渠務署及城市規劃委員會:

A/YL-KTN/1030 的渠務報告詳細

申請地點範圍有約 7,693 平方米，位於錦田北的鄉郊範圍。目前為露天空間。

申請地點附近有臨時建築物及草地。現有水平為約+8.0 mPD。

有一條溪流位於申請地點的西南面，並計劃將場內水流引導到該溪流。

申請範圍的東北及西面水平比申請地點高，有機會有水流從這兩個方向流入。申請範圍北面約 61 米外有一條由民政事務處管理的渠道，因此沒有流水從其他方向流入申請地點。

申請地點的擬議佈局平面圖請參考 Appendix 2。

申請地點範圍有約 921.8 平方米，全部將以混凝土作表面，在申請地點外有約 6,771 平方米，大多為草地及建築物。

擬議發展	
申請地點範圍 (約 m^2)，全部已以混凝土平整	921.8
申請地點外集水區	
申請地點外東北及西面集水區 (約 m^2)，大多為草地及建築物，本報告將以約 15%混凝土及瀝青作評估	6,771

根據 STORMWATER DRAINAGE MANUAL (SDM) - Table 10 – Recommended Design Return Periods based on Flood Levels

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 Systems	200 years
Urban Drainage Branch Systems	50 years

本報告將使用 Main Rural Catchment Drainage Channels, 1 in 50 years return period 作評估。

本渠道設計將參考由　貴署所編寫的 SDM 作基礎，以下為所採用的數據及計算方法。

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 50 years return period, the following values are adopted.

a = 451.3

b = 2.46

c = 0.337

2. The peak runoff is calculated by the Rational Method.

$$Q_p = 0.278\ C\ i\ A$$

where V = peak runoff in m^3/s

C = runoff coefficient (dimensionless)

i = rainfall intensity in mm/hr

A = catchment area in km^2

3. According to Section 7.5.2(b) of the Stormwater Drainage Manual (SDM), Fifth Edition January 2018

Surface Characteristics	Runoff coefficient, C
Asphalt	0.70-0.95
Concrete	0.80-0.95
Brick	0.70-0.85
Grassland (heavy soil)	
Flat	0.13-0.25
Steep	0.25-0.35
Grassland (sandy soil)	
Flat	0.05-0.15
Steep	0.15-0.20

The run-off coefficient (C) of surface runoff area taken as follows:

- Concrete Area C = 0.95
- Grassland (heavy soil) C = 0.35

4. Manning's Equation is used for calculation of velocity of flow inside the channels. It can be expressed by the following algebraic equation.

$$V = \frac{R^{1/6}}{n}\sqrt{RS_f}$$

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. It can be expressed by the following algebraic equation.

$$\bar{V} = -\sqrt{32gRS}\log\log\left(\frac{k_s}{14.8R} + \frac{1.255v}{R\sqrt{32gRS_f}}\right)$$

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)

申請範圍主要平坦，並緩緩斜向西及西南面，渠道設計請參考 Appendix 5。

渠道容量計算請參考 Appendix – Calculation。

根據本報告，本臨時發展不會對附近的渠道有重大影響。

Check The Capacity of Existing Natural Stream

Manning Equation is used in hydraulic design and analysis. The cross-sectional mean velocity is given in the following expression:

$$V = \frac{R^{1/6}}{n}\sqrt{RS_f}$$

Where R = hydraulic (m)
N = Manning coefficient (s/m1/3), refer Table 13 of SDM
Sf = friction gradient (dimensionless)

Using Manning's Equation

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

Where R = A/P = 0.333 m A = 1 m^2
P = 3 m
n = 0.05 $s/m^{1/3}$ (Table 13 of Stormwater Drainage Manual)
S_f = 0.03

Therefor V = $0.333^{2/3} * 0.03^{0.5}/0.05$
= 1.66 m/sec

Maximum Capacity (Qmax)
= V*A
= 1.66 m^3/sec
> Q_{total} *Allowed 10% for siltation.

The Existing Natural Stream has enough capacity.

Capacity Flows Estimation for Propose Catchments and Drainage System with 50 Year Return Period

A1. Calculation of On-Site Runoff (After Development)

Surface Type	Catchment Area (A), m^2	Catchment Area (A), km^2	Average slope (H), m/100m	Flow path length (L), m	Time of Concentration (t_c), min	a (50 year return period)	b (50 year return period)	c (50 year return period)	Runoff intensity (i) mm/hr	Runoff coefficient (C)	C x A	Peak runoff (Q_p), m^3/s
25% Concrete + 75% Grassland (heavy soil), flat	7,693	0.007693	0.58	120	7.91	451.3	2.46	0.337	205	0.5	0.00385	0.219
											Total	0.219

A2. Calculation of the Capacity of Proposed Drainage (After Development)

Channel Type	Width, m	Depth, m	Slope	Length, m	Manning's Roughness Coefficient	Cross Section Area, m2	Wetted Perimeter, m	Hydraulic radius, m	Mean Velocity, m/s	Capacity flow, m3/s	Catchment Served, km^2	Runoff, m3/s	% of capacity flow	Sufficient Capacity (Y/N)
Concrete Channel	0.45	0.45	0.005	114	0.015	0.21	1.16	0.181	1.51	0.317	0.007693	0.219	69%	Y

*Allowed 10% for siltation.

Note:

Runoff is calculated in accordance with DSD's "Stormwater Drainage Manual – Planning, Design and Management" (SDM), fifth edition, January 2018.

Equation used: $t_0 = \frac{0.14465L}{H^{0.2}A^{0.1}}$ $t_c = t_0 + t_f$ $i = \frac{a}{(t_d+b)^c}$ $Q_p = 0.278\,C\,i\,A$ $V = \frac{R^{1/6}}{n}\sqrt{RS_f}$

B1. Calculation of the runoff of Existing Drainage System

Surface Type	Catchment Area (A), m^2	Catchment Area (A), km^2	Average slope (H), m/100m	Flow path length (L), m	Time of Concentration (t_c), min	a (50 year return period)	b (50 year return period)	c (50 year return period)	Runoff intensity (i) mm/hr	Runoff coefficient (C)	C x A	Peak runoff (Q_p), m^3/s
50% Concrete + 50% Grassland (Heavy soil) with flat surface	33,952	0.033952	1.76	182	8.28	451.3	2.46	0.337	203	0.65	0.02207	1.25
											Total	1.25

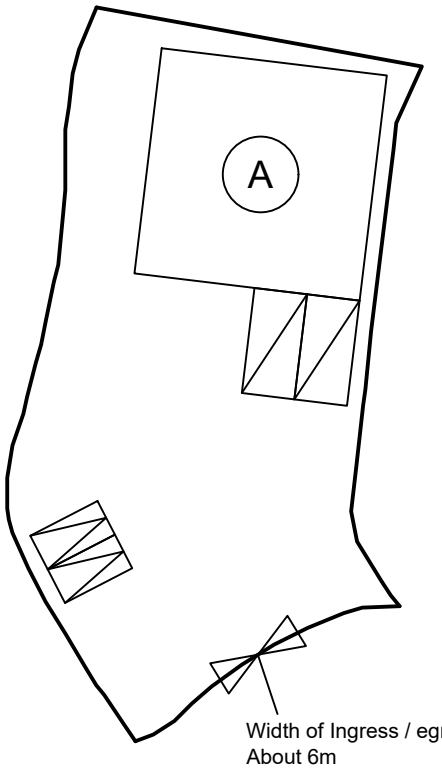
B2. Adequacy Check for Existing Drainage System

Channel Type	Width, m	Depth, m	Slope	Length, m	Manning's Roughness Coefficient	Cross Section Area, m2	Wetted Perimeter, m	Hydraulic radius, m	Mean Velocity, m/s	Capacity flow, m3/s	Catchment Served, km^2	Runoff, m3/s	% of capacity flow	Sufficient Capacity (Y/N)
Concrete Channel	1.2	1	0.03	140	0.05	1	3	0.333	1.66	1.66	0.033952	1.25	75%	Y

*Allowed 10% for siltation. For assessment purpose, assume width and depth of the existing natural stream is 1m.

