Attachment 8

Revised Sewerage Impact Assessment

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Proposed Religious Institution (the Supreme Kwan Ti Temple) and Improvement to the Existing Access Road, Tai Tong, Yuen Long
Sewerage Impact Assessment

Prepared for:
Kwan Ti Culture Service Limited

21 March 2025

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Group COO

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Rev.	Description	Prepared	Reviewed	Approved	Date
0	Sewerage Impact Assessment	MJW	CL	AW	17/07/2024
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1 PROJECT BACKGROUND

1.1 Introduction

1.1.1 It is planned to develop a temple for Kwan Ti ("the Proposed Development") at DD 117 Tai Tong Shan Road Lots Nos. 1622, 1624 and 1629, and the adjoining government land, Yuen Long, N.T., Hong Kong ("the Site"). The site area is approx. 17,393m^2.

1.1.2 The Site is zoned "Recreation" ("REC") and Green Belt ("GB") under the Approved Tai Tong Outline Zoning Plan ("OZP") No. S/YL-TT/20.Referring to the Schedule of Uses under Approved OZP Mo. S/YL-TT/20, "Religious Institution" Use is under Column 2 of both REC and GB zonings. Therefore, a planning application under Section 16 of the *Town Planning Ordinance* ("TPO") is required for the Proposed Development.

1.1.3 EnviroSolutions & Consulting Ltd ("ESC") has been appointed to prepare this Sewerage Impact Assessment ("SIA") to support the S16 application for the Proposed Development.

1.2 Site Description

1.2.1 The site location and its environs are summarized below and shown in **Figure 1-1**:

- To the North: Tai Tong Kwan Ti Square, Tai Tong Organic EcoPark
- To the East: access road, slopes
- To the South: Tai Tong Lychee Valley
- To the West: natural stream, Tai Tong Riding Club

1.2.2 The development schedule of the Proposed Development is shown below:

Site Area	About 17,393.3m^2
Maximum Building Height	35.99m

1.3 Objectives of this Report

1.3.1 The objectives of this SIA Report are to:

- Estimate the quantity of sewage generating from the Proposed Development and the nearby uses
- Recommend the necessary mitigation measures to handle the sewage.

