

SUBMISSION REPORT
FOR
STORMWATER AND SEWAGE DRAINAGE PROPOSAL DESIGN
FOR
PROPOSED TEMPORARY SHOP AND SERVICES
FOR A PERIOD OF 3 YEARS IN “VILLAGE TYPE DEVELOPMENT”
AT LOT 3674 RP IN D.D.124
SUN FUNG WAI, LAM TEI, TUEN MUN, N.T.

TABLE OF CONTENTS

1. Introduction
2. Design parameters & assumptions
3. Existing Drainage Condition
4. Proposed Stormwater Drainage
5. Proposed Sewage Drainage
6. Conclusions

APPENDIX

- Appendix A Assessment of Existing Surface Drainage
- Appendix B Photo of Portable Toilet

1. Introduction

This report is submitted being application of compliance with approval condition (d) and (e) in respect of drainage works for temporary shop and services for a period of 3 years in “Village Type Development” in lot 3674 RP in D.D.124, Sun Fung Wai, Tuen Mun, N.T.

It is noted that this report only assess the adequate of the existing drainage system within the lot which is accepted from Drainage Services Department 3 years ago and no changes for the terminal discharge point outside the lot

2. 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 6.6.2 of the SDM, the existing urban drainage system in the vicinity of the development is classified as urban drainage branch system. Table 10 of the SDM recommends to be adopted a 200 year design return period storm event for the urban drainage branch system.

Stormwater Runoff (Q)

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 200 years is adopted.

Runoff Coefficient (K)

The value of K is taken as 1 for developed urban area.

3. Existing Drainage Condition

The site covers about 93 square metres. A plan showing the existing catchments are enclosed in **Appendix A**. The site is paved surface and the ground level is about +13.4 to +14mPD gently dipping from east to west. The entire lot is covered by a temporary structure. The existing surface runoff of the site is collected by the existing 150mm U-channel and discharged to the existing 375mm U-channel located at the western of the site.

