

# **Appendix 3**

Revised Sewerage Impact  
Assessment (SIA)

# PROPOSED SOCIAL WELFARE FACILITIES (RESIDENTIAL CARE HOME FOR THE ELDERLY (RCHE)) IN “VILLAGE TYPE DEVELOPMENT” ZONE, VARIOUS LOTS IN D.D. 104 AND ADJOINING GOVERNMENT LAND, NAM SANG WAI, YUEN LONG

## SEWERAGE IMPACT ASSESSMENT

14 Oct 2025

Report No: RT25285-SIA-01B

***Prepared By:***



**BeeXergy Consulting Limited (BXG)**

Phone:

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

| Project:    | PROPOSED SOCIAL WELFARE FACILITIES (RESIDENTIAL CARE HOME FOR THE ELDERLY (RCHE)) IN "VILLAGE TYPE DEVELOPMENT" ZONE, VARIOUS LOTS IN D.D. 104 AND ADJOINING GOVERNMENT LAND, NAM SANG WAI, YUEN LONG SEWERAGE IMPACT ASSESSMENT |                    |        |         |          |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------|---------|----------|
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| Revision    | Issue Date                                                                                                                                                                                                                       | Description        | Author | Checker | Approver |
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| A           | 08/07/2025                                                                                                                                                                                                                       | Issued for Comment | LY     | YS      | HM       |
| B           | 14/10/2025                                                                                                                                                                                                                       | Issued for Comment | VS     | LY      | HM       |
|             |                                                                                                                                                                                                                                  |                    |        |         |          |
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Prepared By:

Checked by

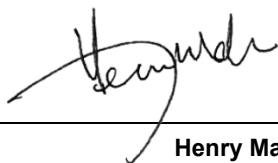


Various

Leo Yu

Consultant

Approved by:



Henry Mak

Director

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## 1 INTRODUCTION

### 1.1 PROJECT BACKGROUND

- 1.1.1. The Project Proponent proposes to develop a 3-storey Residential Care Home for the Elderly (RCHE) in various lots in D.D. 104, Nam Sang Wai (hereafter called “the Proposed Development”).
- 1.1.1. BeeXergy Consulting Limited was appointed by DeSPACE (International) Limited (the Town Planner) to conduct a Sewerage Impact Assessment (SIA) for the Proposed Development to support the application under Section 16 of the Town Planning Ordinance. The latest architectural drawings and technical information on the Project Site were largely provided by the Project Architect.

### 1.2 PROJECT LOCATION

- 1.2.1. The Project Site is approximately 1844m<sup>2</sup>, currently bounded by abandoned fishponds to the north and west, Kam Pok Road East to the south. **Figure 1** shows the location of the Project Site and its surrounding area.

### 1.3 DESCRIPTION OF THE SUBJECT SITE AND PROPOSED DEVELOPMENT

- 1.3.1. The Project Site area is approximately 1,844m<sup>2</sup>. The Proposed Development is an 3-storey building consisting of RCHE dormitory and communal area. The master layout plan provided by the Project Architect is enclosed in **Appendix A**. The tentative population intake year is 2030.

## 2 SEWERAGE IMPACT ASSESSMENT

### 2.1 SCOPE OF WORKS

- 2.1.1. The objective of this SIA is to assess whether the capacity of the sewerage networking is sufficient to cope with the peak sewage flow arising from the Proposed Development during its operation stage or not and to recommend appropriate mitigation measures to alleviate unacceptable sewerage impact, if any.

### 2.2 EXISTING SEWERAGE FACILITIES

- 2.2.1. The existing sewerage record from the Lands Department (LandsD) and Drainage Service Department (DSD) are obtained for this SIA and attached in **Figure 2**. There are no existing manholes identified in the sewerage plan. The public sewerage facility located closest to the Project Site is Nam Sang Wai Sewage Pumping Station which is located approximately 800m away from the boundary of the Project Site. **Reference**

was made to the approved planning application (A/YL-NSW/314), a set of existing 225mm public sewerage system (from feature no. MH540 to MH235) is identified along Kam Pok Road East, which is currently not in use, the relevant information is extracted in **Appendix C**.

## 2.3 OTHER PLANNED SEWERAGE FACILITIES

2.3.1. Reference was made to the approved planning application (A/YL-NSW/314), newly proposed sewers (P1 to P15) and upgrading works of the existing sewers identified along Kam Pok Road East (MH540 to MH235) were proposed to serve its own development and planned development sites in vicinity. The proposed communal sewers will also become public sewers and maintained by relevant government department such as DSD. The location of the proposed connection are shown in **Figure 3**.

2.3.2. It is noted that downstream sections of the communal gravity sewer, from manhole at the junction with Kam Pok Road connecting proposed manhole P3 to existing manhole FSH1001886, which connect along Pok Wai South Road to Nam Sang Wai Sewage Pumping Station (NSWSPS), have been proposed by several approved planning applications (No.: A/YL-NSW/314, Y/YL-NSW/7 and Y/YL-MP/10). The proposed alignment of this downstream section of the communal gravity sewer of different planning applications are shown in **Appendix D**. The proposed communal sewers ranged from twin 675 mm to twin 750 mm for sewer P3 to FSH1001886 along the Pok Wai South Road which will be sufficient to cater the additional sewage due to other nearby developments.

## 2.4 PROPOSED SEWERAGE FACILITIES

2.4.1. New terminal manhole (namely S1, MH660, MH620 and MH580) will be built to collect the sewage generated from the Proposed Development and connect to the communal sewer via a new 225mm diameter sewer pipe. The location of the proposed connection are shown in **Figure 3**. The cover level of proposed terminal manhole should be higher than that of the downstream public manhole(s). The proposed new terminal manhole and 225mm sewer pipe within site boundary will be implemented and maintained by the Project Proponent, other proposed manhole and sewer outside site boundary will become a public sewage system serving multiple users and will be handed over to government for future maintenance. The capacity check of the sewer will start from the proposed terminal manhole S1. The proposed development would not have population intake before the sewerage infrastructure of the project is functionally connected to the public sewerage system by other development mentioned in Section 2.3.

2.4.2. For other proposed sewers and upgrading works from MH540 to FSH100188, the Project Proponent will be responsible for the liaison and coordination with the other interfacing projects for the implementation of the required sewerage works in later stage. In case these planned sewers are not available at the time of completion of the Proposed Development, there will be no population intake until proposed sewerage system becomes available, or otherwise the Project Proponent will, after liaison with DSD and the other future developments near the Proposed Site, construct the sewers in order to secure discharge during operation of Proposed Development should a population intake be required.

## 2.5 MAINTENANCE RESPONSIBILITY

2.5.1. All sewers and sewerage facilities within the proposed development will be constructed, operated, and maintained by the Proposed Development.

2.5.2. For downstream sections of the communal gravity sewer that are proposed along Kam Pok East and Pok Wai South Rod to NSWSPS will become public sewers and handed over to the DSD for future maintenance.

## 2.6 ASSESSMENT CRITERIA, METHODOLOGY, AND ASSUMPTIONS

2.6.1. The Unit Flow Factors and Global Peaking Factor are adopted from the figures in the Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (Version 1.0)<sup>1</sup> (GESF) issued by the Environmental Protection Department (EPD) in March 2005 to estimate the sewage flows generated from the Project Site.

2.6.2. The Unit Flow Factors and Catchment Inflow Factors as shown in **Table 2.1** below are adopted in the assessment and the surrounding catchments are shown in **Figure 3**.

**Table 2.1 Unit Flow Factors and Catchment Inflow Factors Extracted from GESF**

| Parameter                         | Value                   | Justification                                    |
|-----------------------------------|-------------------------|--------------------------------------------------|
| <i>Population</i>                 |                         |                                                  |
| Residents in Proposed Development | 208 people              | 208 beds                                         |
| Employees in Proposed Development | 90 people               | Advised by Project Proponent                     |
| <i>Unit Flow Factors</i>          |                         |                                                  |
| Residents and Visitors in         | 0.19m <sup>3</sup> /day | “Institutional and special class” based on EPD’s |

<sup>1</sup> [http://www.epd.gov.hk/epd/sites/default/files/epd/english/environmentinhk/water/guide\\_ref/files/gesf.pdf](http://www.epd.gov.hk/epd/sites/default/files/epd/english/environmentinhk/water/guide_ref/files/gesf.pdf)

|                                                       |                         |                                                                            |
|-------------------------------------------------------|-------------------------|----------------------------------------------------------------------------|
| Proposed Development                                  |                         | GESF Table T-1.                                                            |
| Employees in Proposed Development                     | 0.28m <sup>3</sup> /day | J11 "Community, Social & Personal Services" based on EPD's GESF Table T-2. |
| <i>Catchment Inflow Factor (<math>P_{CIF}</math>)</i> |                         |                                                                            |
| Discharge from the Project Site and all Catchments    | 1.0                     | Yuen Long Catchment based on EPD's GESF Table T-4.                         |

- 2.6.3. With reference to Table T-5 of GESF, a global peaking factor of 8 and 6 (including stormwater allowance) are adopted according to the contributing population.
- 2.6.4. With reference to Table 5 in the Sewerage Manual (Part 1)<sup>2</sup> issued by the DSD in May 2013, slimed sewer of  $k_s$  of 0.6mm under "Poor" condition is assumed for both the sewers from the Subject Site and existing sewerage system in the worst-case scenario. The Colebrook-White Equation will be used to analyse the flow conditions. Equation (ii) for circular pipes flowing partially full is adopted to estimate the sewage flow for the Subject Site and following sewers.

## 2.7 RESULTS AND DISCUSSION

- 2.7.1. The estimated average flow rate and total peak flow of the Proposed Development are approximately 64.7m<sup>3</sup>/day and 5.99L/s.
- 2.7.2. Sewage generated from the Proposed Development and surrounding catchment areas will be connected at the downstream of sewage network. The cumulative flow is generally no more than 30% of sewer capacity and no adverse sewerage impacts to the existing sewerage system are identified. Therefore, no upgrading or improvement works of the sewerage system are required. Details of the sewage calculation are included in **Appendix B**.

