

Attachment 2

Revised DIA

**PROPOSED TEMPORARY WAREHOUSE (EXCLUDING DANGEROUS
GOODS GODOWN) WITH ANCILLARY FACILITIES AND ASSOCIATED
FILLING OF LAND FOR A PERIOD OF 3 YEARS at VARIOUS LOTS IN
D.D. 106 AND ADJOINING GOVERNMENT LAND, KAM TIN, YUEN LONG,
NEW TERRITORIES**

DRAINAGE IMPACT ASSESSMENT
Sept 2026

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1. Introduction & Background

1.1 Introduction

1.1.1 The applicant plans to construct and operate a Proposed Temporary Warehouse (excluding dangerous goods godown) with Ancillary Facilities and Associated Filling of Land for a period of 3 years at various lots in D.D. 106 and adjoining Government Land, Kam Tin, Yuen Long, New Territories

1.1.2 The Site is currently zoned "Agriculture" (AGR) under the Approved Kam Tin South Outline Zoning Plan ("OZP") No. S/YL-KTS/15. In accordance with paragraph 11(b) of the Explanatory Note of the OZP, temporary use or development of any land or building not exceeding a period of three years would require planning permission from the Town Planning Board ("TPB"). Therefore, a Section 16 Planning Application is made. This Drainage Impact Assessment is made for supporting this planning application.

1.2 Site Description

1.2.1 The site is nearly a square shape land with a strip as a road connecting Kam Sheung Road. The Site is currently a vacant land overgrown with weeds. There are two existing watercourses passing through the site running from the south to north direction.

1.2.2 The Site location and its environs are shown on **Fig. 1** which the uses surrounding the Site include:

- To the north and northwest: vegetation, warehouse temporary structures, village houses and residential temporary structures,
- To the east and northeast: warehouse temporary structures, Kam Shui South Road and Existing Nullah.
- To the south: village houses and Kam Sheung Road.
- To the west: Kam Sheung Road.

1.3 Project Description

1.3.1 The site area is 15,449m². The area of the covered area is 9,109m². Plot ratio is about 0.59.

1.3.2 There are two existing watercourses S1 & S2. S1 and S2 combine together to form existing watercourse S3. S1 passing through the site from south to north. S2 is right in the eastern side of the site. S3 finally discharges to existing nullah in the

further north of the site.

1.3.3 S1 collects runoff from catchment area C and part of the site (catchment area A). S2 collects runoff from catchment area B, D and part of the site (catchment area A). Catchment area E does not contribute to S1 and S2. S3 collects runoff from catchment area A, B, C, D and F. **Figure 2 in Appendix D shows the Catchment Plan.**

1.4 Objectives of this Report

1.4.1 The objectives of this DIA Report are to:

- Assess the potential drainage impacts arising from the Site.
- Provide a schematic design of the upgraded drainage works to support the S16 application. Detailed survey and design will be provided upon approval of the S16 application.

1.5 Reference Materials

1.5.1 In evaluating the drainage impact arising from the Proposed Development, the following materials have been referred to:

- Drainage Services Department (“DSD”) publication Stormwater Drainage Manual (with Eurocodes incorporated) Planning, Design and Management (2018 Edition).
- DSD publication – Stormwater Drainage Manual Corrigendum No. 1/2022 and 1/2024 (“SDM 2024”).
- DSD Advice Note No.1 – Application of the Drainage Impact Assessment Process to Private Sector Projects.
- GeoInfo Map.

2. Description of Existing Environment and Drainage Conditions

2.1 Site Location and Topography

2.1.1 The site area is 15,449m² and is located in Yuen Long District with level vary from +13.5mPD to +14.1mPD.

2.1.2 Kam Sheung Road is to the west of the site, Kam Shui South Road is to the east of the site. A series of village houses and warehouse temporary structures at the north of the site, there is an existing nullah, which collect the flow from S1 and S12, in the further north. There is existing trapezoidal nullah (Top width:20m, bottom width:5.3m, Depth:3.85m), which collect flow from catchment area E beside Kam Shui South Road.

2.1.3 There are two existing watercourses (namely S1 and S2). S1 passes through the site from south to north and converge in the western boundary of the site. S2 is right in the eastern side of the site. Then S1 and S2 finally combine to form S3. S3 finally discharge to the existing channel in the further north of the site.

2.1.4 There are existing U-channel along Kam Shui South Road.

2.1.5 According to the previous site inspection dated 4 June 2026, the site is currently a vacant land overgrown with weeds.

3. Drainage Analysis

3.1 Assumptions and Methodology

3.1.1 Peak instantaneous runoff before and after the Proposed Development was calculated based on the Rational Method. The recommended physical parameters, including runoff coefficient (C) and storm constants for different return periods, are as per the Stormwater Drainage Manual.

3.1.2 The Rational Method has been adopted for hydraulic analysis and the peak runoff is given by the following expression:

$$Q_p = 0.278 C i A \quad \text{--- Equation 1}$$

where Q_p = peak runoff in m^3/s
 C = runoff coefficient
 i = rainfall intensity in mm/hr
 A = catchment area in km^2

3.1.3 Rainfall intensity is calculated using the following expression:

$$i = a/(t+b)^c \quad \text{--- Equation 2}$$

where i = Rainfall intensity in mm/hr
 t = duration in minutes ($t \leq 240$)
 $a=505.5$, $b=3.29$, $c=0.355$, 50 yrs return period in Table 3 of Corrigendum No. 1/2024

3.1.4 The capacities of the drainage pipes have been calculated using the Colebrook-White Equation, assuming full bore flow with no surcharge, as follows, incorporating 10% sedimentation in the calculation of drainage flow capacity in accordance with the Stormwater Drainage Manual:

$$V = -\sqrt{(8gDs)} \log\left(\frac{ks}{3.7D} + \frac{2.51v}{D\sqrt{(2gDs)}}\right) \quad \text{--- Equation 3}$$

where V = mean velocity (m/s)
 g = gravitational acceleration (m/s^2)
 D = Pipe diameter (m)
 ks = hydraulic pipeline roughness (m), 0.06mm for concrete pipe
 v = kinematic viscosity of fluid (m^2/s)
 s =hydraulic gradient (energy loss per unit length due to friction)

3.1.5 On the other hand, the capacity of open channel has been calculated using the Manning Equation:

$$V = R^{2/3} S_f^{0.5} / n \quad \text{--- Equation 5}$$

Where V = mean velocity (m/s)

R = hydraulic radius (m)

n = Manning coefficient ($\text{s/m}^{1/3}$) = 0.016 $\text{s/m}^{1/3}$

S_f = hydraulic gradient (energy loss per unit length due to friction)

3.1.6 Siltation in the stormwater drainage system is considered in the assessment. As a conservative approach, 10% (of flow area) sedimentation is adopted for the drainage system. 200mm freeboard is adopted for checking the proposed rectangular channel

3.2 Assessment Assumptions

Identification of Catchments

3.2.1 The level of the ground to the north of the site is generally lower than that of the site.

3.2.2 The area in the east of the site is known with high potential to be developed.

3.2.3 Site inspection was carried out to identify the catchment of the two existing watercourses S1 & S2 (Catchment A ~ Catchment D). Also, the runoff from the area bounded by the site, Kam Sheung Road and Kam Shui South apart from Catchment A ~ Catchment D is collected by the existing U-channel along Kam Shui South Road, this catchment refers to Catchment E.

