Appendix F – Drainage Impact Assessment

MOTT MACDONALD

Application for Permission under Section 16 of the Town Planning Ordinance (Cap. 131) for Proposed "Flat" with "Commercial (1)" Zone of STTL626 and STTL627 in Shatin

Preliminary Drainage Impact Assessment

July 2026

[redacted]

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[redacted]

Contents

Appendices

1 INTRODUCTION

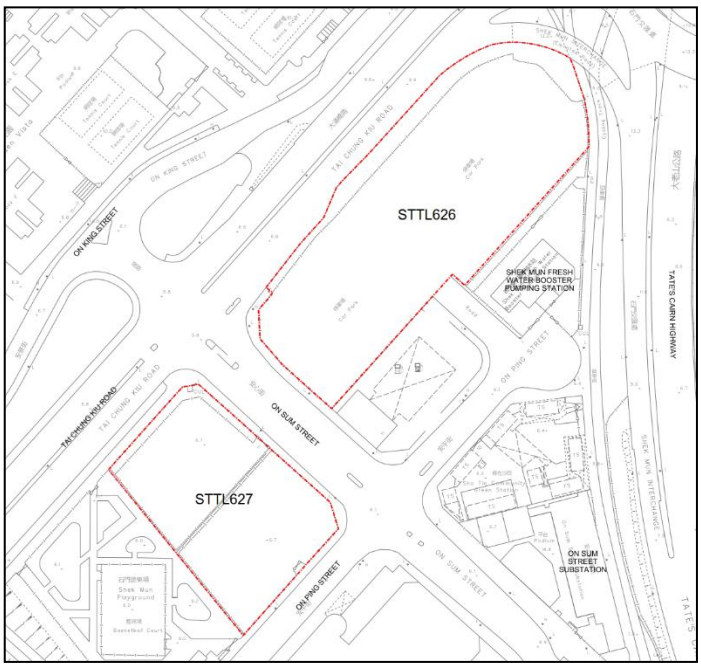
1.1 Study Background

1.1.1 The Government is committed to facilitating steady and continued land supply. The Government will continue to optimise the use of built-up land and its surrounding areas to meet the demand for housing and other development purposes in the short to medium term.

1.1.2 To achieve this objective, the Government has identified potential sites for conversion from commercial to residential use. Upon confirmation of the technical feasibility, a planning application will be submitted under section 16 of Town Planning Ordinance for consideration by the Town Planning Board.

1.1.3 On 15 August 2023, Mott MacDonald Hong Kong Limited (Mott) was commissioned by the CEDD's Housing Projects 3, Civil Engineering Office to undertake the "Term Consultancy for Site Formation and Infrastructure Works for Proposed Housing and Other Developments in Zone 1 (2023 – 2027) – Feasibility Study". Zone 1 mainly covers Shatin, Ma On Shan, Tsuen Wan and Kwai Ching, Lantau and outlying islands. On 31 October 2025, Task Order No. 4 (TO4) was instructed to conduct various technical assessments to support the town planning application for proposed private residential development at two development sites denoted as STTL626 (also known as ST-9353N) and STTL627 (also known as ST-9353S) respectively, located on the north and south sides of the section of On Sum Street between Tai Chung Kiu Road and On Ping Street in Shek Mun, Sha Tin. Location of the Site is shown in **Diagram 1-1** and **Appendix A**.

Diagram 1-1 Location of the Site

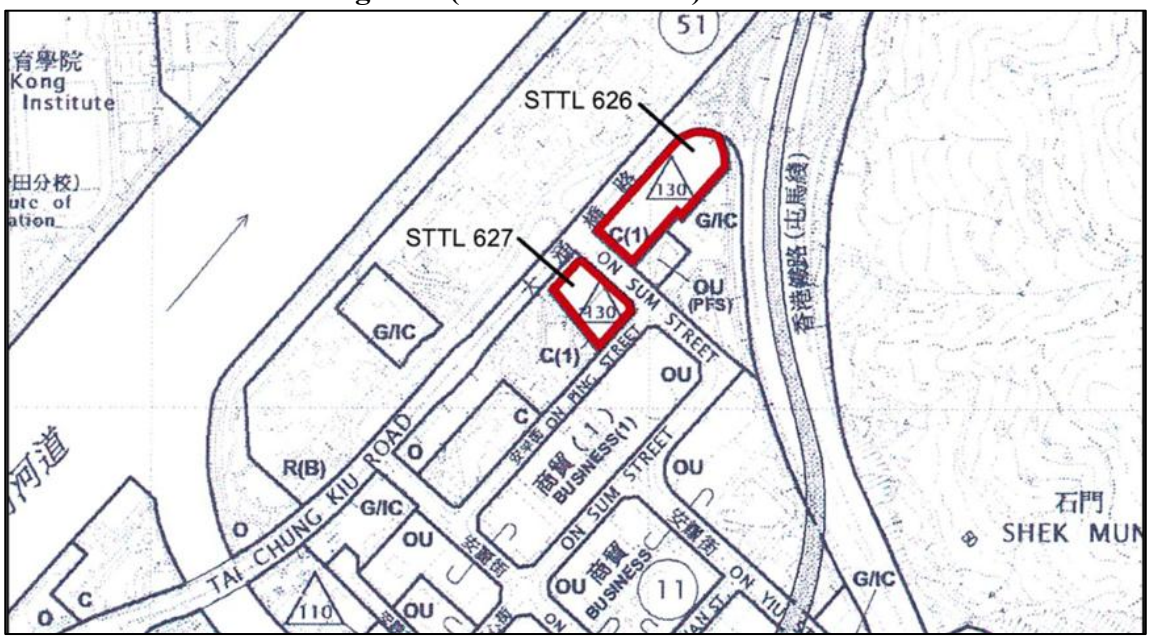


1.2 Site Description and Major Scope of Works

1.2.1 The two subject sites of this assignment STTL626 and STTL627, currently zoned "Commercial (1)" ("C(1)") on the approved Sha Tin Outline Zoning Plan (OZP) no. S/ST/40, cover a site area of approximately 0.80ha and 0.41ha respectively. Located at the northern fringe of the Shek Mun Business Area (Planning Area 11 in the OZP), the sites are generally bounded by Shek Mun Interchange to the north, Tai Chung Kiu Road (TCKR) to the northwest, Shek Mun Playground to the south, and On Ping Street (OPS) to the east, with On Sum Street (OSS) running along a corridor that separates the two sites. A hotel (Courtyard by Marriot Hong Kong Shatin) is located to the further southwest. Currently the STTL626 site is used as a fee-paying carpark (FPC) whereas the STTL627 site is vacant Government land. Both sites are formed flat ground, with an existing ground level at approximately +6mPD.