Proposed Structures Details

	Structures	Gross Floor Area (GFA)	Height (Not Exceeding)	Storey
A	Warehouse (Excluding D.G.G.) with Ancillary Office	About 225 m^2	8m	1 only
	Total	About 225 m^2		
	Private Car Parking Space	Unit(s): 2		
	LGV L/UL Space	Unit(s): 2		



Legend:

- Ingress/egress (Width: About 6m)
- Proposed Structures
- Private Car Parking Space
- LGV L/UL Space
- Ⓐ Warehouse with Ancillary Office

Total Area: 921.8 m^2 (About)
Covered Area: 225 m^2 (About)
Uncovered Area: 696.8 m^2 (About)
Non-Domestic GFA: 225 m^2 (About)
Nos. of Proposed Structures: 1

Appendix 2

Location: DD 109 Lot 1142 (Part)

OZP: S/YL-KTN/11
District: Kam Tin North
Zoning: Agriculture

Date: 20 June 2024

Proposed Layout Plan
擬議佈局平面圖

擬議臨時貨倉（危險品倉庫除外）連附屬設施(為期3年)及填土工程

Proposed Temporary Warehouse (excluding Dangerous Goods Godown) with Ancillary Facilities for a Period of 3 Years and Filling of Land

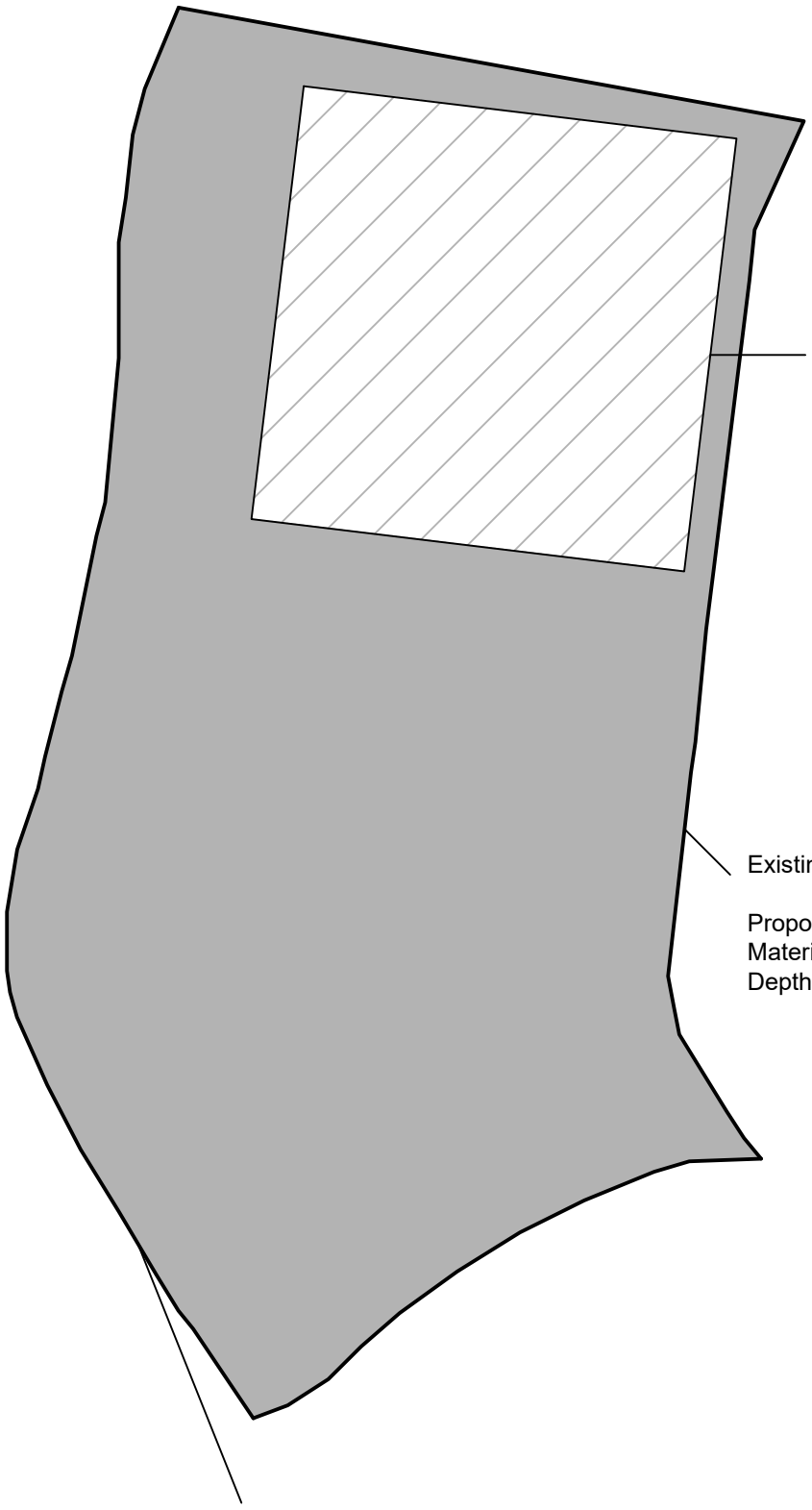
SCALE

1:500

@A4

For Identification Only

Drawing No.: 2-01



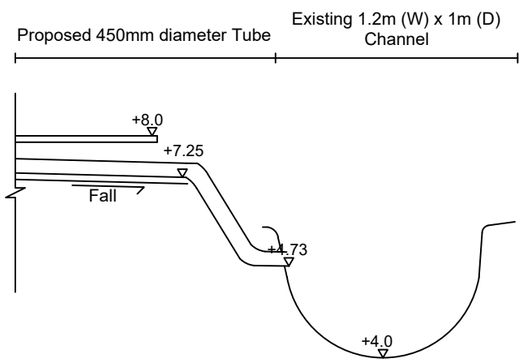
Paved Area: About 921.8 m^2

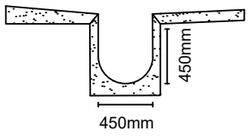
Legend:

Paved Area 平整範圍

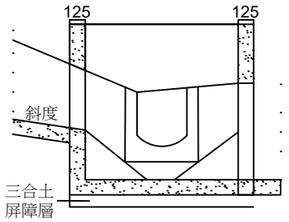
Appendix 4 Location: DD 109 Lot 1142 (Part) OZP: S/YL-KTN/11 District: Kam Tin North Zoning: Agriculture Date: 20 June 2024	Paved Area 平整位置圖 擬議臨時貨倉（危險品倉庫除外）連附屬設施(為期3年)及填土工程 Proposed Temporary Warehouse (excluding Dangerous Goods Godown) with Ancillary Facilities for a Period of 3 Years and Filling of Land	SCALE 1:250 @A4 For Identification Only Drawing No.: 4-01

