

STORM SEWER DESIGN SHEET - 5 YEAR STORM

Project: Cobourg Storm Sewer Analysis
Date: 2022

Pipes 85-99% Capacity
Pipes 100-149% Overcapacity
Pipes >150% Overcapacity
Existence is Doubtful
Assumed
Values Entered In Lookup Tables

Outlet: 57
 Yarnell (Current Standard)
 Manning's Coefficient: 0.0130

LOCATION			GIS INFORMATION			Length (m)	TIME (MIN)		Rainfall Intensity (mm/hr)	Area (Ha)	C	AC	Cumul AC	Runoff Q (L/s)	Grade	Pipe Diameter (mm)	Capacity (L/s)	Full Flow Velocity (m/s)	% Full	Invert Elevations		U/S T/G	U/S Cover (m)	
Street	From MH	To MH	Pipe ID	Downstream Pipe ID	Material		To Upper End	In Reach												Upper Inv.	Lower Inv.			
Ontario St	STMH-488	STMH-487	984	983	CON	16.9	15.00	0.38	79.48	1.070	0.800	0.856	0.856	189.1	0.30%	300	52.1	0.74	362.7%	80.10	80.05		81.25	0.85
Ontario St	STMH-487	STMH-392	983	595	CON	114.6	15.38	1.73	78.52	0.740	0.450	0.333	1.189	259.5	0.49%	375	121.7	1.10	213.3%	79.43	78.87	0.62	81.22	1.42
Sydenham St	STMH-392	STMH-393	595	985	CON	133.2	17.12	2.28	74.41	0.760	0.450	0.342	1.531	316.7	0.30%	450	155.1	0.98	204.2%	78.73	78.33	0.14	80.36	1.18
Bagot St	STMH-514	STMH-393	623	985	CON	113.5	15.00	3.69	79.48	1.930	0.450	0.869	0.869	191.9	0.11%	375	56.7	0.51	338.5%	78.90	78.78		80.66	1.38
Sydenham St	STMH-393	STMH-394	985	986	CON	158.0	19.39	2.49	69.62	0.950	0.450	0.428	2.827	547.2	0.35%	450	168.5	1.06	324.7%	78.21	77.65	0.12	79.90	1.24
Durham St	STMH-394	STMH-347	986	635	CON	43.5	21.88	0.84	65.05	0.180	0.450	0.081	2.908	525.9	0.24%	450	137.7	0.87	381.8%	77.47	77.37	0.18	79.41	1.49
Durham St	STMH-356	STMH-347	624	635	CON	68.3	15.00	0.79	79.48	1.700	0.450	0.765	0.765	169.0	0.84%	375	159.2	1.44	106.2%	78.20	77.63		79.85	1.27
Orr St	STMH-347	STMH-346	635	634	CON	120.0	22.71	1.78	63.65	0.000	0.450	0.000	3.673	649.9	0.40%	450	178.4	1.12	364.2%	77.28	76.80	0.09	79.53	1.81
Orr St	STMH-346	STMH-349	634	1078	CON	15.0	24.50	0.08	60.84	0.710	0.450	0.320	3.993	675.3	1.65%	675	1074.5	3.00	62.9%	76.62	76.37	0.18	78.31	1.02
Hibernia St	STMH-109	STMH-110	632	625	CON	80.0	15.00	1.25	79.48	0.310	0.800	0.248	0.248	54.8	0.46%	375	118.1	1.07	46.4%	78.06	77.69		80.10	1.67
Albert St	CBMH-375	STMH-110	994	625	CON	16.7	15.00	0.12	79.48	0.480	0.750	0.360	0.360	79.5	2.00%	375	246.0	2.23	32.3%	NULL	77.49		79.19	NULL
Hibernia St	STMH-110	STMH-349	625	1078	CON	69.1	16.25	0.60	76.41	0.860	0.620	0.533	1.141	242.4	1.49%	375	212.7	1.93	114.0%	77.47	76.43	0.23	79.31	1.47
Hibernia St	STMH-349	CBMH-384	1078	1079	CON	68.0	24.58	0.38	60.72	0.140	0.450	0.063	5.197	877.2	1.40%	750	1308.5	2.96	67.0%	76.16	75.21	0.22	78.09	1.18
Hibernia St	CBMH-384	CBMH-385	1079	1082	CON	72.0	24.96	0.61	60.15	0.930	0.750	0.698	5.894	985.6	0.62%	750	870.3	1.97	113.2%	75.21	74.76	0.00	76.74	0.78
Hibernia St	CBMH-385	CBMH-386	1082	4041	CON	60.5	25.57	0.68	59.27	0.130	0.700	0.091	5.985	986.2	0.22%	1050	1288.9	1.49	76.5%	74.75	74.61	0.01	76.59	0.79
Hibernia St	CBMH-387	CBMH-386	628	4041	CON	40.5	15.00	0.73	79.48	1.010	0.450	0.455	0.455	100.4	0.47%	300	65.7	0.93	152.9%	75.19	75.00		76.26	0.77
Third St	CBMH-386	STMH-742	4041	1102	CON	67.0	26.25	0.63	58.32	0.120	0.700	0.084	6.524	1057.7	0.32%	1050	1536.4	1.77	68.8%	74.60	74.39	0.01	76.37	0.72
Third St	STMH-742	STMH-395	1102	1101	CON	85.0	26.88	0.80	57.46	1.550	0.750	1.163	7.686	1227.9	0.32%	1050	1532.2	1.77	80.1%	74.39	74.12	0.00	76.15	0.71
Third St	STMH-111	CBMH-265	1090	1094	CON	20.0	15.00	0.14	79.48	0.850	0.750	0.638	0.638	140.9	2.36%	375	266.9	2.42	52.8%	76.14	75.67		77.92	0.69
Third St	CBMH-265	CBMH-266	1094	1095	CON	51.0	15.14	0.50	79.13	0.100	0.900	0.090	0.728	160.0	0.75%	525	368.7	1.70	43.4%	75.49	75.11	0.18	77.96	1.95
Third St	CBMH-266	CBMH-267	1095	1097	CON	42.0	15.64	0.42	77.88	0.240	0.900	0.216	0.944	204.3	0.73%	525	364.6	1.68	56.0%	75.11	74.80	0.00	77.12	1.49

COVER OK?	VELOCITY OK?	SIZE OK?
SHALLOW	TOO FLAT	TOO SMALL
OK	OK	TOO SMALL
SHALLOW	OK	TOO SMALL
SHALLOW	TOO FLAT	TOO SMALL
SHALLOW	OK	TOO SMALL
OK	OK	TOO SMALL
SHALLOW	OK	TOO SMALL
OK	OK	TOO SMALL
SHALLOW	OK	OK
OK	OK	OK
DEEP	OK	OK
OK	OK	TOO SMALL
SHALLOW	OK	OK
SHALLOW	OK	TOO SMALL
SHALLOW	OK	OK
SHALLOW	OK	TOO SMALL
SHALLOW	OK	OK
SHALLOW	OK	OK
OK	OK	OK
OK	OK	OK

