

This dimension varies to suit



Proposed Catch-pit with trapProposed 300mm U-Channel

Proposed UC with C.I cover

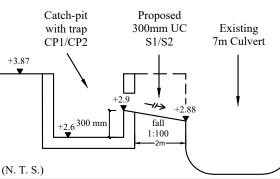
February 2023

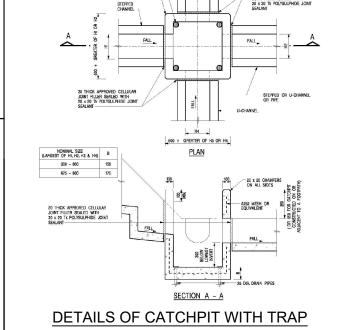
Boundary of Catchment Area

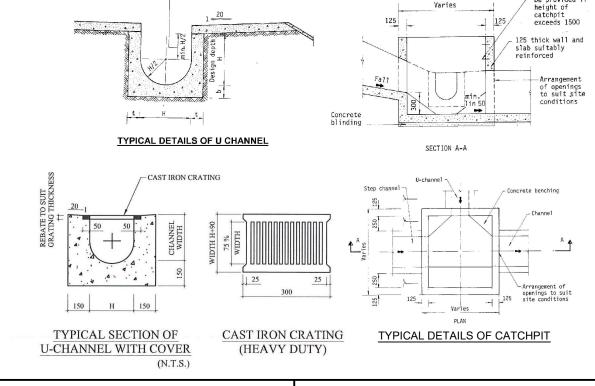
🔭 🔭 Flat Grassland

## Site Area(about): 3,159m<sup>2</sup>

## Connection details of S1 and S2 Proposed outfall between CP1/CP2, S1/S2 and existing watercourse Catch-pit Proposed







## 1:750 (A3) Drainage Proposal

Lot 788(part), 790(part), 793, 794 & 801 RP in D.D. 381 and Adjoining Government Land
Tuen Mun, New Territories

(REFER TO CEDD'S STANDARD DWG. C2406/1)

## Goldrich Planners & Surveyors Ltd.

Plan 5 ( P 22015 )

For Catchment Area A		Ref.
Area, Average slope, Distance on the line of natural flow,		*
Time of concentraction	$t_o = 0.14465L / (H^{0.2}A^{0.1}) = 0.14465 (19.5) / (0.1^0.2*462^0.1)$ = 2.4 min	SDM 7.5.2 (d)
2 For Existing U-Channel in cate	hment area A1	
	From To	
Ground level (mPD) Invert level (mPD)	3.87 3.87 3.70 3.39	
Width of u-channel,		1000
Length of u-channel, Depth of vertical part of u-channel,		
	d = 330  mm $S_f = (3.7-3.39)/46.8 = 0.007$	
Cross-Section Area,	$a = 0.5 \pi r^2 + w d = 0.5 \times 3.14 \times 150^2 + 300 \times 330$	
Wetted Perimeter,	$ = 0.134 \text{ m}^2 $ $ p = \pi \text{ r} + 2 \text{ d} = 3.14 \times 150 + 2 \times 330 $	
Hydralic radius,	= 1.131 m	ODM CO.
nyurane radius,	R = a/p = 0.119 m	SDM 8.2.1
3 Use Manning Equation for esti	mating velocity of stormwater	
	n = 0.016 for concrete lined channels:-	SDM Table 13
Allowable velocity,	$V = R^{1/6} \times (RS_f)^{1/2} / n = (0.119)^1/6 \times (0.119 \times 0.007)^1/2 / 0.016$ = 1.23 m/s	SDM Table 12
Time of flow,		
Use "Rational Method" for calc	ulation of design flow	
Design intensity,	$i = a / (t_o + t_f + b)^c$ = 687 / (2.4+0.6+4.2)^0.42 for return period T = 50 years	SDM 4.3.2 SDM Table 3
	= 299	
Type of surface	Runoff Coefficient C Catchment Area A (m²) C x A	SDM 7.5.2 (b)
Flat Glassland(heavy soil) Concrete Paving	0.25 0.0 0.0 0.95 462.0 438.9	
, annig	SUM = 438.9	
Upstream flow,	$Q_u = 0 \text{ m}^3/\text{s}$	
Design flow,	$Q_d = 0.278i \Sigma C_j A_j + Q_u$ where $A_j$ is in km <sup>2</sup>	SDM 7.5.2 (a)
	$= 0.278 \times 299 \times 438.9 / 1000000 + 0$ $= 0.036 \text{ m}^3/\text{s}$	NO 1 TO
\$		
Allowable flow,	$Q_a = a \times v$ = 0.134 x 1.23	
	$= 0.134 \times 1.23$ = 0.165 m <sup>3</sup> /s	
		E
	> Q <sub>d</sub> (O.K.)	*
Reference was made to Stormwate	Drainage Manual (SDM) by DSD	
Scale: NA	Dramage Calculation	Planners & ors Ltd.
June 2023	T I T A A A A A T T A A A A A A A A A A	ge 1 2015)