- Catchment A – The application site and area to be development. Currently a vacant land overgrown with weeds.
- Catchment B – Area to be development. Currently a vacant land overgrown with weeds, temporary residential structure or temporary warehouse.
- Catchment C – Currently a vacant land overgrown with weeds, temporary residential structure or temporary warehouse.
- Catchment D – Area full of small village houses.
- Catchment E – Area full of small village houses, residential buildings, farm lands/warehouse temporary structures.
- Catchment F – Currently a vacant land overgrown with weeds, temporary residential structure or temporary warehouse.

3.2.4 The surface runoff from Catchment A and C is collected by the watercourse S1. The surface runoff from Catchment B and D is collected by the watercourse S2. The surface runoff from Catchment E is collected by the existing nullah besides Kam Shui South Road. The surface runoff from Catchment F is collected by the watercourse S3

3.2.5 Runoff from Catchment A, B, C, D, E and F is calculation using Rational Method.

3.2.6 The area of Catchment A, B C, D, E and F is 24,848m², 21,441 m², 9,907 m², 62,747 m², 148,314 m² and 16,752 m² respectively.

3.2.7 Storm constants a, b and c is taken as 505.5, 3.29 and 0.355 respectively, 50 years return period, Table 3a, Stormwater Drainage Manual Corrigendum No. 1/2024. Maximum 90% utilization is adopted for checking the design drains due to the consideration of sediment.

3.2.8 Before development, the runoff coefficient of Catchment A, B C, D, E and F is 0.35, 0.35, 0.698, 0.698, 0.65 and 0.65 respectively. After development, the runoff coefficient of Catchment A, B C, D, E and F is 0.95, 0.95, 0.698, 0.698, 0.65 and 0.65 respectively

3.2.9 For the design of drains inside the application site, the site is divided into 8 portions after considering the location of proposed warehouse and configuration of the site (A1a, A1b, from A2 to A7). And there are four outside catchment areas (A8a, A8b, A9 and A10) from future development as illustrated below:

Catchment ID	Description	Area (m ²)
A1a	The Site (Road)	615
A1b	The Site (Road)	343
A2	The Site (Rest Left Top)	724
A3	The Site (Rest Left Bottom)	2300
A4	The Site (Warehouse Left)	3176
A5	The Site (Rest Right Top)	529
A6	The Site (Rest Right Bottom)	1871
A7	The Site (Warehouse Right)	5891
A8a	Outside Catchment at North	2213
A8b	Outside Catchment at North	193
A9	Outside Catchment at South Right	3094
A10	Outside Catchment at South Left	945

The runoff calculation is presented in **Appendix B**

3.3 Estimated Existing and Future Runoff

3.3.1 The estimated peak runoff generated from Catchment A and B before development is $0.608\text{m}^3/\text{s}$ and $0.507\text{m}^3/\text{s}$ respectively (total $1.115\text{m}^3/\text{s}$).

3.3.2 To consider the effect of climate change in the drainage design, the projection of rainfall increase by 11.1% given in SDM 2022 Table 28 is adopted. The design runoffs of Catchment A and B after development is $1.650\text{m}^3/\text{s}$ and $1.377\text{m}^3/\text{s}$ respectively (total $3.027\text{m}^3/\text{s}$) under 50 years return period. There will be around 171% increase in the estimated peak runoff due to the Proposed Development under 50 years return period. Detailed calculations are provided **Appendix A**.

3.3.3 **Fig. 3** shows the total catchment area of the site. It consist the site and part of the potential future development.

3.4 Proposed Drainage Layout

S1 will be replaced by $1.0\text{m(W)}\times 1.0\text{m(D)}$ rectangular channel which finally discharge to S3. S2 will be maintained and unaffected. S3 will be replaced by $2.5\text{m(W)}\times 1.2\text{m(D)}$ rectangular channel.

3.4.1 The existing watercourse S1 will be replaced by $1.0\text{m(W)}\times 1.0\text{m(D)}$ rectangular channel (1:250). It collects runoff of catchment A and C. Its peak runoff $0.958\text{m}^3/\text{s}$ while the capacity is $1.441\text{m}^3/\text{s}$ (66% capacity used)

3.4.2 The existing watercourse S2 will be maintained and unaffected.

3.4.3 F The existing watercourse S3 will be replaced by $2.5\text{m(W)}\times 1.4\text{m(D)}$ rectangular channel (1:250). It collects runoff of catchment A, B, C, D and F. Its peak runoff $7.059\text{m}^3/\text{s}$ while the capacity is $8.550\text{m}^3/\text{s}$ (83% capacity used)

3.4.4 Peripheral u-channel and $1.0\text{m(W)}\times 1.0\text{m(D)}$ rectangular channel is proposed inside the site.

3.4.5 Fig. 4 and Fig. 5 shows the proposed drainage layout of the proposed drains as above.

3.4.6 Appendix B and Appendix C shows the details hydraulic calculation.

The proposed design drainage facilities helps to improve the discharge ability of S1 and S3 without affecting their ability of collecting surface runoff. With the designed drains, the proposed development does not have any drainage impact on the existing stormwater collection system.

4. Recommendation

4.1 The discharge from Catchment B in future development shall be discharge to CP29. S2 and S3 shall be maintained in all time.

4.2 Regular maintenance shall be carried out to the drainage system.

4.3 The proposed drainage works shall be carried out in dry season. Close monitoring to the construction is recommended to avoid the discharge condition from upstream being affected.

4.4 Upon approval of S16, detailed survey and design shall be carried to further justify the proposed drainage scheme.

Appendix A –Calculation of Runoff

Calculation of Runoff

Before Development

Catchment ID	Area (A) km ²	Average Slope (H), m/100	Flow Path (L), m	Inlet time (to), min	Storm constants			Runoff intensity (i), mm/hr	Runoff Coefficient (C)	Q=1.111*0.278CiA, (m ³ /s), 11.1% for climate
					a	b	c			
A	0.024848	0.2	69.36	6.334	505.5	3.29	0.355	226.270	0.35	0.608
B	0.021441	0.2	78.5	7.275	505.5	3.29	0.355	218.898	0.35	0.507
C	0.009907	0.2	66.95	6.703	505.5	3.29	0.355	223.269	0.698	0.477
D	0.062747	3.161	180.35	8.644	505.5	3.29	0.355	209.633	0.698	2.836
E	0.148314	1.588	359	18.119	505.5	3.29	0.355	170.358	0.65	5.072
F	0.016752	0.200	84.17	7.996	505.5	3.29	0.355	213.832	0.65	0.719
Total										10.219

After Development

Catchment ID	Area (A) km ²	Average Slope (H), m/100	Flow Path (L), m	Inlet time (to), min	Storm constants			Runoff intensity (i), mm/hr	Runoff Coefficient (C)	Q=1.111*0.278CiA, (m ³ /s), 11.1% for climate
					a	b	c			
A	0.024848	0.2	69.36	6.334	505.5	3.29	0.355	226.270	0.95	1.650
B	0.021441	0.2	78.5	7.275	505.5	3.29	0.355	218.898	0.95	1.377
C	0.009907	0.2	66.95	6.703	505.5	3.29	0.355	223.269	0.698	0.477
D	0.062747	3.161	180.35	8.644	505.5	3.29	0.355	209.633	0.698	2.836
E	0.148314	1.588	359	18.119	505.5	3.29	0.355	170.358	0.65	5.072
F	0.016752	0.200	84.17	7.996	505.5	3.29	0.355	213.832	0.65	0.719

