



Ref. No. CA0000815.0714

June 20th, 2023

Pam Priest
Universal Realty Group
1601 Lower Water St, Seventh Floor
Halifax, NS B3J 3P6

Re: Ridgeway Towers – Servicing Capacity Analysis

Dear Ms. Priest

WSP understands that Universal Realty Group is considering further development of the Ridgeway Towers site on Ridge Valley Road Water Street. Based on the information provided by Universal Realty Group, the proposed developed site would be comprised of 2 multi unit apartment buildings, with 138 units and 160 units respectively.

Halifax Water has requested a servicing capacity study to assess the capacity of the sanitary infrastructure from the upstream site to the downstream manhole 5773 ensure the new site development project will not exceed the current sanitary pipe capacity. WSP understands that the sanitary servicing for the site will be accessed from the mains on Ridge Valley Drive. The limits of this study were determined using GIS mapping provided by Halifax Water, which resulted in analysis of a 56.73 Ha sewershed. The GIS mapping also provided pipe size, material, and slope.

As per Halifax Water's Design and Construction Specifications (HWDCS) 2022, section 4.2, sanitary design flows were calculated for thirteen runs of sanitary pipe located on Ridge Valley Road, Cowie Hill Road, and Herring Cove Road, consisting of the location of the proposed sanitary lateral for the new development to MH 5773.

The land in the sewershed is developed and falls under a number of different zones including R-1, R-2, R-2P, R-4, RDD, P, and C-2A

Equivalent Populations were calculated for the sewershed. Equivalent Populations were determined based on land-use densities derived from the HRM Land Use By-Laws. Potential building unit numbers were calculated based on the zoning. We have used a density of 3.35 people per unit for single, semi-detached and townhouses, and 2.25 people per unit for the calculated multi-unit dwellings, per the Halifax Water specifications. The results are very conservative as maximum development and density for upstream areas was considered.

CALCULATIONS

Estimated peak average wet-weather flows have been calculated based on the formula for Hydraulic Design presented in Section 4.2 of the HWDCS. Tributary areas, equivalent populations based on the land-use densities, an infiltration / inflow allowance based on tributary area, a sanitary peaking factor derived from the Harmon Formula, and the Halifax Water Safety Factor of 1.25 were used to obtain estimated flows.

Pipe capacities were obtained using Manning's equation.



RESULTS

WASTEWATER

All pipe runs in the area of study were below the 80% capacity threshold. The two highest runs were MH5453 to MH5426 and MH5426 and MH5420 with both being 55% full.

We have enclosed our calculation tables for all the pipe sections in the attached Appendix A. Table 1 shows the results of the sanitary sewer capacity analysis for all 13 runs considered. Sheet 1 shows the properties and land-uses with densities in the sewershed broken down by each catchment area, equivalent populations and tributary areas. Table 2 provides the pipe capacity calculation for the most downstream run in the system. Table 3-15 show the tributary areas and equivalent population for each of the 13 sewer runs. We have also included a drawing, Figure 1, which depicts the delineation of the sewershed tributary areas.

CONCLUSION

Our calculations support that the existing sanitary sewer system on Ridge Valley Road, Cowie Hill Road, and Herring Cove Road will have sufficient capacity to receive the increased sanitary sewer flow from the proposed Ridgeway Tower development.

I trust that the foregoing letter and attached supporting documents are satisfactory. Please do not hesitate to contact us should you have any questions or comments.

Sincerely,


Original Signed

Colin Fogarty, P.Eng.
Project Engineer – Land Development and Municipal Engineering

Appendix A

Table 1 - Sewer Capacity and Tributary Area

Pipe Run #	Diameter (mm)	Slope (%)	Full Flow Capacity (m ³ /s)	Tributary Area (Ha)	Equivalent Population	Wet Weather Allowance - b (m ³ /day)	Average Dry Weather Flow - a (m ³ /day)	Harmon Peaking Factor - M	Sanitary Design Flow (m ³ /day)	Sanitary Design Flow (m ³ /s)	% Full
MH 5471 to MH 5470	200	2%	0.05	2.59	1114	62	334	3.77	1637	0.019	38%
MH 5470 to MH 5464	200	3%	0.06	2.59	1114	62	334	3.77	1637	0.019	32%
MH 5464 to MH 5462	200	9%	0.12	14.40	1968	346	590	3.59	2996	0.035	29%
MH 5462 to MH 5460	200	7%	0.10	15.93	2182	382	655	3.56	3292	0.038	38%
MH 5460 to MH 5458	200	10%	0.12	15.93	2182	382	655	3.56	3292	0.038	32%
MH 5458 to MH 5456	200	14%	0.15	15.93	2182	382	655	3.56	3292	0.038	25%
MH 5456 to MH 5454	250	9%	0.21	18.23	2500	438	750	3.51	3727	0.043	21%
MH 5454 to MH 5453	250	4%	0.12	18.59	2552	446	766	3.50	3797	0.044	37%
MH 5453 to MH 5426	250	2%	0.08	18.59	2552	446	766	3.50	3797	0.044	55%
MH 5426 to MH 5420	300	4%	0.19	50.35	6663	1208	1999	3.13	9022	0.104	55%
MH 5420 to MH 5421	300	6%	0.24	50.35	6663	1208	1999	3.13	9022	0.104	44%
MH 5421 to MH 5422	300	8%	0.27	56.60	7284	1358	2185	3.09	9798	0.113	42%
MH 5422 to MH 5773	300	5%	0.22	56.72	7302	1361	2191	3.09	9819	0.114	52%