Connection Detail

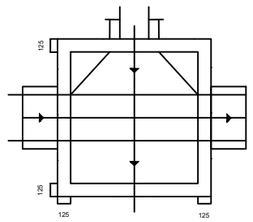




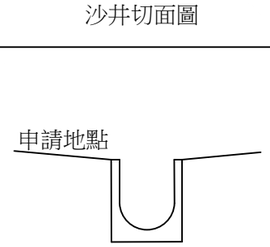
U型明渠切面圖



沙井切面圖

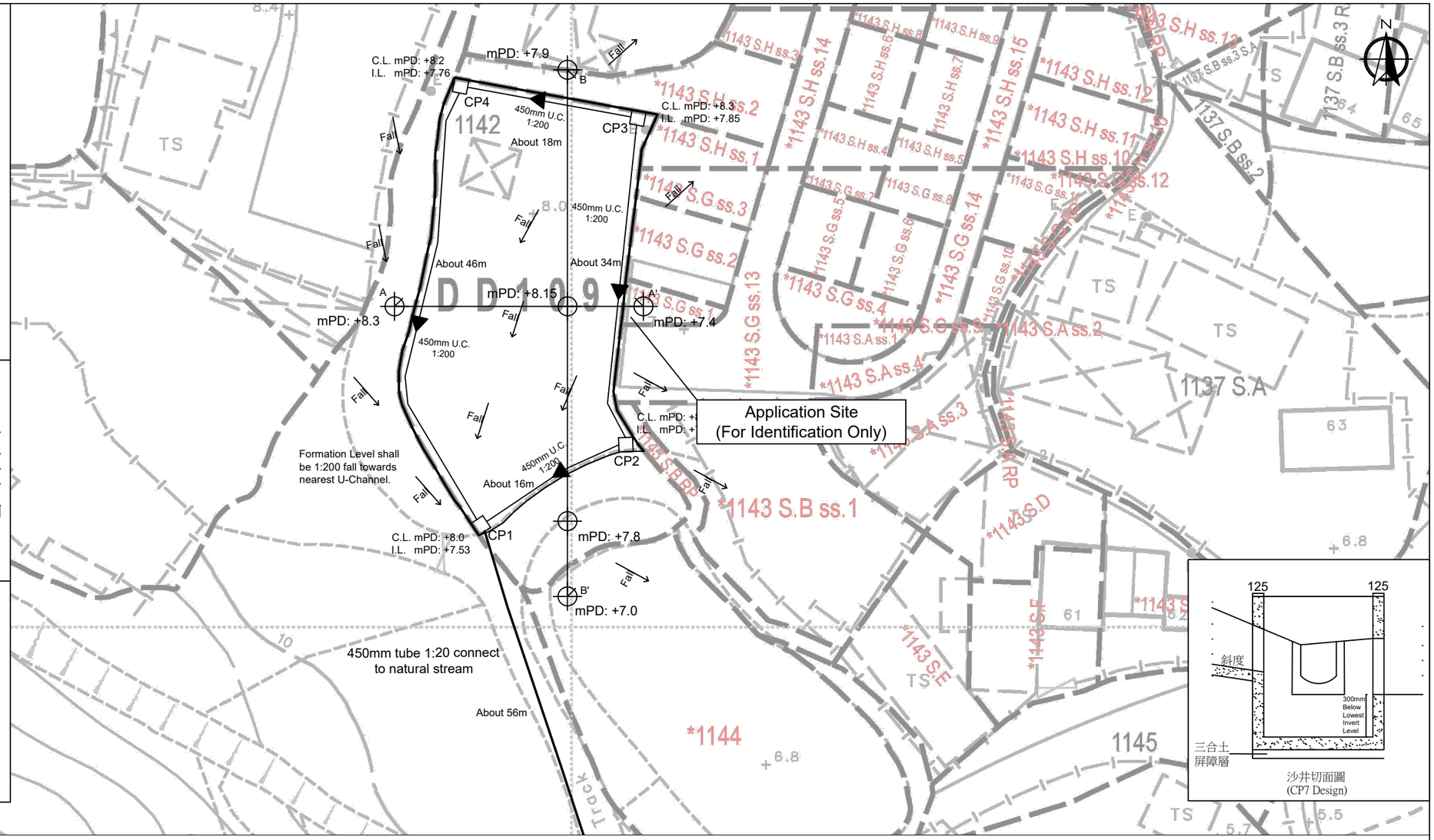


沙井俯視圖



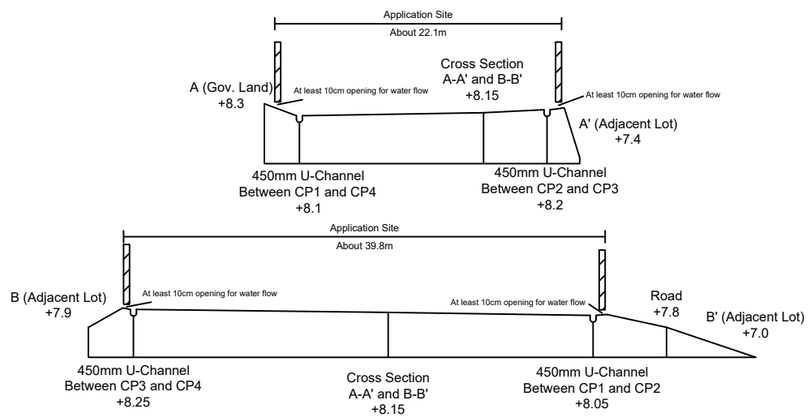
U型明渠切面略圖

申請地點



Note:

1. Adequate opening will be provided around the application site.
2. Catchpit design shall follow CEDD standard drawing No. C2406I.
3. All proposed U-channel and Catchpit must maintain in good shape (i.e. Inspection and maintenance regularly).
4. Grating Cover is provided to reduce the irregular road surface from entering the site.

