Proposed Temporary Place of Recreation, Sport and Culture (Hobby Farm) for a Period of 3 Years and Associated Filling of Land at various lots in DD96 and adjoining Government Land, Shun Yee Shan Tsuen, Ma Tso Lung

Drainage Impact Assessment Report

Rev.	Date	Remarks	Prepared	Reviewed	Approved
1	Feb 2025	1st Submission	HL	KS	KS

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Appendix

1 Drainage Impact Assessment

1.1 Background

The site is planned to be a temporary Place of Recreation, Sport and Culture (Hobby Farm) for a period of 3 years.

It is located on the Approved Ma Tso Lung and Hoo Hok Wai Outline Zoning Plan No. S/SE-MTL/3 at Lot 1219(Part), 1222, 1223, 1226, 1228, 1230, 1242, 1243 and 1244 in DD96 and adjoining Government Land, Shun Yee Shan Tsuen, Ma Tso Lung, New Territories.

The location of the Site is shown in **Figure 1.1**

1.2 Purpose of this Submission

This report demonstrates the proposed works at the Site is viable in terms of its impact on the surrounding drainage system.

1.3 Structure of the Report

This DIA Report comprises the following sections after this introduction:

- **Chapter 2** discusses the development proposal and the existing drainage characteristics in the vicinity of the Site.
- **Chapter 3** presents the approach and criteria in carrying out this DIA
- **Chapter 4** examines the potential drainage impact arising from the proposed works
- **Chapter 5** provides consideration on operation of the drainage system upon completion of the works.
- **Chapter 6** provides the conclusion and recommendation of this DIA Report

2 Development Proposal and Existing Drainage Characteristics

2.1 Proposed Development

The site area is about 8,066m^2 and the outdoor farming area is about 3490m^2. The site will have a 11m wide entrance to the east. 14 structures will be erected on the site for agricultural education centres, greenhouse, wash room and store room. Details of the development as summarized in Table 2.1 as follows:

Table 2.1 Main Development Parameters

Site Area	About 8,066 m^2
Covered Area	About 1,349m^2
Uncovered Area	About 6,717m^2
Outdoor Farming Area	About 3,490m^2

The master layout plan and the surroundings of the Site are shown in **Appendix A**.

2.2 Existing Drainage Networks

The surrounding areas of the site area are characterized by a mixture of various land uses. These include low-rise residential development at Northern side; natural landscapes at East and South side.

With reference to the aerial photographs, aerial views of the orthomap in GeoInfo Map and site condition, an inventory of the existing drainage service in the vicinity of the site is shown in Table 2.2.

Table 2.2 Existing Drainage System in Vicinity of Project Site

Location	Type	Size
Ma Tso Lung Road	Gully Systems`	N/A
North East of the Site	Underground Drains	DN 900
Northern Side of the Site	Pond	1600 m^2
West of the Site	Natural Stream	3000(W) x 500 (D)

To identify, assess and mitigate potential adverse drainage impacts arising from the proposed development at the Site. Major drainage structures, pond and river stream shown in **Appendix B**.

The total catchment area is 8.4ha approximately. From the available record, the surface runoff from the catchment flows to west by gravity. The runoff from this catchment is discharged to existing to natural stream by gravity. The existing sub-catchment plan of the site and adjacent areas is shown in **Appendix C**.

Based on aerial photos and site inspections the existing site is in rural area and vegetated. Current site area comprises fallow grassland and vegetation.

3 Assessment Approach

3.1 Methodology

In general, stormwater drainage design will be carried out in accordance with the criteria set out in DSD's Stormwater Drainage Manual, Fifth Edition, 2018 (SDM) with Corrigendum No. 1/2022; 1/2024 and 2/2024.

3.2 Assessment Criteria

The proposed design criteria to be adopted for design of this stormwater drainage system and factors which have been considered are summarized below.

- Design return periods: 1 in 10 years

- Intensity – Duration – Frequency Relationship: The recommended Intensity – Duration – Frequency relationship is used to estimate the intensity of rainfall. It is expressed by the following algebraic equation.

  $$i = \frac{a}{(t_c + b)^C}$$

  The site is located within the North District Area Rainfall Zone. Therefore, for 10 years return period, the following values are adopted.

  a = 448.1

  b = 3.67

  c = 0.412

- The peak runoff is calculated by the Rational Method.

  Q = 0.278 C i A

  Where,

  Q = peak runoff in m3/s

  C = runoff coefficient

  i = rainfall intensity in mm/hr

  A = catchment area in km^2

- The runoff coefficient (C) of surface runoff are taken as follows:

  Paved Area: C = 0.90

  Unpaved Area: C = 0.30

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

$$\bar{V} = \frac{R^{1/6}}{n}\sqrt{RS_f}$$

Where,

V = velocity of the channel flow (m/s)

S_f = hydraulic gradient

n = manning's coefficient

R = hydraulic radius (m)

- Colebrook-White Equation is used for calculation of flow inside the pipes:

$$\bar{V} = -\sqrt{32gRS_f}\,log\left[\frac{k_s}{14.8R} + \frac{1.255v}{R\sqrt{32gRS_f}}\right]$$

Where,

V = velocity of the pipe flow (m/s)

S_f = hydraulic gradient

k_s = roughness value (m)

v = kinematics viscosity of fluid

D = pipe diameter (m)

R = hydraulic radius (m)

- The roughness values used for stormwater drainage system

Classification	Roughness Coefficient	Remarks
Concrete Pipe,	Ks = 3mm	Slimed
Natural-stream channel, clean	N = 0.030	Fair
Concrete-lined channels	N = 0.016	Fair

- 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.

4 Potential Drainage Impact

4.1 Change in Drainage Characteristics

The Site is proposed to be built at level from +11.2mPD to +19.0mPD after site formation. The site access is located in the eastern of the site and connect to the Ma Tso Lung Road. With such development, there will be an increase in paved areas and the overland flow path for the sub-catchment would be affected. As a result, increase in surface runoff to existing natural stream would be expected. The Site will have about 43% outdoor farming area in accordance to Planning Statement. Hence, it is assumed 57% of site area would be paved and the remaining 43% would be unpaved area.

4.2 Drainage Impact

4.2.1 The runoff from the Site would be collected by internal drainage system. The runoff will be discharged from proposed catch pit to the natural stream.

4.2.2 The sub-catchment plan after the proposed development is presented in **Appendix D**.

4.2.3 Hydraulic calculation under existing condition and after proposed development are attached in **Appendix E**. The proposed drainage scheme is shown in **Appendix F**.

4.2.4 According to the hydraulic calculation results, it is observed that the maximum flow into the concerned natural stream is 1.38m^3/s under existing scenario and 1.64m^3/s under proposed scenario. There is a 19% increase in maximum flow. Considering 10% of flow area will be blocked during the storm, the concerned natural stream still provides flow capacity equal to 5.233m^3/s.

4.2.5 Based on the above, it is considered that the drainage impacts insignificant after the proposed development.

5 Construction and Operation

5.1 Detailed Design

Operation and maintenance requirements should be considered in the detailed design stage in accordance with the requirement specified in the SDM. These features include manholes, and pipes, etc.

5.2 Construction Consideration

5.2.1 The contractor is responsible for temporary drainage arrangement during construction and to ensure that the existing drainage system within and adjacent to the Site would not be affected at the construction stage.

5.2.2 Should any temporary blockage or diversion of the flow path be necessary for construction; the work must be carried out within the dry season(s) and the Contractor must have appropriate mitigation measures in place. Examples of appropriate mitigation measures include providing sandbags or similar to increase the in-channel capacity and to maintain flow through a given channel section through over-pumping.

5.2.3 Proper measures shall be taken to maintain the existing drainage characteristics of the catchment areas and to minimize drainage impacts associated with the construction works. The principal drainage impacts which are associated with construction of the works have been identified as follows:

- Erosion of ground materials;
- Sediment transportation to existing downstream drainage system; and
- Obstruction to drainage systems.

5.2.4 Perimeter ditches / U-channels should be provided at crest of any temporary excavated slope to intercept the runoff and hence avoiding erosion to the surfaces of proposed temporary cutting.

5.2.5 Regular inspection shall be carried out to ensure integrity of the works. These inspections shall cover works under construction as well as recently completed areas.

