

Appendix 4

Drainage Impact Assessment

**PROPOSED FLAT WITH MINOR RELAXATION
OF BUILDING HEIGHT RESTRICTION AT
VARIOUS LOTS IN D.D. 3 TC AND ADJOINING
GOVERNMENT LAND, TUNG CHUNG ROAD
NORTH, TUNG CHUNG, LANTAU ISLAND**

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JANUARY 2026



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Drainage Impact Assessment

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1 INTRODUCTION

1.1 Background

- 1.1.1 Full Fame Development Limited (the “Applicant”) intends to seek approval from the Town Planning Board (“TPB”) under Section 16 of the Town Planning Ordinance for the Proposed Residential Development (Proposed Amendments to the Approved Development Scheme) with Minor Relaxation of Building Height Restriction at Lot Nos. 1766 RP, 1768 RP, 1770 RP, 1771 RP, 1774 RP, and Adjoining Government Land in D.D. 3 TC, Tung Chung Road North, Tung Chung (“the Site”). The Site falls primarily within an area zoned “Residential (Group B)3” (“R(B)3”) zone, with a minor portion of it shown as “Road” on the Approved Tung Chung Town Centre Area Outline Zoning Plan (“the Approved OZP”) No. S/I-TCTC/24.
- 1.1.2 Asia Infrastructure Solutions Limited was commissioned by the Applicant to undertake a Drainage Impact Assessment (DIA) for the Proposed Residential Development and provide technical justifications in supporting the application from the drainage point of view.

1.2 Objectives

- 1.2.1 This report outlines the existing drainage system in the vicinity of the Site, studies the potential drainage impacts that may arise from the proposed residential development and proposed appropriate mitigation measures where necessary.
- 1.2.2 The objectives of this Drainage Impact Assessment (DIA) are as follows:
- Identify any potential drainage impact arising from the Site;
 - Assess the hydraulic performance of the existing drainage outfalls in the Site; and
 - Identify design requirements of the drainage system of the proposed residential development.

1.3 Information Available for the Study

- 1.3.1 The following information was reviewed for the study:
- DSD Stormwater Drainage Manual (SDM) – Planning, Design and Management (Fifth Edition, January 2018) including its corrigenda No. 1/2022, No. 1/2024 and No. 2/2024.
 - Approved Tung Chung Town Centre Area Outline Zoning Plan No. S/I-TCTC/24; and
 - Cap. 123I Building (Standards of Sanitary Fitments, Plumbing, Drainage Works and Latrines) Regulation.

2 PROJECT OUTLINE

2.1 Project Background and Project Site

- 2.1.1 The Site is located at the northwest of the planned public housing development at Area 23 of Tung Chung.
- 2.1.2 The Site is also bounded by Tung Chung Road North to the east and an existing nullah connecting to Ma Wan Chung to the west.
- 2.1.3 The Site has an area of approximate 5,400m² comprising mainly paved areas and some landscaped areas.
- 2.1.4 The proposed development is mainly comprised of two 14-storey residential building towers, a 2-storey clubhouse atop 1 level of basement carpark and a 1-storey underground carpark. A master layout plan and a schematic section of the proposed residential development at Tung Chung Road North are contained in **Appendix A**.

3 EXISTING AND PROPOSED DRAINAGE SYSTEMS

3.1 Existing Drainage Network

- 3.1.1 With reference to Drainage Record Sheets No. 9-SE-8B-3, 9-SE-8B-4, 9-SE-8D-1 and 9-SE-8D-2 contained in **Appendix B**, there is an existing nullah in the west of the Site and there is no existing public drainage pipelines in the vicinity of the Site.
- 3.1.2 With reference to the topographical and tree survey conducted by KEL and Surveying, Planning & GIS Co. Ltd. contained in **Appendix C**, there are two existing 600mm diameter outfalls within the Site that are connected to the existing nullah. Surface runoff from the Site is discharged into the nullah through these two outfalls.
- 3.1.3 With reference to the topographical and tree survey contained in **Appendix C**, two existing 600mm diameter outfalls are identified. However, due to inaccessible dense vegetation within the current Site, existing drainage system of the Site is merely surveyed. In this report, two nodes are assumed to be manhole objects to receive the surface runoff from the Site in the existing scenario model.

3.2 Existing Catchments and Surface Runoffs

- 3.2.1 Existing drainage catchments associated with each of the existing outfalls from the site discharging stormwater to the nullah were identified based on the topography of the site.
- 3.2.2 The boundaries of the existing drainage catchments associated with the Site are shown in drawing no. KEB002681/DIA/1001.
- 3.2.3 Surface characteristics and times of concentration of existing stormwater catchments draining into the two existing outfalls are detailed in the Table contained in **Appendix D**.

3.3 Changes in Catchments and Surface Runoffs due to the Proposed Development

- 3.3.1 The proposed residential development will change the surface characteristics and slightly increase the total area of the catchments draining to the existing 600mm diameter outfalls.
- 3.3.2 Surface characteristics and times of concentration of the proposed drainage catchments (i.e. post-development) are presented in **Appendix E**.
- 3.3.3 The boundaries of the proposed drainage catchments are shown in drawing no. KEB002681/DIA/2001.
- 3.3.4 The proposed development will lead to changes in surface characteristics of Site. The potential drainage impact of this change in surface characteristics is assessed in Section 5.

4 METHOD OF ANALYSIS

4.1 Assessment Criteria

- 4.1.1 With reference to the DSD SDM, underground drainage pipes with a diameter smaller than 1.8m (or equivalent diameter in case of a box culvert) conveying stormwater to a trunk drain, river or sea are normally classified as “Urban Drainage Branch System”. An “Urban Drainage Trunk System” collects stormwater from branch drains and conveys the flow to outfalls in river or sea. Pipes with size or box culverts with equivalent diameter equal to or larger than 1.8m are normally considered as trunk drains. Recommended Design Return Periods from DSD SDM are shown in the Table 1:

| Drainage Type | Design Return Period |
|-------------------------------|----------------------|
| Urban Drainage Trunk Systems | 200 years |
| Urban Drainage Branch Systems | 50 years |

Table 1 Recommended Design Return Periods

- 4.1.2 For the purpose of this drainage impact assessment, 1 in 50 years design period is adopted for assessment of the drainage condition of the existing 600mm diameter outfalls. The 1 in 200 years design return period is adopted to assess the potential susceptibility to flooding of the Site due to backwater from the adjacent nullah.
- 4.1.3 For the selected return periods, the flood levels in the fluvial-tidal zone determining the flood level in the fluvial-tidal zone for selected return period, the following cases are considered:

| Flood Level Return Period | Case A | Case B |
|---------------------------|-------------------------------|-------------------------------|
| 50 years | 50-yr rain + 10-yr sea level | 10-yr rain + 50-yr sea level |
| 200 years | 200-yr rain + 10-yr sea level | 10-yr rain + 200-yr sea level |

- 4.1.4 The classical theory of unit hydrograph with constant proportional losses (runoff coefficient) was adopted to calculate the catchment surface runoffs.

4.1.5 The runoff coefficients adopted for roof/paved area, vegetated area with underlying structures and flat vegetated area are 1.00, 0.60 and 0.20 respectively.

4.1.6 The unit hydrograph used to simulate the 50-year rainfall event was derived synthetically using the symmetrically distributed rainfall based on RO (1991) as recommended in Section 4.3.5 of the DSD SDM. The formulation is shown below:

$$F(t) = \begin{cases} \frac{a[b + 2(1 - c)t]}{(2t + b)^{c+1}} & , \quad 0 \leq t \leq \frac{t_d}{2} \\ F(-t) & , \quad -\frac{t_d}{2} \leq t \leq 0 \end{cases}$$

where: F(t) = rate of rainfall or instantaneous intensity in mm/hr at time t (in minutes)
 t_d = rainstorm duration (in minutes) (t_d ≤ 240)
 a,b,c = storm constants are given in Table 3c of DSD SDM, which are the same as those given of the algebraic equation of the IDF relationship

4.1.7 The times of concentration (t_c) for the different types of catchments are summarized in Table 2.

| Type of Catchment | Time of Concentration |
|----------------------------|--|
| Vegetated Area (flat area) | Based on Brandsby William's equation with a minimum of 5 minutes |
| Paved Area | Based on Brandsby William's equation with a minimum of 5 minutes |

Table 2 – Times of concentration for Different Types of Catchment

4.1.8 The inlet times, or time of concentration of the catchments considered in this DIA Report were estimated using the Brandsby William's Equation as presented below:

$$t_0 = \frac{0.14465L}{H^{0.2}A^{0.1}}$$

where: t₀ = time of concentration of the catchment (min)
 L = distance (on plan) measured on the line of natural flow between the summit and the point under consideration (m)
 A = Catchment area (m²)
 H = Average slope (m per 100m), measured along the line of natural flow, from the summit of the catchment to the point under consideration

4.1.9 To account for the effect of Climate Change, the increase in rainfall intensity and increase in the design extreme sea levels presented in Table 3 to Table 6 are adopted.

| Report | Increase in Rainfall Intensity due to Climate Change (Mid-21st Century) | | |
|---|---|------------------|-------|
| | Rainfall Increase | Design Allowance | Total |
| DSD SDM (2018) 2018 Including the Corrigendum No. 1 of 2022 | 11.1% | 0.0% | 11.1% |

Table 3 - Increase in Rainfall Intensity due to Climate Change (Mid-21st Century) [SSP2-4.5]

| Report | Increase in Rainfall Intensity due to Climate Change (End-21st Century) | | |
|---|---|------------------|-------|
| | Rainfall Increase | Design Allowance | Total |
| DSD SDM (2018) 2018 Including the Corrigendum No. 1 of 2022 | 16.0% | 12.1% | 28.1% |

Table 4 - Increase in Rainfall Intensity due to Climate Change (End-21st Century) [SSP5-8.5]

4.1.10 The design sea levels adopted in the water level at the existing outfalls in the hydraulic assessment are summarized in Table 5 and Table 6.

| Design Return Period (Years) | Tai O (1954-2019) (mPD) | Sea Level Rise due to climate change (m) | Storm Surge Increase in Mid-21st Century | Design Allowance in Mid-21st Century | Design Sea Level Mid-21st Century (mPD) |
|------------------------------|-------------------------|--|--|--------------------------------------|---|
| 10 | 3.36 | 0.20 | 0.05 | 0.00 | 3.61 |
| 50 | 3.84 | 0.20 | 0.08 | 0.00 | 4.12 |
| 200 | 4.28 | 0.20 | 0.10 | 0.00 | 4.58 |

Table 5 – Design Sea Levels (Mid-21st Century) [SSP2-4.5]

| Design Return Period (Years) | Tai O (1954-2019) (mPD) | Sea Level Rise due to climate change (m) | Storm Surge Increase in End of 21st Century | Design Allowance in End-21st Century | Design Sea Level End-21st Century (mPD) |
|------------------------------|-------------------------|--|---|--------------------------------------|---|
| 10 | 3.36 | 0.47 | 0.10 | 0.21 | 4.14 |
| 50 | 3.84 | 0.47 | 0.14 | 0.22 | 4.67 |
| 200 | 4.28 | 0.47 | 0.18 | 0.24 | 5.17 |

Table 6 – Design Sea Levels (End-21st Century) [SSP5-8.5]

4.2 Hydraulic Modelling Details

- 4.2.1 Hydraulic modelling package InfoWorks ICM 2024.5 developed by Innovyze was used to assess surface water runoff and hydraulic performance of existing and proposed drainage systems.
- 4.2.2 A Colebrook white roughness value (ks) of 3mm was adopted for the concrete drainage pipes respectively.
- 4.2.3 Shaft and chamber areas for manholes (nodes) were modelled using InfoWorks default values. All manholes were modelled as a stored type manhole.
- 4.2.4 Flap valves fitted onto the proposed upgraded outfalls were modelled using InfoWorks built-in default values.
- 4.2.5 The following reduction of channel and pipe flow areas was adopted to simulate the pipe hydraulic performance of both existing public drainage system and the proposed drainage system for the site:

- i) A 5% reduction in flow area if the channel or pipe gradient is greater than 1 in 25 and
 - ii) A 10% reduction in flow area for other parts of the drainage network
- 4.2.6 Unit hydrograph routing model was used for all catchments. The times of concentration were input manually in InfoWorks model adopting the values estimated according to the criteria detailed in Section 4.1.8.
- 4.2.7 The fixed runoff volume model was used for all catchments. The fixed runoff coefficients adopted are detailed in Section 4.1.5.
- 4.2.8 Hydraulic model output results in the form of longitudinal profiles are included in **Appendix F**.

5 ASSESSMENT

5.1 Changes to the Drainage Characteristics and Potential Drainage Impacts

Existing Catchments

- 5.1.1 Existing drainage catchments associated with the existing drainage systems serving the Site were identified based on topography of the area and DSD drainage record plans. The boundary of existing sub-catchments is presented in drawing no. KEB002681/DIA/1001.
- 5.1.2 A 50-year storm return period was adopted to assess the hydraulic performance of the existing drainage systems serving the Site.
- 5.1.3 The results of the InfoWorks model for the existing scenario (i.e. pre-development) are contained in **Appendix F2** and **Appendix F3**.
- 5.1.4 The site catchments and the surface runoff flow paths are shown on Figure 1.
- 5.1.5 The area and surface characteristics of the existing drainage catchments associated with the Site are presented in Table 7.



Figure 1 – Site Catchment Plan and Surface Runoff Flow Path

| Catchment ID | Discharge to | Total Area (m ²) | Paved Area (m ²) | Vegetated w/ Underlying Structure (m ²) | Vegetated Area (m ²) | Paved Area (%) | Vegetated w/ Underlying Structure (%) | Vegetated Area (%) |
|--------------|--------------|------------------------------|------------------------------|---|----------------------------------|----------------|---------------------------------------|--------------------|
| SC-A | Outfall 1 | 2,884.4 | 1,680.8 | 0.0 | 1,203.5 | 58.3 | 0 | 41.7 |
| SC-B | Outfall 2 | 3,229.5 | 1,860.6 | 0.0 | 1,368.9 | 57.6 | 0 | 42.4 |
| SC-C | Nullah | 304.4 | 304.4 | 0.0 | 0.0 | 100.0 | 0 | 0.0 |
| Total | | 6,418.3 | 3,845.9 | 0 | 2,572.4 | 59.9 | 0 | 40.1 |

Table 7 – Area and Surface Characteristics of Existing Drainage Catchments

5.1.6 The estimated peak runoff of the existing drainage catchments is presented in Table 8.

| Catchment ID | Discharge to | 1 in 50yr Mid-21 st Century Peak Flow (Case A) (m ³ /s) | 1 in 50yr Mid-21 st Century Peak Flow (Case B) (m ³ /s) |
|--------------|--------------|---|---|
| SC-A | Outfall 1 | 0.143 | 0.120 |
| SC-B | Outfall 2 | 0.158 | 0.133 |
| SC-C | Nullah | 0.023 | 0.019 |
| Total | | 0.324 | 0.271 |

Table 8 – Peak Runoff of the Existing Drainage Catchments

5.1.7 The hydraulic performance of the two existing 600mm diameter outfalls serving the Site is outlined in Table 9 and Table 10. The locations of existing outfalls shall refer to drawing no. KEB002681/DIA/1001.

| Location | Diameter (mm) | Pipe Capacity (m ³ /s) | Existing Peak Flow Rate 1 in 50 years Mid-21 st Century Case A (m ³ /s) | Existing Peak Flow Rate 1 in 50 years Mid-21 st Century Case B (m ³ /s) | Pipe utilization 1 in 50 years Mid-21 st Century Case A (%) | Pipe utilization 1 in 50 years Mid-21 st Century Case A (%) |
|-----------|---------------|-----------------------------------|---|---|--|--|
| Outfall 1 | 600 | 0.473 | 0.143 | 0.120 | 30.1 | 25.3 |
| Outfall 2 | 600 | 0.473 | 0.158 | 0.133 | 33.5 | 28.1 |

Table 9 – Result of the Hydraulic Assessment for the Existing Scenario: Flow Rates & Pipe Utilization

| Location | Existing Ground Level at Upstream Manhole (mPD) | Maximum Water Level at Upstream Manhole 1 in 50 years Mid-21 st Century Case A (mPD) | Maximum Water Level at Upstream Manhole 1 in 50 years Mid-21 st Century Case B (mPD) | Freeboard 1 in 50 years Mid-21 st Century Case A (mm) | Freeboard 1 in 50 years Mid-21 st Century Case B (mm) |
|-----------|---|---|---|--|--|
| Outfall 1 | 4.50 | 3.617 | 4.124 | 883 | 376 |
| Outfall 2 | 4.50 | 3.617 | 4.125 | 883 | 375 |

Table 10 – Result of the Hydraulic Assessment for the Existing Scenario: Water Levels & Freeboard

5.1.8 Due to high design water level at the existing nullah, backwater effect occurs at the existing outfalls, resulting to surcharge in the upstream drainage.

