

Annex VII

Drainage Impact Assessment

PROPOSED TEMPORARY WAREHOUSE AND OPEN STORAGE OF CONSTRUCTION MATERIALS, MACHINERY AND VEHICLES FOR A PERIOD OF 3 YEARS AND ASSOCIATED FILLING OF LAND, AT VARIOUS LOTS IN D.D. 112 AND ADJOINING GOVERNMENT LAND, SHEK KONG, YUEN LONG, NEW TERRITORIES

Drainage Impact Assessment

Jul 2025

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1 Introduction

1.1 Background

- 1.1.1 The applicant seeks planning permission from the Town Planning Board (the Board) under Section (S.) 16 of the Town Planning Ordinance (Cap. 131) (the Ordinance) to use Various Lots in D.D. 112 and Adjoining Government Land (GL), Shek Kong, Yuen Long (the Site) for 'Proposed Temporary Warehouse and open storage of construction materials, machinery and vehicles for a Period of 3 Years and Associated Filling of Land'.
- 1.1.2 This report aims to support the development in drainage aspect.

1.2 Application Site

- 1.2.1 The application site is situated beside Kam Sheung Road at Shek Kong. It has an area of approx. 18,031 m². The site location is shown in **Figure 1**.
- 1.2.2 The existing site is mainly cover with vegetation with level various from approx. +22 to + 23.9mPD. The proposed site intent to pave the whole site for formation of structures, parking, L/UL spaces and circulation.
- 1.2.3 The surrounding site levels are mainly higher at the east (approx. +24mPD) and lower (approx. +22mPD) at the west.
- 1.2.4 There is an existing 12m with rectangular nullah at the north of the proposed site. An existing streamcourse crossing the southern portion of the site from east to west. **Figure 2** indicate the existing drainage system of the area. The existing catchment plan is shown in **Figure 4-1**.

2 Development Proposal

2.1 The Proposed Development

2.1.1 The total site area is approximately 18,031 m². The existing site area is mainly covered by vegetation.

2.1.2 After the development the site would be fully paved. The catchment plan is shown in **Figure 4-2**.

Proposed Development	
Total Site Area (m ²)	18,031
Paved Area after Development (m ²)	17,243

Table 1 – Site Development Area

3 Assessment Criteria

3.1.1 The Recommended Design Return Period based on Flood Level from SDM (Table 10) is adopted for this report. 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 50 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 Zone. Therefore, for 1 in 50 years return period, the following values are adopted.

a	=	505.5
b	=	3.29
c	=	0.355

(Corrigendum_No.1_2024)

11.1% rainfall increase as per Table 28 of SDM Corrigendum No. 1/2022 to be included in the rainfall intensity estimation.

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:

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

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:

$$\text{Colebrook-White Equation: } \frac{1}{v} = -\sqrt{32gRS} \log \log \left(\frac{k_s}{14.8R} + \frac{1.255v}{R\sqrt{32gRS}} \right)$$

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)

4 Proposed Drainage System

4.1 Existing Streamcourse at Southern portion of the Site

- 4.1.1 There is an existing streamcourse crossing the southern portion of the Application Site from east to west. To mitigate the increase in paved area of the development, an catchment area C1 which originally discharge to the existing streamcourse, is proposed to be collected to the proposed development.
- 4.1.2 According to the checking in Appendix A, for the concerned streamcourse, the reduction of equivalent area due to area C1 is larger than the increase of equivalent area due to area A1. Therefore, with the above mitigation measure, positive drainage impact to the existing streamcourse is anticipated.
- 4.1.3 As the existing steamcourse cut off the site into 2 part and prevent traffic in between, it is proposed to deckover the existing streamcourse for the development usage. Point drains at 10m interval is proposed along the deckover section. A min. 675mm x 675mm inspection opening with cover to be provided at mid of the deckover section. The location and typical section of deckover extent is shown in **Figure 3**.

4.2 Proposed Channels

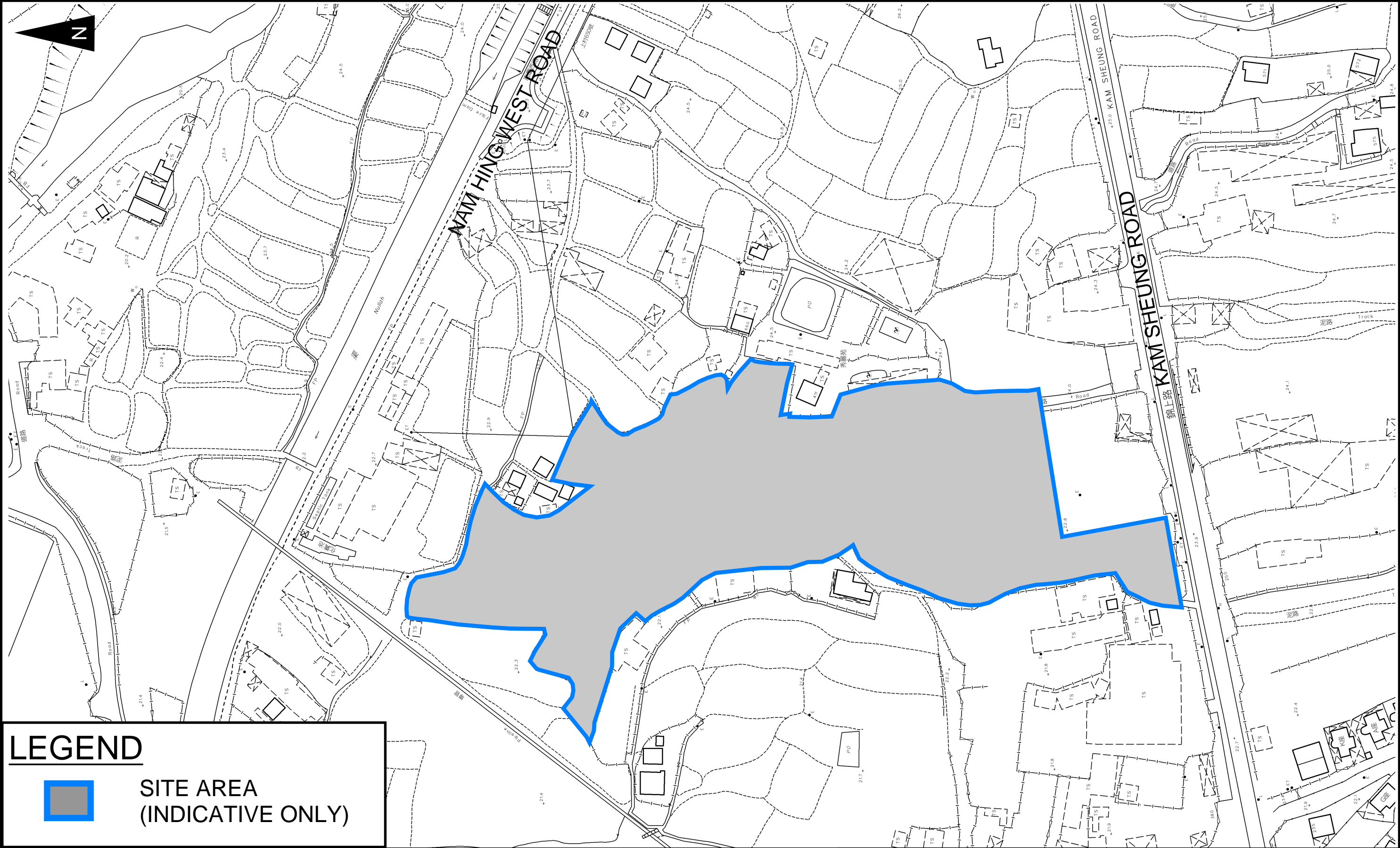
- 4.2.1 Proposed channels are designed for collection of runoff for internal and external catchment. They are proposed to carry the runoff to the north and eventually discharge to existing northern rectangular nullah. The discharge flow would only occupy 1.3% capacity of the existing nullah. The capacity checking is shown in **Appendix A**. No unacceptable drainage impact is anticipated.
- 4.2.2 The design calculations of proposed uchannel and pipe are shown in **Appendix A**.
- 4.2.3 The alignment, size, gradient and details of the proposed drains are shown in **Figure 3-1** and drainage schedule in **Figure 3-2**. The catchment plan is shown in **Figure 4-2**.
- 4.2.5 Reference Drawings are shown in **Appendix C** for reference.

5 Conclusion

- 5.1.1 Drainage review has been conducted for the Proposed Development. U channels and pipe are proposed to mitigate the drainage impact to the nearby area.
- 5.1.2 With implementation of the above drainage system, no unacceptable drainage impact is anticipated.

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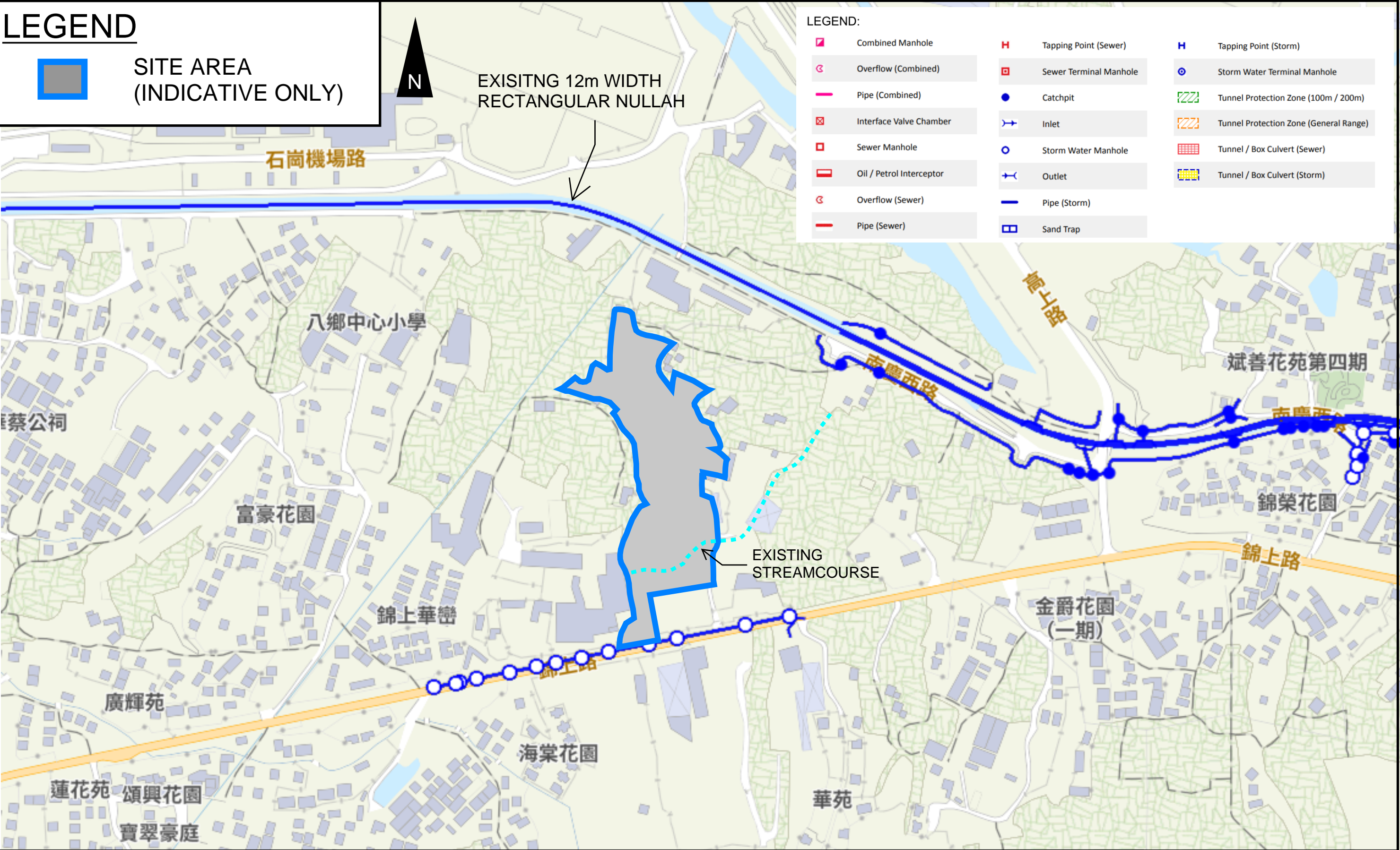
FIGURES



