Attachment 1

DRAINAGE AND SEWERAGE IMPACT ASSESSMENT

Sai Kung Stray Friends Foundation Limited

Proposed Temporary Animal Boarding Establishment (Stray Dog Welfare Facility for Rescue, Rehabilitation and Community Education) for a Period of 3 Years at Various Lots in D.D. 247 and Adjoining Government Land, No. 151 Tai Lam Wu Road, Sai Kung

Drainage and Sewerage Impact Assessments

Project Profile Report

October 2026

Drainage Impact Assessment Report prepared by:



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1 Introduction

1.1 Background

1.1.1 This Drainage Impact Assessment (DIA) Project Profile and Sewerage Impact Assessment (SIA) Report has been prepared in support of a Section 16 Town Planning Application, No. A/HK-SC/379.

1.1.2 The Site is to be used as an animal boarding establishment for a period of 3 years.

1.1.3 This Report assesses the drainage impacts in the vicinity of the Site as a result of the proposed development, with discussion of proposed mitigation measures.

1.1.4 This Project Profile Report has been prepared in accordance with the requirements of the DIA process for private sector projects set out under Drainage Services Department's (DSD's) Technical Advice Note No. 1 (Appendix I).

1.1.5 The Site is located in a Water Gathering Ground (WGG) and the proper collection and disposal of wastewater from the Site is therefore very important. As this is closely related to the drainage issues, this report also addresses sewerage issues in the form of a SIA.

1.2 Information Available for the Study

1.2.1 Reference has been made to Drainage Services Departments DSD's Stormwater Drainage Manual (SDM), 5th Edition, including Corrigenda Nos. 1/2024, and 2/2024 and public drainage information presented on Land's Department's GeoInfo Map website.

1.2.2 Reference has also been made to publicly available topographic plans of the area.

1.2.3 For the Water Supplies Department (WSD) Catchwater near the Site, reference has been made to the Data.Gov.HK website.

1.2.4 Sewage and wastewater flows have been assessed from information on proposed operations at the Site, as well as standard criteria from Environmental Protection Department's (EPD's) "Guidelines for Estimating Sewage Flows for Sewage infrastructure Planning" (GESF).

2 Project Outline

2.1 Project Title

2.1.1 The Project Title is "Proposed Temporary Animal Boarding Establishment (Stray Dog Welfare Facility for Rescue, Rehabilitation and Community Education) for a Period of 3 Years at Various Lots in D.D. 247 and Adjoining Government Land, No. 151 Tai Lam Wu Road, Sai Kung". The location of the Site is shown on **Figure 1**.

2.2 Proponent

2.2.1 The proponent of the project is Sai Kung Stray Friends Foundation Limited.

2.3 Contact Person

2.3.1 For issues relating to these DIA and SIA Studies, please contact Ir Colin Moreby of at [redacted].

2.4 Nature and Description of the Project

2.4.1 The proposed development consists of various covered dog kennels and adjacent paved areas for exercising of the dogs, together with various structures for storage, management and community education. The Site will also include various grassed areas. The Layout (Block) Plan for the proposed development is included in **Appendix A**. The TPB Application is for a period of 3 years, so all facilities will be generally temporary in nature. The Application Site covers an area of approximately 4,010$m^{2.}$

2.4.2 The Site is already largely paved, and no additional paving is proposed. The Site also has existing drainage channels, which discharge to a large natural streamcourse a short distance to the south of the Site. The existing drainage channels will be retained for the future development.

2.5 Planning Application and Lease Modification

2.5.1 This DIA – Project Profile has been prepared in support of a S16 Application, No. A/HK-SC/379.

2.5.2 No Lease Modification is required for the proposed Project.

2.6 Location and Zoning

2.6.1 The Application Site is located a short distance to the east of Tai Lam Wu Road and approximately 100m south of Tai Lam Wu Village.

2.6.2 The Site is zoned as “Conservation Area”.

3 Planning and Implementation Programme

3.1 Planning and Implementation

3.1.1 The proposed development will be planned and implemented under the supervision of appropriately qualified and experienced professionals. The construction of any works for the proposed redevelopment will be carried out by a suitable Contractor.

3.2 Project Timetable

3.2.1 The development is expected to be complete by late-2026/early-2027.

3.3 Interface with Other Projects

3.3.1 There is no foreseeable direct interaction with other development projects in the area, which should be considered at this time.

4 Existing Drainage and Sewerage

4.1 Existing Drainage Routes and Conditions

4.1.1 The main drainage system for the area, including the Site, is the large natural open streamcourse conveying runoff from the sloping hillsides beneath Middle Hill (Cheung Shan) towards Ho Chung River, to the east. The streamcourse is steep (in the order of 1 in 5 adjacent to the Site) and largely unformed (natural), with boulders and pools. The overall upstream catchment in indicated on **Figure 2**. It is noted that the proposed development will have no impact on the upstream catchment.

4.1.2 Immediately to the north of the main upstream catchment is the WSD High Island Catchwater system, with Catchment M13, Sub-catchment SUB003U discharging to High Island Catchwater Section JA1 on the

opposite side of Tai Lam Wu Road to the Site. The Catchwater runs generally northwards from the start of the channel, which is just to the north of the main streamcourse passing the Site, i.e. the WSD Catchwater system will convey runoff to the north and away from the Site and main streamcourse which the Site discharges to.

4.1.3 The nearest property downstream of the Site is approximately 260m to the east and 40m lower in elevation than the Site, at No. 11 Ngau Pui Wo.

4.1.4 The Site itself and 2 small adjacent steep vegetated catchments discharging towards the Site (see **Figure 3**) are drained via various pipes and open rectangular channels. These drainage facilities run generally from north to south through the Site, before discharging towards the main streamcourse to the south of the Site. Photographs of the 2 main existing channels are included in **Appendix B**.

4.1.5 There are no flooding blackspots in the vicinity of the Site and from many years of use of the Site, there is no history of flooding in the area.

4.1.6 There are no Ecologically Important Streams/Rivers in the area.

4.2 Existing Sewerage

4.2.1 The Site contains an existing septic tank arrangement, adjacent to the toilet block, and comprising several chambers. The tanks were measured in October 2026, with details discussed in the SIA below. It is assumed that the tanks discharge to a nearby soakaway.

5 Drainage Impact Assessment

5.1 Drainage Impact Assessment

General

5.1.1 The proposed development at the Site will involve the reuse of existing paved areas. As such, there will be no significant increase in paving and no increase in runoff.

5.1.2 The Site already has drainage channels to collect runoff from the Site itself and small adjacent catchment areas discharging towards the Site. The Site is remote from other properties.

Assessment Criteria

5.1.3 As the catchment areas are all fairly small (<<1.5km^2), the Rational Method (as set out in Section 7.5.2 of the SDM) has been used for the calculation of runoff.

5.1.4 The existing Site contains some buildings and fully paved (concrete) areas and a runoff coefficient, C, of 1.0 has been adopted for these areas. There are also areas of gently sloping unpaved land, for which a runoff coefficient of 0.25 has been adopted. A runoff coefficient of 0.35 has been adopted for the adjacent steep natural sloping catchment areas discharging towards the Site.

