寄件者: Tang Lok San <[redacted]>
寄件日期: 2026年07月08日星期三 8:53
收件者: tpbpd/PLAND
副本: David Chi Chiu CHENG/PLAND; Ivan Sze Yuet FUNG/PLAND
主旨: Re: S. 16 Planning Application No. A/YL-KTN/1196 - Departmental Comments
附件: AYLKTN1196 Drainage Proposal R1 20260708.pdf

類別: Internet Email

To whom may concern,

I am here to submit the updated drainage proposal for Planning Application No.: A/YL-KTN/1196. Please see the attachment below for the proposal. Please contact Mr. Tang via email [redacted] if you have any questions regarding the captioned application.

Yours faithfully,
Mr. Tang

UMWELT CONSULTING LIMITED

Application No. A/YL-KTN/1196 Proposed Temporary Open Storage with Ancillary Facilities and associated Filling of Land for a Period of 3 Years at D.D. 107 Lot 1231 (Part), 1234 (Part), 1235, 1236, 1237 (Part), 1238 (Part), 1240 (Part), Kam Tin North, Yuen Long, New Territories

Drainage Proposal

Revision 1

8 July 2026

Content:

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Appendices:

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1. Introduction

1.1 Project Title

1.1.1 Proposed Temporary Open Storage with Ancillary Facilities and associated Filling of Land for a Period of 3 Years

1.2 Project Background

1.2.1 A Planning Application has been prepared for a proposed temporary open storage use for a period of three years at the application site ("the Project Site") on D.D 107 Lots 1231 (Part), 1234 (Part), 1235, 1236, 1237 (Part), 1238 (Part) and 1240 (Part), Kam Tin North, New Territories.

1.2.2 The Project Site falls within the 'Agriculture' ("AGR") zone according to the Approved Kam Tin North Outline Zoning Plan No. S/YL-KTN/11 ("the OZP"). According to the Notes of the OZP, temporary use or development of any land not exceeding a period of three years requires planning permission from the Board. A Planning Application is therefore submitted for the proposed development at the Project Site.

Location of the Project Site

1.2.3 The location of the Project Site is given in **Figure 1.1.**

1.2.4 The Project Site has an area of about 6,134.3m². The proposed development comprises site formation works and the use of the site for open storage. The open storage area will be approximately 5,573.8m², with a 351m² buffer area surrounding the open storage area. Proposed site formation includes filling of the land area with a 0.8m soil and 0.3m concrete layer to a proposed site level of +10.40mPD. A dried pond (approx. 1,378.4m²) locates within the Project Site will also be filled to proposed site level.

Purpose of this Proposal

1.2.5 This Drainage Proposal is prepared to supplement the planning application. Its purpose is to demonstrate that with the implementation of the proposed drainage infrastructure, the proposed development will not cause any adverse drainage impact to the adjacent areas.

1.2.6 All necessary information necessary for the submission have been included. A checklist detailed the responses on Drainage Services Department's ("DSD") requirements / reminders is given in **Appendix 1.1**.

2. Existing Environment of the Project Site

2.1 Overview of Local Terrain and Surrounding Environment

Local Terrain within Proximity of the Project Site

2.1.1 The Project Site is located within Kam Tin North, New Territories. To the south of the Project Site is a stepped channel that ultimately led to a XWP1001820 channel of 6500mm wide (Feature XWP1001820) and discharge into Kam Tin River. The stepped channel serves as the main discharge channel for the surrounding area. The stepped channel is a man-made channel without a concrete wall at the section south of the Project Site.

2.1.2 To the north and east of the Project Site located a number of open storage areas that used for parking of construction vehicles. To the west of the Project Site located farmlands.

Terrain of the Project Site

2.1.3 The local terrain is higher at the north and lower at the south. Stormwater falling north of the Project Site will flow southwards, either entering the site or flow along the local access road, ultimately discharging into the river to the south. The existing stormwater flow direction is shown in **Figure 2.1**.

2.1.4 The Project Site currently comprises of unpaved land (existing level +10.10mPD) and a dried pond (existing level +9.30mPD), with a total area of 6,134.3m². The site is unpaved with no permanent structures; the pond area is a dried pond. Panorama photos of the Project Site is given in **Figure 2.2**.

2.1.5 The proposed development will fill the entire site to a unified +10.40mPD with soil and concrete.

2.2 Existing Drainage Channel

Recorded Public Drainage Channel

2.2.1 Existing public drainage infrastructure in the proximity of the Project Site includes the stepped channel at the south of the Project Site that discharge the local stormwater into the public drainage feature Features SCP1009640 and XWP1001820 and enters Kam Tin River. Features SCP1009640 and XWP1001820 are also shown in **Figure 2.1**.

2.2.2 The Kam Tin North area is currently not a flooding prone area. This demonstrates that the existing primary discharge channel has adequate capacity to handle the design stormwater flow for the area.

Site Visit and Observation

2.2.3 A site visit was conducted on 28 February 2026 to obtain the current condition of the surrounding area and existing drainage system within the Project Site. A photo map showing the existing situation of the Project Site is given in **Figure 2.3**. Photos taken during the site visit showing the features identified in the following sections are given in **Figure 2.4** to **Figure 2.6**.

Current Condition of the Project Site

2.2.4 A sheet metal hoarding surrounds part of the Project Site; permanent concrete footing was found at the boundary between an elevated land lot at the northwest of the Project Site. As the site boundary is partially sealed, stormwater will flow in/out of the Project Site during rainstorms at unsealed sections.

