Appendix E

Replacement Pages of Drainage Impact Assessment

4. POTENTIAL DRAINAGE IMPACT BY THE PROPOSED DEVELOPMENT

4.1 The Application Site will be developed into a residential development. The master layout plan of the Proposed Development is shown in ***Annex A***.

Changes to Drainage Characteristics

4.2 The Proposed Development will induce changes in land use of the Application Site. The percentage of paved area comprising building blocks, concrete structures, roads and other paved facilities will be increased. As a result, there will be an increase in surface runoff generated from the Proposed Development.

4.3 Information received from DSD indicates that the estimated water levels in River Beas just at the upstream of Fanling Highway under the planned development scenario are 8.90 mPD and 9.41 mPD respectively for a 50-year and 200-year return period combined events. Provided that the Application Site is formed to a minimum level for flood protection and there is effective gravity drainage, the Proposed Development would not be subject to flood in 50-year events. The required minimum site formation levels are discussed in Section 5 below.

Volume of Runoff and Peak Runoff Rate

4.4 The Application Site will be developed into a residential development with plot ratio (PR) not more than 2.012 under the proposed scheme. About 80 % of the Application Site will be paved and the rest will be landscaped. Since the Application Site is located next to the main trunk, a 200-year return period storm event will be used to calculate the estimated peak runoff rate. The increase in peak runoff rates due to the Proposed Development at the Application Site against 200 year return periods storm event under a 24-hour design rainfall as given in DSD's SDM are shown in ***Table 4.1*** below. The effect of climate change in the drainage design has been included in the calculation with reference of Table 28 of the SDM.

Table 4.1 Estimated Peak Runoff Rate

Return Period	Peak Runoff Rate (m^3/s) of Proposed Development		
	Before Development (1)	After Development (2)	Increase in Runoff (2) — (1)
200 years	0.57	1.01	0.44

4.5 The analyses indicate that the change of paved area will result in a slight increase in runoff rates after the development. Improvement to local drainage system is required to discharge the flow to the improved River Beas.

4.6 To assess the impact of the increase in peak runoff rate in River Beas, the full flow discharge rate in River Beas is estimated. The increased peak runoff rate from a 200 year return period storm event when compared to the full flow capacity of River Beas is approximately 0.19%. It is considered that the increased flood risk of River Beas would be negligible. Capacity calculation is shown in ***Annex C.***

5. PROPOSED DRAINAGE STRATEGY FOR THE PROPOSED DEVELOPMENT

5.1 According to the information received from DSD in January 2020, the predicted 50-year return period water level in this area is approximately 8.90 mPD. The existing ground levels within the Application Site vary from 10 mPD (south) to 8 mPD (north). To facilitate drainage via gravity flow from the Proposed Development to the River Beas, it is proposed that a minimum formation level of about 9.50 mPD be kept for the Application Site.

5.2 The runoff from the areas within the Application Site will be collected by the future internal drainage system and discharged to the existing drainage channel along the southern toe of Kwu Tung Road embankment which subsequently discharges into River Beas. Referring to **Section 4.6** above, River Beas is expected to have adequate capacity to cater for the additional runoff from the Proposed Development at the Application Site.

5.3 Based on the topography, the surface runoff from the catchment areas to the west and to the south of the Application Site are flowing towards River Beas. Hence, no surface channels are required along the southern and western boundaries.

5.4 As described above, Hang Tau Road and the existing drainage system along Hang Tau Road intercept and discharge runoff from the village areas east of Hang Tau Road. Thus, there should not be overland flow from that area and peripheral drainages along the eastern boundary would not be required. Similarly, the topography to the west of the Application Site generally falls towards the existing meander in that area and further considering the land status of that area, peripheral drainage along the western boundary is also not required. The short northern and southern boundaries of the Application Site are already bounded by existing surface drainage that are outside the Application Site and would not be modified by this project, hence, peripheral drainage along these boundaries is not required.