5.1.5 No additional paving or buildings are proposed, so the future conditions will be the same as existing.

5.1.6 The overall upstream catchment mostly comprises steep vegetated hillsides, with a runoff coefficient of 0.35 assumed.

5.1.7 The 1 in 10-year scenario has been considered, as the Site is surrounded by (unoccupied) naturally vegetated slopes. Furthermore, the approved usage at the Site is only for a period of 3 years, so a higher return period is not considered justified.

5.1.8 Allowances for increased rainfall intensity up to mid-21st Century and beyond have not been considered, as the TPB Approval is only for a period of 3 years.

5.2 Drainage Impact

5.2.1 The existing (and future, as there will be no change) runoff flows from the Site, adjacent areas and overall catchments are presented in **Appendix C**.

5.2.2 The 1 in 10-year overall discharge from the Site and adjacent local catchments is 0.360m^3/s. In comparison, the runoff from the upstream catchment area (from Middle Hill) is 8.833m^3/s, so the discharge from the Site (and adjacent areas) represents approximately 4% of the discharge from the main upstream catchment, i.e. insignificant in comparison. The proposed development will have no impact on the upstream catchment.

5.2.3 The capacity of the main streamcourse adjacent to the Site has been assessed as just over 27m^3/s, with calculations included in **Appendix D**. This assessment clearly demonstrates that the existing main streamcourse can easily accommodate the discharge from the upstream catchment and from the Site (and adjacent catchment areas).

5.2.4 There are no records of any flooding at the Site or in surrounding areas, even under severe storm events, so the existing Site drainage facilities are clearly adequate.

5.2.5 The Site drainage will be adjusted so that "unpolluted" surface runoff from adjacent (natural/vegetated) catchment areas and rooftops can be collected and discharged to the main streamcourse via peripheral channels and simple silt traps (trapped catchpits, as shown on CEDD Drawings C2406/1A and C2406/2B). The overall stormwater drainage plan and concepts are illustrated on **Figure 4** and **Figure 5** respectively.

5.2.6 There is no use of oil at the Site and there will therefore be no oil tanker deliveries. Furthermore, no vehicle maintenance will be carried out at the Site. Although more related to pollution control than drainage capacity, the visitor parking area and entry driveway will be provided with kerbs and separate drainage channels to convey runoff from these areas to a petrol interceptor located beneath the loading/unloading area. Design calculations for the petrol interceptor, based on ProPECC PN 1/23 and Hyd Drawing No. H3134B, are included in **Appendix E**.

5.2.7 Silt/sand traps (trapped catchpits) will be provided at all discharge points.

5.2.8 The Project Proponent will be responsible for the construction, operation and maintenance of all drainage facilities for the Project.

5.2.9 Issues related to sewerage/wastewater are discussed below.

6 Sewerage Impact Assessment

6.1 Sewerage Impact Assessment

General

6.1.1 The proposed development at the Site will generate sewage flows from the workers and visitors, as well as polluted wastewater from washing operations in the kennel areas.

6.1.2 A significant amount of the potential pollution from the Site is from solid matter (dog faeces) and most of this is physically collected and bagged for disposal via Government refuse disposal facilities.

Assessment Criteria

6.1.3 Sewage flows from the workers and visitors have been estimated from visitor numbers provided by the Applicant and unit flow factors from EPD's GESF. In addition, the volume of washdown water has been estimated based on typical operational details provided by the Applicant, i.e. hosing down of the kennel areas over approximately 6 hours per day. A further nominal allowance of 50% has been added to the daily washdown flow, to provide a factor of safety.

6.1.4 There is a septic tank arrangement at the Site (adjacent to the toilets). The capacities of the existing tanks, as recently measured on Site, are set out in **Appendix F**, showing a total existing storage capacity, including an allowance for 10% siltation, of 14.3m^3.

6.2 Sewerage Impact

General

6.2.1 The overall sewage/wastewater flow from the Site is estimated to be approximately 7.64m^3/day, comprising 2.24m^3/day of sewage and 5.4m^3/day of washdown water (see calculations in **Appendix F**).

6.2.2 The existing septic tank storage capacity (14.3m^3) is significantly greater than the expected sewage flow (7.64m^3).

6.2.3 Effluent from the existing septic tank and any new tank(s) will need to discharge to a soakaway at least 30m away from the main streamcourse. It is proposed to provide this as a soakaway trench (or two parallel trenches) along the entry driveway to the Site, as indicated on **Figure 6**.

If the smallest existing septic tank (Tank 3, 1.7m^3 capacity) were to be modified to act as a pump sump to pump effluent from the existing septic tanks to the new soakaway system, this would leave 12.6m^3 of storage remaining, i.e. still substantially greater than the expected flows.

6.2.4 The detailed arrangements for the internal sewerage system(s), the septic tanks and the proposed soakaway(s) will be subject to further investigation on Site.

7 Conclusions

7.1.1 The Site is remote, with no other properties or facilities likely to be directly affected by runoff from the Site.

7.1.2 The Site has existing drainage facilities to cater for runoff from the Site and adjacent catchment areas. The existing Site drainage facilities are adequate for even severe storm events.

7.1.3 The existing Site drainage facilities discharge to the main streamcourse to the south of the Site, which has substantial capacity to accommodate runoff from the Site and upstream catchment areas.

7.1.4 There will be no increase in the volume of runoff from the Site as a result of the Proposed Development.

7.1.5 Construction, operation and maintenance of all new drainage facilities will be undertaken by the Project Proponent.

7.1.6 There will be no unacceptable increases to the risks of flooding at the Site or in surrounding areas and no unacceptable adverse drainage impacts as a result of the Proposed Development.

