Annex 1

Drainage Proposal

Proposed Temporary Open Storage of Construction Material and Machinery with Ancillary Facilities for a Period of 3 Years and Associated Filling of Land in “Agriculture” Zone, Lots 357 (Part) and 359 (Part) in D.D.87, Hung Lung Hang, N.T.

Drainage Proposal

August 24

Table of Content

List of Table

List of Figure

List of Appendix

1. Introduction

1.1 Background

1.1.1 The applicant seeks planning permission from the Town Planning Board (the Board) to use Lots 357 (Part) and 359 (Part) in D.D. 87, Hung Lung Hang, New Territories (the Site) for 'Proposed Temporary Open Storage of Construction Material and Machinery with Ancillary Facilities for a Period of 3 Years and Associated Filling of Land'

1.1.2 This Drainage Proposal aim to support the development in drainage aspect.

1.2 The Site

1.2.1 The Site has a total area of about 3,110 m^2. The site is partially cover by vegetation and partially paved. The site location plan is shown in **Figure 1**.

1.2.2 The existing site ground level is around +25.5 to +25.9 mPD. The site is proposed to all paved with not more than 200mm hard pavement from +25.7 to +26.1 mPD.

1.2.3 An existing channel is running from southwest to northeast by the side of the site. Existing Drainage Plan are shown in **Figure 2** for reference.

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 3,110 m^2. The indicative development schedule is summarized in **Table 1** below for technical assessment purpose. The catchment plan is shown in **Figure 4**.

Proposed Development	
Total Site Area (m^2)	3,110
Paved Area (m^2) Assume all proposed site area as paved area for assessment purpose	3,110

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 proposed drainage system intended to collect runoff from internal site and external catchment. 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 North District Zone. Therefore, for 10 years return period, the following values are adopted.

a	=	454.9
b	=	3.44
c	=	0.412

(Corrigendum_No.1_2024)

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:

   1. Paved Area: C = 0.95
   2. 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. Proposed Drainage System

4.1. Proposed UChannel

4.1.1 Proposed U-channels are designed for collection of runoff within and near the Development Site. Please refer to the **Figure 4** for proposed catchment plan. The U-channels are proposed to be connected to existing stream at the east. The design calculations of proposed UChannels are shown in **Appendix A**.

4.1.2 The alignment, size, gradient and details of the proposed drains are shown in **Figure 3**.

4.1.3 Further to the discussion with DSD, the following improvement works are proposed.

i. additional 2m width channel at critical section of the existing channel.

ii. additional 600mm width channel along the site boundary at south (connection to 2m channel at item i)..

iii. additional 600mm width channel along the site boundary at the east (connection to 2m channel at item i).

4.1.4 The increase in capacity due to the proposed 2m width and 600mm channel are shown in **Appendix A**. The proposed channels alignment are shown in **Figure 3**.

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

5. Conclusion

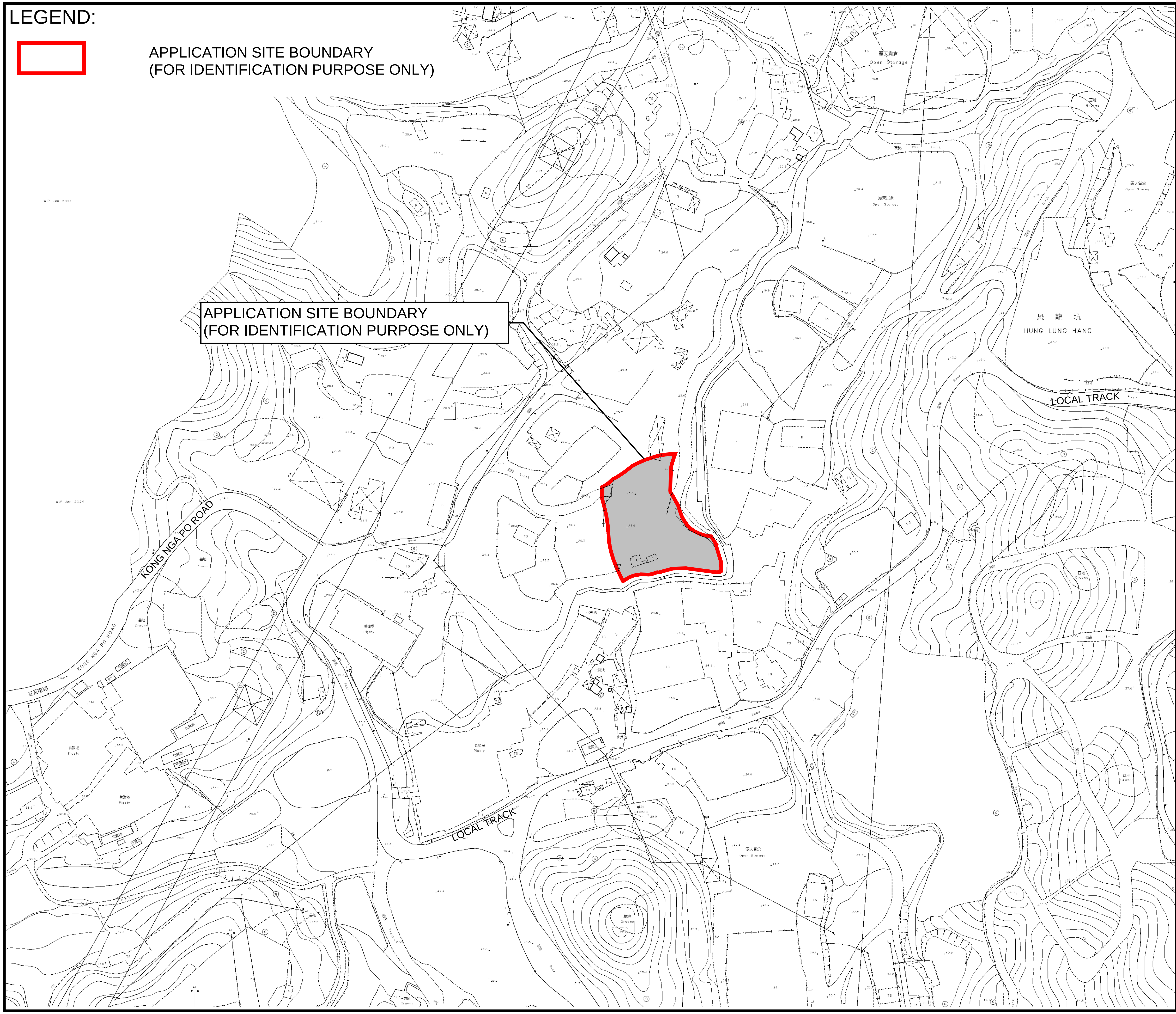
5.1.1 Drainage study has been conducted for the Proposed Development. With implementation of proposed drainage system, no significant drainage impact is anticipated.

