

Appendix V
Drairage & Sewerage Impact Assessment

Prepared for

Health Link Investment Limited

Prepared by

Ramboll Hong Kong Limited

**PROPOSED COMPREHENSIVE DEVELOPMENT AT 8 LAM CHAK
STREET, KOWLOON – N.K.I.L. 6215**

DRAINAGE AND SEWERAGE IMPACT ASSESSMENT

Date **March 2026**
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Signed 

Approved by **Calvin Chiu**
Technical Director

Signed 

Project Reference **CHPHBSHQEI00**

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1. INTRODUCTION

1.1 Project Background

- 1.1.1 The Application Site at No. 8 Lam Chak Street is currently occupied by an office building (Harbourside HQ). The project proponent is proposing to redevelop the Subject Site to residential uses with retail facilities and clubhouse.
- 1.1.2 Ramboll Hong Kong Limited is commissioned by the Applicant to conduct this Drainage and Sewerage Impact Assessment (DSIA) based on the Proposed Development.

1.2 Subject Site and its Environs

- 1.2.1 The Subject Site is currently zoned as “Commercial (2)” (“C(2)”) under Kai Tak Outline Zoning Plan (No. S/K22/8). The site area is approximately 6,541m².
- 1.2.2 An existing building, Pacific Trade Centre, is located to the adjacent northeast. An existing LPG filling station is located some 30m apart to the north of the Subject Site. Kai Tak Fire Station is located on opposite side of Cheung Yip Street to the northwest and is about 40m apart. Kerry Dangerous Goods Waterhouse is situated at waterfront and separated from the Subject Site by around 40m to the south. The Quayside (office building) is on northeast side of Kwun Tong Bypass at more than 120m apart. The more recently completed Hong Kong Children’s Hospital is separated from the Subject Site by around 145m to the southwest.
- 1.2.3 There are a number of planned developments nearby. New Acute Hospital (NAH) is being constructed on the opposite side of Cheung Yip Street to the northwest. A waterfront site is on opposite side of Kai Hing Road to the southeast which was occupied by a godown and is being redeveloped as private residential development. Another site is on opposite side of Lam Chak Street to the southwest which is currently occupied by Lam Chak Street Substation and Public Works Central Laboratory Building and is planned to be redeveloped as private residential development. Regarding this private residential development, a S16 planning application was submitted in 2024 with minor relaxation of plot ratio and building height restriction (Application No. A/K22/43).
- 1.2.4 The location of the Application Site and its surrounding environs are shown in **Figure 1.1**.

1.3 Proposed Development

- 1.3.1 The Proposed Development has 2 residential towers (T1 & T2), ancillary residential facilities (e.g. clubhouse), retail and car parking facilities. One swimming pool will be provided on 2/F. The ground level of the development will remain at 4.5mPD.
- 1.3.2 There will be altogether 1,140 flats, clubhouse of 1,800 m² and commercial area of 3270 m² (retail area of 1,635m² and F&B area of 1,635m²). The tentative occupation year of the development is 2033.
- 1.3.3 The Master Layout Plan (MLP) of the Proposed Development is included in **Appendix 1.1**.

2. DRAINAGE IMPACT ASSESSMENT

2.1 Appraisal of Drainage Impact

- 2.1.1 The Application Site is served by existing public drainage system. There is a Ø600mm drainage pipes (SWD4079122 and SWD4079123) to receive runoff from the Application Site and then connected to the existing Ø1200mm drainage pipe (SWD4055086) along Kai Hing Road. The Application Site currently is 100% paved and occupied by office building.
- 2.1.2 The estimated surface runoff under the existing and future conditions of the Application Site is shown in **Appendix 2.1**. 30% greenery coverage would be provided for the Proposed Development as a resilient measure. The peak 1 in 50-year runoff from the site is expected to decrease from 0.343m³/s to approximately 0.308m³/s after development. In other words, there will be a reduction of surface runoff when compared with the existing condition due to increased greenery. The surface runoff generated from the Application Site will be collected and connected to the aforementioned drainage pipe (existing manhole SMH4067261).
- 2.1.3 A proposed 300mm peripheral channel will be provided as shown in **Figure 2.1**. The details of the peripheral channel will be designed in detailed design stage. **Existing drainage pipes (SWD4079230 and SWD4079121) will be abandoned.**
- 2.1.4 As the total paved area and in turn the surface runoff is expected to decrease after development, it is anticipated that there is no adverse impact on the existing drainage pipe receiving runoff from the site.
- 2.1.5 It is expected that the Proposed Development (with reduced surface runoff) would not result in worsened drainage impact.
- 2.1.6 In addition, the ground level will be raised to 4mPD as another measure to ensure flood resilience of the development.

3. SEWERAGE IMPACT ASSESSMENT

3.1 Scope of Work

3.1.1 The aim of this study is to assess whether the existing sewerage facilities serving the Subject Site are sufficient to cope with the sewage flow from the Proposed Development and, if appropriate, to identify necessary improvement works and/or alternative disposal options.

3.2 Assessment Criteria and Methodology

3.2.1 Environmental Protection Department's (EPD's) Guidelines for Estimating Sewage Flows for Sewerage Infrastructure Planning, Version 1 (GESF) has been referred to for the purposes of estimating the quantity of the sewage generated from the Proposed Development and the existing catchment area. Sewage flow parameters and peaking factors in this document have been adopted for this SIA.

3.2.2 Based on the building types in the area, the following unit flow factors are used in the SIA calculation:

- Residents: 0.27 m³/person/day (R2)
- Clubhouse Staff: 0.28 m³/day (J11 - Community, Social & Personal Services)
- Retail employee: 0.28 m³/day (J4 - Wholesale & Retail)
- F&B employee: 1.58 m³/day (J10 - Restaurants & Hotels)
- Office employee: 0.08 m³/day (J6 - Finance, Insurance, Real Estate & Business Services)
- Manufacturing employee: 0.53 m³/day (J1 - Manufacturing + East Kowloon)

3.2.3 Catchment Inflow Factor (P_{CIF}) of East Kowloon (1.10) has been applied in the assessment.

3.3 Existing and Future Sewerage System

3.3.1 According to the GeoInfo Map, there are two of the Ø225mm sewers (FWD4061280 and FWD4061281) connected to the Ø525mm sewer (FWD4048825) along Kai Hing Road and then discharged to the 2.5m x 2.3m box culvert.

3.3.2 The existing sewers in the vicinity of the Application Site are shown in **Figure 3.1**.

3.3.3 Based on the drainage plan (see **Appendix 3.2**), the existing manhole (FLH4013520) is serving the Application Site. The sewerage system from the Proposed Development will be connected to the existing manhole (FLH4013520) and then convey sewage via sewers along Kai Hing Road.

3.3.4 Based on the Planning Application (A/K22/43) (**Appendix 3.3**), the planned development of Site 3E1 and Site 3E2 will be discharged to the existing manhole FMH4036432 (at Kai Hing Road) and FMH4096818 (at Cheung Yip Street) respectively. Therefore, the planned development of 3E2 would not be included as the upstream catchment.

3.4 Wastewater Generated by the Proposed Development

3.4.1 Wastewater arising from the Proposed Development will be primarily contributed by residents and staff.

3.4.2 Detailed calculation for the Proposed Development is given in **Table 3.1** below and **Appendix 3.1**.

Table 3.1 Estimated Peak Flow

| Development Parameters | Proposed Development | | | |
|--|----------------------|---------------------|--------------------------|-----------------------|
| | Residential Tower | Clubhouse | Commercial Area (Retail) | Commercial Area (F&B) |
| Total number of units | 1,180 | - | - | - |
| Assumed Area (m ²) | - | 1,800 | 1,635 | 1,635 |
| Number of Population | 2950 ⁽¹⁾ | 59 | 57 | 83 |
| Design Flow (m ³ /person/day) | 0.27 ⁽²⁾ | 0.28 ⁽³⁾ | 0.28 ⁽⁴⁾ | 1.58 ⁽⁵⁾ |
| Flow Rate (m³/day) | 796.5 | 16.6 | 16.0 | 131.1 |
| Total Flow Rate with P_{CF} (m³/day) | 1056.3 | | | |
| Peak Flow (L/s) | 73.4 | | | |
| Peak Flow with backwash from Swimming Pool | 85.7 | | | |

(1) 2021 Population Census – Average Household Size of 2.5 in Kwun Tong Central District

(2) Refer to Table T-1 of GESF – Private R2

(3) Refer to Table T-2 of GESF – J11 Community, Social & Personal Services

(4) Refer to Table T-2 of GESF – J4 Wholesale & Retail

(5) Refer to Table T-2 of GESF – J10 Restaurants & Hotels

3.5 Discussion

- 3.5.1 Wastewater from the Proposed Development will be discharged to the existing sewerage manhole nos. FLH4013520 (S1).
- 3.5.2 The potential sewerage impact due to the Proposed Development has been quantitatively addressed. Sewage generation rate from the Application Site is estimated to be: 1056.3m³/day (i.e. peak flow 85.7 litre/sec with backwash from swimming pool).
- 3.5.3 According to Table 4a of **Appendix 3.1**, regarding the sewage generation rate from the Proposed Development and surrounding areas (**Figure 3.2**), one of the existing sewer pipe (S2-S3) would not have adequate capacity to receive the flow and one existing sewer pipe (S5-S6) would slightly over 90% under the worst case scenario.
- 3.5.4 However, as the capacity of the concerned existing sewer pipe (S5-S6) would not over 100%, the freeboard is found to be sufficient as presented in Table 5a and 5d of **Appendix 3.1**. Therefore, further upgrading of this section (S5-S6) is not considered necessary.
- 3.5.5 As such, only upgrading work for the existing sewer pipe (S2-S3) is proposed and summarized in **Table 3.2** below. The proposed upgraded pipe will be handed over to DSD for maintenance.

Table 3.2 Proposed Upgrading Work

| Segment | Manhole Reference | Manhole Reference | Length (m) | Original Size (Ø) | Upgraded Size (Ø) |
|---------|-------------------|-------------------|------------|-------------------|-------------------|
| S2-S3 | FMH4051820 | FMH4043147 | 14.1 | 225 | 300 |

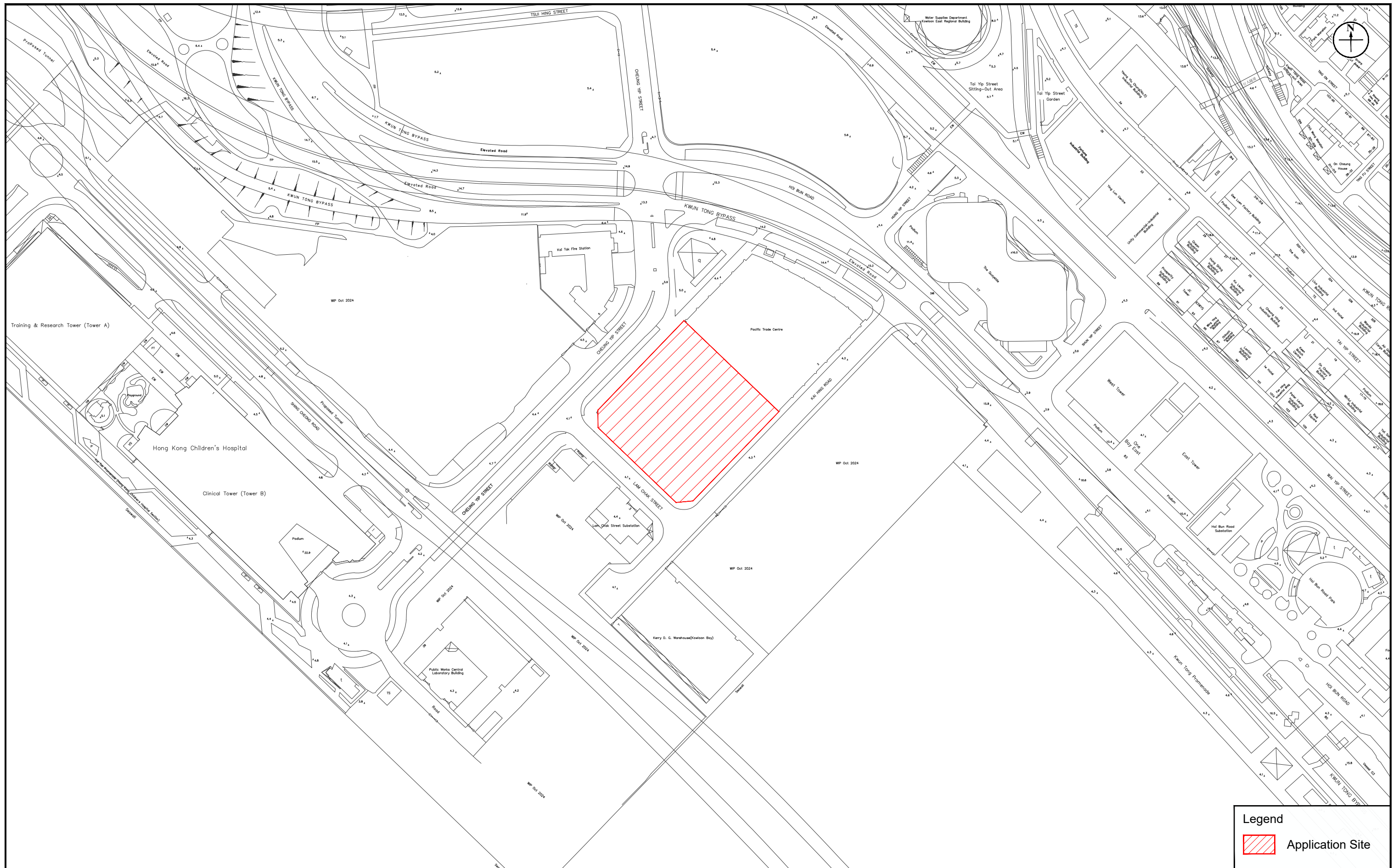
- 3.5.6 With the upgrading work in place, the sewerage system will have adequate capacity to cater the sewage from the Proposed Development and nearby catchments.

4. OVERALL CONCLUSION


4.1 Conclusion


- 4.1.1 A composite development is proposed at No.8 Lam Chak Street, Kowloon Bay. The potential sewerage impact has been quantitatively addressed.
- 4.1.2 The Application Site is currently served by public drainage system. The Proposed Development would result in reduced surface runoff and would follow the same flow regime as per existing condition (connected to the existing manhole SMH4067261). It would not result in worsened drainage impact. Resilient measures in terms of 30% greenery and raised ground floor level are provided.
- 4.1.3 Sewage generated from the Proposed Development will be discharged and connected to the existing manhole nos.: FLH4013520 (S1).
- 4.1.4 Based on the sewerage impact assessment results, it is found that the capacity of part of the existing sewerage system serving the area would not be sufficient to cater for cumulative sewage generated from the Proposed Development and nearby catchment areas. One existing sewerage pipe (S2-S3) will be upgraded to Ø300mm pipe. In addition, sufficient freeboard was found along S5-S6 so that no upgrading work is proposed.
- 4.1.5 With the proposed upgrading work in place, the hydraulic capacity will be adequate to receive cumulative sewage discharge. This SIA confirms the feasibility of the Proposed Development in terms of impact on the public sewerage system.