2.2.5 The extend of the sealed boundary and drainage channels are shown in **Figure 2.3**.

2.2.6 No formal U-channel drainage system currently exists within the Project Site. Stormwater runoff follows natural surface flow paths towards the southern boundary of the site, where it enters the stepped channel.

Current Condition of the Surrounding Area

2.2.7 Area at the north to east of the Project Site is occupied by small rise buildings and open spaces, presumably of industrial uses (**Figure 2.3** and **Figure 2.4**). One of the sites is higher than the Project Site, but have concrete footings at the boundary fence (**Figure 2.5**). Drainage channels are found within the site, demonstrating the stormwater within the site will be properly collected and discharged (**Figure 2.3**).

2.2.8 A stream lies at the east of the Project Site. The stream would intercept stormwater flows from the east and direct the stormwater south towards the stepped channel located at the south of the Project Site (Photo 1 of **Figure 2.6**).

2.2.9 Area at the south of the Project Site is occupied by open storage, houses, and undeveloped land with vegetations (Photo 2 of **Figure 2.6**). The stepped channel discussed in **Section 2.1.1** lies in between the area and the Project Site. Hence the stormwater falls on the southern side of the Project Site would either flow southwards following the terrain or entering the stepped channel and would not enter the Project Site (Photo 3 of **Figure 2.6**).

2.2.10 Area at the west of the Project Site is occupied by developed areas with some farming area. a small river lies in between the area and the Project Site, hence stormwater falls on the western side of the Project Site would either flow southwards following the terrain of entering the river and would not enter the Project Site (**Figure 2.3**).

3. Drainage Flow Evaluation

3.1 Relevant Guidelines and Classification of the Project Site

3.1.1 This Drainage Proposal has been carried out in accordance with the guidelines given as follows:

a) Technical Note to Prepare a Drainage Submission (the TN);
b) Stormwater Drainage Manual Planning, Design and Management (Fifth Edition, January 2018) (the Manual); and
c) Relevant standard drawings provided by Civil Engineering and Development Department.

Classification of the Project Site

3.1.2 The Project Site has a total area of 6,134.3m² (0.613ha), which is smaller than 1ha. In accordance with the TN, the Project Site is classified as a Simple Site. This Drainage Proposal therefore presents the drainage arrangement within the Project Site only and its connection to the existing public drainage network.

3.2 Existing Stormwater Flow Path

Existing Scenario

3.2.1 Under the existing scenario, stormwater falling on the site either infiltrates into the ground or flows as overland surface runoff towards the south, following the natural terrain gradient. The runoff eventually enters the public drainage network and discharges into the Kam Tin River. The existing catchment area is shown in **Figure 3.1**.

Catchment A

3.2.2 Catchment A refers to the open storage area located at the northern side of the Project Site. No local surface channel was identified within the catchment through aerial photo, hence the stormwater falls within the catchment area are assumed to enter the Project Site through the fence for a worst-case scenario.

Catchment B

3.2.3 Catchment B refers to the elevated site located at the northwest side of the Project Site. All stormwater fall within the catchment area will be discharged through the locally available drainage channels and be discharged into the stream located at the west of the catchment area, hence the stormwater falls within the catchment area would not enters the Project Site.

Catchment C

3.2.4 Catchment C refers to the road running at the east of the Project Site, together to the area located at further east of the road. There is a stream running from north to the east along the road and directing all stormwater into the river channel located at the south of the Project Site. Hence all water falls within the catchment will be discharged into the river channel without entering the Project Site.

Project Site

3.2.5 All stormwater fall within the Project Site will be flowing towards the south and enter the stepped channel located at the south. The channel wall of the stepped channel is

covered with vegetation, suggested the channel wall is not paved with concrete (Photo 3 of **Figure 2.6**). Hence, majority of the stormwater would enter the ground but as the section of the stepped channel is not paved, the stormwater will eventually enter the stepped channel.

Dried Pond

3.2.6 A dried pond of area approximately 1,378.4m² is located within the Project Site. The pond functions as retention area for collecting surface runoff from the vicinity during rainfall. Stormwater falls on the pond will be absorbed into the ground and enters the stepped channel at the south of the Project Site.

3.3 Proposed Scenario

3.3.1 Following the proposed filling and site formation, the site will be filled with a concrete surface. This will increase the volume and rate of surface runoff. However, this runoff will be entirely intercepted by the proposed on-site drainage system.

Potential Impact on Filling of the Project Site

3.3.2 The proposed site level of +10.40mPD will not be higher than the adjacent land to the north. Therefore, overland flow from the north of the site (Catchment A) is expected to enter the Project Site same as the scenario before the development. A proposed drainage system will be implemented and collect the overland flow from the Catchment A and discharge into the river steam at the south of the project accordingly.

Potential Impact on Filling of the Dried Pond

3.3.3 Without the proposed development, the dried pond serves as a retention area, that stormwater would not immediately enters the stepped channel at the south. The proposed development will fill the dried pond to match the Project Site, as such stormwater that originally enters the ground would be required to be discharged under the proposed scenario. Assume the pond would have about 1.5m fall across the shortest flow path with 27m long, increment of 0.1150m^3/s is anticipated due to the filling works. Detailed calculation is given in **Appendix 3.1**.

3.3.4 The additional stormwater flow will be mitigated by additional discharge channels. As the dried pond is located within the Project Site, the additional stormwater flow will be intercepted by the proposed drainage channel within the Project Site. The sizing of the drainage channel will be properly increased to take care of the flow.

