# Attachment 3

## Revised Drainage and Sewerage Impact Assessment

Prepared for

**WORLD FIRM LIMITED**

**STAR KEY DEVELOPMENT LIMITED**

**WISE EASE LIMITED**

**CENTRAL SKY INVESTMENT LIMITED**

**CENTRAL MIND INVESTMENT LIMITED**

Prepared by

**Ramboll Hong Kong Limited**

# FOR PROPOSED FLAT WITH SHOP AND SERVICES/EATING PLACE IN "COMMERCIAL" ZONE ON DRAFT WAN CHAI OUTLINE ZONING PLAN NO. S/H5/32 AT 42-44 YIU WA STREET AND 28-29 CANAL ROAD EAST, HONG KONG

## DRAINAGE AND SEWERAGE IMPACT ASSESSMENT

| | |
|---|---|
| Date | **June 2026** |
| Prepared by | **Miko Wan**<br>**Environmental Consultant** |
| Signed |  |
| Approved by | **Calvin Chiu**<br>**Technical Director** |
| Signed |  |
| Project Reference | **TKTYIUWAEI00** |
| Document No. | **R10069_v1.1** |



Ramboll Hong Kong Limited
[redacted]

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# CHAPTERS



# TABLES



# FIGURES



# APPENDICES

# 1. INTRODUCTION

## 1.1 Project Background

1.1.1 The Application Site situated at 42-44 Yiu Wa Street and 28-29 Canal Road East is currently vacant with previous building demolished. It is intended to redevelop the Application Site to include residential flat with shop and services/eating place.

1.1.2 It is therefore to seek approval from Town Planning Board ("TPB") under Section 16 of the Town Planning Ordinance for the proposed flat with shop and services/eating place.

1.1.3 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 Application Site and its Environs

1.2.1 The Application Site is located on east side of Canal Road East and Canal Road Flyover. It is also bounded by Yiu Wa Street on north side and a back alley on south side. The area of the Application Site is approximately 274.2m$^2$.

1.2.2 The Application Site, together with other adjacent lots on east side of Canal Road East and Canal Road Flyover, falls within area currently zoned as "Commercial" ("C") under Draft Wan Chai Outline Zoning Plan (OZP) No. S/H5/32. Generally, it is surrounded by commercial buildings on north, east and south sides.

1.2.3 On the other hand, the areas on opposite side of Canal Road East and Canal Road Flyover are zoned as "Other Specified Uses (MIXED USE)". Both commercial and residential uses can be found.

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 will consist of 1 residential tower, ancillary residential facilities (e.g. clubhouse) and F&B facilities. There is no swimming pool provided.

1.3.2 There will be altogether 66 flats, clubhouse of 52 m$^2$ and F&B commercial area of 162 m$^2$. 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 drainage systems. According to the drainage plan (**Appendix 2.2**), a Ø300 mm drainage pipe runs along the back alley of the Application Site and connects to the existing Ø300 mm drainage pipe (SWD7015179), which then discharges to the Ø2250 mm drainage pipe along Canal Road East. The Application Site is vacant and 100% paved currently.

2.1.2 The estimated surface runoff under the existing and future conditions of the Application Site is shown in **Appendix 2.1**. 20% 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 0.0173$m^3/s$ to approximately 0.0169$m^3/s$ 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 private stormwater manhole) and there is no change of flow regime.

2.1.3 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.

2.1.4 The applicant will be responsible to maintain the proposed drainage pipeline connection.

2.1.5 It is expected that the Proposed Development (with reduced surface runoff and same flow regime) would not result in worsened drainage impact.

# 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 Application Site are sufficient to cope with the sewage flow from the Proposed Development.

## 3.2 Assessment Criteria and Methodology

3.2.1 Environmental Protection Department's (EPD's) Guidelines for Estimating Sewage Flows for Sewage 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 $m^3$/person/day (R2)
- Clubhouse Staff: 0.28 $m^3$/day (J11 - Community, Social & Personal Services)
- F&B employee: 1.58 $m^3$/day (J10 – Restaurants & Hotels)

3.2.3 Catchment Inflow Factor ($P_{CIF}$) of Wan Chai (1.00) has been applied in the assessment.

## 3.3 Existing and Future Sewerage System

3.3.1 According to the existing drainage plan (**Appendix 2.2**), there is a Ø150mm sewer along the lane at the back alley of the Application Site (to the south of the Application Site) and then connected to the existing manhole (FMH7061661).

3.3.2 As the existing sewer along Matheson Street is missing invert level, minimum velocity of 1m/s (based on DSD's sewerage manual) is adopted in the hydraulic calculation in this SIA to cater for worse scenario.

3.3.3 The latest drainage plan for the Application Site was approved on 2 February 2023. In accordance with that approved plan, the developer has already installed a new 225mm diameter sewerage pipeline from terminal manhole T1 to existing sewerage manhole F15 in accordance with the approved plan. For the proposed development, the same connection which is already completed will be adopted.

3.3.4 The existing and future sewers in the vicinity of the Application Site are shown in **Figure 3.1**.

## 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 (F&B) |
| Total number of units | 66 | - | - |
| Assumed Area ($m^2$) | - | 52 | 162 |
| Number of Population | 152(1) | 2 | 9 |
| Design Flow ($m^3$/person/day) | 0.27(2) | 0.28(3) | 1.58(4) |
| **Flow Rate ($m^3$/day)** | **41.0** | **0.6** | **14.2** |
| **Total Flow Rate with $P_{CIF}$ ($m^3$/day)** | **55.8** | | |
| **Peak Flow (L/s)** | **5.2** | | |

(1) 2021 Population Census – Average Household Size of 2.3 in Canal Road
(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 – J10 Restaurants & Hotels

## 3.5 Discussion

3.5.1 Wastewater from the Proposed Development will be discharged to the existing sewerage manhole 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: 55.8$m^3$/day.

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**), seven of the existing private sewerage pipelines would not have adequate capacity to receive the flow, while the existing government sewerage pipelines would have adequate capacity.

3.5.4 Therefore, a sewage retention tank will be proposed for the Proposed Development such that the sewage will be discharged during non-peak sewage discharge period only. It is committed that the sewage would not be discharge during the peak sewage discharge period. Furthermore, the proposed sewage retention tank will be provided with adequate capacity to prevent potential overflow of sewage.

3.5.5 The applicant will be responsible to maintain the proposed sewerage pipeline connection which is already implemented, and the construction, operation & maintenance of the proposed sewage retention tank. With the proposed connection and sewage retention tank for the discharge of sewage during non-peak sewage discharge period 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 development including residential flat with shop and services/eating place is proposed at 42-44 Yiu Wa Street. The potential sewerage impact has been quantitatively addressed.

4.1.2 The Application Site is currently served by 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 same stormwater manhole as it was before development). Resilient measures in terms of 20% greenery is proposed to reduce surface runoff when compared to the existing condition. No worsened drainage impact is therefore anticipated.

4.1.3 Sewage generated from the Proposed Development will be discharged and connected to the existing manhole S1 at the back alley of the Application Site. The proposed connection resembles the connection shown in the drainage plan approved on 2 February 2023 and already implemented.

4.1.4 Based on the sewerage impact assessment results, it is found that the capacity of the existing private sewerage system serving the area would not be sufficient to cater for cumulative sewage generated from the Proposed Development and nearby catchment areas. Sewage retention tank for the Proposed Development will be proposed and the sewerage flow will be discharged during non-peak period.

4.1.5 With the proposed works and proposed holding tank, this SIA confirms the feasibility of the Proposed Development in terms of impact on the sewerage system.

**Figures**

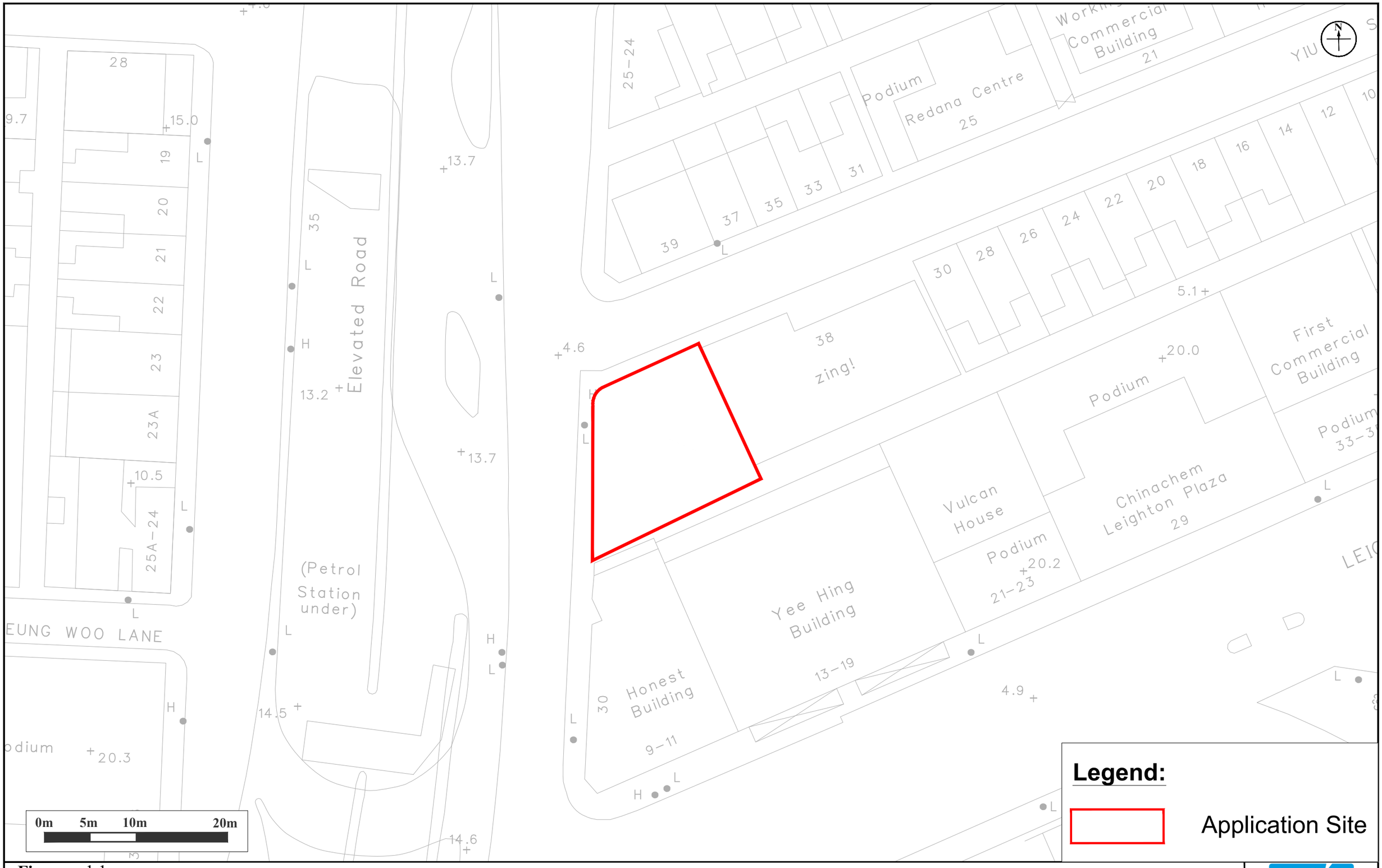


**Figure:** 1.1

**Title:** Location of the Application Site and its Environs

**Project:** For Proposed Flat with Shop and Services/Eating Place in "Commercial" Zone on Draft Wan Chai Outline Zoning Plan No. S/H5/32 at 42-44 Yiu Wa Street and 28-29 Canal Road East, Hong Kong