Proposed Catchments

- 5.1.9 The boundary of the proposed drainage catchments is presented in drawing no. KEB002681/DIA/2001.
- 5.1.10 The results of the InfoWorks model for proposed development scenario (i.e. post-development) are contained in **Appendix F2** and **Appendix F4**.
- 5.1.11 The area and surface characteristics of the proposed drainage catchments are presented in Table 11.

| Catchment ID | Discharge to | Total Area (m ²) | Paved Area (m ²) | Vegetated w/ Underlying Structure (m ²) | Vegetated Area (m ²) | Paved Area (%) | Vegetated w/ Underlying Structure (%) | Vegetated Area (%) |
|--------------|--------------|------------------------------|------------------------------|---|----------------------------------|----------------|---------------------------------------|--------------------|
| SC-A | Outfall 1 | 3,061.8 | 2,449.4 | 37.2 | 575.1 | 80.0 | 1.2 | 18.8 |
| SC-B | Outfall 2 | 3,356.5 | 2,685.2 | 671.3 | 0.0 | 80.0 | 20.0 | 0.0 |
| Total | | 6,418.2 | 5,134.6 | 708.5 | 575.1 | 80.0 | 11.0 | 9.0 |

Table 11 – Area and Surface Characteristics of Proposed Drainage Catchments

- 5.1.12 The estimated peak runoff of the proposed drainage catchments is presented in Table 12.

| Catchment ID | Discharge to | 1 in 50yr Mid-21 st Century Peak Flow (Case A) (m ³ /s) | 1 in 50yr Mid-21 st Century Peak Flow (Case B) (m ³ /s) |
|--------------|--------------|---|---|
| SC-A | Outfall 1 | 0.143 | 0.120 |
| SC-B | Outfall 2 | 0.158 | 0.133 |
| SC-C | Nullah | 0.023 | 0.019 |
| Total | | 0.324 | 0.271 |

Table 12 – Peak Runoff of the Existing Drainage Catchments

- 5.1.13 The hydraulic performance of the two existing 600mm diameter outfalls serving the Site after completion of the proposed residential development is outlined in Table 9 and Table 10.

| Location | Diameter (mm) | Pipe Capacity (m ³ /s) | Proposed Peak Flow Rate 1 in 50 years Mid-21 st Century Case A (m ³ /s) | Proposed Peak Flow Rate 1 in 50 years Mid-21 st Century Case B (m ³ /s) | Pipe utilization 1 in 50 years Mid-21 st Century Case A (%) | Pipe utilization 1 in 50 years Mid-21 st Century Case A (mPD) |
|-----------|---------------|-----------------------------------|---|---|--|--|
| Outfall 1 | 600 | 0.473 | 0.192 | 0.161 | 40.6 | 34.0 |
| Outfall 2 | 600 | 0.473 | 0.229 | 0.192 | 48.4 | 40.6 |

Table 13 – Result of the Hydraulic Assessment for the Proposed Development Scenario: Flow Rates & Pipe Utilization

| Location | Proposed Ground Level at Terminal Manhole (mPD) | Maximum Water Level at Upstream Manhole 1 in 50 years Mid-21 st Century Case A | Maximum Water Level at Upstream Manhole 1 in 50 years Mid-21 st Century Case B | Freeboard 1 in 50 years Mid-21 st Century Case A | Freeboard 1 in 50 years Mid-21 st Century Case B |
|----------|---|---|---|---|---|
|----------|---|---|---|---|---|

| | | (mPD) | (mPD) | (mm) | (mm) |
|-----------|------|-------|-------|------|------|
| Outfall 1 | 6.00 | 3.623 | 4.127 | 2377 | 1873 |
| Outfall 2 | 6.00 | 3.624 | 4.130 | 2376 | 1870 |

Table 14 – Result of the Hydraulic Assessment for the Proposed Development Scenario: Water Levels & Freeboard

5.2 Drainage Impact of the Proposed Development

5.2.1 The changes in peak flow from the Site due to the proposed development are presented in Table 15.

| Existing Peak Flow Rate 1 in 50 years Mid-21 st Century, Case A (m ³ /s) | Existing Peak Flow Rate 1 in 50 years Mid-21 st Century, Case B (m ³ /s) | Proposed Peak Flow Rate 1 in 50 years Mid-21 st Century, Case A (m ³ /s) | Proposed Peak Flow Rate 1 in 50 years Mid-21 st Century, Case B (m ³ /s) | Increase in Peak Flow 1 in 50 years Mid-21 st Century, Case A (m ³ /s) | Increase in Peak Flow 1 in 50 years Mid-21 st Century, Case B (m ³ /s) |
|---|---|--|--|---|---|
| 0.324 | 0.271 | 0.421 | 0.353 | 0.097 | 0.082 |

Table 15 – Result of the Hydraulic Assessment: Changes in Peak due to the Development of the Site

5.2.2 Presently, the ground surface of the existing catchments is 59.9% paved and 40.1% vegetated. The proposed development will change the ground surface of the existing catchments to 80% paved, 11% vegetated with underlying structure and 9% vegetated. Therefore, the proposed development will increase the surface runoff from the Site.

5.2.3 The surface flows from the Site are discharged to the existing 12m wide trapezoidal nullah running from south to north along the west boundary of the Site. Based on the hydraulic modelling results for the 50 years return period, taking into consideration the effects of climate change up to mid-21st Century, the increase of surface runoff (peak flow) for 1 in 50 case A and Case B are 0.097 m³/s and 0.082 m³/s respectively. Since the increase in surface runoff is small compared to the hydraulic capacity of the existing nullah, the drainage impact arising from the proposed development is considered minimal. No adverse impact is envisaged.

5.3 Hydraulic Assessment under the 200-years, End-21st Century (Proposed Development Scenario)

5.3.1 The results of the InfoWorks model for proposed development scenario (i.e. post-development) under the End-21st Century 1 in 200-years Return Period are contained in **Appendix F5** and summarized in Table 16 and Table 17.

| Location | Diameter (mm) | Pipe Capacity (m ³ /s) | Proposed Peak Flow Rate 1 in 200 years End-21 st Century Case A (m ³ /s) | Proposed Peak Flow Rate 1 in 200 years Mid-21 st Century Case B (m ³ /s) | Pipe utilization 1 in 200 years Mid-21 st Century Case A (%) |
|-----------|---------------|-----------------------------------|---|---|--|
| Outfall 1 | 600 | 0.473 | 0.249 | 0.186 | 52.6 |
| Outfall 2 | 600 | 0.473 | 0.297 | 0.222 | 62.8 |

Table 16 – Result of the Hydraulic Assessment for the Proposed Development Scenario: Flow Rates & Pipe Utilization

| Location | Proposed Ground Level at Terminal Manhole (mPD) | Maximum Water Level at Upstream Manhole 1 in 200 years End-21 st Century, Case A (mPD) | Maximum Water Level at Upstream Manhole 1 in 200 years End-21 st Century, Case B (mPD) | Freeboard 1 in 200 years End-21 st Century, Case A (mm) | Freeboard 1 in 200 years End-21 st Century, Case B (mm) |
|-----------|---|---|---|--|--|
| Outfall 1 | 6.00 | 4.157 | 5.179 | 1843 | 821 |
| Outfall 2 | 6.00 | 4.163 | 5.183 | 1837 | 817 |

Table 17 – Result of the Hydraulic Assessment for the Proposed Development Scenario: Water Levels & Freeboard

5.4 Proposed Mitigation Measures

- 5.4.1 In the existing scenario model, backwater effect occurs at the existing outfall pipes due to high water level at the existing nullah. To avoid disturbing the existing nullah and potential environment impacts, the existing outfalls are proposed to be retained and improved by installing flap valves to prevent stormwater at nullah entering the drainage system within the Site.
- 5.4.2 The results of the hydraulic model simulation show that the flap valves fitted onto the outfalls will not adversely affect their hydraulic performance. The minor headlosses of the flap valves have neglectable drainage impact.
- 5.4.3 Peripheral drains shall be provided to collect the surface runoff within the site and convey to the nearby nullah via the proposed terminal manholes and existing 600mm drainage pipes.
- 5.4.4 Based on the hydraulic modelling results for the 200 years return period, taking into consideration the effects of climate change up to end-21st Century, the water level at the terminal manholes discharging to the existing 600mm diameter outfalls will reach about +5.2mPD under case B. Therefore, it is recommended that the formation level of the site be equal to or greater than +6.0mPD to provide long-term protection against tidal-driven flooding.

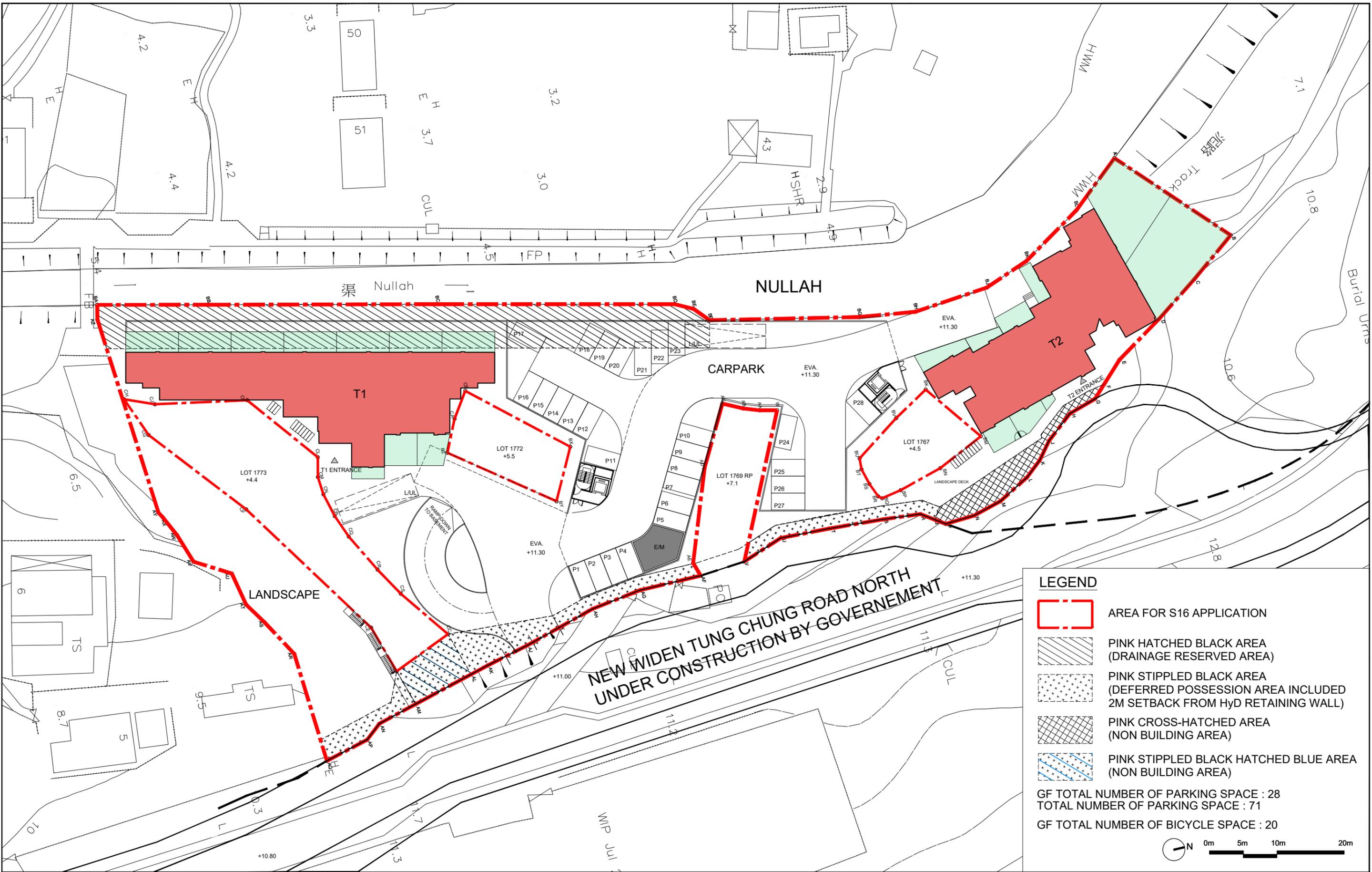
6 CONCLUSION

- 6.1.1 The proposed residential development will change the ground surface of the existing catchments from 59.9% paved and 40.1% vegetated to 80% paved, 11% vegetated with underlying structure and 9% vegetated. Therefore, the proposed development will increase the surface runoff from the Site.
- 6.1.2 The surface flows from the Site are discharged to the existing 12m wide trapezoidal nullah running from south to north along the west boundary of the Site via the proposed terminal manholes and existing 600mm drainage pipes. Based on the hydraulic modelling results for the 50 years return period, taking into consideration the effects of climate change up to mid-21st Century, the increase of surface runoff (peak flow) for 1 in 50 case A and Case B are 0.097 m³/s and 0.082 m³/s respectively. Since the increase in surface runoff is small compared to the hydraulic capacity of the existing nullah, the drainage impact arising from the proposed development is considered minimal. No adverse impact is envisaged.

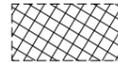
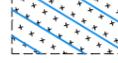
- 6.1.3 According to the results of the hydraulic model simulation, the existing 600mm diameter outfalls serving the Site have adequate hydraulic capacity to cater for the peak flows from the development under the 200 years return period, taking into consideration the effects of climate change up to end-21st Century. As such, the existing outfalls are proposed to be retained and improved by installing flap valves to prevent stormwater at nullah entering the drainage system within the Site.
- 6.1.4 Based on the hydraulic modelling results for the 200 years return period, taking into consideration the effects of climate change up to end-21st Century, the water level at the terminal manholes discharging to the existing 600mm diameter outfalls will reach about +5.2mPD under case B. The proposed basement level for carpark and ground floor level are +6.8mPD and +11.30mPD respectively which provides long-term protection against tidal-driven flooding.
- 6.1.5 It can be concluded that the proposed development will not cause any adverse drainage impact in areas within, upstream and downstream of the Application Site.

APPENDIX A

Proposed Development – Master Layout Plan



LEGEND

-  AREA FOR S16 APPLICATION
-  PINK HATCHED BLACK AREA (DRAINAGE RESERVED AREA)
-  PINK STIPPLED BLACK AREA (DEFERRED POSSESSION AREA INCLUDED 2M SETBACK FROM Hyd RETAINING WALL)
-  PINK CROSS-HATCHED AREA (NON BUILDING AREA)
-  PINK STIPPLED BLACK HATCHED BLUE AREA (NON BUILDING AREA)

GF TOTAL NUMBER OF PARKING SPACE : 28
 TOTAL NUMBER OF PARKING SPACE : 71
 GF TOTAL NUMBER OF BICYCLE SPACE : 20

0m 5m 10m 20m

Drawing Title
GROUND FLOOR PLAN

Scale
1:500 (A3)

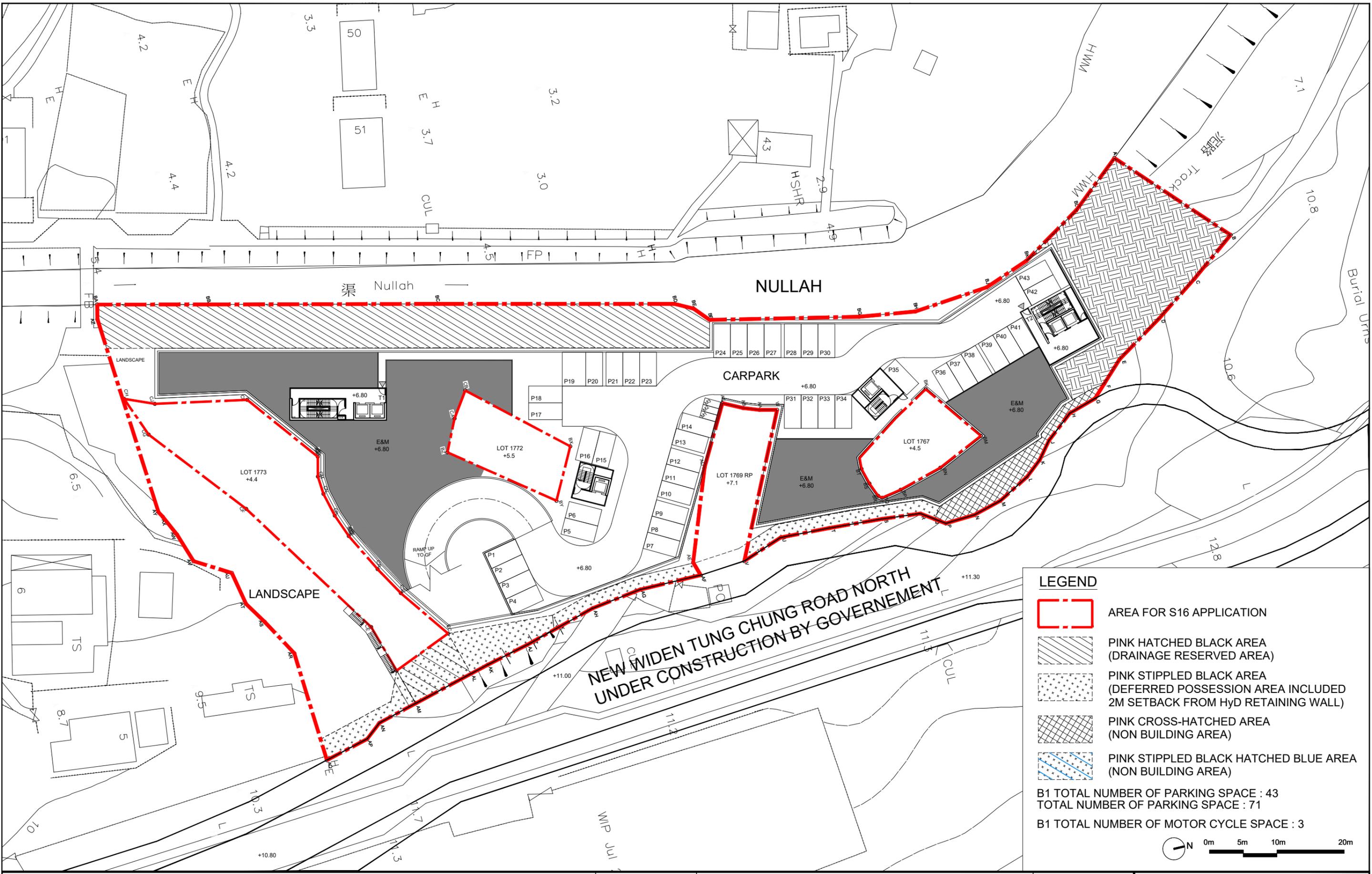
Date
30/1/2026

Project
A-2517
 PROPOSED FLAT WITH MINOR RELAXATION OF BUILDING HEIGHT RESTRICTION AT VARIOUS LOTS IN D.D. 3 TC AND ADJOINING GOVERNMENT LAND, TUNG CHUNG ROAD NORTH, TUNG CHUNG, LANTAU ISLAND

