Annex E

Updated Report of the Drainage Impact Assessment

Lot 4822 in D.D. 104, Kam Pok Road and Adjoining Government Land, Mai Po, Yuen Long

Drainage Impact Assessment

March 2026

Date	Revision	Prepared by	Checked by	Approved by
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MEINHARDT

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1. INTRODUCTION

1.1 Meinhardt Infrastructure & Environmental Ltd (MIEL) has been commissioned to conduct this Drainage Impact Assessment ("DIA") to demonstrate the proposed medium-rise residential development on the Application Site is technically feasible in the drainage aspect.

1.2 The Application Site (hereinafter referred to as "the Site") is located east of Kam Pok Road near Fairview Park in Yuen Long. The Site location is shown in Figure 1 in **Appendix A**.

1.3 The objectives of this DIA are:

- Review the existing drainage conditions of the Application Site based on available information;
- Outline the methodology adopted in this assessment;
- Outline changes to the drainage characteristics and potential drainage impacts which may arise due to the Proposed Development, especially in the respect of the following:
  - Effect on the existing drainage conditions;
  - Susceptibility to flooding of neighboring areas upstream or downstream of the Proposed Development; and
  - Assessing the drainage impact upon completion of the Proposed Development.
- Propose drainage mitigation measures where appropriate to mitigate the potential drainage impact arise from the Proposed Development.

2. GENERAL SITE DESCRIPTION

2.1 The Site is bounded by Fung Chuk Road, Ha Chuk Yuen Road, Kam Pok Road and Ha San Wai Road with an area of about 37,870m^2. It locates in the vicinity of Fairview Park, Villa Camellia, Helene Terrace, 3-storey village dwellings in Ha San Wai and Light Public Housing at Yau Pok Road.

2.2 The existing topography of the Site is sloping gently from the north towards the south with ground level varies from +7.0mPD to +4.3mPD approximately.

3. DEVELOPMENT PROPOSAL

3.1 The Proposed Development comprises five medium-rise residential buildings with a domestic plot ratio of 1.5, and one 2-storey facility compound containing one club house, one 6-classroom kindergarten and an elderly activity centre. The building heights of these 5 residential towers are 16 residential storeys high. The total domestic GFA is about 56,805m^2. Upon completion in 2031, the Proposed Development will provide a total of 1,303 private high-quality flats.

3.2 The Proposed Development also includes a two-storey facility compound comprising a clubhouse (about 2,272m^2 exempted non-domestic GFA), which includes a restaurant, an indoor swimming pool and an outdoor swimming pool; one clubhouse, the 6-classroom kindergarten of about 380 m^2 GFA and one elderly activity centre of about 303m^2 in NOFA.

3.3 The proposed master layout plan is shown in Figure 1 in **Appendix A**.

4. EXISTING STORMWATER DRAINAGE SYSTEM OF THE AREA

4.1 The Site is surrounded by existing open channels. A main drainage channel, Ngau Tam Mei Channel (NTMC), is running alongside Kam Pok Road to the west of the Site. Two rectangular channels of 6.0m and 7.2m wide are located to the east and south of the Site along Ha Chuk Yuen Road and Ha San Wai Road respectively. The 6m rectangular channel along Ha Chuk Yuen Road connects to the flood relief pond located at the north of Fung Chuk Road. The stormwater storage in the flood relief pond is then pumped to NTMC by Chuk Yuen Stormwater Pumping Station (CYSPS).

4.2 There are stormwater drains of diameter ranging from 225mm to 750mm along carriageways of Fung Chuk Road, Ha Chuk Yuen Road and Ha San Wai Road to collect surface runoff from road gullies and surface channels for subsequent discharge to the abovementioned open channels.

4.3 There are surface channels with size ranging from 300mm to 600mm at north and north-east of the Site that connect to the stormwater drains along carriageways of Fung Chuk Road and Ha Chuk Yuen Road.

4.4 In addition, there are surface channels with size ranging from 225mm to 375mm at west of the Site for discharging surface runoff to NTMC via 3 nos. of existing 450mm dia. pipe (Outlet 1, 3 & 4) and a 2.5m (H) x 2.1m (W) box culvert (Outlet 2). Flap valves are found installed at all outlets to prevent back flows from NTMC.

4.5 The existing drainage layout plan and catchment plan are shown in Figure 2 in **Appendix B**.

4.6 Based on the existing topography, the flow from the catchment area at southern side of site has been collected via 450mm and 850mm u-channel along the site boundary and conveyed to the existing box culvert. The hydraulic calculation is enclosed in **Appendix F**.

5. PROPOSED STORMWATER DRAINAGE SYSTEM OF THE AREA

5.1 The existing connecting drains that connect between the Site and the public drainage system and Outlets 1, 2, 3 and 4 will be retained to convey the surface runoff from the proposed residential development. However, the existing surface channels are proposed to be demolished to suit the proposed residential development.

5.2 It is proposed that the surface runoff from the proposed residential development will be conveyed by the proposed internal drains within the site boundary and be discharged to the abovementioned connecting drains and Outlets. The delineation of catchments for the proposed residential development is presented in Figure 3 in **Appendix C**.

5.3 In order to match the formation level of the subject development, the existing uncovered wing wall structure at upstream of the existing box culvert within the site will be demolished and decked over. The proposed decking over the existing box culvert wing wall structure will be designed to allow future maintenance access via removable/inspectable panels. Detailed design stage will provide specifications for maintenance access points and methodology.

5.4 The internal drains will be designed and assessed in the detailed design stage while the capacities of the connecting drains and Outlets have been assessed and discussed in section 7.

