SUBMISSION REPORT
(RESUBMISSION NO.2)
FOR
DRAINAGE PROPOSAL DESIGN
FOR PROPOSED DEVELOPMENT
ON
LOT 1294, 1295, 1298, 1302, 1303, 1304, 1305, 1307 IN D.D.119

Date : March 2025

TABLE OF CONTENTS

APPENDIX

REFERENCES

1. Stormwater Drainage Manual, Planning Design and Management by DSD
2. Geotechnical Manual for Slopes by GEO
3. Standard Drawings by DSD

1. Introduction

This proposal is prepared for the proposed stormwater drainage works for the NTEH development at lot 1294, 1295, 1298, 1302, 1303, 1304, 1305, 1307 in D.D.119.

2. Existing Drainage Condition

A plan showing the existing catchments are enclosed in **Appendix B**. Currently, the surface runoff collected from the site is discharging to existing 1.4m wide stream as shown in **Appendix A**. As per the existing site condition, an additional peripheral U-channels area is considered necessary for the proposed development. A drainage proposal is required to be carried out for the proposed development.

3. Design Parameters & Assumptions

The design criteria to be used for the modeling assessment are based on the standards set out in the Stormwater Drainage Manual, Third Edition (SDM). According to Section 6.6.1 of the SDM, the existing village drainage system in the vicinity of the development is classified as main rural catchment drainage system. Table 10 of the SDM recommends to be adopted a 50 year design return period storm event for the urban drainage branch system.

<u>Stormwater Runoff (Q)</u>

The rate of stormwater runoff used in this assessment report is estimated by the "Rational method" in which the peak runoff is calculated from the formula:

$$Q = K \times i \times A / 3600$$

where Q = maximum runoff (L/s)

i = design mean intensity of rainfall (mm/hr)

A = area of catchment (m^2)

K = runoff coefficient

Time of Concentration (tc)

The time of concentration is defined as the time required for stormwater runoff to flow from the most remote part of the catchment area to the point in the drainage system under consideration. Based on the assumptions adopted in the Rational Method, this is the time taken for the peak runoff to become established at the considered section.

The time of concentration comprises the time for water flowing within natural catchments and along the man-made drainage pipes/channels. For natural catchments, the time of concentration is estimated by the modified form of the Brandsby William's equation.

$$t_o = \frac{0.14465L}{H^{0.2} A^{0.1}}$$

Where t_o = time of concentration of a natural catchment (min.)

A = catchment area (m^2)

H = average slope (m per 100m), 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)

Mean Rainfall Intensity (i)

Mean rainfall intensity-duration curves attached in this report are based on the Statistical analysis of long term rainfall records from the Hong Kong Observatory. A return period of 50 years is adopted.

Runoff Coefficient (K)

The value of K is taken as 1 for developed area. For vegetated ground, the value of K is taken as 0.3.

4. Proposed Stormwater Drainage

The proposed stormwater drainage works include surface U-channels at the peripheral of the site collecting the runoff from catchments within the site. The U-channels will connect and discharge the surface runoff to the existing 1.4m wide stream. Catchpits with 300mm sump are proposed at the discharged points of proposed U-Channel to desilt the surface water before discharging to the drainage outside. The proposed stormwater drainage layout plan is shown in **Appendix A**.