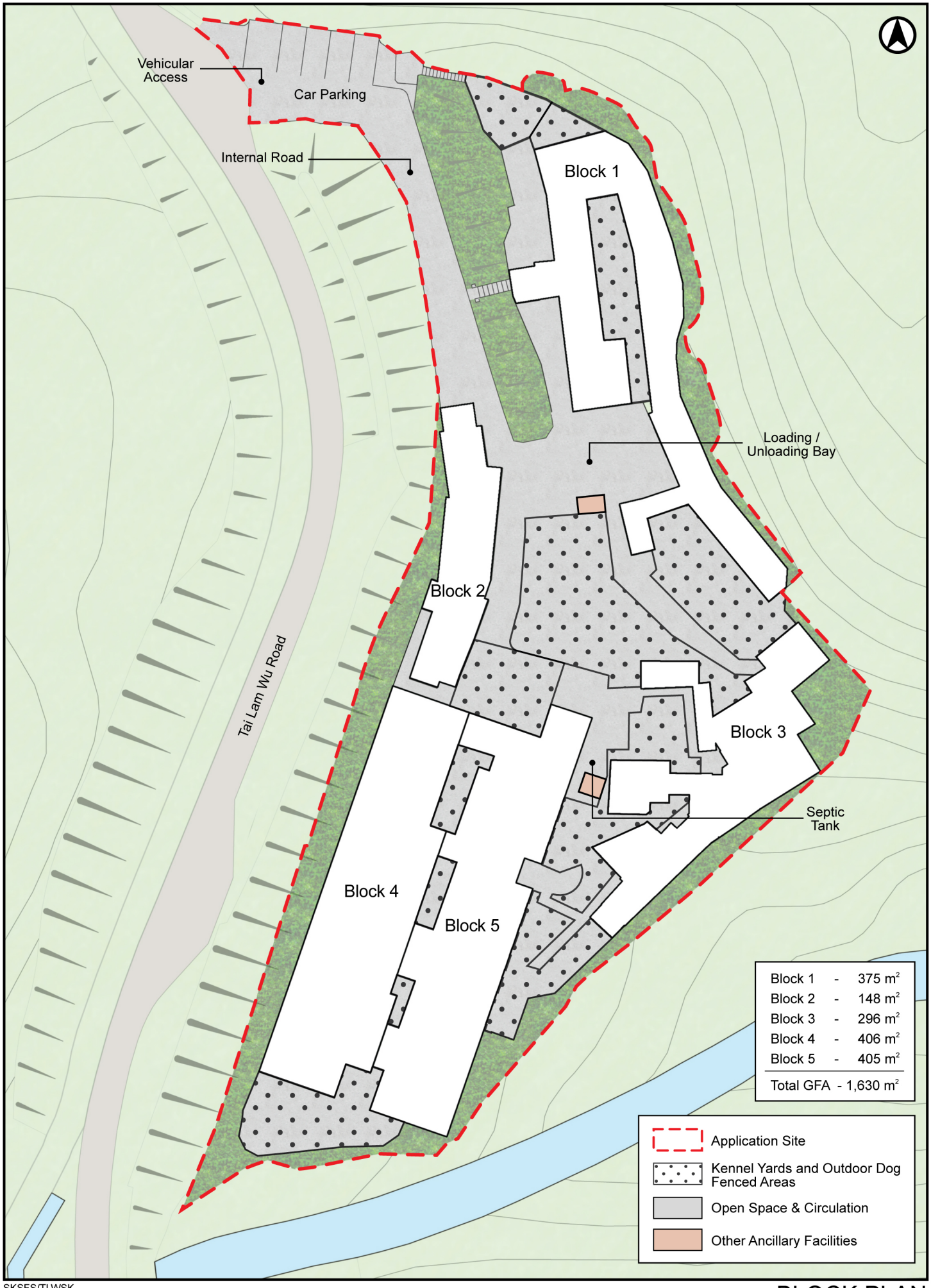
7.1.7 Petrol interceptors will be provided in areas of vehicle access.

7.1.8 The Site drainage will be modified to separate “clean” stormwater runoff from foul sewage and polluted wastewater, with polluted water to be discharged via septic tanks to a new soakaway facility.

7.1.9 Existing septic tank(s) will be retained, although the effluent will be pumped to a new soakaway system beneath the Entry Drive to the Site, i.e. remote from the main streamcourse.

Appendix A

Site Layout Plan



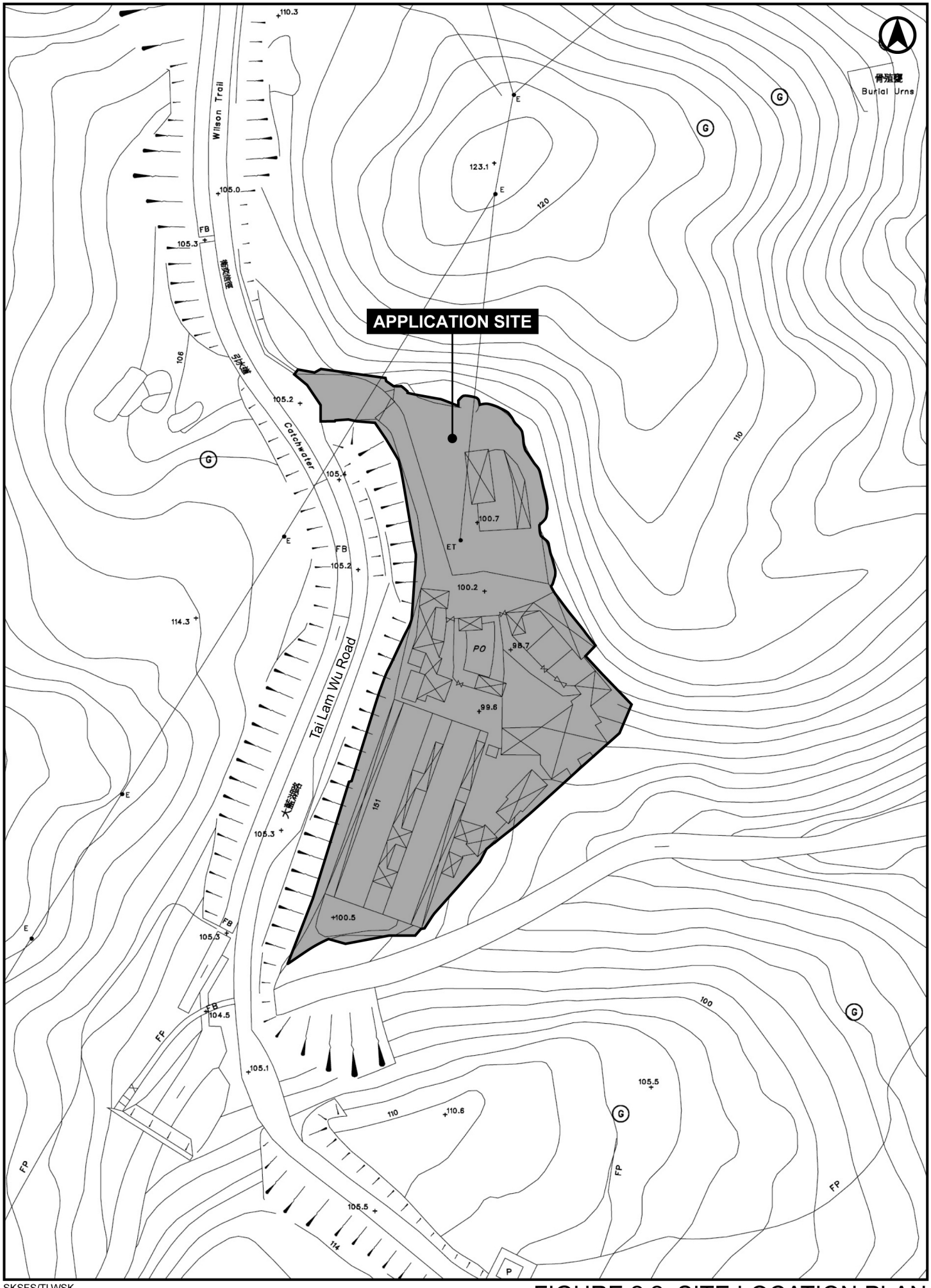
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BLOCK PLAN

SCALE 1 : 500

Appendix B

Site Photographs



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FIGURE 2.2 SITE LOCATION PLAN

SCALE 1 : 1,000

Proposed Temporary Animal Boarding Establishment (Stray Dog Welfare Facility for Rescue, Rehabilitation and Community Education) for a Period of 3 Years at Various Lots in D.D. 247 and Adjoining Government Land, No. 151 Tai Lam Wu Road, Sai Kung

Appendix B – Site Photographs (Dated 2026)

See Plan for Locations.