RAMBOLL

| | |
|---|---|
| Drawn by: | GW |
| Checked by: | CC |
| Rev.: | 1.0 |
| Date: | Apr 2026 |

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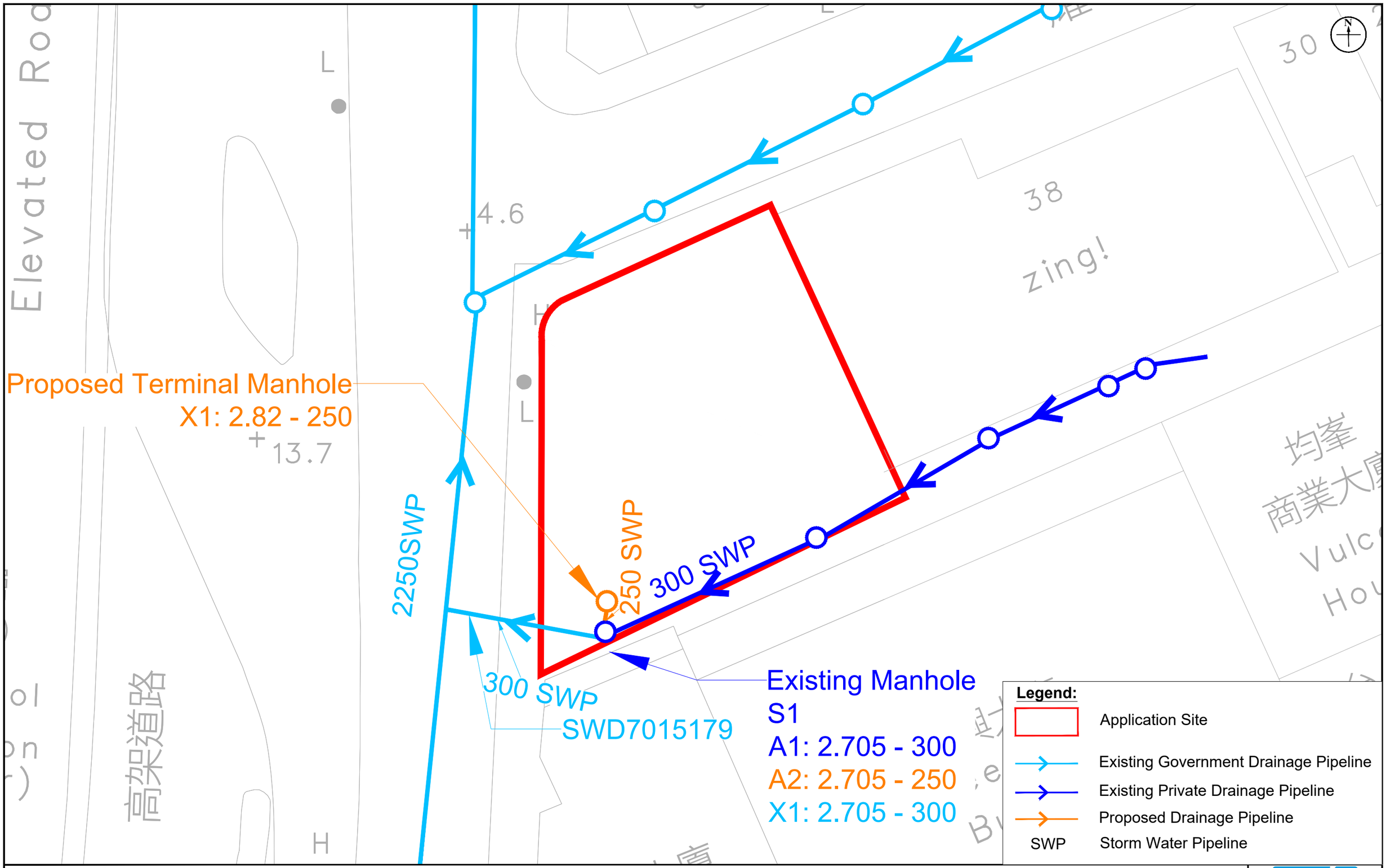


| | |
|---|---|
| **Figure:** 2.1 | RAMBOLL |
| **Title:** Existing and Proposed Drainage System in the Vicinity of the Application site | Drawn by: GW<br>Checked by: CC |
| **Project:** For Proposed Flat with Shop and Services/Eating Place in "Commercial" Zone on Draft Wan Chai Outline Zoning Plan No. S/H5/32 at 42-44 Yiu Wa Street and 28-29 Canal Road East, Hong Kong | Rev.: 1.0<br>Date: Apr 2026 |

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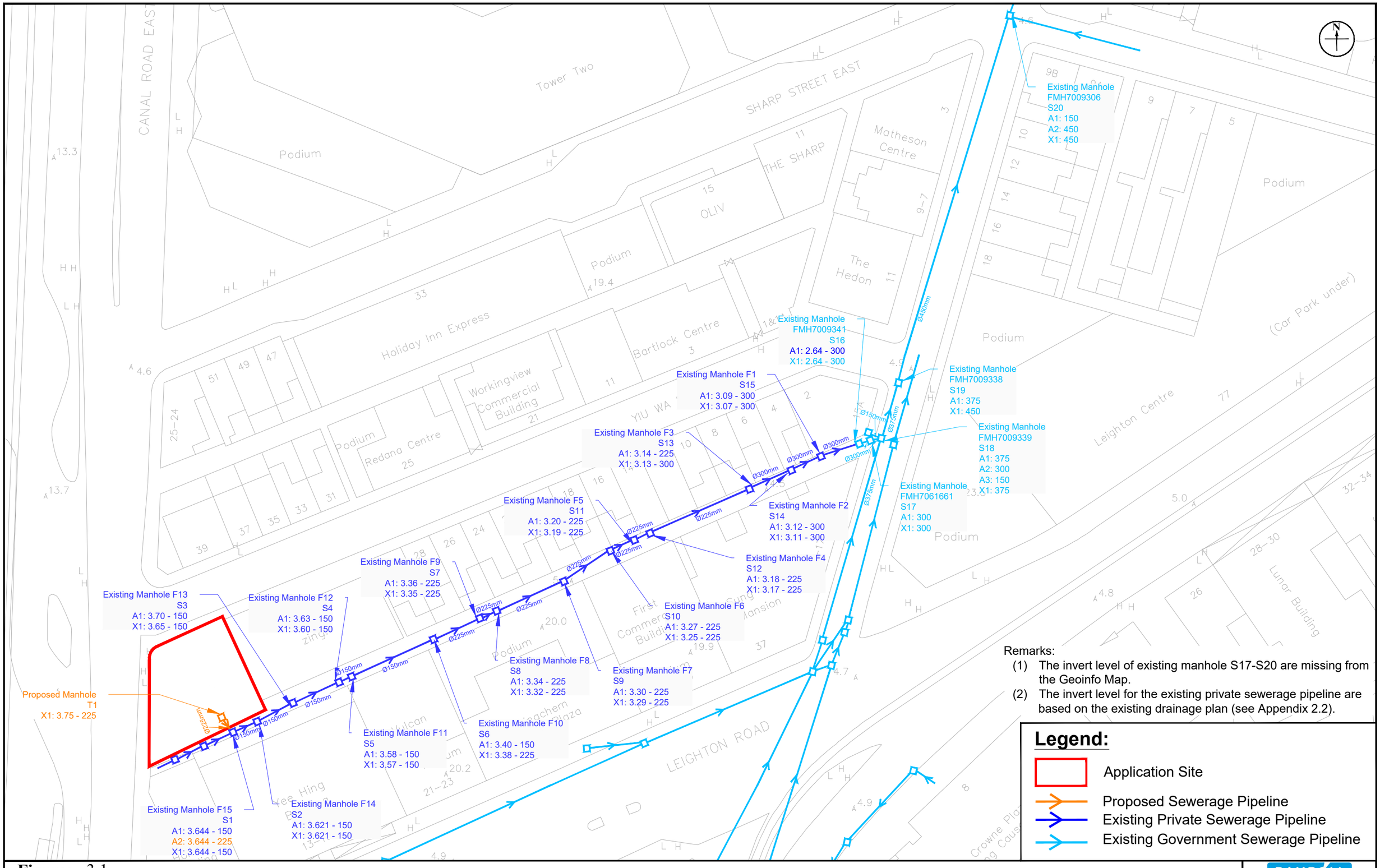


Remarks:

(1) The invert level of existing manhole S17-S20 are missing from the Geoinfo Map.

(2) The invert level for the existing private sewerage pipeline are based on the existing drainage plan (see Appendix 2.2).

## Legend:

- Application Site
- Proposed Sewerage Pipeline
- Existing Private Sewerage Pipeline
- Existing Government Sewerage Pipeline

| | |
|---|---|
| **Figure:** 3.1 | RAMBOLL |
| **Title:** Existing and Proposed Sewerage System in the Vicinity of the Application Site | Drawn by: GW<br>Checked by: CC |
| **Project:** For Proposed Flat with Shop and Services/Eating Place in "Commercial" Zone on Draft Wan Chai Outline Zoning Plan No. S/H5/32 at 42-44 Yiu Wa Street and 28-29 Canal Road East, Hong Kong | Rev.: 1.1<br>Date: Jun 2026 |

