

# Appendix 1

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Drainage Proposal



Table 2d – Intensity-Duration-Frequency (IDF) Relationship of North District Area for durations not exceeding 240 minutes

Duration (min)	Extreme Intensity (mm/h) for various Return Periods T (year)						
	2	5	10	20	50	100	200
240	29.0	38.2	44.5	50.7	59.1	65.6	72.3
120	42.4	54.9	63.2	71.2	81.8	89.8	97.8
60	62.0	77.1	86.1	94.3	104	111	118
30	85.7	103	113	122	133	141	148
15	108	129	141	151	164	173	182
10	120	141	155	168	187	203	219
5	139	162	177	192	214	231	251

Notes:

1. based on continuous rainfall recorded at GEO rain gauges N05 (40 years), N34 (24 years), N46 (24 years), N33 (24 years), N35 (24 years), N36 (24 years), N45 (24 years) and HKO rain gauges EPC (31 years), SSH (20 years), TKL (38 years), R24 (40 years), R29 (39 years), R30\_KAT (34 years), SEK (27 years) up to 2023.
2. rainfall IDF relationships are derived from regional frequency analysis of extreme rainfall of local rain gauges.
3. the trends of the extreme rainfalls observed at HKO Headquarters are used to infer the trends at other locations.

i (rainfall intensity) = 133mm/hr ( Duration of 30min is used)

### Calculations of U-channel

$$Q_p = 0.278C_iA$$

$$C_1 = 0.85 \text{ (Asphalt) (Application Site)}$$

$$i = 133\text{mm/hr}$$

$$A_1 = 7,216\text{m}^2 \text{ (0.007216km}^2\text{) (Application Site)}$$

$$Q_p = 0.278 \times 133 \times ((0.85 \times 0.007216) \times 1.16 \text{ (By considering Rainfall}$$

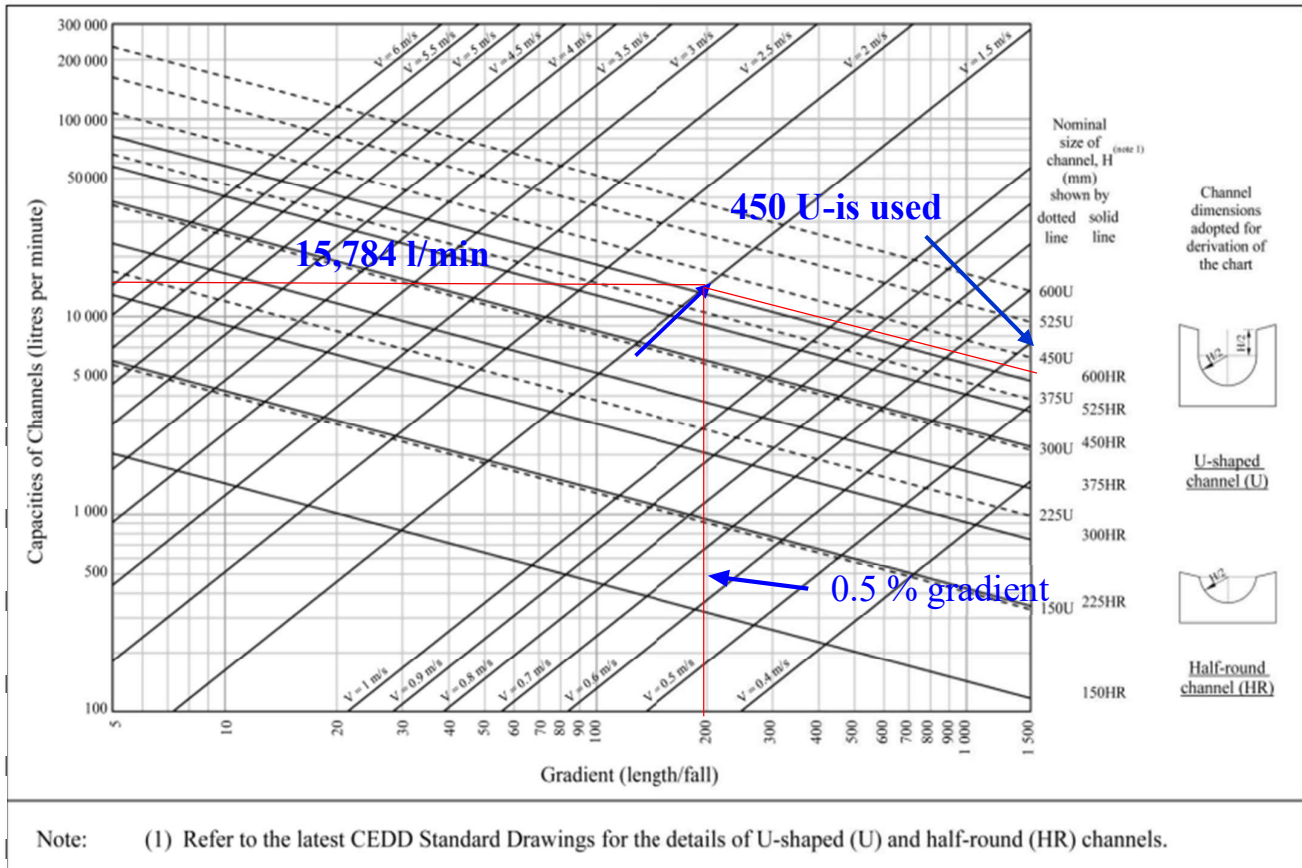
Increase due to climate change, 16% of discharge is added)

