

APPENDIX G

Hydrogeology

**TABLE 1 - MONTHLY WATER BALANCE
Windsor Annexed Area - Pre-Development**

**Monthly Water Balance Analysis
Upper Little River EA
Existing Conditions**

Land Description Factors	Sub-Area 1	Sub-Area 2	Sub-Area 3	Sub-Area 4	Sub-Area 5	Sub-Area 6	Sub-Area 7		
Topography	0.21	0.26	0.22	0.26	0.20	0.30	0.28		
Soils	0.1	0.15	0.1	0.15	0.2	0.1	0.15		
Cover	0.05	0.05	0.1	0.1	0.1	0.2	0.2		
Sum (Infiltration Factor)	0.36	0.46	0.42	0.51	0.50	0.60	0.63		
Soil Moisture Capacity (mm)	75	100	150	200	200	350	400		
Area (ha)	560.9	704.4	2351.1	681.5	44.2	80.1	37.3	4459.5	
Percentage of Total Site Area	12.6%	15.8%	52.7%	15.3%	1.0%	1.8%	0.8%	100%	
Total Site Area (ha)								4459.5	

- Sub-Area 1** Urban Lawn, Clay, Flat to Rolling
- Sub-Area 2** Urban Lawn, Clay Loam, Flat to Rolling
- Sub-Area 3** Moderately Rooted Crops, Clay, Flat to Rolling
- Sub-Area 4** Moderately Rooted Crops, Clay Loam, Flat to Rolling
- Sub-Area 5** Moderately Rooted Crops, Loam, Rolling
- Sub-Area 6** Mature Forest, Clay, Flat to Rolling
- Sub-Area 7** Mature Forest, Clay Loam, Flat to Rolling

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Climate Data (Data from WINDSOR A Station via Environment Canada Website - Climate Normals from 1981-2010)													
Average Daily Temperature (°C)	-3.8	-2.6	2.3	8.9	15	20.5	23	22	17.9	11.3	5.1	-1.2	
Precipitation (mm)	62.1	62.2	70	83	89.3	86.1	89.2	72.6	93.9	72.6	79.6	74.1	934.7
Evapotranspiration Analysis													
Saturation Vapour Pressure (mb)	4.61	5.04	7.21	11.42	17.09	24.18	28.18	26.52	20.56	13.41	8.79	5.60	
PET (Malstrom, 1969) (mm/month)	0.00	0.00	29.50	46.71	69.90	98.90	115.25	108.45	84.09	54.86	35.96	0.00	643.6
Precipitation - PET (mm)	62.10	62.20	40.50	36.29	19.40	-12.80	-26.05	-35.85	9.81	17.74	43.64	74.10	
Weighted Soil Storage Capacity (mm)	146.49	146.49	146.49	146.49	146.49	146.49	146.49	146.49	146.49	146.49	146.49	146.49	
Actual Soil Moisture (mm)	146.49	146.49	146.49	146.49	146.49	133.69	107.64	71.79	81.60	99.34	142.98	146.49	
Change in Soil Moisture (mm)	0.00	0.00	0.00	0.00	0.00	-12.80	-26.05	-35.85	9.81	17.74	43.64	3.52	
Actual Evapotranspiration (mm)	0.00	0.00	29.50	46.71	69.90	98.90	115.25	108.45	84.09	54.86	35.96	0.00	643.6
Recharge/Runoff Analysis													
Surplus	62.1	62.2	40.5	36.3	19.4	0.0	0.0	0.0	0.0	0.0	0.0	70.6	291.1
Deficit	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Weighted Infiltration Factor	0.439	0.439	0.439	0.439	0.439	0.439	0.439	0.439	0.439	0.439	0.439	0.439	
Runoff (mm)	34.85	34.90	22.72	20.37	10.89	0.00	0.00	0.00	0.00	0.00	0.00	39.61	163.3
Recharge (mm)	0.00	0.00	103.30	15.93	8.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	127.7

Balance Check (should equal zero) 0

Volume-Based Balance (m ³)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Precipitation	2,769,374	2,773,834	3,121,678	3,701,418	3,982,369	3,839,664	3,977,910	3,237,626	4,187,508	3,237,626	3,549,794	3,304,519	41,683,320
Evapotranspiration	0	0	1,315,762	2,082,841	3,117,042	4,410,667	5,139,563	4,836,276	3,750,119	2,446,628	1,603,730	0	28,702,630
Runoff	1,554,027	1,556,529	1,013,385	908,260	485,576	0	0	0	0	0	0	1,766,302	7,284,078
Groundwater Recharge	0	0	4,606,544	710,317	379,751	0	0	0	0	0	0	0	5,696,612

Balance Check (should equal zero) 0

TABLE 2 - MONTHLY WATER BALANCE
Windsor Annexed Area
Post-Development

Monthly Water Balance Analysis
 Upper Little River EA
 Proposed Conditions

Land Description Factors for Pervious Areas	Sub-Area A	Sub-Area B	Sub-Area C	Sub-Area D	Sub-Area E	Sub-Area F	Sub-Area G	Sub-Area H	Sub-Area I	Sub-Area J
Topography	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
Soils	0.1	0.15	0.2	0.1	0.15	0.1	0.15	0.2	0.1	0.15
Cover	0.05	0.05	0.05	0.05	0.05	0.15	0.15	0.15	0.05	0.05
Sum (Infiltration Factor)	0.42	0.47	0.52	0.42	0.47	0.52	0.57	0.62	0.42	0.47
Soil Moisture Capacity (mm)	150	100	125	150	100	200	250	250	150	100
Percent Impervious (Assumed)	90%	90%	90%	80%	80%	5%	5%	5%	50%	50%
Area (ha)	261.8	46.7	2.0	1006.1	510.5	637.9	203.8	1.5	1086.3	702.8
Impervious Area (ha)	236	42	2	805	408	32	10	0	543	351
Pervious Area (ha)	26	5	0	201	102	606	194	1	543	351
Percentage of Total Pervious Area	1.3%	0.2%	0.0%	9.9%	5.0%	29.9%	9.5%	0.1%	26.8%	17.3%
Total Pervious Area (ha)	2030.1	46%								
Total Impervious Area (ha)	2429.5	54%								
Total Site Area (ha)	4459.5									

Land Cover Descriptions

- Sub-Area A** Commercial with Urban Lawn, Clay, Rolling to Hilly
- Sub-Area B** Commercial with Urban Lawn, Clay Loam/Clay Sand, Rolling to Hilly
- Sub-Area C** Commercial with Urban Lawn, Loam, Rolling to Hilly
- Sub-Area D** Mixed Use (Urban Lawn), Clay, Rolling to Hilly
- Sub-Area E** Mixed Use (Urban Lawn), Clay Loam/Clay Sand, Rolling to Hilly
- Sub-Area F** Natural Environment (Pasture and Shrubs), Clay, Rolling to Hilly
- Sub-Area G** Natural Environment (Pasture and Shrubs), Clay Loam/Clay Sand, Rolling to Hilly
- Sub-Area H** Natural Environment (Pasture and Shrubs), Loam, Rolling to Hilly
- Sub-Area I** Residential with Urban Lawn, Clay, Rolling to Hilly
- Sub-Area J** Residential with Urban Lawn, Clay Loam/Clay Sand, Rolling to Hilly

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Climate Data (Data from Waterloo Wellington Airport Station via Environment Canada Website - Climate Normals from 1981-2010)													
Average Daily Temperature (°C)	-3.8	-2.6	2.3	8.9	15	20.5	23	22	17.9	11.3	5.1	-1.2	
Precipitation (mm)	62.1	62.2	70	83	89.3	86.1	89.2	72.6	93.9	72.6	79.6	74.1	934.7
Evapotranspiration Analysis - Pervious Areas													
Saturation Vapour Pressure (mb)	4.6	5.0	7.2	11.4	17.1	24.2	28.2	26.5	20.6	13.4	8.8	5.6	
PET (Malstrom, 1969) (mm/month)	0.0	0.0	29.5	46.7	69.9	98.9	115.2	108.4	84.1	54.9	36.0	0.0	643.6
Precipitation - PET (mm)	62.1	62.2	40.5	36.3	19.4	-12.8	-26.0	-35.8	9.8	17.7	43.6	74.1	
Weighted Soil Storage Capacity (mm)	163.2	163.2	163.2	163.2	163.2	163.2	163.2	163.2	163.2	163.2	163.2	163.2	
Actual Soil Moisture (mm)	163.2	163.2	163.2	163.2	163.2	150.4	124.4	88.5	98.4	116.1	159.7	163.2	
Change in Soil Moisture (mm)	0.0	0.0	0.0	0.0	0.0	-12.8	-26.0	-35.8	9.8	17.7	43.6	3.5	
Actual Evapotranspiration (mm)	0.0	0.0	29.5	46.7	69.9	98.9	115.2	108.4	84.1	54.9	36.0	0.0	643.6
Recharge/Runoff Analysis - Pervious Areas													
Surplus	62.1	62.2	40.5	36.3	19.4	0.0	0.0	0.0	0.0	0.0	0.0	70.6	291.1
Deficit	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Weighted Infiltration Factor	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
Runoff (mm)	32.6	32.6	21.2	19.0	10.2	0.0	0.0	0.0	0.0	0.0	0.0	37.0	152.6
Recharge (mm)	0.0	0.0	111.9	17.3	9.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	138.4

Balance Check (should equal zero) 0

Recharge/Runoff Analysis - Impervious Areas													
Precipitation	62.1	62.2	70.0	83.0	89.3	86.1	89.2	72.6	93.9	72.6	79.6	74.1	934.7
Runoff (mm)	62.1	62.2	70.0	83.0	89.3	86.1	89.2	72.6	93.9	72.6	79.6	74.1	934.7
Recharge (mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Site-Wide Volume-Based Balance (m ³)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Year (mm)
Precipitation	2,769,374	2,773,834	3,121,678	3,701,418	3,982,369	3,839,664	3,977,910	3,237,626	4,187,508	3,237,626	3,549,794	3,304,519	41,683,320	934.7
Evapotranspiration	0	0	598,961	948,151	1,418,940	2,007,824	2,339,632	2,201,570	1,707,129	1,113,754	730,050	0	13,066,013	293
Runoff	2,169,799	2,173,293	2,131,732	2,402,842	2,376,084	2,091,772	2,167,085	1,763,794	2,281,270	1,763,794	1,933,856	2,551,639	25,806,960	579
Groundwater Recharge	0	0	2,272,577	350,425	187,345	0	0	0	0	0	0	0	2,810,348	63

