N

Application Site

Fall

Existing Local 300UC

Proposed 250 UC 1:200

CP2 G.L 7.2 I.L 6.75

CP4 G.L7.2 I.L 6.72

CP3 G.L7.2 I.L 6.73

Proposed 300 UC 1:160

CP5 G.L 7.2 I.L 6.63

CP6 G.L 7.0 I.L 6.57

CP7 G.L 7.0 I.L 6.44

CP8 G.L 7.0 I.L 6.41

CP9 G.L 7.0 I.L 6.28

CP10 G.L 7.0 I.L 6.22

CP11 G.L 7.8 I.L 6.01

CP12 G.L 7.8 I.L 5.95

CP13 G.L 7.8 I.L 5.88

CP1 G.L 7.9 I.L 6.1

G.L 7.9 I.L 6.2

G.L 7.9 I.L 6.13

CP14 G.L 7.8 I.L 5.46

CP15 G.L 5.9 I.L 5.1

Proposed 250 UC 1:200

Proposed 300 UC 1:155

Proposed 300 UC 1:150

Proposed covered 300 UC 1:200

To existing Local 300 UC

Existing Fence Wall

Existing Local 300 UC

Existing Public 900 Pipe (SWD1070091)

A

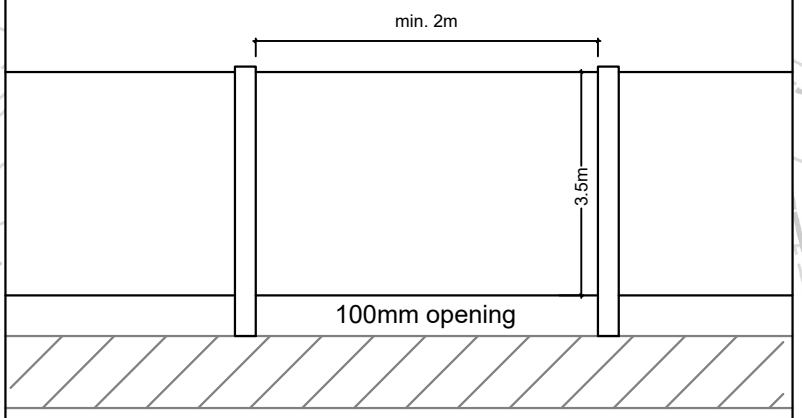
A1

B

B1

Legend

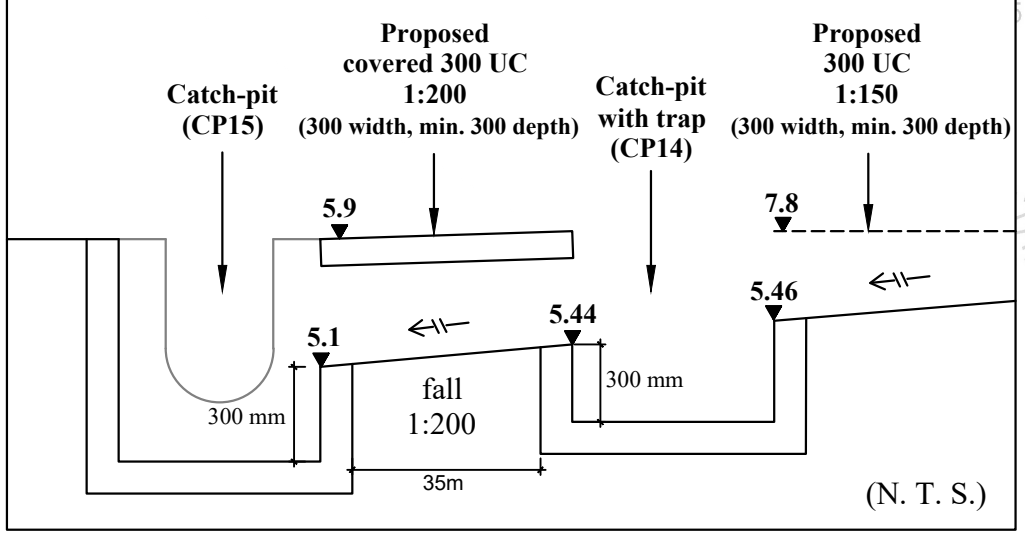
- Proposed Catch-pit
- Proposed Catch-pit with trap
- Proposed U-Channel
- Proposed U-Channel with C.I cover
- Proposed Covered U-Channel
- Existing Fence Wall
- Hoarding with 100mm opening or no hoarding
- Viewpoints of drainage photographs



Details of hoarding with 100mm opening

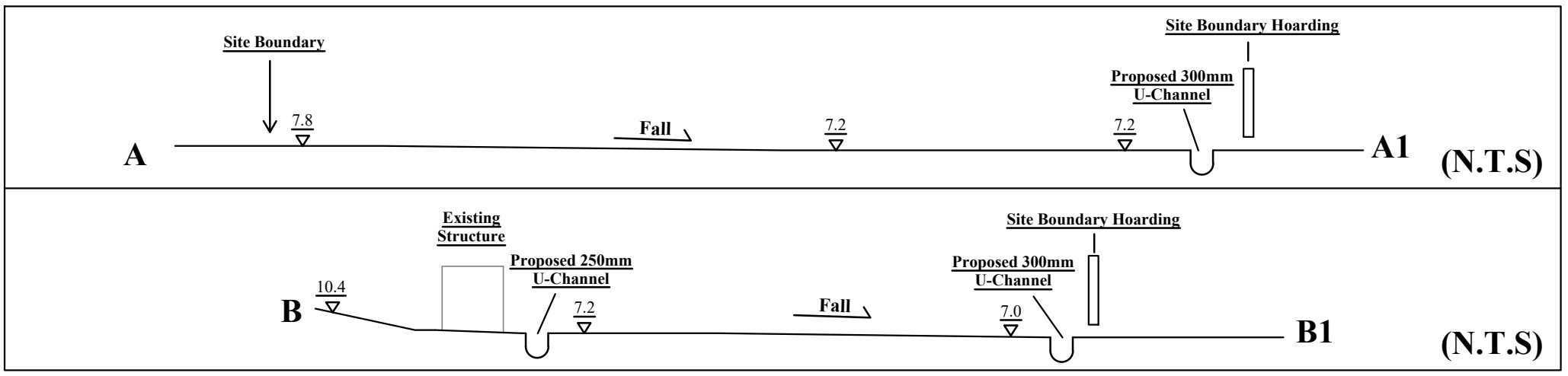
(N. T. S.)

