Proposed Temporary Warehouse and Open Storage of Construction Material with Ancillary Facilities for a Period of 3 Years and Associated Filling of Land at Lot 207 in D.D. 84, Ta Kwu Ling, N.T.

Drainage Proposal

Appendix I

May 2024

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1. Introduction

1.1 Background

1.1.1 With reference to the approval on planning application of A/NE-TKL/695, in which the application seeks planning permission for proposed temporary open storage and warehouse for storage of timber and wooden parts for a period of 3 years at the development site.

1.1.2 This Drainage Proposal aim to discharge/fulfil the planning approval condition (c) and to support the development in drainage aspect.

1.2 The Site

1.2.1 The Development Site was situated beside a village road at Ta Kwu Ling, North Distract. It has an area of about 1,649 m^2. The existing site is fully paved. The site location plan is shown in **Figure 1**.

1.2.2 The existing ground level of the site is approx. +11.6 mPD and it is intended to maintain the same level at the proposed development site.

1.2.3 There is an existing 400 mm width channel at perimeter of development site. At the north of the site, beside the local village road and unused agricultural land, there is an existing channel and stream with size upto approx.. 2.2m width at downstream. Existing Drainage Plan and Site Photo of existing channel/stream are shown in **Figure 2** for reference.

1.2.4 Proposed Development Layout plan is shown in **Appendix B** for reference.

2. Development Proposal

2.1 The Proposed Development

2.1.1 The total site area is approximately 1,649 m^2. The indicative development schedule is summarized in **Table 1** below for technical assessment purpose. The catchment plan is shown in **Figure 4**.

Proposed Development	
Total Site Area (m^2)	1,649
Paved Area (m^2) Assume all proposed site area as paved area for assessment purpose	1,649

Table 1 - Key Development Parameters

3. Assessment Criteria

3.1.1 The Recommended Design Return Period based on Flood Level from SDM (Table 10) is adopted for this DIA. 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 village drainage system intended to collect runoff from the internal site. 1 in 10 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 North District Rainfall Zone. Therefore, for 10 years return period, the following values are adopted.

a	=	1157.7
b	=	19.04
c	=	0.597

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:

- Paved Area: C = 0.95
- Unpaved Area: C = 0.35

4. Manning's Equation is used for calculation of velocity of flow inside the channels:

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:

Colebrook-White Equation: $\underline{v} = -\sqrt{32gRS}\ log\ log\ (\frac{k_s}{14.8R} + \frac{1.255v}{R\sqrt{32gRS_f}})$

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. Design Review of Existing Drainage System

4.1.1 As the existing site area is fully paved, there is no additional runoff generated from the development site.

4.1.2 There is existing 400mm (W) (gradient 1 in 200) channels at the perimeter of the site as shown in **Figure 2**. The site runoff is discharging to an existing channel/stream (approx. 2.2m (W), gradient 1 in 150) at the north of the site.

4.1.3 The alignment, size and gradient of the existing drains are shown in **Figure 3**. The site and nearby area is generally flat. For capacity check of existing channel/stream, additional min. 15m area around the site (Zone E3 in Figure 4) was added to the catchment plan for assessment purpose. The catchment plan is shown in **Figure 4**.