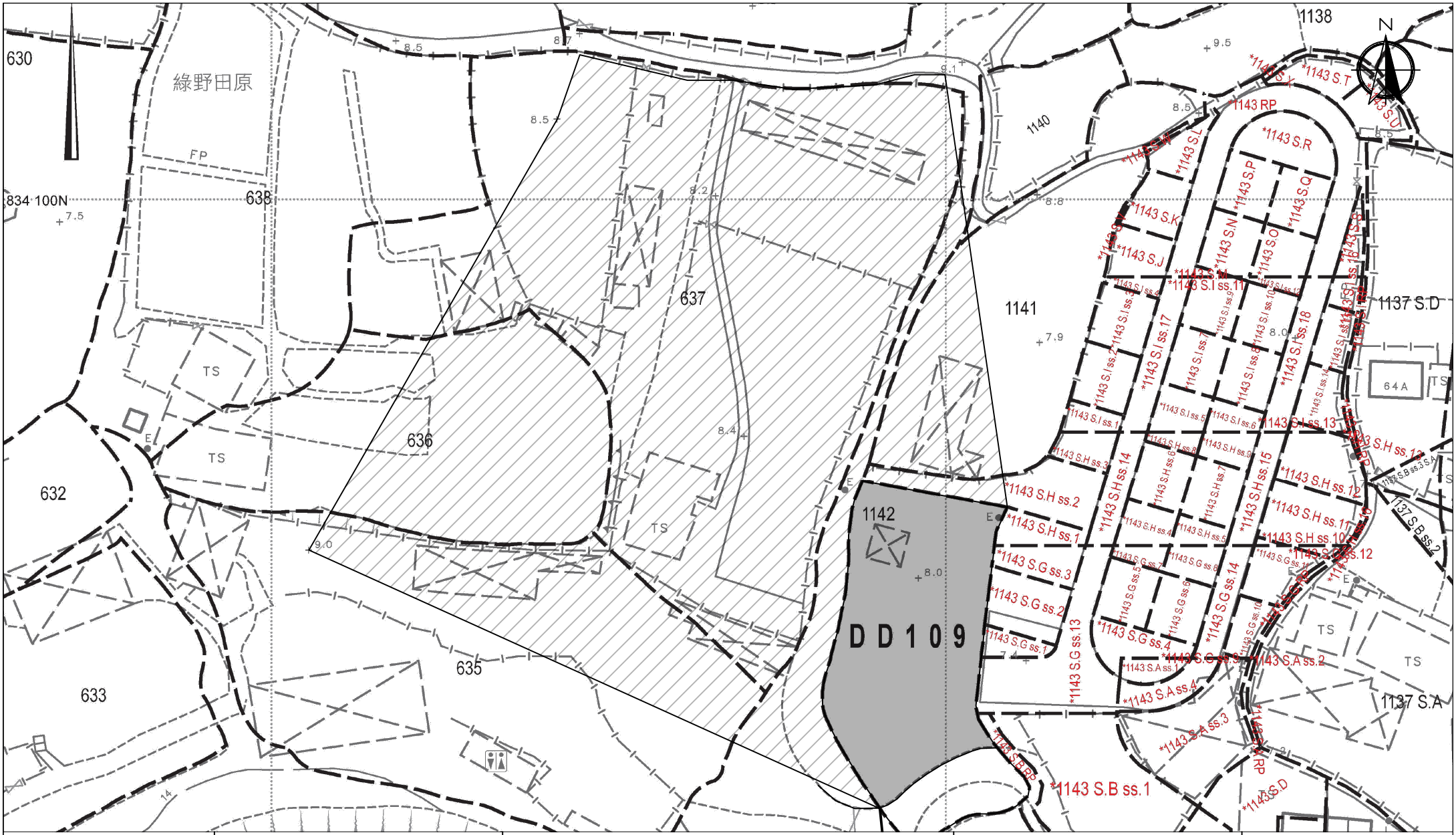


Legend:

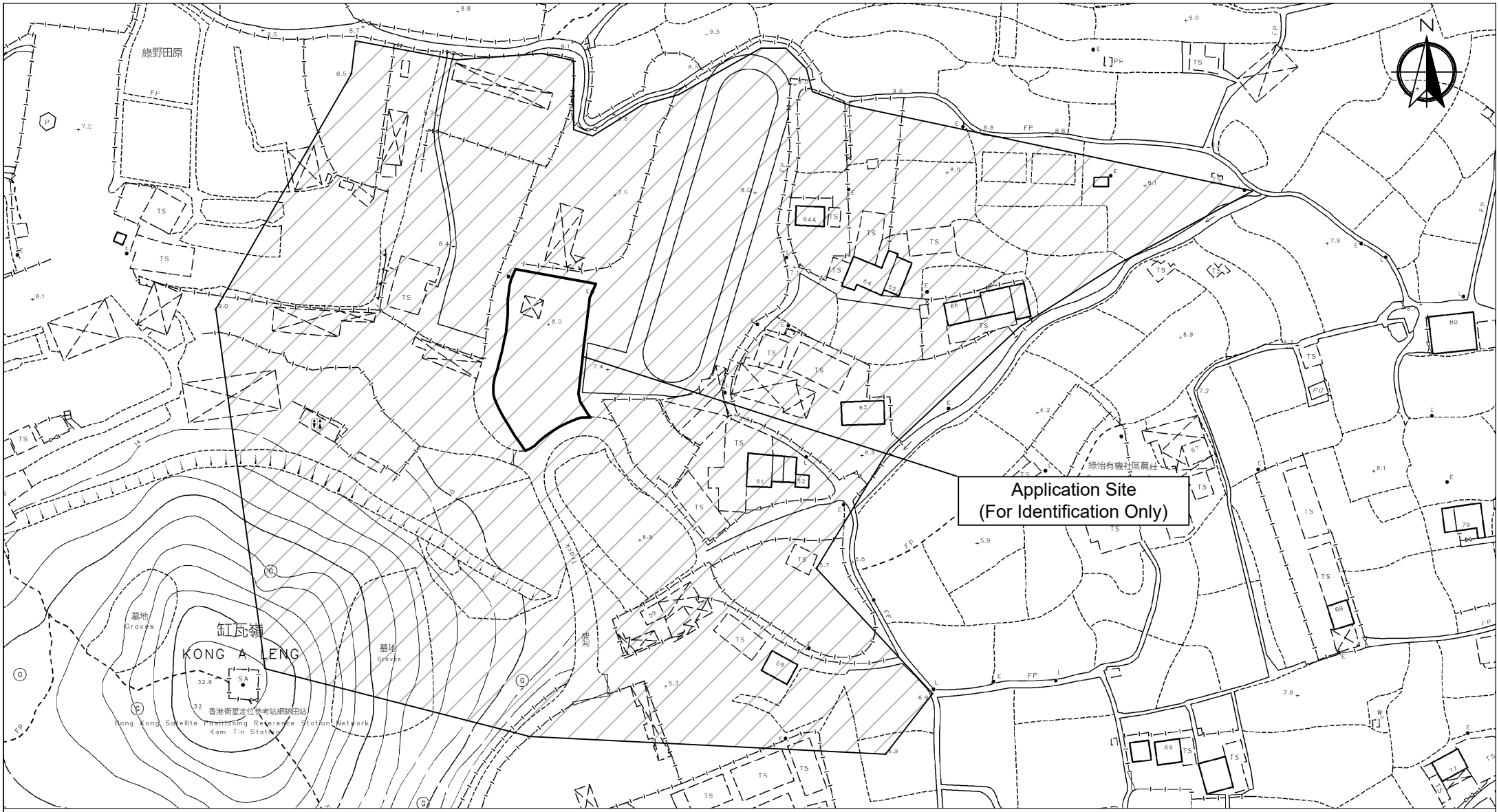
- Proposed Catchpit
- Proposed U-Channel
- Water Flow

*Invert Level of Connection Point Should Be Verified On Site Before Construction.
*Cover Level Are Indicative Only Which Should Be Verified On Site.

Appendix 5	Location: DD 109 Lot 1142 (Part) OZP: S/YL-KTN/11 District: Kam Tin North Zoning: Agriculture	Project: Proposed Temporary Warehouse (excluding Dangerous Goods Godown) with Ancillary Facilities for a Period of 3 Years and Filling of Land	Proposed Drainage Plan and Cross Section	Scale: 1:500 @A4	Drawing No. 5-01 For Identification Only Date: 11 September 2024



Appendix 5.2 Catchment Area	Location: D.D. 109 Lot 1142 OZP: S/YL-KTN/11 District: Kam Tin North Zoning: Agriculture	Project: Proposed Temporary Warehouse (excluding Dangerous Goods Godown) with Ancillary Facilities for a Period of 3 Years and Filling of Land	Around 7,693 m^2 Scale: 1:500 @A4	Drawing No.: 5.2-1 For Identification Only Date: 11/09/2024



