R-Riches
Property Consultants Ltd.

盈卓物業
顧問有限公司

Our Ref.: DD106 Lot 390 RP
Your Ref.: TPB/A/YL-KTS/990

The Secretary,
Town Planning Board,
15/F, North Point Government Offices,
333 Java Road,
North Point, Hong Kong

By Email

6 May 2024

Dear Sir,

1st Further Information

Temporary Shop and Services and Eating Place for a Period of 5 Years in "Village Type Development" Zone, Lot 390 RP (Part) in D.D. 106, Kam Sheung Road, Kam Tin, Yuen Long

(S.16 Planning Application No. A/YL-KTS/990)

We are writing to submit Further Information to address departmental comments of the subject application (**Appendix I**).

Should you require more information regarding the application, please contact our or the undersigned at your convenience. Thank you for your kind attention.

Yours faithfully,

For and on behalf of
R-riches Property Consultants Limited

Matthew NG
Planning and Development Manager

cc DPO/FSYLE, PlanD (Attn.: Mr. Christopher PANG email: cyfpang@pland.gov.hk)
(Attn.: Mr. MO Ying-yeung email: yymo@pland.gov.hk)

Responses-to-Comments

Temporary Shop and Services and Eating Place for a Period of 5 Years in "Village Type Development" Zone, Lot 390 RP (Part) in D.D. 106, Kam Sheung Road, Kam Tin, Yuen Long

(Application No. A/YL-KTS/990)

(i) A RtoC Table:

Departmental Comments		Applicant's Responses
1. Comments of the Chief Engineer/Mainland North, Drainage Services Department		
i)	Please advise the proposed type of drainage facilities to be used (U-channels/pipes) under this application. The gradients and the sizes of the proposed U-channels/pipes should be shown on the drainage plan for clarity.	Please note existing U-channels are used in the application site. Please find **Figure 3** and **Appendix A** for gradient, size and checking of existing U-channels.
ii)	It is found that the invert levels of all proposed catchpits are +9.4. Please demonstrate with hydraulic calculation that the proposed drainage facilities are adequate to collect, convey and discharge the surface runoff accrued on the application site and the overland flow intercepted form the adjacent lands.	Noted. Please find **Figure 3** and **Appendix A** for gradient, size and checking of existing U-channels. The catchment plan is shown in **Figure 4**.
iii)	Please indicate clearly the full alignment of the discharge path from the application site all the way down to the ultimate discharge point (e.g. well-established stream course/public drainage system).	The runoff is proposed to be discharge to the existing ditch (approx. 1m width) beside Kam Sheung Road. The alignment of the drains is shown in and **Figure 3** for your perusal.
iv)	The existing drain, to which the applicant proposed to discharge the stormwater from the subject site was not maintained by this office. The applicant should demonstrate that the proposed drainage construction/ improvement/ modification works and the operation of the drainage can be practicably implemented on site. In the case that it	Noted.

	is a local village drains, DO/YL should be consulted.	
v)	Further to (iv) above, since there is no record of the said discharge path, please provide site photos to demonstrate its presence and existing condition.	Noted. Please refer to the photo in **Annex A**.
vi)	Please confirm if any walls or hoarding are/to be erected or laid along the site boundary. If affirmative, adequate opening should be provided to intercept the existing overland flow passing through the site and please provide its details for comments.	Noted. Fence with gap would be provided. Please refer to the below photo for the existing fencing. 
vii)	Standard details should be provided to indicate the sectional details of the proposed u-channel and the catchpit/sand trap.	Please refer to standard drawing in **Appendix C** showing u-channel and catchpit with trap for your review.
viii)	The development should neither obstruct overland flow nor adversely affect existing natural streams, village drains, ditches and the adjacent areas, etc.	Noted.
ix)	The applicant should consult DLO/YL and demonstrate that the proposed drainage construction/improvement/modification works and the operation of the drainage outside his lot boundary can be practicably implemented on site.	Noted.

Temporary Shop and Services and Eating Place for a Period of 5 Years in "Village Type Development" zone, Lot 390 RP (Part) in D.D. 106, Kam Sheung Road, Yuen Long, New Territories

Drainage Appraisal

March 2024

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1. Introduction

1.1 Background

1.1.1 The applicant seeks to use Lot 390 RP (Part) in D.D. 106, Kam Sheung Road, Yuen Long, New Territories (the Site) for 'Temporary Shop and Services and Eating Place for a Period of 5 Years (Proposed Development).

1.1.2 This Drainage Proposal is to support the planning application for the proposed use.

1.2 The Site

1.2.1 The Application Site area is about 1,217m^2, and it situates beside Kam Sheung Road to the west. The site is currently paved and occupied by existing structures. The site location plan is shown in **Figure 1**.

1.2.2 The Application Site is surrounded by temporary structures. It is generally flat with existing ground level of approx. +9.8 mPD. It is intended to keep the proposed level unchanged at +9.8 mPD.

1.2.3 There is an existing public drainage and ditch along Kam Sheung Road. Existing Drainage Plan is shown in **Figure 2** for reference. There are existing internal drainage channels within site area, the existing internal drainage system is shown in **Figure 3**.

1.2.4 Proposed Development Layout plan is shown in **Appendix B** for reference.

2. Development Proposal

2.1 The Proposed Development

2.1.1 The total site area is approximately 1,217m^2. The indicative development schedule is summarized in **Table 1** below for technical assessment purpose.

Proposed Development	
Total Site Area (m^2)	1,217
Assume all proposed site area as paved area after development for assessment purpose (m^2)	1,217

Table 1 - Key Development Parameters

3. Assessment Criteria

3.1.1 The Recommended Design Return Period based on Flood Level from SDM (Table 10) is adopted for this DIA. The recommendation is summarized in **Table 2** below.

Description	Design Return Periods
Intensively Used Agricultural Land	2 – 5 Years
Village Drainage Including Internal Drainage System under a polder Scheme	10 Years
Main Rural Catchment Drainage Channels	50 Years
Urban Drainage Trunk System	200 Years
Urban Drainage Branch System	50 Years

Table 2– Design Return Periods under SDM

3.1.2 The site and the surroundings are generally flat. The proposed village drainage system intended to collect runoff from the internal site and discharge to existing nearby public drainage system. 1 in 10 years return period is adopted for the drainage design.

3.1.3 Stormwater drainage design will be carried out in accordance with the criteria set out in the Stormwater Drainage Manual published by DSD. The proposed design criteria to be adopted for design of this stormwater drainage system and factors which have been considered are summarised below.