4.1.4 The Design review of the existing 400mm channels are shown in **Appendix A**.

5. Conclusion

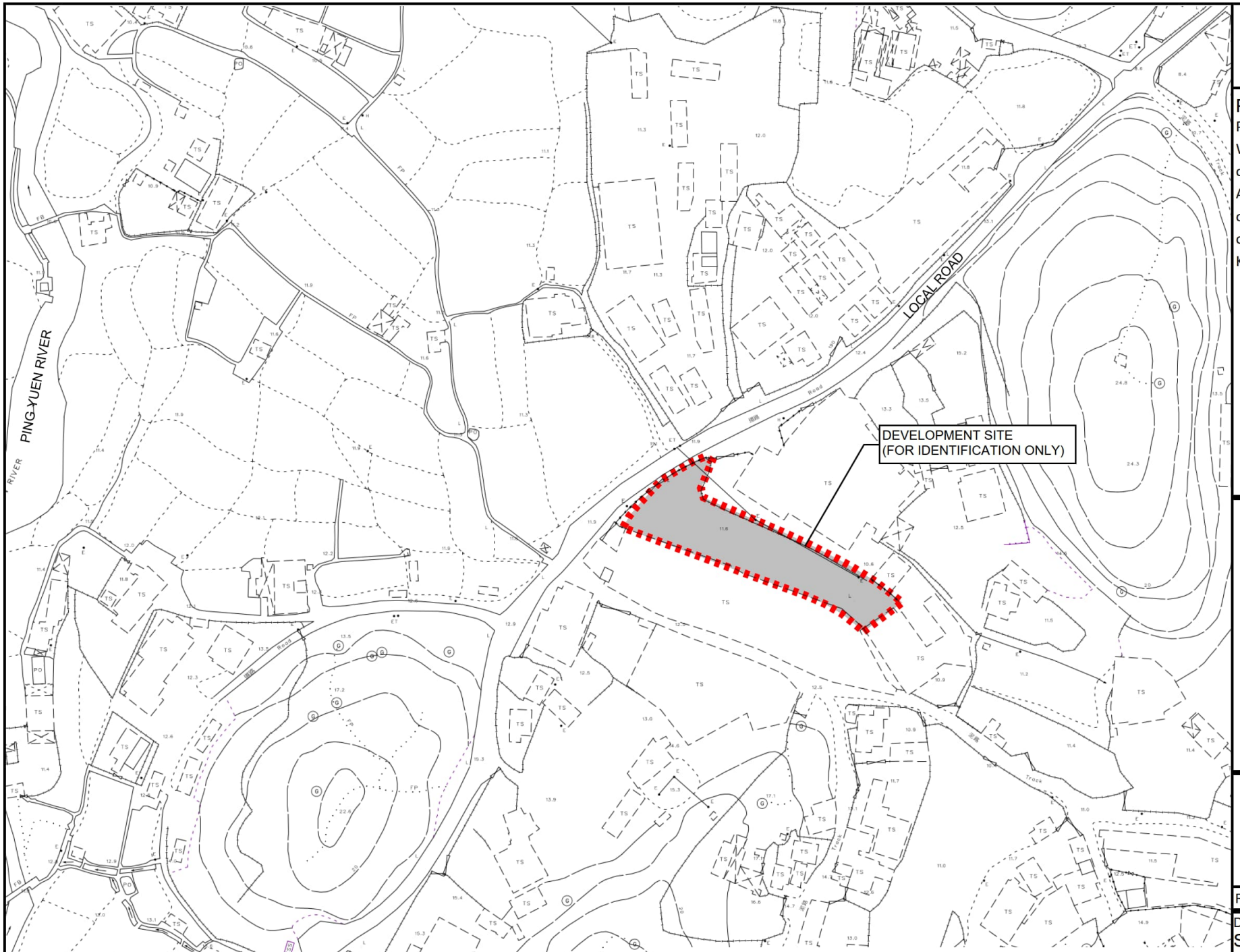
5.1.1 A drainage review has been conducted for the Proposed Development. As the existing site area is fully paved, there is no additional runoff generated from/drainage impact due to the development site.

5.1.2 The surface runoff from the Development Site will be collected by the existing drains and discharged to the existing channel/stream beside local road. The design review in Appendix A demonstrated that the utilization of existing drains is less than 70%.

5.1.2 With the existing drainage system, it is anticipated that there will be no significant drainage impact to the area after the implementation of the development.

- End of Text -

FIGURES



PROJECT:
Proposed Temporary Warehouse and Open Storage of Construction Material with Ancillary Facilities for a Period of 3 Years and Associated Filling of Land at Lot 207 in D.D. 84, Ta Kwu Ling, N.T.