5.2.6 No excavated materials should be left on site. If it is not possible to transport away the excavated material within the same day, the material should be covered by tarpaulin/impervious sheets. Measures shall be taken to ensure that runoff from the Site is managed so that silts and other pollution are properly intercepted.

5.2.7 In the event of extreme weather including Landslip Warning, issuance of Amber/Red/Black Rainstorm Warning, Special Flood Announcement, Typhoon Signal No. 3 or above and the like, site inspections and surveys shall be carried out by the contractor’s emergency team as deemed practical and safe before and after the events to ascertain if there has been any siltation or erosion. If it is determined that any unacceptable siltation or erosion has occurred, the contractor shall rectify it immediately

5.2.8 Erosion protection in the form of rip-rap is proposed at the outlet to prevent erosion and scour within the natural drainage path.

6 Conclusion and Recommendation

6.1 Conclusion

6.1.1 This DIA is prepared to assess the potential drainage impact as a result of the proposed new drainage works for the proposed development.

6.1.2 The maximum flow at the downstream existing natural stream would be increased by $0.26m^3/s$ after the proposed development. This is mainly due to the increased of runoff by changes from unpaved area to paved area and original flow path of surface runoff has been blocked by the site.

6.1.3 Based on the hydraulic assessment, there is no adverse drainage impact to the surrounding natural stream arising from the proposed hobby farm development at Site with proposed drainage works.

6.2 Recommendation

6.2.1 Suitable internal drainage system would be further considered during the detailed design stage to collect the drainage flow within the Site to the natural stream.

6.2.2 The drainage facilities proposed within the Site to convey the surface runoff outside site and discharge to the terminal manhole at the west side of the Site. The stormwater drains will be laid beneath the grassland which connect to the existing natural stream

6.2.3 The proposed site should maintain minimum 43% unpaved area.

Appendix A

Master Layout Plan

DEVELOPMENT PARAMETERS

APPLICATION SITE AREA	:	8,066 m^2 (ABOUT)
COVERED AREA	:	1,349 m^2 (ABOUT)
UNCOVERED AREA	:	6,717 m^2 (ABOUT)
PLOT RATIO	:	0.17 (ABOUT)
SITE COVERAGE	:	17% (ABOUT)
NO. OF STRUCTURE	:	14
DOMESTIC GFA	:	NOT APPLICABLE
NON-DOMESTIC GFA	:	1,349 m^2 (ABOUT)
TOTAL GFA	:	1,349 m^2 (ABOUT)
BUILDING HEIGHT	:	4.5 m (NOT MORE THAN)
NO. OF STOREY	:	1 (NOT MORE THAN)

STRUCTURE	USE	COVERED AREA	GFA	BUILDING HEIGHT
B1	AGRICULTURAL EDUCATION CENTER	209 m^2 (ABOUT)	209 m^2 (ABOUT)	4.5 m (NOT MORE THAN) (1-STOREY)
B2	WASH ROOM	18 m^2 (ABOUT)	18 m^2 (ABOUT)	3 m (ABOUT) (1-STOREY)
B3	STORE ROOM	13 m^2 (ABOUT)	13 m^2 (ABOUT)	4.5 m (NOT MORE THAN) (1-STOREY)
B4 - 1	GREENHOUSE	90 m^2 (ABOUT)	90 m^2 (ABOUT)	4.5 m (NOT MORE THAN) (1-STOREY)
B4 - 2	GREENHOUSE	90 m^2 (ABOUT)	90 m^2 (ABOUT)	4.5 m (NOT MORE THAN) (1-STOREY)
B4 - 3	GREENHOUSE	90 m^2 (ABOUT)	90 m^2 (ABOUT)	4.5 m (NOT MORE THAN) (1-STOREY)
B4 - 4	GREENHOUSE	90 m^2 (ABOUT)	90 m^2 (ABOUT)	4.5 m (NOT MORE THAN) (1-STOREY)
B4 - 5	GREENHOUSE	90 m^2 (ABOUT)	90 m^2 (ABOUT)	4.5 m (NOT MORE THAN) (1-STOREY)
B4 - 6	GREENHOUSE	90 m^2 (ABOUT)	90 m^2 (ABOUT)	4.5 m (NOT MORE THAN) (1-STOREY)
B4 - 7	GREENHOUSE	90 m^2 (ABOUT)	90 m^2 (ABOUT)	4.5 m (NOT MORE THAN) (1-STOREY)
B4 - 8	GREENHOUSE	90 m^2 (ABOUT)	90 m^2 (ABOUT)	4.5 m (NOT MORE THAN) (1-STOREY)
B4 - 9	GREENHOUSE	90 m^2 (ABOUT)	90 m^2 (ABOUT)	4.5 m (NOT MORE THAN) (1-STOREY)
B4 - 10	GREENHOUSE	90 m^2 (ABOUT)	90 m^2 (ABOUT)	4.5 m (NOT MORE THAN) (1-STOREY)
B5	AGRICULTURAL EDUCATION CENTER	209 m^2 (ABOUT)	209 m^2 (ABOUT)	4.5 m (NOT MORE THAN) (1-STOREY)
	TOTAL	**1,349 m^2 (ABOUT)**	**1,349 m^2 (ABOUT)**	

OUTDOOR FARMING AREA

A1	1,072 m^2 (ABOUT)
A2	1,476 m^2 (ABOUT)
A3	942 m^2 (ABOUT)
TOTAL	**3,490 m^2 (ABOUT)**

PARKING AND LOADING / UNLOADING PROVISIONS

NO. OF PRIVATE CAR PARKING SPACE	:	1
DIMENSIONS OF PARKING SPACE	:	5 m (L) X 2.5 m (W)
NO. OF PARKING SPACE FOR LIGHT BUS	:	1
DIMENSIONS OF PARKING SPACE	:	8 m (L) X 3 m (W)

0 20 50 100 M @A3

- ALL DIMENSIONS ARE IN MILLIMETER EXCEPT OTHERWISE NOTED
- DO NOT SCALE DRAWING

LEGEND

- APPLICATION SITE
- AGRICULTURAL EDUCATION CENTER
- WASH ROOM
- STORE ROOM
- GREEHOUSE
- FARMLAND
- OUTDOOR WOOD PAVING
- HARD PAVING
- SOIL
- PARKING SPACE 2.5 m (W) X 5 m (L)
- PARKING SPACE (LIGHT BUS) 3 m (W) X 8 m (L)
- ENTRANCE / EXIT
- 1m thk. CONCRETE WALL

REV	REVISION	DATE
B	REVISED LAYOUT PLAN	18 FEB 2025
A	REVISED LAYOUT PLAN	17 OCT 2024
–	LAYOUT PLAN	23 AUG 2024

REVISION

	name	DATE
drawn	CL & LY	23 AUG 2024
checked	-	-
approved	-	-

contract no. –

project no.

TITLE :

PROPOSED TEMPORARY PLACE OF RECREATION, SPORTS AND CULTURE (HOBBY FARM) FOR A PERIOD OF 3 YEARS AND ASSOCIATED FILLING OF LAND

SITE LOCATION :

