

Appendix 2

Replacement Pages of Sewerage impact Assessment

Table 3 Calculation for Sewage generation rate of the Surrounding Building (Planned Condition)
Catchment A, discharges to FMH4042669 (S2)

1. On Cheong Factory Building (19 Tai Yip Street)

Industrial - Manufacturing

Assumed area	=	2510 m ²
Assumed floor area per employee	=	43.5 m ² per employee -- (refer to Table 8 of CIFSUS - Manufacturing)
Total number of employees	=	58 employees
Design flow	=	530 litre/employee/day -- (refer to Table T-3 of GESF - J1 Manufacturing in East Kowloon)
Sewage generation rate	=	30.6 m³/day

2. Winful Industrial Building (15-17 Tai Yip Street)

Industrial - Manufacturing

Assumed area	=	5280 m ²
Assumed floor area per employee	=	30.3 m ² per employee -- (refer to Table 8 of CIFSUS - Manufacturing - I/O Buildings)
Total number of employees	=	174 employees
Design flow	=	530 litre/employee/day -- (refer to Table T-3 of GESF - J1 Manufacturing in East Kowloon)
Sewage generation rate	=	92.3 m³/day

3. Peter Leung Industrial Building (103 Wai Yip Street)

a) Industrial - Manufacturing

Assumed area	=	2827 m ²
Assumed floor area per employee	=	30.3 m ² per employee -- (refer to Table 8 of CIFSUS - Manufacturing - I/O Buildings)
Total number of employees	=	93 employees
Design flow	=	530 litre/employee/day -- (refer to Table T-3 of GESF - J1 Manufacturing in East Kowloon)
Sewage generation rate	=	49.4 m³/day

b) Express delivery

Assumed area	=	201 m ²
Assumed floor area per employee	=	22.7 m ² per employee -- (refer to Table 8 of CIFSUS - Financial, Insurance, Real Estate & Business Services - I/O Buildings)
Total number of employees	=	9 employees
Design flow	=	80 litre/employee/day -- (refer to Table T-2 of GESF - J6 Finance, Insurance, Real Estate & Business Services)
Sewage generation rate	=	0.7 m³/day

4. Red Square (105 Wai Yip Street)

Office

Assumed area	=	1739 m ²
Assumed floor area per employee	=	18.2 m ² per employee -- (refer to Table 8 of CIFSUS - Financial, Insurance, Real Estate & Business Services)
Total number of employees	=	96 employees
Design flow	=	80 litre/employee/day -- (refer to Table T-2 of GESF - J6 Finance, Insurance, Real Estate & Business Services)
Sewage generation rate	=	7.7 m³/day

F&B

Assumed area	=	191 m ²
Assumed floor area per employee	=	19.6 m ² per employee -- (refer to Table 8 of CIFSUS - Restaurant)
Total number of employees	=	10 employees
Design flow	=	1580 litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurants and Hotels)
Sewage generation rate	=	15.4 m³/day

Reference: SIA report under Approved Planning Application A/K14/809

Table 3 Calculation for Sewage generation rate of the Surrounding Building (Planned Condition)**5. Yat Sang Industrial Building
Industrial - Manufacturing**

Assumed area
Assumed floor area per employee
Total number of employees
Design flow
Sewage generation rate

Reference: SIA report under Approved Planning Application A/K14/809
 = 2400 m²
 = 43.5 m² per employee -- (refer to Table 8 of CIFSUS - Manufacturing)
 = 55 employees
 = 530 litre/employee/day -- (refer to Table T-3 of GESF - J1 Manufacturing in East Kowloon)
 = **29.3** m³/day

**6. Kevin Wong Development Building (11 Tai Yip Street)
Industrial - Manufacturing**

Assumed area
Assumed floor area per employee
Total number of employees
Design flow
Sewage generation rate

Reference: SIA report under Approved Planning Application A/K14/809
 = 3080 m²
 = 30.3 m² per employee -- (refer to Table 8 of CIFSUS - Manufacturing - I/O Buildings)
 = 102 employees
 = 530 litre/employee/day -- (refer to Table T-3 of GESF - J1 Manufacturing in East Kowloon)
 = **53.9** m³/day

**7. Proposed Commercial Development at 111 Wai Yip Street and 1 Tai Yip Street (Planning Application No. A/K14/809)
Office**