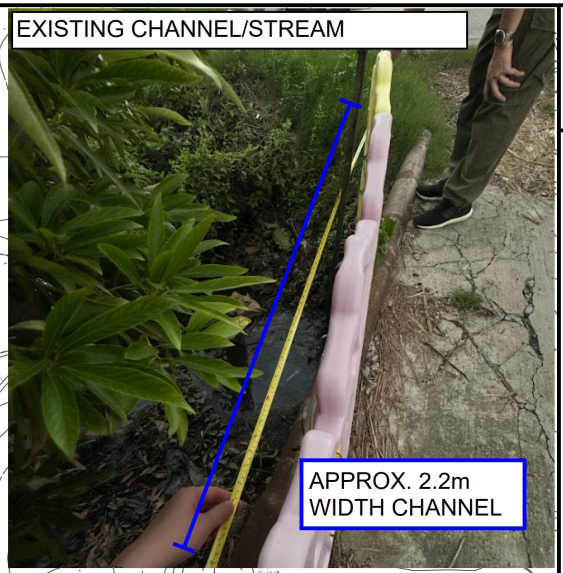
REV	DESCRIPTION	DATE

DRAWING TITLE
SITE LOCATION PLAN

DRAWING NUMBER
FIGURE 1

VIEW 1 - EXISTING CHANNEL/STREAM

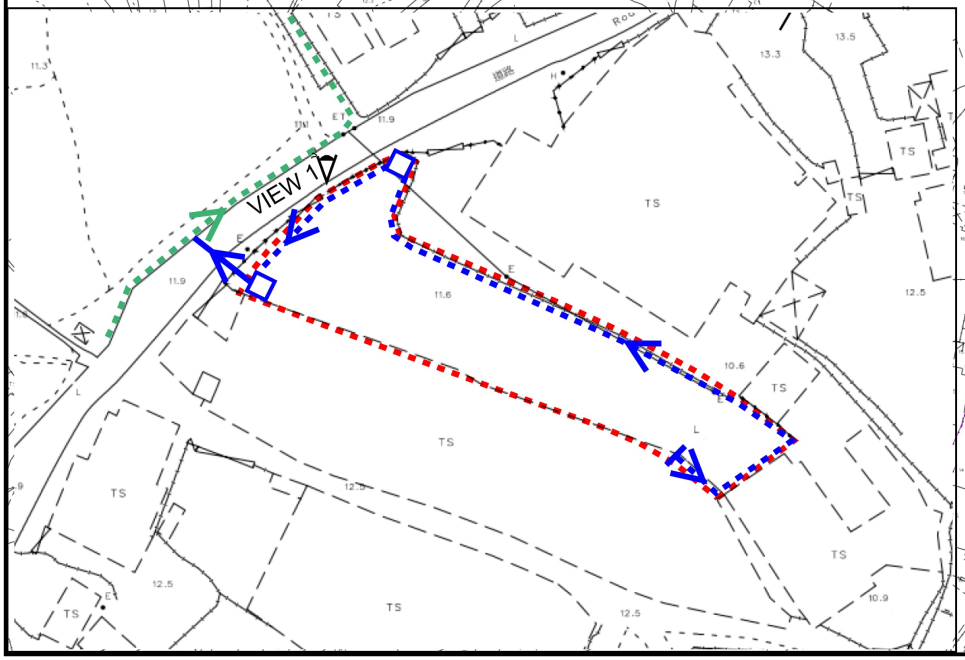
EXISTING CHANNEL/STREAM



LOCAL ROAD

PING YUEN RIVER

DEVELOPMENT SITE
(FOR IDENTIFICATION ONLY)



LEGEND:

PROPOSED DEVELOPMENT SITE
(FOR IDENTIFICATION PURPOSE ONLY)

EXISTING PIT

EXISTING U CHANNEL WITHIN
DEVELOPMENT SITE (400mm, 1 in 200 FALL)

