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更替申請書內頁及增補文件

**PROPOSED TEMPORARY RECYCLABLE COLLECTION
CENTER WITH ANCILLARY FACILITIES
at
LOT102 IN D.D.108, PAT HEUNG, YUEN LONG**

APPLICATION NO: A/YL-PH/1139

DRAINAGE IMPACT ASSESSMENT

May 2026

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2.0 THE SITE

The proposed temporary recyclable center (hereinafter referred to as the proposed development site) is located at Lot 102 in D.D.108, Pat Heung, Yuen Long. The proposed development site has an area of about 6380m², as shown in *Figure 1*.

Presently, the site is vacant land and will be developed into a temporary recyclable center for a period of 3 years.

The overall development parameters are summarised in **Table 1**.

Table 1: Development Parameters

Development Parameters	
Site Area	1660 (m ²)
Site condition	Presently fenced and unoccupied
Proposed Development	Temporary recyclable center

METHODOLOGY OF DRAINAGE IMPACT ASSESSMENT

The DIA is carried out to assess the possible drainage impact arising from the change in land-use. Assessment will be carried out in accordance with the requirements stated in “Advice Note No.1 – Application of the Drainage Impact Assessment Process to Private Sector Projects” issued by Drainage Services Department (DSD). Design parameters as suggested by Stormwater Drainage Manual (SDM) are adopted and are summarized in **Table 2**.

Rational Method has been used for estimation of surface runoff for the proposed development and the associated catchment area. The drainage system for the proposed extension would be designed for 1 in 50-year rainfall event according to SDM, Table 10.

Table 2: Adopted Parameters in Drainage Assessment

Design Standard	1 in 50-years
Runoff Coefficient	0.9 for paved area 0.2 for flat area 0.3 for steep grassland

4.0 POSSIBLE IMPACT ARISING FROM PROPOSED DEVELOPMENT SITE

4.1 Existing Drainage Characteristics

The proposed site is located in an area with ground levels ranging from +41.0mPD to +40.0mPD.

The site is unpaved and vacant and enclosed by chain link fence. Surface runoff is collected by Proposed 400 running along outside boundary. Site photographs showing the condition of the surface channel are enclosed in *Appendix A*.

According to the drainage system layout plan, these existing channels are found to connect to the existing manhole and discharge to the existing stream course. The drainage system layout plan is enclosed in *Appendix A*.

Possible Drainage Impact

The site is proposed to be developed into a temporary recyclable center and will eventually be concrete paved. According to drainage layout plan, the Proposed 400 channels will be proposed to collect the runoff and connected to the existing stream course.

The proposed development will change the original area to paved surface for the temporary public vehicle park but the change in site area is relatively small compared with the overall catchments area.

Hydraulic analysis would be divided into two parts, namely the beginning and the end of the existing stream course. **Table 3** show the comparison of surface runoff under scenarios of existing situation and after development for the two parts of hydraulic analysis.

Table 3: Calculation on Change in Runoff

	Existing Situation	After Development
Discharge from developed site (m ³ /s)	0.25	0.51
Lot 102 in D.D.108	0.03	0.10
Total discharge (m ³ /s)	0.28	0.61

Details of calculation are enclosed in *Appendix B*.

The capacity of the existing stream course based on the available and level is estimated to be 65.22m³/s according to the Manning equation, which is larger than the total discharge both in existing situation and after development and improvement.

Accordingly to the calculation, the capacities of the existing stream course is considered sufficient to cater for the runoff arising from the catchment including the increased runoff from the proposed development site and the drainage improvement works. Thus, there will be no adverse drainage impact on the existing system due to the development.

Since the duration of permission applied for this application is only 3 years, the long term effect of extreme weather is not considered of a too much concern. The estimation of rainfall intensity based on SDM Table 10 for 50

years return period is already considered on the safe side. However the situation should be reviewed in the next application of renewal.

5.0 MAINTENANCE AND DRAINAGE CONNECTION RESPONSIBILITY

The owner of the site will maintain all stormwater pipes within the proposed development before the outlet of the terminal manhole.

The connection can either be done by the government at the developer's cost or done by the developer himself at his own cost with works technically audited by the DSD.

The client desires to select the latter arrangement.