Balance Check (should equal zero) 0

MOE WELL RECORDS		Lot	Township	Easting	Northing	Year Built	Casing	Water	Static	Pump Test	Pump	Test	Well	Well	Water	Static	Pump	Pump	Test	Well	Well Screen			Well	Water	Static	Test Water	Water	Height	Height	Specific	
Well ID	Conc.						Diameter	Found	WL	WL	Rate	Time	Depth	Elevation	Found	WL	Rate	Rate	Depth	Elevation	Rate	Rate	Time	Depth	Depth	Length	Elevation	Found	WL	Elevation	Level	of Water
							(inches)	(feet)	(feet)	(feet)	(IGPM)	(hrs)	(feet)	(ft. AMSL)	(ft. AMSL)	(ft. AMSL)	m3/d	L/min	(hrs)	(m BGS)	(m BGS)	(m BGS)	(m AMSL)	(m AMSL)	(m AMSL)	(m AMSL)	(m)	(m)				
21-02684	3	95	Sandwich East	337420	4680670	1949	4	149	35		6	3.0	149	625	476	590	39.3	27.3		45.4			190.5	145.1	179.8			34.7				
21-02685	3	95	Sandwich East	337280	4680660	1957	10	145	32	108	154	8.0	192	620	475	588	1008.1	700.1		58.5			189.0	144.8	179.2	146.3	23.2	48.8	25.6	43.5	30.2	
21-02686	3	96	Sandwich East	337525	4680670	1949	4	140	24		6	5.0	140	625	485	601	39.3	27.3		42.7			190.5	147.8	183.2			35.4				
21-02687	3	96	Sandwich East	336960	4680910	1952	2	144	28	32	4		144	620	476	592	26.2	18.2		43.9			189.0	145.1	180.4	170.7	1.2	35.4	34.1	21.5	14.9	
21-02688	3	110	Sandwich East	338865	4683180	1960	4						191	614						58.2			187.1									
21-02689	3	111	Sandwich East	339880	4681250	1950	2	218	15	20	3		219	610	392	595	19.6	13.6		66.8			185.9	119.5	181.4	175.3	1.5	62.2	60.7	12.9	8.9	
21-02690	3	136	Sandwich East	342385	4682810	1962	3	130	10	25	10	4.0	130	600	470	590	65.5	45.5		39.6			182.9	143.3	179.8	172.2	4.6	36.6	32.0	14.3	9.9	
21-02691	3	140	Sandwich East	343360	4682035	1952	2	139	7				139	600	461	593				42.4			182.9	140.5	180.7			40.2				
21-02700	5	6	Sandwich South	336360	4675090	1967	4	120	25	30	10	1.0	120	615	495	590	65.5	45.5	1.0	36.6			187.5	150.9	179.8	170.7	1.5	29.0	27.4	43.0	29.8	
21-02702	5	8	Sandwich South	335275	4676370	1949	2	114	22		6	4.0	114	620	506	598	39.3	27.3	4.0	34.7			189.0	154.2	182.3			28.0				
21-02703	5	7	Sandwich South	335145	4676410	1949	4	108	21		6	3.0	108	610	502	589	39.3	27.3	3.0	32.9			185.9	153.0	179.5			26.5				
21-02704	5	7	Sandwich South	336230	4675000	1963	3	113	29	40	4	3.0	113	620	507	591	26.2	18.2	3.0	34.4			189.0	154.5	180.1	167.9	3.4	25.6	22.3	7.8	5.4	
21-02705	5	7	Sandwich South	336330	4676010	1963	4	116	33	45	5	2.0	116	620	504	587	32.7	22.7	2.0	35.4			189.0	153.6	178.9	165.2	3.7	25.3	21.6	8.9	6.2	
21-02706	5	13	Sandwich South	336240	4678615	1950	2	142	30	35	4		142	610	468	580	26.2	18.2		43.3			185.9	142.6	176.8	166.1	1.5	34.1	32.6	17.2	11.9	
21-02707	5	13	Sandwich South	336595	4678710	1951	3	147	35				147	610	463	575				44.8			185.9	141.1	175.3			34.1				
21-02708	5	13	Sandwich South	336620	4678740	1964	3	135	35	70	4	3.0	135	610	475	575	26.2	18.2		41.1			185.9	144.8	175.3	153.9	10.7	30.5	19.8	2.5	1.7	
21-02709	5	15	Sandwich South	335520	4680030	1953	4	134	26	26	4	4.0	134	610	476	584	26.2	18.2		40.8			185.9	145.1	178.0	170.1	0.0	32.9	32.9			
21-02710	5	15	Sandwich South	336555	4680310	1959	3	138	30	85	4	5.0	142	620	482	590	26.2	18.2		43.3			189.0	146.9	179.8	153.9	16.8	34.1	17.4	1.6	1.1	
21-02711	5	15	Sandwich South	336540	4680340	1959	3	158	28	100	4	3.0	160	620	462	592	26.2	18.2		48.8			189.0	140.8	180.4	150.0	21.9	40.2	18.3	1.2	0.8	
21-02712	5	16	Sandwich South	336680	4680340	1951	4	180	35				180	620	440	585				54.9			189.0	134.1	178.3			44.2				
21-02717	6	6	Sandwich South	337760	4675185	1964	3	320	30	45	5	3.0	121	620	300	590	32.7	22.7	3.0	36.9			189.0	91.4	179.8	166.1	4.6	27.7	23.2	7.2	5.0	
21-02719	6	7	Sandwich South	337745	4675500	1956	3	117	42	45	6		117	620	503	578	39.3	27.3		35.7			189.0	153.3	176.2	162.5	0.9	22.9	21.9	43.0	29.8	
21-02720	6	13	Sandwich South	337995	4678870	1955	3	142	38	39	11	1.5	142	625	483	587	72.0	50.0		43.3			190.5	147.2	178.9	167.0	0.3	31.7	31.4	236.2	164.1	
21-02721	6	14	Sandwich South	337670	4679450	1956	3	154	40	50	2	2.0	154	620	466	580	13.1	9.1		46.9			189.0	142.0	176.8	161.5	3.0	34.7	31.7	4.3	3.0	
21-02722	6	15	Sandwich South	337980	4679620	1952	2	152	30		1		153	620	468	590	6.5	4.5		46.6			189.0	142.6	179.8			37.5				
21-02723	6	15	Sandwich South	337410	4680240	1954	2		30	32	4	2.5	140	620	590	590	26.2	18.2		42.7			189.0		179.8	170.1	0.6	33.5	32.9	43.0	29.8	
21-02724	6	15	Sandwich South	337330	4679720	1955	3	167	30	40	6	0.5	167	625	458	595	39.3	27.3		50.9			190.5	139.6	181.4	169.2	3.0	41.8	38.7	12.9	8.9	
21-02725	6	15	Sandwich South	336900	4680330	1956	3	145	28	40	8		152	625	480	597	52.4	36.4		46.3			190.5	146.3	182.0	169.8	3.7	37.8	34.1	14.3	9.9	
21-02726	6	15	Sandwich South	337700	4679605	1957	5	153	65	70	6	6.0	153	620	467	555	39.3	27.3		46.6			189.0	142.3	169.2	147.8	1.5	26.8	25.3	25.8	17.9	
21-02727	6	16	Sandwich South	337340	4680520	1950	3	140	32	32	6		150	625	485	593	39.3	27.3		45.7			190.5	147.8	180.7	171.0	0.0	36.0	36.0			
21-02728	6	16	Sandwich South	337120	4680520	1950	4	147	35		7	3.0	147	625	478	590	45.8	31.8		44.8			190.5	145.7	179.8			34.1				
21-02729	6	16	Sandwich South	337640	4680610	1951	4	165	35				165	625	460	590				50.3			190.5	140.2	179.8			39.6				
21-02730	6	16	Sandwich South	337605	4680620	1953	4		32	33	3	3.0	156	625	593	593	19.6	13.6		47.5			190.5		180.7	170.7	0.3	37.8	37.5	64.4	44.7	
21-02737	7	6	Sandwich South	338925	4675050	1959	4	123	40	60	12	3.5	125	625	502	585	78.6	54.6	3.5	38.1			190.5	153.0	178.3	160.0	6.1	25.9	19.8	12.9	8.9	
21-02738	6	7	Sandwich South	336625	4675900	1954	3	117	30	45	5	1.0	117	620	503	590	32.7	22.7	1.0	35.7			189.0	153.3	179.8	166.1	4.6	26.5	21.9	7.2	5.0	
21-02738	7	12	Sandwich South	339300	4678070	1958	3	135	40	42	4	2.0	135	620	485	580	26.2	18.2	2.0	41.1			189.0	147.8	176.8	164.0	0.6	29.0	28.3	43.0	29.8	
21-02739	7	12	Sandwich South	338000	4678000	1965	4	122	40	50	6	3.0	122	625	503	585	39.3	27.3	3.0	37.2			190.5	153.3	178.3	163.1	3.0	25.0	21.9	12.9	8.9	
21-02740	7	13	Sandwich South	339300	4678310	1959	3	100	40	60	4	8.0	101	620	520	580	26.2	18.2	8.0	30.8			189.0	158.5	176.8	158.5	6.1	18.6	12.5	4.3	3.0	
21-02741	7	13	Sandwich South	338820	4678580	1960	4						63	620						19.2			189.0									
21-02742	7	13	Sandwich South	338825	4678540	1960	4	83	33	35	7	2.0	83	620	537	587	45.8	31.8	2.0	25.3			189.0	163.7	178.9	168.2	0.6	15.2	14.6	75.2	52.2	
21-02743	7	13	Sandwich South	338045	4678880	1962	4	130	38	43	8	1.0	130	625	495	587	52.4	36.4	1.0	39.6			190.5	150.9	178.9	165.8	1.5	28.0	26.5	34.4	23.9	
21-02744	7	13	Sandwich South	338075	4678590	1964	5	122	38	40	10	5.0	122	625	503	587	65.5	45.5	5.0	37.2			190.5	153.3	178.9	166.7	0.6	25.6	25.0	107.4	74.6	
21-02745	7	13	Sandwich South	339260	4678610	1965	8	145	20	60	25	48.0	152	620	475	600	163.7	113.7	48.0	46.3			189.0	144.8	182.9	164.6	12.2	40.2	28.0	13.4	9.3	
21-02746	7	13	Sandwich South	338020	4678430	1967	4	113	35	65	5	3.0	114	628	515	593	32.7	22.7	3.0	34.7			191.4	157.0	180.7	160.9	9.1	24.1	14.9	3.6	2.5	
21-02747	7	15	Sandwich South	339440	4679880	1956	4	140	20	40	5	24.0	145	620	480	600	32.7	22.7	24.0	44.2			189.0	146.3	182.9	170.7	6.1	38.1	32.0	5.4	3.7	
21-02748	7	15	Sandwich South	338120	4679815	1959	3	166	80	170	1	2.																				

MOE WELL RECORDS		Lot	Township	Easting	Northing	Year Built	Casing	Water	Static	Pump Test	Pump	Test	Well	Well	Water	Static	Pump	Pump	Test	Well	Well Screen			Well	Water	Static	Test Water	Water	Height	Height	Specific		
Well ID	Conc.						Diameter	Found	WL	WL	Rate	Time	Depth	Elevation	Found	WL	Elevation	Found	Elevation	Rate	Rate	Time	Depth	Depth	Length	Elevation	Found	WL	Elevation	Level	of Water	of Water	Capacity
							(inches)	(feet)	(feet)	(feet)	(IGPM)	(hrs)	(feet)	(ft. AMSL)	(ft. AMSL)	(ft. AMSL)	m3/d	L/min	(hrs)	(m BGS)	(m BGS)	(m BGS)	(m AMSL)	(m AMSL)	(m AMSL)	(m AMSL)	(m)	(m)	(m)	(m)	m3/d/m	L/min/m	
21-02808	10	10	Sandwich South	342880	4676300	1964	3					110	620										189.0										
21-02809	10	10	Sandwich South	342885	4676340	1964	3	110	28	33	8	3.0	110	620	510	592	52.4	36.4					189.0	155.4	180.4	170.4	1.5	25.0	23.5	34.4	23.9		
21-02810	10	10	Sandwich South	342000	4676780	1967	4	117	27	30	10	1.0	117	620	503	593	65.5	45.5					189.0	153.3	180.7	171.6	0.9	27.4	26.5	71.6	49.7		
21-02811	10	10	Sandwich South	342960	4676250	1967	4	110	30	40	10	2.5	111	620	510	590	65.5	45.5					189.0	155.4	179.8	167.6	3.0	24.7	21.6	21.5	14.9		
21-02812	10	12	Sandwich South	342100	4678020	1963	3	135	20	30	4	2.0	135	615	480	595	26.2	18.2					187.5	146.3	181.4	172.2	3.0	35.1	32.0	8.6	6.0		
21-02814	10	13	Sandwich South	342070	4678030	1956	3	167	30				170	615	448	585							187.5	136.6	178.3			42.7					
21-02815	10	13	Sandwich South	342125	4678590	1958	3	135	20	25	6	3.0	136	615	480	595	39.3	27.3					187.5	146.3	181.4	173.7	1.5	35.4	33.8	25.8	17.9		
21-02816	10	15	Sandwich South	342215	4679160	1966	4	155	50	160	0	3.0	160	610	455	560							185.9	138.7	170.7	121.9	33.5	33.5	0.0				
21-02817	10	16	Sandwich South	343100	4680280	1954	2	145	16	20	6	2.0	146	610	465	594	39.3	27.3					185.9	141.7	181.1	175.0	1.2	39.6	38.4	32.2	22.4		
21-02818	10	19	Sandwich South	342340	4681600	1950	2	118	15	20	5		119	602	484	587	32.7	22.7					183.5	147.5	178.9	172.8	1.5	31.7	30.2	21.5	14.9		
21-02819	10	19	Sandwich South	342590	4681640	1950	2	124	12	16	5		124	602	478	590	32.7	22.7					183.5	145.7	179.8	175.0	1.2	34.1	32.9	26.8	18.6		
21-02826	11	9	Sandwich South	344180	4675840	1950	2	115	24	30	5		115	620	505	596	32.7	22.7					189.0	153.9	181.7	172.5	1.8	27.7	25.9	17.9	12.4		
21-02827	11	12	Sandwich South	343430	4677380	1955	4	145	26	27	12	2.0	145	610	465	584	78.6	54.6					185.9	141.7	178.0	169.8	0.3	36.3	36.0	257.7	179.0		
21-02828	11	12	Sandwich South	343500	4677850	1952	3	137	23	35	4	4.0	137	610	473	587	26.2	18.2					185.9	144.2	178.9	168.2	3.7	34.7	31.1	7.2	5.0		
21-02829	11	17	Sandwich South	343645	4680340	1952	2	110	7				110	605	495	598							184.4	150.9	182.3			31.4					
21-02830	11	18	Sandwich South	343700	4681200	1952	2	116	7	12	3		116	604	488	597	19.6	13.6					184.1	148.7	182.0	178.3	1.5	33.2	31.7	12.9	8.9		
21-02831	11	18	Sandwich South	343740	4681100	1965	4	120	30	20	10	3.0	120	604	484	574	65.5	45.5					184.1	147.5	175.0	168.9	-3.0	27.4	30.5	-21.5	-14.9		
21-02833	10	12	Sandwich South	343340	4677850	1967	5	178	40	140	3	2.0	180	610	432	570	19.6	13.6					185.9	131.7	173.7	131.1	30.5	42.7	12.2	0.6	0.4		
21-02860	297		Sandwich South	341905	4675360	1956	3	108	30	30	6	3.0	108	625	517	595	39.3	27.3					190.5	157.6	181.4	172.2	0.0	23.8	23.8				
21-02861	296		Sandwich South	342230	4675250	1949	4	119	25		5	6.0	119	625	506	600	32.7	22.7					190.5	154.2	182.9			28.7					
21-02862	296		Sandwich South	342640	4675100	1953	4		25	25	5	4.0	120	625	500	600	32.7	22.7					190.5		182.9	175.3	0.0	29.0	29.0				
21-02863	296		Sandwich South	342860	4675060	1953	3	116	30	30	5	3.0	116	625	509	595	32.7	22.7					190.5	155.1	181.4	172.2	0.0	26.2	26.2				
21-02864	296		Sandwich South	343265	4676060	1954	3	106	25	25	5	3.0	106	602	496	577	32.7	22.7					183.5	151.2	175.9	168.2	0.0	24.7	24.7				
21-02865	296		Sandwich South	342660	4675090	1957	3	109	24	24	8	4.0	109	625	516	601	52.4	36.4					190.5	157.3	183.2	175.9	0.0	25.9	25.9				
21-02866	296		Sandwich South	342500	4675145	1967	4	110	25	60	5	2.0	120	625	515	600	32.7	22.7					190.5	157.0	182.9	164.6	10.7	29.0	18.3	3.1	2.1		
21-02867	297		Sandwich South	341825	4675425	1952	3	109	27	27	5		109	625	516	598	32.7	22.7					190.5	157.3	182.3	174.0	0.0	25.0	25.0				
21-02869	298		Sandwich South	341345	4675570	1953	4	108	35	40	3		112	625	517	590	19.6	13.6					190.5	157.6	179.8	167.6	1.5	23.5	21.9	12.9	8.9		
21-02870	299		Sandwich South	340330	4675960	1948	4	115	35		5	2.0	115	625	510	590	32.7	22.7					190.5	155.4	179.8			24.4					
21-02871	300		Sandwich South	339840	4676090	1952	3	104	28	104	3		104	625	521	597	19.6	13.6					190.5	158.8	182.0	150.3	23.2	23.2	0.0	0.8	0.6		
21-02872	300		Sandwich South	340090	4675985	1957	4	87	36	55	5	2.0	87	625	538	589	32.7	22.7					190.5	164.0	179.5	162.8	5.8	15.5	9.8	5.7	3.9		
21-02873	300		Sandwich South	340155	4675990	1965	4	84	50	60	6	3.0	86	625	541	575	39.3	27.3					190.5	164.9	175.3	157.0	3.0	11.0	7.9	12.9	8.9		
21-02874	300		Sandwich South	339880	4676085	1966	4	95	36	55	5	10.0	96	625	530	589	32.7	22.7					190.5	161.5	179.5	162.8	5.8	18.3	12.5	5.7	3.9		
21-02875	301		Sandwich South	340420	4677065	1951	3	107	25		6	3.0	107	620	513	595	39.3	27.3					189.0	156.4	181.4			25.0					
21-02876	301		Sandwich South	340200	4677120	1952	3	90	14	30	10	1.0	90	620	530	606	65.5	45.5					189.0	161.5	184.7	175.6	4.9	23.2	18.3	13.4	9.3		
21-02877	301		Sandwich South	339360	4676280	1966	4	113	27	50	5	4.0	115	625	512	598	32.7	22.7					190.5	156.1	182.3	167.0	7.0	26.8	19.8	4.7	3.2		
21-02878	302		Sandwich South	339580	4677340	1953	2		30	30	4	5.0	104	620		590	26.2	18.2					189.0		179.8	170.7	0.0	22.6	22.6				
21-02879	303		Sandwich South	337720	4676870	1949	2	138	30		5	5.0	138	628	490	598	32.7	22.7					191.4	149.4	182.3			32.9					
21-02880	303		Sandwich South	338220	4677040	1950	4	135	35		6	6.0	135	628	493	593	39.3	27.3					191.4	150.3	180.7			30.5					
21-02881	303		Sandwich South	337815	4677080	1952	4	128	30	30	5		128	628	500	598	32.7	22.7					191.4	152.4	182.3	173.1	0.0	29.9	29.9				
21-02882	303		Sandwich South	338450	4676520	1952	3	130	30	30	5		130	628	498	598	32.7	22.7					191.4	151.8	182.3	173.1	0.0	30.5	30.5				
21-02883	303		Sandwich South	337865	4676950	1954	4	140	30	31	5	3.0	140	628	488	598	32.7	22.7					191.4	148.7	182.3	172.8	0.3	33.5	33.2	107.4	74.6		
21-02884	303		Sandwich South	337940	4676970	1955	4	141	44	45	10	2.5	141	628	487	584	65.5	45.5					191.4	148.4	178.0	164.3	0.3	29.6	29.3	214.8	149.1		
21-02885	303		Sandwich South	338310	4676760	1956	3	131	16	23	5	2.0	131	628	497	612	32.7	22.7					191.4	151.5	186.5	179.5	2.1	35.1	32.9	15.3	10.7		
21-02886	303		Sandwich South	337900	4677160	1957	3	139	42	50	3	1.0	139	626	487	584	19.6	13.6					190.8	148.4	178.0	162.8	2.4	29.6	27.1	8.1	5.6		
21-02887	303		Sandwich South	338600	4677690	1960	4	119	37	37	8	3.0	119	624	505	587	52.4	36.4					190.2	153.9	178.9	167.6	0.						