EXISTING DRAING PIPE
(400mm, 1 in 200 FALL)

EXISTING CHANNEL / STREAM
(APPROX. 2.2m, 1 in 150 FALL)

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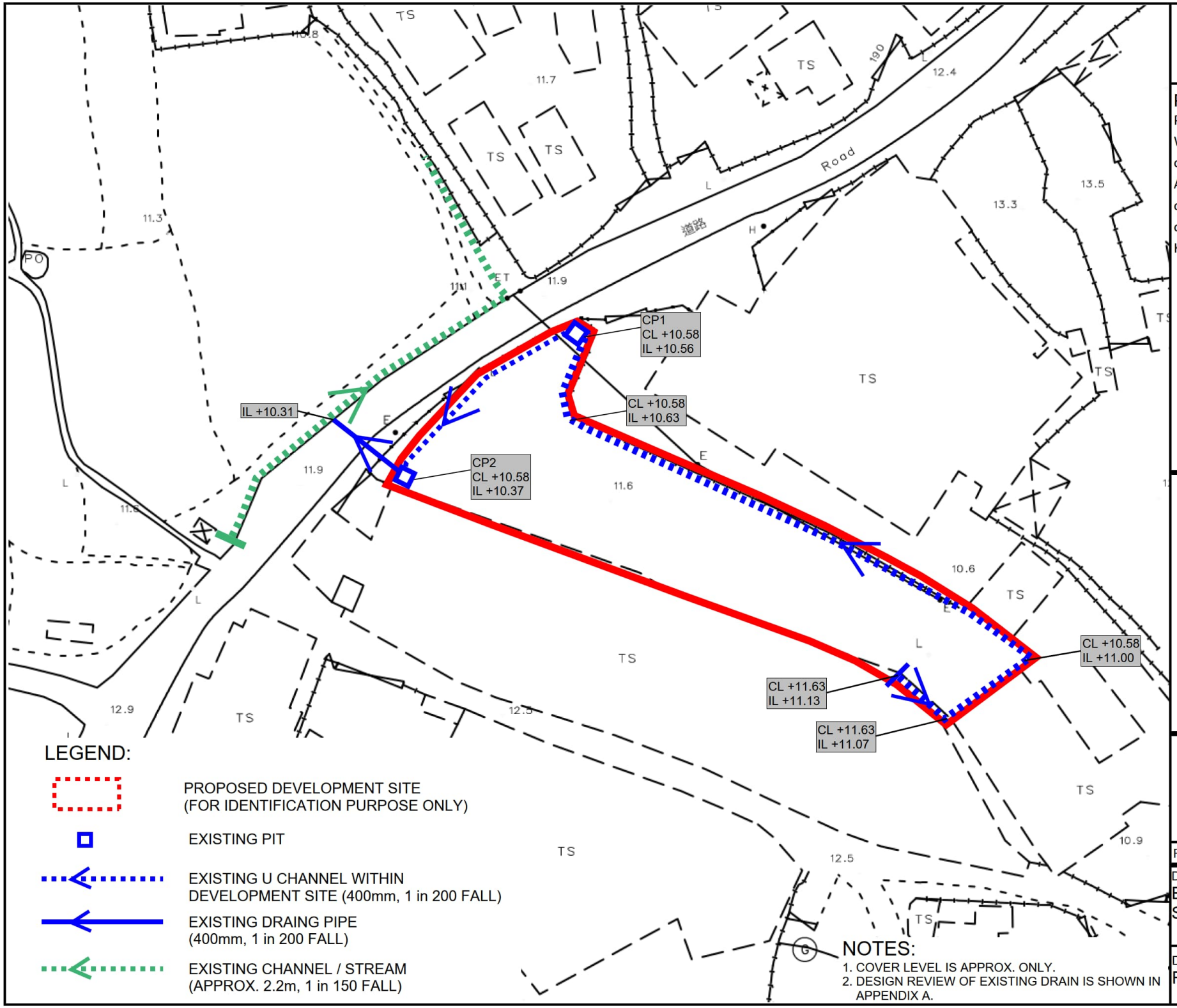
REV	DESCRIPTION	DATE