Connection details of proposed outfall between CP14 and CP15

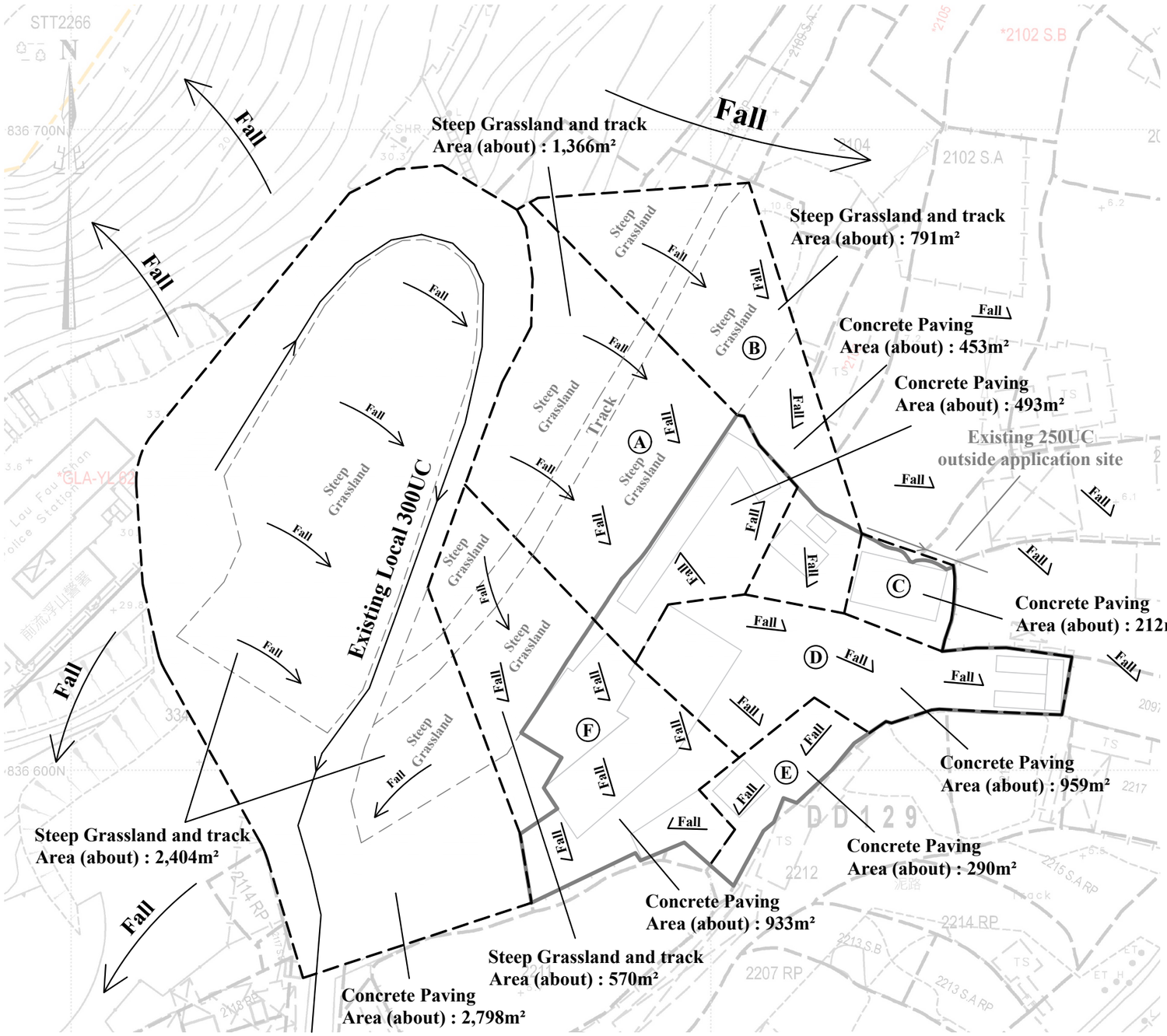


(N. T. S.)

Site Area(about) : 3,007m²

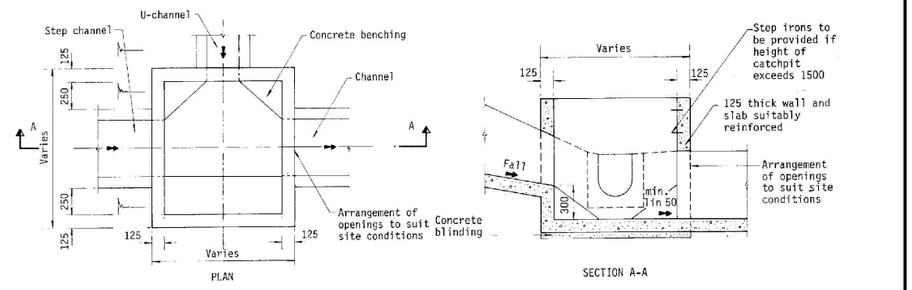


1:750 (A3)	**Drainage Proposal**	Goldrich Planners & Surveyors Ltd.
February 2025	Lots 2098, 2099, 2100(part), 2101 S.A(part), 2101 S.B(part) and 2116(part) in D.D.129	Plan 3.1b (P 24008)