1. Intensity-Duration-Frequency Relationship – The Recommended Intensity-Duration-Frequency relationship is used to estimate the intensity of rainfall. It can be expressed by the following algebraic equation.

$$i = \frac{a}{(t_d + b)^c}$$

The site is located within the HKO Headquarters Rainfall Zone. Therefore, for 10 years return period, the following values are adopted.

a	=	471.9
b	=	3.02
c	=	0.397

2. The peak runoff is calculated by the Rational Method
   i.e. $Q_p = 0.278CiA$

where	Q_p	=	peak runoff in m^3/s
	C	=	runoff coefficient (dimensionless)
	i	=	rainfall intensity in mm/hr
	A	=	catchment area in km^2

3. The run-off coefficient (C) of surface runoff are taken as follows:

- Paved Area: C = 0.95
- Unpaved Area: C = 0.35

4. Manning's Equation is used for calculation of velocity of flow inside the channels:

Manning's Equation: $v = \frac{R^{\frac{1}{6}}}{n} R^{\frac{1}{2}} S_f^{\frac{1}{2}}$

Where,

V = velocity of the pipe flow (m/s)
S_f = hydraulic gradient
n = manning's coefficient
R = hydraulic radius (m)

5. Colebrook-White Equation is used for calculation of velocity of flow inside the pipes:

Colebrook-White Equation: $\underline{v} = -\sqrt{32gRS}\ log\ log\ (\frac{k_s}{14.8R} + \frac{1.255v}{R\sqrt{32gRS_f}})$

where,

V	=	velocity of the pipe flow (m/s)
S_f	=	hydraulic gradient
k_f	=	roughness value (m)
v	=	kinematics viscosity of fluid
D	=	pipe diameter (m)
R	=	hydraulic radius (m)

4. Existing and Proposed Drainage System

4.1.1 The Application Site and the surrounding areas are generally flat. There are existing internal Uchannels and catchpit within Application Site. Design review on the existing Uchannels has been conducted to demonstrate the existing system is capable of carrying the runoff from the Application Site. The alignment, size and gradient of the existing internal drains are shown in **Figure 3**. The catchment plan is shown in **Figure 4**. The checking of existing internal drains is shown in **Appendix A**.

4.1.2 With the existing internal drainage system to collect the runoff from the application site and discharge to the existing ditch/ drainage system beside Kam Sheung Road, no significant drainage impact to the area after the implementation of the development is anticipated.

4.1.3 The reference standard drawings of existing drains are shown in **Appendix C**.

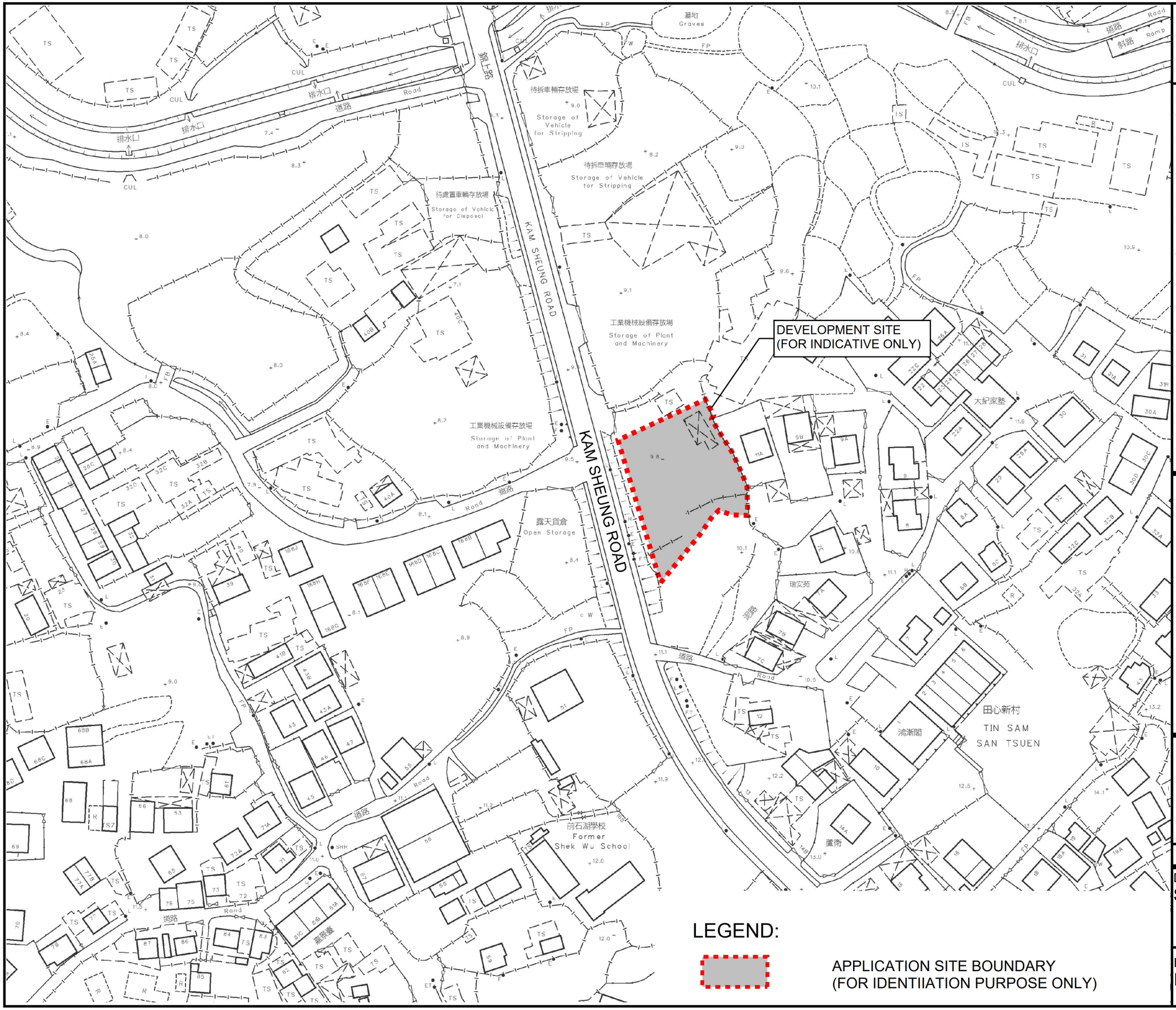
5. Conclusion

5.1.1 A drainage appraisal has been conducted for the Proposed Development. The surface runoff from the Application Site will be collected by the existing internal Uchannels and discharged to the existing ditch/ drainage system beside Kam Sheung Road.

5.1.2 With the proposed drainage system, it is anticipated that there will be no significant drainage impact to the area after the implementation of the development.