1.2.2 The proposed sites are covered by the approved Sha Tin Outline Zoning Plan (OZP) No. S/ST/40 and zoned as "C(1)", as shown in **Diagram 1-2**.

Diagram 1-2 Boundaries of the two sites under Approved Sha Tin Outline Zoning Plan (Plan No. S/ST/40)



Source: Sha Tin Outline Zoning Plan (Plan No. S/ST/40), Town Planning Board Portal

1.2.3 The design parameters of the Indicative Scheme for the Proposed Development are summarised in **Table 1.1** below.

Table 1.1 Target Design Parameters of the Indicative Scheme

	Development Parameters	
	STTL626	**STTL627**
Application Site Area	0.80Ha	0.41Ha
Planned Housing Type	Private Housing	
No. of Flats (Total No. of Flats : 1,456)	962	494

1.2.4 This EFS aims to conduct the necessary technical assessments to support the town planning application for the proposed private residential developments for the two sites STTL626 and STTL627 in Shek Mun. The scope of work includes the followings:

- To conduct the technical assessments related to traffic and transport, drainage, sewerage, water supply and utilities;
- To assess environmental impacts and conduct quantitative risk assessments; and
- To prepare a Planning Report and to provide all necessary inputs to support and complete the planning application procedure.

1.2.5 Based on the information available, the technical assessments are currently scheduled for completion in March 2026 to initiate the Section 16 town planning application procedure in Q2 or Q3 2026. It is targeted that both sites will be included in the 2026/27 Land Sale Programme for private housing development.

1.3 Scope and Structure of this Report

1.3.1 In accordance with Clause 6.6 of the Brief, this Preliminary Drainage Impact Assessment Report was prepared to present the following:

(a) fully satisfies the requirements of this Brief in respect of the prediction and assessment of impacts, the identification of drainage impact mitigation measures and the associated residual impacts;

(b) provides assessment and evaluation of the drainage impact and cumulative effects arising from the Development(s) and the Infrastructure Works sufficient to identify those issues of key concern during the construction and operation of the Development(s) and Infrastructure Works which are likely to influence decisions on the Development(s) and Infrastructure Works;

(c) defines measurable drainage parameters and features likely to be affected by the Development(s) and the associated infrastructures;

(d) recommends the drainage scheme for the Infrastructure Works having regard to the Development(s), and provides plans/drawings of the drainage layout for the Site(s) with connection proposals to the existing public drainage system;

(e) proposes a detailed implementation strategy of the recommended drainage scheme;

(f) records the interaction or conflict with other development projects in the vicinity of the Site(s);

(g) prescribes the specification for detailed design, construction and operation requirements of the recommended drainage scheme;

(h) provides the assessment findings, conclusions, recommendations and a mechanism for implementation;

(i) provides method of analysis (including assessment criteria and hydraulic modelling details);

(j) includes any revisions or supplements to the above as might be required by the Director of Drainage Services (DDS) through the DR; and

(k) incorporates the concept of providing and Integrated Green Infrastructure System/ Blue Green Concept for the Infrastructure Works.

1.3.2 Following this introductory Section, this Report has the following remaining Sections:

- **Section 2: Methodology and Design Parameter for Drainage Impact Assessment;**
- **Section 3: Existing Drainage System**;
- **Section 4: Potential Drainage Connection**;
- **Section 5: Drainage Impact Assessment and Mitigation Measures;** and
- **Section 6: Findings and Conclusion**.

1.4 Nomenclature and Abbreviations

Abbreviations	Term
BD	Building Department
C	Commercial
CEDD	Civil Engineering and Development Department
CEO	Civil Engineering Office
DDS	Director of Drainage Services
DIA	Drainage Impact Assessment
DR	Director's Representative
DSD	Drainage Services Department
DIA	Drainage Impact Assessment
EFS	Engineering Feasibility Study
ETWB TC (W)	Technical circular (works) issued by the then Environment, Transport and Works Bureau

Abbreviations	Term
FPC	Fee-Paying Carpark
FS	Feasibility Study
HKO	Hong Kong Observatory
Mott	Mott MacDonald Hong Kong Limited
OPS	On Ping Street
OSS	On Sum Street
OZP	Outline Zoning Plan
SDM	Stormwater Drainage Manual
ST	Sha Tin
STT	Short-Term Tenancy
STTL	Sha Tin Town Lot
TM	Terminal Manhole
TCKR	Tai Chung Kiu Road
TO	Task Order

2 METHODOLOGY AND DESIGN PARAMETER FOR DRAINAGE IMPACT ASSESSMENT

2.1 General Assessment Methodology

2.1.1 Desktop study will be undertaken to collect the relevant information for this DIA. The existing drainage system within the Study Area will be identified by obtaining existing drainage plans from DSD. Then, hydrology and hydraulic analysis are performed to estimate the existing peak flow and the corresponding performance of the existing drainage systems in terms of capacity and flood protection level.

2.1.2 The following approach and methodology will be adopted in the drainage impact assessment: -

- Carry out desktop study to collect the relevant information for the assessment, relevant information collected (i.e. drainage record plans);
- Based on desktop information, identify the existing drainage systems within and in the vicinity of the Site;
- Estimate the change in runoff generated after the completion of the proposed development;
- Assess the drainage impacts after the completion of the proposed development to check if the drainage system satisfies with the current requirements; and
- Propose upgrading or improvement measures if the drainage system fail to meet the current requirements following the proposed development.

2.2 Design Parameters and Assumptions

General

2.2.1 The preliminary DIA is carried out in accordance with the scope and requirements as set out in ETWB TC(W) No. 2/2006 entitled "Drainage Impact Assessment Process for Public Sector Projects", and the design criteria adopted for the proposed drainage system fully comply with Stormwater Drainage Manual (SDM), including but not limited to SDM Corrigendum 1/2022, 1/2024, and 2/2024.

2.2.2 The assessment criteria are based on the recommendations set out in the Stormwater Drainage Manual (SDM) – 5th Edition issued by the Drainage Services Department (DSD).

2.2.3 The existing drains in the vicinity of the subject sites are sizing from DN600 to DN1650, which are less than 1.8m and categorised as "Urban Drainage Branch System" according to Section 6.6.2 of SDM. Therefore, a 1 in 50 years rainfall event should be adopted for the assessment and design of the drainage system within the Study Area as recommended in Section 6.2 and Table 10 of SDM.

Runoff Estimation

2.2.4 The peak rainfall runoff from the catchments is calculated based on the Rational Method, with the following expression:

$$Q_p = 0.278i \, \Sigma C_j A_j$$

Where
Q_p is peak runoff (m^3/s)
i is rainfall intensity (mm/hr)
A_j is the j^{th} catchment area (km^2)
C_j is the runoff coefficient of the j^{th} catchment

The details of the Rational Method can be referred to the Stormwater Drainage Manual (SDM) (DSD, 2018).