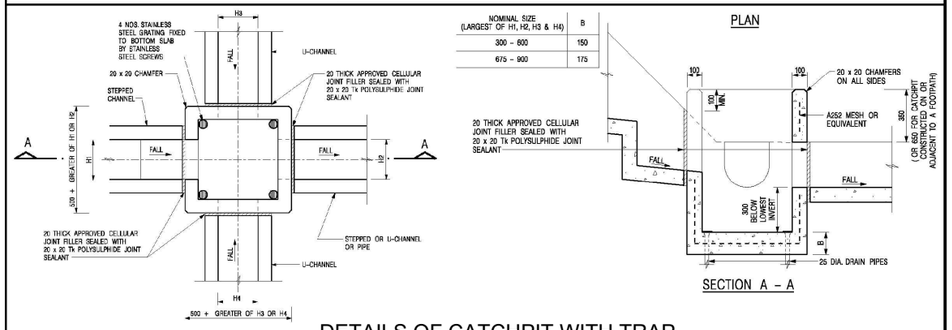


AREA OF CATCHMENT

(N.T.S)

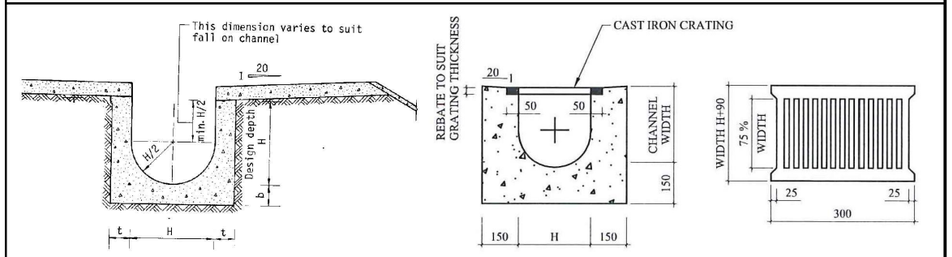


TYPICAL DETAILS OF CATCHPIT

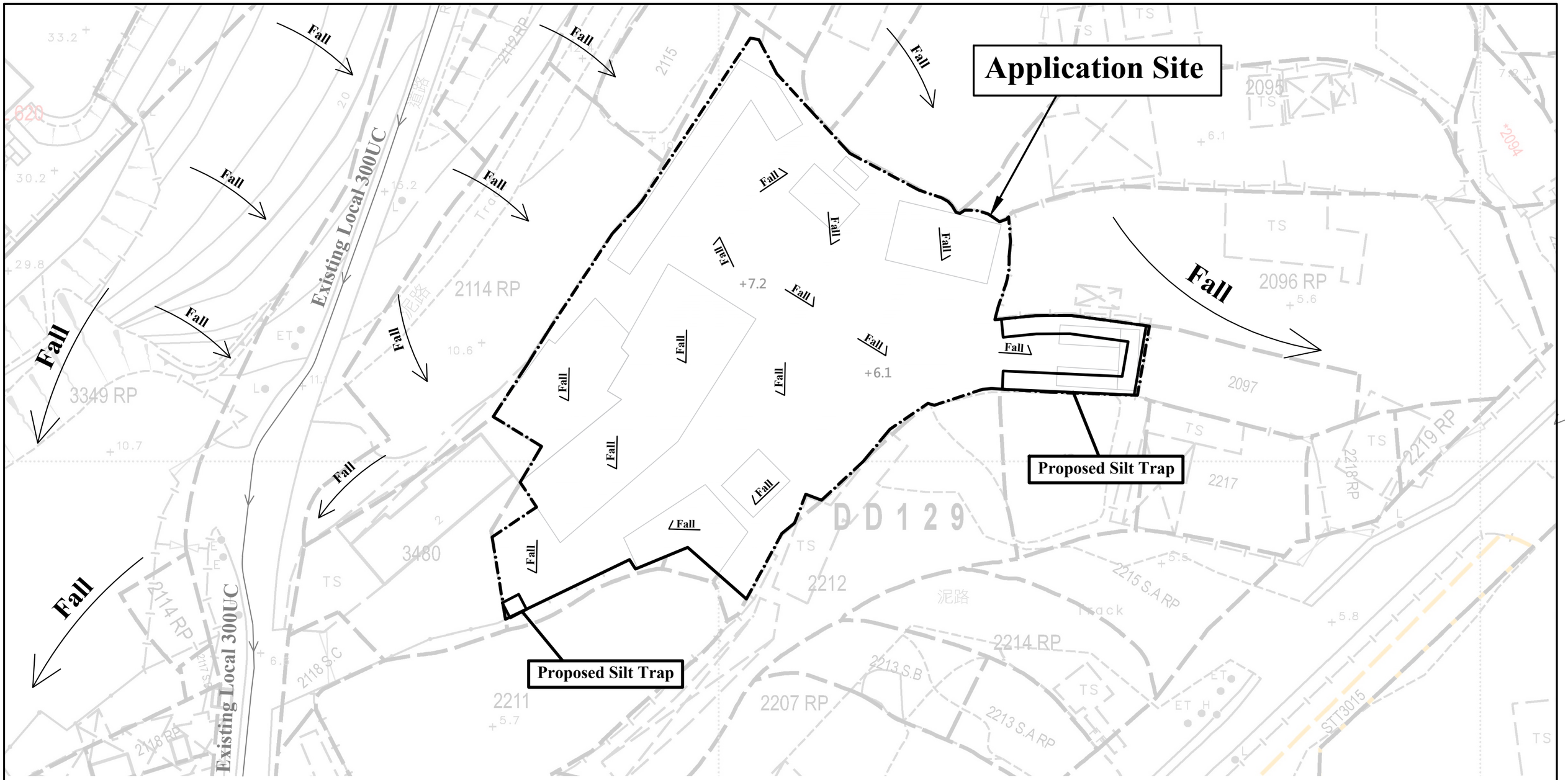


DETAILS OF CATCHPIT WITH TRAP

(REFER TO CEDD'S STANDARD DWG. C2406/1)



N.T.S	**Drainage Proposal**	Goldrich Planners & Surveyors Ltd.
February 2025	Lots 2098, 2099, 2100(part), 2101 S.A(part), 2101 S.B(part) and 2116(part) in D.D.129	Plan 3.2b (P 24008)