<sup>2</sup> [http://www.dsd.gov.hk/EN/Files/Technical\\_Manual/technical\\_manuals/Sewerage\\_Manual\\_1\\_Eurocodes.pdf](http://www.dsd.gov.hk/EN/Files/Technical_Manual/technical_manuals/Sewerage_Manual_1_Eurocodes.pdf)

### **3 CONCLUSION**

- 3.1.1. A Social Welfare Facility (Residential Care Home for the Elderly) is proposed to develop at various lots in D.D. 104, Nam Sang Wai. This is the SIA to support the application under Section 16 of the Town Planning Ordinance.
- 3.1.2. Based on the SIA results, it is found that the existing sewerage system serving the area has sufficient capacity to cater for the sewage generation from the proposed development and the surrounding catchment areas. Adverse sewerage impacts are not anticipated, and thus no upgrading or improvement works are required.

**FIGURE 1**

**LOCATION OF THE PROJECT SITE AND ITS  
SURROUNDING AREA**

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LEGEND:

Site Boundary

|         | Prepared | Checked  | Approved |
|---------|----------|----------|----------|
| Initial | LY       | YS       | HM       |
| Date    | 20250530 | 20250530 | 20250530 |

Project Title

Proposed Social Welfare Facilities (Residential Care Home for the Elderly (RCHE)) in "Village Type Development" Zone, Various Lots in D.D. 104 and Adjoining Government Land, Nam Sang Wai, Yuen Long

DrawingTitle

PROPOSED DEVELOPMENT LOCATION

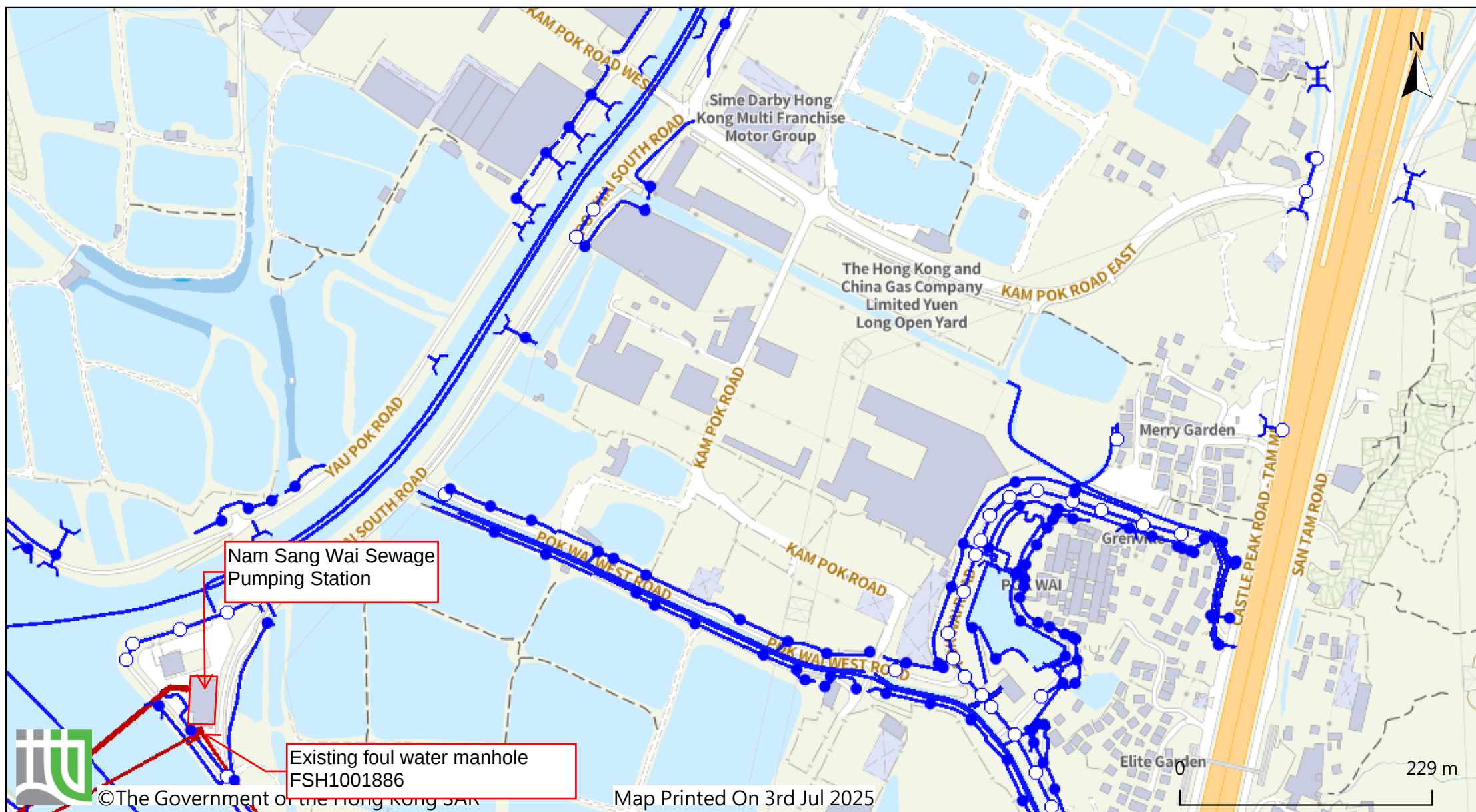
|             |      |
|-------------|------|
| Drawing No. | Rev. |
| FIGURE 1    | 0    |

Scale:

A4 - 1:5500

## **FIGURE 2**

### **EXISTING SEWERAGE SYSTEM**



**FIGURE 3**

**PROPOSED TERMINAL MANHOLE AND  
CONNECTION**

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# **APPENDIX A**

# **MASTER LAYOUT PLAN**

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## **APPENDIX B**

# **SEWAGE CALCULATION AND HYDRAULIC CAPACITY CHECK**

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**APPENDIX B - CALCULATION OF SEWAGE FLOW**

| Development                                                                         | GFA (m <sup>2</sup> ) | No. of Flat | Occupancy Density <sup>(a), (b)</sup><br>(Number of Persons)<br>(Workers per GFA in 100m <sup>2</sup> ) | Estimated Population | Unit Flow Factor (m <sup>3</sup> /day) | Estimated Average Dry Weather Flow (m <sup>3</sup> /day) | Catchment Inflow Factor | Estimated Average Dry Weather Flow X Catchment Inflow Factor (m <sup>3</sup> /day) | Remarks                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------|-----------------------|-------------|---------------------------------------------------------------------------------------------------------|----------------------|----------------------------------------|----------------------------------------------------------|-------------------------|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1) Proposed Development                                                             |                       |             |                                                                                                         |                      |                                        |                                                          |                         |                                                                                    |                                                                                                                                                                                                          |
| Residents in Proposed Development                                                   | 3850                  | -           | -                                                                                                       | 208                  | 0.19                                   | 39.520                                                   | 1.0                     | 39.520                                                                             | Estimated Population: The proposed development scheme will provide 178 bed spaces.<br><br>Unit Flow Factor: 0.190m <sup>3</sup> /day for 'Institutional and special class' based on EPD's GESF Table T-1 |
| Employees in Proposed Development                                                   |                       | -           | -                                                                                                       | 90                   | 0.28                                   | 25.200                                                   |                         | 25.200                                                                             | Estimated Population: Number of staff advised by Project Proponent .<br><br>Unit Flow Factor: 0.280m <sup>3</sup> /day for 'Institutional and special class' based on EPD's GESF Table T-1               |
| Total Aaverage Daily Dry Weather Flow of Proposed Development (m <sup>3</sup> /day) |                       |             |                                                                                                         |                      |                                        |                                                          |                         |                                                                                    | 64.720                                                                                                                                                                                                   |

**Sewage Flow of Planned Development**

| Planning Application No. | ADWF (m3/day) | Contributing Populatoin |
|--------------------------|---------------|-------------------------|
| A/YL-NSW/348             | 59.02         | 268                     |
| A/YL-NSW/314             | 125.3         | 464                     |
| Y/YL-MP/10               | 1972.76       | 6878                    |
| Y/YL-NSW/7               | 1565          | 5742                    |

| Section          | Contributing Development                                                         | Total ADWF (m3/day) | Total Contributing Population | Peaking Factor | Peak Flow (L/s) |
|------------------|----------------------------------------------------------------------------------|---------------------|-------------------------------|----------------|-----------------|
| S2 to MH540      | Proposed Development<br>A/YL-NSW/348                                             | 123.740             | 566                           | 8              | 11.46           |
| MH540 to P3      | Proposed Development<br>A/YL-NSW/348<br>A/YL-NSW/314                             | 249.040             | 1030                          | 6              | 17.29           |
| P3 to P8         | Proposed Development<br>A/YL-NSW/348<br>A/YL-NSW/314<br>Y/YL-MP/10               | 2221.800            | 7908                          | 5              | 128.58          |
| P8 to FSH1001886 | Proposed Development<br>A/YL-NSW/348<br>A/YL-NSW/314<br>Y/YL-MP/10<br>Y/YL-NSW/7 | 3786.800            | 13650                         | 4              | 175.31          |

