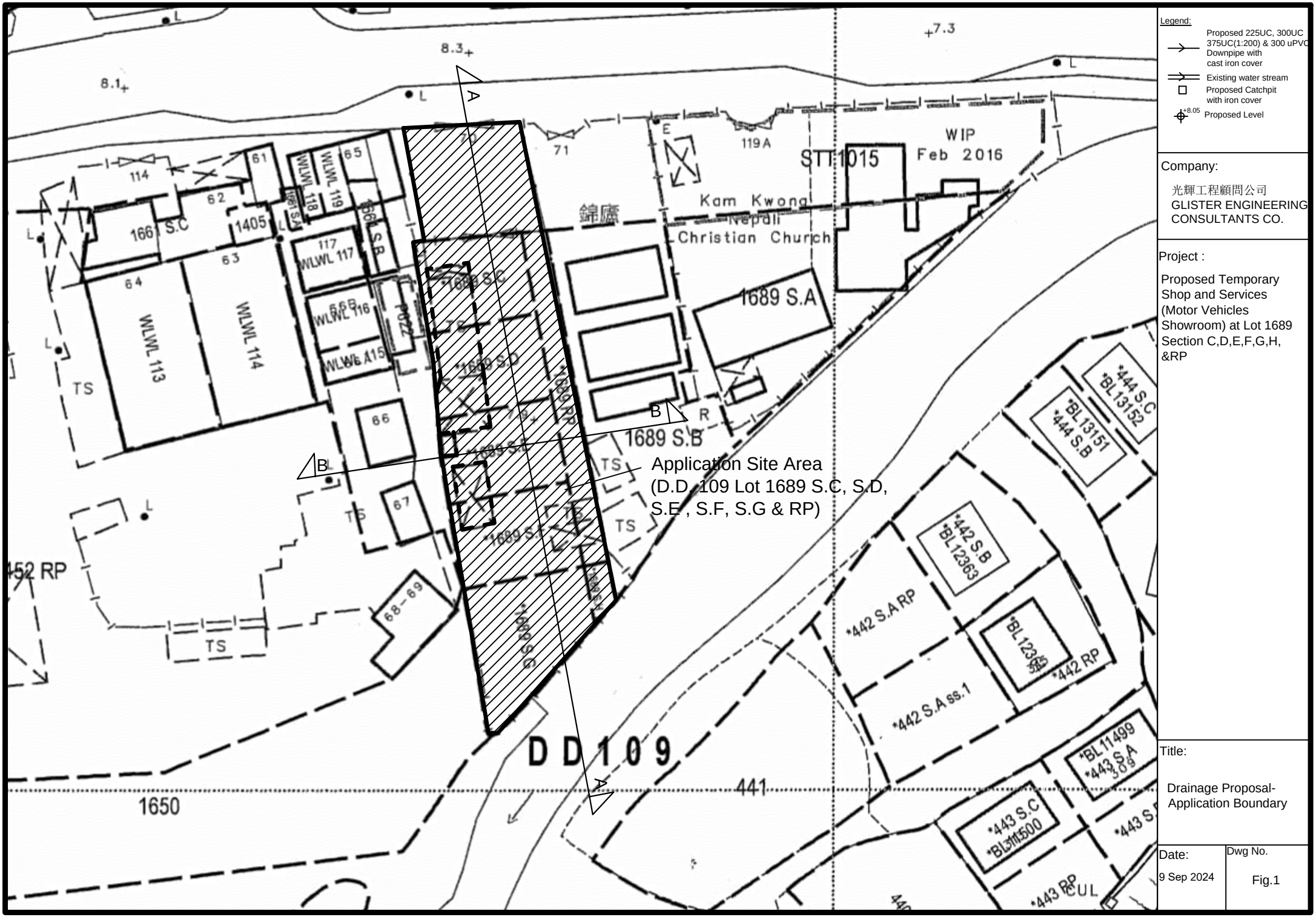
Drainage Assessment Report

Planning Application of Temporary Planning Application to
Shop & Services (Motor Vehicles Showroom) Use
At Lots 1689 S.C(Part)., 1689 S.D(Part), 1689 S.E, 1689 S.F, 1689 S.G., 1689 S.H and 1689 R.P. in D.D. 109 and Adjoining Government Land, Kam Tin Road, Kam Tin, Yuen Long

September 2024



Legend:

- Proposed 225UC, 300UC 375UC(1:200) & 300 uPVC Downpipe with cast iron cover
- Existing water stream
- Proposed Catchpit with iron cover
- +8.05 Proposed Level

Company:

光輝工程顧問公司
GLISTER ENGINEERING CONSULTANTS CO.

Project :

Proposed Temporary Shop and Services (Motor Vehicles Showroom) at Lot 1689 Section C,D,E,F,G,H, &RP

Title:

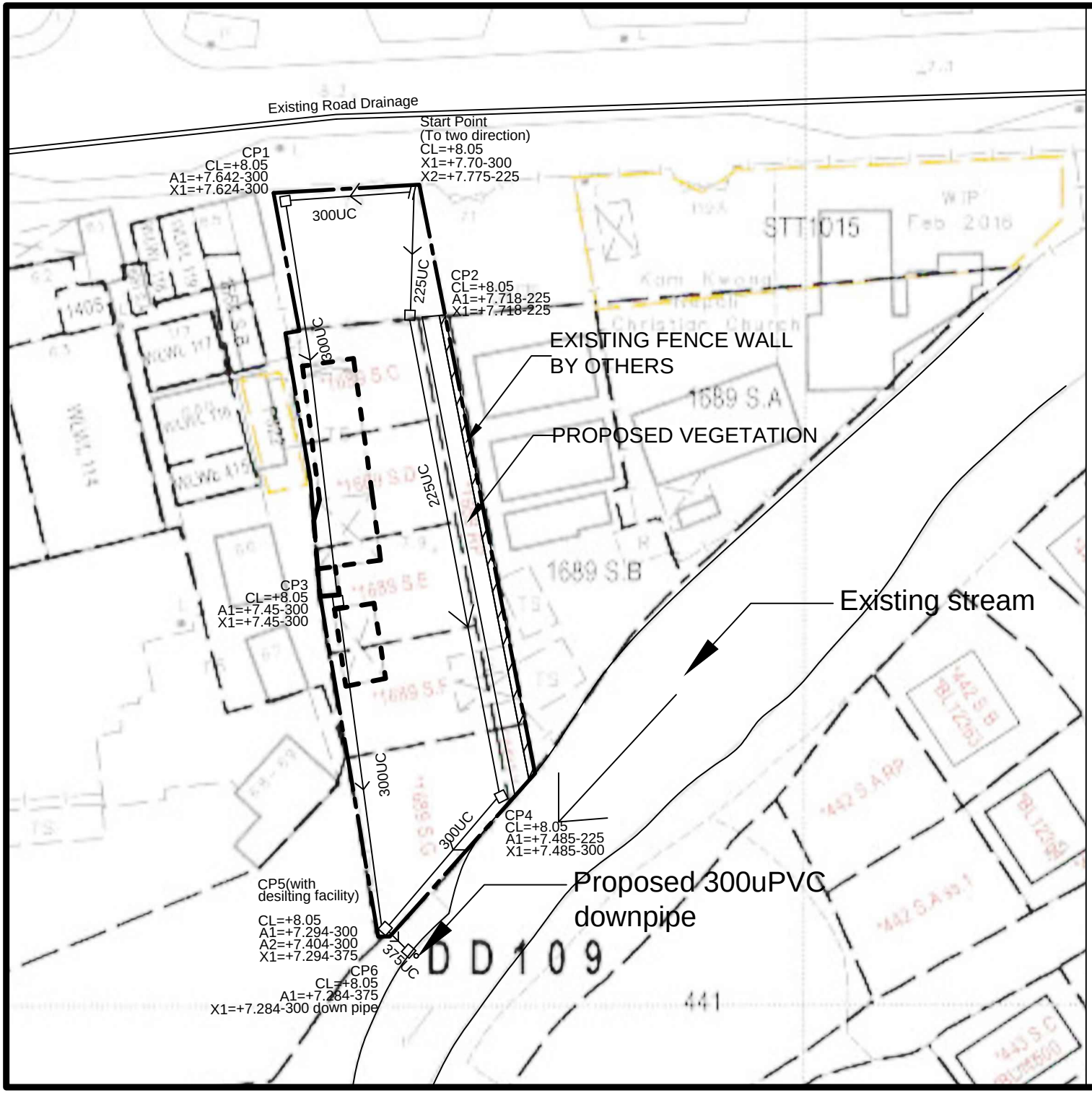
Drainage Proposal- Application Boundary

Date:

9 Sep 2024

Dwg No.