Total	12.131	m ³ /s
Sub total (A+B) before development=	1.115	m ³ /s
Sub total (A+B) after development=	3.027	m ³ /s
Extra runoff due to development=	1.912	m ³ /s
Design Q for Upgrading S3=A+B+C+D+F=	7.059	m ³ /s
Design Q (apart from the site) for Replacing S1=C=	0.477	m ³ /s

Appendix B – Calculation of Drainage Capacity of Designed Drains inside The Site

Calculation of Drainage Capacity of Designed Drains inside The Site

Catchment ID	Area (A) km ²	Average Slope (H), m/100	Flow Path (L), m	Inlet time (to), min	Storm constants			Runoff intensity (i), mm/hr	Runoff Coefficient (C)	Q=1.111*0.278C _i A, (m ³ /s), 11.1% for
					a	b	c			
A1a	0.000615	0.422	66.31	7.549	505.5	3.29	0.355	216.920	0.95	0.039
A1b	0.000343	0.543	36.85	4.230	505.5	3.29	0.355	246.985	0.95	0.025
A2	0.000724	0.2	18.56	2.414	505.5	3.29	0.355	272.446	0.95	0.058
A3	0.0023	0.2	64.14	7.431	505.5	3.29	0.355	217.762	0.95	0.147
A4	0.003176	0.2	52.2	5.856	505.5	3.29	0.355	230.402	0.95	0.215
A5	0.000529	0.2	11.67	1.566	505.5	3.29	0.355	288.461	0.95	0.045
A6	0.001871	0.2	63.55	7.517	505.5	3.29	0.355	217.151	0.95	0.119
A7	0.005891	0.2	68.84	7.260	505.5	3.29	0.355	219.012	0.95	0.379
A8a	0.002213	0.2	51.28	5.964	505.5	3.29	0.355	229.440	0.95	0.149
A8b	0.000193	0.2	11.01	1.634	505.5	3.29	0.355	287.037	0.95	0.016
A9	0.003094	0.2	47.47	5.339	505.5	3.29	0.355	235.207	0.95	0.214
A10	0.000945	0.2	29.57	3.745	505.5	3.29	0.355	252.900	0.95	0.070

Total: 1.475

Q from Catchment C (refer to Appendix C)= 0.477

For the design of drains from Start Point 1 to CP2 and Start Point 1 to CP28, consider A1a+A8a

$$\begin{aligned}
 \text{Design Q} &= 0.188 \text{ m}^3/\text{sec} \\
 \text{Manning Equation} \quad V &= R^{2/3} * S_f^{0.5} / n \\
 \text{where} \quad R &= (\pi r^2 / (2 + 2r)) / (\pi r + 2r) \quad r = 0.225 \text{ m} \\
 &= 0.1563 \text{ m} \quad A = 0.1808 \text{ m}^2 \\
 n &= 0.016 \text{ s/m}^{1/3} \quad (\text{Talbe 13 of Stormwater Drainage Manual}) \\
 S_f &= 0.007 \quad (1: 150) \\
 \text{Therefore,} \quad V &= 0.1563^{2/3} * 0.007^{0.5} / 0.016 \\
 &= 1.480 \text{ m/sec} \\
 \text{Maximum Capacity (Q}_{\text{max}}) &= V * A \\
 &= 0.268 \text{ m}^3/\text{sec} \\
 &> 0.188 \text{ m}^3/\text{sec} \\
 \text{\% of capacity utilization} &= 70\%
 \end{aligned}$$

Provide 450UC (1:100) is OK (70% capacity utilization)

For the design of drains from Start Point 2 to CP4, consider A1b+A10

$$\begin{aligned}
 \text{Design Q} &= 0.095 \text{ m}^3/\text{sec} \\
 \text{Manning Equation} \quad V &= R^{2/3} * S_f^{0.5} / n \\
 \text{where} \quad R &= (\pi r^2 / (2 + 2r)) / (\pi r + 2r) \quad r = 0.15 \text{ m} \\
 &= 0.104 \text{ m} \quad A = 0.0803 \text{ m}^2 \\
 n &= 0.016 \text{ s/m}^{1/3} \quad (\text{Talbe 13 of Stormwater Drainage Manual}) \\
 S_f &= 0.01 \quad (1: 100) \\
 \text{Therefore,} \quad V &= 0.104^{2/3} * 0.01^{0.5} / 0.016 \\
 &= 1.384 \text{ m/sec} \\
 \text{Maximum Capacity (Q}_{\text{max}}) &= V * A \\
 &= 0.111 \text{ m}^3/\text{sec} \\
 &> 0.095 \text{ m}^3/\text{sec} \\
 \text{\% of capacity utilization} &= 85\%
 \end{aligned}$$

Provide 300UC (1:100) is OK (85% capacity utilization)

For the design of drains from CP4to CP7, consider A1b+A10+A9

	Design Q	=	0.309	m ³ /sec	
Manning Equation	V	=	$R^{2/3} * S_f^{0.5} / n$		
where	R	=	$(\pi r^2 / (2 + 2r^2)) / (\pi r + 2r)$	r= 0.3 m	
		=	0.2083	m	A= 0.3214 m ²
	n	=	0.016	s/m ^{1/3}	(Talbe 13 of Stormwater Drainage Manual)
	S _f	=	0.004	(1: 250)	
Therefore,	V	=	$0.2083^{2/3} * 0.004^{0.5} / 0.016$		
		=	1.389	m/sec	
Maximum Capacity (Q _{max})		=	V * A		
		=	0.446	m ³ /sec	
		>	0.309	m ³ /sec	
% of capacity utilization		=	69%		

Provide 600UC (1:250) is OK (69% capacity utilization)

For the design of drains from CP7 to CP13, consider A1b+A10+A9+A6

	Design Q	=	0.428	m ³ /sec	
Manning Equation	V	=	$R^{2/3} * S_f^{0.5} / n$		
where	R	=	$(\pi r^2 / (2 + 2r^2)) / (\pi r + 2r)$	r= 0.3 m	
		=	0.2083	m	A= 0.3214 m ²
	n	=	0.016	s/m ^{1/3}	(Talbe 13 of Stormwater Drainage Manual)
	S _f	=	0.005	(1: 200)	
Therefore,	V	=	$0.2083^{2/3} * 0.005^{0.5} / 0.016$		
		=	1.553	m/sec	
Maximum Capacity (Q _{max})		=	V * A		
		=	0.499	m ³ /sec	
		>	0.428	m ³ /sec	
% of capacity utilization		=	86%		

Provide 600UC (1:200) is OK (86% capacity utilization)

Design Q	=	0.016	m ³ /sec
Manning Equation	V	=	$R^{2/3} * S_f^{0.5} / n$
where	R	=	$(\pi r^2 / (2 + 2r^2)) / (\pi r + 2r)$
		=	0.0781
	n	=	0.016
	S _f	=	0.01
Therefore,	V	=	$0.0781^{2/3} * 0.01^{0.5} / 0.016$
		=	1.142
Maximum Capacity (Q _{max})		=	V * A
		=	0.052
		>	0.016
% of capacity utilization		=	31%

Provide 22SUC (1:100) is OK (31% capacity utilization)

	Design Q	=	0.163	m ³ /sec	
Manning Equation	V	=	$R^{2/3} * S_f^{0.5} / n$		
where	R	=	$(\pi r^2 / (2 + 2r^2)) / (\pi r + 2r)$	r=	0.225 m
		=	0.1563	m	A= 0.1808 m ²
	n	=	0.016	s/m ^{1/3}	(Talbe 13 of Stormwater Drainage Manual)
	S _f	=	0.004	(1: 250)	
Therefore,	V	=	$0.1563^{2/3} * 0.004^{0.5} / 0.016$		
		=	1.147	m/sec	
Maximum Capacity (Q _{max})		=	V * A		
		=	0.207	m ³ /sec	
		>	0.163	m ³ /sec	
% of capacity utilization		=	79%		
			Provide 450UC (1:250) is OK (79% capacity utilization)		