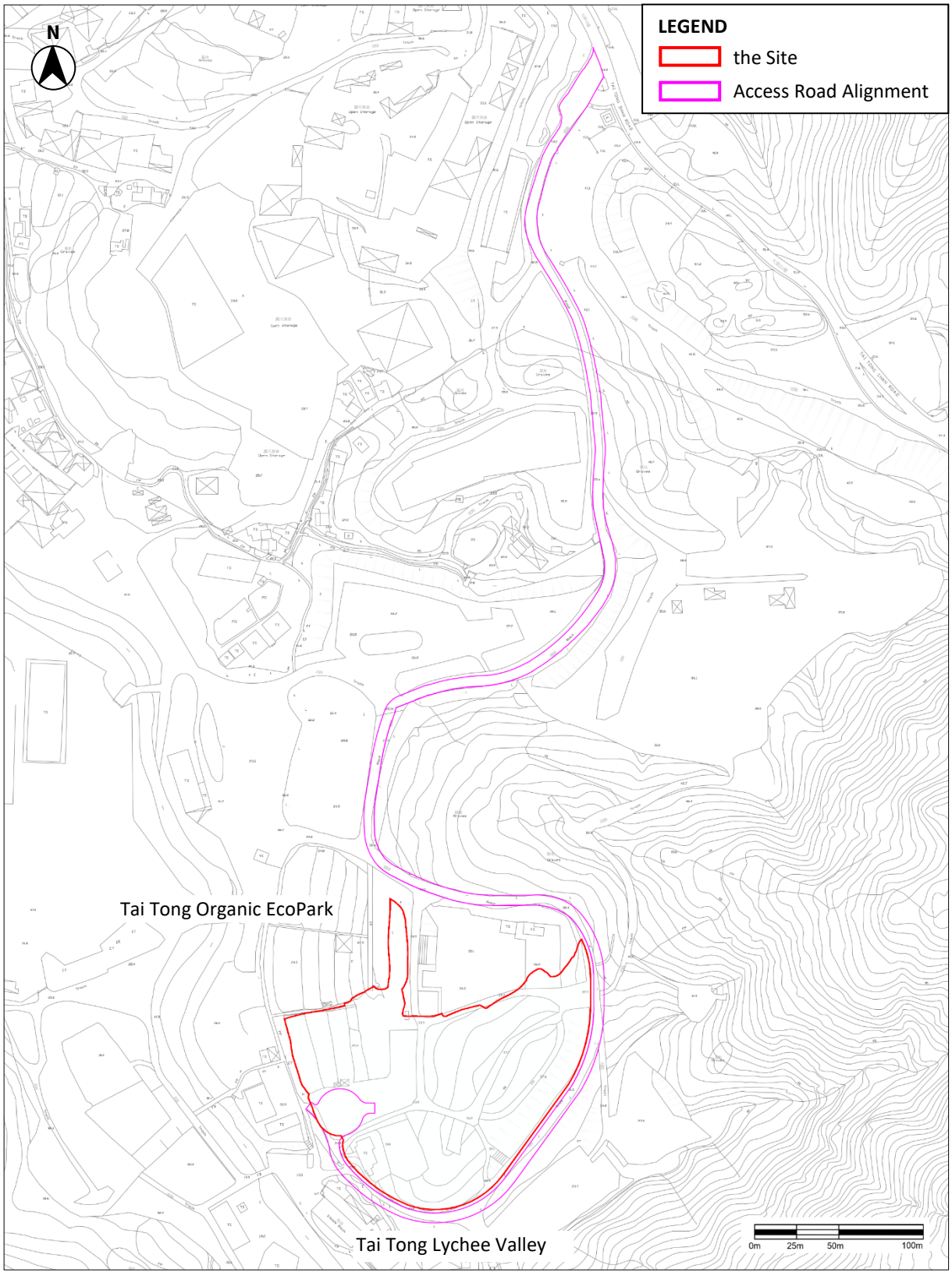
1.4 Reference Materials

1.4.1 In evaluating the sewerage impacts arising from the Proposed Development, the following sources have been specifically referred to:

- Drainage Services Department ("DSD") publication *Sewerage Manual (with Eurocodes incorporated) (Part 1) Key Planning Issues and Gravity Collection System, 3rd Edition, May 2013*
- *Sewerage Manual - Corrigendum No. 1/2024*
- *Sewerage Manual - Corrigendum No. 2/2024*

- Environmental Protection Department ("EPD") publication *Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning Version 1.0, March 2005* ("GESF")
- Building (Standards of Sanitary Fitments, Plumbing, Drainage Works and Latrines) Regulations (Cap.123I)
- Practice Note for Professional Persons Drainage Plans subject to Comment by the Environmental Protection Department -Building (Standards of Sanitary Fitments, Plumbing, Drainage Works and Latrines) Regulations (ProPECC PN1/23)
- Sewerage data of GeoInfo Map checked on 3 July 2024

Figure 1-1 Site Location and its Environs



2 EVALUATION OF SEWERAGE IMPACT

2.1 Existing Baseline Conditions

2.1.1 According to the sewerage data of GeoInfo Map checked on 3 July 2024, there is no municipal sewerage system near the Site.

2.2 Sewerage Impact During the Operation Phase

2.2.1 During the operation of the Proposed Development, the major source of sewage will be sewage from the toilets and bathrooms used by on-site staff and visitors. A staff canteen without kitchen will be provided, and no kitchen will be provided within the Site. Food to be provided to the staff will be delivered from the other service providers and/or the staff will bring their own food from outside. Therefore, there will be no cooking within the Proposed Development and no sullage from kitchen will be generated.

2.2.2 Since there is no existing municipal sewerage system near the Site, disposal of sewage from connection to municipal sewerage system is not practicable. Thus, two options are recommended for handling the wastewater from the Proposed Development:

- Option 1 On-Site Treatment – treated by on-site Septic Tank/Soakaway Pit System
- Option 2 Off-Site Disposal – temporarily stored in sewage storage tanks and ten tankered-away for off-site disposal in a Sewage Treatment Facility

2.2.3 The estimated total daily sewage generation from the Proposed Development and recommendations regarding Option 1 and Option 2 are discussed in the subsequent sections. The proposed sewage handling methods will be further considered in the detailed design stage.

3 SEWERAGE CALCULATIONS

3.1 Assumptions

3.1.1 As the Proposed Development is a Religious Institution, it will hold ceremonies/events on certain days. On these days there will be more site staff and visitors than normal situation, and sewage generation will be greater than normal situation. The number of staff on Normal and Ceremony/Event Days is summarised below, and the calculations and assumptions are provided in detail in **Appendix A**:

- Normal (Non-Ceremony/Event) Days: 1,000 visitors/day and 60 site staff
- Ceremony/Event Days: 4,000 visitors/day and 150 site staff

3.1.2 In order to review whether Option 1 or Option 2 mentioned in **Paragraph 2.2.2** is practicable to handle the sewage arising from the Proposed Development, the maximum sewage generation during normal days and ceremony/event days has been estimated based on the assumptions listed in **Table 3-1**, below. The Average Dry Weather Flows ("ADWFs") of the Proposed Development have been estimated based on the Unit Flow Factors ("UFFs") recommended in GESF.