MOE WELL RECORDS

Well ID	Conc.	Lot	Township	Easting	Northing	Year Built	Casing	Water	Static	Pump Test	Pump	Test	Well	Well	Water	Static	Pump	Pump	Test	Well	Well	Well	Well	Water	Static	Test	Water	Height	Height	Specific		
							Diameter	Found	WL	WL	Rate	Time	Depth	Elevation	Found	WL	Rate	Rate	Time	Depth	Elevation	Found	WL	Elevation	Depth	Length	Elevation	Found	WL	Elevation	Level	of Water
							(inches)	(feet)	(feet)	(feet)	(IGPM)	(hrs)	(feet)	(ft. AMSL)	(ft. AMSL)	(ft. AMSL)	m3/d	L/min	(hrs)	(m BGS)	(m BGS)	(m BGS)	(m AMSL)	(m AMSL)	(m AMSL)	(m AMSL)	(m)	(m)	(m)	(m)		
21-03063	6	12	Sandwich South	337905	4678090	1968	4	139	30	50	3	2.0	140	625	486	595	19.6	13.6		42.7			190.5	148.1	181.4	166.1	6.1	33.5	27.4	3.2	2.2	
21-03082	6	12	Sandwich South	337885	4678150	1968	4	114	35	45	5	2.0	114	625	511	590	32.7	22.7		34.7			190.5	155.8	179.8	166.1	3.0	24.1	21.0	10.7	7.5	
21-03085	8	16	Sandwich South	339970	4680210	1968	4	123	27	30	10	1.0	323	615	492	588	65.5	45.5		98.5			187.5	150.0	179.2	170.1	0.9	90.2	89.3	71.6	49.7	
21-03086	8	16	Sandwich South	339110	4680190	1968	4	123	22	123	2	16.0	123	615	492	593	13.1	9.1		37.5			187.5	150.0	180.7	143.3	30.8	30.8	0.0	0.4	0.3	
21-03087	8	16	Sandwich South	339565	4680150	1968	4	117	27	120	12	2.0	120	618	501	591	78.6	54.6		36.6			188.4	152.7	180.1	143.6	28.3	28.3	0.0	2.8	1.9	
21-03088		295	Sandwich South	343350	4675240	1968	4	115	25	117	20	2.0	117	622	507	597	130.9	90.9		35.7			189.6	154.5	182.0	146.3	28.0	28.0	0.0	4.7	3.2	
21-03125		305	Sandwich South	336260	4677250	1968	4	123	29	40	5	3.0	124	616	493	587	32.7	22.7		37.8			187.8	150.3	178.9	166.7	3.4	29.0	25.6	9.8	6.8	
21-03177		297	Sandwich South	342060	4675320	1968	4	112	30	35	7	3.0	112	626	514	596	45.8	31.8		34.1			190.8	156.7	181.7	171.0	1.5	25.0	23.5	30.1	20.9	
21-03178		304	Sandwich South	337890	4677450	1968	4	128	35	45	4	1.0	129	626	498	591	26.2	18.2		39.3			190.8	151.8	180.1	166.4	3.0	28.7	25.6	8.6	6.0	
21-03183		305	Sandwich South	337560	4678070	1968	4	124	37	50	5	2.0	125	626	502	589	32.7	22.7		38.1			190.8	153.0	179.5	164.3	4.0	26.8	22.9	8.3	5.7	
21-03189	10	10	Sandwich South	342820	4676290	1968	4	143	33	90	4		145	622	479	589	26.2	18.2		44.2			189.6	146.0	179.5	152.1	17.4	34.1	16.8	1.5	1.0	
21-03189	10	10	Sandwich South	342820	4676290	1968	4	143	33	90	4		145	622	479	589	26.2	18.2		44.2			189.6	146.0	179.5	152.1	17.4	34.1	16.8	1.5	1.0	
21-03215	8	11	Sandwich South	340220	4677200	1969	4	118	28	75	3	1.0	120	620	502	592	19.6	13.6	1.0	36.6			189.0	153.0	180.4	157.6	14.3	28.0	13.7	1.4	1.0	
21-03233	5	13	Sandwich South	336600	4678690	1969	4	138	28	35	5	3.0	140	620	482	592	32.7	22.7		42.7			189.0	146.9	180.4	169.8	2.1	34.1	32.0	15.3	10.7	
21-03234		296	Sandwich South	342440	4675070	1969	4	118	27	40	5	2.0	133	626	508	599	32.7	22.7		40.5			190.8	154.8	182.6	170.4	4.0	32.3	28.3	8.3	5.7	
21-03252		303	Sandwich South	336850	4675900	1969	4	126	35				127	621	495	586				38.7			189.3	150.9	178.6		28.0					
21-03253		303	Sandwich South	336840	4675870	1969	4	123	27	28	5	2.0	124	621	498	594	32.7	22.7		37.8			189.3	151.8	181.1	172.5	0.3	29.6	29.3	107.4	74.6	
21-03269	11	14	Sandwich South	343500	4678770	1969	4	150	18	130	2	2.5	165	610	460	592	13.1	9.1		50.3			185.9	140.2	180.4	140.8	34.1	44.8	10.7	0.4	0.3	
21-03305	3	127	Sandwich East	341980	4683200	1969	4	101	14	75	4	0.4	113	605	504	591	26.2	18.2		34.4			184.4	153.6	180.1	157.3	18.6	30.2	11.6	1.4	1.0	
21-03354	8	16	Sandwich South	339570	4680510	1970	4	204	26	100	2	4.0	205	615	411	589	13.1	9.1		62.5			187.5	125.3	179.5	149.0	22.6	54.6	32.0	0.6	0.4	
21-03355	8	16	Sandwich South	339780	4680200	1970	4	123	26	30	5	2.5	123	615	492	589	32.7	22.7		37.5			187.5	150.0	179.5	170.4	1.2	29.6	28.3	26.8	18.6	
21-03385	6	12	Sandwich South	337680	4678090	1970	4	121	35	50	10	3.0	124	625	504	590	65.5	45.5		37.8			190.5	153.6	179.8	164.6	4.6	27.1	22.6	14.3	9.9	
21-03404	6	7	Sandwich South	336900	4675800	1970	4	116	27	29	8	3.0	116	620	504	593	52.4	36.4	3.0	35.4			189.0	153.6	180.7	171.9	0.6	27.1	26.5	85.9	59.7	
21-03405	8	14	Sandwich South	339470	4679410	1970	4	86	33	53	5	5.0	86	625	539	592	32.7	22.7		26.2			190.5	164.3	180.4	164.3	6.1	16.2	10.1	5.4	3.7	
21-03427	8	16	Sandwich South	339800	4680160	1970	4	121	25	35	5	2.0	121	615	494	590	32.7	22.7		36.9			187.5	150.6	179.8	169.2	3.0	29.3	26.2	10.7	7.5	
21-03431	7	15	Sandwich South	338170	4680120	1970	4			358	622									109.1			189.6									
21-03461	5	8	Sandwich South	335720	4676120	1971	4	110	30	40	5	4.0	112	614	504	584	32.7	22.7	4.0	34.1			187.1	153.6	178.0	165.8	3.0	25.0	21.9	10.7	7.5	
21-03524		303	Sandwich South	338720	4677160	1971	4	125	33	45	8	3.0	125	626	501	593	52.4	36.4		38.1			190.8	152.7	180.7	167.0	3.7	28.0	24.4	14.3	9.9	
21-03568	7	13	Sandwich South	339360	4678765	1971	4	116	33	43	8	1.0	116	625	509	592	52.4	36.4	1.0	35.4			190.5	155.1	180.4	167.3	3.0	25.3	22.3	17.2	11.9	
21-03605	10	10	Sandwich South	343250	4676165	1971	4	112	32	50	5	4.0	113	620	508	588	32.7	22.7		34.4			189.0	154.8	179.2	164.0	5.5	24.7	19.2	6.0	4.1	
21-03605	10	10	Sandwich South	343250	4676165	1971	4	112	32	50	5	4.0	113	620	508	588	32.7	22.7		34.4			189.0	154.8	179.2	164.0	5.5	24.7	19.2	6.0	4.1	
21-03606	11	11	Sandwich South	344410	4676625	1971	4	89	40	50	5	4.0	90	620	531	580	32.7	22.7		27.4			189.0	161.8	176.8	161.5	3.0	15.2	12.2	10.7	7.5	
21-03723	9	11	Sandwich South	341080	4676900	1972	4	109	31	33	5	3.0	109	622	513	591	32.7	22.7		33.2			189.6	156.4	180.1	170.1	0.6	23.8	23.2	53.7	37.3	
21-03724		303	Sandwich South	337840	4676830	1972	4	132	32	45	10	6.0	132	628	496	596	65.5	45.5		40.2			191.4	151.2	181.7	167.9	4.0	30.5	26.5	16.5	11.5	
21-03737	8	13	Sandwich South	340270	4678510	1972	7	109	27	60	25	3.0	111	618	509	591	163.7	113.7	3.0	33.8			188.4	155.1	180.1	161.8	10.1	25.6	15.5	16.3	11.3	
21-03752	7	6	Sandwich South	338510	4675220	1972	4	82	23	56	10	3.0	84	624	542	601	65.5	45.5	3.0	25.6			190.2	165.2	183.2	166.1	10.1	18.6	8.5	6.5	4.5	
21-03756	8	11	Sandwich South	340230	4677460	1972	4	91	26	46	10	6.0	102	620	529	594	65.5	45.5	6.0	31.1			189.0	161.2	181.1	167.0	6.1	23.2	17.1	10.7	7.5	
21-03758	7	16	Sandwich South	339480	4680320	1972	4	205	28	145	5	6.0	207	616	411	588	32.7	22.7	6.0	63.1			187.8	125.3	179.2	135.0	35.7	54.6	18.9	0.9	0.6	
21-03862	9	15	Sandwich South	340925	4679951	1973	4	130	25	40	8	2.0	131	612	482	587	52.4	36.4		39.9			186.5	146.9	178.9	166.7	4.6	32.3	27.7	11.5	8.0	
21-03890		304	Sandwich South	336222	4676111	1974	4	114	32	38	10	2.0	114	618	504	586	65.5	45.5		34.7			188.4	153.6	178.6	167.0	1.8	25.0	23.2	35.8	24.9	
21-03919	11	9	Sandwich South	343877	4675965	1974	4	102	35	40	12	2.0	102	620	518	585	78.6	54.6		31.1			189.0	157.9	178.3	166.1	1.5	20.4	18.9	51.5	35.8	
21-03936		296	Sandwich South	342257	4675155	1974	4	106	35	45	5	4.0	108	626	520	591	32.7	22.7		32.9			190.8	158.5	180.1	166.4	3.0	22.3	19.2	10.7	7.5	
21-03937		302	Sandwich South	337834	4676275	1974	4	123	34	50	10	4.0	126	624	501	590	65.5	45.5		38.4			190.2	152.7	179.8	164.6	4.9	28.0	23.2	13.4	9.3	
21-03949		302	Sandwich South	338767	4677052	1974	4	130	45	75	10	3.0	130	624	494	579	65.5	45.5		39.6			190.2	150.6	176.5							