	Design Q	=	0.698	m ³ /sec	
Manning Equation	V	=	$R^{2/3} * S_f^{0.5} / n$		
where	R	=	$A / (W + 2D)$		W= 1 m
		=	0.3077	m	D= 0.8 m, (200mm free board)
					A= 0.8000 m ²
	n	=	0.016	s/m ^{1/3}	(Talbe 13 of Stormwater Drainage Manual)
	S _f	=	0.004	(1: 250)	
Therefore,	V	=	$0.3077^{2/3} * 0.004^{0.5} / 0.016$		
		=	1.802	m/sec	
Maximum Capacity (Q _{max})		=	V * A		
		=	1.441	m ³ /sec	
		>	0.698	m ³ /sec	
% of capacity utilization		=	48%		
Provide 1.0m(W)x1.0m(D) Rectangular Channel (1:250) is OK (48% capacity utilization)					

For the design of drains from CP19 to CP15, consider A8+A3+C+A2+A4

	Design Q	=	0.913	m ³ /sec		
Manning Equation	V	=	$R^{2/3} \cdot S_f^{0.5} / n$			
where	R	=	$A / (W + 2D)$		W=	1 m
		=	0.3077	m	D=	0.8 m, (200mm free board)
					A=	0.8000 m ²
	n	=	0.016	s/m ^{1/3}		(Talbe 13 of Stormwater Drainage Manual)
	S _f	=	0.004			(1: 250)
Therefore,	V	=	$0.3077^{2/3} \cdot 0.004^{0.5} / 0.016$			
		=	1.802	m/sec		
Maximum Capacity (Q _{max})		=	V * A			
		=	1.441	m ³ /sec		
		>	0.913	m ³ /sec		
% of capacity utilization		=	63%			

Provide 1.0m(W)x1.0m(D) Rectangular Channel (1:250) is OK (63% capacity utilization)

For the design of drains from CP15 to CP13, consider A8+A3+C+A2+A4+A5

	Design Q	=	0.957	m ³ /sec		
Manning Equation	V	=	$R^{2/3} \cdot S_f^{0.5} / n$			
where	R	=	$A / (W + 2D)$		W=	1 m
		=	0.3077	m	D=	0.8 m, (200mm free board)
					A=	0.8000 m ²
	n	=	0.016	s/m ^{1/3}		(Talbe 13 of Stormwater Drainage Manual)
	S _f	=	0.004			(1: 250)
Therefore,	V	=	$0.3077^{2/3} \cdot 0.004^{0.5} / 0.016$			
		=	1.802	m/sec		
Maximum Capacity (Q _{max})		=	V * A			
		=	1.441	m ³ /sec		
		>	0.957	m ³ /sec		
% of capacity utilization		=	66%			

Provide 1.0m(W)x1.0m(D) Rectangular Channel (1:250) is OK (66% capacity utilization)

For the design of drains of outfall from CP13, Consider All + C

	Design Q	=	1.952	m ³ /sec
Colebrook-White Equation (For outfall)				

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

where :

V	=		mean velocity (m/s)
g	=	9.81 m/s ²	gravitational acceleration (m/s ²)
D	=	1.05 m	internal pipe diameter (m)
ks	=	0.00006 m	hydraulic pipeline roughness (m)
v	=	1.14E-06 m ² /s	kinematic viscosity of fluid (m ² /s)
s	=	0.00500	hydraulic gradient (1: 200)

Therefore,
design V of

Q= V A	
= 2.568	m ³ /s
> 1.952	lit/min Ok

% of capacity utilization = **76%**

1050mm dia. concrete pipe (1:200) (76% capacity utilization) is OK

Appendix C – Calculation of Drainage Capacity of
Designed Drains replacing the Existing
Watercourse S3

Design of Drains Calculation of Drainage Capacity of Designed Drains replacing the Existing Watercourse S3

Before Development

Catchment ID	Area (A) km ²	Average Slope (H), m/100	Flow Path (L), m	Inlet time (to), min	Storm constants			Runoff intensity (i), mm/hr	Runoff Coefficient (C)	Q=1.111*0.278C ^{1.4} A, (m ³ /s), 11.1% for
					a	b	c			
A	0.024848	0.2	69.36	6.334	505.5	3.29	0.355	226.270	0.35	0.608
B	0.021441	0.2	78.5	7.275	505.5	3.29	0.355	218.898	0.35	0.507
C	0.009907	0.2	66.95	6.703	505.5	3.29	0.355	223.269	0.698	0.477
D	0.062747	3.161	180.35	8.644	505.5	3.29	0.355	209.633	0.698	2.836
E	0.148314	1.588	359	18.119	505.5	3.29	0.355	170.358	0.65	5.072
F	0.016752	0.200	84.17	7.996	505.5	3.29	0.355	213.832	0.65	0.719

After Development

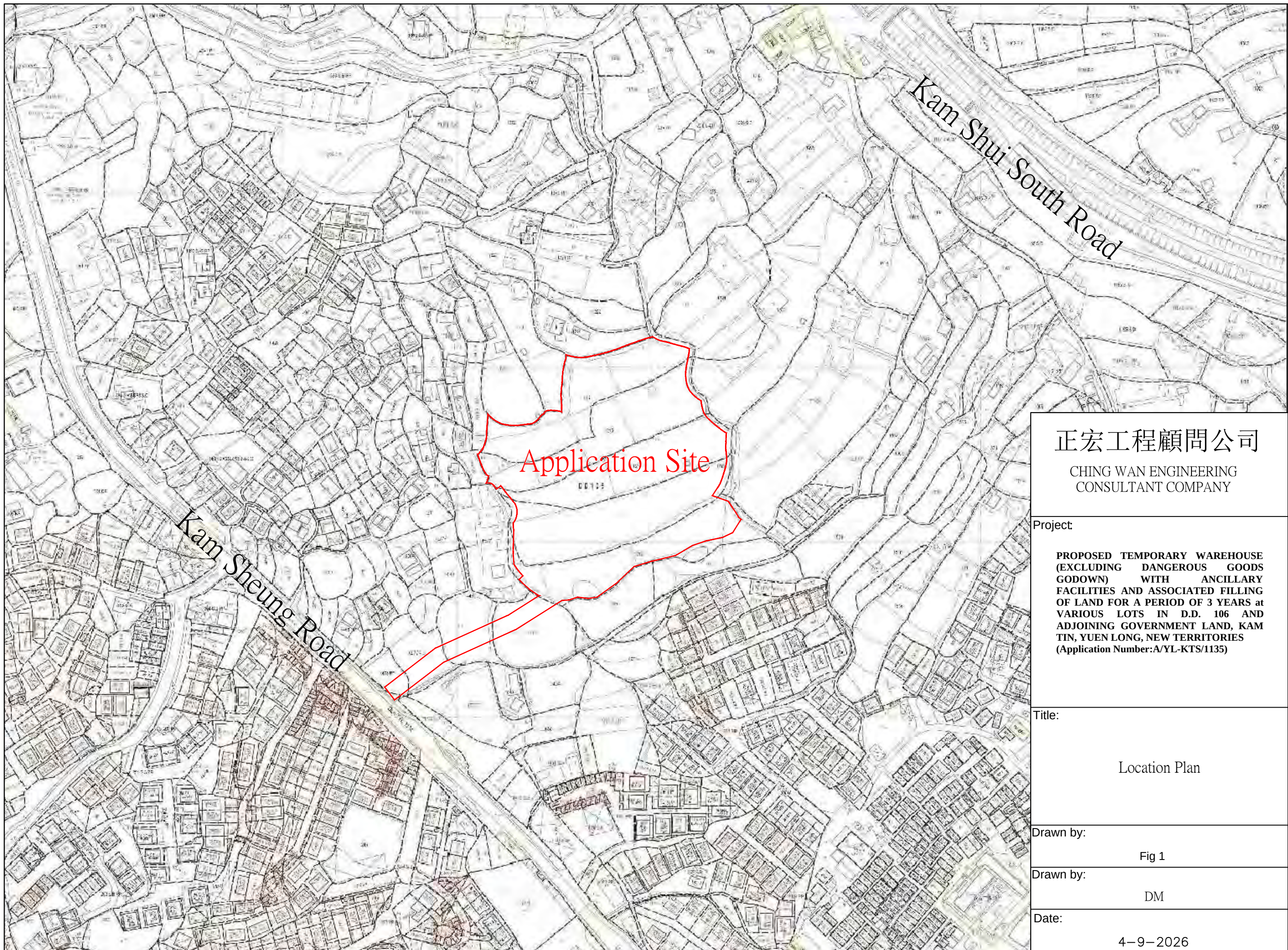
Catchment ID	Area (A) km ²	Average Slope (H), m/100	Flow Path (L), m	Inlet time (to), min	Storm constants			Runoff intensity (i), mm/hr	Runoff Coefficient (C)	Q=1.111*0.278C ^{1.4} A, (m ³ /s), 11.1% for
					a	b	c			
A	0.024848	0.2	69.36	6.334	505.5	3.29	0.355	226.270	0.95	1.650
B	0.021441	0.2	78.5	7.275	505.5	3.29	0.355	218.898	0.95	1.377
C	0.009907	0.2	66.95	6.703	505.5	3.29	0.355	223.269	0.698	0.477
D	0.062747	3.161	180.35	8.644	505.5	3.29	0.355	209.633	0.698	2.836
E	0.148314	1.588	359	18.119	505.5	3.29	0.355	170.358	0.65	5.072
F	0.016752	0.200	84.17	7.996	505.5	3.29	0.355	213.832	0.65	0.719