5. Effect on Drainage Characteristics and Potential Drainage Impact

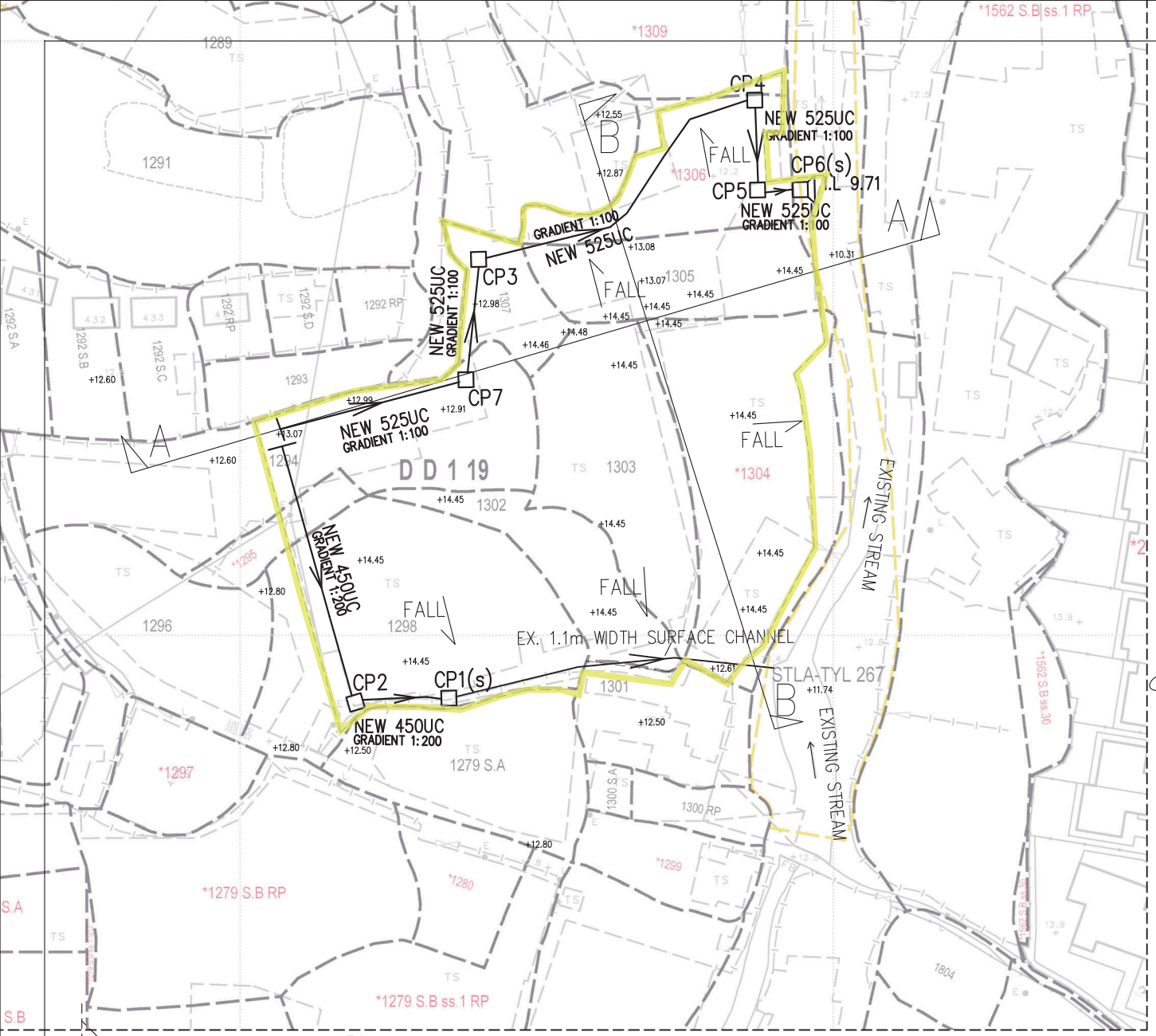
The drainage design of the proposed U-channel are presented in **Appendix B**. Since no new walls or hoarding would be erected or laid along the site boundary, the existing flow path of the site and its adjacent area would not be affected from the development.

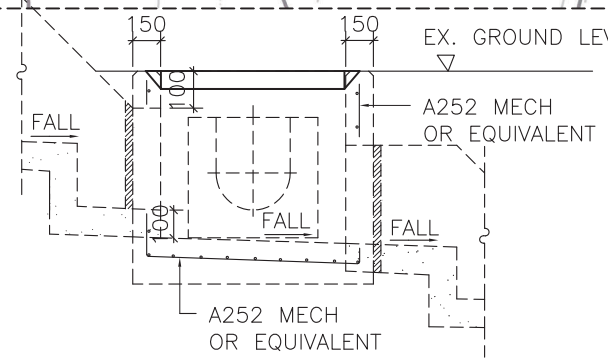
6. Conclusion

Peripheral channels are to be provided along the site boundary where necessary to intercept runoff from crossing the site. The drainage conditions of adjacent areas will not be adversely affected.

Appendix A

Stormwater Drainage Proposal Plan



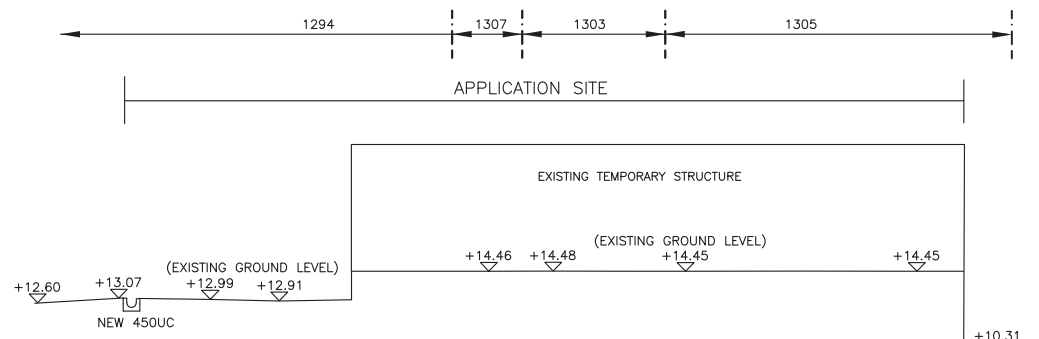


SECTION D–D

N.T.S.

