Attachment 5

REPLACEMENT PAGES OF SEWERAGE IMPACT ASSESSMENT

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2.3. Existing Sewerage Condition

2.3.1. The latest Drainage information was obtained from the Civil Engineering and Development Department (CEDD) in February 2025 to gather the background information on sewerage infrastructure in the vicinity of the Application Site. The infrastructure works, including drainage works, sewerage works (including two sewage pumping stations) are under construction. Concerned sewerage network was identified for estimation of the potential sewerage impact to the downstream sewers associated with the proposed development.

2.3.2. As refer to CEDD report "Sewerage System and Sewage Implication Review for Population Increase and Development Intensity – Case 2 (Final)" (Ref. P149-03), a sewerage network comprising gravity sewer is proposed to convey the collected sewage to the ESPS, which will be locating to the south of the application development. Extract from CEDD report is shown in ***Appendix B***. The implication review was conducted to identify and address possible implication due to the proposed increase in population and residential flats due to the continuous pressing need for housing and further housing intensification in private developments.

2.3.3. Reference to P149-03 report is adopted as conservative approach for this SIA report to assess the cumulative impact from the Application Site and the increased population and development density on the sewerage system within the Tung Chung New Town Extension (TCNTE), and to incorporate the recommended mitigation measures based on latest design information and inputs from relevant authorities. The estimation of the design catchment of ESPS and the estimated average dry weather flow of the subject site are as follows.

Table 2-2 Reference from CEDD report

Development	**ADWF (m^3/day)**	**Peak Flow (m^3/day)**	**Remarks and Assumption**
Design Catchment to ESPS (Area 132)	35,727 (Design)	67,723(1) (Maximum)	Information from CEDD report "Sewerage System and Sewage Implication Review for Population Increase and Development Intensity – Case 2 (Final)" (Ref. P149-03)
Application Site (Area 134)	**314.8 (2)**	-	
Area 129	786.1	-	
Area 130	875.8	-	
Area 131	65.2	-	
Area 135	337.8	-	
Area 137	256.6	-	
Area 138	84.2	-	
Area 133A	4,572.2	-	
Area 133B	1,614.7	-	
Area 133C	1,708.7	-	
Area 132 (3)	3.3	-	
Area 52 (E6)	141.9	-	

Notes:

(1) Peaking Factor 1.89 (excluding stormwater allowance) is adopted according to CEDD Report (Ref. P149-03)

(2) Estimated population of 1,166 people adopted based on CEDD Report (Ref. P149-03)

(3) Sewage generated from the employee of east sewage pumping station (ESPS)

3. Sewerage Impact Assessment

3.1. Legislation, Standards and Guidelines

3.1.1. With reference to ProPECC PN 1/23 Drainage Plans Subject to Comment by the Environmental Protection Department ("EPD"), foul water should be discharged to a foul sewer under the Building (Standards of Sanitary Fitments, Plumbing, Drainage Works and Latrines) Regulations (Cap.123I) Section 40(1), 40(2), 41(1) and 90.

3.1.2. The following standards and guidelines are adopted for the estimation, assessment and evaluation of sewerage implication of the proposed development:

- "Hong Kong Planning Standards and Guidelines" issued by the Planning Department;
- "Sewerage Manual Part 1" published by DSD; and
- "Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning Version 1.0 (Report No.: EPD/TP1/05)" ("GESF") published by Environmental Protection Department ("EPD");

3.2. Assessment Methodology and Assessment

3.2.1. As shown in the drainage plan in ***Appendix C***, the sewage generated from the proposed development will be discharged through the existing terminal manhole (S1: PLUG C0.2) at the south of the Application Site. This terminal hole will be connected to the existing public foul water manhole (S2: SE-C13) outside the Application Site through a 280mm diameter polyethylene (PE) sewage pipe system. The existing sewers in the vicinity of the proposed development are shown in ***Figure 3.1***.

4.2. Estimation of Sewage Flow from Existing and Proposed Developments

4.2.1. The sewage generated from the proposed development will be collected and discharged into an existing terminal sewage manhole PLUG C0.2, as shown in ***Figure 3.1***. This terminal manhole will be connected to the existing public manhole S1 (SE-C13) with 280mm polyethylene sewage pipe.

4.2.2. The proposed development comprises of two 27-storey towers with about 432 residential units. The estimated sewage flow is given in ***Appendix D***.

4.2.3. With reference to **Table 4-2**, the total estimated Average Dry Weather Flow ("ADWF") from the proposed development is 315.7 m^3/day. The population and the estimated ADWF of proposed development are summarized in Table 1 of ***Appendix D***.

Table 4-2 Sewage Flow Estimation for the Proposed Development

Proposed Development			
Residential	**Value**	**Unit**	**Remark**
Total Number of Units	432	units	
Average Household Size	2.7	person/unit	Referred to the average domestic household size of Islands District Council in 2021 Population Census: Summary Results, published by the Census and Statistics Department
Total Number of residents	1,167	persons	
Unit flow	0.27	m^3/person/day	Referred to the planning unit flow for Domestic (housing type specific) – R2 in Table T-1 of GESF.
Average Sewage Discharge	315.1	m^3/day	
Management Office (G/F)			
GFA	58.64	m^2	Provided by project team
Worker Density per GFA (in 100m^2)	3.4	person/100m^2	Refer to worker density of All Economic Activities (All Type) in Table 8 of CIFSUS
Total number of employees	2	persons	
Unit flow	0.28	m^3/person/day	Referred to the planning unit flow for Commercial Employee + Community, Social & Personal Services in Table T-2 of GESF
Average Sewage Discharge	0.6	m^3/day	
Total Average dry weather flow of the Proposed Development	**315.7**	**m^3/day**	

4.5. Peak Discharge from Study Areas

4.5.1. Flow rates of peak discharge from the proposed development and other catchment areas are estimated in accordance with the DSD's "Sewerage Manual Part 1". Peak flows from different catchments at the study area are summarized in **Table 4-5** and detailed calculation for proposed development are given in ***Appendix F***.