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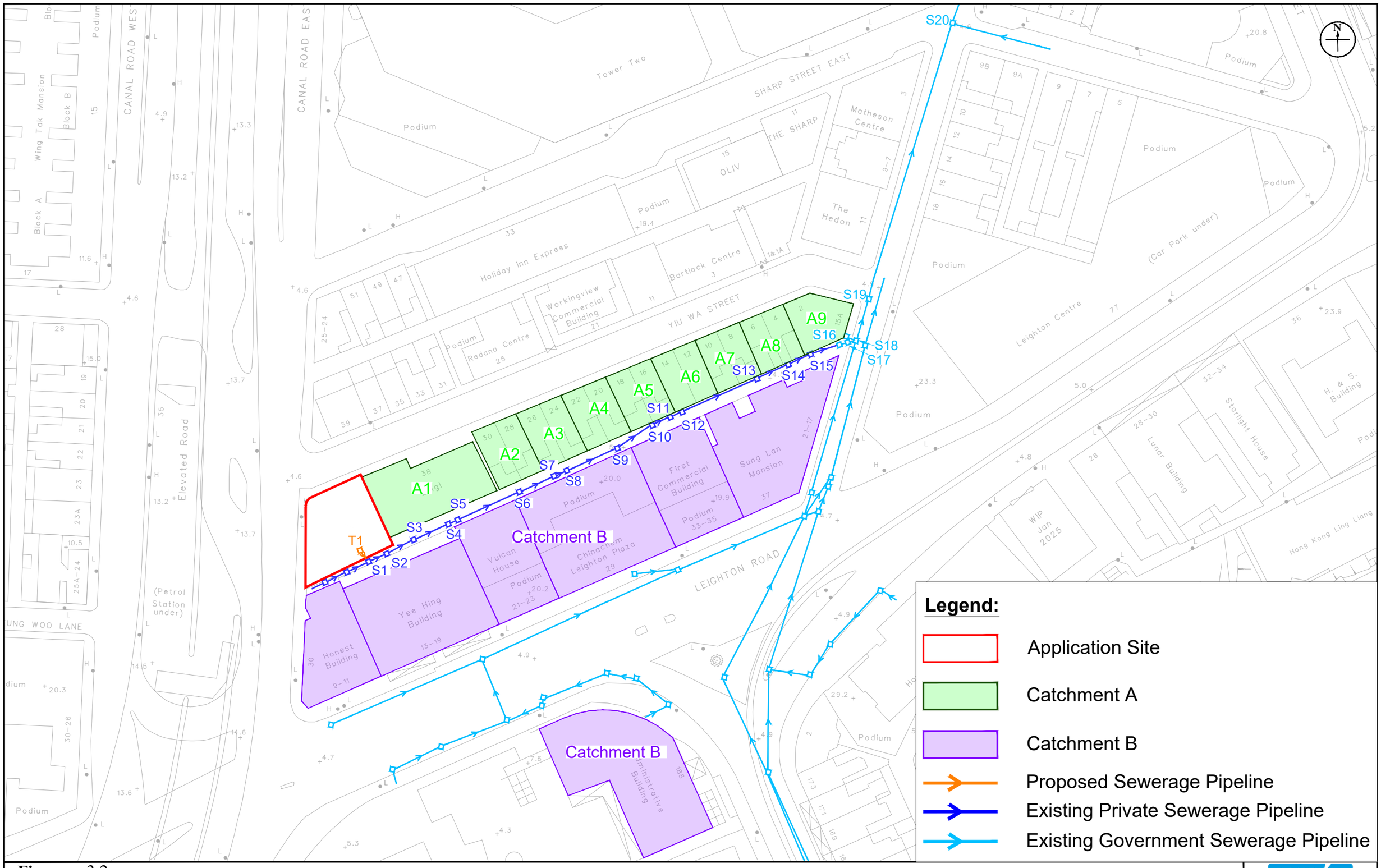


**Figure:** 3.2

**Title:** Catchment Areas in the Vicinity of the Application Site

**Project:** For Proposed Flat with Shop and Services/Eating Place in "Commercial" Zone on Draft Wan Chai Outline Zoning Plan No. S/H5/32 at 42-44 Yiu Wa Street and 28-29 Canal Road East, Hong Kong

RAMBOLL

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| Drawn by: | GW |
| Checked by: | CC |
| Rev.: | 1.0 |
| Date: | Apr 2026 |

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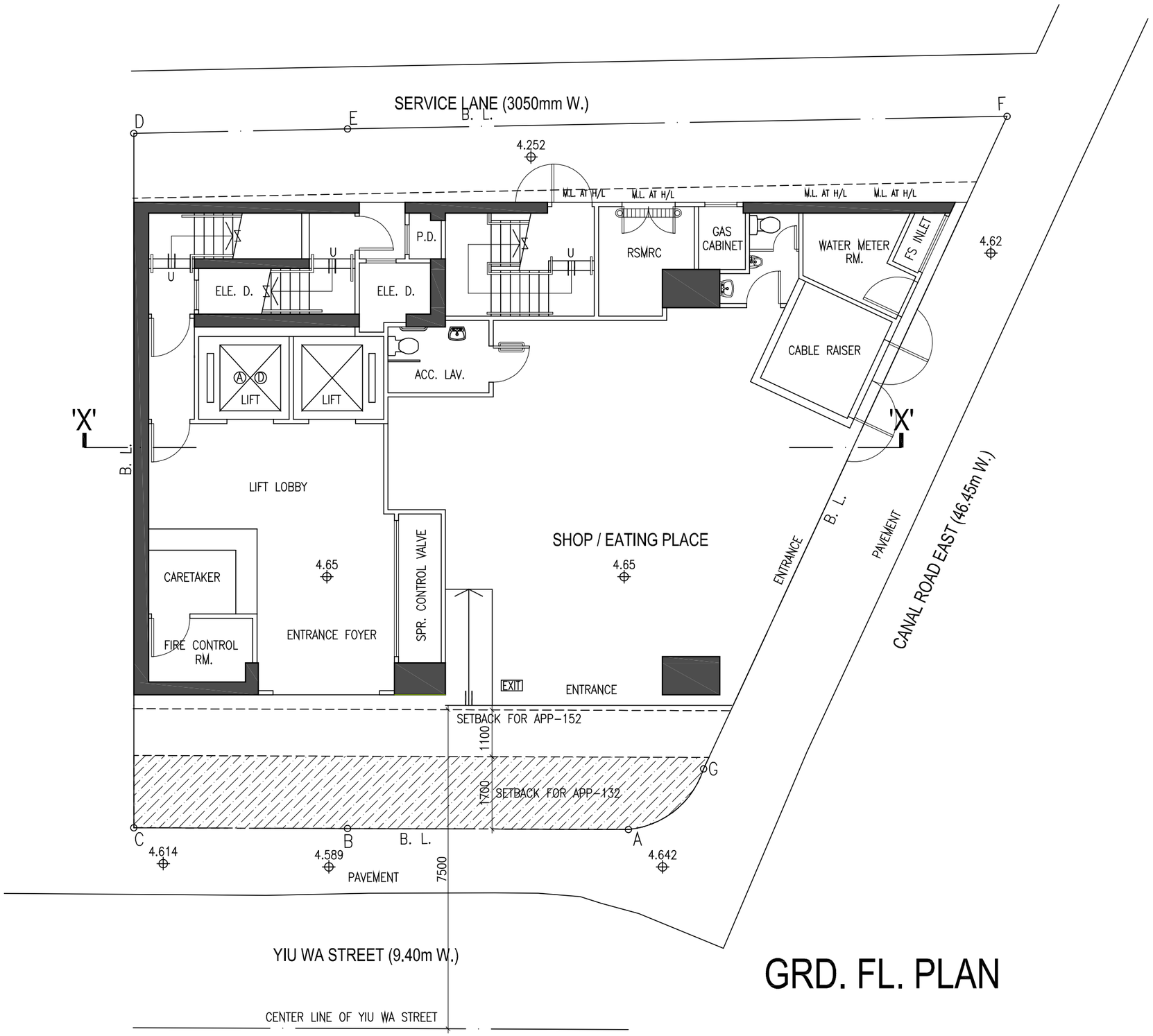
**Appendix 1.1 Master Layout Plan (MLP)**




# GRD. FL. PLAN

B.L.D. REF. NO.

F.P.B. NO.

PROJECT

PROPOSED COMPOSITE BUILDING
AT Nos. 42-44 YIU WAH STREET,
CAUSEWAY BAY
HONG KONG

PLAN

GRD. FL. PLAN

SCALE

1 : 100 (A3)
1 : 200 (A4)

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DRAWING NO. FIG-02 -

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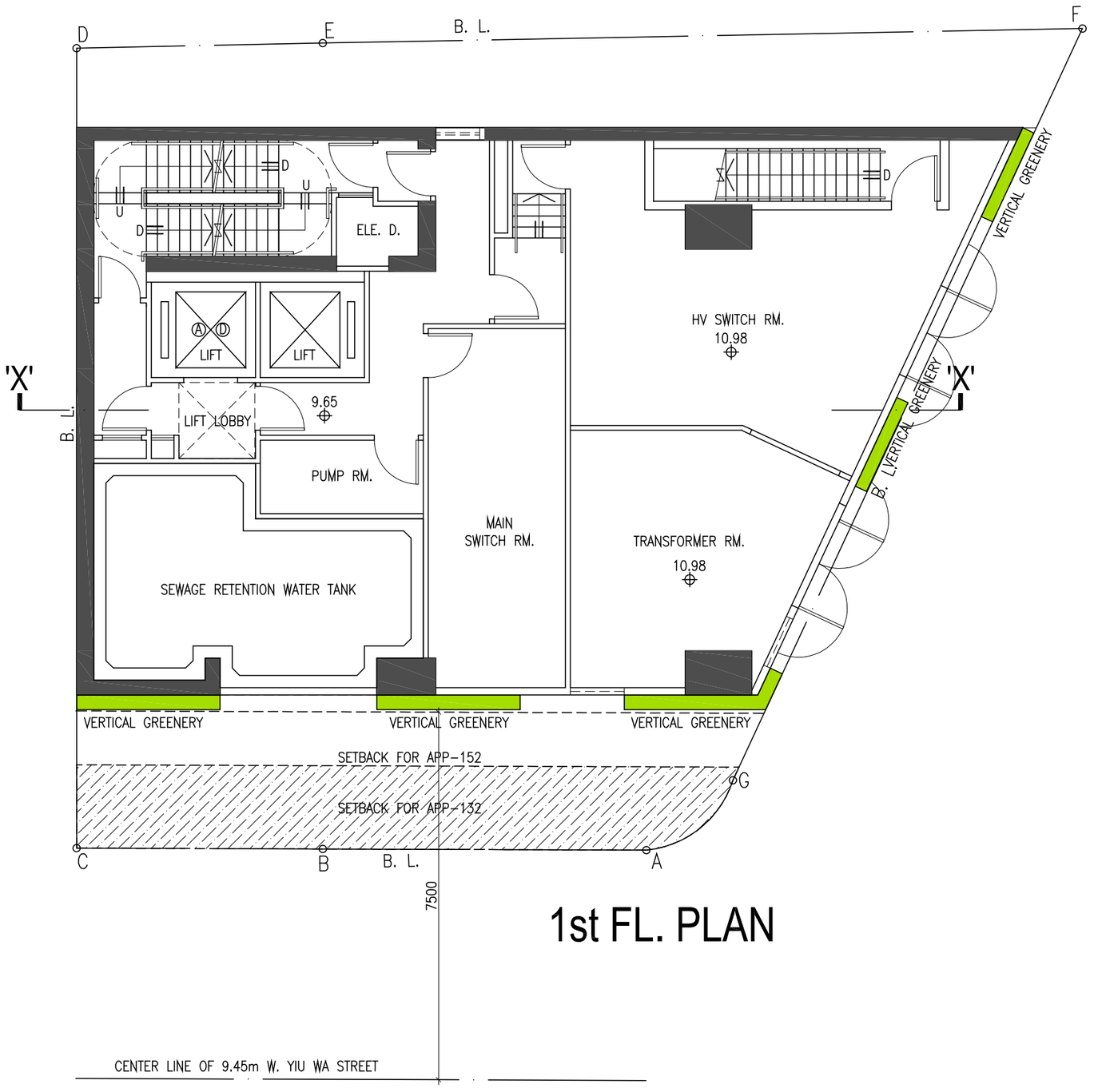
| D 05/06/2026 | | |




# 1st FL. PLAN

B.L.D. REF. NO.

