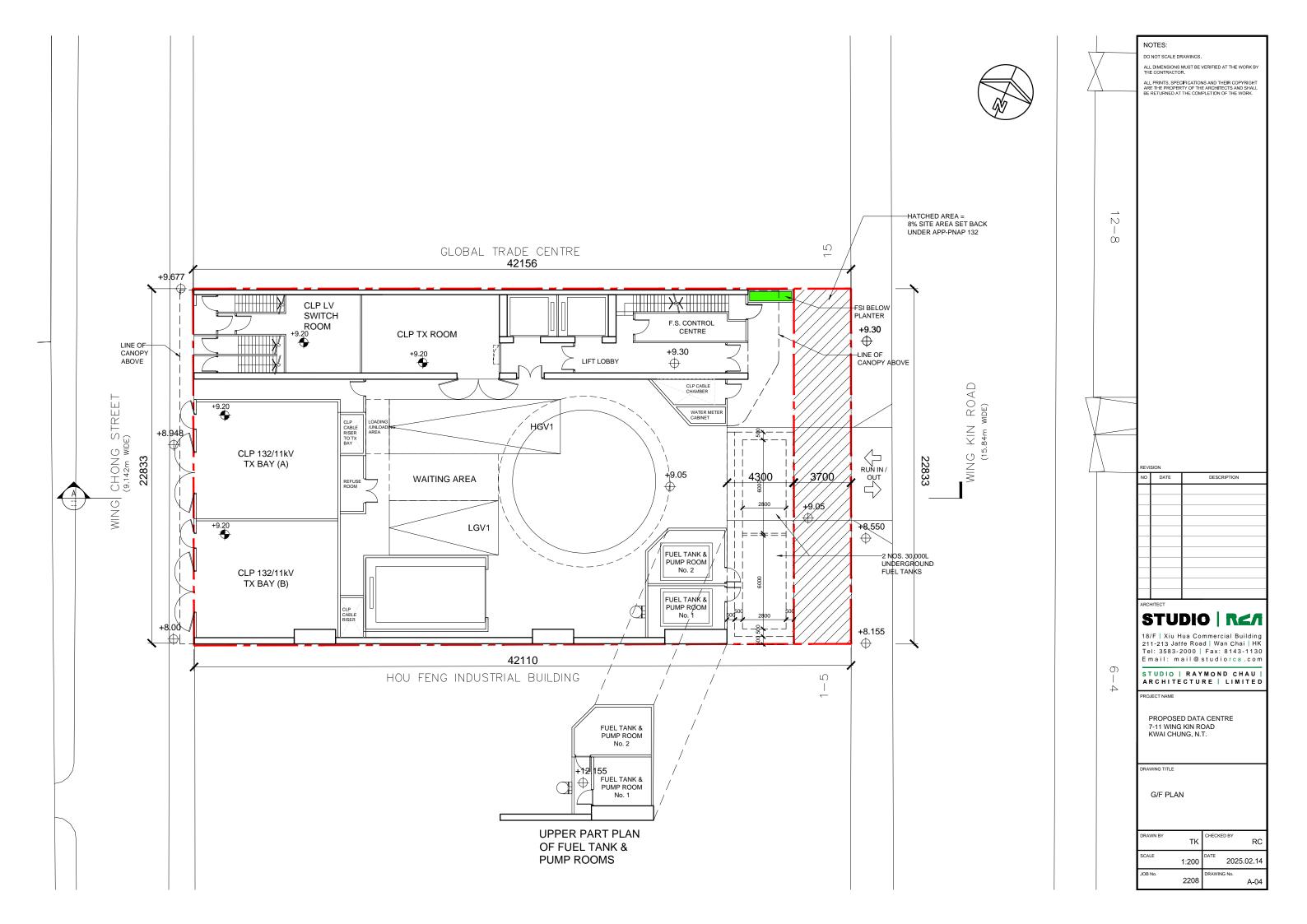
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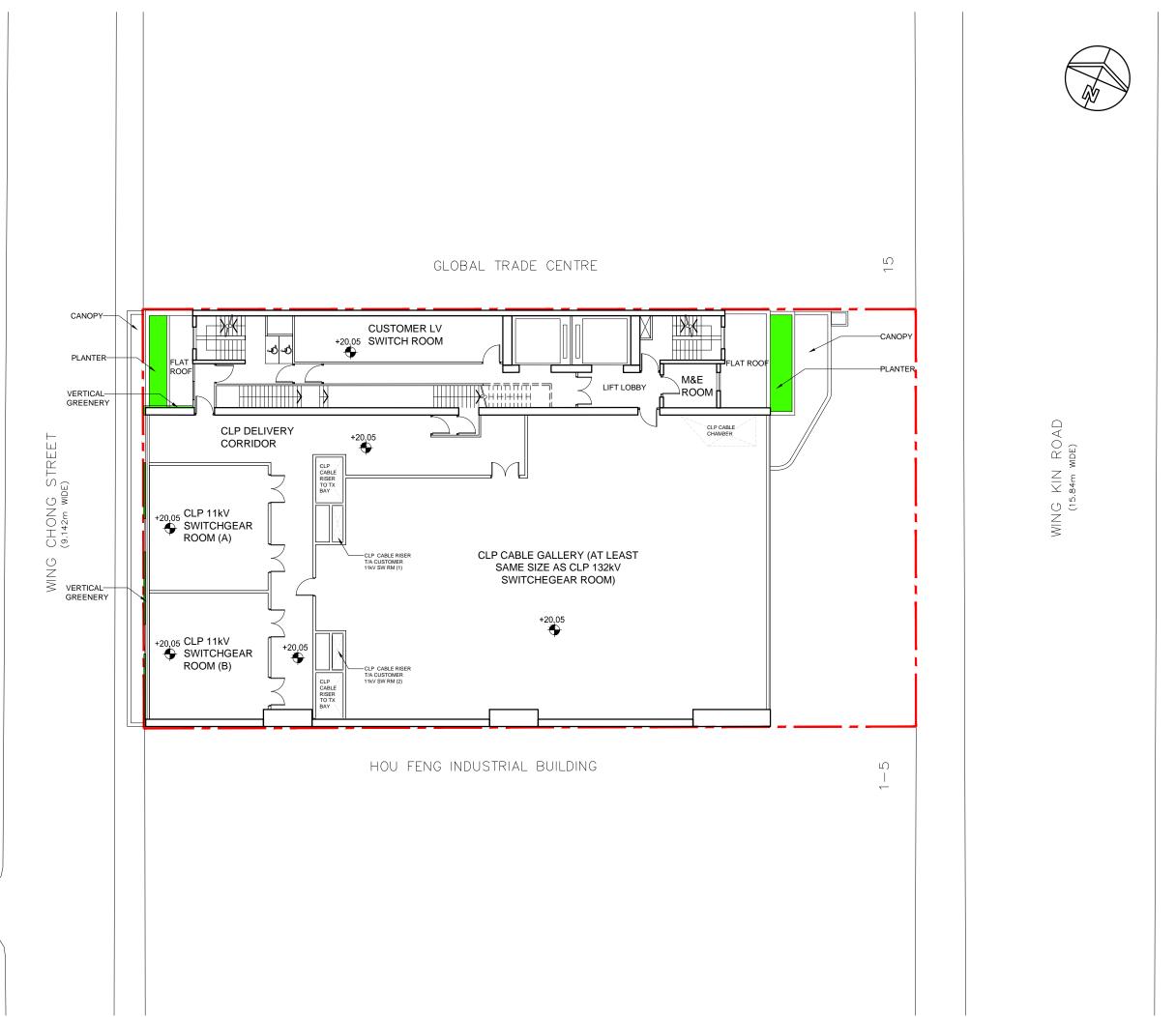