MOE WELL RECORDS

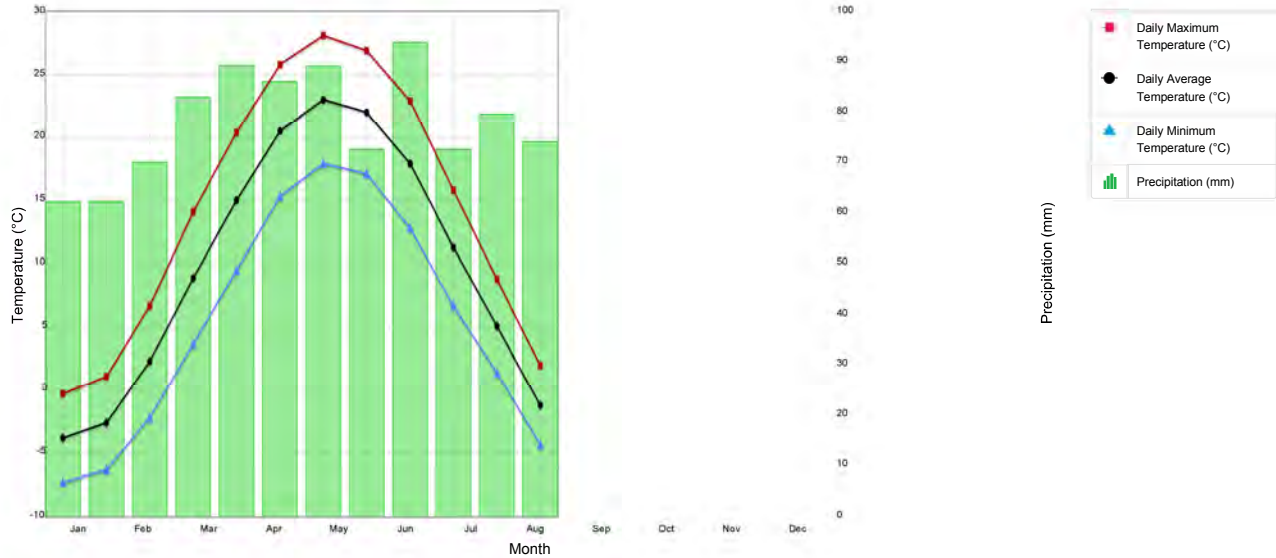
Well ID	Conc.	Lot	Township	Easting	Northing	Year Built	Casing Diameter (inches)	Water Found (feet)	Static WL (feet)	Pump Test WL (feet)	Pump Rate (IGPM)	Test Time (hrs)	Well Depth (feet)	Well Elevation (ft. AMSL)	Water Found Elevation (ft. AMSL)	Static WL Elevation (ft. AMSL)	Pump Rate m3/d	Pump Rate L/min	Test Time (hrs)	Well Depth (m BGS)	Well Screen			Well Elevation (m AMSL)	Water Found Elevation (m AMSL)	Static WL Elevation (m AMSL)	Test Water Elevation (m AMSL)	Water Level Drawdown (m)	Height of Water Static (m)	Height of Water Test (m)	Specific Capacity	
																					Depth (m BGS)	Length (m BGS)	Elevation (m AMSL)								m3/d/m	L/min/m
21-04574	10	10	Sandwich South	343200	4676140	1979	4	111	32	35	10	3.0	111	620	509	588	65.5	45.5		33.8			189.0	155.1	179.2	168.6	0.9	24.1	23.2	71.6	49.7	
21-04580	11	16	Sandwich South	343600	4680040	1979	4	100	14	20	4	3.0	103	603	503	589	26.2	18.2		31.4			183.8	153.3	179.5	173.4	1.8	27.1	25.3	14.3	9.9	
21-04599		296	Sandwich South	342860	4675460	1980	4	113	34	36	15	3.0	113	620	507	586	98.2	68.2		34.4			189.0	154.5	178.6	167.6	0.6	24.1	23.5	161.1	111.9	
21-04600		295	Sandwich South	342960	4675000	1980	4	109	32	45	12	3.0	109	625	516	593	78.6	54.6		33.2			190.5	157.3	180.7	167.0	4.0	23.5	19.5	19.8	13.8	
21-04606		297	Sandwich South	341640	4675500	1981	36	100	36	100	10		100	625	525	589	65.5	45.5		30.5			190.5	160.0	179.5	149.0	19.5	19.5	0.0	3.4	2.3	
21-04618		300	Sandwich South	339680	4676160	1980	4	99	38	38	8	2.0	100	620	521	582	52.4	36.4		30.5			189.0	158.8	177.4	165.8	0.0	18.9	18.9			
21-04619		301	Sandwich South	339360	4676280	1980	4	106	40	40	8	2.0	106	625	519	585	52.4	36.4		32.3			190.5	158.2	178.3	166.1	0.0	20.1	20.1			
21-04643	10	16	Sandwich South	343540	4680260	1980	4	100	14	40	10	4.0	103	600	500	586	65.5	45.5		31.4			182.9	152.4	178.6	166.4	7.9	27.1	19.2	8.3	5.7	
21-04644	12	10	Sandwich South	344500	4676120	1960	4	94					95	620	526					29.0			189.0	160.3								
21-04645	12	10	Sandwich South	344480	4676120	1980	4	90	15	36	10	4.0	90	620	530	605	65.5	45.5		27.4			189.0	161.5	184.4	173.4	6.4	22.9	16.5	10.2	7.1	
21-04662		302	Sandwich South	338700	4676960	1981	4	129	40	60	10	2.0	129	620	491	580	65.5	45.5		39.3			189.0	149.7	176.8	158.5	6.1	27.1	21.0	10.7	7.5	
21-04664	10	11	Sandwich South	342060	4677380	1961	4	127	29	38	15	10.0	127	620	493	591	98.2	68.2		38.7			189.0	150.3	180.1	168.6	2.7	29.9	27.1	35.8	24.9	
21-04711		296	Sandwich South	343000	4675320	1982	4	114	33	38	20	24.0	114	625	511	592	130.9	90.9		34.7			190.5	155.8	180.4	168.9	1.5	24.7	23.2	85.9	59.7	
21-04728		303	Sandwich South	337920	4676600	1982	4	125	38	50	10	2.0	125	615	490	577	65.5	45.5		38.1			187.5	149.4	175.9	160.6	3.7	26.5	22.9	17.9	12.4	
21-04740	9	12	Sandwich South	341920	4677360	1983	4	133	29	34	20	10.0	133	620	487	591	130.9	90.9		40.5			189.0	148.4	180.1	169.8	1.5	31.7	30.2	85.9	59.7	
21-04762	8	11	Sandwich South	340300	4677200	1963	4	86	24	29	5	24.0	96	620	534	596	32.7	22.7	24.0	29.3			189.0	162.8	181.7	172.8	1.5	21.9	20.4	21.5	14.9	
21-04763	11	12	Sandwich South	344480	4677300	1983	4	78	24	31	7	0.4	91	610	532	586	45.8	31.8		27.7			185.9	162.2	178.6	169.2	2.1	20.4	18.3	21.5	14.9	
21-04769		296	Sandwich South	343080	4675260	1984	5	115	32	80	15	1.0	115	620	505	588	98.2	68.2		35.1			189.0	153.9	179.2	154.8	14.6	25.3	10.7	6.7	4.7	
21-04795		302	Sandwich South	337620	4675620	1984	4	115	37	45	12	8.0	115	620	505	583	78.6	54.6		35.1			189.0	153.9	177.7	164.0	2.4	23.8	21.3	32.2	22.4	
21-04829		303	Sandwich South	337920	4676500	1985	5	138	35	132	4	2.0	138	620	482	585	26.2	18.2		42.1			189.0	146.9	178.3	138.1	29.6	31.4	1.8	0.9	0.6	
21-04907		297	Sandwich South	342705	4676210	1986	5	125	31	60	30	1.0	125	620	495	589	196.4	136.4		38.1			189.0	150.9	179.5	161.2	8.8	28.7	19.8	22.2	15.4	
21-04921	9	14	Sandwich South	340825	4678870	1986	4	132	15	25	3	48.0	132	620	488	605	19.6	13.6		40.2			189.0	148.7	184.4	176.8	3.0	35.7	32.6	6.4	4.5	
21-04943		296	Sandwich South	342170	4675150	1987	4	103	32	38	12	3.0	110	630	527	598	78.6	54.6		33.5			192.0	160.6	182.3	170.7	1.8	23.8	21.9	43.0	29.8	
21-04957		300	Sandwich South	338560	4675305	1987	5	122	41	45	40	3.0	122	620	498	579	261.8	181.8		37.2			189.0	151.8	176.5	162.8	1.2	24.7	23.5	214.8	149.1	
21-04972		295	Sandwich South	343350	4675155	1987	5	118	36	41	50	2.0	118	630	512	594	327.3	227.3		36.0			192.0	156.1	181.1	168.6	1.5	25.0	23.5	214.8	149.1	
21-04986		303	Sandwich South	336525	4676005	1987	4	122	32	70	3		122	620	498	588	19.6	13.6		37.2			189.0	151.8	179.2	157.9	11.6	27.4	15.8	15.8	1.2	
21-05291	7	17	Sandwich South	338875	4680864	1993	2	6		26			11							3.4												
21-05292	7	17	Sandwich South	338875	4680864	1993	2	6					12							3.7												
21-05293	7	17	Sandwich South	338875	4680864	1993	2	6					12							3.7												
21-05294	7	17	Sandwich South	338875	4680864	1993	2	6					12							3.7												
21-05295	7	17	Sandwich South	338875	4680864	1993	2	6					12							3.7												
21-05333			Windsor City	336736	4684469	1993	2	18	18	47		0.5	60							18.3							8.8	12.8	4.0			
21-05334			Windsor City	336736	4684469	1993	2	80	30	86		1.0	108							32.9							17.1	23.8	6.7			
21-05335			Windsor City	336736	4684469	1993	2	6	6	21	0	0.2	22							6.7							4.6	4.9	0.3			
21-05344			Windsor City	336736	4684469	1993																										
21-05400	7	5	Sandwich South	338004	4675168	1994	6	117	38			0.5	117																			
21-05405	10	10	Sandwich South	342650	4676717	1994	6	111	30		10	2.0	111				65.5	45.5		0.5												
21-05449			Windsor City	336736	4684469	1996	6	150																								
21-05488		304	Sandwich South	336675	4676514	1997	8	153	37	150	0	1.0	155																			
21-05535			Windsor City	336736	4684469	1999																										
21-05536			Windsor City	336736	4684469	1999																										
21-05537			Windsor City	336736	4684469	1999																										
21-05589	10	11	Sandwich South	342691	4677320	2001	6		29	50	10	1.0	142				65.5	45.5									6.4	34.4	28.0	10.2	7.1	
21-05605			Windsor City	336736	4684469	2001	2						22																			
21-05606			Windsor City	336736	4684469	2001	2						24																			
21-05626	7	7	Sandwich South	338009	4675416	2001																										
21-05660		303	Sandwich South	338207	4676728	2002	6	130	52			1.0	130																			
21-05688	8	14	Sandwich South	339513	4679687	2002							16																			
21-05689		303	Sandwich South	338720	4677636	2003																										
23-04669	7	16	Sandwich South	338200	4680600	1981	5	153	35	88	5	5.0	153	620	467	585	32.7	22.7	5.0	46.6			189.0	142.3	178.3	151.5	16.2	36.0	19.8	2.0	1.4	



Canadian Climate Normals 1981-2010 Station Data

Temperature and Precipitation Graph

Temperature and Precipitation Graph for 1981 to 2010 Canadian Climate Normals WINDSOR A



Normals Data

The minimum number of years used to calculate these Normals is indicated by a code for each element. A "+" beside an extreme date indicates that this date is the first occurrence of the extreme value. Values and dates in bold indicate all-time extremes for the location.

Data used in the calculation of these Normals may be subject to further quality assurance checks. This may result in minor changes to some values presented here.

WINDSOR A*
ONTARIO

Latitude:	42°16'32.000" N	Longitude:	82°57'20.000" W	Elevation:	189.60 m
Climate ID:	6139525	WMO ID:	71538	TC ID:	YQG

* This station meets WMO standards for temperature and precipitation.

Temperature

Temperature														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Code
Daily Average (°C)	-3.8	-2.6	2.3	8.9	15.0	20.5	23.0	22.0	17.9	11.3	5.1	-1.2	9.9	Δ
Standard Deviation	2.9	2.3	1.8	1.5	2.0	1.3	1.3	1.4	1.4	1.6	1.7	2.8	0.8	Δ
Daily Maximum (°C)	-0.3	1.1	6.7	14.1	20.4	25.8	28.1	26.9	22.9	15.8	8.8	2.0	14.4	Δ
Daily Minimum (°C)	-7.3	-6.3	-2.2	3.7	9.5	15.3	17.9	17.1	12.8	6.7	1.4	-4.3	5.4	Δ
Extreme Maximum (°C)	17.8	20.4	26.6	31.1	34.0	40.2	38.3	37.7	37.2	32.2	26.1	19.6		
Date (yyyy/dd)	1950/ 25	2000/ 26	1986/ 30	1990/ 25	1988/ 31	1988/ 25	1941/ 27	1988/ 17	1953/ 02	1963/ 06	1950/ 01	1998/ 06		
Extreme Minimum (°C)	-29.1	-23.4	-19.7	-9.5	-2.8	2.8	5.6	5.2	-1.1	-5.0	-15.6	-23.4		
Date (yyyy/dd)	1994/ 19	1982/ 06	2003/ 03	1982/ 07	1966/ 10	1945/ 05	1945/ 11	1982/ 29	1942/ 29	1965/ 29	1958/ 30	1983/ 30		

Precipitation

Precipitation														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Code
Rainfall (mm)	32.4	35.6	50.9	77.7	89.3	86.1	89.2	72.6	93.9	72.0	74.5	48.3	822.4	Δ
Snowfall (cm)	37.2	30.5	20.9	5.8	0.0	0.0	0.0	0.0	0.0	0.6	5.5	28.8	129.3	Δ
Precipitation (mm)	62.1	62.2	70.0	83.0	89.3	86.1	89.2	72.6	93.9	72.6	79.6	74.1	934.6	Δ
Average Snow Depth (cm)	5	4	1	0	0	0	0	0	0	0	0	2	1	Δ
Median Snow Depth (cm)	4	3	0	0	0	0	0	0	0	0	0	1	1	Δ
Snow Depth at Month-end (cm)	4	4	0	0	0	0	0	0	0	0	0	4	1	Δ

Precipitation													Year	Code
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Extreme Daily Rainfall (mm)	43.0	70.6	46.4	94.6	54.9	78.0	82.0	79.4	89.0	71.6	48.4	72.6		
Date (yyyy/dd)	1993/ 04	1990/ 22	2007/ 01	2000/ 20	1953/ 30	1968/ 25	1983/ 29	1994/ 13	1981/ 30	1949/ 11	2001/ 30	1967/ 21		
Extreme Daily Snowfall (cm)	28.2	36.8	22.4	16.0	0.5	0.0	0.0	0.0	0.0	13.8	34.8	32.3		
Date (yyyy/dd)	1999/ 02	1965/ 25	1968/ 22	2005/ 23	1954/ 03	1941/ 01	1941/ 01	1940/ 01	1940/ 01	1989/ 19	1966/ 02	1974/ 01		
Extreme Daily Precipitation (mm)	43.0	70.6	47.4	94.6	54.9	78.0	82.0	79.4	89.0	71.6	51.1	72.6		
Date (yyyy/dd)	1993/ 04	1990/ 22	2007/ 01	2000/ 20	1953/ 30	1968/ 25	1983/ 29	1994/ 13	1981/ 30	1949/ 11	1951/ 06	1967/ 21		
Extreme Snow Depth (cm)	36	42	30	14	0	0	0	0	0	0	15	33		
Date (yyyy/dd)	1999/ 12	1982/ 09	1960/ 04	1982/ 06	1955/ 01	1955/ 01	1955/ 01	1955/ 01	1955/ 01	1955/ 01	1966/ 03	2000/ 31		

- ▶ Days with Maximum Temperature
- ▶ Days with Minimum Temperature
- ▶ Days with Rainfall
- ▶ Days With Snowfall
- ▶ Days with Precipitation
- ▶ Days with Snow Depth
- ▶ Wind
- ▶ Degree Days
- ▶ Humidex
- ▶ Wind Chill
- ▶ Humidity
- ▶ Pressure
- ▶ Visibility (hours with)
- ▶ Cloud Amount (hours with)
- ▶ Frost-Free

Legend

- A = WMO "3 and 5 rule" (i.e. no more than 3 consecutive and no more than 5 total missing for **either** temperature **or** precipitation)
- B = At least 25 years
- C = At least 20 years
- D = At least 15 years

▼ Station / Element Metadata

Statistics listed below are provided as a guide to determine the validity of Normals and Extremes calculations. For example, a station with 30 years of record between 1981 and 2010 with no missing years would be a more reliable normal than a station with 15 years of record and 2 missing years. Less than 100% possible observations indicates that out of the total number of observations used, some records were missing.