F.P.B. NO.

PROJECT

PROPOSED COMPOSITE BUILDING
AT Nos. 42-44 YIU WAH STREET,
CAUSEWAY BAY
HONG KONG

PLAN

1st FL. PLAN

SCALE

AUTHORIZED PERSON

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DRAWING NO. FIG-03 -

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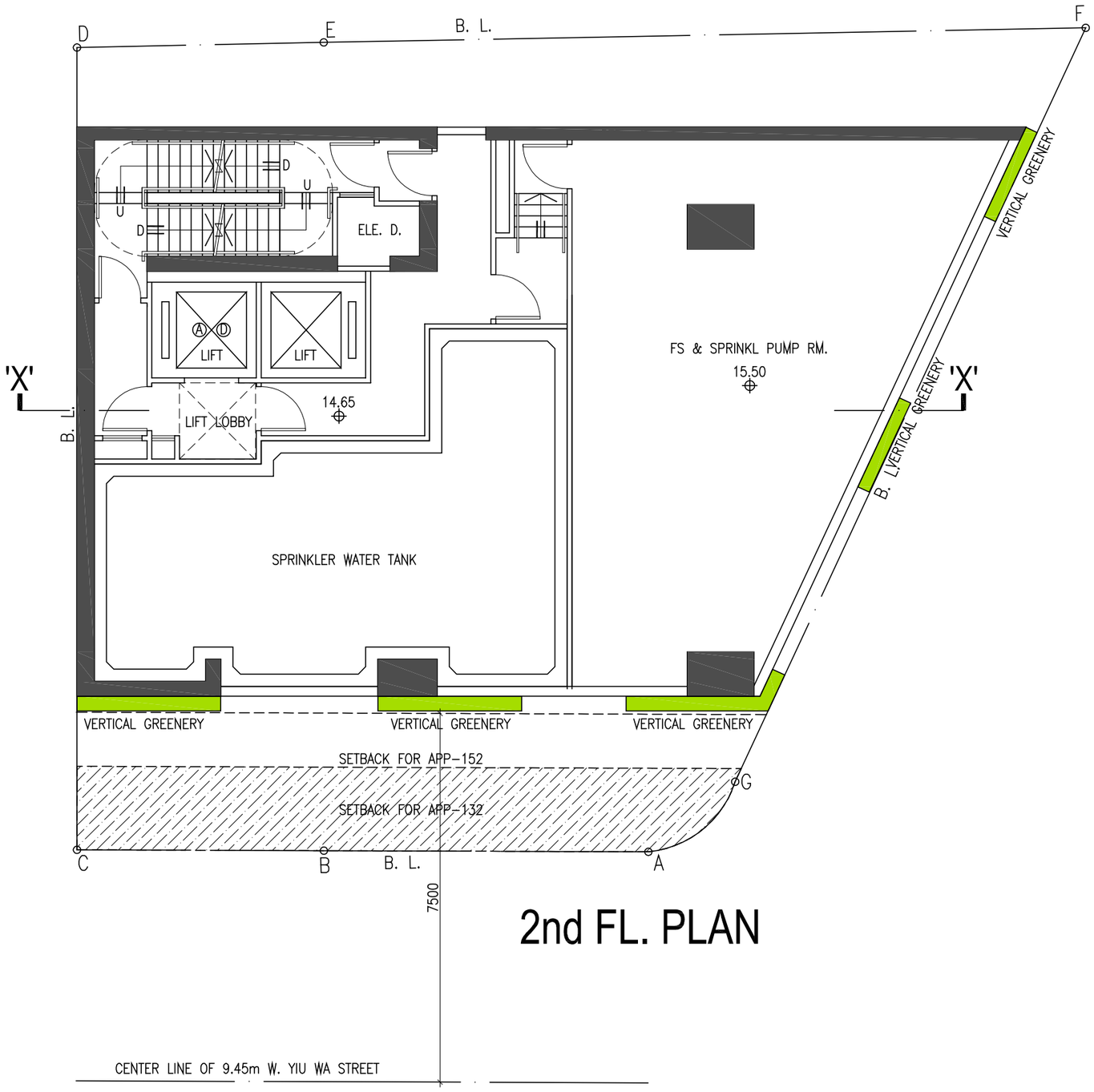


# 2nd FL. PLAN

B.L.D. REF. NO.

F.P.B. NO.

PROJECT

PROPOSED COMPOSITE BUILDING
AT Nos. 42-44 YIU WAH STREET,
CAUSEWAY BAY
HONG KONG

PLAN

2nd FL. PLAN

SCALE

AUTHORIZED PERSON

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DRAWING NO. FIG-04 -

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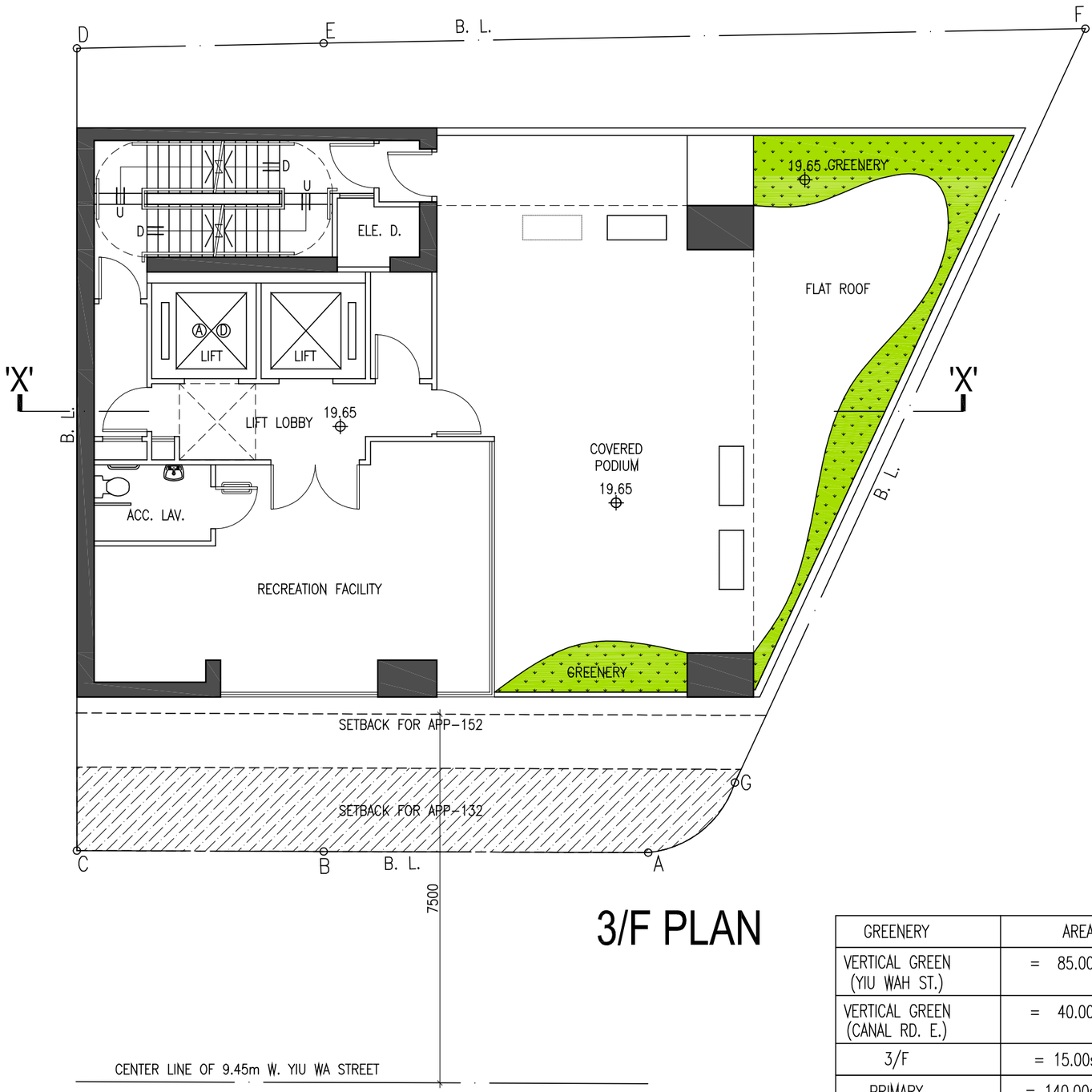


# 3/F PLAN

| GREENERY | AREA | PRIMARY | OVERALL |
|---|---|---|---|
| VERTICAL GREEN (YIU WAH ST.) | = 85.00s.m. | ✓ | ✓ |
| VERTICAL GREEN (CANAL RD. E.) | = 40.00s.m. | ✓ | ✓ |
| 3/F | = 15.00s.m. | ✓ | ✓ |
| PRIMARY | = 140.00s.m. / 274.20 = 51.06% > 10% | | |
| OVERALL | = 140.00s.m. / 274.20 = 51.06% > 20% | | |

B.L.D. REF. NO.

F.P.B. NO.