6. DESIGN CRITERIA, ASSUMPTIONS AND METHODOLOGY OF DRAINAGE IMPACT ASSESSMENT

Design Standards

6.1 The following design manual(s) have been used in this drainage impact assessment:

- Stormwater Drainage Manual (SDM) 5th Edition published by Drainage Services Department (DSD)
- Stormwater Drainage Manual Corrigendum No. 1/2022 published by Drainage Services Department (DSD)
- Stormwater Drainage Manual Corrigendum No. 1/2024 published by Drainage Services Department (DSD)
- Advice Note No.1 – Application of the Drainage Impact Assessment Process to Private Sector Projects published by Drainage Services Department (DSD)

Flood Protection Level

6.2 The Proposed Development is located at a suburb area currently. It is noted that there are various developments in the vicinity of the Site. As such, it is anticipated that the area surrounded the Site will change to an urban area. Therefore, the flood protection levels adopted in this assessment are as follows:

- 1 in 50-year return period flood protection level for branch drainage system
- 1 in 200-year return period flood protection level for trunk drainage system

Rainfall Intensity

6.3 The rainfall profile adopted in this assessment are formulated by the following equations as stipulated in section 4.3.3 of SDM.

$$i = \frac{a}{(t_d + b)^c}$$

where i = extreme mean intensity in mm/hr
t_d = rainstorm duration (in minutes)
a, b, c = storm constants

6.4 The storm constants are referenced to **Table 6.1** which is duplicated from Table 3a in SDM Corrigendum No.1/2024.

Table 6.1 Storm Constants of HKO Headquarters

Return Period	a	b	c
50	505.5	3.29	0.355
200	508.8	3.46	0.322

6.5 The rainfall intensity should be multiplied by a factor of 1.16 for the climate change effect up to end-21st century and a factor of 1.121 for design allowance.

Runoff Coefficient

6.6 Rational Method is adopted for estimation of surface runoff for the Site. The runoff coefficients used are shown in below **Table 6.2**.

Table 6.2 Storm Constants of HKO Headquarters

Surface Characteristics	Runoff Coefficient, C
Paved Area	0.95
Unpaved Area	0.30

Sediment Depth

6.7 5% sediment depth is applied for the pipe gradient greater than 1 in 25 and 10% sediment depth is applied for the pipe gradient equal and less than 1 in 25.

Hydraulic Analysis

6.8 Colebrook-White Equation is adopted for the hydraulic analyses.

Roughness Coefficient

6.9 A roughness coefficient k_s=3mm is adopted for the Colebrook-White Equation.

Gradient

6.10 The gradient of drains is calculated based on the available information. For those drains without sufficient information to determine the gradient, 1 in 150 is assumed in this assessment.

7. DRAINAGE IMPACT ASSESSMENT

Change in Catchment Characteristics

7.1 The proposed residential development will change the catchment characteristics within the site boundary. The summary of changes is presented in below **Table 7.1**.

Table 7.1 Change in Catchment Characteristics

	Paved Area (m^2)	Unpaved Area (m^2)	Total Area within the Site Boundary (m^2)
Pre-Development	24,085	13,785	37,870
Post-Development	22,670	15,200	37,870

Change in Surface Runoff

7.2 The amount of surface runoff in the post-development condition is different from the pre-development condition due to the change in catchment characteristics. The surface runoff under 1 in 50-year return period and 1 in 200-year return period flood protection level are presented in below **Table 7.2**. Detailed calculations are shown in **Appendix D**.

Table 7.2 Change in Surface Runoff

Site Condition	Rainfall Intensity (1 in 50-year return period) (mm/hr)	Surface Runoff (1 in 50-year return period) (m^3/s)	Rainfall Intensity (1 in 200-year return period) (mm/hr)	Surface Runoff (1 in 200-year return period) (m^3/s)
Pre-Development	200.74	1.508	225.17	1.691
Post-Development	200.74	1.508	225.17	1.634

Drainage Impact Assessment

7.3 The hydraulic impact from the southern external catchment has been evaluated under existing conditions. Calculations in **Appendix F** demonstrate that the existing drainage characteristics effectively mitigate potential flooding from external sources, ensuring the proposed development remains free from adverse drainage impact.

7.4 It is noted that the total amount of surface runoff in post-development condition is less than that in pre-development due to the increase in unpaved area. As such, there will be no adverse drainage impacts to the existing drainage system including NTMC.

7.5 The capacities of the connecting drains and Outlets have been assessed. The results show that all of them have sufficient capacities to convey the surface runoff from the proposed residential development. The summaries of the results are presented in **Tables 7.3** and **7.4** and detail calculations are shown in **Appendix D**.

Table 7.3 Summary of Surface Runoff to Existing Drainage System for Pre-Development Condition

Discharge Point	Drain Size (mm)	Gradient	Return Period (1 in X yr)	Peak Surface Runoff (m^3/s)	Capacity (m^3/s)	Spare Capacity (m^3/s)	Full Bore Velocity (m/s)
Outlet 1	450	1 in 150	50	0.013	0.181	0.167	1.263
Outlet 2	2.1(W) x 2.5(H)	1 in 500	200	1.440	8.220	6.780	1.740
Outlet 3	450	1 in 150	50	0.025	0.181	0.156	1.265
Outlet 4	450	1 in 150	50	0.041	0.181	0.140	1.264
SMH1038285	600	1 in 50	50	0.032	0.665	0.633	2.612
SMH1038283	600	1 in 13	50	0.028	1.423	1.395	5.297
SMH1038240	600	1 in 55	50	0.016	0.636	0.620	2.499
SCH1019340	450	1 in 10	50	0.011	0.756	0.745	5.007

Table 7.4 Summary of Surface Runoff to Existing Drainage System for Post-Development Condition