Table 4-5 Population and Sewage Flow Estimation

Contributing Catchment Area	Connected Manhole	Revised ADWF (m^3/day)[1]	Contributing Population[2]	Peaking Factor[3]	Total Peak Discharge (m^3/s)[4]
Application Site	PLUG C0.2	315.7	1,169	6.0	0.022
Application Site + Catchment A to Catchment E	SE-C13	1059.5	3,924	6.0	0.074
Application Site + Catchment A to Catchment M	SE-E28	35,539.7	131,628	3.5	1.444

Notes:
[1] Revised ADWF (m^3/day) = ADWF (m^3/day) × Catchment Inflow Factor
[2] According to Section 12.1 of GESF, Contributing Population = Calculated Total Average Flow (m^3/day) ÷ 0.27 (m^3/person/day)
[3] According to Table T-5 of GESF
[4] Total Peak Discharge (m^3/s) = (Revised ADWF (m^3/day) × Peaking Factor ÷ 86400s/day)

5. Sewerage Capacity

5.1.1. According to the "Sewerage Manual – Key Planning Issues and Gravity Collection System" (Sewerage Manual) published by DSD in 2013, the capacities of respective sewers have been calculated based on the Colebrook White's equation. The roughness coefficients (k_s) of 1.5mm for polyethylene sewer pipe, under poor condition are adopted in the assessment in accordance with Table 5 of DSD's "Sewerage Manual Part 1".

5.1.2. The sewerage impact on various segments of the sewer was evaluated by comparing the estimated peak flow against the capacity of the respective sewer segments. The detailed calculations are provided in ***Appendix F***.

5.1.3. For the capacity of the ESPS, the design capacity is 35,727m^3/day. Given that the ADWF and peak flow from the Application Site are 315.7m^3/day and 0.022m^3/s respectively. Comparing with CEDD report "Sewerage System and Sewage Implication Review for Population Increase and Development Intensity – Case 2 (Final)" (Ref. P149-03), the original designed sewage flow generated from Area 134 is 314.8m^3/day which is lower than the latest designed sewage flow rate. However, the increase represents an overall percentage change of 0.003%, and the sewage discharge from the Application Site accounts for less than 1% of the ESPS design capacity, as shown in table below. As the sewage contribution from the Application Site is minimal, no adverse sewerage impact is expected from the increased population in the proposed development.

Table 5-1 Comparison between Original and Updated Sewage Flow Contribution to East Sewerage Pumping Station

	Original	**Newly estimated**
ADWF	314.8m^3/day	315.7m^3/day
Capacity of ESPS (Design)	35,727m^3/day	
Percentage contribution to ESPS	0.881%	0.884%
Overall percentage change [1]	**+ 0.003%**	

Notes:
[1] Positive sign denotes increase, whereas negative sign denotes reduction

6. Result and Discussion

6.1. Daily Flow and Peak Flow from Existing and Proposed Development

6.1.1. The estimated daily flow and peak flow of the proposed redevelopment will be 315.7 m^3/day and 0.022 m^3/s, taking catchment inflow factor of 1.0 into account. **Table 6-1** tabulates the sewage generated proposed development.

Table 6-1 Sewage Generated from Proposed Development

Development	Daily Flow (m^3/day)	Peak Flow (m^3/s)
Proposed Development	315.7	0.022

6.2. Sewage Generation after Proposed Development

6.2.1. After the development, the percentages of used capacity for the existing sewers (segment S1 – S4) range from 18% to 77%. Flow estimation and capacity checking are detailed in ***Appendix D*** and ***Appendix F***, respectively. Used capacity of proposed development is presented in **Table 6-2** below.

Table 6-2 Used Capacity from Proposed Development

Pipe Segments	Used Capacity, % Proposed Development
S1 – S2	18%
S2 – S3	20%
S3 – S4	77%

Notes:
Pipe segment that exceeded 100% used capacity are bolded and underlined.