VARIOUS LOTS IN D.D. 96, SHUN YEE SAN TSUEN, MA TSO LUNG, NEW TERRITORIES

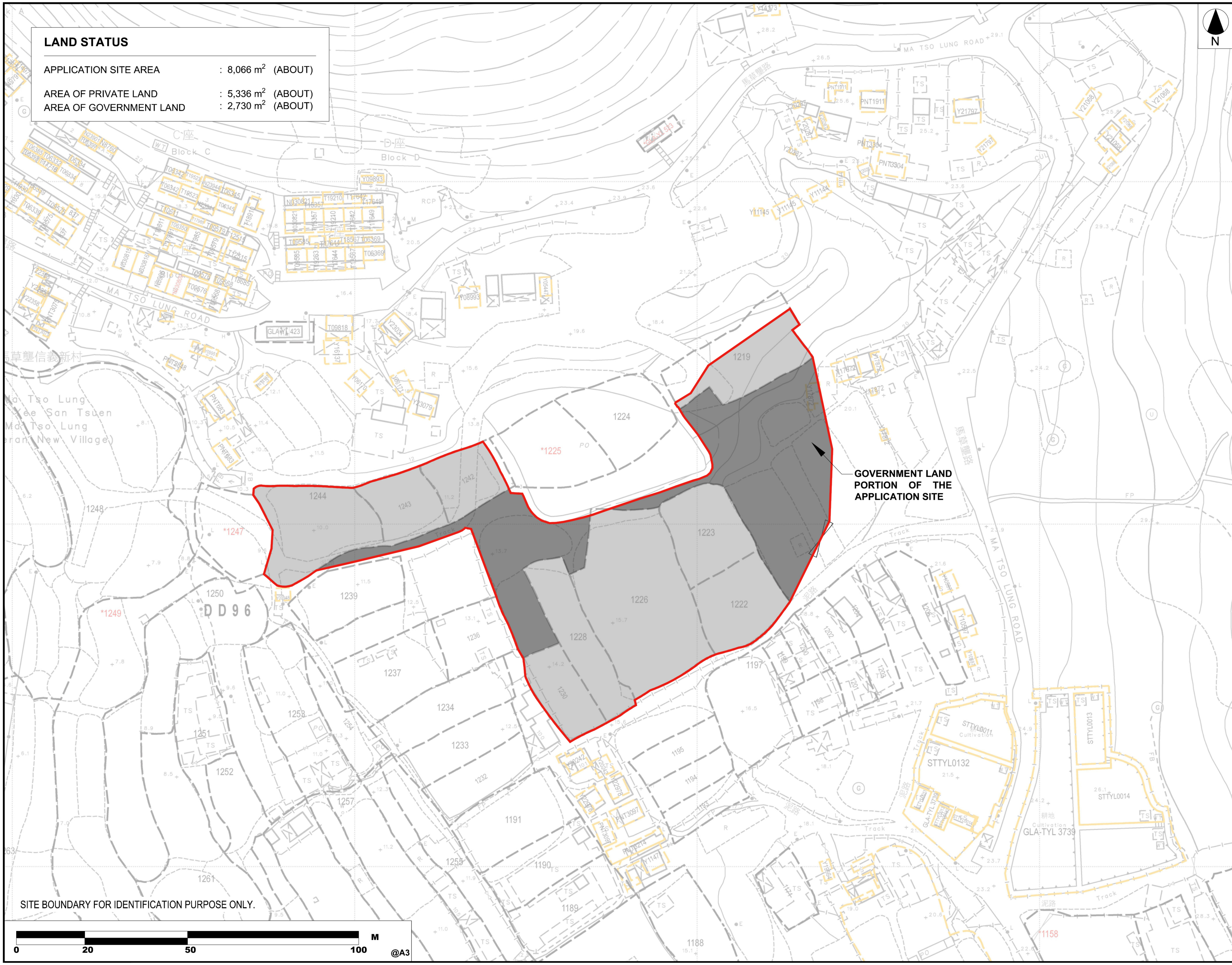
drawing title.

LAYOUT PLAN

drawing no. PLAN 1 | rev. B | scale N.T.S.

LAND STATUS

APPLICATION SITE AREA	:	8,066 m^2 (ABOUT)
AREA OF PRIVATE LAND	:	5,336 m^2 (ABOUT)
AREA OF GOVERNMENT LAND	:	2,730 m^2 (ABOUT)



• ALL DIMENSIONS ARE IN MILLIMETER EXCEPT OTHERWISE NOTED
• DO NOT SCALE DRAWING

LEGEND

- APPLICATION SITE
- GOVERNMENT LAND
- PRIVATE LAND

B	REVISED LAND STATUS PLAN	18 FEB 2025
A	REVISED LAND STATUS PLAN	17 OCT 2024
–	LAND STATUS PLAN	23 AUG 2024

REVISION

	name	
drawn	CL & LY	DATE 23 AUG 2024
checked	-	DATE -
approved	-	DATE -

contract no. –

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SITE LOCATION :

VARIOUS LOTS IN D.D. 96, SHUN YEE SAN TSUEN, MA TSO LUNG, NEW TERRITORIES

drawing title.

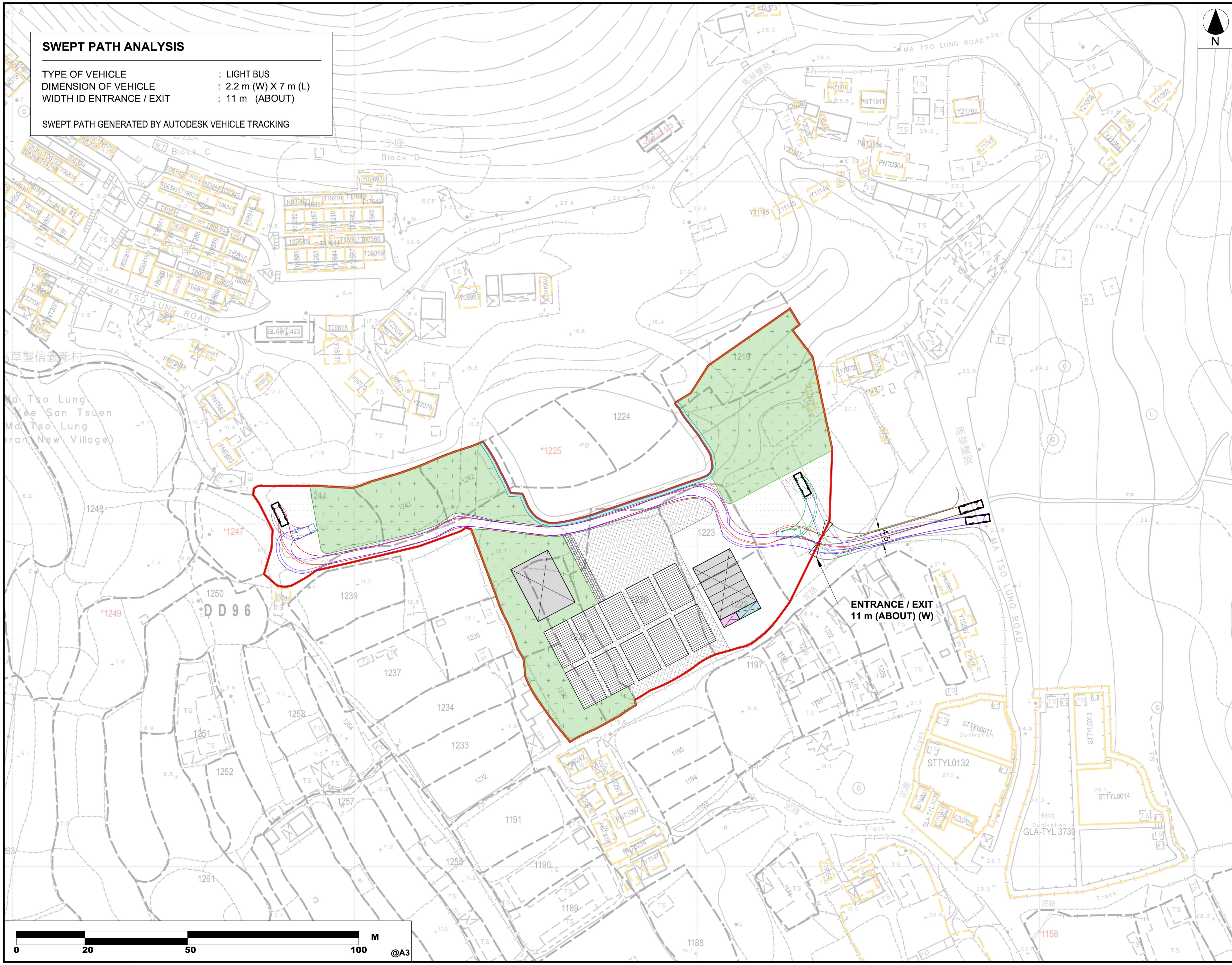
LAND STATUS PLAN

drawing no.	rev.	scale
PLAN 2	B	N.T.S.