Design Rainfall

2.2.5 The rainfall statistics has been adopted in estimating the rainfall intensity of the catchments using Intensity-Duration-Frequency Relationship as expressed by the following equation:

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

Where
i is extreme mean intensity (mm/hr)
t_d is the duration in minutes
a, b, c are the constants given in Table 3 of SDM

Note: According to Stormwater Drainage Manual - Corrigendum No. 1/2024, Table 3a – Storm Constants for Different Return Periods of HKO Headquarters is adopted in this DIA assessment. The storm constants adopted are presented as **Table 2.1** below.

Table 2.1 Storm Constants for Return Periods of HKO Headquarters (1 in 50 year)

Return Period T (years)	50
a	505.5
b	3.29
c	0.355

2.2.6 Brandsby William's Equation has been adopted to calculate the time of concentration of a natural catchment in accordance with SDM.

$$t_0 = \frac{0.14465L}{H^{0.2}A^{0.1}}$$

Where
t_0 is time of concentration of a natural catchment (min.)
A is catchment area (m^2)
H is average slope (m per 100m) measured along the line of natural flow, from the summit of the catchment to the point under consideration
L is distance on plan measured on the line of natural flow between the summit and the point under consideration (m)

2.2.7 The hydraulic capacity of the potential drain pipe is controlled by its size, shape, gradient and friction resistance. In the hydraulic analysis, Colebrook-White Equation shall be used for the drain pipes. Details are as follows:-

Colebrook-White Equation:

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

Where:

$\bar{V}$ = Cross-sectional mean velocity (m/s)
R = Hydraulic radius (m)
S_f = Friction gradient (dimensionless)
k_s = Surface roughness (m)
v = Kinematic viscosity (m^2/s)
g = Acceleration due to gravity (m/s^2)

2.2.8 The required pipe/channel size using the Discharge and Mean Velocity formula as follows:

$$Q = AV$$

Where:

Q = Rate of flow, m^3/s
A = Pipe cross-sectional area, m^2
V = Cross-sectional mean velocity (m/s)

Climate Change and Design Allowance

2.2.9 According to the recommendations of Table 28 and 31 of SDM Corrigendum No.1/2022, a total rainfall increase of 28.1%, with consideration of climate change effect and design allowance in End of 21st Century as presented in **Table 2.2** below, is incorporated into the assessment and design of the drainage system.

Table 2.2 Projected Rainfall Increase for Drainage Assessment

Item	Design Consideration	Rainfall Increase
(A)	Climate Change in End of 21st Century	16.0%
(B)	Design Allowance in End of 21st Century	12.1%
Projected Rainfall Increase Level (A)+(B)		28.1%

Design for Extreme Sea Levels

2.2.10 According to the recommendations of Table 8, 29, 30b and 31 of SDM Corrigendum No.1/2022, the projected extreme sea level at Tai Po Kau in the end of 21st Century (1 in 50 year return period) would be 5.41mPD as presented in **Table 2.3** below.

Table 2.3 Projected Extreme Sea Level at Tai Po Kau

Item	Design Consideration	Level
(A)	Design Extreme Sea Levels	4.41mPD
(B)	Mean Sea Level Rise in End of 21st Century	0.47m
(C)	Storm Surge Increase in End of 21st Century	0.25m
(D)	Design Allowance in End of 21st Century	0.29m
Projected Extreme Sea Level [(A) + (B) + (C) + (D)]		5.42mPD

Sedimentation

2.2.11 For design of potential drains, quantification of sediment for the pipeline system follows the recommendation given in Section 9.3 of SDM, which suggests allowing 5% reduction in flow area if the gradient is greater than 1 in 25, and 10% reduction in flow area in other cases.

Runoff Coefficients

2.2.12 In estimate of runoff coefficient (C), the following sets of runoff coefficient have been considered. Making reference to SDM clause 7.5.2 and conservative assumption, a runoff coefficient of 0.95 is adopted for paved area including buildings and roads; a runoff coefficient of 0.35 is adopted for unpaved area.

Roughness of pipe system

2.2.13 All pipelines are assumed to be precast concrete with poor condition. For the existing drains, the roughness coefficients for Colebrook-White equation (Ks) for pipeline system and Manning equation (n) for open channel are 0.6mm and 0.016mm respectively in order to cater for the aging, sedimentation and siltation effecting acting on the existing pipes. The design roughness coefficients for Colebrook-White equation (Ks) for proposed pipeline system and Manning equation (n) for open channel are 0.6mm and 0.016mm respectively in consideration of its reduced hydraulic performance in future due to degradation of material.

Proposed Flow Velocity

2.2.14 Minimum design velocity of proposed drains is 1m/s at full bore flow for self cleansing purpose, whereas maximum design velocity at peak flow is 3m/s (preferable) and 6m/s (absolute).

3 EXISTING DRAINAGE SYSTEM

3.1 Existing Site Condition and Land Use

3.1.1 The STTL626 Site is currently occupied as carparks under Short-Term Tenancy (STT) for fee-paying car parking area, where the pavement condition is assumed to be approximately 10% unpaved and 90% paved as the existing pavement condition on this assessment.

3.1.2 The STTL627 Site is vacant government land where the pavement condition is assumed to be approximately 10% unpaved and 90% paved as the existing pavement condition on this assessment.

3.1.3 The sites’ existing ground level ranged from +6.0mPD to +6.7mPD based on the latest available information. Considering other site constraints, including the existing carriageway and setback from gas main in the vicinity of the STTL626, the site boundary of STTL626 is refined as Proposed Housing Boundary as shown in Appendices. The site area of STTL626 and STTL627 under Proposed Site Boundary are 8,015m^2 and 4,116m^2 respectively.

3.1.4 The existing catchment plan and summary of existing catchment areas are shown in **Appendix C** and **D**.

3.2 Existing Drainage System

3.2.1 Referring to the existing drainage record plan in the vicinity of the subject sites as shown in **Appendix B**, there is an existing catchpit SCH4005413 with DN600 drainage pipe in the vicinity of STTL626 Site to drainage manhole SMH4050454. Meanwhile, there is also an existing DN600 drainage pipe connecting from the discharge point at site STTL627 to drainage manhole SMH4050454.

3.2.2 Both sites contain existing boundary drain with catchpits that conveying drainage runoff to manhole SMH4050454 at On Sum Street. The runoff is then discharged to the existing drains sizing from DN1350 to DN1650 and eventually outfall towards Shing Mun River at the North-west direction from the sites.