Figures



Legend

 Application Site

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| <p>Figure: 1.1</p> <p>Title: Location of the Application Site and its Environs</p> <p>Project: Proposed Comprehensive Development at 8 Lam Chak Street, Kowloon - N.K.I.L. 6215</p> |  |
| | <p>Drawn by: MW</p> |
| | <p>Checked by: CC</p> |
| | <p>Rev.: 1.0</p> <p>Date: Jul 2025</p> |

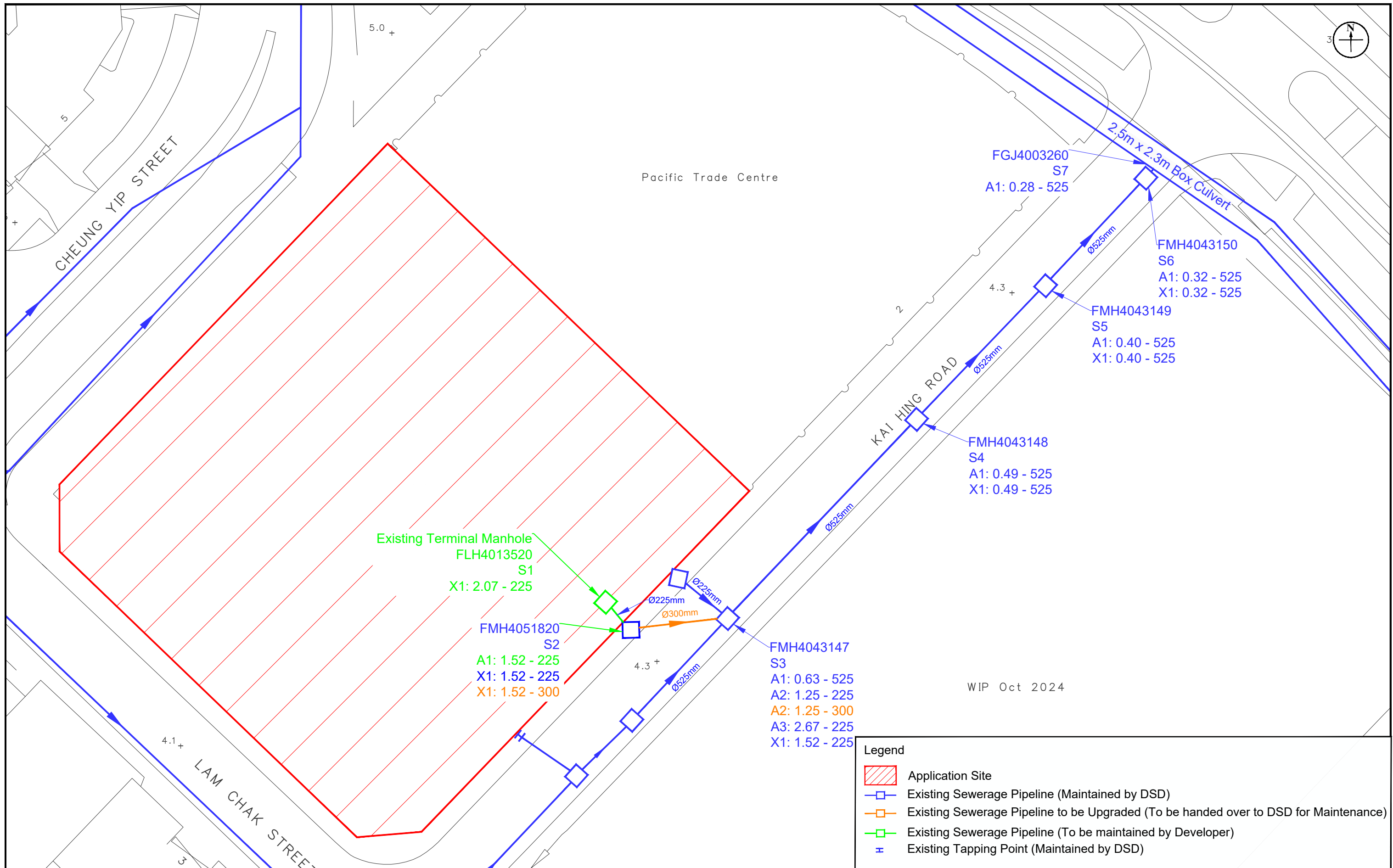


Figure: 3.1

Title: Existing and Proposed Sewerage System in the Vicinity of the Application Site

Project: Proposed Comprehensive Development at 8 Lam Chak Street, Kowloon - N.K.I.L. 6215



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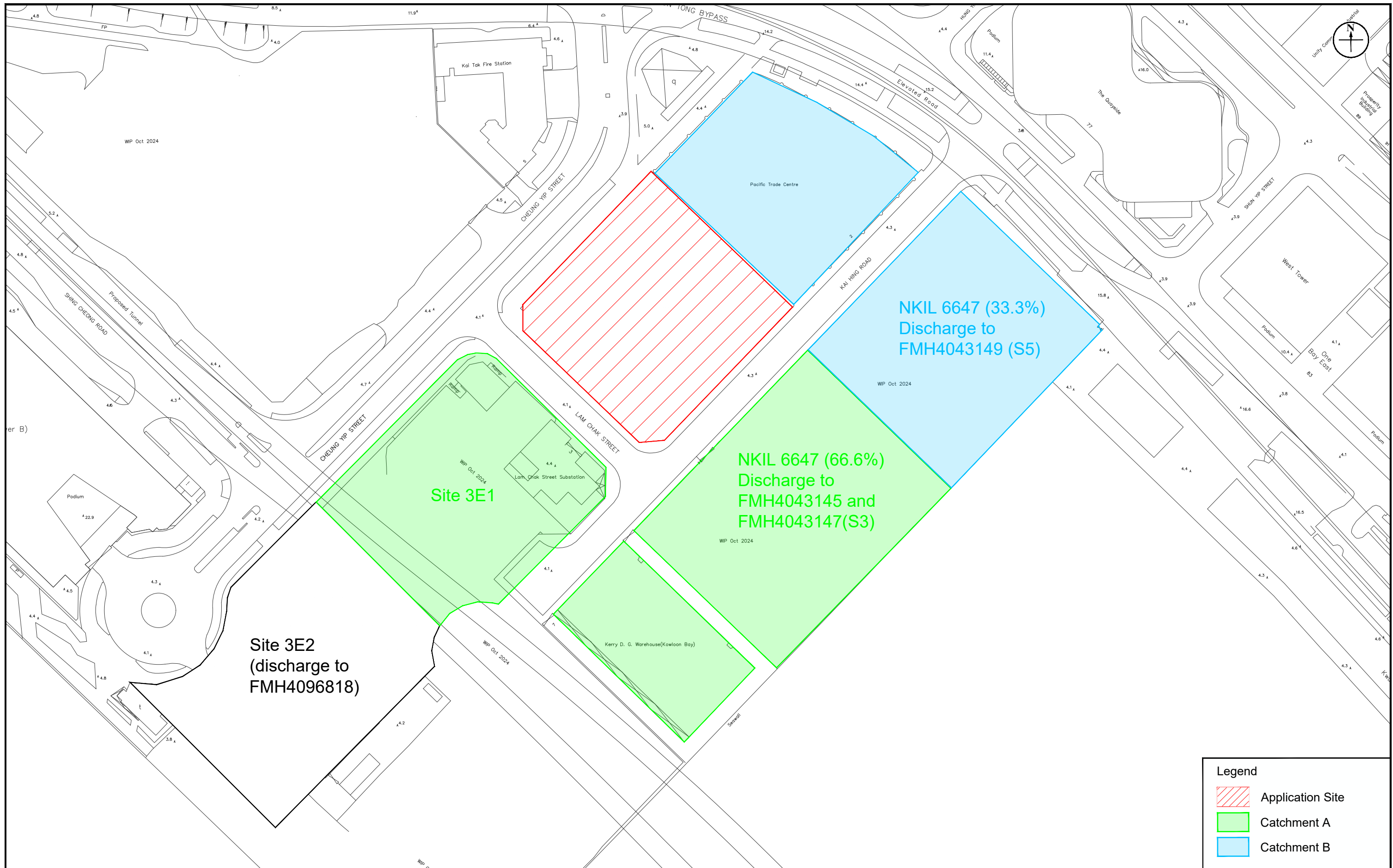


Figure: 3.2

Title: Catchment Area in the Vicinity of the Application Site

Project: Proposed Comprehensive Development at 8 Lam Chak Street, Kowloon - N.K.I.L. 6215

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Date: Aug 2025

Appendix 1.1 Master Layout Plan (MLP)



LEGEND

- APPLICATION SITE BOUNDARY
- LANDSCAPE AREA AT GROUND LEVEL/ ON GRADE
- LANDSCAPE AREA AT PODIUM / ROOF LEVEL
- RETAIL / F&B
- EVA / DRIVEWAY
- DRIVEWAY / L/UL / CARPARK
- E&M
- RECREATIONAL FACILITIES
- RESIDENTIAL USE
- CANOPY

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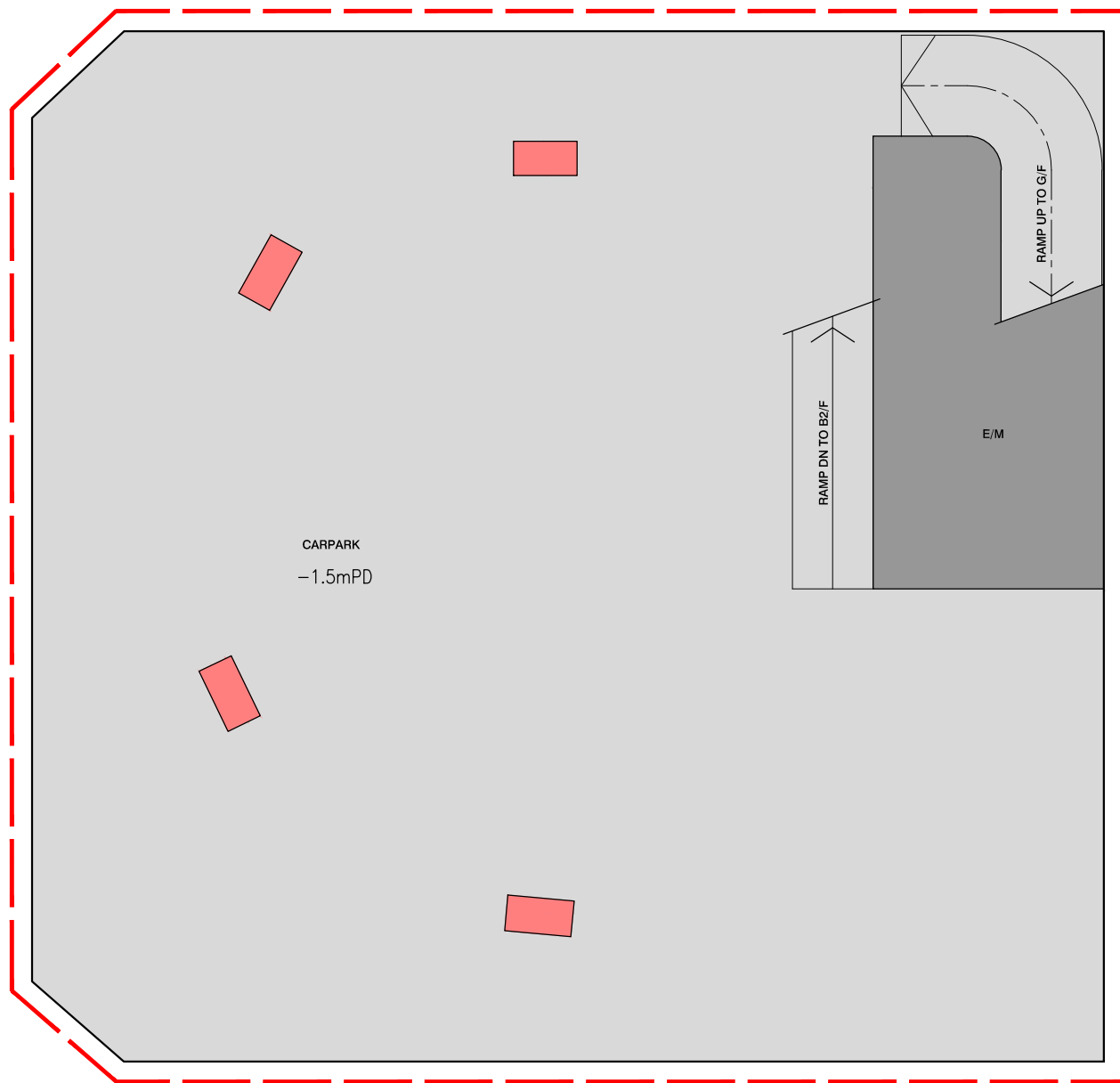
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| INDICATIVE MASTER LAYOUT PLAN | |

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INDICATIVE MASTER LAYOUT PLAN



INDICATIVE BASEMENT 1 FLOOR PLAN

LEGEND

- APPLICATION SITE BOUNDARY
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- LANDSCAPE AREA AT PODIUM / ROOF LEVEL
- RETAIL / F&B
- EVA / DRIVEWAY
- DRIVEWAY / L/UL / CARPARK
- E&M
- RECREATIONAL FACILITIES
- RESIDENTIAL USE



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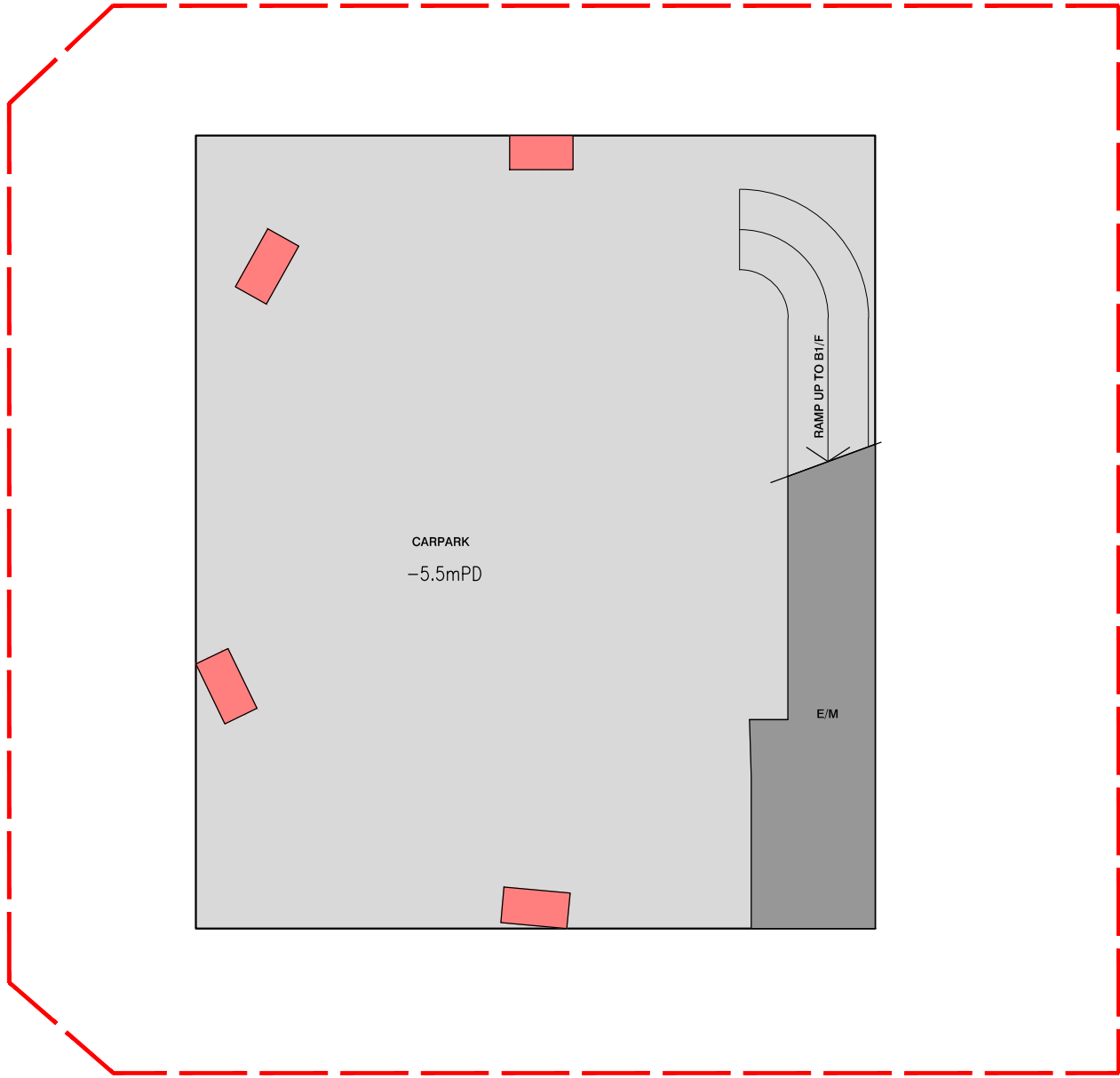
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| INDICATIVE BASEMENT 1 FLOOR PLAN | |