Job No.
A-2517

Dwg No.
GP-01





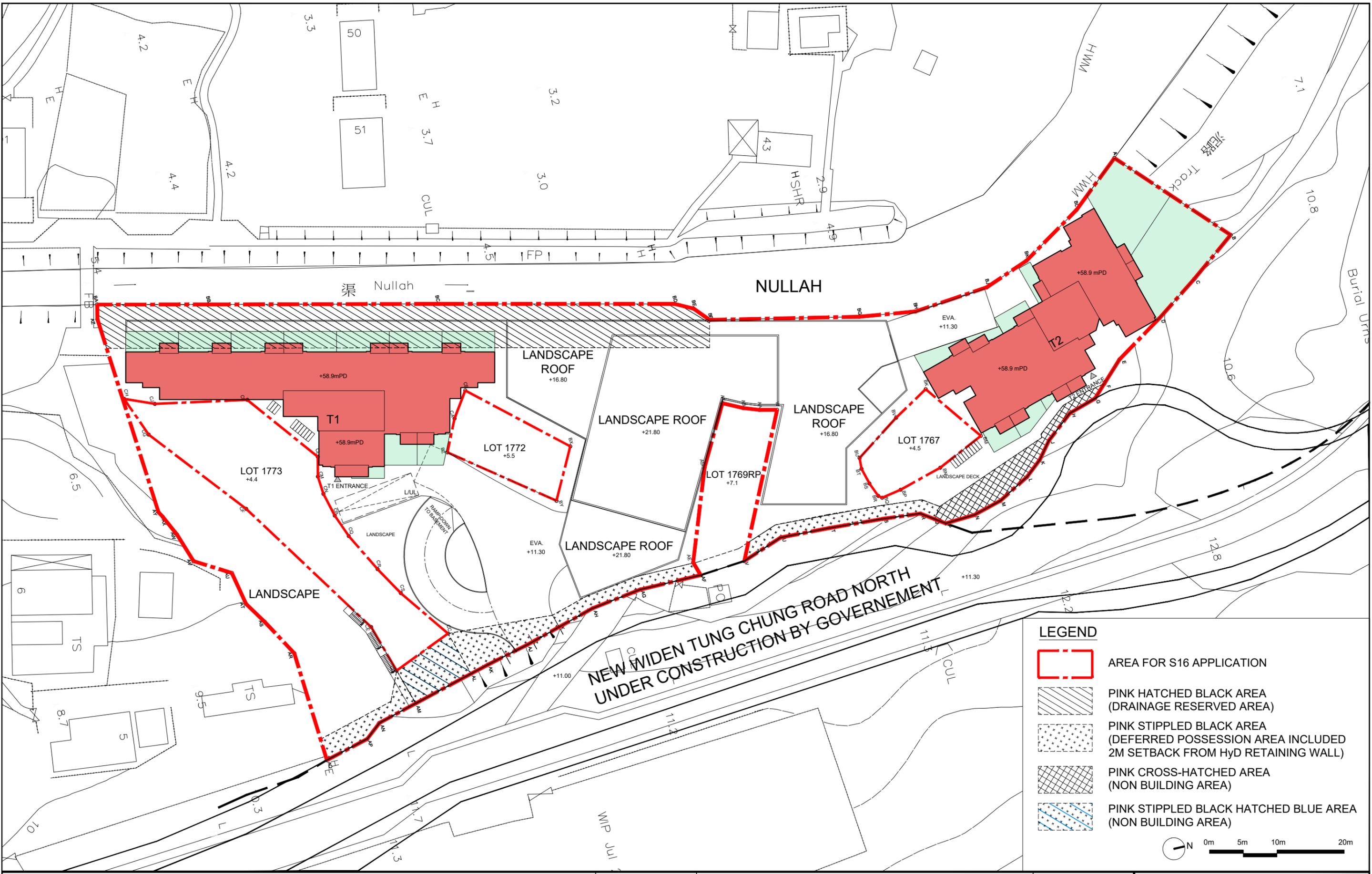
Drawing Title
BASEMENT 1 FLOOR PLAN

Scale
 1:500 (A3)
 Date
 30/1/2026

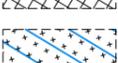
Project
 A-2517
 PROPOSED FLAT WITH MINOR RELAXATION OF BUILDING HEIGHT RESTRICTION AT VARIOUS LOTS IN D.D. 3 TC AND ADJOINING GOVERNMENT LAND, TUNG CHUNG ROAD NORTH, TUNG CHUNG, LANTAU ISLAND

Job No.
 A-2517
 Dwg No.
 GP-02



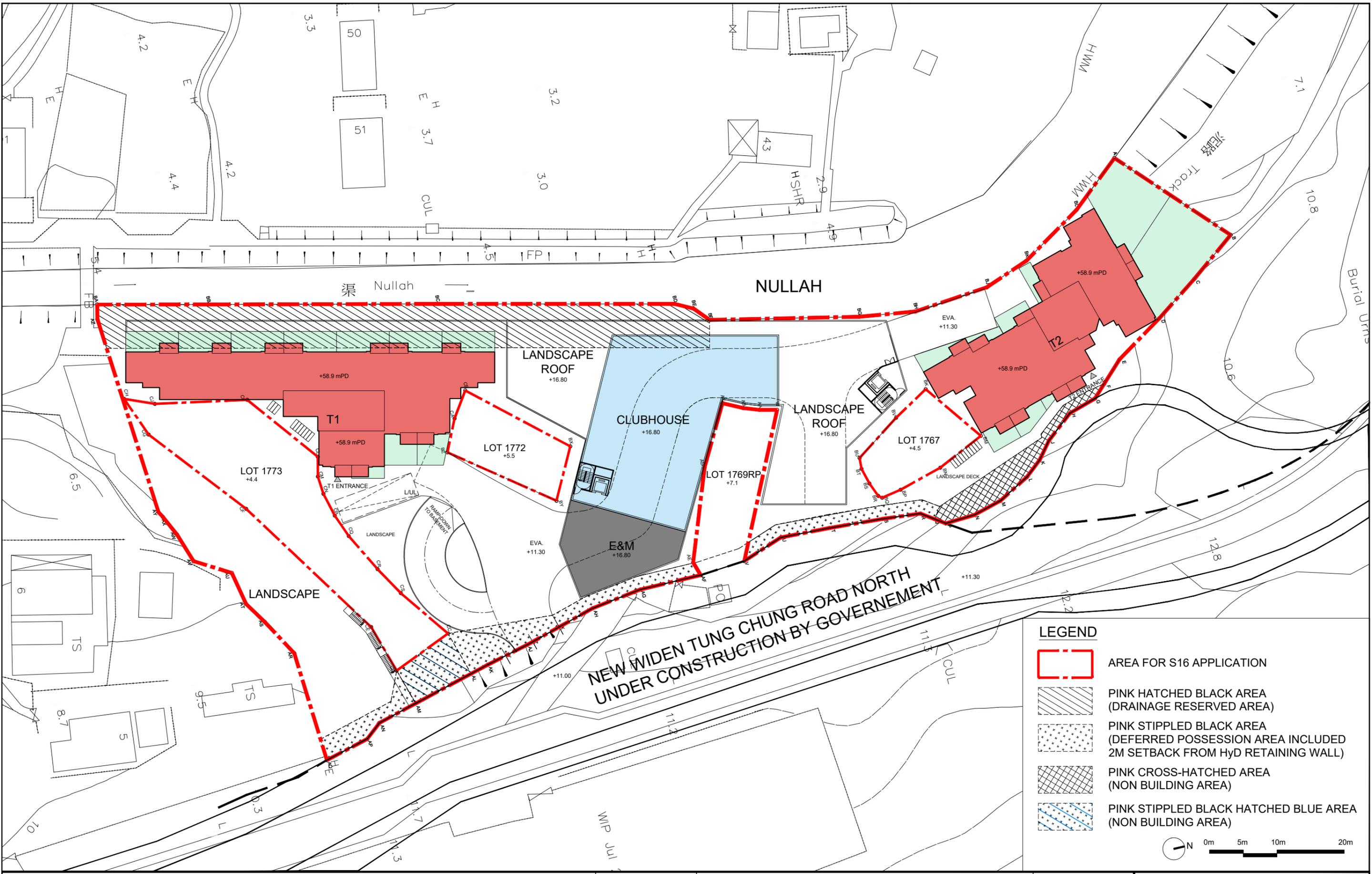


LEGEND

-  AREA FOR S16 APPLICATION
-  PINK HATCHED BLACK AREA (DRAINAGE RESERVED AREA)
-  PINK STIPPLED BLACK AREA (DEFERRED POSSESSION AREA INCLUDED 2M SETBACK FROM Hyd RETAINING WALL)
-  PINK CROSS-HATCHED AREA (NON BUILDING AREA)
-  PINK STIPPLED BLACK HATCHED BLUE AREA (NON BUILDING AREA)


 0m 5m 10m 20m

| | | | |
|---|----------------------------|---|---|
| Drawing Title TYPICAL LAYOUT PLAN | Scale 1:500 (A3) | Project A-2517 PROPOSED FLAT WITH MINOR RELAXATION OF BUILDING HEIGHT RESTRICTION AT VARIOUS LOTS IN D.D. 3 TC AND ADJOINING GOVERNMENT LAND, TUNG CHUNG ROAD NORTH, TUNG CHUNG, LANTAU ISLAND | Job No. A-2517 |
| | Date 24/2/2026 | Dwg No. GP-03 |  ANDREW LEE KING FUN & ASSOCIATES ARCHITECTS LTD |



LEGEND

-  AREA FOR S16 APPLICATION
-  PINK HATCHED BLACK AREA (DRAINAGE RESERVED AREA)
-  PINK STIPPLED BLACK AREA (DEFERRED POSSESSION AREA INCLUDED 2M SETBACK FROM Hyd RETAINING WALL)
-  PINK CROSS-HATCHED AREA (NON BUILDING AREA)
-  PINK STIPPLED BLACK HATCHED BLUE AREA (NON BUILDING AREA)


 0m 5m 10m 20m

| | | | |
|--|----------------------------|---|---|
| Drawing Title MASTER LAYOUT PLAN | Scale 1:500 (A3) | Project A-2517 PROPOSED FLAT WITH MINOR RELAXATION OF BUILDING HEIGHT RESTRICTION AT VARIOUS LOTS IN D.D. 3 TC AND ADJOINING GOVERNMENT LAND, TUNG CHUNG ROAD NORTH, TUNG CHUNG, LANTAU ISLAND | Job No. A-2517 |
| | Date 24/2/2026 | Dwg No. MLP-01 |  ANDREW LEE KING FUN & ASSOCIATES ARCHITECTS LTD |

APPENDIX B

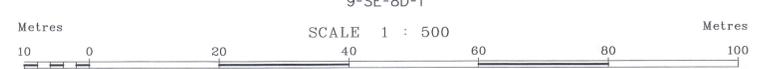
Drainage Records



- Legend :**
- Storm Water Manhole
 - Storm Water Terminal Manhole
 - Sewer Manhole
 - Sewer Terminal Manhole
 - Combined Manhole
 - Catchpit
 - Desludging Opening
 - Inspection Opening
 - Dry Weather Flow Interceptor
 - Sand Trap
 - Inlet
 - Outlet
 - Box Culvert (Storm/Sewer)

- Existing Pipe (Storm/Sewer/Combined)
- Existing Pipe (Storm/Sewer/Combined) (Planning / Identifying to be Abandoned)
- Proposed Pipe (Storm/Sewer)
- Works in Progress Pipe (Storm/Sewer)
- Abandoned Pipe
- Abandoned Pipe (Filled with Materials)
- Proposed U Channel / Stepped Channel (Storm)
- Proposed U Channel / Stepped Channel (Storm)
- Works in Progress U Channel / Stepped Channel (Storm)
- Rising Main
- Vacuum Sewer
- Drainage Reserve

- Gully Sump / Gully
- H/H Tapping Point (Storm/Sewer)
- G/G Overflow (Sewer/Combined)
- Interface Valve Chamber
- Oil / Petrol Interceptor
- Valve
- Water Gauge
- Spot Level (Storm/Sewer)
- ▲ Slope Sign Board
- ▲ Slope Number
- ▲ Slope Boundary
- Existing Submarine Outfall with Diffuser
- Proposed Submarine Outfall with Diffuser
- Works in Progress Submarine Outfall with Diffuser
- Harbour Area Treatment Scheme Sewage Tunnel Protection Area (100m width)
- Harbour Area Treatment Scheme Sewage Tunnel Protection Area (200m width)



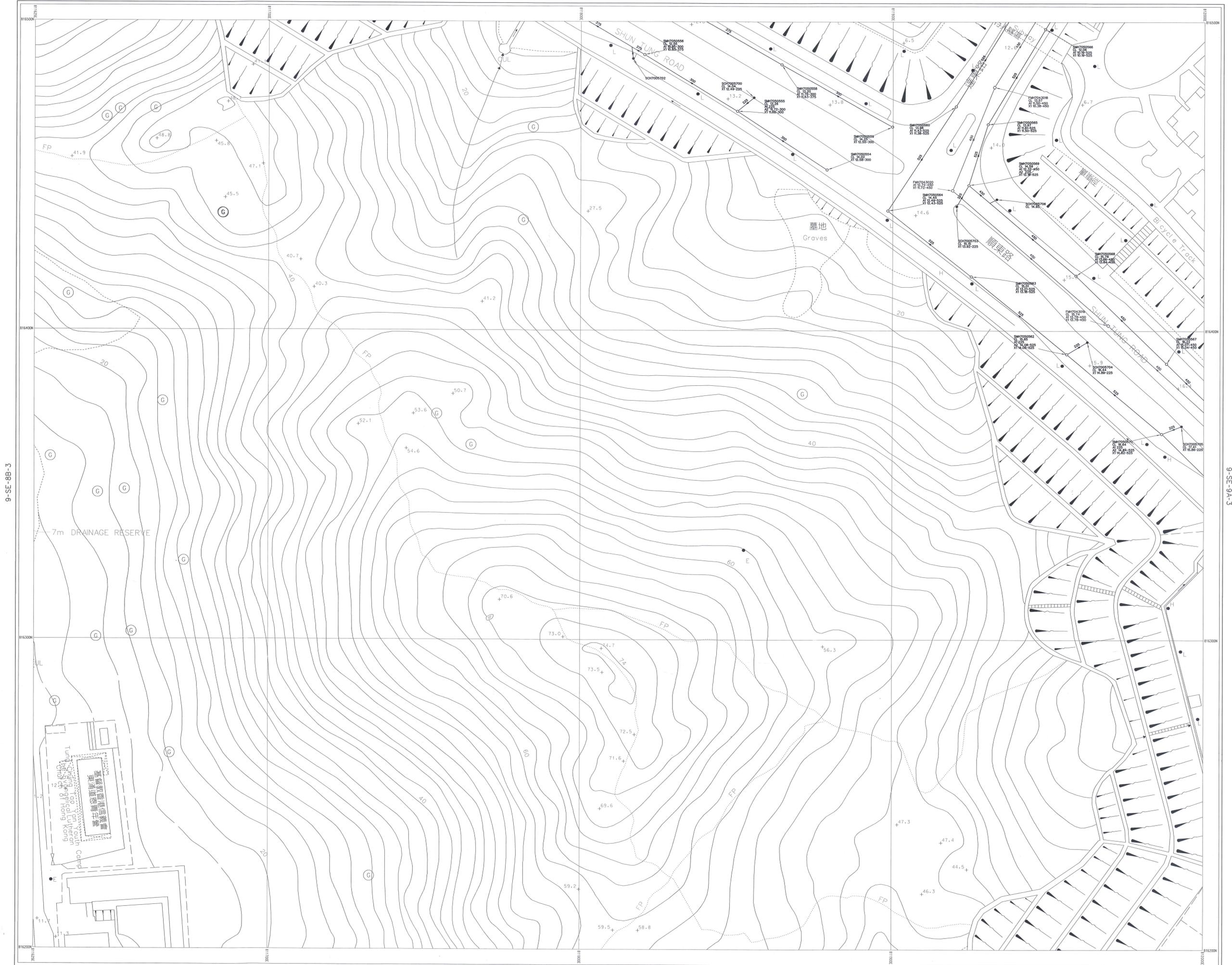
Hong Kong and Islands Division
Drainage Services Department

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- Notes :**
- All levels are in mPD.
 - All dimensions shown are in millimetres unless otherwise stated.
 - The information shown on the record drawings are subject to verification on site and no guarantee can be given that this is a complete record.
 - Abbreviations for Channels of width smaller or equal to 1200mm:
900C - 900mm width Surface Channel
900SC - 900mm width Stepped Channel
900UC - 900mm width U Channel
900DFC - 900mm width Dry Weather Flow Channel

- Drainage Record Sheet Number**
9-SE-8B-3
1. The Incoming Pipes are marked X1, X2, X3, ... counting clockwise from the first Outgoing Pipe. X1, X2, X3 ... counting clockwise from North.
2. Manhole number
3. Cover Level or Ground Level
4. 225mm dia. Incoming Pipe Invert Level
5. 375mm dia. Incoming Pipe Invert Level
6. 525mm dia. Outgoing Pipe Invert Level
7. Piling foundations on culverts may be present but not shown for brevity. Please refer to the relevant as-built drawings on details of the pile foundation.
8. Drainage facilities maintained by other parties, if shown, are indicative only. It is no guarantee that these information are exact.
- Map data renewed on June 2009
- Last Updating : 27-02-2006
- JUL 2011

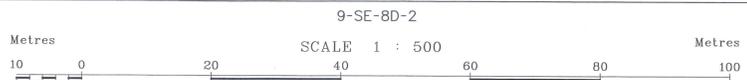


9-SE-8B-3

9-SE-8A-3

Legend :

| | | | |
|--------------------------------|---|--|--|
| ○ Storm Water Manhole | Existing Pipe (Storm/Sewer/Combined) | ●/● Gully Sump / Gully | ▲ Slope Sign Board |
| ○ Storm Water Terminal Manhole | Existing Pipe (Storm/Sewer/Combined) (Planning / Identifying to be Abandoned) | H/H Tapping Point (Storm/Sewer) | ▲ Slope Number |
| □ Sewer Manhole | Proposed Pipe (Storm/Sewer) | G/G Overflow (Sewer/Combined) | --- Slope Boundary |
| ■ Sewer Terminal Manhole | Works In Progress Pipe (Storm/Sewer) | ■ Interface Valve Chamber | --- Existing Submarine Outfall with Diffuser |
| ● Combined Manhole | Abandoned Pipe | ■ Oil / Petrol Interceptor | --- Proposed Submarine Outfall with Diffuser |
| ● Catchpit | Abandoned Pipe Filled with Materials | ■ Valve | --- Works In Progress Submarine Outfall with Diffuser |
| ● Desalting Opening | Existing U Channel / Stepped Channel (Storm) | ■ Water Gauge | --- Harbour Area Treatment Scheme Sewage Tunnel Outer Protection Area (100m width) |
| ● Inspection Opening | Proposed U Channel / Stepped Channel (Storm) | ●/▲ Spot Level (Storm/Sewer) | --- Harbour Area Treatment Scheme Sewage Tunnel Outer Protection Area (200m width) |
| ● Dry Weather Flow Interceptor | Works In Progress U Channel / Stepped Channel (Storm) | --- Existing Y-Junction (Storm/Sewer/Combined) | --- Piling Foundations on Culverts |
| ■ Sand Trap | Rising Main | --- Vacuum Sewer | |
| ■ Inlet | --- Vacuum Sewer | --- Drainage Reserve | |
| ■ Outlet | | | |
| ■ Box Culvert (Storm/Sewer) | | | |



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 Drainage Services Department
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Notes :

- All levels are in mPD.
- All dimensions shown are in millimetres unless otherwise stated.
- The information shown on the record drawings are subject to verification on site and no guarantee can be given that this is a complete record.
- Abbreviations for Channels of width smaller or equal to 1200mm:
 900C - 900mm width Surface Channel
 900SC - 900mm width Stepped Channel
 900UC - 900mm width U Channel
 900WFC - 900mm width Dry Weather Flow Channel
- The Incoming Pipes are marked counting clockwise from the first Outgoing Pipe. Outgoing Pipes are marked X1, X2, X3 ... counting clockwise from North.
- Piling foundations on culverts may be present but not shown for brevity. Please refer to the relevant as-built drawings on details of the pile foundation.
- Drainage facilities maintained by other parties, if shown, are indicative only. It is no guarantee that these information are exact.