SWEPT PATH ANALYSIS

TYPE OF VEHICLE	:	LIGHT BUS
DIMENSION OF VEHICLE	:	2.2 m (W) X 7 m (L)
WIDTH ID ENTRANCE / EXIT	:	11 m (ABOUT)

SWEPT PATH GENERATED BY AUTODESK VEHICLE TRACKING



- ALL DIMENSIONS ARE IN MILLIMETER EXCEPT OTHERWISE NOTED
- DO NOT SCALE DRAWING

LEGEND

- APPLICATION SITE
- AGRICULTURAL EDUCATION CENTER
- WASH ROOM
- STORE ROOM
- GREEHOUSE
- FARMLAND
- OUTDOOR WOOD PAVING
- HARD PAVING
- SOIL
- PARKING SPACE 2.5 m (W) X 5 m (L)
- PARKING SPACE (LIGHT BUS) 3 m (W) X 8 m (L)
- ENTRANCE / EXIT
- 1m thk. CONCRETE WALL

B	REVISED LAYOUT PLAN	18 FEB 2025
A	REVISED SWEPT PATH ANALYSIS	17 OCT 2024
–	SWEPT PATH ANALYSIS	23 AUG 2024

REVISION

	name	
drawn	CL & LY	DATE 23 AUG 2024
checked	-	DATE
approved	-	DATE

contract no. –

project no.

TITLE :

PROPOSED TEMPORARY PLACE OF RECREATION, SPORTS AND CULTURE (HOBBY FARM) FOR A PERIOD OF 3 YEARS AND ASSOCIATED FILLING OF LAND

SITE LOCATION :

VARIOUS LOTS IN D.D. 96, SHUN YEE SAN TSUEN, MA TSO LUNG, NEW TERRITORIES

drawing title.

SWEPT PATH ANALYSIS

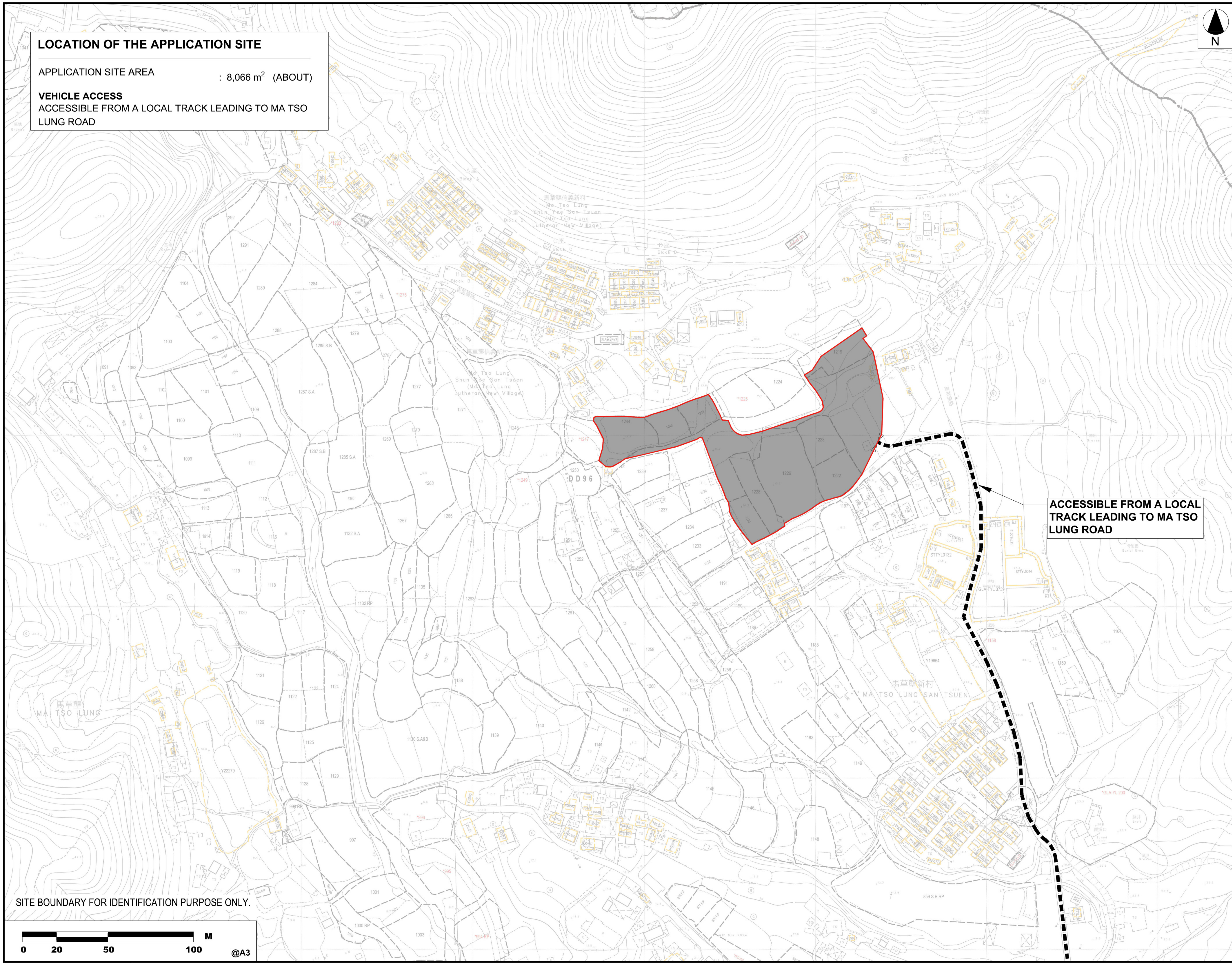
drawing no.	rev.	scale
PLAN 3	B	N.T.S.

LOCATION OF THE APPLICATION SITE

APPLICATION SITE AREA : 8,066 m^2 (ABOUT)

VEHICLE ACCESS

ACCESSIBLE FROM A LOCAL TRACK LEADING TO MA TSO LUNG ROAD



- ALL DIMENSIONS ARE IN MILLIMETER EXCEPT OTHERWISE NOTED
- DO NOT SCALE DRAWING

LEGEND

APPLICATION SITE

ACCESS ROUTE

B	REVISED LAYOUT PLAN	18 FEB 2025
A	REVISED LOCATION PLAN	17 OCT 2024
–	LOCATION PLAN	26 AUG 2024

REVISION

	name	
drawn	CL & LY	DATE 26 AUG 2024
checked	-	DATE
approved	-	DATE

contract no. –

project no.

TITLE :

PROPOSED TEMPORARY PLACE OF RECREATION, SPORTS AND CULTURE (HOBBY FARM) FOR A PERIOD OF 3 YEARS AND ASSOCIATED FILLING OF LAND

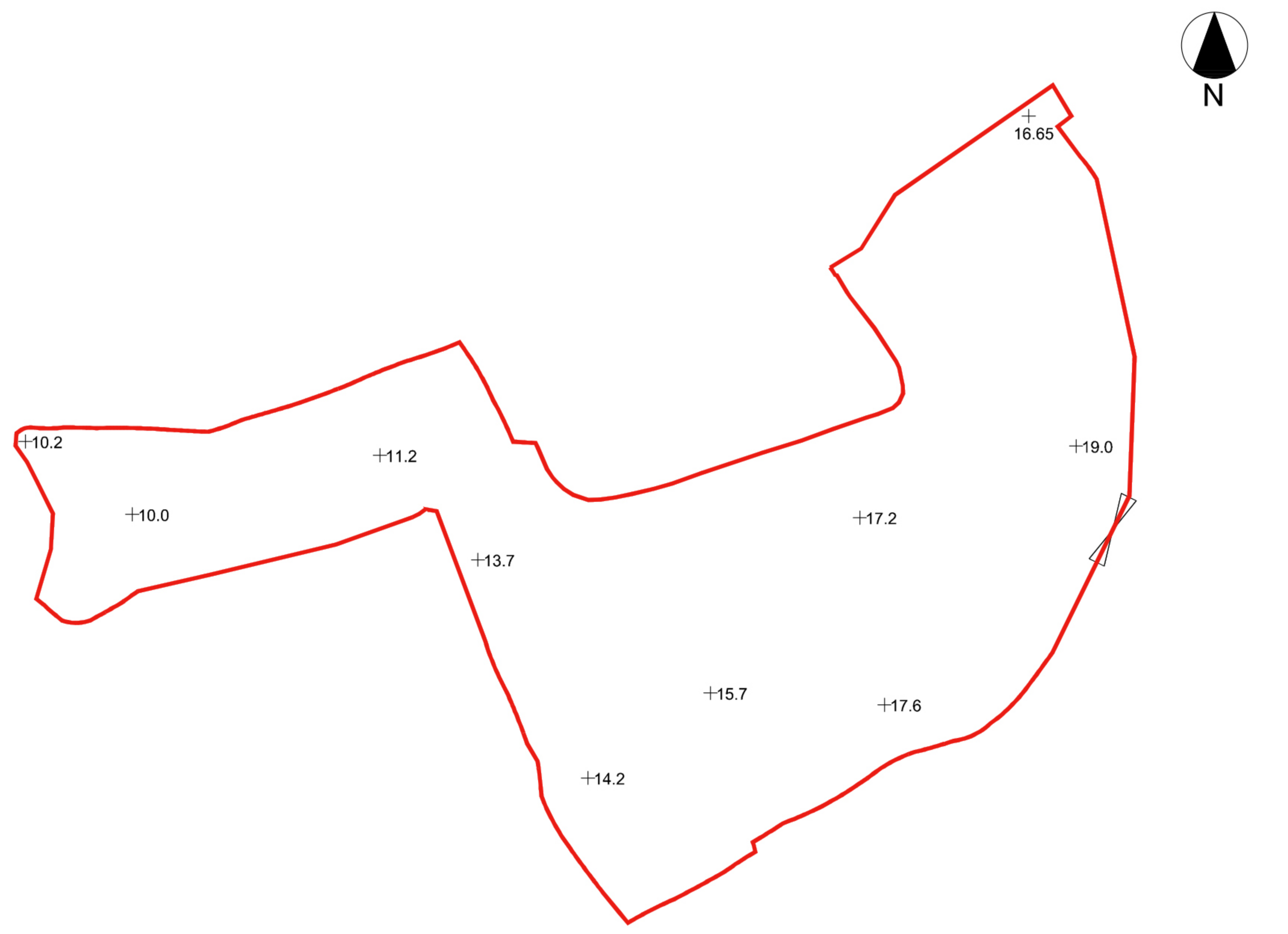
SITE LOCATION :