3.3 Planned Drainage Works

3.3.1 Based on the information available, there is no planned drainage works in the vicinity of the Study Area.

4 PAVEMENT CHARACTERISTIC AND POTENTIAL DRAINAGE CONNECTION

4.1 Change in Pavement Characteristic of the Subject Site

4.1.1 The landscape design including the paved and unpaved area is subject to be designed by future developer in the detailed design stage. Assumption can be made for the preliminary drainage assessment that the minimum site coverage of total greenery areas should be 20%, where at-grade greenery area to be at least 10% of development site since the proposed sub-catchments of sites are within the range of 1,000m^2 - 20,000m^2, as per APP-152 Sustainable Building Design Guidelines by Building Department (BD). For conservative design, 10% of the development site is assumed to be unpaved area.

4.1.2 The pavement characteristic of the sites STTL626 and STTL627 are summarised in **Table 4.1** below.

Table 4.1 Pavement Characteristic of the Site under Existing and Proposed Condition

Scenario	Paved Area (%)	Unpaved Area (%)
Existing Site Condition of Site STTL626	90	10
Proposed Site Condition of Site STTL626 (1)	90	10
Existing Site Condition of Site STTL627	90	10
Proposed Site Condition of Site STTL627 (1)	90	10

Note:
(1) Assumption made for pavement condition after development refer to **Section 4.1**.

4.1.3 The change of catchment characteristics before and after the development is summarized in **Table 4.2** and **4.3** below. The estimation of catchment areas are shown in **Appendix D**.

Table 4.2 Pavement Condition before and after development for the Site STTL626

Pavement Condition	Existing Condition	Proposed condition (i)	Changes
Total Catchment Area (m^2)	8,015	8,015	**Unchanged**
Paved Area (m^2)	7,214	7,214	
Unpaved Area (greenery area) (m^2)	802	802	

Table 4.3 Pavement Condition before and after development for the Site STTL627

Pavement Condition	Existing Condition	Proposed condition (i)	Changes
Total Catchment Area (m^2)	4,116	4,116	**Unchanged**
Paved Area (m^2)	3,704	3,704	
Unpaved Area (greenery area) (m^2)	412	412	

Note:
(i) The arrangement of paved and unpaved area for the proposed site is 90% and 10% of the total site area respectively. (subject to detailed design)

4.1.4 From **Table 4.2** and **Table 4.3**, it shows that pavement area of the 2 sites are unchanged under proposed condition. Therefore, it is considered the proposed housing development would not induce adverse drainage impact to the existing downstream drainage system in the vicinity of the Site.

4.2 Potential Drainage Connection

4.2.1 Terminal manhole TM01 with associated 600mm dia. drains are required for collecting the runoff from STTL626 Site.

4.2.2 Another terminal manhole TM02 is required with utilizing the existing 600mm dia. drains for collecting the drainage runoff from STTL627 Site. The potential drainage connection for the 2 subject sites is shown in **Appendix E**.

4.2.3 With frequent occurrence of extreme rainstorm, Integrated Green Infrastructure System/ Blue Green Concept are promoted for enhancing the flood adaptive capacity of drainage system against the climate change. Some Blue Green Concept examples are as below for reference:

- Rainwater harvesting design is considered for a reuse approach for water saving by flood pond or flood storage tank, as well as reducing the drainage runoff to the drainage system in the vicinity. The harvested rainwater could be used for toilet flushing under water quality examination and enhancement.

- Porous paving system design within the Site for facilitating water storage, which allows runoff to infiltrate through the surface and into the underlying layers. The approach also benefits the drainage system for the Site by reducing the peak stormwater runoff in highly paved areas. However, due to less durability than the normal paving method, it is not recommended to adopt on the heavy traffic roads but suitable for open areas and footpaths within the Site.

4.3 Construction and Maintenance Parties

4.3.1 Tentative construction and maintenance parties of connection works are summarized in **Table 4.4** below.

Table 4.4 Construction and Maintenance Parties of Connection Works

Section of Stormwater Drains	Construction Party	Maintenance Party
Internal Drainage System within STTL626 and STTL627	Private Developer of the Site	Private Developer of the Site
Proposed Terminal Manhole (TM) TM01 & TM02	Private Developer of the Site	Private Developer of the Site
Proposed Drains between TMs and the first downstream manhole	Private Developer of the Site	DSD

5 DRAINAGE IMPACT ASSESSMENT AND MITIGATION MEASURES

5.1 Potential Impact to Existing Drainage System and Mitigation Measures

Change in Land Use and Surface Runoff Characteristics

5.1.1 As the paved and unpaved area remain unchanged at the subject sites as discussed in **Section 4.1**, the proposed development can be completed without aggravating the flooding conditions within and downstream of the subject sites. Therefore, it is anticipated that the proposed development will have no adverse impact and no mitigation measure required for the existing drainage system.

Flooding Susceptibility

5.1.2 A review on the flooding blackspots published on the DSD website reveals no flooding blackspot within the drainage catchment of STTL626 and 627 as of March 2024.

5.1.3 As discussed in **Section 2.2.10** and **Table 2.3**, projection on extreme sea level in End of 21st Century would be 5.42mPD. The subject sites, with the existing ground level at +6mPD or above, is considered to have low flooding susceptibility in the future. Therefore, no mitigation measure is required for backwater effect.

5.2 Connection for Drainage Runoff to the Existing Drainage System

5.2.1 As discussed in **Section 4.2**, a new terminal manhole TM01 with a new 600mm dia. drain is required to connect the existing catchpit no. SCH4005413 for collecting drainage runoff from STTL626 Site, while the existing 600mm dia. drain is reused with a new terminal manhole TM02 for collecting drainage runoff from STTL627 Site. The detail calculations of capacity of the existing and potential drains are provided in **Appendix F** and summarized in **Table 5.1** below.

Table 5.1 Summary Result of Drainage Impact Assessment

Upstream Manhole / Connection Point	Downstream Manhole / Connection Point	Pipe Diameter (mm)	Pipe Full Flow Velocity (l/s)	Utilization
TM01	SCH4005413	600	3.00	72%
SCH4005413	SMH4050454	600	3.75	57%
TM02	SMH4050454	600	3.10	35%

5.2.2 The potential drainage connection and methodology of carrying out drainage assessment are fully complied with the latest design standards and consideration of climate change effect in End 21st Century as outlined in SDM, SDM Corrigendum 1/2022, 1/2024, and 2/2024.

5.3 Temporary Drainage System During Construction Stage

5.3.1 The construction parties engaged in the construction works of the development will be responsible for the design and implementation of the temporary drainage system.