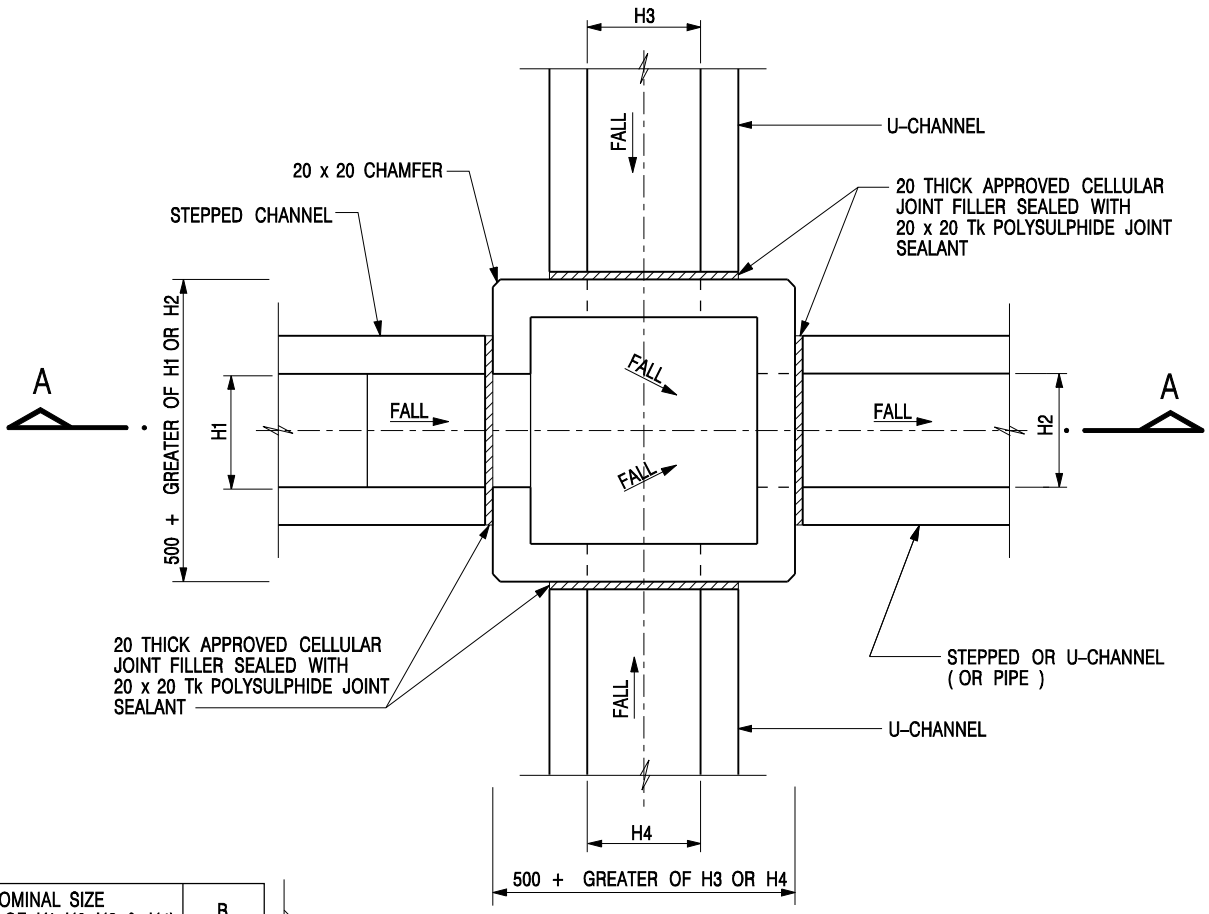
Captured from hkmapservices iB1000 6-NE-7D on 30th May 2024

Appendix 5.2-2 Catchment Area (Existing Natural Stream)	Location: D.D. 109 Lot 1142 OZP: S/YL-KTN/11 District: Kam Tin North Zoning: Agriculture	Project: Proposed Temporary Warehouse (excluding Dangerous Goods Godown) with Ancillary Facilities for a Period of 3 Years and Filling of Land	Around 33,952 m^2 Scale: Undefined @A4	Drawing No.: 5.2-2 For Identification Only Date: 11/09/2024

Scale: Undefined @A4

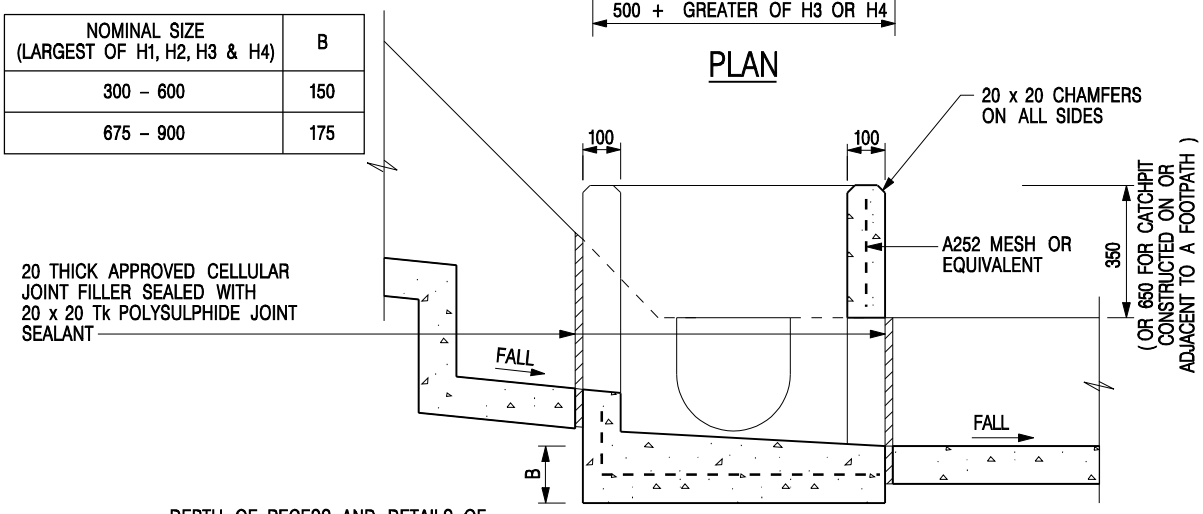
Captured from map.gov.hk on 19th February 2024

Appendix 5.3 Discharge Point and Viewing Point	Location: D.D. 109 Lot 1142 OZP: S/YL-KTN/11 District: Kam Tin North Zoning: Agriculture	Project: Proposed Temporary Warehouse (excluding Dangerous Goods Godown) with Ancillary Facilities for a Period of 3 Years and Filling of Land	Map Legend: Proposed underground 450mm Tube Viewing Point	Drawing No.: 5.3-1 For Identification Only Date: 11/09/2024

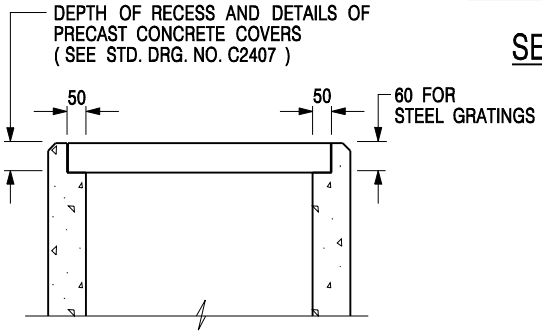


PLAN

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 5 FOR OTHER NOTES.