WINDSOR A

Province	ON	Latitude (dd mm):	42 16 N
Country	CAN	Longitude (ddd mm):	82 57 W
Time Zone	EST	Latitude (decimal degrees):	42.28 N
Climate ID:	6139525	Longitude (decimal degrees):	82.96 W
WMO ID:	71538	Elevation (m):	189.6
TC ID:	YQG		

▼ Temperature

Temperature						
	Begin Year	End Year	Total Number of Years	Missing Years	Total Count of Observations	% of Possible Observations
Daily Average (°C)	1981	2010	30	0	10956	100

Temperature						
	Begin Year	End Year	Total Number of Years	Missing Years	Total Count of Observations	% of Possible Observations
Standard Deviation	1981	2010	30	0	10956	100
Daily Maximum (°C)	1981	2010	30	0	10956	100
Daily Minimum (°C)	1981	2010	30	0	10956	100
Extreme Maximum (°C)	1940	2010			25718	100
Extreme Minimum (°C)	1940	2010			25719	100

▼ Precipitation

Precipitation						
	Begin Year	End Year	Total Number of Years	Missing Years	Total Count of Observations	% of Possible Observations
Rainfall (mm)	1981	2010	30	1	10926	99.7
Snowfall (cm)	1981	2010	30	1	10926	99.7
Precipitation (mm)	1981	2010	30	1	10926	99.7
Average Snow Depth (cm)	1981	2010	30	0	10955	100
Median Snow Depth (cm)	1981	2010	30	0	10955	100
Snow Depth at Month-end (cm)	1981	2010	30	1	359	99.7
Extreme Daily Rainfall (mm)	1940	2010			25719	100
Extreme Daily Snowfall (cm)	1940	2010			25719	100
Extreme Daily Precipitation (mm)	1940	2010			25719	100
Extreme Snow Depth (cm)	1955	2010			20452	100

► Days with Maximum Temperature

► Days with Minimum Temperature

► Days with Rainfall

► Days With Snowfall

► Days with Precipitation

► Days with Snow Depth

► Wind

► Degree Days

► Humidex

► Wind Chill

► Humidity

► Pressure

► Visibility (hours with)

► Cloud Amount (hours with)

► Frost-Free

▼ Calculation Information

- [Calculation Method](#)
- [Normals Code](#)
- [Uncertainty due to shorter period](#)
- [Standard Deviation Calculations](#)
- [Climate Extremes](#)
- [Support Information](#)
- [Data and Observing Stations](#)
- [APPENDIX A](#)

"Climate averages", "climate means" or "climate normals" are all interchangeable terms. They refer to arithmetic calculations based on observed climate values for a given location over a specified time period. Climate normals are often used to classify a region's climate and make decisions for a wide variety of purposes involving basic habitability, agriculture and natural vegetation, energy use, transportation, tourism, and research in many environmental fields. Normals are also used as a reference for seasonal monitoring of climate temperature and precipitation for basic public interest, and for monitoring drought or forest fires risk. Real-time values, such as daily temperature, are often compared to a location's "climate normal" to determine how unusual or how great the departure from "average" they are.

The World Meteorological Organization (WMO) recommends that countries prepare climate normals for the official 30-year normals periods ending in 1930, 1960 and 1990, for which the WMO World Climate Normals are published. In addition, WMO recommends the updating of climate normals at the end of every decade as provided here for 1981 to 2010.

► **Calculation Method**

► **Normals Code**

► **Uncertainty due to shorter period**

► **Standard Deviation Calculations**

► **Climate Extremes**

▶ **Support Information**

▶ **Data Adjustments**

▶ **Data and Observing Stations**

▶ **Temperature**

▶ **Rainfall, Snowfall, and Precipitation**

▶ **Snow Depth**

▶ **Number of Days With Specified Parameters**

▶ **Degree-Days**

▶ **Soil Temperature**

▶ **Evaporation**

▶ **Frost and Freezing-Free Period**

▶ **Hourly Data**

▶ **Wind**

▶ **Bright Sunshine**

▶ **Humidex**

▶ **Wind Chill**

▶ **Humidity**

▶ **Pressure**

▶ **Solar Radiation**

▶ **Visibility (km)**

▶ **Cloud Amount**

▶ **APPENDIX A**

APPENDIX H

Hydrology

1603-11265 - ULR
Model Parameters

Area Description	Catchment Number	Area (ha)	Proposed Land Use (%)											Total Imperviousness (%)	Total Impervious Area (ha)	
			Residential (Low Density)	Residential (Medium Density)	Open Space/ Parks	Institutional	Commercial	Mixed Use	Employment	Industrial	Stormwater Management	Existing Urban	Total			
			(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)			
Existing Urban	2000	91.38	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	60%	54.8
Existing Urban	2002	156.40	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	60%	93.8
Existing Urban	2005	48.04	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	60%	28.8
Existing Urban	2007	20.71	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	60%	12.4
Existing Urban	2010	40.96	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	60%	24.6
Existing Urban	2015	10.55	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	60%	6.3
Proposed Development	2020	66.13	30%	5%	5%	25%	30%	0%	0%	0%	5%	0%	100%	100%	67%	44.1
Existing Urban	2025	12.64	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	60%	7.6
Existing Urban	2027	59.42	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	60%	35.7
Proposed Development	2030	117.58	45%	5%	10%	0%	0%	0%	0%	0%	5%	35%	100%	49%	57.9	
Proposed Development	2035	81.42	40%	0%	0%	20%	20%	10%	0%	0%	10%	0%	100%	100%	63%	51.3
Existing Urban	2040	25.60	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	60%	15.4
Proposed Development	2045	63.81	40%	0%	15%	0%	0%	0%	0%	0%	10%	35%	100%	43%	27.4	
Proposed Development	2050	97.34	20%	0%	15%	0%	0%	0%	55%	0%	10%	0%	100%	47%	45.5	
Proposed Development	2055	65.11	65%	20%	5%	0%	0%	0%	0%	0%	10%	0%	100%	50%	32.4	
Proposed Development	2060	112.73	15%	5%	0%	0%	0%	0%	70%	0%	10%	0%	100%	57%	64.5	
Proposed Development	2065	116.33	0%	0%	0%	0%	45%	0%	0%	45%	10%	0%	100%	77%	89.0	
Existing Agricultural	2070	94.85	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0.0	
Existing Urban	2072	42.27	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	60%	25.4
Existing Agricultural	2073	80.41	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0.0	
Proposed Development and Agri	2075	117.69	0%	0%	40%	0%	30%	30%	0%	0%	0%	0%	100%	47%	54.7	
Proposed Development and Agri	2080	69.76	20%	0%	80%	0%	0%	0%	0%	0%	0%	0%	100%	11%	7.7	
Proposed Development and Agri	2085	100.90	0%	0%	50%	0%	0%	50%	0%	0%	0%	0%	100%	35%	35.3	
Existing Agricultural	2087	133.74	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0.0	
Proposed Development	2090	72.83	25%	0%	30%	0%	20%	0%	0%	0%	25%	0%	100%	31%	22.4	
Proposed Development	2095	117.98	0%	0%	20%	0%	30%	30%	0%	0%	20%	0%	100%	47%	54.9	
Proposed Development	2100	50.57	45%	45%	0%	0%	0%	0%	0%	0%	10%	0%	100%	56%	28.4	
Proposed Development	2105	60.91	90%	0%	0%	0%	0%	0%	0%	0%	10%	0%	100%	50%	30.2	
Proposed Development	2110	49.79	95%	0%	5%	0%	0%	0%	0%	0%	0%	0%	100%	52%	26.0	
Proposed Development	2115	113.58	20%	0%	20%	0%	0%	0%	40%	0%	20%	0%	100%	37%	42.0	
Proposed Development	2125	93.38	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	55%	51.4	
Proposed Development	2130	80.55	0%	0%	0%	0%	75%	0%	25%	0%	0%	0%	100%	80%	64.4	
Proposed Development	2133	93.08	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	100%	65%	60.5	
Proposed Development	2135	22.82	90%	0%	0%	0%	0%	0%	0%	0%	10%	0%	100%	50%	11.3	
Proposed Development	2140	82.10	60%	0%	30%	0%	0%	0%	0%	0%	10%	0%	100%	33%	27.1	
Existing Agricultural	2145	104.35	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	55%	57.4	
Proposed Development	2155	77.27	90%	0%	0%	0%	0%	0%	0%	0%	10%	0%	100%	50%	38.2	
Proposed Development	2165	179.12	20%	20%	15%	10%	5%	0%	0%	0%	5%	25%	100%	53%	94.5	
Proposed Development	2175	47.30	10%	0%	0%	0%	40%	0%	40%	0%	10%	0%	100%	66%	31.0	
Existing Urban	2180	102.00	0%	0%	0%	0%	0%	0%	0%	0%	5%	95%	100%	57%	58.1	
Proposed Development	2185	65.40	0%	0%	0%	0%	0%	0%	85%	0%	15%	0%	100%	55%	36.1	
Proposed Development	2190	84.96	30%	10%	5%	0%	0%	0%	0%	0%	5%	50%	100%	54%	45.5	
Proposed Development	2200	784.14	0%	0%	50%	0%	0%	0%	10%	35%	5%	0%	100%	36%	284.3	
Proposed Development	2210	58.24	0%	0%	0%	0%	30%	0%	30%	0%	10%	30%	100%	63%	36.7	
Proposed Development	2215	106.67	15%	10%	5%	0%	10%	5%	0%	0%	5%	50%	100%	57%	61.1	
Existing Urban	2220	144.51	0%	0%	0%	0%	0%	0%	5%	5%	0%	90%	100%	62%	88.9	
Existing Urban	2225	42.22	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	60%	25.3	
Total		4459.54														2090.3
Average		94.88	23%	3%	15%	1%	7%	3%	10%	2%	5%	32%	100%	50%		44.5

Notes:

Impervious Standards		Typical Pond Characteristics	
	% Impervious	Average pond cross section	
Residential (Low Density)	0.55	Top of PP width	65 m
Residential (Medium Density)	0.70	Bottom of PP width	50 m
Open Space/Parks	0.00	PP Depth	1.5 m
Institutional	0.85	PP cross sectional area	86 m ²
Commercial	0.85		
Mixed Use	0.70	Active Depth	2 m
Employment	0.65	Top of Active Depth (5:1 slopes)	85 m
Industrial	0.85	Active cross section area	150 m ²
Stormwater Management	0.00		
Existing Urban	0.60		