\- End of Text -

FIGURES

LEGEND:

APPLICATION SITE BOUNDARY
(FOR IDENTIFICATION PURPOSE ONLY)

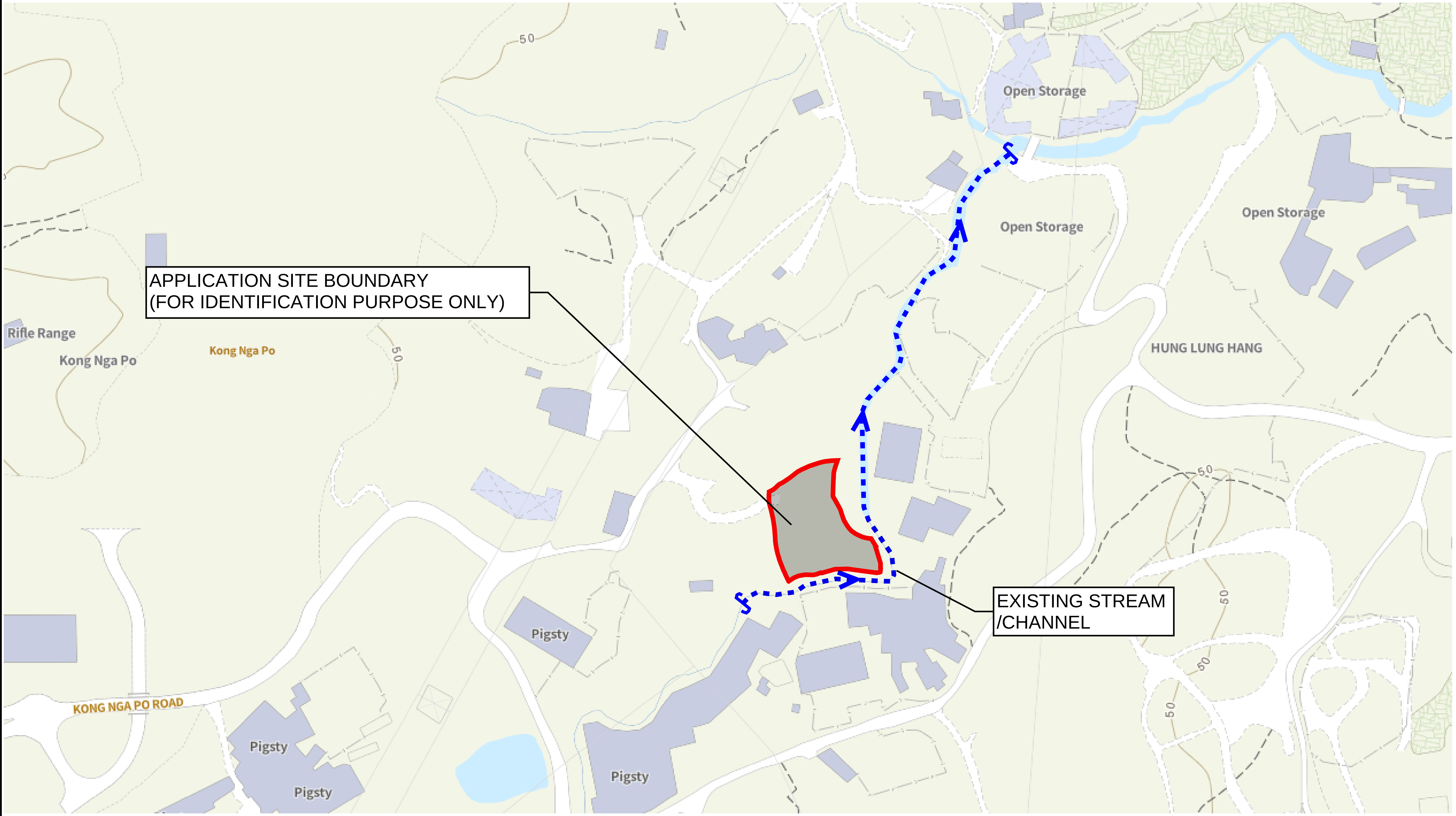


PROJECT:
Proposed Temporary Open Storage of Construction Material and Machinery with Ancillary Facilities for a Period of 3 Years and Associated Filling of Land in “Agriculture” Zone, Lots 357 (Part) and 359 (Part) in D.D.87, Hung Lung Hang, N.T.