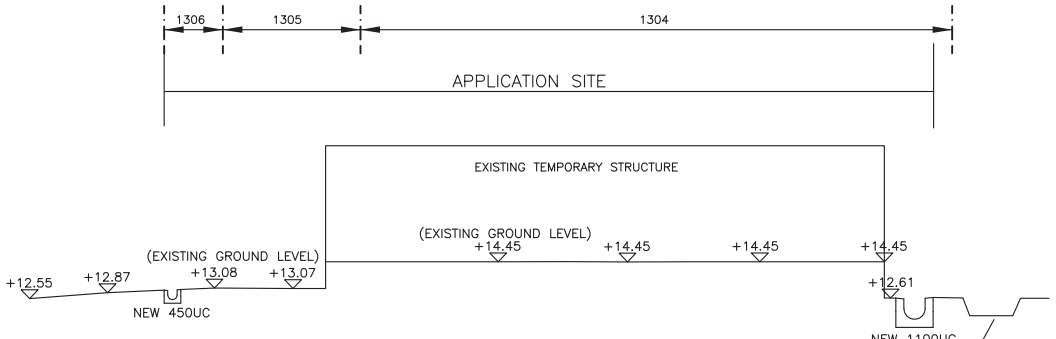
PROPOSED CATCHPIT SCHEDULE

CATCHPIT NO.	C.L. (mPD)	I.L. (mPD)
CP1(s)	12.80	12.05
CP2	12.80	12.12
CP3	12.98	11.67
CP4	12.20	11.12
CP5	12.20	11.00
CP6(s)	12.20	10.99
CP7	12.91	11.85



SECTION A–A

(REMARKS : NO FILLING WORKS FOR THIS APPLICATION)

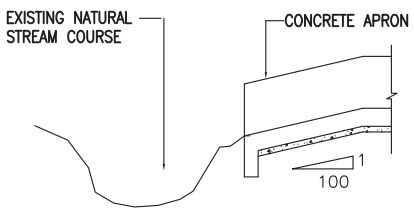


SECTION B–B

(REMARKS : NO FILLING WORKS FOR THIS APPLICATION)

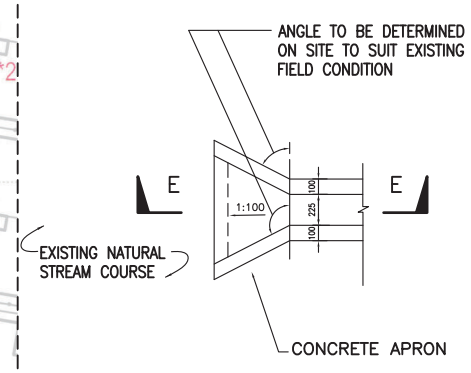
LEGEND:

	HOUSE LOT BOUNDARY
NEW 450UC	PROPOSED 450mm U-CHANNEL
CP1(s)	PROPOSED COVERED DESILTED CATCHPIT NO. CP1
CP2	PROPOSED COVERED CATCHPIT NO. CP2
	PROPOSED DISCHARGE APRON



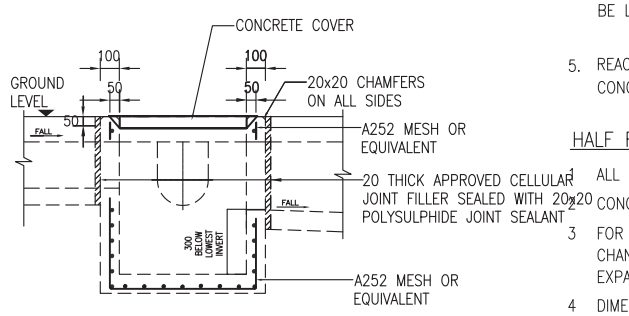
SECTION E – E

N.T.S.



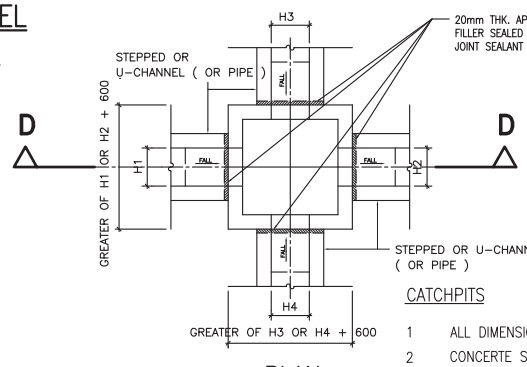
PLAN OF U–CHANNEL DISCHARGE POINT

N.T.S.



SECTION D – D WITH DESILTED TRAP

COMPLY WITH CEDD'S DRAWING NO. DS C2405 AND C2406I



PLAN

TYPICAL DETAILS OF CATCHPIT

CATCHPITS

1 ALL DIMENSIONS ARE IN MILLIMETRES

2 CONCERTE SURFACE FINISH SHALL BE CLASS U2 OR F3 AS APPROPRIATE

GENERAL NOTE

1. THE PROPOSED DRAINAGE WORK, WHETHER WITHIN OR OUTSIDE THE LOT BOUNDARY, SHOULD BE CONSTRUCTED AND MAINTAINED BY THE LOT OWNER AT HIS OWN EXPENSE. FOR WORKS TO BE UNDERTAKEN OUTSIDE THE LOT BOUNDARY, PRIOR CONSENT AND AGREEMENT FROM DLO AND/OR RELEVANT PRIVATE LOT OWNER SHOULD BE SOUGHT.
2. NO NEW WALLS OR HOARDING WOULD BE ERECTED OR LAID ALONG THE SITE BOUNDARY

