DRAINAGE PROPOSAL FOR

PROPOSED TEMPORARY SHOP AND SERVICE (IRONMONGERY) AND ASSOCIATED EXCAVATION OF LAND FOR A PERIOD OF 3 YEARS AT LOT 1294 RP (PART) IN D.D. 105 AND ADJOINING GOVERNMENT LAND

Date: 2026 Oct 28
Version: 1
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1. Evaluations

1.1 The proposed temporary shop for ironmongery (the "Site") is located immediately at a junction of Mai Po Road entering into a local village zone. To the north of the Site lies a drainage channel, which is directly connected to a box culvert under Mai Po Road further to the north for discharge. These facilities are maintained by the Drainage Services Department (DSD). While Mai Po Road is elevated relative to the village area within which the Site is located, the existing drainage channels serve their role in collecting surface runoff and preventing it from entering the village area. Desktop topographic study reveals that the Site is on relatively higher ground than the surrounding area, except for Mai Po Road. Since no runoff is expected to flow from Mai Po Road, the surface runoff flowing through the Site will be limited to runoff generated by the Site itself. Considering the relative locations of the existing channel and the Site, the current runoff generated by the Site is collected by such channel for discharge.

For details of the drainage layout and facilities, please refer to drawings SK-02, SK-04, D-01 and D-02.

2. Calculations

2.1 The time of concentration is determined by the formula given in the Stormwater Drainage Manual (SDM) as follows:

$$t_c = t_o + t_f$$

where t_o *= Inlet time (minutes)*

t_f *= Flow time (minutes)*

2.2 To determine t_o:

Considering the small size of the Site, the peripheral nature of the proposed channels, and the location of the proposed structure, the expected inlet time will be very small. Therefore, a minimum of t_o = 5 minutes is adopted.

2.3 To determine t_f*:*

For the path A-B-C-E-F,

Channel Length L = 46.7m,

Assume Velocity = 2m/s

t_f *= 0.39 minutes*

t_c *= 5 + 0.39 = 5.39 minutes*

2.4 With reference to Table 2d and Table 28 of the SDM, take duration as 5 minutes and extreme intensity of 10 years we get 177mm/hr. After adjustment of 16% due to climate change for the end of 21st Century we get 205.3mm/hr.

2.5 Considering the paved condition of the Site, a runoff coefficient of 0.9 is adopted.

2.6 By Rational Method, with reference to the Manual:

$$Given \quad Q_p = 0.278\ CiA$$

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

2.7 The catchment area is taken as the proposed Site area, which is 530 m², since no runoff is expected to enter the Site from the surrounding area.

2.8 Computing $\mathbf{Q_p}$, we have:

Catchment Area	C	i (mm/h)	A (km^2)	Q_p (m^3/s)
Site	0.9	205.3	0.00053	0.027

2.8.1 The capacities of the proposed U-channels at grade are estimated as follows:

With Manning's Formula for discharge capacity of drain

$$Q_C = \frac{1}{n} A R^{\frac{2}{3}} S^{\frac{1}{2}}$$

where Q_c = *discharge capacity of drain in* m^3/s
n = *roughness coefficient*
A = *flow area in* m^2
P = *wetted perimeter in m*
$R = A/P$ = *hydraulic radius in m*
S = *bed gradient*

2.9 The details of the proposed and existing drainage facilities are tabulated in the following hydraulic calculation table:

Path	Type	CL (mPD)	IL from (mPD)	IL to (mPD)	Distance (m)	Gradient (S)	n	Capacity Qc (m^3/s)	Peak Runoff Qp (m^3/s)	Check
A - B	Proposed 225mm Rectangular Channel	5.4	5.15	4.87	27.8	0.01	0.013	0.11	0.027	✓
B - C	Proposed 225mm Rectangular Channel	5.4	4.84	4.71	12.5	0.01	0.013	0.11	0.027	✓
C - E	Proposed 225mm Rectangular Channel	5.4	4.68	4.64	4.4	0.01	0.013	0.11	0.027	✓
A – D	Proposed 225mm Rectangular Channel	5.4	5.15	5.04	10.9	0.01	0.013	0.11	0.027	✓
D - E	Proposed 225 mm Rectangular Channel	5.4	5.01	4.81	19.6	0.01	0.013	0.11	0.027	✓
E – F (SCH1020163)	Proposed 225mm inclined uPVC pipe	5.4	4.61	3.8	2	0.41	0.011	0.34	0.027	✓
F – Box Culvert	450mm pipe	3.8	N/A	3.38	N/A	N/A	N/A	N/A	N/A	N/A

2.10 The collected runoff will be discharged into an existing catchpit with feature no. SCH1020163, and subsequently discharged into the box culvert under Mai Po Road.

3. Conclusion

3.1 The proposed U-channels and uPVC inclined pipe have been designed to provide sufficient hydraulic capacity for runoff generated within the Site. The sizing of each component has been checked against the calculated peak flow, ensuring the system can reliably convey stormwater under the adopted design conditions.

3.2 The hydraulic verification confirms that each component of the system meets the required capacity for the design storm. Gradients and invert levels have been assessed to maintain effective conveyance, and the checks demonstrate that the proposed facilities operate within their design capacity.

3.3 Since the runoff generated by the Site is currently collected by the existing channel to the north of the Site, the proposed connection to the catchpit along this existing channel will result in no net increase in the total surface runoff collected by the system. Therefore, no adverse drainage impact is anticipated.