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INDICATIVE BASEMENT 2 FLOOR PLAN

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- LANDSCAPE AREA AT PODIUM / ROOF LEVEL
- RETAIL / F&B
- EVA / DRIVEWAY
- DRIVEWAY / L/UL / CARPARK
- E&M
- RECREATIONAL FACILITIES
- RESIDENTIAL USE



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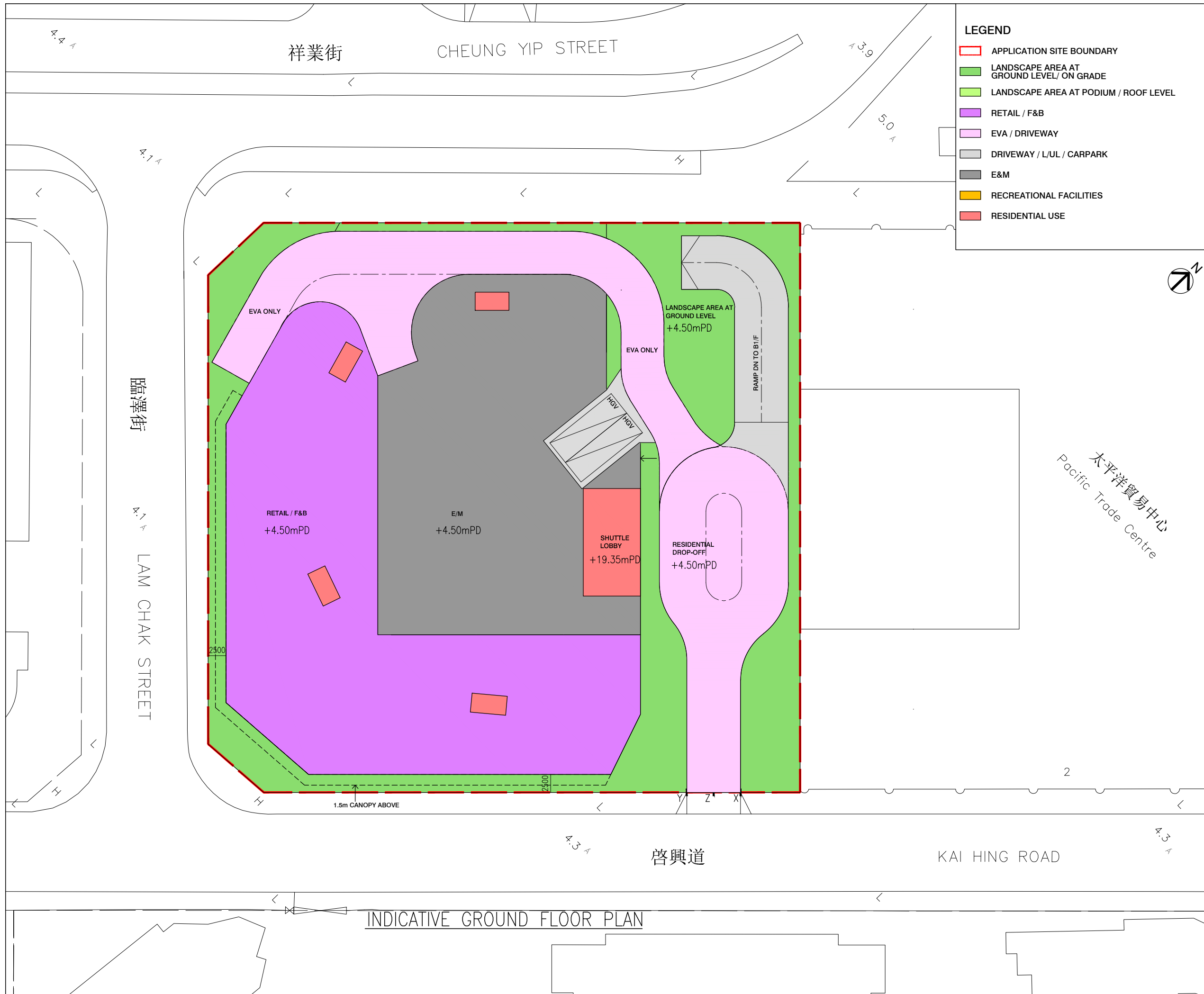
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LEGEND

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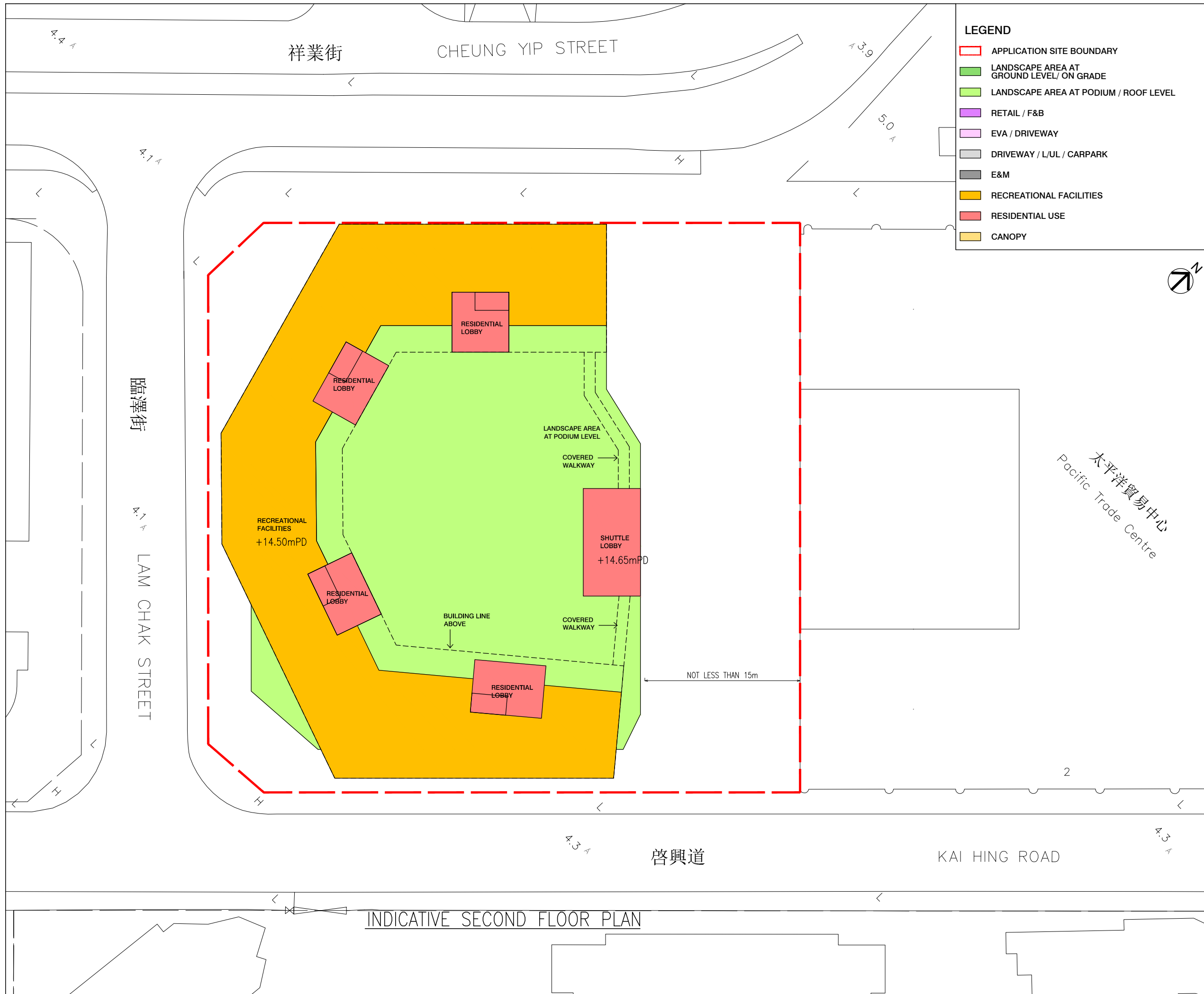
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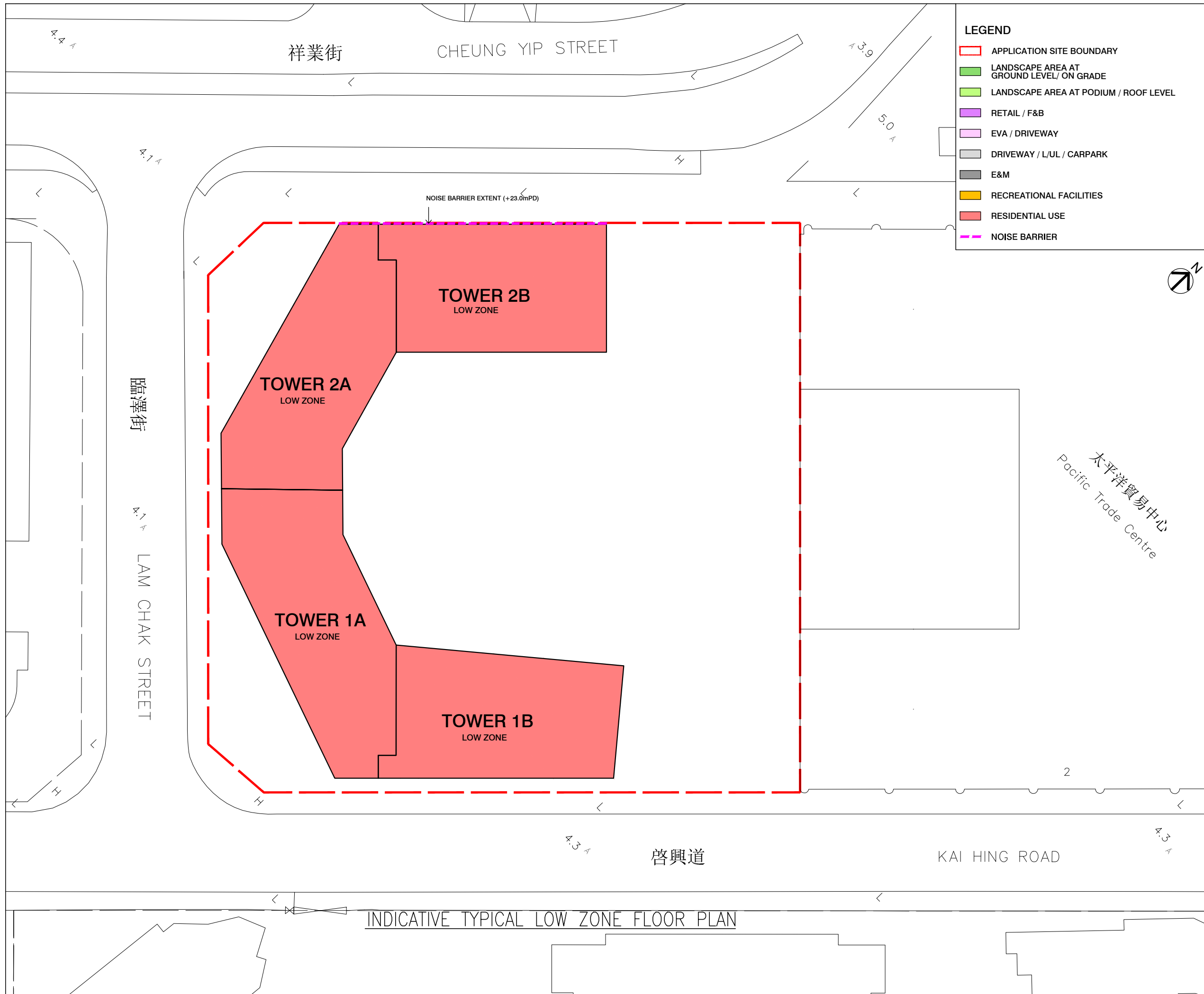
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| TITLE | 標題 |
| INDICATIVE SECOND FLOOR PLAN | |