Pipe Diameter (mm)	Length (m)	Invert Elevations		AREA (ha)	C	U/S T/G
		UPPER INV.	LOWER INV.			
300	16.9	NULL	80.05	1.07	0.8	81.255
375	114.6	79.42783	78.867	0.74	0.45	81.22
450	133.2	78.73	78.33	0.76	0.45	80.3625
375	113.5	78.90053	78.78	1.93	0.45	80.66
450	158	78.21	77.65	0.95	0.45	79.8975
450	43.5	77.47	77.367	0.18	0.45	79.4125
375	68.3	78.199	77.627	1.7	0.45	79.84666
450	120	77.277	76.8	0	0.45	79.5325
675	15	76.62	76.372	0.71	0.45	78.3125
375	80	78.06	77.691	0.31	0.8	80.1025
375	16.7	NULL	77.489	0.48	0.75	79.19
375	69.1	77.466	76.433	0.86	0.62	79.31
750	68	76.155	75.205	0.14	0.45	78.09
750	72	75.205	74.76	0.93	0.75	76.735
1050	60.5	74.75	74.614	0.13	0.7	76.59
300	40.5	75.19	75	1.01	0.45	76.265
1050	67	74.604	74.39	0.12	0.7	76.37
1050	85	74.39	74.12	1.55	0.75	76.1525
375	20	76.14	75.669	0.85	0.75	77.91528
525	51	75.489	75.109	0.1	0.9	77.96
525	42	75.11	74.804	0.24	0.9	77.1225

Cobourg Harbour Infrastructure Repairs
 Contract No. CO-22-22 CSD Addendum No. 2

LOCATION			GIS INFORMATION			Length (m)	TIME (MIN)		Rainfall Intensity (mm/hr)	Area (Ha)	C	AC	Cumul AC	Runoff Q (L/s)	Grade	Pipe Diameter (mm)	Capacity (L/s)	Full Flow Velocity (m/s)	% Full	Invert Elevations		Drop In Upper MH	US T/G	US Cover (m)	COVER OK?	VELOCITY OK?	SIZE OK?	Pipe Diameter (mm)	Length (m)	Invert Elevations		AREA (ha)	C	US T/G
Street	From MH	To MH	Pipe ID	Downstream Pipe ID	Material		To Upper End	In Reach												Upper Inv.	Lower Inv.									UPPER INV.	LOWER INV.			
Third St	CBMH-267	CBMH-268	1097	1099	CON	61.0	16.05	0.85	76.87	0.740	0.750	0.555	1.499	320.2	0.26%	675	429.3	1.20	74.6%	74.72	74.56	0.08	76.67	1.27	SHALLOW	OK	OK	675	61	74.72	74.559	0.74	0.75	76.67
Third St	CBMH-268	STMH-397	1099	1100	CON	10.0	16.90	0.12	74.89	0.130	0.900	0.117	1.616	336.4	0.36%	675	501.4	1.40	67.1%	74.55	74.51	0.01	76.57	1.35	SHALLOW	OK	OK	675	10	74.549	74.513	0.13	0.9	76.575
Third St	STMH-397	STMH-396	1100	627	CON	54.4	17.02	0.62	74.62	0.000	0.450	0.000	1.616	335.1	0.39%	675	522.9	1.46	64.1%	74.51	74.30	0.00	76.44	1.25	SHALLOW	OK	OK	675	54.4	74.513	74.3	0	0.45	76.44
Third St	STMH-396	Pipe 1101	627	1101	CON	9.0	17.64	0.09	73.25	0.000	0.450	0.000	1.616	329.0	0.56%	675	622.8	1.74	52.8%	74.30	74.25	0.00	76.36	1.38	SHALLOW	OK	OK	675	9	74.3	74.25	0	0.45	76.3575
Third St	STMH-395	STMH-743	1101	4043	CON	26.0	27.68	0.27	56.41	1.960	0.900	1.764	11.066	1735.4	0.25%	1050	1369.7	1.58	126.7%	74.12	74.05	0.00	76.14	0.97	SHALLOW	OK	TOO SMALL	1050	26	74.12	74.054	1.96	0.9	76.1375
Third St	STMH-743	Outlet-57	4043	Outlet-57	CON	9.0	27.95	0.08	56.06	0.000	0.450	0.000	11.066	1724.5	0.33%	1050	1569.6	1.81	109.9%	74.05	74.02	0.00	76.52	1.42	OK	OK	TOO SMALL	1050	9	74.054	74.024	0	0.45	76.52

Total Area = 17.59 ha

0.629

STORM SEWER DESIGN SHEET - 5 YEAR STORM

Project: Cobourg Storm Sewer Analysis
Date: 2022

Pipes 85-99% Capacity
Pipes 100-149% Overcapacity
Pipes >150% Overcapacity
Existence is Doubtful
Assumed
Values Entered in Lookup Tables

Outlet: 85
 Yarnell (Current Standard)
 Manning's Coefficient: 0.0130

LOCATION			GIS INFORMATION			Length (m)	TIME (MIN)		Rainfall Intensity (mm/hr)	Area (Ha)	C	AC	Cumul AC	Runoff Q (L/s)	Grade	Pipe Diameter (mm)	Capacity (L/s)	Full Flow Velocity (m/s)	% Full	Invert Elevations		Drop in Upper MH	U/S T/G	U/S Cover (m)			
Street	From MH	To MH	Pipe ID	Downstream Pipe ID	Material		To Upper End	In Reach												Upper Inv.	Lower Inv.						
Queen St	STMH-657	STMH-386	2439	1074	CON	14.0	15.00	0.12	79.48	0.190	0.700	0.133	0.133	29.4	2.00%	300	135.6	1.92	21.7%	79.38	79.10		81.76	2.08	OK	OK	OK
Queen St	STMH-386	STMH-388	1074	1073	CON	82.5	15.12	0.84	79.17	0.820	0.450	0.369	0.502	110.5	1.45%	300	115.4	1.63	95.8%	79.10	77.90	0.00	81.00	1.60	OK	OK	MARGINAL
Queen St	STMH-388	STMH-350	1073	1105	CON	144.2	15.96	1.40	77.09	1.960	0.250	0.490	0.992	212.6	1.61%	300	121.7	1.72	174.6%	77.69	75.37	0.21	79.89	1.90	OK	OK	TOO SMALL
Queen St	STMH-390	STMH-350	1072	1105	CON	116.7	15.00	2.30	79.48	1.610	0.900	1.449	1.449	320.2	0.29%	375	93.2	0.84	943.5%	75.77	75.44		77.79	1.64	OK	OK	TOO SMALL
McGill St	STMH-350	STMH-351	1105	1106	CON	95.5	17.30	0.85	73.98	0.890	0.700	0.623	3.064	630.2	0.76%	600	531.6	1.88	118.5%	75.33	74.60	0.04	77.45	1.52	OK	OK	TOO SMALL
McGill St	STMH-351	STMH-352	1106	1107	CON	24.8	18.15	0.15	72.15	0.230	0.700	0.161	3.225	646.9	1.73%	600	803.4	2.84	80.5%	74.60	74.17	0.00	76.49	1.29	SHALLOW	OK	OK
Bay St	STMH-651	STMH-520	2463	836	CON	92.5	15.00	1.39	79.48	0.340	0.450	0.153	0.153	33.8	0.39%	450	175.8	1.11	19.2%	75.73	75.38		78.12	1.93	OK	OK	OK
Paul Currelly Way	STMH-520	STMH-385	836	830	CON	85.3	16.39	1.32	76.06	0.610	0.450	0.275	0.428	90.4	0.30%	525	232.6	1.07	38.9%	75.29	75.04	0.09	77.65	1.84	OK	OK	OK
Paul Currelly Way	STMH-385	STMH-389	830	1104	CON	45.9	17.72	0.71	73.08	1.250	0.450	0.563	0.990	201.1	0.30%	525	234.2	1.08	85.9%	74.94	74.80	0.10	77.28	1.81	OK	OK	MARGINAL
Victoria Park	STMH-389	STMH-352	1104	1107	CON	181.1	18.42	2.33	71.58	3.310	0.250	0.828	1.818	361.7	0.36%	600	366.1	1.29	98.8%	74.75	74.09	0.05	77.17	1.83	OK	OK	MARGINAL
Victoria Park	STMH-352	CBMH-370	1107	2948	CON	20.0	20.76	0.19	67.04	0.160	0.450	0.072	5.115	953.2	0.50%	750	782.8	1.77	121.8%	74.06	73.96	0.04	75.48	0.68	SHALLOW	OK	TOO SMALL
Victoria Park	CBMH-370	STMH-736	2948	4036	CON	118.0	20.94	1.01	66.70	0.360	0.450	0.162	5.277	978.3	0.47%	900	1234.3	1.94	79.3%	73.95	73.39	0.01	76.25	1.41	OK	OK	OK
Victoria Park	STMH-736	STMH-698	4036	4037	CON	31.2	21.96	0.24	64.92	0.000	0.000	0.000	5.277	952.2	0.56%	900	1352.9	2.13	70.4%	73.29	73.12	0.10	75.32	1.13	SHALLOW	OK	OK
Victoria Park	STMH-698	Pump-1	4037	2946	CON	6.0	22.20	0.03	64.50	0.000	0.000	0.000	5.277	946.1	1.45%	900	2169.1	3.41	43.6%	73.12	73.03	0.00	76.33	2.32	OK	OK	OK
Cobourg Harbour	Pump-1	STMH-699	2946	2947	CON	43.6	22.23	0.33	64.45	0.000	0.000	0.000	5.277	945.4	1.02%	600	617.1	2.18	153.2%	75.30	74.85	-2.27	PUMP	-	OK	OK	TOO SMALL
Cobourg Harbour	STMH-699	Outlet-85	2947	Outlet-85	CON	30.0	22.56	0.22	63.89	0.000	0.000	0.000	5.277	937.2	1.14%	600	650.5	2.30	144.1%	73.77	73.43	1.08	76.36	1.99	OK	OK	TOO SMALL