Fig.1



Note:

1. Catchpit (CP5) with desilting facility shall follow CEDD standard drawing No. C2406I.

2. Catchpit and UC follows Typical Details of Geotechnical Manual for Slope Fig.8.10 and Fig.8.11 respectively.

Legend:

- Proposed 225UC, 300UC 375UC(1:200) & 300 uPVC Downpipe with cast iron cover
- Existing water stream
- Proposed Catchpit with iron cover
- +8.05 Proposed Level

Company:

光輝工程顧問公司
GLISTER ENGINEERING CONSULTANTS CO.

Project :

Proposed Temporary Shop and Services (Motor Vehicles Showroom) at Lot 1689 Section C,D,E,F,G,H, &RP

Title:

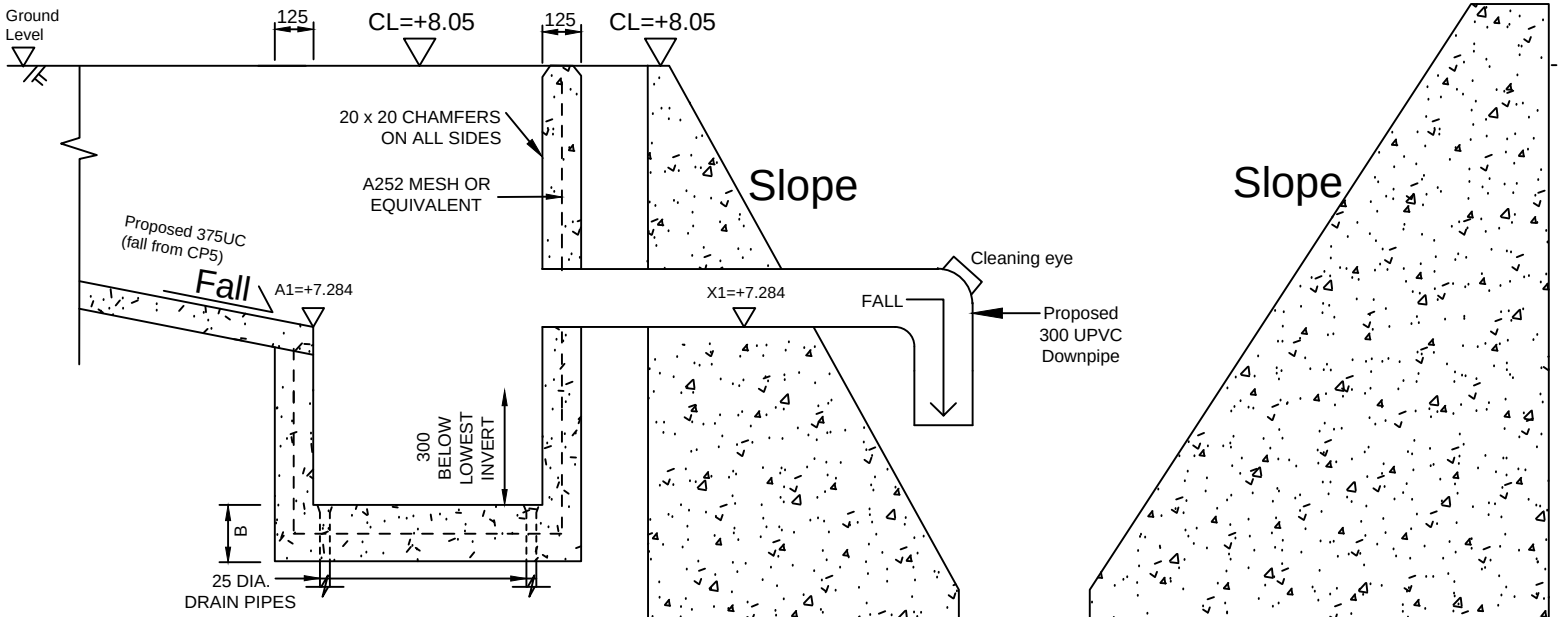
Drainage Proposal-Layout

Date:

9 Sep 2024

Dwg No.

Fig.2



(CP6)With desilting facility

Connection to existing water course

Legend:

- Proposed 225UC, 300UC 375UC(1:200) & 300 uPVC Downpipe with cast iron cover
- Existing water stream
- Proposed Catchpit with iron cover
- +8.05 Proposed Level

Company:

光輝工程顧問公司
GLISTER ENGINEERING CONSULTANTS CO.

Project :

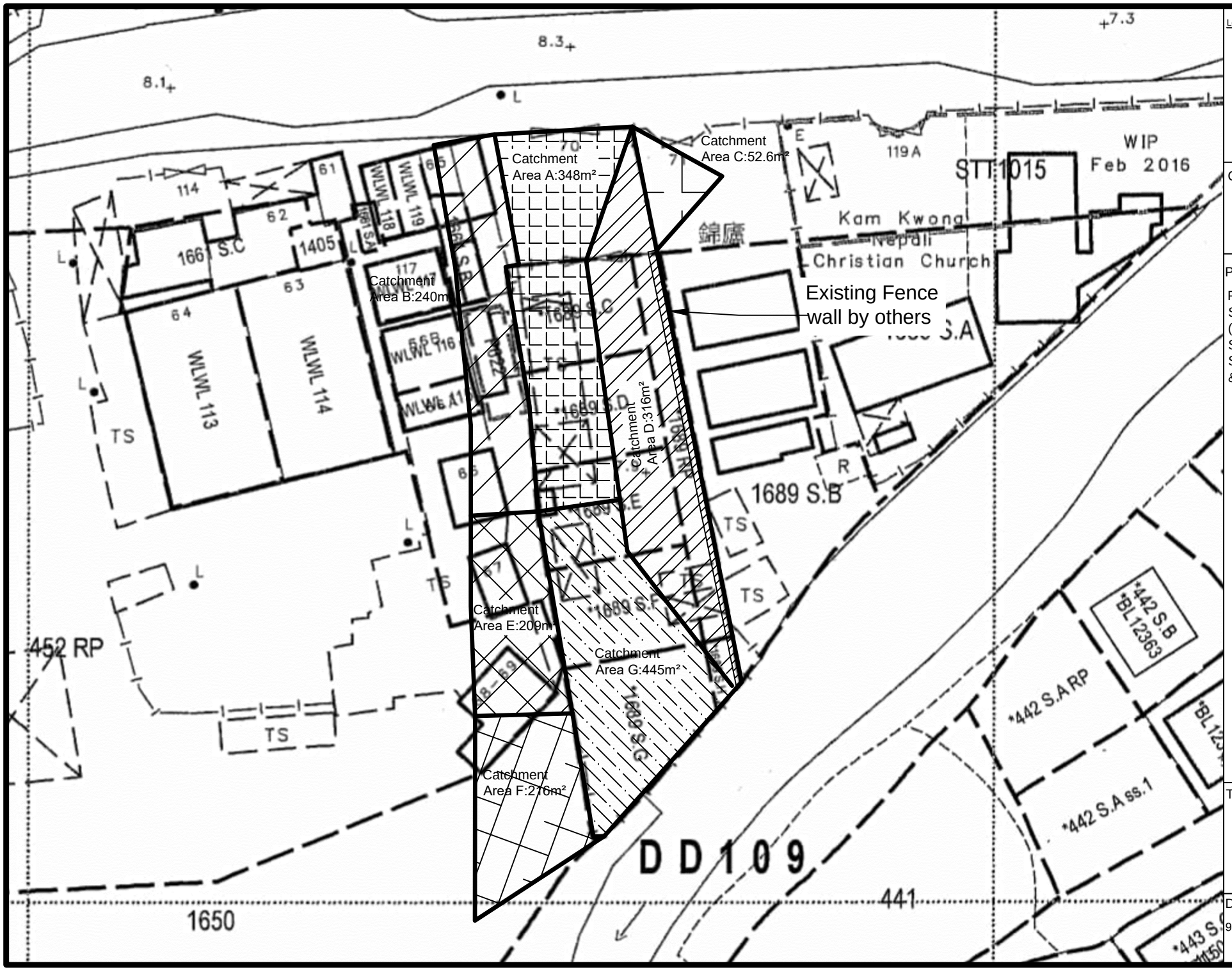
Proposed Temporary Shop and Services (Motor Vehicles Showroom) at Lot 1689 Section C,D,E,F,G,H, &RP