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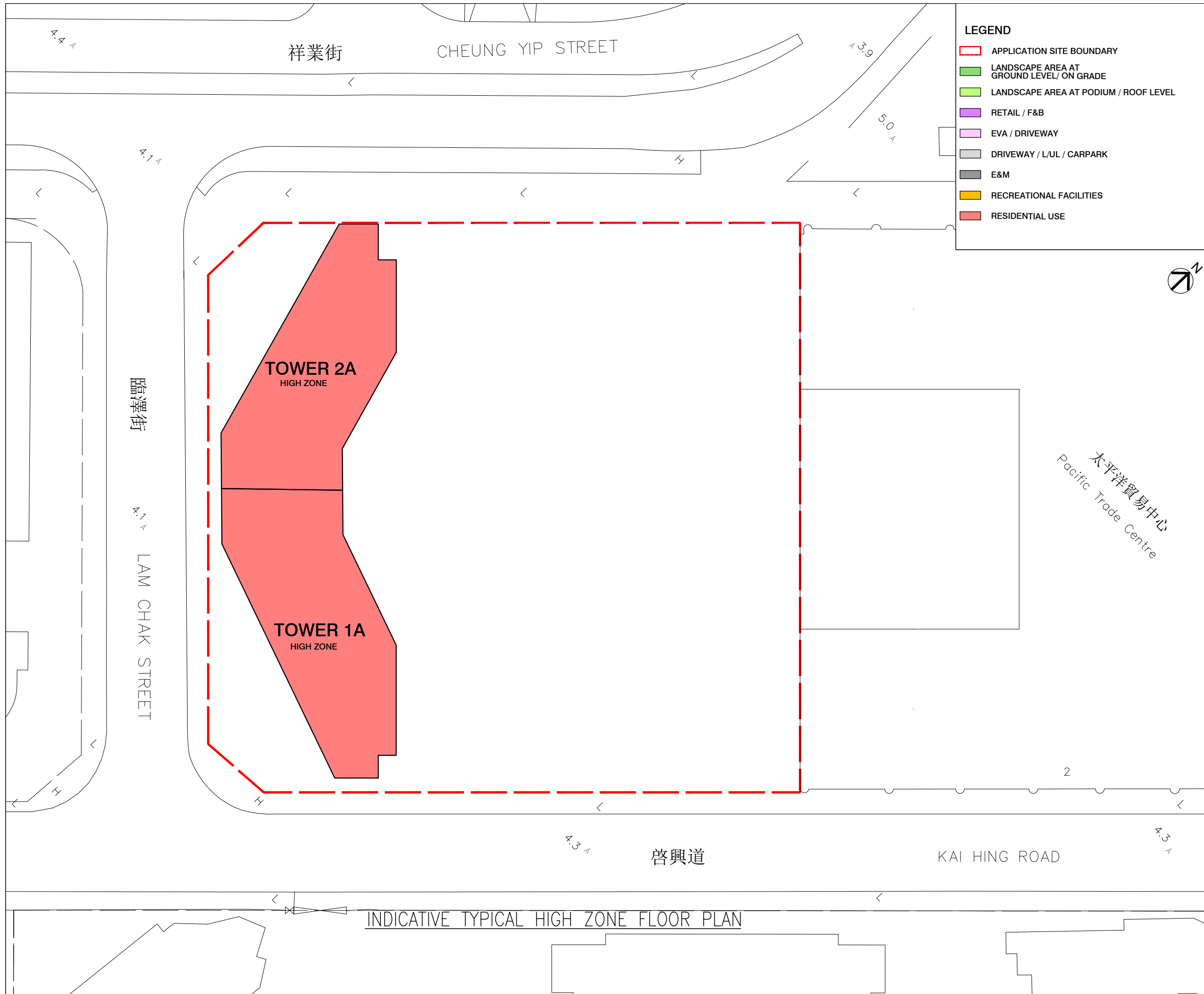
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| TITLE 標題 | INDICATIVE LOW ZONE FLOOR PLAN |
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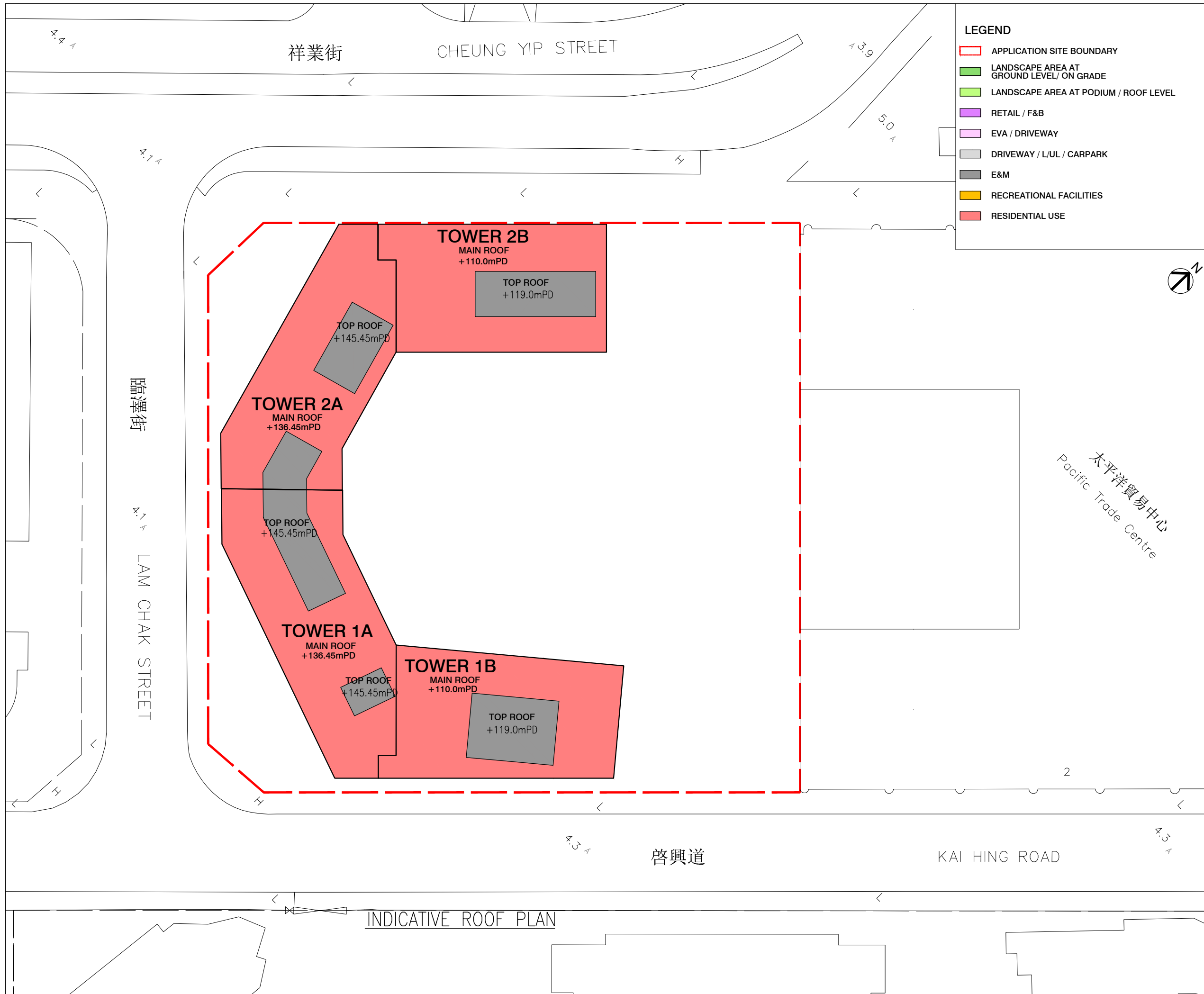
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| TITLE | 標題 |
| INDICATIVE HIGH ZONE FLOOR PLAN | |

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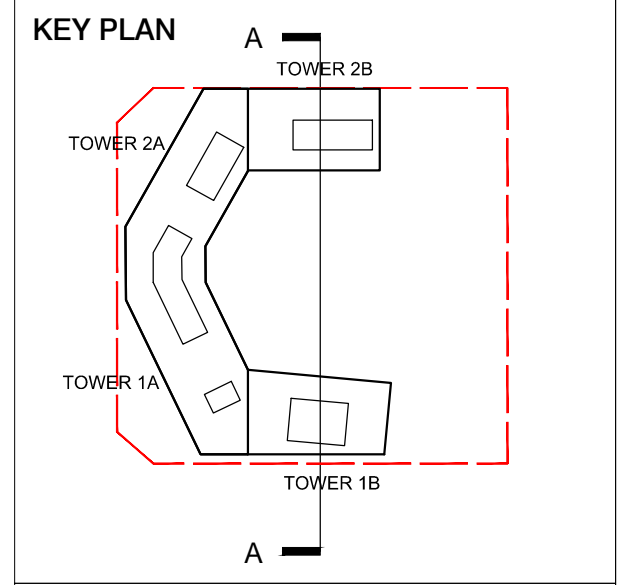
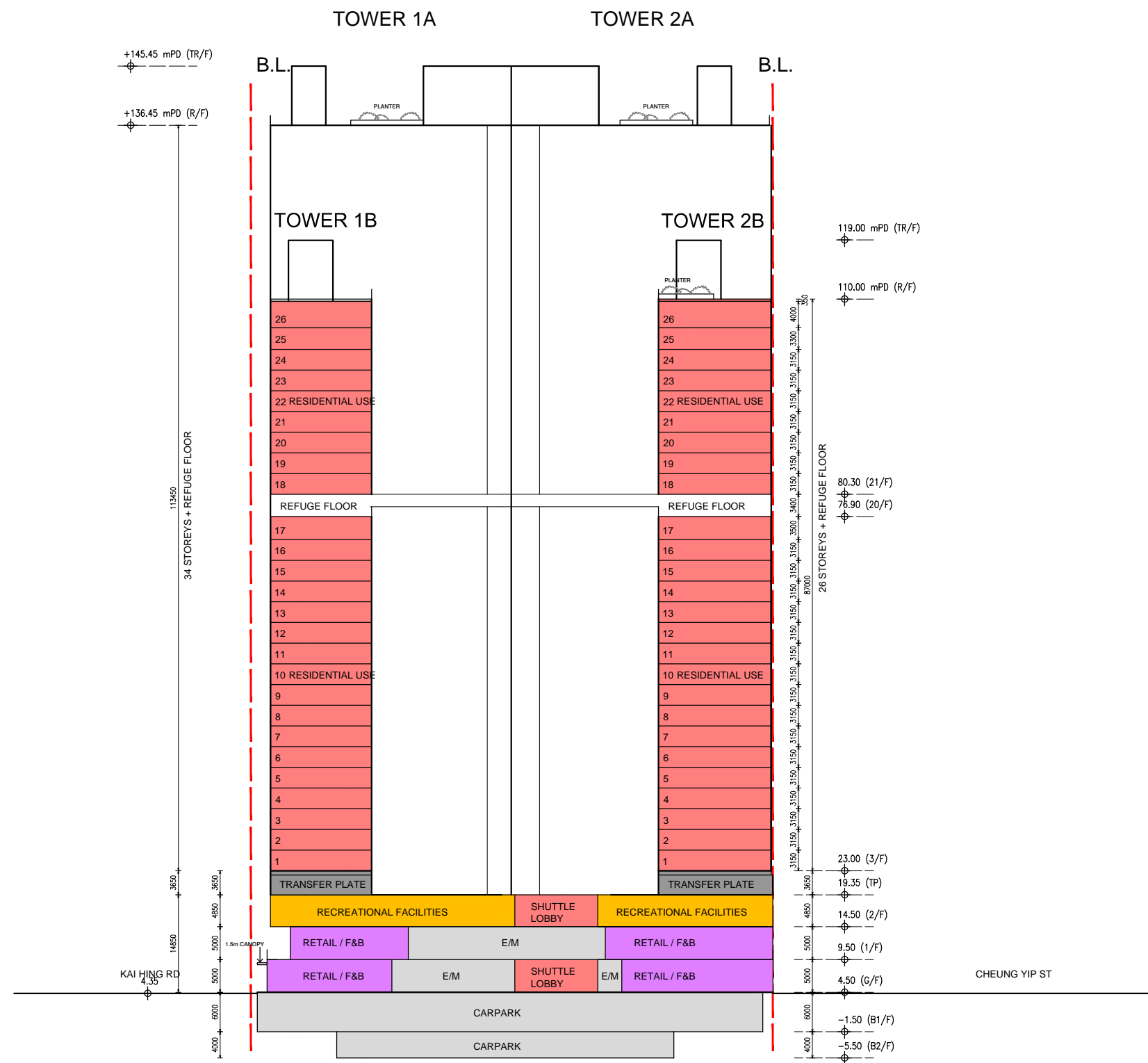
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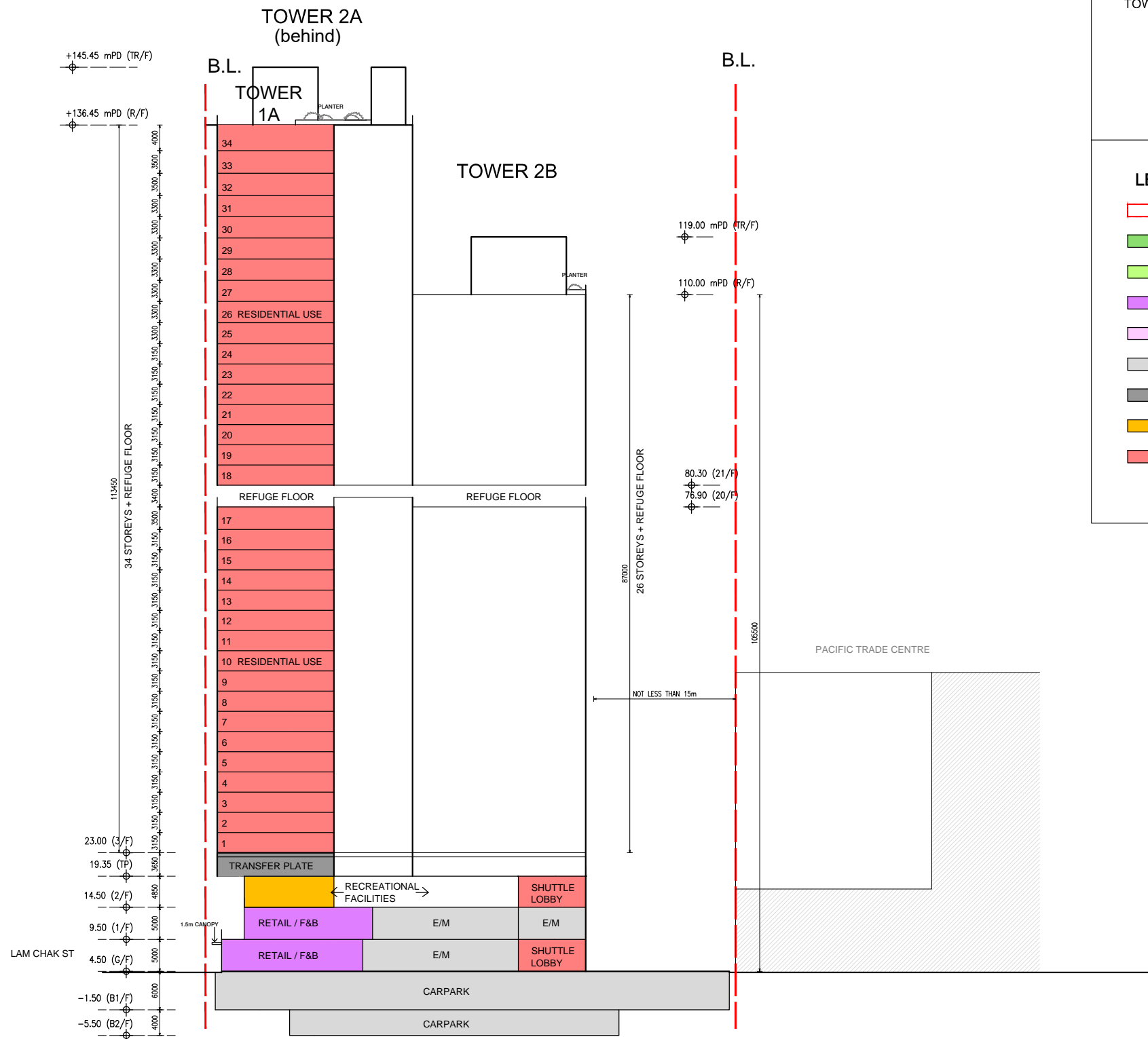
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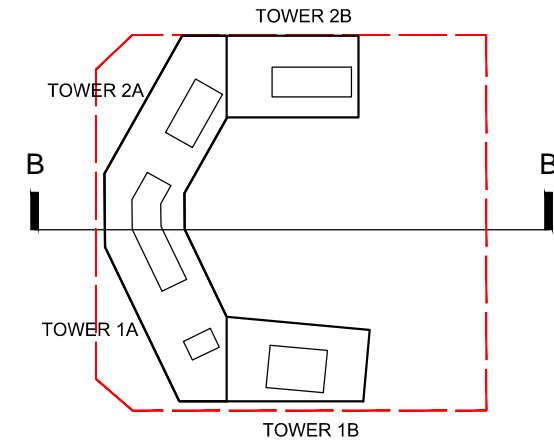
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KEY PLAN