Plate 1 – Existing Open Channel (Eastern Side)



Plate 2 – Existing Open Channel (Western Side)

Appendix C

Runoff Calculations

CM013 Proposed Temporary Animal Boarding Establishment (Stray Dog Welfare Facility for Rescue, Rehabilitation and Community Education), No. 151 Tai Lam Wu Road, Sai Kung
Overall Catchment Areas and Run-off (1 in 10 Year)

Refer:
DSD Stormwater Drainage Manual, including Corrigenda Nos. 1/2022, 1/2024 and 2/2024

Notes:
The existing and future Site comprises flat paving and structures, with some vegatated slopes; C = 0.95
The upstream catchment mostly comprises steep naturally vegetated hillsides; C = 0.35.
The Site accepts no major external runoff, so check the 1 in 10-year Scenario.
The Site and Overall Catchments is small (<1.5km^2), so Rational Method is appropriate.
The Site is well above any tidal impact levels
The Site is within the HKO Rainfall Zone

Intensity = $a/(t_c+b)^c$

a, b and c from the DSD Stormwater Manual , Corrigendum No. 1/2024 (Table 3a - HKO)

	a	b	c
1 in 10 year	485	3.11	0.397

Catchment	Area (m^2)	Levels (mPD)[1] Upsteam	Downstream	Fall (m)	Overland, L (m)	Channel, L (m)	Fall, H (m/100m)	Overland t_c (min)	Velocity (Channel) (m/s)	Flow Time (Channel) (min)	Total t_c* (min)	Intensity (mm/h)	Runoff Coefficient	Run-off (m^3/s)	Remarks
Existing (and Future) Situation															
The Site + Local Catchments															
Overall Site Area	4,010										2.0	254			
Buildings and Paving (Paved)	3,360												1.00	0.237	
Vegetated Areas (Unpaved and Open) - Flat and Gently Sloping	650												0.25	0.011	
Adjacent Strip Between Road and Site (Unpaved and Sloping)	822												0.35	0.020	
Adjacent Natural Slopes (Unpaved and Sloping)	3,925	123.1	103	20.1	49	110	41.0	1.5	1.5	1.2	2.7	241	0.35	0.092	
Total														**0.360**	
Upstream Catchment for Adjacent Main Streamcourse															
Upstream Catchment Area	709,266	585	100	485	1,390		34.9	25.7			25.7	128	0.35	**8.833**	Catchment data from Middle Hill
Proportion of Site Area Discharge to Upstream Catchment Discharge														**4.1%**	

*Assumed t_c for existing Site - Mostly overland flow across paved areas and through drainage channels

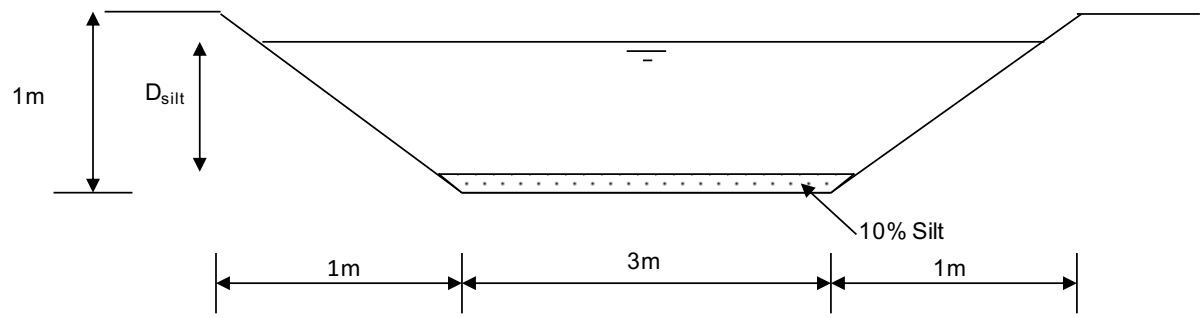
Appendix D

Stream Hydraulics

CM013 Proposed Temporary Animal Boarding Establishment
(Stray Dog Welfare Facility for Rescue, Rehabilitation and Community Education),
No. 151 Tai Lam Wu Road, Sai Kung
Existing Main Natural Streamcourse to the South of the Site
Overall Capacity Check

Steep Natural Streamcourse, so assume:

1. Channel is approximately a trapezoidal channel with 1:1 side wall angles
2. Estimated dimensions (from Site Photographs)
3. Gradient taken from adjacent general ground levels
4. Natural Stream Course - winding, some pools and shoals, clean, bad condition (n = 0.045)



Upstream Ground Level =	100	mPD
Downstream Ground Level =	80	mPD
Fall =	20	m

Length of channel (between level data) = 90 m

Overall ground(/channel) gradient = 0.222 = 1 in 4.5

Natural Stream channel, winding (bad); say, Manning's n = 0.045 (DSD SDM Table 13)

Without Freeboard Allowance

B =	3	m
D =	1.00	m
D_{silt} = D =	0.90	m (allowing for 10% silt)
Top Width =	5.0	m
A (m^2) =	3.51	m^2
P (m) =	3.00	m (base)
	2.55	m (side walls)
	5.55	m
R (m) = A/P =	0.63	m

Q (m^3/s) = Av = A x $R^{2/3}$ x $S^{1/2}$ /n = 27.06 m^3/s

v = 7.71 m/s

Appendix E

Petrol Interceptor(s) Capacity

1 in 2 year

CM013 Proposed Temporary Animal Boarding Establishment (Stray Dog Welfare Facility for Rescue, Rehabilitation and Community Education), No. 151 Tai Lam Wu Road, Sai Parking Catchment Areas and Run-off (1 in 2 Year)

Refer:

DSD Stormwater Drainage Manual, including Corrigenda Nos. 1/2022, 1/2024 and 2/2024

Notes:

The parking area and Entry Drive will be fully paved; C = 1.00

Tai Lam Wu Road is isolated from the Site drainage by a cut-off channel/drain.

Check sizing of Petrol Interceptor(s) required, so assess 1 in 2-Year Storm event (see ProPECC PN 1/23 & HyD Drawing No. H3134B, Note 1)

The Site is within the HKO Rainfall Zone

Intensity = $a/(t_c+b)^c$

a, b and c from the DSD Stormwater Manual , Corrigendum No. 1/2024 (Table 3a - HKO)

	a	b	c
1 in 2 year	446.1	3.38	0.463

Catchment	Area (m^2)	Total t_c* (min)	Intensity (mm/h)	Runoff Coefficient	Run-off (m^3/s)	Remarks
Proposed Development						
The Site						
Parking Area (Uncovered - Visitor Parking + Entry Drive)	430	1.0	225	1.00	0.027	
From HyD Drawing No. H3134B						
20-minute volume at peak flow (m^3)					32.3	
(Provide 5%-10% storage) Say, provide 10% Volume for Petrol Interceptor, Volume = (m^3)					**3.2**	Possibly provide 2 smaller tanks