Drainage Record Sheet Number
9-SE-8B-4
 Last Updating : 27-02-2006
 JUL 2021
 Map data renewed on June 2009



09-SE-08C-2

09-SE-08D-2

Legend:

| | | | |
|--------------------------------------|---|--|--------------------|
| ○ Storm Water Manhole | — Existing Pipe (Storm/Sewer/Combined) | ▭ Tunnel Protection Zone | ▲ Slope Sign Board |
| ○ Storm Water Terminal Manhole | — Existing Pipe (Storm/Sewer/Combined) (Plugging / Identifying to be Abandoned) | ○ Gully Sump / Gully | ▲ Slope Number |
| ○ Storm Water Special Manhole | — Existing Pipe (Storm/Sewer/Combined) (Plugging / Identifying to be Abandoned) | — H/W | — Slope Boundary |
| ○ Sewer Manhole | — Proposed Pipe (Storm/Sewer) | — G/G | — |
| ○ Sewer Terminal Manhole | — Works in Progress Pipe (Storm/Sewer) | — Interface Valve Chamber | — |
| ○ Sewer Special Manhole | — Not Yet Commissioned Pipe (Storm/Sewer) | — Oil / Petrol Interceptor | — |
| ○ Combined Manhole | — Abandoned Pipe | — Valve | — |
| ○ Catchpit | — Abandoned Pipe (Filled with Material) | — Water Gauge | — |
| ○ Dealing Opening | — Existing U Channel / Stepped Channel (Storm) | — Spot Level (Storm/Sewer) | — |
| ○ Inspection Opening | — Proposed U Channel / Stepped Channel (Storm) | — | — |
| ○ Dry Weather Flow Interceptor | — U Channel / Stepped Channel (Storm) | — Existing Y-Junction (Storm/Sewer/Combined) | — |
| ○ Sand Trap | — Rising Main | — | — |
| ○ Inlet | — Vacuum Sewer | — | — |
| ○ Outlet | — Drainage Reserve | — | — |
| ○ Tunnel / Box Culvert (Storm/Sewer) | — | — | — |

| | |
|--|--|
| — Harbour Area Treatment Scheme Sewage Tunnel Protection Area (100m width) | — Harbour Area Treatment Scheme Sewage Tunnel Outer Protection Area (200m width) |
| — Harbour Area Treatment Scheme Sewage Tunnel Protection Area (100m width) (Works in Progress) | — Harbour Area Treatment Scheme Sewage Tunnel Outer Protection Area (200m width) (Works in Progress) |

09-SE-08D-3

Metres SCALE 1 : 500 Metres

D

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Drainage Services Department

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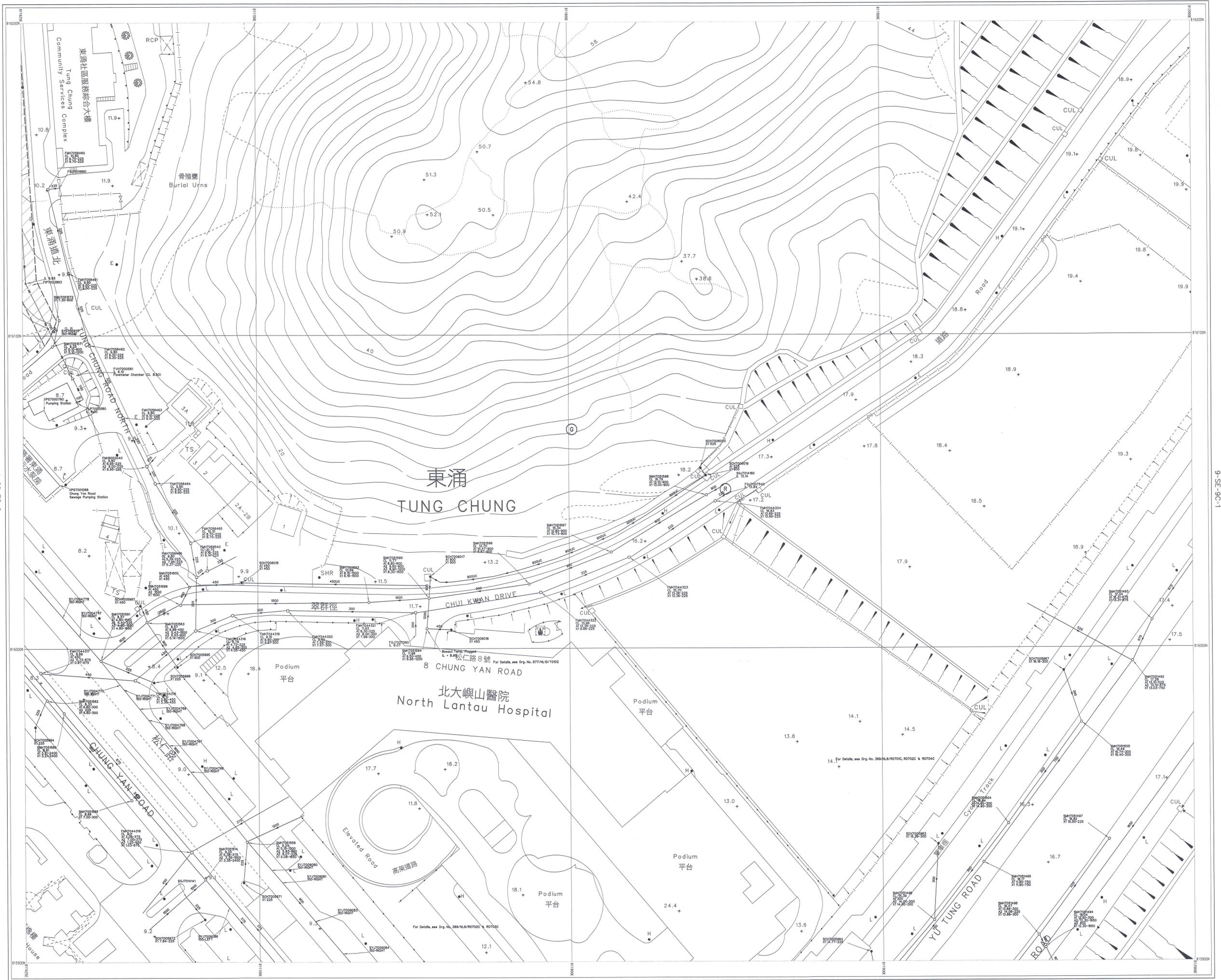
Notes:

- All levels are given in metres principle datum.
- Dimensions shown are in millimetres unless otherwise stated.
- The information shown on the record drawings are subject to verification on site and no guarantee can be given that this is a complete record.
- Abbreviations for Channels of width smaller or equal to 1200mm:
900C = 900mm width Surface Channel
900SC = 900mm width Stepped Channel
900UC = 900mm width U Channel
900DWC = 900mm width Dry Weather Flow Channel
- The Incoming Pipes are marked A1, A2, A3, ... counting clockwise from the first Outgoing Pipe X1. Outgoing Pipes are marked X1, X2, X3 ... counting clockwise from North.
- Piling foundations on culverts may be present but not shown for brevity. Please refer to the relevant as-built drawings on details of the pile foundation.
- Drainage facilities maintained by other parties, if shown, are indicative only. It is no guarantee that these information are exact.

Drainage Record Sheet Number
9-SE-8D-1

Last Updating : 14/6/2016

JUL 2016



9-SE-8D-4

Please note that drainage information is now available in the GeoInfo Map services of the Lands Department (<https://www.map.gov.hk/gm/?lg=en>). Please refer to the Quick Reference Guide of the system for the operation.

For legend of drainage record plans, please refer to the following URL: (https://www.dsd.gov.hk/EN/Files/Legend_BW.pdf)



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Drainage Services Department
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Drainage Record Sheet Number

9-SE-8D-2

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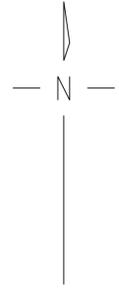
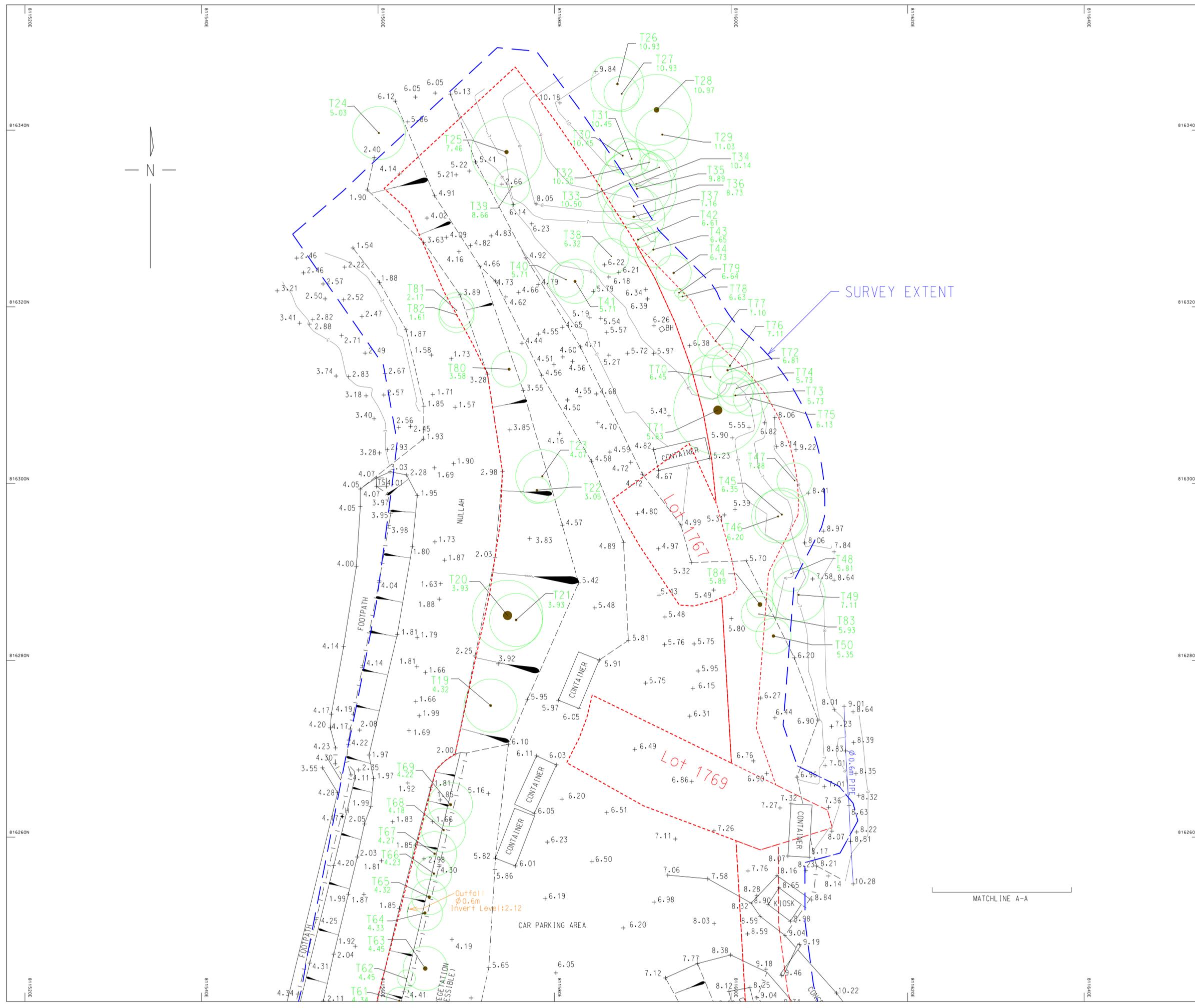
Last Updating : 28/01/2021

JUL 2021

Map data renewed on June 2020

APPENDIX C

Topographical and Tree Survey



KEY PLAN 1:5,000

- NOTES :
1. MEASUREMENTS ARE BASED ON HONG KONG 1980 METRIC GRID & HONG KONG PRINCIPAL DATUM.
 2. ALL UNITS ARE IN METRES OR OTHERWISE STATED.
 3. ALL LEVELS OF KERB WERE MEASURED FROM TOE OF KERB.
 4. PROPOSED RE-GRANT BOUNDARIES SHOWN HEREIN WERE ABSTRACTED FROM THE PLAN NO. KEL/BDY/20/82/PLAN-P02 DATED 10 MAY 2021 AND ARE FOR REFERENCE ONLY.

- LEGEND:
- 300mm CC 300mm COVERED U-CHANNEL
 - 300mm UC 300mm U-CHANNEL
 - 300mm SC 300mm STEPPED CHANNEL
 - FENCE/RAILING
 - +3.00 LEVEL POINT
 - CP CATCH PIT
 - M MANHOLE
 - BH BOREHOLE
 - STAIR/STEP EDGE
 - GATE
 - RETAINING WALL TOP/TOE
 - FB FLOWER BED
 - T1 TREE & TREE NO.
 - BUILDING LINE
 - SLOPE
 - CONTOUR
 - PROPOSED RE-GRANT BOUNDARY
 - SURVEY EXTENT

PROJECT :
 Topographical and Tree Survey for
 the Proposed Re-grant Site in D.D.3 Tung Chung
 (In Surrender of Lot Nos. 1766 RP, 1768, 1770,
 1771 RP and 1774), Ma Wan Chung, Tung Chung

| | |
|-----------------------------|----------------------|
| DATE OF SURVEY JUNE 2021 | SCALE AT A1 1:200 |
|-----------------------------|----------------------|

| | |
|---|----------|
| DRAWING NUMBER KEL/TOP0/21/11 (Sheet 1 of 2) | REVISION |
|---|----------|

Plan Approved By:

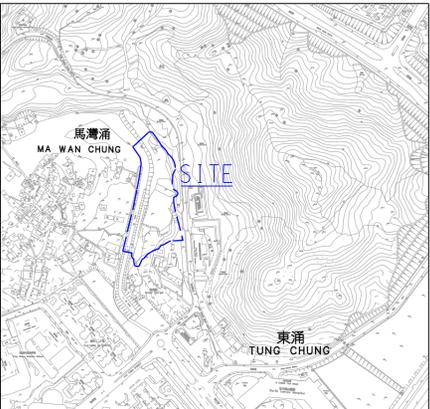
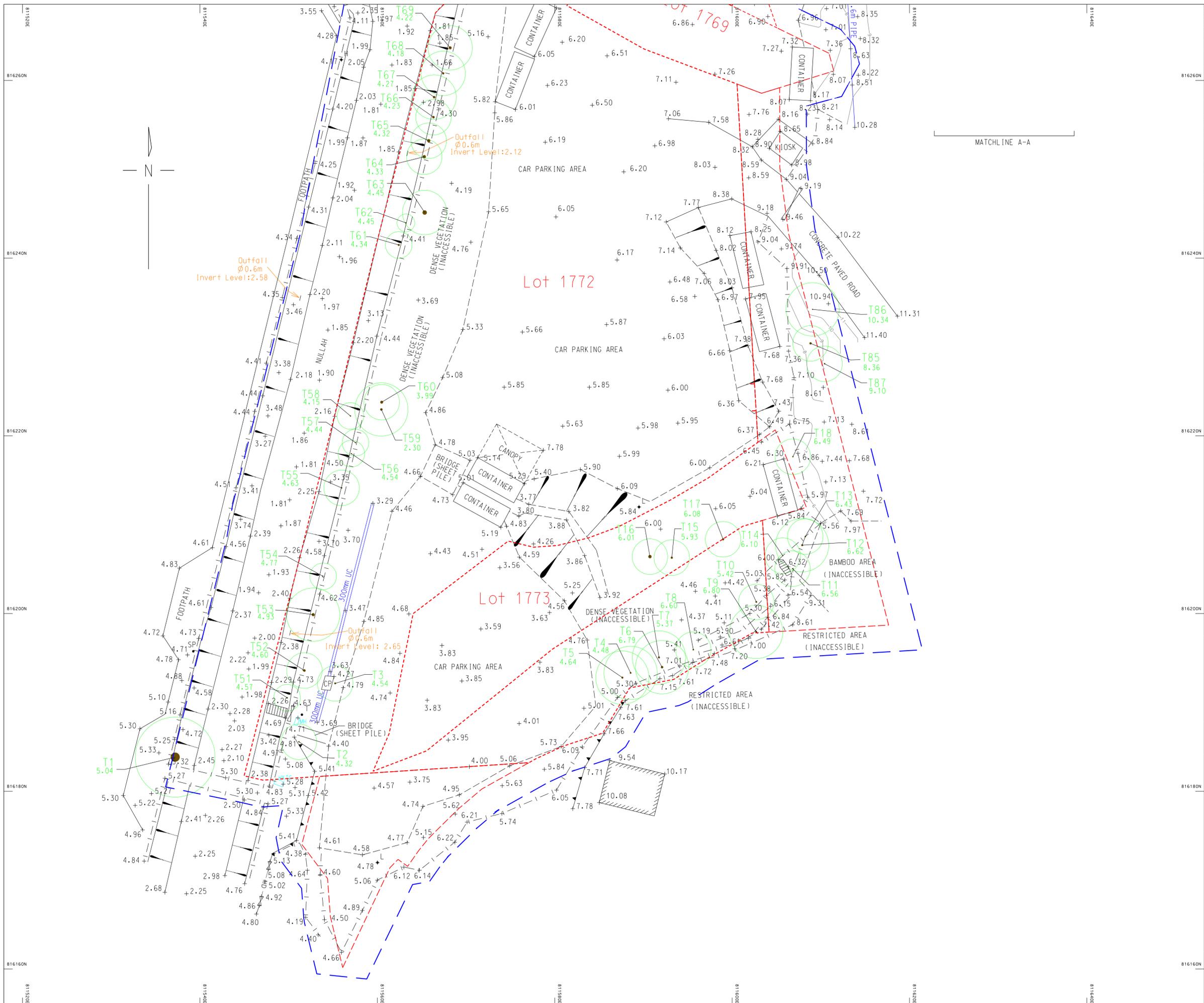
Signature _____
 Sr. Dr. Ching Siu-tong
 Authorized Land Surveyor
 FHKIS, FRICS, MIS(Aust.), RPS(LS), MCIArb, MSS (Aust.)

Dated this: .25th. day ofJune.2021.....

建地測量規劃及地理資訊系統有限公司
KEland Surveying, Planning & GIS Co. Ltd.

Authorized Land Surveyors
 Flat B, 20/F, Chatham Commercial Building, No.399 Chatham Road North, Kowloon
 Tel: 2765 5737 Fax: 2765 5722 Web: www.keland.com.hk E-mail: keland@biznetvigator.com

MATCHLINE A-A



KEY PLAN 1:5,000

- NOTES :
1. MEASUREMENTS ARE BASED ON HONG KONG 1980 METRIC GRID & HONG KONG PRINCIPAL DATUM.
 2. ALL UNITS ARE IN METRES OR OTHERWISE STATED.
 3. ALL LEVELS OF KERB WERE MEASURED FROM TOE OF KERB.
 4. PROPOSED RE-GRANT BOUNDARIES SHOWN HEREIN WERE ABSTRACTED FROM THE PLAN NO. KEL/BDY/20/82/PLAN-P02 DATED 10 MAY 2021 AND ARE FOR REFERENCE ONLY.

