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January 24, 2025

Oikos Management
169 Regency Park Drive, Suite 600
Halifax NS
B3S 1P4

Re: 71 Greenpark Close, 300 Unit Building, Halifax – Downstream Wastewater Sewer Analysis

Oikos Management is proposing to develop at 71 Greenpark Close, Halifax. The project comprises a new 400-unit residential apartment building. As per Halifax Water Design and Construction Specifications (2023), Section 4.2.1 and at the request of Oikos Management, SDMM has prepared the following capacity analysis for the sewer immediately downstream of the proposed development.

Tributary Areas and Population

The above noted development will consist of 400 apartment units; we note that commercial space is not proposed. The downstream terminus of this analysis was established based on correspondence with Halifax Water Development staff; this limit was indicated to be MH11191 at Lacewood Drive. This required fifteen (15) sections of sewer, directly downstream of the development, to be analyzed. Tributary areas for this sewer are depicted in Figure 1, which can be found attached to this report.

The zoning varies throughout the sewer shed; SDMM determined equivalent populations for the sewer sheds based on densities (People/Hectare) derived from the following resources:

- Halifax Water Design & Construction Specifications (2023)
- HRM Halifax Mainland Land-Use By-Law
- Development Agreement (Document #13807) – Schedule E

A summary of the density and population calculations are presented in Tables 1 and 2 which can be found in the appendix.

Estimated Wastewater Flow Calculations

Estimated wastewater flows were calculated for each reach of sewer based on the hydraulic design formula outlined in Section 4.2.2 of the Halifax Water Design & Construction Specifications (2023). Flows calculated include the Halifax Water safety factor of 1.25 with allowances of 0.30m^3 per person per day for residential development and 24m^3 per gross hectare per day for infiltration/inflow. A summary of the estimated wastewater flow calculations are presented in Table 3 which can be found in the appendix.

Existing Pipe Capacity

Existing pipe capacities were calculated using Manning's Equation for each reach of downstream sewer utilizing pipe characteristics provided by Halifax Water GIS information. A summary of the pipe capacities are presented in Table 4 which can be found in the appendix.

Conclusion

Comparisons between the estimated flows calculated in Table 3 and existing pipe capacities calculated in Table 4 for each reach of sewer indicate that the downstream sewer system has sufficient capacity to accommodate the anticipated wastewater flows generated by this proposed development.

For additional information or comment please contact the undersigned.

Regards,

Servant, Dunbrack, McKenzie & MacDonald Ltd.

[redacted]

Alex Pulsifer, P.Eng.
Project Engineer
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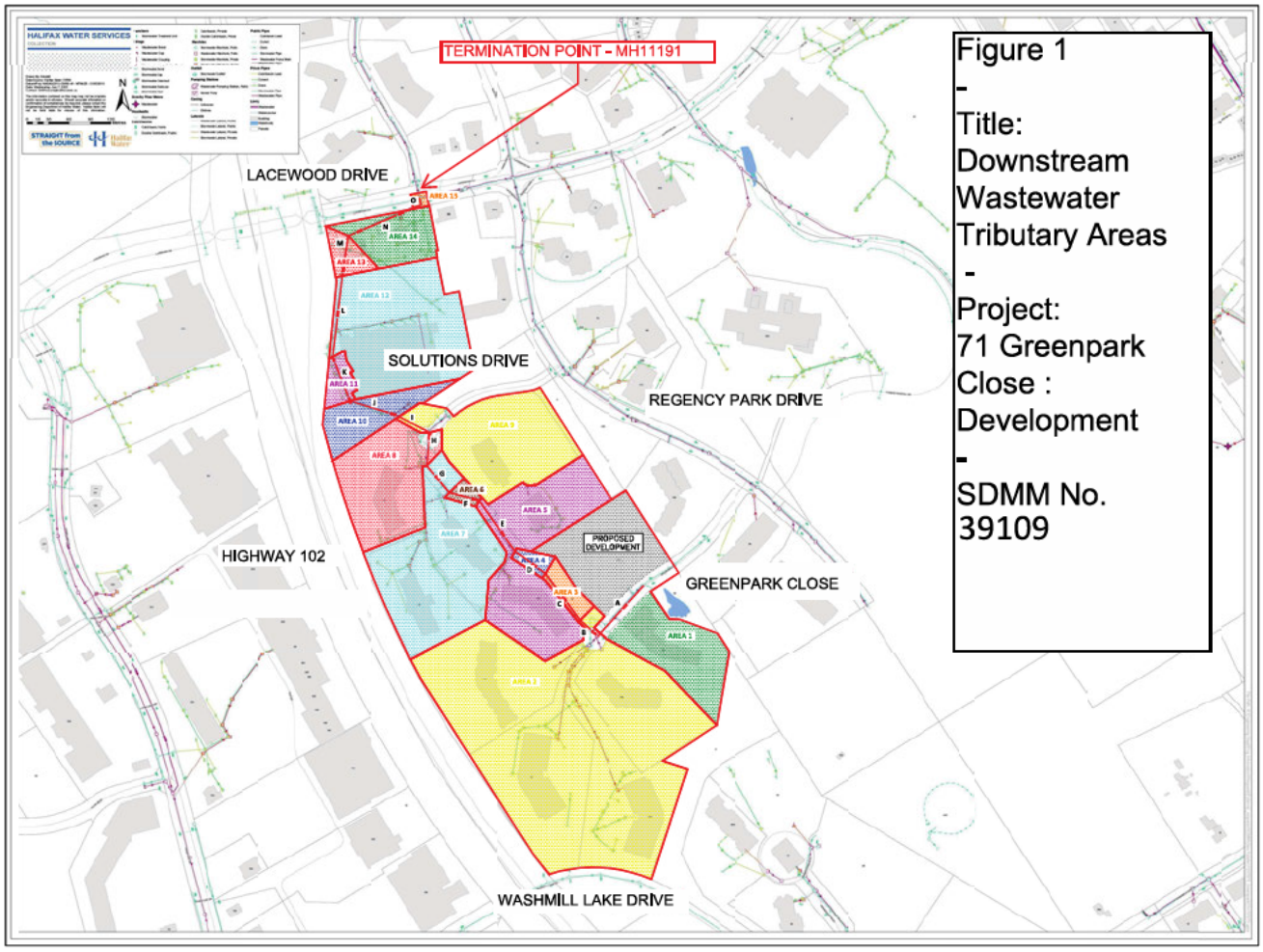
APPENDIX