Open channel or surface runoff collection system will be provided at the periphery of the proposed development site for prevention of any ponding problem within the site. The drainage layout plan shown in *Figure 2*, the details will be subject to approved by both DSD and BD.

7.0 CONCLUSION

This DIA is prepared in support of the temporary recyclable center.

Hydraulic analysis shows that the minor increase in surface runoff due to development as compared to the flow capacity of the existing stream course will be insignificant. It can be concluded that there will be no major drainage impact anticipated arising from the proposed development site.

The internal drainage system will be submitted to Buildings Department and various government departments for approval in the detailed design stage of the development.

Figures

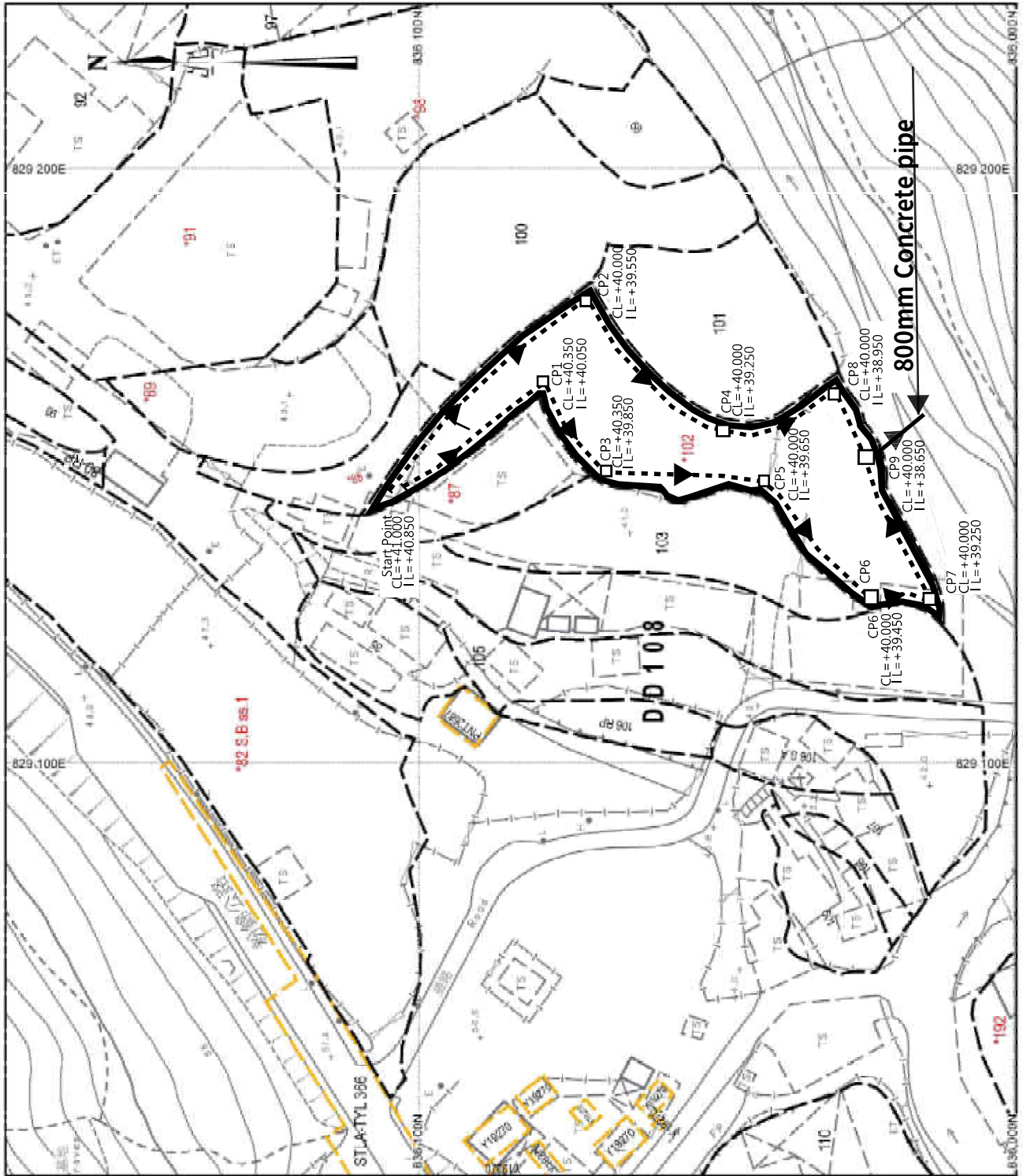
Appendix A

Photo Records

Appendix B

Calculation

雨水排放建議圖



Proposed 450mm U channel
(1:100) with
concrete cover

比例尺 SCALE 1:1000

metres 10 0 10 20 30 40 50 metres

Proposed 600mm Concrete Pipe

Catchment Area of site

Site Catchment Area = $1660 \text{ m}^2 = 0.001660 \text{ km}^2$

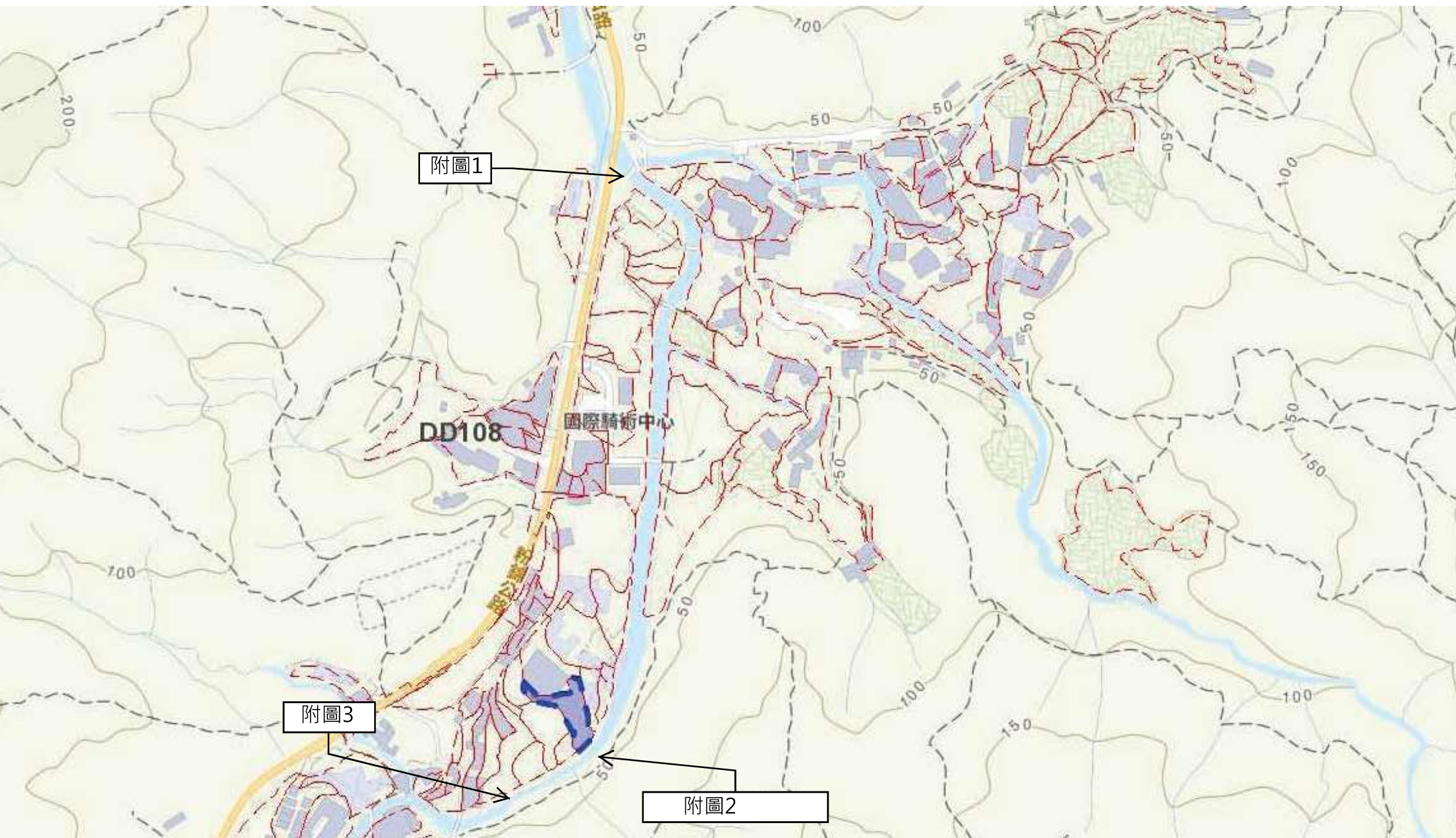
Peak runoff in $\text{m}^3/\text{s} = 0.278 \times 0.95 \times 240 \text{ mm/hr} \times 0.001660 \text{ km}^2 = 0.10522 \text{ m}^3/\text{s}$