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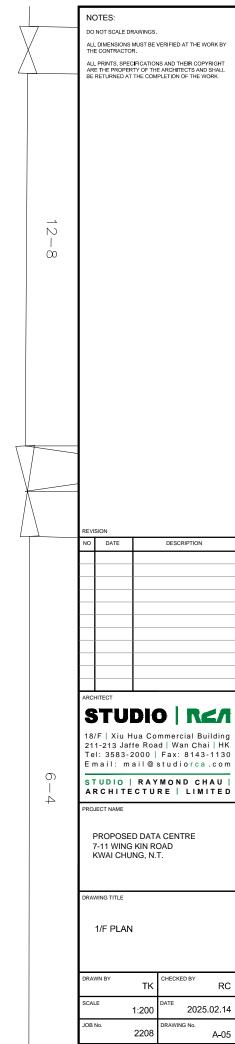
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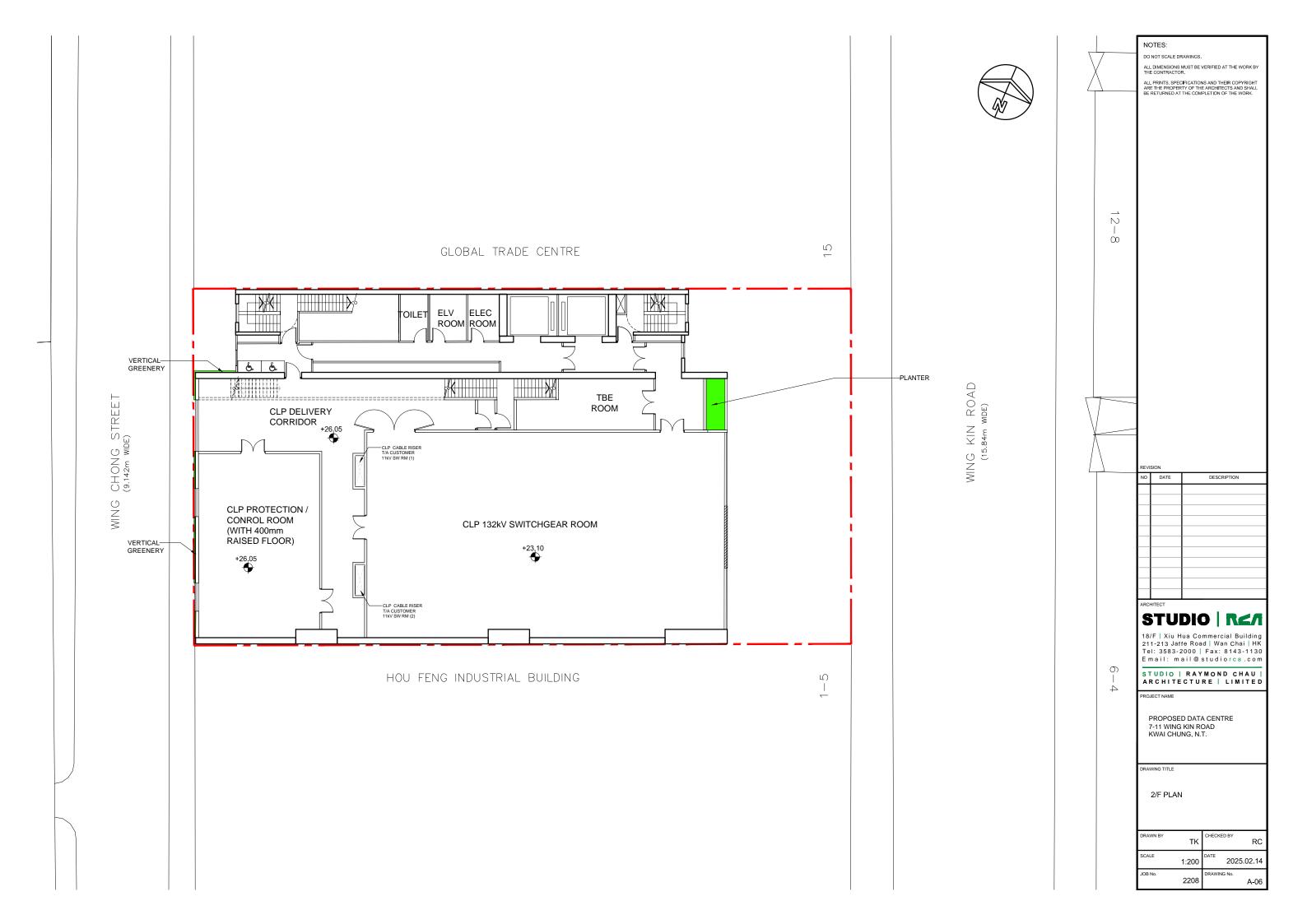