DRAWING TITLE
EXISTING DRAINAGE PLAN

DRAWING NUMBER
FIGURE 2



LEGEND:

- PROPOSED DEVELOPMENT SITE (FOR IDENTIFICATION PURPOSE ONLY)
- EXISTING PIT
- EXISTING U CHANNEL WITHIN DEVELOPMENT SITE (400mm, 1 in 200 FALL)
- EXISTING DRAING PIPE (400mm, 1 in 200 FALL)
- EXISTING CHANNEL / STREAM (APPROX. 2.2m, 1 in 150 FALL)

NOTES:

1. COVER LEVEL IS APPROX. ONLY.
2. DESIGN REVIEW OF EXISTING DRAIN IS SHOWN IN APPENDIX A.

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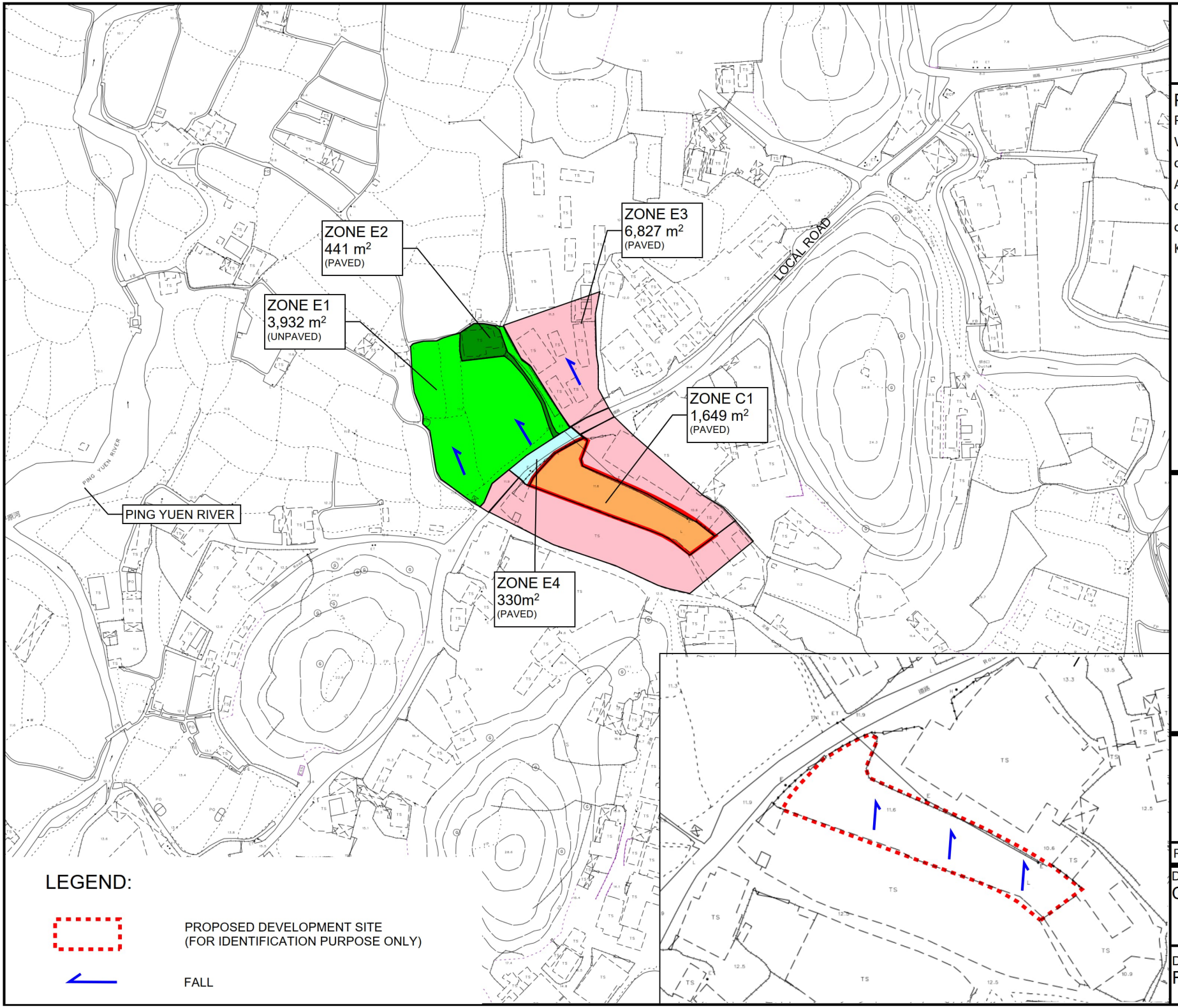
REV	DESCRIPTION	DATE

