

TABLE M1: Detailed Cost Estimates for Recommended Storm Sewer Upgrades to meet a 5-Year Capacity

Ward Area	Network	Pipe Number	Pipe ID	Description	Upgrade	Length (m)	Sewer Type	Geometry 1 (m)	Geometry 2 (m)	Unit Price per metre (2010 prices)	Total Estimated Cost
1	CC01	1	PWOPRSES0006911	375 to a 450	1UP	14.2	CIRCULAR	0.45	0	\$79.10	\$3,000
1	CC02	1	PWOPRSES0007165	675 TO A 750	1UP	14.5	CIRCULAR	0.75	0	\$250.50	\$11,000
1	CC02	2	PWOPRSES0007187	675 TO A 750	1UP	35	CIRCULAR	0.75	0	\$250.50	\$26,000
1	CC02	3	PWOPRSES0007198	375 TO A 450	1UP	70.4	CIRCULAR	0.45	0	\$79.10	\$17,000
1	CC02	NA	ALL	ALL SEWER UPGRADES	NA	120	NA	NA	NA	NA	\$54,000
1	ER01	1	ExSTM01	825 TO A 900	1UP	5	CIRCULAR	0.9	0	\$348.50	\$5,000
1	ER01	2	PWOPRSES0004188	600 TO A 675	1UP	156.05	CIRCULAR	0.675	0	\$190.00	\$89,000
1	ER01	3	PWOPRSES0004227	825 TO A 900	1UP	84	CIRCULAR	0.9	0	\$348.50	\$88,000
1	ER01	4	PWOPRSES0004333	750 TO A 975, U/S INVERT DROPPED FROM 309.3	3UP	76.8	CIRCULAR	0.975	0	\$402.60	\$93,000
1	ER01	5	PWOPRSES0004334	750 TO A 975	3UP	15.24	CIRCULAR	0.975	0	\$402.60	\$18,000
1	ER01	6	PWOPRSES0004365	825 TO A 975, LOWER D/S INVERT TO INCREASE SLOPE	2UP	198.72	CIRCULAR	0.975	0	\$402.60	\$240,000
1	ER01	7	PWOPRSES0004366	750 TO A 975	3UP	34.59	CIRCULAR	0.975	0	\$402.60	\$42,000
1	ER01	NA	ALL	ALL SEWER UPGRADES	NA	570	NA	NA	NA	NA	\$575,000
1	HD02	1	Bennett1		DIVERSION	86.5	CIRCULAR	0.6	0	\$124.00	\$32,000
1	HD02	2	Bennett2	New pipe - eliminate second manhole on Stevenson	DIVERSION	16.2	CIRCULAR	0.75	0	\$250.50	\$12,000
1	HD02	3	DSTM1		DIVERSION	55.6	HORIZ ELLIPSE	1.35	2.11	\$1,261.30	\$210,000
1	HD02	4	DSTM2		DIVERSION	92.9	HORIZ ELLIPSE	1.35	2.11	\$1,261.30	\$352,000
1	HD02	5	DSTM3		DIVERSION	81.7	HORIZ ELLIPSE	1.35	2.11	\$1,261.30	\$309,000
1	HD02	6	DSTM4		DIVERSION	58.9	HORIZ ELLIPSE	1.35	2.11	\$1,261.30	\$223,000
1	HD02	7	Franchetto Inlet		DIVERSION	84.1	CIRCULAR	1.05	0	\$459.90	\$116,000
1	HD02	8	Franchetto Outlet	New pipe - outlet of proposed Franchetto SWM (300)	DIVERSION	10	CIRCULAR	0.3	0	\$62.10	\$2,000
1	HD02	9	Grange	Completely divert flows away from sewer on private property	DIVERSION	47	CIRCULAR	1.65	0	\$1,034.70	\$146,000
1	HD02	10	Lane	Eliminate sewer under private property and tie into proposed trunk	DIVERSION	63	CIRCULAR	1.2	0	\$576.60	\$109,000
1	HD02	11	Normandy	Siphon off high flows	DIVERSION	62.1	CIRCULAR	0.75	0	\$250.50	\$47,000
1	HD02	12	PWOPRSES0000647	525 TO A 675	2UP	49.1	CIRCULAR	0.675	0	\$190.00	\$28,000
1	HD02	13	PWOPRSES0000648	525 TO A 600	1UP	25.3	CIRCULAR	0.6	0	\$124.00	\$9,000
1	HD02	14	PWOPRSES0000652	675 TO A 750	1UP	67.52	CIRCULAR	0.75	0	\$250.50	\$51,000
1	HD02	15	PWOPRSES0000654	300 TO A 450	2UP	82.91	CIRCULAR	0.45	0	\$79.10	\$20,000
1	HD02	16	PWOPRSES0000655	300 TO A 375	1UP	16.16	CIRCULAR	0.375	0	\$76.70	\$4,000
1	HD02	17	PWOPRSES0000656	300 TO A 525	3UP	52.78	CIRCULAR	0.525	0	\$86.20	\$14,000
1	HD02	18	PWOPRSES0000657	675 TO A 1050	3UP	18.29	CIRCULAR	1.05	0	\$459.90	\$25,000
1	HD02	19	PWOPRSES0000658	675 TO A 900	3UP	51.82	CIRCULAR	0.9	0	\$348.50	\$54,000
1	HD02	20	PWOPRSES0000805	450 TO A 600	2UP	73.15	CIRCULAR	0.6	0	\$124.00	\$27,000
1	HD02	21	PWOPRSES0000807	750 to a 1050 EQUIVALENT	3UP	8.99	HORIZ ELLIPSE	0.855	1.345	\$575.40	\$16,000
1	HD02	22	PWOPRSES0000809		DIVERSION	60.35	HORIZ ELLIPSE	0.855	1.345	\$575.40	\$104,000
1	HD02	23	PWOPRSES0000815	1050 TO A 1350	2UP	14.1	CIRCULAR	1.35	0	\$705.80	\$30,000
1	HD02	24	PWOPRSES0000816	1050 TO A 1350	2UP	50.6	CIRCULAR	1.35	0	\$705.80	\$107,000
1	HD02	25	PWOPRSES0000818	300 to a 525	3UP	5.49	CIRCULAR	0.525	0	\$86.20	\$1,000
1	HD02	26	PWOPRSES0000820	250 TO A 300, RAISE D/S INVERT	1UP	79.86	CIRCULAR	0.3	0	\$62.10	\$15,000
1	HD02	27	PWOPRSES0000822	300 TO A 375	1UP	60.35	CIRCULAR	0.375	0	\$76.70	\$14,000
1	HD02	28	PWOPRSES0000828	600 TO A 675	1UP	33	CIRCULAR	0.675	0	\$190.00	\$19,000
1	HD02	29	PWOPRSES0000834	525 TO A 600	1UP	77.57	CIRCULAR	0.6	0	\$124.00	\$29,000
1	HD02	30	PWOPRSES0000957	450 TO A 525	1UP	60.96	CIRCULAR	0.525	0	\$86.20	\$16,000
1	HD02	31	PWOPRSES0000959	375 TO A 450	1UP	76.2	CIRCULAR	0.45	0	\$79.10	\$18,000
1	HD02	32	PWOPRSES0000961	450 TO A 525	1UP	75.75	CIRCULAR	0.525	0	\$86.20	\$20,000
1	HD02	33	PWOPRSES0000980	600 TO A 750	2UP	57.91	CIRCULAR	0.75	0	\$250.50	\$44,000
1	HD02	34	PWOPRSES0000983	375 TO A 750	3UP	61.57	CIRCULAR	0.75	0	\$250.50	\$46,000
1	HD02	35	PWOPRSES0001025	300 TO A 375, CONNECT IN TO MH 691 INSTEAD OF 690	1UP	55.72	CIRCULAR	0.375	0	\$76.70	\$13,000
1	HD02	36	PWOPRSES0002497	375 TO A 450	1UP	105.25	CIRCULAR	0.45	0	\$79.10	\$25,000
1	HD02	37	PWOPRSES0003332	525 TO A 600, LOWER D/S INVERT	1UP	94.95	CIRCULAR	0.6	0	\$124.00	\$35,000
1	HD02	38	PWOPRSES0003334		3UP	39.2	CIRCULAR	0.525	0	\$86.20	\$10,000
1	HD02	39	PWOPRSES0003335	525 to a 600, connect in to different MH (one directly U/S of trunk)	1UP	59.13	CIRCULAR	0.6	0	\$124.00	\$22,000
1	HD02	40	PWOPRSES0003338	300 TO A 525	3UP	74.67	CIRCULAR	0.525	0	\$86.20	\$19,000
1	HD02	41	PWOPRSES0003713	450 TO A 825, lower inverts	3UP	92.35	CIRCULAR	0.825	0	\$290.60	\$81,000
1	HD02	42	PWOPRSES0003839	375 TO A 525, raise d/s invert	2UP	93.72	CIRCULAR	0.525	0	\$86.20	\$24,000
1	HD02	43	PWOPRSES0003842	975 TO A 1800 - eliminate second MH on Stevenson	3UP	93.26	HORIZ ELLIPSE	1.48	2.31	\$1,513.20	\$423,000
1	HD02	44	PWOPRSES0003852A	450 to a 600, adjust inverts	2UP	26	CIRCULAR	0.6	0	\$124.00	\$10,000
1	HD02	45	PWOPRSES0003854	300 TO A 450, adjust inverts	2UP	58.82	CIRCULAR	0.45	0	\$79.10	\$14,000
1	HD02	46	PWOPRSES0003855	450 TO A 525, adjust inverts	1UP	68.42	CIRCULAR	0.525	0	\$86.20	\$18,000
1	HD02	47	PWOPRSES0003859	300 TO A 750, adjust d/s invert	3UP	61.7	CIRCULAR	0.75	0	\$250.50	\$46,000
1	HD02	48	PWOPRSES0003860	300 TO A 375, LOWER D/S INVERT	1UP	7.52	CIRCULAR	0.375	0	\$76.70	\$2,000
1	HD02	49	PWOPRSES0003861	300 TO A 375	1UP	56.5	CIRCULAR	0.375	0	\$76.70	\$13,000
1	HD02	50	PWOPRSES0003865		DIVERSION	61.56	HORIZ ELLIPSE	1.35	2.11	\$1,261.30	\$233,000
1	HD02	51	PWOPRSES0003866		DIVERSION	61.11	HORIZ ELLIPSE	1.48	2.31	\$1,513.20	\$277,000
1	HD02	52	PWOPRSES0003868	975 TO A 1800, adjust inverts	3UP	90.52	HORIZ ELLIPSE	1.48	2.31	\$1,513.20	\$411,000
1	HD02	53	PWOPRSES0003871	300 TO A 375, adjust inverts	1UP	50.29	CIRCULAR	0.375	0	\$76.70	\$12,000
1	HD02	54	PWOPRSES0003872	300 TO A 375, adjust inverts	1UP	61.56	CIRCULAR	0.375	0	\$76.70	\$14,000
1	HD02	55	PWOPRSES0003884	300 TO A 675	3UP	59.43	CIRCULAR	0.675	0	\$190.00	\$34,000
1	HD02	56	PWOPRSES0003911	300 TO A 450, raise U/S and D/S inverts	2UP	90.83	CIRCULAR	0.45	0	\$79.10	\$22,000
1	HD02	57	PWOPRSES0003914	525 TO A 1050	3UP	102.41	CIRCULAR	1.05	0	\$459.90	\$141,000
1	HD02	58	PWOPRSES0003917	300 TO 375. Raise D/S invert. Surcharge due to backwater from trunk	1UP	55.77	CIRCULAR	0.375	0	\$76.70	\$13,000
1	HD02	59	PWOPRSES0003922	525 TO A 675	2UP	66.29	CIRCULAR	0.675	0	\$190.00	\$38,000
1	HD02	60	PWOPRSES0003924	525 TO A 900	3UP	62.48	CIRCULAR	0.9	0	\$348.50	\$65,000
1	HD02	61	PWOPRSES0003926	600 TO A 900	3UP	61.26	CIRCULAR	0.9	0	\$348.50	\$64,000
1	HD02	62	PWOPRSES0003928	600 TO A 900, lower inverts	3UP	66.75	CIRCULAR	0.9	0	\$348.50	\$70,000
1	HD02	63	PWOPRSES0003929	750 to a 1350	3UP	51.51	CIRCULAR	1.35	0	\$705.80	\$109,000
1	HD02	64	PWOPRSES0003930	750 to a 1350	3UP	54.86	CIRCULAR	1.35	0	\$705.80	\$116,000
1	HD02	65	PWOPRSES0003937		DIVERSION	48.61	CIRCULAR	1.35	0	\$705.80	\$103,000
1	HD02	66	PWOPRSES0003948	375 to a 1050. LOWER D/S INVERT	DIVERSION	64	CIRCULAR	1.05	0	\$459.90	\$88,000
1	HD02	67	PWOPRSES0003961	600 TO A 825	3UP	91.44	CIRCULAR	0.825	0	\$290.60	\$80,000
1	HD02	68	PWOPRSES0003962	375 to a 600	3UP	92.5	CIRCULAR	0.6	0	\$124.00	\$34,000
1	HD02	69	PWOPRSES0003964	375 to a 450, raise d/s invert	1UP	53.03	CIRCULAR	0.45	0	\$79.10	\$13,000
1	HD02	70	PWOPRSES0003966	600 TO A 825	3UP	59.13	CIRCULAR	0.825	0	\$290.60	\$52,000
1	HD02	71	PWOPRSES0003971	375 to a 975, lower u/s invert	DIVERSION	68.18	CIRCULAR	0.975	0	\$402.60	\$82,000
1	HD02	72	PWOPRSES0004019	Replace 1500 with 1800 HE equivalent	3UP	21.42	HORIZ ELLIPSE	1.48	2.31	\$1,513.20	\$97,000

TABLE M3: Detailed Cost Estimates for Recommended Storm Sewer Upgrades to meet a 10-Year Capacity (Climate Change Sensitivity Analysis)

Network	Pipe Number	Pipe ID	Description	Upgrade	Length (m)	Sewer Type	Geometry 1 (m)	Geometry 2 (m)	Unit Price per metre (2010 prices)	Total Estimated Cost
LS12	1	PWOPRSE0001449	525 to a 600	1UP	8.5	CIRCULAR	0.6	0	\$124.00	\$3,000
LS12	2	PWOPRSE0001450	525 to a 600	1UP	28	CIRCULAR	0.6	0	\$124.00	\$10,000
LS12	3	PWOPRSE0005480	300 to a 375	1UP	68.4	CIRCULAR	0.375	0	\$76.70	\$16,000
LS12	4	PWOPRSE0005481	900 to a 975	1UP	95.2	CIRCULAR	0.975	0	\$402.60	\$115,000
LS12	5	PWOPRSE0005483	1050 to a 1200	1UP	45	CIRCULAR	1.2	0	\$576.60	\$78,000
LS12	6	PWOPRSE0005491	600 to a 675	1UP	76.8	CIRCULAR	0.675	0	\$190.00	\$44,000
LS12	7	PWOPRSE0005492	675 to a 825	2UP	12.1	CIRCULAR	0.825	0	\$290.60	\$11,000
LS12	8	PWOPRSE0005493	825 to a 900	1UP	80	CIRCULAR	0.9	0	\$348.50	\$84,000
LS12	9	PWOPRSE0005495	675 to a 825	2UP	93	CIRCULAR	0.825	0	\$290.60	\$81,000
LS12	10	PWOPRSE0005508	525 to a 600	1UP	32.9	CIRCULAR	0.6	0	\$124.00	\$12,000
LS12	11	PWOPRSE0005509	525 to a 600	1UP	32.9	CIRCULAR	0.6	0	\$124.00	\$12,000
LS12	12	PWOPRSE0005510	525 to a 600	1UP	33	CIRCULAR	0.6	0	\$124.00	\$12,000
LS12	13	PWOPRSE0005511	525 to a 600	1UP	58.9	CIRCULAR	0.6	0	\$124.00	\$22,000
LS12	NA	ALL	ALL SEWER UPGRADES	NA	665	NA	NA	NA	NA	\$500,000
HD06	1	PWOPRSE0006155	600 TO A 675 to a 750	2UP	14	CIRCULAR	0.75	0	\$250.50	\$11,000
HD06	2	PWOPRSE0006157	600 to a 675 to a 750	2UP	89.8	CIRCULAR	0.75	0	\$250.50	\$67,000
HD06	3	PWOPRSE0006158	600 to a 675 to a 750	2UP	14.5	CIRCULAR	0.75	0	\$250.50	\$11,000
HD06	4	PWOPRSE0006159	600 to a 675 to a 750	2UP	27.6	CIRCULAR	0.75	0	\$250.50	\$21,000
HD06	5	PWOPRSE0006160	600 TO A 675 to a 750	2UP	76.5	CIRCULAR	0.75	0	\$250.50	\$57,000
HD06	6	PWOPRSE0006161	675 TO A 825 to a 975	3UP	74.5	CIRCULAR	0.975	0	\$402.60	\$90,000
HD06	7	PWOPRSE0006162	675 to a 825 to a 975 and slope modification	3UP	6.45	CIRCULAR	0.975	0	\$402.60	\$8,000
HD06	8	PWOPRSE0006163	300 TO A 375 to a 450	2UP	33	CIRCULAR	0.45	0	\$79.10	\$8,000
HD06	9	PWOPRSE0006164	300 TO A 375 to a 525	3UP	7	CIRCULAR	0.525	0	\$86.20	\$2,000
HD06	10	PWOPRSE0006165	750 TO A 825 to a 975	3UP	73.5	CIRCULAR	0.975	0	\$402.60	\$89,000
HD06	11	PWOPRSE0006166	750 TO A 825 to a 975	3UP	92.4	CIRCULAR	0.975	0	\$402.60	\$112,000
HD06	12	PWOPRSE0006167	975 TO A 1200 to a 1350 equivalent	3UP	42.9	HORIZ ELLIPSE	1.09	1.725	\$893.30	\$115,000
HD06	13	PWOPRSE0006168	675 TO A 750 to a 900	3UP	18	CIRCULAR	0.9	0	\$348.50	\$19,000
HD06	14	PWOPRSE0006170	450 TO A 525 to a 600	2UP	86.4	CIRCULAR	0.6	0	\$124.00	\$32,000
HD06	15	PWOPRSE0006171	450 TO A 600	2UP	17.9	CIRCULAR	0.6	0	\$124.00	\$7,000
HD06	16	PWOPRSE0006172	675 TO A 750 to a 900	3UP	48.6	CIRCULAR	0.9	0	\$348.50	\$51,000
HD06	17	PWOPRSE0006173	600 to a 675 to a 750	2UP	54	CIRCULAR	0.75	0	\$250.50	\$48,000
HD06	18	PWOPRSE0006188	975 TO A 1200 to a 1350 equivalent	3UP	50.2	HORIZ ELLIPSE	1.09	1.725	\$893.30	\$135,000
HD06	19	PWOPRSE0006189	1050 TO A 1200 to a 1350 equivalent	2UP	22	HORIZ ELLIPSE	1.09	1.725	\$893.30	\$59,000
HD06	20	PWOPRSE0006190	1050 TO A 1200 to a 1350 equivalent	2UP	62.2	HORIZ ELLIPSE	1.09	1.725	\$893.30	\$167,000
HD06	21	PWOPRSE0006206	600 TO A 675 to a 750	2UP	33.5	CIRCULAR	0.75	0	\$250.50	\$25,000
HD06	22	PWOPRSE0006637	375 TO A 450 to a 525	2UP	49.49	CIRCULAR	0.525	0	\$86.20	\$13,000
HD06	23	PWOPRSE0006638	600 TO A 675 to a 750	2UP	44.02	CIRCULAR	0.75	0	\$250.50	\$33,000
HD06	24	PWOPRSE0007147	1200 to a 1350	1UP	40.17	CIRCULAR	1.35	0	\$705.80	\$85,000
HD06	25	PWOPRSE0007152	375 TO A 450 to a 600	3UP	81.9	CIRCULAR	0.6	0	\$124.00	\$30,000
HD06	26	PWOPRSE0007153	375 TO A 450 to a 600	3UP	11.7	CIRCULAR	0.6	0	\$124.00	\$4,000
HD06	27	PWOPRSE0007154	1050 TO A 1200 to a 1350	2UP	14.5	CIRCULAR	1.35	0	\$705.80	\$31,000
HD06	NA	ALL	ALL SEWER UPGRADES	NA	1,197	NA	NA	NA	NA	\$1,330,000
US08		Avondale1	250 TO A 300 to a 375	2UP	66.9	CIRCULAR	0.375	0	\$76.70	\$15,000
US08		ExhibitionDiversio1	750 TO A 900	DIVERSION	74	CIRCULAR	0.9	0	\$348.50	\$77,000
US08		ExhibitionDiversio2	750 TO A 900	DIVERSION	70	CIRCULAR	0.9	0	\$348.50	\$73,000
US08		ExhibitionDiversio3	750 TO 900	DIVERSION	91	CIRCULAR	0.9	0	\$348.50	\$95,000
US08		ExhibitionDiversio4	750 TO 900	DIVERSION	86	CIRCULAR	0.9	0	\$348.50	\$90,000
US08		ExhibitionDiversio5	900 to a 1050 equivalent	2UP	67	HORIZ ELLIPSE	0.865	1.345	\$575.40	\$116,000
US08		Kathleen	New diversion required to convey 10-year	DIVERSION	86.6	CIRCULAR	0.525	0	\$86.20	\$22,000
US08		PWOPRSE0000341	375 TO A 450	1UP	59.98	CIRCULAR	0.45	0	\$79.10	\$14,000
US08		PWOPRSE0000368	Still a 300, but would have to be regraded to connect to diversion	DIVERSION	20.5	CIRCULAR	0.3	0	\$62.10	\$4,000
US08		PWOPRSE0000697	675 TO A 825	DIVERSION	60.3	CIRCULAR	0.825	0	\$290.60	\$53,000
US08		PWOPRSE0000739	1200 to a 1500	3UP	118.4	CIRCULAR	1.5	0	\$863.00	\$307,000
US08		PWOPRSE0000744	1200 CSP TO 1500	3UP	126	CIRCULAR	1.5	0	\$863.00	\$326,000
US08		PWOPRSE0000748	Increase 825 to a 1500	DIVERSION	133.7	CIRCULAR	1.5	0	\$863.00	\$346,000
US08		PWOPRSE0000751	Replace 1050 CSP with concrete, raise D/S invert, upgrade 1050 to a box	3UP	155.45	RECT CLOSED	1.5	3	\$2,907.90	\$1,356,000
US08		PWOPRSE0000752	Replace 1050 CSP with concrete, raise U/S invert, upgrade 1050 to a box	3UP	104.09	RECT CLOSED	1.5	3	\$2,907.90	\$908,000
US08		PWOPRSE0001036	300 TO A 375	1UP	59.74	CIRCULAR	0.375	0	\$76.70	\$14,000
US08		PWOPRSE0001037	300 TO A 525	3UP	74.53	CIRCULAR	0.525	0	\$86.20	\$19,000
US08		PWOPRSE0001038	300 TO A 375 to a 450 and lower inverts	2UP	58.83	CIRCULAR	0.45	0	\$79.10	\$14,000
US08		PWOPRSE0001039	300 TO A 375 to 450, lower inverts	2UP	59.62	CIRCULAR	0.45	0	\$79.10	\$14,000
US08		PWOPRSE0001041	300 TO A 375	1UP	43.74	CIRCULAR	0.375	0	\$76.70	\$10,000
US08		PWOPRSE0001058	800 TO A 825	3UP	84.22	CIRCULAR	0.825	0	\$290.60	\$73,000
US08		PWOPRSE0001059	825 to a 900 and increase slope	1UP	113.6	CIRCULAR	0.9	0	\$348.50	\$119,000
US08		PWOPRSE0001061	675 TO A 1050 EQUIVALENT, RAISE U/S INVERT TO A 1350 EQUIVALENT	3UP	26.22	HORIZ ELLIPSE	1.09	1.725	\$893.30	\$70,000
US08		PWOPRSE0001065	975 to a 1050 equivalent	1UP	94.7	HORIZ ELLIPSE	0.865	1.345	\$575.40	\$163,000
US08		PWOPRSE0001067	300 TO A 525 to a 750	3UP	65.15	CIRCULAR	0.75	0	\$250.50	\$49,000
US08		PWOPRSE0001068	300 TO A 450 to a 600	3UP	68.4	CIRCULAR	0.6	0	\$124.00	\$25,000
US08		PWOPRSE0001069	300 TO A 375 to a 450, lower d/s invert	2UP	63.86	CIRCULAR	0.45	0	\$79.10	\$15,000
US08		PWOPRSE0001070	300 to a 375	1UP	67.6	CIRCULAR	0.375	0	\$76.70	\$16,000
US08		PWOPRSE0001078	600 TO A 1050 EQUIVALENT, RAISE D/S INVERT TO A 1200 EQUIVALENT	3UP	67.21	HORIZ ELLIPSE	0.965	1.525	\$707.10	\$143,000
US08		PWOPRSE0001082	300 to a 375	1UP	46.7	CIRCULAR	0.375	0	\$76.70	\$11,000
US08		PWOPRSE0001085	300 to a 375	1UP	33.53	CIRCULAR	0.375	0	\$76.70	\$8,000
US08		PWOPRSE0001145	450 TO A 900 EQUIVALENT, LOWER D/S INVERT TO A 1050 EQUIVALENT	3UP	104.09	HORIZ ELLIPSE	0.865	1.345	\$575.40	\$180,000
US08		PWOPRSE0001146	600 TO A 900 EQUIVALENT, LOWER U/S INVERT TO A 1200 EQUIVALENT	3UP	80.5	HORIZ ELLIPSE	0.965	1.525	\$707.10	\$171,000
US08		StAndrews		DIVERSION	82.1	CIRCULAR	0.525	0	\$86.20	\$21,000
US08	NA	ALL	ALL SEWER UPGRADES	NA	2,614	NA	NA	NA	NA	\$4,937,000