4. Proposed Stormwater Drainage

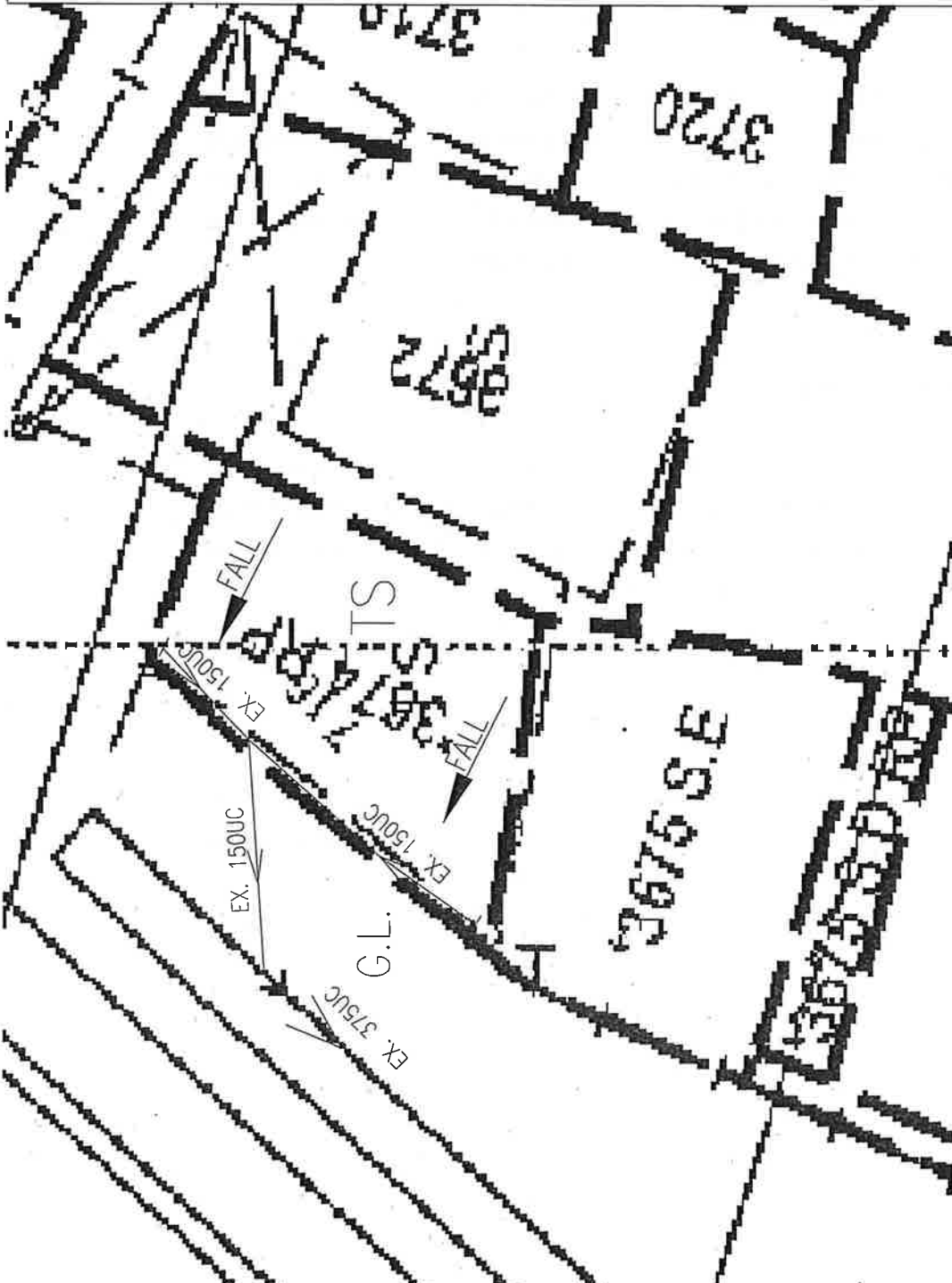
Since the existing stormwater drainage system is accepted by The Drainage Services Department 3 years ago and there are no changes of the site condition, it is considered that the existing drainage system is adequate to collect the runoff from catchments within the site and no additional drainage works is required. The assessment of the existing stormwater drainage system is appended in **Appendix A**.

5. Proposed Sewage Drainage

The portable toilet would be proposed for the temporary shop and services of the captioned site. The sewage would be cleared and delivered out of the site regularly. Thus, no septic tank or sewage drainage proposal is required. The photo of the portable toilet is attached in **Appendix B** for reference.

6. Conclusion

The existing stormwater drainage system have been assessed and found adequate to collect the runoff within the site. The temporary mobilized toilet would be proposed for the temporary shop and services. It is considered that no additional stormwater and sewage drainage proposal is required for this application.



LEGEND:

- LOT. BOUNDARY
- EX. 150UC
- EX. 375UC
- EXISTING 375mm U-CHANNEL
- FALL
- CONCRETE PAVEMENT TO PROVIDE 1:100 FALL TO CHANNEL

GENERAL NOTE

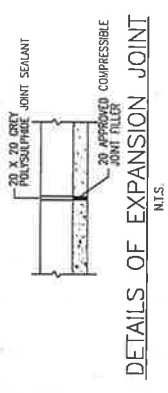
1. THE PROPOSED DRAINAGE WORK, WHETHER WITHIN OR OUTSIDE THE LOT BOUNDARY, SHOULD BE CONSTRUCTED AND MAINTAINED BY THE LOT OWNER AT HIS OWN EXPENSE. FOR WORKS TO BE UNDERTAKEN OUTSIDE THE LOT BOUNDARY, PRIOR CONSENT AND AGREEMENT FROM OLD AND/OR RELEVANT PRIVATE LOT OWNER SHOULD BE SOUGHT.