CONCRETE STRENGTH AND STEEL REINFORCEMENT SPECIFICATION FOR DRAINAGE DETAILS

1. CONCRETE GRADE FOR CATCHPITS AND U–CHANNEL SHALL BE 30D DESIGN IN COMPLIANCE WITH CS1 : 2010 FOR BLINDING LAYER SHALL BE 15D, DESIGN COMPLY WITH CS1–2010.
2. ALL MAIN BARS TO BE HOT ROLLED HIGH YIELD STEEL DEFORMED BAR COMPLM WITH CS2 : 2012
   Y – HIGH YIELD BAR 500 MPa
   M – MILD STEEL BAR 250 MPa
3. CONCRETE COVER TO MAIN REINFORCEMENT TO BE 50mm.
4. LAP LENGTH FOR ALL BARS TO BE 46x DIAMETER OF LARGER BAR TO BE LAPPED.
5. REACTIVE ALKALI CONTENT EXPRESSED IN SODIUM OXIDE PER CUBIC METER OF CONCRETE SHOULD NOT EXCEED 3KG AS PER PNAP APP–74.

HALF ROUND, U, AND STEPPED – CHANNELS

1 ALL DIMENSIONS ARE IN MILLIMETERS

2 CONCRETE SURFACE FINISHING SHALL BE CLASS U2 OR F2 AS APPROPRIATE

3 FOR HALF ROUND AND U – CHANNEL, SPACING OF EXPANSION JOINT IN CHANNELS, BERMS AND APRON TO BE 10m MAXIMUN. FOR STEPPED CHANNELS, EXPANSION JOINTS TO BE PROVIDED AT A MAXIMUN SPACING OF 10m.

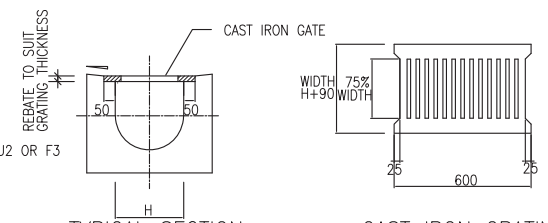
4 DIMENSIONS FOR HALF ROUND AND U–CHANNELS SEE TABLE 1.

5 THE COVER FOR U–CHANNELS AND CATCHPIT SHALL COMPLY WITH CEDD'S STANDARD DRAWINGS NO. C2405 TO C2407 AND C2412.

6 ALL PROPOSED U–CHANNELS SHALL BE COVERED WITH GRATING

TABLE 1 : DIMENSION OF U–CHANNEL AND HALF–ROUND CHANNEL

NORMAL SIZE H	T	B	REINFORCING
<300	100	100	NIL
375 – 675	150	150	NIL
750 – 900	175	175	A252 MESH PLACED CENTRALLY

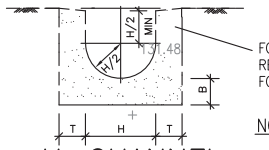


TYPICAL SECTION

CAST IRON GRADING

(DIMENSIONS ARE FOR GUIDANCE ONLY. CONTRACTOR MAY SUBMIT EQUIVALENT TYPE)

U–CHANNEL WITH CAST IRON GRATING

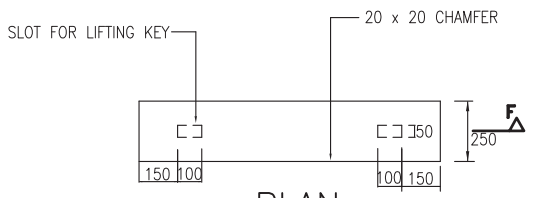


U–CHANNEL

COMPLY WITH FIG 8.11 OF GEOTECHNICAL MANUAL FOR SLOPES

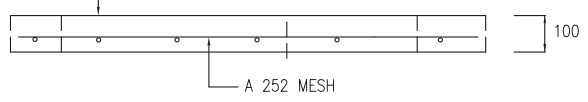
NOTES:

1. H = NOMINAL CHANNEL SIZE.



PLAN

N.T.S.
GRADE 25D CONCRETE WITH ONE LAYER OF A 252 MESH REINFORCEMENT PLACED CENTRALLY F2 AND U2 FINISH



PRECAST CONCRETE COVERS FOR CATCHPIT

N.T.S.