TABLE M2: Estimated Costs for Downspout Disconnection for Identified Sewershed Networks

NETWORK	SUB-CATCHMENT	DRAINAGE AREA (Ha)	DOWNSPOUT MAPPING	ESTIMATED NUMBER OF UNITS
HD02	1	0.81	All yellow	8
HD02	2	1.14	All yellow	11
HD02	3	0.75	All yellow	8
HD02	4	0.58	All yellow	6
HD02	5	3.10	Assumed yellow	31
HD02	6	5.15	Half green, half red	52
HD02	8	0.77	All red	8
HD02	9	3.75	All red	38
HD02	10	0.81	All yellow	8
HD02	11	2.41	All red	24
HD02	12	0.51	All yellow	5
HD02	13	2.86	All red	29
HD02	14	11.86	Assumed red	119
HD02	15	0.98	All red	10
HD02	16	3.25	All red	33
HD02	17	1.31	All red	13
HD02	18	3.20	All red	32
HD02	19	1.12	All red	11
HD02	20	2.55	All red	26
HD02	21	1.09	All red	11
HD02	22	1.10	Assumed red	11
HD02	23	4.75	All yellow	48
HD02	24	2.56	All red	26
HD02	25	2.64	All red	26
HD02	26	1.23	Assumed yellow	12
HD02	27	0.73	All yellow	7
HD02	28	1.16	All yellow	12
HD02	29	7.41	All red	74
HD02	30	1.86	Half red, half yellow	19
HD02	31	1.46	All yellow	15
HD02	36	4.71	Assumed yellow	47
HD02	37	1.22	All red	12
HD02	41	2.53	Half red Half green	25
HD02	42	2.17	All red	22
HD02	50	4.71	Half green, half yellow	47
HD02	65	4.57	Half green, Half yellow	46
HD02	66	1.50	Half green, Half yellow	15
HD02	68	2.16	All red	22
HD02	72	1.17	Half red, half green	12
HD02	73	3.41	All yellow	34
HD02	74	8.72	Assumed red	87
HD02	75	1.67	All red	17
HD02	78	1.68	Half red, half green	17
HD02	101	2.16	All red	22
HD02	TOTAL NUMBER OF UNITS			1,158
HD02	TOTAL ESTIMATED COST			\$116,000
LS05	4	3.85	Assumed blue	39
LS05	6	1.68	All red	17
LS05	7	2.02	All red	20
LS05	8	2.12	All red	21
LS05	9	2.46	All red	25
LS05	10	2.03	All yellow	20
LS05	13	3.27	All red	33
LS05	14	0.86	All red	9
LS05	15	4.89	All red	49
LS05	16	2.51	All red	25
LS05	19	2.31	Half green half red	23
LS05	20	2.33	Assumed red	23
LS05	22	0.94	All yellow	9
LS05	23	0.63	Half yellow half red	6
LS05	24	1.40	All yellow	14
LS05	25	0.38	All yellow	4
LS05	26	1.48	All yellow	15
LS05	27	1.43	All red	14

TABLE M2: Estimated Costs for Downspout Disconnection for Identified Sewershed Networks

NETWORK	SUB-CATCHMENT	DRAINAGE AREA (Ha)	DOWNSPOUT MAPPING	ESTIMATED NUMBER OF UNITS
LS05	28	2.00	All red	20
LS05	30	2.72	Assumed red	27
LS05	36	9.66	All yellow	97
LS05	52	0.91	All yellow	9
LS05	53	0.85	All yellow	9
LS05	54	1.33	All yellow	13
LS05	55	2.50	All yellow	25
LS05	65	3.14	All red	31
LS05	100	0.70	All blue	7
LS05	101	2.91	All yellow	29
LS05	102	0.73	All yellow	7
LS05	103	1.45	All yellow	15
LS05	104	1.57	All blue	16
LS05	106	2.07	All blue	21
LS05	108	7.79	All blue	78
LS05	142	1.48	All red	15
LS05	144	2.46	Assumed red	25
LS05	145	0.13	All red	1
LS05	146	1.08	All red	11
LS05	147	0.53	All red	5
LS05	148	1.98	All red	20
LS05	150	1.39	All red	14
LS05	151	0.92	All red	9
LS05	152	1.87	All red	19
LS05	153	0.80	All red	8
LS05	154	0.72	All red	7
LS05	155	4.29	All red	43
LS05	156	3.95	All red	40
LS05	157	0.52	All red	5
LS05	158	6.86	All red	69
LS05	159	0.45	All red	5
LS05	161	1.19	All red	12
LS05	162	0.95	All red	10
LS05	163	3.08	All red	31
LS05	164	4.87	All red	49
LS05	165	0.73	All red	7
LS05	166	3.28	All red	33
LS05	167	0.72	All red	7
LS05	170	0.75	All red	8
LS05	173	0.75	All red	8
LS05	174	1.82	All red	18
LS05	175	1.64	All red	16
LS05	176	0.77	All red	8
LS05	177	0.36	All red	4
LS05	178	1.04	All red	10
LS05	179	0.64	All red	6
LS05	181	0.34	All red	3
LS05	182	0.76	All red	8
LS05	183	3.14	All red	31
LS05	TOTAL NUMBER OF UNITS			1,335
LS05	TOTAL ESTIMATED COST			\$134,000
LS06	2	1.08	All red	11
LS06	3	2.10	All red	21
LS06	4	3.37	All red	34
LS06	5	0.52	All red	5
LS06	6	0.42	All red	4
LS06	7	2.48	All red	25
LS06	8	7.71	All red	77
LS06	9	1.17	All red	12
LS06	10	3.25	All red	33
LS06	11	0.82	All red	8
LS06	12	0.67	All red	7
LS06	13	1.22	All red	12
LS06	14	1.75	All red	18

TABLE M2: Estimated Costs for Downspout Disconnection for Identified Sewershed Networks

NETWORK	SUB-CATCHMENT	DRAINAGE AREA (Ha)	DOWNSPOUT MAPPING	ESTIMATED NUMBER OF UNITS
LS06	15	1.50	All red	15
LS06	16	1.70	All red	17
LS06	17	3.13	All red	31
LS06	18	3.10	All red	31
LS06	19	6.17	All red	62
LS06	20	2.31	All red	23
LS06	21	0.24	All red	2
LS06	22	0.67	All red	7
LS06	23	0.69	All red	7
LS06	24	0.93	All red	9
LS06	25	5.43	All red	54
LS06	26	2.73	All red	27
LS06	27	0.21	All red	2
LS06	28	1.00	All red	10
LS06	29	1.13	All red	11
LS06	30	2.25	All red	23
LS06	31	1.45	All red	15
LS06	32	2.55	All red	26
LS06	33	1.36	All red	14
LS06	34	1.18	All red	12
LS06	35	2.69	All red	27
LS06	36	0.52	All red	5
LS06	37	0.76	All red	8
LS06	38	0.60	All red	6
LS06	39	0.61	All red	6
LS06	40	0.41	All red	4
LS06	41	2.17	All red	22
LS06	42	2.01	All red	20
LS06	43	1.04	All red	10
LS06	44	1.20	All red	12
LS06	45	0.86	All red	9
LS06	46	0.47	Assumed red	5
LS06	47	1.46	All red	15
LS06	48	1.04	All red	10
LS06	49	1.48	All red	15
LS06	50	0.71	All red	7
LS06	51	1.48	All red	15
LS06	52	2.14	All red	21
LS06	53	9.48	All red	95
LS06	54	3.88	All red	39
LS06	55	2.31	All red	23
LS06	56	1.97	All red	20
LS06	57	4.28	All red	43
LS06	58	3.20	All red	32
LS06	59	3.01	All red	30
LS06	60	2.70	All red	27
LS06	61	1.78	All red	18
LS06	62	3.10	All red	31
LS06	63	4.53	All red	45
LS06	64	1.58	All red	16
LS06	65	0.54	All red	5
LS06	66	1.52	All red	15
LS06	67	4.22	All red	42
LS06	68	0.40	All red	4
LS06	69	4.10	All red	41
LS06	70	0.72	All red	7
LS06	71	3.83	All red	38
LS06	72	3.89	All red	39
LS06	73	10.31	All red	103
LS06	74	0.51	All red	5
LS06	75	2.38	All red	24
LS06	76	1.79	All red	18
LS06	77	0.19	All red	2
LS06	78	3.44	All red	34
LS06	80	1.30	All red	13

TABLE M2: Estimated Costs for Downspout Disconnection for Identified Sewershed Networks

NETWORK	SUB-CATCHMENT	DRAINAGE AREA (Ha)	DOWNSPOUT MAPPING	ESTIMATED NUMBER OF UNITS
LS06	81	0.96	All red	10
LS06	82	0.55	All red	6
LS06	83	0.95	All red	10
LS06	TOTAL NUMBER OF UNITS			1,717
LS06	TOTAL ESTIMATED COST			\$172,000
LS09	37	0.68	All blue	7
LS09	14	5.71	All red	57
LS09	15	2.32	All red	23
LS09	16	0.30	All red	3
LS09	17	2.03	All red	20
LS09	18	0.98	All red	10
LS09	19	1.49	All red	15
LS09	23	2.47	All red	25
LS09	61	3.40	All red	34
LS09	62	1.19	All red	12
LS09	31	0.88	All yellow	9
LS09	35	1.07	All yellow	11
LS09	43	1.71	All yellow	17
LS09	55	0.39	All yellow	4
LS09	54	0.77	Assumed yellow	8
LS09	TOTAL NUMBER OF UNITS			255
LS09	TOTAL ESTIMATED COST			\$26,000
US03	25	0.96	All blue	10
US03	26	1.80	All yellow	18
US03	28	1.00	Assumed yellow	10
US03	29	0.45	All blue	5
US03	39	1.65	Assumed yellow	17
US03	40	3.27	All yellow	33
US03	41	0.44	All yellow	4
US03	42	0.64	All red	6
US03	43	2.94	All red	29
US03	44	0.57	All red	6
US03	45	3.62	All red	36
US03	46	0.48	All red	5
US03	47	0.66	All red	7
US03	48	0.70	All red	7
US03	49	2.86	All red	29
US03	51	4.48	All yellow	45
US03	52	0.89	All red	9
US03	53	1.24	All red	12
US03	54	7.22	All yellow	72
US03	56	0.77	All yellow	8
US03	57	1.28	Assumed yellow	13
US03	60	1.98	All yellow	20
US03	61	2.12	All yellow	21
US03	62	2.97	All red	30
US03	66	0.86	All yellow	9
US03	67	2.60	All yellow	26
US03	68	0.42	Assumed yellow	4
US03	69	2.09	All red	21
US03	70	0.90	All yellow	9
US03	71	1.32	All yellow	13
US03	73	0.79	All yellow	8
US03	74	0.45	All yellow	5
US03	75	0.92	All yellow	9
US03	76	3.82	All yellow	38
US03	77	1.07	All yellow	11
US03	78	1.40	All yellow	14
US03	79	1.43	All yellow	14
US03	80	3.01	All yellow	30
US03	81	1.83	All red	18
US03	82	1.98	All yellow	20
US03	83	0.59	Assumed yellow	6

TABLE M2: Estimated Costs for Downspout Disconnection for Identified Sewershed Networks

NETWORK	SUB-CATCHMENT	DRAINAGE AREA (Ha)	DOWNSPOUT MAPPING	ESTIMATED NUMBER OF UNITS
US03	84	1.01	All yellow	10
US03	86	1.75	All red	18
US03	89	1.81	All red	18
US03	91	2.19	All yellow	22
US03	92	0.85	All yellow	9
US03	93	1.99	All yellow	20
US03	94	1.13	Assumed yellow	11
US03	95	0.27	All yellow	3
US03	97	4.77	Assumed red	48
US03	98	0.95	Assumed yellow	10
US03	99	0.54	Assumed red	5
US03	100	4.04	Assumed yellow	40
US03	101	3.30	All yellow	33
US03	102	1.12	All yellow	11
US03	103	1.36	All yellow	14
US03	104	1.62	All yellow	16
US03	105	2.52	All yellow	25
US03	106	1.24	Assumed yellow	12
US03	108	1.47	All yellow	15
US03	109	0.88	All yellow	9
US03	110	1.10	All yellow	11
US03	TOTAL NUMBER OF UNITS			1,067
US03	TOTAL ESTIMATED COST			\$107,000
US04	1	1.72	All red	17
US04	2	4.32	All red	43
US04	3	0.66	All red	7
US04	4	1.77	Assumed red	18
US04	5	0.51	All yellow	5
US04	6	2.12	Assumed red	21
US04	7	2.92	All yellow	29
US04	8	2.05	All red	21
US04	9	0.64	All red	6
US04	10	3.05	All yellow	31
US04	11	0.89	All red	9
US04	12	2.08	All red	21
US04	14	4.74	Assumed yellow	47
US04	16	2.24	Assumed red	22
US04	17	2.06	Half red, half yellow	21
US04	18	0.26	All red	3
US04	21	0.78	Half green, half yellow	8
US04	22	1.55	Assumed red	16
US04	24	2.24	All yellow	22
US04	26	1.47	All yellow	15
US04	27	0.66	All yellow	7
US04	28	1.47	All red	15
US04	29	2.73	All red	27
US04	30	0.90	All red	9
US04	31	2.02	All red	20
US04	32	3.66	Assumed red	37
US04	33	2.28	All red	23
US04	34	0.39	All red	4
US04	35	3.77	Assumed red	38
US04	36	0.60	All red	6
US04	TOTAL NUMBER OF UNITS			568
US04	TOTAL ESTIMATED COST			\$57,000
US05	1	1.64	All red	16
US05	2	3.20	All red	32
US05	3	5.78	All red	58
US05	5	1.49	All red	15
US05	6	0.98	All red	10
US05	10	0.43	All red	4
US05	16	0.21	All yellow	2
US05	17	0.65	Assumed yellow	7

TABLE M2: Estimated Costs for Downspout Disconnection for Identified Sewershed Networks

NETWORK	SUB-CATCHMENT	DRAINAGE AREA (Ha)	DOWNSPOUT MAPPING	ESTIMATED NUMBER OF UNITS
US05	19	0.72	Assumed yellow	7
US05	20	0.33	Assumed yellow	3
US05	TOTAL NUMBER OF UNITS			154
US05	TOTAL ESTIMATED COST			\$15,000

TABLE M4: Detailed Cost Estimates for Top 25 Priority Jobs

Priority Job Number	Network	Pipe Number	Pipe ID	Construction Year	Sewer Age (Years)	Sewer Description	Upgrade	Length (m)	Sewer Type	Geometry 1 (m)	Geometry 2 (m)	Unit Price per metre (2010 prices)	Total Estimated Cost
20	LS14	3	PWOPRSES0001349	NA	NA	300 TO A 450	2UP	60	CIRCULAR	0.45	0	\$79.10	\$14,000
20	LS14	4	PWOPRSES0001351	NA	NA	300 TO A 450	2UP	64.8	CIRCULAR	0.45	0	\$79.10	\$15,000
20	LS14	5	PWOPRSES0001352	NA	NA	300 TO A 450	2UP	6.15	CIRCULAR	0.45	0	\$79.10	\$1,000
20	LS14	6	STMEdinburgh	2000	11	300 TO A 450	2UP	70.1	CIRCULAR	0.45	0	\$79.10	\$17,000
20	LS14	NA	ALL	NA	NA	ALL SEWER UPGRADES	NA	331	NA	NA	NA	NA	\$93,000
21	HD02	1	PWOPRSES0003334	NA	NA	300 TO 525. Shortened version of existing pipe - new manhole PMH9 a little further south	3UP	39.2	CIRCULAR	0.525	0	\$86.20	\$10,000
21	HD02	2	PWOPRSES0003338	NA	NA	300 TO A 525	3UP	74.67	CIRCULAR	0.525	0	\$86.20	\$19,000
21	HD02	3	PWOPRSES0004414	NA	NA	300 TO A 825, raise d/s invert	3UP	80.61	CIRCULAR	0.825	0	\$290.60	\$70,000
21	HD02	4	PWOPRSES0004453	NA	NA	300 TO A 525	3UP	73.03	CIRCULAR	0.525	0	\$86.20	\$19,000
21	HD02	5	PWOPRSES0004456	NA	NA	300 TO A 675	3UP	77.84	CIRCULAR	0.675	0	\$190.00	\$44,000
21	HD02	NA	ALL	NA	NA	ALL SEWER UPGRADES	NA	345	NA	NA	NA	NA	\$162,000
22	ER01	1	PWOPRSES0004333	1919	92	750 TO A 975, U/S INVERT DROPPED FROM 309.3	3UP	76.8	CIRCULAR	0.975	0	\$402.60	\$93,000
22	ER01	2	PWOPRSES0004334	1919	92	750 TO A 975	3UP	15.24	CIRCULAR	0.975	0	\$402.60	\$18,000
22	ER01	3	PWOPRSES0004365	1919	92	825 TO A 975, LOWER D/S INVERT TO INCREASE SLOPE	2UP	198.72	CIRCULAR	0.975	0	\$402.60	\$240,000
22	ER01	4	PWOPRSES0004366	1919	92	750 TO A 975	3UP	34.59	CIRCULAR	0.975	0	\$402.60	\$42,000
22	ER01	NA	ALL	1919	92	ALL SEWER UPGRADES	NA	325	NA	NA	NA	NA	\$393,000
23	US06	1	PWOPRSES0003749	NA	NA	375 TO A 450	1UP	7.49	CIRCULAR	0.45	0	\$79.10	\$2,000
23	US06	2	PWOPRSES0003753	NA	NA	225 TO A 450	3UP	16.76	CIRCULAR	0.45	0	\$79.10	\$4,000
23	US06	3	PWOPRSES0003754	NA	NA	225 TO A 450	3UP	30.02	CIRCULAR	0.45	0	\$79.10	\$7,000
23	US06	4	PWOPRSES0004322	NA	NA	300 TO A 375	1UP	60.65	CIRCULAR	0.375	0	\$76.70	\$14,000
23	US06	5	PWOPRSES0004325	NA	NA	225 TO A 375	2UP	74.67	CIRCULAR	0.375	0	\$76.70	\$17,000
23	US06	6	PWOPRSES0004329	NA	NA	225 TO A 375	2UP	59.28	CIRCULAR	0.375	0	\$76.70	\$14,000
23	US06	NA	ALL	NA	NA	ALL SEWER UPGRADES	NA	249	NA	NA	NA	NA	\$58,000
24	US08	1	PWOPRSES0001058	NA	NA	600 TO A 825	3UP	84.22	CIRCULAR	0.825	0	\$290.60	\$73,000
24	US08	2	PWOPRSES0001059	1953	58		DIVERSION	113.6	CIRCULAR	0.825	0	\$290.60	\$99,000
24	US08	NA	ALL	1953	58	ALL SEWER UPGRADES	NA	198	NA	NA	NA	NA	\$172,000
25	LS04	1	PWOPRSES0001256	1954	57	250 to a 300, drop u/s invert, raise d/s invert to avoid backwater	1UP	55.32	CIRCULAR	0.3	0	\$62.10	\$10,000
25	LS04	2	PWOPRSES0001257	1954	57	250 TO A 375	2UP	87.48	CIRCULAR	0.375	0	\$76.70	\$20,000
25	LS04	3	PWOPRSES0003046	1954	57	250 TO A 525	3UP	83.38	CIRCULAR	0.525	0	\$86.20	\$22,000
25	LS04	NA	ALL	1954	57	ALL SEWER UPGRADES	NA	226	NA	NA	NA	NA	\$52,000