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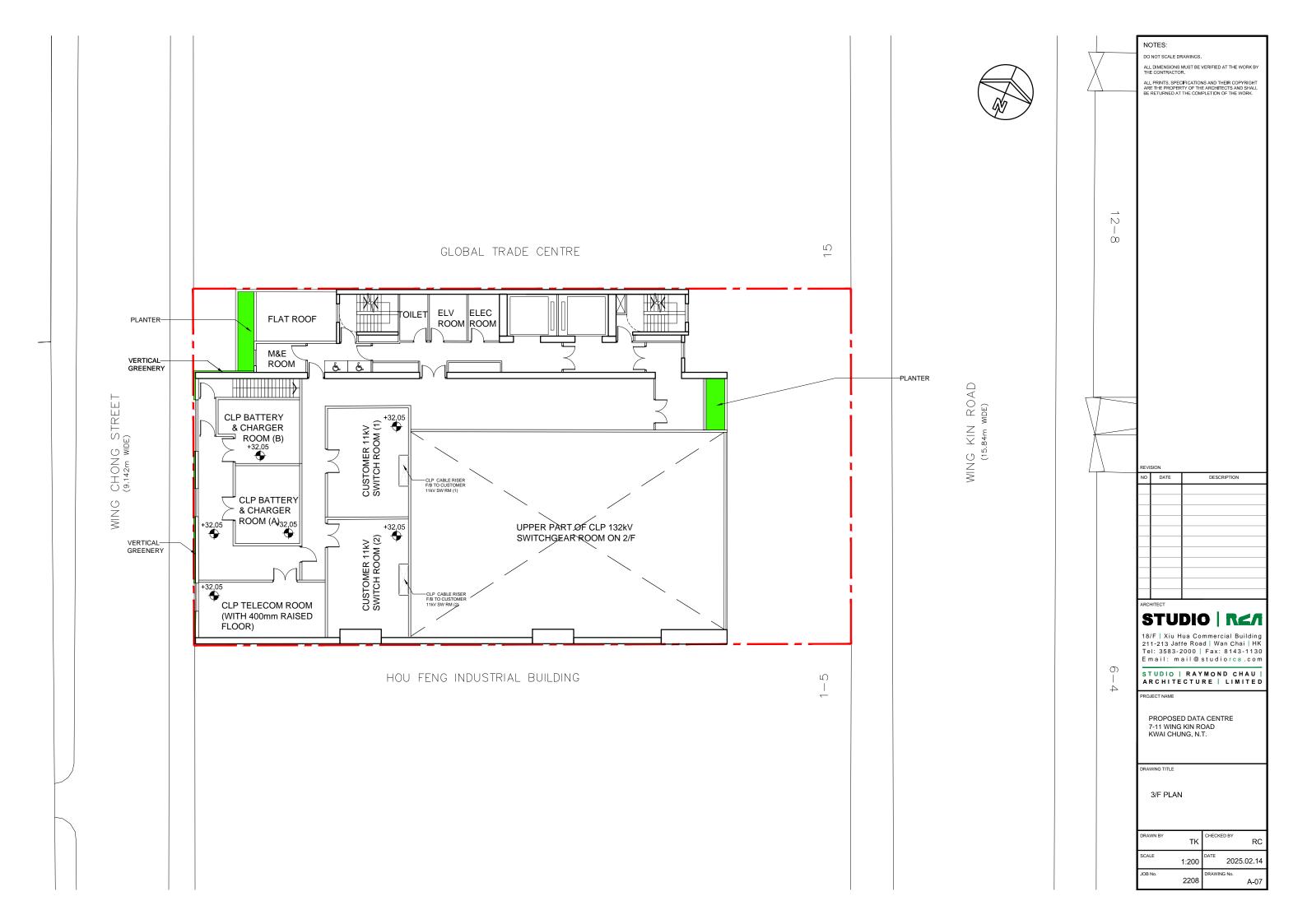
WING CHONG STREET (9.142m WIDE)