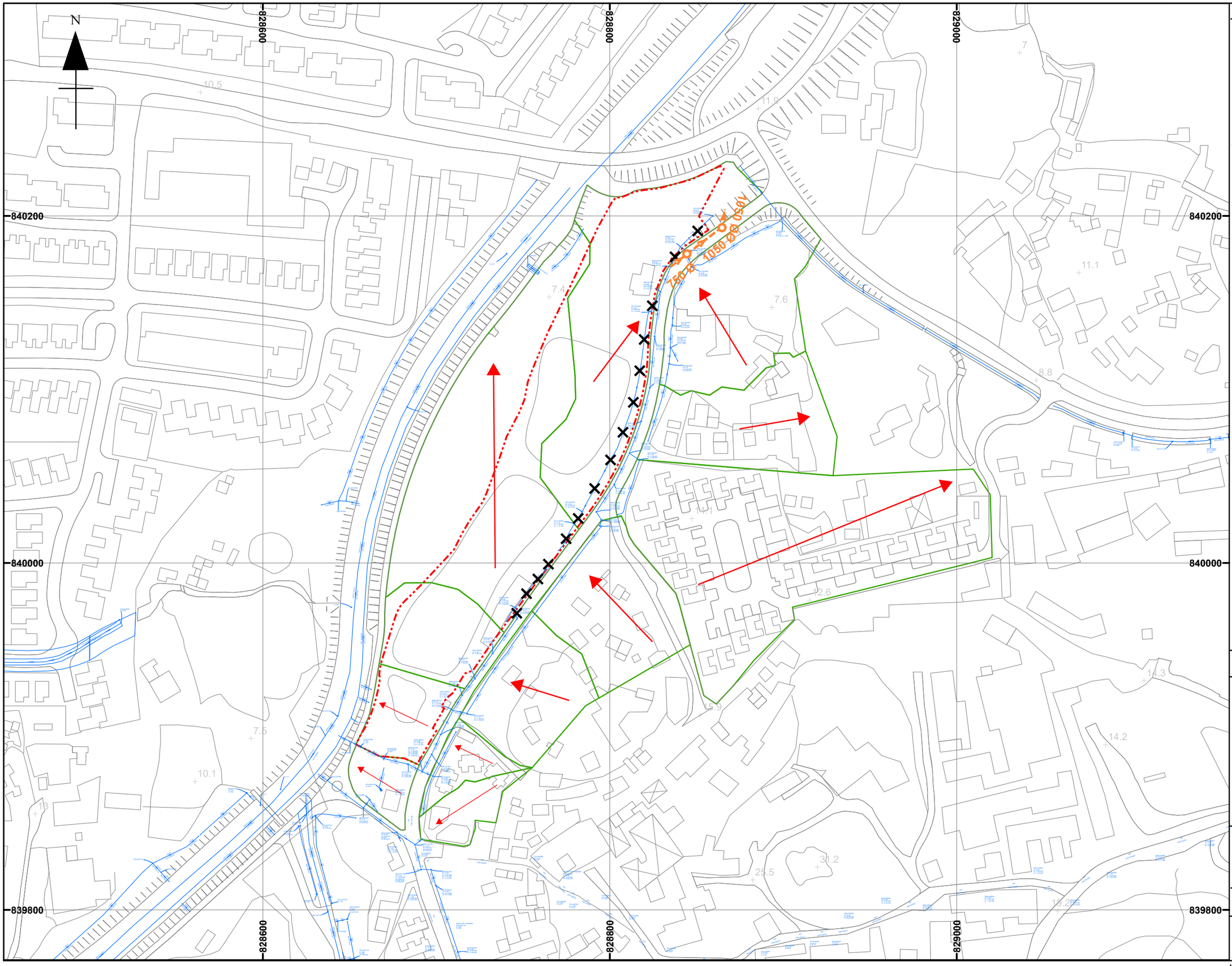
5.5 The internal drainage system within the Application Site will be designed, constructed and maintained by the project proponent in the later stages of the project.

5.6 The series of existing surface channels within the Application Site would not be required after development and would be demolished as the internal drainage system of the Application Site will convey the overland flows within the Application Site to the downstream existing drainage system.