Appendix B - Hydraulic Capacity of the Proposed and Downstream Sewers

| Manhole Reference | Manhole Reference | Pipe Dia. | Pipe Length | Upstream Invert Level | Downstream Invert Level | g <sup>(1)</sup> | k <sub>s</sub> <sup>(1),(2)</sup> | s <sup>(1)</sup> | v <sup>(1)</sup>  | v <sup>(1),(2)</sup> | A              | Q <sup>(4)</sup>  | Estimated Capacity | ADWF                | Contributing Population | Peaking Factor | Peak Flow | Capacity | Compliance | Remarks   |
|-------------------|-------------------|-----------|-------------|-----------------------|-------------------------|------------------|-----------------------------------|------------------|-------------------|----------------------|----------------|-------------------|--------------------|---------------------|-------------------------|----------------|-----------|----------|------------|-----------|
|                   |                   | mm        | m           | mPD                   | mPD                     | m/s <sup>2</sup> | m                                 |                  | m <sup>3</sup> /s | m/s                  | m <sup>2</sup> | m <sup>3</sup> /s | L/s                | m <sup>3</sup> /day |                         |                | L/s       | %        |            |           |
| S1                | S2                | 225       | 27.0        | 4.700                 | 4.500                   | 9.81             | 0.0006                            | 0.0074           | 1.306E-06         | 1.1196               | 0.0398         | 0.0445            | 44.52              | 64.72               | 298                     | 8              | 5.99      | 13.5%    | Yes        |           |
| S2                | S3                | 225       | 42.0        | 4.500                 | 3.650                   | 9.81             | 0.0006                            | 0.0202           | 1.306E-06         | 1.8611               | 0.0398         | 0.0740            | 74.00              | 123.74              | 566                     | 8              | 11.46     | 15.5%    | Yes        |           |
| S3                | S4                | 225       | 31.0        | 3.650                 | 3.150                   | 9.81             | 0.0006                            | 0.0161           | 1.306E-06         | 1.6597               | 0.0398         | 0.0660            | 65.99              | 123.74              | 566                     | 8              | 11.46     | 17.4%    | Yes        |           |
| S4                | MH450             | 225       | 38.0        | 3.150                 | 2.500                   | 9.81             | 0.0006                            | 0.0171           | 1.306E-06         | 1.7097               | 0.0398         | 0.0680            | 67.98              | 123.74              | 566                     | 8              | 11.46     | 16.9%    | Yes        |           |
| MH450             | MH500             | 300       | 46.0        | 2.500                 | 2.300                   | 9.81             | 0.0006                            | 0.0043           | 1.306E-06         | 1.0286               | 0.0707         | 0.0727            | 72.71              | 249.04              | 1030                    | 6              | 17.29     | 23.6%    | Yes        |           |
| MH500             | MH460             | 300       | 40.0        | 2.300                 | 2.100                   | 9.81             | 0.0006                            | 0.0050           | 1.306E-06         | 1.1042               | 0.0707         | 0.0781            | 78.05              | 249.04              | 1030                    | 6              | 17.29     | 22.2%    | Yes        |           |
| MH460             | MH420             | 300       | 27.0        | 2.100                 | 2.000                   | 9.81             | 0.0006                            | 0.0037           | 1.306E-06         | 0.9482               | 0.0707         | 0.0670            | 67.02              | 249.04              | 1030                    | 6              | 17.29     | 25.8%    | Yes        |           |
| MH420             | MH380             | 300       | 24.0        | 2.000                 | 1.900                   | 9.81             | 0.0006                            | 0.0042           | 1.306E-06         | 1.0066               | 0.0707         | 0.0712            | 71.16              | 249.04              | 1030                    | 6              | 17.29     | 24.3%    | Yes        |           |
| MH380             | MH380(1)          | 300       | 23.0        | 1.900                 | 1.800                   | 9.81             | 0.0006                            | 0.0043           | 1.306E-06         | 1.0286               | 0.0707         | 0.0727            | 72.71              | 249.04              | 1030                    | 6              | 17.29     | 23.6%    | Yes        |           |
| MH380(1)          | MH340             | 300       | 29.0        | 1.800                 | 1.700                   | 9.81             | 0.0006                            | 0.0034           | 1.306E-06         | 0.9144               | 0.0707         | 0.0646            | 64.63              | 249.04              | 1030                    | 6              | 17.29     | 26.8%    | Yes        |           |
| MH340             | MH300             | 300       | 38.0        | 1.700                 | 1.570                   | 9.81             | 0.0006                            | 0.0034           | 1.306E-06         | 0.9107               | 0.0707         | 0.0644            | 64.37              | 249.04              | 1030                    | 6              | 17.29     | 26.9%    | Yes        |           |
| MH300             | MH260             | 300       | 35.0        | 1.570                 | 1.450                   | 9.81             | 0.0006                            | 0.0034           | 1.306E-06         | 0.9117               | 0.0707         | 0.0644            | 64.44              | 249.04              | 1030                    | 6              | 17.29     | 26.8%    | Yes        |           |
| MH260             | MH235             | 300       | 39.0        | 1.450                 | 1.320                   | 9.81             | 0.0006                            | 0.0033           | 1.306E-06         | 0.8987               | 0.0707         | 0.0635            | 63.53              | 249.04              | 1030                    | 6              | 17.29     | 27.2%    | Yes        |           |
| MH235             | P1                | 675       | 13.0        | 1.320                 | 1.270                   | 9.81             | 0.0006                            | 0.0038           | 1.306E-06         | 1.6166               | 0.3578         | 0.5785            | 1157.03            | 249.04              | 1030                    | 6              | 17.29     | 1.5%     | Yes        | Twin pipe |
| P1                | P2                | 675       | 66.0        | 0.170                 | -0.300                  | 9.81             | 0.0006                            | 0.0071           | 1.306E-06         | 2.2057               | 0.3578         | 0.7893            | 1578.57            | 249.04              | 1030                    | 6              | 17.29     | 1.1%     | Yes        | Twin pipe |
| P2                | P3                | 675       | 16.0        | -1.400                | -1.510                  | 9.81             | 0.0006                            | 0.0069           | 1.306E-06         | 2.1669               | 0.3578         | 0.7754            | 1550.84            | 249.04              | 1030                    | 6              | 17.29     | 1.1%     | Yes        | Twin pipe |
| P3                | P4                | 675       | 43.0        | -2.610                | -2.920                  | 9.81             | 0.0006                            | 0.0072           | 1.306E-06         | 2.2194               | 0.3578         | 0.7942            | 1588.38            | 2221.80             | 7908                    | 5              | 128.58    | 8.1%     | Yes        | Twin pipe |
| P4                | P5                | 675       | 52.0        | -2.920                | -3.200                  | 9.81             | 0.0006                            | 0.0054           | 1.306E-06         | 1.9158               | 0.3578         | 0.6856            | 1371.14            | 2221.80             | 7908                    | 5              | 128.58    | 9.4%     | Yes        | Twin pipe |
| P5                | P6                | 750       | 60.0        | -3.200                | -3.330                  | 9.81             | 0.0006                            | 0.0022           | 1.306E-06         | 1.2920               | 0.4418         | 0.5708            | 1141.60            | 2221.80             | 7908                    | 5              | 128.58    | 11.3%    | Yes        | Twin pipe |
| P6                | P7                | 750       | 88.0        | -3.330                | -3.520                  | 9.81             | 0.0006                            | 0.0022           | 1.306E-06         | 1.2897               | 0.4418         | 0.5698            | 1139.58            | 2221.80             | 7908                    | 5              | 128.58    | 11.3%    | Yes        | Twin pipe |
| P7                | P8                | 750       | 50.0        | -3.520                | -3.630                  | 9.81             | 0.0006                            | 0.0022           | 1.306E-06         | 1.3020               | 0.4418         | 0.5752            | 1150.45            | 2221.80             | 7908                    | 5              | 128.58    | 11.2%    | Yes        | Twin pipe |
| P8                | P9                | 750       | 61.0        | -3.630                | -3.760                  | 9.81             | 0.0006                            | 0.0021           | 1.306E-06         | 1.2813               | 0.4418         | 0.5660            | 1132.09            | 2221.80             | 7908                    | 5              | 128.58    | 11.4%    | Yes        | Twin pipe |
| P9                | P10               | 750       | 59.0        | -3.760                | -3.890                  | 9.81             | 0.0006                            | 0.0022           | 1.306E-06         | 1.3031               | 0.4418         | 0.5757            | 1151.35            | 3786.80             | 13650                   | 4              | 175.31    | 15.2%    | Yes        | Twin pipe |
| P10               | P11               | 750       | 67.0        | -3.890                | -4.030                  | 9.81             | 0.0006                            | 0.0021           | 1.306E-06         | 1.2685               | 0.4418         | 0.5604            | 1120.85            | 3786.80             | 13650                   | 4              | 175.31    | 15.6%    | Yes        | Twin pipe |
| P11               | P12               | 750       | 34.0        | -4.030                | -4.100                  | 9.81             | 0.0006                            | 0.0021           | 1.306E-06         | 1.2591               | 0.4418         | 0.5562            | 1112.48            | 3786.80             | 13650                   | 4              | 175.31    | 15.8%    | Yes        | Twin pipe |
| P12               | P13               | 750       | 40.0        | -4.100                | -4.180                  | 9.81             | 0.0006                            | 0.0020           | 1.306E-06         | 1.2407               | 0.4418         | 0.5481            | 1096.27            | 3786.80             | 13650                   | 4              | 175.31    | 16.0%    | Yes        | Twin pipe |
| P13               | P14               | 750       | 34.0        | -4.180                | -4.250                  | 9.81             | 0.0006                            | 0.0021           | 1.306E-06         | 1.2591               | 0.4418         | 0.5562            | 1112.48            | 3786.80             | 13650                   | 4              | 175.31    | 15.8%    | Yes        | Twin pipe |
| P14               | P15               | 750       | 39.0        | -4.250                | -4.330                  | 9.81             | 0.0006                            | 0.0021           | 1.306E-06         | 1.2567               | 0.4418         | 0.5552            | 1110.41            | 3786.80             | 13650                   | 4              | 175.31    | 15.8%    | Yes        | Twin pipe |
| P15               | FSH1001886        | 750       | 24.0        | -4.330                | -4.380                  | 9.81             | 0.0006                            | 0.0021           | 1.306E-06         | 1.2666               | 0.4418         | 0.5596            | 1119.16            | 3786.80             | 13650                   | 4              | 175.31    | 15.7%    | Yes        | Twin pipe |

Note:

(1) g=gravitational acceleration; k<sub>s</sub>=equivalent sand roughness; s=gradient; v=kinematic viscosity of water; V=mean velocity

(2) The mean velocity (V) is calculated by the Colebrook-White Equation for circular pipes:

$$V = -\sqrt{(8gDs)} \log\left(\frac{k_s}{3.7D} + \frac{2.51V}{D\sqrt{(2gDs)}}\right)$$

where V = mean velocity (m/s)  
g = gravitational acceleration (m/s<sup>2</sup>)  
D = internal pipe diameter (m)  
s = slope  
k<sub>s</sub> = roughness coefficient(m)  
v = kinematic viscosity of fluid (m<sup>2</sup>/s)

(3) The value of k<sub>s</sub> = 0.6mm is used for the calculation of existing pipe for conservative approach and 0.6mm for proposed new clayware pipe in poor condition based on DSD's "Sewerage Manual" Table 5: Recommended roughness values

(4) Peak flow (Q) is calculated by Q = V x A

**APPENDIX C**

**EXISTING SEWERS IDENTIFIED UNDER  
APPROVED APPLICATION NO. A/YL-NSW/314**

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## 2. SEWERAGE IMPACT ASSESSMENT ("SIA")

### 2.1 Introduction

- 2.1.1 The Proposed Development is a comprehensive development scheme to include wetland restoration proposal. This section gives a brief discussion on the current environmental legislation and standards and assess the impacts arising from the proposed development. Recommendations of mitigation measures have been made if there is any adverse effect induced by the proposed development.