1	→For Catchment Area B	Ref.
	Area, A = $431 \text{ m}^2$ Average slope, H = $0.1 \text{ m per } 100 \text{m}$ Distance on the line of natural flow, L = $24 \text{ m}$	
	Time of concentraction, $t_o = 0.14465L/(H^{0.2}A^{0.1}) = 0.14465(24)/(0.1^0.2*431^0.1) = 3.0 min$	SDM 7.5.2 (d)
2	For Existing U-Channel in catchment area A1	
	From To	
	Ground level (mPD)         3.87         3.87           Invert level (mPD)         3.39         3.23	
	Width of u-channel, $w = 300 \text{ mm}$ Length of u-channel, $L_c = 23.4 \text{ m}$ Depth of vertical part of u-channel, $d = 490 \text{ mm}$	
	Gradient of u-channel, $S_f = (3.39-3.23)/23.4 = 0.007$	
	Cross-Section Area, a = $0.5 \pi r^2 + w d = 0.5 \times 3.14 \times 150^2 + 300 \times 490$ = $0.182 \text{ m}^2$	
	Wetted Perimeter, p = $\pi$ r + 2 d = 3.14 x 150 + 2 x 490 = 1.451 m	
=	Hydralic radius, R = a / p = 0.126 m	SDM 8.2.1
3	Use Manning Equation for estimating velocity of stormwater	
	Take n = 0.016 for concrete lined channels:- Allowable velocity, v = $R^{1/6}x (RS_f)^{1/2}/n = (0.126)^{1/6}x (0.126 \times 0.007)^{1/2} / 0.016$ = 1.30 m/s	SDM Table 13 SDM Table 12
	Time of flow, $t_f = 0.3 \text{ min}$	
4	Use "Rational Method" for calculation of design flow	
	Design intensity, $i = a / (t_0 + t_1 + b)^c$ = 687 / (3+0.3+4.2)^0.42 for return period T = 50 years = 295	SDM 4.3.2 SDM Table 3
	Type of surfaceRunoff Coefficient CCatchment Area A ( $m^2$ ) $C \times A$ Flat Glassland(heavy soil)0.250.00.0Concrete Paving0.95431.0409.5SUM = 409.5	SDM 7.5.2 (b)
	Upstream flow, $Q_u = 0.036 \text{ m}^3/\text{s}$	
	Design flow, $Q_d = 0.278i \Sigma C_j A_j + Q_u$ where $A_j$ is in km <sup>2</sup> = 0.278 x 295 x 409.45 / 1000000 + 0.036 = 0.070 m <sup>3</sup> /s	SDM 7.5.2 (a)
	Allowable flow, $Q_a = a \times v$ = 0.182 x 1.3	8
	= 0.236 m <sup>3</sup> /s	
	> Q <sub>d</sub> (O.K.)	a 4
	Reference was made to Stormwater Drainage Manual (SDM) by DSD	
	Scale: NA Drainage Calculation Goldrich Pl Surveyor	State (State State )
	June 2023  Lots 793, 794 and 801 RP in D.D. 381 and Adjoining Government Land, Tuen Mun, New Territories  (P220	2