- LEGEND:
- 300mm CC 300mm COVERED U-CHANNEL
 - 300mm UC 300mm U-CHANNEL
 - 300mm SC 300mm STEPPED CHANNEL
 - |-|- FENCE/RAILING
 - +3.00 LEVEL POINT
 - CP CATCH PIT
 - MH MANHOLE
 - BH BOREHOLE
 - ▤ STAIR/STEP EDGE
 - ▬ GATE
 - ▬▬▬ RETAINING WALL TOP/TOE
 - FB FLOWER BED
 - T1 TREE & TREE NO.
 - ▭ BUILDING LINE
 - ▨ SLOPE
 - ▭▭▭ CONTOUR
 - - - - PROPOSED RE-GRANT BOUNDARY
 - - - - SURVEY EXTENT

PROJECT :
Topographical and Tree Survey for the Proposed Re-grant Site in D.D.3 Tung Chung (In Surrender of Lot Nos. 1766 RP, 1768, 1770, 1771 RP and 1774), Ma Wan Chung, Tung Chung

| | |
|-----------------------------|----------------------|
| DATE OF SURVEY JUNE 2021 | SCALE AT A1 1:200 |
|-----------------------------|----------------------|

| | |
|---|----------|
| DRAWING NUMBER KEL/TOPO/21/11 (Sheet 2 of 2) | REVISION |
|---|----------|

Plan Approved By:

Signature _____
Sr. Dr. Ching Siu-tong
Authorized Land Surveyor
HKIS, FRICS, MIS(Aust.), RPS(LS), MC(ARB), MSSI (Aust.)

Dated this: 25th day of June, 2021.

APPENDIX D

Existing Catchments - Areas, Surface Types and Times of Concentration

Reference

- SD Stormwater Drainage Manual (SDM) – Planning, Design and Management (Fifth Edition, January 2018) including its corrigenda No. 1/2022, No. 1/2024 and No. 2/2024.

Runoff Coefficient

| Surface Material | Coefficient |
|--|-------------|
| Roof/ Asphalt/ Concrete ("Paved") | 1.00 |
| Vegetated area w/ underlying structure | 0.60 |
| Vegetated | 0.20 |

Catchment Area, Surface Type, and Time of Concentration (Existing Scenario)

| Catchment ID | Discharge to | Total Area (m ²) | Paved Area (m ²) | Vegetated w/ underlying structure (m ²) | Vegetated Area (m ²) | Paved Area (%) | Vegetated w/ underlying structure (%) | Vegetated Area (%) | Flow Length (m) | Average Slope (m/m) | Time of Concentration, t _c (min) |
|--------------|--------------|------------------------------|------------------------------|---|----------------------------------|----------------|---------------------------------------|--------------------|-----------------|---------------------|---|
| SC-A | Outfall 1 | 2,884.4 | 1,680.8 | 0.0 | 1,203.5 | 58.3 | 0.0 | 41.7 | 68.3 | 0.050 | 5.0 |
| SC-B | Outfall 2 | 3,229.5 | 1,860.6 | 0.0 | 1,368.9 | 57.6 | 0.0 | 42.4 | 71.4 | 0.029 | 5.0 |
| SC-C | Nullah | 304.4 | 304.4 | 0.0 | 0.0 | 100.0 | 0.0 | 0.0 | 3.5 | 0.286 | 5.0 |
| Total | | 6,418.3 | 3,845.9 | 0.0 | 2,572.4 | 59.9 | 0.0 | 40.1 | | | |

Estimation of Peak Flow (Existing Scenario)

| Catchment ID | Discharge to | 1 in 50yr Mid-Century Peak Flow (Case A) (m ³ /s) | 1 in 50yr Mid-Century Peak Flow (Case B) (m ³ /s) |
|--------------|--------------|--|--|
| SC-A | Outfall 1 | 0.143 | 0.120 |
| SC-B | Outfall 2 | 0.158 | 0.133 |
| SC-C | Nullah | 0.023 | 0.019 |
| Total | | 0.324 | 0.271 |

APPENDIX E

Proposed Catchments - Areas, Surface Types and Times of Concentration



| |
|--|
| Project No.: Proposed Residential Development in Tung Chung, Lantau Island |
| Date: September 2025 |
| Designed By: Fernando Coutinho |
| Checked By: Fernando Coutinho |
| Proposed Catchment Area and Surface Types |

Reference

- DSD Stormwater Drainage Manual (SDM) – Planning, Design and Management (Fifth Edition, January 2018) including its corrigenda No. 1/2022, No. 1/2024 and No. 2/2024.

Runoff Coefficient

| Surface Material | Coefficient |
|--|-------------|
| Roof/ Asphalt/ Concrete ("Paved") | 1.00 |
| Vegetated area w/ underlying structure | 0.60 |
| Vegetated | 0.20 |

Catchment Area, Surface Type, and Time of Concentration (Proposed Scenario)

| Catchment ID | Discharge to | Total Area (m ²) | Paved Area (m ²) | Vegetated w/ underlying structure (m ²) | Vegetated Area (m ²) | Paved Area (%) | Vegetated w/ underlying structure (%) | Vegetated Area (%) | Flow Length (m) | Average Slope (m/m) | Time of Concentration, t _c (min) |
|--------------|--------------|------------------------------|------------------------------|---|----------------------------------|----------------|---------------------------------------|--------------------|-----------------|---------------------|---|
| SC-A | Outfall 1 | 3,061.8 | 2,449.4 | 37.2 | 575.1 | 80.0 | 1.2 | 18.8 | 68.3 | 0.050 | 5.0 |
| SC-B | Outfall 2 | 3,356.5 | 2,685.2 | 671.3 | - | 80.0 | 20.0 | 0.0 | 71.4 | 0.029 | 5.0 |
| Total | | 6,418.2 | 5,134.6 | 708.5 | 575.1 | 80.0 | 11.0 | 9.0 | | | |

Estimation of Peak Flow (Proposed Scenario)

| Catchment ID | Discharge to | 1 in 50yr Mid-Century Peak Flow (Case A) (m ³ /s) | 1 in 50yr Mid-Century Peak Flow (Case B) (m ³ /s) | 1 in 200yr End-Century Peak Flow (Case A) (m ³ /s) | 1 in 200yr End-Century Peak Flow (Case B) (m ³ /s) |
|--------------|--------------|--|--|---|---|
| SC-A | Outfall 1 | 0.192 | 0.161 | 0.249 | 0.186 |
| SC-B | Outfall 2 | 0.229 | 0.192 | 0.297 | 0.222 |
| Total | | 0.421 | 0.353 | 0.546 | 0.407 |

APPENDIX F

Hydraulic Modelling Simulation Results

APPENDIX F1

Hydraulic Model Network



Hydraulic Model Network - Existing Scenario



Hydraulic Model Network - Proposed Development Scenario

APPENDIX F2

Summary Tables

Existing Scenario: Flow Rates & Pipe Utilization

| Location | Diameter (mm) | Pipe Capacity (m3/s) | Existing Peak Flow Rate 1 in 50 years Mid-21st Century Case A (m3/s) | Existing Peak Flow Rate 1 in 50 years Mid-21st Century Case B (m3/s) | Pipe utilization 1 in 50 years Mid-21st Century Case A (%) | Pipe utilization 1 in 50 years Mid-21st Century Case A (%) |
|-----------|---------------|----------------------|--|--|--|--|
| Outfall 1 | 600 | 0.473 | 0.143 | 0.120 | 30.1 | 25.3 |
| Outfall 2 | 600 | 0.473 | 0.158 | 0.133 | 33.5 | 28.1 |

Existing Scenario: Water Levels & Freeboard

| Location | Existing Ground Level at Upstream Manhole (mPD) | Maximum Water Level at Upstream Manhole 1 in 50 years Mid-21st Century Case A (mPD) | Maximum Water Level at Upstream Manhole 1 in 50 years Mid-21st Century Case B (mPD) | Freeboard 1 in 50 years Mid-21st Century Case A (mm) | Freeboard 1 in 50 years Mid-21st Century Case B (mm) |
|-----------|---|---|---|--|--|
| Outfall 1 | 4.50 | 3.617 | 4.124 | 883 | 376 |
| Outfall 2 | 4.50 | 3.617 | 4.125 | 883 | 375 |

Proposed Development Scenario: Flow Rates & Pipe Utilization

| Location | Diameter (mm) | Pipe Capacity (m3/s) | Proposed Peak Flow Rate 1 in 50 years Mid-21st Century Case A (m3/s) | Proposed Peak Flow Rate 1 in 50 years Mid-21st Century Case B (m3/s) | Pipe utilization 1 in 50 years Mid-21st Century Case A (%) | Pipe utilization 1 in 50 years Mid-21st Century Case A (%) |
|-----------|---------------|----------------------|--|--|--|--|
| Outfall 1 | 600 | 0.473 | 0.192 | 0.161 | 40.6 | 34.0 |
| Outfall 2 | 600 | 0.473 | 0.229 | 0.192 | 48.4 | 40.6 |

Proposed Development Scenario: Water Levels & Freeboard

| Location | Proposed Ground Level at Upstream Manhole (mPD) | Maximum Water Level at Upstream Manhole 1 in 50 years Mid-21st Century Case A (mPD) | Maximum Water Level at Upstream Manhole 1 in 50 years Mid-21st Century Case B (mPD) | Freeboard 1 in 50 years Mid-21st Century Case A (mm) | Freeboard 1 in 50 years Mid-21st Century Case B (mm) |
|-----------|---|---|---|--|--|
| Outfall 1 | 6.00 | 3.623 | 4.127 | 2377 | 1873 |
| Outfall 2 | 6.00 | 3.624 | 4.130 | 2376 | 1870 |

Proposed Development Scenario: Flow Rates & Pipe Utilization

| Location | Diameter (mm) | Pipe Capacity (m ³ /s) | Proposed Peak Flow Rate 1 in 200 years End-21st Century Case A (m ³ /s) | Proposed Peak Flow Rate 1 in 200 years End-21st Century Case B (m ³ /s) | Pipe utilization 1 in 200 years End-21st Century Case A (%) | Pipe utilization 1 in 200 years End-21st Century Case A (%) |
|-----------|---------------|-----------------------------------|--|--|---|---|
| Outfall 1 | 600 | 0.473 | 0.249 | 0.186 | 52.6 | 39.2 |
| Outfall 2 | 600 | 0.473 | 0.297 | 0.222 | 62.8 | 46.8 |

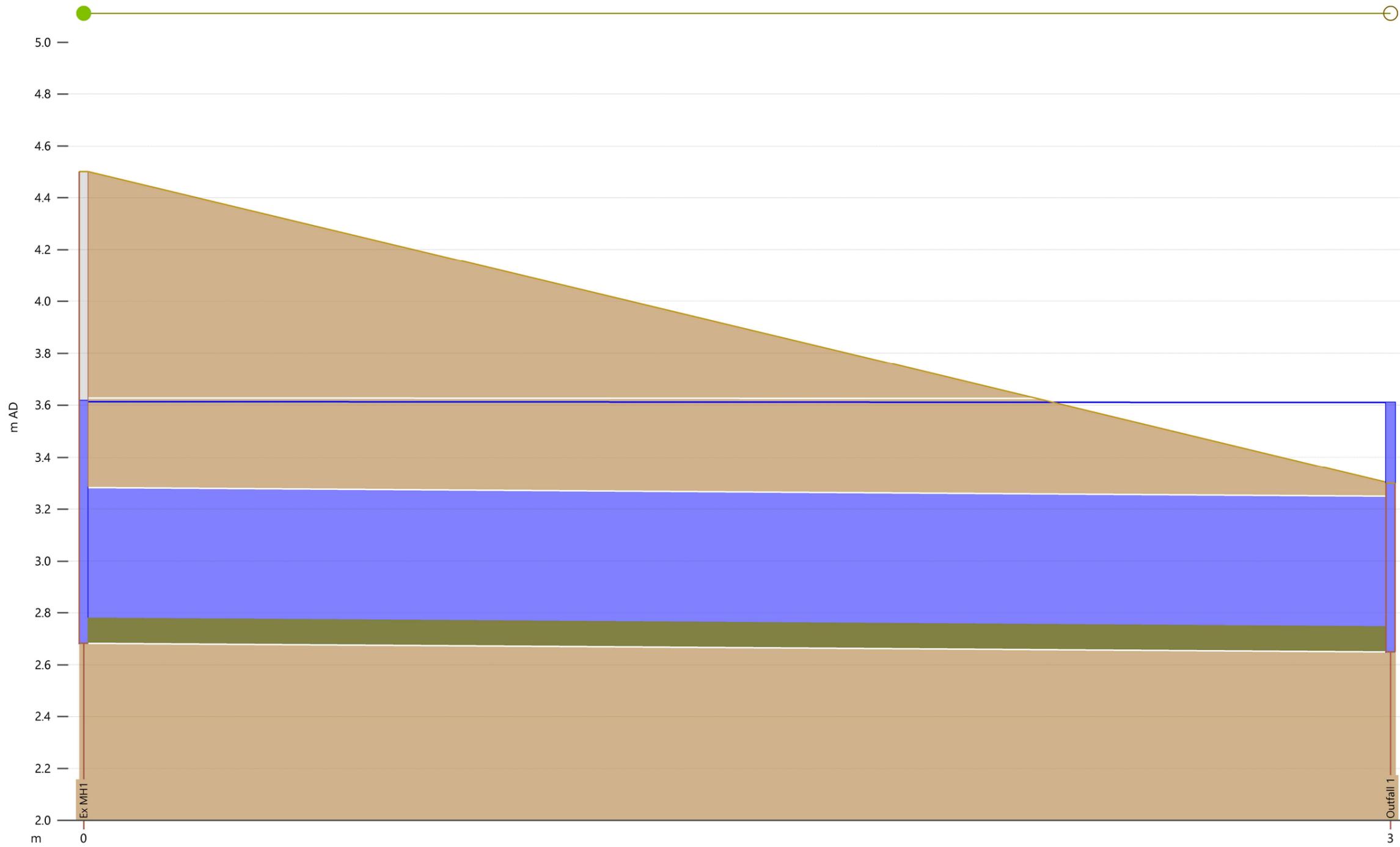
Proposed Development Scenario: Water Levels & Freeboard

| Location | Proposed Ground Level at Upstream Manhole (mPD) | Maximum Water Level at Upstream Manhole 1 in 200 years End-21st Century Case A (mPD) | Maximum Water Level at Upstream Manhole 1 in 200 years End-21st Century Case B (mPD) | Freeboard 1 in 200 years End-21st Century Case A (mm) | Freeboard 1 in 200 years End-21st Century Case B (mm) |
|-----------|---|--|--|---|---|
| Outfall 1 | 6.00 | 4.157 | 5.179 | 1843 | 821 |
| Outfall 2 | 6.00 | 4.163 | 5.183 | 1837 | 817 |

APPENDIX F3

Longitudinal Section

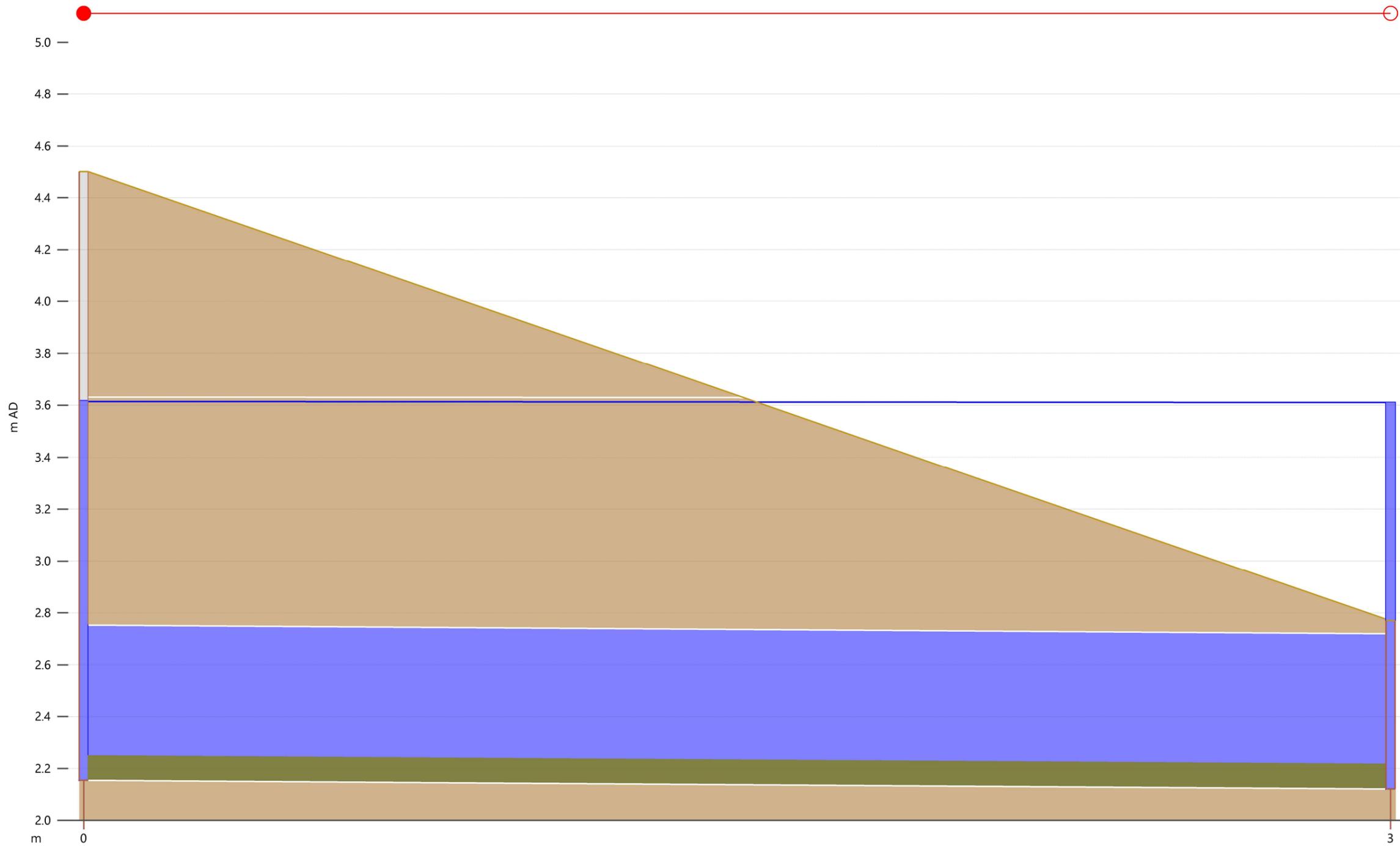
Existing Scenario: 1 in 50 Years Return Period



| | | |
|-------------------|----------|--|
| Link | Ex MH1.1 | |
| width (mm) | 600 | |
| us inv (m AD) | 2.683 | |
| ds inv (m AD) | 2.650 | |
| User text 4 | | |
| r.pfc (m3/s) | 0.473 | |
| surc | 1.00 | |
| US flow (m3/s) | 0.14262 | |
| US velocity (m/s) | 0.533 | |
| DS velocity (m/s) | 0.533 | |
| DS flow (m3/s) | 0.14262 | |

| | | |
|---------------|--------|-----------|
| Node | Ex MH1 | Outfall 1 |
| ground (m AD) | 4.500 | 3.300 |
| level (m AD) | 3.617 | 3.610 |