1.25 Safety Factor

300 Average Daily Domestic Flow (L/day)

24 Future Degradation of Pipe Long-Term I/I Allowance (m³/Ha/day)

Sheet 1 - Tributary Area and Landuse for Catchment Areas

Catchment Area #1

Area (m2)	Zoning	Units	Population		
16856	R-4	108	2.25	ppl/unit	243
2175.6	R-4	13	2.25	ppl/unit	29.25
2484.5	R-4	15	2.25	ppl/unit	33.75
4426.4	R-4	28	2.25	ppl/unit	63
25943	0	108	2.25	0	369

Sub Area	Density	Units	Dwelling Units	Equivalent Population	Area
R-4	2.25	ppl/unit	108	243	25942.61

Catchment Area #2

Area (m2)	Zoning	Units	Population		
51569	RDD	360	2.25	ppl/unit	810
41705.2	R-1	1	3.35	ppl/unit	3.35
20887.5	P	0	3.35	ppl/unit	0
131	R-2	0	3.35	ppl/unit	0
904.2	R-2	2	3.35	ppl/unit	6.7
464.8	R-2	2	3.35	ppl/unit	6.7
405.2	R-2	2	3.35	ppl/unit	6.7
966.1	R-2	2	3.35	ppl/unit	6.7
561.2	R-2	2	3.35	ppl/unit	6.7
550.3	R-2	2	3.35	ppl/unit	6.7
total	3982.8	12	23.45		853.55

Sub Area	Density	Units	Dwelling Units	Equivalent Population	Area
P	3.35	ppl/unit	0	0	20888
R-1	3.35	ppl/unit	1	3.35	41705
R-2	3.35	ppl/unit	12	40.2	3982.8
RDD	2.25	ppl/unit	360	810	51569
Total				853.55	118144.8

Catchment Area #3

Area (m2)	Zoning	Units	Population		
4061.5	R-4	26	2.25	ppl/unit	58.5
6421	R-4	41	2.25	ppl/unit	92.25
4413.5	R-4	28	2.25	ppl/unit	63
Total	14896	95			213.75
232.4	R-2	0	3.35	ppl/unit	0
95	R-2	0	3.35	ppl/unit	0
Total	327.4				0

Sub Area	Density	Units	Dwelling Units	Equivalent Population	Area
R-4	2.25	ppl/unit	95	213.8	14896
R-2	3.35	ppl/unit	0	0	327.4
Total				213.8	15223.4

Catchment Area #4

Area (m2)	Zoning	Units	Population		
705.4	R-2P	4	2.25	ppl/unit	9
700.4	R-2P	4	2.25	ppl/unit	9
696.6	R-2P	4	2.25	ppl/unit	9
695.9	R-2P	4	2.25	ppl/unit	9
675	R-2P	4	2.25	ppl/unit	9
723.2	R-2P	4	2.25	ppl/unit	9
701.4	R-2P	4	2.25	ppl/unit	9
686.6	R-2P	4	2.25	ppl/unit	9
557.9	R-2P	4	2.25	ppl/unit	9
621.9	R-2P	4	2.25	ppl/unit	9
629.1	R-2P	4	2.25	ppl/unit	9
464.9	R-2P	2	3.35	ppl/unit	6.7
464.3	R-2P	2	3.35	ppl/unit	6.7
649.3	R-2P	4	2.25	ppl/unit	9
737.4	R-2P	4	2.25	ppl/unit	9
689.8	R-2P	4	2.25	ppl/unit	9
714.3	R-2P	4	2.25	ppl/unit	9
666.3	R-2P	4	2.25	ppl/unit	9
709.9	R-2P	4	2.25	ppl/unit	9
682.2	R-2P	4	2.25	ppl/unit	9
Total	13171.8	76			175.4

Sub Area	Density	Units	Dwelling Units	Equivalent Population	Area
R-2P	2.25	ppl/unit	76	175.4	13171.4
Total				175.4	13171.4

Catchment Area #5

Area (m2)	Zoning	Units	Population		
464.7	R-2P	2	3.35	ppl/unit	6.7
9419.7	R-4	60	2.25	ppl/unit	135

Sub Area	Density	Units	Dwelling Units	Equivalent Population	Area
R-2P	3.35	ppl/unit	2	6.7	464.7
R-4	2.25	ppl/unit	60	135	9420
Total				141.7	9884.7