Stormwater Flow After Filling Works

3.3.5 Stormwater falling within the Project Site will flow southwards following the newly formed terrain grade. It will be collected by a proposed perimeter U-channel system. The collected stormwater will then be conveyed to a proposed catchpit with a sand trap and discharged into the existing public drainage system, ultimately reaching the Kam Tin River.

4. Proposed Drainage Infrastructure

4.1 Impact on Local Stormwater Flow Pattern and Discharge Channel Capacity

4.1.1 As discussed in **Section 1.2.4**, proposed site formation includes filling of the land area with a 0.8m soil and 0.3m concrete layer to a proposed site level of +10.40mPD. The proposed site level will not be higher than the sites at the north of the Project Site, and will not affect the overland flow that enters the Project Site.

4.1.2 As discussed in **Section 3.2.2**, stormwater falls on Catchment A are considered to enter the Project Site for worse case scenario. The proposed site level is not higher than the ground level of Catchment A, and no concrete footing is proposed at the boundary. Hence the overland flow will not be affected by the proposed development.

4.1.3 Stormwater falls on Catchment B will be discharged through the local discharge channel and enters the small river located at the west of the Project Site and will not enters the Project Site. Similarly, stormwater falls on the west and south of the Project Site will be intercepted by the small river and the stepped channel and will not affect the Project Site.

4.1.4 Stormwater falls on Catchment C will flow towards south and enters the stepped channel or being intercepted by the stream at the east of the Project Site and enters the stepped channel. Stormwater will not enter the Project Site.

4.1.5 As such, filling of the Project Site to 10.4mPD will not have significant impact on the overland flow for the nearby catchments. However, the Project Site will become impermeable and additional stormwater will be generated.

4.1.6 The amount of runoff generated by different catchments before and after the proposed development is given in **Table 4.1**. Detailed calculations are given in **Appendix 4.1** and **4.2**.

Table 4.1: Runoff Generated by the Catchment Area before and after the Proposed Development

Catchment Area	Generated Runoff, m^3/s	
	Before Proposed Development	After Proposed Development
Catchment A	0.1866	0.1866
Project Site	0.0224	0.4265

4.2 General Specification and Dimension of the Channel

4.2.1 In accordance with the TN, for a site of approximately 0.613ha, dual perimeter U-channel with a diameter of 450mm and a self-cleansing gradient will be required. In this drainage proposal, surface U-channel with diameters of 500mm and 650mm were proposed.

4.2.2 Catchpits with robust covers will be provided at all changes in direction and at junctions of the drainage channels. A final catchpit with a sand trap will be provided at the outlet point to intercept silt and debris before the stormwater enters the public system.

4.2.3 Catchpit will be provided at all corners of the Project Site where the U-channel changes direction, and a sand trap will be provided to intercept the debris carried by the stormwater. The dimensions of the U-channels, covers of the catchpits will make

reference to Civil Engineering and Development Department (CEDD) Drawing Nos. C2409I, C2406/1, C2406/2A and Drainage Services Department (DSD) Drawing No. DS 1025B.

4.3 Channel Alignment and Components

Drainage Arrangement for Stormwater Flow within the Project: U-channel, floodwall and catchpit

4.3.1 A perimeter U-channel will be constructed along the Project Site boundary to intercept all surface runoff. For stormwater falling within the Project Site, it will flow southwards following the finished terrain and be collected by the perimeter U-channel along the southern boundary.

4.3.2 Catchpits will be provided at each change of direction and at the junctions of drainage channels.

4.3.3 A final catchpit, FCP, with a sand trap will be constructed at the southeastern side of the Project Site. Stormwater within the Project Site will be discharged through FCP into the stepped channel.

4.3.4 **Figure 4.1** shows the proposed layout of the drainage channel for the Project Site. Technical details, including the type, dimensions, invert levels are given in **Table 4.2**.

Table 4.2: Technical Details of the Proposed Drainage Channels

Segment	Type	Down-stream Manhole	Length, m	Diameter, mm	Slope	90% Full capacity, l/s	% of Full Capacity under the Peak Flow of the Proposed Project
DC-1	Surface U-Channel	CP1	60.00	500	1 in 200	291.49	64%
DC-2	Surface U-Channel	CP2	7.80	500	1 in 156	330.67	56%
DC-3	Surface U-Channel	CP3	75.00	500	1 in 188	301.20	62%
DC-4	Surface U-Channel	FCP	44.30	500	1 in 177	309.97	60%
DC-5	Surface U-Channel	CP4	36.00	650	1 in 180	611.77	70%
DC-6	Surface U-Channel	FCP	113.20	650	1 in 142	691.03	62%
DC-7	Underground Discharge Pipe	Stepped Channel	15.60	650	1 in 78	933.62	66%

4.4 Construction and Maintenance

4.4.1 The Applicant shall furnish DSD with this connection proposal for agreement. After obtaining DSD's agreement, the Applicant shall submit a duly completed Form HBP1 with a cross cheque covering the technical audit fee and a plan showing the details of the proposed drainage connection works to DSD (Mainland North Division) for formal application. The Applicant shall also carry out the proposed connection works in accordance with DSD Standard Drawings at the resources of the Applicant.

4.4.2 During construction stage, the Applicant shall ensure that no works, including any site formation works, shall be carried out adversely interfere with the free flow condition of the existing drains, channels and watercourses on or in the vicinity of the subject site any time during or after the works.

4.4.3 The proposed U-channel will intercept and deliver stormwater into the U-channels at the west and south of the Project Site and ultimately discharged into Ng Tung River. The maintenance of the proposed U-channels and catchpits shall be undertaken by the Applicant.