LEGEND

SITE AREA
(INDICATIVE ONLY)

PROJECT: PROPOSED TEMPORARY WAREHOUSE AND OPEN STORAGE OF CONSTRUCTION MATERIALS, MACHINERY AND VEHICLES FOR A PERIOD OF 3 YEARS AND ASSOCIATED FILLING OF LAND	TITLE SITE LOCATION PLAN		FIGURE NUMBER FIGURE 1		
LOCATION: VARIOUS LOTS IN D.D. 112 AND ADJOINING GOVERNMENT LAND, SHEK KONG, YUEN LONG, NEW TERRITORIES	<div><div>M</div><div>MARVELLOUS</div><div>CONSTRUCTION & DESIGN COMPANY LIMITED</div></div>				
			VER	DESCRIPTION	DATE



LOCATION:
VARIOUS LOTS IN D.D. 112 AND ADJOINING GOVERNMENT LAND, SHEK KONG, YUEN LONG, NEW TERRITORIES

PROJECT:
PROPOSED TEMPORARY WAREHOUSE AND OPEN STORAGE OF CONSTRUCTION MATERIALS, MACHINERY AND VEHICLES FOR A PERIOD OF 3 YEARS AND ASSOCIATED FILLING OF LAND

TITLE PROPOSED DRAINAGE SYSTEM

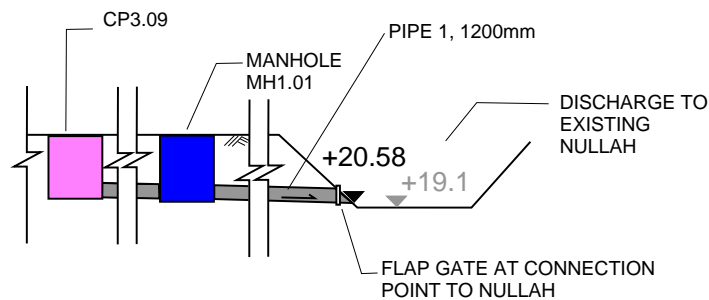
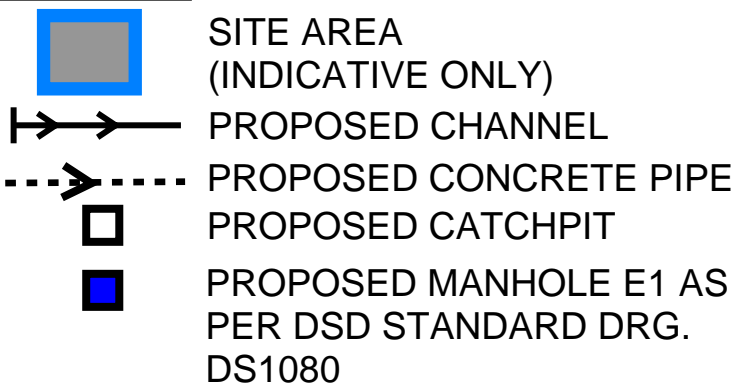
FIGURE NUMBER
FIGURE 3-1

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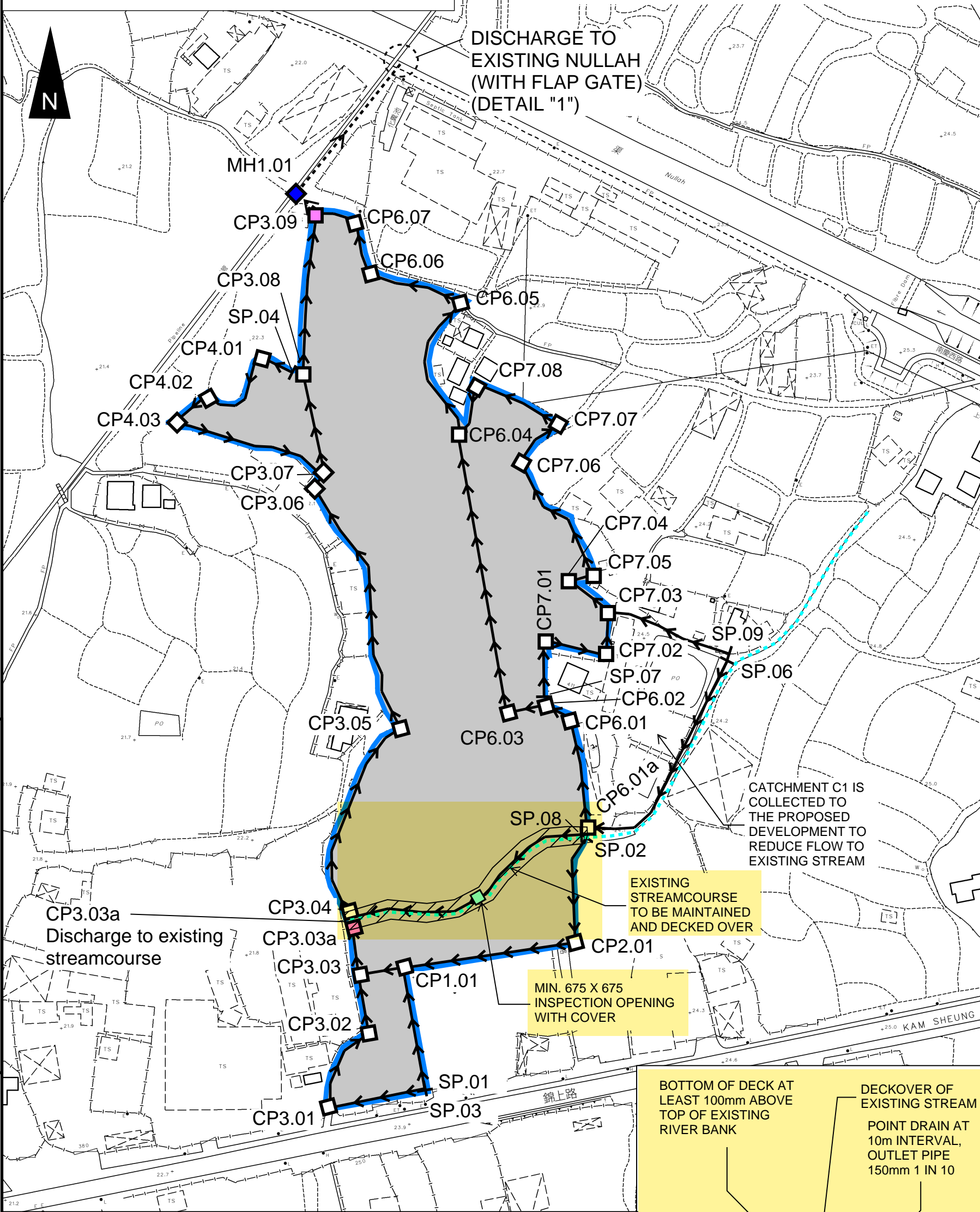
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DATE _____

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DISCHARGE DETAIL "1"
N.T.S.



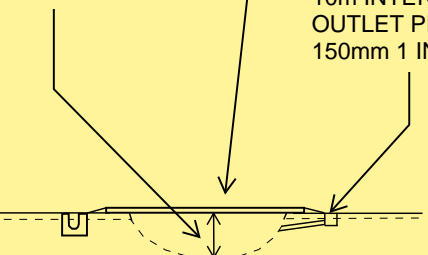
NOTES:

- 1.ALL LEVELS ARE IN METRES TO HONG KONG PRINCIPAL DATUM (m.P.D.) UNLESS NOTED OTHERWISE.
2.ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
3.LOCATION OF CATCHPITS ARE APPROX. ONLY.
4.CONNECTION LEVELS ARE APPROX. ONLY AND SHALL BE VERIFIED ON SITE.

**BOTTOM OF DECK AT
LEAST 100mm ABOVE
TOP OF EXISTING
RIVER BANK**

DECKOVER OF
EXISTING STREAM

POINT DRAIN AT
10m INTERVAL,
OUTLET PIPE
150mm 1 IN 10



TYPICAL SECTION FOR DECKOVER OF EXISTING STREAM

DRINAGE SCHEDULE										
US MH/PIT	DS MH/PIT	US GL	DS GL	Size mm	Gradient 1 in	Type	US IL	DS IL	U/S MH/PIT TYPE #	Remark
SP01	CP1.01	23.9	22.8	750	200	UC	23.15	22.05	SP	#SP: Start Point
CP1.01	CP3.03	22.8	22.4	750	200	UC	21.76	21.65	CP	
SP02	CP2.01	24.0	22.8	750	200	UC	23.25	22.05	SP	
CP2.01	CP1.01	22.8	22.8	750	200	UC	22.05	21.76	CP	
SP03	CP3.01	23.9	23.4	750	200	UC	23.15	22.65	SP	
CP3.01	CP3.02	23.4	22.4	750	200	UC	22.65	21.65	CP	
CP3.02	CP3.03	22.4	22.4	750	200	UC	21.65	21.55	CP	
CP3.03	CP3.03a	22.4	22.4	750	250	UC	21.55	21.48	CP	
CP3.03a	To Existing Stream	22.4	22.4	750	250	UC	21.48	21.47	CP	
SP08	CP3.04	24.0	23.4	750	200	UC	23.25	22.65	SP	
CP3.04	CP3.05	23.4	22.5	750	200	UC	22.65	21.75	CP	
CP3.05	CP3.06	22.5	22.1	750	250	UC	21.75	21.35	CP	
CP3.06	CP3.07	22.1	22.1	750	250	UC	21.35	21.33	CP	
CP3.07	CP3.08	22.1	22.4	1050	250	UC	20.82	20.68	CP	
CP3.08	CP3.09	22.4	22.6	1050	250	UC	20.68	20.46	CP	
CP3.09	MH1.01	22.6	22.6	1200	250	PIPE	20.46	20.43	CP	
MH1.01	Existing Nullah at North	22.6	22.3	1200	250	PIPE	20.43	20.21	E1	
SP04	CP4.01	22.4	22.3	750	200	UC	21.65	21.55	SP	
CP4.01	CP4.02	22.3	22.2	750	200	UC	21.55	21.40	CP	
CP4.02	CP4.03	22.2	21.8	750	200	UC	21.40	21.05	CP	
CP4.03	CP3.07	21.8	22.1	750	200	UC	21.05	20.82	CP	
SP06	CP6.01a	24.2	24.0	750	300	UC	23.45	23.19	SP	
CP6.01a	CP6.01	24.0	23.3	750	300	UC	23.19	22.55	CP	
CP6.01	CP6.02	23.3	23.5	750	300	UC	22.55	22.52	CP	
CP6.02	CP6.03	23.5	23.3	750	300	UC	22.52	22.48	CP	
CP6.03	CP6.04	23.3	23.2	1050	200	UC	22.25	21.78	CP	
CP6.04	CP6.05	23.2	23.1	1050	300	UC	21.78	21.62	CP	
CP6.05	CP6.06	23.1	22.9	1050	300	UC	21.62	21.51	CP	
CP6.06	CP6.07	22.9	22.7	1050	300	UC	21.51	21.45	CP	
CP6.07	CP3.09	22.7	22.6	1050	300	UC	21.45	21.41	CP	
SP07	CP7.01	23.5	23.5	750	200	UC	22.75	22.66	SP	
CP7.01	CP7.02	23.5	24.0	750	200	UC	22.66	22.55	CP	
CP7.02	CP7.03	24.0	23.5	750	200	UC	22.55	22.47	CP	
CP7.03	CP7.04	23.5	23.9	750	300	UC	22.47	22.42	CP	
CP7.04	CP7.05	23.9	23.9	750	300	UC	22.42	22.39	CP	
CP7.05	CP7.06	23.9	23.5	750	300	UC	22.39	22.24	CP	
CP7.06	CP7.07	23.5	23.5	750	300	UC	22.24	22.18	CP	
CP7.07	CP7.08	23.5	23.5	750	300	UC	22.18	22.08	CP	
CP7.08	CP6.04	23.5	23.2	750	300	UC	22.08	22.02	CP	
SP09	CP7.03	24.2	23.5	750	200	UC	23.45	22.75	SP	