Title:

Connection Details (CP6)

Date:
9 Sep 2024

Dwg No.
Fig.3



Legend:

- Proposed 225UC, 300UC 375UC(1:200) & 300 uPVC Downpipe with cast iron cover
- Existing water stream
- Proposed Catchpit with iron cover
- +8.05 Proposed Level

Company:

光輝工程顧問公司
GLISTER ENGINEERING CONSULTANTS CO.

Project :

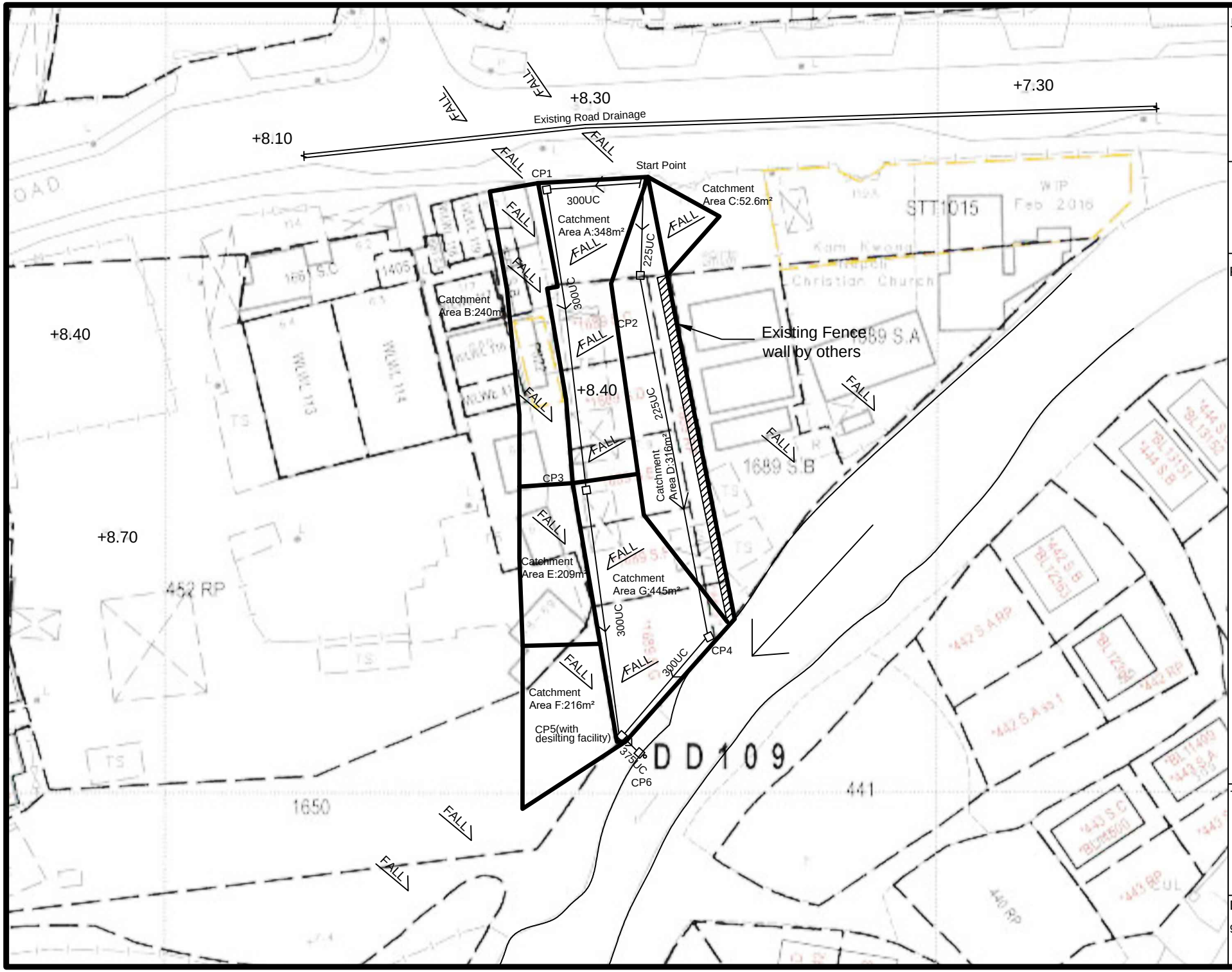
Proposed Temporary Shop and Services (Motor Vehicles Showroom) at Lot 1689 Section C,D,E,F,G,H, &RP

Title:

Drainage Proposal-
Catchment area

Date:
9 Sep 2024

Dwg No.
Fig.4



Legend:

- Proposed 225UC, 300UC 375UC(1:200) & 300 uPVC Downpipe with cast iron cover
- Existing water stream
- Proposed Catchpit with iron cover
- +8.05 Proposed Level

Company:

光輝工程顧問公司
GLISTER ENGINEERING CONSULTANTS CO.

Project :

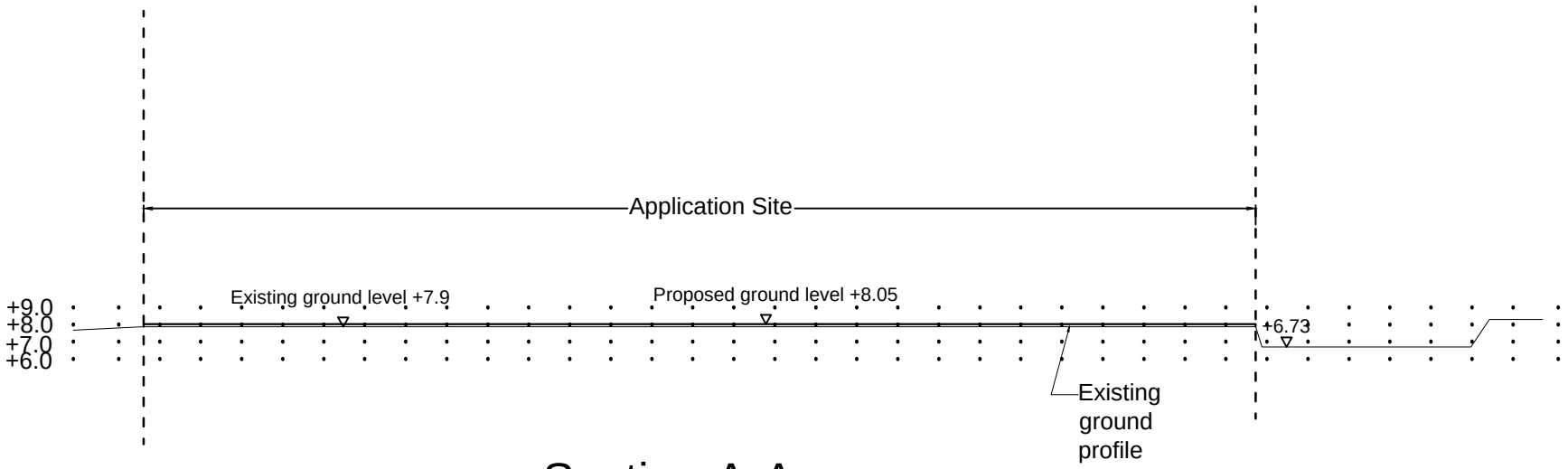
Proposed Temporary Shop and Services (Motor Vehicles Showroom) at Lot 1689 Section C,D,E,F,G,H, &RP