Table 3-1 Parameters for Estimating Wastewater Generation from the Proposed Development

PARAMETER	VALUE	UNIT	REMARK
GENERATION FROM STAFF			
Max. No. of site staff (Normal Days)	60	staff	Information provided by the applicant
Max. No. of site staff (Ceremony/Event Days)	150	staff	Information provided by the applicant
UFF of staff	0.280	m^3/day/staff	Unit flow factor for "Commercial Employee + J11 Community, Social & Personal Services" given in Table T-2 of GESF
Max. No. of visitors (Ceremony/Event Days)	0.0028	m^3/visitor/day	Unit factor for flushing, hand washing and micturition

3.2 Result and Discussion

3.2.1 Detailed sewage generation calculations are provided in **Appendix A**. The estimated ADWF from the Proposed Development is calculated to be 19.6m^3/day on normal days and 53.2m^3/day on ceremony/event days, respectively.

3.2.2 As mentioned in **Paragraph 2.2.2,** sewage arising from the Proposed Development is recommended to be treated by either Option 1 Septic Tank/Soakaway Pit System or Option 2 Offsite Disposal. The options are discussed below.

Option 1 Septic Tank/Soakaway Pit System

3.2.3 The design and construction of the Septic Tank/Soakaway Pit System should fulfil the requirements of the *Building (Standards of Sanitary Fitments, Plumbing, Drainage Works and Latrines) Regulations* (Cap.123I), ProPECC PN1/23, other relevant regulations and other relevant government guidelines.

3.2.4 In accordance with Cap. 123I, the septic tank capacity shall be of such capacity to be capable of storing quantity of soil and waste discharged thereto during any one day

provided that no septic tank shall have a capacity of less than 2.3m^3 or more than 41m^3. As mentioned in **paragraph 3.2.1**, the estimated overall sewage generated during operation of the Proposed Development will be 53.2m^3/day on ceremony/event days, which is the worst-case scenario. According to the Guidelines for Soakaway System, the minimum capacity of septic tank should be three days' storage of wastewater. Thus, four (4) septic tanks with capacity of approx. 40m^3 each shall be provided within the Proposed Development.

3.2.5 Sufficient separation distance should be provided between the Septic Tank/Soakaway Pit System as well as the waterbodies and structures. The minimum clearance requirements are specified in Appendix D of ProPECC PN1/23 as summarised in **Table 3-2**. The tentative location of sewage facilities including the Septic Tank and Soakaway Pit System is shown in **Figure 3-1**.

Table 3-2 Minimum Clearance Requirements for Soakaway Systems

WATERBODIES / STRUCTURES	DISTANCE FROM SOAKAWAY SYSTEM, m	REMARK
Wells	50	-
Stream (where the bed is lower than Invert of soakaway system)	15 (30)*	* These distances should be increased to distances shown in brackets if the water from the stream or pool is used or likely to be used for drinking or domestic purposes
Pools	7.5 (30)*	
Beaches	100	From boundaries of gazetted beaches or bathing beach subzones of Water Control Zones
	30	From High Water Mark ("H.W.M.") and from nearest watercourses for other cases
Groundwater Table	0.6	Below Invert
Building	3	-
Retaining Walls	6	-
Cuts or Embankments	30	-
Paths	1.5	-