ALTERNATIVE TOP SECTION FOR PRECAST CONCRETE COVERS / GRATINGS

REF.	REVISION	SIGNATURE	DATE
–	FORMER DRG. NO. C2405J.	Original Signed	03.2015

STANDARD CATCHPIT DETAILS

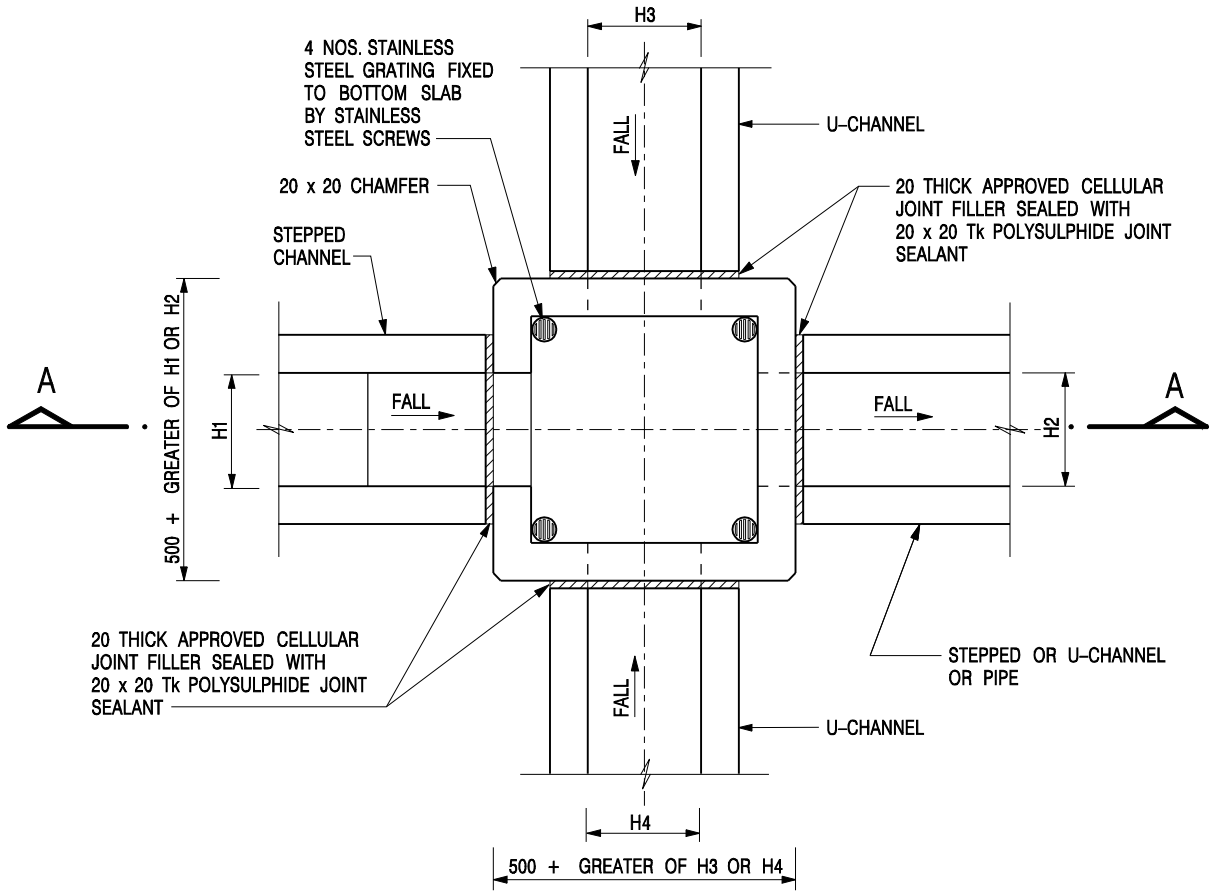
(SHEET 1 OF 5)

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

SCALE	1 : 20	DRAWING NO.
DATE	JAN 1991	C2405 /1

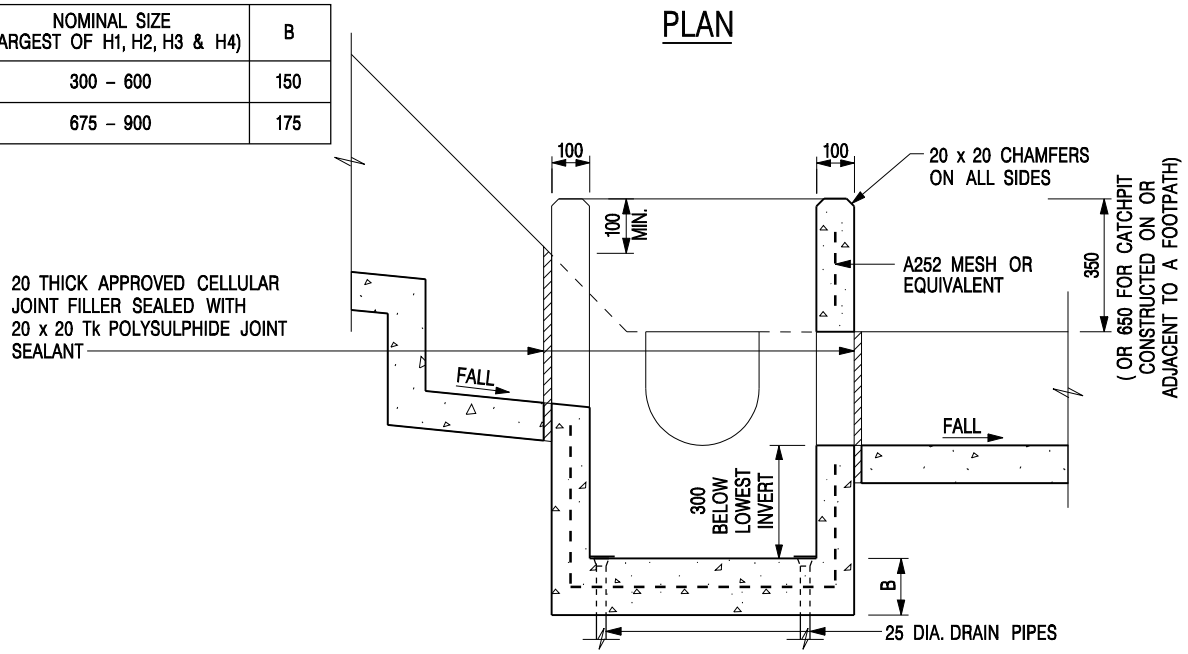
卓越工程 建設香港

We Engineer Hong Kong's Development



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

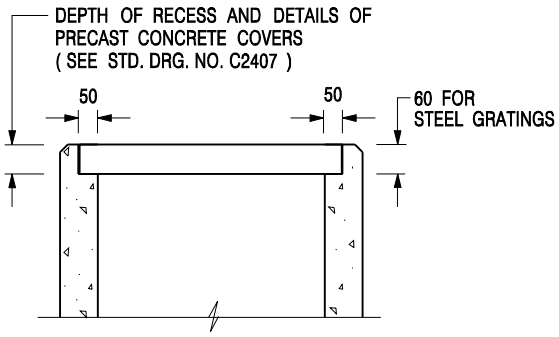
(SHEET 1 OF 2)

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

SCALE 1 : 20

DATE JAN 1991

DRAWING NO. C2406 /1



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

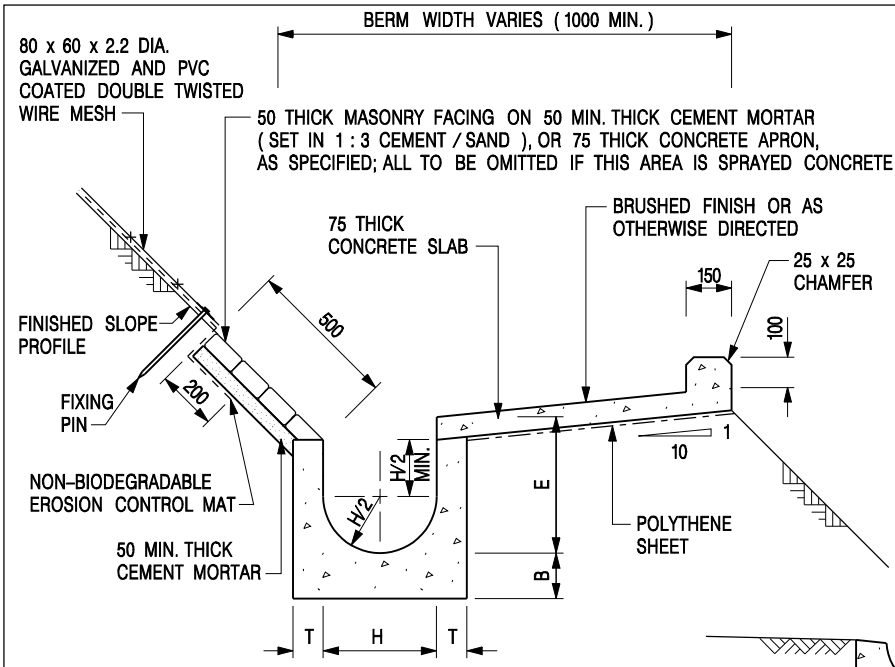
CATCHPIT WITH TRAP
(SHEET 2 OF 2)