	1 For Catchment Area C	Ref.		
,	Area, A = $407 \text{ m}^2$ Average slope, H = $0.1 \text{ m}$ per 100m Distance on the line of natural flow, L = $16.5 \text{ m}$			
	Time of concentraction, $t_o = 0.14465 L / (H^{0.2}A^{0.1}) = 0.14465 (16.5) / (0.1^0.2*407^0.1) = 2.1 min$	SDM 7.5.2 (d)		
	2 For Existing U-Channel in catchment area A1			
	From To  Ground level (mPD) 3.87 3.87 Invert level (mPD) 3.23 2.90			
	Width of u-channel, w = 300 mm Length of u-channel, $L_c$ = 50.1 m Depth of vertical part of u-channel, d = 820 mm Gradient of u-channel, $S_f$ = 3.23-2.9)/50.1 = 0.007	* ,		
	Cross-Section Area, a = $0.5 \pi r^2 + w d = 0.5 \times 3.14 \times 150^2 + 300 \times 820$ = $0.281 \text{ m}^2$			
	Wetted Perimeter, p = $\pi$ r + 2 d = 3.14 x 150 + 2 x 820 = 2.111 m Hydralic radius, R = a / p = 0.133 m	SDM 8.2.1		
	3 Use Manning Equation for estimating velocity of stormwater			
	Take n = 0.016 for concrete lined channels:- Allowable velocity, v = $R^{1/6}x (RS_f)^{1/2}/n = (0.133)^{1/6}x (0.133 \times 0.007)^{1/2} / 0.016$ = 1.32 m/s	SDM Table 13 SDM Table 12		
I	Time of flow, $t_f = 0.6 \text{ min}$			
	4 Use "Rational Method" for calculation of design flow	.,		
	Design intensity, $i = a / (t_o + t_f + b)^c$ = 687 / (2.1+0.6+4.2)^0.4; for return period T = 50 years = 305	SDM 4.3.2 SDM Table 3		
	Type of surfaceRunoff Coefficient CCatchment Area A $(m^2)$ $C \times A$ Flat Glassland(heavy soil) $0.25$ $0.0$ $0.0$ Concrete Paving $0.95$ $407.0$ $386.7$ SUM = $\boxed{386.7}$	SDM 7.5.2 (b)		
	Upstream flow, $Q_u = 0.07 \text{ m}^3/\text{s}$			
	Design flow, $Q_d = 0.278i \Sigma C_j A_j + Q_u$ where $A_j$ is in km <sup>2</sup> = $0.278 \times 305 \times 386.65 / 1000000 + 0.07$ = $0.103 \text{ m}^3/\text{s}$	SDM 7.5.2 (a)		
	Allowable flow, $Q_a = a \times v$ = 0.281 x 1.32 = 0.372 m <sup>3</sup> /s			
	= 0.372 m/s > Q <sub>d</sub> (O.K.)	2 ~		
	Reference was made to Stormwater Drainage Manual (SDM) by DSD			
	Scale: NA Drainage Calculation Goldrich Plans Surveyor			
	June 2023 Lots 793, 794 and 801 RP in D.D. 381 and Adjoining Government Land, Tuen Mun, New Territories (P220)	3		
		A CONTRACTOR OF THE PARTY OF TH		

1	For Catchment Area D	Ref.
	Area, A = $290 \text{ m}^2$ Average slope, H = $0.1 \text{ m per } 100 \text{m}$ Distance on the line of natural flow, L = $27.8 \text{ m}$	
	Time of concentraction, $t_o = 0.14465L / (H^{0.2}A^{0.1}) = 0.14465 (27.8) / (0.1^0.2*290^0.1) = 3.6 min$	SDM 7.5.2 (d)
2	For Existing U-Channel in catchment area A1	
	From To	
	Ground level (mPD)         3.87         3.87           Invert level (mPD)         3.04         2.90	-,
	Width of u-channel, w = 300 mm	
	Length of u-channel, $L_c = 20.7 \text{ m}$ Depth of vertical part of u-channel, $d = 820 \text{ mm}$	
	Gradient of u-channel, $S_i = (3.04-2.9)/20.7 = 0.007$	
	Cross-Section Area, a = $0.5 \pi r^2 + w d = 0.5 \times 3.14 \times 150^2 + 300 \times 820$ = $0.281 \text{ m}^2$	
	Wetted Perimeter, p = $\pi r + 2d = 3.14 \times 150 + 2 \times 820$ = 2.111 m	
	Hydralic radius, R = a / p = 0.133 m	SDM 8.2.1
3	Use Manning Equation for estimating velocity of stormwater	F 10
	Take n = 0.016 for concrete lined channels:- Allowable velocity, v = $R^{1/6}x (RS_t)^{1/2}/n = (0.133)^{1/6}x (0.133 \times 0.007)^{1/2}/0.016$	SDM Table 13 SDM Table 12
	$= 1.34 \text{ m/s}$ Time of flow, $t_f = 0.3 \text{ min}$	
4	Use "Rational Method" for calculation of design flow	
	Design intensity, $i = a / (t_o + t_f + b)^c$ = 687 / (3.6+0.3+4.2)^0.42 for return period T = 50 years = 286	SDM 4.3.2 SDM Table 3
	Type of surfaceRunoff Coefficient CCatchment Area A ( $m^2$ ) $C \times A$ Flat Glassland(heavy soil)0.250.00.0Concrete Paving0.95290.0275.5SUM = $275.5$	SDM 7.5.2 (b)
	Upstream flow, $Q_u = 0 \text{ m}^3/\text{s}$	
	Design flow, $Q_d = 0.278i \Sigma C_j A_j + Q_u$ where $A_j$ is in km <sup>2</sup> = $0.278 \times 286 \times 275.5 / 1000000 + 0$ = $0.022 \text{ m}^3/\text{s}$	SDM 7.5.2 (a)
	Allowable flow, $Q_a = a \times v$ = 0.281 x 1.34	
	= 0.377 m <sup>3</sup> /s	
	> Q <sub>d</sub> (O.K.)	3
	Reference was made to Stormwater Drainage Manual (SDM) by DSD	
	Scale: NA	ich Planners & rveyors Ltd.
	June 2023  Lots 793, 794 and 801 RP in D.D. 381 and Adjoining Government Land, Tuen Mun, New Territories	Page 4 (P22015)