- End of Text -

FIGURES

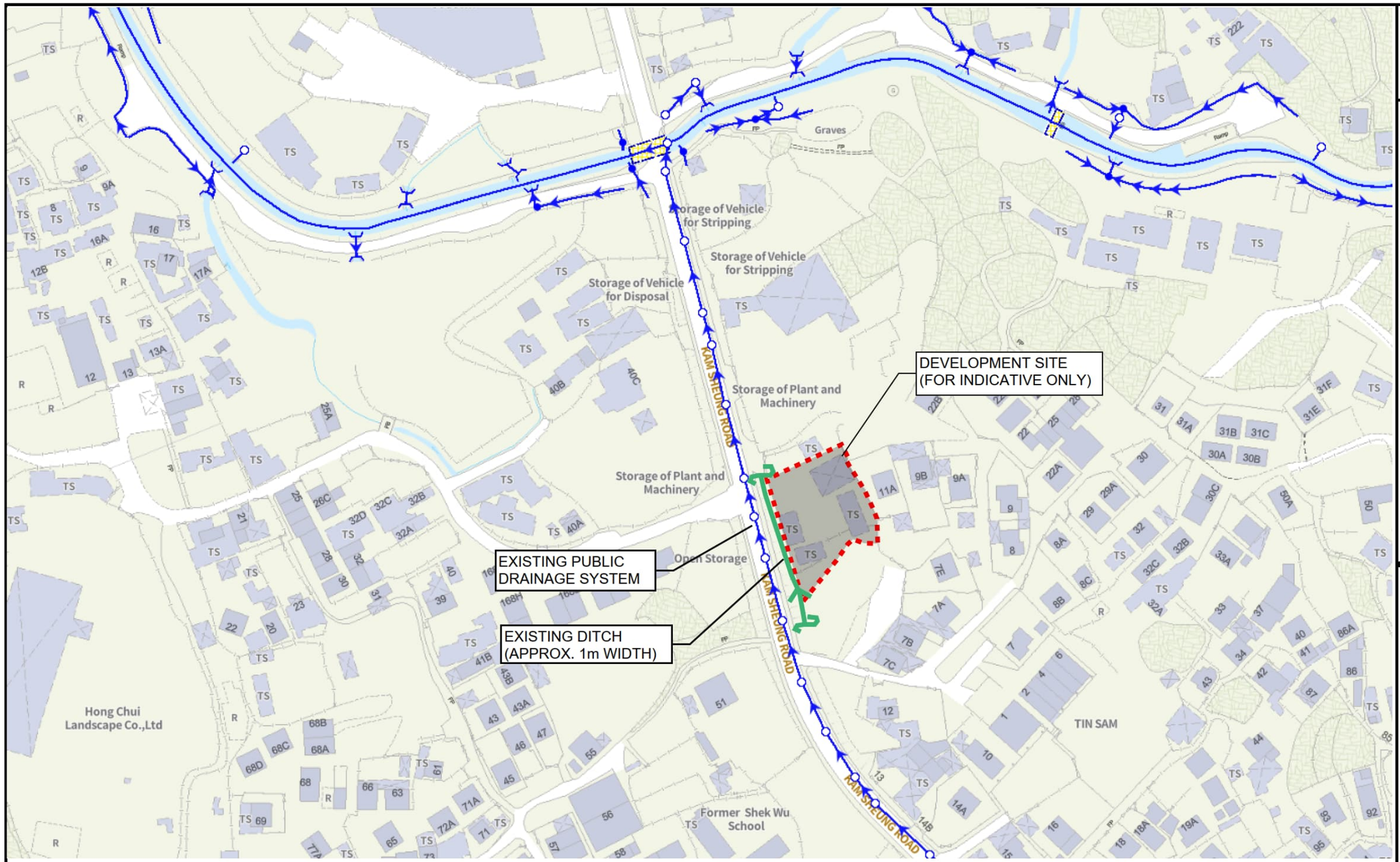


PROJECT:
Temporary Shop and Services and Eating Place for a Period of 5 Years in “Village Type Development” zone, Lot 390 RP (Part) in D.D. 106 , Kam Sheung Road, Yuen Long, New Territories

REV	DESCRIPTION	DATE

DRAWING TITLE
SITE LOCATION PLAN

DRAWING NUMBER
FIGURE 1



LEGEND:

Combined Manhole	H	Tapping Point (Sewer)	H	Tapping Point (Storm)
Overflow (Combined)		Sewer Terminal Manhole		Storm Water Terminal Manhole
Pipe (Combined)		Catchpit		Tunnel Protection Zone (100m / 200m)
Interface Valve Chamber		Inlet		Tunnel Protection Zone (General Range)
Sewer Manhole		Storm Water Manhole		Tunnel / Box Culvert (Sewer)
Oil / Petrol Interceptor		Outlet		Tunnel / Box Culvert (Storm)
Overflow (Sewer)		Pipe (Storm)		
Pipe (Sewer)		Sand Trap		EXISTING DITCH

PROJECT:
Temporary Shop and Services and Eating Place for a Period of 5 Years in “Village Type Development” zone, Lot 390 RP (Part) in D.D. 106 , Kam Sheung Road, Yuen Long, New Territories

REV	DESCRIPTION	DATE

DRAWING TITLE
EXISTING DRAINAGE PLAN

DRAWING NUMBER
FIGURE 2

Storage of Plant and Machinery

TS

22B

+9.4

UC1 300 (HALF ROUND TO U) MINI. 1 IN 450

UC2 300, 1 IN 450

工業機械設備存放場

Storage of Plant and Machinery

9B

9A

11A

UC2 300, 1 IN 450

UC5 300, 1 IN 90

UC1 300 (HALF ROUND TO U) MINI. 1 IN 450

道路

Road

DISCHARGE TO EXISTING DITCH (APPROX. 1m WIDTH)

UC4 300, 1 IN 300

UC4 300, 1 IN 300

露天貨倉

Open Storage

8B

+8.4

10.1

7E

瑞安苑

7A

泥路

7B

+11.1

道路

NOTES:

1. INVERT LEVEL OF CONNECTION POINT SHOULD BE VERIFIED ON SITE BEFORE CONSTRUCTION.

LEGEND:

APPLICATION SITE BOUNDARY (FOR IDENTIIATION PURPOSE ONLY)

EXISTING DITCH

EXISTING CATCHPIT WO/TRAP

EXISTING CATCHPIT W/TRAP

EXISTING UCHANNEL

PROJECT:
Temporary Shop and Services and Eating Place for a Period of 5 Years in “Village Type Development” zone, Lot 390 RP (Part) in D.D. 106 , Kam Sheung Road, Yuen Long, New Territories

REV	DESCRIPTION	DATE

DRAWING TITLE
EXISTING INTERNAL DRAINAGE SYSTEM

DRAWING NUMBER
FIGURE 3

Storage of Plant and Machinery

TS

22B

Zone A1
212 m²

TS

Zone A2
251m²

工業機械設備存放場

Storage of Plant and Machinery

9B

9A

Zone B1
121 m²

9.4

9.5

道路

Road

露天貨倉

Open Storage

DISCHARGE TO EXISTING DITCH

8.4

10.1

Zone B2
639 m²

Zone C1
511m²
(ASSUME 70% PAVED)

7A

泥路

7B

11.1

道路

LEGEND:

APPLICATION SITE BOUNDARY
(FOR IDENTIFICATION PURPOSE ONLY)

CATCHMENT

FALL

EXISTING UCHANNEL

NOTES:

1. INVERT LEVEL OF CONNECTION POINT SHOULD BE VERIFIED ON SITE BEFORE CONSTRUCTION.

PROJECT:
Temporary Shop and Services and Eating Place for a Period of 5 Years in “Village Type Development” zone, Lot 390 RP (Part) in D.D. 106 , Kam Sheung Road, Yuen Long, New Territories

REV	DESCRIPTION	DATE

DRAWING TITLE
CATCHMENT PLAN

DRAWING NUMBER
FIGURE 4

Appendix

Appendix A - Existing U Channel Design Checking

U Channel 1 (Zone A1)

Runoff Estimation				
Design Return Period		1 in	10	years
Paved Area	212 =		212	(m2)
Unpaved Area			0	(m2)
Total Equivalent Area	212 x 0.95 + 0 x 0.35 =		201	(m2)
Rainfall Intensity, I *			206	mm/hr
Design Discharge Rate, Q	0.278 x 201 x 206 / 1000000 =		0.012	m3/s

* $i = \frac{a}{(t_d + b)^c}$

U Channel (Half round to U)			
Channel Size		300	(mm)
Gradient	1 in	450	
Velocity		0.60	m/s
Capacity		0.021	m3/s

Utilization 0.012 / 0.021 = **54.62** % OK

U Channel 2 (Zone A1 + A2)

Runoff Estimation				
Design Return Period		1 in	10	years
Paved Area	463 =		463	(m2)
Unpaved Area			0	(m2)
Total Equivalent Area	463 x 0.95 + 0 x 0.35 =		440	(m2)
Rainfall Intensity, I *			206	mm/hr
Design Discharge Rate, Q	0.278 x 0 x 206 / 1000000 =		0.025	m3/s

* $i = \frac{a}{(t_d + b)^c}$

U Channel			
Channel Size		300	(mm)
Gradient	1 in	450	
Velocity		0.75	m/s
Capacity		0.060	m3/s