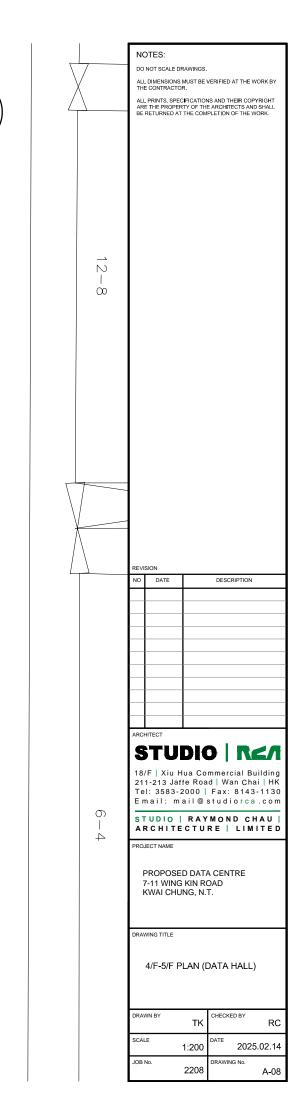






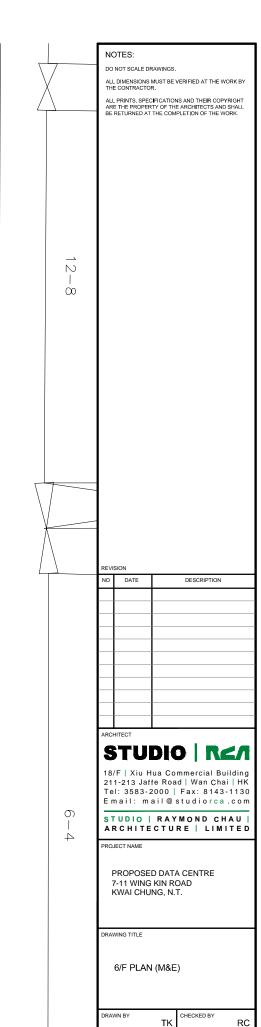
WING

WING KIN ROAD (15.84m WIDE)



WING

WING KIN ROAD (15.84m WIDE)



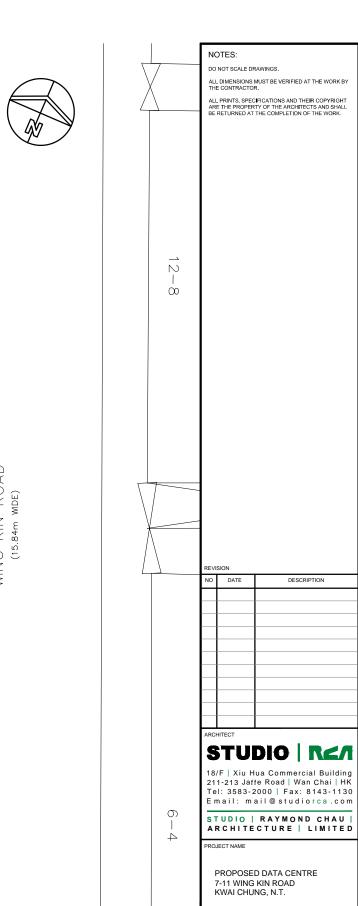
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WING KIN ROAD (15.84m WIDE)



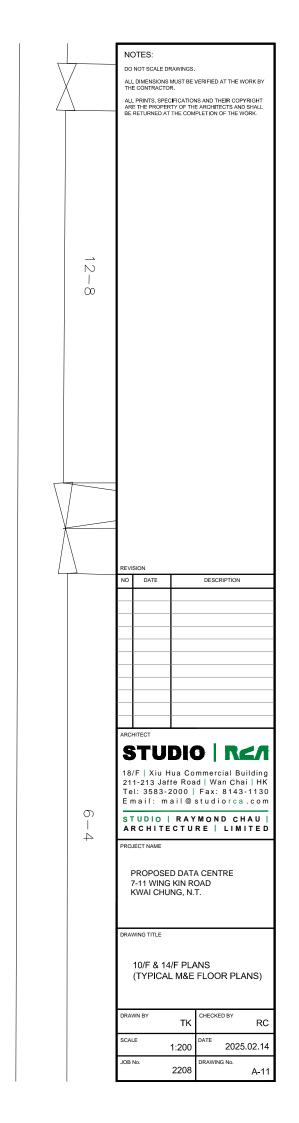
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7/F-9/F, 11/F-13/F & 15/F-16/F PLANS (TYPICAL DATA HALL FLOOR PLANS)

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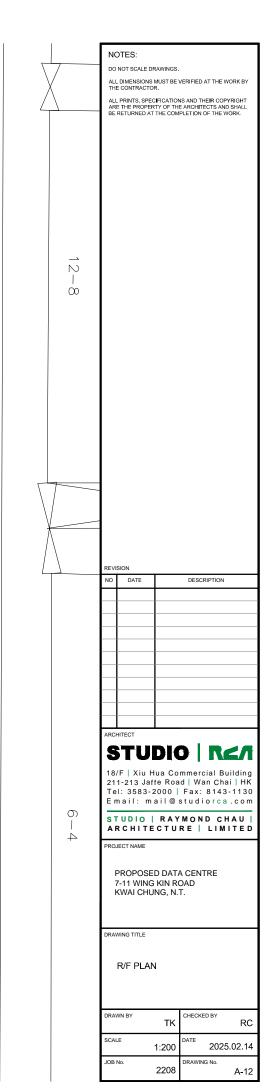
WING KIN ROAD (15.84m WIDE)