0.270 0.900

Total Area = 11.73 ha

0.460

COVER OK?	VELOCITY OK?	SIZE OK?
OK	OK	OK
OK	OK	MARGINAL
OK	OK	TOO SMALL
OK	OK	TOO SMALL
OK	OK	TOO SMALL
OK	OK	TOO SMALL
SHALLOW	OK	OK
OK	OK	OK
OK	OK	OK
OK	OK	MARGINAL
OK	OK	MARGINAL
SHALLOW	OK	TOO SMALL
OK	OK	OK
SHALLOW	OK	OK
OK	OK	OK
OK	OK	TOO SMALL
OK	OK	TOO SMALL

Pipe Diameter (mm)	Length (m)	Invert Elevations		AREA (ha)	C	U/S T/G
		UPPER INV.	LOWER INV.			
300	14	NULL	NULL	0.19	0.70	81.76
300	82.5	79.09625	77.901	0.82	0.45	81
300	144.2	77.69	75.365	1.96	0.25	79.89
375	116.7	75.773	75.438	1.61	0.9	77.7875
600	95.5	75.325	74.6	0.89	0.7	77.44666
600	24.8	74.6	74.17	0.23	0.7	76.49
450	92.5	75.734	75.377	0.34	0.45	78.11667
525	85.3	75.289	NULL	0.61	0.45	77.65
525	45.9	NULL	74.798	1.25	0.45	77.275
600	181.1	74.746	74.094	3.31	0.25	77.1725
750	20	74.056	73.956	0.16	0.45	75.48458
900	118	73.945	73.391	0.36	0.45	76.25
900	31.2	73.291	73.115	0	0	75.31737
900	6	73.115	73.028	0	0	76.335
600	43.6	75.3	74.854	0	0	NULL
600	30	73.769	73.428	0	0	76.36

STORM SEWER DESIGN SHEET - 5 YEAR STORM

Project: Cobourg Storm Sewer Analysis
Date: 2022

Outlet: 36

Yarnell (Current Standard)
 Manning's Coefficient: 0.0130

Pipes 85-99% Capacity
Pipes 100-149% Overcapacity
Pipes >150% Overcapacity
Existence is Doubtful
Assumed
Values Entered In Lookup Tables