Title:

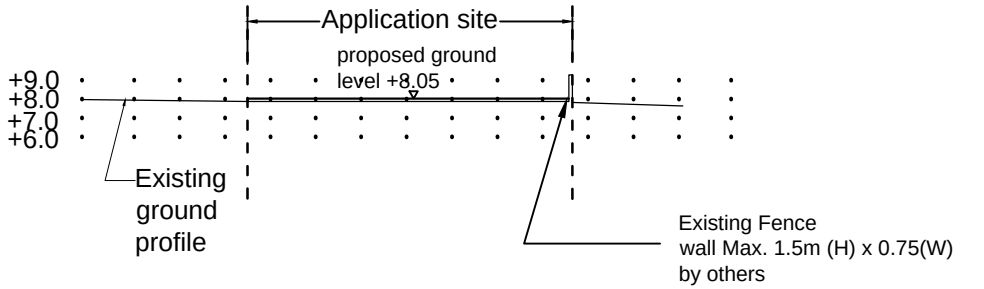
Drainage Proposal-
Catchment zone

Date:
9 Sep 2024

Dwg No.
Fig.5



Section A-A



Section B-B

0m 10m

Legend:

- Proposed 225UC, 300UC 375UC(1:200) & 300 uPVC Downpipe with cast iron cover
- Existing water stream
- Proposed Catchpit with iron cover
- +8.05 Proposed Level

Company:

光輝工程顧問公司
GLISTER ENGINEERING CONSULTANTS CO.

Project :

Proposed Temporary Shop and Services (Motor Vehicles Showroom) at Lot 1689 Section C,D,E,F,G,H, &RP

Title:

Drainage Proposal-
Section A-A & B-B

Date:

9 Sep 2024

Dwg No.

Fig.6

Company: GLISTER ENGINEERING CONSULTANTS CO.
Project: Proposed drainage at Lot1689 SC SD SE SF SG RP D.D. 109, Kam Tin, Yuen Long
Date: 2024/9/9

Calculation for Design of Channels:

i = 250 mm/hr

Catchment Area :						c		i		Peak runoff					
	m^2	km^2								liter/min		liter/min	m^3/s	*Provided UC	Gradient
A	348	0.000348				0.95		250		1378.6	Sum of zone A &B =	2329.362	0.03882	300	1:200
B	240	0.00024				0.95		250		950.76					
C	52.6	5.26E-05				0.25		250		54.836	Sum of zone C &D =	1306.6695	0.02178	225	1:200
D	316	0.000316	X	0.278	X	0.95	X	250	=	1251.8					
E	178	0.000178				0.95		250		705.15	Sum of zone A B E F G =	4511.523	0.07519	300	1:200
F	216	0.000216				0.25		250		225.18					
G	316	0.000316				0.95		250		1251.8					
											Sum of zone C D G =	2558.5035	0.04264	300	1:200
									Total =	5818.2			0.09697	375	1:200

where :

c = dimensionless co-efficient
i = rainfall intensity (mm/hour)
A = catchment area (km^2)

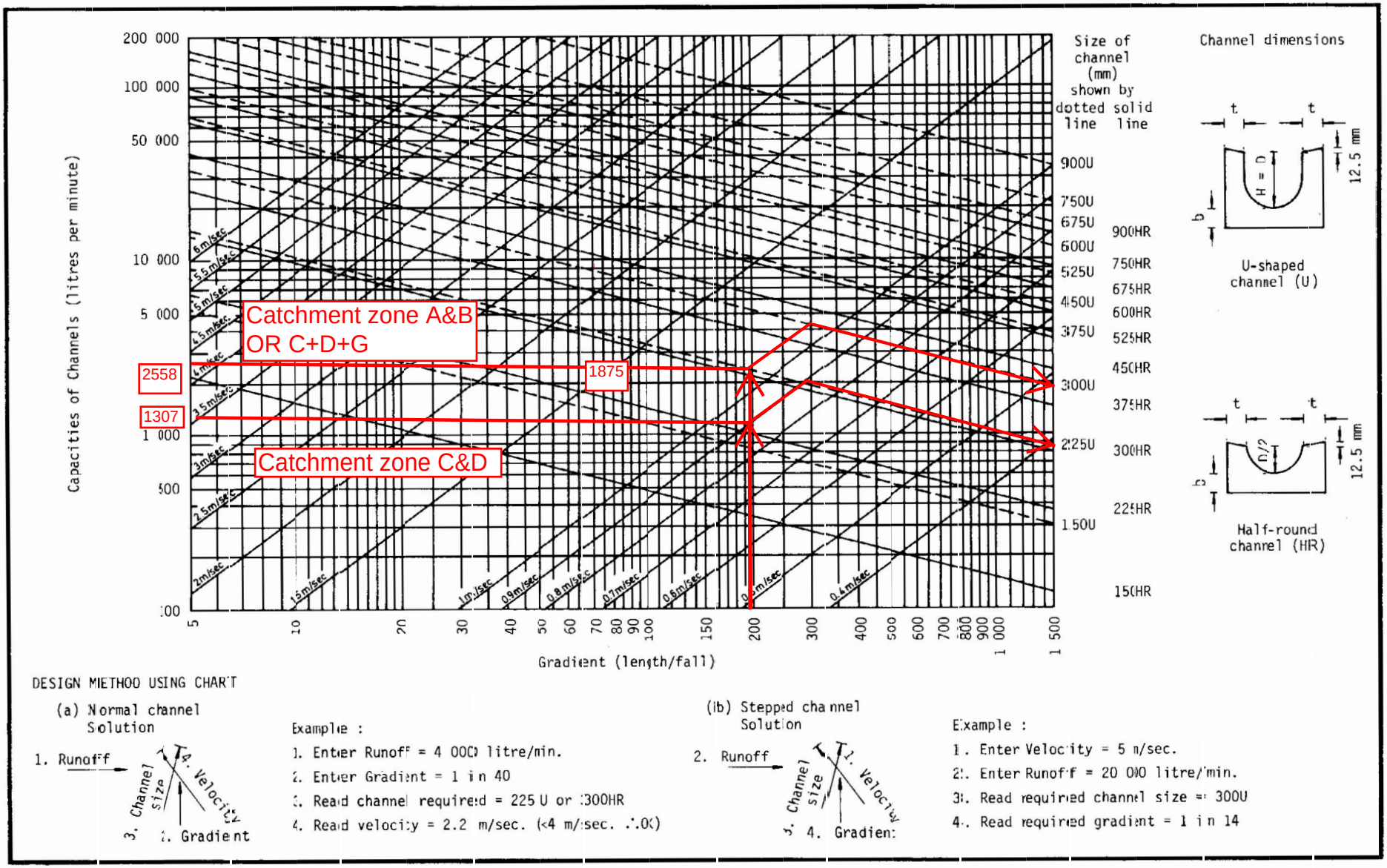
Check 300 dia. Pipe by Colebrook-White Equation