$$= 0.263\text{m}^3/\text{s} \quad \text{or} \quad 15,784\text{l}/\text{min}$$

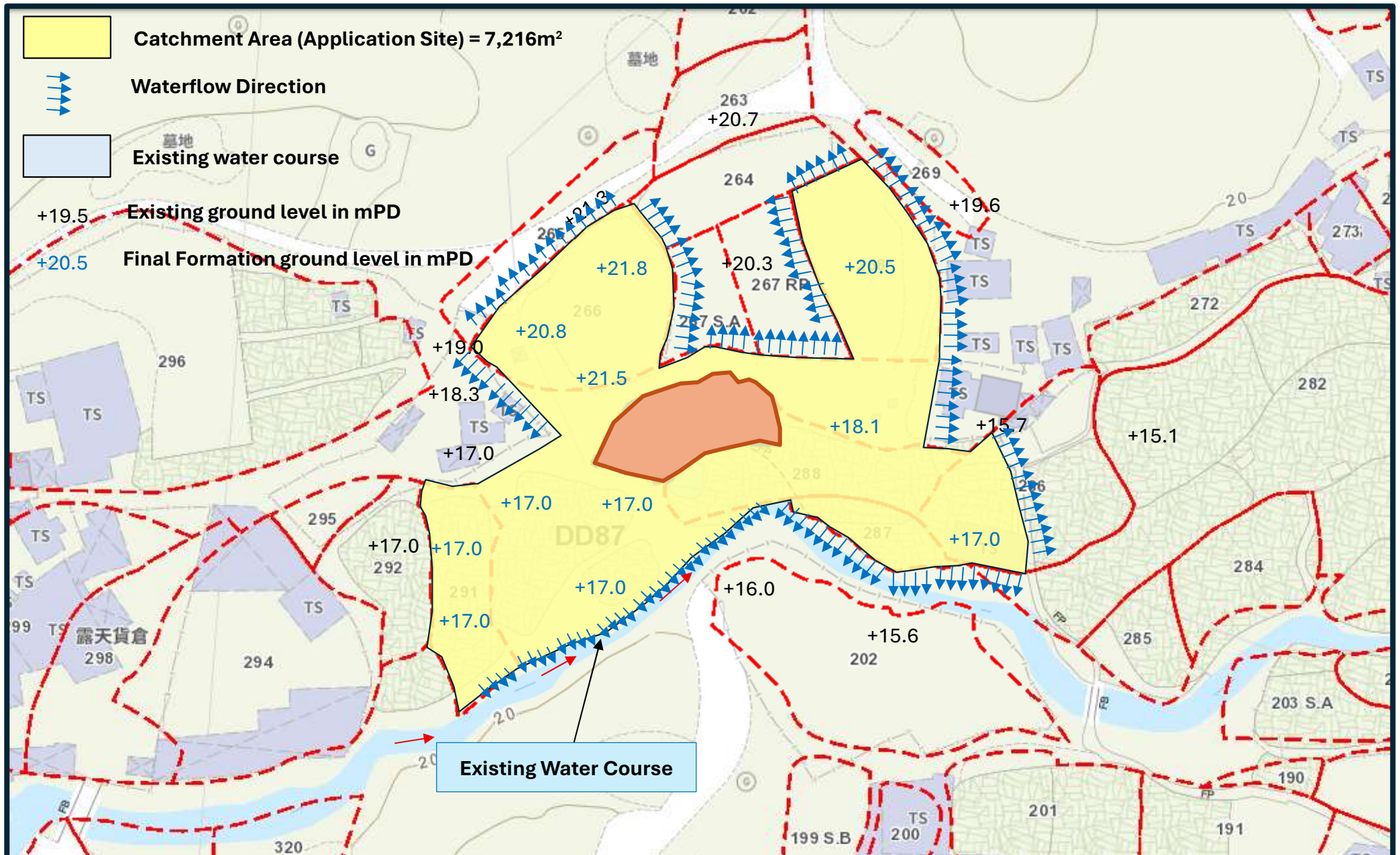
For conservative calculations, all catchment areas are combined for calculation of all U-Channels.