Table 1 - By-Law Density Values		
Zoning		People per Hectare
K Zone (Development Agreement Schedule E : 27 people per acre		67
Halifax Mainland Land-Use By-Law		

Table 2 - Tributary Areas and Population				
Area	Sub-Area	Tributary Area (ha)	People per Hectare	Equivalent Population
D (Proposed Development)				
	400 Unit Apt Building	1.74	2.25ppu	900.00
	Sub-Total	**1.74**	**Sub-Total**	**900.00**
1				
	K Zone	1.50	67	100.50
	Street	0.33	-	-
	Sub-Total	**1.83**	**Sub-Total**	**100.50**
2				
	K Zone	9.94	67	665.98
	Street	0.08	-	-
	Sub-Total	**10.02**	**Sub-Total**	**665.98**
3				
	K Zone	0.27	67	18.09
	Sub-Total	**0.27**	**Sub-Total**	**18.09**
4				
	K Zone	0.14	67	9.38
	Sub-Total	**0.14**	**Sub-Total**	**9.38**
5				
	K Zone	2.71	67	181.57
	Sub-Total	**2.71**	**Sub-Total**	**181.57**
6				
	K Zone	0.13	67	8.71
	Sub-Total	**0.13**	**Sub-Total**	**8.71**
7				
	K Zone	3.20	67	214.40
	Sub-Total	**3.20**	**Sub-Total**	**214.40**
8				
	K Zone	1.86	67	124.62
	Street	0.07	-	-
	Sub-Total	**1.93**	**Sub-Total**	**124.62**
9				
	K Zone	2.36	67	**158.12**
	Street	0.06	-	-
	Sub-Total	**2.42**	**Sub-Total**	**158.12**
10				
	K Zone	0.83	67	55.61
	Sub-Total	**0.83**	**Sub-Total**	**55.61**
11				
	K Zone	0.27	67	18.09
	Sub-Total	**0.27**	**Sub-Total**	**18.09**
12				
	K Zone	3.18	67	213.06
	Sub-Total	**3.18**	**Sub-Total**	**213.06**
13				
	K Zone	0.29	67	19.43
	Sub-Total	**0.29**	**Sub-Total**	**19.43**
14				
	K Zone	0.87	67	58.29
	Sub-Total	**0.87**	**Sub-Total**	**58.29**
15				
	Street	0.05	-	-
	Sub-Total	**0.05**	**Sub-Total**	**-**
Total				
	Total	**29.88**	**Sub-Total**	**2746**