### 2.2 Existing and Planned Sewerage Infrastructure

- 2.2.1 The site currently falls within the Yuen Long / Kam Tin sewerage catchment and is classified as an ~~unsewered area under the Yuen Long / Kam Tin Sewerage Master Plan (YLKT SMP)~~. A set of existing 225mm public sewerage system (from feature no. MH540 to MH235) is identified along Kam Pok Road East, which is currently not in use and could serve the Project Site.
- 2.2.2 The existing Yuen Long Sewage Treatment Works (YLSTW) serves Yuen Long Town, Yuen Long Industrial Estate and Kam Tin areas with a design capacity of 70,000m<sup>3</sup>/day (ADWF). It provides primary and secondary treatment to the effluent, which is then discharged to the Shan Pui River and then to Deep Bay.
- 2.2.3 The public sewerage facility located at the Yuen Long Sewage Treatment Works Pumping Station (SPS), as shown in **Figure 2-1**.

Existing public sewers under  
Approved Planning Application No.  
A/YL-NSW/314

### 2.3 Assessment Methodology and Assumptions

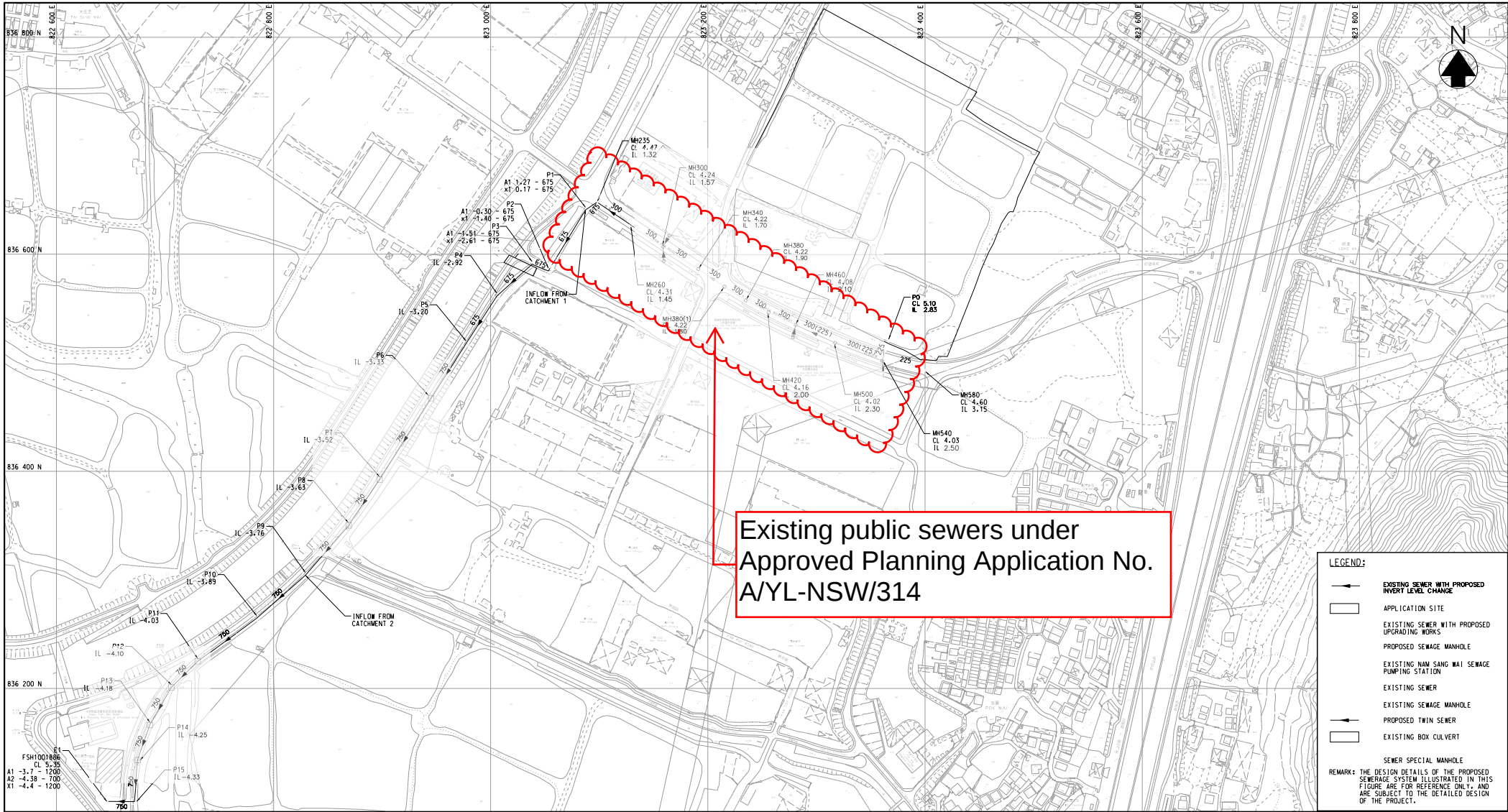
- 2.3.1 An analysis of the capacity of the sewage pipes and the SPS has been carried out to evaluate the adequacy of the proposed sewerage system. The design assumptions and basis are shown in **Table 2-1**.

**Table 2-1 Design Assumption and Basis**

| Items             | Values                                                                                                                                                                                                                                                                                           |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Design Standard   | DSD Sewerage Design Manual, Part 1 & 2                                                                                                                                                                                                                                                           |
| Flow Formula Used | Colebrook White Formula                                                                                                                                                                                                                                                                          |
| Unit Flow Factor  | EPD Guideline for Estimating Sewerage Flows for Sewerage Infrastructure Planning (GESF)<br>0.37 m <sup>3</sup> /d/head (Domestic, Private R3) for residents<br>0.28 m <sup>3</sup> /d/head (Commercial, J11) for clubhouse staff<br>1.58 m <sup>3</sup> /d/head (Restaurant, J10) for restaurant |

### 2.4 Estimate of Sewage Flow

- 2.4.1 The sewage flow to be generated from the projected residential population, as well as activities at the clubhouse and the associated facilities has been estimated following "EPD Guideline for Estimating Sewage Flows for Sewage Infrastructure Planning". Major contributions of sewage flow from the Proposed Development include projected 270 residents. The estimated sewage flow is shown in **Table 2-2**.



|                                                                                                                                                                                                                                                                                                |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Figure: 2.1                                                                                                                                                                                                                                                                                    |  |
| Title: PROPOSED SEWERAGE SYSTEM FOR THE APPLICATION SITE                                                                                                                                                                                                                                       |  |
| Project: PLANNING APPLICATION FOR PROPOSED COMPREHENSIVE DEVELOPMENT SCHEME TO INCLUDE WETLAND RESTORATION PROPOSAL AND PROPOSED FILLING OF PONDS/LAND AND EXCAVATION OF LAND IN "OU(CDWRA)" ZONE AT VARIOUS LOTS IN D.D. 104, NORTH OF KAM POK ROAD EAST, POK WAI, YUEN LONG, NEW TERRITORIES |  |

|             |          |
|-------------|----------|
| RAMBOLL     |          |
| Drawn by:   | CL       |
| Checked by: | NH       |
| Rev:        | 6.1      |
| Date:       | Aug 2023 |

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Plot date : 2023/11/16 User : Che15680

## **APPENDIX D**

# **PLANNED COMMUNAL GRAVITY SEWERS UNDER OTHER APPROVED APPLICATION**

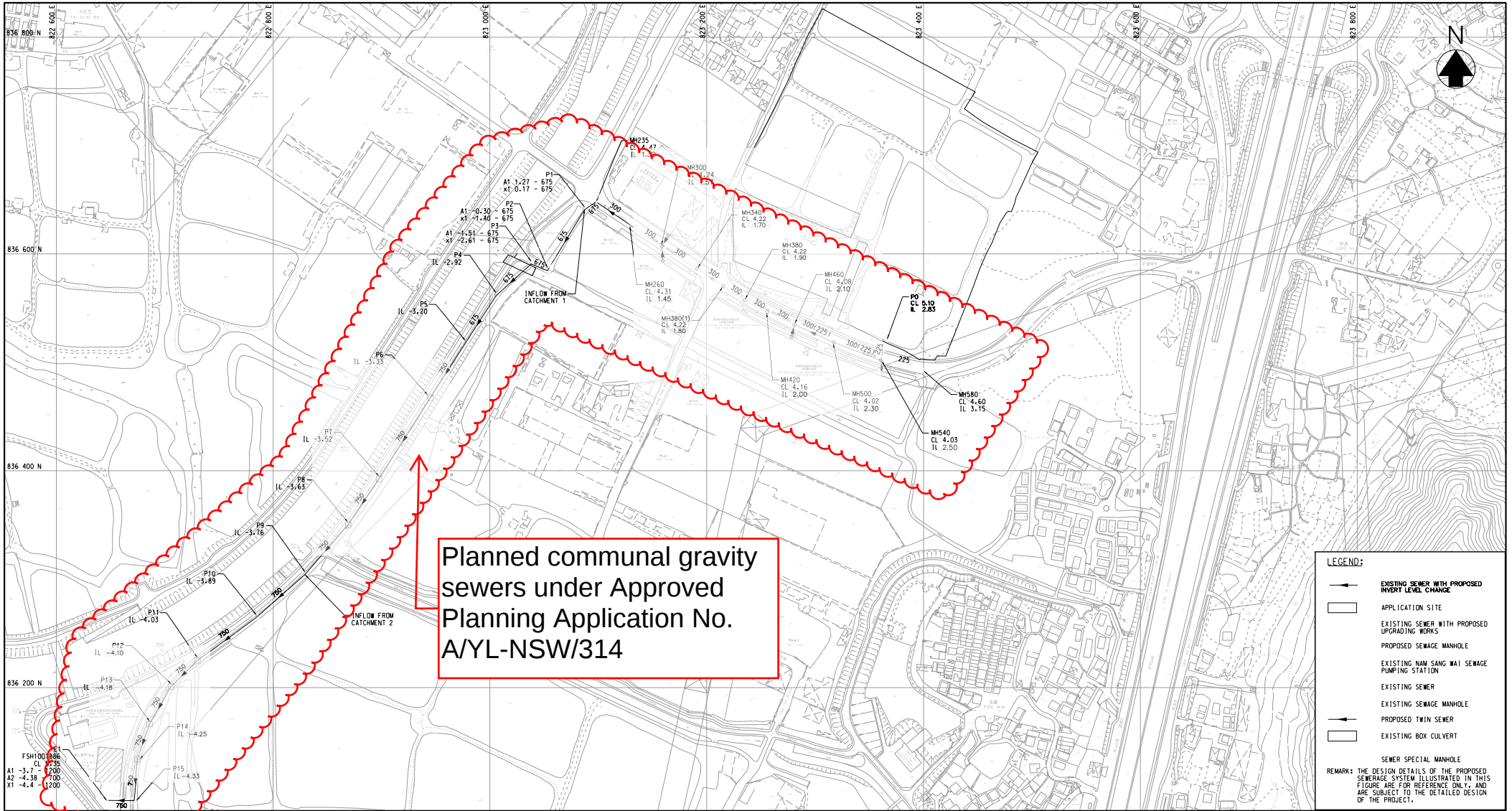
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2.4.2 The average flow and the peak flow from the Application Site will be approximately 125.3 m<sup>3</sup>/day and 11.60 L/s, respectively.