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TITLE 標題
INDICATIVE SECTION B-B

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Appendix 2.1 Detailed Drainage Impact Assessment Calculation

Proposed Composite Development at Harbourside HQ at No. 8 Lam Chak Street, Kowloon Bay
Table 1 - Proposed Catchment Areas and Run-off (1 in 50 year)

$$Q_p = 0.278 C i A$$

Notes:

Site Area 6,541 m²

where Q_p = peak runoff in m³/s
 C = runoff coefficient (dimensionless)
 i = rainfall intensity in mm/hr
 A = catchment area in km²

Catchments are small, so Rational Method is appropriate

1 in 50-year (according to Table 3 of DSD Manual)

a= 505.5

b= 3.29

c= 0.355

| Surface Characteristics | Runoff coefficient, C* |
|---------------------------|------------------------|
| Asphalt | 0.70 - 0.95 |
| Concrete | 0.80 - 0.95 |
| Brick | 0.70 - 0.85 |
| Grassland (heavy soil)**) | |
| Flat | 0.13 - 0.25 |
| Steep | 0.25 - 0.35 |
| Grassland (sandy soil) | |
| Flat | 0.05 - 0.15 |
| Steep | 0.15 - 0.20 |

| | Catchment | Discharge Manhole | Paved | Unpaved | Area | Total t_c | Intensity | Weighted Runoff Coefficient | Run-off | Run-off ² | Run-off ³ |
|-----------------|---------------------|-------------------|-------|---------|-------------------|-------------|-----------|-----------------------------|---------------------|----------------------|----------------------|
| | | | | | (m ²) | (min) | (mm/h) | | (m ³ /s) | (m ³ /s) | (m ³ /s) |
| Existing | Subject Site | | | | | | | | | | |
| | S1 | T1 | 100% | 0% | 6,541 | 5.00 | 239 | 0.95 | 0.412 | 0.458 | 0.478 |
| Future | Subject Site | | | | | | | | | | |
| | S1 | T1 | 70% | 30% | 6,541 | 5.00 | 239 | 0.71 | 0.308 | 0.342 | 0.357 |

Remarks:

1. Assumed Time of Concentration
2. Runoff includes rainfall increase due to Climate Change 11.1% in the mid 21st Century
3. Runoff includes rainfall increase due to Climate Change 16% in the end of 21st Century

Proposed Composite Development at Harbourside HQ at No. 8 Lam Chak Street, Kowloon Bay
Hydraulic Calculations of Proposed Drainage System

Table 2a - 1 in 50 year Runoff of Future Catchments (m³/s)

| Runoff at | Catchment | |
|-----------|-----------|-------|
| | S1 | Total |
| T1 | 0.308 | 0.31 |
| T2 | 0.308 | 0.31 |

Table 3a - Hydraulic Capacities for Existing Drainage System

| Segment | Manhole Reference | Manhole Reference | Type of Channel | Pipe Dia. | Pipe Length | Invert Level 1 | Invert Level 2 | g | k _s | s | Gradient | v | V | Area | Q | Q _{slt} ¹ |
|---------|-------------------|-------------------|-----------------|-----------|-------------|----------------|----------------|------------------|----------------|-------|----------|-------------------|------|----------------|-------------------|-------------------------------|
| | | | | mm | m | mPD | mPD | m/s ² | m | | 1 in | m ² /s | m/s | m ² | m ³ /s | m ³ /s |
| T1 - T2 | SLH4009501 | SMH4067261 | Circular | 600 | 4.2 | 2.63 | 2.10 | 9.81 | 0.0030 | 0.125 | 8 | 0.000001 | 6.97 | 0.28 | 1.97 | 1.87 |
| T2 - T3 | SMH4067261 | SMH4048704 | Circular | 600 | 5.5 | 2.10 | 1.58 | 9.81 | 0.0030 | 0.095 | 11 | 0.000001 | 6.05 | 0.28 | 1.71 | 1.63 |

Table 3b - Hydraulic Capacities for Proposed Drainage System (UC)

| Segment | Type of Channel | Pipe Dia. (D) | Depth (H) | Slope | Gradient | Manning's roughness coefficient | Cross Section Area | Wetted Perimeter | Hydraulic Radius (R) | V | Q | Q _{slt} ¹ |
|-----------------------------|-----------------|---------------|-----------|-------|----------|---------------------------------|--------------------|------------------|----------------------|------|-------------------|-------------------------------|
| | | m | m | | 1 in | | m ² | m | m | m/s | m ³ /s | m ³ /s |
| Proposed Peripheral Channel | U-channel | 0.600 | 0.300 | 0.010 | 1 in | 0.016 | 0.231 | 1.242 | 0.186 | 2.04 | 0.47 | 0.45 |

Table 4a - Comparison of Runoff from Proposed Catchments and Hydraulic Capacities of Existing Drainage System

| Segment | Manhole Reference | Manhole Reference | Pipe Dia. | Q _{slt} ¹ | Catchment Involved | Runoff | Occupancy | Sufficient Capacity? | Runoff [2] | Occupancy | Sufficient Capacity? | Runoff [3] | Occupancy | Sufficient Capacity? | Runoff [4] | Occupancy | Sufficient Capacity? |
|---------|-------------------|-------------------|-----------|-------------------------------|--------------------|-------------------|-----------|----------------------|-------------------|-----------|----------------------|-------------------|-----------|----------------------|-------------------|-----------|----------------------|
| | | | mm | m ³ /s | | m ³ /s | | | m ³ /s | | | m ³ /s | | | m ³ /s | | |
| T1 - T2 | SLH4009501 | SMH4067261 | 600 | 1.87 | S1 | 0.31 | 16.5% | YES | 0.34 | 18.3% | YES | 0.36 | 19.1% | YES | 0.40 | 21.4% | YES |
| T2 - T3 | SMH4067261 | SMH4048704 | 600 | 1.63 | S1 | 0.31 | 19.0% | YES | 0.34 | 21.1% | YES | 0.36 | 22.0% | YES | 0.40 | 24.6% | YES |

Table 4b - Comparison of Runoff from Proposed Catchments and Hydraulic Capacities of Proposed Drainage System

| Segment | Manhole Reference | Manhole Reference | Pipe Dia. | Q _{slt} ¹ | Catchment Involved | Runoff | Occupancy | Sufficient Capacity? | Runoff [2] | Occupancy | Sufficient Capacity? | Runoff [3] | Occupancy | Sufficient Capacity? | Runoff [4] | Occupancy | Sufficient Capacity? |
|-----------------------------|-------------------|-------------------|-----------|-------------------------------|--------------------|-------------------|-----------|----------------------|-------------------|-----------|----------------------|-------------------|-----------|----------------------|-------------------|-----------|----------------------|
| | | | mm | m ³ /s | | m ³ /s | | | m ³ /s | | | m ³ /s | | | m ³ /s | | |
| Proposed Peripheral Channel | - | - | 300 | 0.45 | S1 | 0.31 | 68.8% | YES | 0.34 | 76.3% | YES | 0.36 | 79.8% | YES | 0.40 | 89.4% | YES |

Remarks:

1. Q_{slt}: 10% reduction in flow for gradient is not greater than 1 in 25, 5% reduction in flow for gradient greater than 1 in 25.

Runoff [2] represents the situation in Mid 21st Century of 11.1%

Runoff [3] represents the situation in Late 21st Century of 16.0%

Runoff [4] represents the situation in Late 21st Century due to design allowance with additional runoff of 12.1%

Appendix 3.1 Detailed Sewerage Impact Assessment Calculation

Table 1 Calculation for Sewage Generation Rate of the Proposed Development at the Application Site

Proposed Development (S1)

1. Residential Tower

| | | |
|-----------------------------------|---|--|
| Total number of residential units | = | 1180 units |
| Total number of residents | = | 2950 people -- (2021 Population Census: Average Household Size of 2.5 in Kwun Tong Central District) |
| Design flow | = | 0.27 m ³ /person/day -- (Private R2 in Table T-1 of GESF) |
| Sewage Generation rate | = | 796.5 m³/day |

2. Clubhouse

| | | |
|---------------------------------------|---|--|
| Assumed Area | = | 1800 m ² |
| Assumed floor area per employee | = | 30.3 m ² per worker -- (refer to Table 8 of CIFSUS - Community, Social & Personal Services) |
| Total number of employees | = | 59 employees |
| Design flow for commercial activities | = | 0.28 m ³ /employee/day -- (refer to Table T-2 of GESF - J11) |
| Sewage Generation rate | = | 16.6 m³/day |

3. Commercial Area (Retail)

| | | |
|---------------------------------------|---|--|
| Assumed Area | = | 1635 m ² |
| Assumed floor area per employee | = | 28.57 m ² per worker -- (refer to Table 8 of CIFSUS - Retail Trade) |
| Total number of employees | = | 57 employees |
| Design flow for commercial activities | = | 0.28 m ³ /employee/day -- (refer to Table T-2 of GESF - J4) |
| Sewage Generation rate | = | 16.0 m³/day |

4. Commercial Area (F&B)

| | | |
|---------------------------------------|---|---|
| Assumed Area | = | 1635 m ² |
| Assumed floor area per employee | = | 19.61 m ² per worker -- (refer to Table 8 of CIFSUS - Restaurants) |
| Total number of employees | = | 83 employees |
| Design flow for commercial activities | = | 1.58 m ³ /employee/day -- (refer to Table T-2 of GESF - J10) |
| Sewage Generation rate | = | 131.1 m³/day |

5. Swimming Pools

| | | |
|---|---|---------------------------------------|
| Assumed Area of Swimming Pool | = | 369.0 m ² |
| Average Depth of Water | = | 1.2 m |
| Volume of Swimming Pool (Ordinary Assumption) | = | 442.8 m ³ |
| Turnover Rate | = | 6 hr |
| Required Surface Loading Rate of Filter | = | 74 m ³ /m ² /hr |
| Filter Areas required | = | 1.0 m ² |
| Adopted Surface Loading Rate of Filter | = | 50 m ³ /m ² /hr |
| Adopted Filter Area | = | 1.5 m ² |
| Backwash Duration | = | 7 min/d |
| Backwash flow rate | = | 30 m ³ /m ² /hr |
| Average Daily Flow Rate for Swimming Pool Backwashing | = | 5.2 m ³ /day |
| Flowrate for Swimming Pool Backwashing in 7 mins | = | 12.3 litre/sec |

Total Flow from Proposed Development

| | | |
|---|---|--|
| Flow Rate (without Catchment Inflow Factor) | = | 960.2 m ³ /day |
| Catchment Inflow Factor | = | 1.10 Catchment Inflow Factor for East Kowloon in Table T-4 of GEFS |
| Flow Rate (with Catchment Inflow Factor) | = | 1056.3 m³/day |
| Contributing Population | = | 3912 people |
| Peaking factor | = | 6 Refer to Table T-5 of GESF for population 1,000-5,000 incl. stormwater allowance |
| Peak Flow | = | 73.4 litre/sec |
| Peak Flow with Backwash from Swimming Pool | = | 85.7 litre/sec |

Table 2a Hydraulic Capacity of Existing Sewers

| Segment | Manhole Reference | Manhole Reference | Pipe Dia. | Pipe Length | Invert Level 1 | Invert Level 2 | g | k _s | s | v | V | Area | Q | Estimated Capacity |
|---------|-------------------|-------------------|-----------|-------------|----------------|----------------|------------------|----------------|-------------------|----------|----------------|-------------------|------|--------------------|
| | | | mm | m | mPD | mPD | m/s ² | m | m ² /s | m/s | m ² | m ³ /s | L/s | |
| S1-S2 | FLH4013520 | FMH4051820 | 225 | 4.0 | 2.07 | 1.52 | 9.81 | 0.00060 | 0.136 | 0.000001 | 4.86 | 0.04 | 0.19 | 193 |
| S2-S3 | FMH4051820 | FMH4043147 | 225 | 14.1 | 1.52 | 1.25 | 9.81 | 0.00060 | 0.019 | 0.000001 | 1.81 | 0.04 | 0.07 | 72 |
| S3-S4 | FMH4043147 | FMH4043148 | 525 | 42.6 | 0.63 | 0.49 | 9.81 | 0.00060 | 0.003 | 0.000001 | 1.28 | 0.22 | 0.28 | 277 |
| S4-S5 | FMH4043148 | FMH4043149 | 525 | 28.8 | 0.49 | 0.40 | 9.81 | 0.00060 | 0.003 | 0.000001 | 1.25 | 0.22 | 0.27 | 270 |
| S5-S6 | FMH4043149 | FMH4043150 | 525 | 22.7 | 0.40 | 0.32 | 9.81 | 0.00060 | 0.004 | 0.000001 | 1.32 | 0.22 | 0.29 | 287 |
| S6-S7 | FMH4043150 | FGJ4003260 | 525 | 1.4 | 0.32 | 0.28 | 9.81 | 0.00060 | 0.029 | 0.000001 | 3.80 | 0.22 | 0.82 | 822 |

Table 2b Hydraulic Capacity of Existing Sewers (After Upgrading Segment S2-S3)

| Segment | Manhole Reference | Manhole Reference | Pipe Dia. | Pipe Length | Invert Level 1 | Invert Level 2 | g | k _s | s | v | V | Area | Q | Estimated Capacity |
|---------|-------------------|-------------------|-----------|-------------|----------------|----------------|------------------|----------------|-------------------|----------|----------------|-------------------|------|--------------------|
| | | | mm | m | mPD | mPD | m/s ² | m | m ² /s | m/s | m ² | m ³ /s | L/s | |
| S1-S2 | FLH4013520 | FMH4051820 | 225 | 4.0 | 2.07 | 1.52 | 9.81 | 0.00060 | 0.136 | 0.000001 | 4.86 | 0.04 | 0.19 | 193 |
| S2-S3 | FMH4051820 | FMH4043147 | 300 | 14.1 | 1.52 | 1.25 | 9.81 | 0.00060 | 0.019 | 0.000001 | 2.18 | 0.07 | 0.15 | 154 |
| S3-S4 | FMH4043147 | FMH4043148 | 525 | 42.6 | 0.63 | 0.49 | 9.81 | 0.00060 | 0.003 | 0.000001 | 1.28 | 0.22 | 0.28 | 277 |
| S4-S5 | FMH4043148 | FMH4043149 | 525 | 28.8 | 0.49 | 0.40 | 9.81 | 0.00060 | 0.003 | 0.000001 | 1.25 | 0.22 | 0.27 | 270 |
| S5-S6 | FMH4043149 | FMH4043150 | 525 | 22.7 | 0.40 | 0.32 | 9.81 | 0.00060 | 0.004 | 0.000001 | 1.32 | 0.22 | 0.29 | 287 |
| S6-S7 | FMH4043150 | FGJ4003260 | 525 | 1.4 | 0.32 | 0.28 | 9.81 | 0.00060 | 0.029 | 0.000001 | 3.80 | 0.22 | 0.82 | 822 |

- Remarks:
- (1) g=gravitational acceleration; k_s=equivalent sand roughness; s=gradient; v=kinematic viscosity of water; V=mean velocity
 - (2) Table 2a & 2b: The value of k_s = 0.6mm is used for the calculation of slimed clayware sewer, poor condition (based on Table 5: Recommended roughness values in Sewerage Manual)
 - (3) The value of velocity (V) is referred to the Tables for the hydraulic design of pipes, sewers and channels (8th edition)
 - (4) Equation used:
$$v = -\sqrt{(8gDs)} \log\left(\frac{k_s}{3.7D} + \frac{2.51v}{D\sqrt{(2gDs)}}\right)$$