REV	DESCRIPTION	DATE

DRAWING TITLE
SITE LOCATION PLAN

DRAWING NUMBER
FIGURE 1



LEGEND:

Combined Manhole	Tapping Point (Sewer)	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)	EXISTING STREAM/CHANNEL
Pipe (Sewer)	Sand Trap	

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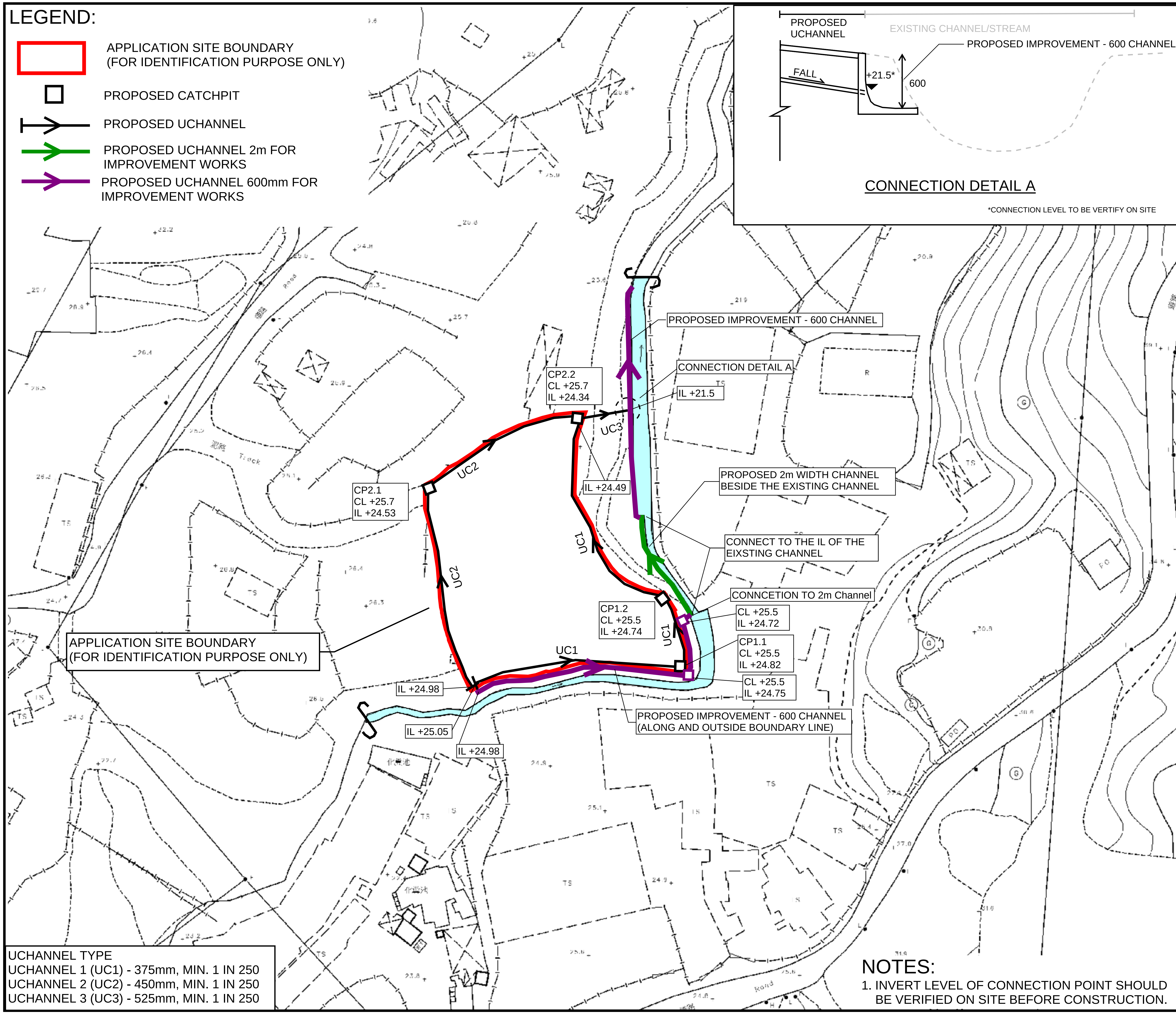
REV	DESCRIPTION	DATE

DRAWING TITLE
EXISTING DRAINAGE PLAN

DRAWING NUMBER
FIGURE 2

LEGEND:

- APPLICATION SITE BOUNDARY (FOR IDENTIFICATION PURPOSE ONLY)
- PROPOSED CATCHPIT
- PROPOSED UCHANNEL
- PROPOSED UCHANNEL 2m FOR IMPROVEMENT WORKS
- PROPOSED UCHANNEL 600mm FOR IMPROVEMENT WORKS



UCHANNEL TYPE
UCHANNEL 1 (UC1) - 375mm, MIN. 1 IN 250
UCHANNEL 2 (UC2) - 450mm, MIN. 1 IN 250
UCHANNEL 3 (UC3) - 525mm, MIN. 1 IN 250