Utilization 0.025 / 0.06 = **42.16** % OK

U Channel 3 (Zone B1)

Runoff Estimation				
Design Return Period		1 in	10	years
Paved Area	121 =		121	(m2)
Unpaved Area			0	(m2)
Total Equivalent Area	121 x 0.95 + 0 x 0.35 =		115	(m2)
Rainfall Intensity, I *			206	mm/hr
Design Discharge Rate, Q	0.278 x 115 x 206 / 1000000 =		0.007	m3/s

* $i = \frac{a}{(t_d + b)^c}$

U Channel (Half round to U)			
Channel Size		300	(mm)
Gradient	1 in	450	
Velocity		0.60	m/s
Capacity		0.021	m3/s

Utilization 0.007 / 0.021 = **31.18** % OK

U Channel 4 (Zone B1 + B2 + C1)

Runoff Estimation				
Design Return Period		1 in	10	years
Paved Area	760 + 511 x 0.7 =		1118	(m2)
Unpaved Area	511 x 0.3 =		153	(m2)
Total Equivalent Area	1118 x 0.95 + 153 x 0.35 =		1115	(m2)
Rainfall Intensity, I *			206	mm/hr
Design Discharge Rate, Q	0.278 x 1115 x 206 / 1000000 =		0.064	m3/s

* $i = \frac{a}{(t_d + b)^c}$

U Channel			
Channel Size		300	(mm)
Gradient	1 in	300	
Velocity		0.91	m/s
Capacity		0.073	m3/s

Utilization 0.064 / 0.073 = **87.29** % OK

U Channel 5 (Zone A1 + A2 + B1 + B2 + C1)

Runoff Estimation				
Design Return Period		1 in	10	years
Paved Area	463 + 1118 =		1581	(m2)
Unpaved Area			153	(m2)
Total Equivalent Area	1581 x 0.95 + 153 x 0.35 =		1555	(m2)
Rainfall Intensity, I *			206	mm/hr
Design Discharge Rate, Q	0.278 x 1555 x 206 / 1000000 =		0.089	mm/hr

* $i = \frac{a}{(t_d + b)^c}$

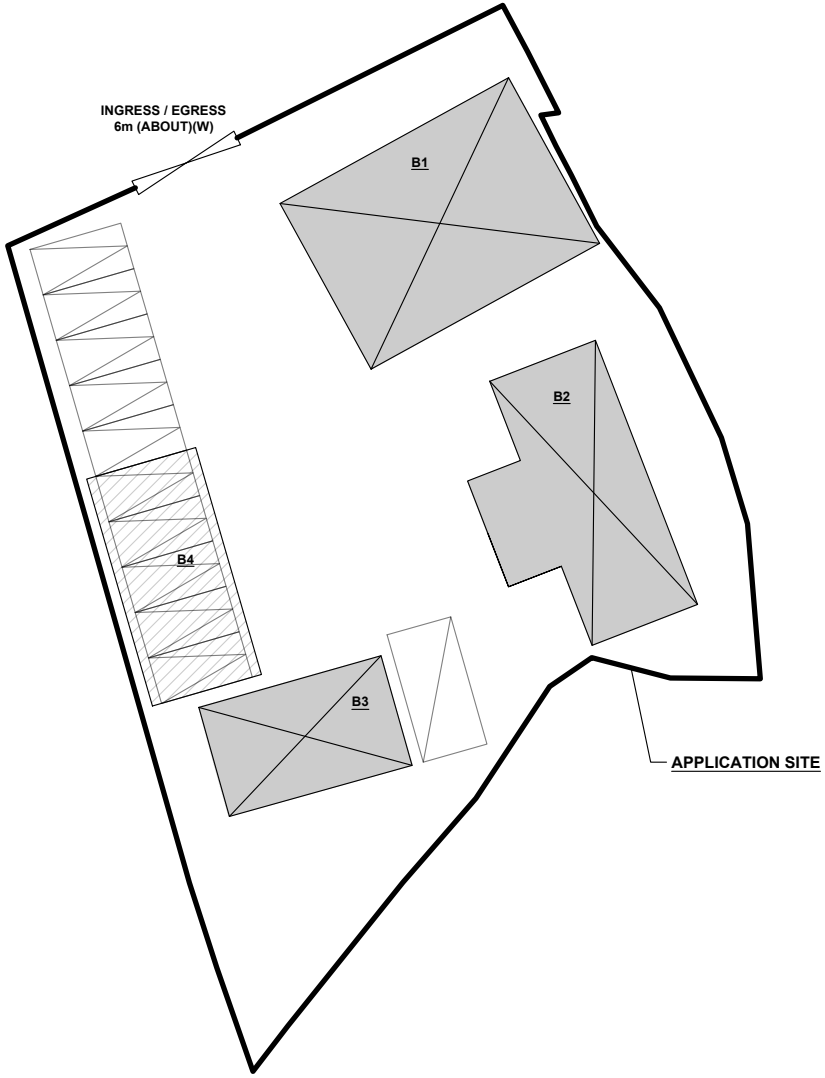
U Channel			
Channel Size		300	(mm)
Gradient	1 in	90	
Velocity		1.67	m/s
Capacity		0.134	m3/s

Utilization 0.089 / 0.134 = **66.66** % OK

Appendix B - Proposed Development Layout Plan

APPLICATION SITE AREA	: 1,217 m^2	(ABOUT)
COVERED AREA	: 381 m^2	(ABOUT)
UNCOVERED AREA	: 836 m^2	(ABOUT)
PLOT RATIO	: 0.4	(ABOUT)
SITE COVERAGE	: 31 %	(ABOUT)
NO. OF STRUCTURE	: 4	
DOMESTIC GFA	: NOT APPLICABLE	
NON-DOMESTIC GFA	: 489 m^2	(ABOUT)
TOTAL GFA	: 489 m^2	(ABOUT)
BUILDING HEIGHT	: 3 - 8 m	(ABOUT)
NO. OF STOREY	: 1 - 2	

			COVERED AREA	GFA	BUILDING HEIGHT
B1	(G/F)	RESTAURANT, KITCHEN & WASHROOM	138 m^2 (ABOUT)	138 m^2 (ABOUT)	3.5m (ABOUT)(1-STOREY)
B2	(G/F) (1/F)	SHOP AND SERVICES OFFICE AND WASHROOM	108 m^2 (ABOUT)	108 m^2 (ABOUT) 108 m^2 (ABOUT)	8m (ABOUT)(2-STOREY)
B3		SHOP AND SERVICES	60 m^2 (ABOUT)	60 m^2 (ABOUT)	3m (ABOUT)(1-STOREY)
B4		RAIN SHELTER FOR PARKING SPACE	75 m^2 (ABOUT)	75 m^2 (ABOUT)	3m (ABOUT)(1-STOREY)
		TOTAL	**381 m^2** (ABOUT)	**489 m^2** (ABOUT)	



PARKING AND LOADING/UNLOADING PROVISIONS

NO. OF PRIVATE CAR PARKING SPACE	: 10
DIMENSION OF PARKING SPACE	: 5m (L) X 2.5m (W)
NO. OF L/UL SPACE FOR LIGHT GOODS VEHICLE	: 1
DIMENSION OF L/UL SPACE	: 7m (L) X 3.5m (W)

LEGEND

- APPLICATION SITE
- STRUCTURE
- PARKING SPACE
- LOADING / UNLOADING SPACE
- INGRESS / EGRESS

NORTH
W E
S

PLANNING CONSULTANT
R-Riches Property Consultants Ltd.