DRAWING TITLE
EXISTING DRAINAGE SYSTEM

DRAWING NUMBER
FIGURE 3



LEGEND:

PROPOSED DEVELOPMENT SITE
(FOR IDENTIFICATION PURPOSE ONLY)

FALL

PROJECT:
Proposed Temporary Warehouse and Open Storage of Construction Material with Ancillary Facilities for a Period of 3 Years and Associated Filling of Land at Lot 207 in D.D. 84, Ta Kwu Ling, N.T.

REV	DESCRIPTION	DATE

DRAWING TITLE
CATCHMENT PLAN

DRAWING NUMBER
FIGURE 4

APPENDIX

Appendix A - Design Review of Existing Drainage System

Existing U Channel 1 (Zone C1 + E4)

Runoff Estimation				
Design Return Period		1 in	10	years
Paved Area	330 + 1649 =		1979	(m2)
Unpaved Area			0	(m2)
Total Equivalent Area	1979 x 0.95 + 0 x 0.35 =		1880	(m2)
Rainfall Intensity, I *			173	mm/hr
Design Discharge Rate, Q	0.278 x 1880 x 173 / 1000000 =		0.091	m3/s

* $i = \frac{a}{(t_d + b)^c}$

U Channel			
Channel Size		400	(mm)
Gradient	1 in	200	
Velocity		1.35	m/s
Capacity		0.193	m3/s

Utilization 0.091 / 0.193 = **46.85** % OK (less than 90%, for 10% siltation allowance)

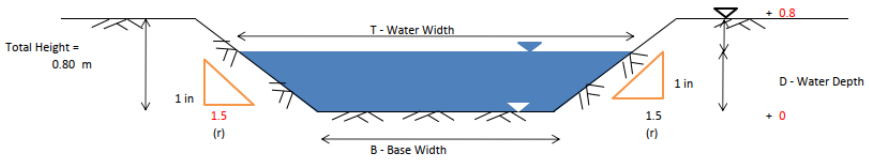
Existing Channel/ Stream (Zone C1 + E1 + E2 + E3 + E4)

Runoff Estimation				
Design Return Period		1 in	10	years
Paved Area	8806 =		8806	(m2)
Unpaved Area	3932 =		3932	(m2)
Total Equivalent Area	8806 x 0.95 + 3932 x 0.35 =		9742	(m2)
Rainfall Intensity, I *			173	mm/hr
Design Discharge Rate, Q	0.278 x 3932 x 173 / 1000000 =		0.470	m3/s

* $i = \frac{a}{(t_d + b)^c}$

Manning's to estimate Capacity

Checking of Capacity of Trapezoidal Channel



Scenario & Case	Assumed Water Depth (m)	Water Width (m)	Base Width (m)	Area (m^2)	Wetted Perimeter (m)	Hydralic Radius (m)	Manning's Roughness n	Friction Slope S_f (1 in)	Velocity (m/s)	Capacity
	D_1	T	B	A_1	P_1	R_1	n	S_f	V_1	Q_1
A	0.50	2.10	0.6	0.68	2.40	0.28	0.035	150	1.0006	0.675
	Utilitization	=	0.47 / 0.675		69.55	%	OK	(less than 90%, for 10% siltation allowance)		