1 For Channel Section S1	·	Ref.
	$A = 0 m^2$	
Average slope Distance on the line of natural flow		
10 Secretaria de Albana de	NAC AND A	
Time of concentraction	$t_o = 0.14465L / (H^{0.2}A^{0.1}) = 0.14465 (0) / (0.1^0.2^00.1)$ = 0.0 min	SDM 7.5.2 (d)
2 For Existing U-Channel in cat	chment area A1	
	From To	
Ground level (mPD) Invert level (mPD)	3.87 3.87 2.90 2.88	
Width of u-channel	w = 300 mm	
Length of u-channel		
Depth of vertical part of u-channel Gradient of u-channel		3 <del>1</del>
Stadion of a shannon	0, - (2.0-2.00)/2 - 0.010	
	a = $0.5 \pi r^2 + w d = 0.5 \times 3.14 \times 150^2 + 300 \times 840$ = $0.287 \text{ m}^2$	
Wetted Perimeter	$p = \pi r + 2 d = 3.14 \times 150 + 2 \times 840$ = 2.151 m	
Hydralic radius		SDM 8.2.1
	= 0.134 m	
3 Use Manning Equation for est		
Take		SDM Table 13
Allowable velocity	$V = R^{1/6}x (RS_f)^{1/2}/n = (0.134)^{1/6} x (0.134 x 0.01)^{1/2} / 0.016$ = 1.63 m/s	SDM Table 12
Time of flow		
4 Use "Rational Method" for cal	culation of design flow	
Design intensity	$i = a / (t_o + t_f + b)^c$	SDM 4.3.2
0007 34072	= 687 / (0+0.02+4.2)^0.42 for return period T = 50 years = 375	SDM Table 3
9	- 373	
Type of surface	Runoff Coefficient C Catchment Area A (m²) C x A	SDM 7.5.2 (b)
Flat Glassland(heavy soil) Concrete Paving	0.25 0.0 0.0 0.95 0.0 0.0	
	$SUM = \boxed{0.0}$	51
Upstream flow,	$Q_u = 0.125 \text{ m}^3/\text{s}$	9
Design flow.	$Q_d = 0.278i \Sigma C_j A_j + Q_u$ where $A_j$ is in km <sup>2</sup>	SDM 7.5.2 (a)
	= 0.278 x 375 x 0 / 1000000 + 0.125	OBM 7.0.2 (d)
9	= 0.125 m <sup>3</sup> /s	
Allowable flow,	$Q_a = a \times v$	
programme approximate to 100 feb cold	$= 0.287 \times 1.63$	l
140 _ 81 41	= 0.469 m <sup>3</sup> /s	
,	> Q <sub>d</sub> (O.K.)	
Reference was made to Stormwater Drainage Manual (SDM) by DSD		
0.1.31	Goldrich Pla	inners &
Scale: NA	Drainage Calculation Surveyor	system of the state of the stat
June 2023	Lots 793, 794 and 801 RP in D.D. 381 and Adjoining Government Land, Tuen Mun, New Territories  (P220)	5
	(1220)	-)

