Proposed Minor Relaxation of Site Coverage Restriction for Permitted House Development in "Residential (Group C) 3" Zone, No. 66 Deep Water Bay Road, Shouson Hill, Hong Kong – S16 Planning Application

Appendix 4

Replacement Pages of Drainage Impact Assessment

6) Existing Watercourses and Drainage Route (Cont'd)

6.5 Evaluation of Runoff Collection

6.5.1 Per DSD SDM Table 10, a 50-year return period and rainfall intensity of 218 mm/hr are adopted for design.

6.5.2 Runoff calculations are summarized below (see **Appendix III** for details).

Catchment Ref:	Location	Area (m2)	Surface Condition	Catchment Coefficient	Rainfall Intensity (mm/hr)	Rainfall Inc. Factor (End of 21 Cen)	Flowrate (L/s)	Discharge Point
А	Northern Slope	682.80	Steep Slope (Heavy Soil)	0.35			17.4	
В	Northern Slope	116.44	Steep Slope (Heavy Soil)	0.35			3.0	Access Road
С	Site (North Portion) Slope	176.77	Steep Slope (Heavy Soil)	0.35			4.5	(East)
D	Site (North Portion) Driveway	524.28	Concrete	0.85			32.5	
E	Site (East Portion) Slope	36.44	Steep Slope (Heavy Soil)	0.35	226	16.0%	0.9	Slope (East), and downstream RBL 667 & Ext.
F	Site (South Portion) Building	1287.85	Concrete	0.85			79.7	Ex. 600mm
		18.53	Steep Slope (Heavy Soil)	0.35			0.5	U-channel (Southwest)

^{*}Rainfall intensity of 226mm/hr according to Table 2a, corrigendum no.1/2024, SDM

6.6 Identified Drainage Issues

- 6.6.1 The existing drainage system presents the following concerns:
 - i. Discharge is dispersed across three routes (access road, government slope, and southwest U-channel), complicating maintenance.
 - ii. No drainage infrastructure for Catchment E, leading to uncontrolled runoff onto adjacent properties.

[#]Rainfall increase factor of 16% according to Table 28, corrigendum no.1/2022, SDM

7) Proposed Drainage System (Cont'd)

7.5 Post-Redevelopment Runoff Assessment

- 7.5.1 The future drainage flow path is illustrated in Appendix IV.
- 7.5.2 Total discharge into the 600mm U-channel will increase from 80.2 L/s to 121 L/s.

7.5.3 The revised drainage pattern is illustrated below and attached in **Appendix V**.

Catchment Ref:	Location	Area (m2)	Surface Condition	Catchment Coefficient	Rainfall Intensity (mm/hr)	Rainfall Inc. Factor (End of 21 Cen)	Flowrate (L/s)	Discharge Point
А	Northern Slope (Government)	682.80	Steep Slope (Heavy Soil)	0.35			17.4	Access Road (East)
В	Northern Slope (Government)	116.44	Steep Slope (Heavy Soil)	0.35			3.0	
G	Site (After Re-development)	2,043.87			226	16.0%		Ex. 600mm
	Greenery	284.62	Flat, Soil	0.2	226	16.0%	4.1	U-channel on Slope
		130.29	Steep Slope (Heavy Soil)	0.35			3.3	(Southwest)
	Concrete	1,628.96	Concrete	0.85			100.8	

Drainage Discharge Point	Existing (L/s)	After Re-development (L/s)
Access Road (East)	39.9	0
Government Slope (East) & downstream RBL 667	0.9	0
Ex. 600mm U-channel on slope (Southern West)	80.2	111.3

7.6 Capacity Assessment of 600mm U-Channel

7.6.1 Using Manning's Equation, the channel's capacity is evaluated as follows:

Runoff collected by 600mm U-Channel:

	Area	Surface	Catchment	Flowrate
	(m ²)	Condition	Coefficient	(L/s)
Upstream Slope	116.44	Steep Slope	0.35	3.0
Site	2,043.87			108.3
			Total	<mark>111.3</mark>

Flow velocity, $V = \frac{1}{U} \times R^{\frac{2}{3}} \times S^{\frac{1}{2}}$

Where U = Roughness coefficient of pipe

(for concrete lined channel in fair condition, U = 0.016)

R = Hydraulic Radius S = Gradient of fall

Gradient Fall:

S = Upstream I.L - Downstream I.L. / Length = (80.21 - 79.25) / 7.37m (as surveyed) = 0.13

Assuming 1/2 bore flow of 600mm channel,

R = 0.25 D V = $\frac{1}{0.016}$ x (0.25 x 0.6)^{3/3} (0.13)^{1/2} = 6.36 m/s

Handling capacity

Q = AV = $(3.14 \times 0.3^2 / 2) \times (6.36)$ = $0.8989 \text{ m}^3/\text{s}$

= 898.9 l/s

> 111.3 l/s (12.4%, acceptable)



Proposed Residential Re-development at 66 Deep Water Bay Road, Hong Kong Evaluation of Runoff from Catchments (Existing)

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Discharge Point					Access Road	(East)				Slope (East),	and	downstream	RBL 667	& Ext.	Ex. 600mm	(Sourbweet)	(Southwe
Flowrate (1/s)	(-/3)	17.4		3.0		4.5		32.5		6.0					79.7	0.5	
Rainfall Inc. Factor	(End of 21 Cen)									16.0%							
Rainfall Intensity	(mm/hr)							_		226							
Catchment	COCINCICIE	0.35		0.35		0.35		0.85		0.35					0.85	0.35	
Surface		Steep Slope	(Heavy Soil)	Steep Slope	(Heavy Soil)	Steep Slope	(Heavy Soil)	Concrete		Steep Slope	(Heavy Soil)				Concrete	Steep Slope	(Heavy Soil)
Area	(m2)	682.80		116.44		176.77		524.28		36.44					1287.85	18.53	
Location		Northern Slope		Northern Slope		Site (North Portion)	Slope	Site (North Portion)	Driveway	Site (East Portion)	Slope				Site (South Portion) Building		
Catchment Ref:		۷		В		C		Q		Э					L.		



Proposed Residential Re-development at 66 Deep Water Bay Road, Hong Kong Evaluation of Runoff from Catchments (Post-redevelopment)

Discharge Point	Access Road (Fact)		Ex. 600mm	U-channel on Slope	(Southwest)				
Flowrate (L/s)	17.4	3.0		4.1	3.3	100.8			
Rainfall Rainfall Intensity Inc. Factor (mm/hr) (End of 21 Cen)		16.0%							
Rainfall Intensity (mm/hr)				077					
Catchment Coefficient	0.35	0.35		0.2	0.35	0.85			
Surface Condition	682.80 Steep Slope (Heavy Soil)	116.44 Steep Slope (Heavy Soil)		Flat, Soil	Steep Slope (Heavy Soil)	Concrete			
Area (m2)	682.80	116.44	2,043.87	284.62	130.29	1,628.96			
Location	Northern Slope	Northern Slope (Government)	Site (After Re-development)	Greenery		Concrete			
Catchment Ref:	⋖	В	ڻ ن						