Flood Mitigation Measures

Note:

1. Silt traps will be provide before excavation works and hard paving works

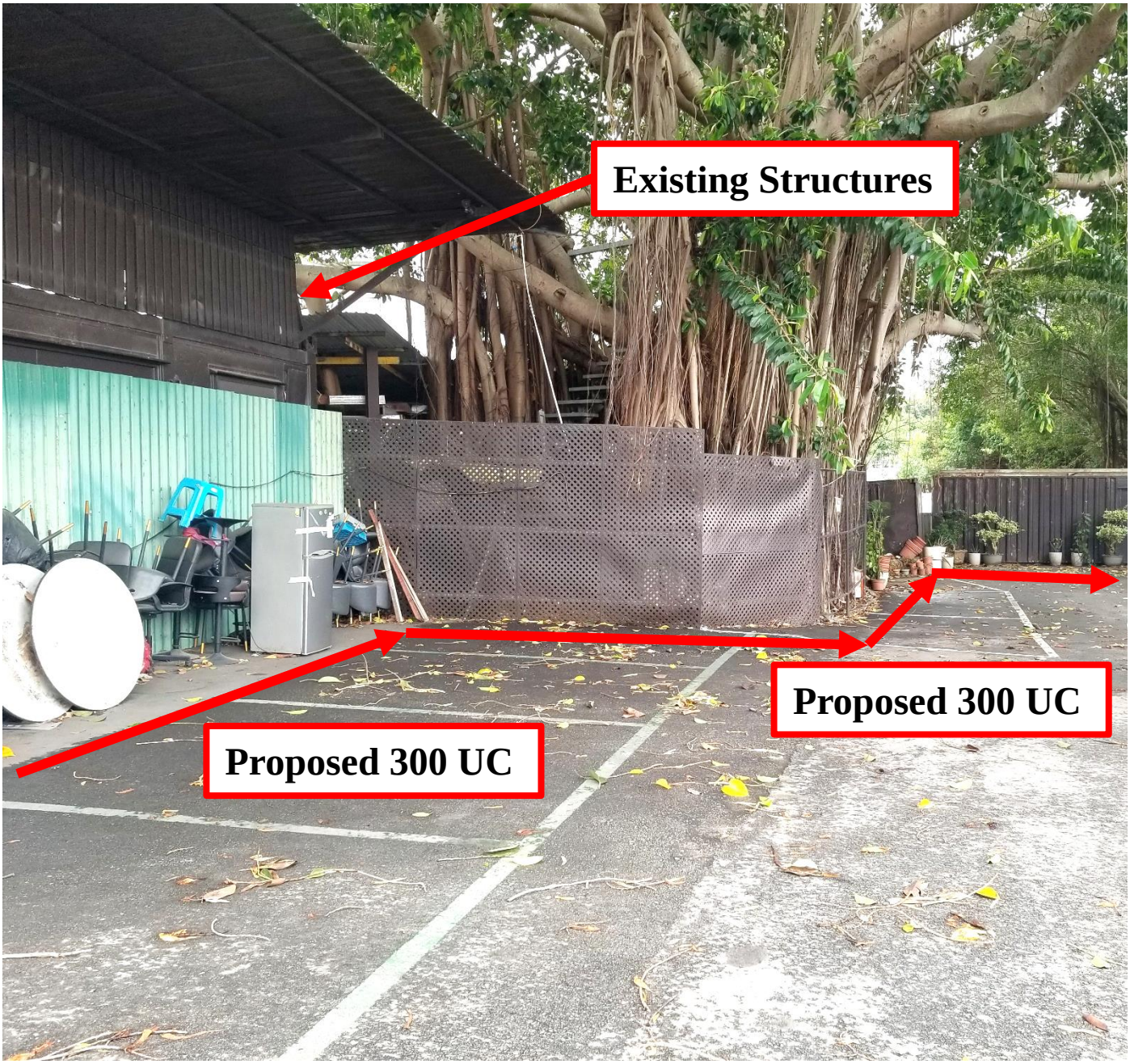
2. Debris / Mud on site will be collected and regularly disposed

3. Debris / Mud in silt traps will be collect and regularly disposed

1:500(A3)	**Drainage Proposal - Flood Mitigation Measures**	Goldrich Planners & Surveyors Ltd.
February 2025	Lots 2098, 2099, 2100(part), 2101 S.A(part), 2101 S.B(part) and 2116(part) in D.D.129	Plan 3.3a (P 24008)