VARIOUS LOTS IN D.D. 96, SHUN YEE SAN TSUEN, MA TSO LUNG, NEW TERRITORIES

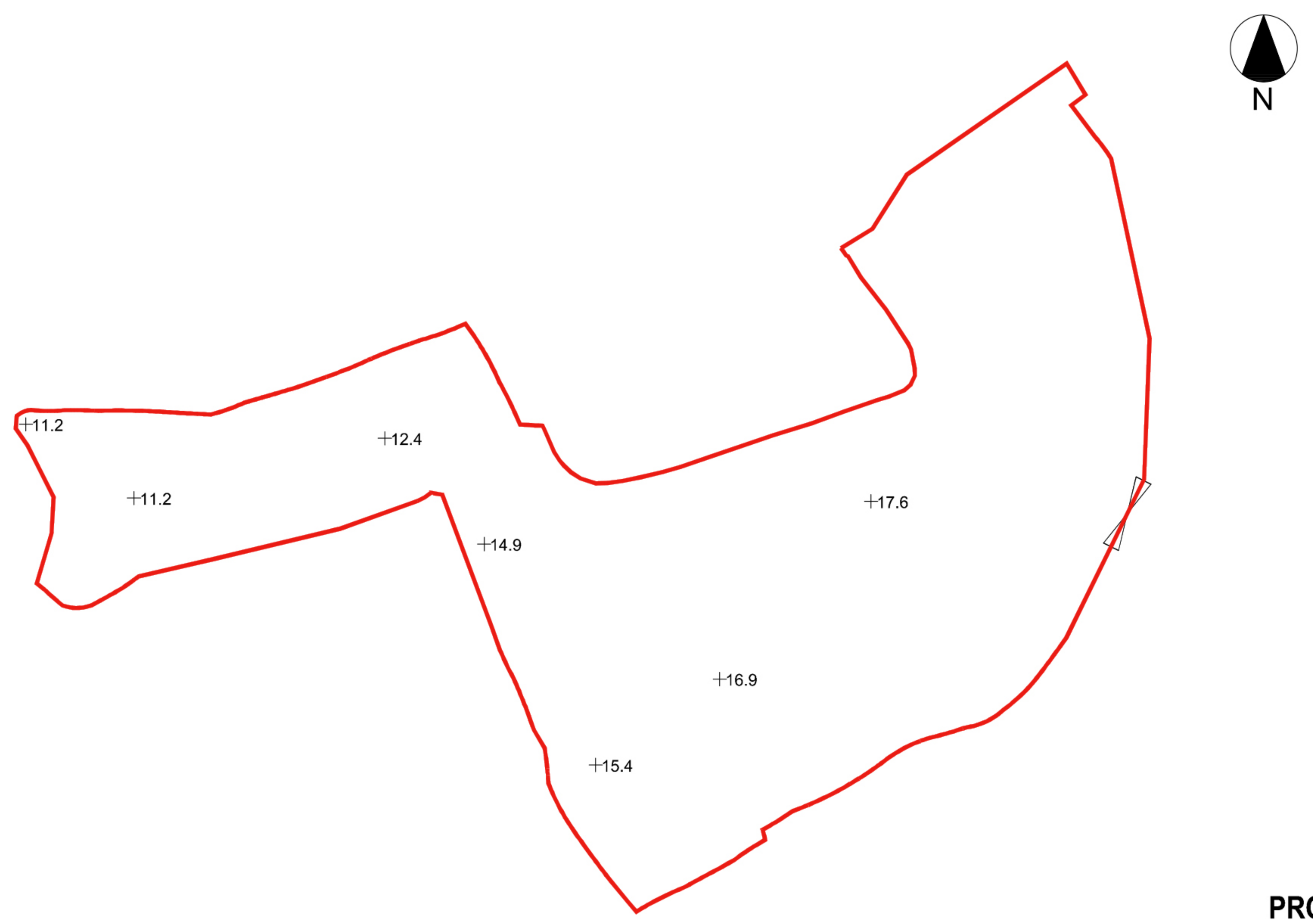
drawing title.

LOCATION PLAN

drawing no.	rev.	scale
PLAN 4	B	N.T.S.



EXISTING SITE LEVEL



PROPOSED SITE LEVEL

SITE BOUNDARY FOR IDENTIFICATION PURPOSE ONLY.

PROPOSED FILLING OF LAND AREA OF THE APPLICATION SITE

APPLICATION SITE AREA	: ABOUT 8,066 m^2
PROPOSED FILLING OF LAND AREA	: ABOUT 8,066 m^2
LAND FILLING DEPTH	: NOT MORE THAN 1.2 m
PROPOSED SITE LEVELS	: +11.2 mPD TO +19 mPD

- ALL DIMENSIONS ARE IN MILLIMETER EXCEPT OTHERWISE NOTED
- DO NOT SCALE DRAWING

LEGEND

(red outline)	APPLICATION SITE
+ 10.0	PROPOSED SITE LEVEL

B	SITE BOUNDARY REVISED	18 FEB 2025
A	SITE BOUNDARY REVISED	17 OCT 2024
–	FILLING OF LAND PLAN	23 AUG 2024

REVISION

	name	
drawn	CL & LY	DATE 23 AUG 2024
checked	-	DATE -
approved	-	DATE -

contract no. –

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SITE LOCATION :