PROJECT

PROPOSED COMPOSITE BUILDING
AT Nos. 42-44 YIU WAH STREET,
CAUSEWAY BAY
HONG KONG

PLAN

3rd FL. PLAN

SCALE

AUTHORIZED PERSON

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FIG-05 - 

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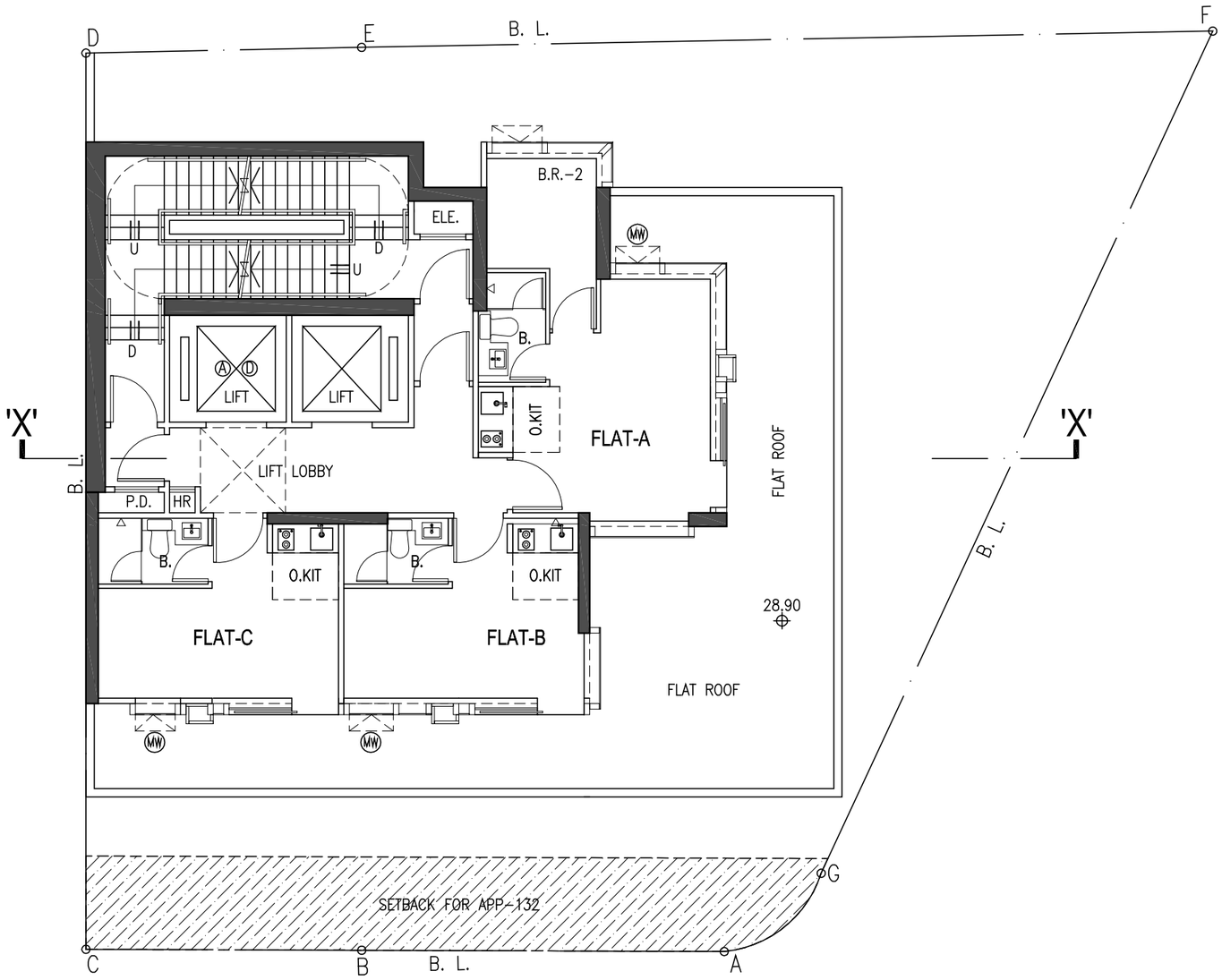


# 5/F PLAN

(NO 4/F)

MW MAINTENANCE WINDOW

B.L.D. REF. NO.

F.P.B. NO.

PROJECT

PROPOSED COMPOSITE BUILDING
AT Nos. 42-44 YIU WAH STREET,
CAUSEWAY BAY
HONG KONG

PLAN

5th FL. PLAN

SCALE

AUTHORIZED PERSON

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FIG-06 -

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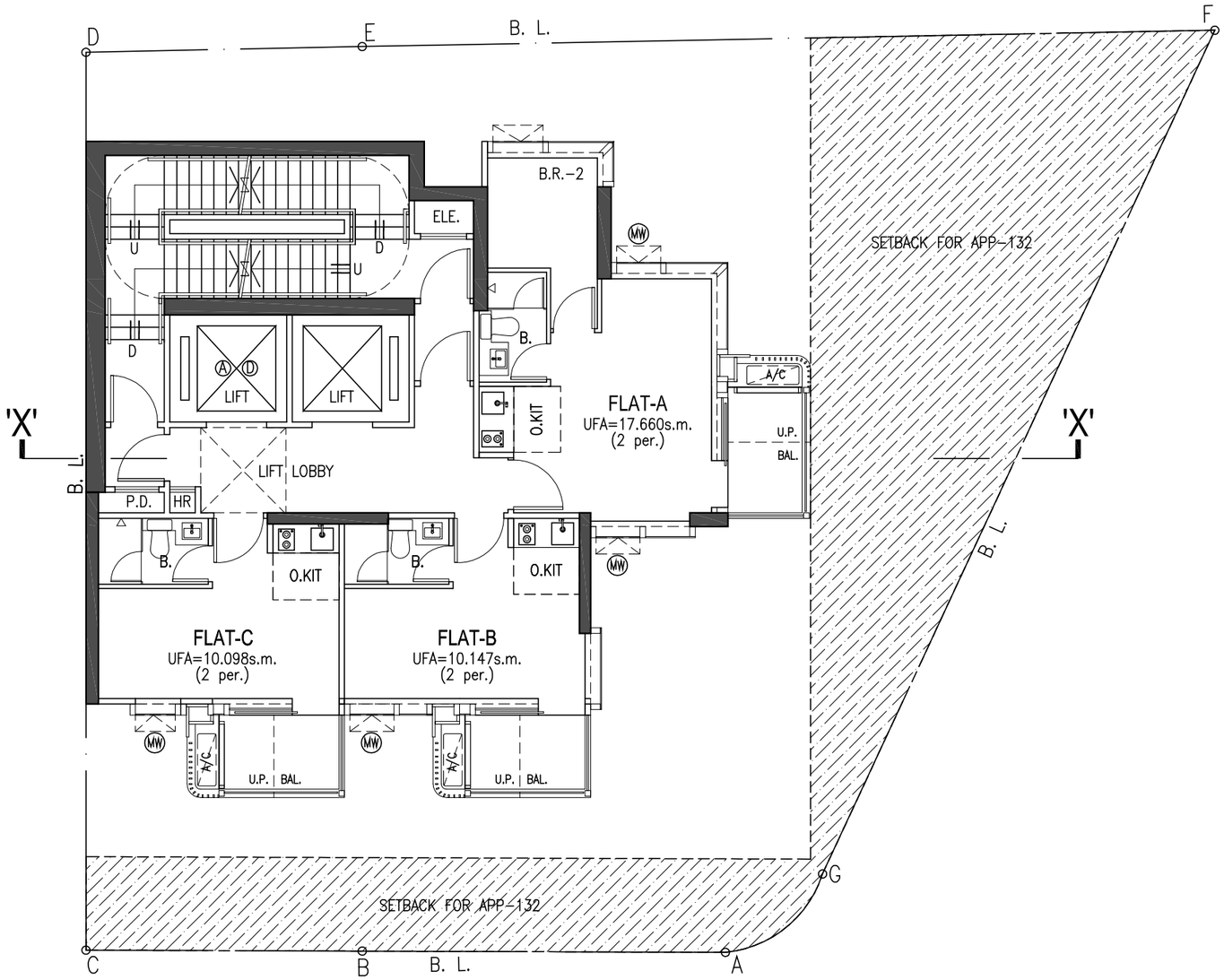


# 6-29/F PLAN

(NO 13/F, 14/F & 24/F)

MW MAINTENANCE WINDOW

B.L.D. REF. NO.

F.P.B. NO.

PROJECT

PROPOSED COMPOSITE BUILDING
AT Nos. 42-44 YIU WAH STREET,
CAUSEWAY BAY
HONG KONG

PLAN

6th-29th FL. PLAN

SCALE

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DRAWN CHECKED

DRAWING NO. FIG-07 -

| DATE | | |
|---|---|---|
| 26/02/2026 | | |
| A 05/03/2026 | E | |
| B 24/03/2026 | | |
| C 10/04/2026 | | |
| D 05/06/2026 | | |

## Appendix 2.1 Detailed Drainage Impact Assessment Calculation

**For Proposed Flat with Shop and Services/Eating Place in "Commercial" Zone on Draft Wan Chai Outline Zoning Plan No. S/H5/32 at 42-44 Yiu Wa Street and 28-29 Canal Road East, Hong Kong**

**Table 1 - Proposed Catchment Areas and Run-off (1 in 50 year)**

$$Q_p = 0.278\ C\ i\ A$$

where $Q_p$ = peak runoff in $m^3/s$
$C$ = runoff coefficient (dimensionless)
$i$ = rainfall intensity in mm/hr
$A$ = catchment area in $km^2$

Notes:

Site Area 274 $m^2$

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 ($m^2$) | Total $t_c$ [1] (min) | Intensity (mm/h) | Weighted Runoff Coefficient | Run-off ($m^3/s$) | Run-off [2] ($m^3/s$) | Run-off [3] ($m^3/s$) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Existing** | **Subject Site** | | | | | | | | | | |
| | S1 | T1 | 100% | 0% | 274 | 5.00 | 239 | 0.95 | 0.0173 | 0.0192 | 0.0200 |
| **Future** | **Subject Site** | | | | | | | | | | |
| | S1 | T1 | 80% | 20% | 274 | 5.00 | 239 | 0.93 | 0.0169 | 0.0188 | 0.0196 |

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

**For Proposed Flat with Shop and Services/Eating Place in "Commercial" Zone on Draft Wan Chai Outline Zoning Plan No. S/H5/32 at 42-44 Yiu Wa Street and 28-29 Canal Road East, Hong Kong**
**Hydraulic Calculations of Proposed Drainage System**

**Table 2a - 1 in 50 year Runoff of Future Catchments ($m^3/s$)**

| Runoff at | Catchment | |
|---|---|---|
| | S1 | Total |
| T1 | 0.017 | **0.02** |

**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 | $Q_{silt}$ [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 - S1 | - | - | Circular | 250 | 1.6 | 2.82 | 2.71 | 9.81 | 0.0030 | 0.073 | 14 | 0.000001 | 2.97 | 0.05 | 0.15 | 0.14 |

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

| Segment | Manhole Reference | Manhole Reference | Pipe Dia. | $Q_{silt}$ [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 - S1 | - | - | 250 | 0.14 | S1 | 0.02 | 12.2% | YES | 0.02 | 13.6% | YES | 0.02 | 14.2% | YES | 0.02 | 15.9% | YES |

Remarks:
1. Qsilt: 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%

**For Proposed Flat with Shop and Services/Eating Place in "Commercial" Zone on Draft Wan Chai Outline Zoning Plan No. S/H5/32 at 42-44 Yiu Wa Street and 28-29 Canal Road East, Hong Kong**