NOTES:

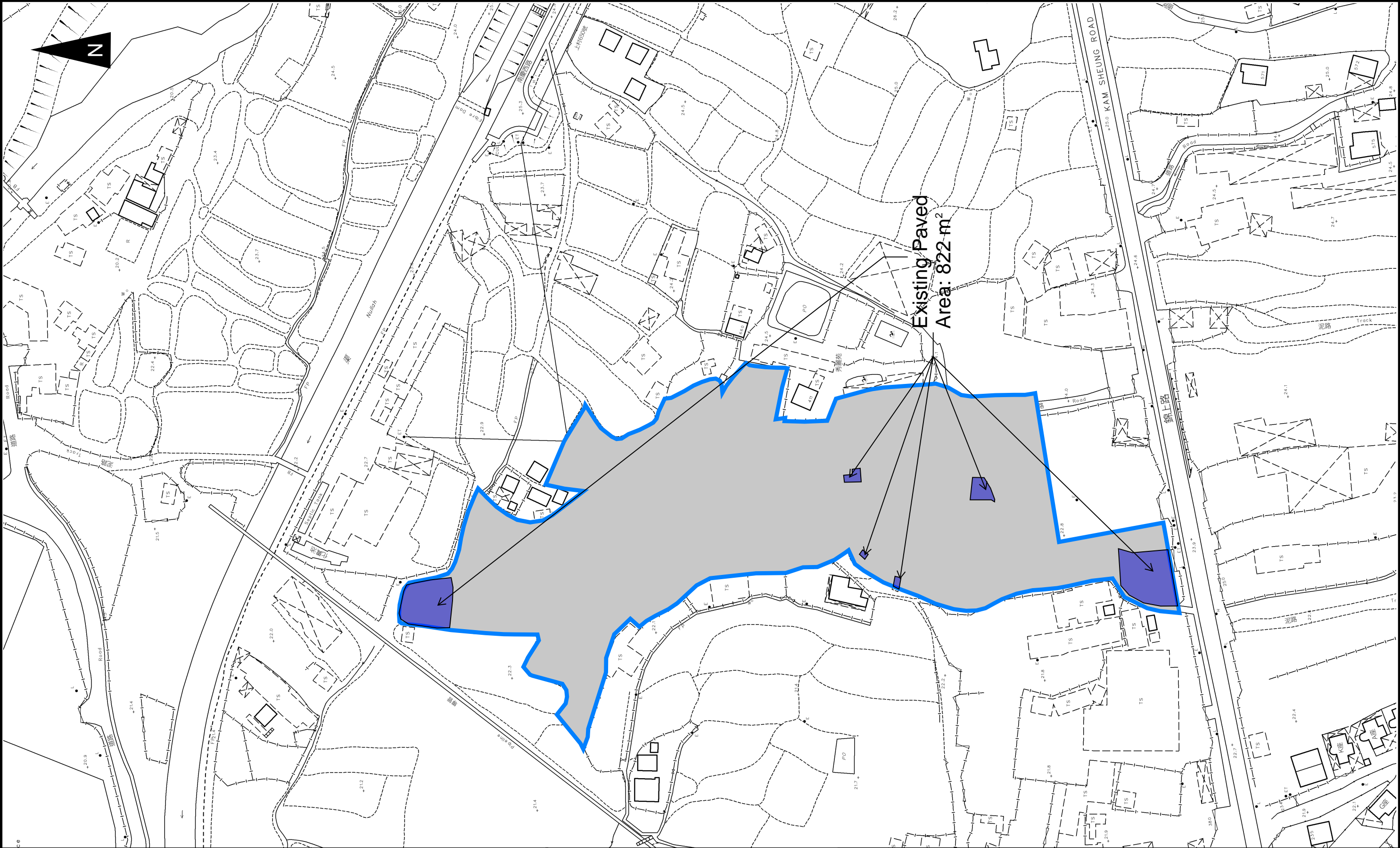
1.ALL LEVELS ARE IN METRES TO HONG KONG PRINCIPAL DATUM (m.P.D.) UNLESS NOTED OTHERWISE.

2.ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.

3.LOCATION OF MANHOLE AND CATCHPITS ARE APPROX. ONLY.

4.COVER LEVELS AND CONNECTION LEVELS ARE APPROXMIATE ONLY AND SHOULD BE CHECKED ON SITE.

<div>PROJECT:</div> <div>PROPOSED TEMPORARY WAREHOUSE AND OPEN STORAGE OF CONSTRUCTION MATERIALS, MACHINERY AND VEHICLES FOR A PERIOD OF 3 YEARS AND ASSOCIATED FILLING OF LAND</div>	<div>TITLE</div> <div>DRAINAGE SCHEDULE</div>	<div>FIGURE NUMBER</div> <div>FIGURE 3-2</div>		
<div>LOCATION:</div> <div>VARIOUS LOTS IN D.D. 112 AND ADJOINING GOVERNMENT LAND, SHEK KONG, YUEN LONG, NEW TERRITORIES</div>	<div></div>			
		VER	DESCRIPTION	DATE



PROJECT:
PROPOSED TEMPORARY WAREHOUSE AND OPEN STORAGE OF CONSTRUCTION MATERIALS, MACHINERY
AND VEHICLES FOR A PERIOD OF 3 YEARS AND ASSOCIATED FILLING OF LAND

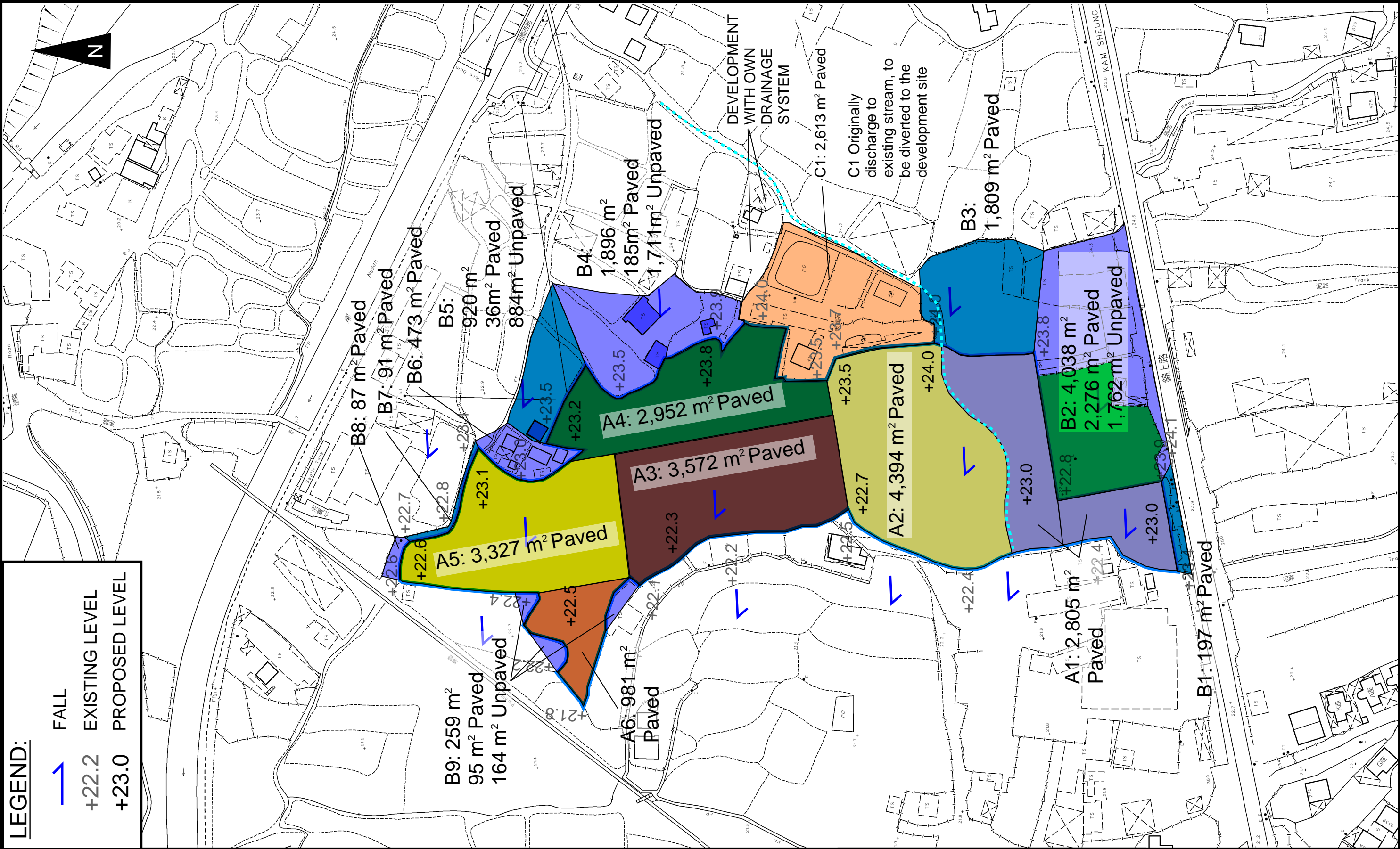
TITLE
EXISTING CATCHMENT
PLAN

FIGURE NUMBER
FIGURE 4-1

LOCATION:
VARIOUS LOTS IN D.D. 112 AND ADJOINING GOVERNMENT LAND, SHEK KONG, YUEN LONG, NEW
TERRITORIES

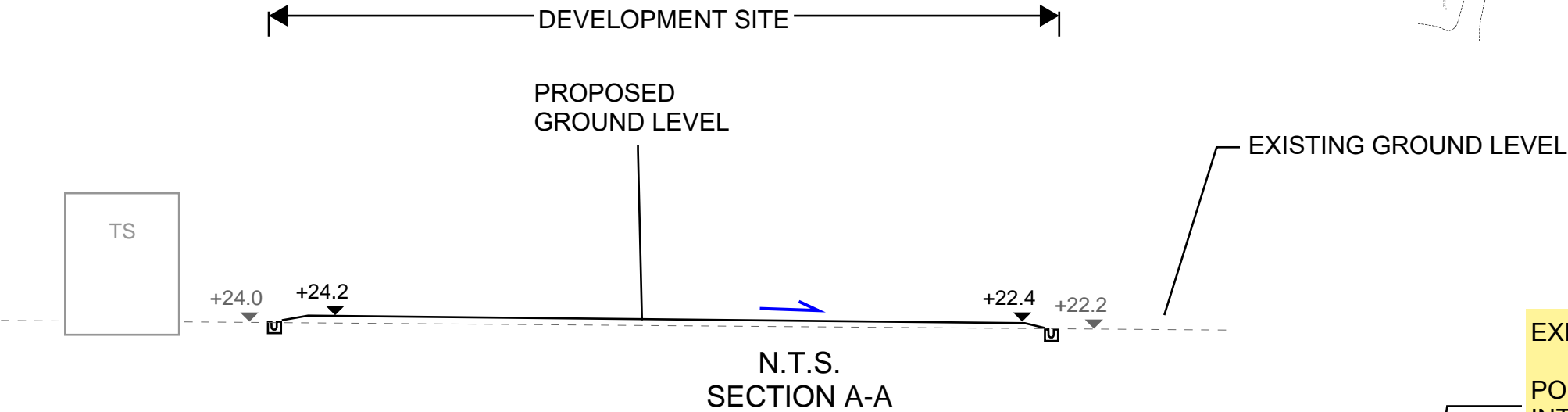
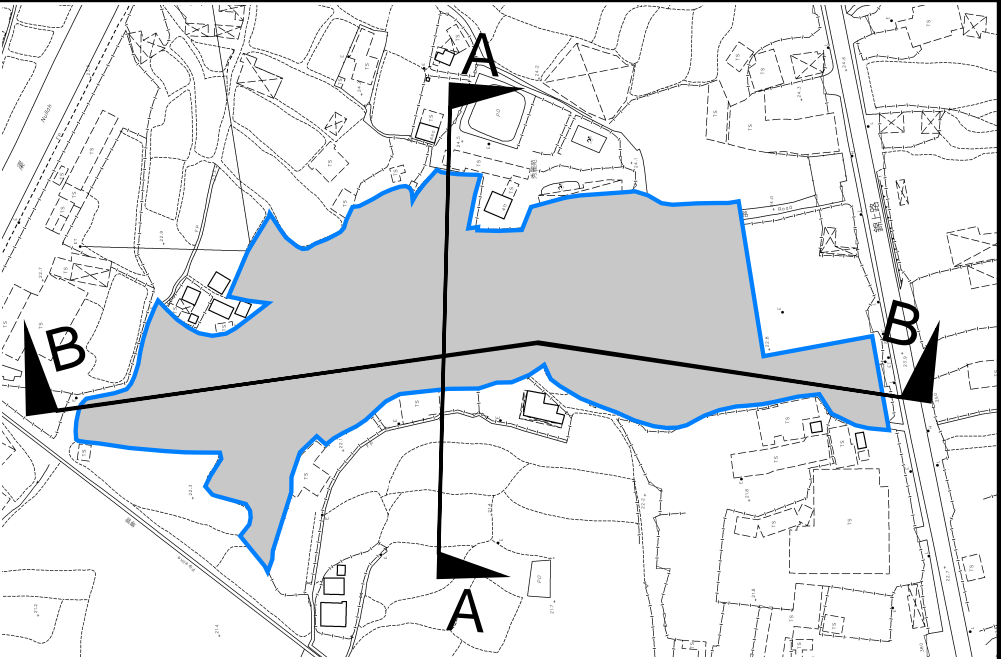