*Assumed t_c

Appendix F

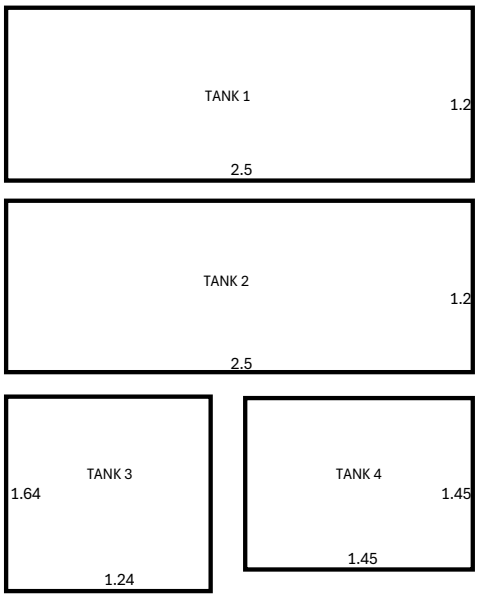
Septic Tank Capacity

CM013 Proposed Temporary Animal Boarding Establishment (Stray Dog Welfare Facility for Rescue, Rehabilitation and Community Education), No. 151 Tai Lam Wu Road, Sai Kung

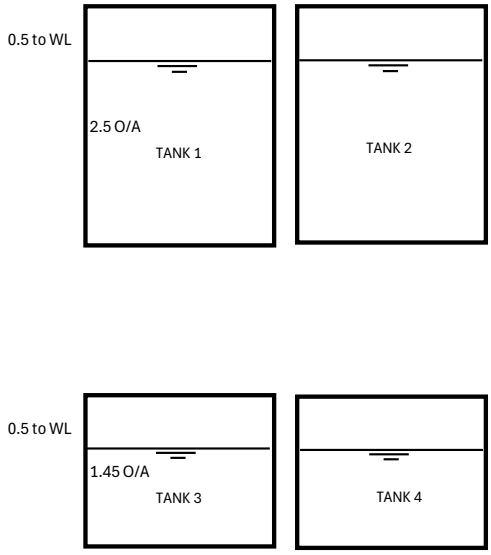
Existing Septic Tank Capacities

Existing Septic Tanks surveyed on 12 October 2026

(N.B. Dimensions shown are overall internal dimensions (m), after cleaning). Calculations include for 10% siltation.



PLAN



SECTION

Storage Capacities:

	Length (m)		Width (m)		Depth (m)		Depth with Siltation		
Tank 1 =	2.5	x	1.2	x	(2.5-0.5)	x	90%	=	5.4 m^3
Tank 2 =	2.5	x	1.2	x	(2.5-0.5)	x	90%	=	5.4 m^3
Tank 3 =	1.24	x	1.64	x	(1.45-0.5)	x	90%	=	1.7 m^3
Tank 3 =	1.45	x	1.45	x	(1.45-0.5)	x	90%	=	1.8 m^3
					Overall Existing Septic Tank Storage Capacity (after cleaning/desilting)			=	**14.3 m^3**

CM013 Proposed Temporary Animal Boarding Establishment (Stray Dog Welfare Facility for Rescue, Rehabilitation and Community Education), No. 151 Tai Lam Wu Road, Sai Kung
Sewage and Wastewater Flows

Refer:
1. Worker and visitor numbers from SKSF
2. Washdown data from SKSF
3. EPD "Guidelines for the Estimation of Sewage Flow for Sewage Infrastructure Planning" (GESF), Table T-2: Unit Flow Factors for Commercial Flows and Student Flows

Existing/Proposed

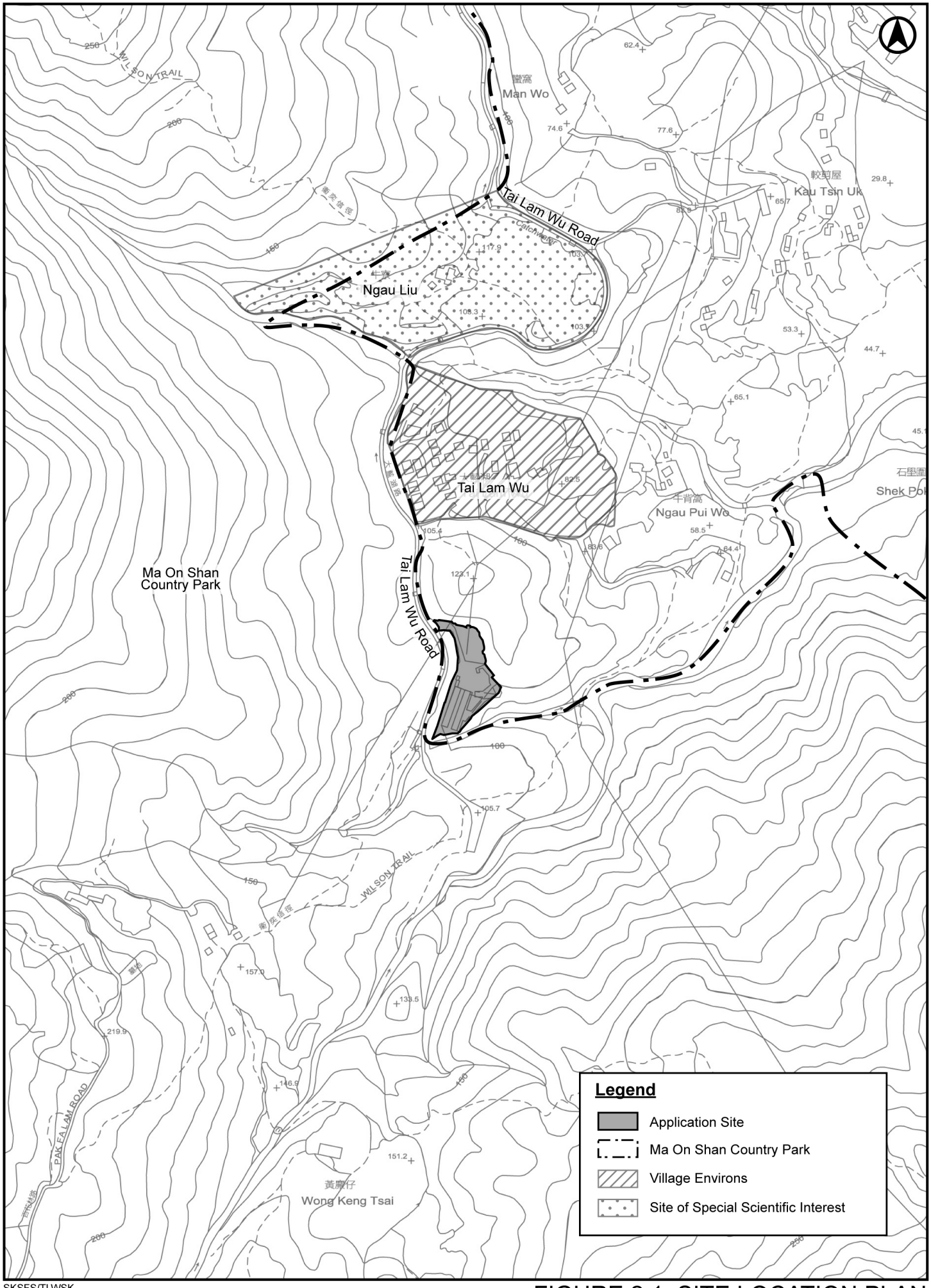
Floor	No. of Workers/ Vistors (Say)	Commercial Activity	Unit Flow Factor (m^3/h/d)	Daily Flow (m^3/d)	Days/ Week (No.)	Peak Daily Flow (m^3/d)
Employee/Volunteer - Weekday	3	J7	0.080	0.24	5	
Employee/Volunteer - Weekend	4	J7	0.080	0.32	2	0.64
Visitors - Weekend	20	Person*	0.040	0.80	2	1.6
					Existing Total Peak Daily Foul Flow	**2.24**
Washing Water = 360 min/day x say, 10l/min x 1.5 Buffer (Factor of Safety) =				5.40		**5.40**
					Overall Peak Daily Flow/Septic Tank Volume Required (m^3)	**7.64**
					Existing Tank Capacity (m^3)	**14.30**
					Residual (New) Tank Capacity Required (m^3)	**0.00**