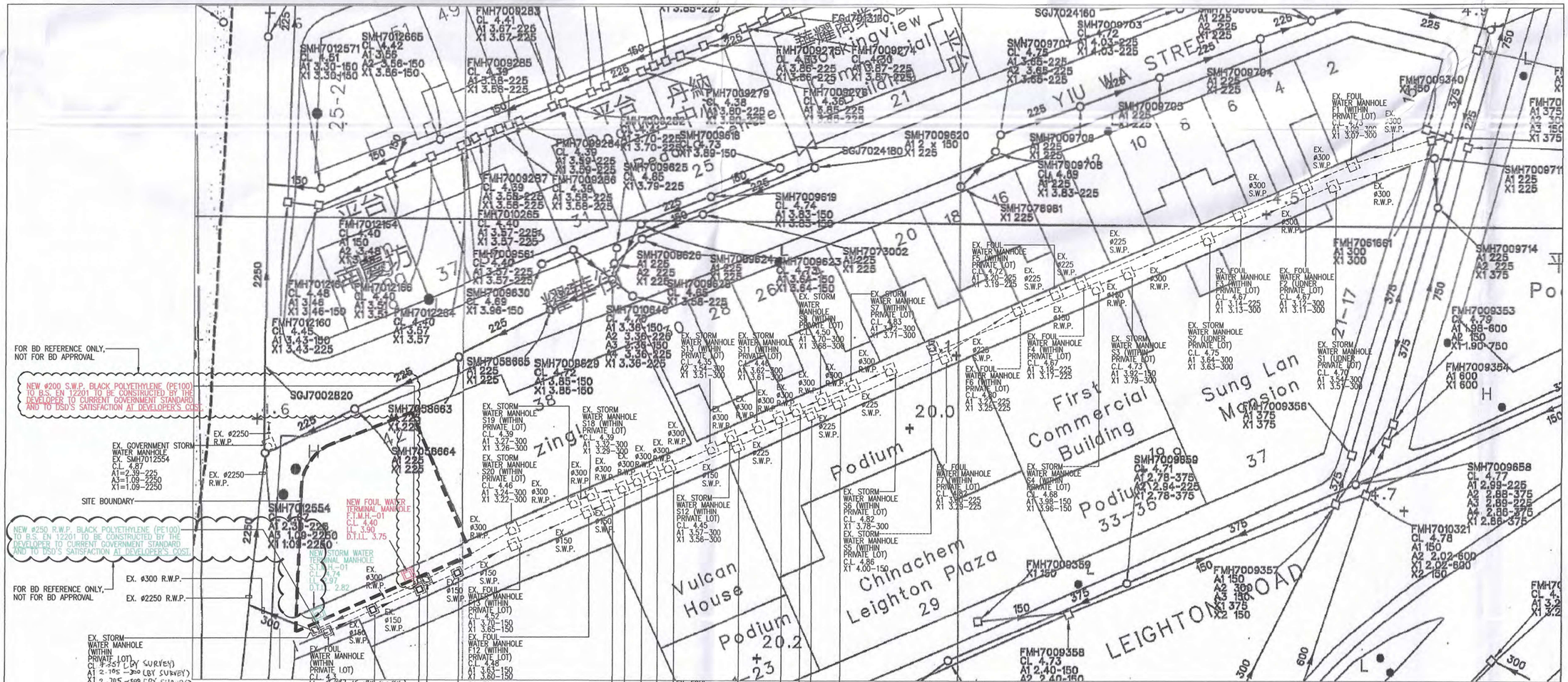
**Table 5 - Sea Levl**

| | | | |
|---|---|---|---|
| 50-year sea level (North Point/Quarry Bay) | = | 3.66 mPD | (Table 8 of SDM Corrigendum No. 1/2022) |
| Mean Sea Level Rise due to Climate Change (End of 21st Century) | = | 0.47 m | (Table 29 of SDM Corrigendum No. 1/2022) |
| Storm Surge Increase in End of 21st Century | = | 0.14 m | (Table 30b of SDM Corrigendum No. 1/2022) |
| | = | **4.27 mPD** | |

**The lowest site formation level is 4.50mPD, therefore no adverse drainage impact is anticipated due to tidal effect.**

## Appendix 2.2 Existing Drainage Plan

| | |
|---|---|
| 1829-BD-3-03 | PROPOSED DRAINAGE LAYOUT PLAN FOR 29/F – TOP ROOF |
| 1829-BD-4-01 | INSTALLATION DETAILS |




BLOCK PLAN (1:400)

Note: This plan has been curtailed check basis under processing system as prom ADM-19. The duties of the registered structural engineer geotechnical engineer conce under section 4(3)(b) and section 14(2)(c) of the Buildi of particular relevance in this

Plan Approved

YEUNG Pal
Senior Building
for BUILDING A

- 2 FEB

## 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 (Catchment S)**

**1. Residential**

| | | | |
|---|---|---|---|
| Total number of units | = | 66 | unit |
| Total number of residents | = | 152 | people -- (2021 Population Census: Average Household Size of 2.3 in Canal Road) |
| Design flow | = | 0.27 | $m^3$/person/day -- (refer to Table T-1 of GESF - R2) |
| Sewage Generation rate | = | **41.0** | $m^3$/day |

**2. Clubhouse**

| | | | |
|---|---|---|---|
| Assumed Area | = | 52 | $m^2$ |
| Assumed floor area per employee | = | 30.30 | $m^2$ per worker -- (refer to Table 8 of CIFSUS - Community, Social & Personal Services) |
| Total number of employees | = | 2 | employees |
| Design flow for commercial activities | = | 0.28 | m3/employee/day -- (refer to Table T-2 of GESF - J11) |
| Sewage Generation rate | = | **0.6** | $m^3$/day |

**3. F&B**

| | | | |
|---|---|---|---|
| Assumed Area | = | 162 | $m^2$ |
| Assumed floor area per employee | = | 19.61 | $m^2$ per worker -- (refer to Table 8 of CIFSUS - Restaurants) |
| Total number of employees | = | 9 | employees |
| Design flow for commercial activities | = | 1.58 | m3/employee/day -- (refer to Table T-2 of GESF - J10) |
| Sewage Generation rate | = | **14.2** | $m^3$/day |

**Total flow from proposed development**

| | | | |
|---|---|---|---|
| Flow Rate (without Catchment Inflow Factor) | = | 55.8 | m³/day |
| Catchment Inflow Factor | = | 1.00 | Catchment Inflow Factor for Wan Chai in Table T-4 of GESF |
| Flow Rate (with Catchment Inflow Factor) | = | **55.8** | m³/day |
| Contributing Population | = | 207 | People |
| Peaking Factor | = | 8 | Refer to Table T-5 of GESF for population <1,000 incl. stormwater allowance |
| Peak Flow | = | 5.2 | litre/sec |

*Table 2a Hydraulic Capacity of Existing Private 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 - S5 [1] | F15 | F11 | 150 | 20.8 | 3.64 | 3.58 | 9.81 | 0.00060 | 0.003 | 0.000001 | 0.55 | 0.02 | 0.01 | 10 |
| S5 - S6 | F11 | F10 | 150 | 14.3 | 3.57 | 3.40 | 9.81 | 0.00060 | 0.012 | 0.000001 | 1.10 | 0.02 | 0.02 | 19 |
| S6 - S7 | F10 | F9 | 225 | 8.2 | 3.38 | 3.36 | 9.81 | 0.00060 | 0.002 | 0.000001 | 0.64 | 0.04 | 0.03 | 25 |
| S7 - S8 | F9 | F8 | 225 | 3.2 | 3.35 | 3.34 | 9.81 | 0.00060 | 0.003 | 0.000001 | 0.73 | 0.04 | 0.03 | 29 |
| S8 - S9 | F8 | F7 | 225 | 11.8 | 3.32 | 3.30 | 9.81 | 0.00060 | 0.002 | 0.000001 | 0.53 | 0.04 | 0.02 | 21 |
| S9 - S10 | F7 | F6 | 225 | 8.9 | 3.29 | 3.27 | 9.81 | 0.00060 | 0.002 | 0.000001 | 0.61 | 0.04 | 0.02 | 24 |
| S10 - S11 | F6 | F5 | 225 | 4.2 | 3.25 | 3.20 | 9.81 | 0.00060 | 0.012 | 0.000001 | 1.44 | 0.04 | 0.06 | 57 |
| S11 - S12 | F5 | F4 | 225 | 2.8 | 3.19 | 3.18 | 9.81 | 0.00060 | 0.004 | 0.000001 | 0.78 | 0.04 | 0.03 | 31 |
| S12 - S13 | F4 | F3 | 225 | 17.4 | 3.17 | 3.14 | 9.81 | 0.00060 | 0.002 | 0.000001 | 0.54 | 0.04 | 0.02 | 21 |
| S13 - S14 | F3 | F2 | 300 | 7.4 | 3.13 | 3.12 | 9.81 | 0.00060 | 0.001 | 0.000001 | 0.57 | 0.07 | 0.04 | 40 |
| S14 - S15 | F2 | F1 | 300 | 5.3 | 3.11 | 3.09 | 9.81 | 0.00060 | 0.004 | 0.000001 | 0.96 | 0.07 | 0.07 | 68 |

*Table 2b Hydraulic Capacity of Existing Government Sewers*

| Segment | Manhole Reference | Manhole Reference | Pipe Dia. | Pipe Length | Invert Level 1 | Invert Level 2 | g | $k_s$ | s | v | V [2] | Area | Q | Estimated Capacity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | mm | m | mPD | mPD | $m/s^2$ | m | | $m^2/s$ | m/s | $m^2$ | $m^3/s$ | L/s |
| S15 - S16 | F1 | FMH7009341 | 300 | 6.4 | 3.07 | 2.64 | 9.81 | 0.00060 | 0.067 | 0.000001 | 4.10 | 0.07 | 0.29 | 290 |
| S16 - S17 | FMH7009341 | FMH7061661 | 300 | 1.6 | 2.64 | - | 9.81 | 0.00060 | - | 0.000001 | 1.00 | 0.07 | 0.07 | 71 |
| S17 - S18 | FMH7061661 | FMH7009339 | 300 | 0.9 | - | - | 9.81 | 0.00060 | - | 0.000001 | 1.00 | 0.07 | 0.07 | 71 |
| S18 - S19 | FMH7009339 | FMH7009338 | 375 | 8.5 | - | - | 9.81 | 0.00060 | - | 0.000001 | 1.00 | 0.11 | 0.11 | 110 |
| S19 - S20 | FMH7009338 | FMH7009306 | 450 | 60.0 | - | - | 9.81 | 0.00060 | - | 0.000001 | 1.00 | 0.16 | 0.16 | 159 |

*Table 2c Hydraulic Capacity of Proposed 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 |
| T1 - S1 | T1 | F15 | 225 | 3.1 | 3.75 | 3.64 | 9.81 | 0.00030 | 0.034 | 0.000001 | 2.66 | 0.04 | 0.11 | 106 |

Notes: [1] Table 2a: According to the drainage plan, the invert level of upstream manhole F14 is lower than the invert level of downstream manhole F15. Therefore, it is assumed that F15 invert level will be connected to F11.

[2] Table 2b: According to the Geoinfo Map, the invert level of the existing manhole from FMH7061661 to FMH7009306 are missing. It is assumed that the minimum velocity of 1m/s will be adopted in this calculation.