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

where :

V	=			mean velocity (m/s)	
g	=	9.81	m/s2	gravitational acceleration (m/s2)	
D	=	0.3	m	internal pipe diameter (m)	
ks	=	0.0003	m	hydraulic pipeline roughness (m)	(Table 5, from DSD Sewerage Manual, uPVC)
v	=	1.14E-06	m2/s	kinematic viscosity of fluid (m2/s)	
s	=	0.01		hydraulic gradient	

Therefore, design V of pipe capacity	=	1.7027	m/s	>	Design velocity from catchment area	=	0.09697 1.371843	m3/s m/s	/	0.3^2 * pi/4 **===>O.K.**



DESIGN METHOD USING CHART

(a) Normal channel Solution

1. Runoff
2. Gradient
3. Channel size
4. Velocity

Example :

1. Enter Runoff = 4 000 litre/min.
2. Enter Gradient = 1 in 40
3. Read channel required = 225 U or 300HR
4. Read velocity = 2.2 m/sec. (<4 m/sec. ∴OK)

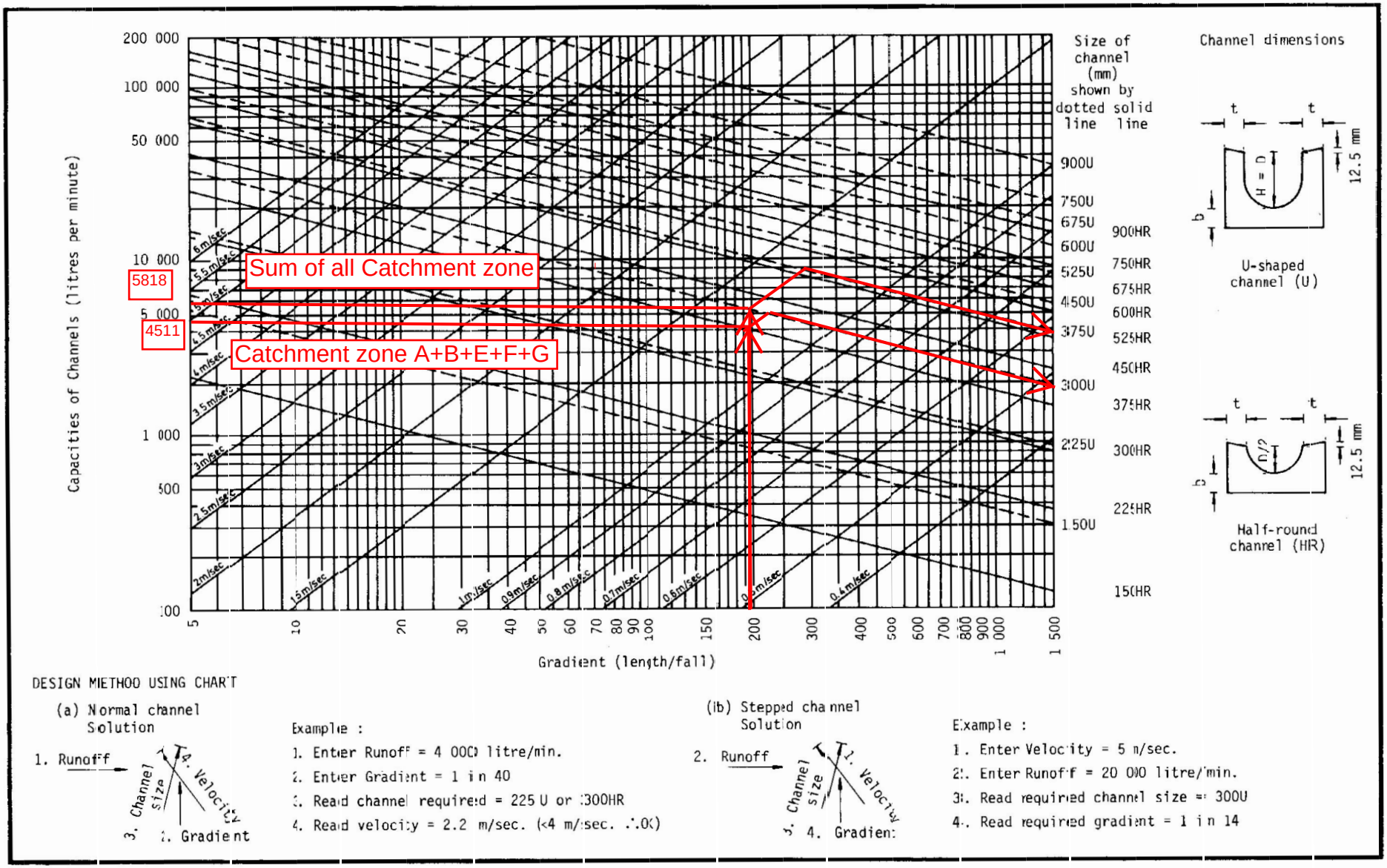
(b) Stepped channel Solution

1. Runoff
2. Gradient
3. Channel size
4. Velocity

Example :

1. Enter Velocity = 5 m/sec.
2. Enter Runoff = 20 000 litre/min.
3. Read required channel size = 300U
4. Read required gradient = 1 in 14

Figure 8.7 - Chart for the Rapid Design of Channels



DESIGN METHOD USING CHART

(a) Normal channel Solution

1. Runoff → 4. Velocity → 3. Channel size → 2. Gradient

Example :

1. Enter Runoff = 4 000 litre/min.
2. Enter Gradient = 1 in 40
3. Read channel required = 225 U or 300HR
4. Read velocity = 2.2 m/sec. (<4 m/sec. ∴OK)

(b) Stepped channel Solution

2. Runoff → 1. Velocity → 3. Channel size → 4. Gradient

Example :

1. Enter Velocity = 5 m/sec.
2. Enter Runoff = 20 000 litre/min.
3. Read required channel size = 300U
4. Read required gradient = 1 in 14

Figure 8.7 - Chart for the Rapid Design of Channels

Legend:

- Proposed 225UC, 300UC 375UC(1:200) & 300 uPVC Downpipe with cast iron cover
- Existing water stream
- Proposed Catchpit with iron cover
- +8.05 Proposed Level

Company:

光輝工程顧問公司
GLISTER ENGINEERING CONSULTANTS CO.

Project :

Proposed Temporary Shop and Services (Motor Vehicles Showroom) at Lot 1689 Section C,D,E,F,G,H, &RP

Title:

Drainage Proposal-
Catchment area (2)

Date:
9 Sep 2024

Dwg No.
Fig.7

Company: GLISTER ENGINEERING CONSULTANTS CO.
Project: Proposed drainage at Lot1689 SC SD SE SF SG RP D.D. 109, Kam Tin, Yuen Long
Date: 2018/7/16

Calculation for Existing village stream :

Catchment Area : 1

= 6186.5 m^2
= 0.006187 km^2

i = 250 mm/hr

Peak runoff in m^3/s = 0.278 x c x i x A
= 0.278 x 0.95 x 250 mm/hr x 0.006187 km^2
= 0.408464 m^3/s
= 24508 liter/min

Catchment Area : 2

= 2219 m^2
= 0.002219 km^2

Peak runoff in m^3/s = 0.278 x c x i x A
= 0.278 x 0.25 x 250 mm/hr x 0.002219 km^2
= 0.038555 m^3/s
= 2313 liter/min

Catchment Area : 3

= 2754 m^2
= 0.002754 km^2

Peak runoff in m^3/s = 0.278 x c x i x A
= 0.278 x 0.95 x 250 mm/hr x 0.002754 km^2
= 0.181833 m^3/s
= 10910 liter/min