TABLE M1: Detailed Cost Estimates for Recommended Storm Sewer Upgrades to meet a 5-Year Capacity

Ward Area	Network	Pipe Number	Pipe ID	Description	Upgrade	Length (m)	Sewer Type	Geometry 1 (m)	Geometry 2 (m)	Unit Price per metre (2010 prices)	Total Estimated Cost
1	HD02	73	PWOPRSE0004398	825 TO A 1050, CONNECT IN TO DIFF MH D/S	3UP	98.14	CIRCULAR	1.05	0	\$459.90	\$135,000
1	HD02	74	PWOPRSE0004400	525 TO A 675	2UP	87.47	CIRCULAR	0.675	0	\$190.00	\$50,000
1	HD02	75	PWOPRSE0004401	525 TO A 675	2UP	67.05	CIRCULAR	0.675	0	\$190.00	\$38,000
1	HD02	76	PWOPRSE0004409	825 TO A 1050	3UP	60.65	CIRCULAR	1.05	0	\$459.90	\$84,000
1	HD02	77	PWOPRSE0004414	300 TO A 825, raise d/s invert	3UP	80.61	CIRCULAR	0.825	0	\$290.60	\$70,000
1	HD02	78	PWOPRSE0004418	750 TO A 1050	3UP	80.83	CIRCULAR	1.05	0	\$459.90	\$112,000
1	HD02	79	PWOPRSE0004437	600 TO A 675	1UP	13.44	CIRCULAR	0.675	0	\$190.00	\$8,000
1	HD02	80	PWOPRSE0004441	750 TO A 1050	3UP	35.9	CIRCULAR	1.05	0	\$459.90	\$50,000
1	HD02	81	PWOPRSE0004444	600 TO A 675	1UP	85.34	CIRCULAR	0.675	0	\$190.00	\$49,000
1	HD02	82	PWOPRSE0004448	300 TO A 675	3UP	88.69	CIRCULAR	0.675	0	\$190.00	\$51,000
1	HD02	83	PWOPRSE0004450		DIVERSION	73.06	CIRCULAR	0.9	0	\$348.50	\$76,000
1	HD02	84	PWOPRSE0004453	300 TO A 525	3UP	73.03	CIRCULAR	0.525	0	\$86.20	\$19,000
1	HD02	85	PWOPRSE0004456	300 TO A 675	3UP	77.84	CIRCULAR	0.675	0	\$190.00	\$44,000
1	HD02	86	PWOPRSE0004468	675 TO A 900	3UP	25.9	CIRCULAR	0.9	0	\$348.50	\$27,000
1	HD02	87	PWOPRSE0004539	675 TO A 750	1UP	48.15	CIRCULAR	0.75	0	\$250.50	\$38,000
1	HD02	88	PWOPRSE0005652	300 TO A 375, adjust inverts	1UP	100.6	CIRCULAR	0.375	0	\$76.70	\$23,000
1	HD02	89	PWOPRSE0005653	300 TO A 450, CSP TO CONCRETE MATERIAL	2UP	34.7	CIRCULAR	0.45	0	\$79.10	\$8,000
1	HD02	90	PWOPRSE0005654	300 TO A 450. CONCRETE INSTEAD OF CSP	2UP	12.8	CIRCULAR	0.45	0	\$79.10	\$3,000
1	HD02	91	PWOPRSE0005655	450 TO A 600	2UP	127.4	CIRCULAR	0.6	0	\$124.00	\$47,000
1	HD02	92	PWOPRSE0005656	600 TO A 825, drop inverts	3UP	164.5	CIRCULAR	0.825	0	\$290.60	\$143,000
1	HD02	93	PWOPRSE0005658	300 TO A 525	3UP	45.3	CIRCULAR	0.525	0	\$86.20	\$12,000
1	HD02	94	PWOPRSE0005664	375 TO A 450	1UP	64.3	CIRCULAR	0.45	0	\$79.10	\$15,000
1	HD02	95	Rail1	Upgrade to take higher flows in excess of 825	DIVERSION	41.69	HORIZ ELLIPSE	1.22	1.93	\$1,063.80	\$133,000
1	HD02	96	Stevenson1		DIVERSION	15.1	CIRCULAR	0.75	0	\$250.50	\$11,000
1	HD02	97	Stevenson2		DIVERSION	45.6	HORIZ ELLIPSE	0.855	1.345	\$575.40	\$79,000
1	HD02	98	STMIPond	1.2 x 2.4 box - at Elizabeth Street	DIVERSION	28.1	RECT CLOSED	1.2	2.4	\$1,858.60	\$157,000
1	HD02	99	STMRelief		DIVERSION	17.4	CIRCULAR	0.9	0	\$348.50	\$18,000
1	HD02	100	Terry	Replace two parallel sewers with a single one	DIVERSION	82.5	CIRCULAR	0.75	0	\$250.50	\$62,000
1	HD02	101	Victoria1		DIVERSION	110.2	CIRCULAR	0.9	0	\$348.50	\$115,000
1	HD02	102	Victoria2		DIVERSION	80.5	CIRCULAR	0.9	0	\$348.50	\$84,000
1	HD02	103	Victoria3		DIVERSION	164.5	CIRCULAR	1.05	0	\$459.90	\$227,000
1	HD02	104	Victoria4		DIVERSION	89.2	CIRCULAR	1.05	0	\$459.90	\$123,000
1	HD02	105	Victoria5	Siphon off some of high flow from existing trunk to new relief sewer	DIVERSION	21.8	CIRCULAR	0.9	0	\$348.50	\$23,000
1	HD02	106	Victoria6		DIVERSION	56.2	CIRCULAR	1.05	0	\$459.90	\$78,000
1	HD02	107	Victoria7		DIVERSION	19	CIRCULAR	0.6	0	\$124.00	\$7,000
1	HD02	108	William1		DIVERSION	33.1	CIRCULAR	1.35	0	\$705.80	\$70,000
1	HD02	109	William2		DIVERSION	77.2	CIRCULAR	1.35	0	\$705.80	\$163,000
1	HD02	110	William3		DIVERSION	44.2	CIRCULAR	1.35	0	\$705.80	\$94,000
1	HD02	111	William4		DIVERSION	53.6	CIRCULAR	1.5	0	\$863.00	\$139,000
1	HD02	112	William5		DIVERSION	49.4	CIRCULAR	1.5	0	\$863.00	\$128,000
1	HD02	113	William6		DIVERSION	106.9	CIRCULAR	1.5	0	\$863.00	\$277,000
1	HD02	114	William7		DIVERSION	64.2	HORIZ ELLIPSE	1.48	2.31	\$1,513.20	\$291,000
1	HD02	115	William8		DIVERSION	91.1	HORIZ ELLIPSE	1.48	2.31	\$1,513.20	\$414,000
1	HD02	116	William9		DIVERSION	55.4	HORIZ ELLIPSE	1.48	2.31	\$1,513.20	\$251,000
1	HD02	NA	ALL	ALL SEWER UPGRADES	NA	7,192	NA	NA	NA	NA	\$9,236,000
1	HD05	1	PWOPRSE0005799	1200 TO A 1350	1UP	7.6	CIRCULAR	1.35	0	\$705.80	\$16,000
1	HD05	2	PWOPRSE0005801	1200 TO A 1350	1UP	6.2	CIRCULAR	1.35	0	\$705.80	\$13,000
1	HD05	3	PWOPRSE0005986	300 TO A 375	1UP	70.3	CIRCULAR	0.375	0	\$76.70	\$16,000
1	HD02	NA	ALL	ALL SEWER UPGRADES	NA	84	NA	NA	NA	NA	\$45,000
1	HD06	1	PWOPRSE0006155	600 TO A 675	1UP	14	CIRCULAR	0.675	0	\$190.00	\$8,000
1	HD06	2	PWOPRSE0006160	600 TO A 675	1UP	76.5	CIRCULAR	0.675	0	\$190.00	\$44,000
1	HD06	3	PWOPRSE0006161	675 TO A 825	2UP	74.5	CIRCULAR	0.825	0	\$290.60	\$65,000
1	HD06	4	PWOPRSE0006162	675 TO A 825 AND INCREASE SLOPE TO MATCH NEIGHBOURING PIPES	2UP	6.45	CIRCULAR	0.825	0	\$290.60	\$6,000
1	HD06	5	PWOPRSE0006163	300 TO A 375	1UP	33	CIRCULAR	0.375	0	\$76.70	\$8,000
1	HD06	6	PWOPRSE0006164	300 TO A 375	1UP	7	CIRCULAR	0.375	0	\$76.70	\$2,000
1	HD06	7	PWOPRSE0006165	750 TO A 825	1UP	73.5	CIRCULAR	0.825	0	\$290.60	\$64,000
1	HD06	8	PWOPRSE0006166	750 TO A 825	1UP	92.4	CIRCULAR	0.825	0	\$290.60	\$81,000
1	HD06	9	PWOPRSE0006167	975 TO A 1200	2UP	42.9	CIRCULAR	1.2	0	\$576.60	\$74,000
1	HD06	10	PWOPRSE0006168	675 TO A 750	1UP	18	CIRCULAR	0.75	0	\$250.50	\$14,000
1	HD06	11	PWOPRSE0006170	450 TO A 525	1UP	86.4	CIRCULAR	0.525	0	\$86.20	\$22,000
1	HD06	12	PWOPRSE0006171	450 TO A 525	1UP	17.9	CIRCULAR	0.525	0	\$86.20	\$5,000
1	HD06	13	PWOPRSE0006172	675 TO A 750	1UP	48.6	CIRCULAR	0.75	0	\$250.50	\$37,000
1	HD06	14	PWOPRSE0006188	975 TO A 1200	2UP	50.2	CIRCULAR	1.2	0	\$576.60	\$87,000
1	HD06	15	PWOPRSE0006189	1050 TO A 1200	1UP	22	CIRCULAR	1.2	0	\$576.60	\$38,000
1	HD06	16	PWOPRSE0006190	1050 TO A 1200	1UP	62.2	CIRCULAR	1.2	0	\$576.60	\$108,000
1	HD06	17	PWOPRSE0006206	600 TO A 675	1UP	33.5	CIRCULAR	0.675	0	\$190.00	\$19,000
1	HD06	18	PWOPRSE0006637	375 TO A 450	1UP	49.49	CIRCULAR	0.45	0	\$79.10	\$12,000
1	HD06	19	PWOPRSE0006638	600 TO A 675	1UP	44.02	CIRCULAR	0.675	0	\$190.00	\$25,000
1	HD06	20	PWOPRSE0007152	375 TO A 450	1UP	81.9	CIRCULAR	0.45	0	\$79.10	\$19,000
1	HD06	21	PWOPRSE0007153	375 TO A 450	1UP	11.7	CIRCULAR	0.45	0	\$79.10	\$3,000
1	HD06	22	PWOPRSE0007154	1050 TO A 1200	1UP	14.5	CIRCULAR	1.2	0	\$576.60	\$25,000
1	HD06	NA	ALL	ALL SEWER UPGRADES	NA	961	NA	NA	NA	NA	\$766,000
1	US01	1	1	300 to a 375	1UP	79.88	CIRCULAR	0.375	0	\$76.70	\$18,000
1	US01	2	9996	Currently a 975, 1050 as shown in 2010 Ferguson drawings	1UP	115.1	CIRCULAR	1.05	0	\$459.90	\$159,000
1	US01	3	9997	1 up from 2010 Ferguson Design (600 to a 675)	3UP	59.9	CIRCULAR	0.675	0	\$190.00	\$34,000
1	US01	4	9999	900 currently, 1050 as shown in 2010 Ferguson drawings	2UP	41.2	CIRCULAR	1.05	0	\$459.90	\$57,000
1	US01	5	Arthur1		DIVERSION	48.6	CIRCULAR	1.2	0	\$576.60	\$84,000
1	US01	6	Arthur2		DIVERSION	15.2	CIRCULAR	0.525	0	\$86.20	\$4,000
1	US01	7	Cross1		DIVERSION	130.4	CIRCULAR	1.2	0	\$576.60	\$226,000
1	US01	8	Neeve1		DIVERSION	40.6	CIRCULAR	1.2	0	\$576.60	\$70,000
1	US01	9	PWOPRSE0003987	1 up from 2010 Ferguson Design (600 to a 675)	3UP	56.81	CIRCULAR	0.675	0	\$190.00	\$32,000
1	US01	10	PWOPRSE0003989	600 rather than 525 in 2010 Ferguson design	3UP	69.2	CIRCULAR	0.6	0	\$124.00	\$26,000
1	US01	11	PWOPRSE0003990	375 currently, 525 as shown in 2010 Ferguson drawings	2UP	75.35	CIRCULAR	0.525	0	\$86.20	\$19,000
1	US01	12	PWOPRSE0004199	900 currently, 1050 as shown in 2010 Ferguson drawings	2UP	74.5	CIRCULAR	1.05	0	\$459.90	\$103,000
1	US01	13	PWOPRSE0004234	Assume upsized when redevelopment occurs - 1050 to a 1200	1UP	8.04	CIRCULAR	1.2	0	\$576.60	\$14,000
1	US01	14	PWOPRSE0004238	Assume upsized when redevelopment occurs - 1050 to a 1200	1UP	92.65	CIRCULAR	1.2	0	\$576.60	\$160,000

TABLE M1: Detailed Cost Estimates for Recommended Storm Sewer Upgrades to meet a 5-Year Capacity