LOCATION			GIS INFORMATION			Length (m)	TIME (MIN)		Rainfall Intensity (mm/hr)	Area (Ha)	C	AC	Cumul AC	Runoff Q (L/s)	Grade	Pipe Diameter (mm)	Capacity (L/s)	Full Flow Velocity (m/s)	% Full	Invert Elevations		Drop in Upper MH	U/S T/G	U/S Cover (m)	COVER OK?	VELOCITY OK?	SIZE OK?	Pipe Diameter (mm)	Length (m)	Invert Elevations		AREA (ha)	C	U/S T/G	
Street	From MH	To MH	Pipe ID	Downstream Pipe ID	Material		To Upper End	In Reach												UPPER INV.	LOWER INV.														
Anne St	STMH-483	CBMH-373	1063	891	CON	140.2	15.00	1.22	79.48	1.650	0.450	0.743	0.743	164.1	2.00%	300	135.6	1.92	121.0%	NULL	NULL		88.18	#VALUE!	#VALUE!	OK	OK	TOO SMALL	300	140.2	NULL	NULL	1.65	0.45	88.18
Anne St	CBMH-373	CBMH-317	891	892	CON	18.0	16.22	0.13	76.48	0.610	0.450	0.275	1.017	216.2	2.21%	375	258.7	2.34	83.6%	83.21	82.82	#VALUE!	84.75	1.17	SHALLOW	OK	OK	375	18	83.214	82.816	0.61	0.45	84.755	
College St	CBMH-316	CBMH-317	778	892	CON	52.5	15.00	0.32	79.48	0.150	0.450	0.068	0.068	14.9	3.96%	300	190.7	2.70	7.8%	84.85	82.78		86.50	1.34	SHALLOW	OK	OK	300	52.5	84.853	82.776	0.15	0.45	86.495	
College St	CBMH-317	STMH-505	892	890	CON	84.5	15.32	0.59	78.66	0.820	0.450	0.369	1.454	317.8	2.33%	375	265.7	2.41	119.6%	82.77	80.80	0.04	84.41	1.26	SHALLOW	OK	TOO SMALL	375	84.5	82.773	80.802	0.82	0.45	84.4125	
James St	CBMH-304	CBMH-303	873	874	CON	91.0	15.00	0.84	79.48	1.340	0.450	0.603	0.603	133.2	1.33%	375	200.6	1.82	66.4%	83.32	82.11		83.54	-0.15	SHALLOW	OK	OK	375	91	83.32	82.11	1.34	0.45	83.54189	
James St	CBMH-303	CBMH-302	874	785	CON	33.0	15.84	0.24	77.40	0.800	0.450	0.360	0.963	207.2	2.19%	375	257.3	2.33	80.5%	82.11	81.39	0.00	83.48	0.99	SHALLOW	OK	OK	375	33	82.11	81.388	0.8	0.45	83.47667	
James St	CBMH-302	CBMH-301	785	875	CON	58.0	16.07	0.59	76.83	0.470	0.450	0.212	1.175	250.9	0.70%	525	357.4	1.65	70.2%	81.21	80.81	0.18	82.89	1.16	SHALLOW	OK	OK	525	58	81.211	80.805	0.47	0.45	82.8925	
James St	CBMH-301	STMH-504	875	876	CON	5.0	16.66	0.05	75.45	0.130	0.450	0.059	1.233	258.6	0.70%	525	357.4	1.65	72.4%	80.81	80.77	0.00	82.11	0.78	SHALLOW	OK	OK	525	5	80.805	80.77	0.13	0.45	82.105	
James St	STMH-504	STMH-505	876	890	CON	19.6	16.71	0.19	75.34	0.540	0.450	0.243	1.476	309.1	0.77%	525	373.7	1.73	82.7%	80.77	80.62	0.00	81.25	-0.05	SHALLOW	OK	OK	525	19.6	80.77	80.62	0.54	0.45	81.2475	
College St	STMH-505	CBMH-318	890	889	CON	52.0	16.90	0.47	74.90	0.030	0.450	0.014	2.943	612.8	0.63%	675	663.7	1.85	92.3%	80.51	80.18	0.29	82.07	0.89	SHALLOW	OK	MARGINAL	675	52	80.508	80.18	0.03	0.45	82.07333	
College St	CBMH-318	CBMH-319	889	2951	CON	58.0	17.36	0.73	73.85	0.470	0.450	0.212	3.155	647.7	0.28%	750	585.1	1.32	110.7%	80.08	79.92	0.10	81.49	0.66	SHALLOW	OK	TOO SMALL	750	58	80.079	79.917	0.47	0.45	81.485	
College St	CBMH-319	STMH-700	2951	2950	CON	13.0	18.09	0.13	72.27	0.550	0.450	0.248	3.402	683.5	0.45%	750	739.5	1.67	92.4%	79.91	79.86	0.00	79.69	-0.97	SHALLOW	OK	MARGINAL	750	13	79.914	79.856	0.55	0.45	79.69	
College St	STMH-700	STMH-506	2950	887	CON	28.0	18.22	0.48	72.00	0.000	0.450	0.000	3.402	680.9	0.15%	750	428.8	0.97	158.8%	79.87	79.83	-0.02	81.21	0.59	SHALLOW	OK	TOO SMALL	750	28	79.871	79.829	0	0.45	81.21333	
College St	STMH-506	CBMH-311	887	883	CON	6.0	18.70	0.07	71.00	0.350	0.450	0.158	3.560	702.6	0.30%	750	606.4	1.37	115.9%	79.82	79.80	0.01	81.38	0.81	SHALLOW	OK	TOO SMALL	750	6	79.822	79.804	0.35	0.45	81.3825	
College St	CBMH-311	CBMH-12	883	880	HECP	124.8	18.78	2.30	70.85	1.150	0.450	0.518	4.077	803.0	0.05%	1220x1920	1595.6	0.90	50.3%	79.35	79.28	0.46	81.26	0.70	SHALLOW	OK	OK	1220x1920	124.8	79.345	79.281	1.15	0.45	81.26	
Henry St	STMH-604	STMH-605	1867	1861	CON	123.2	15.00	2.12	79.48	1.430	0.450	0.644	0.644	142.2	0.38%	375	107.2	0.97	132.6%	86.87	86.40		88.72	1.48	OK	OK	TOO SMALL	375	123.2	86.868	86.4	1.43	0.45	88.725	
Henry St	STMH-605	STMH-633	1861	1862	CON	8.5	17.12	0.10	74.41	0.200	0.450	0.090	0.734	151.7	0.60%	450	219.2	1.38	69.2%	87.20	87.15	-0.80	88.74	1.10	SHALLOW	OK	OK	450	8.5	87.197	87.146	0.2	0.45	88.74333	
James St	CBMH-306	STMH-633	1865	1862	CON	13.0	15.00	0.10	79.48	0.950	0.450	0.428	0.428	94.5	2.70%	300	157.5	2.23	60.0%	87.70	87.35		89.09	1.09	SHALLOW	OK	OK	300	13	87.7	87.349	0.95	0.45	89.09	
Henry St	STMH-633	STMH-606	1862	1869	CON	14.0	17.22	0.11	74.18	0.000	0.450	0.000	1.161	239.4	1.50%	450	346.6	2.18	69.1%	87.15	86.94	0.00	88.82	1.22	SHALLOW	OK	OK	450	14	87.146	86.936	0	0.45	88.82	
Henry St	STMH-606	STMH-607	1869	1872	CON	60.0	17.33	0.43	73.94	0.430	0.450	0.194	1.355	278.4	2.14%	375	254.4	2.30	109.5%	86.25	84.97	0.69	88.40	1.78	OK	OK	TOO SMALL	375	60	86.249	84.966	0.43	0.45	88.4	
Henry St	STMH-607	STMH-608	1872	1880	CON	40.7	17.76	0.23	72.99	0.000	0.450	0.000	1.355	274.8	3.45%	375	323.1	2.93	85.1%	84.81	83.41	0.15	86.60	1.41	OK	OK	MARGINAL	375	40.7	84.814	83.41	0	0.45	86.5975	
Chapel St	CBMH-315	STMH-610	1877	1880	CON	93.0	15.00	0.61	79.48	1.540	0.450	0.693	0.693	153.1	2.57%	375	278.6	2.52	55.0%	85.71	83.33		87.29	1.20	SHALLOW	OK	OK	375	93	85.711	83.325	1.54	0.45	87.29	
Henry St	STMH-610	STMH-609	1880	1882	CON	7.2	17.99	0.03	72.49	0.000	0.450	0.000	2.048	412.6	3.47%	525	796.0	3.68	51.8%	82.94	82.69	0.47	85.07	1.61	OK	OK	OK	525	7.2	82.94	82.69	0	0.45	85.075	
Henry St	STMH-612	STMH-611	1885	1881	CON	56.2	15.00	0.69	79.48	1.410	0.450	0.635	0.635	140.2	0.75%	375	150.6	1.36	93.1%	83.82	83.40		85.58	1.39	SHALLOW	OK	MARGINAL	375	56.2	83.82	83.399	1.41	0.45	85.58334	