Catchment Area #6

	Area (m2)	Zoning	Units	Population		
	469.2	R-2P	2	3.35	ppl/unit	6.7
	459.1	R-2P	2	3.35	ppl/unit	6.7
Total	928.3		4			13.4
	2679.6	C-2A	17	2.25	ppl/unit	38.25
Total	2679.6	C-2A	17	2.25	ppl/unit	38.25

Sub Area	Density	Units	Dwelling Units	Equivalent Population	Area
R-2P	3.35	ppl/unit	4	13.4	928.3
C-A	2.25	ppl/unit	17	38.25	2680
Total				51.65	3608.3

Catchment Area #7

	Area (m2)	Zoning	Units	Population		
	984.4	C-2A	6	2.25	ppl/unit	13.5
	1008.1	C-2A	6	2.25	ppl/unit	13.5
	1600.9	C-2A	10	2.25	ppl/unit	22.5
	1360.6	C-2A	8	2.25	ppl/unit	18
	4599.2	C-2A	29	2.25	ppl/unit	65.25
	98.4	C-2A	0	2.25	ppl/unit	0
	2381.9	C-2A	15	2.25	ppl/unit	33.75
Total	12033.5		74			166.5
	338.5	R-1	1	3.35	ppl/unit	3.35
	605.2	R-1	1	3.35	ppl/unit	3.35
	283.2	R-1	1	3.35	ppl/unit	3.35
	468.3	R-1	1	3.35	ppl/unit	3.35
	78.8	R-1	0	3.35	ppl/unit	0
	538.5	R-1	1	3.35	ppl/unit	3.35
	631.1	R-1	1	3.35	ppl/unit	3.35
	526.3	R-1	1	3.35	ppl/unit	3.35
	611.1	R-1	1	3.35	ppl/unit	3.35
	739.7	R-1	1	3.35	ppl/unit	3.35
	784.4	R-1	1	3.35	ppl/unit	3.35
	834.6	R-1	1	3.35	ppl/unit	3.35
	873	R-1	1	3.35	ppl/unit	3.35
	785.6	R-1	1	3.35	ppl/unit	3.35
	68.6	R-1	0	3.35	ppl/unit	0
	1141.2	R-1	1	3.35	ppl/unit	3.35
	1093.4	R-1	1	3.35	ppl/unit	3.35
	941.7	R-1	1	3.35	ppl/unit	3.35
	858.7	R-1	1	3.35	ppl/unit	3.35
	747.4	R-1	1	3.35	ppl/unit	3.35
	746.2	R-1	1	3.35	ppl/unit	3.35
	688.5	R-1	1	3.35	ppl/unit	3.35
	667.8	R-1	1	3.35	ppl/unit	3.35
	616	R-1	1	3.35	ppl/unit	3.35
	471.4	R-1	1	3.35	ppl/unit	3.35
Total	16139.2		23			77.05
	276.4	R-2	2	3.35	ppl/unit	6.7
	412.3	R-2	2	3.35	ppl/unit	6.7
	296.9	R-2	2	3.35	ppl/unit	6.7
	281.9	R-2	2	3.35	ppl/unit	6.7
	278.7	R-2	2	3.35	ppl/unit	6.7
	1043.2	R-2	2	3.35	ppl/unit	6.7
	1046.8	R-2	2	3.35	ppl/unit	6.7
	1111.2	R-2	2	3.35	ppl/unit	6.7
	1261.5	R-2	2	3.35	ppl/unit	6.7
	1406.7	R-2	2	3.35	ppl/unit	6.7
	936.1	R-2	2	3.35	ppl/unit	6.7
	842.1	R-2	2	3.35	ppl/unit	6.7
	1290.9	R-2	2	3.35	ppl/unit	6.7
	1242.8	R-2	2	3.35	ppl/unit	6.7
	1059.1	R-2	2	3.35	ppl/unit	6.7
	1059.9	R-2	2	3.35	ppl/unit	6.7
	1145.3	R-2	2	3.35	ppl/unit	6.7
	1108	R-2	2	3.35	ppl/unit	6.7
	1138.7	R-2	2	3.35	ppl/unit	6.7
	1136	R-2	2	3.35	ppl/unit	6.7
	282.6	R-2	2	3.35	ppl/unit	6.7
	277.9	R-2	2	3.35	ppl/unit	6.7
	306.4	R-2	2	3.35	ppl/unit	6.7
	289.9	R-2	2	3.35	ppl/unit	6.7
Total	19531.3		48			160.8
	3486.5	R-2P	4	2.25	ppl/unit	9
	2602.4	R-2P	4	2.25	ppl/unit	9
	737.1	R-2P	4	2.25	ppl/unit	9
	675	R-2P	4	2.25	ppl/unit	9
	634.4	R-2P	4	2.25	ppl/unit	9