Viewpoint 1

Viewpoint 2



Viewpoint 3

Viewpoint 4

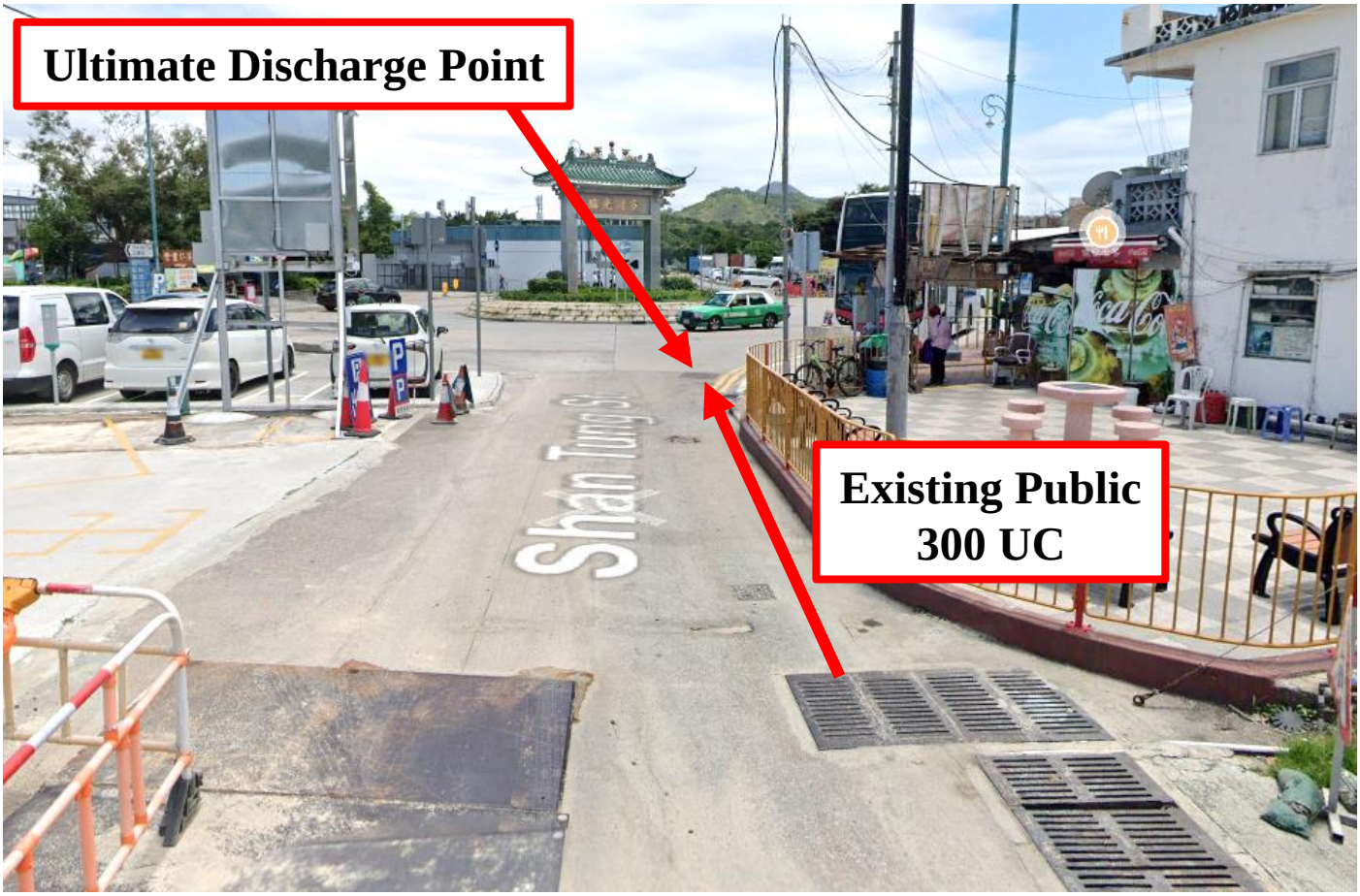
Viewpoint 5


Existing Public 300 UC
Proposed 300 covered UC
皇庭海鮮酒家
THE PALACE RESTAURANT
私房菜

Viewpoint 6

Viewpoint 7

Viewpoint 8


Ultimate Discharge Point
Existing Public
300 UC
Shan Tung St

1 For Catchment Area A

Ref.

Area, A = **1859** m^2
Average slope, H = **24.8** m per 100m
Distance on the line of natural flow, L = **30** m

Time of concentration, t_o = 0.14465L / ($H^{0.2}A^{0.1}$) = 0.14465 (30) / (24.8^0.2*1859^0.1) — SDM 7.5.2 (d)
= 1.1 min

2 For Proposed U-Channel in catchment area A

	From	To
Ground level (mPD)	**7.20**	**7.20**
Invert level (mPD)	**6.95**	**6.72**

Width of u-channel, w = **250** mm
Length of u-channel, L_c = **46** m
Depth of vertical part of u-channel, d = 355 mm
Gradient of u-channel, S_f = (6.95-6.72)/46 = 0.0050

Cross-Section Area, a = 0.5 πr^2 + w d = 0.5 x 3.14 x 125^2 + 250 x 355
= 0.113 m^2
Wetted Perimeter, p = π r + 2 d = 3.14 x 125 + 2 x 355
= 1.103 m
Hydralic radius, R = a / p — SDM 8.2.1
= 0.103 m

3 Use Manning Equation for estimating velocity of stormwater

Take n = 0.016 for concrete lined channels:- — SDM Table 13
Allowable velocity, v = $R^{1/6}$x $(RS_f)^{1/2}$/n = (0.103)^1/6 x (0.103 x 0.005)^1/2 / 0.016 — SDM Table 12
= 0.97 m/s
Time of flow, t_f = 0.8 min

4 Use "Rational Method" for calculation of design flow

Design intensity, i = a / (t_o + t_f +b)^c — SDM 4.3.2
= 505.5 / (1.1+0.8+3.29)^0.355 for return period T = 50 years — Corrigendum 1/2024
= 282 — SDM Table 3a

SDM 7.5.2 (b)

Type of surface	Runoff Coefficient C	Catchment Area A (m^2)	C x A
Flat Glassland(heavy soil)	0.25	**0.0**	0.0
Steep Glassland (heavy soil)	0.35	**1366.0**	478.1
Concrete Paving	0.95	**493.0**	468.4
		SUM =	946.5

Upstream flow, Q_u = **0** m^3/s

Design flow, Q_d = 0.278i Σ C_jA_j + Q_u where A_j is in km^2 — SDM 7.5.2 (a)
= 0.278 x 282 x 946.45 / 1000000 + 0
= 0.074 m^3/s

Allowable flow, Q_a = a x v
= 0.113 x 0.97
= 0.110 m^3/s

> Q_d (O.K.)

Reference was made to Stormwater Drainage Manual (SDM) by DSD

Scale: NA	**Hydraulic Calculation**	Goldrich Planners & Surveyors Ltd.
February 2025	Lots 2098, 2099, 2100(part), 2101 S.A(part), 2101 S.B(part) and 2116(part) in D.D.129	Page 1 (P24008)

1 For Catchment Area B

Ref.