WING



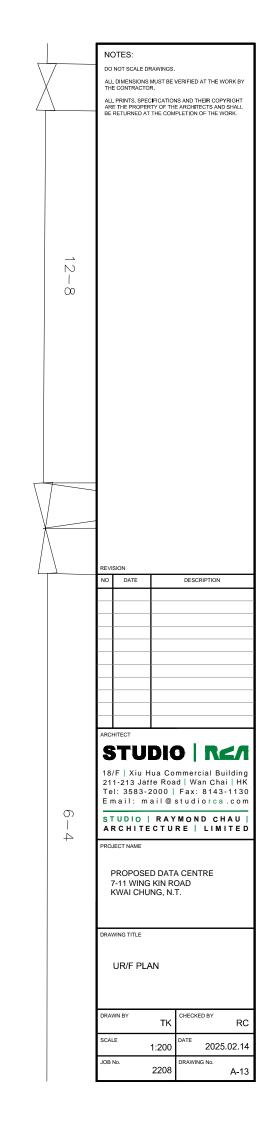
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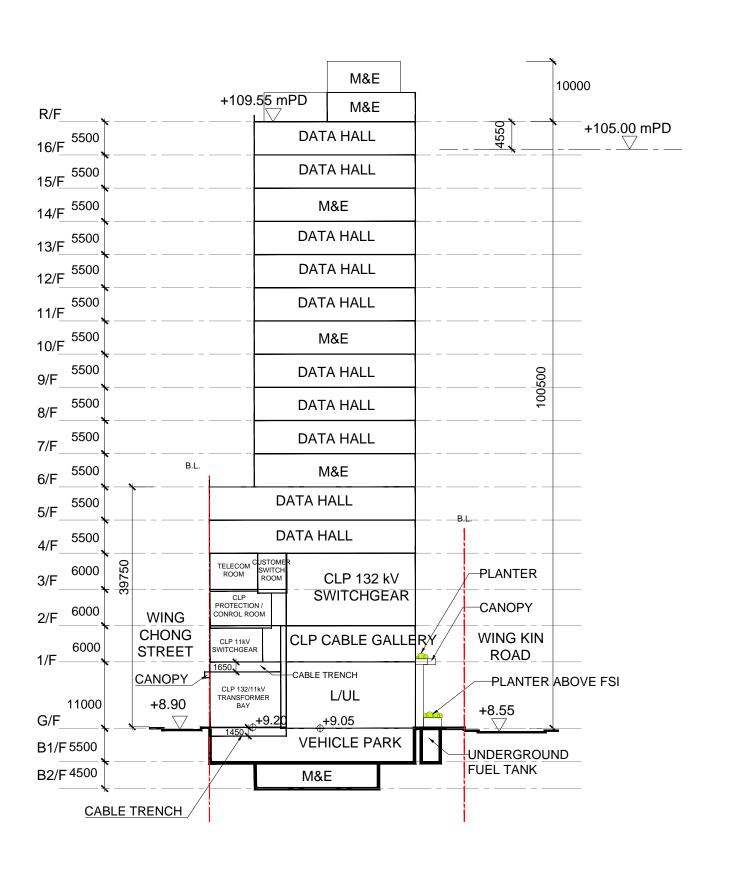


WING



WING KIN ROAD (15.84m wide)