PROJECT
TEMPORARY SHOP AND SERVICES AND EATING PLACE FOR A PERIOD OF 5 YEARS

SITE LOCATION
LOT 390 RP (PART) IN D.D. 106, KAM SHEUNG ROAD, YUEN LONG, NEW TERRITORIES

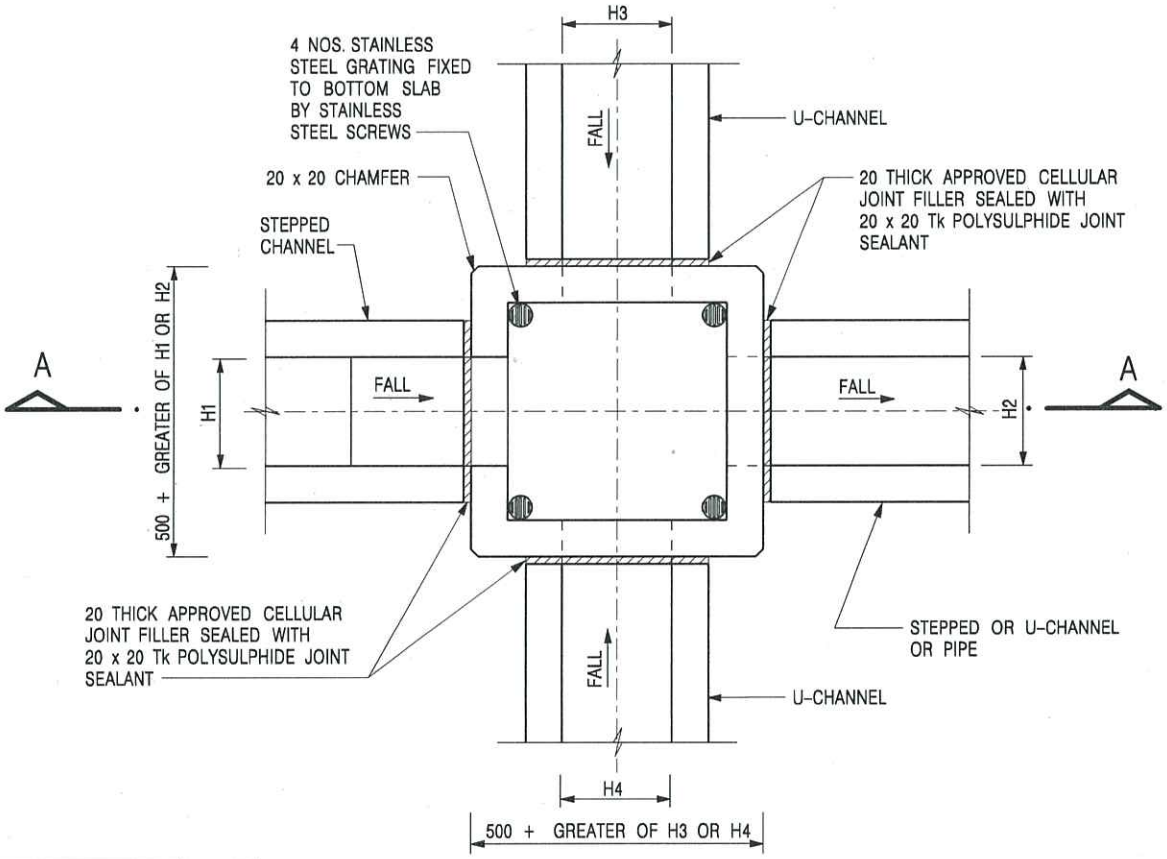
SCALE
1 : 400 @ A4

DRAWN BY	DATE
OL	19.12.2023
REVISED BY	DATE
APPROVED BY	DATE

DWG. TITLE
LAYOUT PLAN

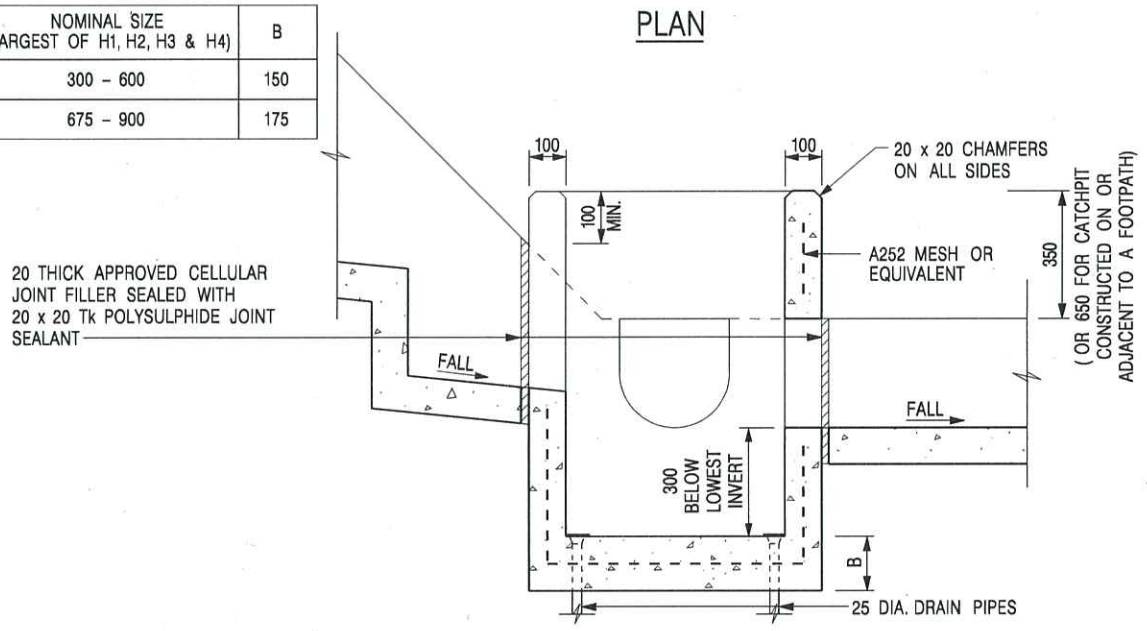
DWG NO.	VER.
PLAN 4	001

Appendix C - Reference Drawings



PLAN

NOMINAL SIZE (LARGEST OF H1, H2, H3 & H4)	B
300 – 600	150
675 – 900	175



SECTION A – A

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. REFER TO SHEET 2 FOR OTHER NOTES.