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) Table 2c-2d: The value of $k_s$ = 0.3mm is used for the calculation of slimed polyethylene for the proposed sewers, poor condition (based on Table 5: Recommended roughness values in Sewerage Manual)
(4) The value of velocity (V) is referred to the Tables for the hydraulic design of pipes, sewers and channels (8th edition)
(5) 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 A1 (S5)**
**Zing!**

| | | | |
|---|---|---|---|
| Assumed Area | = | 2362 | $m^2$ |
| Assumed floor area per employee | = | 18.2 | $m^2$ per worker -- (refer to Table 8 of CIFSUS - Financial, Insurance, Real Estate & Business Services) |
| Total number of employees | = | 130 | employees |
| Design flow for commercial activities | = | 0.08 | $m^3$/employee/day -- (refer to Table T-2 of GESF - J6) |
| Sewage Generation rate | = | **10.4** | $m^3$/day |

F&B

| | | | |
|---|---|---|---|
| Assumed Area | = | 3544 | $m^2$ |
| Assumed floor area per employee | = | 19.61 | $m^2$ per worker -- (refer to Table 8 of CIFSUS - Restaurants) |
| Total number of employees | = | 181 | employees |
| Design flow for commercial activities | = | 1.58 | $m^3$/employee/day -- (refer to Table T-2 of GESF - J10) |
| Sewage Generation rate | = | **285.5** | $m^3$/day |

**Total flow from Catchment A1**

| | | | |
|---|---|---|---|
| Flow Rate (without Catchment Inflow Factor) | = | 295.9 | m³/day |
| Catchment Inflow Factor | = | 1.00 | Catchment Inflow Factor for Wan Chai in Table T-4 of GESF |
| Flow Rate (with Catchment Inflow Factor) | = | **295.9** | m³/day |

**Catchment A2 (S6)**
**30, 28 Yiu Wa Street**

| | | | |
|---|---|---|---|
| Total number of units | = | 10 | unit |
| Total number of residents | = | 23 | people -- (2021 Population Census: Average Household Size of 2.3 in Canal Road) |
| Design flow | = | 0.27 | $m^3$/person/day -- (refer to Table T-1 of GESF - R2) |
| Sewage Generation rate | = | **6.2** | $m^3$/day |

F&B

| | | | |
|---|---|---|---|
| Assumed Area | = | 107 | $m^2$ |
| Assumed floor area per employee | = | 19.61 | $m^2$ per worker -- (refer to Table 8 of CIFSUS - Restaurants) |
| Total number of employees | = | 5 | employees |
| Design flow for commercial activities | = | 1.58 | $m^3$/employee/day -- (refer to Table T-2 of GESF - J10) |
| Sewage Generation rate | = | **8.7** | $m^3$/day |

**Total flow from Catchment A2**

| | | | |
|---|---|---|---|
| Flow Rate (without Catchment Inflow Factor) | = | 14.9 | m³/day |
| Catchment Inflow Factor | = | 1.00 | Catchment Inflow Factor for Wan Chai in Table T-4 of GESF |
| Flow Rate (with Catchment Inflow Factor) | = | **14.9** | m³/day |

**Catchment A3 (S7)**
**26, 24 Yiu Wa Street**

| | | | |
|---|---|---|---|
| Total number of units | = | 10 | unit |
| Total number of residents | = | 23 | people -- (2021 Population Census: Average Household Size of 2.3 in Canal Road) |
| Design flow | = | 0.27 | $m^3$/person/day -- (refer to Table T-1 of GESF - R2) |
| Sewage Generation rate | = | **6.2** | $m^3$/day |

F&B

| | | | |
|---|---|---|---|
| Assumed Area | = | 107 | $m^2$ |
| Assumed floor area per employee | = | 19.61 | $m^2$ per worker -- (refer to Table 8 of CIFSUS - Restaurants) |
| Total number of employees | = | 5 | employees |
| Design flow for commercial activities | = | 1.58 | $m^3$/employee/day -- (refer to Table T-2 of GESF - J10) |
| Sewage Generation rate | = | **8.6** | $m^3$/day |

**Total flow from Catchment A3**

| | | | |
|---|---|---|---|
| Flow Rate (without Catchment Inflow Factor) | = | 14.8 | m³/day |
| Catchment Inflow Factor | = | 1.00 | Catchment Inflow Factor for Wan Chai in Table T-4 of GESF |
| Flow Rate (with Catchment Inflow Factor) | = | **14.8** | m³/day |

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

**Catchment A4 (S9)**

**22, 20 Yiu Wa Street**

| | | | |
|---|---|---|---|
| Total number of units | = | 10 | unit |
| Total number of residents | = | 23 | people -- (2021 Population Census: Average Household Size of 2.3 in Canal Road) |
| Design flow | = | 0.27 | $m^3$/person/day -- (refer to Table T-1 of GESF - R2) |
| Sewage Generation rate | = | **6.2** | $m^3$/day |

F&B

| | | | |
|---|---|---|---|
| Assumed Area | = | 104 | $m^2$ |
| Assumed floor area per employee | = | 19.61 | $m^2$ per worker -- (refer to Table 8 of CIFSUS - Restaurants) |
| Total number of employees | = | 5 | employees |
| Design flow for commercial activities | = | 1.58 | $m^3$/employee/day -- (refer to Table T-2 of GESF - J10) |
| Sewage Generation rate | = | **8.4** | $m^3$/day |

**Total flow from Catchment A4**

| | | | |
|---|---|---|---|
| Flow Rate (without Catchment Inflow Factor) | = | 14.6 | m³/day |
| Catchment Inflow Factor | = | 1.00 | Catchment Inflow Factor for Wan Chai in Table T-4 of GESF |
| Flow Rate (with Catchment Inflow Factor) | = | **14.6** | m³/day |

**Catchment A5 (S10)**

**18, 16 Yiu Wa Street**

| | | | |
|---|---|---|---|
| Total number of units | = | 10 | unit |
| Total number of residents | = | 23 | people -- (2021 Population Census: Average Household Size of 2.3 in Canal Road) |
| Design flow | = | 0.27 | $m^3$/person/day -- (refer to Table T-1 of GESF - R2) |
| Sewage Generation rate | = | **6.2** | $m^3$/day |

F&B

| | | | |
|---|---|---|---|
| Assumed Area | = | 103 | $m^2$ |
| Assumed floor area per employee | = | 19.61 | $m^2$ per worker -- (refer to Table 8 of CIFSUS - Restaurants) |
| Total number of employees | = | 5 | employees |
| Design flow for commercial activities | = | 1.58 | $m^3$/employee/day -- (refer to Table T-2 of GESF - J10) |
| Sewage Generation rate | = | **8.3** | $m^3$/day |

**Total flow from Catchment A5**

| | | | |
|---|---|---|---|
| Flow Rate (without Catchment Inflow Factor) | = | 14.5 | m³/day |
| Catchment Inflow Factor | = | 1.00 | Catchment Inflow Factor for Wan Chai in Table T-4 of GESF |
| Flow Rate (with Catchment Inflow Factor) | = | **14.5** | m³/day |

**Catchment A6 (S12)**

**14, 12 Yiu Wa Street**

| | | | |
|---|---|---|---|
| Total number of units | = | 10 | unit |
| Total number of residents | = | 23 | people -- (2021 Population Census: Average Household Size of 2.3 in Canal Road) |
| Design flow | = | 0.27 | $m^3$/person/day -- (refer to Table T-1 of GESF - R2) |
| Sewage Generation rate | = | **6.2** | $m^3$/day |

F&B

| | | | |
|---|---|---|---|
| Assumed Area | = | 98 | $m^2$ |
| Assumed floor area per employee | = | 19.61 | $m^2$ per worker -- (refer to Table 8 of CIFSUS - Restaurants) |
| Total number of employees | = | 5 | employees |
| Design flow for commercial activities | = | 1.58 | $m^3$/employee/day -- (refer to Table T-2 of GESF - J10) |
| Sewage Generation rate | = | **7.9** | $m^3$/day |

**Total flow from Catchment A6**

| | | | |
|---|---|---|---|
| Flow Rate (without Catchment Inflow Factor) | = | 14.1 | m³/day |
| Catchment Inflow Factor | = | 1.00 | Catchment Inflow Factor for Wan Chai in Table T-4 of GESF |
| Flow Rate (with Catchment Inflow Factor) | = | **14.1** | m³/day |

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

**Catchment A7 (S13)**
**10, 8 Yiu Wa Street**

| | | | |
|---|---|---|---|
| Total number of units | = | 10 | unit |
| Total number of residents | = | 23 | people -- (2021 Population Census: Average Household Size of 2.3 in Canal Road) |
| Design flow | = | 0.27 | $m^3$/person/day -- (refer to Table T-1 of GESF - R2) |
| Sewage Generation rate | = | **6.2** | $m^3$/day |

F&B

| | | | |
|---|---|---|---|
| Assumed Area | = | 97 | $m^2$ |
| Assumed floor area per employee | = | 19.61 | $m^2$ per worker -- (refer to Table 8 of CIFSUS - Restaurants) |
| Total number of employees | = | 5 | employees |
| Design flow for commercial activities | = | 1.58 | $m^3$/employee/day -- (refer to Table T-2 of GESF - J10) |
| Sewage Generation rate | = | **7.8** | $m^3$/day |

**Total flow from Catchment A7**

| | | | |
|---|---|---|---|
| Flow Rate (without Catchment Inflow Factor) | = | 14.0 | m³/day |
| Catchment Inflow Factor | = | 1.00 | Catchment Inflow Factor for Wan Chai in Table T-4 of GESF |
| Flow Rate (with Catchment Inflow Factor) | = | **14.0** | m³/day |

**Catchment A8 (S14)**
**6, 4 Yiu Wa Street**

| | | | |
|---|---|---|---|
| Total number of units | = | 10 | unit |
| Total number of residents | = | 23 | people -- (2021 Population Census: Average Household Size of 2.3 in Canal Road) |
| Design flow | = | 0.27 | $m^3$/person/day -- (refer to Table T-1 of GESF - R2) |
| Sewage Generation rate | = | **6.2** | $m^3$/day |

F&B

| | | | |
|---|---|---|---|
| Assumed Area | = | 94 | $m^2$ |
| Assumed floor area per employee | = | 19.61 | $m^2$ per worker -- (refer to Table 8 of CIFSUS - Restaurants) |
| Total number of employees | = | 5 | employees |
| Design flow for commercial activities | = | 1.58 | $m^3$/employee/day -- (refer to Table T-2 of GESF - J10) |
| Sewage Generation rate | = | **7.6** | $m^3$/day |

**Total flow from Catchment A8**

| | | | |
|---|---|---|---|
| Flow Rate (without Catchment Inflow Factor) | = | 13.8 | m³/day |
| Catchment Inflow Factor | = | 1.00 | Catchment Inflow Factor for Wan Chai in Table T-4 of GESF |
| Flow Rate (with Catchment Inflow Factor) | = | **13.8** | m³/day |

**Catchment A9 (S15)**
**2 Yiu Wa Street**

| | | | |
|---|---|---|---|
| Total number of units | = | 5 | unit |
| Total number of residents | = | 12 | people -- (2021 Population Census: Average Household Size of 2.3 in Canal Road) |
| Design flow | = | 0.27 | $m^3$/person/day -- (refer to Table T-1 of GESF - R2) |
| Sewage Generation rate | = | **3.1** | $m^3$/day |

F&B

| | | | |
|---|---|---|---|
| Assumed Area | = | 98 | $m^2$ |
| Assumed floor area per employee | = | 19.61 | $m^2$ per worker -- (refer to Table 8 of CIFSUS - Restaurants) |
| Total number of employees | = | 5 | employees |
| Design flow for commercial activities | = | 1.58 | $m^3$/employee/day -- (refer to Table T-2 of GESF - J10) |
| Sewage Generation rate | = | **7.9** | $m^3$/day |

**Total flow from Catchment A9**

| | | | |
|---|---|---|---|
| Flow Rate (without Catchment Inflow Factor) | = | 11.0 | m³/day |
| Catchment Inflow Factor | = | 1.00 | Catchment Inflow Factor for Wan Chai in Table T-4 of GESF |
| Flow Rate (with Catchment Inflow Factor) | = | **11.0** | m³/day |