6.2.2. Based on the results shown above, none of the sewer pipes exceeded their used capacity.

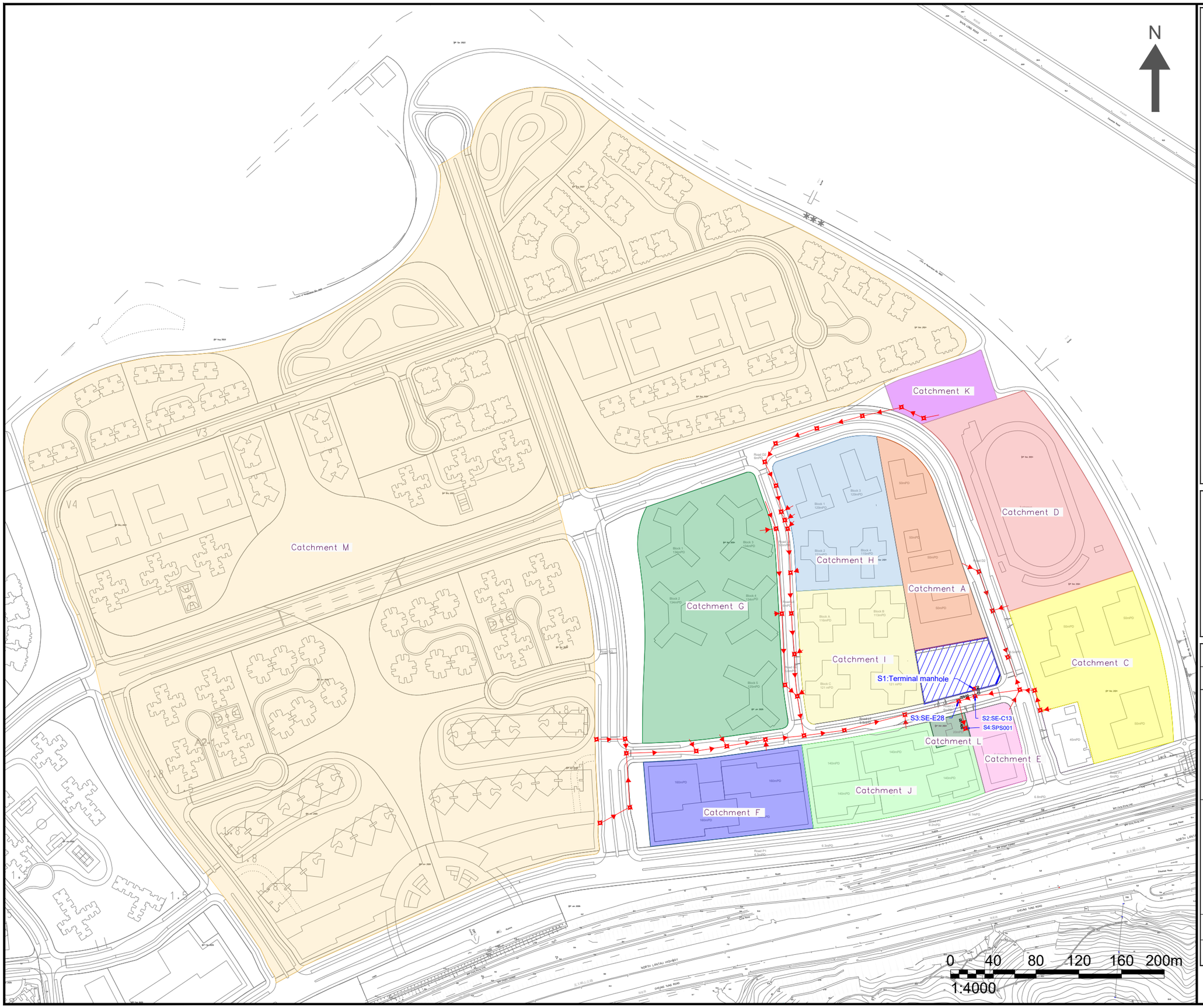
7. Conclusion

7.1.1. A Sewerage Impact Assessment (SIA) has been conducted to evaluate the possible impacts on the public sewerage network due to the proposed development. The sewage generated from the proposed development will be collected and discharged into the existing 280mm public sewers via Manhole (PLUG C0.2). The result showed that 315.7m^3/day of average sewage discharge and 0.022m^3/s of peak sewage discharge are expected to be generated from the proposed development.

7.1.2. The assessment results demonstrated that all sewers have sufficient sewer capacity to cope with the sewage flow from catchments and the proposed development. Therefore, significant sewerage impact arising from the proposed development on the existing sewers is not expected, no mitigation measures are considered necessary for the existing sewers.

7.1.3. The Applicant will be responsible for the design and construction of the proposed sewer segments between the existing public sewers and the proposed development, which will be further discussed with DSD, while future maintenance of sewers outside the Application Site boundary will be carried out by DSD.

7.1.4. Based on the above, it is concluded that the sewerage impact arising from the proposed development should be acceptable.



NOTES :

Subject Site

Catchment Area

Sewer Pipe

Sewer Manhole

Consultant

Allied Environmental Consultants Limited

Project No. :	2240
Drawing By :	CC

Project :

S16 PLANNING APPLICATION FOR PROPOSED MINOR RELAXATION OF BUILDING HEIGHT RESTRICTION FOR PERMITTED FLAT (POLICE MARRIED QUARTERS) IN "GOVERNMENT, INSTITUTION OR COMMUNITY (1)" ZONE AND PROPOSED FLAT (POLICE MARRIED QUARTERS) IN "GOVERNMENT, INSTITUTION OR COMMUNITY" ZONE IN GOVERNMENT LAND AT TUNG CHUNG AREAS 134 AND 135, TUNG CHUNG, LANTAU ISLAND

Drawing Title :