HALF ROUND, U, AND STEPPED - CHANNELS

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. CONCRETE SURFACE FINISHING SHALL BE CLASS U2 OR F2 AS APPROPRIATE FOR HALF ROUND AND U - CHANNEL, SPACING OF EXPANSION JOINT IN CHANNELS, BEAMS AND APRON TO BE 10m MAXIMUM. FOR STEPPED CHANNELS, EXPANSION JOINTS TO BE PROVIDED AT A MAXIMUM 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
225 - 300	150	150	NIL
375 - 450	175	225	NIL



TYPICAL SECTION CAST IRON GRATING U-CHANNEL WITH CAST IRON GRATING

COMPLY WITH CEDD DWG NO. C24120
N.T.S.

REV.	DESCRIPTION	BY	CHK.	DATE

PROJECT TITLE:

STORMWATER DRAINAGE PROPOSAL FOR PROPOSED TEMPORARY SHOP AND SERVICES AT LOT 3674 RP IN D.D.124 SUN FUNG WAI, LAM TEI, TUEN MUN, N.T.

DRAWING TITLE:

DRAINAGE PROPOSAL PLAN AND TYPICAL DETAILS

SCALE	DATE	BY	CHK.	DATE



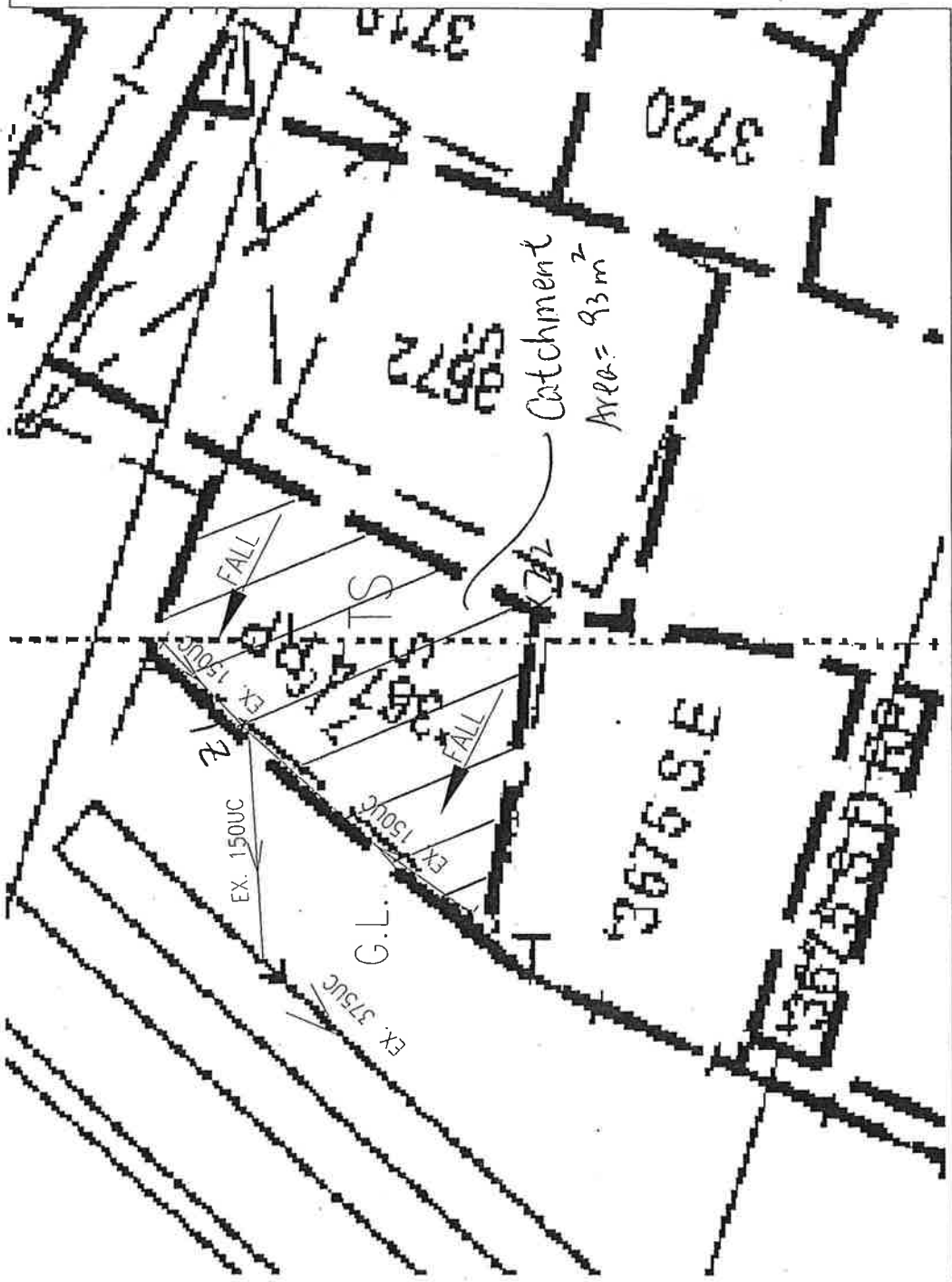
U-CHANNEL

COMPLY WITH FIG. B.11 OF GEOTECHNICAL MANUAL FOR SLOPES

NOTES:
1. H = NOMINAL CHANNEL SIZE.
FOR REINFORCEMENT REFER TO TABLE 1 FOR DETAIL.

Appendix A

Assessment of Existing Surface Drainage



CATCHMENT AREA PLAN