5.7 With reference to the drainage records of DSD, there are drainage pipes that encroach onto the northeastern part of the Application Site. As those drainage pipes serve to convey overland flows collected along Hang Tau Road, it is proposed the existing drainage pipes which encroach onto the Application Site be diverted outside the site to run along Hang Tau Road. Specifically, the existing drainage pipes between existing manholes SMH1041850, SMH1041854 and SCH1023269 is proposed to be diverted. The proposed diversion scheme is shown in ***KT3/DIA/003***.

5.8 The sub-catchment used as input to the hydraulic calculation is shown on ***KT3/DIA/002*** and the associated runoff calculations are shown in ***Annex B***. The proposed drainage infrastructure for the Proposed Development is shown in ***KT3/DIA/004***. The hydraulic calculations of proposed drainages are shown in ***Annex D.***

5.9 The drainage system including the outlet and the internal drainage system will be constructed by the Applicant and will be maintained by the Applicant or the management agent of the development after completion.



Legend

- The Application Site
- Existing Catchment
- Existing drainage Pipe
- Direction of Flow
- Existing Drainage Pipe to be demolished
- Proposed Drainage Diversion Pipe

Initial Data	Checked Data

Project

Section 16 Planning Application for Proposed Residential Development with Minor Relaxation of Plot Ratio Restriction at Lots 1027, 1029, 1030, 1034A, 1034B, 1039 (Part), 1040, 1042 RP, 1043 RP, 1044 RP(Part), 1045, 1047, 2233 (Part), 2251 S.A RP,2256 RP, 2315 (Part) and 2316 RP (Part) in D.D. 92 and Adjoining Government Land (New Lot to be known as Lot 2644 in D.D. 92), Kwu Tung South, Sheung Shui, New Territories

Title

Existing Catchment Plan

Figure No.	Scale
KT3/DIA/003	1:2,000 @ A3

binnies

Plot date: 2020-01-30

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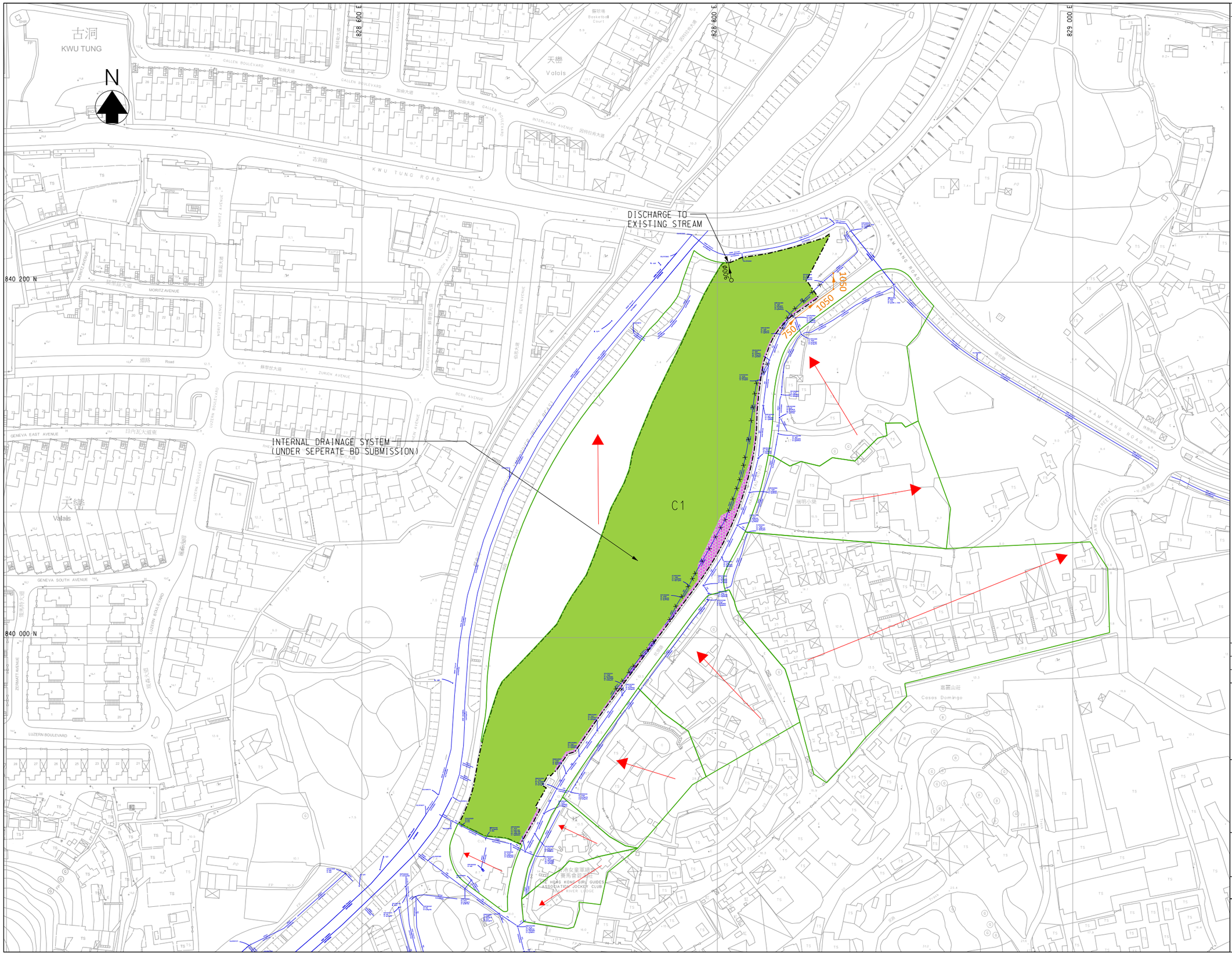