2.5.1 It is proposed that the sewage generated from the Proposed Development will be discharged into the existing 225mm diameter communal sewer at the south of the Application Site for disposal at YLSTW via Nam Sang Wai SPS (**Figure 2.1** refers). Relevant proposed upgrading works and proposed change in invert levels at some of the existing sewers, are also illustrated in **Figure 2.1** such as those between sewer MH540 to MH460, and between MH460 and MH235. The hydraulic checking of existing and proposed sewers starting from the discharge point to Nam Sang Wai SPS is provided in **Appendix 2.1** and it is found to be adequate to serve the Proposed Development with upgrading and modification works on several sewer segments.

2.5.2 There are existing stormwater pipe and box culvert along Pok Wai South Road, which are in vicinity of the proposed sewage system. **Planned communal gravity sewers under Approved** drawings of the proposed sewers and the existing sewers under Approved drawings.

2.5.3 It is understood there are other planned developments in the area, however, none of these have a solid development schedule. The sewer P1 to E1 as shown in **Figure 2.1** will become public sewers. Manhole P1, P2 and P3 are designed as backdrop manhole to cater for the high velocity flow and to avoid the box culvert located at the outfall at Pok Wai South Road at the same time. In order to ensure there is sufficient capacity reserved, a sensitivity test has also been undertaken and provided in **Appendix 2.2**. It is understood that the gravity sewer P1 to E1 should have sufficient capacity to cater the additional sewage of around 15,000 m<sup>3</sup>/d due to other nearby developments (**Appendix 4.1** refers). This is considered to be a very conservative approach. It is therefore suggested to provide twin 675 mm to 750 mm gravity sewers for sewer P1 to E1 along the Pok Wai South Road. The design checking of proposed sewage system, considering a capacity of 15,000 m<sup>3</sup>/d from nearby developments, is provided in



Planned communal gravity  
sewers under Approved  
Planning Application No.  
A/YL-NSW/314

LEGEND:

EXISTING SEWER WITH PROPOSED  
INVERT LEVEL CHANGE

APPLICATION SITE

EXISTING SEWER WITH PROPOSED  
UPGRADING WORKS

PROPOSED SEWAGE MANHOLE

EXISTING NAM SANG WAI SEWAGE  
PUMPING STATION

EXISTING SEWER

EXISTING SEWAGE MANHOLE

PROPOSED TWIN SEWER

EXISTING BOX CULVERT

SEWER SPECIAL MANHOLE

REMARK: THE DESIGN DETAILS OF THE PROPOSED  
SEWERAGE SYSTEM ILLUSTRATED IN THIS  
FIGURE ARE FOR REFERENCE ONLY, AND  
ARE SUBJECT TO THE DETAILED DESIGN  
OF THE PROJECT.

|                                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Figure: 2.1                                                                                                                                                                                                                                                                                    |
| Title: PROPOSED SEWERAGE SYSTEM FOR THE APPLICATION SITE                                                                                                                                                                                                                                       |
| Project: PLANNING APPLICATION FOR PROPOSED COMPREHENSIVE DEVELOPMENT SCHEME TO INCLUDE WETLAND RESTORATION PROPOSAL AND PROPOSED FILLING OF PONDS/LAND AND EXCAVATION OF LAND IN "OU(CDWRA)" ZONE AT VARIOUS LOTS IN D.D. 104, NORTH OF KAM POK ROAD EAST, POK WAI, YUEN LONG, NEW TERRITORIES |

|             |          |
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|             |          |
| Drawn by:   | CL       |
| Checked by: | NH       |
| Rev:        | 6.1      |
| Date:       | Aug 2023 |

Appendix 2.2 Hydraulic Calculation of the Proposed Sewers for the Application Site (Sensitivity Analysis)

Note:

- 1) Colebrook-White's equation is adopted for full-bore pipe velocity calculation.
- 2) Backwash Flowrate generated by swimming pool from developments, if any, has been included in the Design Peak Flowrate.
- 3) Catchment 1 is the planned development in the upstream
- 4) Catchment 2 is the application Y/YL-NSW/7, the ADWF is obtained from the approved SIA Report at October 2023

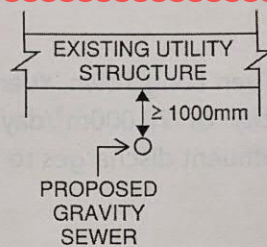
| Catchment 1, ADWF |               |                          |                   | =                           | 13435                         | m3/day          | Proposed Deve, ADWF |                |              |                                          | =                        | 125.3                   | m3/day      | Catchment 2, ADWF                        |                          |                                        |                 | = | 1565         | m3/day |
|-------------------|---------------|--------------------------|-------------------|-----------------------------|-------------------------------|-----------------|---------------------|----------------|--------------|------------------------------------------|--------------------------|-------------------------|-------------|------------------------------------------|--------------------------|----------------------------------------|-----------------|---|--------------|--------|
|                   |               |                          |                   | =                           | 13435/3600/24                 |                 |                     |                |              |                                          | =                        | 125.3/3600/24           |             |                                          |                          |                                        |                 | = | 1565/3600/24 |        |
|                   |               |                          |                   | =                           | 0.1555                        | m3/s            |                     |                |              |                                          | =                        | 0.0015                  | m3/s        |                                          |                          |                                        |                 | = | 0.0181       | m3/s   |
| Pipe              | Diameter (mm) | Diameter for calculation | Original Diameter | Upstream Invert Level (mPD) | Downstream Invert Level (mPD) | Pipe Length (m) | Gradient (1 in)     | Roughness (mm) | No. of Pipes | Inflow                                   | ADWF (m <sup>3</sup> /s) | Contributing Population | Peak Factor | Design Peak Flowrate (m <sup>3</sup> /s) | Full Bore Velocity (m/s) | Full Bore Capacity (m <sup>3</sup> /s) | Utilization (%) |   |              |        |
| P0 to MH540       | 225           | 225                      | 225               | 2.83                        | 2.50                          | 18,910          | 57                  | 3,000          | 1            | Proposed Deve.                           | 0.0015                   | 464                     | 8           | 0.012                                    | 1.354                    | 0.054                                  | 21.6%           |   |              |        |
| MH540 to MH500    | 300           | 300                      | 300               | 2.50                        | 2.30                          | 46,020          | 230                 | 3,000          | 1            | Proposed Deve.                           | 0.0015                   | 464                     | 8           | 0.012                                    | 0.819                    | 0.058                                  | 20.0%           |   |              |        |
| MH500 to MH460    | 300           | 300                      | 300               | 2.30                        | 2.10                          | 39,640          | 198                 | 3,000          | 1            | Proposed Deve.                           | 0.0015                   | 464                     | 8           | 0.012                                    | 0.882                    | 0.062                                  | 18.6%           |   |              |        |
| MH460 to MH420    | 300           | 300                      | 300               | 2.10                        | 2.00                          | 27,370          | 274                 | 3,000          | 1            | Proposed Deve.                           | 0.0015                   | 464                     | 8           | 0.012                                    | 0.751                    | 0.053                                  | 21.9%           |   |              |        |
| MH420 to MH380    | 300           | 300                      | 300               | 2.00                        | 1.90                          | 23,630          | 236                 | 3,000          | 1            | Proposed Deve.                           | 0.0015                   | 464                     | 8           | 0.012                                    | 0.808                    | 0.057                                  | 20.3%           |   |              |        |
| MH380 to MH380(1) | 300           | 300                      | 300               | 1.90                        | 1.80                          | 23,230          | 232                 | 3,000          | 1            | Proposed Deve.                           | 0.0015                   | 464                     | 8           | 0.012                                    | 0.815                    | 0.058                                  | 20.1%           |   |              |        |
| MH380(1) to MH340 | 300           | 300                      | 300               | 1.80                        | 1.70                          | 28,910          | 289                 | 3,000          | 1            | Proposed Deve.                           | 0.0015                   | 464                     | 8           | 0.012                                    | 0.730                    | 0.052                                  | 22.5%           |   |              |        |
| MH340 to MH300    | 300           | 300                      | 300               | 1.70                        | 1.57                          | 38,240          | 294                 | 3,000          | 1            | Proposed Deve.                           | 0.0015                   | 464                     | 8           | 0.012                                    | 0.724                    | 0.051                                  | 22.7%           |   |              |        |
| MH300 to MH260    | 300           | 300                      | 300               | 1.57                        | 1.45                          | 34,900          | 291                 | 3,000          | 1            | Proposed Deve.                           | 0.0015                   | 464                     | 8           | 0.012                                    | 0.728                    | 0.051                                  | 22.5%           |   |              |        |
| MH260 to MH235    | 300           | 300                      | 300               | 1.45                        | 1.32                          | 38,840          | 299                 | 3,000          | 1            | Proposed Deve.                           | 0.0015                   | 464                     | 8           | 0.012                                    | 0.718                    | 0.051                                  | 22.9%           |   |              |        |
| MH235 to P1       | 300           | 300                      | 300               | 1.32                        | 1.27                          | 12,590          | 252                 | 3,000          | 1            | Proposed Deve.                           | 0.0015                   | 464                     | 8           | 0.012                                    | 0.783                    | 0.055                                  | 21.0%           |   |              |        |
| P1 to P2          | 675           | 675                      | 675               | 0.17                        | -0.30                         | 65,790          | 140                 | 3,000          | 2            | Catchment 1, Proposed Deve.              | 0.1569                   | 50,223                  | 4.05684     | 0.637                                    | 1.794                    | 1.284                                  | 49.6%           |   |              |        |
| P2 to P3          | 675           | 675                      | 675               | -1.40                       | -1.51                         | 16,250          | 148                 | 3,000          | 2            | Catchment 1, Proposed Deve.              | 0.1569                   | 50,223                  | 4.05684     | 0.637                                    | 1.746                    | 1.250                                  | 50.9%           |   |              |        |
| P3 to P4          | 675           | 675                      | 675               | -2.61                       | -2.92                         | 43,380          | 140                 | 3,000          | 2            | Catchment 1, Proposed Deve.              | 0.1569                   | 50,223                  | 4.05684     | 0.637                                    | 1.794                    | 1.284                                  | 49.6%           |   |              |        |
| P4 to P5          | 675           | 675                      | 675               | -2.92                       | -3.20                         | 52,150          | 186                 | 3,000          | 2            | Catchment 1, Proposed Deve.              | 0.1569                   | 50,223                  | 4.05684     | 0.637                                    | 1.555                    | 1.113                                  | 57.2%           |   |              |        |
| P5 to P6          | 750           | 750                      | 750               | -3.20                       | -3.33                         | 59,790          | 460                 | 3,000          | 2            | Catchment 1, Proposed Deve.              | 0.1569                   | 50,223                  | 4.05684     | 0.637                                    | 1.058                    | 0.935                                  | 68.1%           |   |              |        |
| P6 to P7          | 750           | 750                      | 750               | -3.33                       | -3.52                         | 88,210          | 464                 | 3,000          | 2            | Catchment 1, Proposed Deve.              | 0.1569                   | 50,223                  | 4.05684     | 0.637                                    | 1.053                    | 0.931                                  | 68.4%           |   |              |        |
| P7 to P8          | 750           | 750                      | 750               | -3.52                       | -3.63                         | 50,460          | 459                 | 3,000          | 2            | Catchment 1, Proposed Deve.              | 0.1569                   | 50,223                  | 4.05684     | 0.637                                    | 1.060                    | 0.936                                  | 68.0%           |   |              |        |
| P8 to P9          | 750           | 750                      | 750               | -3.63                       | -3.76                         | 61,240          | 471                 | 3,000          | 2            | Catchment 1, Proposed Deve.              | 0.1569                   | 50,223                  | 4.05684     | 0.637                                    | 1.046                    | 0.924                                  | 68.9%           |   |              |        |
| P9 to P10         | 750           | 750                      | 750               | -3.76                       | -3.89                         | 59,460          | 457                 | 3,000          | 2            | Catchment 1, Catchment 2, Proposed Deve. | 0.1751                   | 56,020                  | 3.991       | 0.699                                    | 1.061                    | 0.938                                  | 74.5%           |   |              |        |
| P10 to P11        | 750           | 750                      | 750               | -3.89                       | -4.03                         | 67,200          | 480                 | 3,000          | 2            | Catchment 1, Catchment 2, Proposed Deve. | 0.1751                   | 56,020                  | 3.991       | 0.699                                    | 1.036                    | 0.915                                  | 76.3%           |   |              |        |
| P11 to P12        | 750           | 750                      | 750               | -4.03                       | -4.10                         | 34,060          | 487                 | 3,000          | 2            | Catchment 1, Catchment 2, Proposed Deve. | 0.1751                   | 56,020                  | 3.991       | 0.699                                    | 1.029                    | 0.909                                  | 76.8%           |   |              |        |
| P12 to P13        | 750           | 750                      | 750               | -4.10                       | -4.18                         | 39,540          | 494                 | 3,000          | 2            | Catchment 1, Catchment 2, Proposed Deve. | 0.1751                   | 56,020                  | 3.991       | 0.699                                    | 1.021                    | 0.902                                  | 77.5%           |   |              |        |
| P13 to P14        | 750           | 750                      | 750               | -4.18                       | -4.25                         | 33,830          | 483                 | 3,000          | 2            | Catchment 1, Catchment 2, Proposed Deve. | 0.1751                   | 56,020                  | 3.991       | 0.699                                    | 1.032                    | 0.912                                  | 76.6%           |   |              |        |
| P14 to P15        | 750           | 750                      | 750               | -4.25                       | -4.33                         | 38,830          | 485                 | 3,000          | 2            | Catchment 1, Catchment 2, Proposed Deve. | 0.1751                   | 56,020                  | 3.991       | 0.699                                    | 1.030                    | 0.910                                  | 76.7%           |   |              |        |
| P15 to E1         | 750           | 750                      | 750               | -4.33                       | -4.38                         | 23,630          | 473                 | 3,000          | 2            | Catchment 1, Catchment 2, Proposed Deve. | 0.1751                   | 56,020                  | 3.991       | 0.699                                    | 1.044                    | 0.923                                  | 75.7%           |   |              |        |