Discharge Point	Drain Size (mm)	Gradient	Return Period (1 in X yr)	Peak Surface Runoff (m^3/s)	Capacity (m^3/s)	Spare Capacity (m^3/s)	Full Bore Velocity (m/s)
Outlet 1	450	1 in 150	50	0.068	0.181	0.123	1.263
Outlet 2	2.1(W) x 2.5(H)	1 in 500	200	1.345	8.220	6.875	1.740
Outlet 3	450	1 in 150	50	0.032	0.181	0.149	1.265
Outlet 4	450	1 in 150	50	0.016	0.181	0.165	1.264
SMH1038285	600	1 in 50	50	0.037	0.665	0.628	2.612
SMH1038283	600	1 in 13	50	0.068	1.423	1.355	5.297
SMH1038240	600	1 in 55	50	0.073	0.636	0.562	2.499
SCH1019340	450	1 in 10	50	0.015	0.756	0.742	5.007

8. MAINTENANCE RESPONSIBILITY

8.1 During the construction phase, the Applicant will be responsible for the maintenance of all existing surface channels, internal drainage system within the boundary of the Site, while the existing outlet pipes outside the Site boundary/ box culvert shall be maintained by Drainage Services Department (DSD).

8.2 Upon the completion of construction, no additional drainage outlet will be resulted and the Applicant will be responsible for the maintenance of proposed surface channels and internal drainage system, including the proposed sand trap within the Site boundary.

8.3 The maintenance responsibility of all drainage facilities outside the Site will remain unchanged.

9. CONCLUSION

9.1 This report has assessed the drainage impact due to the proposed development of Lot 4822 in D.D. 104 and adjoining government land, Kam Pok Road, Mai Po, Yuen Long.

9.2 The surface runoff to be collected from the proposed development will be conveyed by the proposed internal drainage system, which will be designed in detailed design stage, and then be discharged to the connecting drains between the Site and public drainage system.

9.3 Based on the assessment results, the surface runoff in post-development status is less than that of the pre-development status. As such, it is anticipated that there is no adverse drainage impact to the existing drainage system due to the proposed residential development.

9.4 The connecting drains are also assessed and the results show that all connecting drains have sufficient capacities to cater the surface runoff from the Site.

APPENDIX A –

SITE LOCATION AND MASTER LAYOUT PLAN

PLOTTED BY : $USER$

823200 E
823400 E
823600 E
823800 E
837500 N
837300 N
837100 N

FAIRVIEW PARK
YAU POK ROAD LIGHT PUBLIC HOUSING
CHUK YUEN TSUEN
HA SAN WAI
KAM POK ROAD
FUNG CHUK ROAD
HA CHUK YUEN ROAD
SAN TIN HIGHWAY
YAU POK ROAD
NGAU TAM MEI CHANNEL
HA SAN WAI ROAD
HELENE TERRACE
VILLA CAMELLIA

T6
T5
T3
T2
T1
TX ROOM & MAIN SWITCH ROOM
SEWAGE PUMPING STATION
KINDERGARTEN & ELDERLY ACTIVITY CENTRE
OUTDOOR SWIMMING POOL
CLUBHOUSE

LEGENDS:

APPLICATION SITE

PLOT DRV : $PLTDRVL$

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LOT 4822 IN D.D. 104, KAM POK ROAD AND ADJOINING GOVERNMENT LAND, MAI PO, YUEN LONG

LOCATION PLAN AND PROPOSED MASTER LAYOUT PLAN

FIGURE 1

Scale 1 : 1250(A1)

CAD FILE : $FILE$

PLOT DATE & TIME : $DATE$ $TIME$

APPENDIX B –

EXISTING DRAINAGE LAYOUT PLAN

PLOTTED BY : $USER$

837100 N
837200 N
837300 N
823400 E
823500 E

KAM POK ROAD
KAM POK ROAD

OUTLET 1
450ø
BOX CULVERT
2.5m(H)x2.1m(W)
NGAU TAM MEI CHANNEL
OUTLET 2
OUTLET 3
450ø
OUTLET 4
450ø

AREA A1: 518m2
225U
225U
225U
AREA A2: 835m2
225U
AREA A3: 744m2
225U
AREA A4: 1034m2
225U
AREA A5: 1749m2
375U
225U
600U
AREA A6: 1243m2
600U
600U
AREA A7: 1031m2
600U

EXISTING WING WALL

AREA A10: 29756m2

SMH1038285
SMH1038283

SCH1019340
AREA A9: 374m2
300U
450U
300U
450U
600U
450U
AREA A8: 586m2
450U

HA CHUK YUEN ROAD
SMH1038220
SMH1038240

FUNG CHUK ROAD

LEGENDS:
- APPLICATION SITE
- EXISTING U-CHANNEL
- EXISTING STEP CHANNEL
- EXISTING STORM DRAIN
- EXISTING CATCHPIT
- EXISTING OUTLET
- EXISTING MANHOLE
- PAVED AREA (24085m²)
- UNPAVED AREA (13785m²)

PLOT DRV : $PLTDRVL$

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LOT 4822 IN D.D. 104, KAM POK ROAD AND ADJOINING GOVERNMENT LAND, MAI PO, YUEN LONG

EXISTING DRAINAGE LAYOUT PLAN

FIGURE 2

Scale 1 : 500 (A1)

CAD FILE : $FILE$

PLOT DATE & TIME : $DATE$ $TIME$

APPENDIX C –

PROPOSED DRAINAGE LAYOUT PLAN

PLOTTED BY : caseymon

837100 N
837200 N
837300 N
823400 E
823500 E

KAM POK ROAD
KAM POK ROAD
Nullah
單車徑 Cycling Track
攸學路
錦學路
下荔圍路
FUNG CHUK ROAD
HA CHUK YUEN ROAD
Open Storage & Garage 露天貨倉及車房
泥路
Ramp
Track
WIP Feb 2024