Assumed area
Assumed floor area per employee
Total number of employees
Design flow
Sewage generation rate

Reference: Approved Planning Application A/K14/809 (<https://www.ozp.tpb.gov.hk/api/Perm/Gist?caseNo=A%2fK14%2f809&lang=EN&ext=pdf&d>)
 = 13349 m²
 = 18.2 m² per employee -- (refer to Table 8 of CIFSUS - Financial, Insurance, Real Estate & Business Services)
 = 734 employees
 = 80 litre/employee/day -- (refer to Table T-2 of GESF - J6 Finance, Insurance, Real Estate & Business Services)
 = **58.7** m³/day

**8. Ho King Industrial Building (9 Tai Yip Street)
Industrial - Manufacturing**

Assumed area
Assumed floor area per employee
Total number of employees
Design flow
Sewage generation rate

= 2044 m²
 = 43.5 m² per employee -- (refer to Table 8 of CIFSUS - Manufacturing)
 = 47 employees
 = 530 litre/employee/day -- (refer to Table T-3 of GESF - J1 Manufacturing in East Kowloon)
 = **24.9** m³/day

**9. Wing Tai Factory Building (3 Tai Yip Street)
Industrial - Manufacturing**

Assumed area
Assumed floor area per employee
Total number of employees
Design flow
Sewage generation rate

= 3144 m²
 = 30.3 m² per employee -- (refer to Table 8 of CIFSUS - Manufacturing - I/O Buildings)
 = 104 employees
 = 530 litre/employee/day -- (refer to Table T-3 of GESF - J1 Manufacturing in East Kowloon)
 = **55.0** m³/day

Storage

Assumed area
Assumed floor area per employee
Total number of employees
Design flow
Sewage generation rate

= 147 m²
 = 250.0 m² per employee -- (refer to Table 8 of CIFSUS - Storage)
 = 1 employees
 = 180 litre/employee/day -- (refer to Table T-2 of GESF - Transport, Storage & Communication)
 = **0.1** m³/day

Table 3 Calculation for Sewage generation rate of the Surrounding Building (Planned Condition)**11. Air Goal Cargo Building (330 Kwun Tong Road)****Industrial - Manufacturing**

Assumed area	=	2309 m ²
Assumed floor area per employee	=	43.5 m ² per employee -- (refer to Table 8 of CIFSUS - Manufacturing)
Total number of employees	=	53 employees
Design flow	=	530 litre/employee/day -- (refer to Table T-3 of GESF - J1 Manufacturing in East Kowloon)
Sewage generation rate	=	28.2 m³/day

12. Hong Kong Commercial Daily (332 Kwun Tong Road)**Office**

Assumed area	=	2304 m ²
Assumed floor area per employee	=	18.2 m ² per employee -- (refer to Table 8 of CIFSUS - Financial, Insurance, Real Estate & Business Services)
Total number of employees	=	127 employees
Design flow	=	80 litre/employee/day -- (refer to Table T-2 of GESF - J6 Finance, Insurance, Real Estate & Business Services)
Sewage generation rate	=	10.1 m³/day

13. Far East Factory Building (334-336 Kwun Tong Road)**Office**

Assumed area	=	7833 m ²
Assumed floor area per employee	=	30.3 m ² per employee -- (refer to Table 8 of CIFSUS - Manufacturing - I/O Buildings)
Total number of employees	=	258 employees
Design flow	=	530 litre/employee/day -- (refer to Table T-3 of GESF - J1 Manufacturing in East Kowloon)
Sewage generation rate	=	137.0 m³/day

14. Room Kwun Tong (338 Kwun Tong Road)**Storage**

Assumed area	=	6570 m ²
Assumed floor area per employee	=	250.0 m ² per employee -- (refer to Table 8 of CIFSUS - Storage)
Total number of employees	=	26 employees
Design flow	=	180 litre/employee/day -- (refer to Table T-2 of GESF - J3 Transport, Storage & Communication)
Sewage generation rate	=	4.7 m³/day

15. Johnson Industrial Mansion (340 Kwun Tong Road)**Industrial - Manufacturing**

Assumed area	=	5772 m ²
Assumed floor area per employee	=	30.3 m ² per employee -- (refer to Table 8 of CIFSUS - Manufacturing - I/O Buildings)
Total number of employees	=	190 employees
Design flow	=	530 litre/employee/day -- (refer to Table T-3 of GESF - J1 Manufacturing in East Kowloon)
Sewage generation rate	=	101.0 m³/day

