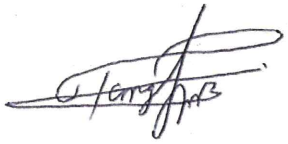
DRAINAGE IMPACT ASSESSMENT

Proposed Temporary Warehouse for the Storage of Car Parts and Associated Filling of Land for the period of 3 years at Lots 664S.A. in DD 90 and Adjoining Government Land, Lin Ma Hang, Ta Kwu Ling

DATE: Jan 2026




ENGINEERS REGISTRATION BOARD
工 程 師 註 冊 管 理 局
Registered Professional Engineer Card
註冊專業工程師註冊證明書
TANG SZE WO
(CVL)
Last 3 Digits of HKID Card: ----045
Registration No
[redacted]
Valid From
01/09/25
Good Thru
Last Day of
08/26

DRAINAGE IMPACT ASSESSMENT

Contents

1. Introduction

1.1 Project Background

Ching Wan Engineering Consultants Company was appointed by the client of the captioned site to conduct a drainage impact assessment (DIA) for a Proposed Temporary Warehouse for the Storage of Car Parts and Associated Filling of Land for the period of 3 years at Lots 664S.A. in DD 90 and Adjoining Government Land, Lin Ma Hang, Ta Kwu Ling (Location Plan is shown in Appendix A).

The proposed use is under S.16 planning application. This DIA report is prepared in support of the planning application.

This DIA is to assess the likely impacts of the proposed development on the existing drainage system, form the drainage connection point and recommend the necessary improvement/upgrading works.

1.2 Objectives of the Report

The report is to present the Drainage Impact Assessment (DIA) due to the proposed warehouse development. It includes formulation of proposed storm drain systems and mitigation measures with the aim to minimize the impacts to the existing drainage system, minimizing flood risk within and around the site.

The objectives of this report are set out as follows:

- To assess the existing flooding susceptibility;
- To assess the flooding susceptibility of the proposed development;
- To assess the likely impacts of the proposed development on the existing drainage system upon completion;
- To carry out schematic design of the drainage system arising from the proposed development including carrying out all necessary hydraulic analysis to substantiate the proposed scheme;
- To formulate drainage connection point and details for the proposed development to illustrate the hydraulic feasibility of the proposed connection point; and
- To formulate and recommend suitable mitigation measures including necessary improvement/upgrading works to existing drainage system for the proposed development.

1.3 Structure of the Report

The structure of this report is as follows:

Section 1 – Introduces the background of the study, as well as the purpose of this report

Section 2 – Presents the key data of the proposed development on which the impact assessment is based.

Section 3 – Assess the impacts on the existing and designed storm drain systems due to the development and formulate corresponding mitigation measures.

Section 4 – Conclusion

2. PROJECT DESCRIPTION

2.1 Site Location

The project site is located right in the north of Lin Ma Hang Road. Vehicles shall enter the site via Kung Um Road. Location Plan is shown in Appendix A.

2.2 Existing Condition

The site is currently a vacant land with concrete paving.

Lin Ma Hang Road is right in the southern side of the site. There is an existing stream passing through the site from the southeastern, the portion of this existing stream that passing the site was modified into an open channel. The existing stream is the final discharge point of the runoff generated from the proposed development.

In the east, south and west of the site, there are other warehouses, natural vegetation, burial grounds and graves

3 DRAINAGE IMPACT ASSESSMENT

3.1 Introduction

Site inspection was carried out and the existing drainage facility inside and in the vicinity of the site was recorded. Desk study was carried out to identify the final discharge point.

3.2 Methodology

The following approach is adopted in carrying out the DIA.

- Identify the scope of development
- Identify the existing drainage systems within the site.
- Design a drainage system for the proposed development.
- Examine the potential impacts arising from the development on the drainage condition upon completion; and
- Recommend mitigation of the potential impacts including improvement or upgrading of exiting drainage system.

3.3 Design Assumption and Parameters

The following is referred in the DIA:

i. Stormwater Drainage Manual (SDM) for Planning, Design and Management (2018)

ii. SDM Corrigendum No. 1/2022: Rainfall increase due to climate change

iii. SDM Corrigendum No. 1/2024 for updated storm constants.

iv. Catchment area is defined based on the topographical information is DLO's geoinfo map.

The following rainfall runoff parameters are adopted in this study

- Runoff coefficients C=0.95 for paved and rood surfaces
- Runoff coefficient C=0.25 for permeable surface
- Storm constant a=474.6, b=2.90 and c=0.371 for 50 years return period is adopted (Table 3d).
- 16% increase of design runoff will be adopted for the consideration of climate change according to SDM Corrigendum No. 1/2022.

Manning equation is applied for open channel and stream hydraulic analysis. The roughness coefficient for Manning equation is 0.018 for existing and modified open channel.

200mm sediment thickness is adopted for the calculation of maximum capacity of open channel.

3.4 Existing Drainage System

There is an existing stream passing through the site from the southeastern, the portion of this existing stream that passing the site was modified into an 2.1m(W)x2.7m(D) open channel (Photo 1 in Appendix B shows the photos of existing 2.1m(W)x2.7m(D) open channel). Steel members are found in the existing 2.1m(W)x2.7m(D) open channel. After passing through the site, there is an existing stream course collecting the runoff from this existing 2.1m(W)x2.7m(D) open channel (the area of this existing stream course is inaccessible), then the runoff is finally discharged to Shenzhen River via another existing open channel in the northwestern side of the site (Photo 3 in Appendix B shows the photos of that another existing open channel)

The immediate upstream of the existing 2.1m(W)x2.7m(D) open channel is a natural stream in the south of lot 663S.A. RP. The further upstream is a main drain from Chau Tin Tsuen.

Flooding is found in the immediate upstream of the existing 2.1m(W)x2.7m(D) open channel, i.e. in the south of lot 663S.A. RP (Photo 2 in Appendix B shows the photos of the flooding).

3.5 Proposed Drainage System

A 375UC is proposed peripherally along the boundary of the application site to prevent runoff escaped from the site. (Appendix C shows the Drainage Proposal of the site)

Topographical survey was carried out on 30-12-2025, it is presented in drawing D01a. It can be observed that the flooding problem is due to the insufficient depth of the existing 2.1m(W)x2.7m(D) open channel. In order to solve the flooding problem in the immediate upstream of the existing 2.1m(W)x2.7m(D) open channel, i.e. in the south of lot 663S.A. RP, All the steel members inside the existing 2.1m(W)x2.7m(D) open channel shall be removed and the existing 2.1m(W)x2.7m(D) open channel shall be modified to a 3m(W)x3.2m(D) trapezoidal open channel to increase its flow capacity and depth.

3.6 Drainage impact Assessment

The proposed 375UC is checked. It is capable to collect the runoff generated from the site. No flooding risk. (Appendix D shows the detailed calculation).

The modified open channel is checked. It is capable to collect the runoff generated from the site. No flooding risk. However, (Appendix E shows the detailed calculation).

Other recommendation:
It is recommended that the hoarding, if any, should be open-bottom to allow runoff to be collected the overland flow.