LEGEND:

- EX. 150UC → EXISTING 150mm U-CHANNEL WITH STEEL GRATING COVER AT FALL 1: 100 (MIN)
- EX. 375UC → EXISTING 375mm U-CHANNEL
- LOT BOUNDARY
- FALL
- CONCRETE PAVEMENT TO PROVIDE

GENERAL NOTE

1. THE PROPOSED DRAINAGE SHALL BE IN ACCORDANCE WITH THE LATEST REQUIREMENTS SPECIFIED FOR CONCRETE, STEEL MANHOLES, AND CAST IRON GRATING. THE PROPOSED DRAINAGE SHALL BE IN ACCORDANCE WITH THE LATEST REQUIREMENTS SPECIFIED FOR CONCRETE, STEEL MANHOLES, AND CAST IRON GRATING.
2. THE PROPOSED DRAINAGE SHALL BE IN ACCORDANCE WITH THE LATEST REQUIREMENTS SPECIFIED FOR CONCRETE, STEEL MANHOLES, AND CAST IRON GRATING.
3. THE PROPOSED DRAINAGE SHALL BE IN ACCORDANCE WITH THE LATEST REQUIREMENTS SPECIFIED FOR CONCRETE, STEEL MANHOLES, AND CAST IRON GRATING.
4. THE PROPOSED DRAINAGE SHALL BE IN ACCORDANCE WITH THE LATEST REQUIREMENTS SPECIFIED FOR CONCRETE, STEEL MANHOLES, AND CAST IRON GRATING.
5. THE PROPOSED DRAINAGE SHALL BE IN ACCORDANCE WITH THE LATEST REQUIREMENTS SPECIFIED FOR CONCRETE, STEEL MANHOLES, AND CAST IRON GRATING.
6. ALL DIMENSIONS ARE IN METERS.