Total Flow of Catchment A, discharges to FMH4042669 (S2)**= 699.0 m³/day**

Table 3 Calculation for Sewage generation rate of the Surrounding Building (Planned Condition)
Catchment B, discharges to FMH4042670 (S3)

16. Chuan Yuan Factory Building (342-344 Kwun Tong Road)
Industrial - Manufacturing

Assumed area	=	13344 m ²
Assumed floor area per employee	=	43.5 m ² per employee -- (refer to Table 8 of CIFSUS - Manufacturing)
Total number of employees	=	307 employees
Design flow	=	530 litre/employee/day -- (refer to Table T-3 of GESF - J1 Manufacturing in East Kowloon)
Sewage generation rate	=	162.7 m³/day

17. Hong Kong Baptist Hospital (4 Tai Yip Street)

Sewage generation rate	=	Reference: SIA report under Approved Planning Application A/K14/782 181.6 m³/day
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18. Linkchart Centre (2 Tai Yip Street)
Office

Assumed area	=	9109 m ²
Assumed floor area per employee	=	18.2 m ² per employee -- (refer to Table 8 of CIFSUS - Financial, Insurance, Real Estate & Business Services)
Total number of employees	=	501 employees
Design flow	=	80 litre/employee/day -- (refer to Table T-2 of GESF - J6 Finance, Insurance, Real Estate & Business Services)
Sewage generation rate	=	40.1 m³/day

Reference: Online building profile (<https://www.interasia.com.hk/en/Kowloon-Building/Kwun-Tong/1563/Linkchart-Centre>)

24a. KTR 350 (65% of total discharge capacity)

a) Office

Assumed area	=	19223 m ²
Assumed floor area per employee	=	18.2 m ² per employee -- (refer to Table 8 of CIFSUS - Financial, Insurance, Real Estate & Business Services)
Total number of employees	=	1057 employees
Design flow	=	80 litre/employee/day -- (refer to Table T-2 of GESF - J6 Finance, Insurance, Real Estate & Business Services)
Sewage generation rate	=	84.6 m³/day

Reference: SIA report under Approved Planning Application A/K14/763

b) F&B

Assumed area	=	1201 m ²
Assumed floor area per employee	=	19.6 m ² per employee -- (refer to Table 8 of CIFSUS - Restaurants)
Total number of employees	=	61 employees
Design flow	=	1580 litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurants and Hotels)
Sewage generation rate	=	96.8 m³/day

b) Retail

Assumed area	=	1646 m ²
Assumed floor area per employee	=	28.6 m ² per employee -- (refer to Table 8 of CIFSUS - Retail Trade)
Total number of employees	=	58 employees
Design flow	=	280 litre/employee/day -- (refer to Table T-2 of GESF - J4 Wholesale & Retail)
Sewage generation rate	=	16.1 m³/day
65% of Total sewage generation rate	=	128.4 m³/day

Total Flow of Catchment B, discharges to FMH4042670 (S3)	=	512.7 m³/day
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Table 3 Calculation for Sewage generation rate of the Surrounding Building (Planned Condition)
Catchment C, discharges to FMH4042672 (S5)

19. Manulife Place

a) Office

Assumed area	=	42693 m ²
Assumed floor area per employee	=	18.2 m ² per employee -- (refer to Table 8 of CIFSUS - Financial, Insurance, Real Estate & Business Services)
Total number of employees	=	2348 employees
Design flow	=	80 litre/employee/day -- (refer to Table T-2 of GESF - J6 Finance, Insurance, Real Estate & Business Services)
Sewage generation rate	=	187.8 m ³ /day

b) F&B

Total number of employees	=	28 employees
Design flow	=	1580 litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurants and Hotels)
Sewage generation rate	=	44.2 m ³ /day

b) Retail

Total number of employees	=	1 employees
Design flow	=	280 litre/employee/day -- (refer to Table T-2 of GESF - J4 Wholesale & Retail)
Sewage generation rate	=	0.3 m ³ /day