OUTLET 1
450ø
BOX CULVERT
2.5m(H)x2.1m(W)
NGAU TAM MEI CHANNEL
排水口 Outfall
OUTLET 2
OUTLET 3
OUTLET 4
450ø
450ø

AREA A1= 3110m²
AREA A2= 1365m²
AREA A3= 630m²
AREA A4
= 740m²
AREA A5
= 875m²
AREA A6= 1470m²
AREA A7
= 515m²
AREA A8= 29165m²
AREA B1
= 935m²
AREA B2
= 775m²

T1
T2
T3
T5
T6
OUTDOOR
SWIMMIMNG POOL
CLUBHOUSE
KINDERGARTEN &
ELDERLY
ACTIVTIY CENTRE

SMH1038285
SMH1038283
SCH1019340
SMH1038220
SMH1038240

600U
600U
300U
300U
600U
450U

LEGENDS:

- APPLICATION SITE
- EXISTING U-CHANNEL
- EXISTING STORM DRAIN
- EXISTING CATCHPIT
- EXISTING OUTLET
- EXISTING MANHOLE
- PAVED AREA (22670m²)
- UNPAVED AREA (15200m²)
- CATCHMENT

LOT 4822 IN D.D. 104, KAM POK ROAD AND ADJOINING GOVERNMENT LAND, MAI PO, YUEN LONG

PLOT DRV : K:_STANDARD\MICROSTATION\Plot\MIEL_A1_COL.PLT

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LOT 4822 IN D.D. 104, KAM POK ROAD AND ADJOINING GOVERNMENT LAND, MAI PO, YUEN LONG

PROPOSED DRAINAGE LAYOUT PLAN

FIGURE 3

Scale 1 : 500 (A1)

CAD FILE : A:\Projects Current\CIVIL\91469 Kam Pok Road Proposed Low Rise and Low Density Residential Development (DIA, SIA)\S12A Application\DIA\Rev C\20251208\Drawings\91469_DIA_Figure_3.dgn

PLOT DATE & TIME : 8/12/2025 4:25:15 pm

APPENDIX D –

DETAILED CALCULATIONS FOR DRAINGE IMPACT ASSESSMENT

91469 - Lot 4822 in D.D. 104, Kam Pok Road and Adjoining Government Land, Mai Po, Yuen Long - Drainage Impact Assessment (Discharge Points Assessment) (1 in 50-year return period)(Pre-Development)

US	DS	Catchment Area						Channel character								Hydraulic parameter		Time of Concentration	i	Peak	Full bore	Full bore	Q_{check}
		Paved Area		Unpaved Area		Total		channel shape	No. of pipes	pipe size			invert level		channel	ks (mm)	3.0000						
		Sub-catchment (m^2)	Accumulative Area (m^2)	Sub-catchment (m^2)	Accumulative Area (m^2)	Sub-catchment (m^2)	Accumulative Area (m^2)			width (mm)	height (mm)	length (m)	US (mPD)	DS (mPD)	slope	cross area (m^2)	Wetted Perimeter (m)	t_c (min)	**50** yr (mm/h)	Runoff (m^3/s)	Capacity (m^3/s)	Velocity (m/s)	(capacity - peak runoff) (m^3/s)
Catchment A1	Outlet 1	0	0	518	518	518	518	CC	1	450	450	19.1	2.620	2.493	0.007	0.143	1.375	5.05	309.55	0.013	0.181	1.263	0.167
Catchment A4	Outlet 3	0	0	1,034	1,034	1,034	1,034	CC	1	450	450	25.7	2.150	1.978	0.007	0.143	1.375	6.33	294.33	0.025	0.181	1.265	0.156
Catchment A5	Outlet 4	0	0	1,749	1,749	1,749	1,749	CC	1	450	450	36.4	1.350	1.107	0.007	0.143	1.375	7.81	279.73	0.041	0.181	1.264	0.140
Catchment A6	SMH1038285	0	0	1,243	1,243	1,243	1,243	CC	1	600	600	10.3	1.250	1.050	0.020	0.254	1.833	5.50	303.91	0.032	0.665	2.612	0.633
Catchment A7	SMH1038283	0	0	1,031	1,031	1,031	1,031	CC	1	600	600	3.9	1.400	1.100	0.076	0.269	1.860	3.88	326.58	0.028	1.423	5.297	1.395
Catchment A8	SMH1038240	0	0	586	586	586	586	CC	1	600	600	5.6	1.780	1.680	0.018	0.254	1.833	4.14	322.52	0.016	0.636	2.499	0.620
Catchment A9	SCH1019340	0	0	374	374	374	374	CC	1	450	450	3.7	2.520	2.150	0.099	0.151	1.395	2.46	353.36	0.011	0.756	5.007	0.745

Notes: Rational Method is adopted for the peak runoff estimate i.e. Qp = 0.278 C i A
The runoff coefficient of 0.95 for the paved area and 0.3 for the unpaved area have been adopted.