Sub Area	Density	Units	Dwelling Units	Equivalent Population	Area
C-2A	2.25	ppl/unit	74	166.5	12033.5
R-1	3.35	ppl/unit	23	77.05	16139.2
R-2	3.35	ppl/unit	48	160.8	19531.3
R-2P	2.25	ppl/unit	232	522	52094.5
R-2P	3.35	ppl/unit	27	90.45	6305.1
R-4	2.25	ppl/unit	865	1946	135684.2
RDD	2.25	ppl/unit	506	1139	74384.1
RC-1	2.25	ppl/unit	4	9	1437.9
Total				4110.8	317609.8

	833.6	R-2P	4	2.25	ppl/unit	9
	771.3	R-2P	4	2.25	ppl/unit	9
	737.1	R-2P	4	2.25	ppl/unit	9
	679.7	R-2P	4	2.25	ppl/unit	9
	669.2	R-2P	4	2.25	ppl/unit	9
	1471.4	R-2P	4	2.25	ppl/unit	9
	1429.5	R-2P	4	2.25	ppl/unit	9
	663.5	R-2P	4	2.25	ppl/unit	9
	663.3	R-2P	4	2.25	ppl/unit	9
	657.8	R-2P	4	2.25	ppl/unit	9
	659.7	R-2P	4	2.25	ppl/unit	9
	658.7	R-2P	4	2.25	ppl/unit	9
	658.8	R-2P	4	2.25	ppl/unit	9
	659.7	R-2P	4	2.25	ppl/unit	9
	660.7	R-2P	4	2.25	ppl/unit	9
	661	R-2P	4	2.25	ppl/unit	9
	662.1	R-2P	4	2.25	ppl/unit	9
	662.9	R-2P	4	2.25	ppl/unit	9
	590	R-2P	4	2.25	ppl/unit	9
	703.5	R-2P	4	2.25	ppl/unit	9
	684.7	R-2P	4	2.25	ppl/unit	9
	604.9	R-2P	4	2.25	ppl/unit	9
	810.8	R-2P	4	2.25	ppl/unit	9
	868.2	R-2P	4	2.25	ppl/unit	9
	953	R-2P	4	2.25	ppl/unit	9
	664.2	R-2P	4	2.25	ppl/unit	9
	813.8	R-2P	4	2.25	ppl/unit	9
	762.7	R-2P	4	2.25	ppl/unit	9
	988.1	R-2P	4	2.25	ppl/unit	9
	1010.2	R-2P	4	2.25	ppl/unit	9
	1027.5	R-2P	4	2.25	ppl/unit	9
	896.1	R-2P	4	2.25	ppl/unit	9
	1902.6	R-2P	4	2.25	ppl/unit	9
	911.1	R-2P	4	2.25	ppl/unit	9
	973.6	R-2P	4	2.25	ppl/unit	9
	574.6	R-2P	4	2.25	ppl/unit	9
	914.6	R-2P	4	2.25	ppl/unit	9
	891	R-2P	4	2.25	ppl/unit	9
	941.1	R-2P	4	2.25	ppl/unit	9
	894.1	R-2P	4	2.25	ppl/unit	9
	800.2	R-2P	4	2.25	ppl/unit	9
	833	R-2P	4	2.25	ppl/unit	9
	813.1	R-2P	4	2.25	ppl/unit	9
	715.4	R-2P	4	2.25	ppl/unit	9
	699	R-2P	4	2.25	ppl/unit	9
	678.2	R-2P	4	2.25	ppl/unit	9
	667.7	R-2P	4	2.25	ppl/unit	9
	1018.1	R-2P	4	2.25	ppl/unit	9
	704.9	R-2P	4	2.25	ppl/unit	9
	1187.2	R-2P	4	2.25	ppl/unit	9
	854.2	R-2P	4	2.25	ppl/unit	9
	908.3	R-2P	4	2.25	ppl/unit	9
	839.4	R-2P	4	2.25	ppl/unit	9
Total	52094.5		232			522
	469.4	R-2P	2	3.35	ppl/unit	6.7
	379.8	R-2P	2	3.35	ppl/unit	6.7
	440.4	R-2P	2	3.35	ppl/unit	6.7
	329.8	R-2P	1	3.35	ppl/unit	3.35
	328	R-2P	1	3.35	ppl/unit	3.35
	384.5	R-2P	2	3.35	ppl/unit	6.7
	530.4	R-2P	2	3.35	ppl/unit	6.7
	386.1	R-2P	2	3.35	ppl/unit	6.7
	271.7	R-2P	1	3.35	ppl/unit	3.35
	392.4	R-2P	2	3.35	ppl/unit	6.7
	417.4	R-2P	2	3.35	ppl/unit	6.7
	460.4	R-2P	2	3.35	ppl/unit	6.7
	500	R-2P	2	3.35	ppl/unit	6.7
	496.6	R-2P	2	3.35	ppl/unit	6.7
	518.2	R-2P	2	3.35	ppl/unit	6.7
Total	6305.1		27			90.45
	3231.1	R-4	20	2.25	ppl/unit	45
	15533	R-4	99	2.25	ppl/unit	222.75
	5007.6	R-4	32	2.25	ppl/unit	72
	14989.3	R-4	96	2.25	ppl/unit	216
	3605.9	R-4	23	2.25	ppl/unit	51.75
	11936	R-4	76	2.25	ppl/unit	171
	5914.2	R-4	38	2.25	ppl/unit	85.5
	18373	R-4	118	2.25	ppl/unit	265.5
	8089.2	R-4	52	2.25	ppl/unit	117