4.4.4 The Applicant shall rectify the system if it is found to be inadequate or ineffective during operation at his / her own expense, in addition to those within the Project Site.

4.4.5 In addition, the Applicant, and the successive lot owners, shall also:

a) make good all adjacent affected areas upon the completion of the drainage works;
b) allow all time free access for the Government and its agent to conduct site inspection on his completed drainage works; and
c) allow connections from the adjacent lots to be completed drainage works on Government Land when so required.

5. Conclusion

5.1.1 Consider the location is not a flooding black spot, the stepped channel is adequate to handle the stormwater discharge for the area. Although the project proposed to fill up the site with area of about 6,134.3m², which included a dried pond of about 1,378.4m² in area, the increased stormwater discharge will be discharged through the stepped channel. The drainage system after the implementation of the project will not be adversely affected.

5.1.2 Additional connecting U-channels and catchpits are required to collect the stormwater falls within the Project Site and divert to the stepped channel for discharge. Associated drainage proposal has been presented.

5.1.3 The Applicant will ensure the construction works be conducted in a manner that the works will not adversely interfere with the free flow condition of the existing drains, channels and watercourses on or in the vicinity of the subject site any time during or after the works.

Figures

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Figure 1.1: Location of the Project Site

Map Source: GeoInfo Map

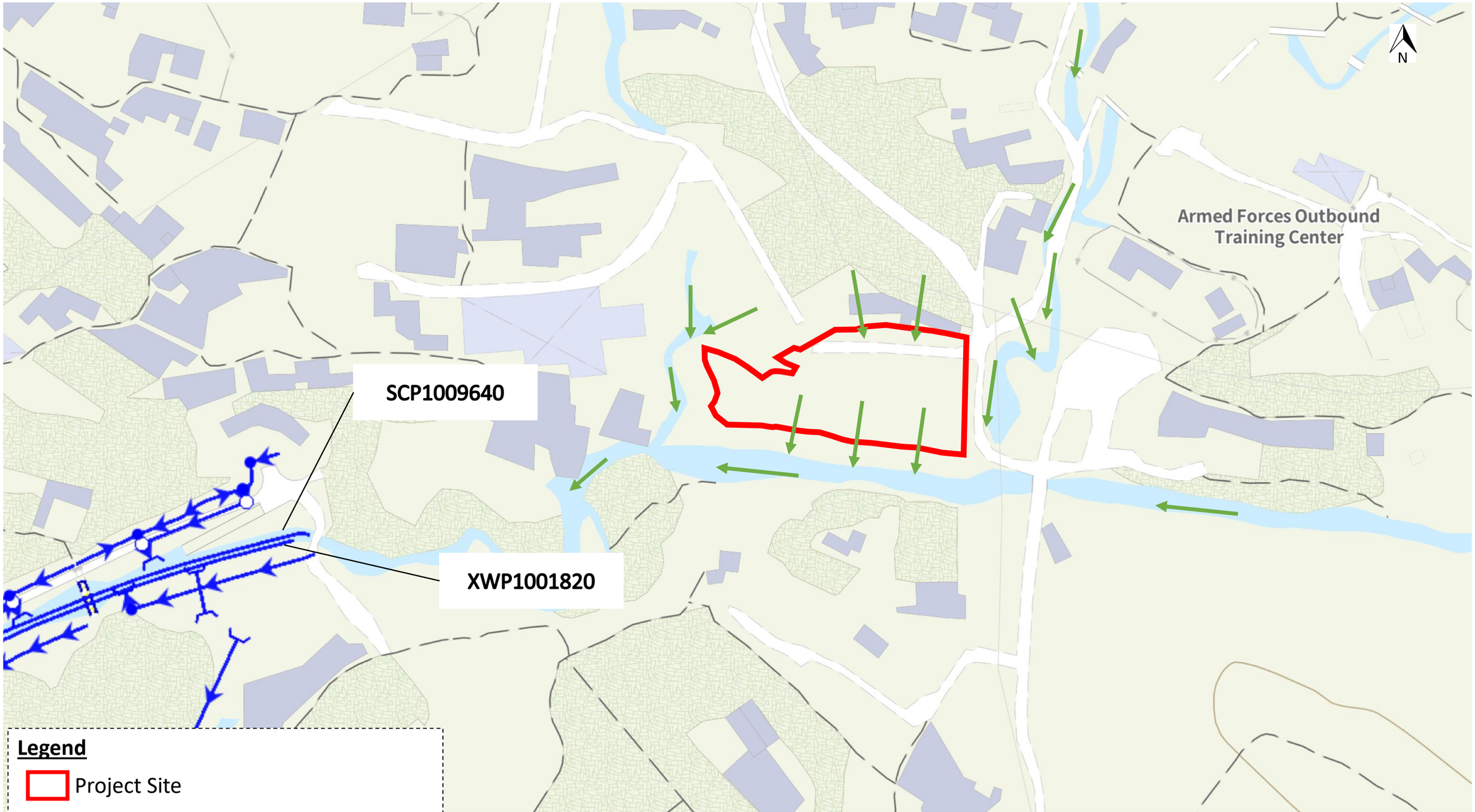

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Figure 2.1: Existing Stormwater Flow Direction

Map Source: GeoInfo Map

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Figure 2.2: Panoramic View of the Project Site

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Figure 2.3: Photo Map of the Project Site