Peak runoff of catchment area : 1+2+3= 37731 liter/min

where :
c = dimensionless co-efficient
i = rainfall intensity (mm/hour)
A = catchment area (km^2)

Company: GLISTER ENGINEERING CONSULTANTS CO.
Project: Proposed drainage at Lot1689 SC SD SE SF SG RP D.D. 109, Kam Tin, Yuen Long
Date: 2018/7/16

Check 4m(w) x 0.5m(d) existing Existing village stream by Manning's Equation

Peak runoff of catchment area :

Zone 1+2+3=		37731	liter/min	=	0.62885	m^3/s

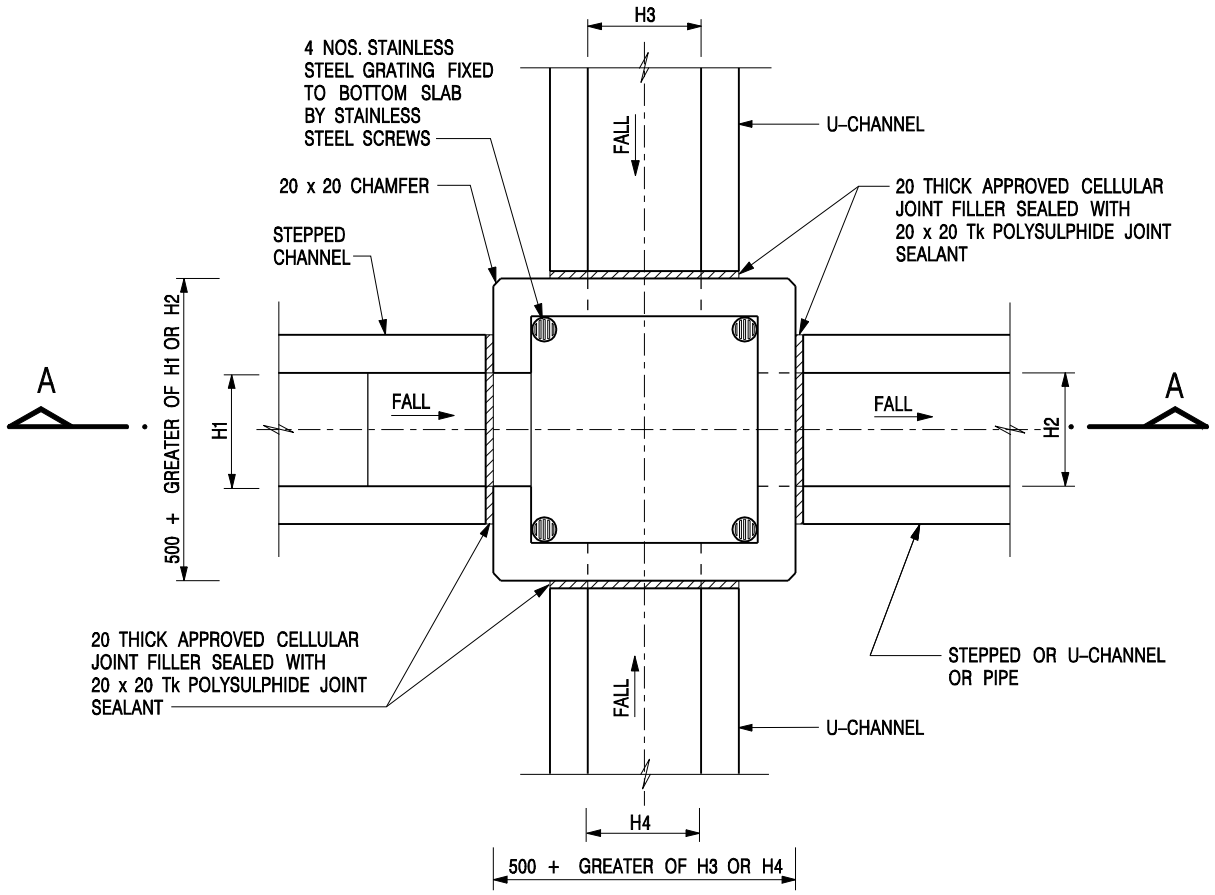
$$V = \frac{R^{2/3} s^{1/2}}{n}$$

where :

V	=			mean velocity (m/s)
R	=	A/P		
g	=	9.81	m/s2	gravitational acceleration (m/s2)
n	=	0.03	m	hydraulic pipeline roughness (m)
A	=	2	m^2	
P	=	5	m	
s	=	0.005		hydraulic gradient

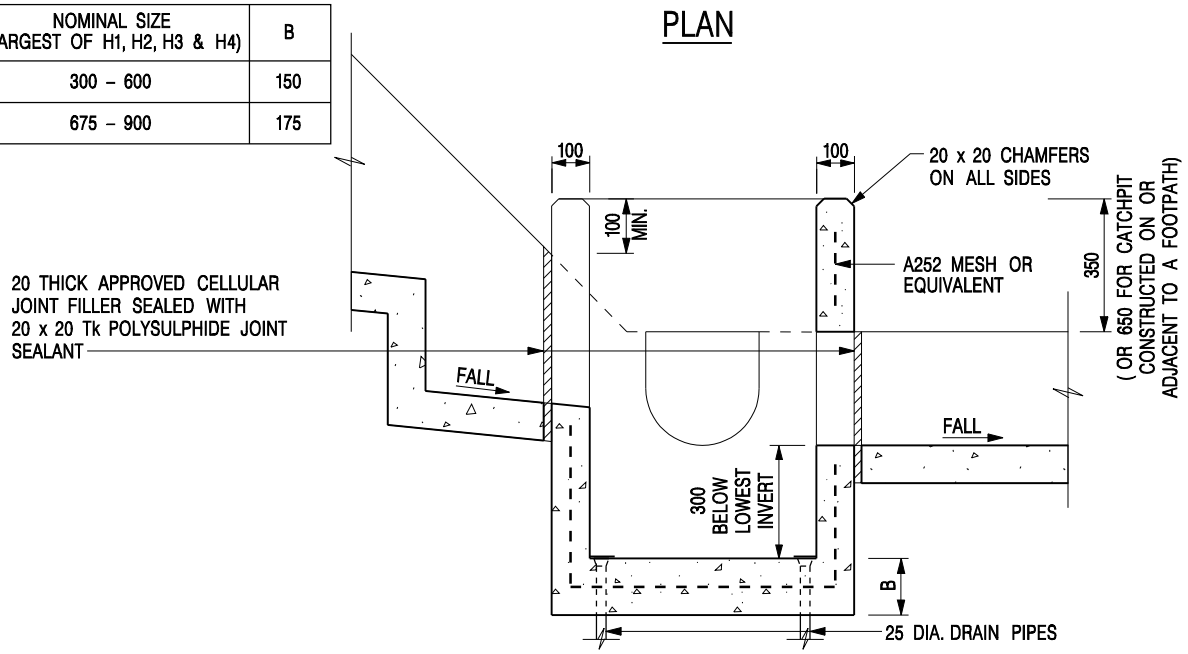
(Table 6, from DSD Sewerage Manual, Natural-stream channels ,Clean, straight bank, full stage, no rifts or deep pools)

Therefore, design V of pipe capacity	=	1.2796	m/s	>	Design velocity from catchment area	=	0.628852 0.314426	m3/s / m/s	4 x .5	**===>O.K.**



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

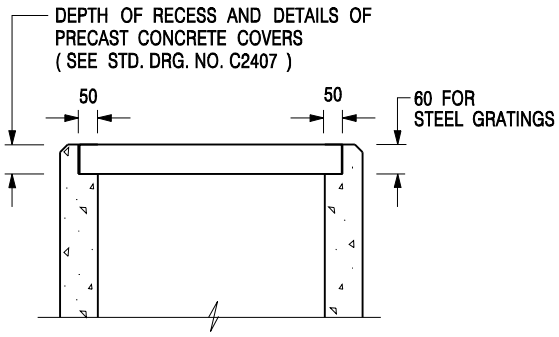
(SHEET 1 OF 2)