20. Chen Yip Industrial Building (5 Lai Yip Street)
Industrial - Manufacturing

Assumed area	=	7431 m ²
Assumed floor area per employee	=	43.5 m ² per employee -- (refer to Table 8 of CIFSUS - Manufacturing)
Total number of employees	=	171 employees
Design flow	=	530 litre/employee/day -- (refer to Table T-3 of GESF - J1 Manufacturing in East Kowloon)
Sewage generation rate	=	90.6 m ³ /day

21. Proposed Commercial Development at 7 Lai Yip Street (Planning Application No. A/K14/774)

a) Office

Assumed area	=	12375 m ²
Assumed floor area per employee	=	18.2 m ² per employee -- (refer to Table 8 of CIFSUS - Financial, Insurance, Real Estate & Business Services)
Total number of employees	=	681 employees
Design flow	=	80 litre/employee/day -- (refer to Table T-2 of GESF - J6 Finance, Insurance, Real Estate & Business Services)
Sewage generation rate	=	54.5 m ³ /day

b) F&B

Assumed area	=	1200 m ²
Assumed floor area per employee	=	19.6 m ² per employee -- (refer to Table 8 of CIFSUS - Restaurants)
Total number of employees	=	61 employees
Design flow	=	1580 litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurants and Hotels)
Sewage generation rate	=	96.7 m ³ /day

c) Retail

Assumed area	=	1200 m ²
Assumed floor area per employee	=	28.6 m ² per employee -- (refer to Table 8 of CIFSUS - Retail Trade)
Total number of employees	=	42 employees
Design flow	=	280 litre/employee/day -- (refer to Table T-2 of GESF - J4 Wholesale & Retail)
Sewage generation rate	=	11.8 m ³ /day

Table 3 Calculation for Sewage generation rate of the Surrounding Building (Planned Condition)**22. Tung Lee Industrial Building (9 Lai Yip Street)****Industrial - Manufacturing**

Assumed area	=	9524 m ²
Assumed floor area per employee	=	43.5 m ² per employee -- (refer to Table 8 of CIFSUS - Manufacturing)
Total number of employees	=	219 employees
Design flow	=	530 litre/employee/day -- (refer to Table T-3 of GESF - J1 Manufacturing in East Kowloon)
Sewage generation rate	=	116.1 m ³ /day

23. United Overseas Plaza (11 Lai Yip Street)**Industrial - Manufacturing**

Assumed area	=	7272 m ²
Assumed floor area per employee	=	43.5 m ² per employee -- (refer to Table 8 of CIFSUS - Manufacturing)
Total number of employees	=	167 employees
Design flow	=	530 litre/employee/day -- (refer to Table T-3 of GESF - J1 Manufacturing in East Kowloon)
Sewage generation rate	=	88.6 m ³ /day

24b. KTR 350 (35% of total discharge capacity)**a) Office**

Assumed area	=	19223 m ²
Assumed floor area per employee	=	18.2 m ² per employee -- (refer to Table 8 of CIFSUS - Financial, Insurance, Real Estate & Business Services)
Total number of employees	=	1057 employees
Design flow	=	80 litre/employee/day -- (refer to Table T-2 of GESF - J6 Finance, Insurance, Real Estate & Business Services)
Sewage generation rate	=	84.6 m ³ /day

b) F&B

Assumed area	=	1201 m ²
Assumed floor area per employee	=	19.6 m ² per employee -- (refer to Table 8 of CIFSUS - Restaurants)
Total number of employees	=	61 employees
Design flow	=	1580 litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurants and Hotels)
Sewage generation rate	=	96.8 m ³ /day

b) Retail

Assumed area	=	1646 m ²
Assumed floor area per employee	=	28.6 m ² per employee -- (refer to Table 8 of CIFSUS - Retail Trade)
Total number of employees	=	58 employees
Design flow	=	280 litre/employee/day -- (refer to Table T-2 of GESF - J4 Wholesale & Retail)
Sewage generation rate	=	16.1 m ³ /day
35% of Total sewage generation rate	=	69.1 m ³ /day

Total Flow of Catchment C, discharges to FMH4042672 (S5)	=	759.7 m ³ /day
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Reference: SIA report under Approved Planning Application A/K14/763

Table 3 Calculation for Sewage generation rate of the Surrounding Building (Planned Condition)
Catchment D, discharges to FMH4042678 (S12)