HAIR ROUND, U- AND STEPPED - CHANNELS

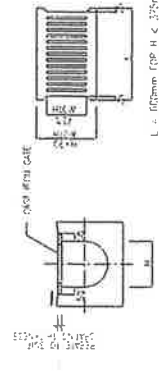
1. ALL DIMENSIONS ARE IN METERS.
2. CONCRETE CHANNELS SHALL BE CLASS UP TO 15 AS APPROPRIATE.
3. FOR HAIR ROUND AND U- CHANNELS, JOINTS OF EXPANSION JOINTS IN CHANNELS SHALL BE IN ACCORDANCE WITH THE LATEST REQUIREMENTS SPECIFIED FOR CONCRETE, STEEL MANHOLES, AND CAST IRON GRATING.
4. EXPANSION JOINTS SHALL BE PROVIDED AT A MAXIMUM SPACING OF 10M.
5. THE COVER FOR U-CHANNELS AND STEPPED CHANNELS SHALL BE IN ACCORDANCE WITH THE LATEST REQUIREMENTS SPECIFIED FOR CONCRETE, STEEL MANHOLES, AND CAST IRON GRATING.
6. ALL DIMENSIONS ARE IN METERS.

TABLE 1. DIMENSION OF U-CHANNEL AND HALF-ROUND CHANNEL

CHANNEL SIZE (mm)	B	H	R	DEPTH
150	150	75	15	60
375	375	187.5	37.5	150



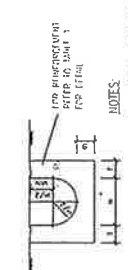
DETAILS OF EXPANSION JOINT



TYPICAL SECTION U-CHANNEL WITH CAST IRON GRATING

COVER WITH 20mm DIA TO G-1100
V.T.C.

NO.	DESCRIPTION	QTY	UNIT



U-CHANNEL

COVER WITH 20mm DIA TO G-1100
V.T.C.

NOTES

1. ALL DIMENSIONS ARE IN METERS.
2. ALL DIMENSIONS ARE IN METERS.
3. ALL DIMENSIONS ARE IN METERS.
4. ALL DIMENSIONS ARE IN METERS.
5. ALL DIMENSIONS ARE IN METERS.
6. ALL DIMENSIONS ARE IN METERS.

STORMWATER DRAINAGE PROPOSAL FOR PROPOSED TEMPORARY SHOP AND SERVICES AT LOT 3677/1, RP IN D/D 124, SUN FUNG WAI, 'LAM' TET, TUEN MUN, N.T.

DRAINAGE PROPOSAL PLAN AND TYPICAL DETAILS

Drainage Design and Checking

Page no.

Project No.: Lam Tei
 Prepared by: Ray Cheng
 Date: 21-Nov-15

Check for the drainage capacity inside Area A1

Catchment area, A1 = 93 m² Assume k = 1 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)

Longest distance from summit point to outlet, Z₂ (Ld) = 20.00 m

Shortest distance from summit point to outlet, Z₂ (Ls) = 9.00 m

Elevation of remote point (z₁) = 13.69 mPD

Elevation of outlet point (z₂) = 13.09 mPD

Average fall, H = (z₁-z₂)/L_s × 100
 = 6.67 m per 100m

From TGN30

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

= 1.26 min

Assume a 1 in 200 year design rainfall return period for proposed channel

From Geo-Manual (Fig 8.2)

$$i = 450 \text{ mm/hr}$$

$$Q = kiA/60$$

= 698 lit/min

From TGN 43A1

For proposed 150 UC with 1 in 100 gradient

Maximum capacity = 1500 lit/min > 698 o.k.

The corresponding velocity = 1.10 m/s < 4 o.k.

GEO Technical Guidance Note No. 30 (TGN 30)
New Intensity-Duration-Frequency Curves for Slope Drainage Design

Issue No.: 1	Revision: -	Date: 21.3.2011	Page: 3 of 4
--------------	-------------	-----------------	--------------