B	RESUBMISSION NO.2	RC	AY	RY	MARCH 25
A	RESUBMISSION NO.1	RC	AY	RY	OCT 24
	DLO SUBMIT	RC	AY	RY	DEC 23
REV	DESCRIPTION	CHECKED	APPROVED	DWN	DATE

PROJECT TITLE:

STORMWATER DRAINAGE PROPOSAL
LOT 1294,1295,1298,1302,1303,1304,
1305,1307 IN D.D. 119

DRAWING TITLE:

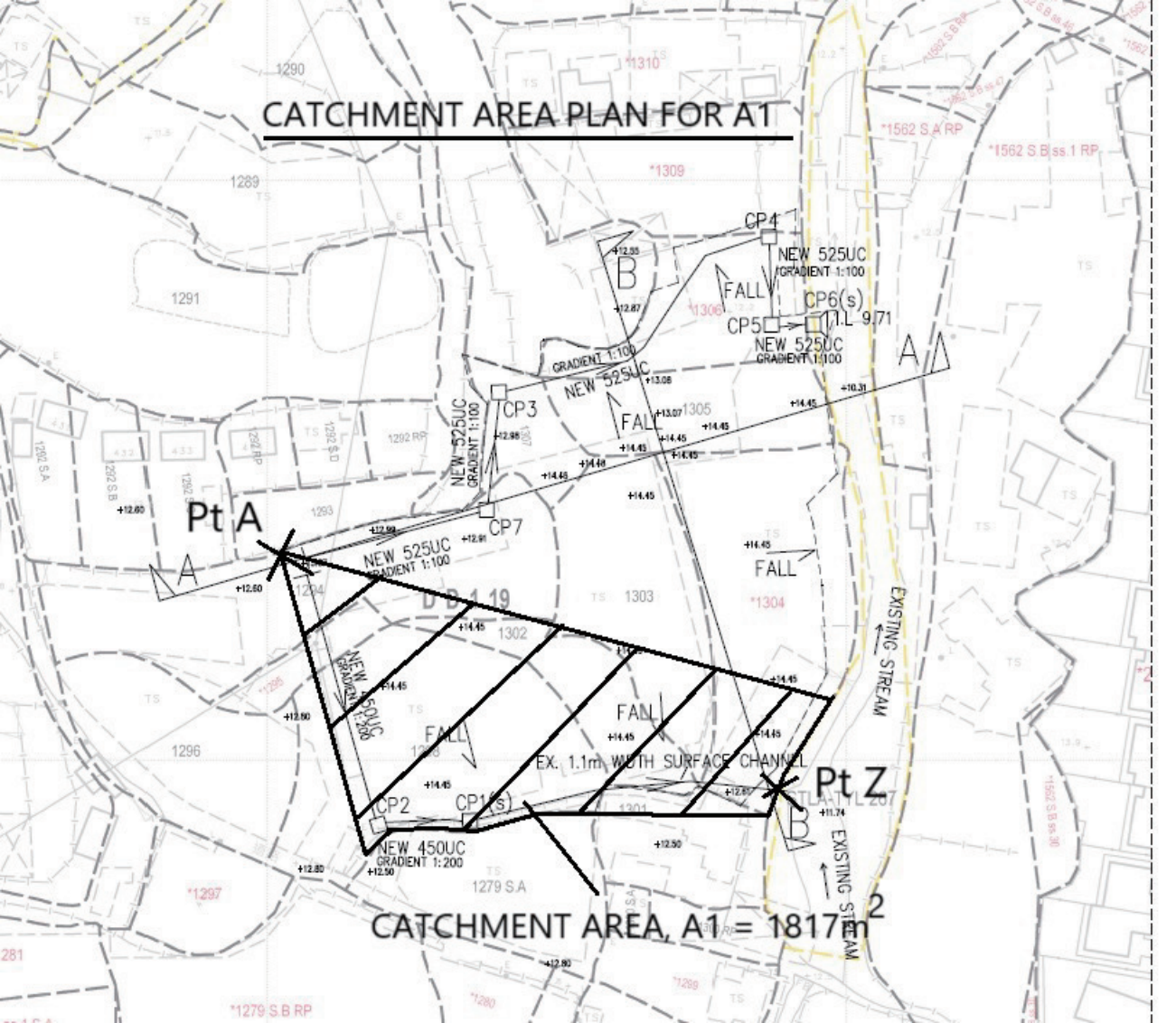
DRAINAGE PROPOSAL PLAN
AND TYPICAL DETAILS

SCALE :	N.T.S.		CAD FILE: CAD_REF
DRAWN	RY		DRAWING NO.
S.D	RY		SDP001B
DESIGNED	RC		
CHECKED	AY		B.D. REF. NO.:

Appendix B

Surface Drainage Design

CATCHMENT AREA PLAN FOR A1



Drainage Design Page no.