Photo 1: Fenced Areas at the north of the Project Site

Photo 3: Fenced Areas at the north of the Project Site

Photo 2: Vacant Space at the east of the Project Site

View Angle of the Photos

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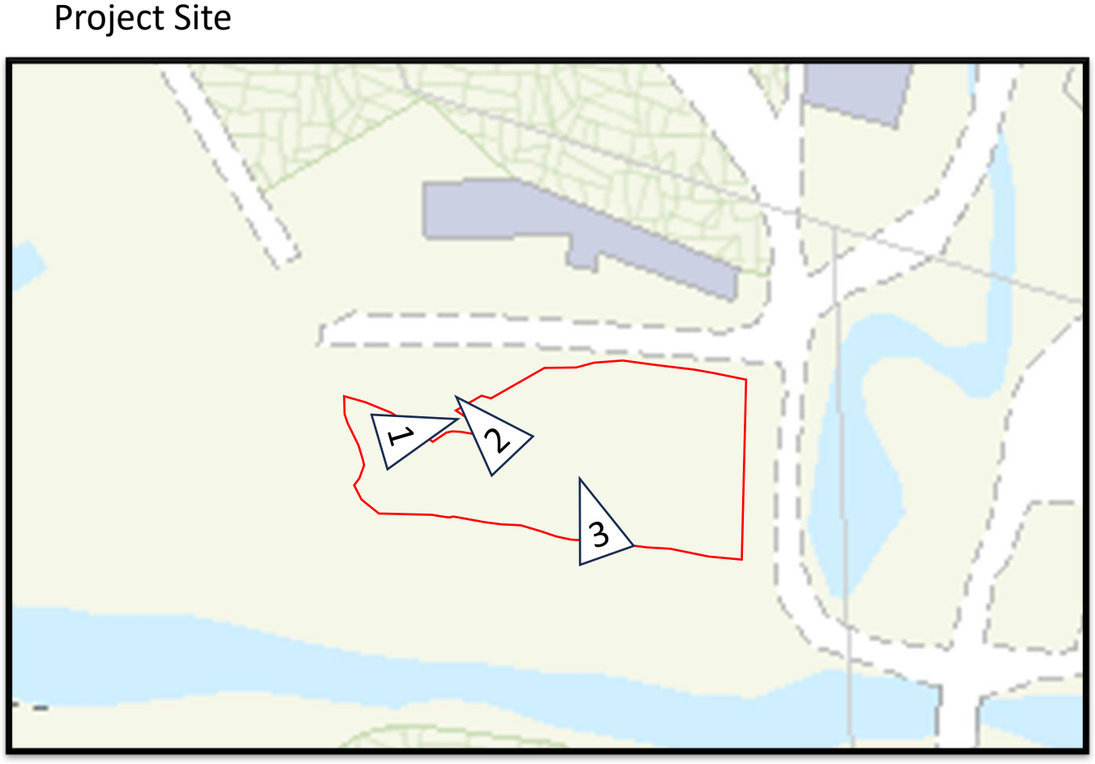
Figure 2.4: Site Photos showing the Existing Scenario of the Project Site

Photo 1: Concrete Footing at the Site Located at the North of the Project Site

Photo 2: Concrete Footing at the Site Located at the North of the Project Site

Photo 3: Concrete Footing at the Site Located at the North of the Project Site



View Angle of the Photos

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Figure 2.5: Site Photos showing the Existing Scenario of the Project Site

Photo 1: Stream at the East of the Project Site

Photo 3: Stepped Channel at South of the Project Site

Photo 2: Open Storage Areas and Houses at the South of the Project Site

View Angle of the Photos

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Figure 2.6: Site Photos showing the Existing Scenario of the Project Site

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Figure 3.1: Identified Catchment Area