= 6576 liter/min

Note:

1. Catchpit (CP8) with desilting facility shall follow CEDD's standard drawing No. C2406/I.C2406/2A
2. Catchpit and UC follows Typical Details of Geotechnical Manual for Slope Fig.8.10 and Fig.8.11 respectively.
3. The inverted level of the connection point shall be verified on site prior the commencement of work
4. Grating Concrete Cover follows CEDD's standard drawing No. C2412E: U-CHANNELS WITH PRECAST CONCRETE SLABS

政府河道相片說明位置圖



附圖1



附圖2



附圖3



Computation of Drainage System (Before development)

Design of surface drainage in accordance with "Stormwater Drainage Manual"

Drainage system is designed to a frequency of 1 in 10 rainfall return period. (refer to "Stormwater Drainage Manual, 6.6.1")

Time of concentration is calculated based on the equation refer to "Stormwater Drainage Manual, 7.5.2)

Average rainfall intensity refer to "Stormwater Drainage Manual, Figure 4"

Peak discharge is calculated based on the "Stormwater Drainage Manual, 7.5.2"

The runoff coefficient for steep grassland = 0.3 (A1)

	Catchment Area (A) (m ²)	Gradient (H) (m/100m)	Maximum Length form the summit (L) (m)	Time of Concentration (t _c) (min)	Rainfall Intensity (i) (mm/hr)	Rainfall increase due to climate change (11.1%)	Estimated Peak Discharge (Qp) (m ³ /sec)
A1	1750	0.99	101.00	5.94	225.000	249.975	0.033

$$t_c = \frac{0.14465L}{H^{0.5} A^{0.1}}$$

$$Q_p = 0.278 C i A$$

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

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

Computation of Drainage System (After development)

Computation of Drainage System (After development)

Design of surface drainage in accordance with "Stormwater Drainage Manual"

Drainage system is designed to a frequency of 1 in 10 rainfall return period. (refer to "Stormwater Drainage Manual, 6.6.1")

Time of concentration is calculated based on the equation refer to "Stormwater Drainage Manual, 7.5.2)

Average rainfall intensity refer to "Stormwater Drainage Manual, Figure 4"

Peak discharge is calculated based on the "Stormwater Drainage Manual, 7.5.2"

The runoff coefficient for concrete pavement = 0.9 (A1)

	Catchment Area (A) (m ²)	Gradient (H) (m/100m)	Maximum Length form the summit (L) (m)	Time of Concentration (t _c) (min)	Rainfall Intensity (i) (mm/hr)	Rainfall increase due to climate change (11.1%)	Estimated Peak Discharge (Q _p) (m ³ /sec)
A1	1750	0.99	101.00	6.94	225.000	249.975	0.099
					Increased Discharge =		0.066

$$t_c = \frac{0.1446SL}{H^{0.5} A^{0.5}}$$

$$Q_p = 0.278 C i A$$

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

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

Computation of Drainage System (Before development)

Design of surface drainage in accordance with "Stormwater Drainage Manual"

Drainage system is designed to a frequency of 1 in 10 rainfall return period. (refer to "Stormwater Drainage Manual, 6.6.1")

Time of concentration is calculated based on the equation refer to "Stormwater Drainage Manual, 7.5.2)

Average rainfall intensity refer to "Stormwater Drainage Manual, Figure 4"

Peak discharge is calculated based on the "Stormwater Drainage Manual, 7.5.2"

The runoff coefficient for steep grassland = 0.3 (A1) and concrete pavement = 0.9 (A2)

	Catchment Area (A) (m ²)	Gradient (H) (m/100m)	Maximum Length form the summit (L) (m)	Time of Concentration (t _c) (min)	Rainfall Intensity (i) (mm/hr)	Rainfall increase due to climate change (11.1%)	Estimated Peak Discharge (Q _p) (m ³ /sec)
A1	6380	1.55	116.00	6.40	220.000	244.420	0.130
A2	1585	4.89	36.80	1.85	275.000	305.525	0.121
Lot 102 in D.D.108							0.033
Total Pak Discharge =							0.28

$$t_c = \frac{0.1446SL}{H^{0.5} A^{0.1}}$$

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

$$Q_p = 0.278 C i A$$

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

Computation of Drainage System (After development)