6 FINDINGS AND CONCLUSION

6.1.1 The preliminary DIA is carried out in accordance with the scope and requirements as set out in ETWB TCW No. 2/2006 entitled “Drainage Impact Assessment Process for Public Sector Projects”, and the design criteria adopted for the proposed drainage system fully comply with Stormwater Drainage Manual (SDM) Corrigendum 1/2022, 1/2024, and 2/2024.

6.1.2 The proposed housing developments at sites STTL626 and STTL627 would not alter the existing drainage catchment areas and result in no change to the pavement condition as discussed in **Section 4.1**. Consequently, no adverse drainage impacts would be anticipated from the proposed housing developments.

6.1.3 To cater the runoff from the proposed site, terminal manhole TM01 with 600mm dia. drain is required for STTL626 Site, and terminal manhole TM02 is required to connect the existing 600mm dia. drains for STTL627 Site.

6.1.4 As discussed in **Section 3** and **4**, it is found that no additional runoff would be induced following the proposed housing developments. Hence, no mitigation measures would be required for the existing drainage system.

APPENDICES

A. General Layout Plan

HONG KONG JOCKEY CLUB SHA TIN RACECOURSE

SHING MUN RIVER CHANNEL

SHING MUN RIVER CHANNEL

PICTORIAL GARDEN

SHEK MUN INTERCHANGE

TATE'S CAIRN HIGHWAY

A KUNG KOK STREET

A KUNG KOK SHAN STREET

GARDEN VISTA

STTL 626

SHEK MUN FRESH WATER BOOSTER PUMPING STATION

STTL 627

ON SUM STREET SUBSTATION

RAVANA GARDEN

TAI CHUNG KIU ROAD

COURTYARD BY MARRIOTT HONG KONG SHA TIN

ON PING STREET

ON SUM STREET

ON YIU STREET

ON LAI STREET

ON KWAN STREET

KINGS WING PLAZA 2

SHING MUN RIVER PROMENADE GARDEN NO.2

ON MUK STREET GARDEN

ON MUK STREET

SIU LEK YUEN ROAD

TAK KEI STREET

KINGS WING PLAZA 1

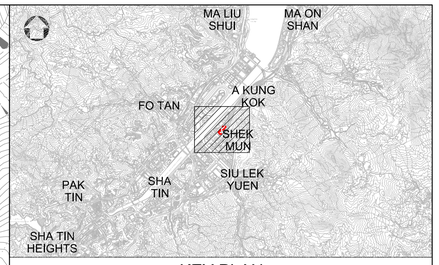
ON MING STREET

ON HING LANE

TATE'S CAIRN HIGHWAY

0 50 100m

1 : 2 000 SCALE BAR



KEY PLAN

LEGEND:

APPLICATION SITE BOUNDARY

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	JAN 2026	TL	FIRST ISSUE	VF	DN

MOTT MACDONALD

[redacted]

Client

CEDD

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

AGREEMENT NO. CE 19/2023 (CE) - TERM CONSULTANCY FOR SITE FORMATION AND INFRASTRUCTURE WORKS FOR PROPOSED HOUSING AND OTHER DEVELOPMENTS IN ZONE 1 (2023-2027) TASK ORDER NO.4

Title

GENERAL LAYOUT PLAN

Designed	TC		Eng check	VF	
Drawn	TL		Coordination	VF	
Dwg check	AT		Approved	DN	
Scale at A1	1:2000	Status	PRE	Rev	P1

Drawing Number

MMH/CE19/TO4/DIA/FIG/1.1

B. Existing Drainage System

HONG KONG JOCKEY CLUB SHA TIN RACECOURSE

SHING MUN RIVER CHANNEL

SHING MUN RIVER CHANNEL

PICTORIAL GARDEN

SHEK MUN INTERCHANGE

TATE'S CAIRN HIGHWAY

A KUNG KOK STREET

A KUNG KOK SHAN STREET

GARDEN VISTA

STTL 626

SHEK MUN FRESH WATER BOOSTER PUMPING STATION

STTL 627

ON SUM STREET SUBSTATION

RAVANA GARDEN

TAI CHUNG KIU ROAD

COURTYARD BY MARRIOTT HONG KONG SHA TIN

ON PING STREET

ON SUM STREET

ON YIU STREET

ON LAI STREET

ON KWAN STREET

ON MUK STREET

SHING MUN RIVER PROMENADE GARDEN NO.2

ON MUK STREET GARDEN

SIU LEK YUEN ROAD

TAK KEI STREET

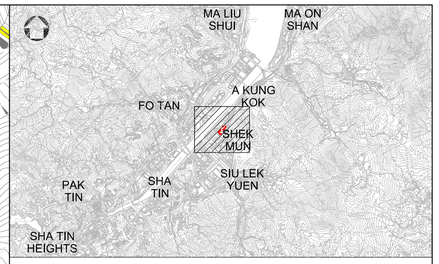
KINGS WING PLAZA 2

KINGS WING PLAZA 1

ON MING STREET

ON HING LANE

TATE'S CAIRN HIGHWAY



KEY PLAN

LEGEND:

- APPLICATION SITE BOUNDARY
- EXISTING STORM DRAIN
- EXISTING MANHOLE
- EXISTING CATCHPIT
- EXISTING BOX CULVERT
- EXISTING DRAINAGE RESERVE

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	JAN 2026	TL	FIRST ISSUE	VF	DN

MOTT MACDONALD

[redacted]

Client

CEDD

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

AGREEMENT NO. CE 19/2023 (CE) - TERM CONSULTANCY FOR SITE FORMATION AND INFRASTRUCTURE WORKS FOR PROPOSED HOUSING AND OTHER DEVELOPMENTS IN ZONE 1 (2023-2027) TASK ORDER NO.4

Title

EXISTING DRAINAGE SYSTEM (SHEET 1)

Designed	TC		Eng check	VF	
Drawn	TL		Coordination	VF	
Dwg check	AT		Approved	DN	
Scale at A1	1:2000	Status	PRE	Rev	P1

Drawing Number

MMH/CE19/TO4/DIA/FIG/2.1

SHING MUN RIVER CHANNEL

城門河道

SHING MUN RIVER CHANNEL

GARDEN VISTA

ON KING STREET

TAI CHUNG KIU ROAD

STTL 626

SHEK MUN FRESH WATER BOOSTER PUMPING STATION

ON SUM STREET

STTL 627

ON SUM STREET SUBSTATION

TATE'S CAIRN HIGHWAY

RAVANA GARDEN

COURTYARD BY MARRIOTT HONG KONG SHA TIN

ON PING STREET

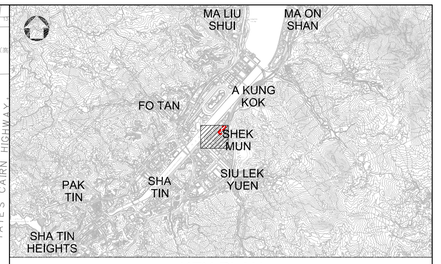
ON LAI STREET

ON MUK STREET

ON YIU STREET

ON KWAN STREET

KWAN STREET



KEY PLAN

LEGEND:

- APPLICATION SITE BOUNDARY
- EXISTING STORM DRAIN
- EXISTING MANHOLE
- EXISTING CATCHPIT
- EXISTING BOX CULVERT
- EXISTING DRAINAGE RESERVE

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	JAN 2026	TL	FIRST ISSUE	VF	DN

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CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

AGREEMENT NO. CE 19/2023 (CE) - TERM CONSULTANCY FOR SITE FORMATION AND INFRASTRUCTURE WORKS FOR PROPOSED HOUSING AND OTHER DEVELOPMENTS IN ZONE 1 (2023-2027) TASK ORDER NO.4

Title

EXISTING DRAINAGE SYSTEM (SHEET 2)

Designed	TC		Eng check	VF	
Drawn	TL		Coordination	VF	
Dwg check	AT		Approved	DN	

Scale at A1: 1:1000

Status: PRE

Rev: P1

Drawing Number: MMH/CE19/TO4/DIA/FIG/2.2

WIP May 2022

0 10 20 30 40 50m
1 : 1 000 SCALE BAR

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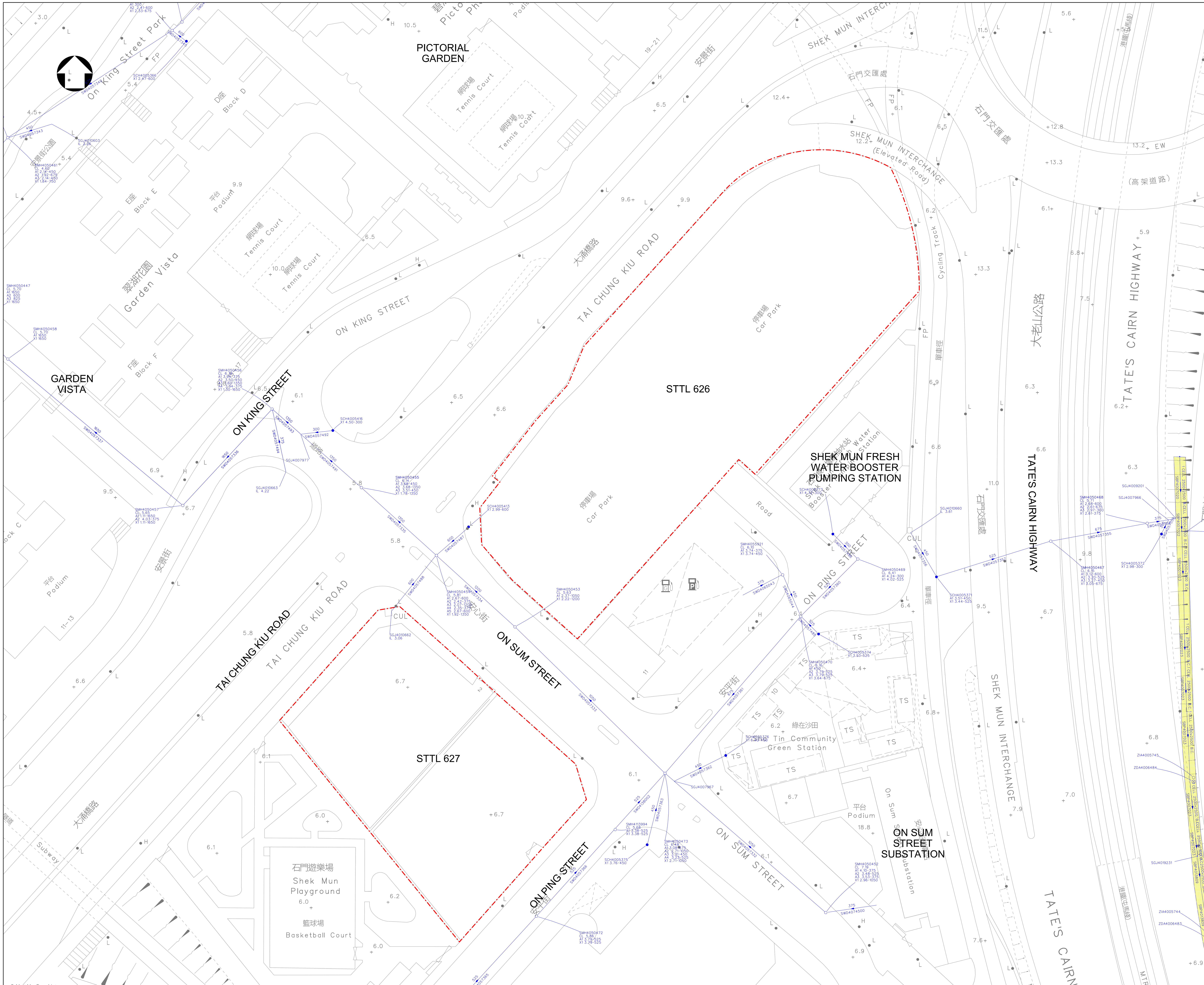

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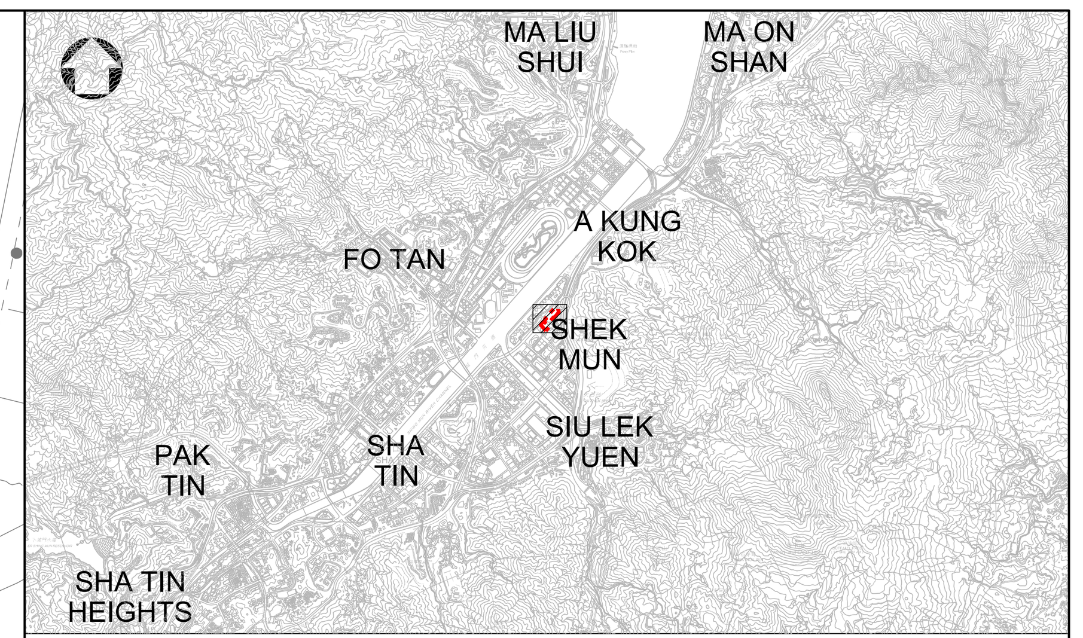