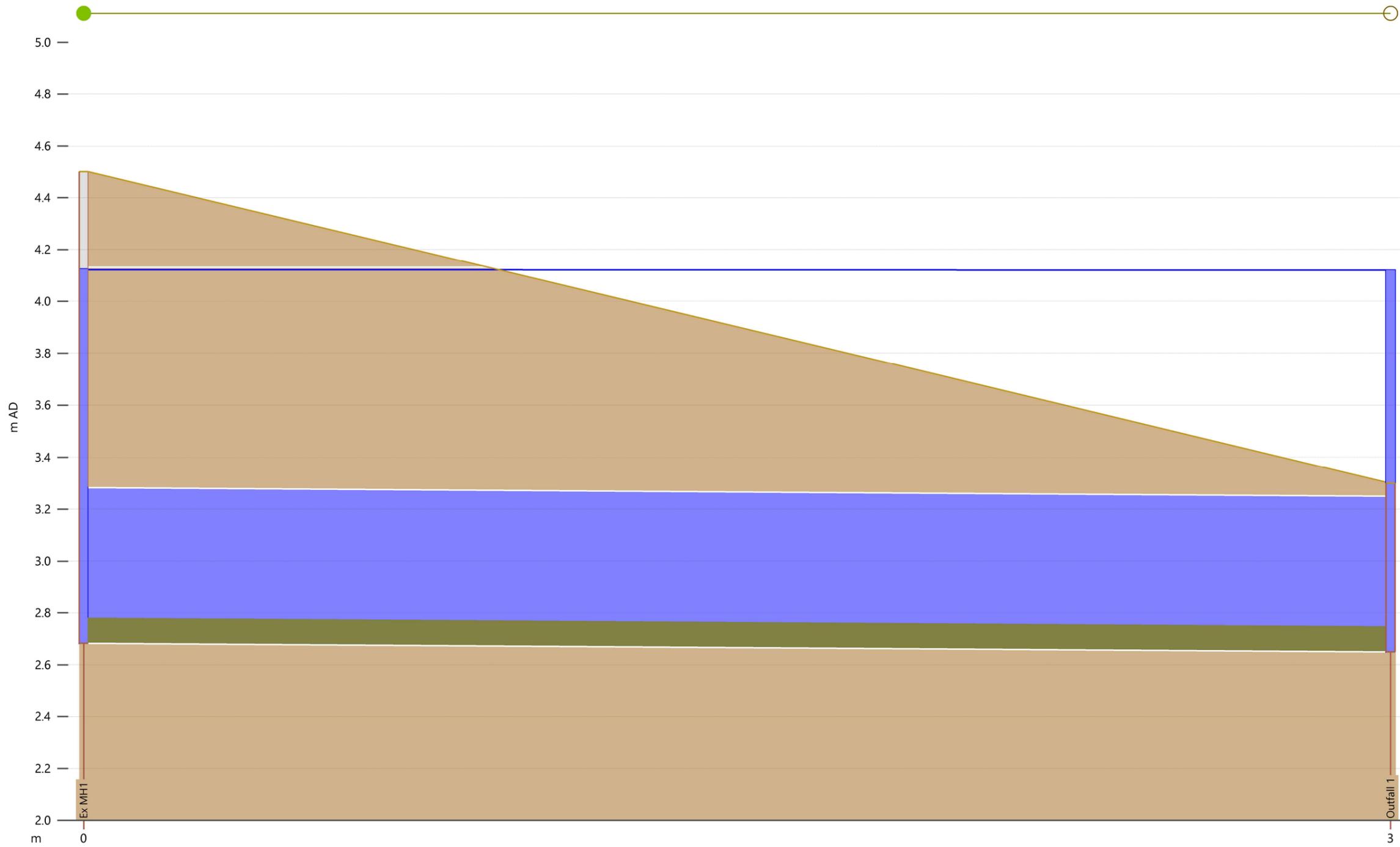
Existing Scenario: 50-year Rain + 10-year Sea Level
 Mid 21st Century
 Outfall 1



| | | |
|-------------------|----------|--|
| Link | Ex MH2.1 | |
| width (mm) | 600 | |
| us inv (m AD) | 2.153 | |
| ds inv (m AD) | 2.120 | |
| User text 4 | | |
| r.pfc (m3/s) | 0.473 | |
| surc | 1.00 | |
| US flow (m3/s) | 0.15835 | |
| US velocity (m/s) | 0.579 | |
| DS velocity (m/s) | 0.578 | |
| DS flow (m3/s) | 0.15835 | |

| | | |
|---------------|--------|-----------|
| Node | Ex MH2 | Outfall 2 |
| ground (m AD) | 4.500 | 2.770 |
| level (m AD) | 3.617 | 3.610 |

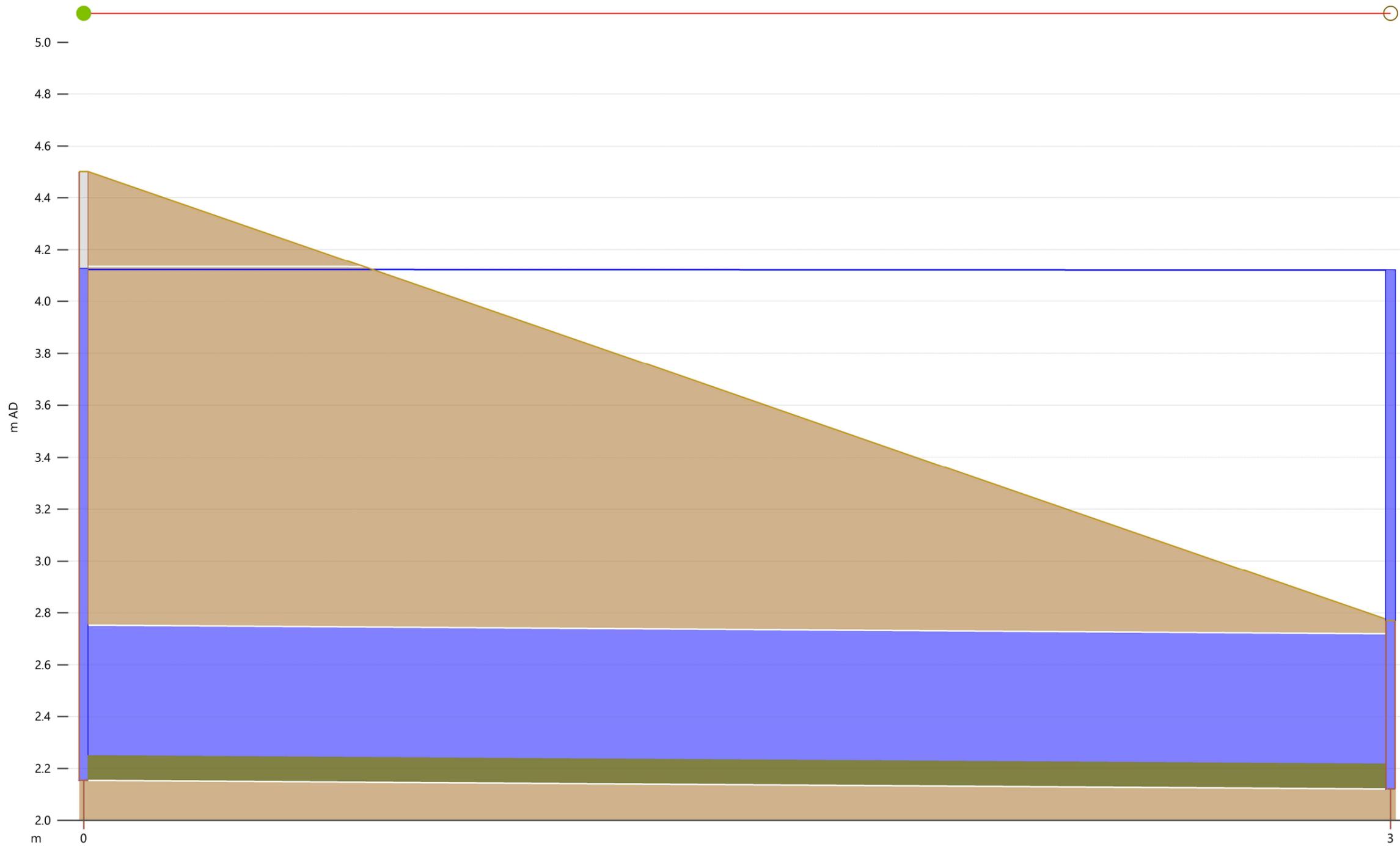
Existing Scenario: 50-year Rain + 10-year Sea Level
 Mid 21st Century
 Outfall 2



| | | |
|-------------------|----------|--|
| Link | Ex MH1.1 | |
| width (mm) | 600 | |
| us inv (m AD) | 2.683 | |
| ds inv (m AD) | 2.650 | |
| User text 4 | | |
| r.pfc (m3/s) | 0.473 | |
| surc | 1.00 | |
| US flow (m3/s) | 0.11956 | |
| US velocity (m/s) | 0.437 | |
| DS velocity (m/s) | 0.437 | |
| DS flow (m3/s) | 0.11956 | |

| | | |
|---------------|--------|-----------|
| Node | Ex MH1 | Outfall 1 |
| ground (m AD) | 4.500 | 3.300 |
| level (m AD) | 4.124 | 4.120 |

Existing Scenario: 10-year Rain + 50-year Sea Level
 Mid 21st Century
 Outfall 1



| | | |
|-------------------|----------|--|
| Link | Ex MH2.1 | |
| width (mm) | 600 | |
| us inv (m AD) | 2.153 | |
| ds inv (m AD) | 2.120 | |
| User text 4 | | |
| r.pfc (m3/s) | 0.473 | |
| surc | 1.00 | |
| US flow (m3/s) | 0.13275 | |
| US velocity (m/s) | 0.475 | |
| DS velocity (m/s) | 0.474 | |
| DS flow (m3/s) | 0.13275 | |

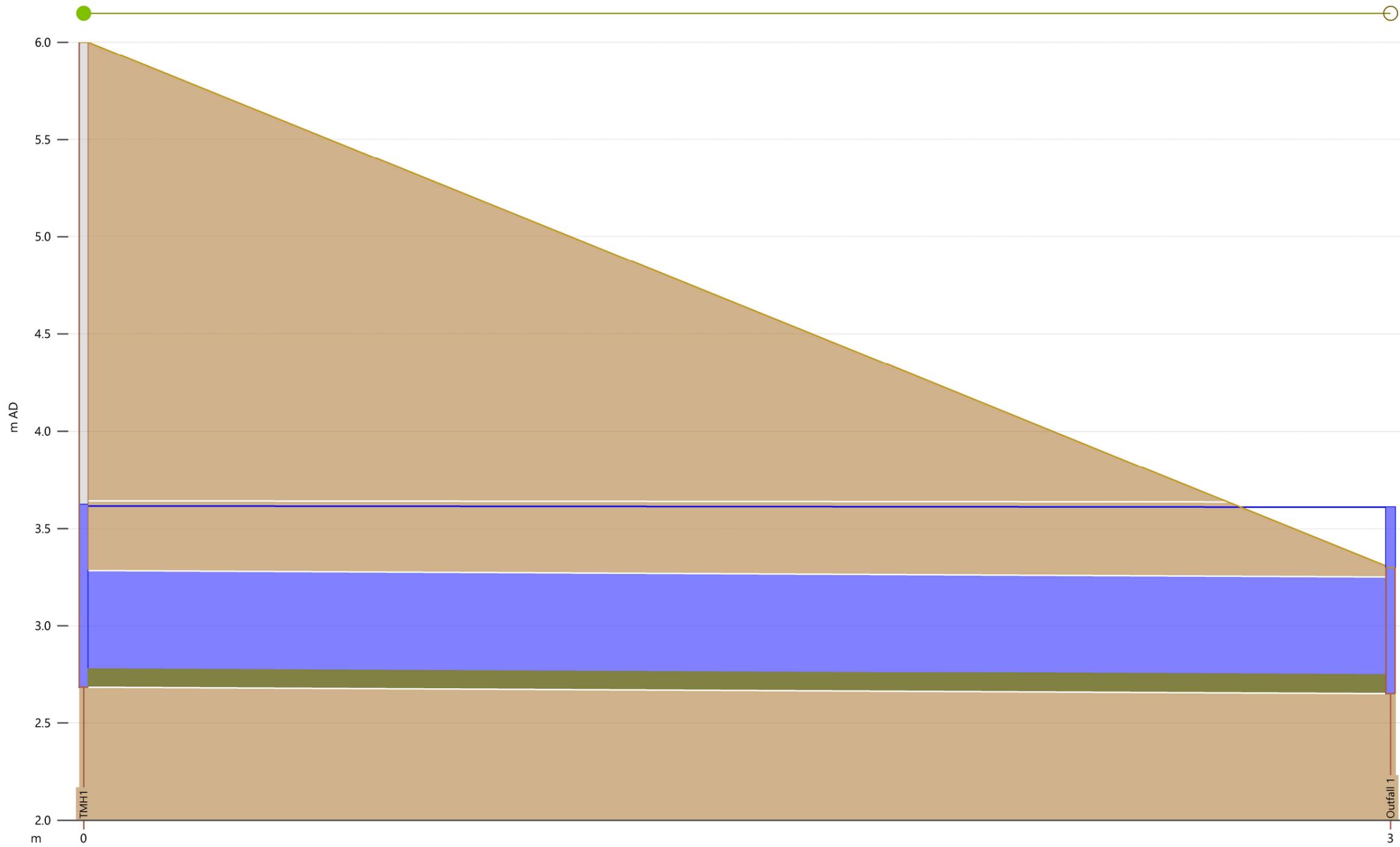
| | | |
|---------------|--------|-----------|
| Node | Ex MH2 | Outfall 2 |
| ground (m AD) | 4.500 | 2.770 |
| level (m AD) | 4.125 | 4.120 |

Existing Scenario: 10-year Rain + 50-year Sea Level
 Mid 21st Century
 Outfall 2

APPENDIX F4

Longitudinal Section

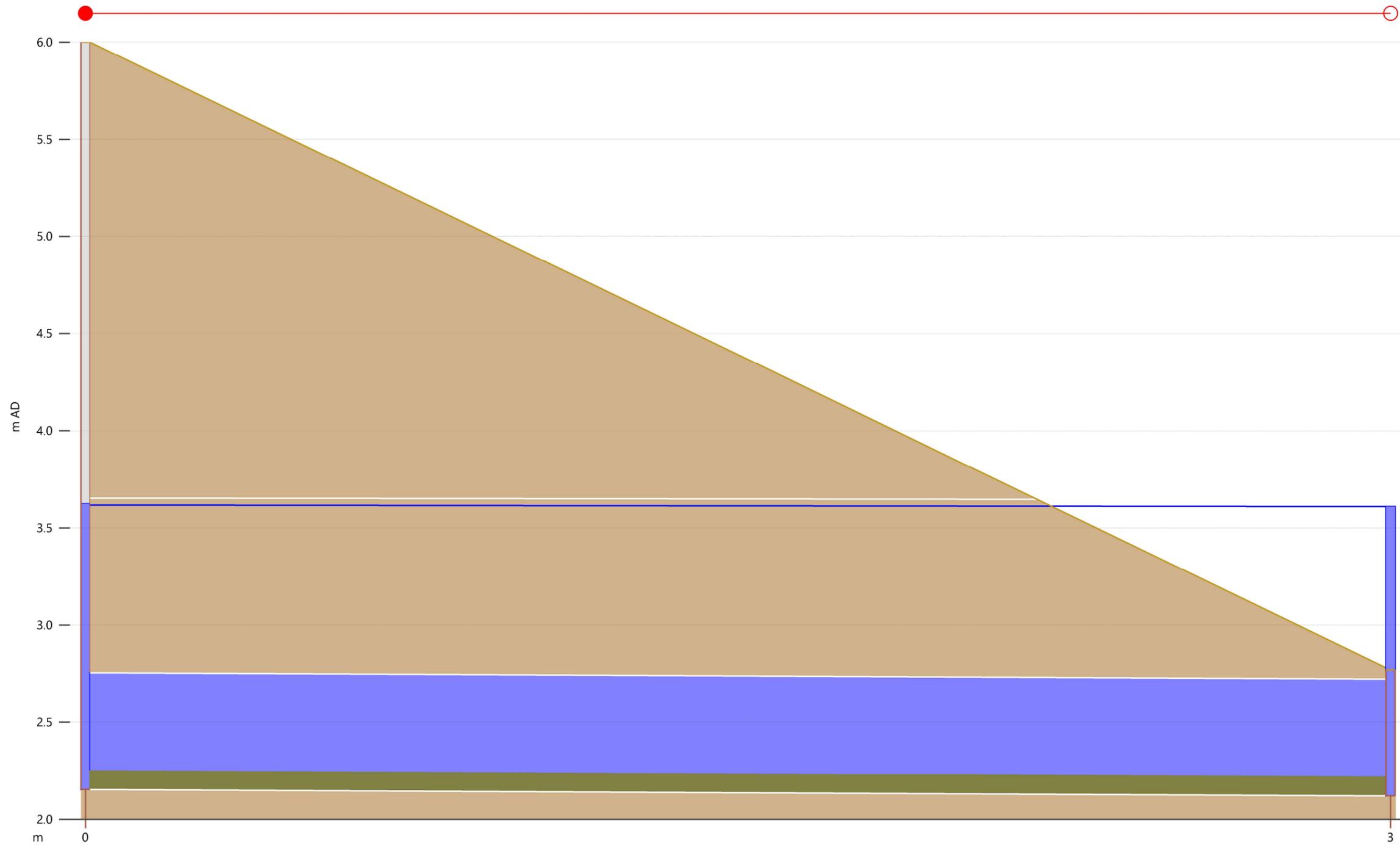
Proposed Development Scenario: 1 in 50 Years Return Period



| | | | |
|-------------------|--|---------|--|
| Link | | TMH1.1 | |
| width (mm) | | 600 | |
| us inv (m AD) | | 2.683 | |
| ds inv (m AD) | | 2.650 | |
| User text 4 | | | |
| r.pfc (m3/s) | | 0.473 | |
| surc | | 1.00 | |
| US flow (m3/s) | | 0.19194 | |
| US velocity (m/s) | | 0.718 | |
| DS velocity (m/s) | | 0.717 | |
| DS flow (m3/s) | | 0.19194 | |

| | | | |
|---------------|-------|--|-----------|
| Node | TMH1 | | Outfall 1 |
| ground (m AD) | 6.000 | | 3.300 |
| level (m AD) | 3.623 | | 3.610 |