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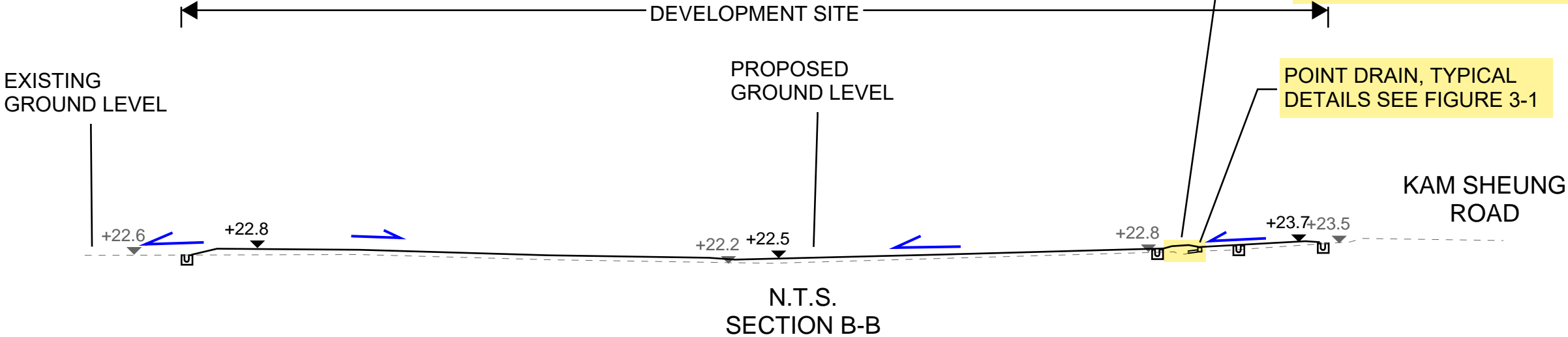
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SITE AREA
(INDICATIVE ONLY)



EXISTING STREAM TO BE DECKOVER

POINT DRAIN TO BE PROVIDED AT 10m INTERVAL AND MIN. 675 X 675 INSPECTION OPENING TO BE PROVIDED AT MID SECTION (SEE FIGURE 3-1)



PROJECT:
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TITLE
SECTIONS

FIGURE NUMBER
FIGURE 5

LOCATION:
VARIOUS LOTS IN D.D. 112 AND ADJOINING GOVERNMENT LAND, SHEK KONG, YUEN LONG, NEW TERRITORIES



VER	DESCRIPTION	DATE

APPENDIX

Appendix A: Design Calculation

Zone

HKO

Return Period	1 in	50	years
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n	0.014
Ks	0.15
Viscosity	0.000001

Storm Constant	HKO a	505.5
	HKO b	3.29
	HKO c	0.355

Time of Concentration Checking

Catchment	Flow Distance	Highest Level	Lowest Level	Gradient (per 100m) = (H1-H2)/L x 100	to (min) = 0.14465L / (H ^{1.48} A ^{0.14})	tc = to + tf
A (m2)	L (m)	H1 (mPD)	H2 (mPD)		(min)	(min)
197	8.6	24.1	23.9	2.326	0.6	0.6



Catchment Area Table (Area in m²)

Catchment	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	B7	B8	B9	Total Site Area (After Development)	Outer Catchment (B1 - B9)	A1 Existing	C1	Change in equivalent area of Existing Stream [A1 - A1 (existing) - C1]*
Total Area	2805	4394	3572	2952	3327	981	197	4038	1809	1896	920	473	91	87	259	18031	9770	2805	2613	0
Hard Paved Area	2805	4394	3572	2952	3327	981	197	2276	1809	185	36	473	91	87	95	18031	5249	339	2613	0
Unpaved Area	0	0	0	0	0	0	0	1762	0	1711	884	0	0	0	164	0	4521	2466	0	0
Equival. Area	2664.75	4174.3	3393.4	2804.4	3160.65	931.95	187.15	2778.9	1718.55	774.60	343.60	449.35	86.45	82.65	147.65	17129.45	6568.9	1185.15	2482.35	-1002.75

Change in equivalent area of Existing Stream [A1 - A1 (existing) - C1]* = 2664.75 - 1185.15 - 2482.35 = -1002.75

*Equivalent Area to the existing stream is reduced after the flow from C1 is diverted to the Application Site.

Pavement Type	Hard Paved	Unpaved
Runoff Coefficient	0.95	0.35

Calculation Table of Drainage System

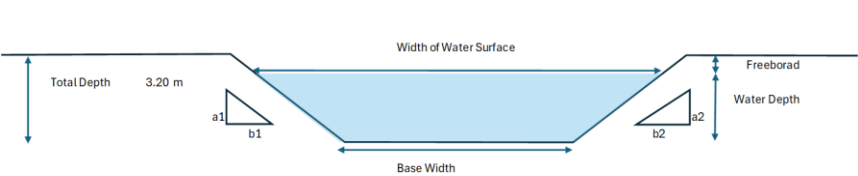
US MH/PIT	DS MH/PIT	US GL	DS GL	Size mm	Gradient 1 in	Type	US IL	DS IL	U/S MH/PIT TYPE #	Length m	V m/s**	Capacity m ³ /s	Catchment ID1	Catchment ID2	Catchment ID3	Catchment ID4	Catchment ID5	Catchment ID6	Catchment ID7	Catchment ID8	Catchment ID9	Catchment ID10	Catchment ID11	Catchment ID12	Total Equivalent Area m ²	ToC min	Intensity mm/hr***	Total Discharge m ³ /s	Utilization
SP01	CP1.01	23.90	22.80	750	200	UC	23.15	22.05	SP	41.4	1.92	0.87	B2												2778.90	0.60	347	0.27	30.9%
CP1.01	CP3.03	22.80	22.40	750	200	UC	21.76	21.65	CP	14	1.92	0.87	A1	B2											5443.65	1.40	324	0.49	56.6%
SP02	CP2.01	24.00	22.80	750	200	UC	23.25	22.05	SP	35.2	1.92	0.87	A1	B3											4383.30	0.60	347	0.42	48.7%
CP2.01	CP1.01	22.80	22.80	750	200	UC	22.05	21.76	CP	57.3	1.92	0.87	A1	B2	B3										7162.20	0.91	338	0.67	77.5%
SP03	CP3.01	23.90	23.40	750	200	UC	23.15	22.65	SP	31.6	1.92	0.87	A1	B1											2851.90	0.60	347	0.27	31.7%
CP3.01	CP3.02	23.40	22.40	750	200	UC	22.65	21.65	CP	29.6	1.92	0.87	A1	B1											2851.90	0.87	338	0.27	30.9%
CP3.02	CP3.03	22.40	22.40	750	200	UC	21.65	21.55	CP	19.9	1.92	0.87	A1	B1											2851.90	1.13	331	0.26	30.3%
CP3.03	CP3.03a	22.40	22.40	750	250	UC	21.55	21.48	CP	18.5	1.72	0.78	A1	B1	B2										5630.80	1.52	321	0.50	64.8%
CP3.03a	To Existing Stream	22.40	22.40	750	250	UC	21.48	21.47	CP	0.5	1.72	0.78	A1	B1	B2										5630.80	1.70	317	0.50	64.0%
SP08	CP3.04	24.00	23.40	750	200	UC	23.25	22.65	SP	86.9	1.92	0.87	A2												4174.30	0.60	347	0.40	46.4%
CP3.04	CP3.05	23.40	22.50	750	200	UC	22.65	21.75	CP	90.3	1.92	0.87	A2												4174.30	1.35	326	0.38	43.5%
CP3.05	CP3.06	22.50	22.10	750	250	UC	21.75	21.35	CP	88.2	1.72	0.78	A2	A3											7567.70	2.14	308	0.65	83.5%
CP3.06	CP3.07	22.10	22.10	750	250	UC	21.35	21.33	CP	4.5	1.72	0.78	A2	A3											7567.70	2.99	292	0.62	79.3%
CP3.07	CP3.08	22.10	22.40	1050	250	UC	20.82	20.68	CP	34.1	2.15	1.90	A2	A3	A5	A6	B9								11807.95	3.04	292	0.96	50.3%
CP3.08	CP3.09	22.40	22.60	1050	250	UC	20.68	20.46	CP	54.1	2.15	1.90	A2	A3	A5	A6	B9								11807.95	3.30	288	0.94	49.6%
CP3.09	MH1.01	22.60	22.60	1200	250	PIPE	20.46	20.43	CP	8	2.53	2.57	A2	A3	A4	A5	A6	B4	B5	B6	B7	B8	B9	C1	18831.35	3.72	281	1.47	57.2%
MH1.01	Existing Nullah at North	22.60	22.30	1200	250	PIPE	20.43	20.21	E1	56.3	2.53	2.57	A2	A3	A4	A5	A6	B4	B5	B6	B7	B8	B9	C1	18831.35	3.77	281	1.47	57.1%
SP04	CP4.01	22.40	22.30	750	200	UC	21.65	21.55	SP	11.1	1.92	0.87	A6	B9											1079.60	0.60	347	0.10	12.0%
CP4.01	CP4.02	22.30	22.20	750	200	UC	21.55	21.40	CP	29.9	1.92	0.87	A6	B9											1079.60	0.70	344	0.10	11.9%
CP4.02	CP4.03	22.20	21.80	750	200	UC	21.40	21.05	CP	14.1	1.92	0.87	A6	B9											1079.60	0.96	336	0.10	11.6%
CP4.03	CP3.07	21.80	22.10	750	200	UC	21.05	20.82	CP	46.6	1.92	0.87	A6	B9											1079.60	1.08	333	0.10	11.5%
SP06	CP6.01a	24.00	24.00	750	300	UC	23.45	23.19	SP	79.4	1.57	0.71	C1												2482.35	0.60	347	0.24	33.8%
CP6.01a	CP6.01	24.00	23.30	750	300	UC	23.19	22.55	CP	36.8	1.57	0.71	A2	C1											6656.65	1.44	323	0.60	84.5%
CP6.01	CP6.02	23.30	23.30	750	300	UC	22.55	22.52	CP	9.4	1.57	0.71	A2	C1											6656.65	1.84	314	0.58	82.1%
CP6.02	CP6.03	23.50	23.30	750	300	UC	22.52	22.48	CP	12.8	1.57	0.71	A2	C1											6656.65	1.94	312	0.58	81.6%
CP6.03	CP6.04	23.30	23.20	1050	200	UC	22.25	21.78	CP	93.8	2.40	2.13	A2	A3	A4	A5	C1								12854.45	2.07	309	1.11	51.9%
CP6.04	CP6.05	23.20	23.10	1050	300	UC	21.78	21.62	CP	49.4	1.96	1.74	A2	A3	A4	A5	B4	B5	B6	C1					17582.65	2.72	297	1.45	83.6%
CP6.05	CP6.06	23.10	22.90	1050	300	UC	21.62	21.51	CP	31.1	1.96	1.74	A2	A3	A4	A5	B4	B5	B6	B7	C1				17669.10	3.14	290	1.42	82.0%
CP6.06	CP6.07	22.90	22.70	1050	300	UC	21.51	21.45	CP	17.7	1.96	1.74	A2	A3	A4	A5	B4	B5	B6	B7	C1				17669.10	3.41	286	1.40	80.8%
CP6.07	CP3.09	22.70	22.60	1050	300	UC	21.45	21.41	CP	12.9	1.96	1.74	A2	A3	A4	A5	B4	B5	B6	B7	B8	C1			17751.75	3.56	284	1.40	80.6%
SP07	CP7.01	23.50	23.50	750	200	UC	22.75	22.66	SP	18.8	1.92	0.87	A4												2804.40	0.60	347	0.27	31.2%
CP7.01	CP7.02	23.50	24.00	750	200	UC	22.66	22.55	CP	21.6	1.92	0.87	A4												2804.40	0.76	342	0.27	30.7%
CP7.02	CP7.03	24.00	23.50	750	200	UC	22.55	22.47	CP	15.1	1.92	0.87	A4												2804.40	0.95	336	0.26	30.2%
CP7.03	CP7.04	23.50	23.90	750	300	UC	22.47	22.42	CP	15.8	1.57	0.71	A4	B4	C1										6061.35	1.08	333	0.56	79.1%
CP7.04	CP7.05	23.90	23.90	750	300	UC	22.42	22.39	CP	7.5	1.57	0.71	A4	B4	C1										6061.35	1.25	328	0.55	78.1%
CP7.05	CP7.06	23.90	23.50	750	300	UC	22.39	22.24	CP	46.3	1.57	0.71	A4	B4	C1										6061.35	1.33	326	0.55	77.6%
CP7.06	CP7.07	23.50	23.50	750	300	UC	22.24	22.18	CP	18	1.57	0.71	A4	B4	C1										6061.35	1.82	315	0.53	74.8%
CP7.07	CP7.08	23.50	23.50	750	300	UC	22.18	22.08	CP	31.1	1.57	0.71	A4	B4	B5	C1									6404.95	2.01	311	0.55	78.1%
CP7.08	CP6.04	23.50	23.20	750	300	UC	22.08	22.02	CP	18.2	1.57	0.71	A4	B4	B5	C1									6404.95	2.34	304	0.54	76.4%
SP09	CP7.03	24.20	23.50	750	200	UC	23.45	22.75	SP	42.5	1.92	0.87	C1												2482.35	0.60	347	0.24	27.6%