REF.	REVISION	SIGNATURE	DATE
–	FORMER DRG. NO. C2406J.	Original Signed	03.2015

CATCHPIT WITH TRAP

(SHEET 1 OF 2)

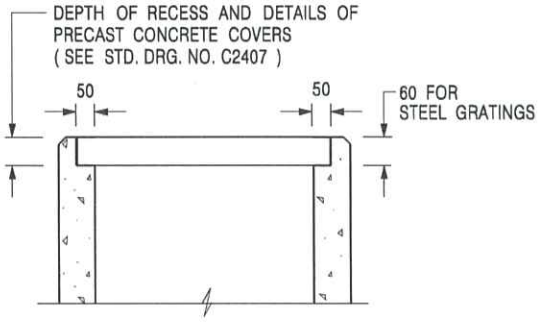
CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

SCALE 1 : 20

DATE JAN 1991

DRAWING NO. C2406 /1

卓越工程 建設香港 We Engineer Hong Kong's Development



ALTERNATIVE TOP SECTION
FOR PRECAST CONCRETE COVERS / GRATINGS

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. ALL CONCRETE SHALL BE GRADE 20 /20.
3. CONCRETE SURFACE FINISH SHALL BE CLASS U2 OR F2 AS APPROPRIATE.
4. FOR DETAILS OF JOINT, REFER TO STD. DRG. NO. C2413.
5. CONCRETE TO BE COLOURED AS SPECIFIED.
6. UNLESS REQUESTED BY THE MAINTENANCE PARTY AND AS DIRECTED BY THE ENGINEER, CATCHPIT WITH TRAP IS NORMALLY NOT PREFERRED DUE TO PONDING PROBLEM.
7. UPON THE REQUEST FROM MAINTENANCE PARTY, DRAIN PIPES AT CATCHPIT BASE CAN BE USED BUT THIS IS FOR CATCHPITS LOCATED AT SLOPE TOE ONLY AND AS DIRECTED BY THE ENGINEER.
8. FOR CATCHPITS CONSTRUCTED ON OR ADJACENT TO A FOOTPATH, STEEL GRATINGS (SEE DETAIL 'A' ON STD. DRG. NO. C2405 /2) OR CONCRETE COVERS (SEE STD. DRG. NO. C2407) SHALL BE PROVIDED AS DIRECTED BY THE ENGINEER.
9. IF INSTRUCTED BY THE ENGINEER, HANDRAILING (SEE DETAIL 'J' ON STD. DRG. NO. C2405 /5; EXCEPT ON THE UPSLOPE SIDE) IN LIEU OF STEEL GRATINGS OR CONCRETE COVERS CAN BE ACCEPTED AS AN ALTERNATIVE SAFETY MEASURE FOR CATCHPITS NOT ON A FOOTPATH NOR ADJACENT TO IT. TOP OF THE HANDRAILING SHALL BE 1 000 mm MIN. MEASURED FROM THE ADJACENT GROUND LEVEL.
10. MINIMUM INTERNAL CATCHPIT WIDTH SHALL BE 1 000 mm FOR CATCHPITS WITH A HEIGHT EXCEEDING 1 000 mm MEASURED FROM THE INVERT LEVEL TO THE ADJACENT GROUND LEVEL. AND, STEP IRONS (SEE DSD STD. DRG. NO. DS1043) AT 300 c/c STAGGERED SHALL BE PROVIDED. THICKNESS OF CATCHPIT WALL FOR INSTALLATION OF STEP IRONS SHALL BE INCREASED TO 150 mm.
11. FOR RETROFITTING AN EXISTING CATCHPIT WITH STEEL GRATING, SEE DETAIL 'G' ON STD. DRG. NO. C2405 /4.
12. SUBJECT TO THE APPROVAL OF THE ENGINEER, OTHER MATERIALS CAN ALSO BE USED AS COVERS / GRATINGS.

REF.	REVISION	SIGNATURE	DATE
A	MINOR AMENDMENT.	Original Signed	04.2016
–	FORMER DRG. NO. C2406J.	Original Signed	03.2015

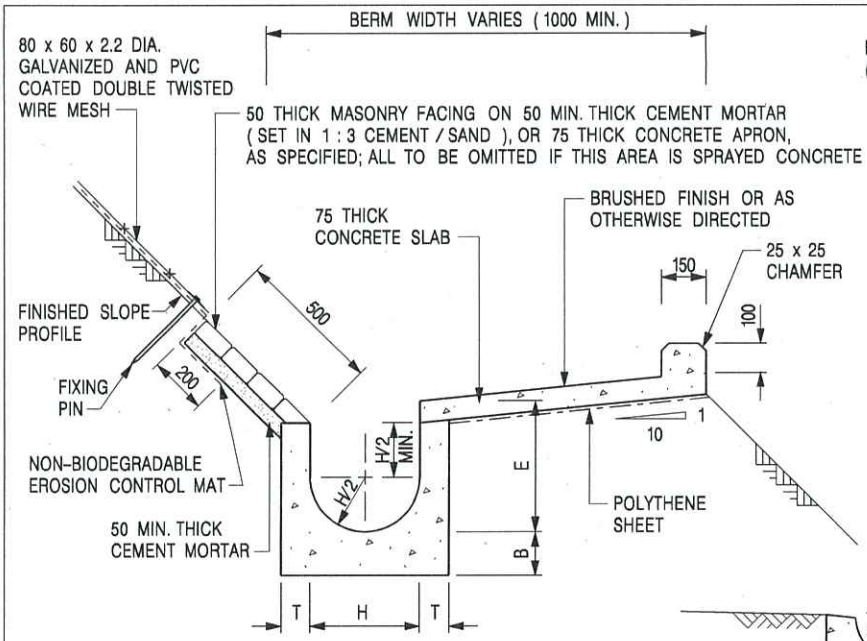
CATCHPIT WITH TRAP
(SHEET 2 OF 2)