Area, A = **1244** m^2
Average slope, H = **5.8** m per 100m
Distance on the line of natural flow, L = **59** m

Time of concentraction, t_o = 0.14465L / ($H^{0.2}A^{0.1}$) = 0.14465 (59) / (5.8^0.2*1244^0.1) — SDM 7.5.2 (d)
= 2.9 min

2 For Proposed U-Channel in catchment area B

	From	To
Ground level (mPD)	**7.20**	**7.00**
Invert level (mPD)	**6.72**	**6.57**

Width of u-channel, w = **300** mm
Length of u-channel, L_c = **24** m
Depth of vertical part of u-channel, d = 280 mm
Gradient of u-channel, S_f = (6.72-6.57)/24 = 0.0062

Cross-Section Area, a = 0.5 πr^2 + w d = 0.5 x 3.14 x 150^2 + 300 x 280
= 0.119 m^2
Wetted Perimeter, p = π r + 2 d = 3.14 x 150 + 2 x 280
= 1.031 m
Hydralic radius, R = a / p — SDM 8.2.1
= 0.116 m

3 Use Manning Equation for estimating velocity of stormwater

Take n = 0.016 for concrete lined channels:- — SDM Table 13
Allowable velocity, v = $R^{1/6}$x $(RS_f)^{1/2}$/n = (0.116)^1/6 x (0.116 x 0.006)^1/2 / 0.016 — SDM Table 12
= 1.17 m/s
Time of flow, t_f = 0.3 min

4 Use "Rational Method" for calculation of design flow

Design intensity, i = a / (t_o + t_f +b)^c — SDM 4.3.2
= 505.5 / (2.9+0.3+3.29)^0.355 for return period T = 50 years — Corrigendum 1/2024
= 259 — SDM Table 3a

SDM 7.5.2 (b)

Type of surface	Runoff Coefficient C	Catchment Area A (m^2)	C x A
Flat Glassland(heavy soil)	0.25	**0.0**	0.0
Steep Glassland (heavy soil)	0.35	**791.0**	276.9
Concrete Paving	0.95	**453.0**	430.4
		SUM =	707.2

Upstream flow, Q_u = **0.074** m^3/s

Design flow, Q_d = 0.278i Σ C_jA_j + Q_u where A_j is in km^2 — SDM 7.5.2 (a)
= 0.278 x 259 x 707.2 / 1000000 + 0.074
= 0.125 m^3/s

Allowable flow, Q_a = a x v
= 0.119 x 1.17
= 0.140 m^3/s

> Q_d (O.K.)

Reference was made to Stormwater Drainage Manual (SDM) by DSD

1 For Catchment Area C

				Ref.
Area, A	=	**212**	m^2	
Average slope, H	=	**1.67**	m per 100m	
Distance on the line of natural flow, L	=	**12**	m	
Time of concentraction, t_o	=	0.14465L / ($H^{0.2}A^{0.1}$) = 0.14465 (12) / (1.67^0.2*212^0.1)		SDM 7.5.2 (d)
	=	0.9	min	

2 For Proposed U-Channel in catchment area C

	From	To
Ground level (mPD)	**7.00**	**7.00**
Invert level (mPD)	**6.57**	**6.44**

Width of u-channel, w	=	**300**	mm
Length of u-channel, L_c	=	**20**	m
Depth of vertical part of u-channel, d	=	410	mm
Gradient of u-channel, S_f	=	(6.57-6.44)/20 = 0.0065	
Cross-Section Area, a	=	0.5 πr^2 + w d = 0.5 x 3.14 x 150^2 + 300 x 410	
	=	0.158	m^2
Wetted Perimeter, p	=	π r + 2 d = 3.14 x 150 + 2 x 410	
	=	1.291	m
Hydralic radius, R	=	a / p	SDM 8.2.1
	=	0.123	m

3 Use Manning Equation for estimating velocity of stormwater

Take n	=	0.016	for concrete lined channels:-	SDM Table 13
Allowable velocity, v	=	$R^{1/6}$x $(RS_f)^{1/2}$/n = (0.123)^1/6 x (0.123 x 0.006)^1/2 / 0.016		SDM Table 12
	=	1.24	m/s	
Time of flow, t_f	=	0.3	min	

4 Use "Rational Method" for calculation of design flow

Design intensity, i	=	a / (t_o + t_f +b)^c		SDM 4.3.2
	=	505.5 / (0.9+0.3+3.29)^0.355	for return period T = 50 years	Corrigendum 1/2024
	=	297		SDM Table 3a

Type of surface	Runoff Coefficient C	Catchment Area A (m^2)	C x A
Flat Glassland(heavy soil)	0.25	**0.0**	0.0
Concrete Paving	0.95	**212.0**	201.4
		SUM =	201.4

SDM 7.5.2 (b)

Upstream flow, Q_u	=	**0.125**	m^3/s	
Design flow, Q_d	=	0.278i Σ C_jA_j + Q_u where A_j is in km^2		SDM 7.5.2 (a)
	=	0.278 x 297 x 201.4 / 1000000 + 0.125		
	=	0.142	m^3/s	
Allowable flow, Q_a	=	a x v		
	=	0.158 x 1.24		
	=	0.197	m^3/s	
	>	Q_d (O.K.)		

Reference was made to Stormwater Drainage Manual (SDM) by DSD

1 For Catchment Area D

Ref.

Area, A = **959** m^2
Average slope, H = **2.75** m per 100m
Distance on the line of natural flow, L = **51** m

Time of concentration, t_o = $0.14465L / (H^{0.2}A^{0.1})$ = 0.14465 (51) / (2.75^0.2*959^0.1) — SDM 7.5.2 (d)
= 3.0 min

2 For Proposed U-Channel in catchment area d

	From	To
Ground level (mPD)	**7.00**	**7.80**
Invert level (mPD)	**6.44**	**5.88**

Width of u-channel, w = **300** mm
Length of u-channel, L_c = **85.3** m
Depth of vertical part of u-channel, d = 1770 mm
Gradient of u-channel, S_f = (6.44-5.88)/85.3 = 0.0066

Cross-Section Area, a = $0.5 \pi r^2 + w d$ = 0.5 x 3.14 x 150^2 + 300 x 1770
= 0.566 m^2
Wetted Perimeter, p = $\pi r + 2 d$ = 3.14 x 150 + 2 x 1770
= 4.011 m
Hydralic radius, R = a / p — SDM 8.2.1
= 0.141 m