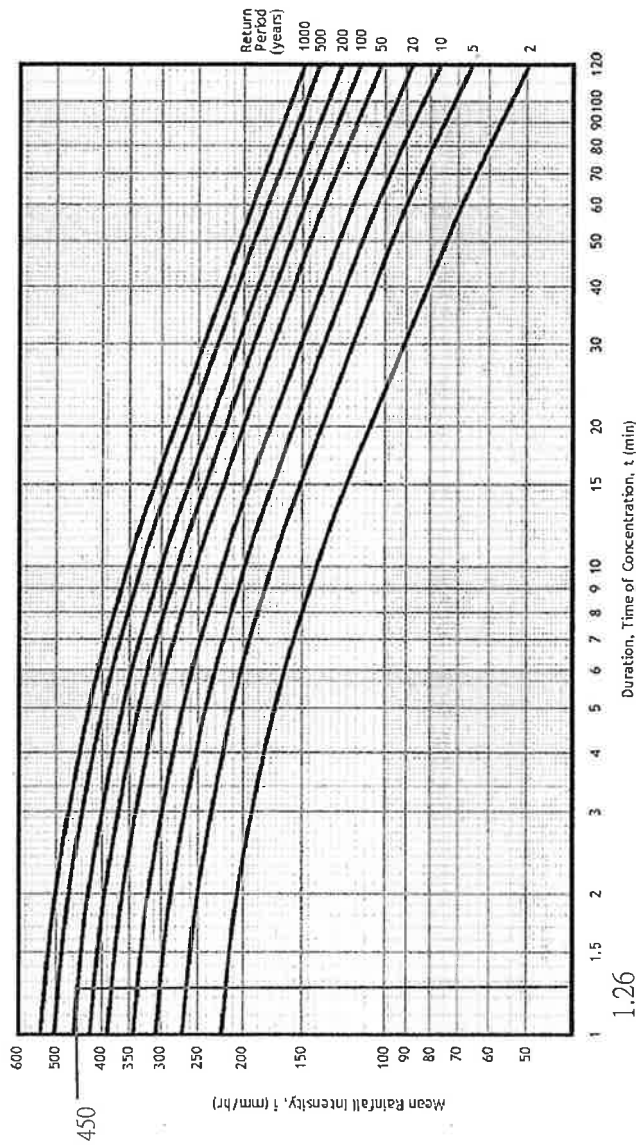


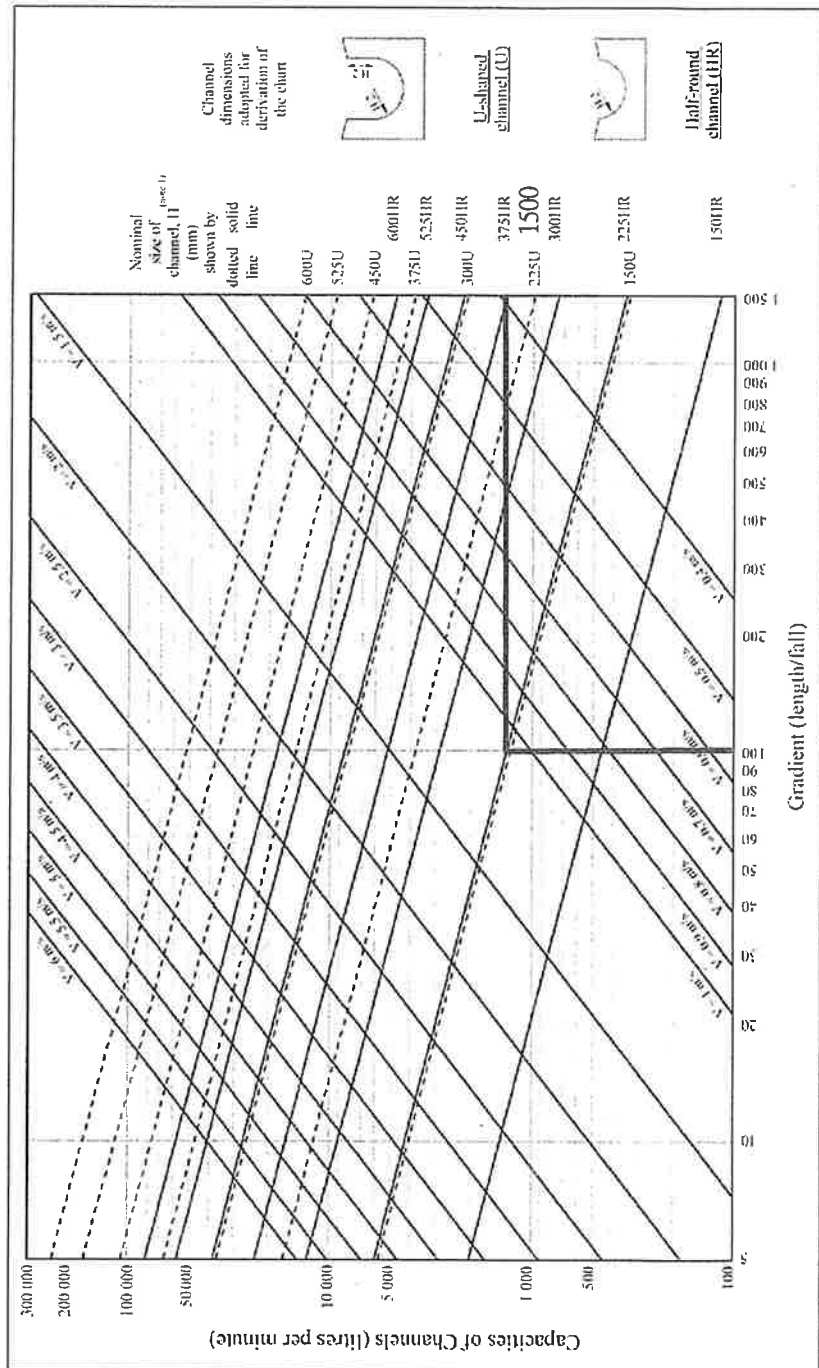
Figure 1 – New Intensity-Duration-Frequency (IDF) Curves (Tang & Cheung, 2011)