KEY PLAN

LEGEND:

- APPLICATION SITE BOUNDARY
- EXISTING STORM DRAIN
- EXISTING MANHOLE
- EXISTING CATCHPIT
- EXISTING BOX CULVERT
- EXISTING DRAINAGE RESERVE

Rev	Date	Drawn	Description	Ch'k'd	App'd
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TERM CONSULTANCY FOR SITE FORMATION AND INFRASTRUCTURE WORKS FOR PROPOSED HOUSING AND OTHER DEVELOPMENTS IN ZONE 1 (2023-2027)
TASK ORDER NO.4

Title

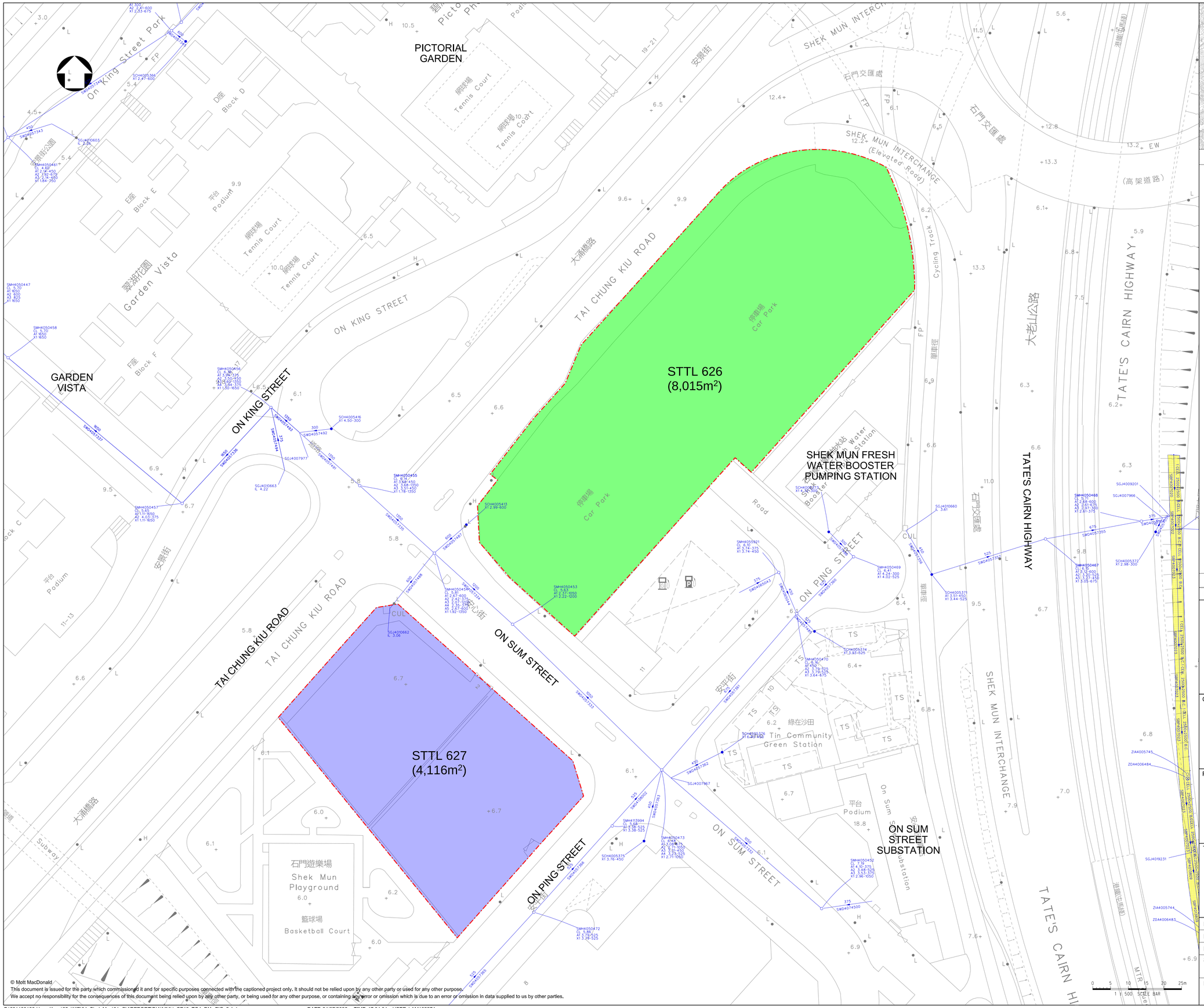
EXISTING DRAINAGE SYSTEM (SHEET 3)

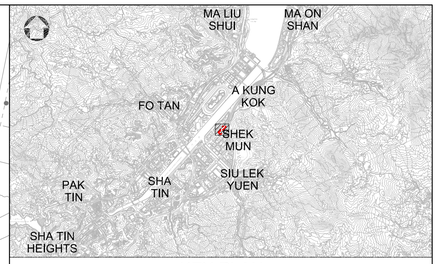
Designed	TC		Eng check	VF
Drawn	TL		Coordination	VF
Dwg check	AT		Approved	DN

Scale at A1	Status	Rev
1:500	PRE	P1

Drawing Number
MMH/CE19/TO4/DIA/FIG/2.3

C. Site Catchment Plan





KEY PLAN

LEGEND:

- APPLICATION SITE BOUNDARY
- EXISTING STORM DRAIN
- EXISTING MANHOLE
- EXISTING CATCHPIT
- EXISTING BOX CULVERT
- EXISTING DRAINAGE RESERVE

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AGREEMENT NO. CE 19/2023 (CE) - TERM CONSULTANCY FOR SITE FORMATION AND INFRASTRUCTURE WORKS FOR PROPOSED HOUSING AND OTHER DEVELOPMENTS IN ZONE 1 (2023-2027) TASK ORDER NO.4