3 Use Manning Equation for estimating velocity of stormwater

Take n = 0.016 for concrete lined channels:- — SDM Table 13
Allowable velocity, v = $R^{1/6} x (RS_f)^{1/2}/n$ = (0.141)^1/6 x (0.141 x 0.007)^1/2 / 0.016 — SDM Table 12
= 1.37 m/s
Time of flow, t_f = 1.0 min

4 Use "Rational Method" for calculation of design flow

Design intensity, i = $a / (t_o + t_f + b)^c$ — SDM 4.3.2
= 505.5 / (3+1+3.29)^0.355 for return period T = 50 years — Corrigendum 1/2024
= 249 — SDM Table 3a

Type of surface	Runoff Coefficient C	Catchment Area A (m^2)	C x A
Flat Glassland(heavy soil)	0.25	**0.0**	0.0
Concrete Paving	0.95	**959.0**	911.1
		SUM =	911.1

SDM 7.5.2 (b)

Upstream flow, Q_u = **0.142** m^3/s

Design flow, Q_d = $0.278i \Sigma C_j A_j + Q_u$ where A_j is in km^2 — SDM 7.5.2 (a)
= 0.278 x 249 x 911.05 / 1000000 + 0.142
= 0.205 m^3/s

Allowable flow, Q_a = a x v
= 0.566 x 1.37
= 0.778 m^3/s

> Q_d (O.K.)

Reference was made to Stormwater Drainage Manual (SDM) by DSD

1 For Catchment Area E

Ref.

Area, A = **290** m^2
Average slope, H = **0.1** m per 100m
Distance on the line of natural flow, L = **11.5** m

Time of concentration, t_o = $0.14465L / (H^{0.2}A^{0.1})$ = 0.14465 (11.5) / (0.1^0.2*290^0.1) — SDM 7.5.2 (d)
= 1.5 min

2 For Proposed U-Channel in catchment area E

	From	To
Ground level (mPD)	**7.90**	**7.80**
Invert level (mPD)	**6.20**	**5.88**

Width of u-channel, w = **250** mm
Length of u-channel, L_c = **63** m
Depth of vertical part of u-channel, d = 1795 mm
Gradient of u-channel, S_f = (6.2-5.88)/63 = 0.0051

Cross-Section Area, a = $0.5 \pi r^2 + w d$ = 0.5 x 3.14 x 125^2 + 250 x 1795
= 0.473 m^2
Wetted Perimeter, p = $\pi r + 2 d$ = 3.14 x 125 + 2 x 1795
= 3.983 m
Hydralic radius, R = a / p — SDM 8.2.1
= 0.119 m

3 Use Manning Equation for estimating velocity of stormwater

Take n = 0.016 for concrete lined channels:- — SDM Table 13
Allowable velocity, v = $R^{1/6} x (RS_f)^{1/2}/n$ = (0.119)^1/6 x (0.119 x 0.005)^1/2 / 0.016 — SDM Table 12
= 1.08 m/s
Time of flow, t_f = 1.0 min

4 Use "Rational Method" for calculation of design flow

Design intensity, i = $a / (t_o + t_f + b)^c$ — SDM 4.3.2
= 505.5 / (1.5+1+3.29)^0.355 for return period T = 50 years — Corrigendum 1/2024
= 271 — SDM Table 3a

Type of surface	Runoff Coefficient C	Catchment Area A (m^2)	C x A
Flat Glassland(heavy soil)	0.25	**0.0**	0.0
Concrete Paving	0.95	**290.0**	275.5
		SUM =	275.5

SDM 7.5.2 (b)

Upstream flow, Q_u = **0** m^3/s

Design flow, Q_d = $0.278i \Sigma C_j A_j + Q_u$ where A_j is in km^2 — SDM 7.5.2 (a)
= 0.278 x 271 x 275.5 / 1000000 + 0
= 0.021 m^3/s

Allowable flow, Q_a = a x v
= 0.473 x 1.08
= 0.510 m^3/s

> Q_d (O.K.)

Reference was made to Stormwater Drainage Manual (SDM) by DSD

1 For Catchment Area F

Ref.

Area, A = **1171** m^2
Average slope, H = **14.35** m per 100m
Distance on the line of natural flow, L = **42.5** m

Time of concentration, t_o = 0.14465L / ($H^{0.2}A^{0.1}$) = 0.14465 (42.5) / (14.35^0.2*1171^0.1) — SDM 7.5.2 (d)
= 1.8 min

2 For Proposed U-Channel in catchment area F

	From	To
Ground level (mPD)	**7.80**	**7.80**
Invert level (mPD)	**5.88**	**5.46**

Width of u-channel, w = **300** mm
Length of u-channel, L_c = **63** m
Depth of vertical part of u-channel, d = 2190 mm
Gradient of u-channel, S_f = (5.88-5.46)/63 = 0.0067

Cross-Section Area, a = 0.5 πr^2 + w d = 0.5 x 3.14 x 150^2 + 300 x 2190
= 0.692 m^2
Wetted Perimeter, p = π r + 2 d = 3.14 x 150 + 2 x 2190
= 4.851 m
Hydralic radius, R = a / p — SDM 8.2.1
= 0.143 m

3 Use Manning Equation for estimating velocity of stormwater

Take n = 0.016 for concrete lined channels:- — SDM Table 13
Allowable velocity, v = $R^{1/6}$x $(RS_f)^{1/2}$/n = (0.143)^1/6 x (0.143 x 0.007)^1/2 / 0.016 — SDM Table 12
= 1.39 m/s
Time of flow, t_f = 0.8 min

4 Use "Rational Method" for calculation of design flow

Design intensity, i = a / (t_o + t_f +b)^c — SDM 4.3.2
= 505.5 / (1.8+0.8+3.29)^0.355 for return period T = 50 years — Corrigendum 1/2024
= 270 — SDM Table 3a

Type of surface	Runoff Coefficient C	Catchment Area A (m^2)	C x A
Flat Glassland(heavy soil)	0.25	**0.0**	0.0
Steep Glassland (heavy soil)	0.35	**570.0**	199.5
Concrete Paving	0.95	**933.0**	886.4
		SUM =	1085.9

— SDM 7.5.2 (b)

Upstream flow, Q_u = **0.163** m^3/s

Design flow, Q_d = 0.278i Σ C_jA_j + Q_u where A_j is in km^2 — SDM 7.5.2 (a)
= 0.278 x 270 x 1085.85 / 1000000 + 0.163
= 0.245 m^3/s

Allowable flow, Q_a = a x v
= 0.692 x 1.39
= 0.965 m^3/s

> Q_d (O.K.)