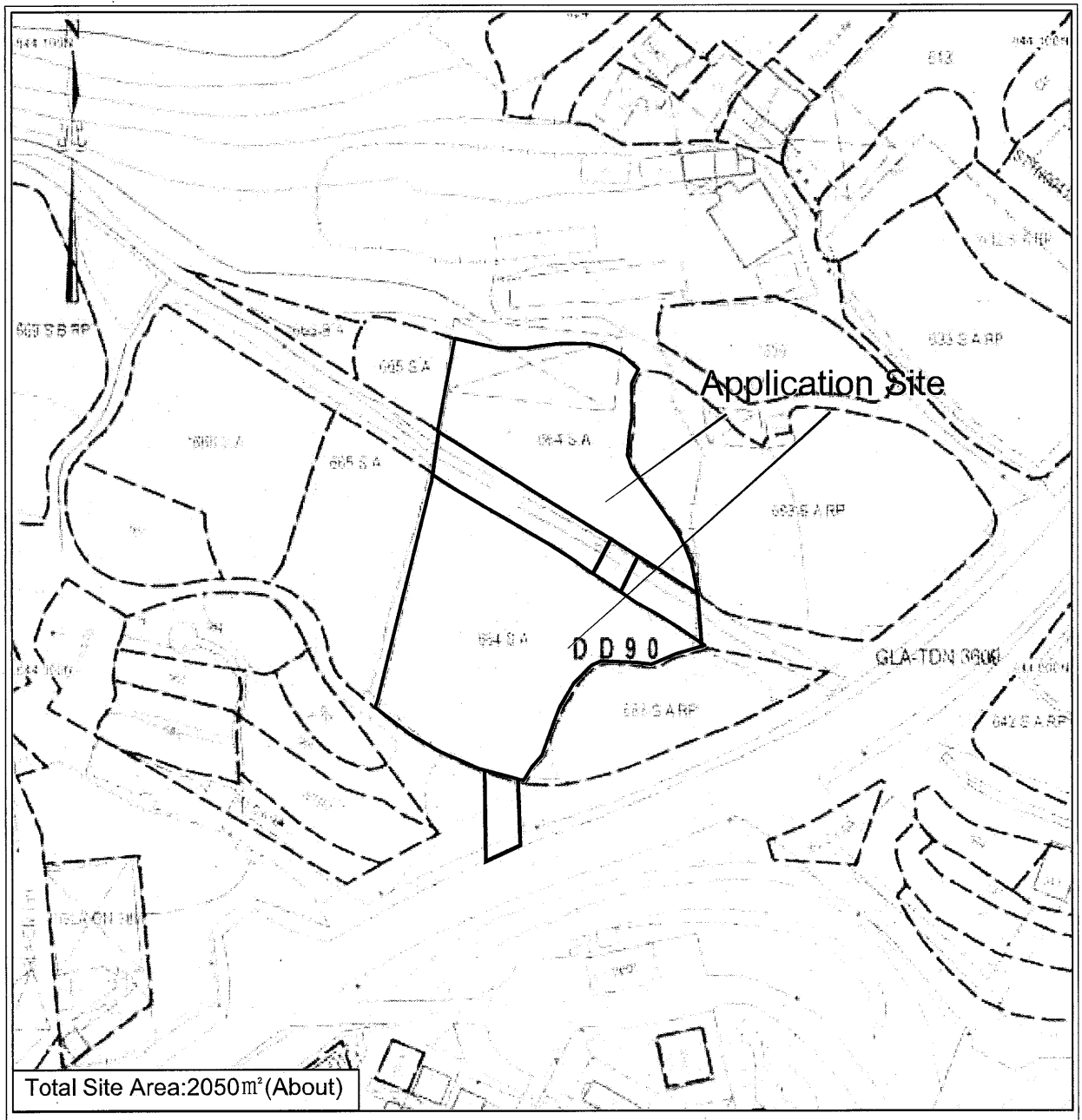
It is also recommended to remove the vegetation and debris in the existing open channel to utilize the capacity.

It is also recommended the existing 2.1m(W)x2.7m(D) open channel shall be modified to a 3m(W)x3.2m(D) trapezoidal open channel, it is recommended that no structure is allowed beyond the 3m line offset from the top bank of the trapezoidal open channel.

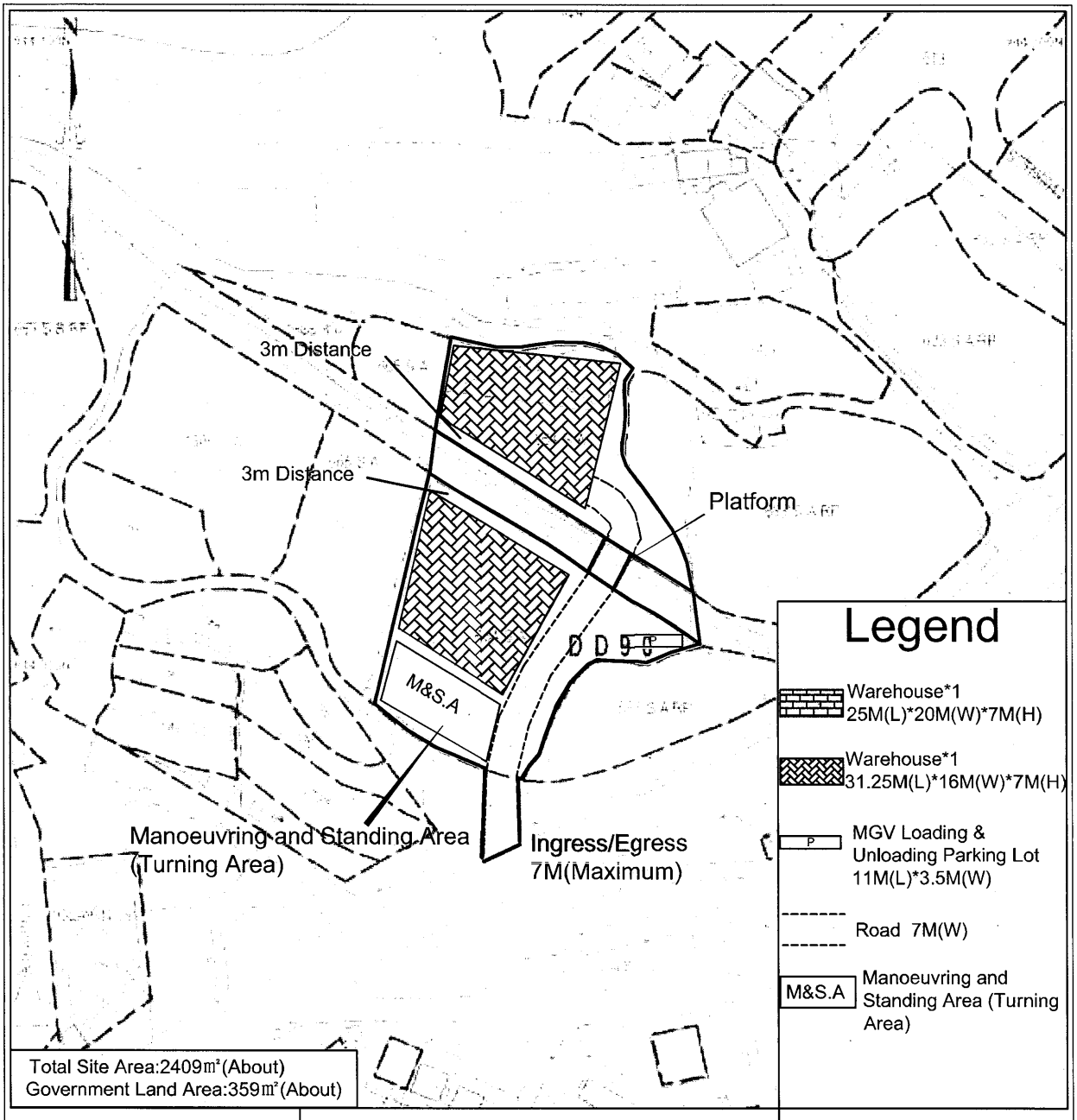
4. Conclusion

- A warehouse development is proposed in the site.
- Proposed 375UC and 375pipe is capable to collect the design runoff.
- Existing 2.1m(W)x2.7m(D) open channel is recommended to be modified to 3m(W)x3.2m(D) Trapezoidal open channel. And all the steel struts inside the 2.1m(W)x2.7m(D) open channel shall be removed.
- All drains are finally discharged to Shenzhen River.
- Hoarding, if any, is recommended to be open-bottom type to collect the overland flow.
- It is also recommended to remove the vegetation and debris in the existing open channel to utilize the capacity,
- With the designed drains and recommendations, the proposed development would not cause any flooding to any existing/proposed drains.