Title

SITE CATCHMENT PLAN

Designed	TC		Eng check	VF	
Drawn	TL		Coordination	VF	
Dwg check	AT		Approved	DN	

Scale at A1: 1:500

Status: PRE

Rev: P1

Drawing Number: MMH/CE19/TO4/DIA/FIG/2.4

D. Summary of Site Catchment Area

Appendix D - Summary of Site Catchment Area

Existing Condition

Catchment ID	Catchment Location	Discharge Location	Surface Type % (Conc. Paved)	Surface Type % (Grassland)	Catchment Area, A (m^2)	Catchment Area, A (m^2) (Conc. Paved only)	Catchment Area, A (m^2) (Grassland only)
A	STTL626 Site	SCH4005413	90	10	8015.00	7214.00	802.00
B	STTL627 Site	Existing Catchpit	90	10	4116.00	3704.00	412.00
Total			90	10	12131.00	10918.00	1214.00

Proposed Condition

Catchment ID	Catchment Location	Discharge Location	Surface Type % (Conc. Paved)	Surface Type % (Grassland)	Catchment Area, A (m^2)	Catchment Area, A (m^2) (Conc. Paved only)	Catchment Area, A (m^2) (Grassland only)
A	STTL626 Site	TM01	90	10	8015.00	7214.00	802.00
B	STTL627 Site	TM02	90	10	4116.00	3704.00	412.00
Total			90	10	12131.00	10918.00	1214.00

E. Potential Drainage Connection

PICTORIAL GARDEN

GARDEN VISTA

STTL 626

STTL 627

SHEK MUN FRESH WATER BOOSTER PUMPING STATION

ON SUM STREET SUBSTATION

EXISTING CATCHPIT SGJ4010662 TO BE DEMOLISHED AND REPLACED BY PROPOSED TERMINAL MANHOLE TM02 TO CONVEY DRAINAGE RUNOFF FROM STTL627 SITE

PROPOSED TERMINAL MANHOLE TM01 TO CONVEY DRAINAGE RUNOFF FROM STTL626 SITE

TM01
C.L. +6.00
X1 +3.65 - 600

SCH4005413
C.L. +6.14
A1 +3.59 - 600
X1 +2.99 - 600

TM02
C.L. +6.00
X1 +3.06 - 600

ON KING STREET

TAI CHUNG KIU ROAD

ON PING STREET

ON SUM STREET

SHEK MUN INTERCHANGE (Elevated Road)

TATE'S CAIRN HIGHWAY

Cycling Track

Footpath

Subway

Tennis Court

Podium

Car Park

Shek Mun Playground

Basketball Court

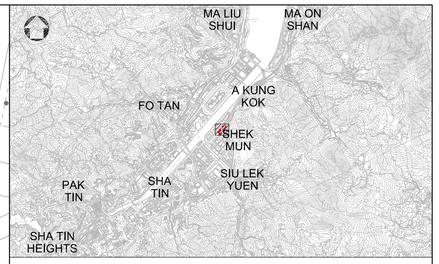
Tin Community Green Station

Block C

Block D

Block E

Block F



KEY PLAN

LEGEND:

- APPLICATION SITE BOUNDARY
- EXISTING STORM DRAIN
- EXISTING MANHOLE
- EXISTING CATCHPIT
- EXISTING BOX CULVERT
- PROPOSED STORM DRAIN
- PROPOSED MANHOLE

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	JAN 2026	TL	FIRST ISSUE	VF	DN

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AGREEMENT NO. CE 19/2023 (CE) - TERM CONSULTANCY FOR SITE FORMATION AND INFRASTRUCTURE WORKS FOR PROPOSED HOUSING AND OTHER DEVELOPMENTS IN ZONE 1 (2023-2027) TASK ORDER NO.4

Title

PROPOSED DRAINAGE CONNECTION

Designed	TC		Eng check	VF	
Drawn	TL		Coordination	VF	
Dwg check	AT		Approved	DN	

Scale at A1: 1:500 | Status: PRE | Rev: P1

Drawing Number: MMH/CE19/TO4/DIA/FIG/3.1

F. Hydraulic Capacity Assessment of Potential Drainage Connection

Appendix F - Hydraulic Capacity Assessment for Potential Drainage Connection

Design assumptions and parameters

1 The hydraulic design for gravity pipes is based on Colebrook-White equation and Wallingford charts.

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

2 Pipe roughness = 0.6 mm Concrete Pipe under poor condition

3 Transitional flow and water at 15 degree celcius, i.e. kinematic viscosity, v = 1.14 x 10-6 m^2/s

(i) Full bore flow velocity >= 1m/s

4 Reduction in flow area = 5% if the gradient is greater than 1 in 25
10% in other cases

5 Design return period = 1 in 50 year
a = 505.5
b = 3.29
c = 0.355

Rainfall intensity $i = \frac{a}{(b + t_d)^c}$ where t_d = duration in rainfall and is equal to the time of concentration, minutes

6 Runoff is calculated by Rational Method (Q_{peak} = CiA)

7 Time of flow in the pipe = L/pipe partial flow velocity/60

8 Rainfall Increase (End of 21st Century): 28.10% (with 12.1% Design Allowance)

9 Runoff Coefficient C 0.35 for steep grassland
0.95 for Concrete Paved Area (Conc. Paved)

10 Design Return Period 1 in 50 yr for urban drainage branch system

Pipe Information								Time of Concentration								Design Runoff							Capacity Check			
US MH	DS MH	Pipe Dia (mm)	Approx. Pipe Length m	Pipe material	US IL mPD	DS IL mPD	Pipe Gradient (1 in x)	Catchment ID	Catchment Area m2	H1 (m)	H2 (m)	Flow Path (m)	Time of Entry min.	Time of Flow min.	Time of Conc. min.	Surface Type % (Conc. Paved)	Surface Type % (Grassland)	Runoff Coefficient	C*Catchment Area m2	Rainfall Intensity mm/hr	Cumulative C*Catchment Area m2	Cumulative Design Discharge l/s	Pipe Capacity l/s	Pipe Full Flow Velocity m/s	Capacity Check	% utilization
Proposed Drains																										
TM01	SCH4005413	600	3.21	CONC.	3.65	3.59	54	A	8,015	-	-	-	-	-	5.00	90	10	0.89	7,133.35	305.62	7133.35	606.07	848	3.00	OK	72
Existing Drains																										
SCH4005413	SMH4050454	600	10.96	CONC.	2.99	2.67	34	-	-	-	-	-	-	-	5.00	-	-	-	7,133.35	305.62	7133.35	606.07	1061	3.75	OK	57
TM02	SMH4050454	600	19.50	CONC.	3.06	2.67	50	B	4,116	-	-	-	-	-	5.00	90	10	0.89	3,663.24	305.62	3663.24	311.24	877	3.10	OK	35