Ward Area	Network	Pipe Number	Pipe ID	Description	Upgrade	Length (m)	Sewer Type	Geometry 1 (m)	Geometry 2 (m)	Unit Price per metre (2010 prices)	Total Estimated Cost
1	US01	15	PWOPRSE0004239	Assume upsized when redevelopment occurs - 1050 to a 1200	1UP	55.16	CIRCULAR	1.2	0	\$576.60	\$95,000
1	US01	16	PWOPRSE0004249	Assume upsized when redevelopment occurs - 1050 to a 1200	1UP	13.62	CIRCULAR	1.2	0	\$576.60	\$24,000
1	US01	17	PWOPRSE0004289	300 to a 375	1UP	8.53	CIRCULAR	0.375	0	\$76.70	\$2,000
1	US01	18	PWOPRSE0004290	300 to a 375	1UP	93	CIRCULAR	0.375	0	\$76.70	\$21,000
1	US01	19	PWOPRSE0004291	300 to a 450, lower d/s invert	2UP	41.2	CIRCULAR	0.45	0	\$79.10	\$10,000
1	US01	20	PWOPRSE0006265	300 to a 375	1UP	55.78	CIRCULAR	0.375	0	\$76.70	\$13,000
1	US01	21	PWOPRSE0007558	1 up from 2010 Ferguson design (600 to a 675)	3UP	6.2	CIRCULAR	0.675	0	\$190.00	\$4,000
1	US01	NA	ALL	ALL SEWER UPGRADES	NA	1,181	NA	NA	NA	NA	\$1,175,000
1	US02	1	Carden1	600 to a 675 - unlikely to be done given that road was just done in 2010	1UP	20.6	CIRCULAR	0.675	0	\$190.00	\$12,000
1	US02	2	Fountain1	450 to a 525	1UP	14.6	CIRCULAR	0.525	0	\$86.20	\$4,000
1	US02	3	PWOPRSE00002845	300 TO A 525, RAISE D/S INVERT	3UP	79.25	CIRCULAR	0.525	0	\$86.20	\$20,000
1	US02	4	PWOPRSE00002921	375 to a 450	1UP	61.4	CIRCULAR	0.45	0	\$79.10	\$15,000
1	US02	5	PWOPRSE00002927	Still a 450, connected in to 600 instead of 450	DIVERSION	50.53	CIRCULAR	0.45	0	\$79.10	\$12,000
1	US02	6	PWOPRSE00002963	450 to a 525	1UP	58.02	CIRCULAR	0.525	0	\$86.20	\$15,000
1	US02	7	PWOPRSE00002990	750 to a 825	1UP	7.71	CIRCULAR	0.825	0	\$290.60	\$7,000
1	US02	8	PWOPRSE00003712	300 TO A 375, LOWER INVERTS	1UP	48.4	CIRCULAR	0.375	0	\$76.70	\$11,000
1	US02	9	PWOPRSE00003790	300 to a 450, Adjust inverts	2UP	18.5	CIRCULAR	0.45	0	\$79.10	\$4,000
1	US02	10	PWOPRSE00003811	450 to a 525	1UP	58	CIRCULAR	0.525	0	\$86.20	\$15,000
1	US02	NA	ALL	ALL SEWER UPGRADES	NA	417	NA	NA	NA	NA	\$115,000
1	US06	1	PWOPRSE00003737	375 TO A 600	3UP	7.4	CIRCULAR	0.6	0	\$124.00	\$3,000
1	US06	2	PWOPRSE00003749	375 TO A 450	1UP	7.49	CIRCULAR	0.45	0	\$79.10	\$2,000
1	US06	3	PWOPRSE00003753	225 TO A 450	3UP	16.76	CIRCULAR	0.45	0	\$79.10	\$4,000
1	US06	4	PWOPRSE00003754	225 TO A 450	3UP	30.02	CIRCULAR	0.45	0	\$79.10	\$7,000
1	US06	5	PWOPRSE00003771	250 TO A 300	1UP	82	CIRCULAR	0.3	0	\$62.10	\$15,000
1	US06	6	PWOPRSE00004322	300 TO A 375	1UP	60.65	CIRCULAR	0.375	0	\$76.70	\$14,000
1	US06	7	PWOPRSE00004325	225 TO A 375	2UP	74.67	CIRCULAR	0.375	0	\$76.70	\$17,000
1	US06	8	PWOPRSE00004329	225 TO A 375	2UP	59.28	CIRCULAR	0.375	0	\$76.70	\$14,000
1	US06	NA	ALL	ALL SEWER UPGRADES	NA	338	NA	NA	NA	NA	\$76,000
2	HD01	1	Eramosa1	300 TO A 375	1UP	47	CIRCULAR	0.375	0	\$76.70	\$11,000
2	HD01	2	Eramosa2	300 TO A 375	1UP	34	CIRCULAR	0.375	0	\$76.70	\$8,000
2	HD01	NA	ALL	ALL SEWER UPGRADES	NA	81	NA	NA	NA	NA	\$19,000
2	US03	1	Marlborough1	375 to a 525. Just done recently, unlikely to be upda	2UP	16.8	CIRCULAR	0.525	0	\$86.20	\$4,000
2	US03	2	Marlborough2	450 to a 525. Just done recently, unlikely to be don	1UP	50.4	CIRCULAR	0.525	0	\$86.20	\$13,000
2	US03	3	PWOPRSE00000616	1650 to 1950 equivalent	2UP	122.38	HORIZ ELLIPSE	1.6	2.49	\$1,513.20	\$556,000
2	US03	4	PWOPRSE00000621	750 to a 900	2UP	70.1	CIRCULAR	0.9	0	\$348.50	\$73,000
2	US03	5	PWOPRSE00000622	750 to a 900. Done recently?	2UP	76.08	CIRCULAR	0.9	0	\$348.50	\$80,000
2	US03	6	PWOPRSE00000631	525 to a 675	2UP	77.82	CIRCULAR	0.675	0	\$190.00	\$44,000
2	US03	7	PWOPRSE00000781	300 to a 375	1UP	76.96	CIRCULAR	0.375	0	\$76.70	\$18,000
2	US03	8	PWOPRSE00000785	375 to a 525	2UP	22.25	CIRCULAR	0.525	0	\$86.20	\$6,000
2	US03	9	PWOPRSE00000786	375 to a 525	2UP	33.53	CIRCULAR	0.525	0	\$86.20	\$9,000
2	US03	10	PWOPRSE00000794	300 TO A 375	1UP	82.85	CIRCULAR	0.375	0	\$76.70	\$19,000
2	US03	11	PWOPRSE00000803	300 TO A 375	1UP	13.84	CIRCULAR	0.375	0	\$76.70	\$3,000
2	US03	12	PWOPRSE00000862	525 TO A 750, raise d/s invert from 337.94	3UP	54.25	CIRCULAR	0.75	0	\$250.50	\$41,000
2	US03	13	PWOPRSE00000863	CSP to concrete, lower inverts to give more cover	1UP	87.94	CIRCULAR	1.5	0	\$863.00	\$228,000
2	US03	14	PWOPRSE00000869	300 to a 375	1UP	66.14	CIRCULAR	0.375	0	\$76.70	\$15,000
2	US03	15	PWOPRSE00000870	CSP to concrete, lower inverts to give more cover	1UP	78.33	CIRCULAR	1.5	0	\$863.00	\$203,000
2	US03	16	PWOPRSE00000871	300 to a 375, raise d/s invert to avoid tailwater	1UP	89.34	CIRCULAR	0.375	0	\$76.70	\$21,000
2	US03	17	PWOPRSE00000872	300 to a 375	1UP	53.34	CIRCULAR	0.375	0	\$76.70	\$12,000
2	US03	18	PWOPRSE00000873	1350 CSP to 1500 concrete, lower inverts to give m	1UP	74.07	CIRCULAR	1.5	0	\$863.00	\$192,000
2	US03	19	PWOPRSE00000910	300 to a 450	2UP	73.15	CIRCULAR	0.45	0	\$79.10	\$17,000
2	US03	20	PWOPRSE00000911	300 to a 375	1UP	44.2	CIRCULAR	0.375	0	\$76.70	\$10,000
2	US03	21	PWOPRSE00000921	1500 to a 1650	1UP	65.08	CIRCULAR	1.65	0	\$1,034.70	\$202,000
2	US03	22	PWOPRSE00000931	1500 to a 1650	1UP	132.59	CIRCULAR	1.65	0	\$1,034.70	\$412,000
2	US03	23	PWOPRSE00000944	OK as a 1350 given steep grade, but should probab	1UP	63.09	CIRCULAR	1.5	0	\$863.00	\$163,000
2	US03	24	PWOPRSE00000945	CSP Arch to concrete, lower inverts to give more c	1UP	49.84	CIRCULAR	1.5	0	\$863.00	\$129,000
2	US03	25	PWOPRSE00000946	CSP Arch to concrete, lower inverts to give more c	1UP	49.68	CIRCULAR	1.5	0	\$863.00	\$129,000
2	US03	26	PWOPRSE00000950	OK as a 1350, but should probably upgrade to matc	1UP	75.13	CIRCULAR	1.5	0	\$863.00	\$195,000
2	US03	27	PWOPRSE00000952	375 to a 675, adjust inverts	3UP	55.47	CIRCULAR	0.675	0	\$190.00	\$32,000
2	US03	28	PWOPRSE00000967	375 to a 525	2UP	22.56	CIRCULAR	0.525	0	\$86.20	\$6,000
2	US03	29	PWOPRSE00000970	375 to a 525	2UP	77.42	CIRCULAR	0.525	0	\$86.20	\$20,000
2	US03	30	PWOPRSE00000993	1650 to a 1800	1UP	176.94	CIRCULAR	1.8	0	\$1,251.10	\$664,000
2	US03	31	PWOPRSE00000994	1650 CSP to 1950 equivalent concrete. Raise d/s o	2UP	78.95	HORIZ ELLIPSE	1.6	2.49	\$1,513.20	\$358,000
2	US03	32	PWOPRSE00000995	675 to a 750, lower d/s invert	1UP	20.73	CIRCULAR	0.75	0	\$250.50	\$16,000
2	US03	33	PWOPRSE00000997	750 to a 825	1UP	60.96	CIRCULAR	0.825	0	\$290.60	\$53,000
2	US03	34	PWOPRSE00010000	750 to a 825	1UP	67.06	CIRCULAR	0.825	0	\$290.60	\$58,000
2	US03	35	PWOPRSE00010001	300 to a 375	1UP	52.43	CIRCULAR	0.375	0	\$76.70	\$12,000
2	US03	36	PWOPRSE00010111	1500 to a 1800	2UP	106.07	CIRCULAR	1.8	0	\$1,251.10	\$398,000
2	US03	37	PWOPRSE00010119	525 to a 750	3UP	60.35	CIRCULAR	0.75	0	\$250.50	\$45,000
2	US03	38	PWOPRSE00022245	450 to a 675	3UP	90.53	CIRCULAR	0.675	0	\$190.00	\$52,000
2	US03	39	PWOPRSE00022262	375 to a 450	1UP	67.06	CIRCULAR	0.45	0	\$79.10	\$16,000
2	US03	40	PWOPRSE00022267	750 to a 900	2UP	107.29	CIRCULAR	0.9	0	\$348.50	\$112,000
2	US03	41	PWOPRSE00022268	375 to a 450	1UP	95.56	CIRCULAR	0.45	0	\$79.10	\$23,000
2	US03	42	PWOPRSE00022269	1350 to a 1500, lower d/s invert	1UP	74.37	CIRCULAR	1.5	0	\$863.00	\$193,000
2	US03	43	PWOPRSE00022270	1350 to a 1500	1UP	63.52	CIRCULAR	1.5	0	\$863.00	\$164,000
2	US03	44	PWOPRSE00022280	675 to a 750	1UP	69.8	CIRCULAR	0.75	0	\$250.50	\$52,000
2	US03	45	PWOPRSE00022282	675 to a 750	1UP	8.61	CIRCULAR	0.75	0	\$250.50	\$6,000
2	US03	46	PWOPRSE00022286	375 to a 450	1UP	87.78	CIRCULAR	0.45	0	\$79.10	\$21,000
2	US03	47	PWOPRSE00022287	375 to a 525, raise u/s and d/s invert	2UP	61.42	CIRCULAR	0.525	0	\$86.20	\$16,000
2	US03	48	PWOPRSE00022299	525 TO A 675	2UP	115.67	CIRCULAR	0.675	0	\$190.00	\$66,000
2	US03	49	PWOPRSE00023003	525 to a 600, raise d/s invert	1UP	69.04	CIRCULAR	0.6	0	\$124.00	\$26,000
2	US03	50	PWOPRSE00023004	525 to a 600	1UP	58.83	CIRCULAR	0.6	0	\$124.00	\$22,000
2	US03	51	PWOPRSE00023009	1350 to a 1500	1UP	83.82	CIRCULAR	1.5	0	\$863.00	\$217,000
2	US03	52	PWOPRSE00023100	1350 to a 1500	1UP	63.55	CIRCULAR	1.5	0	\$863.00	\$165,000
2	US03	53	PWOPRSE00023112	450 to a 600	2UP	94.8	CIRCULAR	0.6	0	\$124.00	\$35,000
2	US03	54	PWOPRSE00023200	300 to a 450	2UP	75.9	CIRCULAR	0.45	0	\$79.10	\$18,000
2	US03	55	PWOPRSE00023222	300 to a 450	2UP	64.92	CIRCULAR	0.45	0	\$79.10	\$15,000
2	US03	56	PWOPRSE00023228	375 TO A 525	2UP	69.8	CIRCULAR	0.525	0	\$86.20	\$18,000
2	US03	57	PWOPRSE00023300	825 TO A 900	1UP	127.71	CIRCULAR	0.9	0	\$348.50	\$134,000
2	US03	58	PWOPRSE00023344	450 TO A 525	1UP	92.81	CIRCULAR	0.525	0	\$86.20	\$24,000
2	US03	59	PWOPRSE00023350	900 to a 975	1UP	51.51	CIRCULAR	0.975	0	\$402.60	\$62,000

TABLE M1: Detailed Cost Estimates for Recommended Storm Sewer Upgrades to meet a 5-Year Capacity

Ward Area	Network	Pipe Number	Pipe ID	Description	Upgrade	Length (m)	Sewer Type	Geometry 1 (m)	Geometry 2 (m)	Unit Price per metre (2010 prices)	Total Estimated Cost
2	US03	60	PWOPRSE0002351	900 to a 975	1UP	50.6	CIRCULAR	0.975	0	\$402.60	\$61,000
2	US03	61	PWOPRSE0002352	300 TO A 450	2UP	62.18	CIRCULAR	0.45	0	\$79.10	\$15,000
2	US03	62	PWOPRSE0002353	300 TO A 450	2UP	76.2	CIRCULAR	0.45	0	\$79.10	\$18,000
2	US03	63	PWOPRSE0002354	525 TO A 675	2UP	55.14	CIRCULAR	0.675	0	\$190.00	\$31,000
2	US03	64	PWOPRSE0002355	450 TO A 675	3UP	63.09	CIRCULAR	0.675	0	\$190.00	\$36,000
2	US03	65	PWOPRSE0002357	450 TO A 600	2UP	82.45	CIRCULAR	0.6	0	\$124.00	\$31,000
2	US03	66	PWOPRSE0002364	750 to a 900	2UP	76.32	CIRCULAR	0.9	0	\$348.50	\$80,000
2	US03	67	PWOPRSE0002365	375 to a 525	2UP	51.82	CIRCULAR	0.525	0	\$86.20	\$13,000
2	US03	68	PWOPRSE0002366	900 to a 975	1UP	39.01	CIRCULAR	0.975	0	\$402.60	\$47,000
2	US03	69	PWOPRSE0002373	750 to a 900	2UP	94.79	CIRCULAR	0.9	0	\$348.50	\$99,000
2	US03	70	PWOPRSE0002374	900 to a 975	1UP	40.08	CIRCULAR	0.975	0	\$402.60	\$48,000
2	US03	71	PWOPRSE0002375	300 to a 450	2UP	75.9	CIRCULAR	0.45	0	\$79.10	\$18,000
2	US03	72	PWOPRSE0002376	900 to a 975	1UP	52.6	CIRCULAR	0.975	0	\$402.60	\$64,000
2	US03	73	PWOPRSE0002377	1350 to a 1800, lower both inverts	3UP	4.42	HORIZ ELLIPSE	1.48	2.31	\$1,513.20	\$20,000
2	US03	74	PWOPRSE0002379	900 to a 975	1UP	65.75	CIRCULAR	0.975	0	\$402.60	\$79,000
2	US03	75	PWOPRSE0002382	1200 to a 1500	2UP	10.67	CIRCULAR	1.5	0	\$863.00	\$28,000
2	US03	76	PWOPRSE0002383	600 to a 675	1UP	81.53	CIRCULAR	0.675	0	\$190.00	\$46,000
2	US03	77	PWOPRSE0002409	1500 to a 1650	1UP	16	CIRCULAR	1.65	0	\$1,034.70	\$50,000
2	US03	78	PWOPRSE0002411	1500 to a 1650	1UP	158.19	CIRCULAR	1.65	0	\$1,034.70	\$491,000
2	US03	79	PWOPRSE0002416	300 to a 450, raise d/s invert	2UP	75.44	CIRCULAR	0.45	0	\$79.10	\$18,000
2	US03	80	PWOPRSE0002418	375 to a 600. Undersized, but will likely still be surc	3UP	76.05	CIRCULAR	0.6	0	\$124.00	\$28,000
2	US03	81	PWOPRSE0002419	1500 to a 1650	1UP	102.41	CIRCULAR	1.65	0	\$1,034.70	\$318,000
2	US03	82	PWOPRSE0002431	1500 to a 1650	1UP	14.23	CIRCULAR	1.65	0	\$1,034.70	\$44,000
2	US03	83	PWOPRSE0002432	1350 to a 1500	1UP	83.27	CIRCULAR	1.5	0	\$863.00	\$216,000
2	US03	84	PWOPRSE0002439	300 to a 450, raise d/s invert to avoid backwater	2UP	52.88	CIRCULAR	0.45	0	\$79.10	\$13,000
2	US03	85	PWOPRSE0002440	1350 to a 1800 equivalent, lower both inverts	3UP	45.11	HORIZ ELLIPSE	1.48	2.31	\$1,513.20	\$205,000
2	US03	86	PWOPRSE0002450	Increase grade and replace CSP with concrete, low	1UP	27.86	CIRCULAR	1.5	0	\$863.00	\$72,000
2	US03	87	PWOPRSE0002513	300 to a 375	1UP	45.72	CIRCULAR	0.375	0	\$76.70	\$11,000
2	US03	88	PWOPRSE0002515A	1200 to a 1350 equivalent	1UP	84.3	HORIZ ELLIPSE	1.09	1.73	\$893.30	\$226,000
2	US03	89	PWOPRSE0002518	300 TO A 450	2UP	92.66	CIRCULAR	0.45	0	\$79.10	\$22,000
2	US03	90	PWOPRSE0002519	Lower u/s invert, 600 to a 900	3UP	12.5	CIRCULAR	0.9	0	\$348.50	\$13,000
2	US03	91	PWOPRSE0002520	600 to a 900	3UP	21.25	CIRCULAR	0.9	0	\$348.50	\$22,000
2	US03	92	PWOPRSE0002524	1200 to a 1350 equivalent	1UP	68.89	HORIZ ELLIPSE	1.09	1.73	\$893.30	\$185,000
2	US03	93	PWOPRSE0002556	675 to a 825	2UP	49.08	CIRCULAR	0.825	0	\$290.60	\$43,000
2	US03	94	PWOPRSE0002559	675 to a 900	3UP	48.77	CIRCULAR	0.9	0	\$348.50	\$51,000
2	US03	95	PWOPRSE0002562	750 to a 900	2UP	83.37	CIRCULAR	0.9	0	\$348.50	\$87,000
2	US03	96	PWOPRSE0002564	750 to a 900, adjust inverts both u/s and d/s	2UP	17.5	CIRCULAR	0.9	0	\$348.50	\$18,000
2	US03	97	PWOPRSE0002568	600 to a 900	3UP	66.63	CIRCULAR	0.9	0	\$348.50	\$70,000
2	US03	98	PWOPRSE0002573	450 to a 675	3UP	44.9	CIRCULAR	0.675	0	\$190.00	\$26,000
2	US03	99	PWOPRSE0004093	450 to a 525	1UP	34.49	CIRCULAR	0.525	0	\$86.20	\$9,000
2	US03	100	PWOPRSE0004094	375 to a 450	1UP	47.24	CIRCULAR	0.45	0	\$79.10	\$11,000
2	US03	101	PWOPRSE0004102	300 to a 375	1UP	35.66	CIRCULAR	0.375	0	\$76.70	\$8,000
2	US03	102	PWOPRSE0007482	450 TO A 600	2UP	48	CIRCULAR	0.6	0	\$124.00	\$18,000
2	US03	103	Speedvale15	750 to a 825	1UP	118.17	CIRCULAR	0.825	0	\$290.60	\$103,000
2	US03	NA	ALL	ALL SEWER UPGRADES	NA	6,726	NA	NA	NA	NA	\$9,025,000
2	US04	1	PWOPRSE0002225	300 TO A 450	2UP	82.6	CIRCULAR	0.45	0	\$79.10	\$20,000
2	US04	2	PWOPRSE0002230	900 TO A 1200	3UP	54.56	CIRCULAR	1.2	0	\$576.60	\$94,000
2	US04	3	PWOPRSE0002239	900 TO A 1050	2UP	92.05	CIRCULAR	1.05	0	\$459.90	\$127,000
2	US04	4	PWOPRSE0002240	750 TO A 975	3UP	67.06	CIRCULAR	0.975	0	\$402.60	\$81,000
2	US04	5	PWOPRSE0002241	375 TO A 525	2UP	30.48	CIRCULAR	0.525	0	\$86.20	\$8,000
2	US04	6	PWOPRSE0002243	375 TO A 525	2UP	55.81	CIRCULAR	0.525	0	\$86.20	\$14,000
2	US04	7	PWOPRSE0002255	900 TO A 1200	3UP	63.4	CIRCULAR	1.2	0	\$576.60	\$110,000
2	US04	8	PWOPRSE0002257	900 TO A 1200	3UP	71.93	CIRCULAR	1.2	0	\$576.60	\$124,000
2	US04	9	PWOPRSE0002258	900 TO A 1050	2UP	42.37	CIRCULAR	1.05	0	\$459.90	\$58,000
2	US04	10	PWOPRSE0002261	900 TO A 1200	3UP	75.29	CIRCULAR	1.2	0	\$576.60	\$130,000
2	US04	11	PWOPRSE0002274	675 TO A 825	2UP	93.88	CIRCULAR	0.825	0	\$290.60	\$82,000
2	US04	12	PWOPRSE0002466	525 TO A 600	1UP	55.9	CIRCULAR	0.6	0	\$124.00	\$21,000
2	US04	13	PWOPRSE0002467	300 TO A 375	1UP	70.78	CIRCULAR	0.375	0	\$76.70	\$16,000
2	US04	14	PWOPRSE0003566	1050 to a 1200	1UP	7.92	CIRCULAR	1.2	0	\$576.60	\$14,000
2	US04	15	PWOPRSE0003582	525 TO A 600	1UP	42.98	CIRCULAR	0.6	0	\$124.00	\$16,000
2	US04	16	PWOPRSE0003583	1200 TO A 1500, EQUIVALENT, LOWER D/S INVERT	1UP	38.68	HORIZ ELLIPSE	1.22	1.93	\$1,063.80	\$123,000
2	US04	17	PWOPRSE0003585	975 TO A 1350	3UP	82.45	CIRCULAR	1.35	0	\$705.80	\$175,000
2	US04	18	PWOPRSE0003586	975 TO A 1350	3UP	62.94	CIRCULAR	1.35	0	\$705.80	\$133,000
2	US04	19	PWOPRSE0003587	1200 TO A 1350	1UP	80.47	CIRCULAR	1.35	0	\$705.80	\$170,000
2	US04	20	PWOPRSE0003588	1200 TO A 1350	1UP	48.49	CIRCULAR	1.35	0	\$705.80	\$103,000
2	US04	21	PWOPRSE0003589	1200 TO A 1500 EQUIVALENT	2UP	61.36	HORIZ ELLIPSE	1.22	1.93	\$1,063.80	\$196,000
2	US04	22	PWOPRSE0003590	1200 TO A 1500 EQUIVALENT	2UP	93.02	HORIZ ELLIPSE	1.22	1.93	\$1,063.80	\$297,000
2	US04	23	PWOPRSE0003591	1200 TO A 1500 EQUIVALENT	2UP	91.44	HORIZ ELLIPSE	1.22	1.93	\$1,063.80	\$292,000
2	US04	24	PWOPRSE0003592	1200 TO A 1500 EQUIVALENT	2UP	24.38	HORIZ ELLIPSE	1.22	1.93	\$1,063.80	\$78,000
2	US04	25	PWOPRSE0003593	1200 TO A 1500 EQUIVALENT	2UP	87.72	HORIZ ELLIPSE	1.22	1.93	\$1,063.80	\$280,000
2	US04	26	PWOPRSE0003606	1350 TO 1500 EQUIVALENT	1UP	6.1	HORIZ ELLIPSE	1.22	1.93	\$1,063.80	\$19,000
2	US04	27	PWOPRSE0003609	1350 TO A 1500 EQUIVALENT	1UP	6.4	HORIZ ELLIPSE	1.22	1.93	\$1,063.80	\$20,000
2	US04	28	PWOPRSE0003611	1350 TO A 1500 EQUIVALENT	1UP	38.5	HORIZ ELLIPSE	1.22	1.93	\$1,063.80	\$123,000
2	US04	29	PWOPRSE0003612	1350 TO A 1500 EQUIVALENT, RAISE U/S INVERT	1UP	22.77	HORIZ ELLIPSE	1.22	1.93	\$1,063.80	\$73,000
2	US04	30	PWOPRSE0003613	1350 TO A 1500 EQUIVALENT	1UP	31.58	HORIZ ELLIPSE	1.22	1.93	\$1,063.80	\$101,000
2	US04	31	PWOPRSE0003614	1350 TO 1500 EQUIVALENT, RAISE U/S INVERT	1UP	44.81	HORIZ ELLIPSE	1.22	1.93	\$1,063.80	\$143,000
2	US04	32	PWOPRSE0003619	1350 TO A 1500 EQUIVALENT	1UP	67.73	HORIZ ELLIPSE	1.22	1.93	\$1,063.80	\$216,000
2	US04	33	PWOPRSE0003620	1350 TO A 1500 EQUIVALENT	1UP	84.13	HORIZ ELLIPSE	1.22	1.93	\$1,063.80	\$268,000
2	US04	34	PWOPRSE0003621	1350 TO A 1500 EQUIVALENT, LOWER D/S INVERT	1UP	22.86	HORIZ ELLIPSE	1.22	1.93	\$1,063.80	\$73,000
2	US04	35	Victoria01	1050 TO A 1200	1UP	112.8	CIRCULAR	1.2	0	\$576.60	\$195,000
2	US04	36	Woodlawn01	1050 TO A 1200	1UP	81.99	CIRCULAR	1.2	0	\$576.60	\$142,000
2	US04	37	Woodlawn02	1050 TO A 1200	1UP	87.1	CIRCULAR	1.2	0	\$576.60	\$151,000
2	US04	NA	ALL	ALL SEWER UPGRADES	NA	2,185	NA	NA	NA	NA	\$4,286,000
2	US05	1	Emma1	750 TO A 975	3UP	68.5	CIRCULAR	0.975	0	\$402.60	\$83,000
2	US05	2	PWOPRSE0000640	750 TO A 975	3UP	50.14	CIRCULAR	0.975	0	\$402.60	\$61,000
2	US05	3	PWOPRSE0000643	300 TO A 375, DROP D/S INVERT	1UP	60.35	CIRCULAR	0.375	0	\$76.70	\$14,000
2	US05	4	PWOPRSE0000666	675 TO A 825	2UP	101.81	CIRCULAR	0.825	0	\$290.60	\$89,000
2	US05	5	PWOPRSE0000671	525 TO A 600	1UP	92.97	CIRCULAR	0.6	0	\$124.00	\$35,000
2	US05	6	PWOPRSE0000673	375 TO A 450	1UP	77.57	CIRCULAR	0.45	0	\$79.10	\$18,000
2	US05	7	PWOPRSE0000742	750 TO A 975	3UP	92.81	CIRCULAR	0.975	0	\$402.60	\$112,000
2	US05	8	PWOPRSE0000915A	750 TO A 975	3UP	21.7	CIRCULAR	0.975	0	\$402.60	\$26,000