Cobourg Harbour Infrastructure Repairs
Contract No. CO-22-22 CSD Addendum No. 2

LOCATION			GIS INFORMATION			Length (m)	TIME (MIN)		Rainfall Intensity (mm/hr)	Area (Ha)	C	AC	Cumul AC	Runoff Q (L/s)	Grade	Pipe Diameter (mm)	Capacity (L/s)	Full Flow Velocity (m/s)	% Full	Invert Elevations		Drop In Upper MH	U/S T/G	U/S Cover (m)	COVER OK?	VELOCITY OK?	SIZE OK?	Pipe Diameter (mm)	Length (m)	Invert Elevations		AREA (ha)	C	U/S T/G
Street	From MH	To MH	Pipe ID	Downstream Pipe ID	Material		To Upper End	In Reach												Upper Inv.	Lower Inv.									UPPER INV.	LOWER INV.			
Henry St	STMH-611	STMH-609	1881	1882	CON	8.0	15.69	0.07	77.76	0.000	0.450	0.000	0.635	137.2	1.19%	450	308.4	1.94	44.5%	83.37	83.27	0.03	85.28	1.46	OK	OK	OK	450	8	83.366	83.271	0	0.45	85.275
Chapel St	STMH-609	STMH-499	1882	898	CON	90.0	18.02	0.72	72.42	0.410	0.450	0.185	2.867	577.1	0.68%	750	914.4	2.07	63.1%	82.59	81.97	0.10	84.78	1.44	OK	OK	OK	750	90	82.588	81.974	0.41	0.45	84.775
Walton St	STMH-83	STMH-82	1971	1965	CON	110.2	15.00	1.44	79.48	3.590	0.450	1.616	1.616	357.0	0.89%	300	90.5	1.28	394.6%	88.33	87.35		90.81	2.19	OK	OK	TOO SMALL	300	110.2	88.328	87.347	3.59	0.45	90.81333
Walton St	STMH-82	STMH-480	1965	844	CON	113.6	16.44	1.54	75.97	3.040	0.450	1.368	2.984	630.1	0.61%	375	136.1	1.23	463.1%	86.66	85.96	0.69	89.51	2.48	OK	OK	TOO SMALL	375	113.6	86.655	85.96	3.04	0.45	89.51
Walton St	STMH-480	STMH-481	844	847	CON	13.6	17.97	0.12	72.53	0.660	0.450	0.297	3.281	661.5	0.74%	600	523.2	1.85	126.4%	85.50	85.40	0.46	88.71	2.61	OK	OK	TOO SMALL	600	13.6	85.5	85.4	0.66	0.45	88.715
Spencer St	STMH-61	STMH-62	1980	1975	CON	90.5	15.00	1.56	79.48	0.870	0.450	0.392	0.392	86.5	0.51%	300	68.2	0.96	126.8%	89.76	89.31		91.04	0.98	SHALLOW	OK	TOO SMALL	300	90.5	89.764	89.306	0.87	0.45	91.04308
Henry ST	STMH-62	STMH-497	1975	567	CON	117.4	16.56	1.64	75.67	0.770	0.450	0.347	0.738	155.2	0.78%	300	84.6	1.20	183.5%	89.31	88.39	0.00	90.99	1.38	SHALLOW	OK	TOO SMALL	300	117.4	89.306	88.392	0.77	0.45	90.99
Henry St	STMH-497	STMH-496	567	841	CON	6.4	18.20	0.04	72.05	0.000	0.450	0.000	0.738	147.8	2.19%	525	631.8	2.92	23.4%	87.95	87.81	0.44	89.23	0.76	SHALLOW	OK	OK	525	6.4	87.95	87.81	0	0.45	89.23
University Ave	CBMH-417	CBMH-416	1745	568	CON	57.2	15.00	0.62	79.48	0.720	0.450	0.324	0.324	71.6	1.29%	300	109.0	1.54	65.7%	88.90	88.16		90.36	1.16	SHALLOW	OK	OK	300	57.2	88.9	88.16	0.72	0.45	90.35667
University Ave	CBMH-416	STMH-496	568	841	CON	9.1	15.62	0.07	77.93	0.490	0.450	0.221	0.545	118.0	2.09%	375	251.4	2.28	46.9%	88.07	87.88	0.09	89.53	1.08	SHALLOW	OK	OK	375	9.1	88.07	87.88	0.49	0.45	89.5275
University Ave	STMH-496	CBMH-415	841	842	CON	84.3	18.23	0.74	71.97	0.000	0.450	0.000	1.283	256.6	0.77%	600	535.8	1.89	47.9%	87.68	87.03	0.13	89.18	0.90	SHALLOW	OK	OK	600	84.3	87.68	87.03	0	0.45	89.1775
University Ave	CBMH-415	STMH-481	842	847	CON	15.6	18.98	0.17	70.45	0.190	0.450	0.086	1.368	267.9	0.51%	600	436.9	1.55	61.3%	86.98	86.90	0.05	88.84	1.26	SHALLOW	OK	OK	600	15.6	86.98	86.9	0.19	0.45	88.84
University Ave	CBMH-412	CBMH-413	850	848	CON	80.2	15.00	0.73	79.48	0.330	0.450	0.149	0.149	32.8	1.82%	300	129.4	1.83	25.4%	89.13	87.67		90.56	1.13	SHALLOW	OK	OK	300	80.2	89.13	87.67	0.33	0.45	90.55666
University Ave	CBMH-413	CBMH-414	848	843	CON	80.1	15.73	1.27	77.65	0.700	0.450	0.315	0.464	100.1	0.60%	300	74.2	1.05	134.8%	87.66	87.18	0.01	89.13	1.17	SHALLOW	OK	TOO SMALL	300	80.1	87.66	87.18	0.7	0.45	89.1275
University Ave	CBMH-414	STMH-481	843	847	CON	5.0	17.00	0.08	74.66	0.350	0.450	0.158	0.621	128.9	0.60%	300	74.3	1.05	173.6%	87.18	87.15	0.00	88.67	1.19	SHALLOW	OK	TOO SMALL	300	5	87.18	87.15	0.35	0.45	88.6675
Walton St	STMH-481	STMH-482	847	780	CON	11.7	19.14	0.09	70.11	0.000	0.450	0.000	5.270	1027.1	0.68%	825	1180.7	2.21	87.0%	85.13	85.05	0.27	88.72	2.77	DEEP	OK	MARGINAL	825	11.7	85.13	85.05	0	0.45	88.72
Walton St	STMH-482	STMH-477	780	868	CON	162.7	19.23	1.61	69.93	0.970	0.450	0.437	5.706	1109.4	0.90%	450	268.4	1.69	413.3%	85.89	84.43	-0.84	88.05	1.71	OK	OK	TOO SMALL	450	162.7	85.893	84.43	0.97	0.45	88.05
Walton St	STMH-477	STMH-478	868	782	CON	8.0	20.84	0.05	66.88	0.540	0.450	0.243	5.949	1106.1	1.17%	750	1200.0	2.72	92.2%	84.33	84.23	0.10	86.20	1.12	SHALLOW	OK	MARGINAL	750	8	84.326	84.232	0.54	0.45	86.1975
James St	CBMH-305	STMH-478	869	782	CON	14.0	15.00	0.12	79.48	0.360	0.450	0.162	0.162	35.8	2.20%	300	142.2	2.01	25.2%	85.35	85.04		86.57	0.92	SHALLOW	OK	OK	300	14	85.35	85.042	0.36	0.45	86.57
Walton St	STMH-478	STMH-479	782	893	CON	15.0	20.89	0.13	66.80	0.000	0.450	0.000	6.111	1134.8	0.62%	750	871.7	1.97	130.2%	84.23	84.14	0.00	86.32	1.34	SHALLOW	OK	TOO SMALL	750	15	84.232	84.139	0	0.45	86.325
Walton St	STMH-479	STMH-751	893	4539	CON	57.9	15.12	0.36	79.19	0.460	0.450	0.207	6.318	1390.9	2.25%	450	424.1	2.67	327.9%	84.40	83.10	-0.26	85.98	1.13	SHALLOW	OK	TOO SMALL	450	57.9	84.4	83.1	0.46	0.45	85.9825
Walton St	STMH-751	STMH-498	4539	896	CON	60.0	21.02	0.48	66.57	0.000	0.450	0.000	6.318	1169.2	1.37%	450	330.9	2.08	353.4%	82.94	82.12	0.16	84.68	1.29	SHALLOW	OK	TOO SMALL	450	60	82.94	82.12	0	0.45	84.68
Walton St	STMH-498	STMH-499	896	898	CON	25.0	15.48	0.22	78.28	0.420	0.450	0.189	6.507	1416.0	1.11%	450	297.9	1.87	475.3%	82.12	81.84	0.01	84.16	1.60	OK	OK	TOO SMALL	450	25	82.115	81.838	0.42	0.45	84.16
Walton St	STMH-747	CBMH-372	910	897	CON	109.4	15.00	1.38	79.48	0.990	0.450	0.446	0.446	98.4	0.95%	300	93.4	1.32	105.4%	83.51	82.47		85.28	1.47	OK	OK	TOO SMALL	300	109.4	83.509	82.47	0.99	0.45	85.28
Walton St	CBMH-372	STMH-499	897	898	CON	7.0	16.38	0.06	76.10	0.600	0.450	0.270	0.716	151.4	1.71%	375	227.8	2.06	66.5%	82.39	82.27	0.08	83.72	0.96	SHALLOW	OK	OK	375	7	82.393	82.273	0.6	0.45	83.72334
Chapel St	STMH-499	CBMH-314	898	899	CON	102.0	18.75	0.54	70.91	0.130	0.450	0.059	10.148	2000.4	1.01%	1050	2733.2	3.16	73.2%	81.63	80.60	0.34	83.86	1.18	SHALLOW	OK	OK	1050	102	81.633	80.602	0.13	0.45	83.86
Chapel St	CBMH-314	CBMH-313	899	885	CON	100.0	19.29	0.65	69.83	0.830	0.450	0.374	10.521	2042.3	0.66%	1050	2206.9	2.55	92.5%	80.55	79.90	0.05	82.76	1.16	SHALLOW	OK	MARGINAL	1050	100	80.554	79.895	0.83	0.45	82.765
Chapel St	CBMH-313	CBMH-312	885	886	CON	95.0	19.94	0.75	68.56	2.970	0.450	1.337	11.858	2259.9	0.38%	1200	2390.4	2.11	94.5%	79.76	79.40	0.13	81.64	0.68	SHALLOW	OK	MARGINAL	1200	95	79.761	79.401	2.97	0.45	81.645
Chapel St	CBMH-312	STMH-500	886	884	CON	12.0	20.69	0.13	67.16	0.490	0.450	0.221	12.078	2254.9	0.22%	1200	1807.5	1.60	124.8%	79.39	79.36	0.02	81.31	0.72	SHALLOW	OK	TOO SMALL	1200	12	79.386	79.36	0.49	0.45	81.3075
College St	STMH-500	STMH-507	884	882	CON	123.5	20.82	1.37	66.93	0.000	0.450	0.000	12.078	2247.3	0.49%	600	425.3	1.50	528.4%	80.10	79.50	-0.74	81.37	0.67	SHALLOW	OK	TOO SMALL	600	123.5	80.1	79.5	0	0.45	81.37