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NO	DATE	DESCRIPTION					

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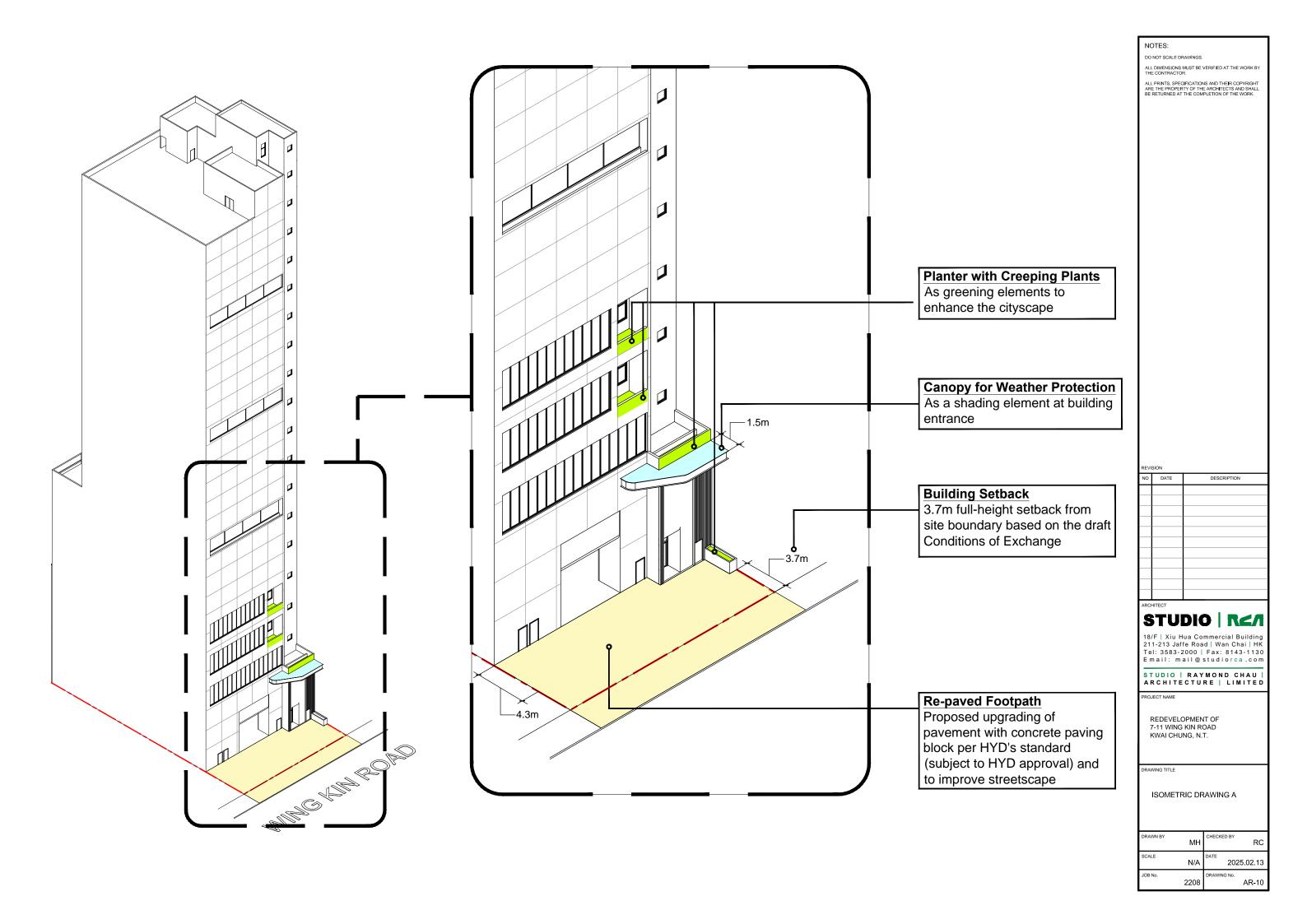