Drainage Design at 1291, 1293, 1298, 1302, 1303, 1304, 1305, 1307

Project No.: D.D.119 Date: 1-Mar-25

Prepared by: Ray Cheng

Check for the drainage capactiy of proposed 450UC

Catchment area, A1 = 1817 m^2 Assume k = 1.0 for paved surface

Use Rational Method from Geo-Manual

$Q = kiA/3600$ where,

Q = Maximum runoff (lit/sec)
k = Runoff coefficient
i = Design mean intensity of rainfall (mm/hr)
A = Total catchment area (m^2)

Longest distance from summit point to outlet, Pt Z (Ld) = 118.00 m
Shortest distance from summit point to outlet, Pt Z (Ls) = 92.00 m

Elevation of remote point (Pt A) = 12.80 mPD
Elevation of outlet point, Pt Z = 11.40 mPD

Average fall, H = $(z_1-z_2)/L_s$ x 100
= 1.52 m per 100m

From TGN30

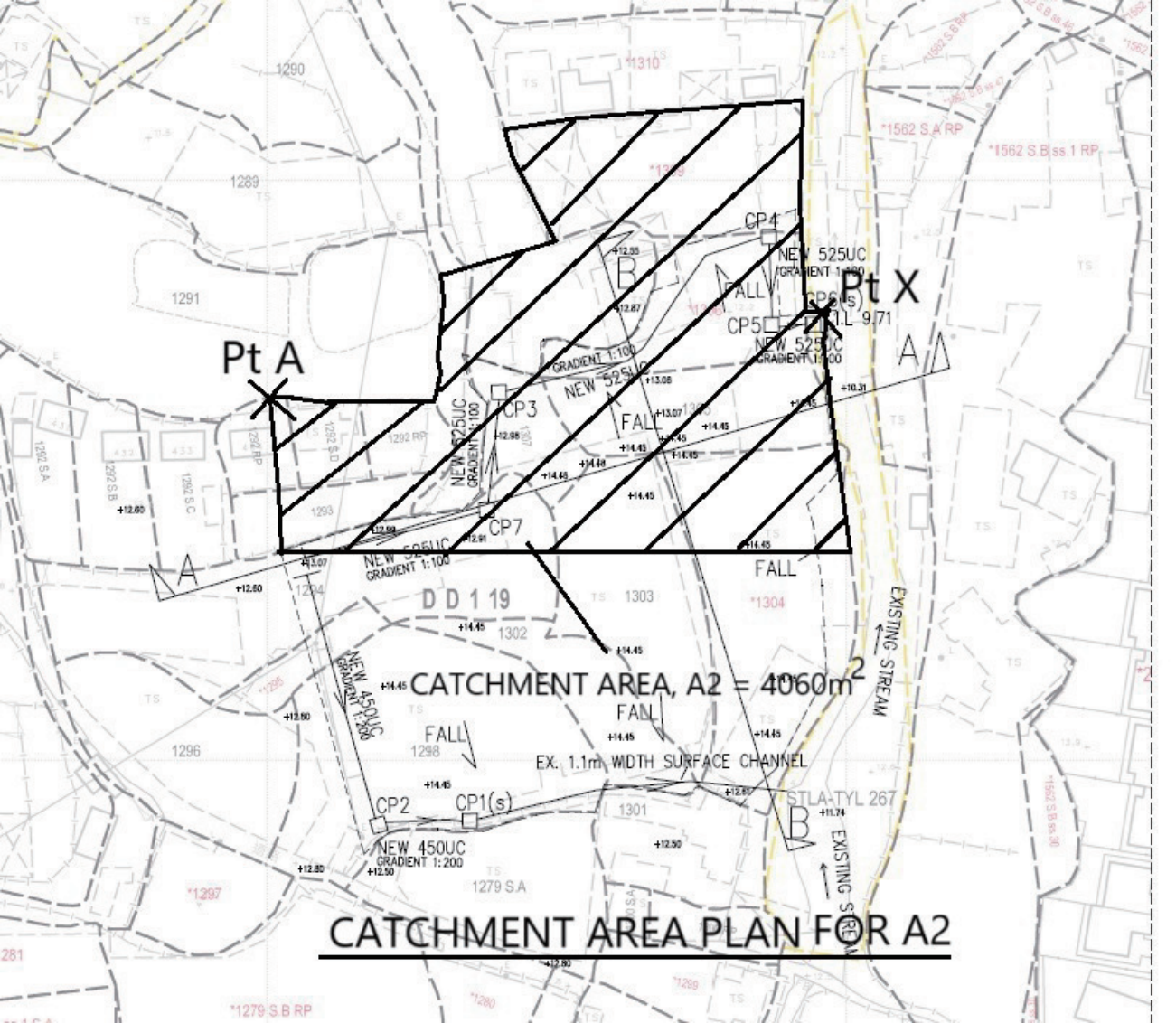
T_c = $0.14465 \times L_d / (H^{0.2} \times A^{0.1})$
= 7.41 min

Assume a 1 in 50 year design rainfall return period for rural area
From Geo-Manual (Fig 8.2)

i = 295 mm/hr
Q = kiA/60 x 1.138
10166 lit/min

From TGN 43A1
For proposed 450 UC with 1 in 200 gradient

Maximum capacity	=	15750	lit/min	>	10166	o.k.
The corresponding velocity	=	1.60	m/s	<	4	o.k.