Appendix A – LOCATION PLAN



September 2025	Location Plan	YING SHING (HOPEWELL) ENGINEERING CO.LTD.
Not to Scale		Annex 2



Layout plan

December 2025

YING SHING (HOPEWELL) ENGINEERING CO.LTD.

Not to Scale

Annex 1

Appendix B –PHOTOS

Photo 1


All steels shall be removed
Existing 2.1mx2.7m(D) open channel to be modified to 3m(W)x3.2m(D) trapezoidal open channel
All steels shall be removed

Photo 2

Google Photo 3

香港, 新界

Photo 4

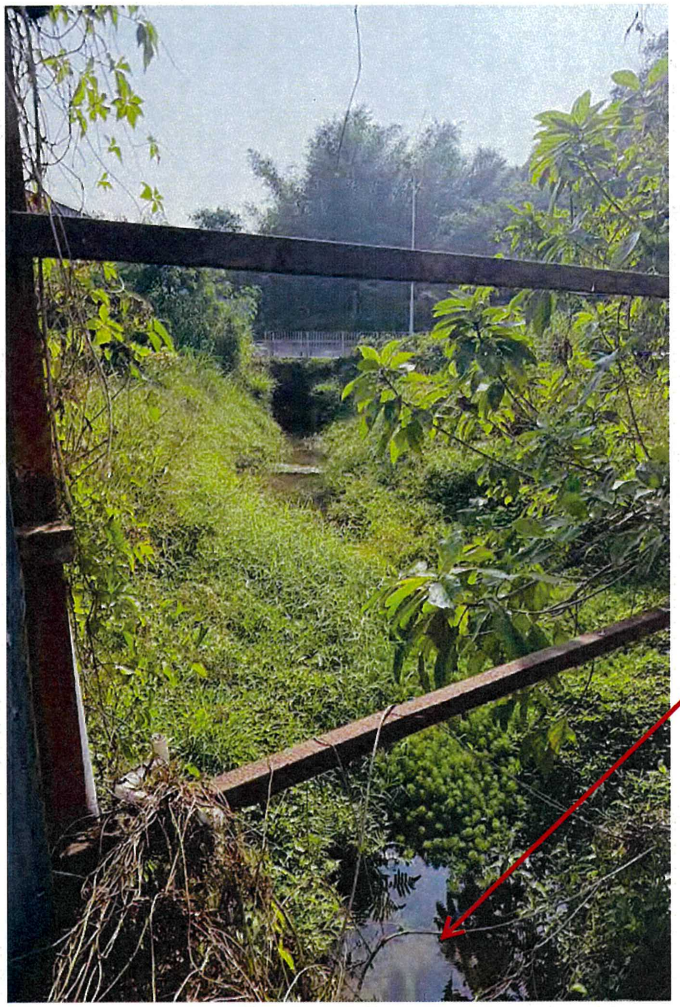
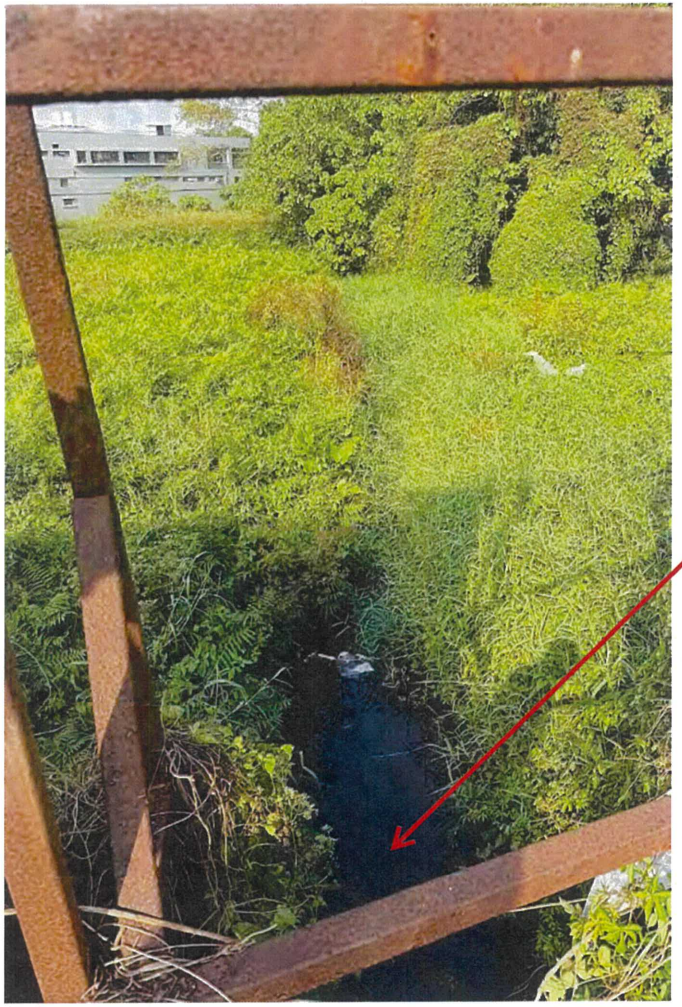
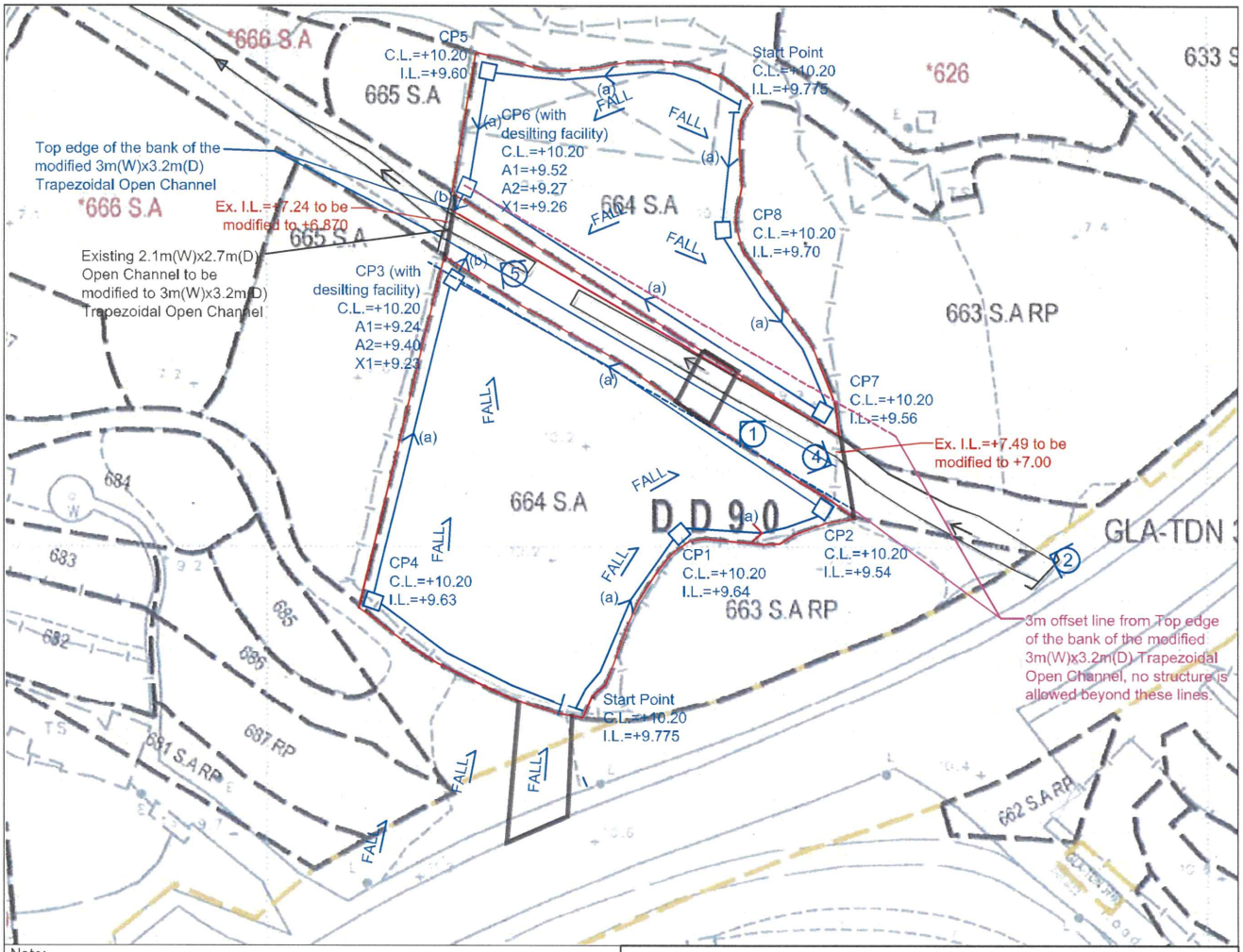