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

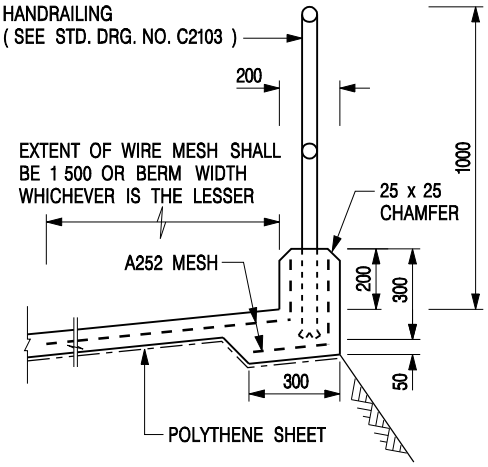
SCALE 1 : 20

DATE JAN 1991

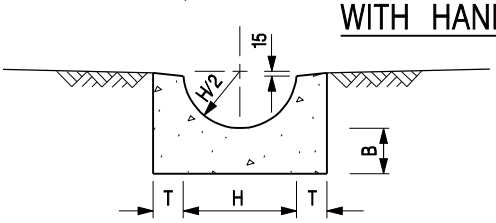
DRAWING NO. C2406 /2A



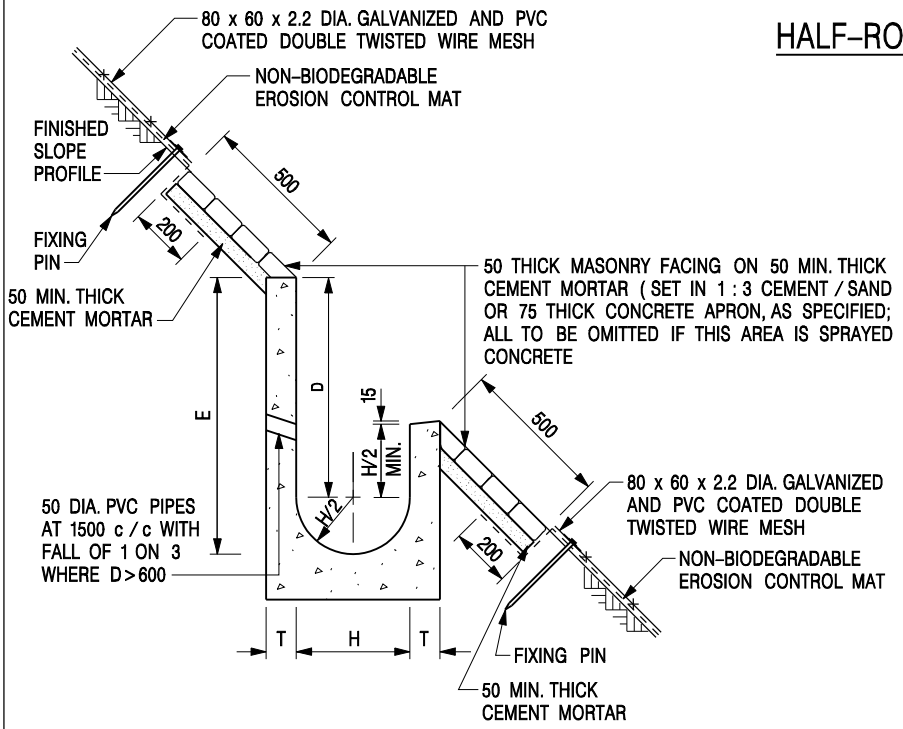
U-CHANNELS CONSTRUCTED ON BERM



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

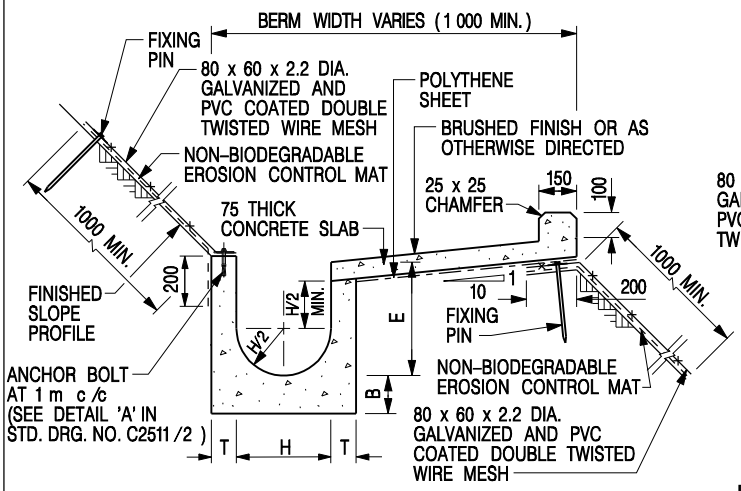
DETAILS OF HALF-ROUND AND U-CHANNELS (TYPE A - WITH MASONRY APRON)

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

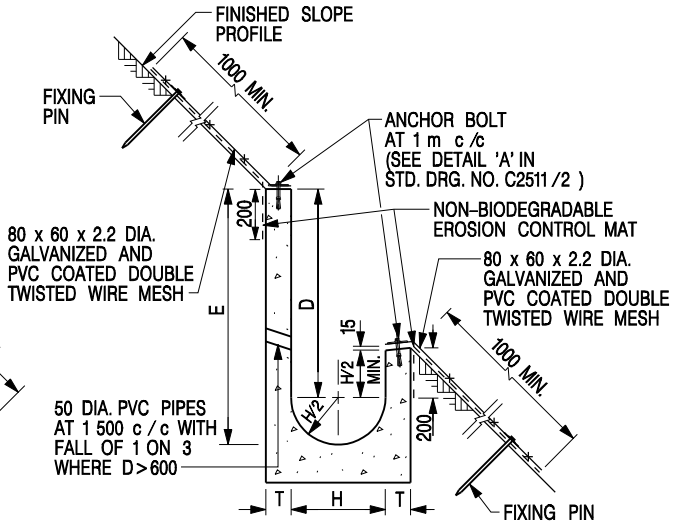
SCALE 1 : 25

DATE JAN 1991

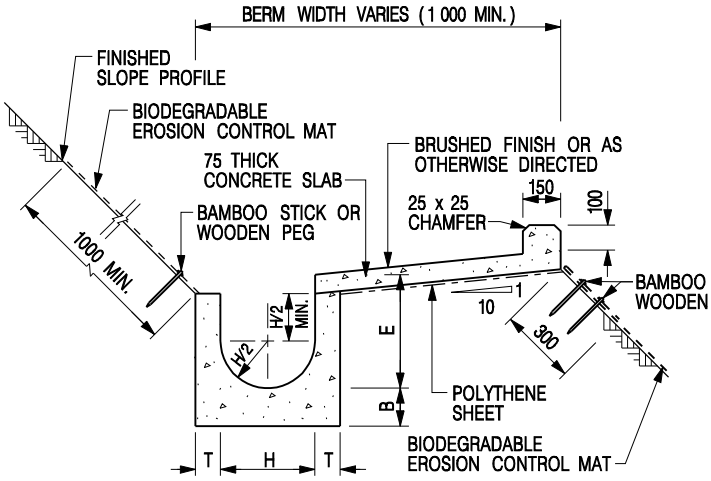
DRAWING NO. C2409I



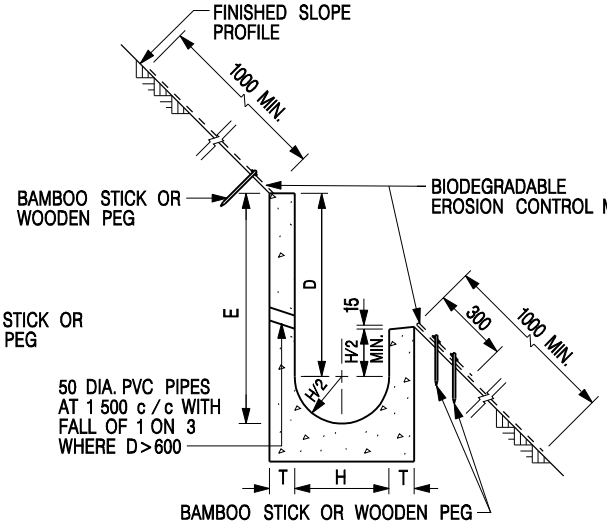
U-CHANNELS CONSTRUCTED ON BERM WITH NON-BIODEGRADABLE EROSION CONTROL MAT



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

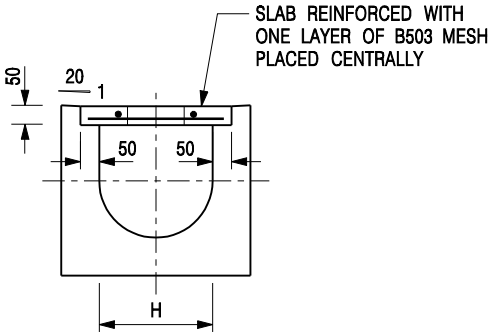
DETAILS OF HALF-ROUND AND U-CHANNELS (TYPE B - WITH EROSION CONTROL MAT APRON)