#SP: Start Point

##:with 10% reduction in flow area

: With 11.1% rainfall increase as per Table 28 of SDM Corrigendum No. 1/2022.

Capacity Checking of Existing 12m Width Rectangular Nullah



a1	1	
b1	0.0	
a2	1	
b2	0.0	
Total Depth	3.20	m
Base Width	12.00	m
Assumed Water Depth	2.70	m
Freeboard	0.50	m

Assumed Water Depth	Freeboard	Base Width	Width of Water Surface	Flow Area	Wetted Perimeter	Hydraulic Radius	Manning's Roughness	Gradient	Velocity	Capacity
m	m	m	m	m ²	m	m		1 in	m/s	m ³ /s
2.70	0.50	12.00	12.00	32.40	17.40	1.86	0.035	150	3.53	114.40

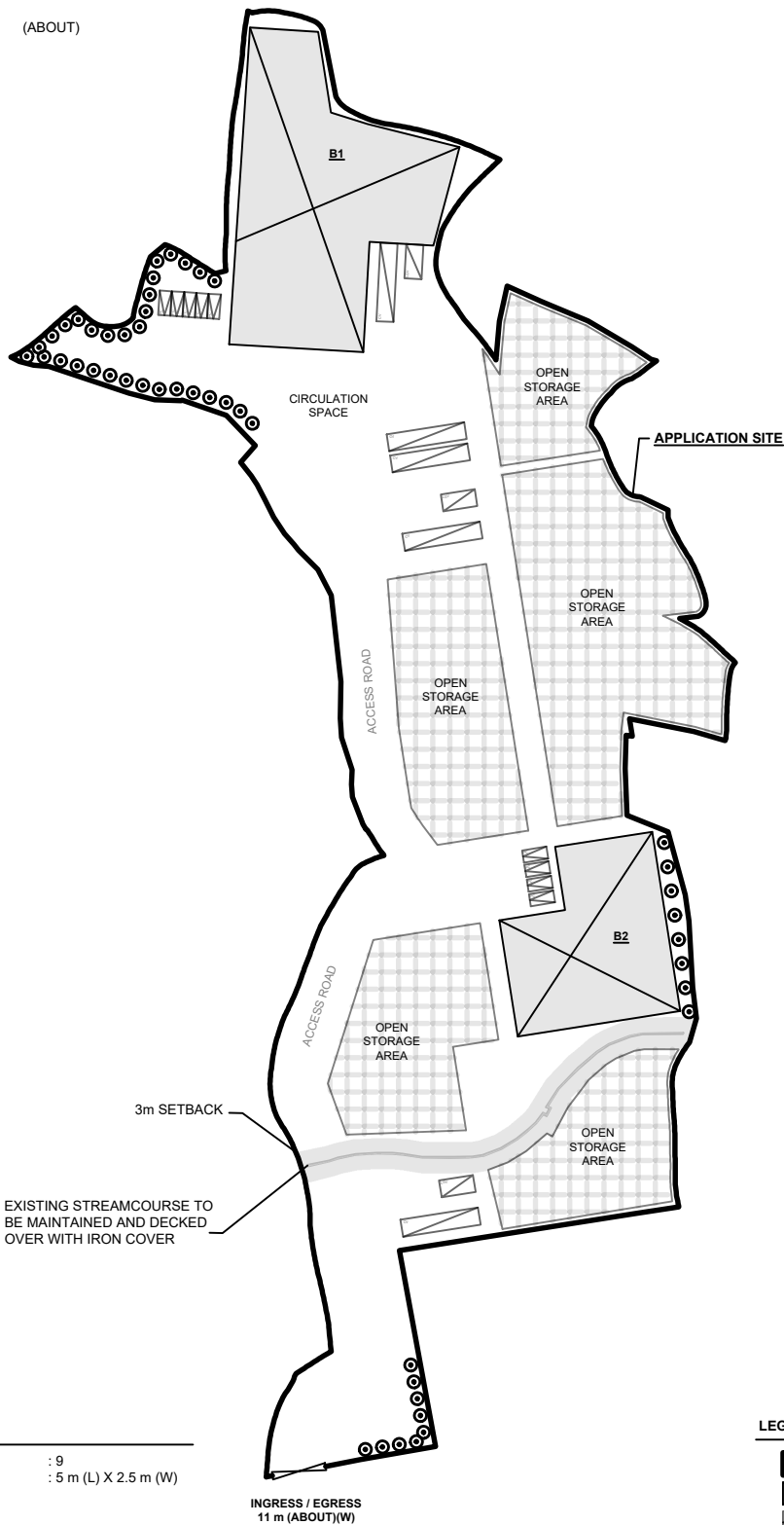
Total Flow from The Application Site = 1.45 m³/s (See Appendix A1)
Utilization Rate = 1.3%
Total flow from proposed site only occupy 1.3% of the existing Nullah.

DEVELOPMENT PARAMETERS

APPLICATION SITE AREA	: 18,031 m ²	(ABOUT)
COVERED AREA	: 2,961 m ²	(ABOUT)
UNCOVERED AREA	: 15,070 m ²	(ABOUT)
PLOT RATIO	: 0.16	(ABOUT)
SITE COVERAGE	: 16 %	(ABOUT)
NO. OF STRUCTURE	: 2	
DOMESTIC GFA	: NOT APPLICABLE	
NON-DOMESTIC GFA	: 2,961 m ²	(ABOUT)
TOTAL GFA	: 2,961 m ²	(ABOUT)
BUILDING HEIGHT	: 13 m	(ABOUT)
NO. OF STOREY	: 1	
OPEN STORAGE AREA	: 5,852 m ²	(ABOUT)

STRUCTURE	USE	COVERED AREA	GROSS FLOOR AREA	BUILDING HEIGHT
B1	WAREHOUSE (EXCL. D.G.G.)	1,896 m ² (ABOUT)	1,896 m ² (ABOUT)	13 m (ABOUT)(1-STOREY)
B2	WAREHOUSE (EXCL. D.G.G.)	1,065 m ² (ABOUT)	1,065 m ² (ABOUT)	13 m (ABOUT)(1-STOREY)
TOTAL		2,961 m ² (ABOUT)	2,961 m ² (ABOUT)	

*D.G.G. - DANGEROUS GOODS GODOWN



PARKING PROVISIONS

NO. OF PRIVATE CAR PARKING SPACE	: 9
DIMENSION OF PARKING SPACE	: 5 m (L) X 2.5 m (W)

LOADING/UNLOADING PROVISIONS

NO. OF L/UL SPACE FOR LIGHT GOODS VEHICLE	: 3
DIMENSION OF L/UL SPACE	: 7 m (L) X 3.5 m (W)
NO. OF L/UL SPACE FOR CONTAINER VEHICLE	: 5
DIMENSION OF L/UL SPACE	: 16 m (L) X 3.5 m (W)

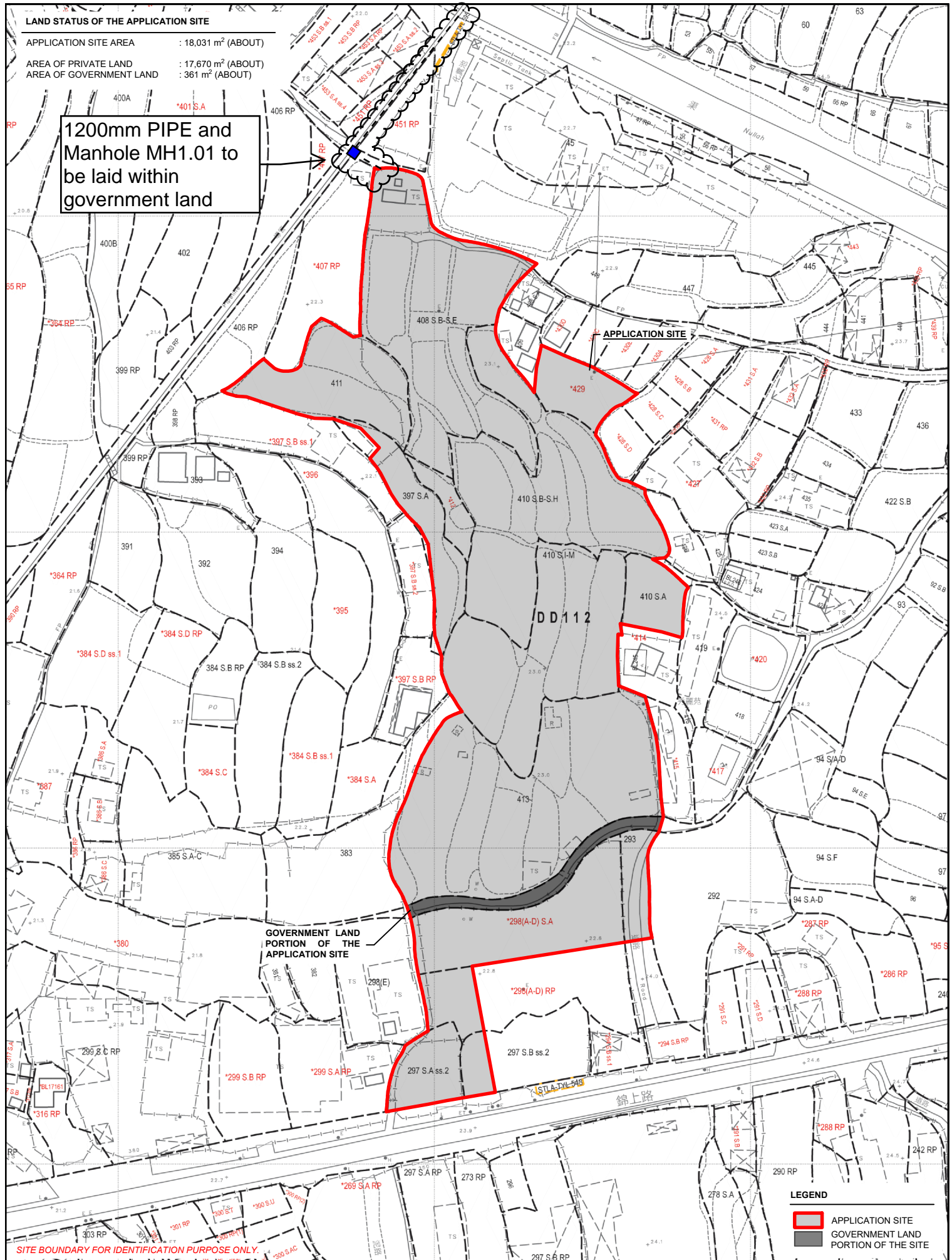
LEGEND

- APPLICATION SITE
- STRUCTURE
- PARKING SPACE (PRIVATE CAR)
- L/UL SPACE (LIGHT GOODS VEHICLE)
- L/UL SPACE (CONTAINER VEHICLE)
- INGRESS / EGRESS
- PROPOSED NEW TREES