LEGEND:

- THE APPLICATION SITE
- PROPOSED OUTFALL STRUCTURE
- PROPOSED DRAINAGE DIVERSION PIPE
- EXISTING CATCHMENT
- DIRECTION OF FLOW
- EXISTING DRAINAGE PIPE/U-CHANNEL TO BE DEMOLISHED
- PLANNED ROAD WIDENING WORKS BY DEVELOPER

	Designed	Checked
Initial		
Date		

Project title

SECTION 16 PLANNING APPLICATION FOR PROPOSED HOUSES AT LOTS 1027, 1029, 1030, 1034 S.A, 1034 S.B, 1039 (PART), 1040, 1042 RP, 1043 RP, 1044 RP (PART), 1045, 1047, 2233 (PART), 2251 S.A RP, 2256 RP, 2315 (PART) AND 2316 RP (PART) IN D.D. 92 AND ADJOINING GOVERNMENT LAND (NEW LOT TO BE KNOWN AS LOT 2644 IN D.D. 92), KWU TUNG SOUTH, SHEUNG SHUI, THE NEW TERRITORIES

Drawing title

PROPOSED DRAINAGE SYSTEM AND CATCHMENT PLAN

Figure no.	Revision
KT3/DIA/004	-

Scale: A1 1 : 1000

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賓尼斯工程顧問有限公司

Plot Date = 2025/5/26

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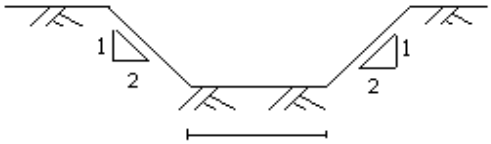
Annex C Hydraulic calculation at River Beas

$$Q = \frac{A}{n} S^{1/2} R^{2/3}$$



16m

Area of flow	A =	35.280	m^2	(Based on as-built drawing)
Wetted Perimeter	P =	24.050	m	
Hydraulic radius	R =	1.467		
Hydraulic gradient	S =	0.002		From as-built
Mannings Coefficient	n =	0.035		Table 13 of SDM

Discharge in the Channel $Q = \frac{A}{n} \times s^{(1/2)} \times R^{(2/3)}$

$= 60.955 \ m^3/s$

Increase rate of discharge Q' = 0.44 m^3/s (Refer to Annex B)

Percentage with respect to Full flow of River Beas = 0.72%