CATCHMENT AREA PLAN FOR A2

Drainage Design at lot1294, 1295, 1298, 1302, 1303, 1304, 1305, 1307

Project No.: D.D.119 Date: 1-Mar-25

Prepared by: Ray Cheng

Check for the drainage capactiy of proposed 525UC

Catchment area, A2 = 4060 m^2 Assume k = 1.0 for paved surface

Use Rational Method from Geo-Manual

$Q = kiA/3600$ where,

Q = Maximum runoff (lit/sec)
k = Runoff coefficient
i = Design mean intensity of rainfall (mm/hr)
A = Total catchment area (m^2)

Longest distance from summit point to outlet, Pt X (Ld) = 172.00 m
Shortest distance from summit point to outlet, Pt X (Ls) = 101.00 m

Elevation of remote point (Pt A) = 13.07 mPD
Elevation of outlet point, Pt X = 9.71 mPD

Average fall, H = $(z_1-z_2)/L_s$ x 100
= 3.33 m per 100m

From TGN30

T_c = $0.14465 \times L_d / (H^{0.2} \times A^{0.1})$
= 8.52 min

Assume a 1 in 50 year design rainfall return period for rural area
From Geo-Manual (Fig 8.2)

i = 280 mm/hr
Q = kiA/60 x 1.138
21561 lit/min

From TGN 43A1
For proposed 525 UC with 1 in 100 gradient

Maximum capacity	=	34200	lit/min	>	21561	o.k.
The corresponding velocity	=	2.50	m/s	<	4	o.k.

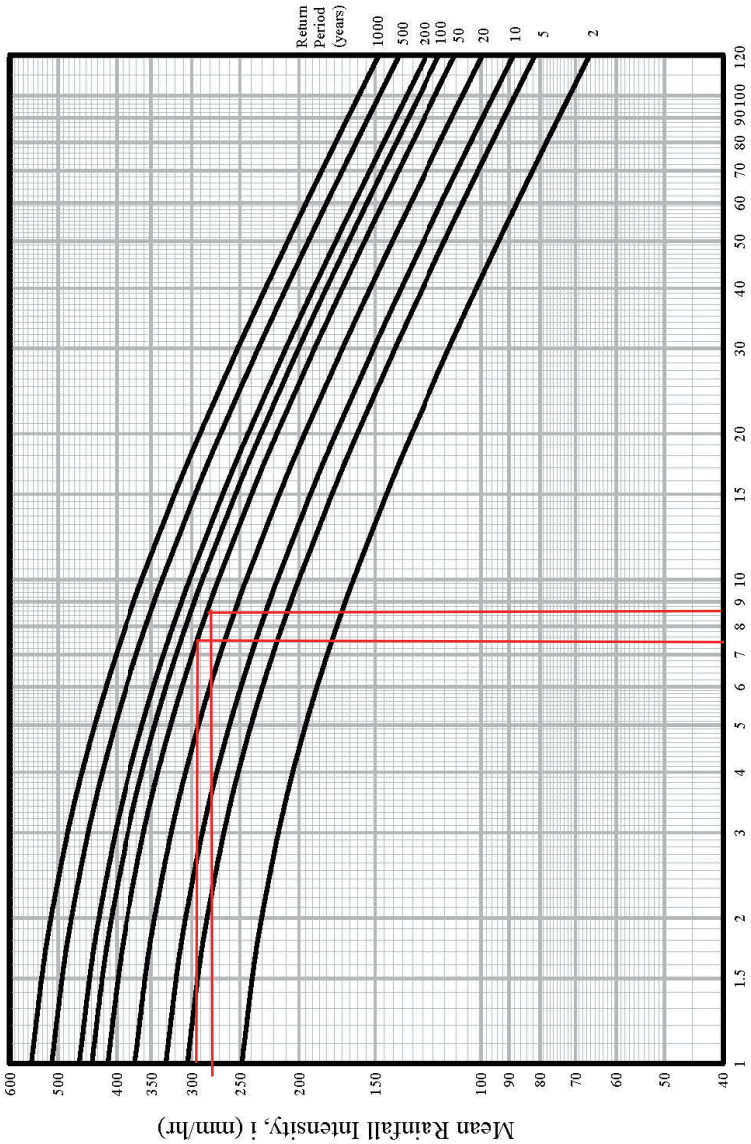


Figure 1 – Updated Intensity-Duration-Frequency Curves

Notes:
1. These IDF curves are to supersede those given in Figure 8.2 of the Geotechnical Manual for Slopes (GCO, 1984).
2. These IDF curves have not incorporated any projected climate change effects. Except for temporary slope drainage design, the mean rainfall intensity given by these IDF curves shall be increased by 13.8% for incorporating climate change effects.
3. The mathematical formulae of these IDF curves are shown in Table 1 of Annex TGN 30 A1.