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

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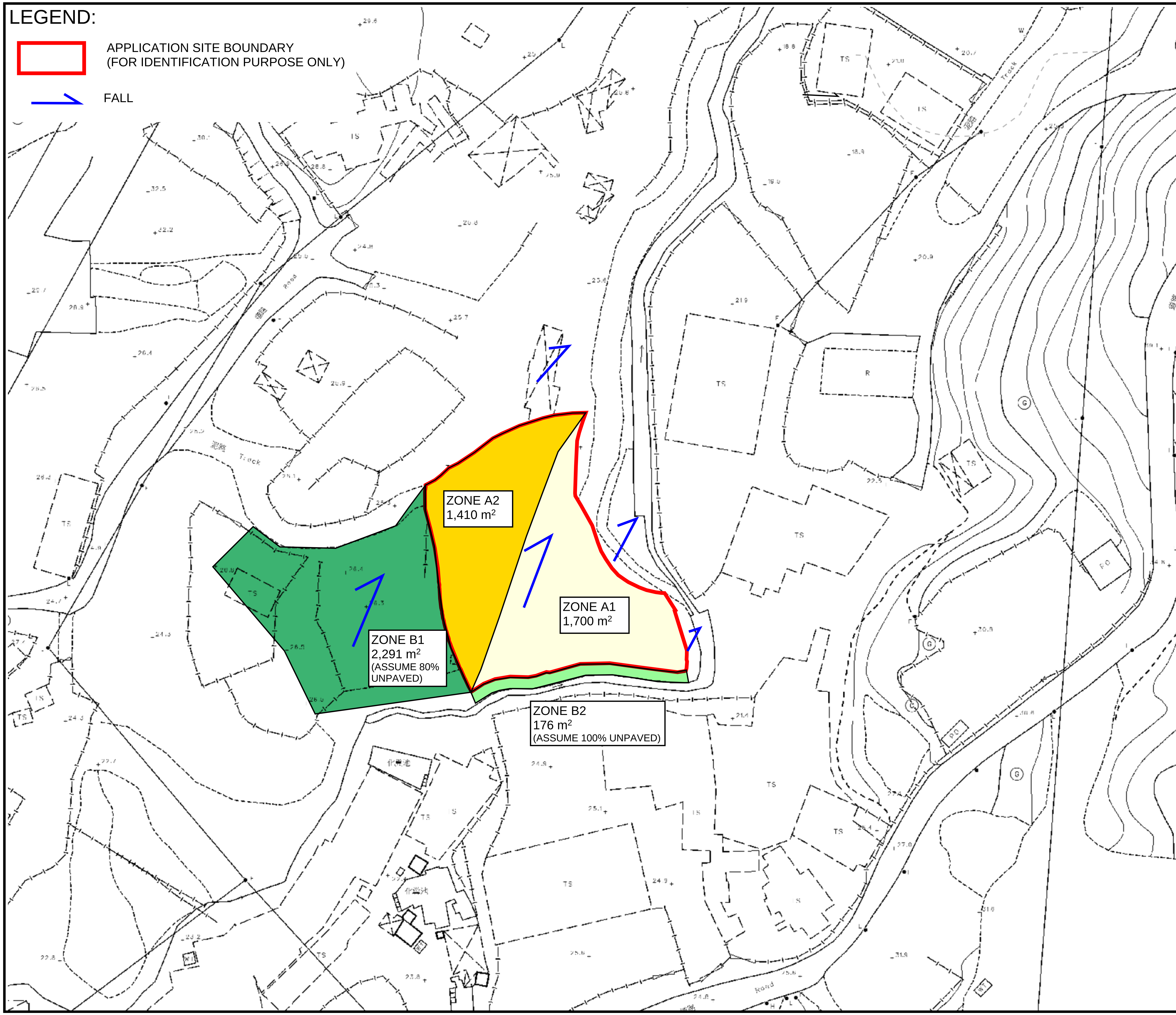
REV	DESCRIPTION	DATE

DRAWING TITLE
PROPOSED DRAINAGE SYSTEM

DRAWING NUMBER
FIGURE 3



PROJECT:
Proposed Temporary Open Storage of Construction Material and Machinery with Ancillary Facilities for a Period of 3 Years and Associated Filling of Land in "Agriculture" Zone, Lots 357 (Part) and 359 (Part) in D.D.87, Hung Lung Hang, N.T.

REV	DESCRIPTION	DATE

DRAWING TITLE
CATCHMENT PLAN

DRAWING NUMBER
FIGURE 4

Appendix

Appendix A - Channel Design Calculation

(n = 0.016)

U Channel 1 (Zone A1 + B2)

Runoff Estimation				
Design Return Period		1 in	10	years
Paved Area	1700 + 176 x 0		1700	(m2)
Unpaved Area	176 x 1 =		176	(m2)
Total Equivalent Area	1700 x 0.95 + 176 x 0.35 =		1677	(m2)
Time of Concentration			5	min
Rainfall Intensity, I *			189	mm/hr
Design Discharge Rate, Q	0.278 x 1677 x 189 / 1000000 =		0.088	m3/s

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

U Channel				
Channel Size			375	(mm)
Gradient		1 in	250	
Area	π x 0.38^2 /8 + 0.38 x 0.38/2 =		0.126	(m2)
Wetted Perimeter	π x 0.38 / 2 + 0.38/2 x 2 =		0.964	(m)
R	0.126 / 0.964 =		0.208	(m)
Velocity $v = \frac{R^{\frac{1}{6}}}{n} R^{\frac{1}{2}} S_f^{\frac{1}{2}}$			1.02	m/s
Capacity			0.127	m3/s

Utilization 0.088 / 0.127 = **69.07** % OK (less than 90%, for 10% siltation allowance)

U Channel 2 (Zone A2 + B1)

Runoff Estimation				
Design Return Period		1 in	10	years
Paved Area	1410 + 2291 x 0.2 =		1868	(m2)
Unpaved Area	176 + 2291 x 0.8 =		2009	(m2)
Total Equivalent Area	1868 x 0.95 + 2009 x 0.35 =		2478	(m2)
Time of Concentration			5	min
Rainfall Intensity, I *			189	mm/hr
Design Discharge Rate, Q	0.278 x 2009 x 189 / 1000000 =		0.130	m3/s

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

U Channel				
Channel Size			450	(mm)
Gradient		1 in	250	
Area	π x 0.45^2 /8 + 0.45 x 0.45/2 =		0.181	(m2)
Wetted Perimeter	π x 0.45 / 2 + 0.45/2 x 2 =		1.157	(m)
R	0.181 / 1.157 =		0.156	(m)
Velocity $v = \frac{R^{\frac{1}{6}}}{n} R^{\frac{1}{2}} S_f^{\frac{1}{2}}$			1.15	m/s
Capacity			0.207	m3/s

Utilization 0.13 / 0.207 = **62.77** % OK (less than 90%, for 10% siltation allowance)

U Channel 3 (Zone [A1 + B2] + [A2 + B1])

Runoff Estimation				
Design Return Period		1 in	10	years
Paved Area	1700 + 1868 =		3568	(m2)
Unpaved Area	176 + 2009 =		2185	(m2)
Total Equivalent Area	3568 x 0.95 + 2185 x 0.35 =		4154	(m2)
Time of Concentration			5	min
Rainfall Intensity, I *			189	mm/hr
Design Discharge Rate, Q	0.278 x 4154 x 189 / 1000000 =		0.218	m3/s