Design Review of Existing 400mm Pipe

Runoff Estimation			
Design Return Period	1 in	10	years
Paved Area*		1979	m2
Unpaved Area*		0	m2
Total Equivalent Area		1880	m2
Rainfall Intensity		173	mm/hr
Design Discharge Rate		0.091	m3/s

Pipe Design			
Pipe Size		400	mm
Gradient	1 in	200	
Velocity		1.54	m/s
Capacity		0.193	m3/s

Utilization = **46.97** % OK (less than 90%, for 10% siltation allowance)

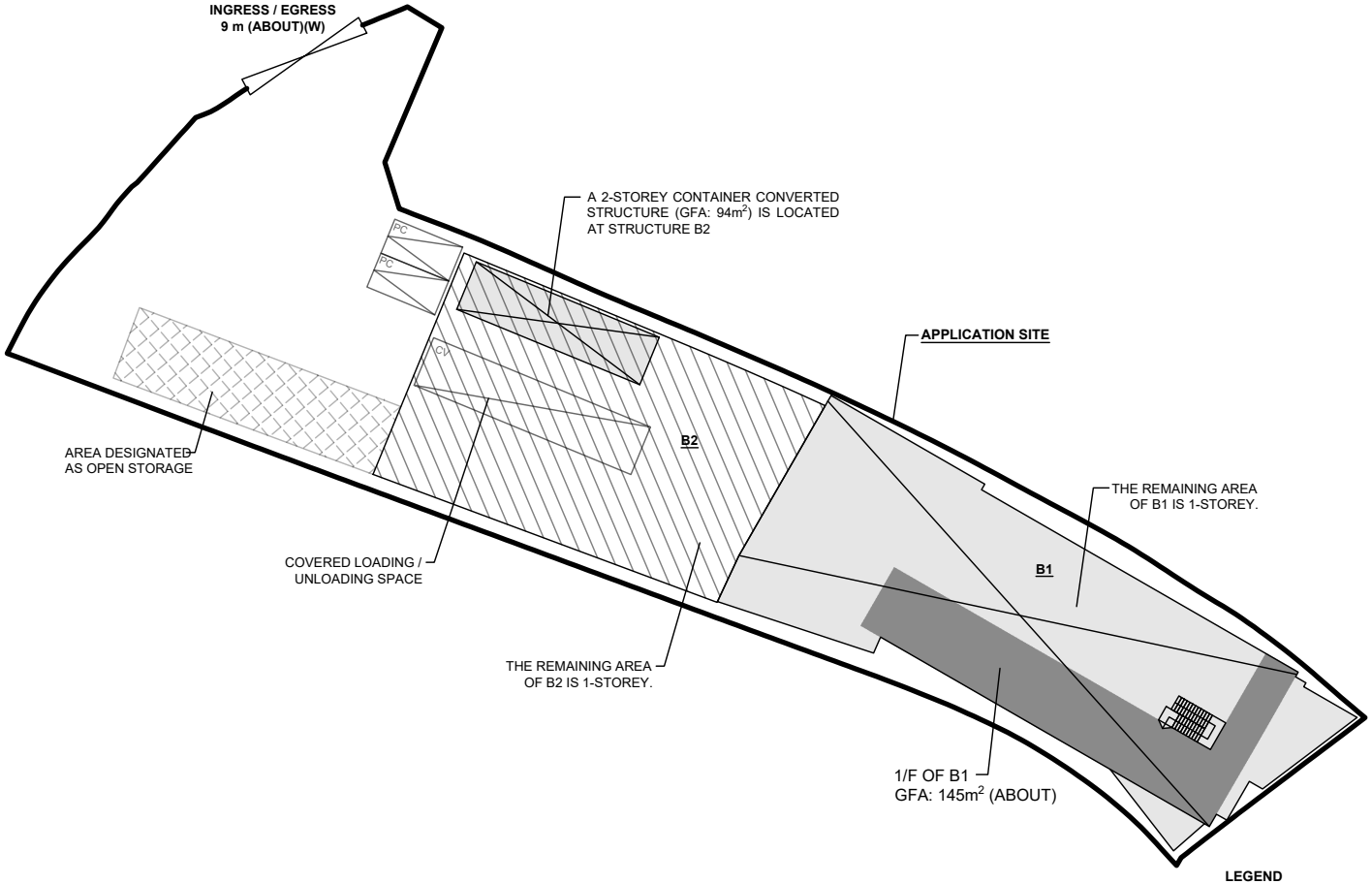
Appendix B - Proposed Development Layout Plan