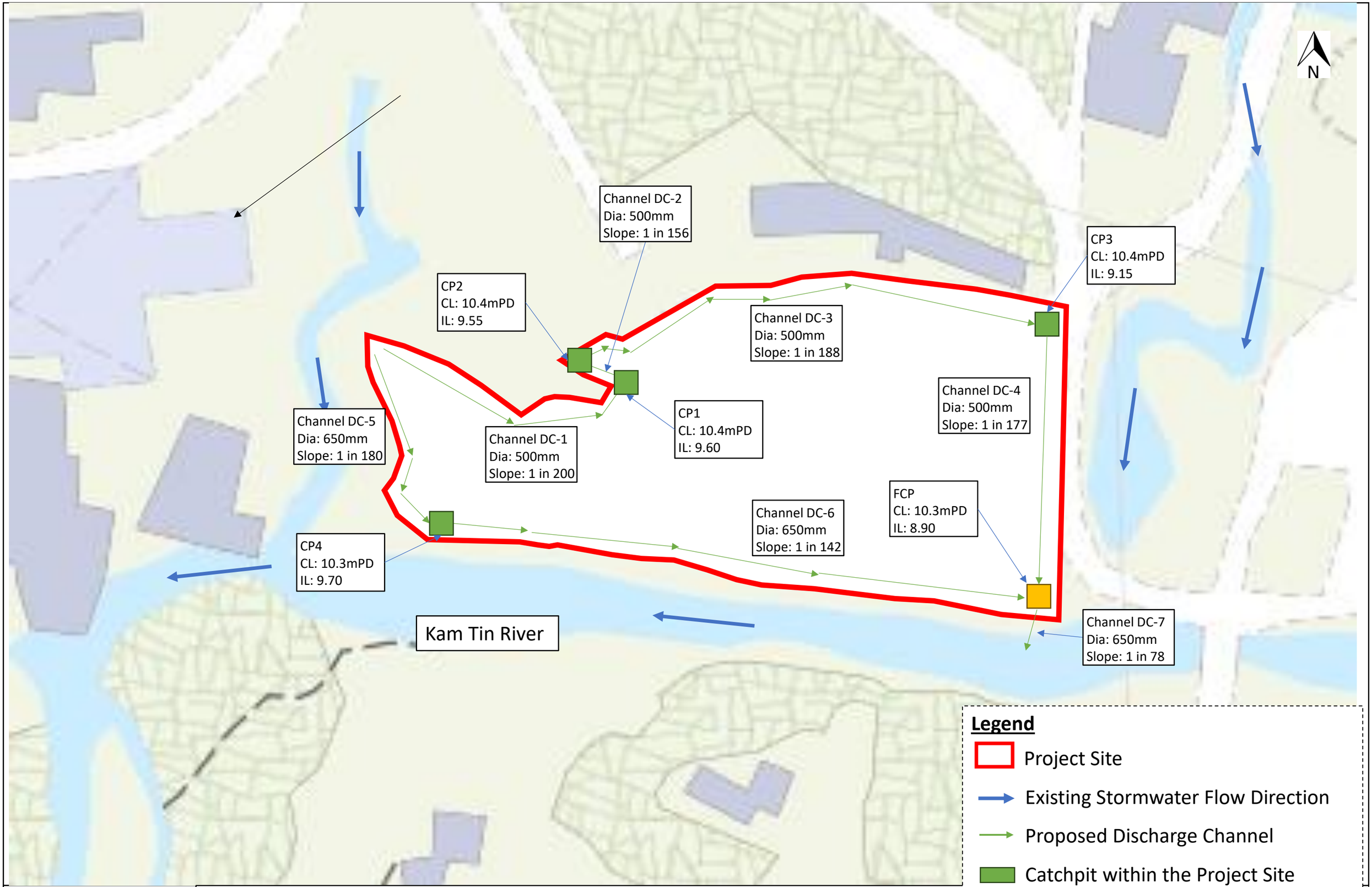

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Figure 4.1: Proposed Layout of the Drainage Channel for the Project Site

Map Source: GeoInfo Map

Appendix 1.1:
Responses on DSD's Requirements / Reminders

Appendix 1.1

Responses on DSD's Requirements / Reminders

Planning Application No.: A/YL-KTN/1196

Location: Lot No. Lot No. Lot 1231 (Part), 1234 (Part), 1235, 1236, 1237 (Part), 1238 (Part), 1240 (Part)

In D.D. 107

Site Area:	6,134.3	m^2
Land filling works involved?	Yes	
Maximum increase in formation level:	0.5	m
Maximum level difference with adjoining lot:	1	m
Filling of pond(s) involved?	Yes	
Estimated size of pond to be filled:	1,378.4	m3

(A) DSD's Requirements	Fulfilled in the submission? (Yes / No)
(1) The proposed development should neither obstruct overland flow nor adversely affect any existing natural streams, village drains, ditches and the adjacent areas, etc., unless there is proper diversion.	Yes
(2) Adequate surface channels shall be provided to collect and convey the surface runoff accrued on the application site.	Yes
(3) For site formation level higher than the adjoining lots, peripheral surface channels, set at a level lower than the adjoining lots, should be constructed to collect runoff flowing from adjoining lots toward the application site.	Not Applicable
(4) Where the site formation level is lower than the adjoining lots and boundary walls or hoarding are erected, adequate openings must be provided to allow existing overland flow from those lots to pass through. Otherwise, peripheral surface channels set at a lower level must be constructed to intercept the runoff.	Not Applicable

(A) DSD's Requirements	Fulfilled in the submission? (Yes / No)
(5) The applicant shall be required to place all the proposed works 3m away from the top of the bank of any existing watercourses. All the proposed works in the vicinity of the watercourses should not create any adverse drainage impacts, both during and after construction. Adequate measures should be provided at the resources of the applicant to our satisfaction in order to avoid the subject site from being eroded and flooded and to ensure capacity of watercourses and flooding susceptibility of the adjoining areas would not be adversely affected by the proposed development.	Yes
(6) The applicant should indicate the proposed and existing ground levels of the application site and ground levels of adjacent areas on the drainage plan.	Yes
(7) Cross sections showing the proposed drainage facilities and existing and proposed ground levels of the captioned site with respect to the adjacent areas should be given.	Yes
(8) The proposal should indicate how the runoff (the flow direction) within the site and from the adjacent areas would be discharged to the proposed drainage system.	Yes
(9) Sand trap or provision alike should be clearly indicated on the proposed drainage plan and provided before the collected runoff is discharged to the existing drainage facilities.	Yes
(10) The applicant should clearly indicate the full alignment of the discharge path from the application site all the way down to the ultimate discharge point (e.g. a well-established stream course/public drainage system).	Yes
(11) The applicant should clearly indicate the existing drainage facilities on the proposed drainage plan. Site photos of existing drainage facilities including the discharge point (e.g. existing local village drain and its downstream drainage facilities) should be provided in order to demonstrate the presence and reflect condition of the existing drainage system. Also, the applicant should provide site photo(s) to demonstrate size of the existing drainage facilities.	Yes