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Catchment Number	Water Quality Requirements						SWM Corridor Sizing Calculations														
	Water Quality Volume Required	Permanent Pool Volume Required	Extended Detention Volume Required	Total Water Quality Volume Required	Permanent Pool Volume Required	Extended Detention Volume Required	Average SWM Area Permanent Pool Cross Section	Length Required at Permanent Pool Elevation- Assume x6 Permanent pool storage requirements	Active Storage Length - 5:1 side slopes with 2 m depth	Assigned Corridor Length	Surface Area at Permanent Pool Elevation	Extended Detention Surface Area	Weir Elevation Surface Area	Active Storage Surface Area	Extended Detention Volume	Weir Elevation Volume	Total Available Storage Volume (2m depth)	Max Storage Volume / unit area	Permanent Pool Surface Area per ha of Drainage Area	Active Storage Surface Area per ha of Drainage Area	
	(m ³ /ha)	(m ³ /ha)	(m ³ /ha)	(m ³)	(m ³)	(m ³)	(m ²)	(m)	(m)	(m)	(m ²)	(m ²)	(m ²)	(m ²)	(m ³)	(m ³)	(m ³)	(m ³ /ha)	(m ² /ha)	(m ² /ha)	
2000																					
2002																					
2005																					
2007																					
2010																					
2015																					
2020	126	86	40	8,310	5,665	2,645	86	394	414	600	25,616	26,538	35,198	35,198	5,215	60,814	60,814	920	97	532	
2025																					
2027																					
2030	104	64	40	12,258	7,555	4,703	86	526	546	1400	34,160	35,345	46,370	46,370	6,950	80,530	80,530	685	73	394	
2035	121	81	40	9,825	6,568	3,257	86	457	477	600	29,698	30,746	40,536	40,536	6,044	70,234	70,234	863	91	498	
2040																					
2045	98	58	40	6,253	3,701	2,552	86	257	277	600	16,735	17,384	23,584	23,584	3,412	40,319	40,319	632	66	370	
2050	102	62	40	9,904	6,011	3,894	86	418	438	600	27,179	28,149	37,242	37,242	5,533	64,421	64,421	662	70	383	
2055	105	65	40	6,820	4,216	2,604	86	293	313	600	19,063	19,784	26,629	26,629	3,885	45,692	45,692	702	73	409	
2060	113	73	40	12,738	8,229	4,509	86	572	592	700	37,211	38,490	50,360	50,360	7,570	87,571	87,571	777	83	447	
2065	139	99	40	16,131	11,478	4,653	86	798	818	1000	51,900	53,631	69,569	69,569	10,553	121,469	121,469	1044	112	598	
2070																					
2072																					
2073																					
2075	102	62	40	11,946	7,238	4,708	86	504	524	1000	32,728	33,869	44,498	44,498	6,660	77,226	77,226	656	70	378	
2080	66	26	40	4,604	1,814	2,790	86	126	146	700	8,201	8,588	12,425	12,425	1,679	20,626	20,626	296	29	178	
2085	90	50	40	9,081	5,045	4,036	86	351	371	700	22,812	23,648	31,531	31,531	4,646	54,343	54,343	539	57	313	
2087																					
2090	86	46	40	6,245	3,332	2,913	86	232	252	600	15,066	15,664	21,402	21,402	3,073	36,468	36,468	501	52	294	
2095	102	62	40	11,975	7,256	4,719	86	505	525	1000	32,809	33,952	44,604	44,604	6,676	77,412	77,412	656	70	378	
2100	112	72	40	5,647	3,624	2,023	86	252	272	600	16,388	17,026	23,130	23,130	3,341	39,518	39,518	781	81	457	
2105	105	65	40	6,365	3,929	2,436	86	273	293	600	17,765	18,445	24,931	24,931	3,621	42,695	42,695	701	73	409	
2110	107	67	40	5,340	3,348	1,992	86	233	253	600	15,140	15,740	21,499	21,499	3,088	36,640	36,640	736	76	432	
2115	92	52	40	10,449	5,906	4,543	86	411	431	600	26,706	27,662	36,623	36,623	5,437	63,329	63,329	558	59	322	
2125	110	70	40	10,272	6,537	3,735	86	455	475	600	29,557	30,600	40,351	40,351	6,016	69,908	69,908	749	79	432	
2130	143	103	40	11,546	8,324	3,222	86	579	599	700	37,637	38,929	50,917	50,917	7,657	88,554	88,554	1099	117	632	
2133	123	83	40	11,480	7,757	3,723	86	540	560	600	35,074	36,287	47,566	47,566	7,136	82,639	82,639	888	94	511	
2135	105	65	40	2,385	1,472	913	86	102	122	600	6,656	6,994	10,403	10,403	1,365	17,059	17,059	748	73	456	
2140	88	48	40	7,225	3,941	3,284	86	274	294	1000	17,819	18,502	25,002	25,002	3,632	42,821	42,821	522	54	305	
2145																					
2155	105	65	40	8,075	4,984	3,091	86	347	367	600	22,536	23,363	31,170	31,170	4,590	53,706	53,706	695	73	403	
2165	108	68	40	19,300	12,135	7,165	86	844	864	1100	54,873	56,695	73,457	73,457	11,157	128,330	128,330	716	77	410	
2175	124	84	40	5,865	3,973	1,892	86	276	296	700	17,966	18,653	25,194	25,194	3,662	43,159	43,159	912	95	533	
2180																					
2185	110	70	40	7,216	4,600	2,616	86	320	340	600	20,799	21,573	28,899	28,899	4,237	49,698	49,698	760	80	442	
2190	109	69	40	9,218	5,820	3,398	86	405	425	900	26,315	27,259	36,112	36,112	5,357	62,428	62,428	735	77	425	
2200	91	51	40	71,553	40,187	31,366	86	2796	2816		181,716	187,441	239,329	239,329	36,916	421,044	421,044	537	58	305	
2210	121	81	40	7,028	4,698	2,330	86	327	347	1000	21,243	22,031	29,480	29,480	4,327	50,723	50,723	871	91	506	
2215	113	73	40	12,054	7,787	4,267	86	542	562	600	35,210	36,428	47,744	47,744	7,164	82,955	82,955	778	83	448	
2220																					
2225																					
				337,107	207,128	129,980		14,409			936,578	969,416	1,275,756	1,275,756	190,599	2,212,333	2,212,333				
107	67	40	11237	6904	4333	86											724		76	420	

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Catchment Number	SWM Corridor Elevations						Depth of Pond Check			SWM Outlet Configuration						Storm Sewer Depth Calculations					
	Estimated Outlet Channel Invert (m)	Permanent Pool Offset From Channel (m)	Permanent Pool Elevation (m)	Low Orifice Invert Elevation (m)	High Orifice Invert Elevation (m)	Overflow Weir Elevation (m)	Approximate Ground Elevation (m)	Permanent Pool Elevation (m)	Depth of pond (m)	Low Orifice Average Flow for 36 hour drawdown (m ³ /s)	Low Orifice Cross Section Area (m ²)	Low Orifice Diameter (m)	High Orifice Average Flow (m ³ /s)	High Orifice Area (m ²)	High Orifice Diameter (m)	Permanent Pool Elevation (m)	Estimate Pipe Length from Pond to Upstream Limit (m)	Upstream Invert Elevation at 0.35% slope (m)	Upstream Ground Elevation (m)	Cover available with 1.2 m Diameter Pipe (m)	Estimated depth of storm sewer (m)
2000																					
2002																					
2005																					
2007																					
2010																					
2015																					
2020	186.40	0.50	186.90	186.90	187.10	188.90	190.0	186.90	3.1	0.020	0.034	0.200	0.384	0.102	0.360	186.90	500	188.65	190.6	0.8	1.9
2025																					
2027																					
2030	184.80	0.50	185.30	185.30	185.50	187.30	188.5	185.30	3.2	0.036	0.061	0.270	0.682	0.181	0.480	185.30	1400	190.20	189.3	-2.1	-0.9
2035	185.40	0.50	185.90	185.90	186.10	187.90	188.0	185.90	2.1	0.025	0.042	0.230	0.472	0.125	0.390	185.90	700	188.35	190	0.5	1.7
2040																					
2045	183.20	0.50	183.70	183.70	183.90	185.70	186.5	183.70	2.8	0.020	0.033	0.200	0.370	0.098	0.350	183.70	800	186.50	186.7	-1.0	0.2
2050	184.40	0.50	184.90	184.90	185.10	186.90	187.0	184.90	2.1	0.030	0.051	0.250	0.565	0.150	0.430	184.90	1000	188.40	190	0.4	1.6
2055	182.20	0.50	182.70	182.70	182.90	184.70	185.0	182.70	2.3	0.020	0.034	0.200	0.378	0.100	0.350	182.70	800	185.50	186.4	-0.3	0.9
2060	183.40	0.50	183.90	183.90	184.10	185.90	186.0	183.90	2.1	0.035	0.059	0.270	0.654	0.174	0.470	183.90	1400	188.80	190	0.0	1.2
2065	185.72	0.50	186.22	186.22	186.42	188.22	189.0	186.22	2.8	0.036	0.060	0.270	0.675	0.179	0.470	186.22	1300	190.77	190	-2.0	-0.8
2070	185.72	0.50	186.22	186.22	186.42	188.22	189.0	186.22				0.550	0.154	0.440	186.22	1400	191.12	190	-2.3	-1.1	
2072																					
2073	185.72	0.50	186.22	186.22	186.42	188.22	189.0	186.22	2.8					0.000	0.000	186.22	1800	192.52	190	-3.7	-2.5
2075	187.00	0.50	187.50	187.50	187.70	189.50	192.0	187.50	4.5	0.036	0.061	0.270	0.683	0.181	0.480	187.50	1800	193.80	190	-5.0	-3.8
2080	187.00	0.50	187.50	187.50	187.70	189.50	191.0	187.50	3.5	0.022	0.036	0.210	0.405	0.107	0.360	187.50	900	190.65	190	-1.8	-0.7
2085	187.25	0.50	187.75	187.75	187.95	189.75	191.0	187.75	3.3	0.031	0.052	0.250	0.585	0.155	0.440	187.75	1900	194.40	190	-5.6	-4.4
2087																					
2090	180.92	1.50	182.42	182.42	182.62	184.42	184.5	182.42	2.1	0.022	0.038	0.210	0.422	0.112	0.370	182.42	1000	185.92	185.5	-1.6	-0.4
2095	182.40	0.50	182.90	182.90	183.10	184.90	185.5	182.90	2.6	0.036	0.061	0.270	0.684	0.182	0.480	182.90	1300	187.45	190	1.3	2.5
2100	180.92	1.00	181.92	181.92	182.12	183.92	185.0	181.92	3.1	0.016	0.026	0.180	0.293	0.078	0.310	181.92	1000	185.42	185.3	-1.3	-0.1
2105	181.90	0.50	182.40	182.40	182.60	184.40	185.0	182.40	2.6	0.019	0.032	0.200	0.353	0.094	0.340	182.40	900	185.55	185.5	-1.3	-0.1
2110	180.06	1.50	181.56	181.56	181.76	183.56	185.0	181.56	3.4	0.015	0.026	0.180	0.289	0.077	0.310	181.56	900	184.71	184.1	-1.8	-0.6
2115	180.06	1.50	181.56	181.56	181.76	183.56	183.5	181.56	1.9	0.035	0.059	0.270	0.659	0.175	0.470	181.56	2300	189.61	186.1	-4.7	-3.5
2125	179.10	1.50	180.60	180.60	180.80	182.60	184.5	180.60	3.9	0.029	0.048	0.240	0.542	0.144	0.420	180.60	1250	184.98	184.3	-1.9	-0.7
2130	182.40	0.50	182.90	182.90	183.10	184.90	186.0	182.90	3.1	0.025	0.042	0.230	0.467	0.124	0.390	182.90	1200	187.10	187.5	-0.8	0.4
2133	183.40	0.50	183.90	183.90	184.10	185.90	186.0	183.90	2.1	0.029	0.048	0.240	0.540	0.143	0.420	183.90	1200	188.10	187.5	-1.8	-0.6
2135	178.67	1.50	180.17	180.17	180.37	182.17	182.0	180.17	1.8	0.007	0.012	0.120	0.132	0.035	0.210	180.17	1100	184.02	182.3	-2.9	-1.7
2140	178.70	1.00	179.70	179.70	179.90	181.70	183.0	179.70	3.3	0.025	0.043	0.230	0.476	0.126	0.400	179.70	750	182.33	182.5	-1.0	0.2
2145																					
2155	178.68	1.50	180.18	180.18	180.38	182.18	183.5	180.18	3.3	0.024	0.040	0.220	0.448	0.119	0.380	180.18	1500	185.43	182.5	-4.1	-2.9
2165	179.40	0.50	179.90	179.90	180.10	181.90	183.0	179.90	3.1	0.055	0.093	0.340	1.039	0.276	0.590	179.90	1400	184.80	185	-1.0	0.2
2175	178.30	0.50	178.80	178.80	179.00	180.80	182.0	178.80	3.2	0.015	0.025	0.170	0.274	0.073	0.300	178.80	700	181.25	183.5	1.1	2.3
2180																					
2185	178.00	1.50	179.50	179.50	179.70	181.50	182.0	179.50	2.5	0.020	0.034	0.200	0.379	0.101	0.350	179.50	700	181.95	182.5	-0.6	0.6
2190	178.75	0.50	179.25	179.25	179.45	181.25	182.5	179.25	3.3	0.026	0.044	0.230	0.493	0.131	0.400	179.25	1000	182.75	184.5	0.6	1.8
2200	178.95	0.50	179.45	179.45	179.65	181.45	183.0	179.45	3.6	0.242	0.407	0.720	4.548	1.208	1.240	179.45	3600	192.05	189.1	-4.1	-2.9
2210	178.40	0.50	178.90	178.90	179.10	180.90	183.0	178.90	4.1	0.018	0.030	0.190	0.338	0.090	0.330	178.90	700	181.35	183.5	1.0	2.2
2215	179.00	0.50	179.50	179.50	179.70	181.50	182.5	179.50	3.0	0.033	0.055	0.260	0.619	0.164	0.450	179.50	1200	183.70	185	0.1	1.3
2220																					
2225																					
										1.003			19.397								
										0.033	0.056	0.244	0.626	0.161	0.412						

[AS] [AT] [AU] [AV] [AW] [AX]
 C 0.60 C 0.60
 height_{mv} 0.0 height_{mv} 0.2
 Δheight_{max} 0.2 Δheight_{max} 1.8
 drawdown (hr) 36 drawdown (hr) 12

[AS] Extended Detention Volume / Drawdown time
 [AT] $([AS] * 2) / (C * (2 * g * Δh)^{0.5})$
 [AU] $2 * ([AT] / π)^{0.5}$
 [AV] 0.116 * Area * 0.05 = municipal drain capacity or 50 mm of runoff over 24 hours
 [AW] $([AV] * 2) / (C * (2 * g * Δh)^{0.5})$
 [AX] $2 * ([AW] / π)^{0.5}$

Little River

Single Station Frequency Analysis

Station ID	Year	Peak Flow (m ³ /s)	Log of the Peak Flow	Return Period	Probability	z	K	Log Q	Flow (m3/s)	Transposed Flow (m3/s)	A1 - Little River at Windsor	50.5	km ²
02GH011	1983	26.6	1.42										
02GH011	1984	21.1	1.32										
02GH011	1985	21.1	1.32										
02GH011	1988	7.3	0.86	2	0.5	0.00	0.19	1.43	27.0	24.7			
02GH011	1989	15.7	1.20	5	0.2	0.84	0.84	1.55	35.2	32.2			
02GH011	1990	42.6	1.63	10	0.1	1.28	1.09	1.59	39.0	35.7			
02GH011	1991	17.6	1.25	25	0.04	1.75	1.30	1.63	42.4	38.8			
02GH011	1992	18.4	1.26	50	0.02	2.05	1.40	1.65	44.2	40.5			
02GH011	1993	25.0	1.40	100	0.01	2.33	1.48	1.66	45.6	41.8			
02GH011	1994	19.8	1.30	200	0.005	2.58	1.53	1.67	46.7	42.8			
02GH011	1995	27.0	1.43										
02GH011	1996	26.6	1.42										
02GH011	1999	34.3	1.54										
02GH011	2000	42.0	1.62										
02GH011	2003	16.0	1.20										
02GH011	2004	29.0	1.46										
02GH011	2005	38.4	1.58										
02GH011	2006	34.9	1.54										
02GH011	2007	31.5	1.50										
02GH011	2008	40.0	1.60										
02GH011	2009	27.4	1.44										
02GH011	2010	38.9	1.59										
02GH011	2011	34.8	1.54										
02GH011	2012	14.6	1.16										
02GH011	2013	25.3	1.40										
02GH011	2014	21.5	1.33										