1 <sub>.</sub> For Catchment Area E		Ref.	
Area, A Average slope, I Distance on the line of natural flow, I	$A = 287 \text{ m}^2$ A = 0.1  m per  100  m A = 15.8  m		
Time of concentraction, t	$f_0 = 0.14465 L / (H^{0.2}A^{0.1}) = 0.14465 (15.8) / (0.1^0.2*287^0.1)$ = 2.1 min	SDM 7.5.2 (d)	
2 For Existing U-Channel in catch	iment area A1	9	
Ground level (mPD)	From To 3.87 3.87 3.69 3.48	122	
Width of u-channel, w Length of u-channel, L Depth of vertical part of u-channel, of Gradient of u-channel, S	<sub>-c</sub> = 31.5 m	5	
Cross-Section Area, a	$a = 0.5 \pi r^2 + w d = 0.5 \times 3.14 \times 150^2 + 300 \times 240$ = 0.107 m <sup>2</sup>		
Wetted Perimeter, p Hydralic radius, F	$\pi r + 2 d = 3.14 \times 150 + 2 \times 240$ = 0.951 m	SDM 8.2.1	
in a state of the	= 0.113 m	ODW 0.2.1	
3 Use Manning Equation for estim			
Take n Allowable velocity, v	$= R^{1/6} \times (RS_1)^{1/2} / n = (0.113)^{1/6} \times (0.113 \times 0.007)^{1/2} / 0.016$	SDM Table 13 SDM Table 12	
Time of flow, t <sub>f</sub>	= 1.19 m/s = 0.4 min		
4 Use "Rational Method" for calcu	lation of design flow		
Design intensity,	$i = a / (t_0 + t_f + b)^c$ = 687 / (2.1+0.4+4.2)^0.42 for return period T = 50 years = 309	SDM 4.3.2 SDM Table 3	
Type of surface Flat Glassland(heavy soil) Concrete Paving	Runoff Coefficient CCatchment Area A $(m^2)$ $C \times A$ 0.250.00.00.95287.0272.7SUM = $\boxed{272.7}$	SDM 7.5.2 (b)	
Upstream flow, C	$v_u = 0 \text{ m}^3/\text{s}$	¥8	
Design flow, C	$Q_d = 0.278i \Sigma C_j A_j + Q_u$ where $A_j$ is in km <sup>2</sup> = 0.278 x 309 x 272.65 / 1000000 + 0 = 0.023 m <sup>3</sup> /s	SDM 7.5.2 (a)	
Allowable flow, Q	$a_a = a \times v$ = 0.107 x 1.19		
	= 0.128 m <sup>3</sup> /s	, a	
	> Q <sub>d</sub> (O.K.)		
Reference was made to Stormwater Drainage Manual (SDM) by DSD			
Scale: NA	Trainage Calculation	Planners & yors Ltd.	
June 2023	The Art St. Art St. Co. St. Co	age 6 22015)	

1 <sub>.</sub> For Catchment Area F		Ref.
Area Average slope Distance on the line of natural flow	, H = 0.1 m per 100m	-
Time of concentraction	$t_o = 0.14465L / (H^{0.2}A^{0.1}) = 0.14465 (9) / (0.1^0.2*605^0.1)$ = 1.1 min	SDM 7.5.2 (d)
2 For Existing U-Channel in cat	chment area A1	9
-	From To	
Ground level (mPD) Invert level (mPD)	3.87 3.87 3.48 2.90	
Width of u-channe	, w = 300 mm	ar.
Length of u-channe	$L_{c} = 88.3 \text{ m}$	
Depth of vertical part of u-channe		
Gradient of u-channe	, S <sub>f</sub> = (3.48-2.9)/88.3 = 0.007	
Cross-Section Area	, a = $0.5 \pi r^2 + w d = 0.5 \times 3.14 \times 150^2 + 300 \times 820$ = $0.281 \text{ m}^2$	)
Wetted Perimeter	$p = \pi r + 2 d = 3.14 \times 150 + 2 \times 820$	
Hydralic radius	= 2.111 m .R = a/p	ODMAAA
Tryurano radius	R = a/p = 0.133 m	SDM 8.2.1
3 Use Manning Equation for est		
Take		SDM Table 13
Allowable velocity	Y W. Street, and the street, a	SDM Table 12
Time of flow	= 1.32 m/s $t_f =$ 1.1 min	
4 Use "Rational Method" for cal	culation of design flow	
Design intensity	$i = a / (t_o + t_f + b)^c$ = 687 / (1.1+1.1+4.2)^0.42 for return period T = 50 years = 315	SDM 4.3.2 SDM Table 3
Type of surface Flat Glassland(heavy soil) Concrete Paving	Runoff Coefficient C       Catchment Area A ( $m^2$ )       C x A         0.25       0.0       0.0         0.95       605.0       574.8         SUM = 574.8	SDM 7.5.2 (b)
Upstream flow	$Q_u = 0.023 \text{ m}^3/\text{s}$	
Design flow	$Q_d = 0.278i \Sigma C_j A_j + Q_u$ where $A_j$ is in km <sup>2</sup> = 0.278 x 315 x 574.75 / 1000000 + 0.023 = 0.073 m <sup>3</sup> /s	SDM 7.5.2 (a)
Allowable flow	$Q_a = a \times v$ = 0.281 × 1.32	,
	= 0.372 m <sup>3</sup> /s	9
	> Q <sub>d</sub> (O.K.)	8 *
Reference was made to Stormwate	er Drainage Manual (SDM) by DSD	
Scale: NA	Drainage Calculation  Goldrich Pla Surveyor	
June 2023	Lots 793, 794 and 801 RP in D.D. 381 and Adjoining Government Land, Tuen Mun, New Territories  (P220)	7