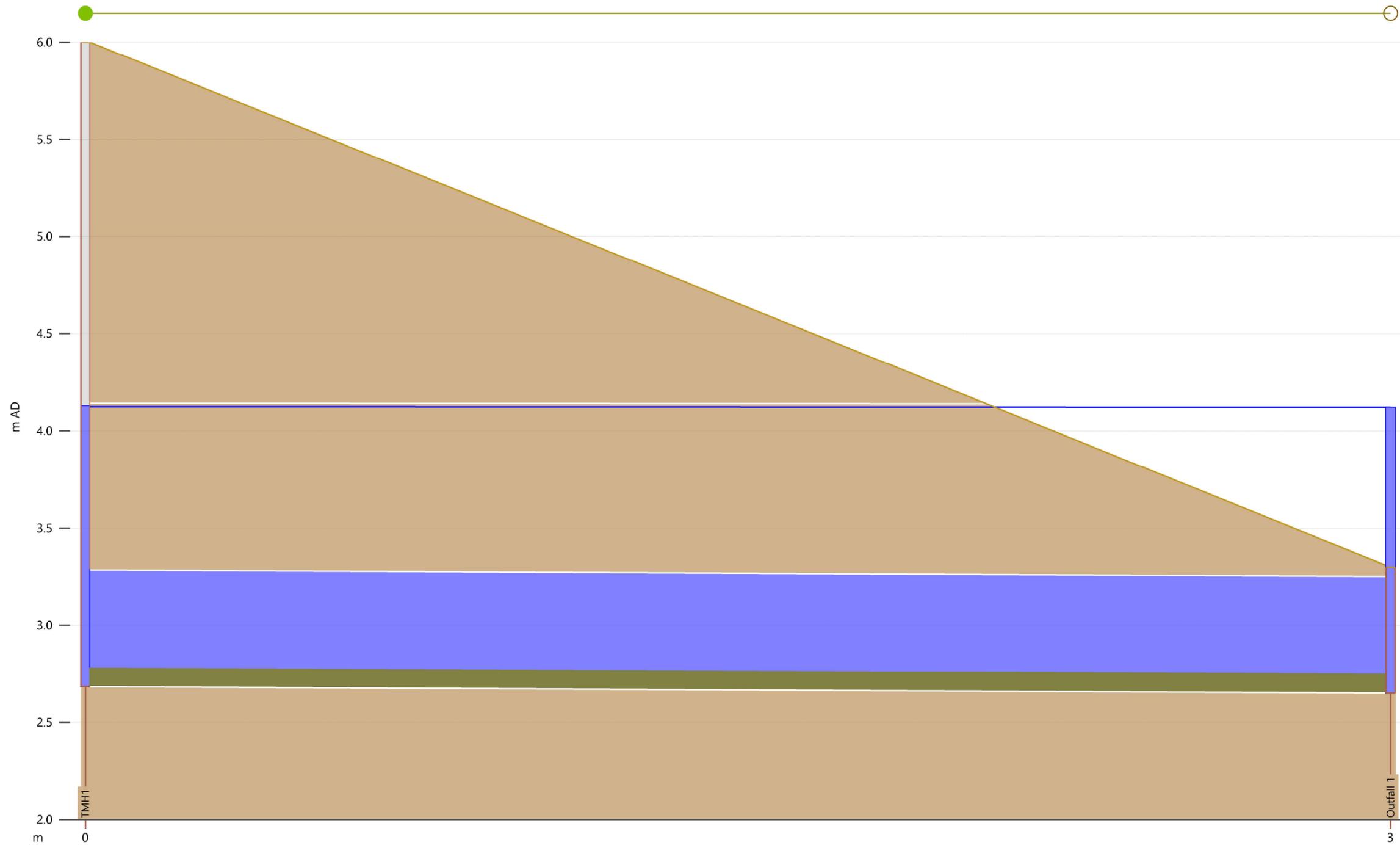
Proposed Development Scenario: 50-year Rain + 10-year Sea Level
 Mid 21st Century
 Outfall 1



| | | |
|-------------------|---------|--|
| Link | TMH2.1 | |
| width (mm) | 600 | |
| us inv (m AD) | 2.153 | |
| ds inv (m AD) | 2.120 | |
| User text 4 | | |
| r.pfc (m3/s) | 0.473 | |
| surc | 1.00 | |
| US flow (m3/s) | 0.22912 | |
| US velocity (m/s) | 0.837 | |
| DS velocity (m/s) | 0.836 | |
| DS flow (m3/s) | 0.22912 | |

| | | |
|---------------|-------|-----------|
| Node | TMH2 | Outfall 2 |
| ground (m AD) | 6.000 | 2.770 |
| level (m AD) | 3.624 | 3.610 |

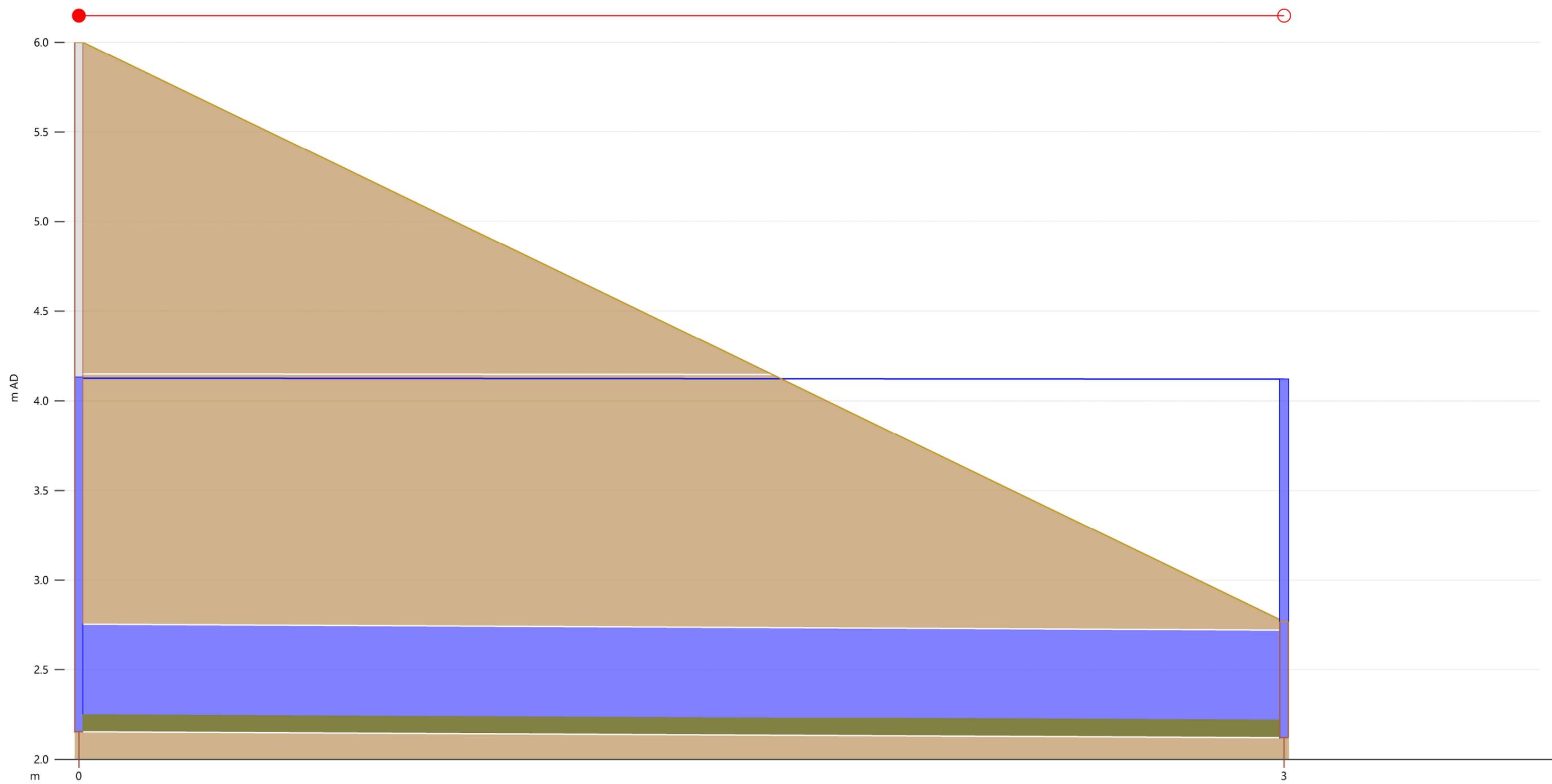
Proposed Development Scenario: 50-year Rain + 10-year Sea Level
 Mid 21st Century
 Outfall 2



| | | | |
|-------------------|--|---------|--|
| Link | | TMH1.1 | |
| width (mm) | | 600 | |
| us inv (m AD) | | 2.683 | |
| ds inv (m AD) | | 2.650 | |
| User text 4 | | | |
| r.pfc (m3/s) | | 0.473 | |
| surc | | 1.00 | |
| US flow (m3/s) | | 0.16091 | |
| US velocity (m/s) | | 0.589 | |
| DS velocity (m/s) | | 0.588 | |
| DS flow (m3/s) | | 0.16091 | |

| | | | |
|---------------|-------|--|-----------|
| Node | TMH1 | | Outfall 1 |
| ground (m AD) | 6.000 | | 3.300 |
| level (m AD) | 4.127 | | 4.120 |

Proposed Development Scenario: 10-year Rain + 50-year Sea Level
 Mid 21st Century
 Outfall 1



| | | |
|-------------------|---------|--|
| Link | TMH2.1 | |
| width (mm) | 600 | |
| us inv (m AD) | 2.153 | |
| ds inv (m AD) | 2.120 | |
| User text 4 | | |
| r.pfc (m3/s) | 0.473 | |
| surc | 1.00 | |
| US flow (m3/s) | 0.19208 | |
| US velocity (m/s) | 0.687 | |
| DS velocity (m/s) | 0.686 | |
| DS flow (m3/s) | 0.19208 | |

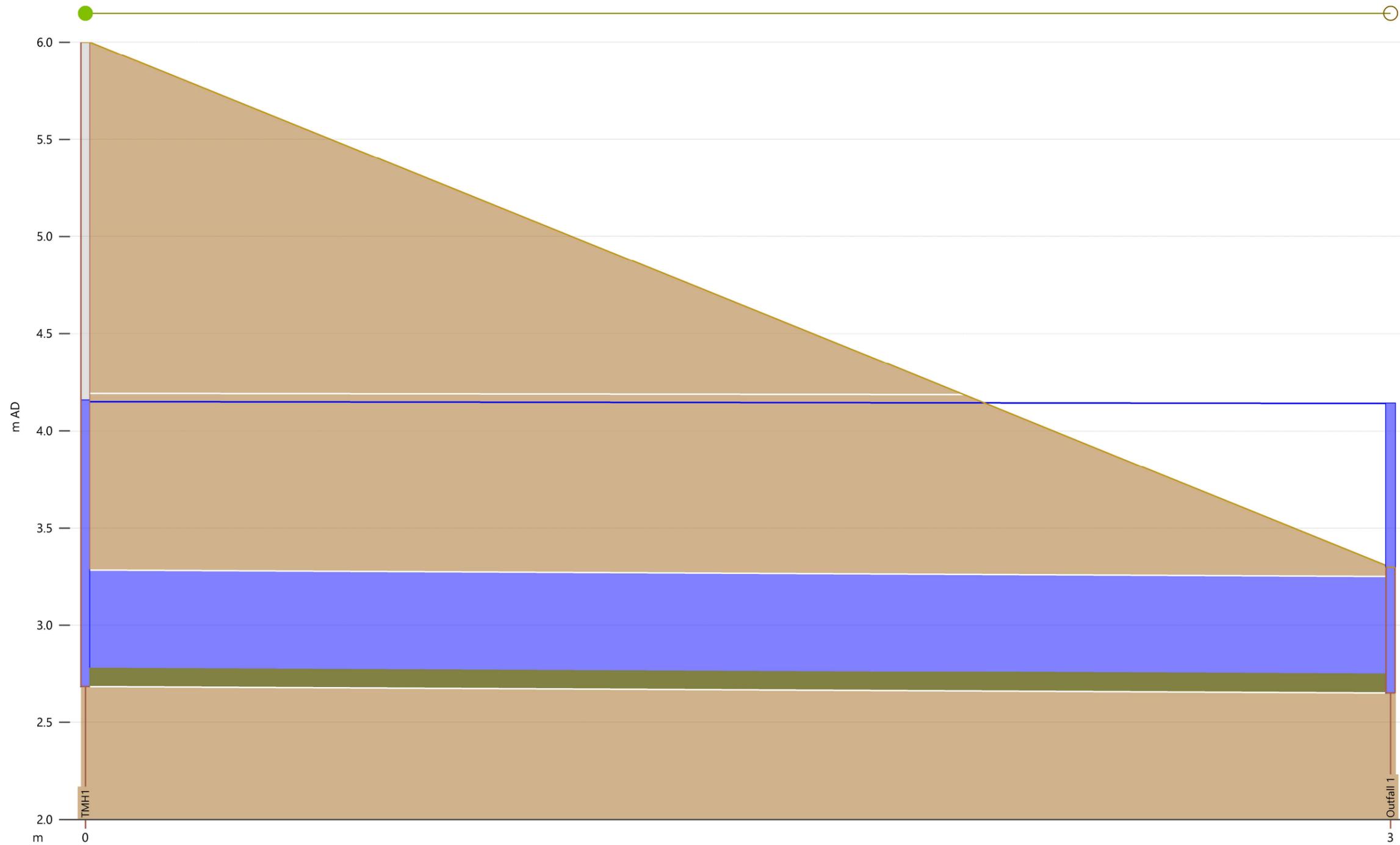
| | | |
|---------------|-------|-----------|
| Node | TMH2 | Outfall 2 |
| ground (m AD) | 6.000 | 2.770 |
| level (m AD) | 4.130 | 4.120 |

Proposed Development Scenario: 10-year Rain + 50-year Sea Level
 Mid 21st Century
 Outfall 2

APPENDIX F5

Longitudinal Section

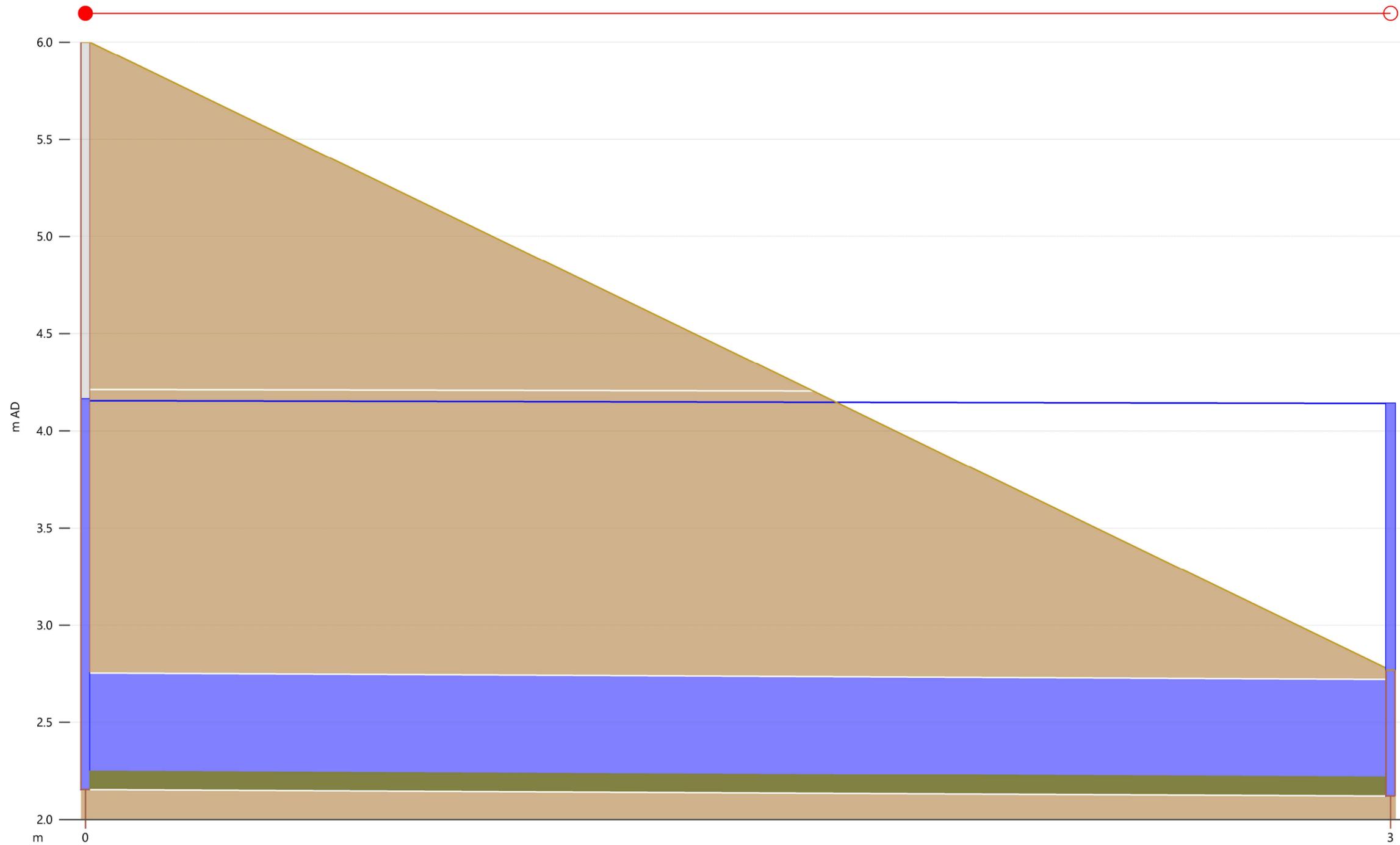
Proposed Development Scenario: 1 in 200 Years Return Period



| | | |
|-------------------|---------|--|
| Link | TMH1.1 | |
| width (mm) | 600 | |
| us inv (m AD) | 2.683 | |
| ds inv (m AD) | 2.650 | |
| User text 4 | | |
| r.pfc (m3/s) | 0.473 | |
| surc | 1.00 | |
| US flow (m3/s) | 0.24891 | |
| US velocity (m/s) | 0.909 | |
| DS velocity (m/s) | 0.908 | |
| DS flow (m3/s) | 0.24891 | |

| | | |
|---------------|-------|-----------|
| Node | TMH1 | Outfall 1 |
| ground (m AD) | 6.000 | 3.300 |
| level (m AD) | 4.157 | 4.140 |