Log Pearson Type III Distribution

$$K = \frac{2}{C_s} \left\{ \left[\left(z - \frac{C_s}{6} \right) \frac{C_s}{6} + 1 \right]^3 - 1 \right\}$$

$$Q = avg + K * s_y$$

Where C_s = Coefficient of Skew

avg = average flow

s_y = standard deviation

Q = flow

z = frequency factor

Transposition of Flood Discharges

As per Equation 8.31 in MTO Drainage Manual (1997)

$$Q_2 = Q_1 \left(\frac{A_2}{A_1} \right)^{0.75}$$

where Q₁ = known peak discharge

Q₂ = unknown peak discharge

A₁ = known basin area

A₂ = unknown basin area

avg = average flow 1.40
s_y = standard deviation 0.177
C_s = Coefficient of Skew -1.182

Modified Index Flood Method

Southern Ontario Type Basin

Upper Little River

Watershed Area - A	44.9 km ²	
Water Storage Area - A _d	2 km ²	
Storage (%) - A _d /A	4.5 %	
CN	82	
Slope	0.15 % 0.0015 m/m	
Base Watershed Class	10.1	From Design Chart 1.17
Slope adjustment	-0.82	From Design Chart 1.18
Storage adjustment	-0.50	From Design Chart 1.19
Net adjustment	-1.32	
Net Watershed Class	8.73	
Class Coefficient	2.38	From Design Chart 1.15
$Q_{2.33} = Q_{25} * 0.46$	19.0 m ³ /s	From Design Chart C5-10b
$Q_5 = Q_{25} * 0.65$	26.9 m ³ /s	From Design Chart C5-10b
$Q_{10} = Q_{25} * 0.80$	33.1 m ³ /s	From Design Chart C5-10b
$Q_{25} = CxA^{0.75}$	41.3 m ³ /s	
$Q_{50} = Q_{25} * 1.15$	47.5 m ³ /s	From Design Chart C5-10b
$Q_{100} = Q_{25} * 1.29$	53.3 m ³ /s	From Design Chart C5-10b

Notes:

*Based on Example 8.8 of the MTO Drainage Management Manual 1995-1997
Design Chart C5-10b from MTC Drainage Manual Volume 1 Chapter C*

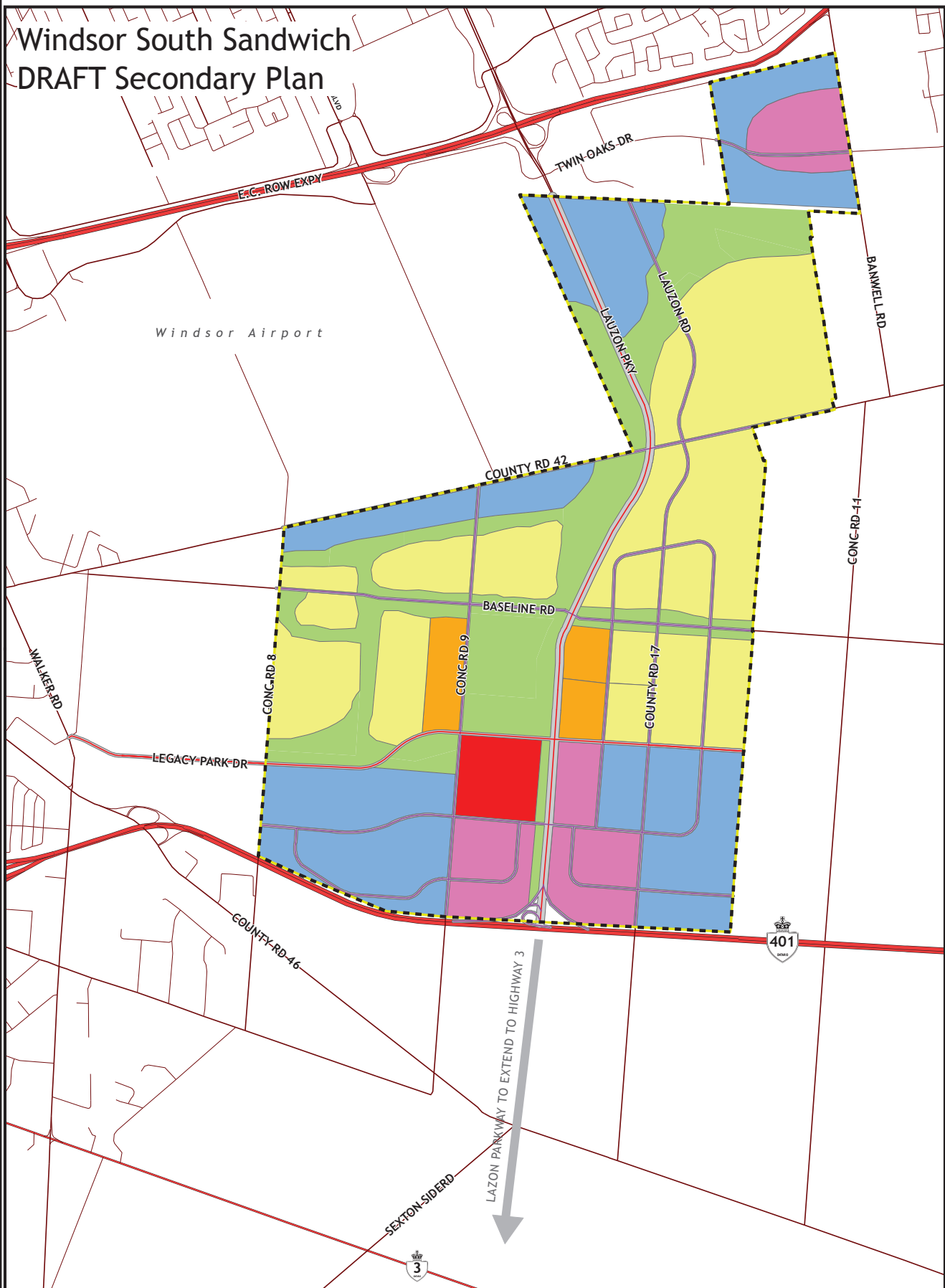
Existing Condition Flows

Catchment	Area	24-hour Chicago Flow from PC-SWMM			Municipal Drain Capacity
		2-year (m ³ /s)	5-year (m ³ /s)	100 year (m ³ /s)	(m ³ /s)
1000	96.4	5.00	7.24	14.22	0.559
1002	158.4	6.23	8.95	17.76	0.919
1005	51.6	4.41	6.32	12.26	0.299
1007	21.0	1.09	1.57	3.09	0.122
1010	38.4	2.47	3.52	6.77	0.223
1015	14.3	1.36	1.89	3.46	0.083
1020	92.9	1.26	1.74	3.29	0.539
1025	13.9	0.63	0.88	1.63	0.081
1027	56.5	3.97	5.68	11.32	0.328
1030	33.4	3.14	4.48	8.60	0.194
1035	105.2	1.44	2.00	3.80	0.610
1040	27.4	2.05	2.98	5.94	0.159
1045	26.7	0.39	0.55	1.07	0.155
1050	122.6	2.73	3.76	6.89	0.711
1055	32.0	0.45	0.62	1.19	0.185
1060	115.3	1.50	2.07	3.88	0.669
1065	29.0	1.19	1.65	3.02	0.168
1070	88.0	1.03	1.41	2.60	0.510
1072	53.6	3.41	4.92	9.55	0.311
1075	38.6	0.60	0.86	1.71	0.224
1080	279.4	5.14	7.17	13.28	1.621
1085	135.0	1.66	2.29	4.23	0.783
1090	24.8	0.37	0.52	1.02	0.144
1095	161.2	1.96	2.70	4.97	0.935
1100	53.8	0.66	0.91	1.69	0.312
1105	138.2	4.21	6.01	11.65	0.802
1110	59.5	0.81	1.13	2.14	0.345
1115	113.7	2.92	4.03	7.49	0.660
1120	142.0	1.96	2.72	5.18	0.824
1125	87.3	1.20	1.66	3.16	0.506
1130	226.5	2.69	3.71	6.82	1.314
1133	35.3	0.55	0.78	1.56	0.205
1135	24.4	0.35	0.49	0.94	0.142
1140	25.8	1.43	1.97	3.60	0.150
1145	161.9	3.02	4.21	7.78	0.939
1150	13.2	0.61	0.85	1.57	0.077
1155	110.5	1.43	1.98	3.69	0.641
1160	7.8	0.12	0.17	0.33	0.045
1165	188.4	2.40	3.31	6.16	1.093
1170	4.7	0.08	0.12	0.25	0.027
1175	145.0	3.11	4.30	7.87	0.841
1180	43.8	1.77	2.60	5.28	0.254
1185	131.5	4.11	5.87	11.34	0.762
1190	107.8	1.51	2.10	4.01	0.625
1195	147.8	1.98	2.74	5.16	0.857
1200	198.5	6.95	10.06	19.79	1.151
1205	59.6	2.38	3.50	7.11	0.346
1210	161.8	5.08	7.16	13.47	0.939
1215	127.9	4.46	6.24	11.60	0.742
1220	117.7	4.74	6.96	14.14	0.683
1225	40.5	4.89	6.85	12.71	0.235
total	4490.76				
average		2.33	3.30	6.31	0.511

Proposed Data from PC-SWMM

Catchment	Area (ha)	Municipal Drain Capacity (m ³ /s)	Flow - 2yr (m ³ /s)	Flow - 5yr (m ³ /s)	Flow - 100 yr (m ³ /s)	Flow - 2yr (L/ha)	Flow - 5yr (L/ha)	Flow - 100 yr (L/ha)	Runoff - 2yr (ML)	Runoff - 5yr (ML)	Runoff - 100yr (ML)	Runoff - 2yr (m ³ /ha)	Runoff - 5yr (m ³ /ha)	Runoff - 100yr (m ³ /ha)	Max Vol - 2yr (ML)	Max Vol - 5yr (ML)	Max Vol - 100yr (ML)	Max Vol - 2yr (m ³ /ha)	Max Vol - 5yr (m ³ /ha)	Max Vol - 100yr (m ³ /ha)	Max. Pond Depth - 2yr (m)	Max. Pond Depth - 5yr (m)	Max. Pond Depth - 100yr (m)	
S2020	66.13	0.384	0.226	0.286	0.409	3.4	4.3	6.2	28	37	64	420	559	962	20	27	49	302.1	410.8	739.5	0.73	0.97	1.65	
S2030	117.58	0.682	0.396	0.512	0.742	3.4	4.4	6.3	41	56	99	349	475	844	29	40	72	247.4	341.2	613.3	0.80	1.07	1.82	
S2035	81.42	0.472	0.274	0.348	0.498	3.4	4.3	6.1	33	44	77	403	540	940	23	32	58	287.7	393.5	716.0	0.74	0.99	1.70	
S2045	63.81	0.370	0.209	0.274	0.413	3.3	4.3	6.5	20	28	53	312	440	828	12	18	36	194.8	277.6	562.3	0.69	0.96	1.81	
S2050	97.34	0.565	0.310	0.410	0.615	3.2	4.2	6.3	32	44	82	326	456	845	21	29	56	211.7	297.3	579.0	0.71	0.98	1.78	
S2055	65.11	0.378	0.233	0.294	0.399	3.6	4.5	6.1	24	32	56	362	493	866	18	24	44	269.8	374.8	679.0	0.85	1.15	1.94	
S2060	112.73	0.654	0.331	0.441	0.667	2.9	3.9	5.9	40	54	98	352	482	870	26	36	67	232.7	316.5	592.9	0.67	0.89	1.58	
S2065	116.33	0.675	0.326	0.417	0.603	2.8	3.6	5.2	51	67	114	439	578	984	36	49	89	313.6	420.1	769.0	0.67	0.88	1.53	
S2075	117.69	0.683	0.320	0.426	0.668	2.7	3.6	5.7	37	52	97	314	439	823	24	33	63	203.1	276.3	535.0	0.69	0.92	1.67	
S2080	69.76	0.405	0.151	0.246	0.686	2.2	3.5	9.8	12	20	46	176	289	654	7	10	22	96.8	145.3	312.7	0.75	1.08	2.09	
S2085	100.9	0.585	0.189	0.294	0.532	1.9	2.9	5.3	26	38	75	258	375	746	17	24	46	171.7	233.2	456.4	0.71	0.95	1.73	
S2090	72.83	0.422	0.195	0.265	0.424	2.7	3.6	5.8	18	26	53	241	357	725	10	14	30	133.2	190.5	407.5	0.61	0.85	1.68	
S2095	117.98	0.684	0.308	0.410	0.618	2.6	3.5	5.2	36	50	95	305	426	802	24	33	65	200.0	277.3	549.7	0.68	0.92	1.71	
S2100	50.57	0.293	0.194	0.231	0.299	3.8	4.6	5.9	19	26	46	372	512	903	14	20	37	275.7	395.9	737.6	0.79	1.10	1.90	
S2105	60.91	0.353	0.198	0.254	0.371	3.3	4.2	6.1	20	28	52	335	465	855	13	19	38	212.5	305.9	623.7	0.68	0.96	1.81	
S2110	49.79	0.289	0.174	0.221	0.313	3.5	4.4	6.3	18	24	44	357	490	886	12	16	32	234.9	329.3	636.6	0.72	0.98	1.77	
S2115	113.58	0.659	0.289	0.418	0.673	2.5	3.7	5.9	29	42	84	258	373	739	17	23	48	151.3	205.7	420.2	0.61	0.81	1.56	
S2125	93.38	0.542	0.273	0.349	0.505	2.9	3.7	5.4	32	44	80	345	474	862	21	28	55	222.2	304.5	592.1	0.66	0.89	1.63	
S2130	80.55	0.467	0.242	0.307	0.426	3.0	3.8	5.3	37	48	80	453	593	997	26	36	64	328.9	443.2	794.3	0.66	0.88	1.50	
S2133	93.08	0.540	0.271	0.353	0.528	2.9	3.8	5.7	36	49	85	388	522	917	24	33	60	261.4	352.2	645.3	0.66	0.87	1.51	
S2135	22.82	0.132	0.087	0.108	0.151	3.8	4.7	6.6	8	11	20	351	485	879	5	7	15	224.7	325.2	640.7	0.70	0.98	1.76	
S2140	82.1	0.476	0.234	0.315	0.482	2.9	3.8	5.9	22	32	63	265	387	766	13	19	41	156.6	232.6	497.8	0.68	0.98	1.92	
S2155	77.27	0.448	0.238	0.303	0.436	3.1	3.9	5.6	26	36	66	338	469	860	17	24	47	219.4	308.5	610.3	0.70	0.97	1.79	
S2165	179.12	1.039	0.442	0.635	0.952	2.5	3.5	5.3	61	83	153	338	466	853	41	55	106	227.1	305.4	589.5	0.70	0.92	1.68	
S2175	47.3	0.274	0.149	0.184	0.254	3.2	3.9	5.4	22	29	47	471	614	994	19	26	42	411.8	544.1	884.5	0.99	1.27	1.95	
S2185	65.4	0.379	0.204	0.260	0.374	3.1	4.0	5.7	23	32	57	354	486	878	15	22	42	230.3	330.1	648.2	0.68	0.95	1.74	
S2190	84.96	0.493	0.087	0.200	0.377	1.0	2.4	4.4	30	41	74	350	481	872	25	32	58	299.1	380.4	677.5	0.89	1.11	1.86	
S2200	784.14	4.548	1.018	1.599	3.142	1.3	2.0	4.0	176	252	511	225	321	652	119	157	287	151.5	199.7	365.8	0.62	0.81	1.42	
S2210	58.24	0.338	0.040	0.085	0.205	0.7	1.5	3.5	23	31	54	402	527	925	23	27	44	391.8	470.1	754.0	0.98	1.16	1.77	
S2215	106.67	0.619	0.146	0.256	0.499	1.4	2.4	4.7	38	52	94	357	487	878	31	39	68	290.2	370.0	641.8	0.82	1.03	1.69	
Total	3351.49								1058	1465	2712				723	979	1825							
Average		0.63	0.26	0.36	0.58	3	4	6	34	47	87	341	469	853	23	32	59	238	325	609	0.73	0.98	1.73	