OVERVIEW OF EXISTING SEWAGE NETWORK AND CATCHMENTS

Drawing No :	Revision :
FIGURE 3.1	2
Scale : AS SHOWN	Date : OCT 2025

A3 420 x 297

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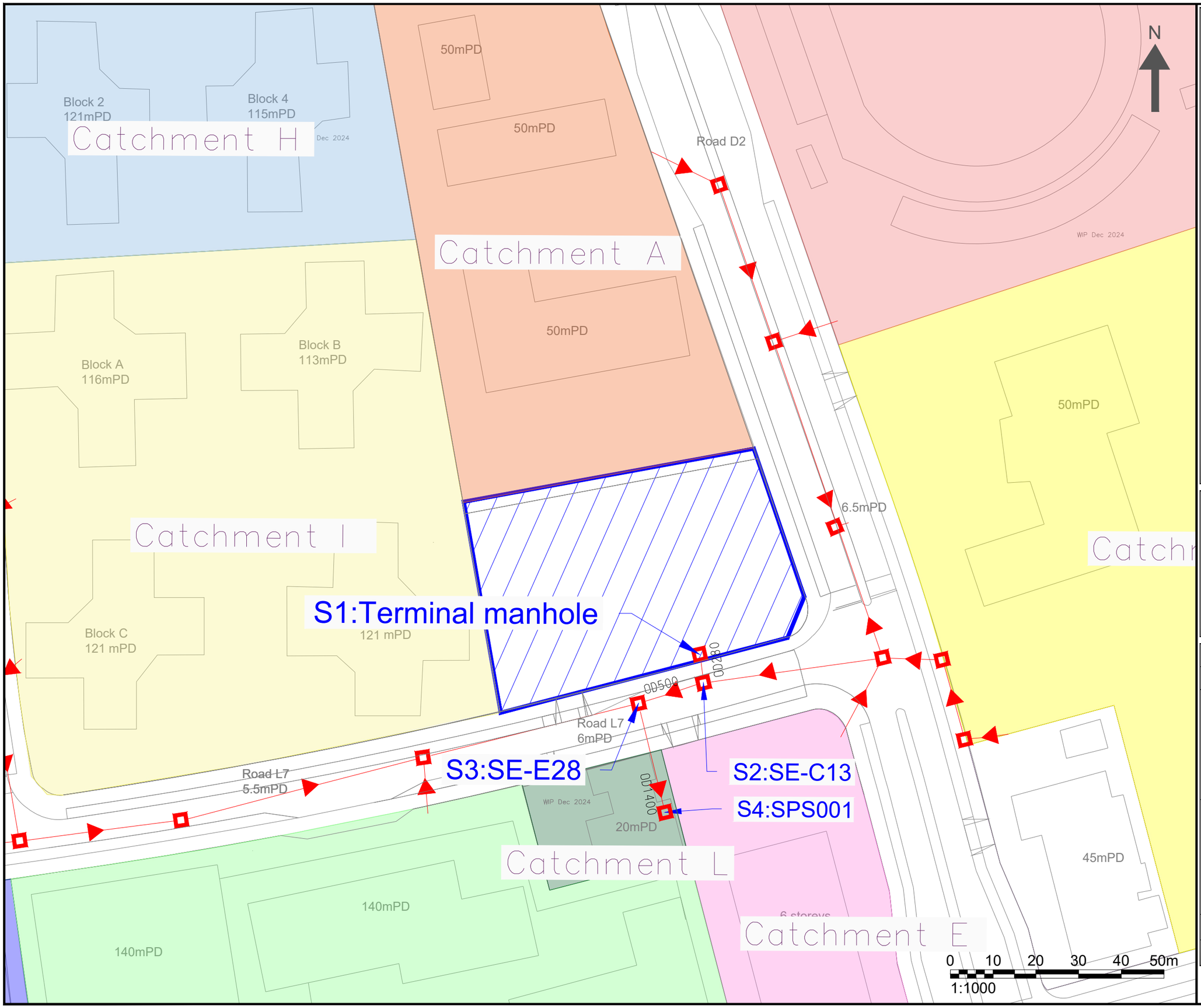

NOTES :

- Subject Site
- Catchment Area
- Sewer Pipe
- Sewer Manhole

Consultant

Allied Environmental Consultants Limited

Project No. :	2240
Drawing By :	CC

Project :

S16 PLANNING APPLICATION FOR PROPOSED MINOR RELAXATION OF BUILDING HEIGHT RESTRICTION FOR PERMITTED FLAT (POLICE MARRIED QUARTERS) IN "GOVERNMENT, INSTITUTION OR COMMUNITY (1)" ZONE AND PROPOSED FLAT (POLICE MARRIED QUARTERS) IN "GOVERNMENT, INSTITUTION OR COMMUNITY" ZONE IN GOVERNMENT LAND AT TUNG CHUNG AREAS 134 AND 135, TUNG CHUNG, LANTAU ISLAND

Drawing Title :

OVERVIEW OF EXISTING SEWAGE NETWORK AND CATCHMENTS

Drawing No : FIGURE 3.1a	Revision : 2
Scale : AS SHOWN	Date : OCT 2025

A3 420 x 297

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Appendix C

Sewerage Plan of the Project Site

SEWERAGE MANHOLE SCHEDULE FOR SE-H1 TO SPS001

U/S M.H.	D/S M.H.	U/S G.L. (mPD)	D/S G.L. (mPD)	GRADIENT 1 IN	U/S I.L. (mPD)	D/S I.L. (mPD)	PIPE SIZE (mm) (DN/OD)	MH TYPE U/S	MH TYPE D/S	BACKDROP TO D/S MH	PIPE MATERIAL	BEDDING	SDR NO.
SE-H1	SE-H2	6.000	5.500	220	-1.400	-1.611	800	S1	S1	-	PE	B	17
SE-H2	SE-H3	5.500	5.500	220	-1.611	-1.684	800	S1	S1	-	PE	B	17
SE-H3	SE-H4	5.500	5.000	220	-1.684	-1.788	800	S1	S1	BD2	PE	B	17
SE-H4	SE-H4A	5.000	5.500	220	-3.312	-3.449	800	S1	S1	-	PE	B	17
SE-H4A	SE-H5	5.000	5.500	220	-3.449	-3.657	800	S1	S1	-	PE	B	17
SE-H5	SPS001	5.500	5.500	220	-3.657	-3.700	800	S1	TO SPS	-	PE	B	17