	11804.2	R-4	75	2.25	ppl/unit	168.75
	10532.1	R-4	67	2.25	ppl/unit	150.75
	15888.7	R-4	102	2.25	ppl/unit	229.5
	2846.7	R-4	18	2.25	ppl/unit	40.5
	209.3	R-4	0	2.25	ppl/unit	0
	7723.9	R-4	49	2.25	ppl/unit	110.25
Total	135684.2		865			1946.3
	37433.6	RDD	259	2.25	ppl/unit	582.75
	31966.1	RDD	220	2.25	ppl/unit	495
	4345.1	RDD	23	2.25	ppl/unit	51.75
	639.3	RDD	4	2.25	ppl/unit	9
Total	74384.1		506			1138.5
	1437.9	RC-1	4	2.25	ppl/unit	9

Catchment Area #8

	Area (m2)	Zoning	Units	Population		
	603	R-1	1	3.35	ppl/unit	3.35
	510.4	R-1	1	3.35	ppl/unit	3.35
	590.1	R-1	1	3.35	ppl/unit	3.35
	615.5	R-1	1	3.35	ppl/unit	3.35
	713.3	R-1	1	3.35	ppl/unit	3.35
	720.7	R-1	1	3.35	ppl/unit	3.35
	225.3	R-1	0	3.35	ppl/unit	0
	462.6	R-1	1	3.35	ppl/unit	3.35
	732.9	R-1	1	3.35	ppl/unit	3.35
	707.4	R-1	1	3.35	ppl/unit	3.35
	693.1	R-1	1	3.35	ppl/unit	3.35
	700.3	R-1	1	3.35	ppl/unit	3.35
	910.2	R-1	1	3.35	ppl/unit	3.35
	933.9	R-1	1	3.35	ppl/unit	3.35
	915.5	R-1	1	3.35	ppl/unit	3.35
	1323.7	R-1	1	3.35	ppl/unit	3.35
	1291.8	R-1	1	3.35	ppl/unit	3.35
	541.1	R-1	1	3.35	ppl/unit	3.35
	652.2	R-1	1	3.35	ppl/unit	3.35
	658.7	R-1	1	3.35	ppl/unit	3.35
	592.6	R-1	1	3.35	ppl/unit	3.35
	278.6	R-1	1	3.35	ppl/unit	3.35
	317.3	R-1	1	3.35	ppl/unit	3.35
	470.1	R-1	1	3.35	ppl/unit	3.35
	552.3	R-1	1	3.35	ppl/unit	3.35
	678.5	R-1	1	3.35	ppl/unit	3.35
	670.8	R-1	1	3.35	ppl/unit	3.35
	711.2	R-1	1	3.35	ppl/unit	3.35
	708.8	R-1	1	3.35	ppl/unit	3.35
	1319.5	R-1	1	3.35	ppl/unit	3.35
	1218.2	R-1	1	3.35	ppl/unit	3.35
	750.7	R-1	1	3.35	ppl/unit	3.35
	636.6	R-1	1	3.35	ppl/unit	3.35
	499.8	R-1	1	3.35	ppl/unit	3.35
	15.7	R-1	0	3.35	ppl/unit	0
Total	23922.4		33			110.55
	303.9	R-2	2	3.35	ppl/unit	6.7
	284.3	R-2	2	3.35	ppl/unit	6.7
	882.5	R-2	2	3.35	ppl/unit	6.7
	834.3	R-2	2	3.35	ppl/unit	6.7
	809	R-2	2	3.35	ppl/unit	6.7
	744.9	R-2	2	3.35	ppl/unit	6.7
	747	R-2	2	3.35	ppl/unit	6.7
	707.1	R-2	2	3.35	ppl/unit	6.7
	760.1	R-2	2	3.35	ppl/unit	6.7
	798.5	R-2	2	3.35	ppl/unit	6.7
	665.7	R-2	2	3.35	ppl/unit	6.7
	750.1	R-2	2	3.35	ppl/unit	6.7
	722.6	R-2	2	3.35	ppl/unit	6.7
	901.4	R-2	2	3.35	ppl/unit	6.7
	689.8	R-2	2	3.35	ppl/unit	6.7
	853.8	R-2	2	3.35	ppl/unit	6.7
	874.2	R-2	2	3.35	ppl/unit	6.7
	841.1	R-2	2	3.35	ppl/unit	6.7
Total	13170.3		36			120.6
	25351.6	RDD	173	2.25	ppl/unit	389.25