(A) DSD's Requirements	Fulfilled in the submission? (Yes / No)
(12) Cover levels and invert levels of the proposed and existing drainage facilities should be shown on the drainage plan. Invert levels of drainage facilities at the upstream should be higher than that at the downstream. Also, gradients and sizes of the proposed and existing drainage facilities should be shown on the drainage plan.	Yes
(13) The applicant should demonstrate with hydraulic calculation that the proposed drainage facilities are adequate to collect, convey and discharge the surface runoff accrued on the application site and the overland flow intercepted from the adjacent lands.	Yes
(14) The applicant should demonstrate with hydraulic calculation that the existing facilities to be discharged to have sufficient capacity to cater for any additional flow generated due to the subject application.	Yes
(15) When the ground adjacent to the application site is generally/significantly higher, the overland flow from the adjacent lands shall be probably intercepted. External catchment shall be considered in the hydraulic calculation. Also, the catchment area shall not be less than area of the application site. The applicant should demonstrate catchment area considered in the proposal is adequate.	Yes
(16) Stormwater Drainage Manual (SDM) and the newly promulgated SDM - Corrigendum published by DSD shall be considered in the hydraulic calculation. Also, storm constants of HKO Headquarters shall be adopted in the hydraulic calculation.	Yes
(17) The applicant should provide evidence to support the adoption of any design assumptions (e.g. time of concentration, catchment area, rainfall intensity, runoff coefficient, information of the existing stream and etc.) in the hydraulic calculation.	Yes
(18) Deposition of sediment in stormwater drainage system should be considered in the hydraulic calculation as per the requirement in Stormwater Drainage Manual (Section 9.3).	Yes

(A) DSD's Requirements	Fulfilled in the submission? (Yes / No)
(19) The applicant should check flow velocity of the proposed drainage facilities. The flow velocity is suggested to be within a range, i.e. 0.75 m/s to 3.0 m/s.	Yes
(20) Catchpit should be provided at where a proposed surface channel changes direction / gradient.	Yes
(21) The applicant should provide construction details of the proposed drainage facilities.	Yes
(22) The applicant should provide details for connection of the proposed and existing drainage facilities.	Yes
(23) The applicant should employ a qualified engineer (Registered Professional Engineer (R.P.E.) in the Civil Engineering discipline) to prepare for drainage submission. The drainage submission should be signed and certified by a qualified engineer.	Yes

(B) DSD's Reminders	Fulfilled in the submission? (Yes / No)
(1) Any existing drainage facilities within/outside the application site should not be disturbed or interfered with until any necessary diversion works, which have been accepted by the owner of the existing drainage facilities, have been satisfactorily completed. Such diversion works should be carried out by the applicant at his/her own cost. Moreover, sufficient allowance for future maintenance of the existing drainage facilities should be provided.	Yes
(2) The applicant should be reminded to minimize the possible adverse environmental impacts on any existing watercourses in his design and during construction. DEP and DAFC should be consulted on possible environmental and/or ecological impacts of the proposed development which is in the vicinity of any existing watercourses.	Yes
(3) The applicant is required to rectify/modify the drainage system if they are found to be inadequate or ineffective during operation. The applicant shall also be liable for and shall indemnify claims and demands arising out of damage or nuisance caused by a failure of the drainage system.	Yes

(B) DSD's Reminders	Fulfilled in the submission? (Yes / No)
(4) For the construction details of the proposed drainage facilities, reference should be made to current CEDD's standard drawings.	Yes
(5) Precast concrete pipe should generally be used for stormwater connection.	Yes
(6) Consideration should be given to provide grating for the surface channels.	Yes
(7) For any proposed connection to DSD's drainage facilities, the applicant should submit form HBP1 to this Division for application of technical audit. Upon our acceptance of the connection application, the applicant shall carry out the proposed connection works in accordance with DSD's Standard Drawings at the resources of the applicant.	Yes
(8) If the existing drainage facilities, to which the applicant proposed to discharge the stormwater from the application site was not maintained by this office, the applicant should identify the owner of the existing drainage facilities and seek agreement from the owner prior to commencement of the proposed works. In the case that it is a local village drains, DO/YL should be consulted.	Yes
(9) Connection to existing drainage facilities should be designed and constructed to prevent back flows at the drainage outlet when water level at the existing drainage facilities is high.	Yes
(10) Connection of the proposed and existing drainage facilities shall be designed and constructed such that there is no water leakage at the proposed connection.	Yes
(11) The applicant should consult DLO/YL and seek consent from the relevant owners for any drainage works to be carried out outside his lot boundary before commencement of the drainage works.	Yes
(12) Comments from HyD, TD and RMO shall be sought if drainage works are proposed to be carried out within highway polygon or on carriageway.	Yes

Appendix 3.1:
Catchment Runoff Estimation for the Dried Pond

Appendix 3.1:
Catchment Runoff Estimation for the Dried Pond
Time of Concentration

Brandsby William's Equation

$$t_c = \frac{0.14465 \times L}{(H^{0.2} \times A^{0.1})}$$

where:

t_c: time of concentration (min)

A: area of catchment (m^2)

H: average fall (m per 100m) from the summit of catchment to the point of design

L : distance in metre measured on the line of natural flow between the design section and that point of catchment from which water would take the longest time to reach the design section (m)

Catchment Time of Concentration Calculation

	A				H	L	t_c
	Area	High Point	Low Point	Length	Average Fall	Distance of line of natural flow	Time of Concentration
	m^2	m	m	m	m per 100m	m	min
Dried Pond	1,378.40	9.3	7.8	27	5.556	27.0	1.345

Appendix 3.1:
Catchment Runoff Estimation for the Dried Pond

Intensity Calculation:

Intensity-Duration-Frequency Relation:

$$i = \frac{a}{(t_d + b)^c} \times 116\%$$

where:
Constants used in the formula refers to Table 2a-d of the Stormwater Drainage Manual, Fifth Edition, January 2018

Location: HKO Headquarters
Return Period T: 50 Years
a: 451.3
b: 2.46
c: 0.337

NOTE:
1. Storm Constants for Return Periods of 50 Years for HKO Headquarters is used in the calculation
2. 16% has been added to allow a worse case scenario