Table 3: Estimated Wastewater Flow Calculations										
Pipe	Area Number(s)	Tributary Area (ha)	Equivalent Population	Average Dry Weather Flow, a (m^3/d)	Harmon Peaking Factor, M	Infiltration/Inflow Allowance, b (m^3/d)	Peak Dry Weather Flow, a x M (m^3/d)	Peak Design Flow, (a x M) + b, (m^3/d)	Safety Factor	**Estimated Flow, Q (m^3/d)**
A	D+1	3.57	1001	300.2	3.80	85.7	1,140.5	1,226.2	1.25	**1,511**
B	D+(1-2)	13.59	1666	499.9	3.65	326.2	1,822.8	2,149.0	1.25	**2,605**
C	D+(1-3)	13.86	1685	505.4	3.64	332.6	1,840.8	2,173.5	1.25	**2,634**
D	D+(1-4)	14.00	1694	508.2	3.64	336.0	1,850.2	2,186.2	1.25	**2,649**
E	D+(1-5)	16.71	1876	562.7	3.61	401.0	2,029.7	2,430.7	1.25	**2,938**
F	D+(1-6)	16.84	1884	565.3	3.61	404.2	2,038.2	2,442.4	1.25	**2,952**
G	D+(1-7)	20.04	2099	629.6	3.57	481.0	2,247.3	2,728.2	1.25	**3,290**
H	D+(1-8)	21.97	2223	667.0	3.55	527.3	2,367.5	2,894.8	1.25	**3,487**
I	D+(1-9)	24.39	2381	714.4	3.53	585.4	2,518.7	3,104.1	1.25	**3,734**
J	D+(1-10)	25.22	2437	731.1	3.52	605.3	2,571.6	3,176.9	1.25	**3,820**
K	D+(1-11)	25.49	2455	736.5	3.51	611.8	2,588.8	3,200.5	1.25	**3,848**
L	D+(1-12)	28.67	2668	800.4	3.49	688.1	2,789.7	3,477.7	1.25	**4,175**
M	D+(1-13)	28.96	2688	806.3	3.48	695.0	2,807.9	3,502.9	1.25	**4,205**
N	D+(1-14)	29.83	2746	823.8	3.47	715.9	2,862.4	3,578.3	1.25	**4,294**
O	D+(1-15)	29.88	2746	823.8	3.47	717.1	2,862.4	3,579.5	1.25	**4,295**

Table 4: Pipe Capacity Calculations													
Pipe	MH Upstream	MH Downstream	Invert Upstream (m)	Invert Downstream (m)	Length (m)	Sewer Type	Pipe Shape	Pipe Diameter (mm)	Material	Slope (%)	Mannings Coefficient, n	**Manning's Capacity, Qc (m^3/d)**	**Wastewater % of Capacity**
A	MH49278	MH49279	119.85	117.93	96.8	Sanitary	Round	250	PVC	1.98	0.010	**9,407**	**16%**
B	MH49279	MH49291	117.49	117.04	32.4	Sanitary	Round	250	PVC	1.39	0.010	**7,872**	**33%**
C	MH49291	MH54126	116.99	111.32	82.8	Sanitary	Round	250	PVC	6.85	0.010	**17,479**	**15%**
D	MH54126	MH54125	111.32	109.63	53.6	Sanitary	Round	250	PVC	3.15	0.010	**11,860**	**22%**
E	MH54125	MH54124	109.56	108.97	88.8	Sanitary	Round	300	PVC	0.66	0.010	**8,853**	**33%**
F	MH54124	MH54122	108.97	108.71	42.4	Sanitary	Round	300	PVC	0.61	0.010	**8,505**	**35%**
G	MH54122	MH54120	108.66	108.17	49.2	Sanitary	Round	300	PVC	1.00	0.010	**10,839**	**30%**
H	MH54120	MH54116	107.19	106.90	45.6	Sanitary	Round	300	PVC	0.64	0.010	**8,662**	**40%**
I	MH54116	MH54118	106.78	106.32	54.4	Sanitary	Round	300	PVC	0.85	0.010	**9,988**	**37%**
J	MH54118	MH67964	106.13	105.37	67.2	Sanitary	Round	300	PVC	1.13	0.010	**11,551**	**33%**
K	MH67964	MH67963	105.31	104.65	67.6	Sanitary	Round	300	PVC	0.98	0.010	**10,732**	**36%**
L	MH67963	MH67968	104.60	103.47	116.8	Sanitary	Round	300	PVC	0.97	0.010	**10,683**	**39%**
M	MH67968	MH58149	103.40	101.99	56.8	Sanitary	Round	300	PVC	2.48	0.010	**17,113**	**25%**
N	MH58149	MH58598	101.13	100.04	112.0	Sanitary	Round	300	PVC	0.97	0.010	**10,715**	**40%**
O	MH58598	MH11191	100.04	99.94	6.8	Sanitary	Round	300	PVC	1.47	0.010	**13,171**	**33%**


HALIFAX WATER SERVICES
TERMINATION POINT - MH11191
LACEWOOD DRIVE
SOLUTIONS DRIVE
REGENCY PARK DRIVE
HIGHWAY 102
GREENPARK CLOSE
WASHMILL LAKE DRIVE
PROPOSED DEVELOPMENT
AREA 1
AREA 2
AREA 3
AREA 4
AREA 5
AREA 6
AREA 7
AREA 8
AREA 9
AREA 10
AREA 11
AREA 12
AREA 13
AREA 14
AREA 15
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
Figure 1
-
Title:
Downstream
Wastewater
Tributary Areas
-
Project:
71 Greenpark
Close :
Development
-
SDMM No.
39109