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

U Channel				
Channel Size			525	(mm)
Gradient		1 in	250	
Area	π x 0.53^2 /8 + 0.53 x 0.53/2 =		0.246	(m2)
Wetted Perimeter	π x 0.53 / 2 + 0.53/2 x 2 =		1.350	(m)
R	0.246 / 1.35 =		0.182	(m)
Velocity $v = \frac{R^{\frac{1}{6}}}{n} R^{\frac{1}{2}} S_f^{\frac{1}{2}}$			1.27	m/s
Capacity			0.313	m3/s

Utilization 0.218 / 0.313 = **69.77** % OK (less than 90%, for 10% siltation allowance)

2m Channel (Checking Capacity for Additional 2m width Channel at critical section of Existing Channel)

U Channel				
Channel Size			2000	(mm)
Gradient		1 in	250	
Area	π x 2^2 /8 + 2 x 2/2 =		3.571	(m2)
Wetted Perimeter	π x 2 / 2 + 2/2 x 2 =		5.142	(m)
R	3.571 / 5.142 =		0.694	(m)
Velocity			3.10	m/s
Capacity			11.069	m3/s

>> flow from site (0.218 m3/s)

600mm Channel at Connection Point along Existing Channel/Stream

U Channel				
Channel Size			600	(mm)
Gradient		1 in	250	
Area	π x 0.6^2 /8 + 0.6 x 0.6/2 =		0.321	(m2)
Wetted Perimeter	π x 0.6 / 2 + 0.6/2 x 2 =		1.542	(m)
R	0.321 / 1.542 =		0.208	(m)
Velocity			1.39	m/s
Capacity			0.446	m3/s

>> flow from site (0.218 m3/s)

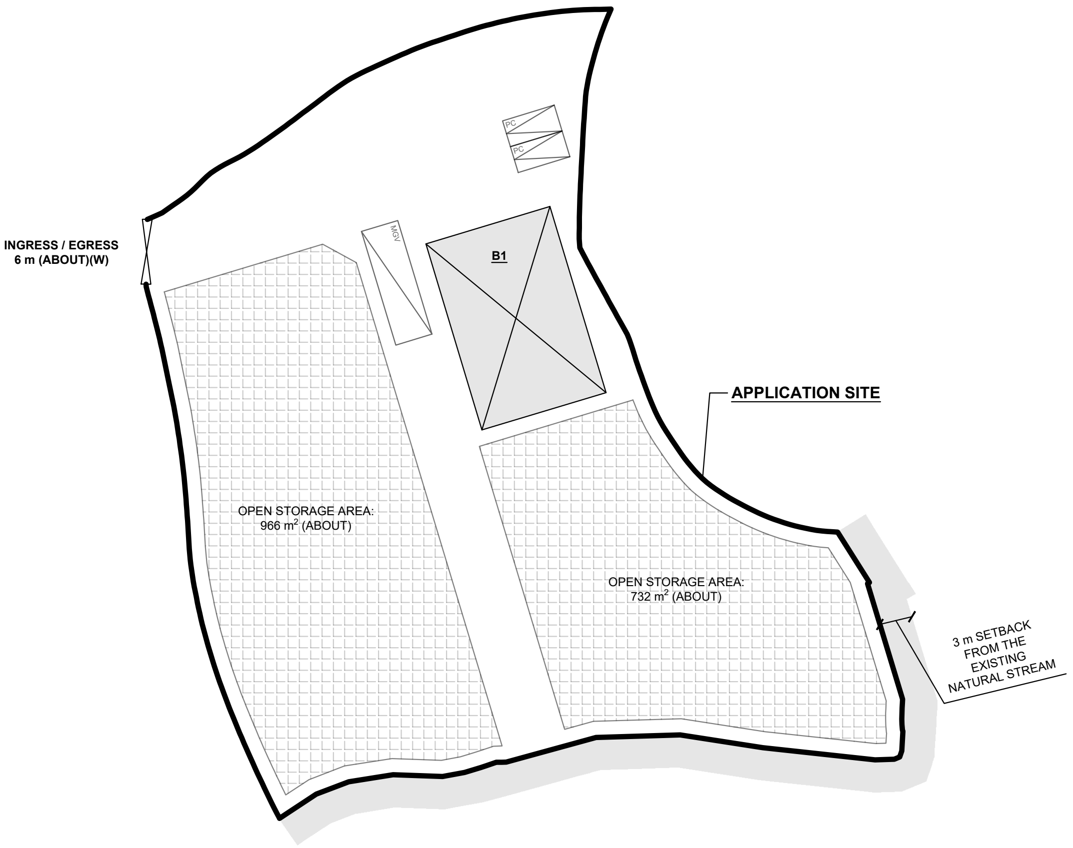
Appendix B - Proposed Development Layout Plan

DEVELOPMENT PARAMETERS

APPLICATION SITE AREA	: 3,110 m^2	(ABOUT)
COVERED AREA	: 216 m^2	(ABOUT)
UNCOVERED AREA	: 2,894 m^2	(ABOUT)
PLOT RATIO	: 0.07	(ABOUT)
SITE COVERAGE	: 7 %	(ABOUT)
NO. OF STRUCTURE	: 1	
DOMESTIC GFA	: NOT APPLICABLE	
NON-DOMESTIC GFA	: 216 m^2	(ABOUT)
TOTAL GFA	: 216 m^2	(ABOUT)
BUILDING HEIGHT	: 5 m	(ABOUT)
NO. OF STOREY	: 1	

B1	STORAGE OF CONSTRUCTION MATERIAL AND MACHINERY, SITE OFFICE AND WASHROOM	216 m^2 (ABOUT)	216 m^2 (ABOUT)	5 m (ABOUT)(1-STOREY)
	TOTAL	**216 m^2 (ABOUT)**	**216 m^2 (ABOUT)**	

W E S



PARKING AND LOADING/UNLOADING PROVISIONS

NO. OF PRIVATE CAR PARKING SPACE	: 2
DIMENSION OF PARKING SPACE	: 5 m (L) X 2.5 m (W)
NO. OF L/UL SPACE FOR MEDIUM GOODS VEHICLE	: 1
DIMENSION OF L/UL SPACE	: 11 m (L) X 3.5 m (W)

LEGEND

- APPLICATION SITE
- STRUCTURE
- OPEN STORAGE AREA
- PARKING SPACE (PRIVATE CAR)
- L/UL SPACE (MEDIUM GOODS VEHICLE)
- INGRESS / EGRESS

PLANNING CONSULTANT

R-Riches Property Consultants Ltd.