For design of Stream S3, Catchment A+B+C+D+E

$Q = 7.059$ m³/s
 Manning Equation $V = R^{2/3} * S_f^{0.5} / n$
 where $R = A / (W + 2D) = 0.6122$ m
 $n = 0.016$ s/m^{1/3} (Talbe 13 of Stormwater Drainage Manual)
 $S_f = 0.004$ (1: 250)
 Therefore, $V = 0.5745^{2/3} * 0.005^{0.5} / 0.016 = 2.850$ m/sec
 Maximum Capacity (Q_{max}) = V * A = **8.550** m³/sec
 > 7.059 m³/sec
 % of capacity utilization = **83%**

Provide 2.5m(W)x1.4m(D) Rectangular Channel (1:250) is OK (83% capacity utilization)

Appendix D –Figures and Photos



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Project

**PROPOSED TEMPORARY WAREHOUSE
(EXCLUDING DANGEROUS GOODS
GODOWN) WITH ANCILLARY
FACILITIES AND ASSOCIATED FILLING
OF LAND FOR A PERIOD OF 3 YEARS at
VARIOUS LOTS IN D.D. 106 AND
ADJOINING GOVERNMENT LAND, KAM
TIN, YUEN LONG, NEW TERRITORIES
(Application Number:A/YL-KTS/1135)**

Title:

Location Plan

Drawn by:

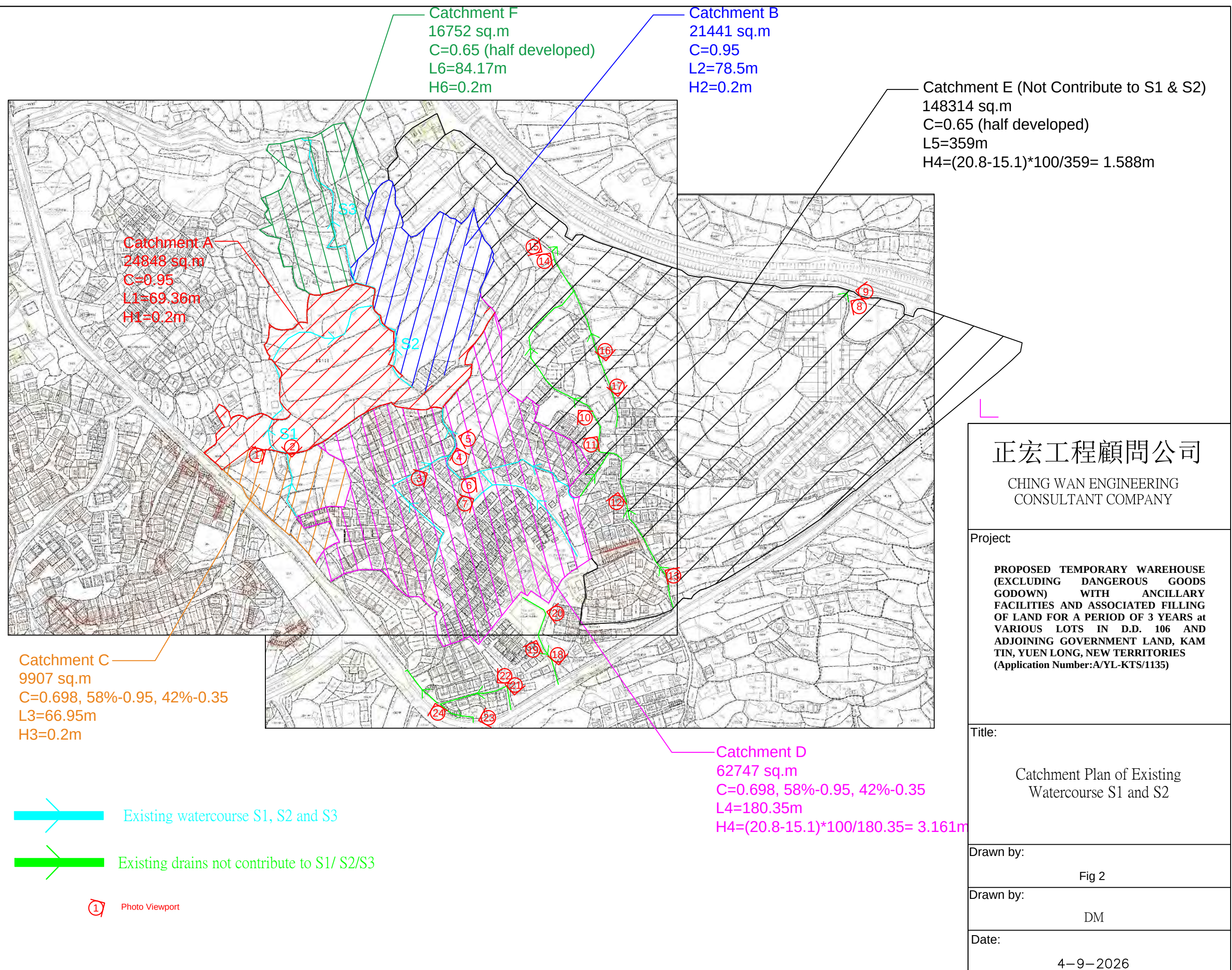
Fig 1

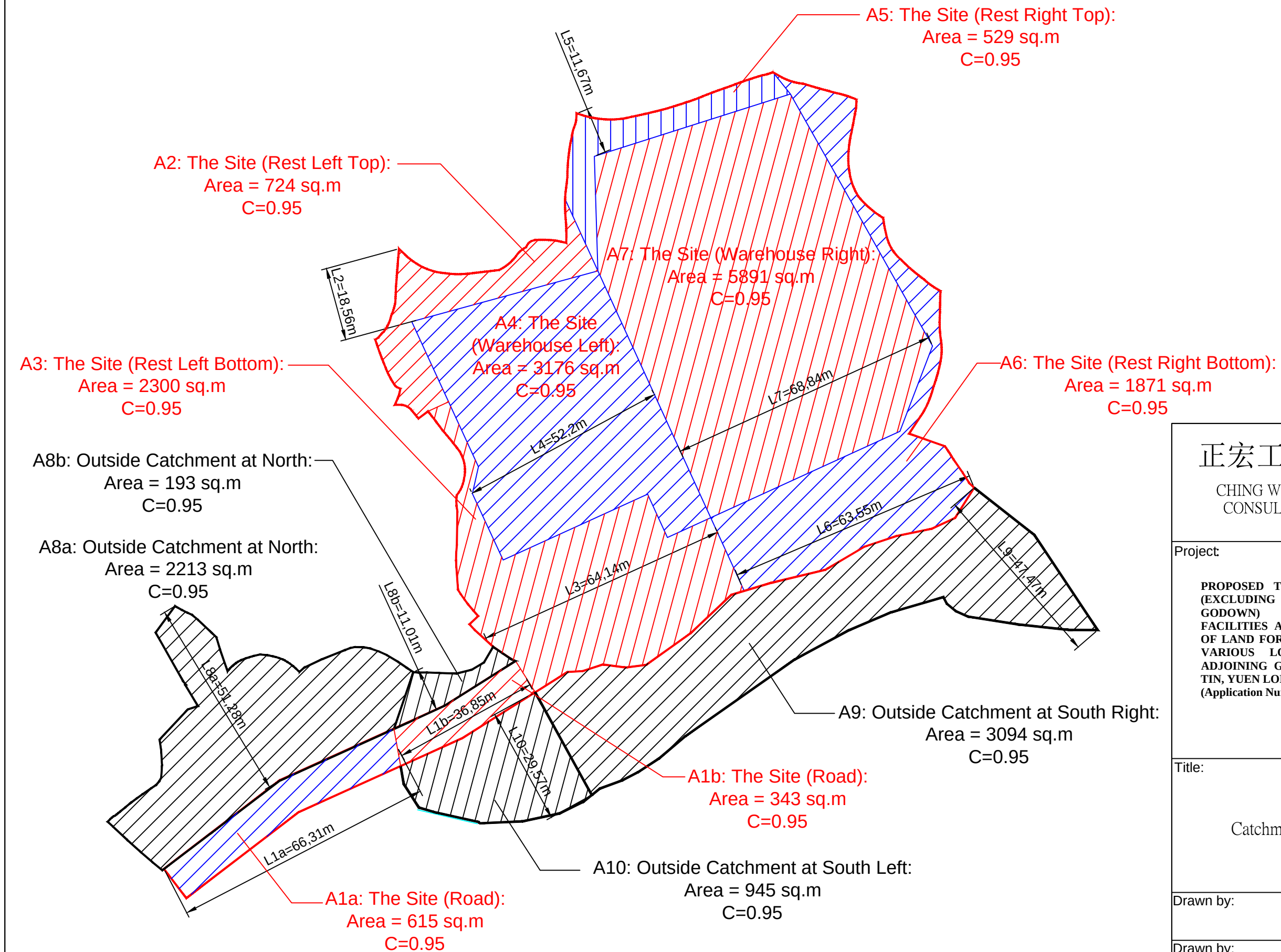
Drawn by:

DM

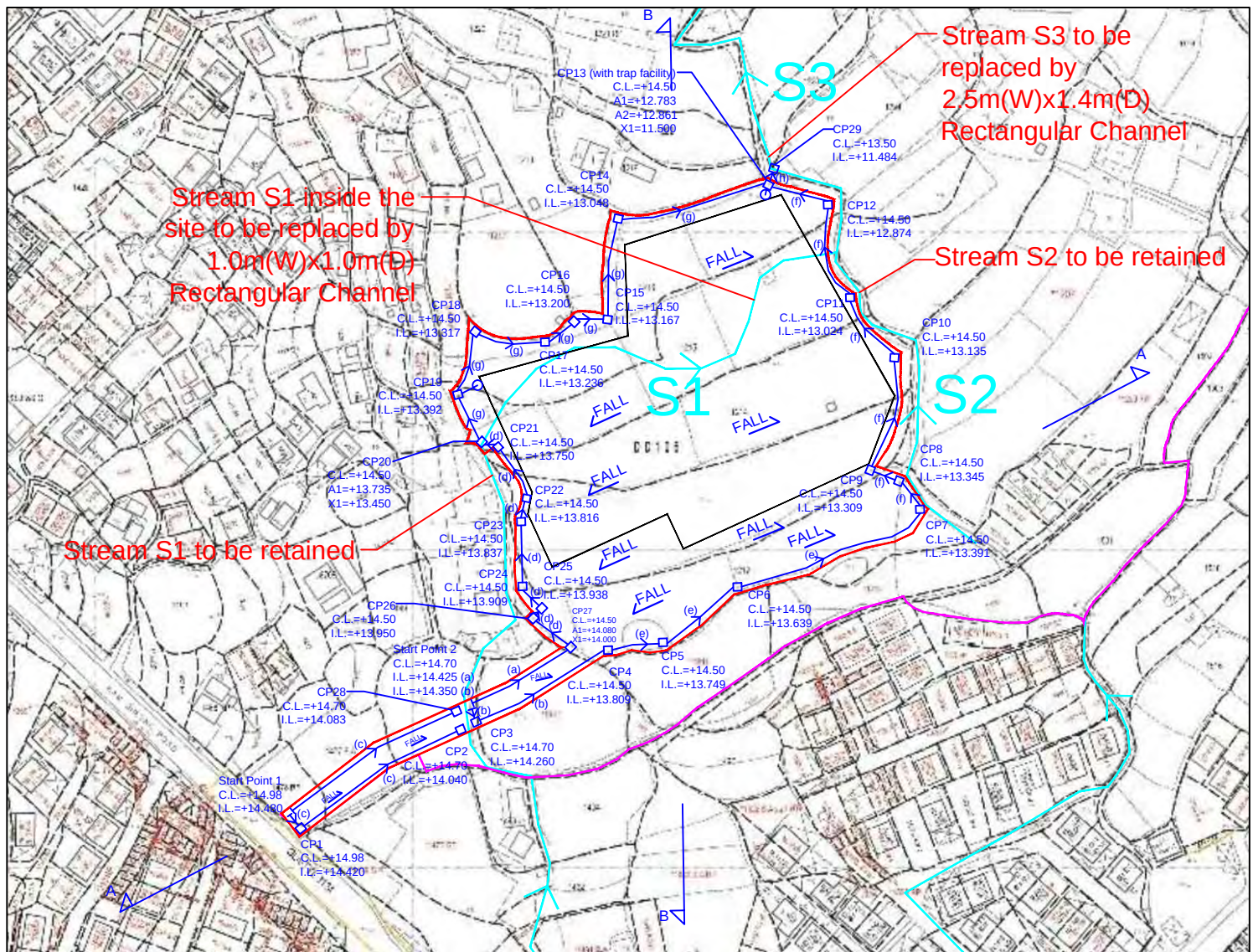
Date:

4-9-2026



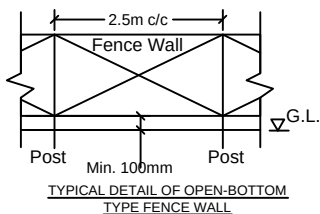


正宏工程顧問公司 CHING WAN ENGINEERING CONSULTANT COMPANY	
Project	PROPOSED TEMPORARY WAREHOUSE (EXCLUDING DANGEROUS GOODS GODOWN) WITH ANCILLARY FACILITIES AND ASSOCIATED FILLING OF LAND FOR A PERIOD OF 3 YEARS at VARIOUS LOTS IN D.D. 106 AND ADJOINING GOVERNMENT LAND, KAM TIN, YUEN LONG, NEW TERRITORIES (Application Number:A/YL-KTS/1135)
Title:	Catchment Plan of The Site
Drawn by:	Fig 3
Drawn by:	DM
Date:	4-9-2026



Note:

- Catchpits (CP13) with desilting facility shall follow CEDD standard drawing No. C2406I.
- Catchpit and UC follows Typical Details of Geotechnical Manual for Slope Fig.8.10 and Fig.8.11 respectively.
- Fence Wall to be erected (if any) shall be Open-bottom type.
- Maximum 900mm filling.



LEGEND

- | | | | |
|-----|--|------|---------------------------|
| (a) | Proposed 225UC (1:100) with Cast Iron Cover | □ CP | Proposed CatchPit |
| (b) | Proposed 300UC (1:100) with Cast Iron Cover | — | Existing Stream |
| (c) | Proposed 450UC (1:150) with Cast Iron Cover | ⊙ | Proposed 52Supvc downpipe |
| (d) | Proposed 450UC (1:250) with Cast Iron Cover | | |
| (e) | Proposed 600UC (1:250) with Cast Iron Cover | | |
| (f) | Proposed 600UC (1:200) with Cast Iron Cover | | |
| (g) | Proposed 1.0m(W)x1.0m(D) Rectangular Channel (1:250) | | |
| (h) | Proposed 1050mm dia. concrete pipe (1:200) | | |

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Project:

PROPOSED TEMPORARY WAREHOUSE (EXCLUDING DANGEROUS GOODS GODOWN) WITH ANCILLARY FACILITIES AND ASSOCIATED FILLING OF LAND FOR A PERIOD OF 3 YEARS at VARIOUS LOTS IN D.D. 106 AND ADJOINING GOVERNMENT LAND, KAM TIN, YUEN LONG, NEW TERRITORIES
(Application Number: A/YL-KTS/1135)

Title:

Drainage Proposal - LAYOUT

Fig. 4

Drawn by:

DM

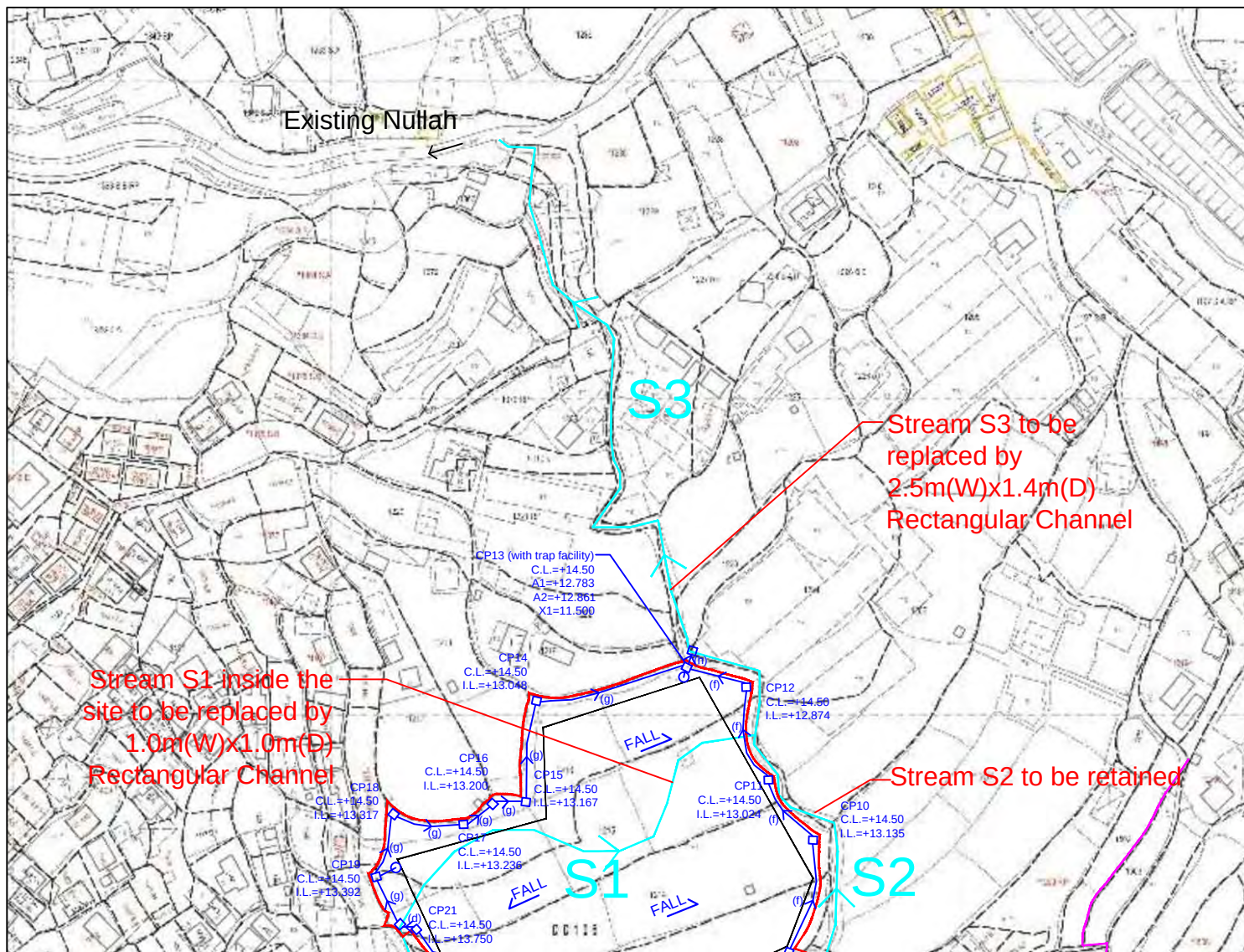
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4-9-2026

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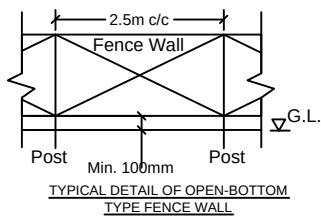
DM

Scale:



Note:

1. Catchpits (CP13) 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.
3. Fence Wall to be erected (if any) shall be Open-bottom type.
4. Maximum 900mm filling.