Sub Area	Density	Units	Dwelling Units	Equivalent Population	Area
R-1	3.35	ppl/unit	33	110.6	23922
R-2	3.35	ppl/unit	36	120.6	13170
RDD	2.25	ppl/unit	173	389.3	25352
Total				620.5	62444

Catchment Area #9

	Area (m2)	Zoning	Notes	Units	Population		Sub Area	Density	Units	Dwelling Units	Equivalent Population	Area	
	649.8	R-2P	3-4 Unit Apartment Building Permitted	4	2.25	ppl/unit	9	R-2P	2.25	ppl/unit	8	18	1253.2
	603.4	R-2P	3-4 Unit Apartment Building Permitted	4	2.25	ppl/unit	9						
Total	1253.2			8			18						

Table 2 - Pipe Capacity		
Capacity Area	A	
Pipe Size	300	
Slope	5.0%	
Manning's (n)	0.013	
	Capacity	Estimated
Depth (mm)	300	155
Flow (m ³ /s)	0.22	0.11
Q_{est}/Q_{cap}	51.7%	

Table 3 - Tributary Area and Landuse MH 5471 to MH 5470			
Sub Area	Equivalent Population	Tributary Area (Acres)	Tributary Area (sq.m)
Area 1			
Proposed Building	745	4.10	16655
Catchment Area 1	369	2.30	9293
Catchment Area 2	0	0.00	0
Catchment Area 3	0	0.00	0
Catchment Area 4	0	0.00	0
Catchment Area 5	0	0.00	0
Catchment Area 6	0	0.00	0
Catchment Area 7	0	0.00	0
Catchment Area 8	0	0.00	0
Catchment Area 9	0	0.00	0
Total	1114	6.40	

Tributary Area (Ha) 2.59

Table 4 - Tributary Area and Landuse MH 5470 to MH 5464			
Sub Area	Equivalent Population	Tributary Area (Acres)	Tributary Area (sq.m)
Area 1			
Proposed Building	745	4.10	16655
Catchment Area 1	369	2.30	9293
Catchment Area 2	0	0.00	0
Catchment Area 3	0	0.00	0
Catchment Area 4	0	0.00	0
Catchment Area 5	0	0.00	0
Catchment Area 6	0	0.00	0
Catchment Area 7	0	0.00	0
Catchment Area 8	0	0.00	0
Catchment Area 9	0	0.00	0
Total	1114	6.40	

Tributary Area (Ha) 2.59

Table 5 - Tributary Area and Landuse MH 5464 to MH 5462

Sub Area	Equivalent Population	Tributary Area (Acres)	Tributary Area (sq.m)
Area 1			
Proposed Building	745	4.10	16655
Catchment Area 1	369	2.30	9293
Catchment Area 2	854	29.19	118144
Catchment Area 3	0	0.00	0
Catchment Area 4	0	0.00	0
Catchment Area 5	0	0.00	0
Catchment Area 6	0	0.00	0
Catchment Area 7	0	0.00	0
Catchment Area 8	0	0.00	0
Catchment Area 9	0	0.00	0
Total	1968	35.59	

Tributary Area (Ha) 14.40

Table 6 - Tributary Area and Landuse MH 5462 to MH 5460

Sub Area	Equivalent Population	Tributary Area (Acres)	Tributary Area (sq.m)
Area 1			
Proposed Building	745	4.10	16655
Catchment Area 1	369	2.30	9293
Catchment Area 2	854	29.19	118144
Catchment Area 3	214	3.76	15223
Catchment Area 4	0	0.00	0
Catchment Area 5	0	0.00	0
Catchment Area 6	0	0.00	0
Catchment Area 7	0	0.00	0
Catchment Area 8	0	0.00	0
Catchment Area 9	0	0.00	0
Total	2182	39.36	

Tributary Area (Ha) 15.93

Table 7 - Tributary Area and Landuse MH 5460 to MH 5458

Sub Area	Equivalent Population	Tributary Area (Acres)	Tributary Area (sq.m)
Area 1			
Proposed Building	745	4.10	16655
Catchment Area 1	369	2.30	9293
Catchment Area 2	854	29.19	118144
Catchment Area 3	214	3.76	15223
Catchment Area 4	0	0.00	0
Catchment Area 5	0	0.00	0
Catchment Area 6	0	0.00	0
Catchment Area 7	0	0.00	0
Catchment Area 8	0	0.00	0
Catchment Area 9	0	0.00	0
Total	2182	39.36	

Tributary Area (Ha)