Table 3 Calculation for Sewage Generation Rate of the Existing Surrounding Building

Catchment A (S3)

1. Proposed Development (Site 3E1) - A/K22/43

| | | |
|-----------------------------------|---|---|
| Total number of residential units | = | 888 units |
| Total GFA for Retail Area | = | 2405 m ² |
| Total GFA for Social Services | = | 3087 m ² |
| Sewage Generation rate | = | 508.0 m³/day -- from SIA of A/K22/43 (Appendix 3.3) |

2. Kerry D.G. Warehouse

Business Services

| | | |
|---------------------------------------|---|---|
| Assumed Area | = | 26917 m ² -- from SIA of A/K22/43 (Appendix 3.3) |
| Assumed floor area per employee | = | 18.18 m ² per worker -- (refer to Table 8 of CIFSUS - Business Services) |
| Total number of employees | = | 1481 employees |
| Design flow for commercial activities | = | 0.08 m ³ /employee/day -- (refer to Table T-2 of GESF - J6) |
| Sewage Generation rate | = | 118.5 m³/day |

Retail

| | | |
|---------------------------------------|---|--|
| Assumed Area | = | 17129 m ² -- from SIA of A/K22/43 (Appendix 3.3) |
| Assumed floor area per employee | = | 28.57 m ² per worker -- (refer to Table 8 of CIFSUS - Retail Trade) |
| Total number of employees | = | 600 employees |
| Design flow for commercial activities | = | 0.28 m ³ /employee/day -- (refer to Table T-2 of GESF - J4) |
| Sewage Generation rate | = | 168.0 m³/day |

F&B

| | | |
|---------------------------------------|---|---|
| Assumed Area | = | 4894 m ² -- from SIA of A/K22/43 (Appendix 3.3) |
| Assumed floor area per employee | = | 19.61 m ² per worker -- (refer to Table 8 of CIFSUS - Restaurants) |
| Total number of employees | = | 250 employees |
| Design flow for commercial activities | = | 1.58 m ³ /employee/day -- (refer to Table T-2 of GESF - J10) |
| Sewage Generation rate | = | 395.0 m³/day |

| | | |
|------------|---|---------------------------|
| Total ADWF | = | 681.5 m ³ /day |
|------------|---|---------------------------|

3. NKIL 6647 (66.6%)

| | | |
|-----------------------------------|---|---|
| Total number of residential units | = | 1782 units |
| Total GFA for Social Services | = | 5500 m ² |
| ADWF to FMH4043145 and FMH4043147 | = | 900.1 m³/day -- from Planning Application A/K22/31 (Appendix 3.4) |

Swimming Pool of NKIL 6647

Outdoor Swimming Pool

| | | |
|---|---|---------------------------------------|
| Assumed Area of Swimming Pool | = | 463.6 m ² |
| Average Depth of Water | = | 1.2 m |
| Volume of Swimming Pool (Ordinary Assumption) | = | 556.3 m ³ |
| Turnover Rate | = | 6 hr |
| Required Surface Loading Rate of Filter | = | 93 m ³ /m ² /hr |
| Filter Areas required | = | 1.0 m ² |
| Adopted Surface Loading Rate of Filter | = | 50 m ³ /m ² /hr |
| Adopted Filter Area | = | 1.9 m ² |
| Backwash Duration | = | 7 min/d |
| Backwash flow rate | = | 30 m ³ /m ² /hr |
| Average Daily Flow Rate for Swimming Pool Backwashing | = | 6.5 m ³ /day |
| Flowrate for Swimming Pool Backwashing in 7 mins | = | 15.5 litre/sec |

Indoor Swimming Pool

| | | |
|---|---|--|
| Assumed Area of Swimming Pool | = | 625.0 m ² |
| Average Depth of Water | = | 1.2 m |
| Volume of Swimming Pool (Ordinary Assumption) | = | 750.0 m ³ |
| Turnover Rate | = | 4 hr |
| Required Surface Loading Rate of Filter | = | 188 m ³ /m ² /hr |
| Filter Areas required | = | 1.0 m ² |
| Adopted Surface Loading Rate of Filter | = | 50 m ³ /m ² /hr |
| Adopted Filter Area | = | 3.8 m ² |
| Backwash Duration | = | 7 min/d |
| Backwash flow rate | = | 30 m ³ /m ² /hr |
| Average Daily Flow Rate for Swimming Pool Backwashing | = | 13.1 m ³ /day |
| Flowrate for Swimming Pool Backwashing in 7 mins | = | 31.3 litre/sec |

Overall Catchment A

| | | |
|-------------------------|---|--|
| Estimated Flow Rate | = | 2089.6 m ³ /day |
| Catchment Inflow Factor | = | 1.10 Catchment Inflow Factor for East Kowloon in Table T-4 of GEFS |
| Total Flow Rate | = | 2298.6 m³/day |

Catchment B (S4)

1. Pacific Trade Centre (50%)

| | | |
|---------------------------------------|---|---|
| Assumed Area | = | 70856 m ² -- from SIA of A/K22/43 (Appendix 3.3) |
| Assumed floor area per employee | = | 43.48 m ² per worker -- (refer to Table 8 of CIFSUS - Manufacturing) |
| Total number of employees | = | 1630 employees |
| Design flow for commercial activities | = | 0.53 m ³ /employee/day -- (refer to Table T-2 of GESF - J1 + East Kowloon) |
| Sewage Generation rate | = | 863.9 m ³ /day |
| ADWF to FMH4043148 (S4) | = | 432.0 m³/day |

Overall Catchment B

| | | |
|-------------------------|---|--|
| Estimated Flow Rate | = | 432.0 m ³ /day |
| Catchment Inflow Factor | = | 1.10 Catchment Inflow Factor for East Kowloon in Table T-4 of GEFS |
| Total Flow Rate | = | 475.1 m³/day |

Catchment C (S5)

1. Pacific Trade Centre (50%)

| | | |
|---------------------------------------|---|---|
| Assumed Area | = | 70856 m ² -- from SIA of A/K22/43 (Appendix 3.3) |
| Assumed floor area per employee | = | 43.48 m ² per worker -- (refer to Table 8 of CIFSUS - Retail Trade) |
| Total number of employees | = | 1630 employees |
| Design flow for commercial activities | = | 0.53 m ³ /employee/day -- (refer to Table T-2 of GESF - J1 + East Kowloon) |
| Sewage Generation rate | = | 863.9 m ³ /day |
| ADWF to FMH4043149 (S5) | = | 432.0 m³/day |

2. NKIL 6647 (33.3%)

| | | |
|-----------------------------------|---|---|
| Total number of residential units | = | 1782 units |
| Total GFA for Social Services | = | 5500 m ² |
| ADWF to FMH4043149 (S5) | = | 450.1 m³/day -- from Planning Application A/K22/31 (Appendix 3.4) |

Overall Catchment C

| | | |
|-------------------------|---|--|
| Estimated Flow Rate | = | 882.0 m ³ /day |
| Catchment Inflow Factor | = | 1.10 Catchment Inflow Factor for East Kowloon in Table T-4 of GEFS |
| Total Flow Rate | = | 970.2 m³/day |

Table 4a Comparison of the Hydraulic Capacity of Existing Sewers for Sewerage generated from the Proposed Development and Surrounding Catchment Areas

| Segment | Pipe Dia. (mm) | Pipe Length (m) | Gradient | Estimated Capacity (L/s) | Catchment Involved | ADWF (m ³ /day) | Contributing Population | Peaking Factor | Swimming Pool/Public Toilet (L/s) | Peak Flow from the Proposed Development and Catchment Areas (L/s) | Contribution from the Proposed Development and the Surrounding Catchment Areas (%) | Status |
|---------|----------------|-----------------|----------|--------------------------|------------------------------|----------------------------|-------------------------|----------------|-----------------------------------|---|--|--------------|
| S1-S2 | 225 | 4.0 | 0.136 | 193 | Application Site | 1056.3 | 3912 | 6 | 12.3 | 85.7 | 44.3% | OK |
| S2-S3 | 225 | 14.1 | 0.019 | 72 | Application Site | 1056.3 | 3912 | 6 | 12.3 | 85.7 | 118.7% | Not Adequate |
| S3-S4 | 525 | 42.6 | 0.003 | 277 | Application Site + A | 3354.8 | 12425 | 4 | 59.0 | 214.3 | 77.4% | OK |
| S4-S5 | 525 | 28.8 | 0.003 | 270 | Application Site + A + B | 3830.0 | 14185 | 4 | 59.0 | 236.3 | 87.6% | OK |
| S5-S6 | 525 | 22.7 | 0.004 | 287 | Application Site + A + B + C | 4800.2 | 17778 | 4 | 59.0 | 281.2 | 98.1% | Not Adequate |
| S6-S7 | 525 | 1.4 | 0.029 | 822 | Application Site + A + B + C | 4800.2 | 17778 | 4 | 59.0 | 281.2 | 34.2% | OK |

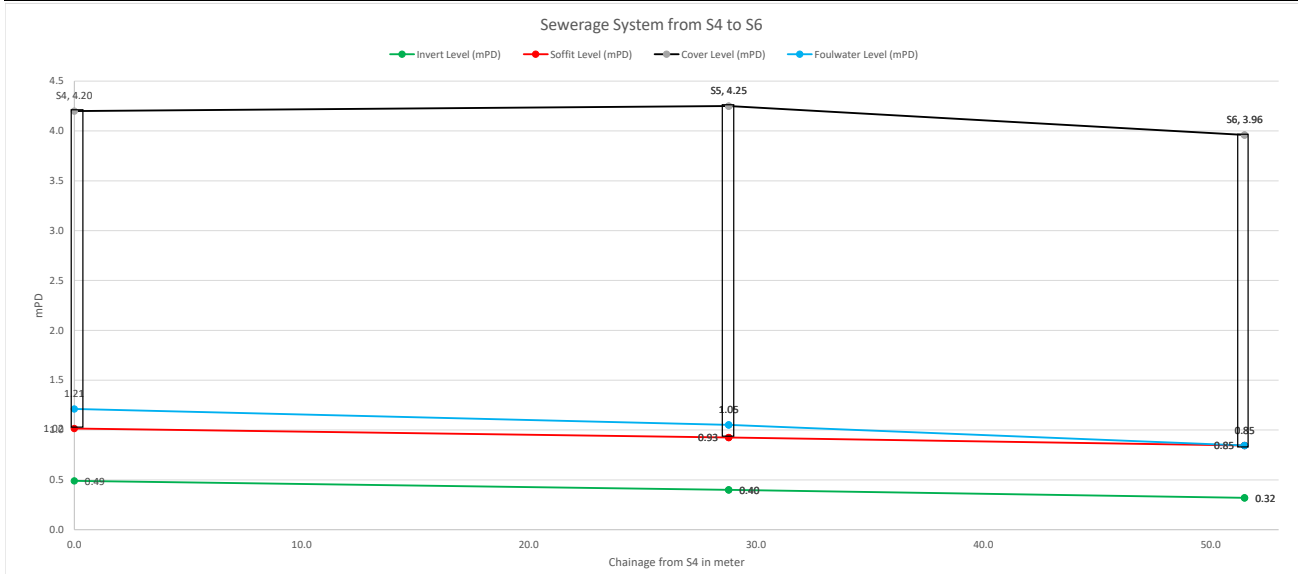
Table 4b Comparison of the Hydraulic Capacity of Existing Sewers for Sewerage generated from the Proposed Development and Surrounding Catchment Areas (After Upgrade)

| Segment | Pipe Dia. (mm) | Pipe Length (m) | Gradient | Estimated Capacity (L/s) | Catchment Involved | ADWF (m ³ /day) | Contributing Population | Peaking Factor | Swimming Pool/Public Toilet (L/s) | Peak Flow from the Proposed Development and Catchment Areas (L/s) | Contribution from the Proposed Development and the Surrounding Catchment Areas (%) | Status |
|---------|----------------|-----------------|----------|--------------------------|------------------------------|----------------------------|-------------------------|----------------|-----------------------------------|---|--|--------------|
| S1-S2 | 225 | 4.0 | 0.136 | 193 | Application Site | 1056.3 | 3912 | 6 | 12.3 | 85.7 | 44.3% | OK |
| S2-S3 | 300 | 14.1 | 0.019 | 154 | Application Site | 1056.3 | 3912 | 6 | 12.3 | 85.7 | 55.6% | OK |
| S3-S4 | 525 | 42.6 | 0.003 | 277 | Application Site + A | 3354.8 | 12425 | 4 | 59.0 | 214.3 | 77.4% | OK |
| S4-S5 | 525 | 28.8 | 0.003 | 270 | Application Site + A + B | 3830.0 | 14185 | 4 | 59.0 | 236.3 | 87.6% | OK |
| S5-S6 | 525 | 22.7 | 0.004 | 287 | Application Site + A + B + C | 4800.2 | 17778 | 4 | 59.0 | 281.2 | 98.1% | Not Adequate |
| S6-S7 | 525 | 1.4 | 0.029 | 822 | Application Site + A + B + C | 4800.2 | 17778 | 4 | 59.0 | 281.2 | 34.2% | OK |

Remarks: (a) The value of peaking factor = 6 is used for population 1,000-5,000 incl. stormwater allowance (refers to Table T-5 of GESF)
 (b) The value of peaking factor = 4 is used for population 10,000-50,000 incl. stormwater allowance (refers to Table T-5 of GESF)

Table 5a Hydraulic Capacity of Existing Sewers - Surcharged Condition

| Segment | Manhole Reference | Manhole Reference | Pipe Dia. mm | Pipe Length m | Invert Level 1 mPD | Invert Level 2 mPD | Foulwater Level 1 mPD | Foulwater Level 2 mPD | Cover Level 1 mPD | Cover Level 2 mPD | Freeboard 1 m | Freeboard 2 m | Friction Loss m | Entry and Exit Loss m | g | ks | Required %hydraulic | v m ² /s | V m/s | Area m ² | Q m ³ /s | Delivered Flow rate L/s |
|---------|-------------------|-------------------|--------------|---------------|--------------------|--------------------|-----------------------|-----------------------|-------------------|-------------------|---------------|---------------|-----------------|-----------------------|------|--------|---------------------|---------------------|-------|---------------------|---------------------|-------------------------|
| S4-S5 | FMH4043148 | FMH4043149 | 525 | 28.8 | 0.49 | 0.40 | 1.21 | 1.05 | 4.20 | 4.25 | 2.99 | 3.20 | 0.07 | 0.09 | 9.81 | 0.0006 | 0.0024 | 0.000001 | 1.09 | 0.22 | 0.24 | 236.3 |
| S5-S6 | FMH4043149 | FMH4043150 | 525 | 22.7 | 0.40 | 0.32 | 1.05 | 0.85 | 4.25 | 3.96 | 3.20 | 3.12 | 0.08 | 0.13 | 9.81 | 0.0006 | 0.0034 | 0.000001 | 1.30 | 0.22 | 0.28 | 281.2 |
| S6-S7 | FMH4043150 | FGJ4003260 | 525 | 1.4 | 0.32 | | 0.85 | | 3.96 | | 3.12 | 0.00 | 0.00 | 0.13 | 9.81 | 0.0006 | 0.0034 | 0.000001 | 1.30 | 0.22 | 0.28 | 281.2 |