Intensity of Catchments:

	a	b	c	t_d, min	*i*
Dried Pond	451.3	2.46	0.337	1.35	333.543

Runoff Estimation:

Rational Method

$$Q_p = 0.278 i \sum_{j=1}^{m} C_j A_j$$

Catchment	Site Area, m2	Percentage of Paved area	Fixed runoff coefficients		Runoff, m^3/s
			Paved	Unpaved	50 Year
Without Project:					
Dried Pond	1378.4	0%	0.95	0.05	0.0064
With Project:					
Dried Pond	1378.4	100%	0.95	0.05	0.1214
				Increment of Runoff:	**0.1150**

Appendix 4.1:
Catchment Runoff Estimation

Appendix 4.1:
Catchment Runoff Estimation for Identified Catchments
Time of Concentration

Brandsby William's Equation

$$t_c = \frac{0.14465 \times L}{(H^{0.2} \times A^{0.1})}$$

where:

t_c: time of concentration (min)

A: area of catchment (m^2)

H: average fall (m per 100m) from the summit of catchment to the point of design

L : distance in metre measured on the line of natural flow between the design section and that point of catchment from which water would take the longest time to reach the design section (m)

Catchment Time of Concentration Calculation

	A				H	L	t_c
	Area	High Point	Low Point	Length	Average Fall	Distance of line of natural flow	Time of Concentration
	m^2	m	m	m	m per 100m	m	min
Catchment A	2,511.80	11.3	10.5	61.5	1.301	61.5	3.858
Project Site	6,134.30	10.4	10.2	45	0.444	73.5	5.227

Appendix 4.1:
Catchment Runoff Estimation for Identified Catchments

Intensity Calculation:

Intensity-Duration-Frequency Relation:

$$i = \frac{a}{(t_d + b)^c} \times 116\%$$

where:
Constants used in the formula refers to Table 2a-d of the Stormwater Drainage Manual, Fifth Edition, January 2018

Location: HKO Headquarters
Return Period T: 50 Years
a: 451.3
b: 2.46
c: 0.337

NOTE:
1. Storm Constants for Return Periods of 50 Years for HKO Headquarters is used in the calculation
2. 16% has been added to allow a worse case scenario

Intensity of Catchments:

	a	b	c	t_d, min	*i*
Catchment A	451.3	2.46	0.337	3.86	281.243
Project Site	451.3	2.46	0.337	5.23	263.249

Runoff Estimation:

Rational Method

$$Q_p = 0.278 i \sum_{j=1}^{m} C_j A_j$$

Catchment	Site Area, m2	Percentage of Paved area	Fixed runoff coefficients		Runoff, m^3/s
			Paved	Unpaved	50 Year
Catchment A	2511.8	100%	0.95	0.05	0.1866
Project Site	6134.3	100%	0.95	0.05	0.4265
Total:	**8646.1**			**Total:**	**0.6130**

Appendix 4.2:

Calculation of Pipe Capacity for the Proposed Discharge Segment for the Project Site

Appendix 4.2

Calculation of Pipe Capacity for the Proposed Discharge Segment for the Project Site

Colebrook-White Equation

$$\bar{V} = -\sqrt{32gRS_f}\log\left[\frac{k_s}{14.8R} + \frac{1.25 \times 5v}{R\sqrt{32gRS_f}}\right]$$

where: g = gravity constant, 9.8m/s^2

Segment	Upstream Manhole	Downstream Manhole	Slope		Dimension				R	S_f	*v*	*ks*	90% Full Capacity Velocity [2]	90% Full Capacity	% of Full Capacity under the Peak Flow of the Proposed Project	Catchment Area
			Upstream Invert Level	Downstream Invert Level	Length	Diameter	Diameter	Area	Hydraulic Radius	Slope	Kinematic Viscosity	Hydraulic Pipeline Roughness [1]				
			mPD	mPD	m	mm	m	m^2	m	-	m^2/s	m	m/s	l/s	%	-
DC-1	-	CP1	9.90	9.60	60.0	500	0.500	0.196	0.12500	0.005	1.140E-06	0.0003	1.485	291.488	64.01%	Catchment A
DC-2	CP1	CP2	9.60	9.55	7.8	500	0.500	0.196	0.12500	0.006	1.140E-06	0.0003	1.684	330.668	56.42%	Catchment A
DC-3	CP2	CP3	9.55	9.15	75.0	500	0.500	0.196	0.12500	0.005	1.140E-06	0.0003	1.534	301.201	61.94%	Catchment A
DC-4	CP3	FCP	9.15	8.90	44.3	500	0.500	0.196	0.12500	0.006	1.140E-06	0.0003	1.579	309.966	60.19%	Catchment A
DC-5	-	CP4	9.90	9.70	36.0	650	0.650	0.332	0.16250	0.006	1.140E-06	0.0003	1.844	611.768	69.71%	Project Site
DC-6	CP4	FCP	9.70	8.90	113.2	650	0.650	0.332	0.16250	0.007	1.140E-06	0.0003	2.082	691.034	61.72%	Project Site
DC-7	FCP	Stepped Channel	8.90	8.70	15.6	650	0.650	0.332	0.16250	0.013	1.140E-06	0.0003	2.814	933.624	65.66%	All Catchment

NOTE:

[1] For the proposed pipe, the roughness coefficient for concrete channels created through Monolithic construction against steel forms under good condition is adopted; the ks values are 0.3mm.

[2] Consider the sedimentation, the pipes are considered to be at 90% of its full capcacity for worse case scenario