91469 - Lot 4822 in D.D. 104, Kam Pok Road and Adjoining Government Land, Mai Po, Yuen Long - Drainage Impact Assessment (Discharge Points Assessment) (1 in 200-year return period)(Pre-Development)

US	DS	Catchment Area						Channel character								Hydraulic parameter		Time of Concentration	i	Peak	Full bore	Full bore	Q_{check}
		Paved Area		Unpaved Area		Total		channel shape	No. of pipes	pipe size			invert level		channel	ks (mm)	3.0000						
		Sub-catchment (m^2)	Accumulative Area (m^2)	Sub-catchment (m^2)	Accumulative Area (m^2)	Sub-catchment (m^2)	Accumulative Area (m^2)			width (mm)	height (mm)	length (m)	US (mPD)	DS (mPD)	slope	cross area (m^2)	Wetted Perimeter (m)	t_c (min)	**200** yr (mm/h)	Runoff (m^3/s)	Capacity (m^3/s)	Velocity (m/s)	(capacity - peak runoff) (m^3/s)
Catchment A2 + Catchment A3 + Catchment A10	Outlet 2	24,085	24,085	7,250	7,250	31,335	31,335	BC	1	2100	2500	33.0	2.000	1.950	0.002	4.725	8.700	33.63	206.68	1.440	8.220	1.740	6.780

Notes: Rational Method is adopted for the peak runoff estimate i.e. Qp = 0.278 C i A
The runoff coefficient of 0.95 for the paved area and 0.3 for the unpaved area have been adopted.

91469 - Lot 4822 in D.D. 104, Kam Pok Road and Adjoining Government Land, Mai Po, Yuen Long - Drainage Impact Assessment (Discharge Points Assessment) (1 in 50-year return period) (Post-Development)

US	DS	Catchment Area						Channel character								Hydraulic parameter		Time of Concentration	i	Peak	Full bore	Full bore	Q_{check}
		Paved Area		Unpaved Area		Total		channel shape	No. of pipes	pipe size			invert level		channel	ks (mm)	3.0000						
		Sub-catchment (m^2)	Accumulative Area (m^2)	Sub-catchment (m^2)	Accumulative Area (m^2)	Sub-catchment (m^2)	Accumulative Area (m^2)			width (mm)	height (mm)	length (m)	US (mPD)	DS (mPD)	slope	cross area (m^2)	Wetted Perimeter (m)	t_c (min)	**50** yr (mm/h)	Runoff (m^3/s)	Capacity (m^3/s)	Velocity (m/s)	(capacity - peak runoff) (m^3/s)
Catchment A1	Outlet 1	0	0	3,110	3,110	3,110	3,110	CC	1	450	450	19.1	2.620	2.493	0.007	0.143	1.375	10.08	261.79	0.068	0.181	1.263	0.113
Catchment A2	Outlet 3	0	0	1,365	1,365	1,365	1,365	CC	1	450	450	25.7	2.150	1.978	0.007	0.143	1.375	7.41	283.39	0.032	0.181	1.265	0.149
Catchment A3	Outlet 4	0	0	630	630	630	630	CC	1	450	450	36.4	1.350	1.107	0.007	0.143	1.375	5.67	301.81	0.016	0.181	1.264	0.165
Catchment A4	SMH1038285	306	306	434	434	740	740	CC	1	600	600	10.3	1.250	1.050	0.020	0.254	1.833	4.53	316.71	0.037	0.665	2.612	0.628
Catchment A5 + Catchment B1	SMH1038283	375	375	1,435	1,435	1,810	1,810	CC	1	600	600	3.9	1.400	1.100	0.076	0.269	1.860	4.88	311.89	0.068	1.423	5.297	1.355
Catchment A6 + Catchment B2	SMH1038240	385	385	1,860	1,860	2,245	2,245	CC	1	600	600	5.6	1.780	1.680	0.018	0.254	1.833	7.12	286.11	0.073	0.636	2.499	0.562
Catchment A7	SCH1019340	0	0	515	515	515	515	CC	1	450	450	3.7	2.520	2.150	0.099	0.151	1.395	2.80	346.07	0.015	0.756	5.007	0.742

Notes: Rational Method is adopted for the peak runoff estimate i.e. Qp = 0.278 C i A
The runoff coefficient of 0.95 for the paved area and 0.3 for the unpaved area have been adopted.

91469 - Lot 4822 in D.D. 104, Kam Pok Road and Adjoining Government Land, Mai Po, Yuen Long - Drainage Impact Assessment (Discharge Points Assessment) (1 in 200-year return period) (Post-Developement)

US	DS	Catchment Area						Channel character								Hydraulic parameter		Time of Concentration	i	Peak	Full bore	Full bore	Q_{check}
		Paved Area		Unpaved Area		Total		channel shape	No. of pipes	pipe size			invert level		channel	ks (mm)	3.0000	t_c	**200**	Runoff	Capacity	Velocity	(capacity - peak runoff)
		Sub-catchment (m^2)	Accumulative Area (m^2)	Sub-catchment (m^2)	Accumulative Area (m^2)	Sub-catchment (m^2)	Accumulative Area (m^2)			width (mm)	height (mm)	length (m)	US (mPD)	DS (mPD)	slope	cross area (m^2)	Wetted Perimeter (m)	(min)	yr (mm/h)	(m^3/s)	(m^3/s)	(m/s)	(m^3/s)
Catchment A8	Outlet 2	22,244	22,244	6,921	6,921	29,165	29,165	BC	1	2100	2500	33.0	2.000	1.950	0.002	4.725	8.700	32.69	208.40	1.345	8.220	1.740	6.875

Notes: Rational Method is adopted for the peak runoff estimate i.e. Qp = 0.278 C i A
The runoff coefficient of 0.95 for the paved area and 0.3 for the unpaved area have been adopted.

91469 - Lot 4822 in D.D. 104, Kam Pok Road and Adjoining Government Land, Mai Po, Yuen Long - Drainage Impact Assessment

(Estimation of Surface Runoff) (1 in 50-year)

Condition	Catchment Area						Time of Concentration	i	Peak
	Paved Area		Unpaved Area		Total			**50**	Runoff
	Sub-catchment (m^2)	Accumulative Area (m^2)	Sub-catchment (m^2)	Accumulative Area (m^2)	Sub-catchment (m^2)	Accumulative Area (m^2)	t_c (min)	yr (mm/h)	(m^3/s)
Pre-development	24,085	24,085	13,785	13,785	37,870	37,870	24.97	200.74	1.508
Post-development	22,670	22,670	15,200	15,200	37,870	37,870	24.97	200.74	1.456

Notes: Rational Method is adopted for the peak runoff estimate i.e. $Qp = 0.278\ C\ i\ A$

The runoff coefficient of 0.95 for the paved area, 0.3 for the unpaved area and 1.0 for pond area have been adopted.