PROJECT

PROPOSED TEMPORARY OPEN STORAGE OF CONSTRUCTION MATERIAL AND MACHINERY WITH ANCILLARY FACILITIES FOR A PERIOD OF 3 YEARS AND ASSOCIATED FILLING OF LAND

SITE LOCATION

LOTS 357 (PART) AND 359 (PART) IN D.D. 87, HUNG LUNG HANG, NEW TERRITORIES

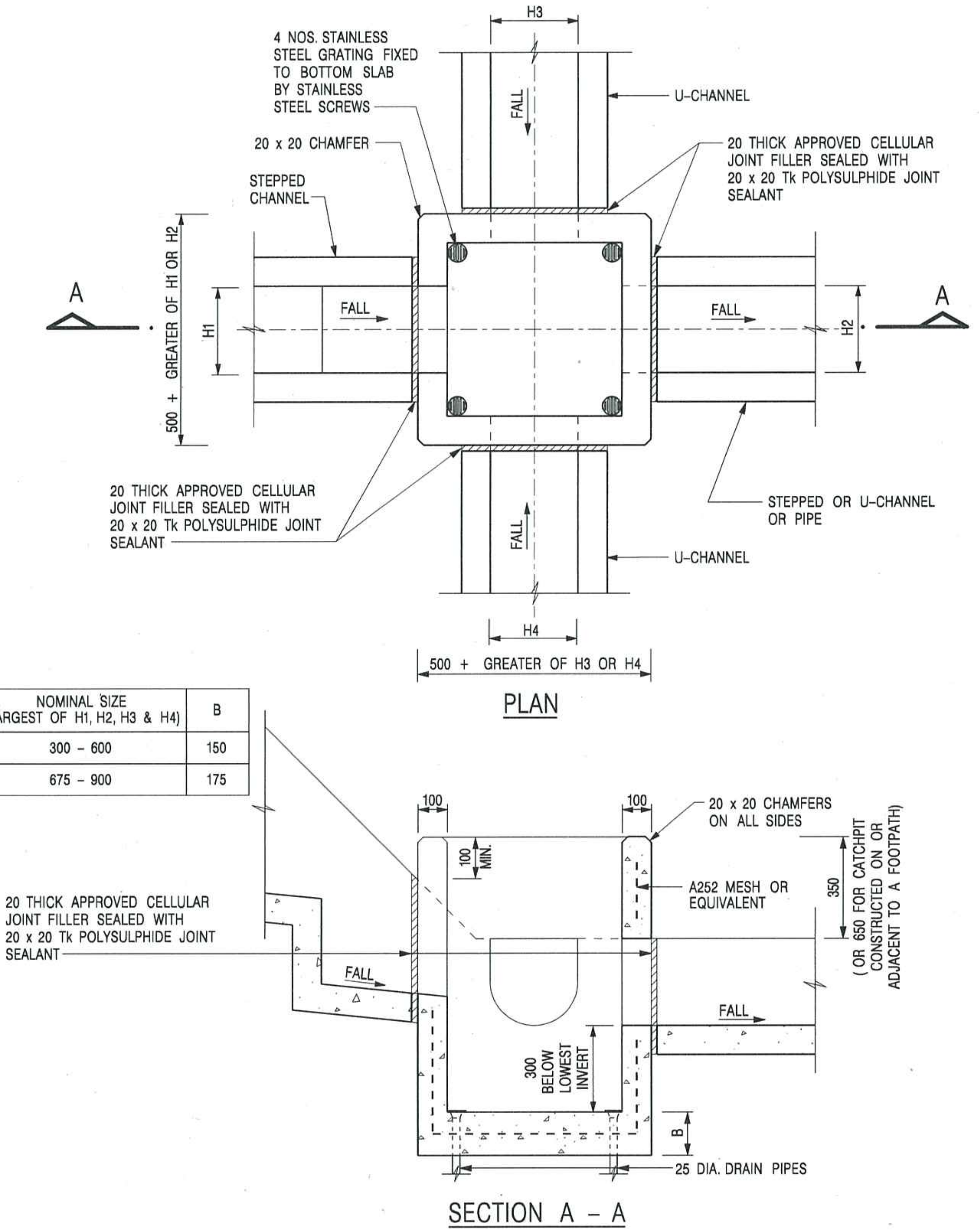
SCALE: 1 : 700 @ A4

DRAWN BY	DATE
MN	16.5.2024
CHECKED BY	DATE
APPROVED BY	DATE

DWG. TITLE: LAYOUT PLAN

DWG NO.	VER.
PLAN 5	001

Appendix C - Reference Drawings



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

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

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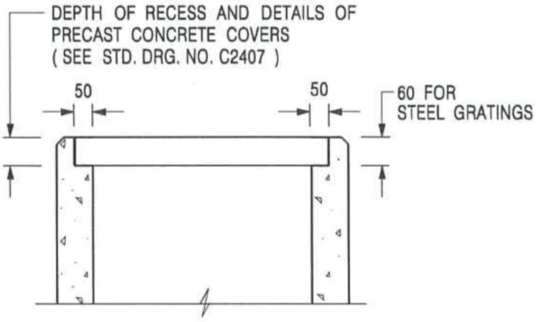

ALTERNATIVE TOP SECTION
FOR PRECAST CONCRETE COVERS / GRATINGS

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)