Photo 5



Appendix C –DRAINGAE PROPOSAL



Note:

1. Catchpits (CP3 & CP6) with desilting facility shall follow CEDD standard drawing No. C2406l.
2. Catchpit and UC follows Typical Details of Geotechnical Manual for Slope Fig.8.10 and Fig.8.11 respectively.
3. Open-bottom type Fence Wall to be erected.
4. No site formation works/ massive land filling works to be carried out. Minor filling works to be carried to leveling the site.

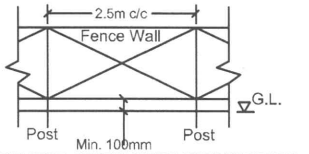
□CP Proposed CatchPit

(a) Proposed 375UC (1:150) with Cast Iron Cover

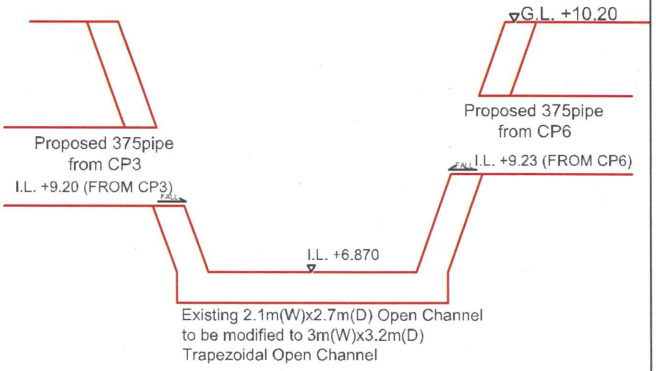
(b) Proposed 375mm dia. concrete pipe (1:100)

Existing 2.1m(W)x2.7m(D) Open Channel (1:350) to be modified to 3m(W)x3.2m(D) Trapezoidal Open Channel (1:350)