VARIOUS LOTS IN D.D. 96, SHUN YEE SAN TSUEN, MA TSO LUNG, NEW TERRITORIES

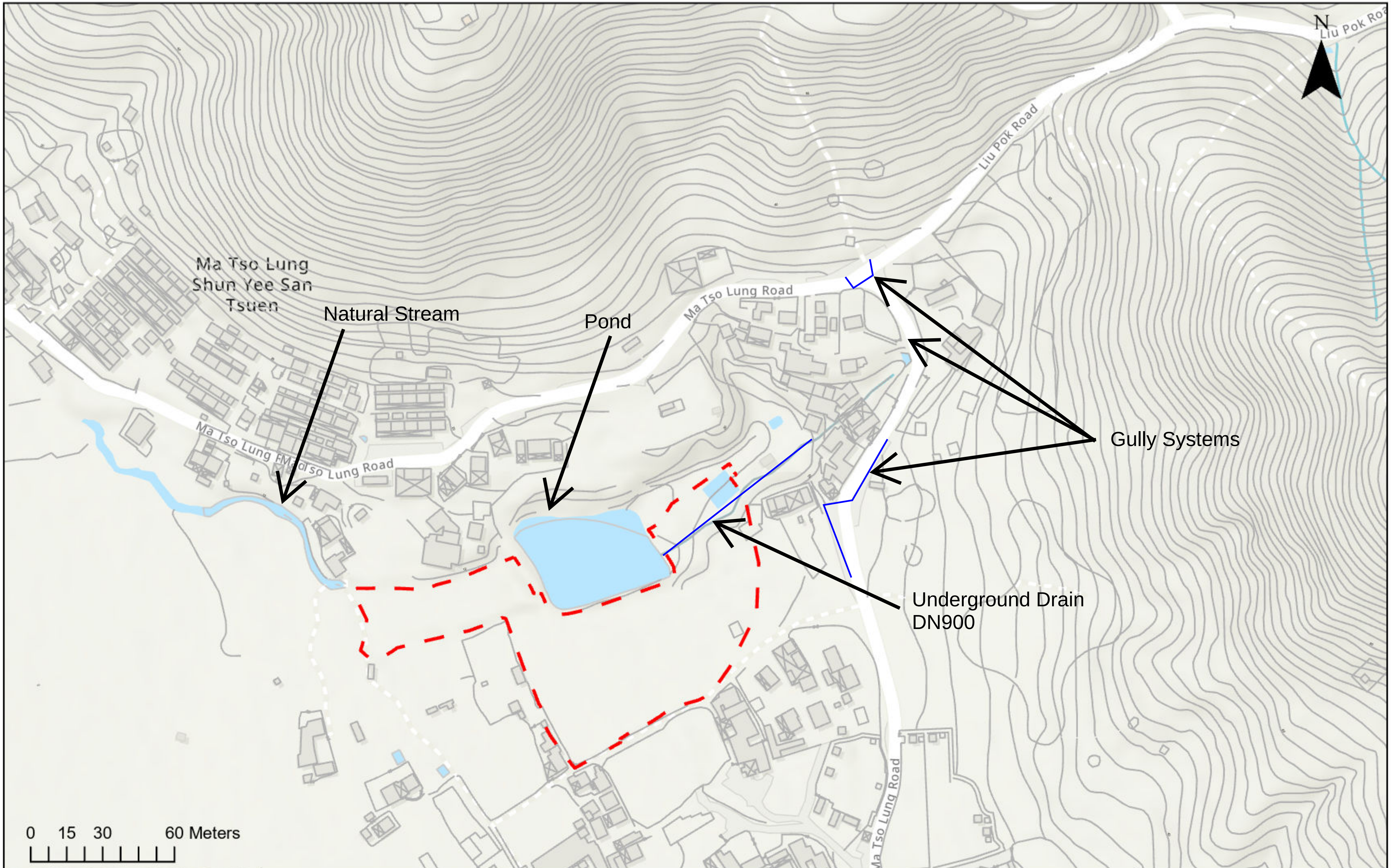
drawing title.

FILLING OF LAND PLAN

drawing no.	rev.	scale
PLAN 5	B	N.T.S.

Appendix B

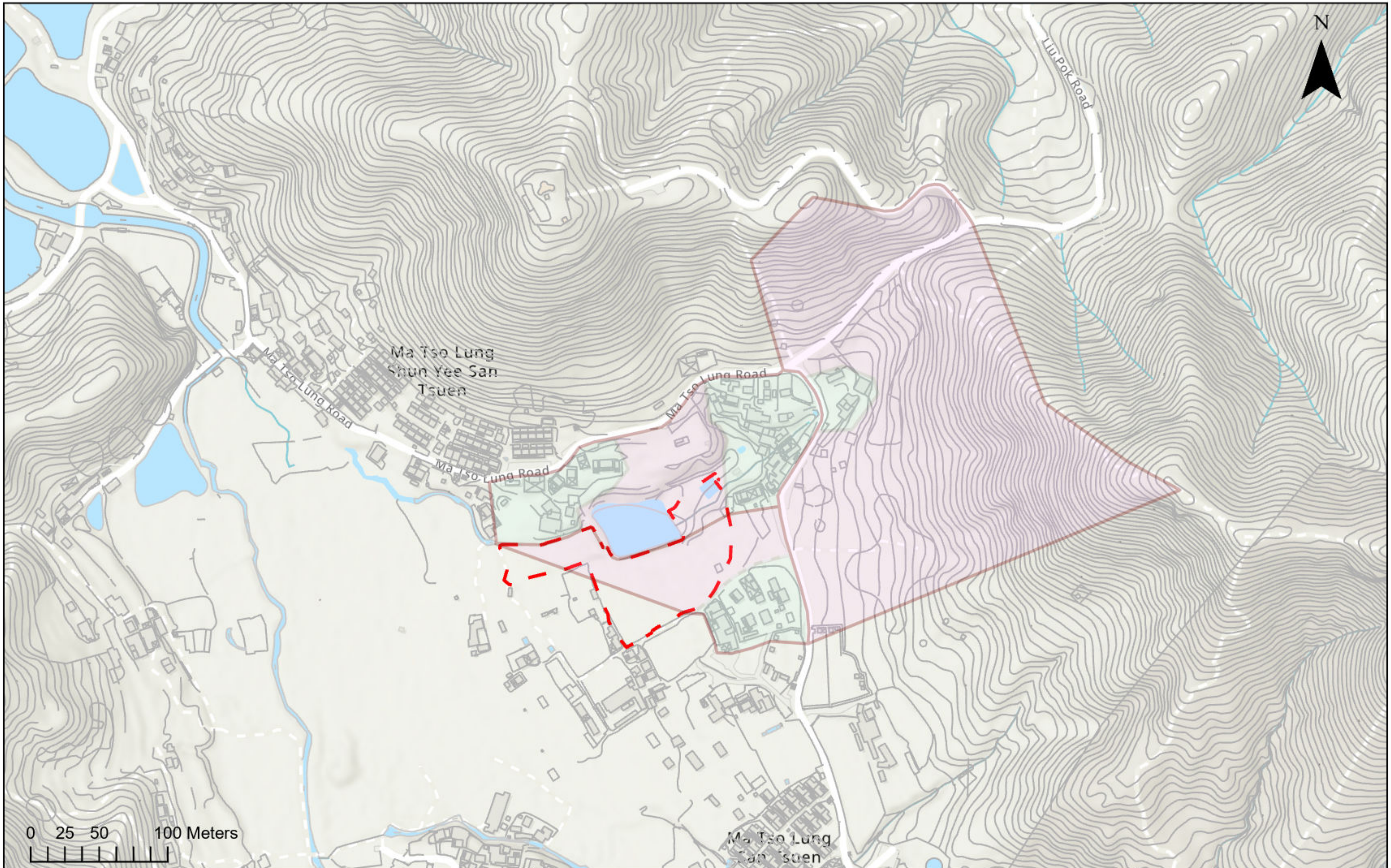
Location of Major Drainage Structures



Client:	Contract No. and Title:	Drawing Title:	Scale: 1:2,000
Hong Kong Arts and Culture Youth Association Limited	Proposed Temporary Place of Recreation Sports and Culture (Hobby Farm)	Location of Major Drainage Structures	Date: Feb - 2025
			Drawing No. 001 / Rev. -