Cobourg Harbour Infrastructure Repairs
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LOCATION			GIS INFORMATION			Length (m)	TIME (MIN)		Rainfall Intensity (mm/hr)	Area (Ha)	C	AC	Cumul AC	Runoff Q (L/s)	Grade	Pipe Diameter (mm)	Capacity (L/s)	Full Flow Velocity (m/s)	% Full	Invert Elevations		Drop In Upper MH	U/S T/G	U/S Cover (m)	COVER OK?	VELOCITY OK?	SIZE OK?	Pipe Diameter (mm)	Length (m)	Invert Elevations		AREA (ha)	C	U/S T/G
Street	From MH	To MH	Pipe ID	Downstream Pipe ID	Material		To Upper End	In Reach												Upper Inv.	Lower Inv.									UPPER INV.	LOWER INV.			
College St	STMH-507	CBMH-12	882	880	CON	4.0	22.18	0.02	64.53	0.000	0.450	0.000	12.078	2166.7	2.17%	600	899.8	3.18	240.8%	79.47	79.38	0.03	82.49	2.42	OK	OK	TOO SMALL	600	4	79.466	79.379	0	0.45	82.49
College St	CBMH-12	STMH-508	880	878	CON	45.0	22.20	0.33	64.49	0.110	0.450	0.050	16.205	2905.4	0.32%	1500	3957.9	2.24	73.4%	79.28	79.14	0.00	82.21	1.43	OK	OK	OK	1500	45	79.283	79.141	0.11	0.45	82.2125
College St	STMH-508	CBMH-321	878	914	CON	18.0	22.54	0.10	63.93	0.310	0.450	0.140	16.344	2904.9	0.72%	1200	3303.2	2.92	87.9%	79.14	79.01	0.00	82.04	1.70	OK	OK	MARGINAL	1200	17.96577	79.14	79.01	0.31	0.45	82.0425
King St	CBMH-327	CBMH-325	2058	2055	CON	94.0	15.00	0.87	79.48	0.360	0.450	0.162	0.162	35.8	1.77%	300	127.4	1.80	28.1%	86.66	85.00		88.21	1.25	SHALLOW	OK	OK	300	94	86.66	85	0.36	0.45	88.2125
King St	CBMH-325	CBMH-324	2055	913	CON	88.0	15.87	1.19	77.32	1.350	0.450	0.608	0.770	165.4	0.48%	450	195.5	1.23	84.6%	84.82	84.40	0.18	86.01	0.74	SHALLOW	OK	OK	450	88	84.82	84.4	1.35	0.45	86.0075
King St	CBMH-324	CBMH-323	913	1906	CON	89.0	17.06	0.89	74.53	0.640	0.450	0.288	1.058	219.1	0.88%	450	265.0	1.67	82.7%	84.38	83.60	0.02	85.76	0.93	SHALLOW	OK	OK	450	89	84.38	83.6	0.64	0.45	85.7575
King St	CBMH-323	CBMH-326	1906	4024	CON	95.0	17.95	0.76	72.57	1.090	0.450	0.491	1.548	312.3	1.12%	525	451.2	2.08	69.2%	83.46	82.40	0.14	85.00	1.02	SHALLOW	OK	OK	525	95	83.46	82.4	1.09	0.45	85
King St	CBMH-326	CBMH-322	4024	789	CON	71.0	18.71	0.54	70.98	0.880	0.450	0.396	1.944	383.6	1.24%	525	475.6	2.20	80.7%	82.38	81.50	0.02	83.98	1.08	SHALLOW	OK	OK	525	71	82.38	81.5	0.88	0.45	83.98
King St	CBMH-322	CBMH-321	789	914	CON	69.0	19.25	0.46	69.90	0.840	0.450	0.378	2.322	451.2	1.59%	525	539.3	2.49	83.7%	81.49	80.39	0.01	82.99	0.97	SHALLOW	OK	OK	525	69	81.49	80.39	0.84	0.45	82.99
King St	CBMH-321	STMH-391	914	918	CON	91.0	22.64	0.54	63.76	0.070	0.450	0.032	18.698	3314.4	0.66%	1200	3153.1	2.79	105.1%	79.00	78.40	0.01	81.88	1.68	OK	OK	TOO SMALL	1200	91	79	78.4	0.07	0.45	81.8825
King St	STMH-391	STMH-509	918	919	CON	83.0	23.19	0.49	62.88	0.470	0.450	0.212	18.909	3305.4	0.67%	1200	3189.6	2.82	103.6%	78.40	77.84	0.00	80.86	1.26	SHALLOW	OK	TOO SMALL	1200	83	78.4	77.84	0.47	0.45	80.86
King St	STMH-509	STMH-378	919	1116	VECP	84.8	23.68	0.47	62.10	0.560	0.450	0.252	19.161	3308.0	0.77%	1525x965	3399.7	3.01	97.3%	77.55	76.90	0.29	80.52	2.00	OK	OK	MARGINAL	1525x965	84.8	77.55	76.9	0.56	0.45	80.52
Swayne St	STMH-716	STMH-715	4559	3094	CON	7.3	15.00	0.07	79.48	1.520	0.450	0.684	0.684	151.1	0.69%	525	354.2	1.64	42.7%	77.95	77.90		79.18	0.71	SHALLOW	OK	OK	525	7.27	77.95	77.9	1.52	0.45	79.18
							20.5191	0.4																										
Division St	CBMH-277	CBMH-278	3094	3096	CON	51.0	20.90	0.36	66.78	0.000	0.450	0.000	0.684	723.5	0.76%	825	1245.5	2.33	58.1%	77.79	77.40		79.50	0.89	SHALLOW	OK	OK	825	51	77.785	77.397	0	0.45	79.50241
Division St	CBMH-278	STMH-715	3096	3097	CON	7.0	21.26	0.14	66.12	0.360	0.450	0.162	0.846	752.0	0.07%	1050	726.6	0.84	103.5%	77.19	77.18	0.21	79.49	1.25	SHALLOW	OK	TOO SMALL	1050	7	77.189	77.184	0.36	0.45	79.49
Division St	STMH-715	CBMH-279	3097	3095	CON	10.0	21.40	0.08	65.88	0.000	0.450	0.000	0.846	751.4	0.40%	1050	1719.4	1.99	43.7%	77.14	77.10	0.04	79.71	1.52	OK	OK	OK	1050	10	77.14	77.1	0	0.45	79.705
Division St	CBMH-279	STMH-378	3095	1116	CON	66.0	21.49	0.76	65.73	0.260	0.450	0.117	0.963	772.5	0.21%	1050	1252.1	1.45	61.7%	77.10	76.96	0.00	79.78	1.63	OK	OK	OK	1050	66	77.1	76.96	0.26	0.45	79.78
Division St	STMH-378	STMH-521	1116	1113	CON	116.3	24.15	0.49	61.37	1.180	0.450	0.531	20.655	4120.7	1.11%	1350	5615.4	3.92	73.4%	76.73	75.43	0.17	79.84	1.76	OK	OK	OK	1350	116.33	76.727	75.43	1.18	0.45	79.84
Division St	STMH-521	STMH-353	1113	1110	HECP	61.5	24.64	0.31	60.63	0.930	0.450	0.419	21.074	4148.4	0.77%	1095x1730	4746.7	3.27	87.4%	75.36	74.89	0.07	77.82	1.37	SHALLOW	OK	MARGINAL	1095x1730	61.5	75.361	74.89	0.93	0.45	77.825
Division St	STMH-353	STMH-355	1110	802	HECP	35.5	24.95	0.19	60.16	0.650	0.450	0.293	21.366	4170.1	0.66%	1095x1731	4413.0	3.04	94.5%	74.88	74.64	0.02	77.09	1.12	SHALLOW	OK	MARGINAL	1095x1731	35.5	74.875	74.64	0.65	0.45	77.0925
Division St	STMH-355	STMH-345	802	2945	HECP	48.6	25.15	0.40	59.88	0.680	0.450	0.306	21.672	4204.1	0.30%	1095x1732	2962.7	2.04	141.9%	74.64	74.50	0.00	76.75	1.02	SHALLOW	OK	TOO SMALL	1095x1732	48.6	74.64	74.495	0.68	0.45	76.75
Division St	STMH-345	Outlet-9	2945	Outlet-9	CON	16.0	25.55	0.07	59.31	0.000	0.450	0.000	21.672	4169.6	1.12%	1200	4118.7	3.64	101.2%	74.58	74.40	-0.08	76.45	0.67	SHALLOW	OK	TOO SMALL	1200	16	74.58	74.4	0	0.45	76.4475