① Photo Viewport



TYPICAL DETAIL OF OPEN-BOTTOM TYPE FENCE WALL



CONNECTION DETAILS

正宏工程顧問公司

CHING WAN ENGINEERING CONSULTANT COMPANY

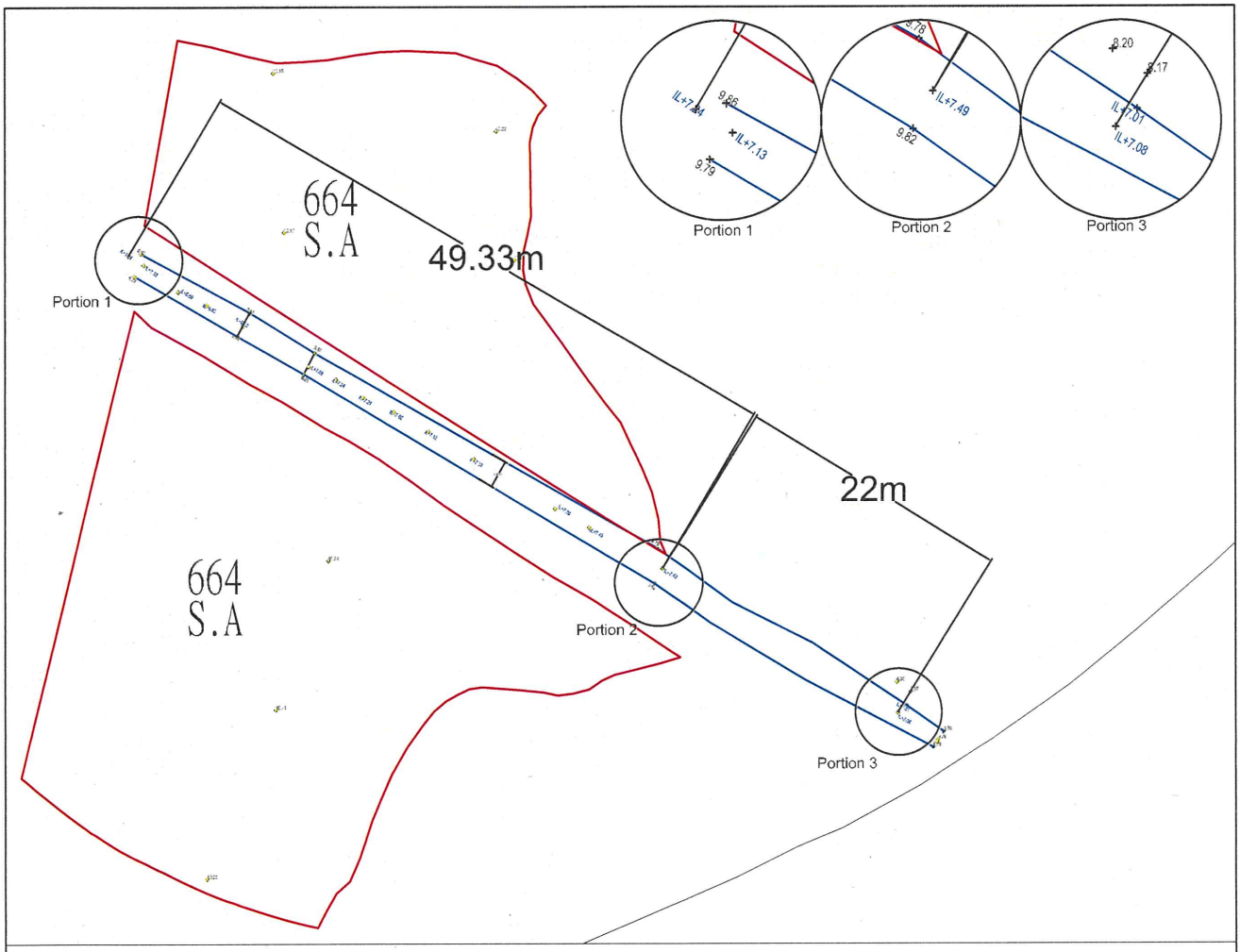
Title: Drainage Proposal - LAYOUT

D01

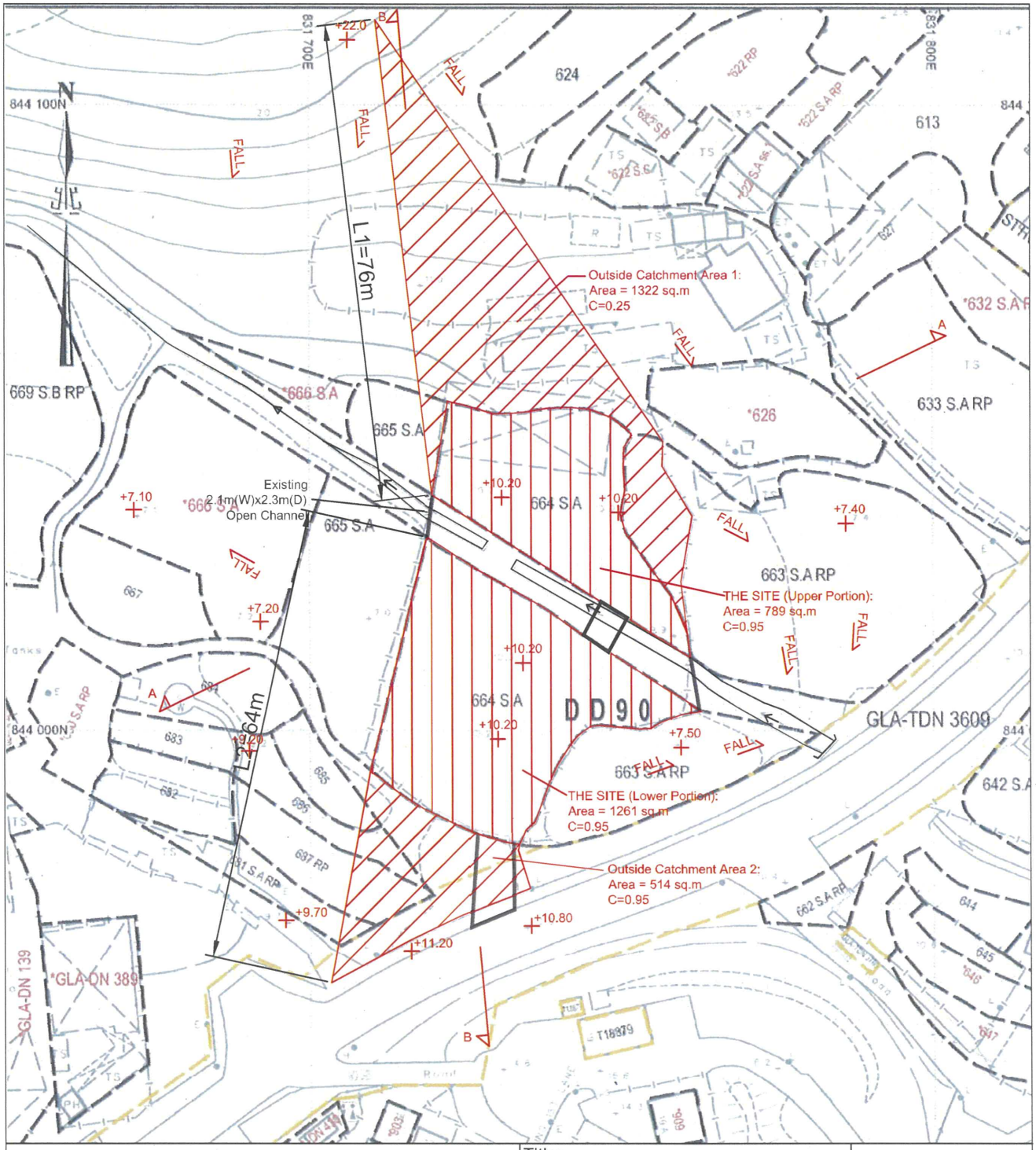
Project:
Proposed Temporary Warehouse for the Storage of Car Parts and Associated Filling of Land for the period of 3 years at Lots 664S.A. in DD 90 and Adjoining Government Land, Lin Ma Hang

(Application No.:)

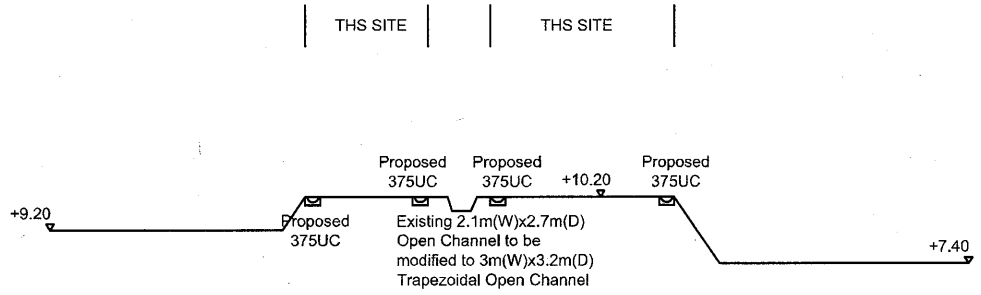
Drawn by:	Date:
DM	9–1–2026
Check by:	**Scale:**
DM	————



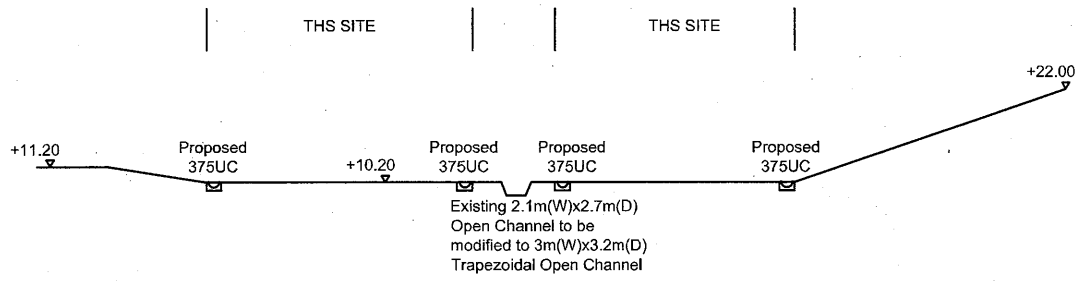
正宏工程顧問公司 CHING WAN ENGINEERING CONSULTANT COMPANY	Title: Topograpgical Survey	D01a
Project: Proposed Temporary Warehouse for the Storage of Car Parts and Associated Filling of Land for the period of 3 years at Lots 664S.A. in DD 90 and Adjoining Government Land, Lin Ma Hang **(Application No.:)**	Drawn by: DM	Date: 9–1–2026
	Check by: DM	Scale: – – – –



正宏工程顧問公司 CHING WAN ENGINEERING CONSULTANT COMPANY	Title: Drainage Proposal - CATCHEMTN AREA PLAN	D02
Project: Proposed Temporary Warehouse for the Storage of Car Parts and Associated Filling of Land for the period of 3 years at Lots 664S.A. in DD 90 and Adjoining Government Land, Lin Ma Hang **(Application No.:)**	Drawn by: DM	Date: 9-1-2026
	Check by: DM	Scale: ----