SEWERAGE MANHOLE SCHEDULE FOR SPS001 TO BOX CULVERT NO. 4

U/S M.H.	D/S M.H.	U/S G.L. (mPD)	D/S G.L. (mPD)	GRADIENT 1 IN	U/S I.L. (mPD)	D/S I.L. (mPD)	PIPE SIZE (mm) (OD)	MH TYPE U/S	MH TYPE D/S	BACKDROP TO D/S MH	PIPE MATERIAL	BEDDING	SDR NO.
SPS001	SE-J1	5.500	5.500	187	3.700	3.658	1000	G1	G1	-	PE	B	17
SE-J1	SE-J1A	5.500	5.500	190	3.658	3.445	1000	G1	G1	-	PE	B	17
SE-J1A	SE-J2	5.500	5.100	190	3.445	3.256	1000	G1	H/D	BD2	PE	B	17
SE-J2	BC4	5.100	5.000	190	2.131	2.000	1000	H/D	TO BC4	-	PE	B	

PE pipe

OD 420mm
ID 500mm
Length: 19.201m

UP_INV : 1.59mPD
DN_INV : 1.24mPD

Gradient: 1/55

PE pipe

OD 280mm
ID 235mm
Length: 6.55m

UP_INV : 5.233mPD
DN_INV : 4.3mPD

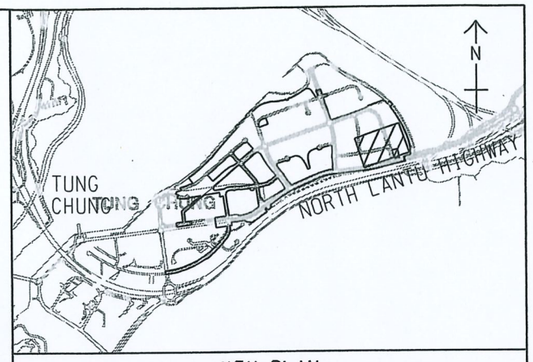
Gradient: 1/22

PE pipe

OD 1400mm
ID 1190mm
Length: 105m

UP_INV : -2.339mPD
DN_INV : -2.401mPD

Gradient: 1/480



KEY PLAN
SCALE 1:50000 (A3)

NOTES:

1. FOR NOTES AND LEGEND REFER TO DRAWING NO. 60507694/C3/1350.
2. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING NOS. 60507694/C3/SSK1017B TO SSK1018A
3. THE LEAD-IN LOCATION IS SHOWN FOR INDICATION AND SHALL BE CONFIRMED WITH CORRESPONDING INTERFACING CONTRACTORS.

CONNECTED TO THE CO-USED BOX CULVERT AT I.L. -1.400mPD

CO-USE BOX CULVERT

CONNECTED TO THE CO-USE BOX CULVERT AT I.L. +2.000mPD
CONNECTION DETAILS REFER TO 60507694/C3/5008

ROAD L7

ROAD D2

CUT LINE A-A
SEE DRAWING NO. 60507694/C3/SSK1017B

817900 N

818400 E

817200 E

818300 E

EXTRACTED FROM DRG. NO. 60507694/C3/1368B & 1370A

PREPARED BY MA

$USER$
$TIME$
$DATE$
$FILE$

AECOM

TUNG CHUNG NEW TOWN EXTENSION - MAJOR INFRASTRUCTURE WORKS IN TUNG CHUNG EAST

SEWERAGE LAYOUT PLAN AT ROAD L7

SHEET 2 OF 2

SCALE	1:1000 (A3)	DATE	22-MAY-2024
CHECK	TP	DRAWN	KYY
CONTRACT No.	NL/2020/03	DRAWING No.	60507694/C3/SSK1018
		REV	A

Appendix D

Estimation of Sewage Discharge from the Site

1 Proposed Development

JPOMQ Residential Block			
Site Area	4876	m^2	
Flat unit	432	units	
Average housedhold size [1]	2.7	person/unit	Refer to Average Domestic Household Size of Islands District Council in 2021 Population Census: Summary Result, published by Census and Statistics Department
Total Number of Persons	1167	persons	
Unit Flow Factor [2]	0.27	m^3/person/day	Referred to the planning unit flow for Domestic (housing type specific) - R2 in Table T-1 of GESF
Average Sewage Discharge	315.1	m^3/day	
JPOMQ G/F			
Management Office			
GFA	58.64	m2	Provided by project team
Worker Density per GFA (in 100m2)	3.4	person/100 m2	Refer to worker density of All Economic Activities (All Type) in Table 8 of CIFSUS
Total number of employee	2	persons	
Unit Flow Factor [2]	0.28	m^3/person/day	Referred to the planning unit flow for Commercial Employee + Community, Social & Personal Services in Table T-2 of GESF.
Average Sewage Discharge	0.6	m^3/day	
Total			
Total Sewage Generation Rate (DWF)	**315.7**	**m^3/day**	
Catchment Inflow Factor (North Lantau)	1.0		Reference from Table T-4 of Guidelines for Estimating Sewage Flows for Sewerage Infrastructure Planning
Revised Dry Weather Flow	**315.7**	**m^3/day**	
Contributing Population	1169		
Peaking Factor	6		Refer to Table T-5 of GESF
Peak Flow	**0.022**	**m^3/s**	

Notes:
[1] The average household size is made reference to "*2021 Population Census Summary Results* ", published by C&SD.
[2] The unit flow factor is made reference to "*Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (Version 1.0)* ", published by EPD.