25. Neo Office

Assumed area	=	55390 m ²
Assumed floor area per employee	=	18.2 m ² per employee -- (refer to Table 8 of CIFSUS - Financial, Insurance, Real Estate & Business Services)
Total number of employees	=	3046 employees
Design flow	=	80 litre/employee/day -- (refer to Table T-2 of GESF - J6 Finance, Insurance, Real Estate & Business Services)
Sewage generation rate	=	243.7 m³/day

26, 27, 29. Lai Yip Street Commercial Development Site (MPC Paper No. 7/23)

a) Office

Assumed area	=	19400 m ²
Assumed floor area per employee	=	18.2 m ² per employee -- (refer to Table 8 of CIFSUS - Financial, Insurance, Real Estate & Business Services)
Total number of employees	=	1067 employees
Design flow	=	80 litre/employee/day -- (refer to Table T-2 of GESF - J6 Finance, Insurance, Real Estate & Business Services)
Sewage generation rate	=	85.4 m³/day

b) F&B

Assumed area	=	1800 m ²
Assumed floor area per employee	=	19.6 m ² per employee -- (refer to Table 8 of CIFSUS - Restaurants)
Total number of employees	=	92 employees
Design flow	=	1580 litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurants and Hotels)
Sewage generation rate $K \sqrt{\sum DU}$	=	145.0 m³/day

c) Retail

Assumed area	=	1800 m ²
Assumed floor area per employee	=	28.6 m ² per employee -- (refer to Table 8 of CIFSUS - Retail Trade)
Total number of employees	=	63 employees
Design flow	=	280 litre/employee/day -- (refer to Table T-2 of GESF - J4 Wholesale & Retail)
Sewage generation rate	=	17.6 m³/day

28. Hoi Bun Road Park Public Restroom

Discharge from WC (Qty * DU)	=	21.6 L/s
Discharge from Basin (Qty * DU)	=	2.7 L/s
Discharge from Single Urinal with Cistern (Qty * DU)	=	1.2 L/s
Discharge from Shower without Plug (Qty * DU)	=	2.4 L/s
Sum of DUs	=	27.9 L/s
Wastewater Flow Rate $(K \sqrt{\sum DU})$	=	5.3 L/s

Frequency of use, $K = 1$, extracted from Table 6 of Plumbing Engineering Services Design Guide (PESDG)

Discharge Unit (DU) of WC = 1.8 L/s; DU of Basin = 0.3 L/s, DU of Single Urinal with Cistern = 0.4L/s, DU of Shower without Plug = 0.4L/s, extracted from Table 5 of PESDG

Total number of WC = 12; Total number of Basin = 9; Total number of Single Urinal with Cistern = 3; Total number of Shower without plug = 6 (Site observation)

Total Flow of Catchment D, excluding public toilet/restroom/RCP, discharges to FMH4042678 (S12)	=	491.8 m³/day
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Table 3 Calculation for Sewage generation rate of the Surrounding Building (Planned Condition)**Sub-total**

Total Flow at S0 (including Proposed Development)	=	884.2	m ³ /day
Total Flow at S1 (including Proposed Development)	=	884.2	m ³ /day
Total Flow at S2 (including Proposed and Planned Development + Catchment A)	=	1,583.1	m ³ /day
Total Flow at S3 (including Proposed and Planned Development + Catchment A & B)	=	2,095.8	m ³ /day
Total Flow at S4 (including Proposed and Planned Development + Catchment A & B)	=	2,095.8	m ³ /day
Total Flow at S5 (including Proposed and Planned Development + Catchment A & B & C)	=	2,855.6	m ³ /day
Total Flow at S6 (including Proposed and Planned Development + Catchment A & B & C)	=	2,855.6	m ³ /day
Total Flow at S7 (including Proposed and Planned Development + Catchment A & B & C)	=	2,855.6	m ³ /day
Total Flow at S8 (including Proposed and Planned Development + Catchment A & B & C)	=	2,855.6	m ³ /day
Total Flow at S9 (including Proposed and Planned Development + Catchment A & B & C)	=	2,855.6	m ³ /day
Total Flow at S10 (including Proposed and Planned Development + Catchment A & B & C)	=	2,855.6	m ³ /day
Total Flow at S11 (including Proposed and Planned Development + Catchment A & B & C)	=	2,855.6	m ³ /day
Total Flow at S12 (including Proposed and Planned Development + Catchment A & B & C & D)	=	3,347.3	m ³ /day
Total Flow at S13 (including Proposed and Planned Development + Catchment A & B & C & D)	=	3,347.3	m ³ /day