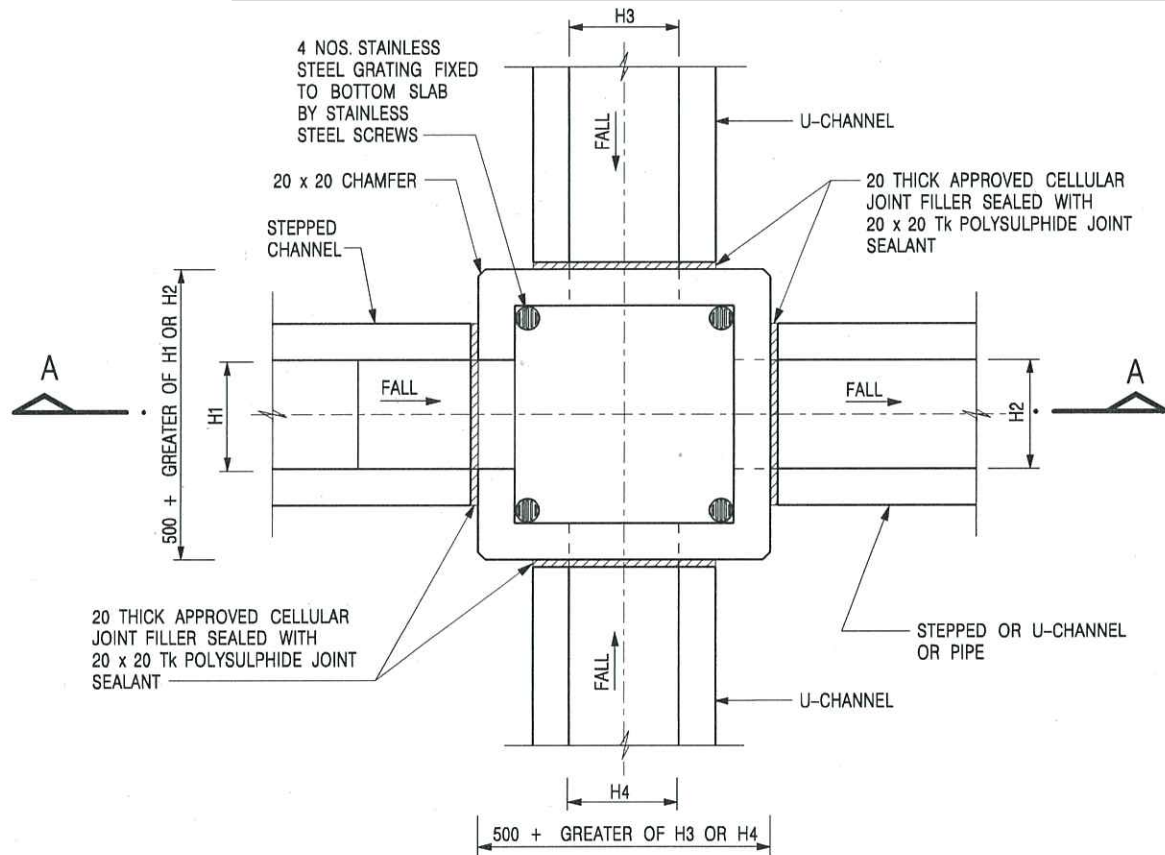
LAND STATUS OF THE APPLICATION SITE

APPLICATION SITE AREA : 18,031 m² (ABOUT)
 AREA OF PRIVATE LAND : 17,870 m² (ABOUT)
 AREA OF GOVERNMENT LAND : 361 m² (ABOUT)

1200mm PIPE and
 Manhole MH1.01 to
 be laid within
 government land

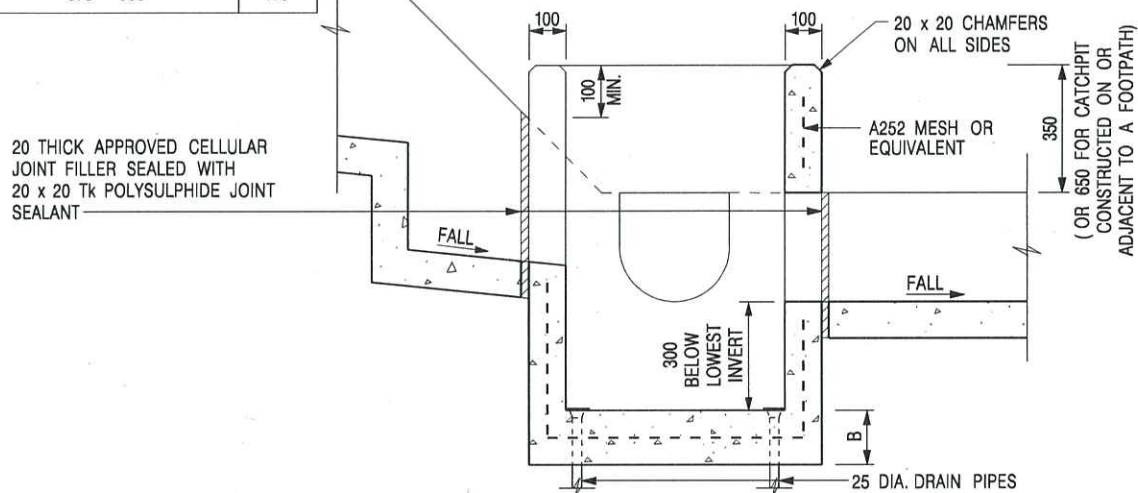


Appendix C - Reference Drawings



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.

CATCHPIT WITH TRAP
(SHEET 1 OF 2)

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



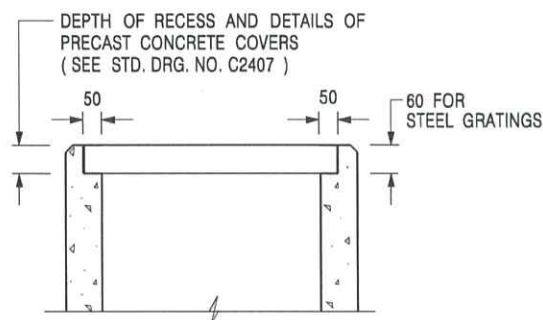
**CIVIL ENGINEERING AND
DEVELOPMENT DEPARTMENT**

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.

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

**CATCHPIT WITH TRAP
(SHEET 2 OF 2)**



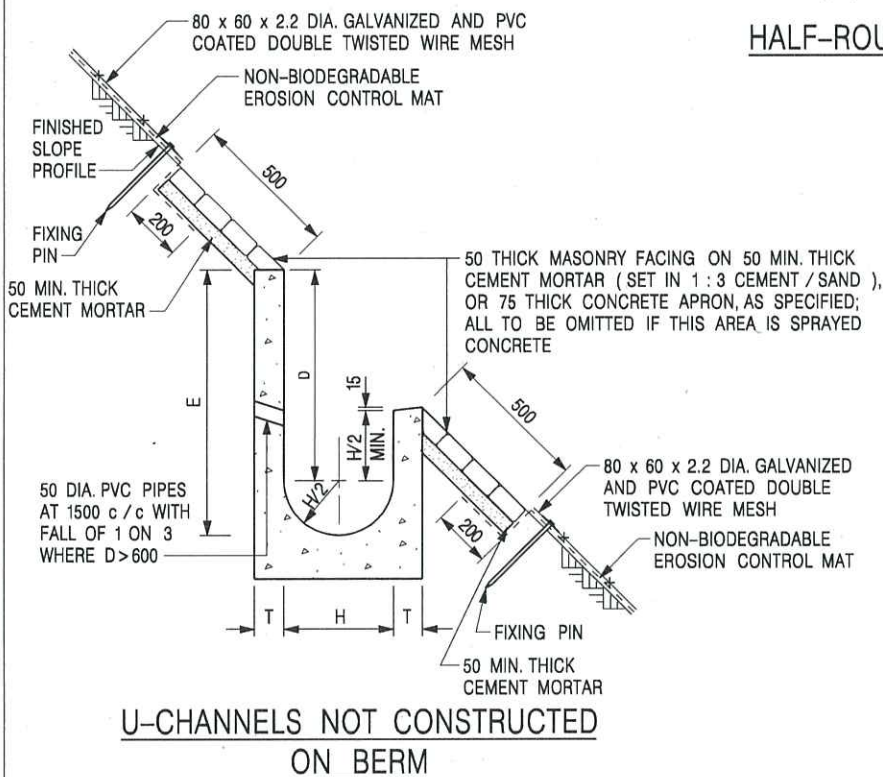
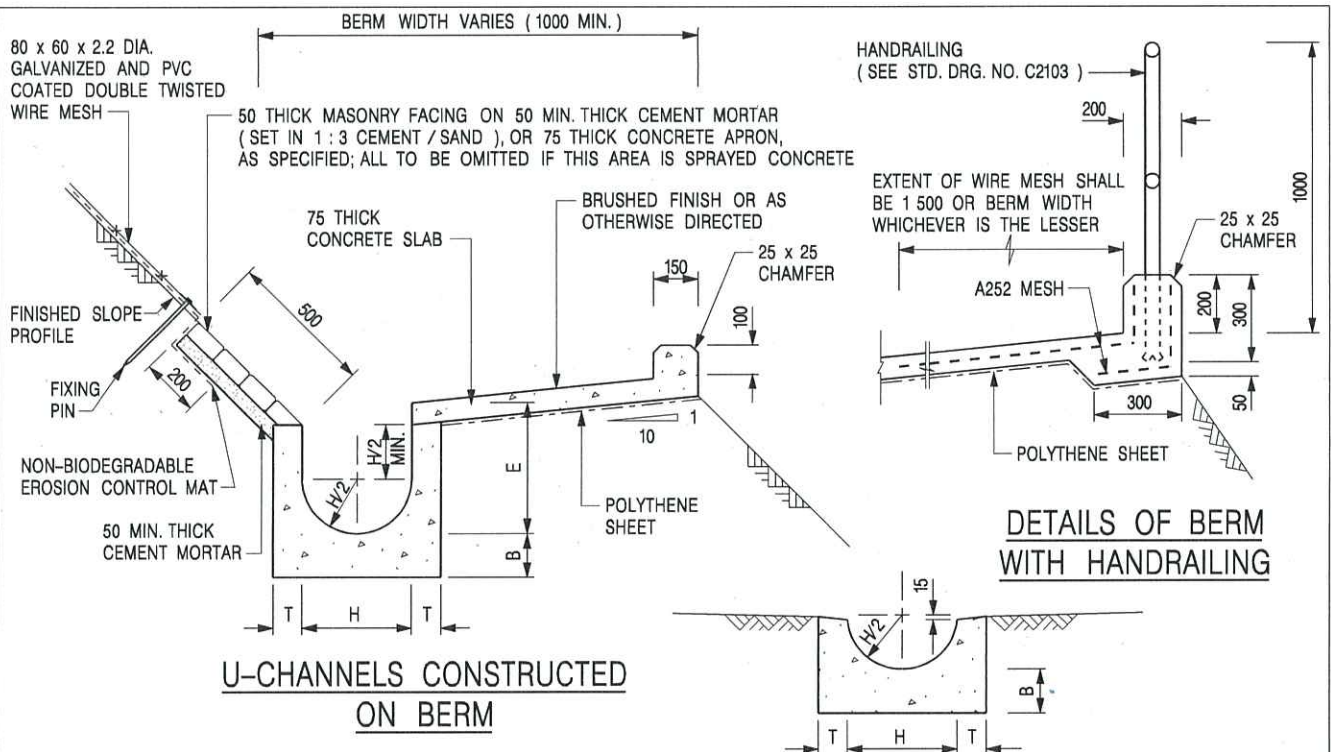
**CIVIL ENGINEERING AND
DEVELOPMENT DEPARTMENT**

SCALE 1 : 20

DRAWING NO.