TABLE M1: Detailed Cost Estimates for Recommended Storm Sewer Upgrades to meet a 5-Year Capacity											
Ward Area	Network	Pipe Number	Pipe ID	Description	Upgrade	Length (m)	Sewer Type	Geometry 1 (m)	Geometry 2 (m)	Unit Price per metre (2010 prices)	Total Estimated Cost
2	US05	9	PWOPRSES0000915B	750 TO A 975	3UP	62.6	CIRCULAR	0.975	0	\$402.60	\$76,000
2	US05	10	PWOPRSES0000953	300 TO A 450	2UP	91.14	CIRCULAR	0.45	0	\$79.10	\$22,000
2	US05	11	PWOPRSES0000992	300 TO A 375	1UP	60.96	CIRCULAR	0.375	0	\$76.70	\$14,000
2	US05	12	PWOPRSES0001002	750 TO A 975	3UP	77.42	CIRCULAR	0.975	0	\$402.60	\$94,000
2	US05	13	PWOPRSES0001008	675 TO A 825	2UP	75.14	CIRCULAR	0.825	0	\$290.60	\$66,000
2	US05	NA	ALL	ALL SEWER UPGRADES	NA	933	NA	NA	NA	NA	\$710,000
2	US07	1	PWOPRSES0001423	300 TO A 375	1UP	65.84	CIRCULAR	0.375	0	\$76.70	\$15,000
2	US07	2	PWOPRSES0001426	450 TO A 525	1UP	62.5	CIRCULAR	0.525	0	\$86.20	\$16,000
2	US07	3	PWOPRSES0001427	300 TO A 450	2UP	68.7	CIRCULAR	0.45	0	\$79.10	\$16,000
2	US07	4	PWOPRSES0002911	450 TO A 525	1UP	44.1	CIRCULAR	0.525	0	\$86.20	\$11,000
2	US07	5	PWOPRSES0007525	375 TO A 450	1UP	10.3	CIRCULAR	0.45	0	\$79.10	\$2,000
2	US07	6	PWOPRSES0007526	450 TO A 525	1UP	10	CIRCULAR	0.525	0	\$86.20	\$3,000
2	US07	NA	ALL	ALL SEWER UPGRADES	NA	261	NA	NA	NA	NA	\$63,000
2	US09	1	PWOPRSES0000595	900 EQUIVALENT TO A 1200 EQUIVALENT	3UP	5.8	HORIZ ELLIPSE	0.965	1.525	\$707.10	\$12,000
2	US09	2	PWOPRSES0000596	450 TO A 525	1UP	81.38	CIRCULAR	0.525	0	\$86.20	\$21,000
2	US09	3	PWOPRSES00007578	750 TO A 825	1UP	81.1	CIRCULAR	0.825	0	\$290.60	\$71,000
2	US09	4	PWOPRSES00007579	750 TO A 825	1UP	8.3	CIRCULAR	0.825	0	\$290.60	\$7,000
2	US09	5	PWOPRSES00007583	750 TO A 825	1UP	29.6	CIRCULAR	0.825	0	\$290.60	\$26,000
2	US09	6	PWOPRSES00007584	750 TO A 825	1UP	38	CIRCULAR	0.825	0	\$290.60	\$33,000
2	US09	7	PWOPRSES00007585	750 TO A 825	1UP	41.3	CIRCULAR	0.825	0	\$290.60	\$36,000
2	US09	8	PWOPRSES00007586	750 TO A 825	1UP	88.2	CIRCULAR	0.825	0	\$290.60	\$77,000
2	US09	9	PWOPRSES00007587	750 TO A 825	1UP	33.9	CIRCULAR	0.825	0	\$290.60	\$30,000
2	US09	NA	ALL	ALL SEWER UPGRADES	NA	408	NA	NA	NA	NA	\$313,000
3	LS02	1	PWOPRSES0000177	525 TO A 675	2UP	62.18	CIRCULAR	0.675	0	\$190.00	\$35,000
3	LS02	2	PWOPRSES0000184	675 TO A 825	2UP	95.71	CIRCULAR	0.825	0	\$290.60	\$83,000
3	LS02	3	PWOPRSES0000358	300 TO A 375	1UP	62.49	CIRCULAR	0.375	0	\$76.70	\$14,000
3	LS02	4	PWOPRSES0000372A	HE TO BOX, LOWER D/S INVERT	3UP	63	RECT_CLOSED	1.2	2.4	\$1,858.60	\$351,000
3	LS02	5	PWOPRSES0000372B	HE TO BOX, LOWER U/S AND D/S INVERTS	3UP	42	RECT_CLOSED	1.2	2.4	\$1,858.60	\$234,000
3	LS02	6	PWOPRSES0000389	750 TO A 1200	3UP	30.17	CIRCULAR	1.2	0	\$576.60	\$52,000
3	LS02	7	PWOPRSES0000391	750 TO A 1200, DROP D/S INVERT	3UP	84.89	CIRCULAR	1.2	0	\$576.60	\$147,000
3	LS02	8	PWOPRSES0000393	750 TO A 1200	3UP	78.03	CIRCULAR	1.2	0	\$576.60	\$135,000
3	LS02	9	PWOPRSES0000410	300 TO A 375	1UP	84.28	CIRCULAR	0.375	0	\$76.70	\$19,000
3	LS02	10	PWOPRSES0000411	300 TO A 375	1UP	57	CIRCULAR	0.375	0	\$76.70	\$13,000
3	LS02	11	PWOPRSES0000425	300 TO A 450	2UP	59.74	CIRCULAR	0.45	0	\$79.10	\$14,000
3	LS02	12	PWOPRSES0000481	300 TO A 600	3UP	62.18	CIRCULAR	0.6	0	\$124.00	\$23,000
3	LS02	13	PWOPRSES0000483	1200 TO A 1500 EQUIVALENT	2UP	71.9	HORIZ ELLIPSE	1.22	1.93	\$1,063.80	\$229,000
3	LS02	14	PWOPRSES0000484	1200 TO A 1650 EQUIVALENT	3UP	94.19	HORIZ ELLIPSE	1.345	2.11	\$1,261.30	\$356,000
3	LS02	15	PWOPRSES0000491	HE TO BOX, LOWER U/S INVERT, RAISE D/S INVERT	3UP	35	RECT_CLOSED	1.2	2.4	\$1,858.60	\$195,000
3	LS02	16	PWOPRSES0000496	300 TO A 525	3UP	96.62	CIRCULAR	0.525	0	\$86.20	\$25,000
3	LS02	17	PWOPRSES0000498	675 to a 750	1UP	50.9	CIRCULAR	0.75	0	\$250.50	\$38,000
3	LS02	18	PWOPRSES0000499		DIVERSION	4.27	CIRCULAR	0.75	0	\$250.50	\$3,000
3	LS02	19	PWOPRSES0000500	1350 TO BOX, RAISE U/S INVERT	3UP	89.92	RECT_CLOSED	1.2	2.4	\$1,858.60	\$501,000
3	LS02	20	PWOPRSES0000503	1350 TO BOX, RAISE U/S INVERT	3UP	128	RECT_CLOSED	1.2	2.4	\$1,858.60	\$714,000
3	LS02	21	PWOPRSES0000504	Circular to box, lower u/s invert (was 327.57) and d/s invert (was 327.4)	3UP	47.8	RECT_CLOSED	1.2	2.4	\$1,858.60	\$267,000
3	LS02	22	PWOPRSES0000508	300 TO A 375	1UP	85.65	CIRCULAR	0.375	0	\$76.70	\$20,000
3	LS02	23	PWOPRSES0000524	750 TO A 975	3UP	49.99	CIRCULAR	0.975	0	\$402.60	\$60,000
3	LS02	24	PWOPRSES0000529	525 TO A 825	3UP	78.03	CIRCULAR	0.825	0	\$290.60	\$68,000
3	LS02	25	PWOPRSES0000532	750 TO A 975	3UP	60.96	CIRCULAR	0.975	0	\$402.60	\$74,000
3	LS02	26	PWOPRSES0000535	450 TO A 600	2UP	79.71	CIRCULAR	0.6	0	\$124.00	\$30,000
3	LS02	27	PWOPRSES0000536	750 TO A 1200	3UP	57.15	CIRCULAR	1.2	0	\$576.60	\$99,000
3	LS02	28	PWOPRSES0001216	300 TO A 450	2UP	95.75	CIRCULAR	0.45	0	\$79.10	\$23,000
3	LS02	29	PWOPRSES0005184	375 TO A 450	1UP	42.1	CIRCULAR	0.45	0	\$79.10	\$10,000
3	LS02	30	PWOPRSES0005178	525 TO A 600	1UP	69.18	CIRCULAR	0.6	0	\$124.00	\$26,000
3	LS02	31	PWOPRSES0005179	525 TO A 600	1UP	68.88	CIRCULAR	0.6	0	\$124.00	\$26,000
3	LS02	32	PWOPRSES0005187	525 TO A 600	1UP	74.67	CIRCULAR	0.6	0	\$124.00	\$28,000
3	LS02	33	PWOPRSES0005200	300 TO A 525	3UP	44.86	CIRCULAR	0.525	0	\$86.20	\$12,000
3	LS02	34	PWOPRSES0005219	300 TO A 450	2UP	61.56	CIRCULAR	0.45	0	\$79.10	\$15,000
3	LS02	35	PWOPRSES0005231	300 TO A 450	2UP	47.24	CIRCULAR	0.45	0	\$79.10	\$11,000
3	LS02	36	PWOPRSES0005232	375 TO A 525	2UP	68.58	CIRCULAR	0.525	0	\$86.20	\$18,000
3	LS02	37	PWOPRSES0005241	300 TO A 600	3UP	77.57	CIRCULAR	0.6	0	\$124.00	\$29,000
3	LS02	38	PWOPRSES0005242	300 TO A 600	3UP	84.73	CIRCULAR	0.6	0	\$124.00	\$32,000
3	LS02	39	PWOPRSES0005253	300 TO A 450	2UP	95.4	CIRCULAR	0.45	0	\$79.10	\$23,000
3	LS02	40	PWOPRSES0005257	375 TO A 525	2UP	60.96	CIRCULAR	0.525	0	\$86.20	\$16,000
3	LS02	41	PWOPRSES0005259	300 TO A 375	1UP	6.57	CIRCULAR	0.375	0	\$76.70	\$2,000
3	LS02	42	PWOPRSES0005265	300 TO A 375	1UP	92.05	CIRCULAR	0.375	0	\$76.70	\$21,000
3	LS02	43	PWOPRSES0005269		DIVERSION	76.2	CIRCULAR	0.9	0	\$348.50	\$80,000
3	LS02	44	PWOPRSES0005270		DIVERSION	72.23	CIRCULAR	0.9	0	\$348.50	\$76,000
3	LS02	45	PWOPRSES0005271		DIVERSION	59.43	CIRCULAR	0.9	0	\$348.50	\$62,000
3	LS02	46	PWOPRSES0005272		DIVERSION	64.3	CIRCULAR	0.9	0	\$348.50	\$67,000
3	LS02	47	PWOPRSES0005280	375 TO A 675	3UP	84.92	CIRCULAR	0.675	0	\$190.00	\$37,000
3	LS02	48	PWOPRSES0005281	375 TO A 675	3UP	21.33	CIRCULAR	0.675	0	\$190.00	\$12,000
3	LS02	49	PWOPRSES0006274	375 TO A 450	1UP	102	CIRCULAR	0.45	0	\$79.10	\$24,000
3	LS02	50	PWOPRSES0006276	375 TO A 600	3UP	66.8	CIRCULAR	0.6	0	\$124.00	\$25,000
3	LS02	NA	ALL	ALL SEWER UPGRADES	NA	3,329	NA	NA	NA	NA	\$4,474,000
3	LS03	1	Division01	TECHNICALLY WORKS AS A 450, BUT SHOULD MATCH U/S SIZE - 450 TO A 525	1UP	15	CIRCULAR	0.525	0	\$86.20	\$4,000
3	LS03	2	Edinburgh1	450 TO A 525 (UNLIKELY TO BE DONE SOON - DONE IN 2010)	1UP	15.6	CIRCULAR	0.525	0	\$86.20	\$4,000
3	LS03	3	Edinburgh2	450 TO A 525 (UNLIKELY TO BE DONE SOON - DONE IN 2010)	1UP	34.6	CIRCULAR	0.525	0	\$86.20	\$9,000
3	LS03	4	Kathleen1		DIVERSION	79	CIRCULAR	0.525	0	\$86.20	\$20,000
3	LS03	5	Kathleen2		DIVERSION	178	CIRCULAR	0.825	0	\$290.60	\$155,000
3	LS03	6	Kathleen3		DIVERSION	114	CIRCULAR	0.825	0	\$290.60	\$99,000
3	LS03	7	Kathleen4		DIVERSION	197	CIRCULAR	0.825	0	\$290.60	\$172,000
3	LS03	8	Lyon		DIVERSION	54	CIRCULAR	0.45	0	\$79.10	\$13,000
3	LS03	9	PWOPRSES0000332	250 TO A 450	3UP	80.7	CIRCULAR	0.45	0	\$79.10	\$19,000
3	LS03	10	PWOPRSES0000446	300 TO A 375	1UP	79.69	CIRCULAR	0.375	0	\$76.70	\$18,000
3	LS03	11	PWOPRSES0000459	200 TO A 300	1UP	73.1	CIRCULAR	0.3	0	\$62.10	\$14,000
3	LS03	12	PWOPRSES0000462	300 TO A 525	3UP	79.22	CIRCULAR	0.525	0	\$86.20	\$20,000
3	LS03	13	PWOPRSES0000463	300 to a 525, lower d/s invert to give a better grade	3UP	12.19	CIRCULAR	0.525	0	\$86.20	\$3,000

TABLE M1: Detailed Cost Estimates for Recommended Storm Sewer Upgrades to meet a 5-Year Capacity