91469 - Lot 4822 in D.D. 104, Kam Pok Road and Adjoining Government Land, Mai Po, Yuen Long - Drainage Impact Assessment
(Estimation of Surface Runoff) (1 in 200-year)

Condition	Catchment Area						Time of Concentration	i	Peak
	Paved Area		Unpaved Area		Total				
	Sub-catchment (m^2)	Accumulative Area (m^2)	Sub-catchment (m^2)	Accumulative Area (m^2)	Sub-catchment (m^2)	Accumulative Area (m^2)	t_c (min)	**200** yr (mm/h)	Runoff (m^3/s)
Pre-development	24,085	24,085	13,785	13,785	37,870	37,870	24.97	225.17	1.691
Post-development	22,670	22,670	15,200	15,200	37,870	37,870	24.97	225.17	1.634

Notes: Rational Method is adopted for the peak runoff estimate i.e. Qp = 0.278 C i A
The runoff coefficient of 0.95 for the paved area, 0.3 for the unpaved area and 1.0 for pond area have been adopted.

APPENDIX E –

SECTIONS SHOWING EXISTING GROUND LEVEL AND PROPOSED GROUND LEVEL

PLOTTED BY : caseymon

837100 N
837200 N
837300 N
823400 E
823500 E

KAM POK ROAD
KAM POK ROAD
NGAU TAM MEI CHANNEL
Nullah
Cycling Track
單車徑
攸學路
錦學路
下新圍路
FUNG CHUK ROAD
HA CHUK YUEN ROAD
Open Storage & Garage
露天貨倉及車房
Ramp
Track
泥路

OUTLET 1
450ø
BOX CULVERT
2.5m(H)x2.1m(W)
排水口
Outlet
OUTLET 2
OUTLET 3
OUTLET 4
450ø
450ø

S1
S2
S3

AREA A1= 3110m²
AREA A2= 1365m²
AREA A3= 630m²
AREA A4
= 740m²
AREA A5
= 875m²
AREA A6= 1470m²
AREA A7
= 515m²
AREA A8= 29165m²
AREA B1
= 935m²
AREA B2
= 775m²

T1
T2
T3
T5
T6
CLUBHOUSE
OUTDOOR
SWIMMIMNG POOL
KINDERGARTEN &
ELDERLY
ACTIVTIY CENTRE

SMH1038285
SMH1038283
SCH1019340
SMH1038220
SMH1038240

600U
300U
300U
600U
450U

LEGENDS:
- APPLICATION SITE
- EXISTING U-CHANNEL
- EXISTING STORM DRAIN
- EXISTING CATCHPIT
- EXISTING OUTLET
- EXISTING MANHOLE
- PAVED AREA (22670m²)
- UNPAVED AREA (15200m²)
- CATCHMENT