DATE JAN 1991

C2406 /2A



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/E.
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/E)

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

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
REF.	REVISION	SIGNATURE	DATE

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



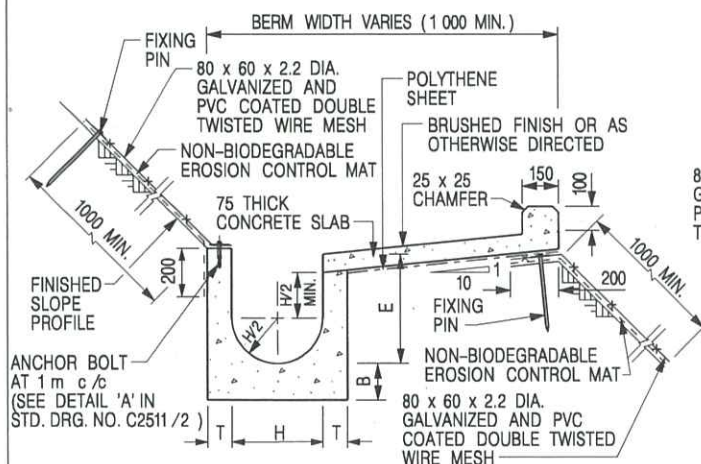
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

SCALE 1 : 25

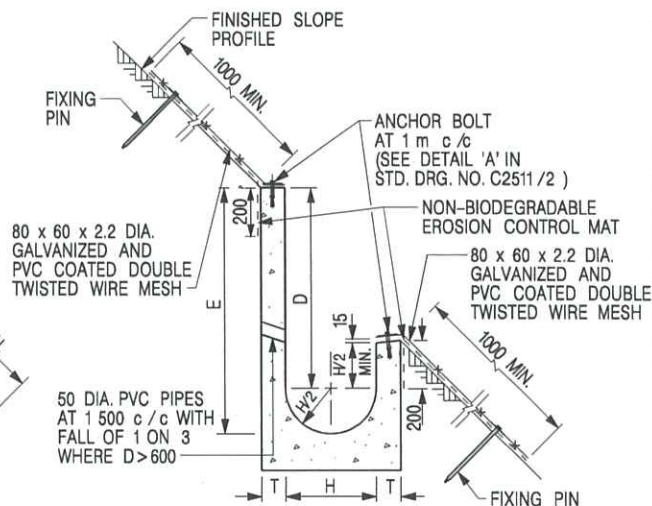
DRAWING NO.

DATE JAN 1991

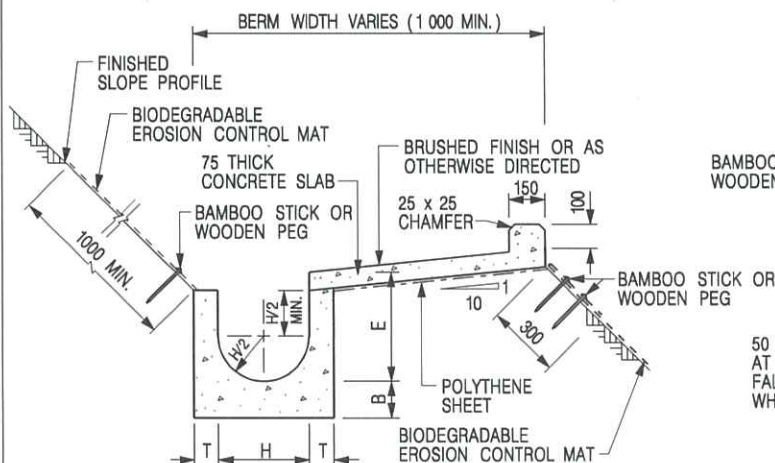
C2409I



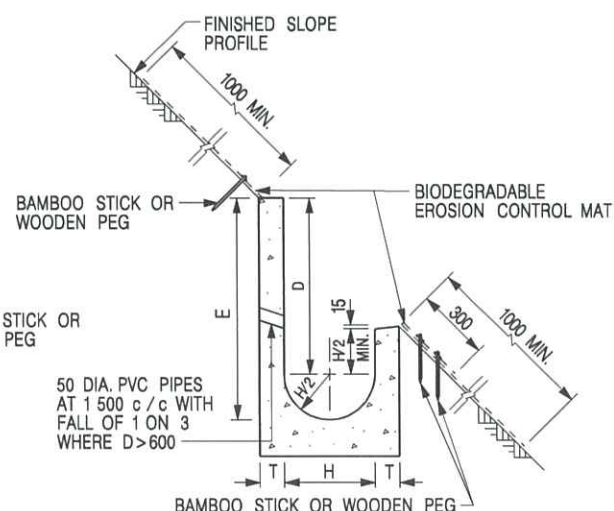
**U-CHANNELS CONSTRUCTED ON BERM
WITH NON-BIODEGRADABLE
EROSION CONTROL MAT**



**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:

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



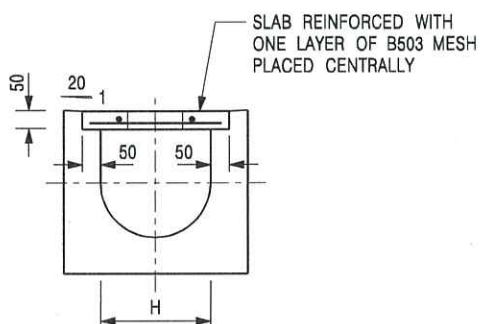
**CIVIL ENGINEERING AND
DEVELOPMENT DEPARTMENT**

SCALE DIAGRAMMATIC

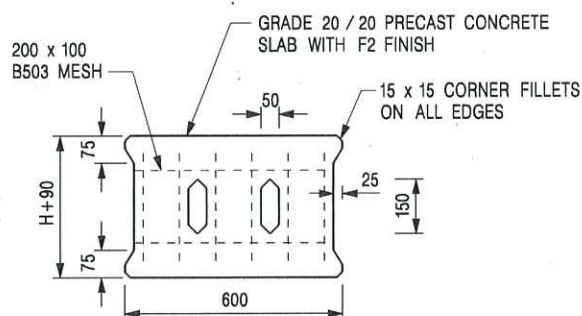
DRAWING NO.

DATE JAN 1991

C24101



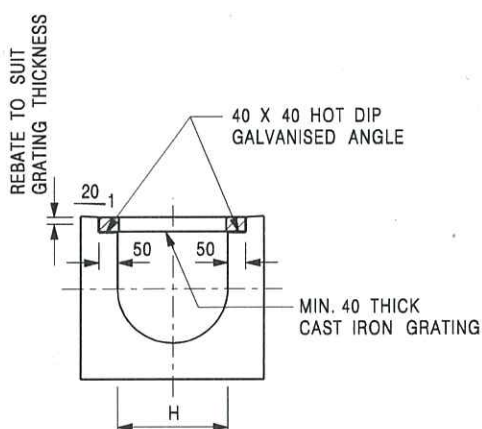
TYPICAL SECTION



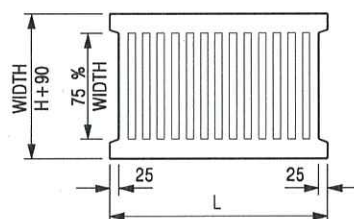
PLAN OF SLAB

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.

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
REF.	REVISION	SIGNATURE	DATE

COVER SLAB AND CAST IRON
GRATING FOR CHANNELS



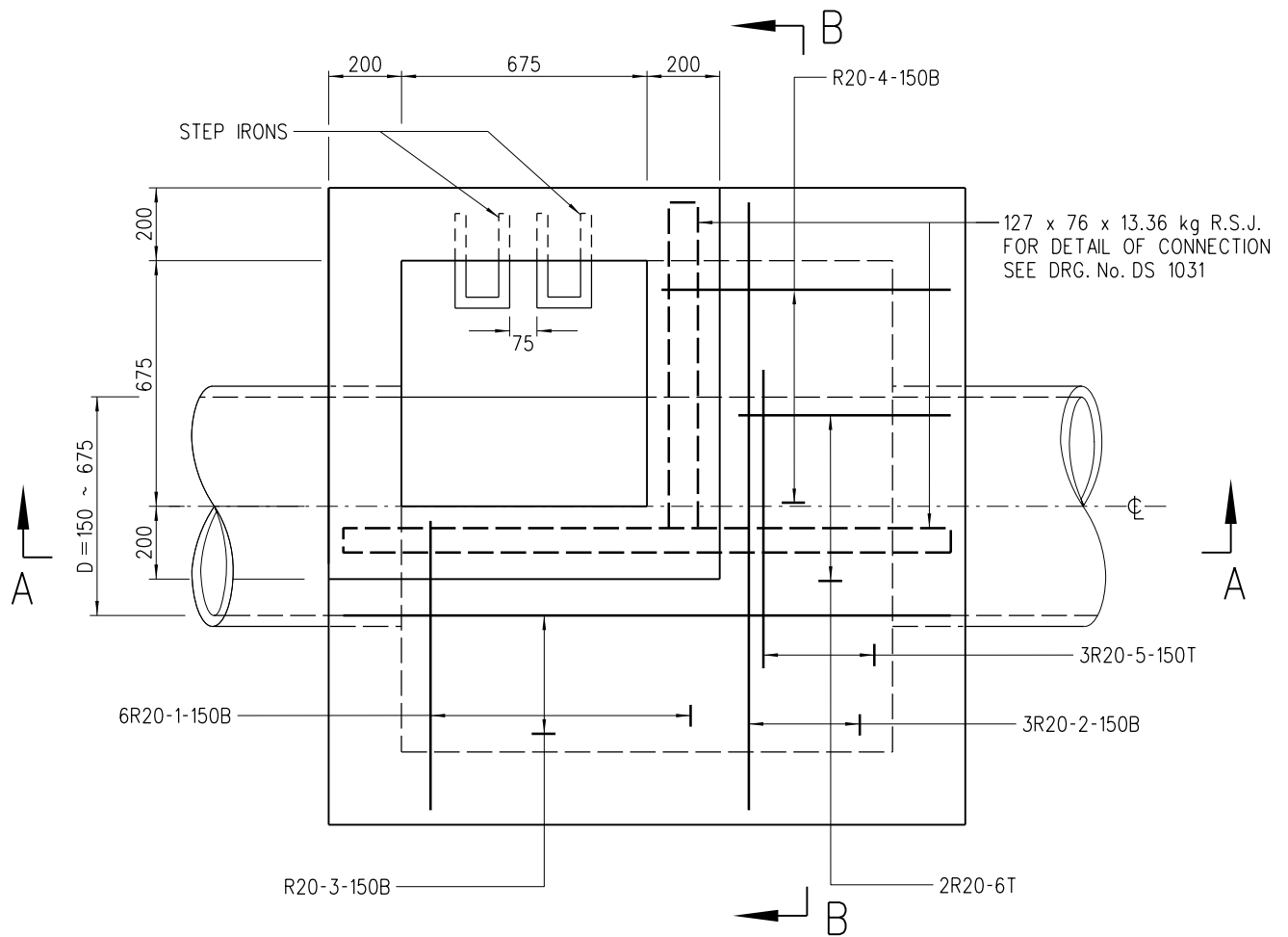
**CIVIL ENGINEERING AND
DEVELOPMENT DEPARTMENT**

SCALE 1 : 20

DATE JAN 1991

DRAWING NO.