LEGEND

- | | | | |
|-----|--|------|---------------------------|
| (a) | Proposed 225UC (1:100) with Cast Iron Cover | □ CP | Proposed CatchPit |
| (b) | Proposed 300UC (1:100) with Cast Iron Cover | — | Existing Stream |
| (c) | Proposed 450UC (1:150) with Cast Iron Cover | ⊗ | Proposed 525upvc downpipe |
| (d) | Proposed 450UC (1:250) with Cast Iron Cover | | |
| (e) | Proposed 600UC (1:250) with Cast Iron Cover | | |
| (f) | Proposed 600UC (1:200) with Cast Iron Cover | | |
| (g) | Proposed 1.0m(W)x1.0m(D) Rectangular Channel (1:250) | | |
| (h) | Proposed 1050mm dia. concrete pipe (1:200) | | |

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Project:

PROPOSED TEMPORARY WAREHOUSE (EXCLUDING DANGEROUS GOODS GODOWN) WITH ANCILLARY FACILITIES AND ASSOCIATED FILLING OF LAND FOR A PERIOD OF 3 YEARS at VARIOUS LOTS IN D.D. 106 AND ADJOINING GOVERNMENT LAND, KAM TIN, YUEN LONG, NEW TERRITORIES
(Application Number: A/YL-KTS/1135)

Title:

Drainage Proposal - LAYOUT

Fig. 5

Drawn by:

DM

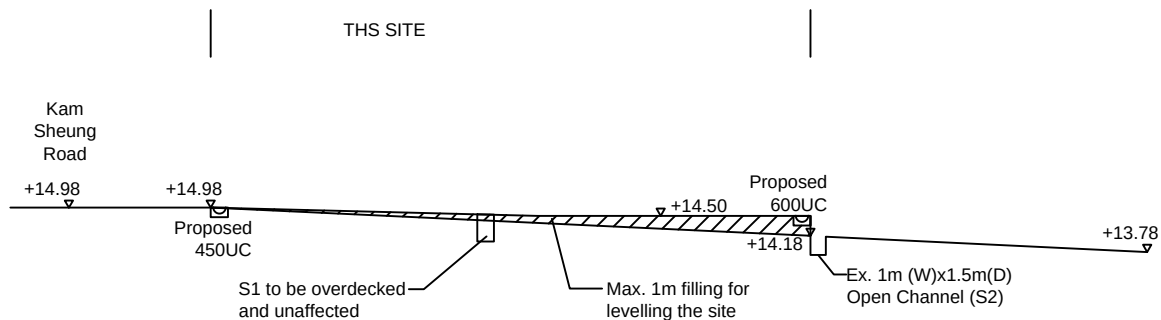
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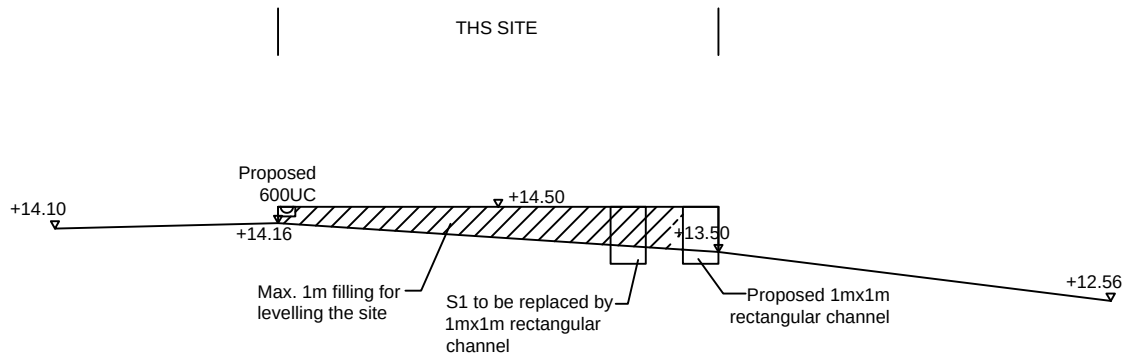
Check by:

DM

Scale:



SECTION A-A



SECTION B-B

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Project:
PROPOSED TEMPORARY WAREHOUSE (EXCLUDING DANGEROUS GOODS GODOWN) WITH ANCILLARY FACILITIES AND ASSOCIATED FILLING OF LAND FOR A PERIOD OF 3 YEARS at VARIOUS LOTS IN D.D. 106 AND ADJOINING GOVERNMENT LAND, KAM TIN, YUEN LONG, NEW TERRITORIES
 (Application Number:A/YL-KTS/1135)

Title:

Drainage Proposal -
SECTIONS

Fig. 6

Drawn by:

DM

Date:

4-9-2026

Check by:

DM

Scale:



Photo 3

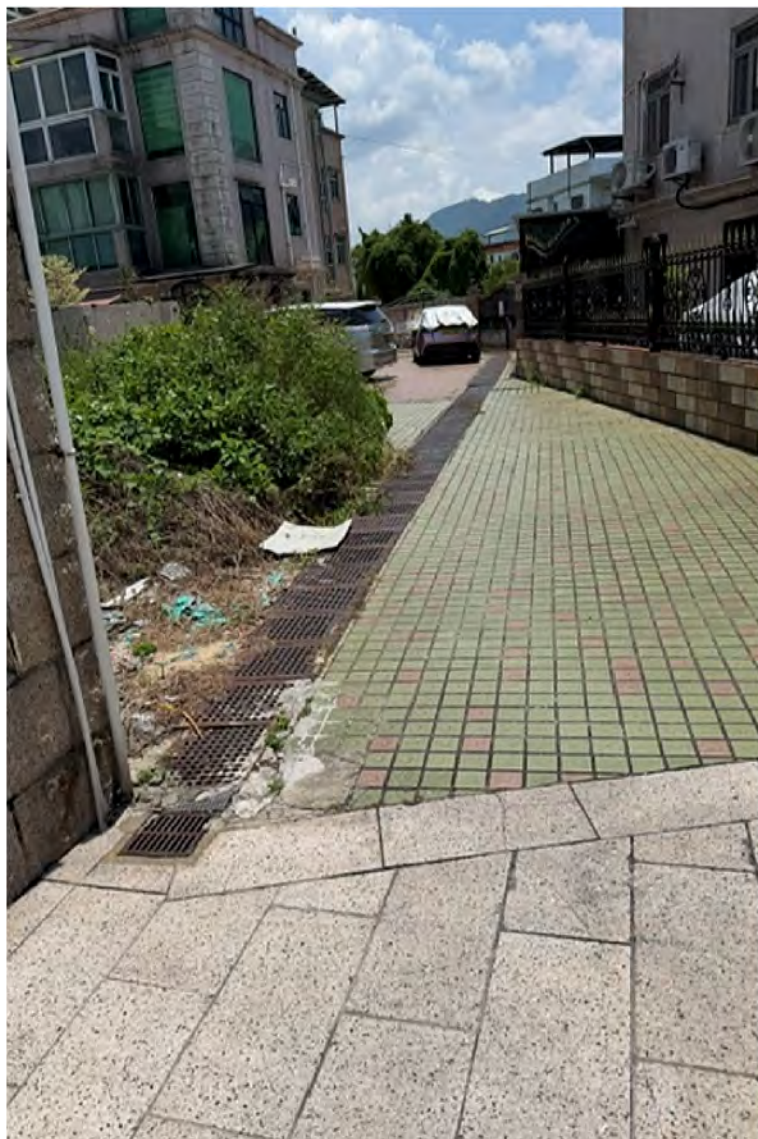


Photo 4



Photo 5



Photo 6



Photo 7



Photo 8



Photo 9



Photo 10



Photo 11



Photo 12



Photo 13



Photo 14



Photo 15



Photo 16



Photo 17



Photo 18



Photo 19



Photo 20



Photo 21



Photo 22



Photo 23 SCH1037320