Appendix E

Estimation of Sewage Discharge from Catchment Areas

Table 2 - Population Estimation for Catchment Area （data based on CEDD report)

Area No.	Catchment ID	Description	Magnitude	Unit	Remark
135	A	**Other School Use**			
		Total no. of student	1200	persons	based on CEDD SIA report
		Unit flow	0.04	m^3/person/day	Referred to the planning unit flow for School Student in Table T-2 of GESF.
		Total no. of teacher	104	persons	based on CEDD SIA report
		Unit flow	0.28	m^3/person/day	Referred to the planning unit flow for Commercial Employee + Community, Social & Personal Services in Table T-2 of GESF.
		Average dry weather flow	**77.1**	m^3/day	
		Fire Station			
		FSD quarters			
		Total no. of residents	810	persons	based on CEDD SIA report
		Unit flow	0.27	m^3/person/day	based on Table T-1: Private residential R2 type
		Average dry weather flow	**218.7**	m^3/day	
		Sub-divisional fire Station sum ambulance depot			
		Total no. of employee	150	persons	based on CEDD SIA report
		Unit flow	0.28	m^3/person/day	Referred to the planning unit flow for Commercial Employee + Community, Social & Personal Services in Table T-2 of GESF.
		Average dry weather flow	**42.0**	m^3/day	
		Total ADWF for Area 135	**337.8**	m^3/day	
137	C	**Post Secondary Institution**			
		Total no. of student	4000	persons	based on CEDD SIA report
		Unit flow	0.04	m^3/person/day	Referred to the planning unit flow for School Student in Table T-2 of GESF.
		Total no. of employee	345	persons	based on CEDD SIA report
		Unit flow	0.28	m^3/person/day	Referred to the planning unit flow for Commercial Employee + Community, Social & Personal Services in Table T-2 of GESF.
		Total ADWF for Area 137	**256.6**	m^3/day	CEDD SIA report = 256.6m3/d OK
138	D	**Sports Ground**			
		Total no. of spectator	2500	persons	based on CEDD SIA report
		Unit flow	0.032	m^3/person/day	Estimated by HAB in 2015, based on the employment figures of Tseung Kwan O Sports Ground. According to 2015 employment figures of Tseung Kwan O Sports Ground with 5,000 spectatators, the permanent employees are 30. The UFF of 0.032 is estimated by making reference to the deviation under Section 7.4 of the EIA report of Kai Tak Multi-Sports Complex.
		Total no. of employee	15	persons	based on CEDD SIA report
		Unit flow	0.28	m^3/person/day	Referred to the planning unit flow for Commercial Employee + Community, Social & Personal Services in Table T-2 of GESF.
		Total ADWF for Area 138	**84.2**	m^3/day	
131	E	**Police Station**			
		Total number of person	233	persons	based on CEDD SIA report
		Unit flow	0.28	m^3/person/day	Referred to the planning unit flow for Commercial Employee + Community, Social & Personal Services in Table T-2 of GESF.
		Total ADWF for Area 131	**65.2**	m^3/day	
		Total ADWF connected to SE-C13	**743.9**	m^3/day	Sum of Catchement A to Catchment E
129	F	**Retail**			
		Total number of employee	736	persons	based on CEDD SIA report
		Unit flow	0.28	m^3/person/day	Referred to the planning unit flow for Commercial Employee + Wholesale & Retail J4 in Table T-2 of GESF.
		Average dry weather flow	**206.1**	m^3/day	
		Office			
		Total number of employee	7250	persons	based on CEDD SIA report
		Unit flow	0.08	m^3/person/day	Referred to the planning unit flow for Commercial Employee + Business Services J6 in Table T-2 of GESF.
		Average dry weather flow	**580.0**	m^3/day	
		F&B trade			
		Population of possible F&B trade	73.6	persons	Population of possible F&B trade in TCE is assumed to be 10% of retail employee
		Unit flow	1.58	m^3/person/day	Commercial Employee + Restaurants & Hotels - J10 in Table T-2 of GESF.
		Average dry weather flow	**116.3**	m^3/day	
		Total ADWF for Area 129	**902.4**	m^3/day	

Table 2 - Population Estimation for Catchment Area （data based on CEDD report)