Notes:

* - Visitors assumed as School Students from Table T-2 of GESF

Appendix G

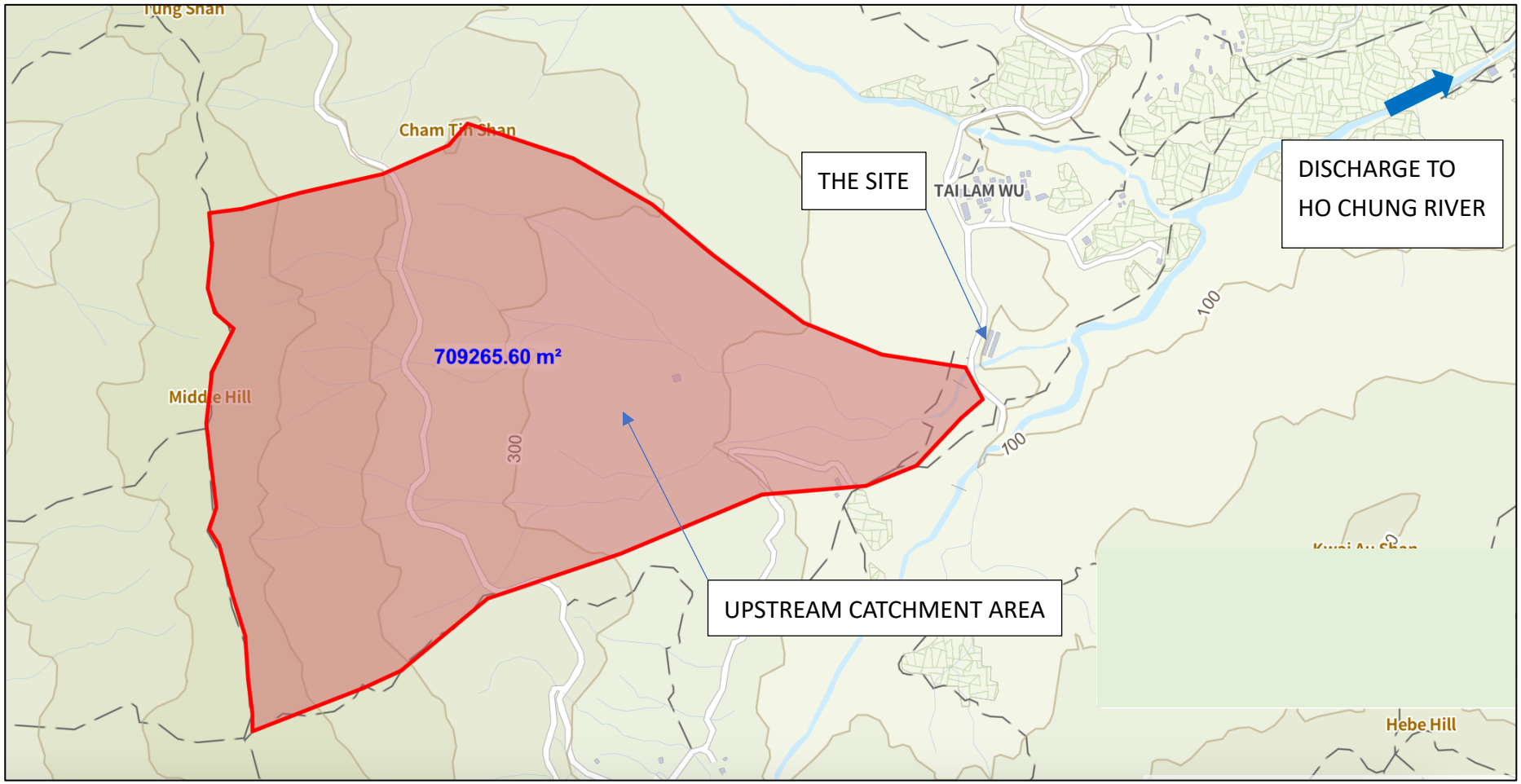
Figures



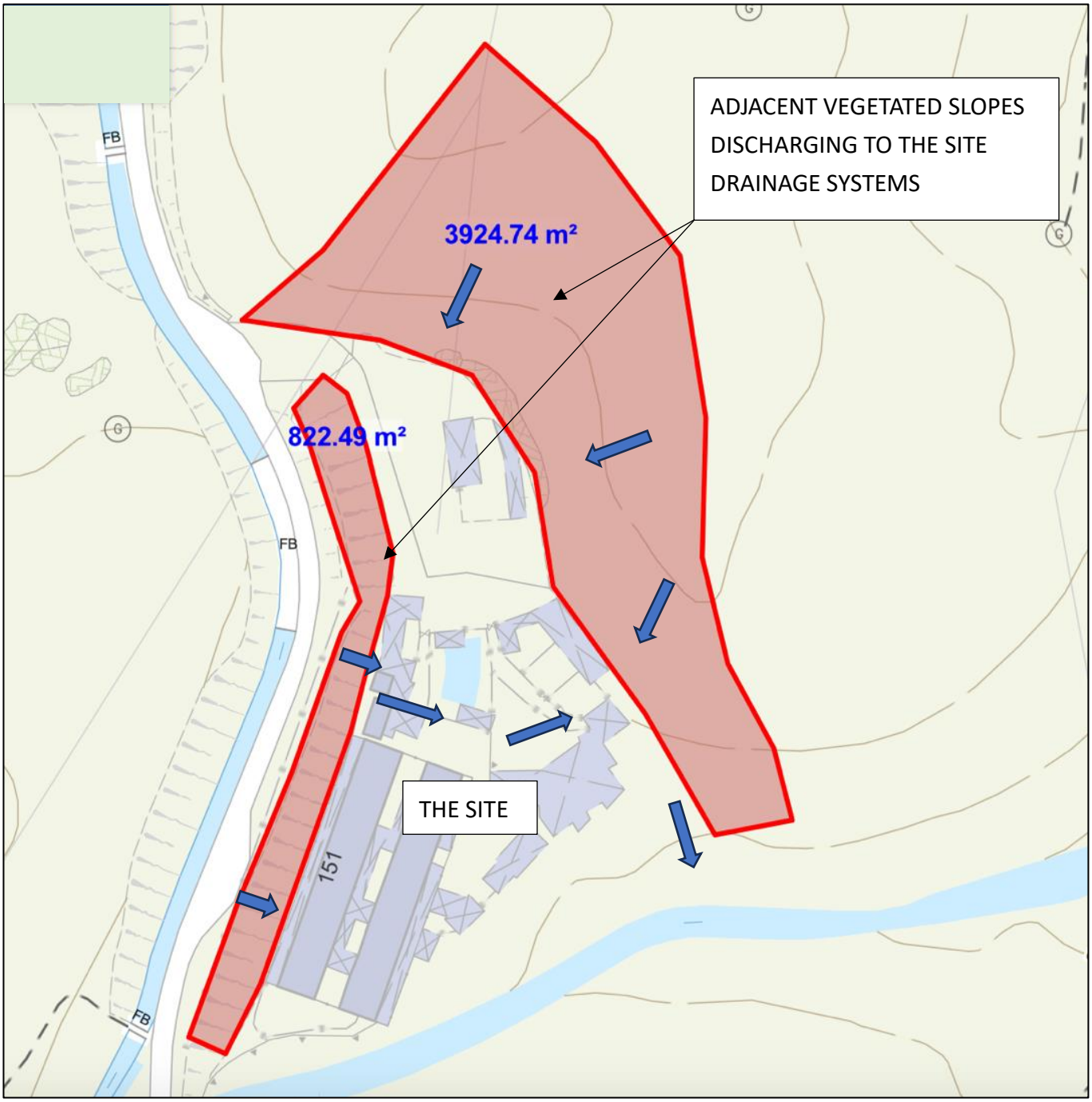
SKSFS/TLWSK

FIGURE 2.1 SITE LOCATION PLAN

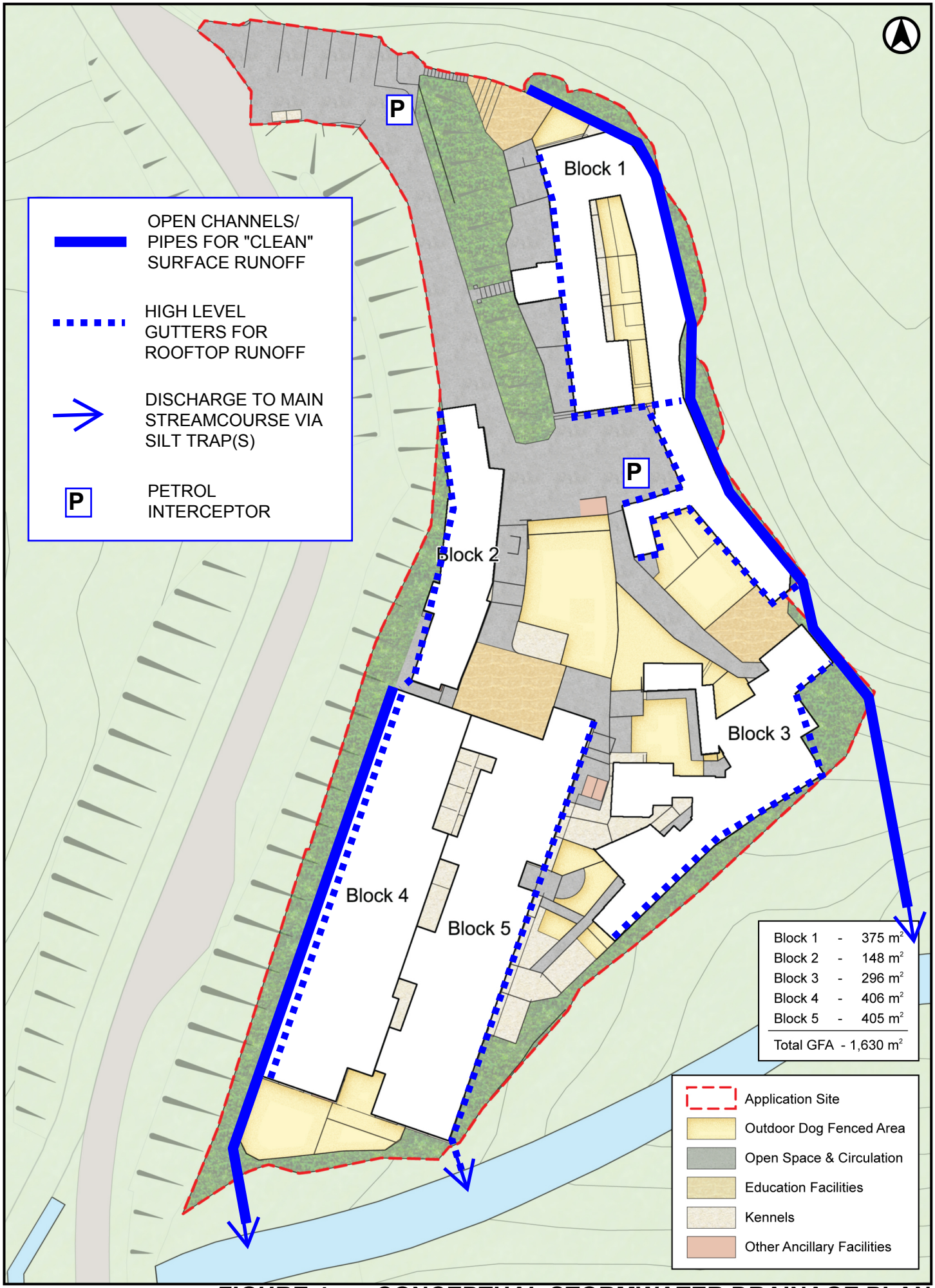
SCALE 1 : 5,000



Proposed Temporary Animal Boarding Establishment (Stray Dog Welfare Facility for Rescue, Rehabilitation and Community Education) for a Period of 3 Years at Various Lots in D.D. 247 and Adjoining Government Land, No. 151 Tai Lam Wu Road, Sai Kung	**Upstream Catchment Area**
	Figure 2