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

SCALE 1 : 20	DRAWING NO.
DATE JAN 1991	C2406 /2A

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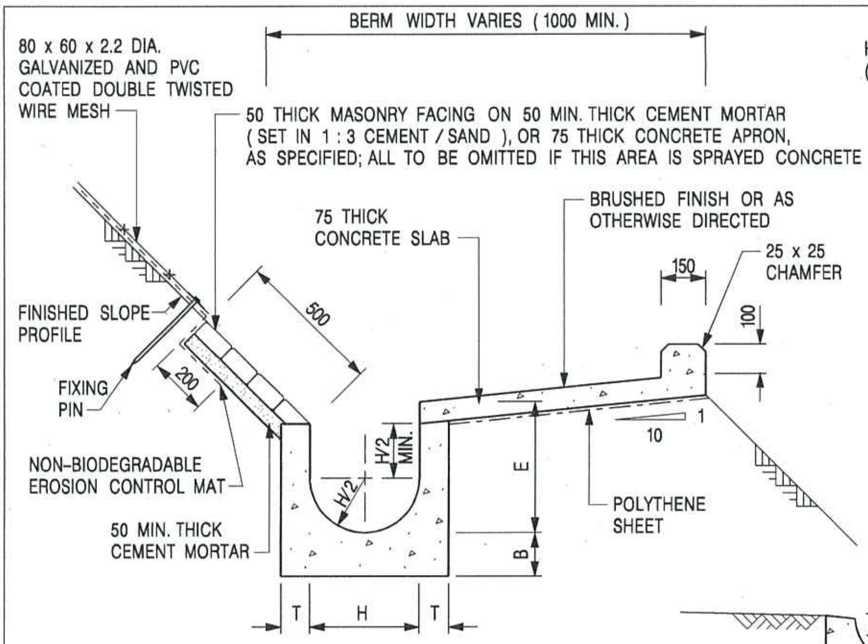
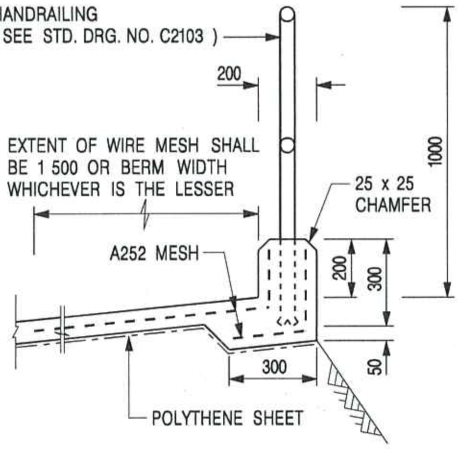
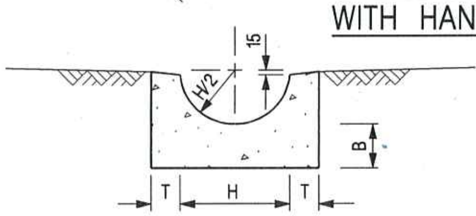