Sub-total with Catchment Inflow Factor - East Kowloon = 1.1

Total Flow at S0 (including Proposed Development)	=	972.6	m ³ /day
Total Flow at S1 (including Proposed Development)	=	972.6	m ³ /day
Total Flow at S2 (including Proposed and Planned Development + Catchment A)	=	1,741.4	m ³ /day
Total Flow at S3 (including Proposed and Planned Development + Catchment A & B)	=	2,305.4	m ³ /day
Total Flow at S4 (including Proposed and Planned Development + Catchment A & B)	=	2,305.4	m ³ /day
Total Flow at S5 (including Proposed and Planned Development + Catchment A & B & C)	=	3,141.1	m ³ /day
Total Flow at S6 (including Proposed and Planned Development + Catchment A & B & C)	=	3,141.1	m ³ /day
Total Flow at S7 (including Proposed and Planned Development + Catchment A & B & C)	=	3,141.1	m ³ /day
Total Flow at S8 (including Proposed and Planned Development + Catchment A & B & C)	=	3,141.1	m ³ /day
Total Flow at S9 (including Proposed and Planned Development + Catchment A & B & C)	=	3,141.1	m ³ /day
Total Flow at S10 (including Proposed and Planned Development + Catchment A & B & C)	=	3,141.1	m ³ /day
Total Flow at S11 (including Proposed and Planned Development + Catchment A & B & C)	=	3,141.1	m ³ /day
Total Flow at S12 (including Proposed and Planned Development + Catchment A & B & C & D)	=	3,682.0	m ³ /day
Total Flow at S13 (including Proposed and Planned Development + Catchment A & B & C & D)	=	3,682.0	m ³ /day

Table 4 Comparision of the Hydraulic Capacity of Existing Sewers for Sewerage generated from the Proposed Development and Surrounding Catchment Areas

Hydraulic Capacity of Existing Sewers

Segment	Manhole Reference	Manhole Reference	Pipe Dia. (mm)	Pipe Length (m)	Gradient	Estimated Capacity (L/s)	Peak Flow from the Proposed Development only (L/s)	Contribution from the Proposed Development only (%)	Status	Included Catchment	Daily Flow (m ³ /day)	Contributing Population	Peaking Factor	Public Toilet/ Restroom/ RCP (L/s)	Peak Flow from the Proposed Development and Catchment Areas (Without Water Feature Backwash) (L/s)	Water Feature Backwash (L/s)	Peak Flow from the Proposed Development and Catchment Areas (With Water Feature Backwash) (L/s)	Contribution from the Proposed Development and the Surrounding Catchment Areas (%)	Status
P1-S1	FTMH-01	FMH4042668	225	16.4	0.030	79	67.5	85.4%	OK	-	972.6	3,602	6	-	67.5	2.5	70.0	88.5%	OK
S1-S2	FMH4042668	FMH4042669	225	53.5	0.012	56	67.5	120.6%	Spill	-	972.6	3,602	6	-	67.5	2.5	70.0	125.1%	Spill
S2-S3	FMH4042669	FMH4042670	400	34.3	0.007	202	67.5	33.4%	OK	A	1741.4	6,450	5	-	100.8	2.5	103.3	51.1%	OK
S3-S4	FMH4042670	FMH4042671	400	19.1	0.004	153	67.5	44.2%	OK	A + B	2305.4	8,539	5	-	133.4	2.5	135.9	89.0%	OK
S4-S5	FMH4042671	FMH4042672	400	46.5	0.008	206	67.5	32.9%	OK	A + B	2305.4	8,539	5	-	133.4	2.5	135.9	66.1%	OK
S5-S6	FMH4042672	FMH4042673	400	20.5	0.005	173	67.5	39.0%	OK	A + B + C	3141.1	11,634	4	-	145.4	2.5	147.9	85.3%	OK
S6-S7	FMH4042673	FMH4042674	400	6.4	0.003	106	67.5	63.9%	OK	A + B + C	3141.1	11,634	4	-	145.4	2.5	147.9	140.0%	Spill
S7-S8	FMH4042674	FMH4100299	400	22.8	0.002	89	67.5	76.3%	OK	A + B + C	3141.1	11,634	4	-	145.4	2.5	147.9	167.0%	Spill
S8-S9	FMH4100299	FMH4042675	400	20.8	0.002	93	67.5	72.9%	OK	A + B + C	3141.1	11,634	4	-	145.4	2.5	147.9	159.7%	Spill
S9-S10	FMH4042675	FMH4042676	400	28.2	0.004	123	67.5	54.8%	OK	A + B + C	3141.1	11,634	4	-	145.4	2.5	147.9	120.0%	Spill
S10-S11	FMH4042676	FMH4042677	400	26.4	0.004	122	67.5	55.3%	OK	A + B + C	3141.1	11,634	4	-	145.4	2.5	147.9	121.1%	Spill
S11-S12	FMH4042677	FMH4042678	400	3.6	0.006	141	67.5	47.9%	OK	A + B + C	3141.1	11,634	4	-	145.4	2.5	147.9	104.8%	Spill
S12-S13	FMH4042678	FG4003341	400	10.1	0.107	779	67.5	8.7%	OK	A + B + C + D	3682.0	13,637	4	5.3	175.7	2.5	178.2	22.9%	OK