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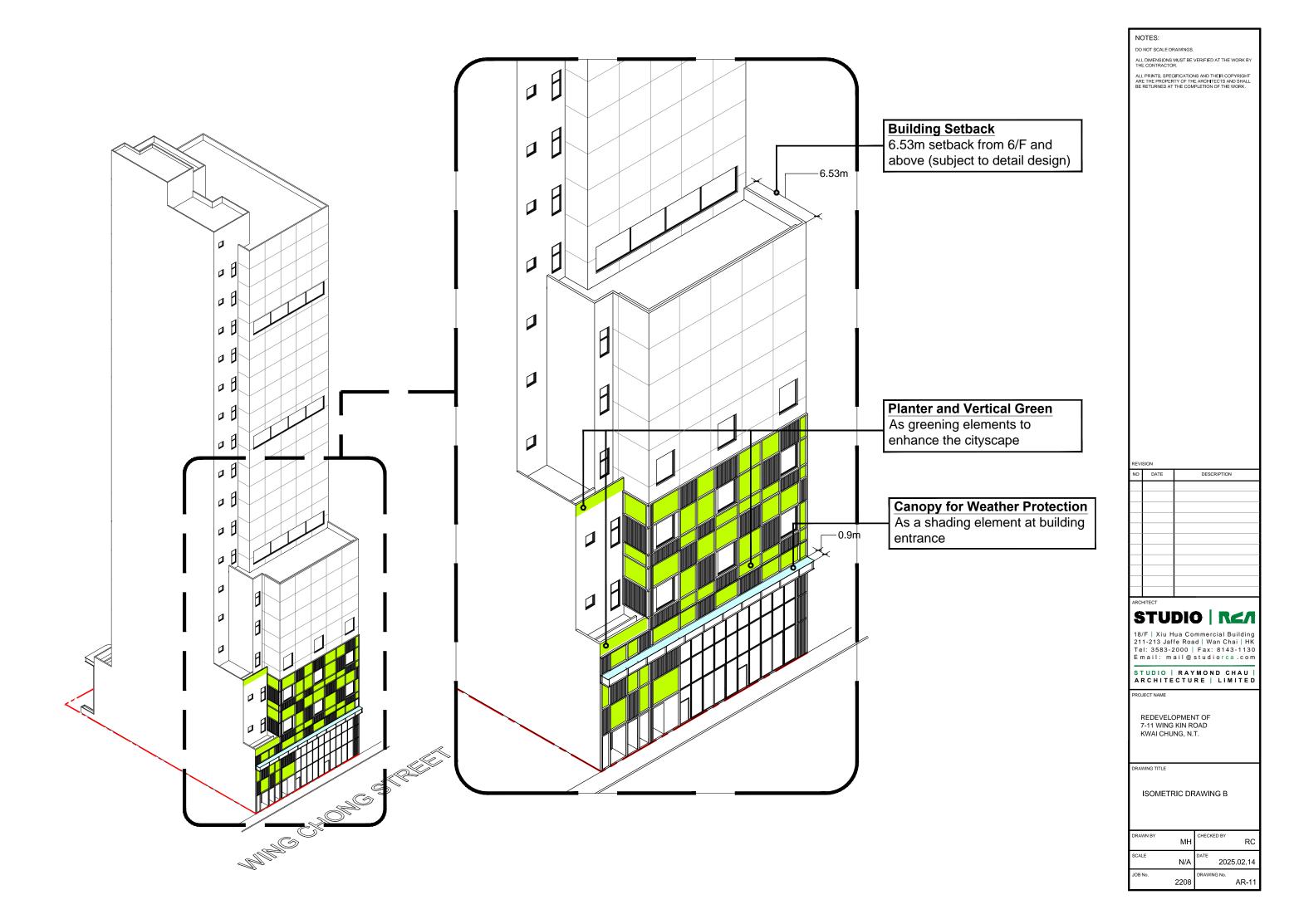
PROPOSED DATA CENTRE 7-11 WING KIN ROAD KWAI CHUNG, N.T.