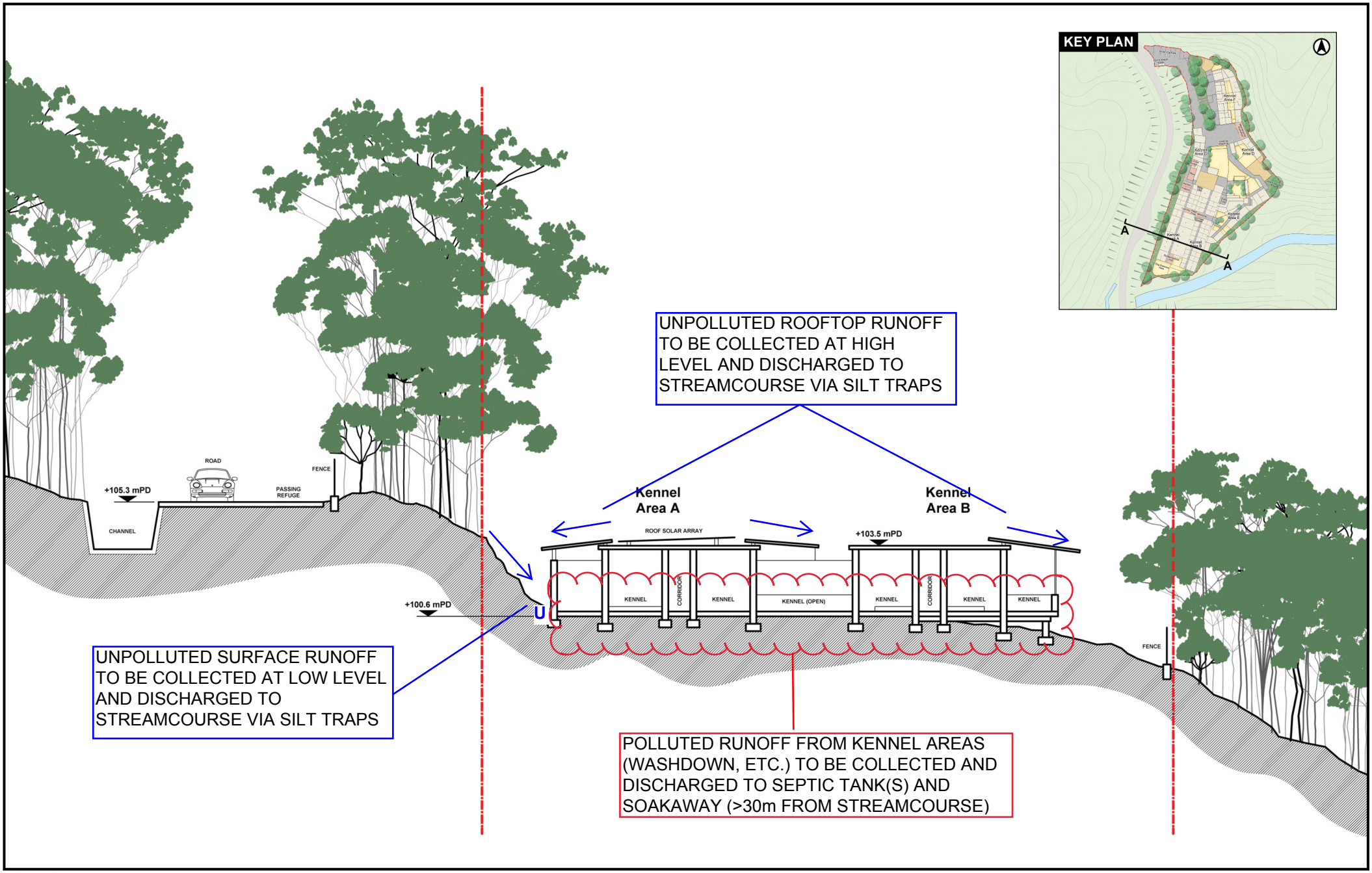
Proposed Temporary Animal Boarding Establishment (Stray Dog Welfare Facility for Rescue, Rehabilitation and Community Education) for a Period of 3 Years at Various Lots in D.D. 247 and Adjoining Government Land, No. 151 Tai Lam Wu Road, Sai Kung	Adjacent Catchment Areas
	Figure 3



SKSFS/TLWSK

FIGURE 4 CONCEPTUAL STORMWATER DRAINAGE PLAN

SCALE 1 : 500



SKSFS/TLWSK

FIGURE 5 DIAGRAMMATIC SECTION AND DRAINAGE/SEWERAGE CONCEPTS

SCALE 1 : 200

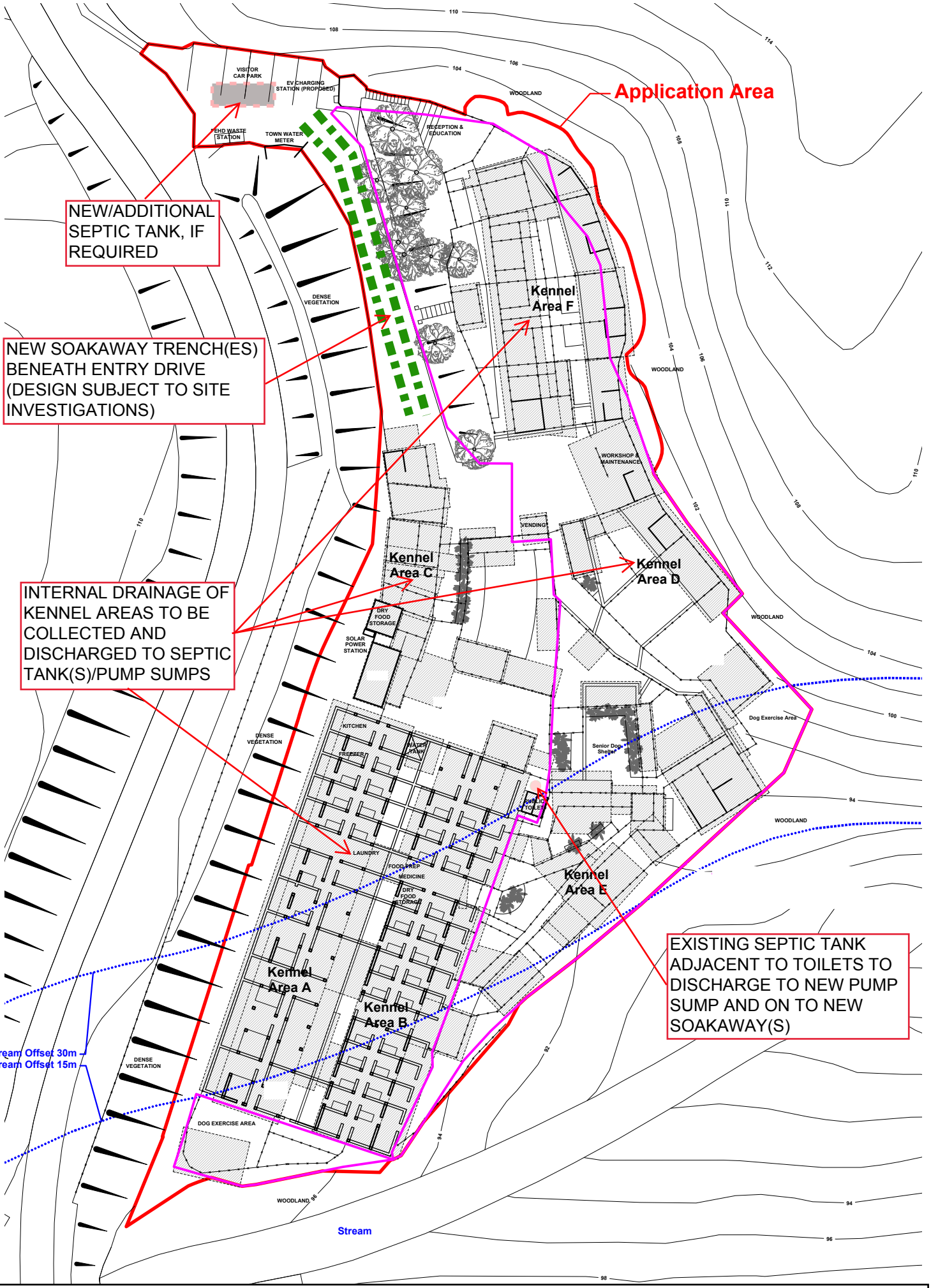


FIGURE 6
CONCEPTUAL ARRANGEMENT OF FOUL WATER COLLECTION AND DISPOSAL