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

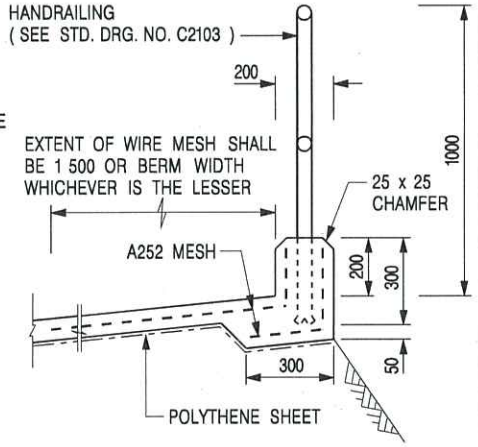
SCALE 1 : 20

DATE JAN 1991

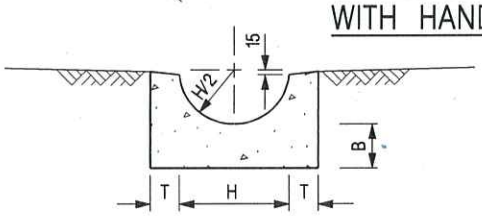
DRAWING NO. C2406 /2A



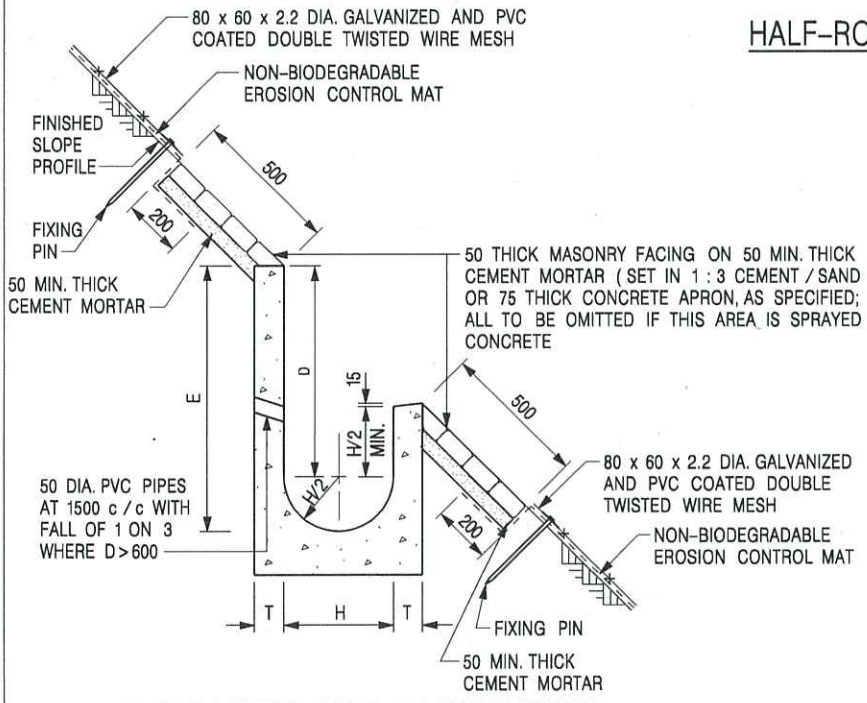
U-CHANNELS CONSTRUCTED ON BERM



DETAILS OF BERM WITH HANDRAILING



HALF-ROUND CHANNEL



U-CHANNELS NOT CONSTRUCTED ON BERM

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. ALL CONCRETE TO BE GRADE 20 / 20.
3. CONCRETE SURFACE FINISH SHALL BE CLASS U2, F2 OR BRUSHED FINISH AS DIRECTED.
4. SPACING OF EXPANSION JOINT IN CHANNELS, BERM SLABS AND APRONS TO BE 10 METRES MAXIMUM, SEE STD. DRG. NO. C2413 FOR DETAILS.
5. JOINTS FOR CHANNELS, BERM SLABS, APRONS AND WALLS, ETC. TO BE ON THE SAME ALIGNMENT.
6. FOR DIMENSIONS T, H, & B, SEE TABLE BELOW.
7. BIODEGRADABLE EROSION CONTROL MAT IF REQUIRED, SEE STD. DRG. NO. C2511/1E.
8. CONCRETE TO BE COLOURED AS SPECIFIED.
9. CONCRETE U-CHANNEL CAN BE CAST IN-SITU OR PRECAST CONCRETE SUBJECT TO THE ENGINEER'S AGREEMENT ON THE DETAILS.
10. DETAILS OF EROSION CONTROL MAT AND WESH MESH ON BERM. (SEE STD DRG. NO. C2511/1E)

NOMINAL SIZE H	T	B	REINFORCEMENT
300	80	100	A252 MESH PLACED CENTRALLY AND T=100 WHEN E>650
375 - 600	100	150	
675 - 900	125	175	A252 MESH PLACED CENTRALLY

REF.	REVISION	SIGNATURE	DATE
I	MINOR AMENDMENT.	Original Signed	07.2018
H	THICKNESS OF MASONRY FACING AMENDED.	Original Signed	01.2005
G	MINOR AMENDMENT.	Original Signed	01.2004
F	GENERAL REVISION.	Original Signed	12.2002
E	DRAWING TITLE AMENDED.	Original Signed	11.2001
D	MINOR AMENDMENT.	Original Signed	08.2001
C	150 x 100 UPSTAND ADDED AT BERM.	Original Signed	6.99
B	MINOR AMENDMENTS.	Original Signed	3.94

DETAILS OF HALF-ROUND AND U-CHANNELS (TYPE A - WITH MASONRY APRON)

CEDD **CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT**

SCALE 1 : 25

DATE JAN 1991

DRAWING NO. C2409I

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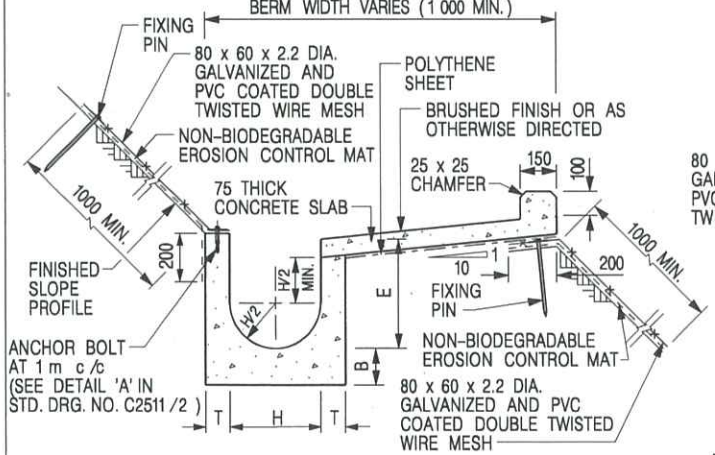
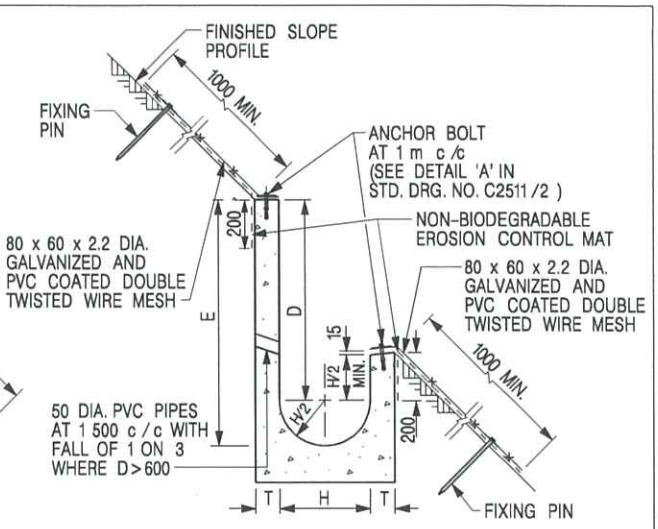
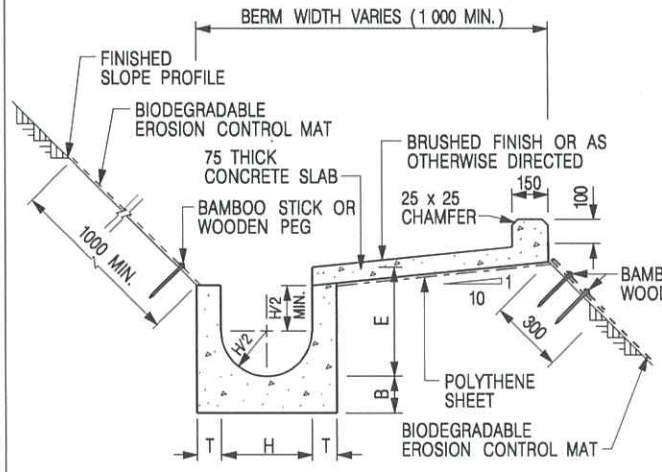