Total Area = 46.51 ha

Half of the outlet flow from Outlet-94 continues south to Outlet-36. This value was added to all pipes downstream: 596.5 L/s

Walton street drawings indicate many changes in diameters going from larger pipes to smaller pipes. It is recommended that the area be surveyed to ensure accuracy, and if true, smaller pipes be upgraded.

There are manholes with higher incoming inverts than outgoing inverts. This does not allow water to flow properly downstream and should be surveyed to ensure accuracy, and if true, should be fixed.

Cobourg Harbour Infrastructure Repairs
 Contract No. CO-22-22 CSD Addendum No. 2

Pipes 85-99% Capacity	STORM SEWER DESIGN SHEET - 5 YEAR STORM Project: Cobourg Storm Sewer Analysis Date: 2022 Outlet: 94 Yarnell (Current Standard) Manning's Coefficient: 0.0130
Pipes 100-149% Overcapacity	
Pipes >150% Overcapacity	
Existence is Doubtful	
Assumed	
Values Entered in Lookup Tables	

LOCATION			GIS INFORMATION			Length (m)	TIME (MIN)		Rainfall Intensity (mm/hr)	Area (Ha)	C	AC	Cumul AC	Runoff Q (L/s)	Grade	Pipe Diameter (mm)	Capacity (L/s)	Full Flow Velocity (m/s)	% Full	Invert Elevations		U/S T/G	U/S Cover (m)	COVER OK?	VELOCITY OK?	SIZE OK?	Pipe Diameter (mm)	Length (m)	Invert Elevations		AREA (ha)	C	U/S T/G	
Street	From MH	To MH	Pipe ID	Downstream Pipe ID	Material		To Upper End	In Reach												Upper Inv.	Lower Inv.								Drop in Upper MH					
Division St	CBMH-273	CBMH-274	1743	861	CON	111.0	15.00	1.03	79.48	0.940	0.450	0.423	0.423	93.5	1.77%	300	127.4	1.80	73.4%	85.75	83.79		87.25	1.20	SHALLOW	OK	OK	300	111	85.75	83.79	0.94	0.45	87.2475
Division St	CBMH-274	STMH-510	861	1059	CON	9.0	16.03	0.07	76.94	0.860	0.450	0.387	0.810	173.2	2.00%	375	246.0	2.23	70.4%	83.58	83.40	0.21	84.89	0.93	SHALLOW	OK	OK	375	9	83.58	83.4	0.86	0.45	84.88833
University Ave	CBMH-411	CBMH-410	853	855	CON	72.2	15.00	0.60	79.48	0.690	0.450	0.311	0.311	68.6	2.20%	300	142.3	2.01	48.2%	88.13	86.54		89.44	1.01	SHALLOW	OK	OK	300	72.2	88.13	86.54	0.69	0.45	89.44
University Ave	CBMH-410	CBMH-409	855	856	CON	74.5	15.60	0.55	77.98	0.520	0.450	0.234	0.545	118.0	2.72%	300	158.3	2.24	74.6%	86.54	84.51	0.00	87.86	1.02	SHALLOW	OK	OK	300	74.5	86.54	84.51	0.52	0.45	87.865
University Ave	CBMH-409	STMH-502	856	857	CON	9.0	16.15	0.06	76.63	0.850	0.450	0.383	0.927	197.5	3.67%	300	183.6	2.60	107.6%	84.53	84.20	-0.02	85.78	0.95	SHALLOW	OK	TOO SMALL	300	9	84.53	84.2	0.85	0.45	85.775
John St	STMH-84	STMH-502	1958	857	CON	108.7	15.00	0.72	79.48	1.610	0.450	0.725	0.725	160.1	3.40%	300	176.9	2.50	90.5%	88.13	84.43		89.85	1.42	OK	OK	MARGINAL	300	108.7	88.13	84.43	1.61	0.45	89.85
University Ave	STMH-502	CBMH-408	857	859	CON	54.0	16.21	0.86	76.50	0.000	0.450	0.000	1.652	351.2	0.34%	450	166.1	1.04	211.4%	83.80	83.61	0.40	85.78	1.53	OK	OK	TOO SMALL	450	54	83.8	83.614	0	0.45	85.7825
University Ave	CBMH-408	CBMH-407	859	860	CON	53.0	17.07	0.74	74.50	0.230	0.450	0.104	1.755	363.5	0.37%	525	259.8	1.20	139.9%	83.60	83.41	0.01	85.12	0.99	SHALLOW	OK	TOO SMALL	525	53	83.604	83.408	0.23	0.45	85.12334
University Ave	CBMH-407	STMH-510	860	1059	CON	9.0	17.81	0.05	72.88	0.370	0.450	0.167	1.922	389.3	2.10%	525	619.0	2.86	62.9%	83.41	83.22	0.00	84.09	0.16	SHALLOW	OK	OK	525	9	83.408	83.219	0.37	0.45	84.09
Division St	STMH-510	CBMH-275	1059	2986	CON	83.0	17.86	0.60	72.77	0.000	0.450	0.000	2.732	552.6	1.35%	525	496.2	2.29	111.4%	83.24	82.12	0.16	85.07	1.30	SHALLOW	OK	TOO SMALL	525	83	83.24	82.12	0	0.45	85.07
Division St	CBMH-275	CBMH-276	2986	2988	CON	100.0	18.46	0.75	71.49	0.610	0.450	0.275	3.006	597.5	1.28%	525	483.3	2.23	123.6%	82.02	80.74	0.10	83.78	1.23	SHALLOW	OK	TOO SMALL	525	100	82.02	80.74	0.61	0.45	83.775