Details of the planned communal gravity sewers under the Approved Application No. A/YL-NSW/314

with necessary manholes will be constructed from the Proposed Development and connect to the existing NSWSPS. No private land will be affected for making such connection.

- 4.1.3 As per EPD request, the proposed gravity sewers have taken account the sewage flow from other sites in the vicinity leading to NSWSPS via Pok Wai South Road. The proposed sewage disposal scheme, proposed sewer longitudinal profile and calculations of design flow and manhole schedule are shown in **Figure 2**, **Figure 3** and **Annex 4** respectively. Clearance of not less than 1000mm will be maintained between the proposed sewers and existing utility structures (i.e. 2 cells 4000x2950 Box Culvert at J/O Kam Pok Road and Pok Wai West Road and 4 cells 2500x2000 trunk box culvert at Pok Wai South Road near Pok Wai West Road).

planned communal gravity sewers under Approved Planning Application No. Y/YL-NSW/7



Section showing the interface between existing utility structure and proposed gravity sewer

- 4.1.4 The design capacity of NSWSPS is 42,921m<sup>3</sup>/day in ADWF and the average daily flow recorded in December 2021 is around 3,600m<sup>3</sup>/day (see **Annex 3**). Based on the calculations shown in **Table 2**, the estimated sewage to be generated from the Proposed Development is 1,565m<sup>3</sup>/day, which is only equivalent to 3.6% of existing NSWSPS design capacity and 2.2% of existing YLSTW design capacity. Therefore, it is considered that sewage generated by the Proposed Development would not overload NSWSPS and YLSTW.

- 4.1.5 A matrix for different type of proposed sewerage system is provided in **Table 3** to summarize the construction and maintenance responsibilities.

**Table 3 – Matrix of construction and maintenance responsibilities**

| Element                         | Location                     | Construction Responsibility | Maintenance Responsibility |
|---------------------------------|------------------------------|-----------------------------|----------------------------|
| Proposed Sewage Pumping Station | Within Development Boundary  | The Developer               | The Developer              |
| Proposed Rising Mains           | Within Development Boundary  | The Developer               | The Developer              |
| Proposed Terminal Manhole       | Within Development Boundary  | The Developer               | The Developer              |
| Proposed Sewers and Manholes    | Outside Development Boundary | The Developer               | DSD                        |

## 5. EVALUATION OF THE STRATEGY AND RECOMMENDATIONS

### 5.1 Regional sewerage strategy

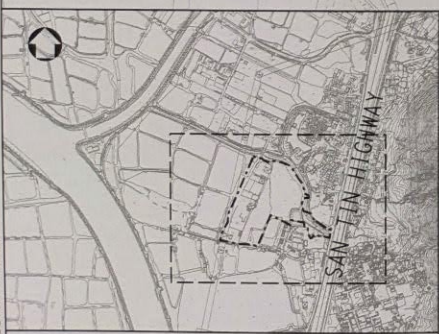
Matrix of construction and maintenance responsibilities under the Approved Application Y/YL-NSW/7

Planing communal gravity  
sewers under the  
Approved Application  
Y/YL-NSW/7

NAM SANG WAI  
SEWAGE PUMPING  
STATION (NSWSPS)

FWD1050573  
DIAMETER 1200(mm)  
UPSTREAM INVERT LEVEL -4.4(mPD)

FSH1001886  
CL 5.35  
A1-3.70-1200  
A2-4.38-700  
X1-4.40-1200  
SP M/H



KEY PLAN  
1 : 30000

- LEGEND:
- REZONING SITE
  - DEVELOPMENT BOUNDARY
  - PROPOSED ALIGNMENT OF GRAVITY SEWERS AND MANHOLE
  - PROPOSED ALIGNMENT OF TWIN RISING MAIN
  - PROPOSED LAST MANHOLE

|                                                                                                                                                                                                                                                                      |                            |                                   |                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------------------|--------------------------|
| <p>Title</p> <p>PROPOSED SEWAGE DISPOSAL SCHEME</p>                                                                                                                                                                                                                  |                            | <p>Figure no.</p> <p>FIGURE 2</p> |                          |
| <p>PROPOSED REZONING FROM "OUICDWR1" TO "OUICDWR11" FOR COMPREHENSIVE RESIDENTIAL DEVELOPMENT WITH WETLAND RESTORATION AREA AT VARIOUS LOTS IN DD104 AND ADJOINING GOVERNMENT LAND, WING KEI TSUEN, NAM SANG WAI, YUEN LONG - S12A AMENDMENT OF PLAN APPLICATION</p> | <p>Prepared</p> <p>SYW</p> | <p>Checked</p> <p>CYW</p>         | <p>Date</p> <p>04/22</p> |
| <p>binnies</p> <p>BINNIES HONG KONG LIMITED</p> <p>寶尼新工程顧問有限公司</p>                                                                                                                                                                                                   | <p>Date</p> <p>04/22</p>   | <p>Scale</p> <p>A3 1:3000</p>     |                          |

Plot date : 8/3/2022

**PROPOSED REZONING FROM "OU(CDWRA)" TO "OU(CDWRA)1"**  
**FOR COMPREHENSIVE RESIDENTIAL DEVELOPMENT WITH WETLAND RESTORATION AREA**  
**AT VARIOUS LOTS IN DD104 AND ADJOINING GOVERNMENT LAND,**  
**WING KEI TSUEN, NAM SANG WAI, YUEN LONG – S12A AMENDMENT OF PLAN APPLICATION**