15.93

Table 8 - Tributary Area and Landuse MH 5458 to MH 5456			
Sub Area	Equivalent Population	Tributary Area (Acres)	Tributary Area (sq.m)
Area 1			
Proposed Building	745	4.10	16655
Catchment Area 1	369	2.30	9293
Catchment Area 2	854	29.19	118144
Catchment Area 3	214	3.76	15223
Catchment Area 4	0	0.00	0
Catchment Area 5	0	0.00	0
Catchment Area 6	0	0.00	0
Catchment Area 7	0	0.00	0
Catchment Area 8	0	0.00	0
Catchment Area 9	0	0.00	0
Total	2182	39.36	

Tributary Area (Ha)

15.93

Table 9 - Tributary Area and Landuse MH 5456 to MH 5454			
Sub Area	Equivalent Population	Tributary Area (Acres)	Tributary Area (sq.m)
Area 1			
Proposed Building	745	4.10	16655
Catchment Area 1	369	2.30	9293
Catchment Area 2	854	29.19	118144
Catchment Area 3	214	3.76	15223
Catchment Area 4	176	3.25	13170
Catchment Area 5	142	2.44	9884
Catchment Area 6	0	0.00	0
Catchment Area 7	0	0.00	0
Catchment Area 8	0	0.00	0
Catchment Area 9	0	0.00	0
Total	2500	45.05	

Tributary Area (Ha)

18.23

Table 10 - Tributary Area and Landuse MH 5454 to MH 5453			
Sub Area	Equivalent Population	Tributary Area (Acres)	Tributary Area (sq.m)
Area 1			
Proposed Building	745	4.10	16655
Catchment Area 1	369	2.30	9293
Catchment Area 2	854	29.19	118144
Catchment Area 3	214	3.76	15223
Catchment Area 4	176	3.25	13170
Catchment Area 5	142	2.44	9884
Catchment Area 6	52	0.89	3607
Catchment Area 7	0	0.00	0
Catchment Area 8	0	0.00	0
Catchment Area 9	0	0.00	0
Total	2552	45.94	

Tributary Area (Ha)

18.59

Table 11 - Tributary Area and Landuse MH 5453 to MH 5426

Sub Area	Equivalent Population	Tributary Area (Acres)	Tributary Area (sq.m)
Area 1			
Proposed Building	745	4.10	16655
Catchment Area 1	369	2.30	9293
Catchment Area 2	854	29.19	118144
Catchment Area 3	214	3.76	15223
Catchment Area 4	176	3.25	13170
Catchment Area 5	142	2.44	9884
Catchment Area 6	52	0.89	3607
Catchment Area 7	0	0.00	0
Catchment Area 8	0	0.00	0
Catchment Area 9	0	0.00	0
Total	2552	45.94	

Tributary Area (Ha) 18.59

Table 12 - Tributary Area and Landuse MH 5426 to MH 5420

Sub Area	Equivalent Population	Tributary Area (Acres)	Tributary Area (sq.m)
Area 1			
Proposed Building	745	4.10	16655
Catchment Area 1	369	2.30	9293
Catchment Area 2	854	29.19	118144
Catchment Area 3	214	3.76	15223
Catchment Area 4	176	3.25	13170
Catchment Area 5	142	2.44	9884
Catchment Area 6	52	0.89	3607
Catchment Area 7	4111	78.48	317592
Catchment Area 8	0	0.00	0
Catchment Area 9	0	0.00	0
Total	6663	124.42	

Tributary Area (Ha) 50.35

Table 13 - Tributary Area and Landuse MH 5420 to MH 5421

Sub Area	Equivalent Population	Tributary Area (Acres)	Tributary Area (sq.m)
Area 1			
Proposed Building	745	4.10	16655
Catchment Area 1	369	2.30	9293
Catchment Area 2	854	29.19	118144
Catchment Area 3	214	3.76	15223
Catchment Area 4	176	3.25	13170
Catchment Area 5	142	2.44	9884
Catchment Area 6	52	0.89	3607
Catchment Area 7	4111	78.48	317592
Catchment Area 8	0	0.00	0
Catchment Area 9	0	0.00	0
Total	6663	124.42	

Tributary Area (Ha) 50.35

Table 14 - Tributary Area and Landuse MH 5421 to MH 5422

Sub Area	Equivalent Population	Tributary Area (Acres)	Tributary Area (sq.m)
Area 1			
Proposed Building	745	4.10	16655
Catchment Area 1	369	2.30	9293
Catchment Area 2	854	29.19	118144
Catchment Area 3	214	3.76	15223
Catchment Area 4	176	3.25	13170
Catchment Area 5	142	2.44	9884
Catchment Area 6	52	0.89	3607
Catchment Area 7	4111	78.48	317592
Catchment Area 8	621	15.43	62444
Catchment Area 9	0	0.00	0
Total	7284	139.85	

Tributary Area (Ha)