Computation of Drainage System (After development)

Design of surface drainage in accordance with "Stormwater Drainage Manual"

Drainage system is designed to a frequency of 1 in 10 rainfall return period. (refer to "Stormwater Drainage Manual, 6.6.1")

Time of concentration is calculated based on the equation refer to "Stormwater Drainage Manual, 7.5.2)

Average rainfall intensity refer to "Stormwater Drainage Manual, Figure 4"

Peak discharge is calculated based on the "Stormwater Drainage Manual, 7.5.2"

The runoff coefficient for concrete pavement = 0.9 (A1&A2)

	Catchment Area (A) (m ²)	Gradient (H) (m/100m)	Maximum Length form the summit (L) (m)	Time of Concentration (t _c) (min)	Average Rainfall Intensity (i) (mm/hr)	Rainfall increase due to climate change (11.1%)	Estimated Peak Discharge (Q _p) (m ³ /sec)
A1	6380	1.55	116.00	6.40	220.000	244.420	0.390
A2	1585	4.89	36.80	1.85	275.000	305.525	0.121
Lot 102 in D.D.108							0.099
Total Pak Discharge =							0.61
Increased Discharge =							0.33

$$t_c = \frac{0.14465L}{H^{0.5} A^{0.1}}$$

$$Q_p = 0.278 C i A$$

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

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

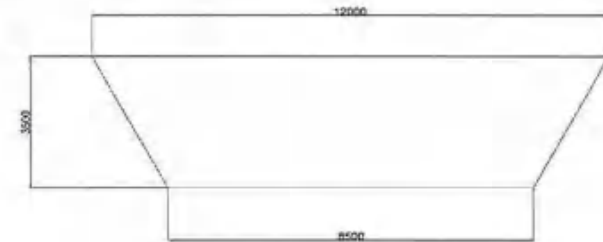
Checking existing stream course

Width (m)	Depth (m)	Inlet level (mPD)	Outlet level (mPD)	Length (m)	Gradient (S_f)	Hydraulic radius (R)	Manning coefficient (n)	Velocity (m/s)	Max. Discharge (m^3/s)
4.80	3.50	36.50	32.20	435.00	0.010	1.27	0.030	3.88	65.22

Maximum design flow velocity of pipe is based on Mannings's formula (Refer to "Stormwater Drainage Manual, Table 12 and 13)