**Manhole Schedule - Wing Kei Tsuen**

| Manhole No. | Manhole type   | Backdrop manhole required | Manhole type (Combine) | To Manhole | From Manhole | Ground Level (mPD) | PIPE IN            |                   |                   | PIPE OUT           |          |                   |                   |
|-------------|----------------|---------------------------|------------------------|------------|--------------|--------------------|--------------------|-------------------|-------------------|--------------------|----------|-------------------|-------------------|
|             |                |                           |                        |            |              |                    | Invert Level (mPD) | Pipe Size (mm) DN | Pipe Size (mm) OD | Invert Level (mPD) | IL Check | Pipe Size (mm) DN | Pipe Size (mm) OD |
| WKT000      | L              | -                         | L                      | WKT001     | WKT000       | 4.70               | -0.27              | 351.35            | 400.00            | -0.36              | OK       | 351.35            | 400.00            |
| WKT001      | L              | No                        | L                      | WKT002     | WKT001       | 4.60               | -0.36              | 491.85            | 560.00            | -0.50              | OK       | 491.85            | 560.00            |
| WKT002      | L              | No                        | L                      | WKT003     | WKT002       | 4.90               | -0.50              | 491.85            | 560.00            | -0.56              | OK       | 491.85            | 560.00            |
| WKT003      | L              | No                        | L                      | WKT004     | WKT003       | 4.85               | -0.56              | 491.85            | 560.00            | -0.63              | OK       | 491.85            | 560.00            |
| WKT004      | L              | No                        | L                      | WKT005     | WKT004       | 4.80               | -0.63              | 491.85            | 560.00            | -0.90              | OK       | 491.85            | 560.00            |
| WKT005      | L              | No                        | L                      | WKT006     | WKT005       | 4.75               | -0.90              | 491.85            | 560.00            | -1.16              | OK       | 491.85            | 560.00            |
| WKT006      | L              | No                        | L                      | WKT007     | WKT006       | 4.70               | -1.16              | 491.85            | 560.00            | -1.43              | OK       | 491.85            | 560.00            |
| WKT007      | L              | No                        | L                      | WKT008     | WKT007       | 4.50               | -1.43              | 491.85            | 560.00            | -1.70              | OK       | 491.85            | 560.00            |
| WKT008      | Special Type 1 | No                        | Special Type 1         | WKT009     | WKT008       | 4.70               | -1.70              | 491.85            | 560.00            | -1.85              | OK       | 491.85            | 560.00            |
| WKT009      | L              | No                        | L                      | WKT010     | WKT009       | 4.20               | -1.85              | 623.60            | 710.00            | -2.11              | OK       | 623.60            | 710.00            |
| WKT010      | L              | No                        | L                      | WKT011     | WKT010       | 4.00               | -2.11              | 623.60            | 710.00            | -2.38              | OK       | 623.60            | 710.00            |
| WKT011      | Special Type 1 | No                        | Special Type 1         | WKT012     | WKT011       | 4.15               | -2.38              | 623.60            | 710.00            | -2.53              | OK       | 623.60            | 710.00            |
| WKT012      | Special Type 1 | No                        | Special Type 1         | WKT013     | WKT012       | 4.20               | -2.53              | 623.60            | 710.00            | -2.65              | OK       | 623.60            | 710.00            |
| WKT013      | Special Type 1 | No                        | Special Type 1         | WKT014     | WKT013       | 4.15               | -2.65              | 623.60            | 710.00            | -2.75              | OK       | 623.60            | 710.00            |
| WKT014      | Special Type 1 | No                        | Special Type 1         | WKT015     | WKT014       | 4.10               | -2.75              | 623.60            | 710.00            | -2.83              | OK       | 623.60            | 710.00            |
| WKT015      | Special Type 1 | No                        | Special Type 1         | Existing   | WKT015       | 4.05               | -2.83              | 623.60            | 710.00            | -2.88              | OK       | 623.60            | 710.00            |

| Manhole No. | Material of pipe | Velocity (m/s) | Velocity check | Cumulative Design Flow (m3/s) | Full Bore Capacity (m3/s) | Full Bore Capacity with 10% reduction (m3/s) | Usage percentage (%) | Capacity check | TYPE OF BEDDING |
|-------------|------------------|----------------|----------------|-------------------------------|---------------------------|----------------------------------------------|----------------------|----------------|-----------------|
| WKT000      | HDPE             | 1.22           | OK             | 0.072                         | 0.118                     | 0.107                                        | 67.98                | OK             | TYPE B BEDDING  |
| WKT001      | HDPE             | 1.51           | OK             | 0.166                         | 0.287                     | 0.258                                        | 64.46                | OK             | TYPE B BEDDING  |
| WKT002      | HDPE             | 1.51           | OK             | 0.166                         | 0.287                     | 0.258                                        | 64.46                | OK             | TYPE B BEDDING  |
| WKT003      | HDPE             | 1.51           | OK             | 0.166                         | 0.287                     | 0.258                                        | 64.46                | OK             | TYPE B BEDDING  |
| WKT004      | HDPE             | 1.51           | OK             | 0.166                         | 0.287                     | 0.258                                        | 64.46                | OK             | TYPE B BEDDING  |
| WKT005      | HDPE             | 1.51           | OK             | 0.166                         | 0.287                     | 0.258                                        | 64.46                | OK             | TYPE B BEDDING  |
| WKT006      | HDPE             | 1.51           | OK             | 0.166                         | 0.287                     | 0.258                                        | 64.46                | OK             | TYPE B BEDDING  |
| WKT007      | HDPE             | 1.51           | OK             | 0.166                         | 0.287                     | 0.258                                        | 64.46                | OK             | TYPE B BEDDING  |
| WKT008      | HDPE             | 1.51           | OK             | 0.166                         | 0.287                     | 0.258                                        | 64.46                | OK             | TYPE B BEDDING  |
| WKT009      | HDPE             | 1.75           | OK             | 0.320                         | 0.535                     | 0.481                                        | 66.56                | OK             | TYPE B BEDDING  |
| WKT010      | HDPE             | 1.75           | OK             | 0.320                         | 0.535                     | 0.481                                        | 66.56                | OK             | TYPE B BEDDING  |
| WKT011      | HDPE             | 1.75           | OK             | 0.320                         | 0.535                     | 0.481                                        | 66.56                | OK             | TYPE B BEDDING  |
| WKT012      | HDPE             | 1.75           | OK             | 0.320                         | 0.535                     | 0.481                                        | 66.56                | OK             | TYPE B BEDDING  |
| WKT013      | HDPE             | 1.75           | OK             | 0.320                         | 0.535                     | 0.481                                        | 66.56                | OK             | TYPE B BEDDING  |
| WKT014      | HDPE             | 1.75           | OK             | 0.320                         | 0.535                     | 0.481                                        | 66.56                | OK             | TYPE B BEDDING  |
| WKT015      | HDPE             | 1.75           | OK             | 0.320                         | 0.535                     | 0.481                                        | 66.56                | OK             | TYPE B BEDDING  |

Details of the planned communal gravity sewers under the Approved Application No. Y/YL-NSW/7

**Table 4-2: Comparison of Additional Sewage Flow with Capacity of Public Sewerage**

| Sewerage Facilities | Design Capacity (m <sup>3</sup> /day) <sup>(1)</sup> | Current Average Daily Flow (m <sup>3</sup> /day) | Estimated Future Flow <sup>(2)</sup> (m <sup>3</sup> /day) | Total Future Flow (m <sup>3</sup> /day) | Spare Capacity (m <sup>3</sup> /day) |
|---------------------|------------------------------------------------------|--------------------------------------------------|------------------------------------------------------------|-----------------------------------------|--------------------------------------|
| <b>NSWSPS</b>       | 42,921                                               | 3,900                                            | 16,561                                                     | 20,461                                  | 22,460                               |

Notes:

- 1) For NSWSPS and YLEPP, the design capacity and current average daily flow comparison refer to ADWF.
- 2) The estimated future flow includes the EPD initial estimation for the communal gravity sewers (i.e., 15,500 m<sup>3</sup>/d) and the estimated sewage flow from light public housing (i.e., 1,061 m<sup>3</sup>/d). The estimated sewage flow from light public housing is based on the technical schedule of "Light Public Housing at Yau Pok Road, Yuen Long - Project Profile". **Appendix 3 and 4** refers.

4.2.2. The sewage from the Development (i.e. 1,973m<sup>3</sup>/day) merely occupies 5% of the design capacity of existing NSWSPS, 2% of the design capacity of existing YLEPP (phase I) and 1% of the design capacity of planned YLEPP (Phase II). Hence no adverse impact on the existing NSWSPS, existing YLEPP (Phase I) and planned YLEPP (Phase II) is envisaged. The assessment also shows that the existing and planned sewerage system would be sufficient to cater for the proposed development.