WIP Feb 2024

LOT 4822 IN D.D. 104, KAM POK ROAD AND ADJOINING GOVERNMENT LAND, MAI PO, YUEN LONG

PLOT DRV : K:_STANDARD\MICROSTATION\Plot\MEL_A1_COL.PLT

Meinhardt Infrastructure and Environment Limited
邁進基建環保工程顧問有限公司

LOT 4822 IN D.D. 104, KAM POK ROAD AND ADJOINING GOVERNMENT LAND, MAI PO, YUEN LONG

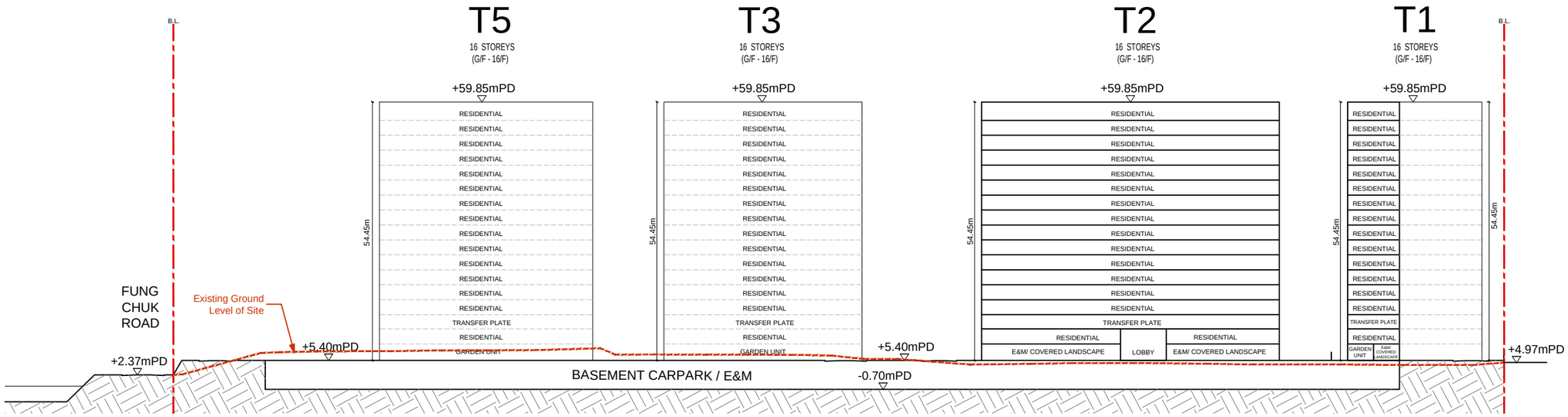
PROPOSED DRAINAGE LAYOUT PLAN

FIGURE 3

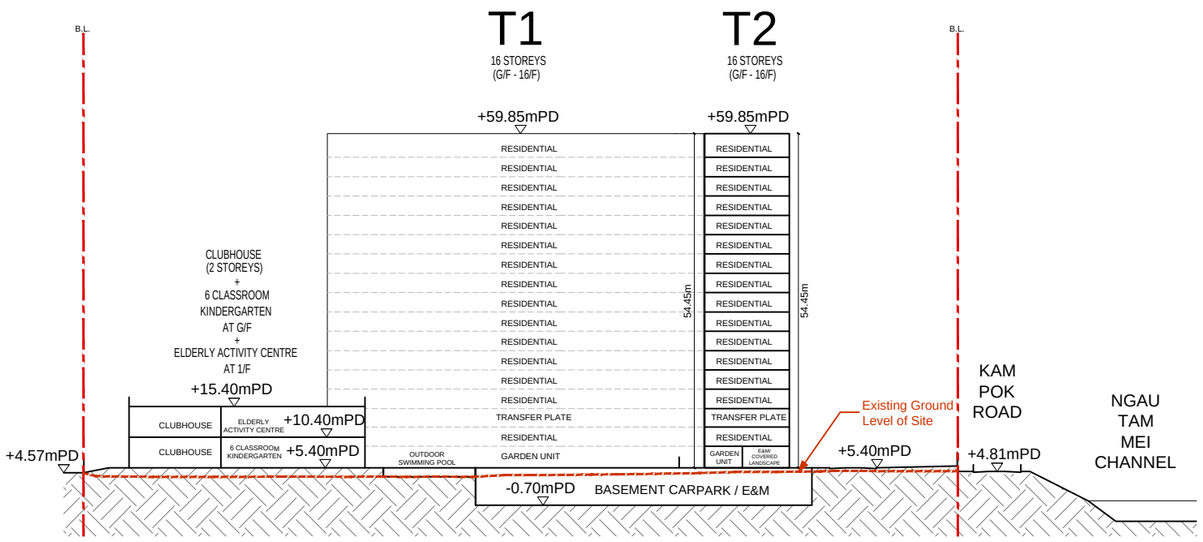
Scale 1 : 500 (A1)

CAD FILE : A:\Projects Current\CIVIL\91469 Kam Pok Road Proposed Low Rise and Low Density Residential Development (DIA, SIA)\S12A Application\DIA\Rev C\20251208\Drawings\91469_DIA_Figure_3.dgn

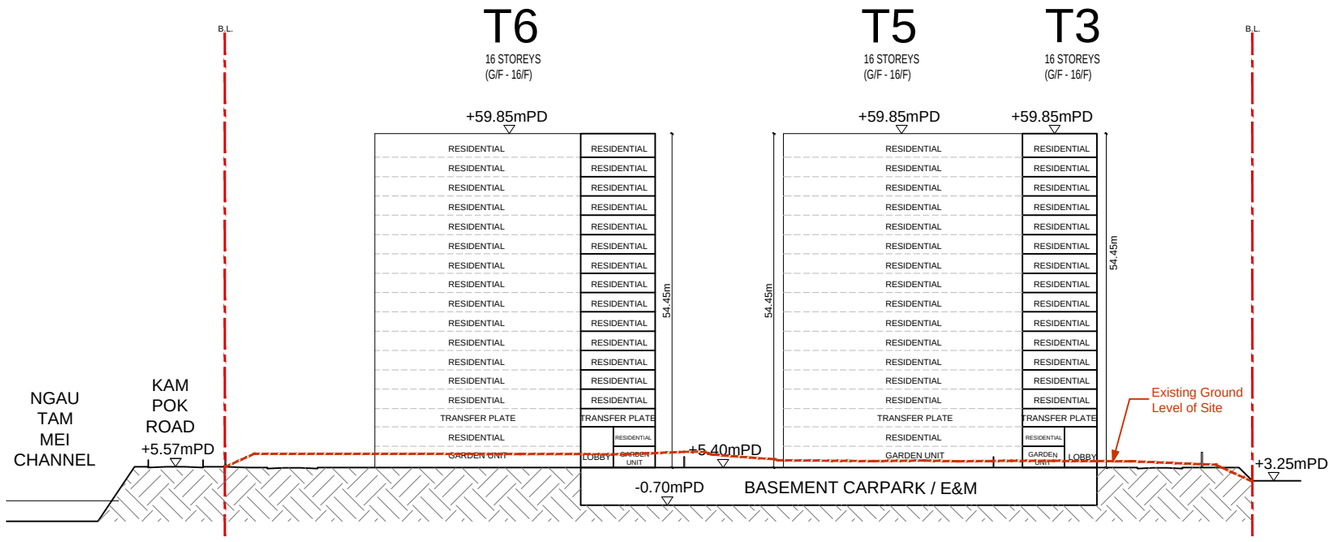
PLOT DATE & TIME : 8/12/2025 4:25:15 pm



SECTION S1-S1



SECTION S2-S2



SECTION S3-S3

Lot 4822 IN D.D.104, Kam Pok Road, Mai Po, Yuen Long

INDICATIVE SECTIONS

0 10 20 30m

DATE : 26/01/2026

R:\6177\DESIGN\Progress\20250402_TPO Section 12A\20260126\20260126_MLP.dwg, 1/26/2026 4:27:09 PM, DWG To PDF.pc3

APPENDIX F –

FLOOD MITIGATION MEASURE INCORPORATED WITH CATCHMENT AREA AND CALCULATION

NOTES :

1. INTERNAL DRAINAGE WITHIN THE SITE WILL BE SUBMITTED UNDER SEPARATE SUBMISSION.
2. CATCHMENTS A5, A6, A7 & A8 DISCHARGE TO EXISTING DRAINAGE SYSTEM ALONG FUNG CHUK ROAD AND HA CHUK YUEN ROAD.