Ward Area	Network	Pipe Number	Pipe ID	Description	Upgrade	Length (m)	Sewer Type	Geometry 1 (m)	Geometry 2 (m)	Unit Price per metre (2010 prices)	Total Estimated Cost
3	LS03	14	PWOPRSE0000472	375 TO A 450	1UP	12	CIRCULAR	0.45	0	\$79.10	\$3,000
3	LS03	15	PWOPRSE0000476	300 TO A 450	2UP	83.82	CIRCULAR	0.45	0	\$79.10	\$20,000
3	LS03	16	PWOPRSE0000520	300 TO A 375	1UP	20	CIRCULAR	0.375	0	\$76.70	\$5,000
3	LS03	17	PWOPRSE0001096	300 TO A 525	3UP	60	CIRCULAR	0.525	0	\$86.20	\$16,000
3	LS03	18	PWOPRSE0001106	300 TO A 450	2UP	36.67	CIRCULAR	0.45	0	\$79.10	\$9,000
3	LS03	19	PWOPRSE0001192	SAME SIZE, JUST ADJUST D/S INVERT	1UP	79.5	CIRCULAR	0.75	0	\$250.50	\$60,000
3	LS03	20	PWOPRSE0001195	SAME SIZE, DROP U/S INVERT	1UP	9.8	CIRCULAR	0.75	0	\$250.50	\$7,000
3	LS03	21	PWOPRSE0001205	300 TO A 375	1UP	97.65	CIRCULAR	0.375	0	\$76.70	\$22,000
3	LS03	22	PWOPRSE0001209	200 TO A 450	3UP	6.1	CIRCULAR	0.45	0	\$79.10	\$1,000
3	LS03	23	PWOPRSE0001221	375 TO A 525, RAISE D/S INVERT	2UP	63.2	CIRCULAR	0.525	0	\$86.20	\$16,000
3	LS03	24	PWOPRSE0001222	600 TO A 675, BUT LOWER D/S INVERT	1UP	35.8	CIRCULAR	0.675	0	\$190.00	\$20,000
3	LS03	25	PWOPRSE0001223	600 TO A 675, LOWER U/S INVERT	1UP	72.3	CIRCULAR	0.675	0	\$190.00	\$41,000
3	LS03	26	PWOPRSE0001224	375 TO A 525	2UP	27.8	CIRCULAR	0.525	0	\$86.20	\$7,000
3	LS03	27	PWOPRSE0001225	300 TO A 375, RAISE D/S INVERT	1UP	20.7	CIRCULAR	0.375	0	\$76.70	\$5,000
3	LS03	28	PWOPRSE0001227	300 TO A 375	1UP	68.43	CIRCULAR	0.375	0	\$76.70	\$16,000
3	LS03	29	PWOPRSE0001231	200 TO A 375	2UP	82.91	CIRCULAR	0.375	0	\$76.70	\$19,000
3	LS03	30	PWOPRSE0001234	200 TO A 375	2UP	70.71	CIRCULAR	0.375	0	\$76.70	\$16,000
3	LS03	31	PWOPRSE0001237	300 TO A 450	2UP	92.69	CIRCULAR	0.45	0	\$79.10	\$22,000
3	LS03	32	PWOPRSE0001271	300 TO A 525	3UP	45.5	CIRCULAR	0.525	0	\$86.20	\$12,000
3	LS03	33	PWOPRSE0001272	450 TO A 675, LOWER D/S INVERT	3UP	112.3	CIRCULAR	0.675	0	\$190.00	\$64,000
3	LS03	34	PWOPRSE0001338	250 TO A 300	1UP	4.88	CIRCULAR	0.3	0	\$62.10	\$1,000
3	LS03	35	PWOPRSE0001365	300 TO A 450	2UP	77.76	CIRCULAR	0.45	0	\$79.10	\$18,000
3	LS03	36	PWOPRSE0001398	375 TO A 450	1UP	73.15	CIRCULAR	0.45	0	\$79.10	\$17,000
3	LS03	37	PWOPRSE0001439	300 TO A 375	1UP	63.25	CIRCULAR	0.375	0	\$76.70	\$15,000
3	LS03	38	PWOPRSE0001442	300 TO A 375	1UP	4.5	CIRCULAR	0.375	0	\$76.70	\$1,000
3	LS03	39	STM Glasgow	300 TO A 375	1UP	7.8	CIRCULAR	0.375	0	\$76.70	\$2,000
3	LS03	40	STM Kathleen	Part of Kathleen St Diversion	DIVERSION	16	CIRCULAR	0.825	0	\$290.60	\$14,000
3	LS03	41	STM Kirkland	300 TO A 375	1UP	9.8	CIRCULAR	0.375	0	\$76.70	\$2,000
3	LS03	42	STMLyon1	300 TO A 450	2UP	34.4	CIRCULAR	0.45	0	\$79.10	\$8,000
3	LS03	43	Torrance1		DIVERSION	31	CIRCULAR	0.6	0	\$124.00	\$12,000
3	LS03	NA	ALL	ALL SEWER UPGRADES	NA	2,433	NA	NA	NA	NA	\$1,021,000
3	LS04	1	Bristol1		DIVERSION	108.7	CIRCULAR	0.825	0	\$290.60	\$95,000
3	LS04	2	Bristol2		DIVERSION	51	CIRCULAR	0.75	0	\$250.50	\$38,000
3	LS04	3	Bristol3	Divert high flows into existing 450 to help take load off proposed diversion	DIVERSION	5	CIRCULAR	0.3	0	\$62.10	\$1,000
3	LS04	4	Holliday		DIVERSION	74.8	CIRCULAR	0.825	0	\$290.60	\$65,000
3	LS04	5	PWOPRSE0001256	250 to a 300, drop u/s invert, raise d/s invert to avoid backwater	1UP	55.32	CIRCULAR	0.3	0	\$62.10	\$10,000
3	LS04	6	PWOPRSE0001257	250 TO A 375	2UP	87.48	CIRCULAR	0.375	0	\$76.70	\$20,000
3	LS04	7	PWOPRSE0001258		DIVERSION	67.97	CIRCULAR	0.9	0	\$348.50	\$71,000
3	LS04	8	PWOPRSE0001263		DIVERSION	70.11	CIRCULAR	0.9	0	\$348.50	\$73,000
3	LS04	9	PWOPRSE0001265	600 TO A 975	3UP	29.26	CIRCULAR	0.975	0	\$402.60	\$35,000
3	LS04	10	PWOPRSE0002835	600 TO A 1500 EQUIVALENT, OUTLET INVERT RAISED - USE HE PIPE TO LOWER TAILWATER AND SAVE COVER	3UP	59.18	HORIZ_ELLIPSE	1.22	1.93	\$1,063.80	\$189,000
3	LS04	11	PWOPRSE0002866	600 TO A 1500 EQUIVALENT, U/S INVERT LOWERED SLIGHTLY - USE HE PIPE WITH LOW COVER AND TO LOWER TAILWATER	3UP	51.51	HORIZ_ELLIPSE	1.22	1.93	\$1,063.80	\$164,000
3	LS04	12	PWOPRSE0003031	1050 TO 1500 EQUIVALENT, LOWER INVERTS - NEED HE TO AVOID BACKWATER ONTO DUBLIN	3UP	137.16	HORIZ_ELLIPSE	1.22	1.93	\$1,063.80	\$438,000
3	LS04	13	PWOPRSE0003032	300 TO A 525	3UP	19.2	CIRCULAR	0.525	0	\$86.20	\$5,000
3	LS04	14	PWOPRSE0003033	450 TO A 900	3UP	90.92	CIRCULAR	0.9	0	\$348.50	\$95,000
3	LS04	15	PWOPRSE0003037	300 TO A 375, lower d/s invert, residual surcharge from tailwater from trunk	1UP	48.8	CIRCULAR	0.375	0	\$76.70	\$11,000
3	LS04	16	PWOPRSE0003045		DIVERSION	81.35	CIRCULAR	0.75	0	\$250.50	\$61,000
3	LS04	17	PWOPRSE0003046	250 TO A 525	3UP	83.38	CIRCULAR	0.525	0	\$86.20	\$22,000
3	LS04	18	PWOPRSE0003076	450 TO A 750	3UP	42.48	CIRCULAR	0.75	0	\$250.50	\$32,000
3	LS04	19	PWOPRSE0003077	450 TO A 750, Lower u/s and d/s inverts	3UP	45.72	CIRCULAR	0.75	0	\$250.50	\$34,000
3	LS04	20	PWOPRSE0003080	450 TO A 900	3UP	3.35	CIRCULAR	0.9	0	\$348.50	\$4,000
3	LS04	21	PWOPRSE0003831	300 TO A 450	2UP	53.39	CIRCULAR	0.45	0	\$79.10	\$13,000
3	LS04	22	PWOPRSE0007495	450 TO A 600	2UP	14.8	CIRCULAR	0.6	0	\$124.00	\$6,000
3	LS04	23	PWOPRSE0007503	525 TO A 600	1UP	56.4	CIRCULAR	0.6	0	\$124.00	\$21,000
3	LS04	24	Wellington1		DIVERSION	56	CIRCULAR	1.2	0	\$576.60	\$97,000
3	LS04	25	Wellington2		DIVERSION	97.8	CIRCULAR	1.2	0	\$576.60	\$169,000
3	LS04	26	Wellington3		DIVERSION	115.1	CIRCULAR	1.2	0	\$576.60	\$199,000
3	LS04	NA	ALL	ALL SEWER UPGRADES	NA	1,606	NA	NA	NA	NA	\$1,968,000
3	LS14	1	PWOPRSE0001278	300 TO A 375, raise both u/s and d/s invert to avoid TW	1UP	44.8	CIRCULAR	0.375	0	\$76.70	\$10,000
3	LS14	2	PWOPRSE0001279A	600 to a 825	3UP	65.7	CIRCULAR	0.825	0	\$290.60	\$57,000
3	LS14	3	PWOPRSE0001279B	600 to a 1050	3UP	22.8	CIRCULAR	1.05	0	\$459.90	\$31,000
3	LS14	4	PWOPRSE0001282	450 TO A 600	2UP	115	CIRCULAR	0.6	0	\$124.00	\$43,000
3	LS14	5	PWOPRSE0001285	300 TO A 750 - includes a diversion of flow from subcatchment LS14-01	3UP	60.96	CIRCULAR	0.75	0	\$250.50	\$46,000
3	LS14	6	PWOPRSE0001286	300 TO A 375, RAISE D/S INVERT TO AVOID TW	1UP	97.8	CIRCULAR	0.375	0	\$76.70	\$23,000
3	LS14	7	PWOPRSE0001288	300 to a 450, lower d/s slope	2UP	23.82	CIRCULAR	0.45	0	\$79.10	\$6,000
3	LS14	8	PWOPRSE0001290	600 to a 1050	3UP	106.2	CIRCULAR	1.05	0	\$459.90	\$147,000
3	LS14	9	PWOPRSE0001301	375 TO A 450	1UP	60.6	CIRCULAR	0.45	0	\$79.10	\$14,000
3	LS14	10	PWOPRSE0001311	300 TO A 375	1UP	67.36	CIRCULAR	0.375	0	\$76.70	\$15,000
3	LS14	11	PWOPRSE0001341	300 TO A 375	1UP	14.75	CIRCULAR	0.375	0	\$76.70	\$3,000
3	LS14	12	PWOPRSE0001349	300 TO A 450	2UP	60	CIRCULAR	0.45	0	\$79.10	\$14,000
3	LS14	13	PWOPRSE0001351	300 TO A 450	2UP	64.8	CIRCULAR	0.45	0	\$79.10	\$15,000
3	LS14	14	PWOPRSE0001352	300 TO A 450	2UP	6.15	CIRCULAR	0.45	0	\$79.10	\$1,000
3	LS14	15	PWOPRSE0003493	250 TO A 300	1UP	84.43	CIRCULAR	0.3	0	\$62.10	\$16,000
3	LS14	16	STM Edinburgh	300 TO A 450	2UP	70.1	CIRCULAR	0.45	0	\$79.10	\$17,000
3	LS14	NA	ALL	ALL SEWER UPGRADES	NA	965	NA	NA	NA	NA	\$458,000
3	LS15	1	PWOPRSE0003538	300 TO A 450	2UP	62.94	CIRCULAR	0.45	0	\$79.10	\$15,000
3	NW01	1	PWOPRSE0005067	DROP U/S AND D/S INVERT, 1050 TO A 1200	1UP	28.8	CIRCULAR	1.2	0	\$576.60	\$50,000
3	NW01	2	PWOPRSE0005069	1050 TO A 1200	1UP	104.72	CIRCULAR	1.2	0	\$576.60	\$181,000
3	NW01	3	PWOPRSE0005070	1200 TO A 1350	1UP	121.92	CIRCULAR	1.35	0	\$705.80	\$258,000
3	NW01	4	PWOPRSE0005071	1200 TO A 1350	1UP	114.3	CIRCULAR	1.35	0	\$705.80	\$242,000
3	NW01	5	PWOPRSE0005072	1050 TO A 1200	1UP	46.8	CIRCULAR	1.2	0	\$576.60	\$81,000

TABLE M1: Detailed Cost Estimates for Recommended Storm Sewer Upgrades to meet a 5-Year Capacity

Ward Area	Network	Pipe Number	Pipe ID	Description	Upgrade	Length (m)	Sewer Type	Geometry 1 (m)	Geometry 2 (m)	Unit Price per metre (2010 prices)	Total Estimated Cost
3	NW01	6	PWOPRSE0005144	450 to a 675	3UP	81	CIRCULAR	0.675	0	\$190.00	\$46,000
3	NW01	7	PWOPRSE0005145	600 TO A 750, LOWER D/S INVERT	2UP	31.7	CIRCULAR	0.75	0	\$250.50	\$24,000
3	NW01	8	PWOPRSE0005146	600 TO A 750, lower d/s invert	2UP	50.29	CIRCULAR	0.75	0	\$250.50	\$38,000
3	NW01	9	PWOPRSE0005147	600 TO A 750, lower u/s invert	2UP	28.04	CIRCULAR	0.75	0	\$250.50	\$21,000
3	NW01	10	PWOPRSE0005148	300 to a 450	2UP	74.06	CIRCULAR	0.45	0	\$79.10	\$18,000
3	NW01	11	PWOPRSE0005149	300 to a 525	3UP	75.59	CIRCULAR	0.525	0	\$86.20	\$20,000
3	NW01	12	PWOPRSE0005150	300 to a 525	3UP	82	CIRCULAR	0.525	0	\$86.20	\$21,000
3	NW01	13	PWOPRSE0005284	300 to a 450	2UP	65.68	CIRCULAR	0.45	0	\$79.10	\$16,000
3	NW01	14	PWOPRSE0005285	300 to a 450	2UP	76.2	CIRCULAR	0.45	0	\$79.10	\$18,000
3	NW01	15	PWOPRSE0005286	300 to a 450	2UP	55.16	CIRCULAR	0.45	0	\$79.10	\$13,000
3	NW01	16	PWOPRSE0005308	375 TO A 450	1UP	92.65	CIRCULAR	0.45	0	\$79.10	\$22,000
3	NW01	17	PWOPRSE0005311	300 to a 375	1UP	69.79	CIRCULAR	0.375	0	\$76.70	\$16,000
3	NW01	18	PWOPRSE0005313	300 to a 375	1UP	85.03	CIRCULAR	0.375	0	\$76.70	\$20,000
3	NW01	19	PWOPRSE0005314	375 TO A 450	1UP	91.44	CIRCULAR	0.45	0	\$79.10	\$22,000
3	NW01	20	PWOPRSE0005323	600 TO A 675	1UP	79.7	CIRCULAR	0.675	0	\$190.00	\$45,000
3	NW01	21	PWOPRSE0005324	300 TO A 375	1UP	55.93	CIRCULAR	0.375	0	\$76.70	\$13,000
3	NW01	22	PWOPRSE0005337	300 TO A 375	1UP	76.5	CIRCULAR	0.375	0	\$76.70	\$18,000
3	NW01	23	PWOPRSE0005344	300 TO A 375	1UP	87.81	CIRCULAR	0.375	0	\$76.70	\$20,000
3	NW01	24	PWOPRSE0005715	1200 TO A 1350	1UP	43.28	CIRCULAR	1.35	0	\$705.80	\$92,000
3	NW01	25	PWOPRSE0005717	1200 TO A 1350	1UP	64.01	CIRCULAR	1.35	0	\$705.80	\$136,000
3	NW01	26	PWOPRSE0005718	1200 TO A 1350	1UP	67.67	CIRCULAR	1.35	0	\$705.80	\$143,000
3	NW01	27	PWOPRSE0005719	1200 TO A 1350	1UP	47.55	CIRCULAR	1.35	0	\$705.80	\$101,000
3	NW01	NA	ALL	ALL SEWER UPGRADES	NA	1,898	NA	NA	NA	NA	\$1,695,000
3	US08	1	Avondale1	250 TO A 300	1UP	66.9	CIRCULAR	0.3	0	\$62.10	\$12,000
3	US08	2	ExhibitionDiversio1		DIVERSION	74	CIRCULAR	0.75	0	\$250.50	\$56,000
3	US08	3	ExhibitionDiversio2		DIVERSION	70	CIRCULAR	0.75	0	\$250.50	\$53,000
3	US08	4	ExhibitionDiversio3		DIVERSION	91	CIRCULAR	0.75	0	\$250.50	\$68,000
3	US08	5	ExhibitionDiversio4		DIVERSION	86	CIRCULAR	0.75	0	\$250.50	\$65,000
3	US08	6	ExhibitionDiversio5		DIVERSION	67	CIRCULAR	0.9	0	\$348.50	\$70,000
3	US08	7	PWOPRSE0000341	375 TO A 450	1UP	59.98	CIRCULAR	0.45	0	\$79.10	\$14,000
3	US08	8	PWOPRSE0000697		DIVERSION	60.3	CIRCULAR	0.675	0	\$190.00	\$34,000
3	US08	9	PWOPRSE0000744	1200 CSP TO 1200 CONCRETE	1UP	126	CIRCULAR	1.2	0	\$576.60	\$218,000
3	US08	10	PWOPRSE0000748	Increase 825 to a 1200	DIVERSION	133.7	CIRCULAR	1.2	0	\$576.60	\$231,000
3	US08	11	PWOPRSE0000751	Replace 1050 CSP with concrete, raise D/S invert, upgrade 1050 to a box	3UP	155.45	RECT_CLOSED	1.2	2.4	\$1,858.60	\$867,000
3	US08	12	PWOPRSE0000752	Replace 1050 CSP with concrete, raise U/S invert, upgrade 1050 to a box	3UP	104.09	RECT_CLOSED	1.2	2.4	\$1,858.60	\$580,000
3	US08	13	PWOPRSE0001036	300 TO A 375	1UP	59.74	CIRCULAR	0.375	0	\$76.70	\$14,000
3	US08	14	PWOPRSE0001037	300 TO A 450	2UP	74.53	CIRCULAR	0.45	0	\$79.10	\$18,000
3	US08	15	PWOPRSE0001038	300 TO A 375	1UP	58.83	CIRCULAR	0.375	0	\$76.70	\$14,000
3	US08	16	PWOPRSE0001039	300 TO A 375	1UP	59.62	CIRCULAR	0.375	0	\$76.70	\$14,000
3	US08	17	PWOPRSE0001041	300 TO A 375	1UP	43.74	CIRCULAR	0.375	0	\$76.70	\$10,000
3	US08	18	PWOPRSE0001058	600 TO A 825	3UP	84.22	CIRCULAR	0.825	0	\$290.60	\$73,000
3	US08	19	PWOPRSE0001059		DIVERSION	113.6	CIRCULAR	0.825	0	\$290.60	\$99,000
3	US08	20	PWOPRSE0001061	675 TO A 1050 EQUIVALENT, RAISE U/S INVERT	3UP	26.22	HORIZ_ELLIPSE	0.865	1.345	\$575.40	\$45,000
3	US08	21	PWOPRSE0001065		DIVERSION	94.7	CIRCULAR	0.975	0	\$402.60	\$114,000
3	US08	22	PWOPRSE0001067	300 TO A 525	3UP	65.15	CIRCULAR	0.525	0	\$86.20	\$17,000
3	US08	23	PWOPRSE0001068	300 TO A 450	2UP	68.4	CIRCULAR	0.45	0	\$79.10	\$16,000
3	US08	24	PWOPRSE0001069	300 TO A 375	1UP	63.86	CIRCULAR	0.375	0	\$76.70	\$15,000
3	US08	25	PWOPRSE0001078	600 TO A 1050 EQUIVALENT, RAISE D/S INVERT	3UP	67.21	HORIZ_ELLIPSE	0.865	1.345	\$575.40	\$116,000
3	US08	26	PWOPRSE0001145	450 TO A 900 EQUIVALENT, LOWER D/S INVERT	3UP	104.09	HORIZ_ELLIPSE	0.735	1.145	\$474.60	\$148,000
3	US08	27	PWOPRSE0001146	600 TO A 900 EQUIVALENT, LOWER U/S INVERT	3UP	80.5	HORIZ_ELLIPSE	0.735	1.145	\$474.60	\$115,000
3	US08	NA	ALL	ALL SEWER UPGRADES	NA	2,159	NA	NA	NA	NA	\$3,096,000
3	US10	1	PWOPRSE0000122	525 TO A 600	1UP	63.09	CIRCULAR	0.6	0	\$124.00	\$23,000
3	US10	2	PWOPRSE0000123	450 TO A 600	2UP	58.67	CIRCULAR	0.6	0	\$124.00	\$22,000
3	US10	3	PWOPRSE0000124	450 TO A 600	2UP	49.84	CIRCULAR	0.6	0	\$124.00	\$19,000
3	US10	4	PWOPRSE0000125	450 TO A 600	2UP	58.67	CIRCULAR	0.6	0	\$124.00	\$22,000
3	US10	5	PWOPRSE0000126	450 TO A 600	2UP	60.5	CIRCULAR	0.6	0	\$124.00	\$23,000
3	US10	6	PWOPRSE0000127	450 TO A 600	2UP	61.36	CIRCULAR	0.6	0	\$124.00	\$23,000
3	US10	7	PWOPRSE0000139	Replace 1500 CSP with concrete, d/s invert adjusted to ensure continuous grade	1UP	103.75	CIRCULAR	1.65	0	\$1,034.70	\$322,000
3	US10	8	PWOPRSE0000141	525 TO A 750	3UP	45.17	CIRCULAR	0.75	0	\$250.50	\$34,000
3	US10	9	PWOPRSE0000142	Replace 1500 CSP with concrete, u/s invert adjusted to ensure continuous grade	1UP	81.99	CIRCULAR	1.65	0	\$1,034.70	\$255,000
3	US10	10	PWOPRSE0000143	Replace 1500 CSP with concrete	1UP	77.63	CIRCULAR	1.65	0	\$1,034.70	\$241,000
3	US10	11	PWOPRSE0000555	300 TO A 375	1UP	35.97	CIRCULAR	0.375	0	\$76.70	\$8,000
3	US10	12	PWOPRSE0000556	Replace 1200 CSP with concrete	3UP	89.67	CIRCULAR	1.65	0	\$1,034.70	\$278,000
3	US10	13	PWOPRSE0000557	Replace 1200 CSP with concrete	3UP	113.78	CIRCULAR	1.65	0	\$1,034.70	\$353,000
3	US10	14	PWOPRSE0000559	Replace 1200 CSP with concrete	3UP	105.25	CIRCULAR	1.65	0	\$1,034.70	\$327,000
3	US10	15	PWOPRSE0000560	Replace 1050 CSP with concrete	3UP	91.29	CIRCULAR	1.65	0	\$1,034.70	\$283,000
3	US10	16	PWOPRSE0000561	Replace 1500 CSP with concrete	1UP	63.7	CIRCULAR	1.65	0	\$1,034.70	\$198,000
3	US10	17	PWOPRSE0000562	Replace 1500 CSP with concrete	1UP	91.96	CIRCULAR	1.65	0	\$1,034.70	\$285,000
3	US10	18	PWOPRSE0000563	Replace 1500 CSP with concrete	1UP	100.34	CIRCULAR	1.65	0	\$1,034.70	\$311,000
3	US10	19	PWOPRSE00007524	525 TO A 750	3UP	15.18	CIRCULAR	0.75	0	\$250.50	\$11,000
3	US10	NA	ALL	ALL SEWER UPGRADES	NA	1,368	NA	NA	NA	NA	\$3,038,000
3	US11	1	PWOPRSE0000545	300 TO A 450	2UP	75.29	CIRCULAR	0.45	0	\$79.10	\$18,000
3	US11	2	PWOPRSE0000547	600 TO A 675	1UP	70.3	CIRCULAR	0.675	0	\$190.00	\$40,000
3	US11	3	PWOPRSE0000552	600 TO A 675	1UP	48.16	CIRCULAR	0.675	0	\$190.00	\$27,000
3	US11	4	PWOPRSE0000553	450 TO A 675	3UP	50.29	CIRCULAR	0.675	0	\$190.00	\$29,000
3	US11	5	PWOPRSE0000645	900 CSP REPLACED WITH 1200 CONCRETE	3UP	152.1	CIRCULAR	1.2	0	\$576.60	\$263,000
3	US11	6	PWOPRSE0000704	375 TO A 450	1UP	46.18	CIRCULAR	0.45	0	\$79.10	\$11,000
3	US11	7	PWOPRSE0000706	525 TO A 600	1UP	74.68	CIRCULAR	0.6	0	\$124.00	\$28,000
3	US11	NA	ALL	ALL SEWER UPGRADES	NA	517	NA	NA	NA	NA	\$416,000
4	LS06	1	PWOPRSE0004673	675 TO A 900	3UP	86.3	CIRCULAR	0.9	0	\$348.50	\$90,000
4	LS06	2	PWOPRSE0004674	675 TO A 900	3UP	74.55	CIRCULAR	0.9	0	\$348.50	\$78,000
4	LS06	3	PWOPRSE0004675	675 TO A 900, lower d/s invert	3UP	15.5	CIRCULAR	0.9	0	\$348.50	\$16,000
4	LS06	4	PWOPRSE0004676	375 TO A 450	1UP	13.6	CIRCULAR	0.45	0	\$79.10	\$3,000
4	LS06	5	PWOPRSE0004712	675 TO A 900, u/s invert lowered slightly	3UP	62.48	CIRCULAR	0.9	0	\$348.50	\$65,000
4	LS06	6	PWOPRSE0004716	675 TO A 900	3UP	20.11	CIRCULAR	0.9	0	\$348.50	\$21,000

TABLE M1: Detailed Cost Estimates for Recommended Storm Sewer Upgrades to meet a 5-Year Capacity