Appendix C

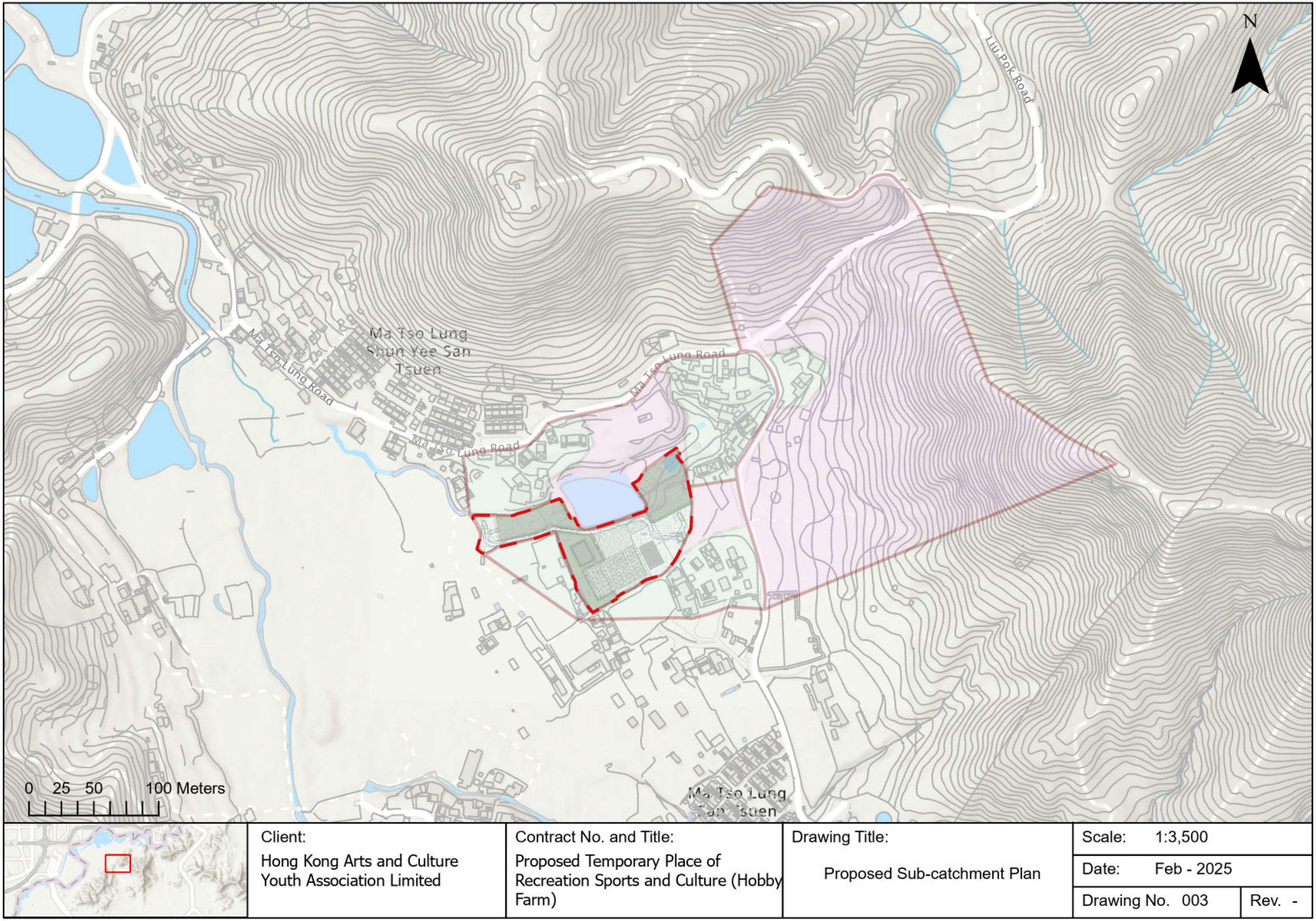
Existing Sub-catchment Plan



Client:	Contract No. and Title:	Drawing Title:	Scale: 1:3,500
Hong Kong Arts and Culture Youth Association Limited	Proposed Temporary Place of Recreation Sports and Culture (Hobby Farm)	Existing Sub-catchment Plan	Date: Feb - 2025
			Drawing No. 002 / Rev. -

Appendix D

Proposed Sub-catchment Plan



Client: Hong Kong Arts and Culture Youth Association Limited	Contract No. and Title: Proposed Temporary Place of Recreation Sports and Culture (Hobby Farm)	Drawing Title: Proposed Sub-catchment Plan	Scale: 1:3,500 Date: Feb - 2025 Drawing No. 003 Rev. -

Appendix E

Hydraulic Calculation

Summary of Sub-catchment Area

Existing Scenario		
Location	Paved Area (m2)	Unpaved Area (m2)
Hill Side	1,644.00	53,193.00
Village	10,534.00	7,869.00
Site Area	3,930.00	6,769.00
Total	16,108.00	67,831.00

Proposed Scenario		
Location	Paved Area (m2)	Unpaved Area (m2)
Hill Side	1,644.00	53,193.00
Village	10,534.00	6,762.00
Proposed Site	4,576.00	3,490.00
Site Area	7,658.00	1,691.00
Total	24,412.00	65,136.00

Design Parameters

Design storm		10	year return period		(North District Area)
Storm constants	a	448.1			
	b	3.67			
	c	0.412			
Highest Point	=	136	mPD		
Lowest Point (Inlet)	=	22.0	mPD		
Average Slope	H	41.45	m/100m		
Length of flow	L	275	m		
Inlet time $t_0=0.14465L/H^{0.2}A^{0.1}$	t_0	6.34	min		
Catchment area	A	54837	m^2		
Catchment area (Paved)	A_{paved}	1644	m^2	(C = 0.9)	
Catchment area (Unpaved)	$A_{unpaved}$	53193	m^2	(C = 0.3)	
Runoff coef.	C	0.32		(Weighted C Value)	

Peak Runoff

Time of concentration	t_c	=	t_0	
		=	6.34	min
Inetnsity	i	=	$a / (t_c + b)^c$	
		=	173.44	mm/hr
Peak runoff	Q_p	=	0.278 C i A	
		=	**0.841**	m^3/s

Hydraulic Capacity of Existing Underground DN900 Drains (Colebrook-White Equation)

Surface roughness	k_s		3	mm	
kinematic viscosity	v		1.14	mm^2/s	
Frictional gradient	S_f 1 in		100		
Trial pipe size	D		=	900	mm
Hydraulic radius	R = D/4		=	0.225	m

Mean velocity (Colebrook-White)

$$\bar{V} = -\sqrt{32gRS_f}\,\log\left[\frac{k_s}{14.8R} + \frac{1.255v}{R\sqrt{(32gRS_f)}}\right]$$

		=	2.56	m/s
Capacity provided	Q	=	V x Cross Section Area of Drain	
		=	**1.626**	m^3/s
10% reduction in flow area		=	**1.464**	m^3/s
		>	Peak runoff Q_p	**OK**

Design Parameters

Design storm		10	year return period	(North District Area)
Storm constants	a	448.1		
	b	3.67		
	c	0.412		
Highest Point	=	136	mPD	
Lowest Point (Inlet)	=	8.3	mPD	
Average Slope	H	25.03	m/100m	
Length of flow	L	510	m	
Inlet time $t_0=0.14465L/H^{0.2}A^{0.1}$	t_0	12.47	min	
Catchment area	A	83939	m^2	
Catchment area (Paved)	A_{paved}	16108	m^2	(C = 0.9)
Catchment area (Unpaved)	$A_{unpaved}$	67831	m^2	(C = 0.3)
Runoff coef.	C	0.42		(Weighted C Value)

Peak Runoff under Existing Scenario

Time of concentration	t_c	=	t_0	
		=	12.47	min
Inetnsity	i	=	$a / (t_c + b)^c$	
		=	142.48	mm/hr
Peak runoff	Q_p	=	0.278 C i A	
		=	**1.380**	m^3/s

Hydraulic Capacity of Existing Natural Stream (Manning Equation)

Size	W	=	3000	mm	
	D	=	500	mm	
Area	A	=	1.500	m^2	
Wetted Perimeter	P	=	4.000	m	
Hydraulic Radius	R	=	0.375	m	
Slope [Decimal]	s	=	0.050		(1:20)
Manning's Roughness	n	=	0.03	For Natural-stream channel, clean	
Full Flow Velocity	v	=	3.876	m/s	
Full Flow Discharge	Q	=	5.814	m^3/s	
10% reduction in flow area		=	**5.233**	m^3/s	
		>	Peak runoff Q_p		**OK**

Design Parameters

Design storm		10	year return period	(North District Area)
Storm constants	a	448.1		
	b	3.67		
	c	0.412		
Highest Point	=	136	mPD	
Lowest Point (Inlet)	=	8.3	mPD	
Average Slope	H	25.03	m/100m	
Length of flow	L	510	m	
Inlet time $t_0=0.14465L/H^{0.2}A^{0.1}$	t_0	12.39	min	
Catchment area	A	89548	m^2	
Catchment area (Paved)	A_{paved}	24412	m^2	(C = 0.9)
Catchment area (Unpaved)	$A_{unpaved}$	65136	m^2	(C = 0.3)
Runoff coef.	C	0.46		(Weighted C Value)