Area No.	Catchment ID	Description	Magnitude	Unit	Remark
133A	**G**	**Kindergarten**			
		Total no. of student	452	persons	based on CEDD SIA report
		Unit flow	0.04	m^3/person/day	Referred to the planning unit flow for School Student in Table T-2 of GESF.
		Total no. of teacher	51	persons	based on CEDD SIA report
		Unit flow	0.28	m^3/person/day	Referred to the planning unit flow for Commercial Employee + Community, Social & Personal Services in Table T-2 of GESF.
		Average dry weather flow	**32.4**	m^3/day	
		Management Office			
		Total number of employee	50	persons	based on CEDD SIA report
		Unit flow	0.28	m^3/person/day	Referred to the planning unit flow for Commercial Employee + Community, Social & Personal Services in Table T-2 of GESF.
		Average dry weather flow	**14.0**	m^3/day	
		Commercial			
		Total number of employee	913	persons	based on CEDD SIA report
		Unit flow	0.28	m^3/person/day	Referred to the planning unit flow for Commercial Employee + Wholesale & Retail J4 in Table T-2 of GESF.
		Average dry weather flow	**255.6**	m^3/day	
		F&B trade			
		Total number of employee	393	persons	based on CEDD SIA report
		Unit flow	1.58	m^3/person/day	Commercial Employee + Restaurants & Hotels - J10 in Table T-2 of GESF.
		Average dry weather flow	**620.9**	m^3/day	
		F&B trade			
		Population of possible F&B trade	96	persons	Population of possible F&B trade in TCE is assumed to be 10% of commercial+management office employee
		Unit flow	1.58	m^3/person/day	Commercial Employee + Restaurants & Hotels - J10 in Table T-2 of GESF.
		Average dry weather flow	**152.2**	m^3/day	
		Special Residential			
		Total number of residents	18406	persons	based on CEDD SIA report
		Unit flow	0.19	m^3/person/day	based on Table T-1: Private residential R1 type
		Average dry weather flow	**3497.1**	m^3/day	
		Total ADWF for Area 133A	**4572.2**	m^3/day	

Table 2 - Population Estimation for Catchment Area （data based on CEDD report)

Area No.	Catchment ID	Description	Magnitude	Unit	Remark
133B	**H**	**Welfare facilities**			
		Total number of employee	182	persons	based on CEDD SIA report
		Unit flow	0.28	m^3/person/day	Referred to the planning unit flow for Commercial Employee + Community, Social & Personal Services in Table T-2 of GESF.
		Total number of residents	100	persons	based on CEDD SIA report
		Unit flow	0.19	m^3/person/day	based on Table T-1: Private residential R1 type
		Average dry weather flow	**70.0**	m^3/day	
		Special Residential			
		Total number of residents	7984	persons	based on CEDD SIA report
		Unit flow	0.19	m^3/person/day	based on Table T-1: Private residential R1 type
		Average dry weather flow	**1517.0**	m^3/day	
		Kindergarten			
		Total no. of student	239	persons	
		Unit flow	0.04	m^3/person/day	Referred to the planning unit flow for School Student in Table T-2 of GESF.
		Total no. of teacher	26	persons	
		Unit flow	0.28	m^3/person/day	Referred to the planning unit flow for Commercial Employee + Community, Social & Personal Services in Table T-2 of GESF.
		Average dry weather flow	**16.8**	m^3/day	
		Management Office			
		Total number of employee	25	persons	based on CEDD SIA report
		Unit flow	0.28	m^3/person/day	Referred to the planning unit flow for Commercial Employee + Community, Social & Personal Services in Table T-2 of GESF.
		Average dry weather flow	**7.0**	m^3/day	
		F&B trade			
		Total number of employee	3	persons	Population of possible F&B trade in TCE is assumed to be 10% of retail employee
		Unit flow	1.58	m^3/person/day	Commercial Employee + Restaurants & Hotels - J10 in Table T-2 of GESF.
		Average dry weather flow	**4.0**	m^3/day	
		Total ADWF for Area 133B	**1614.7**	m^3/day	
133C	**I**	**Welfare facilities**			
		Total number of employee	194	persons	based on CEDD SIA report
		Unit flow	0.28	m^3/person/day	Referred to the planning unit flow for Commercial Employee + Community, Social & Personal Services in Table T-2 of GESF.
		Total number of residents	180	persons	based on CEDD SIA report
		Unit flow	0.19	m^3/person/day	based on Table T-1: Private residential R1 type
		Average dry weather flow	**88.5**	m^3/day	
		Special Residential			
		Total number of residents	8382	persons	based on CEDD SIA report
		Unit flow	0.19	m^3/person/day	based on Table T-1: Private residential R1 type
		Average dry weather flow	**1592.6**	m^3/day	
		Kindergarten			
		Total no. of student	233	persons	based on CEDD SIA report
		Unit flow	0.04	m^3/person/day	Referred to the planning unit flow for School Student in Table T-2 of GESF.
		Total no. of teacher	26	persons	based on CEDD SIA report
		Unit flow	0.28	m^3/person/day	Referred to the planning unit flow for Commercial Employee + Community, Social & Personal Services in Table T-2 of GESF.
		Average dry weather flow	**16.6**	m^3/day	
		Management Office			
		Total number of employee	25	persons	based on CEDD SIA report
		Unit flow	0.28	m^3/person/day	Referred to the planning unit flow for Commercial Employee + Community, Social & Personal Services in Table T-2 of GESF.
		Average dry weather flow	**7.0**	m^3/day	
		F&B trade			
		Total number of employee	3	persons	Population of possible F&B trade in TCE is assumed to be 10% of management office
		Unit flow	1.58	m^3/person/day	Commercial Employee + Restaurants & Hotels - J10 in Table T-2 of GESF.
		Average dry weather flow	**4.0**	m^3/day	
		Total ADWF for Area 133C	**1708.7**	m^3/day	

Table 2 - Population Estimation for Catchment Area （data based on CEDD report)