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PROPOSED HOUSE DEVELOPMENT WITH MINOR RELAXATION OF BUILDING HEIGHT RESTRICTION FROM 6M TO 6.6M, AND FILLING OF POND/LAND AND EXCAVATION OF LAND AT LOT NO. 4822 IN D.D.104, MAI PO, YUEN LONG, NEW TERRITORIES

FLOOD MITIGATION MEASURE INCORPORATED WITH CATCHMENT AREA

FIGURE 6

Scale 1 : 2000 (A3)

Hydraulic Calculation of U-Channel along site boundary for Flood Mitigation

Locations		Sub-Catchment	Catchment Area						Channel character										Manning Coefficient		Peak	Peak	Hydraulic	Mean	Capacity of Channel Used	Capacity of Channel Used	Water	Free
			Impermeable Areas (C = 0.95)		Permeable Areas (C = 0.2)		Total		channel		channel size			ground level		invert level		channel	n= 0.016		Runoff	Runoff	Capacity	Velocity			Level	Board
US	DS	Reference	Sub-catchment	Accumulative Area	Sub-catchment	Accumulative Area	Sub-catchment	Accumulative Area	shape		width	height	length	USG	DSG	US	DS	slope	Cross Area	Wetted Piermeter		(Climate change up to end of 21st Century)			(Climate change up to end of 21st Century)		
			(m^2)	(m^2)	(m^2)	(m^2)	(m^2)	(m^2)			(mm)	(mm)	(m)	(mPD)	(mPD)	(mPD)	(mPD)		(m^2)	(m)	(m^3/s)		(m^3/s)	(m/s)	%	%	(mPD)	(m)
	CPa	B1, A1	16,136	16,136	662	662	16,798	16,798	UC	Single	850	850	99.2	4.380	4.380	3.450	3.000	0.0045	0.645	2.185	0.823	0.937	1.444	2.2	57.00%	64.86%	3.77	0.613
CPa	CPb	B1, A1, A10	0	16,136	160	822	160	16,958	UC	Single	850	850	31.8	4.380	4.130	3.000	2.866	0.0042	0.645	2.185	0.758	0.862	1.392	2.2	54.42%	61.93%	3.27	1.108
CPb	CPc	B1, A1, A10	0	16,136	0	822	0	16,958	UC	Single	850	850	2.9	4.130	4.200	2.866	2.855	0.0038	0.645	2.185	0.754	0.858	1.321	2.0	57.12%	65.00%	3.18	0.945
CPc	MH1	B1, A1, A10	55	16,191	150	972	205	17,163	UC	Single	850	850	26.9	4.200	4.300	2.855	2.630	0.0084	0.645	2.185	1.230	1.400	1.961	3.0	62.73%	71.39%	3.27	0.929
	CPd1	B2, A2	922	922	336	336	1,258	1,258	UC	Single	450	450	34.3	5.300	5.300	4.850	4.650	0.0058	0.181	1.157	0.065	0.074	0.300	1.7	21.61%	24.59%	4.69	0.606
CPd1	CPd2	B2, A2	904	1,826	0	336	904	2,162	UC	Single	450	450	33.6	5.300	4.500	4.350	3.760	0.0176	0.181	1.157	0.134	0.152	0.521	2.9	25.68%	29.22%	4.23	1.069
CPd2	CPd	B2, A2	941	2,767	0	336	941	3,103	UC	Single	450	450	35.0	4.260	4.360	3.460	3.350	0.0031	0.181	1.157	0.182	0.207	0.220	1.2	82.59%	93.99%	3.86	0.398
CPd	CPe	B2, A2 A3	0	2,767	0	336	0	3,103	UC	Single	450	450	11.0	4.360	4.430	3.350	3.295	0.0050	0.181	1.157	0.172	0.196	0.278	1.5	61.91%	70.45%	3.56	0.797
CPe	CPf	B2, A2 A3	0	2,767	371	707	371	3,474	UC	Single	450	450	27.3	4.430	4.440	3.295	3.151	0.0053	0.181	1.157	0.206	0.234	0.286	1.6	71.96%	81.89%	3.60	0.830
CPf	CPg	B2, A2 A3	0	2,767	140	847	140	3,614	UC	Single	450	450	20.9	4.430	4.440	3.151	3.050	0.0048	0.181	1.157	0.220	0.250	0.273	1.5	80.29%	91.36%	3.53	0.898
CPg	TMH1	B2, A2 A3	0	2,767	48	895	48	3,662	UC	Single	450	450	11.7	4.430	4.440	2.900	2.680	0.0188	0.181	1.157	0.254	0.289	0.539	3.0	47.09%	53.59%	2.98	1.453

Abbreviations: UC - U-Channel
i - Rainfall Intensity (based on Intensity-Duration-Frequency Relationship)

Notes: Rational Method is adopted for the peak runoff estimate i.e. Qp = 0.278 C i A
The rainstorm event of 1 in 50 years return period has been adopted in the design of the proposed drainage system.
The rainfall intensity has been calculated based on the Intensity-Duration-Frequency (IDF) Relationship.
The runoff coefficients of 0.2 and 0.95 for permeable and impermeable areas have been adopted in the assessment respectively.
The Manning's equation was used for hydraulic analysis of the drainage system.
The Manning coefficient of 0.016 for stormwater pipe/culvert was assumed in the assessment.