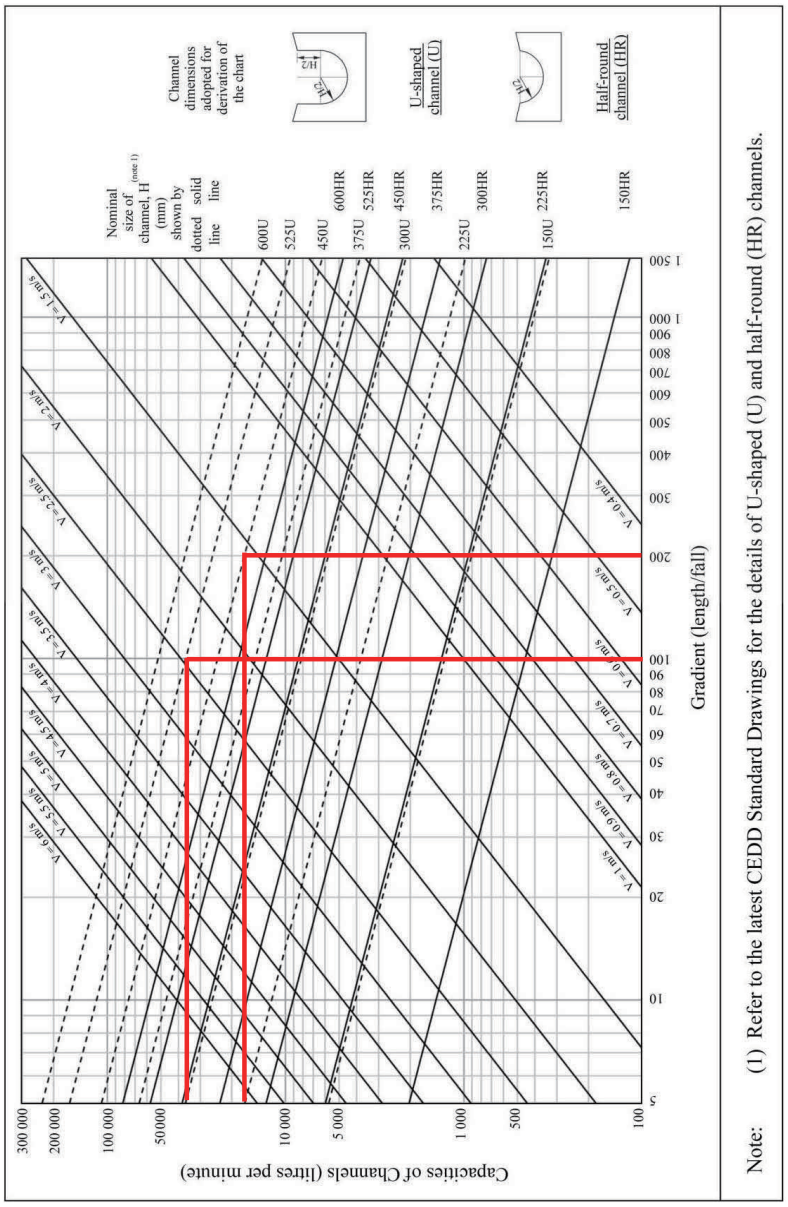


Figure 1 - Chart for the rapid design of U-shaped and half-round channels up to 600 mm

Since 10% reduction would be considered for deposition of sediment,
the capacity of the proposed
525UC should be 38,000 x 0.9 = 34,200lit/min,
450UC should be 17,500 x 0.9 = 15,750lit/min

Appendix C

General View of Existing 1.1m Width Surface Channel

1 Photo Location

Photo Direction

General View for 1.1m surface channel, V1

General View for point A, V2

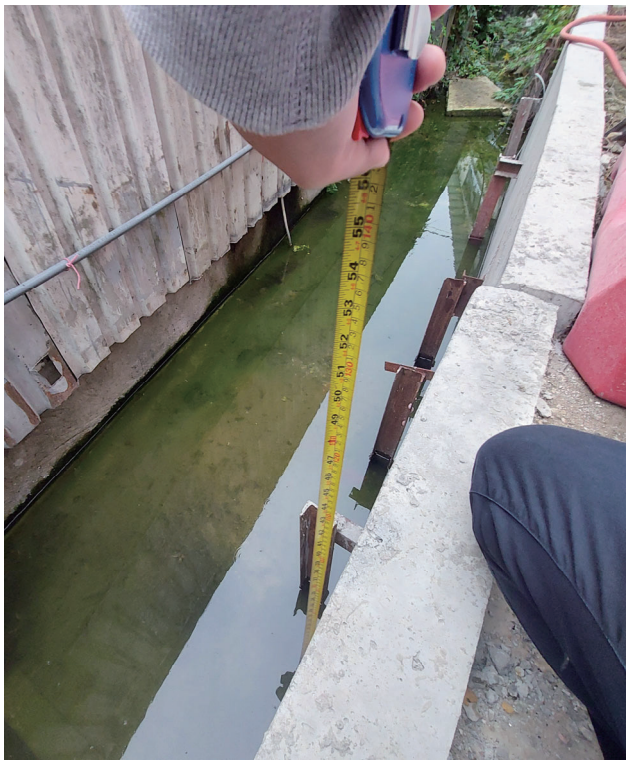
General View for point A, V3

General View for point A, V4

General View for point A, V5

General View for point B, V6

General View for point B, V7



General View for point B, V8

General View for point B, V9

General View for point C, V10

General View for point C, V11

General View for point C, V12

General View for point C, V13