Table 5 Hydraulic Capacity of Existing and Proposed Sewers - Free Flow Condition (Proposed Mitigation)

Segment	Manhole Reference	Manhole Reference	Material	Pipe Dia.	Pipe Length	Invert Level 1	Invert Level 2	g	k _s	s	v	V	Area	Q	Estimated Capacity
				mm	m	mPD	mPD	m/s ²	m		m ² /s	m/s	m ²	m ³ /s	L/s
P1-S1	FTMH-01	FMH4042668	PE	225	16.37	2.40	1.91	9.81	0.0015	0.030	0.000001	1.99	0.04	0.08	79
S1-S2	FMH4042668	FMH4042669	clayware	400	53.49	1.42	0.80	9.81	0.0006	0.012	0.000001	2.03	0.13	0.26	255
S2-S3	FMH4042669	FMH4042670	clayware	400	34.30	0.68	0.43	9.81	0.0006	0.007	0.000001	1.61	0.13	0.20	202
S3-S4	FMH4042670	FMH4042671	clayware	400	19.14	0.38	0.30	9.81	0.0006	0.004	0.000001	1.22	0.13	0.15	153
S4-S5	FMH4042671	FMH4042672	clayware	400	46.50	0.26	-0.09	9.81	0.0006	0.008	0.000001	1.64	0.13	0.21	206
S5-S6	FMH4042672	FMH4042673	clayware	400	20.50	-0.22	-0.33	9.81	0.0006	0.005	0.000001	1.38	0.13	0.17	173
S6-S7	FMH4042673	FMH4042674	clayware	525	6.40	-0.33	-0.35	9.81	0.0030	0.003	0.000001	1.01	0.22	0.22	218
S7-S8	FMH4042674	FMH4100299	clayware	525	22.76	-0.37	-0.42	9.81	0.0030	0.002	0.000001	0.84	0.22	0.18	183
S8-S9	FMH4100299	FMH4042675	clayware	525	20.80	-0.44	-0.49	9.81	0.0030	0.002	0.000001	0.88	0.22	0.19	191
S9-S10	FMH4042675	FMH4042676	clayware	525	28.23	-0.50	-0.62	9.81	0.0030	0.004	0.000001	1.17	0.22	0.25	254
S10-S11	FMH4042676	FMH4042677	clayware	525	26.36	-0.62	-0.73	9.81	0.0030	0.004	0.000001	1.16	0.22	0.25	252
S11-S12	FMH4042677	FMH4042678	clayware	525	3.59	-0.74	-0.76	9.81	0.0030	0.006	0.000001	1.34	0.22	0.29	291
S12-S13	FMH4042678	FG4003341	clayware	525	10.11	-0.76	-0.94	9.81	0.0006	0.018	0.000001	2.99	0.22	0.65	648