# GEO Technical Guidance Note No. 43 (TGN 43) Guidelines on Hydraulic Design of U-shaped

Figure 1 - Chart for the rapid design of U-shaped and half-round channels up to 600 mm



For 15,784l/min, 450 U-channel with 0.5% gradient is used.

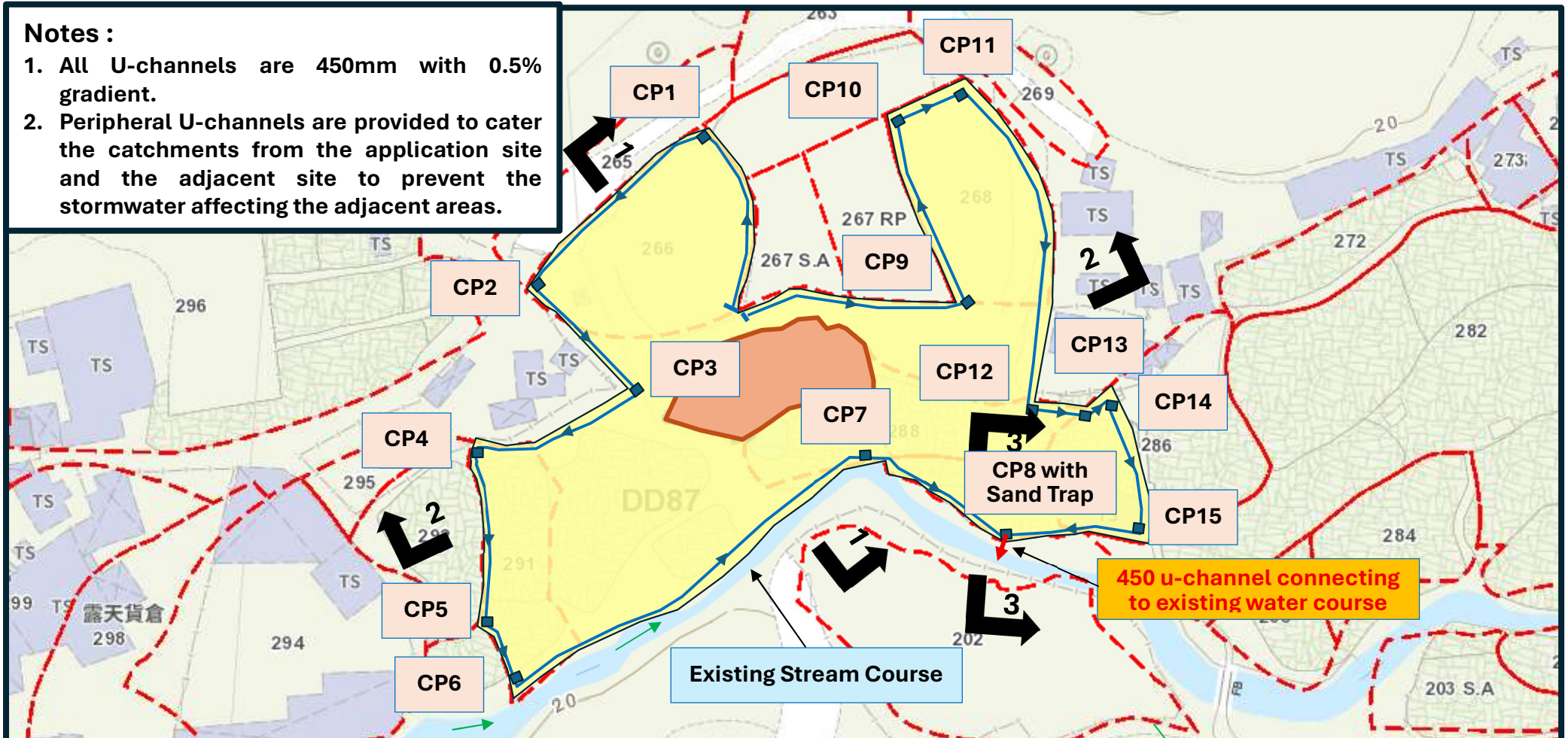


**Catchment Plan**

**Drawing No. HLH 001**

**Notes :**

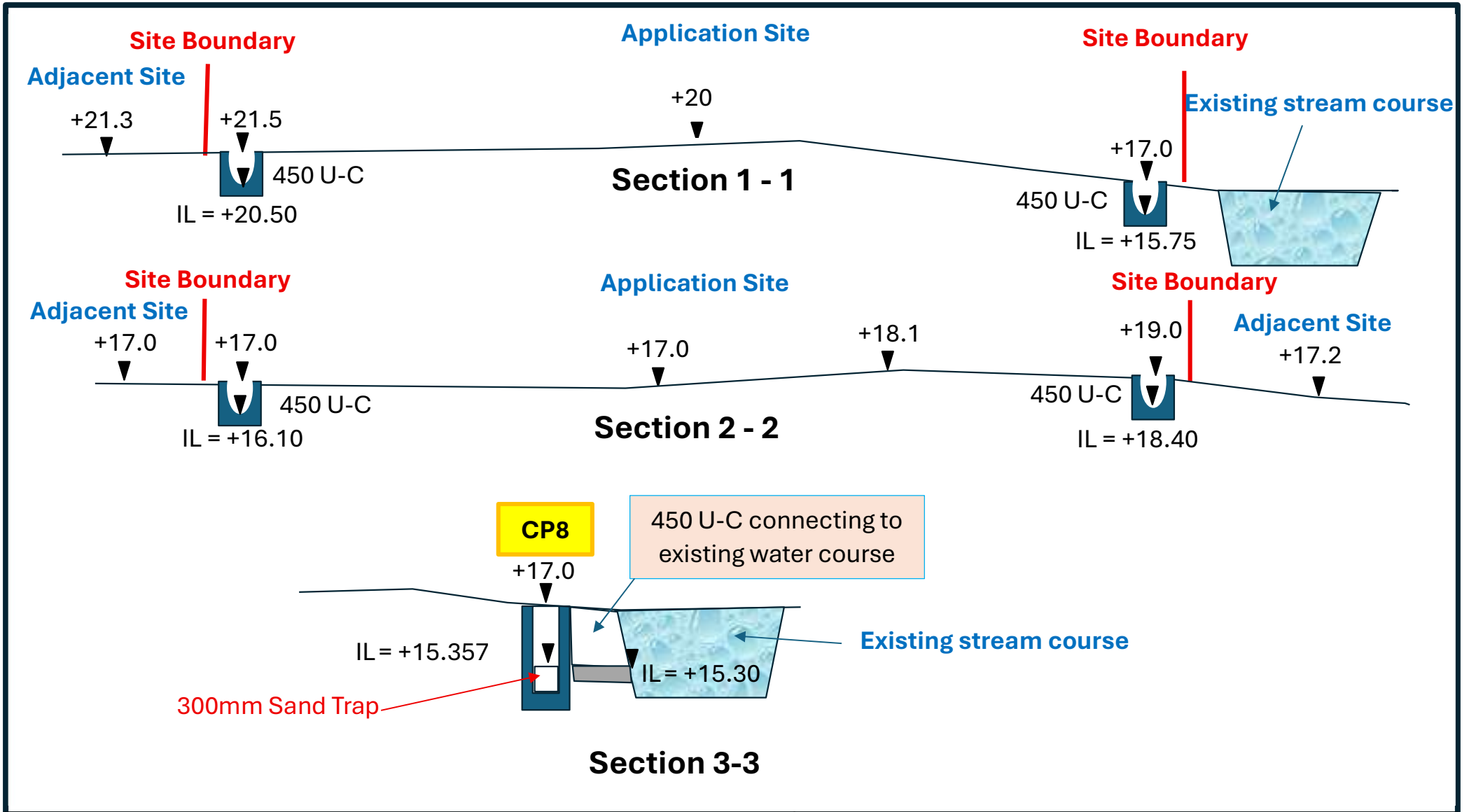
1. All U-channels are 450mm with 0.5% gradient.
2. Peripheral U-channels are provided to cater the catchments from the application site and the adjacent site to prevent the stormwater affecting the adjacent areas.