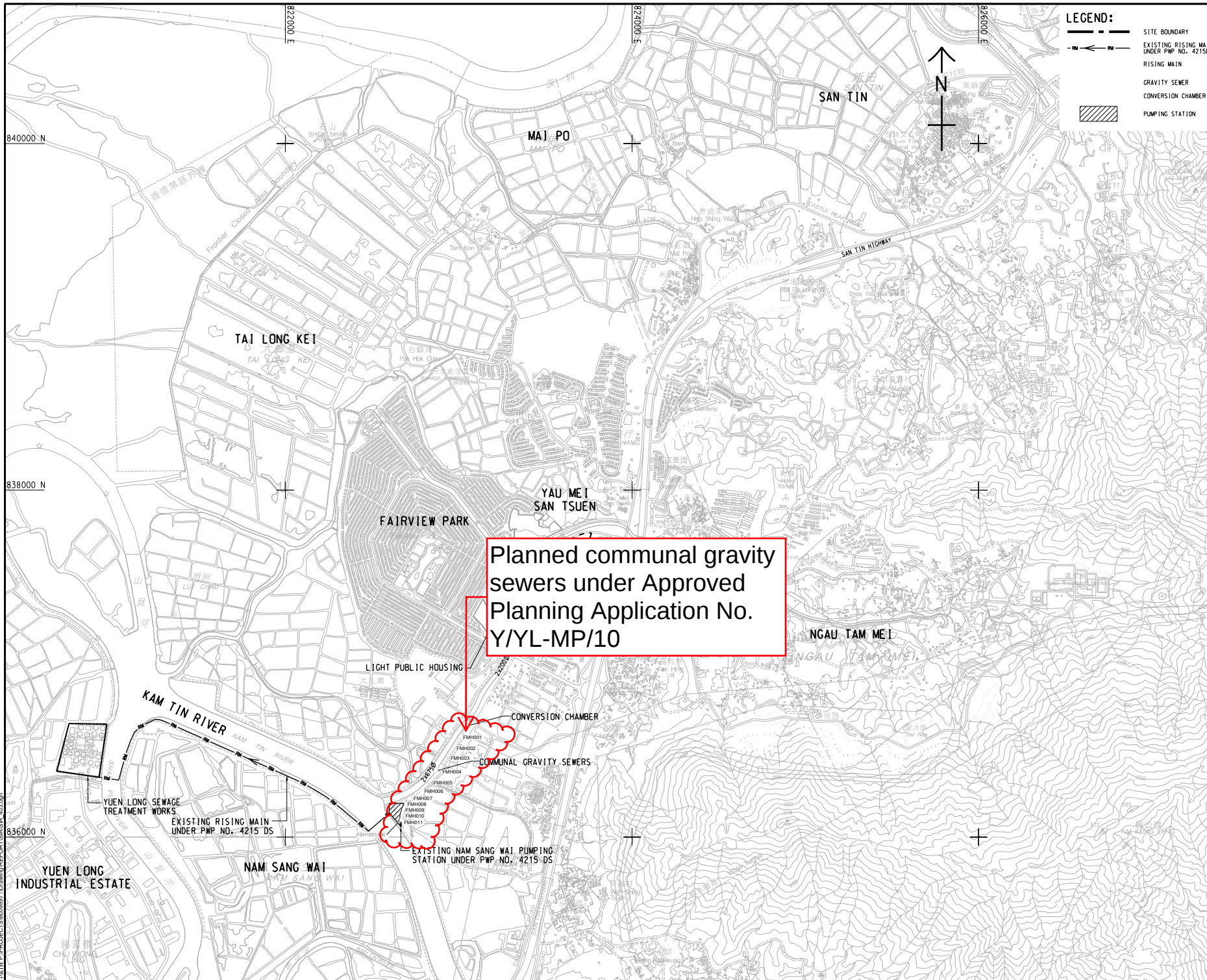
4.2.3. It is noted a light public housing site is located within the vicinity. The location of the light public housing site is as shown in **Figure 3**. The sewage (i.e. ADWF=1,061m<sup>3</sup>/day) generated will be conveyed to NSWSPS via exclusive sewage rising main from the site only.

#### 4.3. Proposed communal gravity sewers under Approved Planning Application No.

##### 4.3.1. The Y/YL-MP/10

proposed development will be conveyed to a private underground sewage pumping station (SPS) located at the western boundary of the site. It is proposed that twin 200mm dia. rising mains will lay along Kam Pok Road to convey the sewage to a proposed common conversion chamber at Pok Wai South Road. The conversion chamber connected to proposed communal gravity sewers downstream is designed to cater for other existing and planned developments within the area. The proposed communal gravity sewers and manholes also facilitate future discharge of sewage from other development in the vicinity. The proposed downstream communal gravity sewers and manholes are proposed public sewerage system serving multiple users. The sewer will be constructed to discharge the sewage from the proposed development to the existing NSWSPS and ultimately discharge to YLEPP. The proposed alignment of the rising mains and the gravity sewers is shown in **Figure 3**. The tentative location of the proposed private SPS is shown in **Figure 4**.

4.3.2. Hydraulic checking of the proposed rising mains has been conducted. It is found to be adequate to serve the proposed development, **Appendix 2** refers.



- LEGEND:**
- SITE BOUNDARY
  - EXISTING RISING MAIN UNDER PWP NO. 4215DS
  - RISING MAIN
  - GRAVITY SEWER
  - CONVERSION CHAMBER
  - PUMPING STATION



**PROJECT**  
S.12A PLANNING APPLICATION  
ON THE DRAFT MAI PO &  
FAIRVIEW PARK OZP  
NO. S/YL-MP/7  
REZONING FROM "RESIDENTIAL  
(GROUP D)" TO "RESIDENTIAL  
(GROUP C) 1" ZONE FOR A  
PROPOSED RESIDENTIAL  
DEVELOPMENT AT VARIOUS  
LOTS IN D.D. 104 AND THE  
ADJOINING GOVERNMENT LAND  
IN YUEN LONG, N.T.

**CLIENT**

**CONSULTANT**

AECOM Asia Company Ltd.  
www.aecom.com

**SUB-CONSULTANTS**

**ISSUE/REVISION**

| IR | DATE | DESCRIPTION | CHK. |
|----|------|-------------|------|
|    |      |             |      |
|    |      |             |      |
|    |      |             |      |
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|    |      |             |      |

**STATUS**

**SCALE**  
A3 1: 20000  
**DIMENSION UNIT**  
METRES

**KEY PLAN**

**PROJECT NO.**  
60098971  
**AGREEMENT NO.**

**SHEET TITLE**

EXISTING AND PLANNED  
SEWERAGE NETWORK PLAN

**SHEET NUMBER**

60098971/SIA/FIGURE 3

V of water = 0.000001 m<sup>3</sup>/s 20 °C

| Manhole No.        |            | Pipe        |      |              |       |                               |                       |        |           |               |               |                      |                          |                                 |                         |                               |                          |                |    | Remark |
|--------------------|------------|-------------|------|--------------|-------|-------------------------------|-----------------------|--------|-----------|---------------|---------------|----------------------|--------------------------|---------------------------------|-------------------------|-------------------------------|--------------------------|----------------|----|--------|
|                    |            | Cover Level |      | Invert Level |       | Nominal Outside Diameter (OD) | Nominal Diameter (DN) | Length | Flow Area | Pipe Gradient | Pipe Velocity | Capacity (Twin Pipe) | Roughness <sup>(4)</sup> | Accumulated ADWF <sup>(5)</sup> | Contributing Population | Peaking Factor <sup>(6)</sup> | Estimated Peak Discharge | Capacity Check |    |        |
| U/S                | D/S        | U/S         | D/S  | U/S          | D/S   |                               |                       |        |           |               |               |                      |                          |                                 |                         |                               |                          |                | mm | mm     |
| Conversion Chamber | FMH001     | 4.50        | 4.50 | -2.68        | -2.87 | 800                           | 675                   | 75.0   | 0.36      | 400           | 1.09          | 0.78                 | 1.5                      | 15,500                          | 57,408                  | 3.98                          | 0.713                    | 91             |    |        |
| FMH001             | FMH002     | 4.50        | 4.55 | -2.87        | -3.04 | 800                           | 675                   | 70.0   | 0.36      | 400           | 1.09          | 0.78                 | 1.5                      | 15,500                          | 57,408                  | 3.98                          | 0.713                    | 91             |    |        |
| FMH002             | FMH003     | 4.55        | 4.60 | -3.04        | -3.22 | 800                           | 675                   | 70.0   | 0.36      | 400           | 1.09          | 0.78                 | 1.5                      | 15,500                          | 57,408                  | 3.98                          | 0.713                    | 91             |    |        |
| FMH003             | FMH004     | 4.60        | 4.65 | -3.22        | -3.41 | 800                           | 675                   | 75.0   | 0.36      | 400           | 1.09          | 0.78                 | 1.5                      | 15,500                          | 57,408                  | 3.98                          | 0.713                    | 91             |    |        |
| FMH004             | FMH005     | 4.65        | 4.20 | -3.41        | -3.61 | 800                           | 675                   | 80.0   | 0.36      | 400           | 1.09          | 0.78                 | 1.5                      | 15,500                          | 57,408                  | 3.98                          | 0.713                    | 91             |    |        |
| FMH005             | FMH006     | 4.20        | 4.00 | -3.61        | -3.81 | 800                           | 675                   | 80.0   | 0.36      | 400           | 1.09          | 0.78                 | 1.5                      | 15,500                          | 57,408                  | 3.98                          | 0.713                    | 91             |    |        |
| FMH006             | FMH007     | 4.00        | 4.15 | -3.81        | -4.01 | 800                           | 675                   | 80.0   | 0.36      | 400           | 1.09          | 0.78                 | 1.5                      | 15,500                          | 57,408                  | 3.98                          | 0.713                    | 91             |    |        |
| FMH007             | FMH008     | 4.15        | 4.20 | -4.01        | -4.12 | 800                           | 675                   | 45.0   | 0.36      | 400           | 1.09          | 0.78                 | 1.5                      | 15,500                          | 57,408                  | 3.98                          | 0.713                    | 91             |    |        |
| FMH008             | FMH009     | 4.20        | 4.15 | -4.12        | -4.21 | 800                           | 675                   | 35.0   | 0.36      | 400           | 1.09          | 0.78                 | 1.5                      | 15,500                          | 57,408                  | 3.98                          | 0.713                    | 91             |    |        |
| FMH009             | FMH010     | 4.15        | 4.10 | -4.21        | -4.28 | 800                           | 675                   | 30.0   | 0.36      | 400           | 1.09          | 0.78                 | 1.5                      | 15,500                          | 57,408                  | 3.98                          | 0.713                    | 91             |    |        |
| FMH010             | FMH011     | 4.10        | 4.05 | -4.28        | -4.34 | 800                           | 675                   | 25.0   | 0.36      | 400           | 1.09          | 0.78                 | 1.5                      | 15,500                          | 57,408                  | 3.98                          | 0.713                    | 91             |    |        |
| FMH011             | FSH1001886 | 4.05        | 5.35 | -4.34        | -4.38 | 800                           | 675                   | 15.0   | 0.36      | 400           | 1.09          | 0.78                 | 1.5                      | 15,500                          | 57,408                  | 3.98                          | 0.713                    | 91             |    |        |

Note:

- Contributing population = Projected Flow + Flow from Development (ADWF in m<sup>3</sup>/day) / 0.27 (m<sup>3</sup>/person/day).
- Peaking factor with stormwater allowance is adopted.
- The proposed gravity sewer shall be constructed to discharge the sewage to from the both R(D) and REC Development and other residential development which has similar sewerage arrangement in the vicinity to the existing NSWSPS and ultimately to YLEPP.
- Concrete sewers slimed to about half depth; velocity, when flowing half full, approximately 1.2 m/s, normal condition is as
- Base on EPD initial estimation, the communal gravity sewer need to cater for design sewage flow of at least 15,500 m<sup>3</sup>/d.
- The communal gravity sewer is subject to detailed design, the hydraulic calculation demonstrate the feasibility in terms of

Details of the planned communal gravity sewers under the Approved Application No. Y/YL-MP/10