Ward Area	Network	Pipe Number	Pipe ID	Description	Upgrade	Length (m)	Sewer Type	Geometry 1 (m)	Geometry 2 (m)	Unit Price per metre (2010 prices)	Total Estimated Cost
4	LS06	7	PWOPRSE0004726	300 TO A 375	1UP	71.62	CIRCULAR	0.375	0	\$76.70	\$16,000
4	LS06	8	PWOPRSE0004730	900 TO A 1200	3UP	64.61	CIRCULAR	1.2	0	\$576.60	\$112,000
4	LS06	9	PWOPRSE0004731	900 TO A 1200	3UP	15.24	CIRCULAR	1.2	0	\$576.60	\$26,000
4	LS06	10	PWOPRSE0004732	900 TO A 1200	3UP	94.48	CIRCULAR	1.2	0	\$576.60	\$163,000
4	LS06	11	PWOPRSE0004733	900 TO A 1200	3UP	46.32	CIRCULAR	1.2	0	\$576.60	\$80,000
4	LS06	12	PWOPRSE0004734	1050 TO A 1200	1UP	29.56	CIRCULAR	1.2	0	\$576.60	\$51,000
4	LS06	13	PWOPRSE0004735	1050 TO A 1200	1UP	45.11	CIRCULAR	1.2	0	\$576.60	\$78,000
4	LS06	14	PWOPRSE0004763	675 TO A 975	3UP	95.4	CIRCULAR	0.975	0	\$402.60	\$115,000
4	LS06	15	PWOPRSE0004764	300 TO A 375	1UP	12.92	CIRCULAR	0.375	0	\$76.70	\$3,000
4	LS06	16	PWOPRSE0004767	375 TO A 450	1UP	57.91	CIRCULAR	0.45	0	\$79.10	\$14,000
4	LS06	17	PWOPRSE0004816	675 TO A 750	1UP	30.73	CIRCULAR	0.75	0	\$250.50	\$23,000
4	LS06	18	PWOPRSE0004817	750 TO A 1050	3UP	94.48	CIRCULAR	1.05	0	\$459.90	\$130,000
4	LS06	19	PWOPRSE0004818	825 TO A 1050	3UP	67.66	CIRCULAR	1.05	0	\$459.90	\$93,000
4	LS06	20	PWOPRSE0004819	825 TO A 1050	3UP	14.02	CIRCULAR	1.05	0	\$459.90	\$19,000
4	LS06	21	PWOPRSE0004821	1350 TO 1500 EQUIVALENT	1UP	113.38	HORIZ ELLIPSE	1.22	1.93	\$1,063.80	\$362,000
4	LS06	22	PWOPRSE0004833	1500 TO 1650 EQUIVALENT	1UP	248.41	HORIZ ELLIPSE	1.345	2.11	\$1,261.30	\$940,000
4	LS06	23	PWOPRSE0004834	1500 TO 1650 EQUIVALENT	1UP	100.88	HORIZ ELLIPSE	1.345	2.11	\$1,261.30	\$382,000
4	LS06	24	PWOPRSE0004835	1500 TO 1650 EQUIVALENT	1UP	168.1	HORIZ ELLIPSE	1.345	2.11	\$1,261.30	\$636,000
4	LS06	25	PWOPRSE0004836	750 TO A 900	2UP	62.8	CIRCULAR	0.9	0	\$348.50	\$66,000
4	LS06	26	PWOPRSE0004841	750 TO A 900	2UP	33.83	CIRCULAR	0.9	0	\$348.50	\$35,000
4	LS06	27	PWOPRSE0004851	525 TO A 600	1UP	87.17	CIRCULAR	0.6	0	\$124.00	\$32,000
4	LS06	28	PWOPRSE0004852	675 TO A 825	2UP	52.73	CIRCULAR	0.825	0	\$290.60	\$46,000
4	LS06	29	PWOPRSE0004853	675 TO A 825	2UP	24.99	CIRCULAR	0.825	0	\$290.60	\$22,000
4	LS06	30	PWOPRSE0004854	675 TO A 825	2UP	38.7	CIRCULAR	0.825	0	\$290.60	\$34,000
4	LS06	31	PWOPRSE0004858	450 TO A 600	2UP	58.52	CIRCULAR	0.6	0	\$124.00	\$22,000
4	LS06	32	PWOPRSE0004859	450 TO A 600	2UP	11.27	CIRCULAR	0.6	0	\$124.00	\$4,000
4	LS06	33	PWOPRSE0004908	450 TO A 525	1UP	21.5	CIRCULAR	0.525	0	\$86.20	\$6,000
4	LS06	34	PWOPRSE0004909	450 TO A 525	1UP	14	CIRCULAR	0.525	0	\$86.20	\$4,000
4	LS06	35	PWOPRSE0004915	300 TO A 375, RAISE D/S INVERT	1UP	92.7	CIRCULAR	0.375	0	\$76.70	\$21,000
4	LS06	36	PWOPRSE0004917	300 TO A 375, RAISE D/S INVERT	1UP	58.6	CIRCULAR	0.375	0	\$76.70	\$13,000
4	LS06	37	PWOPRSE0005095	525 TO A 600, RAISE D/S INVERT SLIGHTLY	1UP	33.5	CIRCULAR	0.6	0	\$124.00	\$12,000
4	LS06	38	PWOPRSE0005852	675 TO A 900	3UP	95.4	CIRCULAR	0.9	0	\$348.50	\$100,000
4	LS06	39	PWOPRSE0005853	675 TO A 750	1UP	84.13	CIRCULAR	0.75	0	\$250.50	\$63,000
4	LS06	40	PWOPRSE0005854	675 TO A 750	1UP	9.94	CIRCULAR	0.75	0	\$250.50	\$7,000
4	LS06	41	PWOPRSE0005857	375 TO A 450, RAISE D/S INVERT ABOVE D/S PIPE	1UP	103.33	CIRCULAR	0.45	0	\$79.10	\$25,000
4	LS06	42	PWOPRSE0005858	675 TO A 900	3UP	54.16	CIRCULAR	0.9	0	\$348.50	\$57,000
4	LS06	NA	ALL	ALL SEWER UPGRADES	NA	2,581	NA	NA	NA	NA	\$4,085,000
4	NW02	1	PWOPRSE0005415	600 TO A 675	1UP	44.43	CIRCULAR	0.675	0	\$190.00	\$25,000
4	NW02	2	PWOPRSE0005417	300 TO A 375	1UP	53.34	CIRCULAR	0.375	0	\$76.70	\$12,000
4	NW02	3	PWOPRSE0005430	675 TO A 750	1UP	75.68	CIRCULAR	0.75	0	\$250.50	\$57,000
4	NW02	4	PWOPRSE0005431	675 TO A 750	1UP	47.7	CIRCULAR	0.75	0	\$250.50	\$36,000
4	NW02	5	PWOPRSE0005437	525 TO A 600	1UP	87.17	CIRCULAR	0.6	0	\$124.00	\$32,000
4	NW02	6	PWOPRSE0005445	375 TO A 450	1UP	73.45	CIRCULAR	0.45	0	\$79.10	\$17,000
4	NW02	7	PWOPRSE0005447	375 TO A 450	1UP	78.66	CIRCULAR	0.45	0	\$79.10	\$19,000
4	NW02	NA	ALL	ALL SEWER UPGRADES	NA	460	NA	NA	NA	NA	\$198,000
4	NW04	1	PWOPRSE0000090	600 TO A 675	1UP	83.8	CIRCULAR	0.675	0	\$190.00	\$48,000
4	NW04	2	PWOPRSE0000212	600 TO A 750	2UP	86.87	CIRCULAR	0.75	0	\$250.50	\$65,000
4	NW04	3	PWOPRSE0000215	300 TO A 375	1UP	110.64	CIRCULAR	0.375	0	\$76.70	\$25,000
4	NW04	4	PWOPRSE0005370	450 TO A 525 (UNLIKELY TO REPLACE SINCE SO DEEP)	1UP	80.2	CIRCULAR	0.525	0	\$86.20	\$21,000
4	NW04	NA	ALL	ALL SEWER UPGRADES	NA	362	NA	NA	NA	NA	\$159,000
4	WW01	1	PWOPRSE0000063		1UP	33.2	CIRCULAR	0.75	0	\$250.50	\$25,000
4	WW01	2	PWOPRSE0000067		DIVERSION	118	CIRCULAR	0.975	0	\$402.60	\$143,000
4	WW01	3	PWOPRSE0000068		1UP	83	CIRCULAR	0.75	0	\$250.50	\$62,000
4	WW01	4	PWOPRSE00004961		1UP	45.17	CIRCULAR	0.6	0	\$124.00	\$17,000
4	WW01	5	PWOPRSE00004962		2UP	81.53	CIRCULAR	0.75	0	\$250.50	\$61,000
4	WW01	6	PWOPRSE00004969		2UP	14.32	CIRCULAR	0.6	0	\$124.00	\$5,000
4	WW01	7	PWOPRSE00004982		2UP	42.97	CIRCULAR	0.9	0	\$348.50	\$45,000
4	WW01	8	WILLOW_DIVERSION		DIVERSION	38	CIRCULAR	0.825	0	\$290.60	\$33,000
4	WW01	NA	ALL	ALL SEWER UPGRADES	NA	456	NA	NA	NA	NA	\$391,000
4	WW04	1	PWOPRSE0000223	675 TO A 825	2UP	60.5	CIRCULAR	0.825	0	\$290.60	\$53,000
4	WW04	2	PWOPRSE0000224	675 TO A 825	2UP	8.5	CIRCULAR	0.825	0	\$290.60	\$7,000
4	WW04	3	PWOPRSE0000225	675 TO A 750	1UP	95.5	CIRCULAR	0.75	0	\$250.50	\$72,000
4	WW04	4	PWOPRSE0000230	525 TO A 600	1UP	89.3	CIRCULAR	0.6	0	\$124.00	\$33,000
4	WW04	5	PWOPRSE0000231	525 TO A 600	1UP	6.5	CIRCULAR	0.6	0	\$124.00	\$2,000
4	WW04	6	PWOPRSE0000233	525 TO A 600	1UP	43	CIRCULAR	0.6	0	\$124.00	\$16,000
4	WW04	NA	ALL	ALL SEWER UPGRADES	NA	303	NA	NA	NA	NA	\$183,000
4	WW05	1	PWOPRSE0000019	525 TO A 600	1UP	92.3	CIRCULAR	0.6	0	\$124.00	\$34,000
4	WW05	2	PWOPRSE0000098	450 TO A 525	1UP	55.7	CIRCULAR	0.525	0	\$86.20	\$14,000
4	WW05	3	PWOPRSE0000267	525 TO A 600	1UP	21.34	CIRCULAR	0.6	0	\$124.00	\$8,000
4	WW05	4	PWOPRSE0000309	450 TO A 600	2UP	13.4	CIRCULAR	0.6	0	\$124.00	\$5,000
4	WW05	5	PWOPRSE0000310	450 TO A 600	2UP	84.5	CIRCULAR	0.6	0	\$124.00	\$31,000
4	WW05	6	PWOPRSE0000313	375 TO A 450	1UP	108.81	CIRCULAR	0.45	0	\$79.10	\$26,000
4	WW05	7	PWOPRSE00004993	900 TO A 975	1UP	40.99	CIRCULAR	0.975	0	\$402.60	\$50,000
4	WW05	8	PWOPRSE00004994	900 TO A 1050	2UP	25.6	CIRCULAR	1.05	0	\$459.90	\$35,000
4	WW05	9	PWOPRSE00004995	900 TO A 1200	3UP	66.29	CIRCULAR	1.2	0	\$576.60	\$115,000
4	WW05	10	PWOPRSE00004996	750 TO A 900	2UP	45.72	CIRCULAR	0.9	0	\$348.50	\$48,000
4	WW05	11	PWOPRSE00004997	750 TO A 900	2UP	48.15	CIRCULAR	0.9	0	\$348.50	\$50,000
4	WW05	12	PWOPRSE00005014	900 TO A 1200	3UP	89.6	CIRCULAR	1.2	0	\$576.60	\$155,000
4	WW05	13	PWOPRSE00005015	900 TO A 1200	3UP	86.25	CIRCULAR	1.2	0	\$576.60	\$149,000
4	WW05	14	PWOPRSE00005016	900 TO A 1200, RAISE D/S INVERT	3UP	14.93	CIRCULAR	1.2	0	\$576.60	\$26,000
4	WW05	15	PWOPRSE00005380	300 TO A 375	1UP	82.26	CIRCULAR	0.375	0	\$76.70	\$19,000
4	WW05	16	PWOPRSE00005381	525 TO A 600	1UP	75.4	CIRCULAR	0.6	0	\$124.00	\$28,000
4	WW05	17	PWOPRSE00006435	300 TO A 375	1UP	51.97	CIRCULAR	0.375	0	\$76.70	\$12,000
4	WW05	18	STM1	525 TO A 600	1UP	82.3	CIRCULAR	0.6	0	\$124.00	\$31,000
4	WW05	NA	ALL	ALL SEWER UPGRADES	NA	1,086	NA	NA	NA	NA	\$836,000
4	WW06	1	PWOPRSE0000003	Propose HE pipe replacement for existing CSP culvert	2UP	27.2	HORIZ_ELLIPSE	0.735	1.145	\$474.60	\$39,000
5	HC01	1	PWOPRSE0001809	675 TO A 750	1UP	74.52	CIRCULAR	0.75	0	\$250.50	\$56,000

TABLE M1: Detailed Cost Estimates for Recommended Storm Sewer Upgrades to meet a 5-Year Capacity

Ward Area	Network	Pipe Number	Pipe ID	Description	Upgrade	Length (m)	Sewer Type	Geometry 1 (m)	Geometry 2 (m)	Unit Price per metre (2010 prices)	Total Estimated Cost
5	HC01	2	PWOPRSE0001962	750 TO A 825	1UP	76.81	CIRCULAR	0.825	0	\$290.60	\$67,000
5	HC01	NA	ALL	ALL SEWER UPGRADES	NA	151	NA	NA	NA	NA	\$123,000
5	HC02	1	PWOPRSE0001546	Adjust inverts, 600 to a 675	1UP	20.24	CIRCULAR	0.675	0	\$190.00	\$12,000
5	HC02	2	PWOPRSE0001547	Adjust inverts and upsize from a 600 to a 675	1UP	18.46	CIRCULAR	0.675	0	\$190.00	\$9,000
5	HC02	3	PWOPRSE0001555	600 to a 675	1UP	76.66	CIRCULAR	0.675	0	\$190.00	\$44,000
5	HC02	4	PWOPRSE0001556	600 to a 675	1UP	62.61	CIRCULAR	0.675	0	\$190.00	\$36,000
5	HC02	5	PWOPRSE0001559	Raised inverts, upsized from a 975 to a 1050	1UP	40.75	CIRCULAR	1.05	0	\$459.90	\$56,000
5	HC02	6	PWOPRSE0001564	600 to a 750	2UP	15.24	CIRCULAR	0.75	0	\$250.50	\$11,000
5	HC02	7	PWOPRSE0001572	Raised inverts, upsized from a 975 to a 1050	1UP	58.83	CIRCULAR	1.05	0	\$459.90	\$81,000
5	HC02	8	PWOPRSE0001633	525 to a 600	1UP	14.33	CIRCULAR	0.6	0	\$124.00	\$5,000
5	HC02	9	PWOPRSE0001654	975 to a 1050	1UP	141.73	CIRCULAR	1.05	0	\$459.90	\$196,000
5	HC02	10	PWOPRSE0001655	975 to a 1050	1UP	77.27	CIRCULAR	1.05	0	\$459.90	\$107,000
5	HC02	11	PWOPRSE0001656	975 to a 1050	1UP	152.1	CIRCULAR	1.05	0	\$459.90	\$210,000
5	HC02	12	PWOPRSE0001658	975 to a 1050	1UP	81.69	CIRCULAR	1.05	0	\$459.90	\$113,000
5	HC02	13	PWOPRSE0001660	Adjust inverts, upsize 975 to a 1050	1UP	72.09	CIRCULAR	1.05	0	\$459.90	\$99,000
5	HC02	14	PWOPRSE0001682	750 to a 825	1UP	89.46	CIRCULAR	0.825	0	\$290.60	\$78,000
5	HC02	15	PWOPRSE0001919	375 to a 450	1UP	27.74	CIRCULAR	0.45	0	\$79.10	\$7,000
5	HC02	16	PWOPRSE0001930	450 to a 525	1UP	54.56	CIRCULAR	0.525	0	\$86.20	\$14,000
5	HC02	NA	ALL	ALL SEWER UPGRADES	NA	1,002	NA	NA	NA	NA	\$1,078,000
5	HC04	1	PWOPRSE0001724	Inverts dropped, size increased from a 1095x1730 to a 1220x1920	1UP	74.5	HORIZ_ELLIPSE	1.22	1.93	\$1,063.80	\$238,000
5	HC04	2	PWOPRSE0001725	Inverts dropped, size increased from a 1095x1730 to a 1220x1920	1UP	41	HORIZ_ELLIPSE	1.22	1.93	\$1,063.80	\$131,000
5	HC04	3	PWOPRSE0001728	Inverts dropped, size increased from a 1095x1730 to a 1220x1920	1UP	17.1	HORIZ_ELLIPSE	1.22	1.93	\$1,063.80	\$55,000
5	HC04	4	PWOPRSE0001744	975 to a 1050	1UP	32.5	CIRCULAR	1.05	0	\$459.90	\$45,000
5	HC04	5	PWOPRSE0001750	1050 to 1200	1UP	16.1	CIRCULAR	1.2	0	\$576.60	\$28,000
5	HC04	6	PWOPRSE0001753	1050 to a 1200	1UP	42.5	CIRCULAR	1.2	0	\$576.60	\$74,000
5	HC04	7	PWOPRSE0001755	975 to a 1050	1UP	32.1	CIRCULAR	1.05	0	\$459.90	\$44,000
5	HC04	8	PWOPRSE0001756	975 to a 1050	1UP	13.5	CIRCULAR	1.05	0	\$459.90	\$19,000
5	HC04	9	PWOPRSE0001757	975 to a 1050	1UP	32.8	CIRCULAR	1.05	0	\$459.90	\$45,000
5	HC04	10	PWOPRSE0001759	975 to a 1050	1UP	70.9	CIRCULAR	1.05	0	\$459.90	\$98,000
5	HC04	11	PWOPRSE0001760	975 to a 1050	1UP	18.8	CIRCULAR	1.05	0	\$459.90	\$26,000
5	HC04	12	PWOPRSE0001765B	825 to a 900	1UP	24.3	CIRCULAR	0.9	0	\$348.50	\$25,000
5	HC04	NA	ALL	ALL SEWER UPGRADES	NA	416	NA	NA	NA	NA	\$828,000
5	HC05	1	PWOPRSE0005744	450 to a 525	1UP	17	CIRCULAR	0.525	0	\$86.20	\$4,000
5	HC06	1	PWOPRSE0001777	525 to a 600	1UP	89.8	CIRCULAR	0.6	0	\$124.00	\$33,000
5	HC06	2	PWOPRSE0001778	600 to a 675	1UP	17.25	CIRCULAR	0.675	0	\$190.00	\$10,000
5	HC06	3	PWOPRSE0001782	600 to a 675	1UP	83.8	CIRCULAR	0.675	0	\$190.00	\$48,000
5	HC06	4	PWOPRSE0001783	450 to a 600	2UP	19.4	CIRCULAR	0.6	0	\$124.00	\$7,000
5	HC06	5	PWOPRSE0001784	825 TO A 1050	3UP	88.4	CIRCULAR	1.05	0	\$459.90	\$122,000
5	HC06	6	PWOPRSE0001786	525 to a 750	3UP	3.8	CIRCULAR	0.75	0	\$250.50	\$3,000
5	HC06	7	PWOPRSE0001797	900 to a 1050	2UP	88.6	CIRCULAR	1.05	0	\$459.90	\$122,000
5	HC06	8	PWOPRSE0001798	900 to a 1050	2UP	24.15	CIRCULAR	1.05	0	\$459.90	\$33,000
5	HC06	9	PWOPRSE0005531	675 to a 750	1UP	21.4	CIRCULAR	0.75	0	\$250.50	\$16,000
5	HC06	10	PWOPRSE0005532	RAISE D/S INVERT, 675 TO A 750	1UP	25.9	CIRCULAR	0.75	0	\$250.50	\$19,000
5	HC06	NA	ALL	ALL SEWER UPGRADES	NA	463	NA	NA	NA	NA	\$413,000
5	LS05	1	HanlonOutlet		DIVERSION	10	CIRCULAR	0.3	0	\$62.10	\$2,000
5	LS05	2	OakParkInlet		DIVERSION	10	CIRCULAR	0.9	0	\$348.50	\$10,000
5	LS05	3	OakParkOutlet		DIVERSION	50	CIRCULAR	0.3	0	\$62.10	\$9,000
5	LS05	4	PWOPRSE0001644	600 to a 675	1UP	10.06	CIRCULAR	0.675	0	\$190.00	\$6,000
5	LS05	5	PWOPRSE0001645	300 to a 375	1UP	97.17	CIRCULAR	0.375	0	\$76.70	\$22,000
5	LS05	6	PWOPRSE0001668	600 to a 675	1UP	44.2	CIRCULAR	0.675	0	\$190.00	\$25,000
5	LS05	7	PWOPRSE0001669	600 to a 675	1UP	48.07	CIRCULAR	0.675	0	\$190.00	\$27,000
5	LS05	8	PWOPRSE0001671	450 to a 600	2UP	5.95	CIRCULAR	0.6	0	\$124.00	\$2,000
5	LS05	9	PWOPRSE0001672	450 to a 600	2UP	53.59	CIRCULAR	0.6	0	\$124.00	\$20,000
5	LS05	10	PWOPRSE0001879	300 to a 375	1UP	67	CIRCULAR	0.375	0	\$76.70	\$15,000
5	LS05	11	PWOPRSE0001880	300 to a 450	2UP	59.5	CIRCULAR	0.45	0	\$79.10	\$14,000
5	LS05	12	PWOPRSE0001882	300 to a 450	2UP	30.03	CIRCULAR	0.45	0	\$79.10	\$7,000
5	LS05	13	PWOPRSE0001883	300 to a 450	2UP	92.97	CIRCULAR	0.45	0	\$79.10	\$22,000
5	LS05	14	PWOPRSE0001902	300 to a 450. D/S invert adjusted to match as-built	2UP	31.1	CIRCULAR	0.45	0	\$79.10	\$7,000
5	LS05	15	PWOPRSE0001903	300 to a 450	2UP	120.4	CIRCULAR	0.45	0	\$79.10	\$29,000
5	LS05	16	PWOPRSE0002040	750 to a 825	1UP	52.88	CIRCULAR	0.825	0	\$290.60	\$46,000
5	LS05	17	PWOPRSE0002042	750 to a 825	1UP	88.7	CIRCULAR	0.825	0	\$290.60	\$77,000
5	LS05	18	PWOPRSE0002046	825 to a 1050 equivalent	3UP	49.68	HORIZ_ELLIPSE	0.865	1.345	\$575.40	\$86,000
5	LS05	19	PWOPRSE0002068	825 to a 1050 equivalent	3UP	37.74	HORIZ_ELLIPSE	0.865	1.345	\$575.40	\$65,000
5	LS05	20	PWOPRSE0002069	375 to a 450	1UP	23.59	CIRCULAR	0.45	0	\$79.10	\$6,000
5	LS05	21	PWOPRSE0002072	750 to a 900 equivalent	2UP	60.9	HORIZ_ELLIPSE	0.735	1.145	\$474.60	\$87,000
5	LS05	22	PWOPRSE0002073	600 to a 675	1UP	52.12	CIRCULAR	0.675	0	\$190.00	\$30,000
5	LS05	23	PWOPRSE0002077	375 to a 450	1UP	127.3	CIRCULAR	0.45	0	\$79.10	\$30,000
5	LS05	24	PWOPRSE0002083	825 to a 900, raise inverts	1UP	70.9	CIRCULAR	0.9	0	\$348.50	\$74,000
5	LS05	25	PWOPRSE0002095A	1200 to a 1350 equivalent	1UP	38.8	HORIZ_ELLIPSE	1.09	1.725	\$893.30	\$104,000
5	LS05	26	PWOPRSE0002095B	Restrictor to force higher flows into storage unit and save capacity in main branch	DIVERSION	64	CIRCULAR	0.675	0	\$190.00	\$36,000
5	LS05	27	PWOPRSE0002098	1200 to a 1350 equivalent	1UP	95.8	HORIZ_ELLIPSE	1.09	1.725	\$893.30	\$257,000
5	LS05	28	PWOPRSE0002102	450 to a 525	1UP	66.85	CIRCULAR	0.525	0	\$86.20	\$17,000
5	LS05	29	PWOPRSE0002138	900 to a 975, raise inverts slightly	1UP	65.29	CIRCULAR	0.975	0	\$402.60	\$79,000
5	LS05	30	PWOPRSE0002140	900 to a 975, raise inverts	1UP	65.29	CIRCULAR	0.975	0	\$402.60	\$79,000
5	LS05	31	PWOPRSE0002210	300 to a 375	1UP	48.6	CIRCULAR	0.375	0	\$76.70	\$11,000
5	LS05	32	PWOPRSE0002213	450 to a 525	1UP	126.5	CIRCULAR	0.525	0	\$86.20	\$33,000
5	LS05	33	PWOPRSE0002606	825 to a 975	2UP	123.25	CIRCULAR	0.975	0	\$402.60	\$149,000
5	LS05	34	PWOPRSE0002611	600 to a 675	1UP	93.64	CIRCULAR	0.675	0	\$190.00	\$53,000
5	LS05	35	PWOPRSE0002623	300 to a 525	3UP	94.09	CIRCULAR	0.525	0	\$86.20	\$24,000
5	LS05	36	PWOPRSE0002626	900 to a 1050	2UP	37.49	CIRCULAR	1.05	0	\$459.90	\$52,000
5	LS05	37	PWOPRSE0002629	900 to a 1050	2UP	57.4	CIRCULAR	1.05	0	\$459.90	\$79,000
5	LS05	38	PWOPRSE0002631	900 to a 1050, lower u/s invert	2UP	56.78	CIRCULAR	1.05	0	\$459.90	\$78,000
5	LS05	39	PWOPRSE0002635	900 to a 1050	2UP	58.01	CIRCULAR	1.05	0	\$459.90	\$80,000
5	LS05	40	PWOPRSE0002641	600 to a 675	1UP	121.92	CIRCULAR	0.675	0	\$190.00	\$69,000
5	LS05	41	PWOPRSE0002644	375 to a 450	1UP	82.15	CIRCULAR	0.45	0	\$79.10	\$19,000
5	LS05	42	PWOPRSE0002645	900 to a 1050	2UP	18.4	CIRCULAR	1.05	0	\$459.90	\$25,000
5	LS05	43	PWOPRSE0002646	375 to a 450	1UP	9.4	CIRCULAR	0.45	0	\$79.10	\$2,000