Peak Runoff under Proposed Scenario

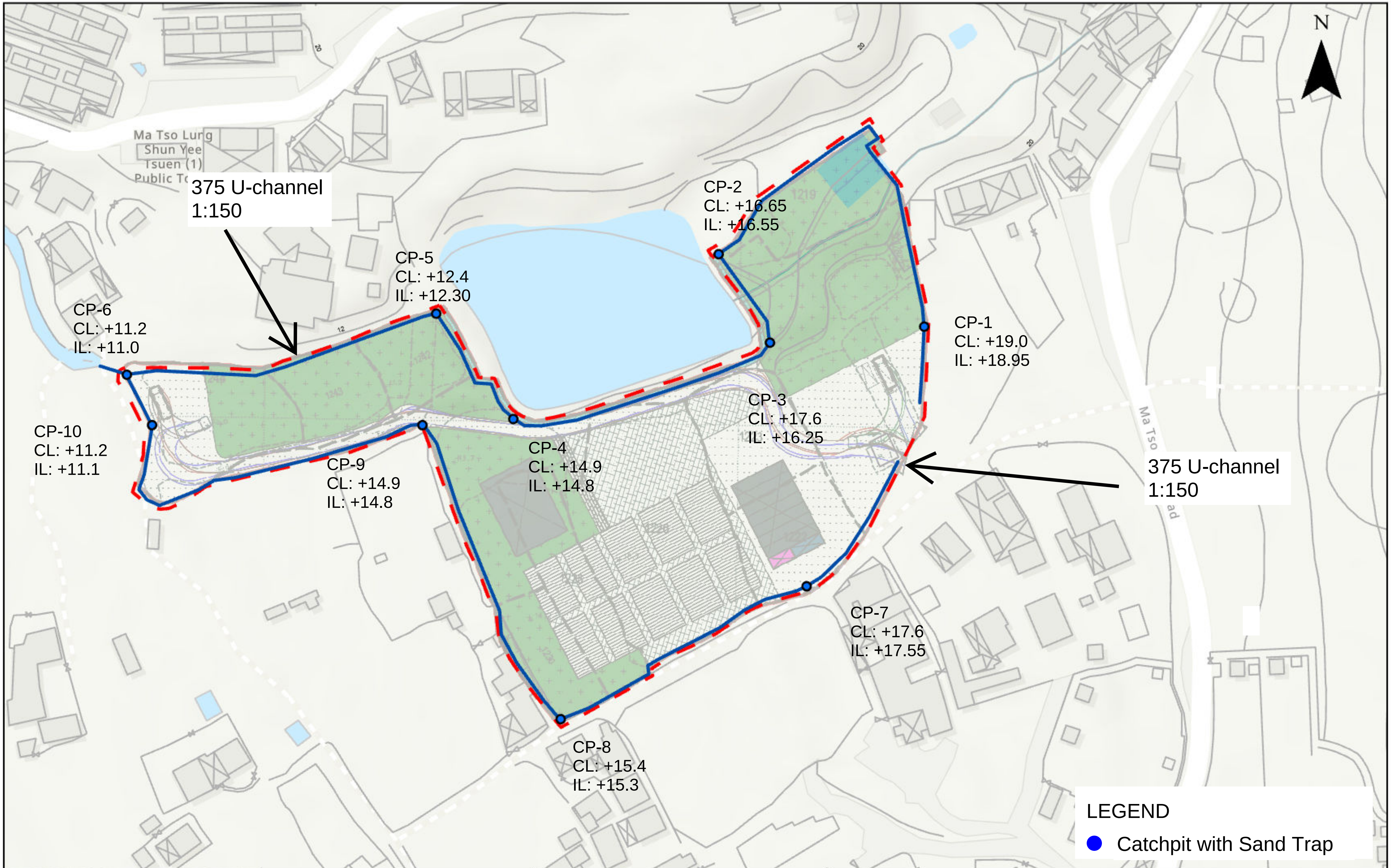
Time of concentration	t_c	=	t_0	
		=	12.39	min
Inetnsity	i	=	$a / (t_c + b)^c$	
		=	142.77	mm/hr
Peak runoff	Q_p	=	0.278 C i A	
		=	**1.648**	m^3/s

Hydraulic Capacity of Existing Natural Stream (Manning Equation)

Size	W	=	3000	mm	
	D	=	500	mm	
Area	A	=	1.500	m^2	
Wetted Perimeter	P	=	4.000	m	
Hydraulic Radius	R	=	0.375	m	
Slope [Decimal]	s	=	0.050		(1:20)
Manning's Roughness	n	=	0.03	For Natural-stream channel, clean	
Full Flow Velocity	v	=	3.876	m/s	
Full Flow Discharge	Q	=	5.814	m^3/s	
10% reduction in flow area		=	**5.233**	m^3/s	
		>	Peak runoff Q_p		**OK**

Appendix F

Proposed Drainage Works



Client: Hong Kong Arts and Culture Youth Association Limited	Contract No. and Title: Proposed Temporary Place of Recreation Sports and Culture (Hobby Farm)	Drawing Title: Proposed Drainage Works	Scale: 1:1,000	
			Date: Feb - 2025	
			Drawing No. 004	Rev. -

Appendix G

Design Calculation for Proposed Drainage Works

Summary of Sub-catchment Area for Proposed Side Area

Proposed Scenario		
Location	Paved Area	Unpaved Area
Proposed Site at North Side	2,310.00	2,548.00
Proposed Site at South Side	2,266.00	942.00
Total	4,576.00	3,490.00

Design Parameters				
Design storm		10	year return period	(North District Area)
Storm constants	a	448.1		
	b	3.67		
	c	0.412		
Highest Point	=	19.5	mPD	
Lowest Point (Inlet)	=	8.3	mPD	
Average Slope	H	6.57	m/100m	
Length of flow	L	170	m	
Inlet time $t_0=0.14465L/H^{0.2}A^{0.1}$	t_0	7.22	min	
Catchment area	A	4858	m^2	
Catchment area (Paved)	Apaved	2310	m^2	(C = 0.9)
Catchment area (Unpaved)	Aunpaved	2548	m^2	(C = 0.3)
Runoff coef.	C	0.59		(Weighted C Value)

Peak Runoff				
Time of concentration	t_c	=	t_0	
		=	7.22	min
Inetnsity	i	=	$a / (t_c + b)^c$	
		=	167.53	mm/hr
Peak runoff	Q_p	=	0.278 C i A	
		=	**0.132**	m^3/s

Hydraulic Capacity of Proposed U-Channel at North Side of Site (Manning Equation)					
Size	W	=	375	mm	
	D	=	375	mm	
Area	A	=	0.1255	m^2	
Wetted Perimeter	P	=	0.9638	m	
Hydraulic Radius	R	=	0.130	m	
Slope [Decimal]	s	=	0.007		(1:150)
Manning's Roughness	n	=	0.016	For Concrete-lined channels	
Full Flow Velocity	v	=	1.311	m/s	
Full Flow Discharge	Q	=	0.165	m^3/s	
10% reduction in flow area		=	**0.148**	m^3/s	
		>	Peak runoff Q_p		**OK**

Design Parameters					
Design storm		10	year return period		(North District Area)
Storm constants	a	448.1			
	b	3.67			
	c	0.412			
Highest Point	=	19.5	mPD		
Lowest Point (Inlet)	=	8.3	mPD		
Average Slope	H	6.57	m/100m		
Length of flow	L	170	m		
Inlet time $t_0=0.14465L/H^{0.2}A^{0.1}$	t_0	7.53	min		
Catchment area	A	3208	m^2		
Catchment area (Paved)	Apaved	2266	m^2	(C = 0.9)	
Catchment area (Unpaved)	Aunpaved	942	m^2	(C = 0.3)	
Runoff coef.	C	0.72		(Weighted C Value)	

Peak Runoff				
Time of concentration	t_c	=	t_0	
		=	7.53	min
Inetnsity	i	=	$a / (t_c + b)^c$	
		=	165.63	mm/hr
Peak runoff	Q_p	=	0.278 C i A	
		=	**0.107**	m^3/s

Hydraulic Capacity of Proposed U-Channel at South Side of Site (Manning Equation)					
Size	W	=	375	mm	
	D	=	375	mm	
Area	A	=	0.1255	m^2	
Wetted Perimeter	P	=	0.9638	m	
Hydraulic Radius	R	=	0.130	m	
Slope [Decimal]	s	=	0.007		(1:150)
Manning's Roughness	n	=	0.016	For Concrete-lined channels	
Full Flow Velocity	v	=	1.311	m/s	
Full Flow Discharge	Q	=	0.165	m^3/s	
10% reduction in flow area		=	**0.148**	m^3/s	
		>	Peak runoff Q_p		**OK**