- Note:
- From Table 4, Section S6 to S7 is less than 90% flow, free flow is expected at S6 to S7 with sufficient freeboard. Therefore, backwater calculation is conducted upstream manhole S6. Foulwater level at S6 is assumed to be: 0.32 (IL) + 0.525 (pipe dia.) = 0.85mPD as a conservative approach
 - For this assessment, the Colebrook-White Equation has been used to calculate the friction loss. (Sewerage Manual section 5.2.1)
 - According to DSD's Sewerage Manual (Part 1) section 5.2.2, Local losses are usually small in relation to the pipeline head losses and are not normally considered. However, as a conservative approach, further allowances have been included for local losses at pipe entry (K = 0.5) and exit (K = 1), with a total local loss coefficient of 1.5
 - Comparing the Cover levels and foulwater levels at each manhole, the freeboards are found sufficient (>1m). Therefore, no unacceptable adverse sewerage impacts are identified.
 - Friction loss is deduced by required hydraulic gradient x pipe length, while the local loss is deduced by the equation:

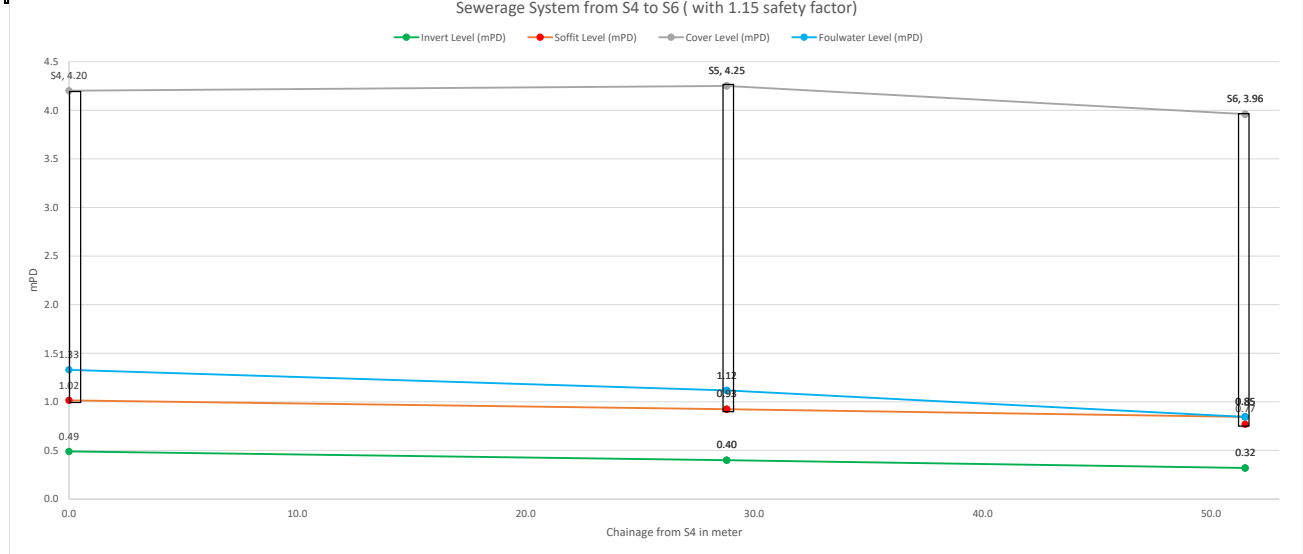
$$h_f = K \frac{V^2}{2g}$$

- Remarks:
- (1) g=gravitational acceleration; ks=equivalent sand roughness; s=gradient; v=kinematic viscosity of water; V=mean velocity
 - (2) Table 5a & 5b: The value of ks = 0.6mm is used for the calculation of slimed clayware sewer, poor condition (based on Table 5: Recommended roughness values in Sewerage Manual)
 - (3) The value of velocity (V) is referred to the Tables for the hydraulic design of pipes, sewers and channels (8th edition)
 - (4) Equation used:

$$V = \sqrt{\frac{2.51v}{3.7D} \log\left(\frac{ks}{D} + \frac{2.51v}{D\sqrt{2gDs}}\right)}$$

Table 5b Hydraulic Capacity of Existing Sewers - Surcharged Condition with 1.15 Safety Factor

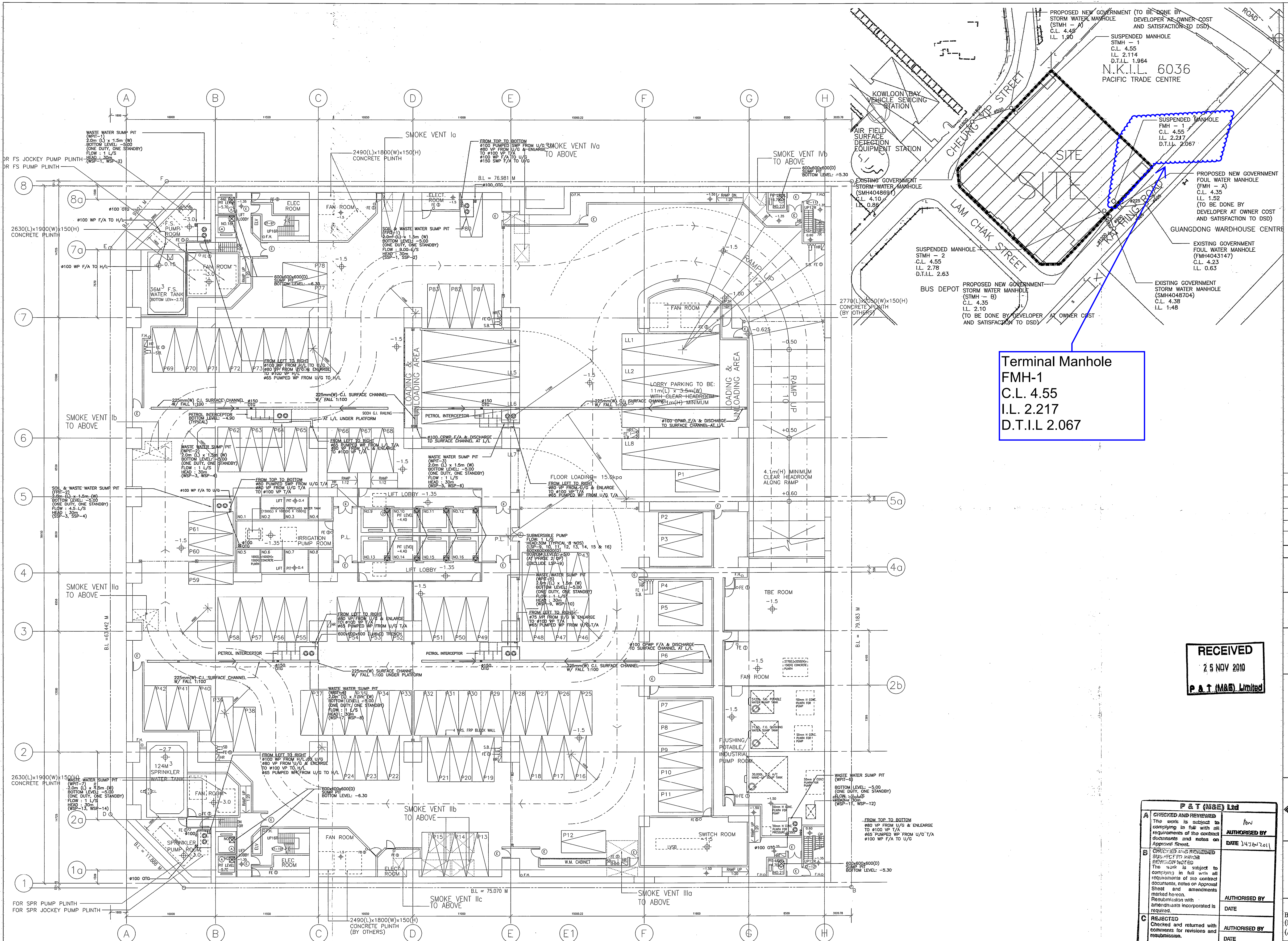
| Segment | Manhole Reference | Manhole Reference | Pipe Dia. | Pipe Length | Invert Level 1 | Invert Level 2 | Foulwater Level 1 | Foulwater Level 2 | Cover Level 1 | Cover Level 2 | Freeboard 1 | Freeboard 2 | Friction Loss | Entry and Exit Loss | g | k_s | Required $S_{hydraulic}$ | v | V | Area | Q | Required Peak Flow |
|---------|-------------------|-------------------|-----------|-------------|----------------|----------------|-------------------|-------------------|---------------|---------------|-------------|-------------|---------------|---------------------|------------------|--------|--------------------------|-------------------|------|----------------|-------------------|--------------------|
| | | | mm | m | mPD | mPD | mPD | mPD | mPD | mPD | m | m | m | m | m/s ² | m | | m ² /s | m/s | m ² | m ³ /s | L/s |
| S4-S5 | FMH4043148 | FMH4043149 | 525 | 28.8 | 0.49 | 0.40 | 1.33 | 1.12 | 4.20 | 4.25 | 2.87 | 3.13 | 0.09 | 0.12 | 9.81 | 0.0006 | 0.0032 | 0.000001 | 1.26 | 0.22 | 0.27 | 271.8 |
| S5-S6 | FMH4043149 | FMH4043150 | 525 | 22.7 | 0.40 | 0.32 | 1.12 | 0.85 | 4.25 | 3.96 | 3.13 | 3.12 | 0.10 | 0.17 | 9.81 | 0.0006 | 0.0045 | 0.000001 | 1.49 | 0.22 | 0.32 | 323.4 |
| S6-S7 | FMH4043150 | FGJ4003260 | 525 | 1.4 | 0.32 | | 0.85 | | 3.96 | | 3.12 | | 0.01 | 0.17 | 9.81 | 0.0006 | 0.0045 | 0.000001 | 1.49 | 0.22 | 0.32 | 323.4 |



- Note:
1. From Table 4, Section S6 to S7 is less than 90% flow, free flow is expected at S6 to S7 with sufficient freeboard. Therefore, backwater calculation is conducted upstream manhole S6. Foulwater level at S6 is assumed to be: 0.32 (IL) + 0.525 (pipe dia.) = 0.85mPD as a conservative approach
 2. For this assessment, the Colebrook-White Equation has been used to calculate the friction loss. (Sewerage Manual section 5.2.1)
 3. According to DSD's Sewerage Manual (Part 1) section 5.2.2, Local losses are usually small in relation to the pipeline head losses and are not normally considered. However, as a conservative approach, further allowances have been included for local losses at pipe entry (K = 0.5) and exit (K = 1), with a total local loss coefficient of 1.5
 4. Comparing the Cover levels and foulwater levels at each manhole, no overflowing is found (freeboard > 0m). Therefore, no unacceptable adverse sewerage impacts are identified.
 5. Friction loss is deduced by required hydraulic gradient x pipe length, while the local loss is deduced by the equation: $h_f = K \frac{v^2}{2g}$

- Remarks:
- (1) g=gravitational acceleration; k_s =equivalent sand roughness; s=gradient; v=kinematic viscosity of water; V=mean velocity
 - (2) Table 5a & 5b: The value of k_s = 0.6mm is used for the calculation of slimed clayware sewer, poor condition (based on Table 5; Recommended roughness values in Sewerage Manual)
 - (3) The value of velocity (V) is referred to the Tables for the hydraulic design of pipes, sewers and channels (8th edition)
 - (4) Equation used: $V = \sqrt{\frac{8gDs}{3.7D + \frac{2.51v}{D\sqrt{2gDs}}}}$

Appendix 3.2 Existing Drainage Plan



Terminal Manhole
 FMH-1
 C.L. 4.55
 I.L. 2.217
 D.T.I.L. 2.067

RECEIVED
 25 NOV 2010
 P. A. T. (M&E) Limited

| P & T (M&E) Ltd | |
|--|--------------------------------|
| A CHECKED AND REVIEWED The work is subject to compliance in full with all requirements of the contract documents and notes on approved sheets. | AUTHORISED BY DATE 14/10/10 |
| B CHECKED AND REVIEWED The work is subject to compliance in full with all requirements of the contract documents, notes on approved sheets and amendments marked hereon. Resubmission with amendments incorporated is required. | AUTHORISED BY DATE |
| C REJECTED Checked and returned with comments for revisions and resubmission. | AUTHORISED BY DATE |

Remarks: Refer to covering Contract Instruction No. / Approval Sheet No. 219/11/10/10-14

| REV. | DESCRIPTION | DATE |
|-------------------|-------------|----------|
| AS FITTED DRAWING | | 13-11-10 |

PROJECT MANAGER
 BORDON CONSTRUCTION CO., LTD

CONSULTANT
 P & T (M&E) Ltd

ARCHITECT
 CHAU & LEUNG ARCHITECTS & ENGINEERS LTD

SUB-CONTRACTOR
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PROJECT
 CHEUNG YIP ST. / LAM CHAK ST.
 N.K.I.L. 6215

TITLE
 BASEMENT FLOOR DRAINAGE LAYOUT PLAN
 (LOW LEVEL) (PHASE 1)
 (AS FITTED DRAWING)

SCALE : 1 : 200 DATE : 13-11-10 Rev.

DRAWING No. : D1/201

APPROVED BY : —

CHECKED BY : Raymond Mark

DRAWN BY : Y.K.Luk

Appendix 3.3 Extracted Pages from Planning Application No. A/K22/43

Table 4-3 Proposed Sewage Discharge Locations

| Sites | Upstream Manhole | Downstream Manhole | Sewer size (mm) | Upstream Invert Level (mPD) | Downstream Invert Level (mPD) | Capacity (L/s) |
|-------|------------------|--------------------|-----------------|-----------------------------|-------------------------------|----------------|
| 3E1 | FMH4036432 | FMH4043143 | 225 | 2.00 | 1.80 | 80.83 |
| 3E2 | FMH4096818 | FMH4100328 | 300 | 2.54 | 1.11 | 236.15 |
| 4C4 | FTH4011157 | FMH4098424 | 300 | 2.48 | 2.13 | 190.66 |
| 4C5 | FTH4011160 | FMH4098431 | 300 | 1.74 | 1.35 | 212.82 |

- 4.3.2 The existing sewer at the discharge location has sufficient capacity to convey the proposed flows as detailed in **Appendix C**.
- 4.3.3 The development terminal manhole will be located close to the lot boundary, exact location will be determined in detailed design.
- 4.3.4 The proposed development utilizes the existing sewer networks; no existing sewer pipe is proposed to be abandoned. In case future detailed design will require the abandoning of existing sewers, these should comply with DSD Technical Circular No. 1/2022 - Handling of Abandoned Pipes under DSD's Purview.