TABLE M1: Detailed Cost Estimates for Recommended Storm Sewer Upgrades to meet a 5-Year Capacity

Ward Area	Network	Pipe Number	Pipe ID	Description	Upgrade	Length (m)	Sewer Type	Geometry 1 (m)	Geometry 2 (m)	Unit Price per metre (2010 prices)	Total Estimated Cost
5	LS05	44	PWOPRSE0002647	900 to a 1050	2UP	129	CIRCULAR	1.05	0	\$459.90	\$178,000
5	LS05	45	PWOPRSE0002649	750 to a 900	2UP	165.7	CIRCULAR	0.9	0	\$348.50	\$173,000
5	LS05	46	PWOPRSE0002652	675 to a 825	2UP	53.6	CIRCULAR	0.825	0	\$290.60	\$47,000
5	LS05	47	PWOPRSE0002653	750 to a 825	1UP	5	CIRCULAR	0.825	0	\$290.60	\$4,000
5	LS05	48	PWOPRSE0002656	450 to a 525	1UP	78.5	CIRCULAR	0.525	0	\$86.20	\$20,000
5	LS05	49	PWOPRSE0002657	200 to a 375	2UP	34.9	CIRCULAR	0.375	0	\$76.70	\$8,000
5	LS05	50	PWOPRSE0002658	450 to a 525	1UP	18	CIRCULAR	0.525	0	\$86.20	\$5,000
5	LS05	51	PWOPRSE0002661	450 to a 525	1UP	92.05	CIRCULAR	0.525	0	\$86.20	\$24,000
5	LS05	52	PWOPRSE0002666	300 to a 375	1UP	33.53	CIRCULAR	0.375	0	\$76.70	\$8,000
5	LS05	53	PWOPRSE0002669	825 to a 1050	3UP	99.06	CIRCULAR	1.05	0	\$459.90	\$137,000
5	LS05	54	PWOPRSE0002670	825 to a 1050	3UP	57.61	CIRCULAR	1.05	0	\$459.90	\$79,000
5	LS05	55	PWOPRSE0002671	825 to a 1050	3UP	11.89	CIRCULAR	1.05	0	\$459.90	\$16,000
5	LS05	56	PWOPRSE0002707	525 to a 750	3UP	11.86	CIRCULAR	0.75	0	\$250.50	\$9,000
5	LS05	57	PWOPRSE0002709A	750 to a 825	1UP	17.2	CIRCULAR	0.825	0	\$290.60	\$15,000
5	LS05	58	PWOPRSE0002709B	750 to a 825	1UP	45.7	CIRCULAR	0.825	0	\$290.60	\$40,000
5	LS05	59	PWOPRSE0002720	900 to a 1050	2UP	91.44	CIRCULAR	1.05	0	\$459.90	\$126,000
5	LS05	60	PWOPRSE0002722	300 to a 375	1UP	42.37	CIRCULAR	0.375	0	\$76.70	\$10,000
5	LS05	61	PWOPRSE0002731	750 to a 825	1UP	66.9	CIRCULAR	0.825	0	\$290.60	\$58,000
5	LS05	62	PWOPRSE0002733	450 to a 600	2UP	74.07	CIRCULAR	0.6	0	\$124.00	\$28,000
5	LS05	63	PWOPRSE0002745	1050 to a 1200	1UP	117.65	CIRCULAR	1.2	0	\$576.60	\$204,000
5	LS05	64	PWOPRSE0002760	375 to a 525	2UP	85.19	CIRCULAR	0.525	0	\$86.20	\$22,000
5	LS05	65	PWOPRSE0002764	825 to a 900	1UP	78.64	CIRCULAR	0.9	0	\$348.50	\$82,000
5	LS05	66	PWOPRSE0002766	825 to a 900	1UP	99.97	CIRCULAR	0.9	0	\$348.50	\$105,000
5	LS05	67	PWOPRSE0002769	525 to a 600	1UP	68.63	CIRCULAR	0.6	0	\$124.00	\$26,000
5	LS05	68	PWOPRSE0002770	525 to a 600	1UP	38.71	CIRCULAR	0.6	0	\$124.00	\$14,000
5	LS05	69	PWOPRSE0002802	300 to a 525	3UP	84.19	CIRCULAR	0.525	0	\$86.20	\$22,000
5	LS05	70	PWOPRSE0002803	300 to a 525	3UP	120.4	CIRCULAR	0.525	0	\$86.20	\$31,000
5	LS05	71	PWOPRSE0002808	525 to a 600	1UP	42.67	CIRCULAR	0.6	0	\$124.00	\$16,000
5	LS05	72	PWOPRSE0003384	600 to a 750	2UP	97.57	CIRCULAR	0.75	0	\$250.50	\$73,000
5	LS05	73	PWOPRSE0003385	825 to a 900	1UP	104.55	CIRCULAR	0.9	0	\$348.50	\$109,000
5	LS05	74	PWOPRSE0003386	825 to a 900	1UP	102.2	CIRCULAR	0.9	0	\$348.50	\$107,000
5	LS05	75	PWOPRSE0003387	825 to a 900	1UP	14.48	CIRCULAR	0.9	0	\$348.50	\$15,000
5	LS05	76	PWOPRSE0003404	525 to a 600	1UP	48.25	CIRCULAR	0.6	0	\$124.00	\$18,000
5	LS05	NA	ALL	ALL SEWER UPGRADES	NA	4,849	NA	NA	NA	NA	\$3,793,000
5	LS07	1	Denver1		DIVERSION	76.3	CIRCULAR	0.525	0	\$86.20	\$20,000
5	LS07	2	Municipal1		DIVERSION	39.9	CIRCULAR	0.525	0	\$86.20	\$10,000
5	LS07	3	Municipal2		DIVERSION	27.3	CIRCULAR	0.525	0	\$86.20	\$7,000
5	LS07	4	PWOPRSE0003308		1UP	15.09	CIRCULAR	1.2	0	\$576.60	\$26,000
5	LS07	5	PWOPRSE0003340		1UP	49.68	CIRCULAR	0.525	0	\$86.20	\$13,000
5	LS07	6	PWOPRSE0003351		1UP	66.2	CIRCULAR	1.2	0	\$576.60	\$115,000
5	LS07	7	PWOPRSE0003352		1UP	123.44	CIRCULAR	1.2	0	\$576.60	\$214,000
5	LS07	8	PWOPRSE0003353		1UP	56.69	CIRCULAR	1.2	0	\$576.60	\$98,000
5	LS07	9	PWOPRSE0003365		DIVERSION	63.03	CIRCULAR	0.525	0	\$86.20	\$16,000
5	LS07	10	PWOPRSE0003366		1UP	83.58	CIRCULAR	0.525	0	\$86.20	\$22,000
5	LS07	11	Water4		DIVERSION	29.6	CIRCULAR	0.6	0	\$124.00	\$11,000
5	LS07	NA	ALL	ALL SEWER UPGRADES	NA	631	NA	NA	NA	NA	\$552,000
5	LS08	1	PWOPRSE0001319	600 TO A 675	1UP	75.59	CIRCULAR	0.675	0	\$190.00	\$43,000
5	LS08	2	PWOPRSE0001320	600 TO A 675	1UP	71.63	CIRCULAR	0.675	0	\$190.00	\$41,000
5	LS08	3	PWOPRSE0001321	300 TO A 375	1UP	59.74	CIRCULAR	0.375	0	\$76.70	\$14,000
5	LS08	4	PWOPRSE0001322	450 TO A 600	2UP	75.9	CIRCULAR	0.6	0	\$124.00	\$28,000
5	LS08	5	PWOPRSE0003114	300 TO A 450	2UP	73	CIRCULAR	0.45	0	\$79.10	\$17,000
5	LS08	6	PWOPRSE0003168	300 TO A 525	3UP	39	CIRCULAR	0.525	0	\$86.20	\$10,000
5	LS08	7	PWOPRSE0003169	375 TO A 525	2UP	46.94	CIRCULAR	0.525	0	\$86.20	\$12,000
5	LS08	NA	ALL	ALL SEWER UPGRADES	NA	442	NA	NA	NA	NA	\$165,000
5	LS09	1	DIVERSION CALEDONIA		DIVERSION	128.5	CIRCULAR	0.375	0	\$76.70	\$30,000
5	LS09	2	DIVERSION MOORE		DIVERSION	126.7	CIRCULAR	0.45	0	\$79.10	\$30,000
5	LS09	3	James 1A		DIVERSION	26.5	CIRCULAR	1.05	0	\$459.90	\$37,000
5	LS09	4	PWOPRSE0002702		1UP	57.18	CIRCULAR	0.45	0	\$79.10	\$14,000
5	LS09	5	PWOPRSE0003091		1UP	113.23	CIRCULAR	0.375	0	\$76.70	\$26,000
5	LS09	6	PWOPRSE0003098		1UP	31.85	CIRCULAR	0.375	0	\$76.70	\$7,000
5	LS09	7	PWOPRSE0003104		2UP	42.06	HORIZ ELLIPSE	0.865	1.345	\$575.40	\$73,000
5	LS09	8	PWOPRSE0003116		1UP	102.66	HORIZ ELLIPSE	0.865	1.345	\$575.40	\$177,000
5	LS09	9	PWOPRSE0003119		2UP	80.77	HORIZ ELLIPSE	0.965	1.525	\$707.10	\$171,000
5	LS09	10	PWOPRSE0003120		1UP	100.46	HORIZ ELLIPSE	0.865	1.345	\$575.40	\$173,000
5	LS09	11	PWOPRSE0003121		1UP	13.81	HORIZ ELLIPSE	0.865	1.345	\$575.40	\$24,000
5	LS09	12	PWOPRSE0003128		3UP	91.9	HORIZ ELLIPSE	0.965	1.525	\$707.10	\$195,000
5	LS09	13	PWOPRSE0003133		DIVERSION	196.16	CIRCULAR	0.825	0	\$290.60	\$171,000
5	LS09	14	PWOPRSE0003138		2UP	41.76	CIRCULAR	0.375	0	\$76.70	\$10,000
5	LS09	15	PWOPRSE0003156		2UP	134.2	HORIZ ELLIPSE	0.865	1.345	\$575.40	\$232,000
5	LS09	16	PWOPRSE0003159		3UP	62.48	CIRCULAR	0.675	0	\$190.00	\$36,000
5	LS09	17	PWOPRSE0003160A		3UP	73.3	CIRCULAR	0.675	0	\$190.00	\$42,000
5	LS09	18	PWOPRSE0003160B		3UP	60.5	CIRCULAR	0.675	0	\$190.00	\$34,000
5	LS09	19	PWOPRSE0003161		DIVERSION	122.22	CIRCULAR	1.2	0	\$576.60	\$211,000
5	LS09	20	PWOPRSE0003194		3UP	41.8	CIRCULAR	0.6	0	\$124.00	\$16,000
5	LS09	21	PWOPRSE0003195		3UP	39.35	CIRCULAR	0.675	0	\$190.00	\$22,000
5	LS09	22	PWOPRSE0003197		2UP	41.39	CIRCULAR	0.45	0	\$79.10	\$10,000
5	LS09	23	PWOPRSE0003206		1UP	145.08	CIRCULAR	1.2	0	\$576.60	\$251,000
5	LS09	24	PWOPRSE0003207		DIVERSION	83.21	CIRCULAR	1.2	0	\$576.60	\$144,000
5	LS09	25	PWOPRSE0003215		1UP	46.63	CIRCULAR	0.45	0	\$79.10	\$11,000
5	LS09	26	PWOPRSE0003218		2UP	74.98	CIRCULAR	0.6	0	\$124.00	\$28,000
5	LS09	27	PWOPRSE0003219		2UP	19.35	CIRCULAR	0.6	0	\$124.00	\$7,000
5	LS09	28	PWOPRSE0003249		3UP	78.55	CIRCULAR	0.6	0	\$124.00	\$29,000
5	LS09	29	PWOPRSE0003266		1UP	61.08	CIRCULAR	0.375	0	\$76.70	\$14,000
5	LS09	30	PWOPRSE0003395		3UP	71.63	CIRCULAR	0.45	0	\$79.10	\$17,000
5	LS09	31	TalbotDivision1		DIVERSION	61.6	CIRCULAR	1.2	0	\$576.60	\$107,000
5	LS09	32	TalbotDivision2		DIVERSION	60	CIRCULAR	1.2	0	\$576.60	\$104,000
5	LS09	NA	ALL	ALL SEWER UPGRADES	NA	2,431	NA	NA	NA	NA	\$2,453,000
5	LS10	1	PWOPRSE0003049	300 TO A 375	1UP	52.88	CIRCULAR	0.375	0	\$76.70	\$12,000
5	LS10	2	PWOPRSE0003053	450 TO A 525	1UP	32.6	CIRCULAR	0.525	0	\$86.20	\$8,000
5	LS10	3	PWOPRSE0003054	450 TO A 525	1UP	81.2	CIRCULAR	0.525	0	\$86.20	\$21,000
5	LS10	4	PWOPRSE0003055	375 TO 450	1UP	81.2	CIRCULAR	0.45	0	\$79.10	\$19,000
5	LS10	5	PWOPRSE0003063	900 TO A 975	1UP	31.7	CIRCULAR	0.975	0	\$402.60	\$38,000
5	LS10	6	PWOPRSE0003067	900 TO A 975	1UP	48	CIRCULAR	0.975	0	\$402.60	\$58,000

TABLE M1: Detailed Cost Estimates for Recommended Storm Sewer Upgrades to meet a 5-Year Capacity

Ward Area	Network	Pipe Number	Pipe ID	Description	Upgrade	Length (m)	Sewer Type	Geometry 1 (m)	Geometry 2 (m)	Unit Price per metre (2010 prices)	Total Estimated Cost
5	LS10	7	PWOPRSES0003274	375 TO A 525	2UP	74.07	CIRCULAR	0.525	0	\$86.20	\$19,000
5	LS10	NA	ALL	ALL SEWER UPGRADES	NA	402	NA	NA	NA	NA	\$175,000
5	LS11	1	PWOPRSES0001588	675 TO A 825	2UP	16.9	CIRCULAR	0.825	0	\$290.60	\$15,000
5	LS11	2	PWOPRSES0001589	675 TO A 825	2UP	33.2	CIRCULAR	0.825	0	\$290.60	\$29,000
5	LS11	3	PWOPRSES0001590	675 TO A 825	2UP	50.8	CIRCULAR	0.825	0	\$290.60	\$44,000
5	LS11	4	PWOPRSES0001591	675 TO A 825	2UP	50.9	CIRCULAR	0.825	0	\$290.60	\$44,000
5	LS11	5	PWOPRSES0001606	750 TO A 825	1UP	93.8	CIRCULAR	0.825	0	\$290.60	\$82,000
5	LS11	NA	ALL	ALL SEWER UPGRADES	NA	246	NA	NA	NA	NA	\$214,000
5	LS16	1	PWOPRSES0003314		2UP	58.28	CIRCULAR	0.45	0	\$79.10	\$14,000
5	LS16	2	PWOPRSES0003315		2UP	7.01	CIRCULAR	0.525	0	\$86.20	\$2,000
5	LS16	3	PWOPRSES0003316		2UP	17.22	CIRCULAR	0.525	0	\$86.20	\$4,000
5	LS16	4	PWOPRSES0003317		2UP	54.47	CIRCULAR	0.525	0	\$86.20	\$14,000
5	LS16	5	PWOPRSES0003321		3UP	61.26	CIRCULAR	0.525	0	\$86.20	\$16,000
5	LS16	6	PWOPRSES0003322		3UP	75.9	CIRCULAR	0.675	0	\$190.00	\$43,000
5	LS16	7	PWOPRSES0003324		DIVERSION	78.03	CIRCULAR	0.75	0	\$250.50	\$59,000
5	LS16	8	Water3		DIVERSION	71.5	CIRCULAR	0.6	0	\$124.00	\$27,000
5	LS16	NA	ALL	ALL SEWER UPGRADES	NA	424	NA	NA	NA	NA	\$179,000
5	LS17	1	James1B		DIVERSION	61.8	CIRCULAR	1.05	0	\$459.90	\$85,000
5	LS17	2	James2		DIVERSION	123	CIRCULAR	1.05	0	\$459.90	\$170,000
5	LS17	3	Mary		DIVERSION	160	CIRCULAR	1.05	0	\$459.90	\$221,000
5	LS17	4	OutletPipe		DIVERSION	61	CIRCULAR	1.05	0	\$459.90	\$84,000
5	LS17	5	PWOPRSES0003096		2UP	64.92	CIRCULAR	0.375	0	\$76.70	\$15,000
5	LS17	6	PWOPRSES0003190		1UP	54.86	CIRCULAR	0.375	0	\$76.70	\$13,000
5	LS17	7	PWOPRSES0003203		1UP	83.76	CIRCULAR	0.375	0	\$76.70	\$19,000
5	LS17	NA	ALL	ALL SEWER UPGRADES	NA	609	NA	NA	NA	NA	\$607,000