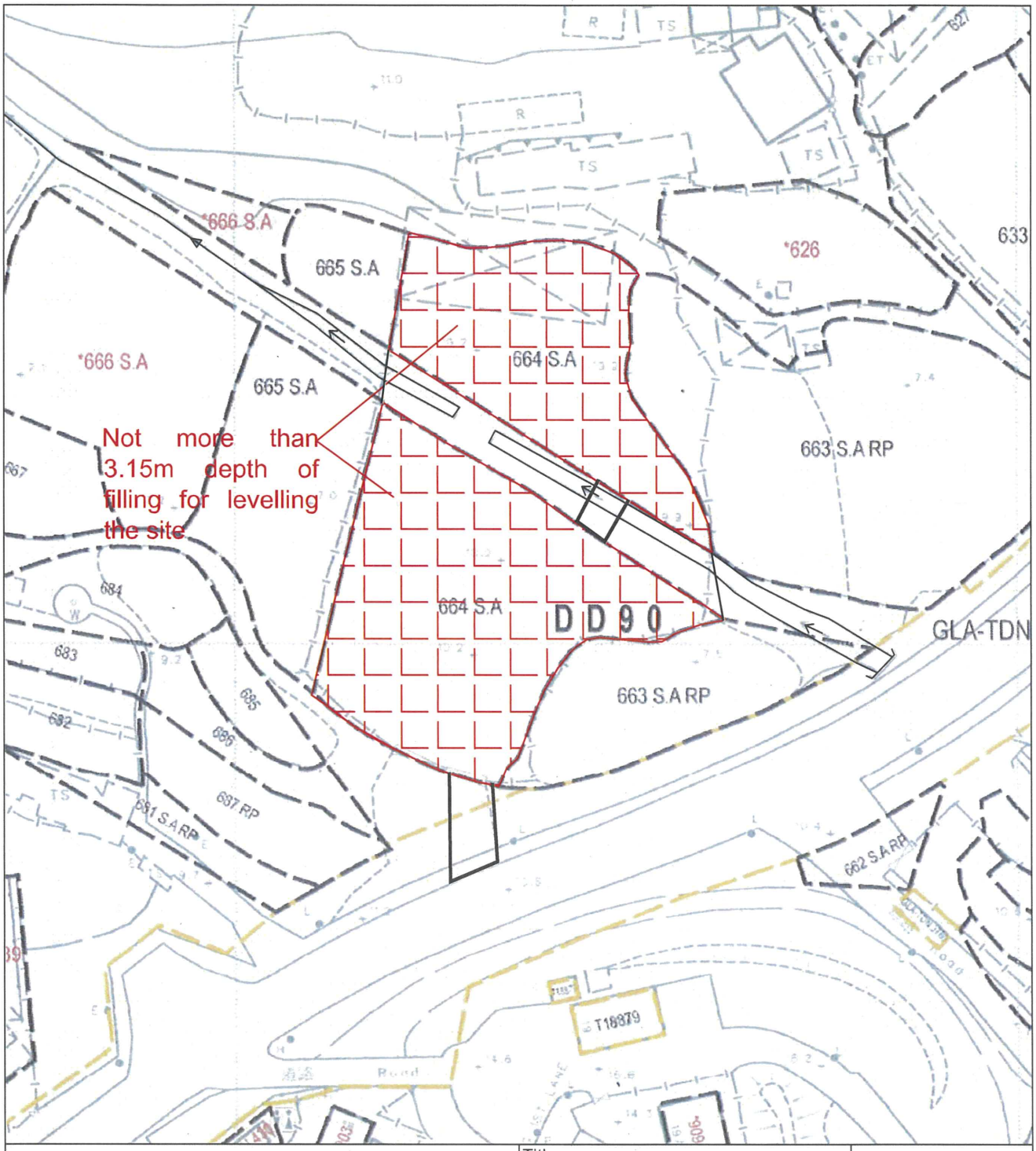


SECTION A-A



SECTION B-B

正宏工程顧問公司 CHING WAN ENGINEERING CONSULTANT COMPANY	Title: Drainage Proposal - SECTIONS	D03
Project: Proposed Temporary Warehouse for the Storage of Car Parts and Associated Filling of Land for the period of 3 years at Lots 664S.A. in DD 90 and Adjoining Government Land, Lin Ma Hang **(Application No.:)**	Drawn by: DM	Date: 9–1–2026
	Check by: DM	Scale: ————



正宏工程顧問公司 CHING WAN ENGINEERING CONSULTANT COMPANY	Title: Drainage Proposal SITE FORMATION PLAN	D04
Project: Proposed Temporary Warehouse for the Storage of Car Parts and Associated Filling of Land for the period of 3 years at Lots 664S.A. in DD 90 and Adjoining Government Land, Lin Ma Hang **(Application No.:)**	Drawn by: DM	Date: 6–10–2025
	Check by: DM	Scale: ----

GEOINFO MAP
地理資訊地圖

前往地圖: https://www.map.gov.hk/gm/geo:22.5376,114.1295?z=4514

Further downstream of existing 2.1m(W)x2.7m(D) Open Channel

由「地理資訊地圖」網站提供: https://www.map.gov.hk

Appendix D –CALCULATION OF PROPOSED 375UC AND 375PIPE WITHIN THE SITE

Outside Catchment Area 1, Area	=	1322	m^2	(C=	0.25)
Outside Catchment Area 2, Area	=	514	m^2	(C=	0.95)
THE SITE (Upper Portion), Area	=	789	m^2	(C=	0.95)
THE SITE (Lower Portion), Area	=	1261	m^2	(C=	0.95)

Calculation of Design Runoff of the Proposed Development,

For the design of drains of the Upper Portion of the site, Outside Catchment Area 1 + The Site (Upper Portion)

$\Sigma Q = \Sigma 0.278\ C\ i\ A$

$A = 1322+789 = 2111 = 0.002111$ m^2 / km^2

$t = 0.14465\ L1/\ H^{0.2}A^{0.1}$

$= 0.14465*76/1^{0.2}*2111^{0.1}$

$= 5.113$ min

$i = 1.16*a/(t+b)^c$ (50 yrs return period, Table 3d, Corrigendum 2024, SDM) and (16% increase due to climate change)

$= 1.16*474.6/(5.113+2.90)^{0.371}$

$= 254.4$ mm/hr

Therefore, $Q = 0.278*0.25*254.4*0.001322+0.278*0.95*254.4*0.000789$

$= 0.0764$ m^3/sec

$= \underline{4583}$ lit/min

Provide 375UC (1:150) is OK

For the design of drains of the Lower Portion of the site, Outside Catchment Area 2 + The Site (Lower Portion)

$\Sigma Q = \Sigma 0.278\ C\ i\ A$

$A = 514+1261 = 1775$ m^2 / km^2

$t = 0.14465\ L2/\ H^{0.2}A^{0.1}$

$= 0.14465*64/1^{0.2}*1775^{0.1}$

$= 4.381$ min

$i = 1.16*a/(t+b)^c$ (50 yrs return period, Table 3d, Corrigendum 2024, SDM) and (16% increase due to climate change)

$= 1.16*474.6/(4.381+2.90)^{0.371}$

$= 263.6$ mm/hr

Therefore, $Q = 0.278*0.95*263.6*0.000514+0.278*0.95*263.6*0.001261$

$= 0.1236$ m^3/sec

$= \underline{7414}$ lit/min

Provide 375UC (1:150) is OK

Check 375mm dia. Pipes by Colebrook-White Equation

$$V = -\sqrt{(8gDs)}\,\log\left(\frac{ks}{3.7D} + \frac{2.51v}{D\sqrt{(2gDs)}}\right)$$

where :