Estimation of Sewage Flows Estimation from Catchments Not Affected by the Proposed Development

Design Code

1. Based on EPD Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning.
2. Planning Department CIFSUS.
3. BS EN 12056-2:2000 Gravity drainage systems inside buildings

External Discharge - Near Sites 3E1 and 3E2

| ADWF Sewage Flow Estimates | Estimation | Unit | Remark |
|---------------------------------|-------------------|----------------------------|---|
| E_1 Kai Tak Fire Station | | | |
| Type | Social Services | - | |
| Total GFA | 6,450 | m ² | Building footprint on 5 floors |
| Assumed GFA per Employee | 30.3 | m ² /Person | Table 8 CIFSUS - Social Services |
| Employee Population | 213 | Persons | |
| Unit flow factor (UFF) | 0.28 | m ³ /person/day | Table T-2: Employee & Community, Social & Personal Services |
| Catchment Inflow Factors(PCIF) | 1.1 | - | Table T-4 of GESF - East Kowloon |
| ADWF | 65.60 | m ³ /day | |
| Total building ADWF | 65.60 | m ³ /day | |
| Discharges to: | | | |
| FMH4096823 | 65.60 | m ³ /day | assumed |
| E_2 Pacific Trade Centre | | | |
| Type | Manufacturing | - | |
| Total GFA | 70,856 | m ² | Building footprint time 17 floors. Source: geoinfo and https://property.jll.com.hk/en/industrial-lease/hong-kong/kowloon-bay/pacific-trade-centre-hk-p-1933 |
| Assumed GFA per Employee | 43.5 | m ² /Person | Table 8 CIFSUS - Manufacturing |
| Employee Population | 1,630 | Persons | |
| Unit flow factor (UFF) | 0.53 | m ³ /person/day | Table T-3: Employee & J1 Manufacturing - East Kowloon |
| Catchment Inflow Factors(PCIF) | 1.1 | - | Table T-4 of GESF - East Kowloon |
| ADWF | 950.29 | m ³ /day | |
| Total building ADWF | 950.29 | m ³ /day | |
| Discharges to: | | | |
| FMH4043148 | 475.15 | m ³ /day | Assumed 50% flow split between the two discharge locations |
| FMH4043149 | 475.15 | m ³ /day | Assumed 50% flow split between the two discharge locations |
| E_3 Harbourside HQ | | | |
| Type | Business Services | - | |
| Total GFA | 63,080 | m ² | Source: https://office.propwisser.com.hk/en/Building/kowloon-bay/harbourside-hq/316 |
| Assumed GFA per Employee | 18.2 | m ² /Person | Table 8 CIFSUS - Business Services |
| Employee Population | 3,470 | Persons | |
| Unit flow factor (UFF) | 0.08 | m ³ /person/day | Table T-2: Employee & J6 Finance, Insurance, Real Estate & Business Services |
| Catchment Inflow Factors(PCIF) | 1.1 | - | Table T-4 of GESF - East Kowloon |
| ADWF | 42.81 | m ³ /day | |
| Total building ADWF | 42.81 | m ³ /day | |
| Discharges to: | | | |
| FMH4043146 | 42.81 | m ³ /day | |
| E_4 Kerry D.G. Warehouse | | | |
| Type | Business Services | - | Source: https://www.tpb.gov.hk/en/papers/MPC/K/A_K22_27/A_K22_27_MainPaper(revised).pdf |
| Total GFA | 26,917 | m ² | Assumed 55% office |
| Assumed GFA per Employee | 18.2 | m ² /Person | Table 8 CIFSUS - Business Services |
| Employee Population | 1,481 | Persons | |
| Unit flow factor (UFF) | 0.08 | m ³ /person/day | Table T-2: Employee & J6 Finance, Insurance, Real Estate & Business Services |
| Catchment Inflow Factors(PCIF) | 1.1 | - | Table T-4 of GESF - East Kowloon |
| ADWF | 130.33 | m ³ /day | |
| Type | Retail Trade | - | |
| Total GFA | 17,129 | m ² | Assumed 35% retail trade |
| Assumed GFA per Employee | 28.6 | m ² /Person | Table 8 CIFSUS - Retail Trade |
| Employee Population | 600 | Persons | |
| Unit flow factor (UFF) | 0.28 | m ³ /person/day | Table T-2: Employee & J4 Retail |
| Catchment Inflow Factors(PCIF) | 1.1 | - | Table T-4 of GESF - East Kowloon |
| ADWF | 184.80 | m ³ /day | |
| Type | Restaurants | - | |
| Total GFA | 4,894 | m ² | Assumed 10% restaurants |
| Assumed GFA per Employee | 19.6 | m ² /Person | Table 8 CIFSUS - Restaurants |
| Employee Population | 250 | Persons | |
| Unit flow factor (UFF) | 1.58 | m ³ /person/day | Table T-2: Employee-Customers & J10 Restaurants |
| Catchment Inflow Factors(PCIF) | 1.1 | - | Table T-4 of GESF - East Kowloon |
| ADWF | 434.50 | m ³ /day | |
| Total building ADWF | 749.63 | m ³ /day | |
| Discharges to: | | | |
| FMH4043143 | 749.63 | m ³ /day | |
| E_5 NKIL 6647 | | | |
| Type | Residential | - | |
| Number of flats | 1,782 | flats | Source: https://www.tpb.gov.hk/plan_application/Attachment/20210803/s16fi_A_K22_31_4_gist.pdf |
| Average household | 2.7 | Persons/flat | Census, Household Characteristics of Population in Kowloon City District, 2021 |
| Population | 4,812 | Persons | |
| Unit flow factor (UFF) | 0.27 | m ³ /person/day | Table T-1 of GESF - Residential R2 |
| Catchment Inflow Factors(PCIF) | 1.0 | - | GESF section 10 - Not applicable for new developments. |
| ADWF | 1,299.24 | m ³ /day | |
| Type | Social Services | - | |
| Total GFA | 5,500 | m ² | Club house |
| Assumed GFA per Employee | 30.3 | m ² /Person | assumed |
| Employee Population | 182 | Persons | Table 8 CIFSUS - Social Services |
| Unit flow factor (UFF) | 0.28 | m ³ /person/day | Table T-2: Employee & Community, Social & Personal Services |
| Catchment Inflow Factors(PCIF) | 1.0 | - | GESF section 10 - Not applicable for new developments. |
| ADWF | 50.96 | m ³ /day | |
| Total building ADWF | 1,350.20 | m ³ /day | |
| Discharges to: | | | |
| FMH4043145 | 450.07 | m ³ /day | Assumed split in 3 terminal manholes |
| FMH4043147 | 450.07 | m ³ /day | Assumed split in 3 terminal manholes |
| FMH4043149 | 450.07 | m ³ /day | Assumed split in 3 terminal manholes |
| E_6 Gas station | | | |
| Type | Retail Trade | - | |
| Total GFA | 106 | m ² | Source: plan form geoinfo map |
| Assumed GFA per Employee | 28.6 | m ² /Person | Table 8 CIFSUS - Retail Trade |
| Employee Population | 4 | Persons | |
| Unit flow factor (UFF) | 0.28 | m ³ /person/day | Table T-2: Employee & J4 Retail |
| Catchment Inflow Factors(PCIF) | 1.1 | - | Table T-4 of GESF - East Kowloon |
| ADWF | 1.23 | m ³ /day | |
| Total building ADWF | 1.23 | m ³ /day | |
| Discharges to: | | | |
| FMH4036900 | 1.23 | m ³ /day | EXTERNAL (on box culvert) |

| Localised Sewage Flow Estimates | Estimation | Unit | Remark |
|---|------------|------|-------------------------------------|
| EL_1 Hong Kong Children's Hospital | | | |
| Total building Localised Flow | 36.24 | l/s | information provided by development |
| Discharges to: | | | |

Estimation of Sewage Flows Estimation for Proposed Development

Design Code

1. Based on EPD Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning.
2. Planning Department CIFSUS.
3. BS EN 12056-2:2000 Gravity drainage systems inside buildings

Proposed Discharge - Sites 3E1 and 3E2

| ADWF Sewage Flow Estimates | | | |
|--------------------------------|-----------------|----------------------------|--|
| | Estimation | Unit | Remark |
| P_1 Site 3E1 | | | |
| Type | Residential | - | |
| Number of flats | 888 | flats | |
| Average household | 2.7 | Persons/flat | Census, Household Characteristics of Population in Kowloon City District, 2021 |
| Population | 2,398 | Persons | |
| Unit flow factor (UFF) | 0.19 | m ³ /person/day | Table T-1 of GESF - Residential R1 |
| Catchment Inflow Factors(PCIF) | 1.0 | - | GESF section 10 - Not applicable for new developments. |
| ADWF | 455.62 | m ³ /day | |
| Retail Trade | | | |
| Type | Retail Trade | - | |
| Total GFA | 2,405 | m ² | FROM PRELIM LAYOUT |
| Assumed GFA per Employee | 28.6 | m ² /Person | Table 8 CIFSUS - Retail Trade |
| Employee Population | 85 | Persons | |
| Unit flow factor (UFF) | 0.28 | m ³ /person/day | Table T-2: Employee & J4 Retail |
| Catchment Inflow Factors(PCIF) | 1.0 | - | GESF section 10 - Not applicable for new developments. |
| ADWF | 23.80 | m ³ /day | |
| Social Services | | | |
| Type | Social Services | - | Club house and social and welfare facilities |
| Total GFA | 3,087 | m ² | FROM PRELIM LAYOUT |
| Assumed GFA per Employee | 30.3 | m ² /Person | Table 8 CIFSUS - Social Services |
| Employee Population | 102 | Persons | |
| Unit flow factor (UFF) | 0.28 | m ³ /person/day | Table T-2: Employee & Community, Social & Personal Services |
| Catchment Inflow Factors(PCIF) | 1.0 | - | GESF section 10 - Not applicable for new developments. |
| ADWF | 28.56 | m ³ /day | |
| Total building ADWF | 507.98 | m ³ /day | |
| Discharges to: | | | |
| TMH_3E1 | 507.98 | m ³ /day | |
| P_2 Site 3E2 | | | |
| Type | Residential | - | |
| Number of flats | 1,040 | flats | |
| Average household | 2.7 | Persons/flat | Census, Household Characteristics of Population in Kowloon City District, 2021 |
| Employee Population | 2,808 | Persons | |
| Unit flow factor (UFF) | 0.19 | m ³ /person/day | Table T-1 of GESF - Residential R1 |
| Catchment Inflow Factors(PCIF) | 1.0 | - | GESF section 10 - Not applicable for new developments. |
| ADWF | 533.52 | m ³ /day | |
| Retail Trade | | | |
| Type | Retail Trade | - | |
| Total GFA | 3,843 | m ² | FROM PRELIM LAYOUT |
| Assumed GFA per Employee | 28.6 | m ² /Person | Table 8 CIFSUS - Retail Trade |
| Employee Population | 135 | Persons | |
| Unit flow factor (UFF) | 0.28 | m ³ /person/day | Table T-2: Employee & J4 Retail |
| Catchment Inflow Factors(PCIF) | 1.0 | - | GESF section 10 - Not applicable for new developments. |
| ADWF | 37.80 | m ³ /day | |
| Social Services | | | |
| Type | Social Services | - | Club house and social |
| Total GFA | 2,065 | m ² | FROM PRELIM LAYOUT |
| Assumed GFA per Employee | 30.3 | m ² /Person | Table 8 CIFSUS - Social Services |
| Employee Population | 69 | Persons | |
| Unit flow factor (UFF) | 0.28 | m ³ /person/day | Table T-2: Employee & Community, Social & Personal Services |
| Catchment Inflow Factors(PCIF) | 1.0 | - | GESF section 10 - Not applicable for new developments. |
| ADWF | 19.32 | m ³ /day | |
| Total building ADWF | 590.64 | m ³ /day | |
| Discharges to: | | | |
| TMH_3E2 | 590.64 | m ³ /day | |
| TOT ADWF | 1,098.62 | m³/day | |

Appendix 3.4 Extracted Pages from Planning Application No. A/K22/31

**Broad Development Parameters of the Applied Use/Development
in respect of Application No. A/K22/31**

關乎申請編號 A/K22/31 的擬議用途/發展的概括發展規範

Revised broad development parameters in view of
the further information received on 28.1.2022, 31.1.2022 and 9.2.2022

因應於 2022 年 1 月 28 日、2022 年 1 月 31 日及 2022 年 2 月 9 日接獲的進一步資料而修訂的概括發展規範

| | | | |
|---|---|----------------|--------------------|
| Application No. 申請編號 | A/K22/31 | | |
| Location/address 位置/地址 | New Kowloon Inland Lot Nos. 5805, 5806 and 5982, 1-5 Kai Hing Road, Kowloon Bay, Kowloon 九龍九龍灣啟興道 1-5 號新九龍內地段第 5805 號、5806 號及 5982 號 | | |
| Site area 地盤面積 | About 約 15,404 sq. m 平方米 | | |
| Plan 圖則 | Section 16 application 第 16 條申請 Approved Kai Tak Outline Zoning Plan No. S/K22/6 啟德分區計劃大綱核准圖編號 S/K22/6 | | |
| | Further information received 接獲進一步資料 Draft Kai Tak Outline Zoning Plan No. S/K22/7 啟德分區計劃大綱草圖編號 S/K22/7 | | |
| Zoning 地帶 | Section 16 application 第 16 條申請 "Commercial (2)" 「商業(2)」 | | |
| | Further information received 接獲進一步資料 "Commercial (2)" 「商業(2)」 | | |
| Applied use/ development 申請用途/發展 | Proposed Residential Development with Public Waterfront Promenade, a Pier (Landing Steps) and Shop and Services/Eating Place 擬議住宅發展連公眾海濱長廊、碼頭(登岸梯級)及商店及服務行業 / 食肆 | | |
| Gross floor area and/or plot ratio 總樓面面積及/ 或地積比率 | | sq. m 平方米 | Plot ratio 地積比率 |
| | Domestic 住用 | About 約 76,420 | About 約 4.96 |
| | Non-domestic 非住用 | About 約 600 | About 約 0.04 |
| No. of block 幢數 | Domestic 住用 | 7 | |
| | Non-domestic 非住用 | 1 | |
| | Composite 綜合用途 | - | |

| | | | |
|--|---|---------------------------|---|
| Building height/No. of storeys 建築物高度／層數 | Domestic 住用 | - | m 米 |
| | | Not more than 不多於 100 | mPD 米(主水平基準上) |
| | | Not more than 不多於 28 2 | Storey(s) 層 Exclude 不包括 Basement 地庫 |
| | Non-domestic 非住用 | - | m 米 |
| | | - | mPD 米(主水平基準上) |
| | | 1 | Storey(s) 層 |
| | Composite 綜合用途 | - | m 米 |
| | | - | mPD 米(主水平基準上) |
| | | - | Storey(s) 層 |
| Site coverage 上蓋面積 | About 約 33.33 % | | |
| No. of units 單位數目 | Not more than 不多於 1,782 Flats 住宅單位 | | |
| Open space 休憩用地 | Private 私人 | Not less than 不少於 4,634 | sq. m 平方米 |
| | Public 公眾 | About 約 3,821 | sq. m 平方米 |
| No. of parking spaces and loading / unloading spaces 停車位及上落客貨車位數目 | Total no. of vehicle spaces 停車位總數 | | 568 |
| | Private Car Parking Spaces 私家車車位 | | 437 |
| | Motorcycle Parking Spaces 電單車車位 | | 19 |
| | Bicycle Parking Spaces 單車停泊位 | | 112 |
| | Total no. of vehicle loading/unloading bays/lay-bys 上落客貨車位／停車處總數 | | 8 |
| Heavy Goods Vehicle Spaces 重型貨車車位 | | 8 | |

* 有關資料是為方便市民大眾參考而提供。對於所載資料在使用上的問題及文義上的歧異，城市規劃委員會概不負責。若有任何疑問，應查閱申請人提交的文件。

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