Reference was made to Stormwater Drainage Manual (SDM) by DSD

1 For Catchment Area between CP14 and CP15

Ref.

Area, A = **0** m^2
Average slope, H = **0.1** m per 100m
Distance on the line of natural flow, L = **0** m

Time of concentration, t_o = $0.14465L / (H^{0.2}A^{0.1})$ = 0.14465 (0) / (0.1^0.2*0^0.1) — SDM 7.5.2 (d)
= 0.0 min

2 For Proposed U-Channel between CP14 and CP15

	From	To
Ground level (mPD)	**7.80**	**5.90**
Invert level (mPD)	**5.46**	**5.10**

Width of u-channel, w = **300** mm
Length of u-channel, L_c = **72** m
Depth of vertical part of u-channel, d = 650 mm
Gradient of u-channel, S_f = (5.46-5.1)/72 = 0.0050

Cross-Section Area, a = $0.5 \pi r^2 + w d$ = 0.5 x 3.14 x 150^2 + 300 x 650
= 0.230 m^2
Wetted Perimeter, p = $\pi r + 2 d$ = 3.14 x 150 + 2 x 650
= 1.771 m
Hydralic radius, R = a / p — SDM 8.2.1
= 0.130 m

3 Use Manning Equation for estimating velocity of stormwater

Take n = 0.016 for concrete lined channels:- — SDM Table 13
Allowable velocity, v = $R^{1/6} x (RS_f)^{1/2}/n$ = (0.13)^1/6 x (0.13 x 0.005)^1/2 / 0.016 — SDM Table 12
= 1.13 m/s
Time of flow, t_f = 1.06 min

4 Use "Rational Method" for calculation of design flow

Design intensity, i = $a / (t_o + t_f + b)^c$ — SDM 4.3.2
= 505.5 / (0+1.1+3.29)^0.355 for return period T = 50 years — Corrigendum 1/2024
= 300 — SDM Table 3a

Type of surface	Runoff Coefficient C	Catchment Area A (m^2)	C x A
Flat Glassland(heavy soil)	0.25	**0.0**	0.0
Concrete Paving	0.95	**0.0**	0.0
		SUM =	0.0

SDM 7.5.2 (b)

Upstream flow, Q_u = **0.245** m^3/s

Design flow, Q_d = $0.278i \Sigma C_j A_j + Q_u$ where A_j is in km^2 — SDM 7.5.2 (a)
= 0.278 x 300 x 0 / 1000000 + 0.245
= 0.245 m^3/s

Allowable flow, Q_a = a x v
= 0.23 x 1.13
= 0.261 m^3/s

> Q_d (O.K.)

Reference was made to Stormwater Drainage Manual (SDM) by DSD

1 For Catchment Area to the North of CP15

Ref.

Area, A = **5202** m^2
Average slope, H = **50** m per 100m
Distance on the line of natural flow, L = **33** m

Time of concentration, t_o = $0.14465L / (H^{0.2}A^{0.1})$ = 0.14465 (33) / (50^0.2*5202^0.1) — SDM 7.5.2 (d)
= 0.9 min

2 For Existing Public U-Channel after CP15

	From	To
Ground level (mPD)	**5.90**	**5.80**
Invert level (mPD)	**5.10**	**4.50**

Width of u-channel, w = **300** mm
Length of u-channel, L_c = **72** m
Depth of vertical part of u-channel, d = **1150** mm
Gradient of u-channel, S_f = (5.1-4.5)/72 = 0.0083

Cross-Section Area, a = $0.5 \pi r^2 + w d$ = 0.5 x 3.14 x 150^2 + 300 x 1150
= 0.380 m^2
Wetted Perimeter, p = π r + 2 d = 3.14 x 150 + 2 x 1150
= 2.771 m
Hydralic radius, R = a / p — SDM 8.2.1
= 0.137 m

3 Use Manning Equation for estimating velocity of stormwater

Take n = 0.016 for concrete lined channels:- — SDM Table 13
Allowable velocity, v = $R^{1/6} x (RS_f)^{1/2}/n$ = (0.137)^1/6 x (0.137 x 0.008)^1/2 / 0.016 — SDM Table 12
= 1.52 m/s
Time of flow, t_f = 0.79 min

4 Use "Rational Method" for calculation of design flow

Design intensity, i = $a / (t_o + t_f + b)^c$ — SDM 4.3.2
= 505.5 / (0.9+0.8+3.29)^0.355 for return period T = 50 years — Corrigendum 1/2024
= 285 — SDM Table 3a

SDM 7.5.2 (b)

Type of surface	Runoff Coefficient C	Catchment Area A (m^2)	C x A
Flat Glassland(heavy soil)	0.25	**0.0**	0.0
Steep Glassland (heavy soil)	0.35	**2404.0**	841.4
Concrete Paving	0.95	**2798.0**	2658.1
		SUM =	3499.5

Upstream flow, Q_u = **0.245** m^3/s

Design flow, Q_d = $0.278i \Sigma C_j A_j + Q_u$ where A_j is in km^2 — SDM 7.5.2 (a)
= 0.278 x 285 x 3499.5 / 1000000 + 0.245
= 0.523 m^3/s

Allowable flow, Q_a = a x v
= 0.38 x 1.52
= 0.577 m^3/s

> Q_d (O.K.)

Reference was made to Stormwater Drainage Manual (SDM) by DSD