V	=			mean velocity (m/s)	
g	=	9.81	m/s2	gravitational acceleration (m/s2)	
D	=	0.375	m	internal pipe diameter (m)	
ks	=	0.00015	m	hydraulic pipeline roughness (m)	(Table14, from DSD SDM 2018, concrete pipe)
v	=	1.14E-06	m2/s	kinematic viscosity of fluid (m2/s)	
s	=	0.01		hydraulic gradient	

Therefore, design V of pipe capacity = 2.0971 m/s

Q= 0.8VA			(0.8 factor for sedimentation)
= 0.185	m3/s		
= 11118	lit/min		
> Max (7414, 4583)	lit/min	Ok	
= 7414	lit/min	Ok	

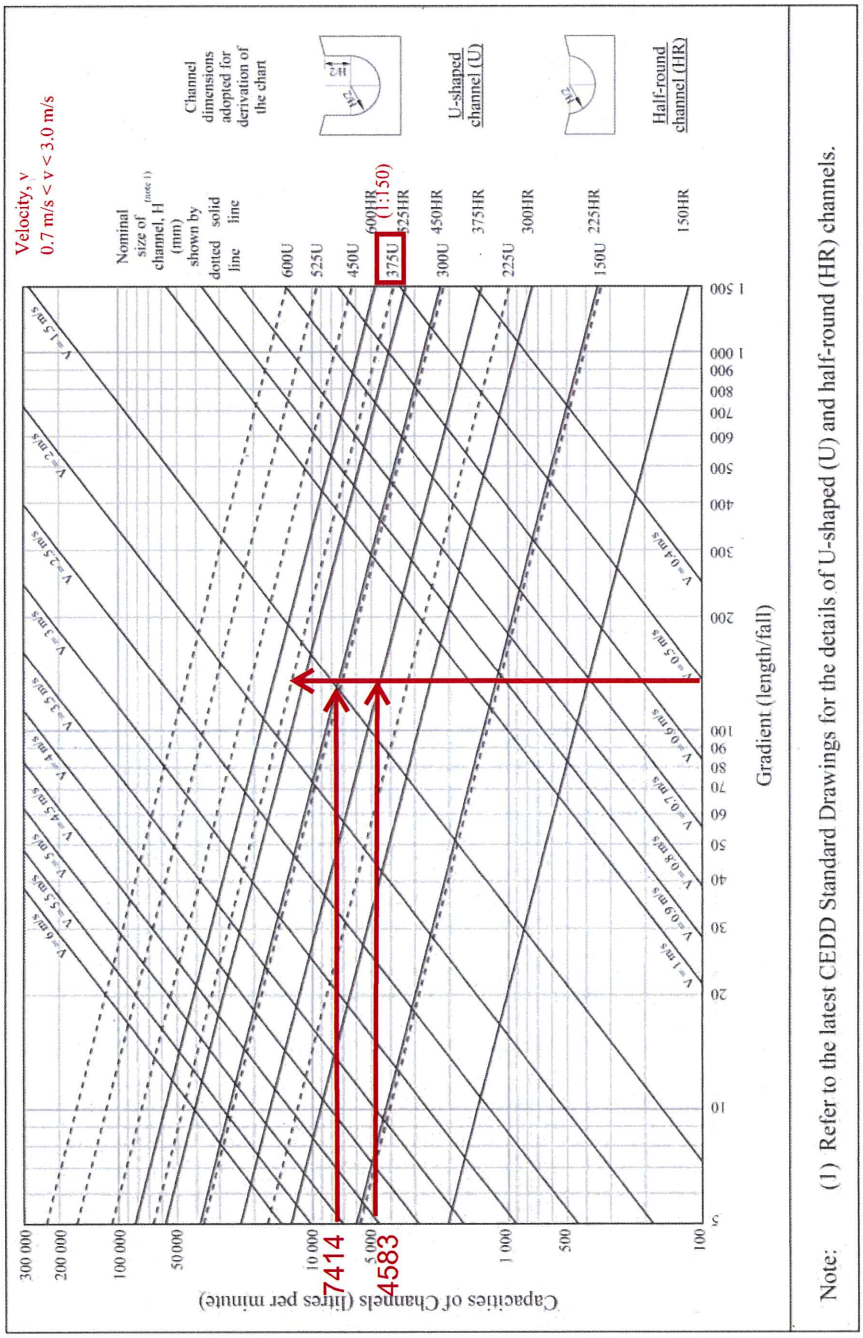


Figure 1 - Chart for the rapid design of U-shaped and half-round channels up to 600 mm

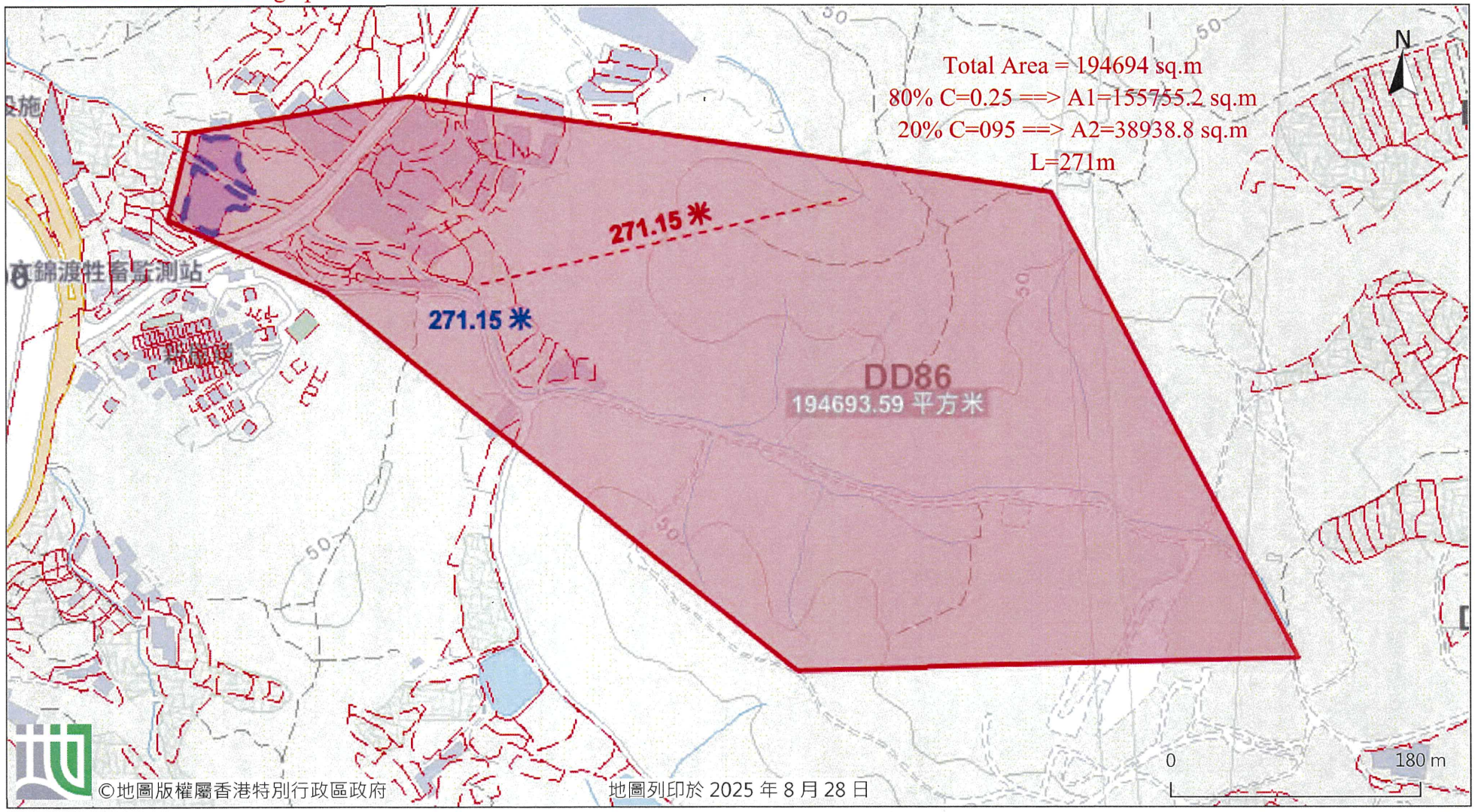
Appendix E –CALCULATION OF MODIFIED 3m(W)X3.2m(D)