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:

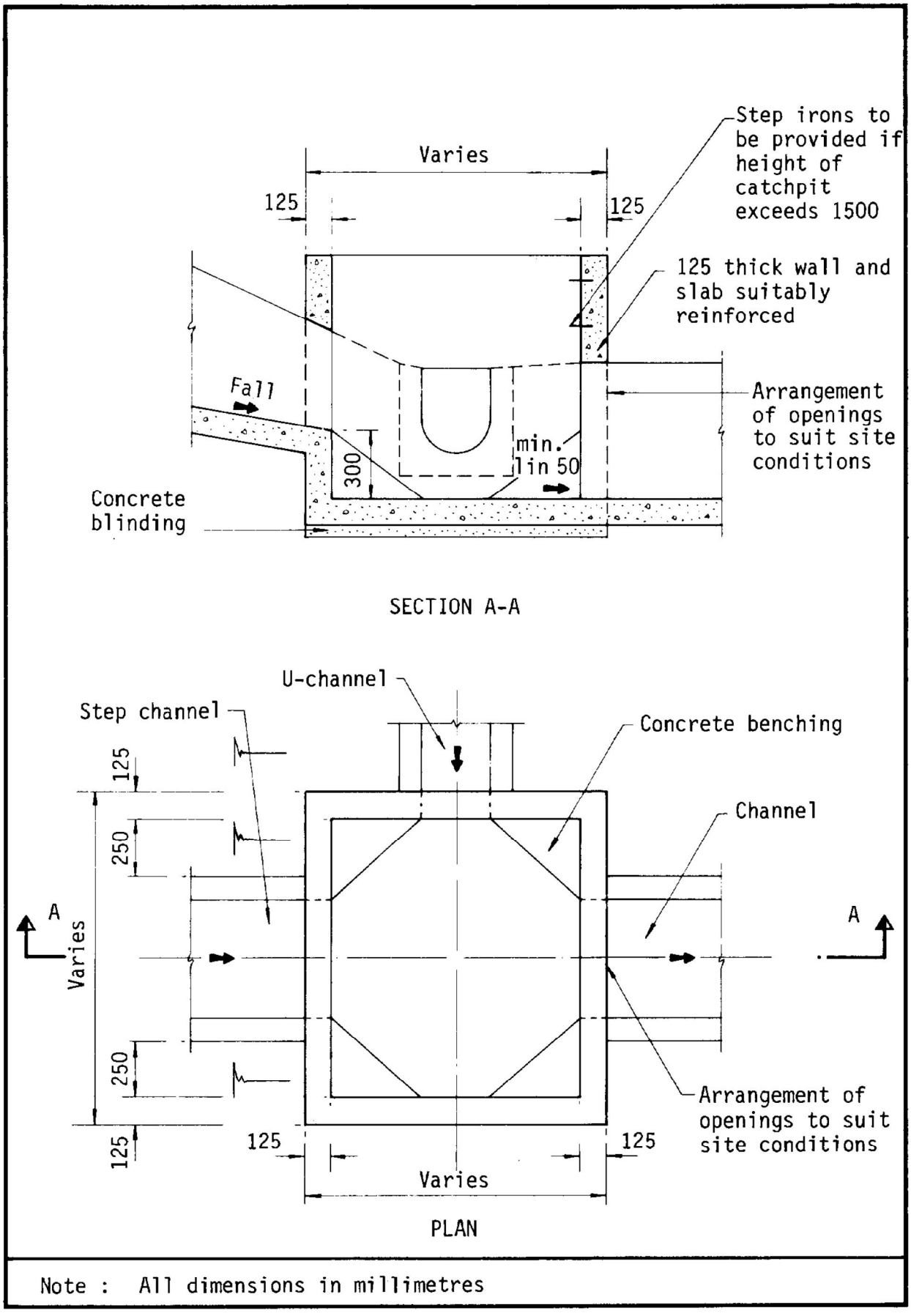
1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. ALL CONCRETE SHALL BE GRADE 20 /20.
3. CONCRETE SURFACE FINISH SHALL BE CLASS U2 OR F2 AS APPROPRIATE.
4. FOR DETAILS OF JOINT, REFER TO STD. DRG. NO. C2413.
5. CONCRETE TO BE COLOURED AS SPECIFIED.
6. UNLESS REQUESTED BY THE MAINTENANCE PARTY AND AS DIRECTED 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) 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 'G' ON STD. DRG. NO. C2405; 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 'F' ON STD. DRG. NO. C2405.
12. SUBJECT TO THE APPROVAL OF THE ENGINEER, OTHER MATERIALS CAN ALSO BE USED AS COVERS / GRATINGS.

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

CATCHPIT WITH TRAP
(SHEET 2 OF 2)

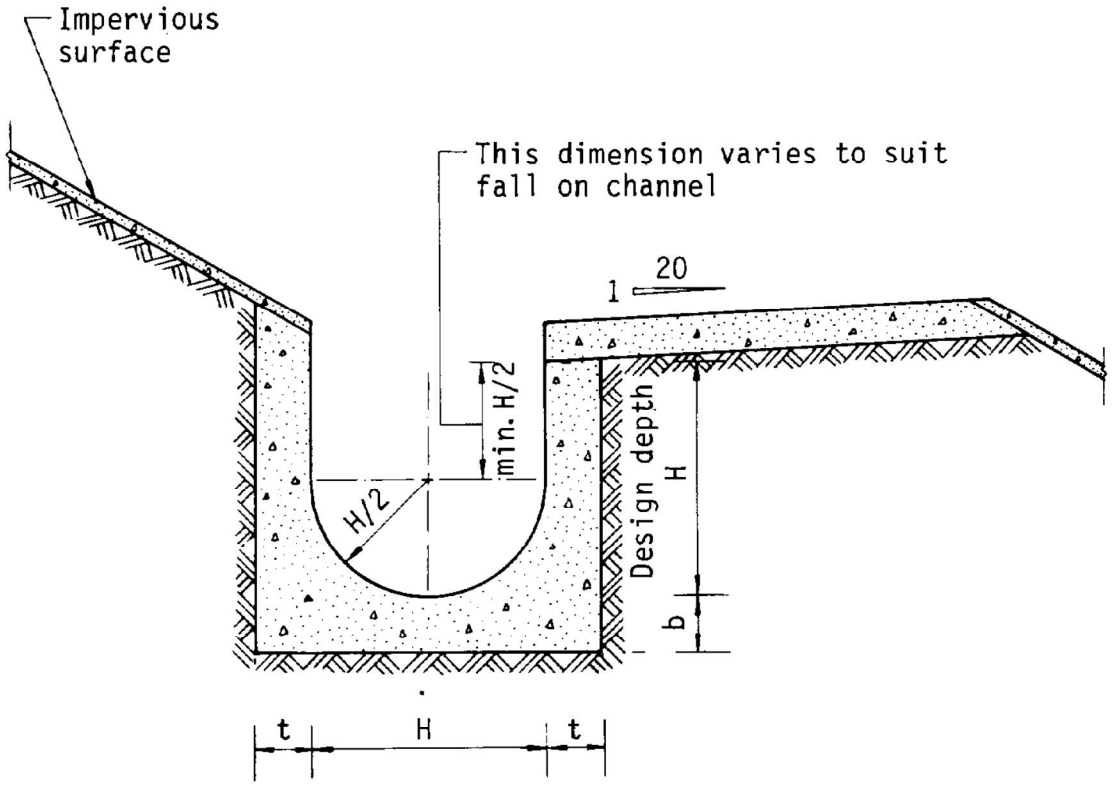
CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