Division St	CBMH-276	STMH-512	2988	572	CON	13.0	19.21	0.12	69.98	0.870	0.450	0.392	3.398	661.0	0.75%	600	529.8	1.87	124.8%	80.68	80.58	0.06	82.57	1.29	SHALLOW	OK	TOO SMALL	600	13	80.68	80.582	0.87	0.45	82.575
Division St	STMH-512	CBMH-29	572	574	CON	80.0	19.33	0.73	69.75	0.160	0.450	0.072	3.470	672.8	0.71%	600	515.0	1.82	130.6%	80.35	79.78	0.23	82.30	1.35	SHALLOW	OK	TOO SMALL	600	80	80.35	79.78	0.16	0.45	82.2975
Division St	CBMH-29	STMH-513	574	905	CON	57.0	20.06	0.46	68.33	0.990	0.450	0.446	3.915	743.7	0.91%	600	582.8	2.06	127.6%	79.72	79.20	0.06	81.61	1.29	SHALLOW	OK	TOO SMALL	600	57	79.72	79.2	0.99	0.45	81.605
John St	STMH-503	STMH-501	1124	1123	CON	83.6	15.00	0.62	79.48	0.000	0.450	0.000	0.000	0.0	2.72%	300	158.1	2.24	0.0%	83.34	81.07		85.36	1.72	OK	OK	OK	300	83.6	83.34	81.065	0	0.45	85.365
John St	STMH-501	STMH-511	1123	1127	CON	96.0	15.62	1.62	77.92	1.430	0.450	0.644	0.644	139.4	0.39%	375	109.2	0.99	127.7%	81.00	80.62	0.07	82.72	1.35	SHALLOW	OK	TOO SMALL	375	96	80.998	80.62	1.43	0.45	82.72
John St	STMH-511	CB-1582	1127	909		69.4	17.24	0.65	74.12	0.630	0.450	0.284	0.927	191.0	1.28%	375	197.0	1.78	97.0%	80.62	79.73	0.00	82.01	1.01	SHALLOW	OK	MARGINAL	375	69.39323	NULL	NULL	0.63	0.45	82.0075
John St	CB-1582	CBMH-434	909	908		48.9	17.89	0.46	72.71	0.000	0.450	0.000	0.927	187.4	1.26%	375	195.2	1.77	96.0%	79.73	79.11	0.00	81.36	1.25	SHALLOW	OK	MARGINAL	375	48.91167	NULL	NULL	0	0.45	81.355
John St	CBMH-434	CBMH-435	908	907		14.5	18.35	0.22	71.73	0.240	0.450	0.108	1.035	206.4	0.26%	600	308.5	1.09	66.9%	79.11	79.08	0.00	80.90	1.19	SHALLOW	OK	OK	600	14.47175	79.114	79.077	0.24	0.45	80.905
Chapel St	CBMH-435	CBMH-308	907	764		9.9	18.57	0.13	71.27	0.190	0.450	0.086	1.121	222.0	0.34%	600	356.9	1.26	62.2%	79.05	79.02	0.02	80.94	1.29	SHALLOW	OK	OK	600	9.936452	79.054	79.02	0.19	0.45	80.94
Chapel St	CBMH-432	CBMH-433	902	904	CON	58.0	15.00	1.15	79.48	0.410	0.450	0.185	0.185	40.8	0.38%	300	59.3	0.84	68.7%	79.64	79.42		81.00	1.06	SHALLOW	OK	OK	300	58	79.639	79.417	0.41	0.45	80.995
Chapel St	CBMH-433	CBMH-308	904	764	CON	39.0	16.15	0.76	76.64	0.450	0.450	0.203	0.387	82.4	0.29%	375	94.0	0.85	87.7%	79.37	79.26	0.05	80.72	0.98	SHALLOW	OK	MARGINAL	375	39	79.371	79.257	0.45	0.45	80.72334
Chapel St	CBMH-308	CBMH-28	764	906	CON	96.0	18.70	1.14	71.00	0.430	0.450	0.194	1.701	335.7	0.36%	675	503.8	1.41	66.6%	78.95	78.61	0.07	80.86	1.23	SHALLOW	OK	OK	675	96	78.954	78.605	0.43	0.45	80.855
Chapel St	CBMH-28	STMH-513	906	905	CON	10.0	19.84	0.11	68.75	0.460	0.450	0.207	1.908	364.7	0.41%	675	535.1	1.50	68.2%	78.60	78.56	0.01	81.13	1.86	OK	OK	OK	675	10	78.597	78.556	0.46	0.45	81.13

Cobourg Harbour Infrastructure Repairs
 Contract No. CO-22-22 CSD Addendum No. 2

LOCATION			GIS INFORMATION			Length (m)	TIME (MIN)		Rainfall Intensity (mm/hr)	Area (Ha)	C	AC	Cumul AC	Runoff Q (L/s)	Grade	Pipe Diameter (mm)	Capacity (L/s)	Full Flow Velocity (m/s)	% Full	Invert Elevations		Drop In Upper MH	U/S T/G	U/S Cover (m)	COVER OK?	VELOCITY OK?	SIZE OK?
Street	From MH	To MH	Pipe ID	Downstream Pipe ID	Material		To Upper End	In Reach												Upper Inv.	Lower Inv.						
Division St	STMH-513	CBMH-277	905	1119	CON	60.0	20.52	0.38	67.47	0.150	0.450	0.068	5.891	1104.9	1.10%	750	1163.8	2.63	94.9%	78.52	77.86	0.68	80.96	1.69	OK	OK	MARGINAL
Covert St	CBMH-277	Outlet-94	1119	Outlet-94	CON	86.0	20.90	0.96	66.78	0.670	0.800	0.536	6.427	596.5	0.31%	825	795.6	1.49	75.0%	77.79	77.52	0.07	79.50	0.89	SHALLOW	OK	OK

Total Area = 12.82 ha

Half of the outlet flow from Outlet-94 continues south to Outlet-36. The flow leaving CBMH-277 was divided by 2 to account for this.

Pipe Diameter (mm)	Length (m)	Invert Elevations		AREA (ha)	C	U/S T/G
		UPPER INV.	LOWER INV.			
750	60	78.52	77.857	0.15	0.45	80.965
825	86	77.785	77.518	0.67	0.8	79.50241