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

**Catchment B**

**Honest Building**

| | | | |
|---|---|---|---|
| Assumed Area | = | 4992 | $m^2$ |
| Assumed floor area per employee | = | 18.2 | $m^2$ per worker -- (refer to Table 8 of CIFSUS - Financial, Insurance, Real Estate & Business Services) |
| Total number of employees | = | 275 | employees |
| Design flow for commercial activities | = | 0.08 | $m^3$/employee/day -- (refer to Table T-2 of GESF - J6) |
| Sewage Generation rate | = | **22.0** | $m^3$/day |

**Yee Hing Building**

| | | | |
|---|---|---|---|
| Total number of units | = | 47 | unit |
| Total number of residents | = | 108 | people -- (2021 Population Census: Average Household Size of 2.3 in Canal Road) |
| Design flow | = | 0.27 | $m^3$/person/day -- (refer to Table T-1 of GESF - R2) |
| Sewage Generation rate | = | **29.2** | $m^3$/day |

F&B

| | | | |
|---|---|---|---|
| Assumed Area | = | 867 | $m^2$ |
| Assumed floor area per employee | = | 19.61 | $m^2$ per worker -- (refer to Table 8 of CIFSUS - Restaurants) |
| Total number of employees | = | 44 | employees |
| Design flow for commercial activities | = | 1.58 | $m^3$/employee/day -- (refer to Table T-2 of GESF - J10) |
| Sewage Generation rate | = | **69.9** | $m^3$/day |

**Vulcan House**

| | | | |
|---|---|---|---|
| Assumed Area | = | 3759 | $m^2$ |
| Assumed floor area per employee | = | 18.2 | $m^2$ per worker -- (refer to Table 8 of CIFSUS - Financial, Insurance, Real Estate & Business Services) |
| Total number of employees | = | 207 | employees |
| Design flow for commercial activities | = | 0.08 | $m^3$/employee/day -- (refer to Table T-2 of GESF - J6) |
| Sewage Generation rate | = | **16.5** | $m^3$/day |

F&B

| | | | |
|---|---|---|---|
| Assumed Area | = | 289 | $m^2$ |
| Assumed floor area per employee | = | 19.61 | $m^2$ per worker -- (refer to Table 8 of CIFSUS - Restaurants) |
| Total number of employees | = | 15 | employees |
| Design flow for commercial activities | = | 1.58 | $m^3$/employee/day -- (refer to Table T-2 of GESF - J10) |
| Sewage Generation rate | = | **23.3** | $m^3$/day |

**Chinachem Leighton Plaza**

| | | | |
|---|---|---|---|
| Assumed Area | = | 6586 | $m^2$ |
| Assumed floor area per employee | = | 18.2 | $m^2$ per worker -- (refer to Table 8 of CIFSUS - Financial, Insurance, Real Estate & Business Services) |
| Total number of employees | = | 362 | employees |
| Design flow for commercial activities | = | 0.08 | $m^3$/employee/day -- (refer to Table T-2 of GESF - J6) |
| Sewage Generation rate | = | **29.0** | $m^3$/day |

F&B

| | | | |
|---|---|---|---|
| Assumed Area | = | 980 | $m^2$ |
| Assumed floor area per employee | = | 19.61 | $m^2$ per worker -- (refer to Table 8 of CIFSUS - Restaurants) |
| Total number of employees | = | 50 | employees |
| Design flow for commercial activities | = | 1.58 | $m^3$/employee/day -- (refer to Table T-2 of GESF - J10) |
| Sewage Generation rate | = | **79.0** | $m^3$/day |

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

**First Commercial Building**

| | | | |
|---|---|---|---|
| Assumed Area | = | 4486 | $m^2$ |
| Assumed floor area per employee | = | 18.2 | $m^2$ per worker -- (refer to Table 8 of CIFSUS - Financial, Insurance, Real Estate & Business Services) |
| Total number of employees | = | 247 | employees |
| Design flow for commercial activities | = | 0.08 | $m^3$/employee/day -- (refer to Table T-2 of GESF - J6) |
| Sewage Generation rate | = | **19.7** | $m^3$/day |

**Sung Lan Mansion**

| | | | |
|---|---|---|---|
| Total number of units | = | 64 | unit |
| Total number of residents | = | 147 | people -- (2021 Population Census: Average Household Size of 2.3 in Canal Road) |
| Design flow | = | 0.27 | $m^3$/person/day -- (refer to Table T-1 of GESF - R2) |
| Sewage Generation rate | = | **39.7** | $m^3$/day |

F&B

| | | | |
|---|---|---|---|
| Assumed Area | = | 394 | $m^2$ |
| Assumed floor area per employee | = | 19.61 | $m^2$ per worker -- (refer to Table 8 of CIFSUS - Restaurants) |
| Total number of employees | = | 20 | employees |
| Design flow for commercial activities | = | 1.58 | $m^3$/employee/day -- (refer to Table T-2 of GESF - J10) |
| Sewage Generation rate | = | **31.8** | $m^3$/day |

**Craigengowar Cricket Club**

| | | | |
|---|---|---|---|
| a. Assumed Pipe Capacity | = | 100 | % |
| b. Pipe Diameter | = | 150 | mm |
| c. Pipe Length | = | 14.04 | m |
| d. Invert Level 1 | = | 3.14 | mPD |
| e. Invert Level 2 | = | 3.09 | mPD |
| f. Invert Level Difference | = | 0.05 | m |
| g. Gravitational Acceleration | = | 9.81 | $ms^{-2}$ |
| h. Equivalent Sand Roughness | = | 0.0006 | m |
| i. Gradient | = | 0.0036 | |
| j. Kinematic Viscosity of Water | = | 0.000001 | $m^2$/s |
| k. Mean Velocity | = | 0.59 | m/s |
| l. Cross Sectional Area of the Pipe | = | 0.02 | $m^2$ |
| m. Velocity of the Concerned Pipe | = | 0.01 | $m^3$/s |
| n. Estimated Capacity | = | **10.5** | litre/sec |

**Sub-total**

| | | | |
|---|---|---|---|
| Peak Flow | = | 10.5 | litre/sec |
| Peaking factor | = | 8.00 | Refer to Table T-5 of GESF for population 420 incl. stormwater allowance |
| Contributing Population | = | 420 | people |
| Equivalent Flow Rate | = | **113.5** | $m^3$/day |

Remark:
According to the Geoinfo map, there are few discharge points for Craiagengower Cricket Club. As a conservative approach, the sewerage flow for the club was estimated using a full-bore calculation of the existing sewerage pipe (FWD7011134).

Swimming Pool (Outdoor)

| | | | |
|---|---|---|---|
| Assumed Area of each Swimming Pool | = | 360.0 | $m^2$ |
| Average Depth of Water | = | 1.5 | m |
| Volume of Swimming Pool (Ordinary Assumption) | = | 540.0 | $m^3$ |
| Turnover Rate | = | 6 | hr |
| Required Surface Loading Rate of Filter | = | 50 | $m^3/m^2$/hr (based on min. 2 identical filters) |
| Filter Area required | = | 1.8 | $m^2$ |
| Backwash Duration | = | 3 | min/d |
| Backwash flow rate | = | 30 | $m^3/m^2$/hr (based on min. 2 identical filters) |
| Design flow for Swimming Pool Backwashing | = | 2.7 | $m^3$/day (based on min. 2 identical filters) |
| Design flow for Swimming Pool Backwashing | = | **15.0** | litre/sec (based on min. 2 identical filters) |
| Design Flowrate for Each Filter | = | **7.5** | litre/sec (assuming 2 identical filters to be used and operated sequentially) |

**Total flow from Catchment B**

| | | | |
|---|---|---|---|
| Flow Rate (without Catchment Inflow Factor) | = | 473.6 | $m^3$/day |
| Catchment Inflow Factor | = | 1.00 | Catchment Inflow Factor for Wan Chai in Table T-4 of GESF |
| Flow Rate (with Catchment Inflow Factor) | = | **473.6** | $m^3$/day |

*Table 4a Comparison of the Hydraulic Capacity of Existing Private 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 - S5 | 150 | 20.8 | 0.003 | 10 | S | 56 | 207 | 8 | 0.0 | 5.2 | 52.9% | OK |
| S5 - S6 | 150 | 14.3 | 0.012 | 19 | S + A1 | 352 | 1303 | 6 | 0.0 | 24.4 | 126.0% | Not OK |
| S6 - S7 | 225 | 8.2 | 0.002 | 25 | S + A1 - A2 | 367 | 1358 | 6 | 0.0 | 25.5 | 100.2% | Not OK |
| S7 - S8 | 225 | 3.2 | 0.003 | 29 | S + A1 - A3 | 381 | 1413 | 6 | 0.0 | 26.5 | 91.4% | Not OK |
| S8 - S9 | 225 | 11.8 | 0.002 | 21 | S + A1 - A3 | 381 | 1413 | 6 | 0.0 | 26.5 | 125.5% | Not OK |
| S9 - S10 | 225 | 8.9 | 0.002 | 24 | S + A1 - A4 | 396 | 1467 | 6 | 0.0 | 27.5 | 112.6% | Not OK |
| S10 - S11 | 225 | 4.2 | 0.012 | 57 | S + A1 - A5 | 410 | 1520 | 6 | 0.0 | 28.5 | 49.9% | OK |
| S11 - S12 | 225 | 2.8 | 0.004 | 31 | S + A1 - A5 | 410 | 1520 | 6 | 0.0 | 28.5 | 91.8% | Not OK |
| S12 - S13 | 225 | 17.4 | 0.002 | 21 | S + A1 - A6 | 425 | 1573 | 6 | 0.0 | 29.5 | 138.3% | Not OK |
| S13 - S14 | 300 | 7.4 | 0.001 | 40 | S + A1 - A7 | 439 | 1624 | 6 | 0.0 | 30.5 | 75.8% | OK |
| S14 - S15 | 300 | 5.3 | 0.004 | 68 | S + A1 - A8 | 452 | 1676 | 6 | 0.0 | 31.4 | 46.1% | OK |

*Table 4b Comparison of the Hydraulic Capacity of Existing Government 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S15 - S16 | 300 | 6.4 | 0.067 | 290 | S + A1 - A9 | 463 | 1716 | 6 | 0.0 | 32.2 | 11.1% | OK |
| S16 - S17 | 300 | 1.6 | - | 71 | S + A1 - A9 | 463 | 1716 | 6 | 0.0 | 32.2 | 45.5% | OK |
| S17 - S18 | 300 | 0.9 | - | 71 | S + A1 - A9 | 463 | 1716 | 6 | 0.0 | 32.2 | 45.5% | OK |
| S18 - S19 | 375 | 8.5 | - | 110 | S + A1 - A9 + B | 937 | 3470 | 6 | 15.0 | 80.1 | 72.5% | OK |
| S19 - S20 | 450 | 60.0 | - | 159 | S + A1 - A9 + B | 937 | 3470 | 6 | 15.0 | 80.1 | 50.3% | OK |

*Table 4c Comparison of the Hydraulic Capacity of Proposed Sewers from the Terminal Manhole of the Proposed Development for Sewage generated from the Proposed Development*

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T1 - S1 | 225 | 3.1 | 0.034 | 106 | S | 56 | 207 | 8 | 0.0 | 5.2 | 4.9% | OK |