C2412E



PLAN

NOTES:

- ALL DIMENSIONS ARE IN MILLIMETRES.
- NOTATION OF REINFORCEMENT : THE SEQUENCE OF DESCRIPTION OF IDENTIFICATION MARKS ON DRAWINGS FOR STEEL REINFORCING BARS FOR CONCRETE WORK IS AS FOLLOWS (NUMBER, TYPE, SIZE, MARK, SPACING, LOCATION OR COMMENT)
- B DENOTES GRADE 500B RIBBED REINFORCEMENT.
- R DENOTES GRADE 250 PLAIN REINFORCEMENT.
- PIPE DIAMETER : 150 TO 675 mm
- NORMAL RANGE OF DEPTH : 1 500 TO 3 000 mm (MEASURED FROM ROAD LEVEL TO LOWEST INVERT)
- USED IN : STORMWATER DRAIN AND SEWER
- JUNCTION : POSITION OF JUNCTION TO BE DETERMINED IN EACH INDIVIDUAL CASE. CHANNELS IMMEDIATELY UNDER ACCESS TO MANHOLE SHOULD BE AVOIDED.
- TOP TREATMENT : SEE DRG. No. DS 1032
- FOUNDATION : FOUNDATION OF MANHOLE VARIES WITH SITE CONDITION. THEREFORE, IT SHOULD BE DETERMINED ON SITE BY THE ENGINEER.
- CONCRETE : GRADE 30/20
- ALL BAR MARKS APPEARED HEREON ARE USED FOR REFERENCE IN THIS DRAWING ONLY.
- MINIMUM COVER AT END OF BARS 40 mm
- COVER AND FRAME NOT SHOWN ON PLAN FOR CLARITY.
- RECESS WITH SQUARE STEEL ROD SHALL BE PROVIDED AT TOP OF MANHOLE CHAMBER FOR INSTALLING MONITORING DEVICE(S). DETAILS REFER TO DSD STANDARD DRAWING NO. DS 1099.

C	NOTE 15 ADDED	ORIGINAL SIGNED	2.8.2022
B	NOTE 11 DELETED NOTES 2, 3 & 4 ADDED	ORIGINAL SIGNED	29.4.2015
A	NOTE 11 REVISED	ORIGINAL SIGNED	24.11.2014
	NEW ISSUE	ORIGINAL SIGNED	15.8.2007
REV.	DESCRIPTION	SIGNATURE	DATE

STANDARD MANHOLE
TYPE E1

DRAINAGE SERVICES DEPARTMENT

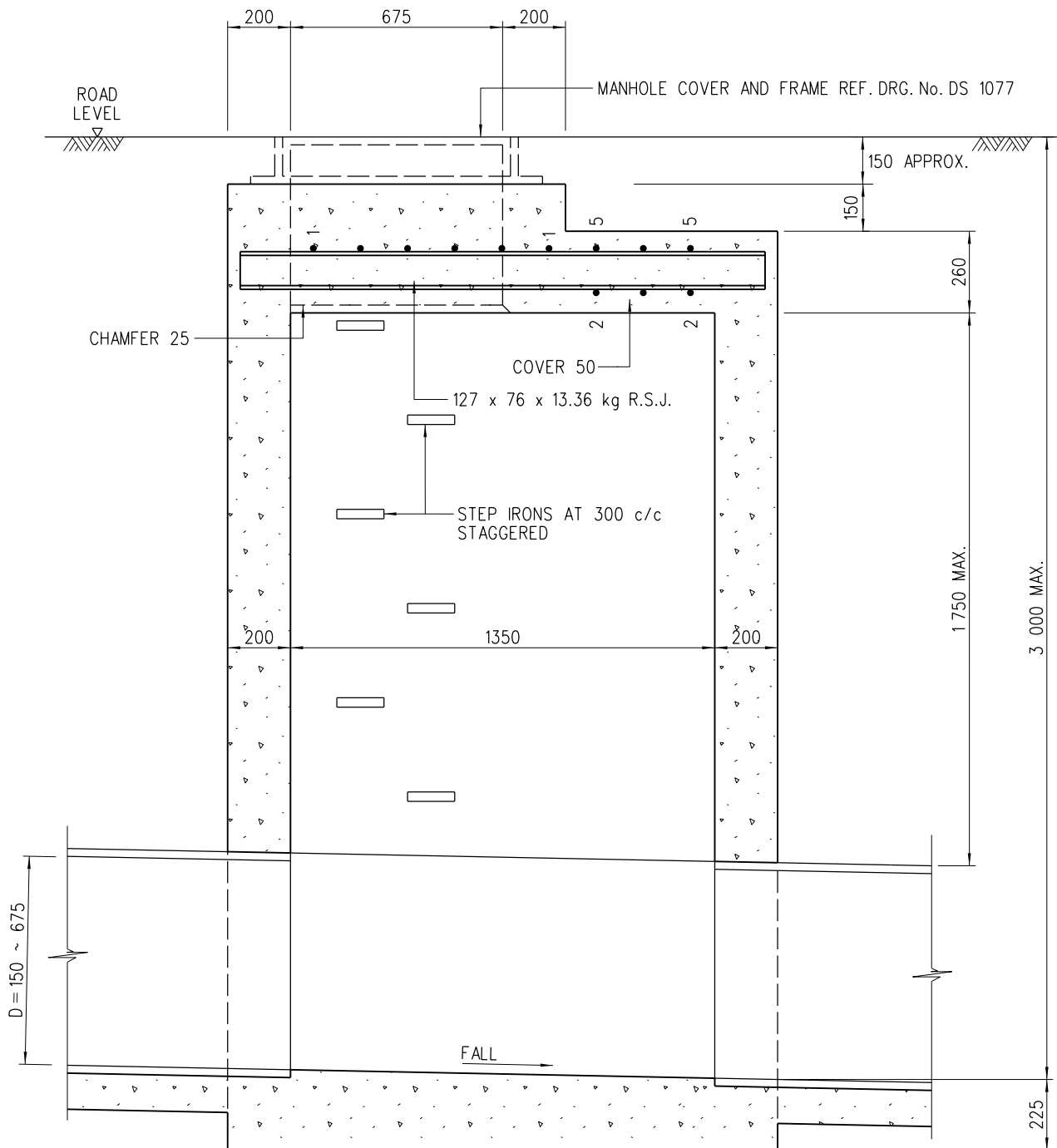
REFERENCE

DRAWING No.

SCALE

1 : 20

DS 1080C
(SHEET 1 OF 3)



SECTION A-A

BAR MARKS	SHAPE CODE ○
1 & 4	(99)
2, 3 & 6	(35)
5	(20)

C	NOTE 15 ADDED	ORIGINAL SIGNED	2.8.2022
B	NOTE 11 DELETED NOTES 2, 3 & 4 ADDED	ORIGINAL SIGNED	29.4.2015
A	NOTE 11 REVISED	ORIGINAL SIGNED	24.11.2014
	NEW ISSUE	ORIGINAL SIGNED	15.8.2007
REV.	DESCRIPTION	SIGNATURE	DATE

STANDARD MANHOLE
TYPE E1

DRAINAGE SERVICES DEPARTMENT

REFERENCE

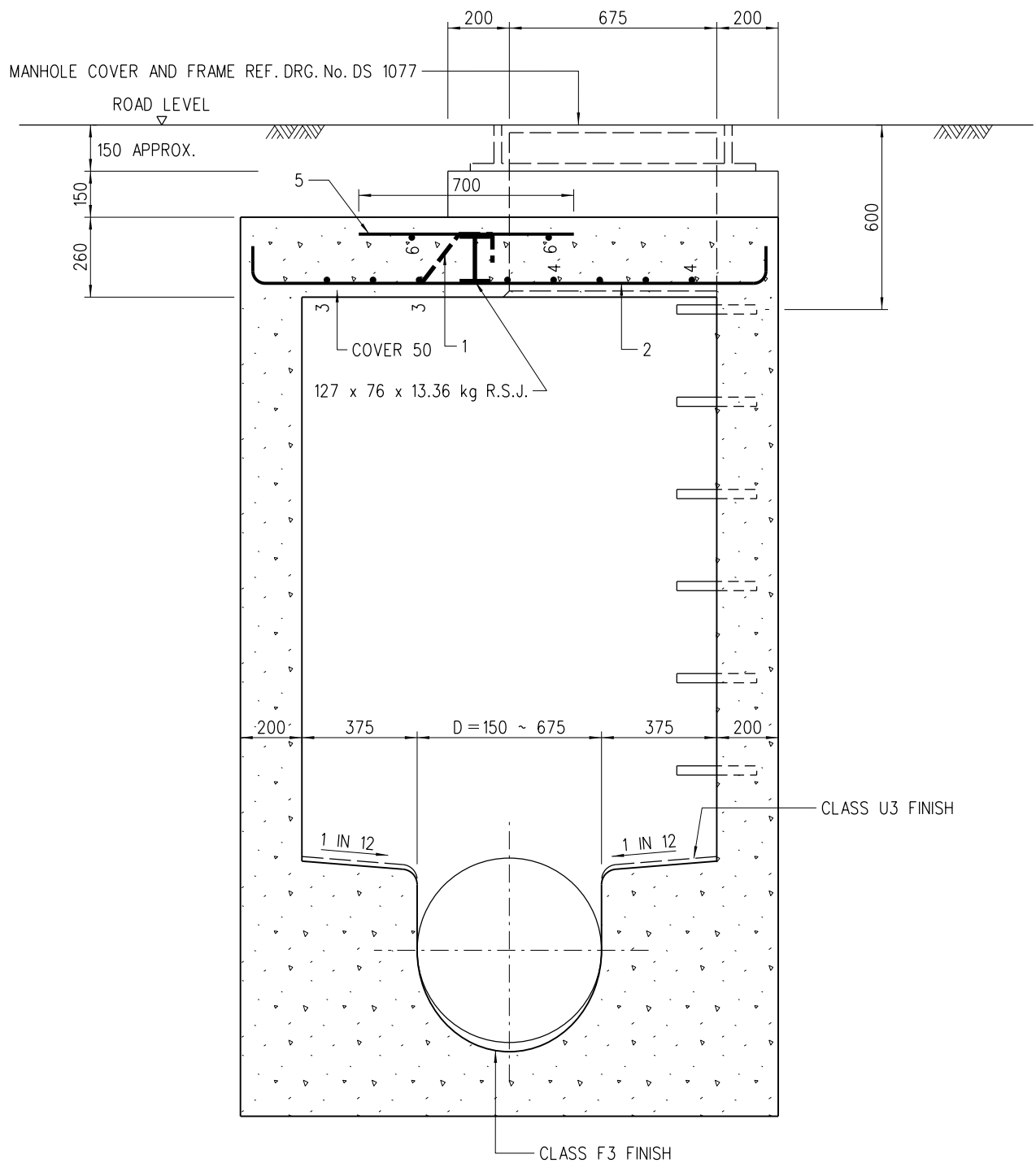
DRAWING No.

SCALE

1 : 20

DS 1080C

(SHEET 2 OF 3)



SECTION B-B

C	NOTE 15 ADDED	ORIGINAL SIGNED	2.8.2022
B	NOTE 11 DELETED NOTES 2, 3 & 4 ADDED	ORIGINAL SIGNED	29.4.2015
A	NOTE 11 REVISED	ORIGINAL SIGNED	24.11.2014
	NEW ISSUE	ORIGINAL SIGNED	15.8.2007
REV.	DESCRIPTION	SIGNATURE	DATE

STANDARD MANHOLE
TYPE E1

DRAINAGE SERVICES DEPARTMENT

REFERENCE

DRAWING No.

SCALE

1 : 20

DS 1080C

(SHEET 3 OF 3)