1	For Channel Section S2	Ref.
	Area, A = $0 \text{ m}^2$ Average slope, H = $0.1 \text{ m per } 100 \text{m}$ Distance on the line of natural flow, L = $0 \text{ m}$	
	Time of concentraction, $t_o = 0.14465L/(H^{0.2}A^{0.1}) = 0.14465(0)/(0.1^0.2^00.1)$ = 0.0 min	SDM 7.5.2 (d)
2	For Existing U-Channel in catchment area A1	
	From To	
) (4	Ground level (mPD)       3.87       3.87         Invert level (mPD)       2.90       2.88	. "
	Width of u-channel, $w = 300 \text{ mm}$	
	Length of u-channel, $L_c = 2 \text{ m}$	24
	Depth of vertical part of u-channel, d = 840 mm	=
	Gradient of u-channel, $S_f = (2.9-2.88)/2 = 0.010$	
	Cross-Section Area, a = $0.5 \pi r^2 + w d = 0.5 \times 3.14 \times 150^2 + 300 \times 840$ = $0.287 \text{ m}^2$	
	Wetted Perimeter, p = $\pi r + 2 d$ = 3.14 x 150 + 2 x 840	
	= 2.151 m Hydralic radius, R = a / p	opuse.
	= 0.134  m	SDM 8.2.1
3	Use Manning Equation for estimating velocity of stormwater	
J	ose Marining Equation for estimating velocity of stormwater	
	Take n = $0.016$ for concrete lined channels:-	SDM Table 13
	Allowable velocity, $v = R^{1/6}x (RS_f)^{1/2}/n = (0.134)^1/6 \times (0.134 \times 0.01)^1/2 / 0.016$ = 1.63 m/s	SDM Table 12
	Time of flow, $t_f = 0.02 \text{ min}$	
4	Use "Rational Method" for calculation of design flow	
	Design intensity, $i = a / (t_o + t_f + b)^c$ = 687 / (0+0.02+4.2)^0.42 for return period T = 50 years = 375	SDM 4.3.2 SDM Table 3
	Type of surface Runoff Coefficient C Catchment Area A (m²) C x A	ODM 7.50 (L)
	Type of surface Runoff Coefficient C Catchment Area A (m²) C x A  Flat Glassland(heavy soil) 0.25 0.0 0.0	SDM 7.5.2 (b)
	Concrete Paving 0.95 0.0 0.0	
	$SUM = \boxed{0.0}$	
	Upstream flow, $Q_u = 0.073 \text{ m}^3/\text{s}$	
	Design flow, $Q_d = 0.278i \Sigma C_j A_j + Q_u$ where $A_j$ is in km <sup>2</sup> = 0.278 x 375 x 0 / 1000000 + 0.073 = 0.073 m <sup>3</sup> /s	SDM 7.5.2 (a)
	Allowable flow, $Q_a = a \times v$	8
	$= 0.287 \times 1.63$	
	= 0.469 m <sup>3</sup> /s	
	> Q <sub>d</sub> (O.K.)	+ 3
	Reference was made to Stormwater Drainage Manual (SDM) by DSD	
	Scale: NA Drainage Calculation Goldrich Pl Surveyor	PRODUCTION CONTRACTOR OF THE PRODUCTION OF THE P
	June 2023  Lots 793, 794 and 801 RP in D.D. 381 and Adjoining Government Land, Tuen Mun, New Territories  (P220	8
renname.		/
	*	