56.60

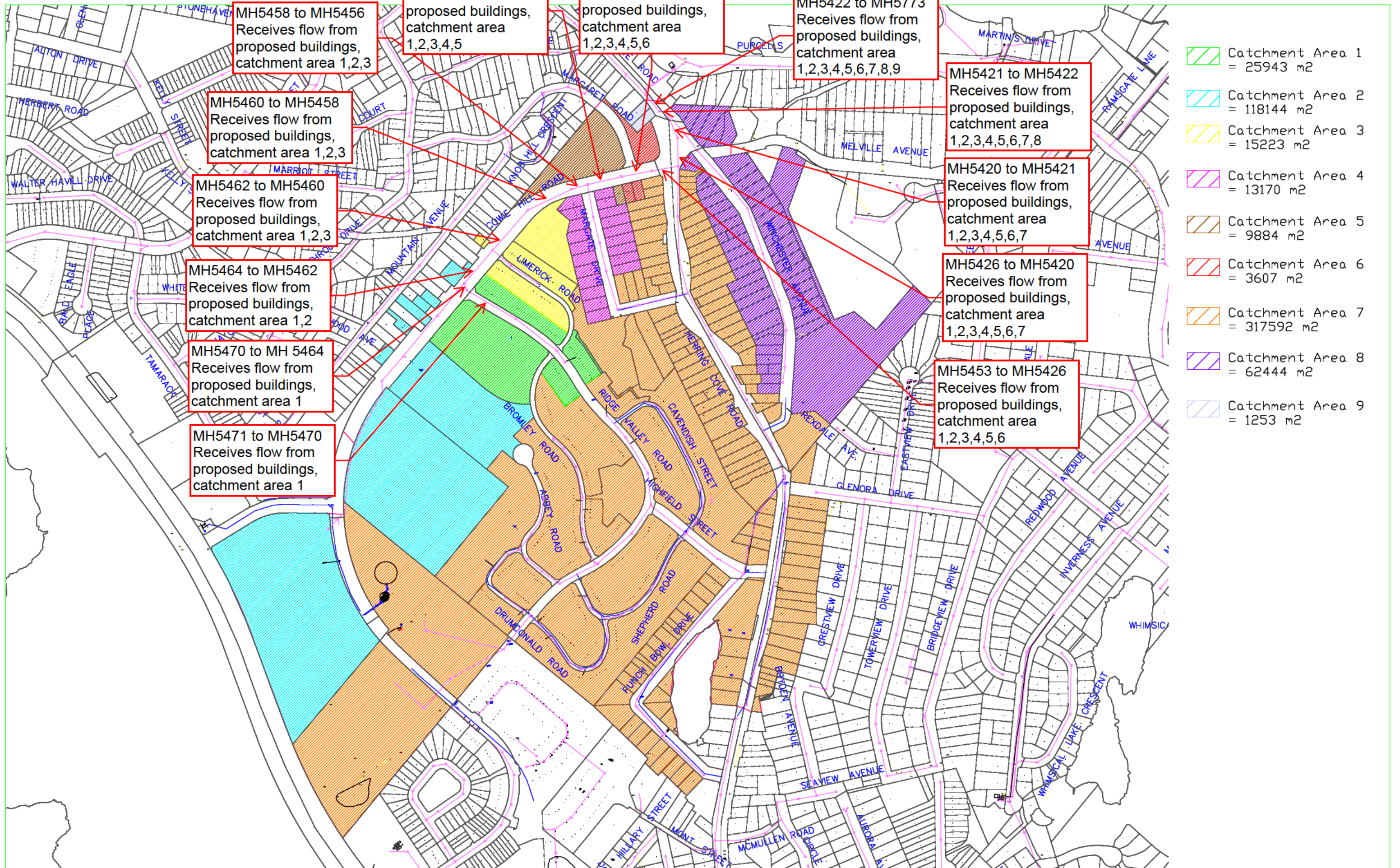
Table 15 - Tributary Area and Landuse MH 5422 to MH 5773

Sub Area	Equivalent Population	Tributary Area (Acres)	Tributary Area (sq.m)
Area 1			
Proposed Building	745	4.10	16655
Catchment Area 1	369	2.30	9293
Catchment Area 2	854	29.19	118144
Catchment Area 3	214	3.76	15223
Catchment Area 4	176	3.25	13170
Catchment Area 5	142	2.44	9884
Catchment Area 6	52	0.89	3607
Catchment Area 7	4111	78.48	317592
Catchment Area 8	621	15.43	62444
Catchment Area 9	18	0.31	1253
Total	7302	140.16	

Tributary Area (Ha)

56.72

Figure 1: Sewershed Tributary Areas



- Catchment Area 1 = 25943 m²
- Catchment Area 2 = 118144 m²
- Catchment Area 3 = 15223 m²
- Catchment Area 4 = 13170 m²
- Catchment Area 5 = 9884 m²
- Catchment Area 6 = 3607 m²
- Catchment Area 7 = 317592 m²
- Catchment Area 8 = 62444 m²
- Catchment Area 9 = 1253 m²