$$\bar{V} = \frac{R^{1/6}}{n} \sqrt{RS_f}$$

where $R = \text{Area} / \text{Perimeter}$



Reference

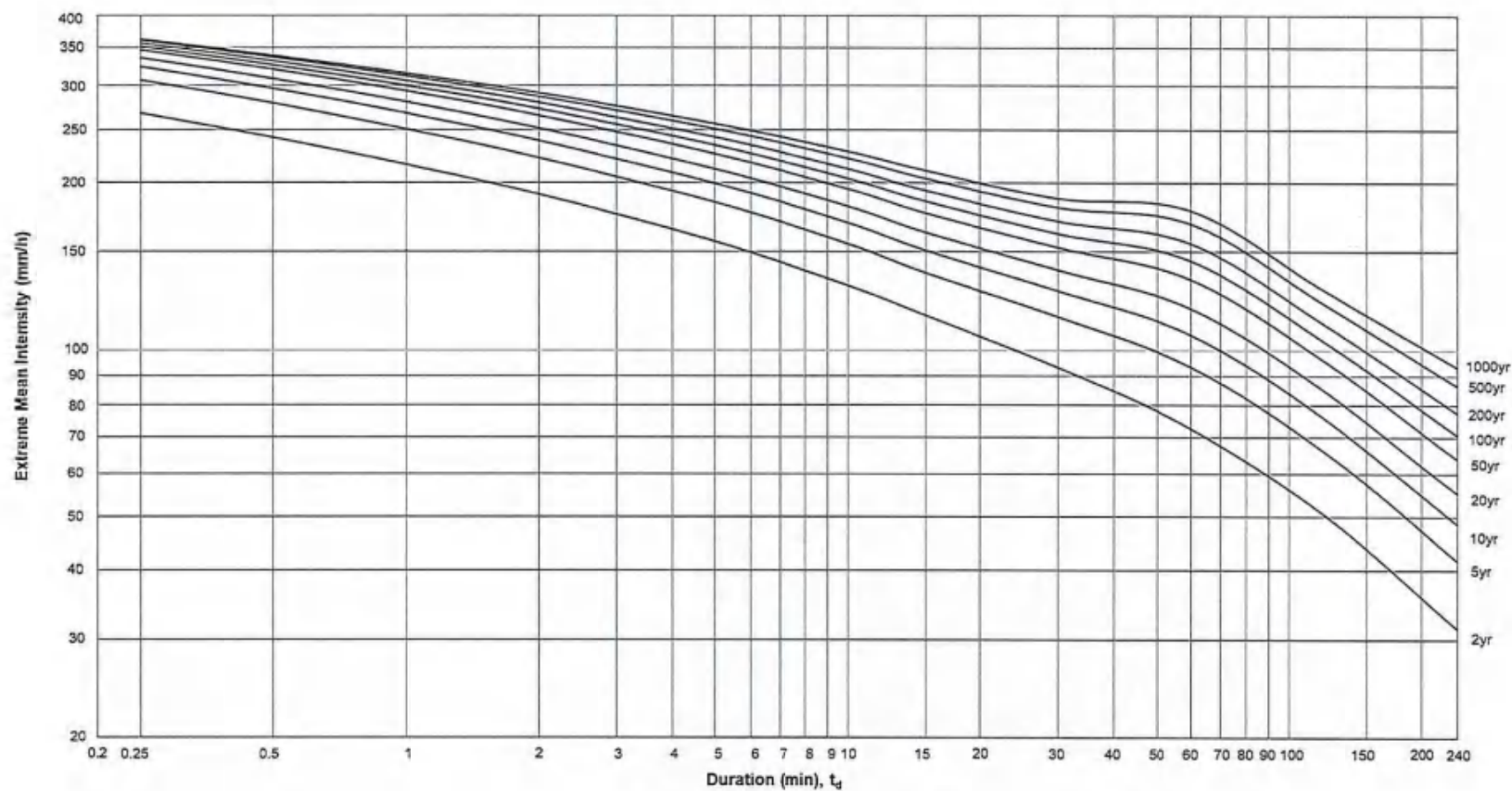


Figure 4a – Intensity-Duration-Frequency Curves of HKO Headquarters
(for durations not exceeding 4 hours)

Corrigendum No.1/2022

- (k) Table 28
Rainfall
Increase due
to Climate
Change

Replace the table with the following:

Table 28 – Rainfall Increase due to Climate Change

	Rainfall Increase
Mid 21 st Century	11.1%
End of 21 st Century	16.0%

Notes:

1. The rainfall increase is relative to the average of 1995-2014.
2. Mean projection values are adopted in the table.
3. Mid 21st century refers to years 2041 – 2060; end of 21st century refers to years 2081 – 2100.

- (l) Table 29
Mean Sea
Level Rise due
to Climate
Change

Add the following table:

Table 29 – Mean Sea Level Rise due to Climate Change

	Mean Sea Level Rise
Mid 21 st Century	0.20 m
End of 21 st Century	0.47 m

Notes:

1. The mean sea level rise is relative to the average of 1995-2014.
2. Median projection values are adopted in the table.
3. Mid 21st century refers to period around 2050; end of 21st century refers to period around 2090.

- (m) Table 30
Storm Surge
Increase due
to Climate
Change

Add the following table:

Table 30 – Storm Surge Increase due to Climate Change

Table 30a Storm Surge Increase in Mid 21st Century

Return Period (Years)	North Point/ Quarry Bay (m)	Tai Po Kau (m)	Tsim Bei Tsui (m)	Tai O (m)
2	0.04	0.05	0.05	0.03
5	0.05	0.07	0.06	0.05
10	0.06	0.08	0.08	0.05
20	0.07	0.10	0.09	0.06
50	0.08	0.13	0.11	0.08
100	0.09	0.15	0.12	0.09
200	0.10	0.17	0.13	0.10

Notes: Mid 21st century refers to period around 2050.