DEVELOPMENT PARAMETERS

APPLICATION SITE AREA	: 1,649 m^2	(ABOUT)
COVERED AREA	: 929 m^2	(ABOUT)
UNCOVERED AREA	: 720 m^2	(ABOUT)
PLOT RATIO	: 0.68	(ABOUT)
SITE COVERAGE	: 56 %	(ABOUT)
NO. OF STRUCTURE	: 2	
DOMESTIC GFA	: NOT APPLICABLE	
NON-DOMESTIC GFA	: 1,121 m^2	(ABOUT)
TOTAL GFA	: 1,121 m^2	(ABOUT)
BUILDING HEIGHT	: NOT EXCEEDING 8 m	
NO. OF STOREY	: 2	

STRUC				
B1	WAREHOUSE FOR STORAGE OF CONSTRUCTION MATERIALS	520 m^2 (ABOUT)	665 m^2 (ABOUT)	NOT EXCEEDING 8 m (#2-STOREY)
B2	WAREHOUSE FOR STORAGE OF CONSTRUCTION MATERIALS, COVERED L/UL AREA, SITE OFFICE AND WASHROOM	409 m^2 (ABOUT)	456 m^2 (ABOUT)	NOT EXCEEDING 8 m (#2-STOREY)
	TOTAL	**929 m^2 (ABOUT)**	**1,121 m^2 (ABOUT)**	

#ONLY PORTIONS OF STRUCTURES B1 AND B2 ARE 2-STOREY, THE REMAINING AREA OF STRUCTURES B1 AND B2 ARE 1-STOREY.



LEGEND

- APPLICATION SITE
- OPEN STORAGE AREA
- STRUCTURE (SHED)
- STRUCTURE (ENCLOSED)
- PARKING SPACE (PC)
- LOADING / UNLOADING SPACE (CV)
- INGRESS / EGRESS

PARKING AND LOADING / UNLOADING PROVISIONS

NO. OF PRIVATE CAR PARKING SPACE	: 2
DIMENSION OF PARKING SPACE	: 5 m (L) x 2.5 m (W)
NO. OF L/UL SPACE FOR CONTAINER VEHICLE	: 1
DIMENSION OF L/UL SPACE	: 16 m (L) x 3.5 m (W)

W — E
S

PLANNING CONSULTANT
R-Riches Property Consultants Ltd.

PROJECT
PROPOSED TEMPORARY WAREHOUSE AND OPEN STORAGE OF CONSTRUCTION MATERIAL WITH ANCILLARY FACILITIES FOR A PERIOD OF 3 YEARS AND ASSOCIATED FILLING OF LAND

SITE LOCATION
LOT 207 IN D.D. 84, PING CHE, TA KWU LING, NEW TERRITORIES

SCALE
1 : 500 @ A4

DRAWN BY	DATE
MN	14.5.2024
REVISED BY	DATE
APPROVED BY	DATE

DWG. TITLE
LAYOUT PLAN

DWG NO.	VER.
PLAN 4	001