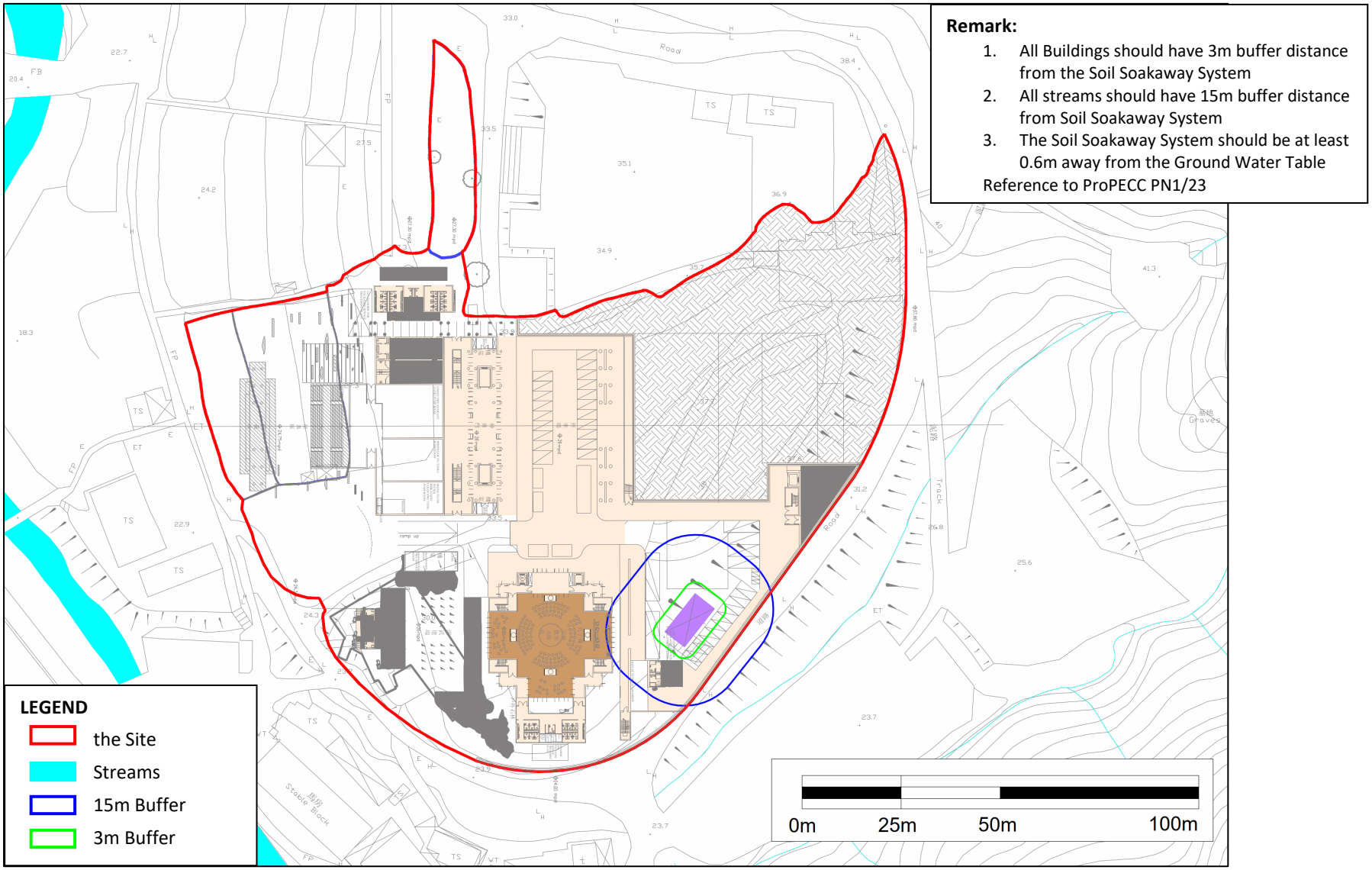
3.2.6 The details of the Septic Tank/Soakaway Pit System will be subject to the detailed design in the future.

Option 2 Off-Site Disposal

3.2.7 As advised by the Applicant, five (5) sewage holding tanks with the capacity of 11m3 for each will be provided on-site. With the total capacity of 55m3, the proposed sewage holding tanks is sufficient to cater the sewage generation. The details of sewage holding tanks will be further reviewed in the detailed design. The Applicant (or Project Proponent) will be responsible for the operation and maintenance of the proposed sewage holding tanks.

3.2.8 With the provision of either Option 1 or Option 2, no adverse impact due to sewage generation from the Proposed Development is anticipated.

Figure 3-1 Tentative Location of Sewage Facilities and Buffer Distance



4 CONCLUSION AND RECOMMENDATIONS

4.1.1 It is planned to develop the Supreme Kwan Ti Temple at DD 117 Tai Tong Shan Road Lots Nos. 1622, 1624 and 1629, and the adjoining government land, Yuen Long, N.T., Hong Kong. The Site is zoned "Recreation" ("REC") and Green Belt ("GB") under the Approved Tai Tong Outline Zoning Plan ("OZP") No. S/YL-TT/20. This Sewerage Impact Assessment is carried out in order to support the Section 16 planning application for the Proposed Development.

4.1.2 During operation, detailed sewage generation calculations demonstrate that total estimated ADWF from the Proposed Development will be approx. 19.6m^3/day on normal days and 53.2m^3/day on ceremony/event days, respectively.