Area No.	Catchment ID	Description	Magnitude	Unit	Remark
130	**J**	**Office**			
		Total number of employee	6900	persons	based on CEDD SIA report
		Unit flow	0.08	m^3/person/day	Referred to the planning unit flow for Commercial Employee + Business Services J6 in Table T-2 of GESF.
		Average dry weather flow	**552.0**	m^3/day	
		Retail			
		Total number of person	739	person	based on CEDD SIA report
		Unit flow	0.28	m3/person/day	Referred to the planning unit flow for Commercial Employee + Wholesale & Retail J4 in Table T-2 of GESF.
		Average dry weather flow	**207.0**	m^3/day	
		F&B trade			
		Total number of employee	74	person	Population of possible F&B trade in TCE is assumed to be 10% of retail employee
		Unit flow	1.58	m3/person/day	Commercial Employee + Restaurants & Hotels - J10 in Table T-2 of GESF.
		Average dry weather flow	**116.8**	m^3/day	
		Total ADWF for Area 130	**875.8**	m^3/day	
52 (E6)	**K**	**Open Space**			
		Total number of employee	14	persons	based on CEDD SIA report
		Unit flow	0.28	m^3/person/day	Referred to the planning unit flow for Commercial Employee + Community, Social & Personal Services in Table T-2 of GESF.
		Average dry weather flow	**3.9**	m^3/day	
		Open Space (No shower room)			
		Total number of person	10	person	based on CEDD SIA report
		Unit flow	10.8	m3/person/day	Calculation of ADWF in open space retrieved from agreed SIA for Open Space Development in Tung Chung New Town Extension (East) in Agreement No. 9AJ126.
		Average dry weather flow	**108.0**	m^3/day	
		Open Space (Visitor)			
		Total number of person	3000	person	based on CEDD SIA report
		Unit flow	0.01	m3/person/day	Calculation of ADWF in open space retrieved from agreed SIA for Open Space Development in Tung Chung New Town Extension (East) in Agreement No. 9AJ126.
		Average dry weather flow	**30.0**	m^3/day	
		Total ADWF for Area 52	**141.9**	m^3/day	
132	**L**	**Sewage Pumping Station**			
		Total number of employee	10	persons	based on CEDD SIA report
		Unit flow	0.33	m^3/person/day	based on CEDD SIA report
		Total ADWF for Area 132	**3.3**	m^3/day	
	M	**Total ADWF for Catchement M**	**24661.2**	m^3/day	based on CEDD SIA report, the accumulated ADWF connecting manhole SE-A15 to SE-E23A is 24,661.2m3/day
		Total ADWF connected to SE-E28	**35224.0**	m^3/day	Catchment A to Catchment M

Appendix F

Calculation of Flow Capacity of Proposed Development

Calculation of Flow Capacity of Proposed Development

Sewer No.				Material	Outer Diameter (m)	Internal Diameter (m) [a]	Cross-section Area (m^2)	Length (m)	Inlet mPD (m) [a]	Outlet mPD (m) [a]	Hydraulic pipeline roughness (m) [b]	Hydraulic Gradient	Mean Velocity (m/s) [c]	Max Capacity of Sewer (m^3/s)	Total Average Dry Weather Flow	Catchment Inflow Factor	Revised Total Average Dry Weather Flow [g]	Contributing Population	Peaking Factor	Peak Discharge from Project Site m^3/day	Peak Discharge through Manhole m^3/s	Percentage of capacity after Development	Proposed Development Contribution	Remark
ID	From	ID	To		d	D	A	l				s	V		m^3/day	[f]	m^3/day	[d]	[e]			[h]		
S1	PLUG C0.2	S2	SE-C13	PE	0.28	0.235	0.043	6.550	4.300	4.000	0.0015	0.04580	2.841	0.123	315.7	1.0	315.7	1169	6.0	1893.9	0.022	18%	18%	The Site
S2	SE-C13	S3	SE-E28	PE	0.50	0.420	0.139	19.201	1.590	1.240	0.0015	0.01823	2.607	0.361	1059.5	1.0	1059.5	3924	6.0	6357.1	0.074	20%	6%	The Site + Catchment A-E
S3	SE-E28	S4	SPS001 Sewage pumping Station (TCE East)	PE	1.40	1.190	1.112	29.735	-2.339	-2.401	0.0015	0.00209	1.686	1.876	35539.7	1.0	35539.7	131628	3.5	124776.8	1.444	77%	1%	The Site + Catchment A-M

[a] Reference from CEDD Design Report

[b] Reference from CEDD Design Report,
Pipe is made up of polyethylene, roughness coefficient = 0.0015m

[c] The velocity is calculated using the Colebrook-White Formula:

$$V = -2(2gDS)^{0.5}\log\left(\frac{k}{3.7D} + \frac{2.5\nu}{D(2gDS)^{0.5}}\right)$$

where
k = Colebrook-White roughness coefficient, in meter
V = mean velocity (m/s)
D = circular cross-section pipe, inside diameter (m)
S = slope, in meters per meter
v = kinematic viscosity of water, in meter per second (0.000001306 m/s)
g = gravitational acceleration (m/s2) (9.807m/s2)

[d] The Contributing Population is defined as:

$$\text{Contributing Population} = \frac{\text{Calculated total average flow } (m^3/\text{day})}{0.27\ (m^3/\text{person/day})}$$

[e] Reference from Table T-5 of Guidelines for Estimating Sewage Flows for Sewerage Infrastructure Planning
[f] Reference from Table T-4 of Guidelines for Estimating Sewage Flows for Sewerage Infrastructure Planning
[h] Revised Total Average Dry Weather Flow = Total Average Dry Weather Flow x Catchment Inflow Factor
[i] Pipe segment that exceeded 100% used capacity are bolded and underlined