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

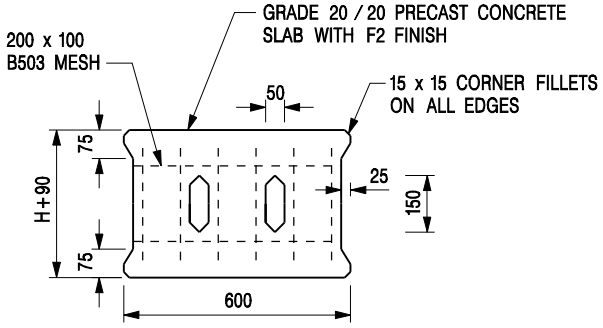
SCALE DIAGRAMMATIC

DATE JAN 1991

DRAWING NO. C2410I



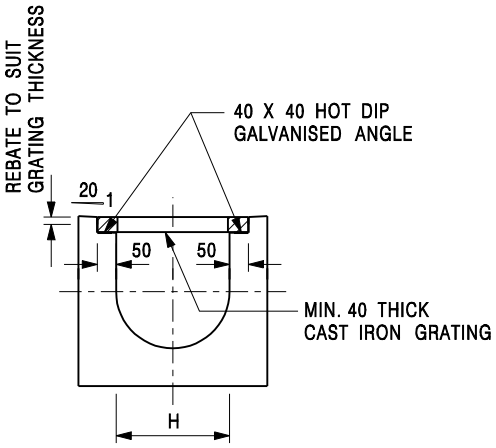
TYPICAL SECTION



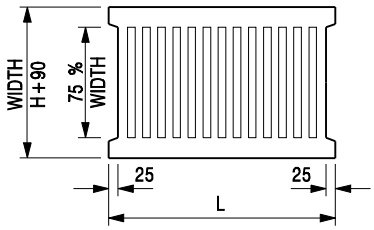
PLAN OF SLAB

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

Table 3a – Storm Constants for Different Return Periods of HKO Headquarters

Return Period T (years)	2	5	10	20	50	100	200	500	1000
a	499.8	480.2	471.9	463.6	451.3	440.8	429.5	414.0	402.1
b	4.26	3.36	3.02	2.76	2.46	2.26	2.05	1.77	1.55
c	0.494	0.429	0.397	0.369	0.337	0.316	0.295	0.269	0.251

Table 3b – Storm Constants for Different Return Periods of Tai Mo Shan Area

Return Period T (years)	2	5	10	20	50	100	200
a	1743.9	2183.2	2251.3	2159.2	1740.1	1307.3	1005.0
b	22.12	27.12	27.46	25.79	19.78	12.85	7.01
c	0.694	0.682	0.661	0.633	0.570	0.501	0.434

Table 3c – Storm Constants for Different Return Periods of West Lantau Area

Return Period T (years)	2	5	10	20	50	100	200
a	2047.9	1994.1	1735.2	1445.6	1107.2	909.1	761.8
b	24.27	24.23	21.82	18.36	13.01	8.98	5.40
c	0.733	0.673	0.619	0.561	0.484	0.428	0.377

Table 3d – Storm Constants for Different Return Periods of North District Area

Return Period T (years)	2	5	10	20	50	100	200
a	1004.5	1112.2	1157.7	1178.6	1167.6	1131.2	1074.8
b	17.24	18.86	19.04	18.49	16.76	14.82	12.47
c	0.644	0.614	0.597	0.582	0.561	0.543	0.523

Table 13 - Values of n to be used with the Manning equation

Source: Brater, E.F. & King, H.W. (1976)

Surface	**Best**	**Good**	**Fair**	**Bad**
Uncoated cast-iron pipe	0.012	0.013	0.014	0.015
Coated cast-iron pipe	0.011	0.012*	0.013*	
Commercial wrought-iron pipe, black	0.012	0.013	0.014	0.015
Commercial wrought-iron pipe, galvanized	0.013	0.014	0.015	0.017
Smooth brass and glass pipe	0.009	0.010	0.011	0.013
Smooth lockbar and welded “OD” pipe	0.010	0.011*	0.013*	
Riveted and spiral steel pipe	0.013	0.015*	0.017*	
Vitrified sewer pipe	0.010	0.013*	0.015	0.017
Common clay drainage tile	0.011	0.012*	0.014*	0.017
Glazed brickwork	0.011	0.012	0.013*	0.015
Brick in cement mortar; brick sewers	0.012	0.013	0.015*	0.017
Neat cement surfaces	0.010	0.011	0.012	0.013
Cement mortar surfaces	0.011	0.012	0.013*	0.015
Concrete pipe	0.012	0.013	0.015*	0.016
Wood stave pipe	0.010	0.011	0.012	0.013
Plank flumes - Planed	0.010	0.012*	0.013	0.014
- Unplaned	0.011	0.013*	0.014	0.015
- With battens	0.012	0.015*	0.016	
Concrete-lined channels	0.012	0.014*	0.016*	0.018
Cement-rubble surface	0.017	0.020	0.025	0.030
Dry-rubble surface	0.025	0.030	0.033	0.035
Dressed-ashlar surface	0.013	0.014	0.015	0.017
Semicircular metal flumes, smooth	0.011	0.012	0.013	0.015
Semicircular metal flumes, corrugated	0.0225	0.025	0.0275	0.030
Canals and ditches				
1. Earth, straight and uniform	0.017	0.020	0.0225*	0.025
2. Rock cuts, smooth and uniform	0.025	0.030	0.033*	0.035
3. Rock cuts, jagged and irregular	0.035	0.040	0.045	
4. Winding sluggish canals	0.0225	0.025*	0.0275	0.030
5. Dredged-earth channels	0.025	0.0275*	0.030	0.033
6. Canals with rough stony beds, weeds on earth banks	0.025	0.030	0.035*	0.040
7. Earth bottom, rubble sides	0.028	0.030*	0.033*	0.035
Natural-stream channels				
1. Clean, straight bank, full stage, no rifts or deep pools	0.025	0.0275	0.030	0.033
2. Same as (1) but some weeds and stones	0.030	0.033	0.035	0.040
3. Winding some pools and shoals, clean	0.033	0.035	0.040	0.045
4. Same as (3), lower stages, more ineffective slope and sections	0.040	0.045	0.050	0.055

Table 13 (Cont'd)

Surface	Best	Good	Fair	Bad
5. Same as (3) some weeds and stones	0.035	0.040	0.045	0.050
6. Same as (4) stony sections	0.045	0.050	0.055	0.060
7. Sluggish river reach, rather weedy or with very deep pools	0.050	0.060	0.070	0.080
8. Very weedy reaches	0.075	0.100	0.125	0.150

Notes: *Values commonly used for design.