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



Note : All dimensions in millimetres

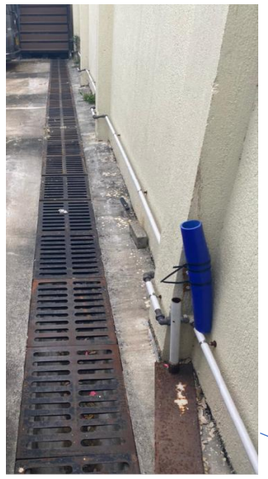
Figure 8.10 - Typical Details of Catchpits

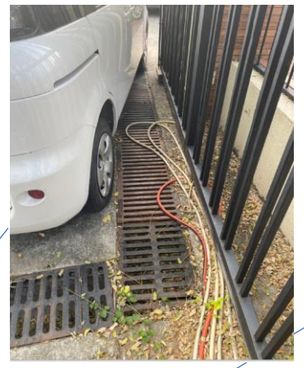


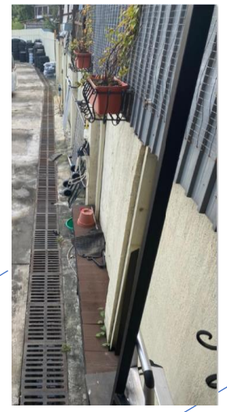
Dimensions of U - channel

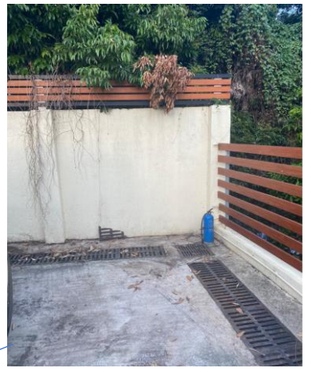
Nominal size of channel H (mm)	Thickness t (mm)	Thickness b (mm)
225 to 600	150	150
675 to 1200	175	225

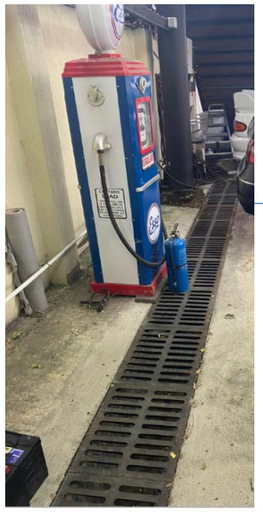
Figure 8.11 - Typical U-channel Details

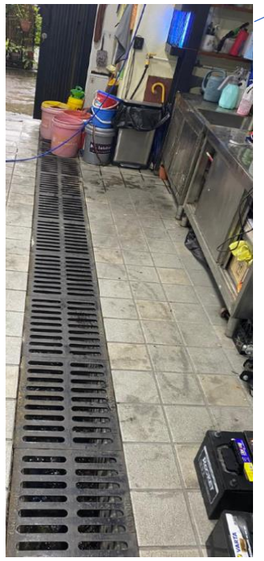


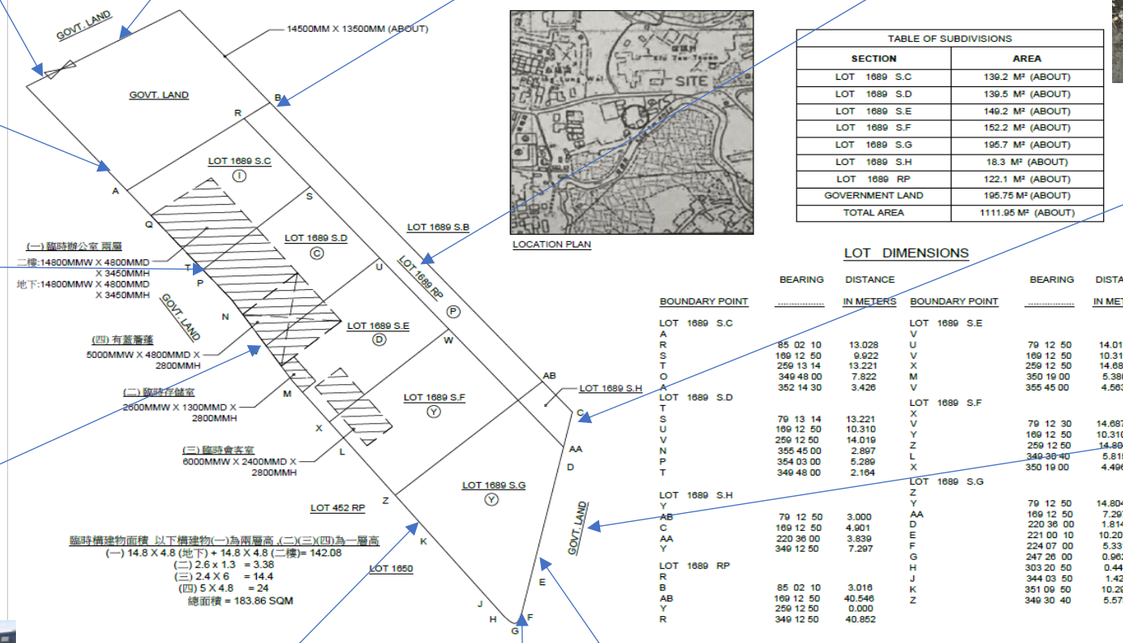












LOCATION PLAN

TABLE OF SUBDIVISIONS	
SECTION	AREA
LOT 1689 S.C	139.2 M² (ABOUT)
LOT 1689 S.D	139.5 M² (ABOUT)
LOT 1689 S.E	149.2 M² (ABOUT)
LOT 1689 S.F	152.2 M² (ABOUT)
LOT 1689 S.G	195.7 M² (ABOUT)
LOT 1689 S.H	18.3 M² (ABOUT)
LOT 1689 RP	122.1 M² (ABOUT)
GOVERNMENT LAND	195.75 M² (ABOUT)
TOTAL AREA	1111.95 M² (ABOUT)

LOT DIMENSIONS

BOUNDARY POINT	BEARING	DISTANCE IN METERS
LOT 1689 S.C		
A		
R	85 02 10	13.028
S	169 12 50	9.922
T	259 13 14	13.221
Q	349 48 00	7.822
A	352 14 30	3.426
LOT 1689 S.D		
T		
S	79 13 14	13.221
U	169 12 50	10.310
V	259 12 50	14.019
N	355 45 00	2.897
P	354 03 00	5.289
T	349 48 00	2.184
LOT 1689 S.H		
Y		
AB	79 12 50	3.000
C	169 12 50	4.901
AA	220 36 00	3.839
Y	349 12 50	7.297
LOT 1689 RP		
R		
B	85 02 10	3.016
AB	169 12 50	40.546
Y	259 12 50	0.000
R	349 12 50	40.852

BOUNDARY POINT	BEARING	DISTANCE IN METERS
LOT 1689 S.E		
V		
U	79 12 50	14.019
V	169 12 50	10.310
X	259 12 50	14.687
M	350 19 00	5.380
V	355 45 00	4.563
LOT 1689 S.F		
X		
V	79 12 30	14.687
Y	169 12 50	10.310
Z	259 12 50	14.804
L	349 30 40	5.815
X	350 19 00	4.496
LOT 1689 S.G		
Z		
Y	79 12 50	14.804
AA	169 12 50	7.297
D	220 36 00	1.814
E	221 00 10	10.201
F	224 07 00	5.331
G	247 26 00	0.962
H	303 20 50	0.448
J	344 03 50	1.426
K	351 09 50	10.298
Z	349 30 40	5.578

Location: Section C(Part) , D(Part), E, F, G, H and The Remaining Portion of Lot No. 1689 in D.D. 109 And adjoining Government Land

現有排水系統相片記錄 日期: 09-09-2024