Note: These IDF curves are to supersede those given in Figure 8.2 of the Geotechnical Manual for Slopes (GCO, 1984).

GEO Technical Guidance Note No. 43 (TGN 43)
Guidelines on Hydraulic Design of U-shaped and Half-round Channels

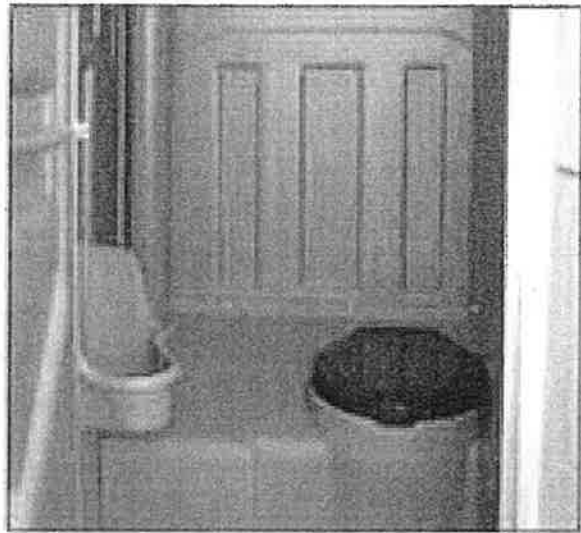
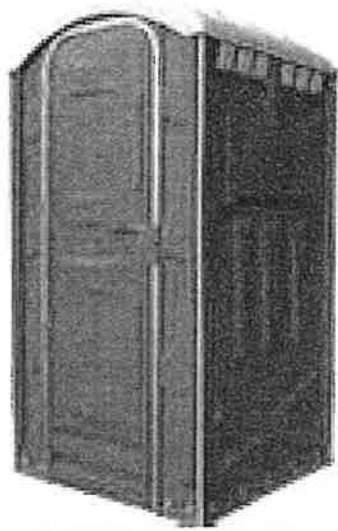
Issue No.: 1 Revision: - Date: 05.06.2014 Page: 3 of 3

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



Appendix B

Photo of Portable Toilet



10/10/10