TRAPEZOIDAL OPEN CHANNEL

GEOINFO MAP
地理資訊地圖

前往地圖: https://www.map.gov.hk/gm/geo:22.5342,114.1340?z=4514

Catchment area of existing open channel

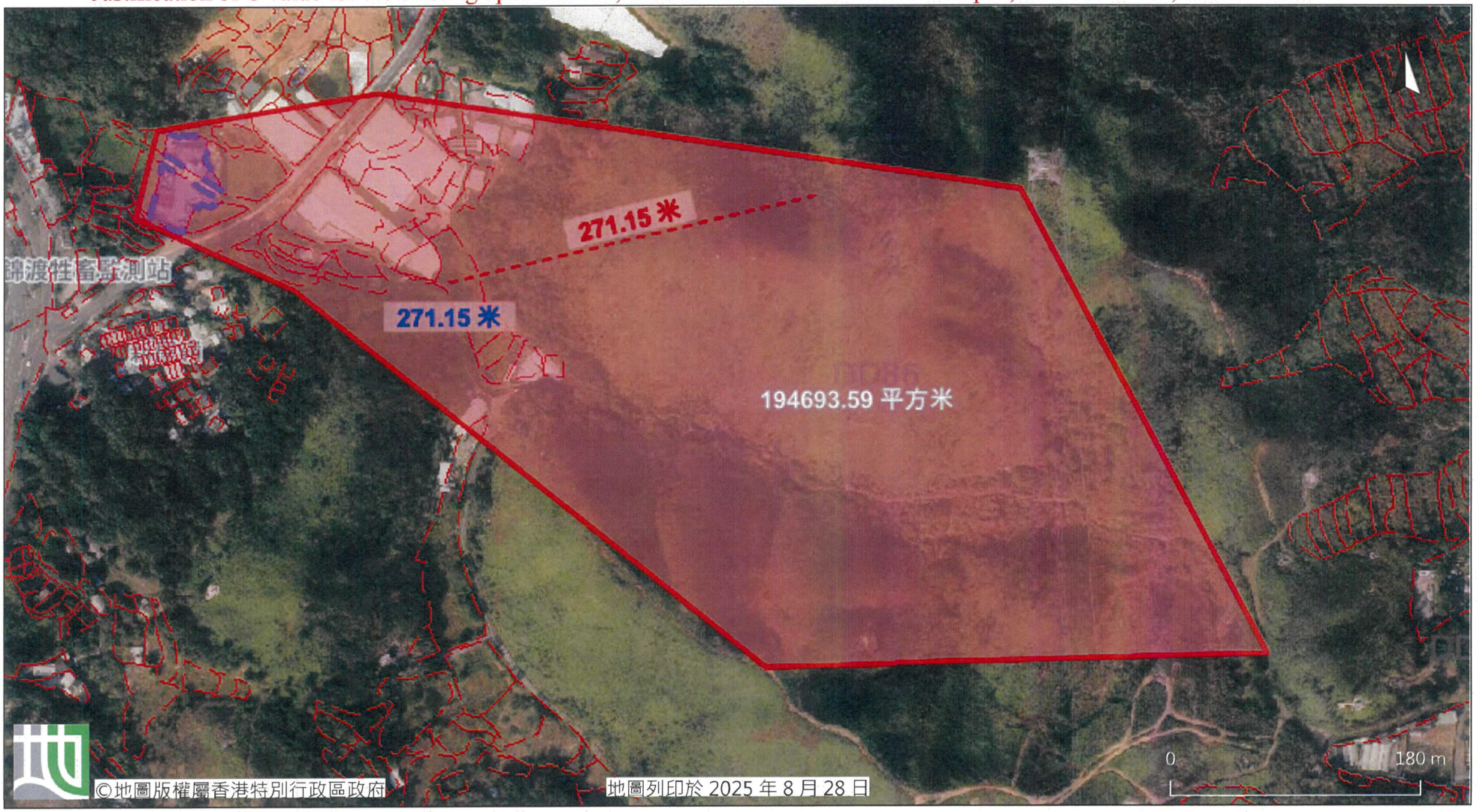


由「地理資訊地圖」網站提供: https://www.map.gov.hk

GEOINFO MAP
地理資訊地圖

前往地圖: https://www.map.gov.hk/gm/geo:22.5342,114.1342?z=4514

Justification of C value for the existing open channel, 80% of catchment area is undeveloped, i.e. 80% C=0.5, 20% C=0.95



由「地理資訊地圖」網站提供: https://www.map.gov.hk

A1, Area = 155755.2 m^2 (C= 0.25)

A2, Area = 38938.8 m^2 (C= 0.95)

Check Modified 3m(W)x3.2m(D) Open Channel

Calculation of Design Runoff of the Proposed Development,

$\Sigma Q = \Sigma 0.278\ C\ i\ A$

A = 155755.2+38938.8 m^2
= 194694
= 0.194694 km^2

t = $0.14465\ L/\ H^{0.2}A^{0.1}$
= $0.14465*271/1^{0.2}*194694^{0.1}$
= 11.597 min

i = $1.16*a/(t+b)^c$ (50 yrs return period, Table 3d, Corrigendum 2024, SDM) and (16% increase due to climate change)
= $1.16*474.6/(11.597+2.90)^{0.371}$
= 204.2 mm/hr

Therefore, Q = 0.278*0.25*204.2*0.1557552+0.278*0.95*204.2*0.0389388
= 4.3093 m^3/sec
= 258561 lit/min

Calculation Maximum Capacity of Modified 3m(W)x3m(D) Trapezoidal Open Channel

Manning Equation $V = R^{2/3}*S_f^{0.5}/n$

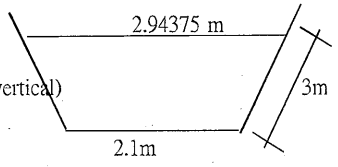
D=2.3-0.2= 2.1 m (200mm freeboard is considered)

where $R = A/(2E+B)$ Inclined edge, E= 3.029518 m
= 0.9273 W= 2.94375 m
A= 7.565625 m2
B= 2.1 m

n = 0.018 $s/m^{1/3}$ (Talbe 13 of Stormwater Drainage Manual)

S_f = 0.00286 (1:350)

Therefore, $V = 0.8265^{2/3}*0.00333^{0.5}/0.018$
= 2.824 m/sec



Maximum Capacity (Q_{max}) = V*A
= 21.364 m^3/sec
= 1281819 lit/min
> 258561 lit/min OK