	Start of u-channel northern Dissection	Distance /Gradient	CP 1	Distance /Gradient	CP 2	Distance /Gradient	CP 3	Distance /Gradient	CP 4	Distance /Gradient	CP 5	Distance /Gradient	CP 6	Distance /Gradient	CP 7	Distance /Gradient	CP 8 with Sand Trap	Distance /Gradient	CP 15	Distance /Gradient	CP 14	Distance /Gradient	CP 13	Distance /Gradient	CP 12	Distance /Gradient	CP 11	Distance /Gradient	CP 10	Distance /Gradient	CP 9	Distance /Gradient	Start of u-channel Eastern Direction
Direction of Flow	→		→		→		→		→		→		→		→		Terminal Catchpit		←		←		←		←		←		←		←		
CL	21.7		21.8		20.8		17		17		17		17		17		17		17		18		18		18		20.5		20.5		20		21.7
Distance		40		45		30		35		40		15		80		35		30		25		5		15		60		18		40		45	
Gradient		1:200		1:200		1:200		1:200		1:200		1:200		1:200		1:200		1:200		1:200		1:200		1:200		1:200		1:200		1:200		1:200	
IL1	21.100		20.900		20.200		16.400		16.225		16.025		15.950		15.550		15.375		16.400		17.300		17.325		17.400		19.110		19.200		19.400		21.100
IL2																	16.250		16.400		17.300		17.325		17.400		19.110		19.200		19.400		21.100
IL out	21.100		20.900		20.200		16.400		16.225		16.025		15.950		15.550		15.375		16.400		17.300		17.325		17.400		19.110		19.200		19.400		21.100

**Drainage Plan**

**Drawing No. HLH 002**



**Sections**

**Drawing No. HLH 003**