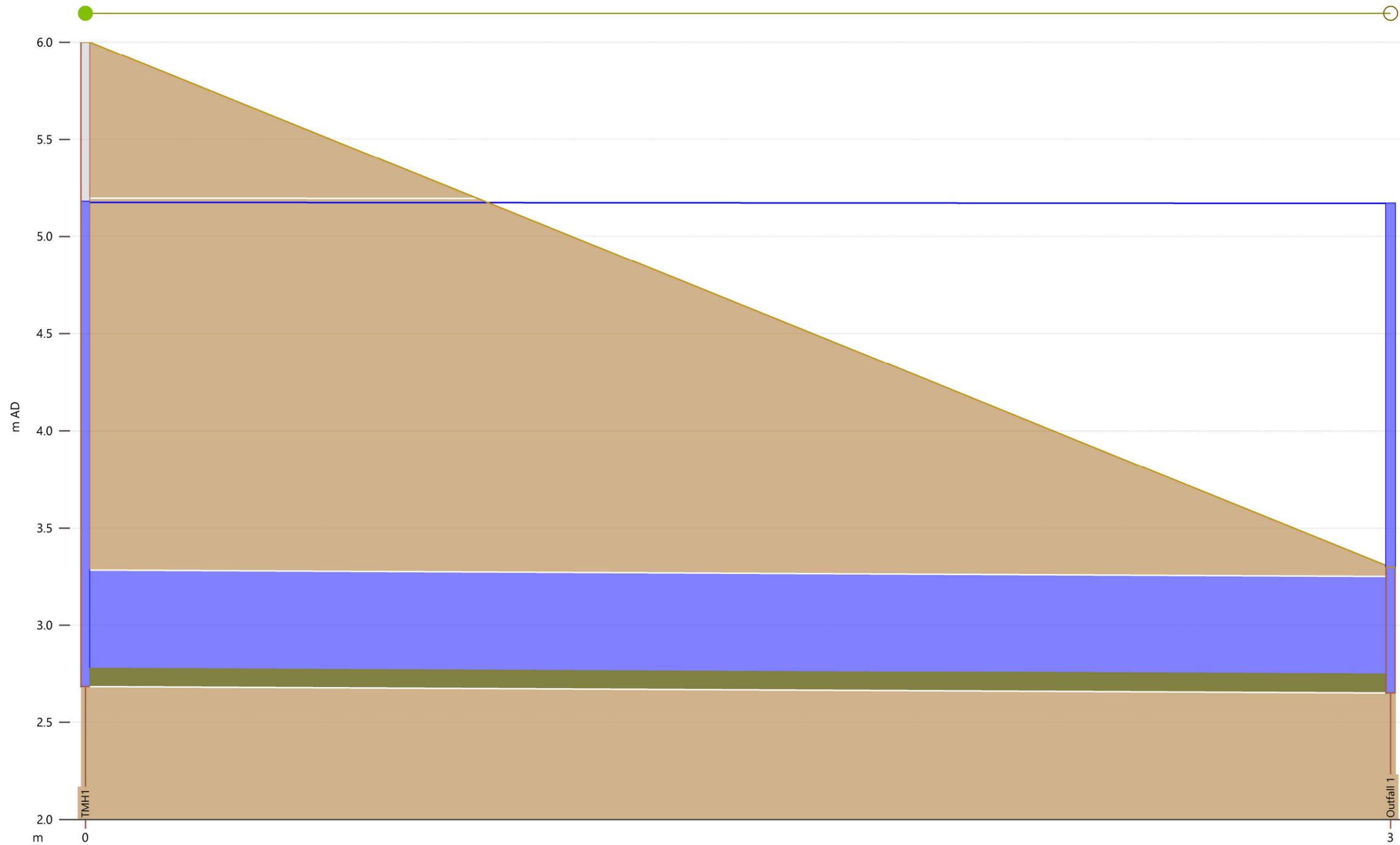
Proposed Development Scenario: 200-year Rain + 10-year Sea Level
 End 21st Century
 Outfall 1



| | | |
|-------------------|---------|--|
| Link | TMH2.1 | |
| width (mm) | 600 | |
| us inv (m AD) | 2.153 | |
| ds inv (m AD) | 2.120 | |
| User text 4 | | |
| r.pfc (m3/s) | 0.473 | |
| surc | 1.00 | |
| US flow (m3/s) | 0.29713 | |
| US velocity (m/s) | 1.061 | |
| DS velocity (m/s) | 1.060 | |
| DS flow (m3/s) | 0.29713 | |

| | | |
|---------------|-------|-----------|
| Node | TMH2 | Outfall 2 |
| ground (m AD) | 6.000 | 2.770 |
| level (m AD) | 4.163 | 4.140 |

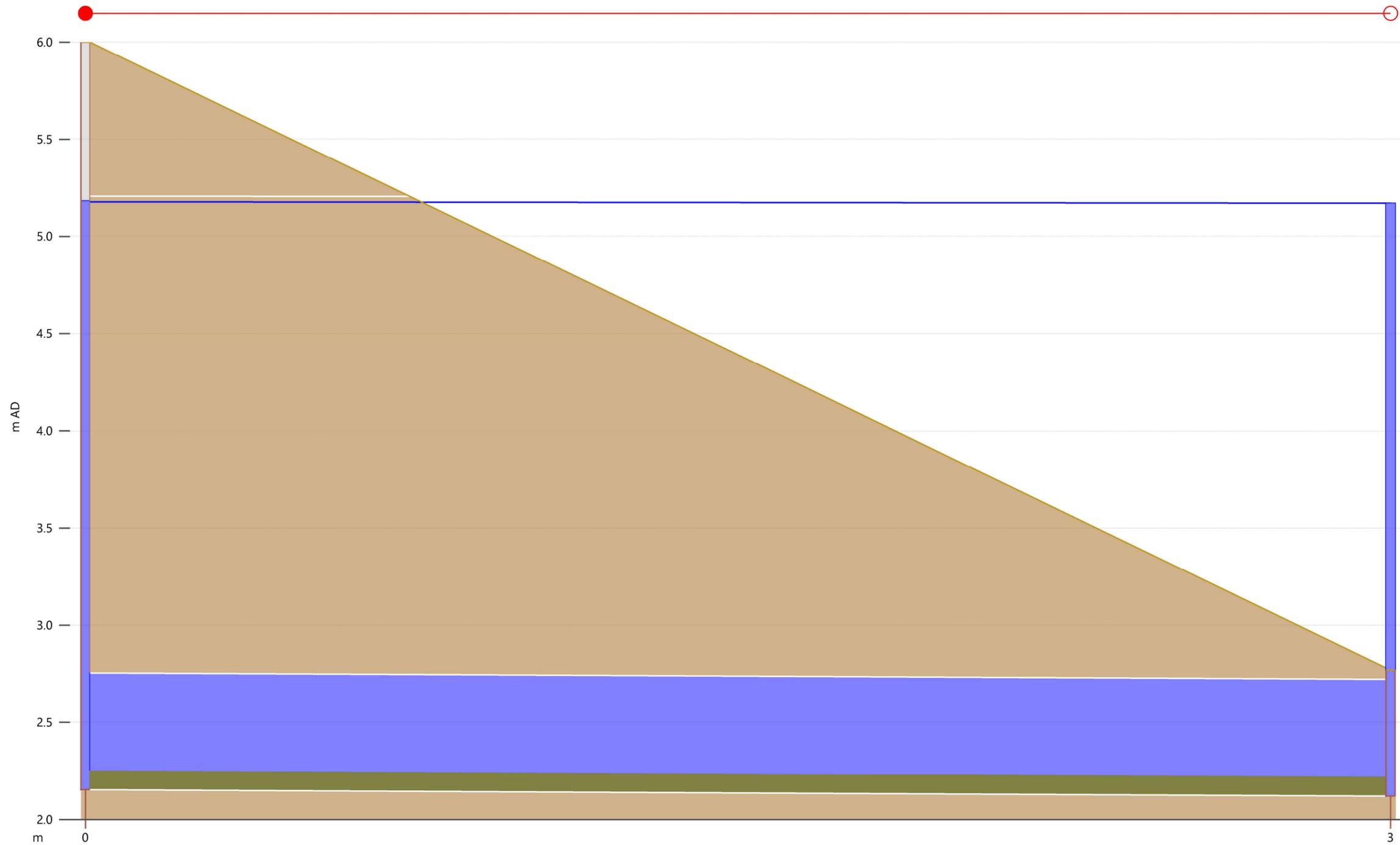
Proposed Development Scenario: 200-year Rain + 10-year Sea Level
 End 21st Century
 Outfall 2



| | | | |
|-------------------|--|---------|--|
| Link | | TMH1.1 | |
| width (mm) | | 600 | |
| us inv (m AD) | | 2.683 | |
| ds inv (m AD) | | 2.650 | |
| User text 4 | | | |
| r.pfc (m3/s) | | 0.473 | |
| surc | | 1.00 | |
| US flow (m3/s) | | 0.18555 | |
| US velocity (m/s) | | 0.649 | |
| DS velocity (m/s) | | 0.648 | |
| DS flow (m3/s) | | 0.18555 | |

| | | | |
|---------------|-------|--|-----------|
| Node | TMH1 | | Outfall 1 |
| ground (m AD) | 6.000 | | 3.300 |
| level (m AD) | 5.179 | | 5.170 |

Proposed Development Scenario: 10-year Rain + 200-year Sea Level
 End 21st Century
 Outfall 1

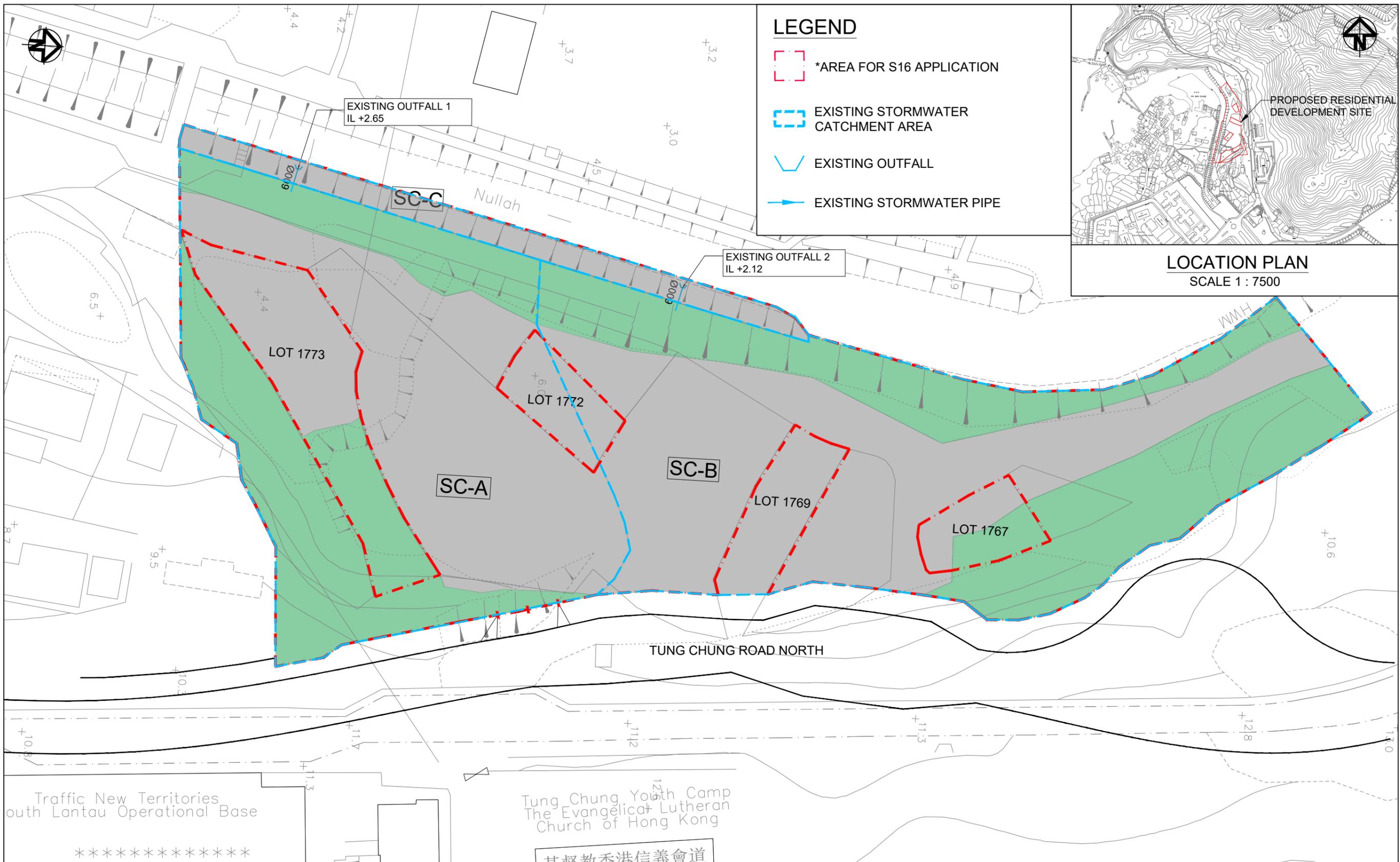


| | | |
|-------------------|---------|--|
| Link | TMH2.1 | |
| width (mm) | 600 | |
| us inv (m AD) | 2.153 | |
| ds inv (m AD) | 2.120 | |
| User text 4 | | |
| r.pfc (m3/s) | 0.473 | |
| surc | 1.00 | |
| US flow (m3/s) | 0.22150 | |
| US velocity (m/s) | 0.758 | |
| DS velocity (m/s) | 0.757 | |
| DS flow (m3/s) | 0.22150 | |

| | | |
|---------------|-------|-----------|
| Node | TMH2 | Outfall 2 |
| ground (m AD) | 6.000 | 2.770 |
| level (m AD) | 5.183 | 5.170 |

Proposed Development Scenario: 10-year Rain + 200-year Sea Level
 End 21st Century
 Outfall 2

DRAWINGS



| Issue | Description | Date |
|-------|-------------|------|
| | | |

Client

FULL FRAME DEVELOPMENT LIMITED

其叔教香港信義會道

| | | | |
|---------------|--|--------------------------|----|
| Status | PRELIMINARY NOT TO BE USED FOR CONSTRUCTION | | |
| Scales | 1 : 500 @ A3 | Current Issue Signatures | |
| Original Size | A3 | Draw | ML |
| Height Datum | HKPD | Checker | FC |
| Grid | | Approver | TK |
| Filename | © Copyright reserved EBK0025XX-DIA-1001.DWG | | |

Project

Proposed Flat with Minor Relaxation of Building Height Restriction at Various Lots in D.D. 3 TC and Adjoining Government Land, Tung Chung Road North, Tung Chung, Lantau Island

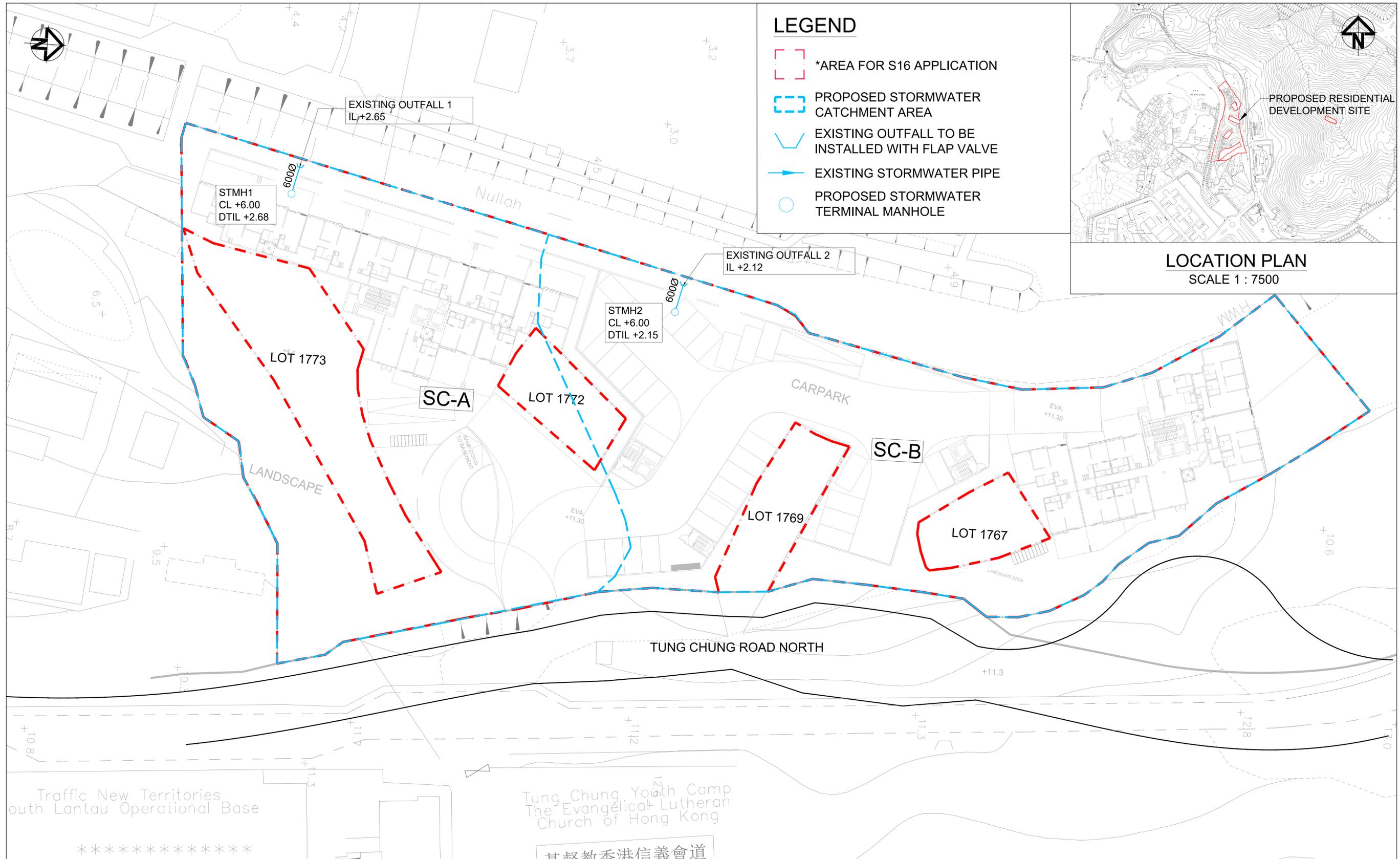
Title

EXISTING DRAINAGE LAYOUT PLAN



Drawing No.

EBK0025XX/DIA/1001



| | | |
|-------|--------------------|------------|
| ***** | | |
| A | PRELIMINARY DESIGN | 28/01/2026 |
| Rev | Description | Date |

Tung Chung Youth Camp
The Evangelical Lutheran Church of Hong Kong
其叔勒香港信義會道

Client
FULL FRAME DEVELOPMENT LIMITED

Status: PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION
Scales: 1 : 500 @ A3
Original Size: A3
Height Datum: HKPD
Grid: © Copyright reserved
Filename: KEB002681-DIA-2001.DWG

Project: Proposed Flat with Minor Relaxation of Building Height Restriction at Various Lots in D.D. 3 TC and Adjoining Government Land, Tung Chung Road North, Tung Chung, Lantau Island
Title: PROPOSED DRAINAGE LAYOUT PLAN



Drawing No: KEB002681/DIA/2001

50mm on Original



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For more details, contact us:

Sherine Chng | Head of Bid Management, Marketing & Communications

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