4.1.3 Due to lack of public sewerage system in the vicinity of the Site, the sewage generated from the Proposed Development is proposed to be treated by Septic Tank/Soakaway Pit System (Option 1) or Off-Site Disposal by temporary storage in sewage storage tanks and then tankered-away to a Sewage Treatment Plant (Option 2).

4.1.4 For Option1, four (4) septic tanks with a capacity of about 40m^3 each shall be provided. For Option 2, five (5) sewage holding tanks with a tota capacity of 55m^3 will be proposed to temporarily store the sewage before final off-site disposal. The details of either Option1 or Option 2 will be subject to the detailed design in the future. The Project Proponent will be responsible for the operation and maintenance of either Option 1 or Option 2.

4.1.5 Overall, with the provision of Option 1 or Option 2, no adverse sewerage impact from the Proposed Development is anticipated.

Appendix A Calculation of Sewage Generation

Appendix A - Calculation of Sewage Generation

Sewage Calculations for the Proposed Development				**Notes**
Sewage generated by the Site				
1) **Wastewater generated by Staff**				
Max No of Site Staff (Normal Days)	=	60	staff	As advised by the Applicant
Max No of Site Staff (Ceremony/Event Days)	=	150	staff	As advised by the Applicant
Unit Flow Factor (UFF) per staff	=	0.280	m^3/day-staff	Refer to "Commercial Employee" and "J11 Community, Social & Personal Services" of Table T-2. [Note 1 &2]
Total Average Dry Weather Flow (Normal Days)	=	16.800	m^3/day	Average Dry Weather Flow
Total Average Dry Weather Flow (Ceremony/Event Days)	=	**42.000**	m^3/day	Average Dry Weather Flow
2) **Wastewater generated by Visitors**				
Max No of Visitors (Normal Days)	=	1,000	visitors	As advised by the Applicant
Max No of Visitors (Ceremony/Event Days)	=	4,000	visitors	As advised by the Applicant
Flow rate per flushing	=	1.2	L/flush	As advised by the supplier of chemical/container toilet (c)
Flow rate per hand washing	=	1.4	L/per hand washing	[Note 3] (d)
Flow rate from micturtion per visit	=	0.2	L/per visit	Human's micturition is assumed to be 200mL in accordance with p. 3081 of [Note 4] (e)
Percentage of visitors will go to toilet	=	100	%	
UFF per visitor	=	0.0028	m^3/day-visitor	(c) + (d) + (e)
Total Average Dry Weather Flow (Normal Days)	=	2.800	m^3/day	Average Dry Weather Flow (f)
Total Average Dry Weather Flow (Event/Ceremony Days)	=	**11.200**	m^3/day	Average Dry Weather Flow (g)
Overall Average Daily Dry Weather Flow of Proposed Development (Normal Days)	=	19.600	m^3/day	(a) + (f)
Overall Average Daily Dry Weather Flow of Proposed Development (Ceremony/Event Days)	=	**53.200**	**m^3/day**	(b) + (g)
Sewage Handling Options				
Normals Days (Staff and Visitors)				
Overall Average Daily Dry Weather Flow of Proposed Development	=	19.600	m^3	
Ceremony/Event Days (Staff and Visitors)				
Overall Average Daily Dry Weather Flow of Proposed Development	=	53.200	m^3	
Option 1 Septic Tank/Soakaway Pit System				
Minimum Capacity of Septic Tank/Soakaway Pit System	=	160	m^3	According to the [Note 5], the minimum capacity of septic tank should be three days' storage of wastewater
Size of a Sewage Holding Tank	=	40	m^3 / tank	In accordance with Section 65 of [Note 6], the capacity of septic tank shall be: (1) not less than 2.3m^3 or more than 41m^3. (2) capable of storing the quantity of soil and waste discharged thereto during any one day.
No. of Sewage Holding Tanks	=	3.99	tanks	
Option 2 Off-Site Disposal				
Size of a Sewage Holding Tank	=	11	m^3 / tank	As advised by the Applicant
No. of Sewage Holding Tanks	=	4.84	tanks	

Note:
1 Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning ("GESF") Version 1.0, Environmental Protection Department of HK Government, March 2005.
2 As per the GESF, for job types J10 and J11, the "per-employee" UFF takes into account the flows of visitors.
3 BEAM Plus New Buildings Version 2.0 (2023 Edition), Non-mixing Type Water Taps (bathrooms and toilets) (4.0L/mins x 20s)
4 Magill's Medical Guide", 6th ed., various medical editors, Salem Press, USA, 2011
5 Guidelines for Soakaway System
6 Building (Standards of Sanitary Fitments, Plumbing, Drainage Works and Latrines) Regulations (Cap.123I)

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