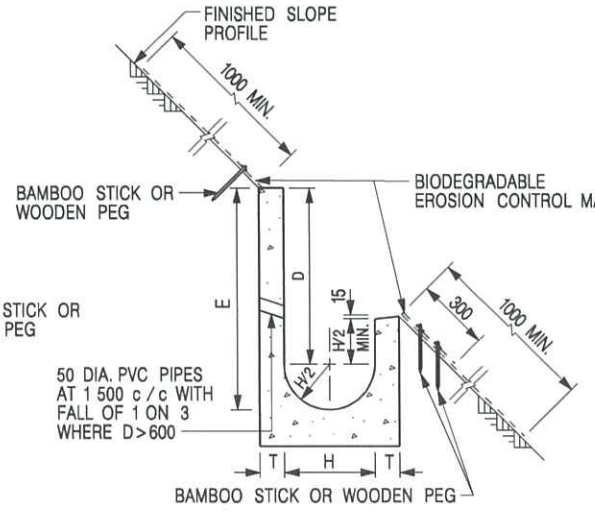
U-CHANNELS CONSTRUCTED ON BERM WITH NON-BIODEGRADABLE EROSION CONTROL MAT



U-CHANNELS NOT CONSTRUCTED ON BERM WITH NON-BIODEGRADABLE EROSION CONTROL MAT



U-CHANNELS CONSTRUCTED ON BERM WITH BIODEGRADABLE EROSION CONTROL MAT



U-CHANNELS NOT CONSTRUCTED ON BERM WITH BIODEGRADABLE EROSION CONTROL MAT

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. ALL CONCRETE TO BE GRADE 20 /20.
3. CONCRETE SURFACE FINISH SHALL BE CLASS U2, F2 OR BRUSHED FINISH AS DIRECTED.
4. SPACING OF EXPANSION JOINT IN CHANNELS, BERM SLABS AND APRONS TO BE 10 METRES MAXIMUM, SEE STD. DRG. NO. C2413 FOR DETAILS.
5. JOINTS FOR CHANNELS, BERM SLABS, APRONS AND WALLS, ETC. TO BE ON THE SAME ALIGNMENT.
6. FOR DIMENSIONS T, H, & B, SEE TABLE BELOW.
7. FOR TYPICAL FIXING PIN DETAILS, SEE STD. DRG. NO. C2511/2.
8. MINIMUM SIZE OF 25 x 50 x 300mm SHALL BE PROVIDED FOR WOODEN PEG.
9. MINIMUM SIZE OF 10mm DIAMETER WITH 200mm LONG SHALL BE PROVIDED FOR BAMBOO STICK.
10. THE FIXING DETAILS OF NON-BIODEGRADABLE AND BIODEGRADABLE EROSION CONTROL MATS ON EXISTING BERM SHALL REFER TO STD. DRG. NO. C2511/1.

NOMINAL SIZE H	T	B	REINFORCEMENT
300	80	100	A252 MESH PLACED CENTRALLY AND T=100 WHEN E>650
375 - 600	100	150	
675 - 900	125	175	A252 MESH PLACED CENTRALLY

REF.	REVISION	SIGNATURE	DATE
I	MINOR AMENDMENT.	Original Signed	07.2018
H	FIXING DETAILS OF BIODEGRADABLE EROSION CONTROL MAT ADDED.	Original Signed	12.2017
G	DIMENSION TABLE AMENDED.	Original Signed	01.2005
F	MINOR AMENDMENT.	Original Signed	01.2004
E	GENERAL REVISION.	Original Signed	12.2002
D	MINOR AMENDMENT.	Original Signed	08.2001
C	150 x 100 UPSTAND ADDED AT BERM.	Original Signed	6.99
B	MINOR AMENDMENT.	Original Signed	3.94
A	MINOR AMENDMENT.	Original Signed	10.92

DETAILS OF HALF-ROUND AND U-CHANNELS (TYPE B - WITH EROSION CONTROL MAT APRON)

CEDD **CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT**

SCALE DIAGRAMMATIC

DATE JAN 1991

DRAWING NO. C2410I

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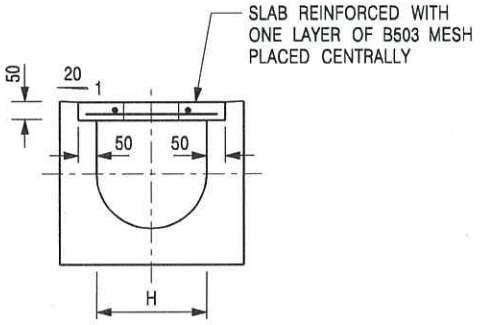
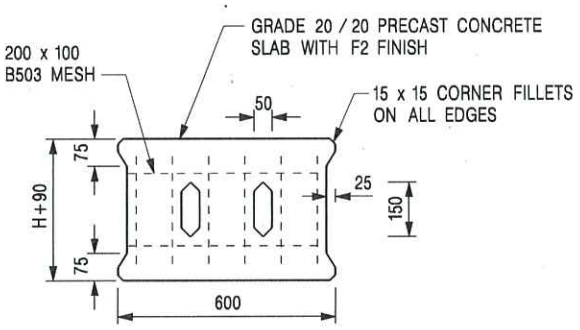


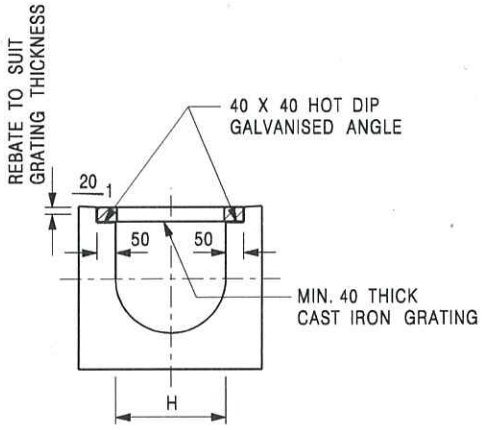
TYPICAL SECTION



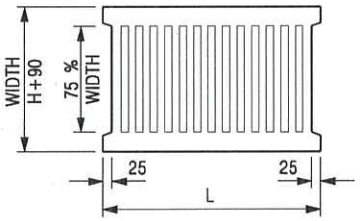
PLAN OF SLAB

U-CHANNELS WITH PRECAST CONCRETE SLABS

(UP TO H OF 525)



TYPICAL SECTION



L = 600mm FOR H ≤ 375mm
L = 400mm FOR H > 375mm

CAST IRON GRATING

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

U-CHANNEL WITH CAST IRON GRATING

(UP TO H OF 525)

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. H = NOMINAL CHANNEL SIZE.
3. ALL CAST IRON FOR GRATINGS SHALL BE GRADE EN-GJL-150 COMPLYING WITH BS EN 1561.
4. FOR COVERED CHANNELS TO BE HANDED OVER TO HIGHWAYS DEPARTMENT FOR MAINTENANCE, THE GRATING DETAILS SHALL FOLLOW THOSE AS SHOWN ON HyD STD. DRG. NO. H3156.

REF.	REVISION	SIGNATURE	DATE
E	NOTES 3 & 4 AMENDED.	Original Signed	12.2014
D	NOTE 4 ADDED.	Original Signed	06.2008
C	MINOR AMENDMENT. NOTE 3 ADDED.	Original Signed	12.2005
B	NAME OF DEPARTMENT AMENDED.	Original Signed	01.2005
A	CAST IRON GRATING AMENDED.	Original Signed	12.2002

COVER SLAB AND CAST IRON GRATING FOR CHANNELS

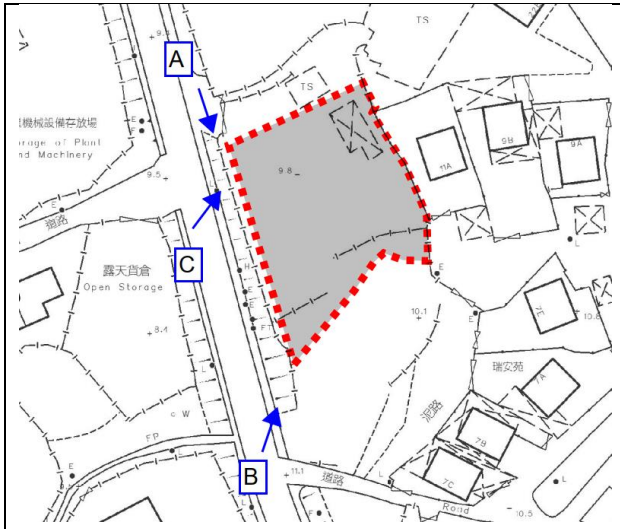
CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

SCALE 1 : 20

DATE JAN 1991

DRAWING NO. C2412E

Annex A – Photographic records showing the presence and existing condition of the discharge path



View A

View B

View C