RAWING TITLE

SECTION A-A

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APPENDIX 5-1 MAXIMUM ALLOWABLE SWL AT SOURCE FOR PLANNED FIXED NOISE

## Maximum Allowable SWL at Source for Planned Fixed Noise

Noise Sensitive Receiver (ID)	Description	Nearest Distance to the Representative NSR, metres	( correction	Barrier Correction, dB(A)	Façade Correction, dB(A)	Tonality Correction, dB(A)	Maximum Allowable SPL at NSR, dB(A)	Maximum Allowable SWL at Site Boundary, dB(A) [1]	Adopted Maximum Allowable SWL at Site Boundary, dB(A)
		Ι	Day and Ever	ning Time (0'	7:00-23:00)				
NSR01	Wing Hau Street Driving Test Centre	109	-49	0	3	3	65	107	
NSR02	Kwai Shing West Estate Block 8	289	-57	0	3	3	65	116	107
NSR03	CNEC Lee I Yao Memorial Secondary School	194	-54	0	3	3	65	112	
			Night Ti	me (23:00 –	07:00)				
NSR01	Wing Hau Street Driving Test Centre	109	-49	0	3	3	55	97	
NSR02	Kwai Shing West Estate Block 8	289	-57	0	3	3	55	106	97
NSR03	CNEC Lee I Yao Memorial Secondary School	194	-54	0	3	3	55	102	

Note:

<sup>[1]</sup> Maximum Allowable SWL at Source is rounded down for conservative approach.