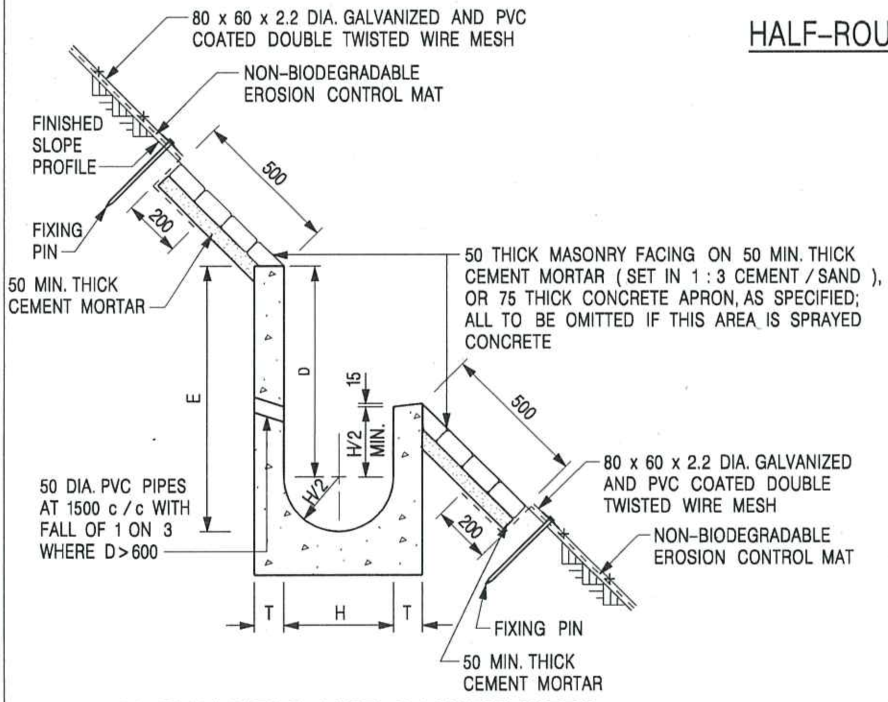
U-CHANNELS CONSTRUCTED ON BERM



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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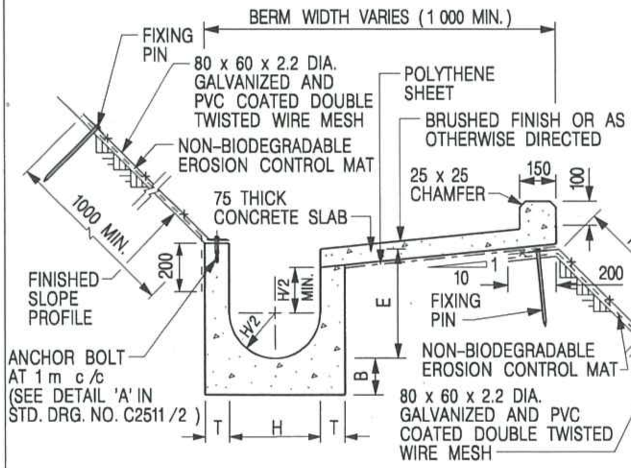
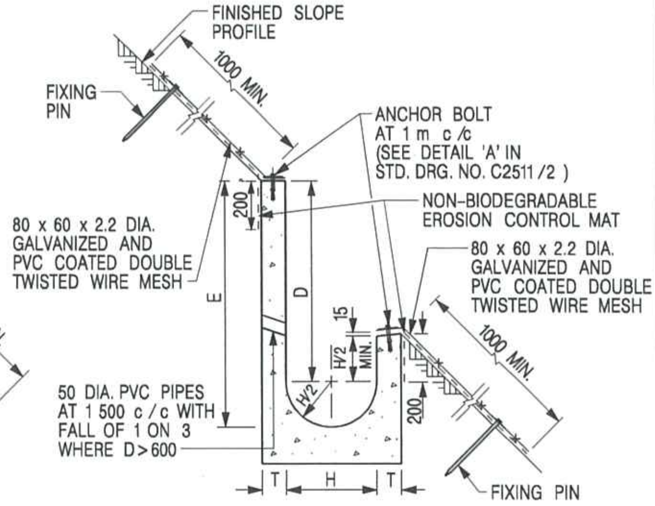
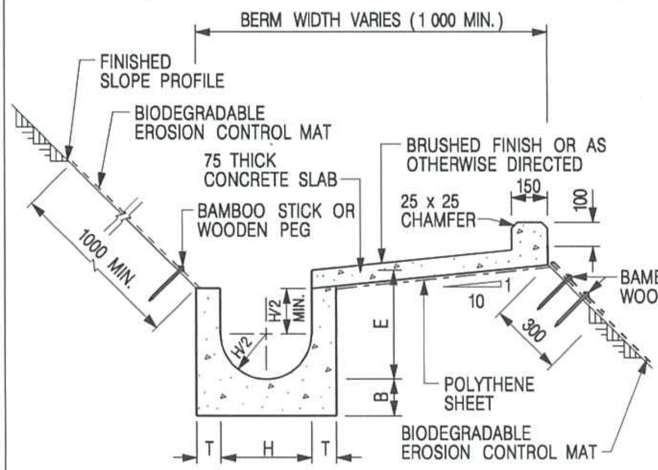


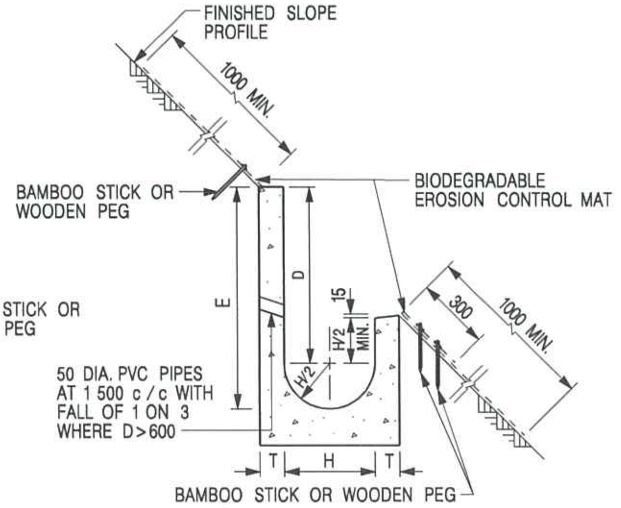
U-CHANNELS CONSTRUCTED ON BERM WITH NON-BIODEGRADABLE EROSION CONTROL MAT



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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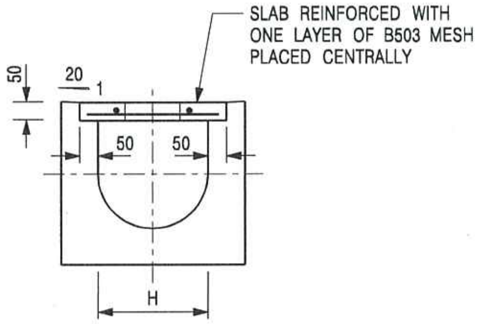
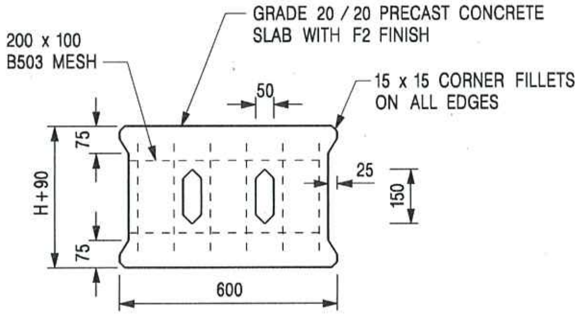


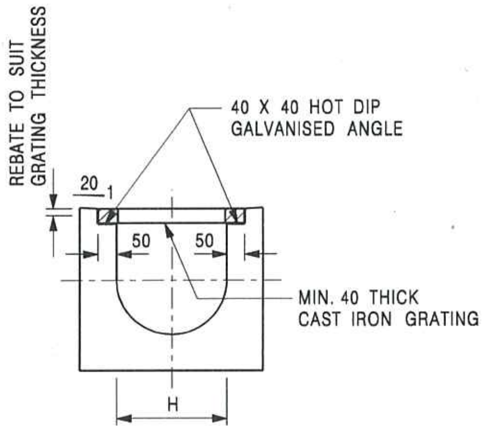
TYPICAL SECTION



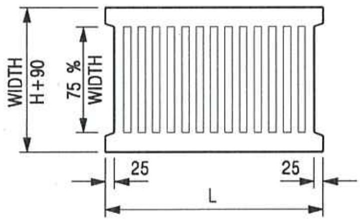
PLAN OF SLAB

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	DRAWING NO.
DATE JAN 1991	C2412E

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