Remarks: (1) g=gravitational acceleration; k_s=equivalent sand roughness; s=gradient; v=kinematic viscosity of water; V=mean velocity
(2) The values of k_s = 0.6mm and 3mm are used for the calculation of slimed clayware sewer, poor condition @mean velocity = approximately 1.2m/s and 0.75m/s respectively (based on Table 5: Recommended Roughness Values in Sewerage Manual)
(3) The values of k_s = 1.5mm is used for the calculation of proposed polyethylene sewer, poor condition @mean velocity = approximately 0.75m/s (based on Table 5: Recommended Roughness Values in Sewerage Manual)
(4) The value of velocity (V) is referred to the Tables for the hydraulic design of pipes, sewers and channels (8th edition)
(5) Equation used: $V = \frac{1.49}{n} R^{2/3} S^{1/2}$

Table 6 Comparison of the Hydraulic Capacity of Existing Sewers for Sewerage generated from the Proposed Development and Surrounding Catchment Areas (Proposed Mitigation)

Hydraulic Capacity of Existing Sewers

Segment	Manhole Reference	Manhole Reference	Pipe Dia. (mm)	Pipe Length (m)	Gradient	Estimated Capacity (L/s)	Peak Flow from the Proposed Development only (L/s)	Contribution from the Proposed Development only (%)	Status	Included Catchment	Daily Flow (m ³ /day)	Contributing Population	Peaking Factor	Public Toilet/ Restroom/ RCP (L/s)	Peak Flow from the Proposed Development and Catchment Areas (Without Water Feature Backwash) (L/s)	Water Feature Backwash (L/s)	Peak Flow from the Proposed Development and Catchment Areas (With Water Feature Backwash) (L/s)	Contribution from the Proposed Development and the Surrounding Catchment Areas (%)	Status
P1-S1	FTMH-01	FMH4042668	225	16.4	0.030	79	67.5	85.4%	OK	-	972.6	3,602	6	-	67.5	2.5	70.0	88.5%	OK
S1-S2	FMH4042668	FMH4042669	400	53.5	0.012	255	67.5	26.4%	OK	-	972.6	3,602	6	-	67.5	2.5	70.0	27.4%	OK
S2-S3	FMH4042669	FMH4042670	400	34.3	0.007	202	67.5	33.4%	OK	A	1741.4	6,450	5	-	100.8	2.5	103.3	51.1%	OK
S3-S4	FMH4042670	FMH4042671	400	19.1	0.004	153	67.5	44.2%	OK	A + B	2305.4	8,539	5	-	133.4	2.5	135.9	89.0%	OK
S4-S5	FMH4042671	FMH4042672	400	46.5	0.008	206	67.5	32.9%	OK	A + B	2305.4	8,539	5	-	133.4	2.5	135.9	66.1%	OK
S5-S6	FMH4042672	FMH4042673	400	20.5	0.005	173	67.5	39.0%	OK	A + B + C	3141.1	11,634	4	-	145.4	2.5	147.9	85.3%	OK
S6-S7	FMH4042673	FMH4042674	525	6.4	0.003	218	67.5	31.0%	OK	A + B + C	3141.1	11,634	4	-	145.4	2.5	147.9	67.9%	OK
S7-S8	FMH4042674	FMH4100299	525	22.8	0.002	183	67.5	37.0%	OK	A + B + C	3141.1	11,634	4	-	145.4	2.5	147.9	81.0%	OK
S8-S9	FMH4100299	FMH4042675	525	20.8	0.002	191	67.5	35.4%	OK	A + B + C	3141.1	11,634	4	-	145.4	2.5	147.9	77.5%	OK
S9-S10	FMH4042675	FMH4042676	525	28.2	0.004	254	67.5	26.6%	OK	A + B + C	3141.1	11,634	4	-	145.4	2.5	147.9	58.2%	OK
S10-S11	FMH4042676	FMH4042677	525	26.4	0.004	252	67.5	26.8%	OK	A + B + C	3141.1	11,634	4	-	145.4	2.5	147.9	58.7%	OK
S11-S12	FMH4042677	FMH4042678	525	3.6	0.006	291	67.5	23.2%	OK	A + B + C	3141.1	11,634	4	-	145.4	2.5	147.9	50.9%	OK
S12-S13	FMH4042678	FG4003341	525	10.1	0.018	648	67.5	10.4%	OK	A + B + C + D	3682.0	13,637	4	5.3	175.7	2.5	178.2	27.5%	OK