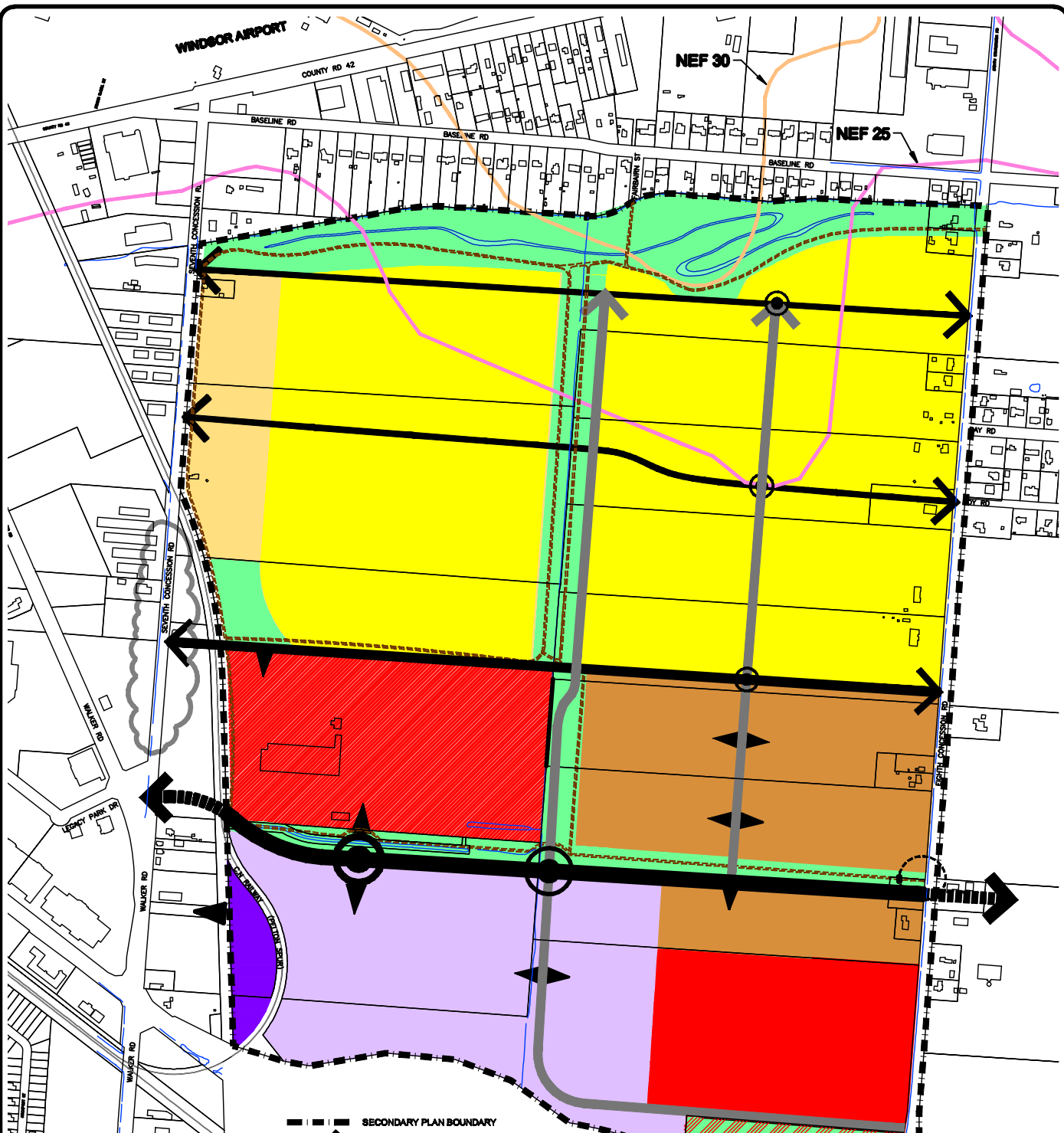
Windsor South Sandwich DRAFT Secondary Plan



Legend

- Study Area
- Business Park
- Low Density Residential
- Proposed Collector Road
- Community Core
- Medium/High Density Residential
- Proposed Arterial Road
- Employment
- Open Space / Natural Heritage; EP





LEGEND

- RESIDENTIAL (LOW DENSITY)
- RESIDENTIAL (MEDIUM DENSITY)
- OPEN SPACE
- MAJOR INSTITUTIONAL
- MINOR INSTITUTIONAL
- COMMERCIAL CENTRE
- COMMERCIAL CORRIDOR
- MIXED USE
- PRIVATE RECREATION

- SECONDARY PLAN BOUNDARY
- ARTERIAL ROAD (CLASS I)
- COLLECTOR ROADS (CLASS I)
- COLLECTOR ROADS (CLASS II)
- ROUNDABOUT
- PROPERTY ACCESS
- BIKEWAY
- ALIGNMENT OF 7th CONCESSION RD TO BE EVALUATED
- STORM WATER MANAGEMENT
- COMMUNITY NODE
- NOISE EXPOSURE FORECAST CONTOURS (NEF)

SCALE 1 : 3000 (A1)

APPENDIX "A"



**WINDSOR AIRPORT
MASTER PLAN**

FIGURE 7-1 - RECOMMENDED LAND USE PLAN



TOWN OF TECUMSEH
TECUMSEH HAMLET SECONDARY PLAN

**TECUMSEH HAMLET
POTENTIAL FUTURE LAND USES
AND COMMUNITY DESIGN**

DESIGNING FUTURE URBAN DEVELOPMENT FOR:

- settlement patterns, built forms and transportation systems that create a more sustainable, efficient, healthy and livable communities
- mixed use, compact, pedestrian-oriented communities
- neighbourhoods designed for people, not just cars
- places of work, play and shopping located close to where people live
- neighbourhoods should be diverse in land use and population
- broad range of housing choices
- public places and corridors that foster a sense of community
- schools should be sized and located within neighbourhoods to allow children to safely bike and walk to and from home
- shorter block lengths, sidewalks, trails, bike paths and the "5 minute walk rule" should be provided to encourage a healthy lifestyle
- provide greater opportunities to interact and move about in a community for those who cannot or choose not to drive automobiles (ie. seniors, youth)
- mixed-use areas where residential units locate above commercial shops are important in creating a community that is not divided into "sections"

CONCEPTUAL COMMERCIAL DESIGN









CONCEPTUAL RESIDENTIAL DESIGN

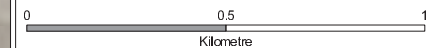


CONCEPTUAL RECREATIONAL DESIGN



LEGEND

	URBAN AREA BOUNDARY		Residential
	STUDY AREA		Commercial
	POTENTIAL ROAD LINKAGES		Institutional
	POTENTIAL RECREATIONAL TRAIL LINKAGES		Industrial
	POTENTIAL RESIDENTIAL		Recreational
	POTENTIAL RECREATIONAL		Ontario Hydro POW
	POTENTIAL INSTITUTIONAL		Public Utility
	POTENTIAL COMMERCIAL		



PREPARED BY:
TECUMSEH PLANNING & GIS DEPARTMENT
May 2011



Sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

WINDSOR SOLAR PROJECT

**FIGURE 2
PROJECT LOCATION -
NATURAL FEATURES AND SETBACKS**

- Gate
- ▲ Communication Tower
- Point of Common Coupling
- Fence
- Solar Panel Row
- Access Road
- Operations & Maintenance Building
- MV Station
- Substation Transformer
- Substation Yard
- Temporary Laydown Area
- Railway
- Permanent / Intermittent Stream
- Ephemeral Drain
- Project Location
- Project Location 50 m Setback
- Project Location 120 m Setback
- Project Location 300 m Setback
- Parcel Boundary
- Provincially Significant Wetland
- Woodland



MAP DRAWING INFORMATION:
DATA PROVIDED BY MNR, ERCA

MAP CREATED BY: GM
MAP CHECKED BY: JP
MAP PROJECTION: NAD 1983 UTM Zone 17N

FILE LOCATION: I:\GIS\149152 - Samsung Windsor\mxd\Water Assessment



PROJECT: 149152
STATUS: DRAFT
DATE: 11/13/2014

Town of Tecumseh Consolidated Official Plan Land Use Designations

LEGEND

- Settlement Area Boundary
- Town Limits

Official Plan Land Use Designations:

- Residential
- Hamlet Residential
- Medium Density Residential
- Maidstone Hamlet Residential
- Maidstone Hamlet Residential 30.48 metre Frontage Lots
- Hamlet Development
- General Commercial
- Neighbourhood Commercial
- Hamlet Commercial
- Industrial / Business Park
- Restricted Industrial
- Highway Service Centre
- Community Facility
- Restricted Community Facility
- Natural Environment
- Recreational
- Ontario Hydro Right of Way

Former Tecumseh

Lake St. Clair

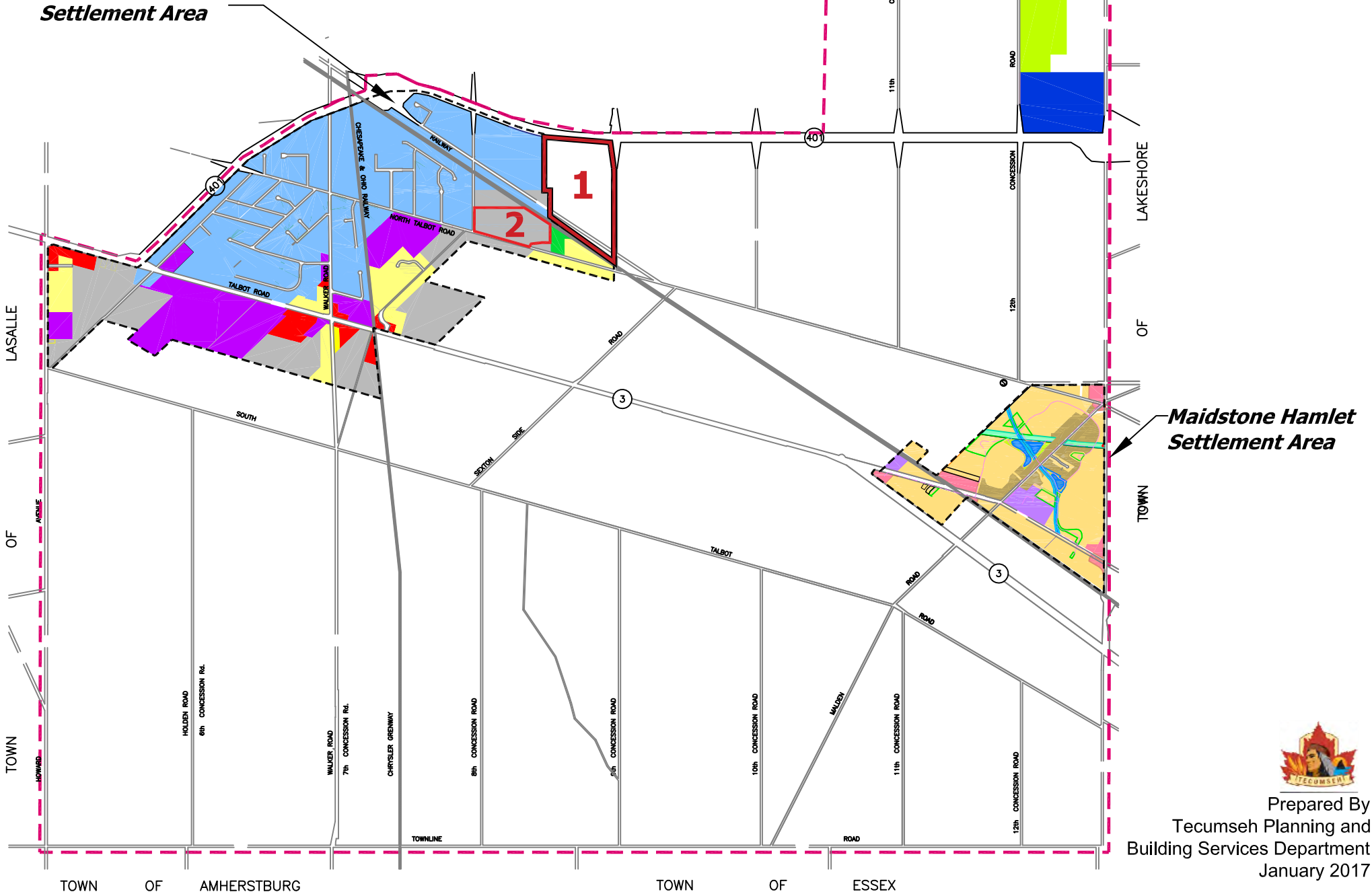
Former St. Clair Beach

Tecumseh Hamlet Settlement Area



1. Oldcastle Hamlet Settlement Area Expansion, as approved in County Official Plan
2. Proposed Business Park/Industrial. Official Plan and Zoning By-law Amendments appealed to the OMB.

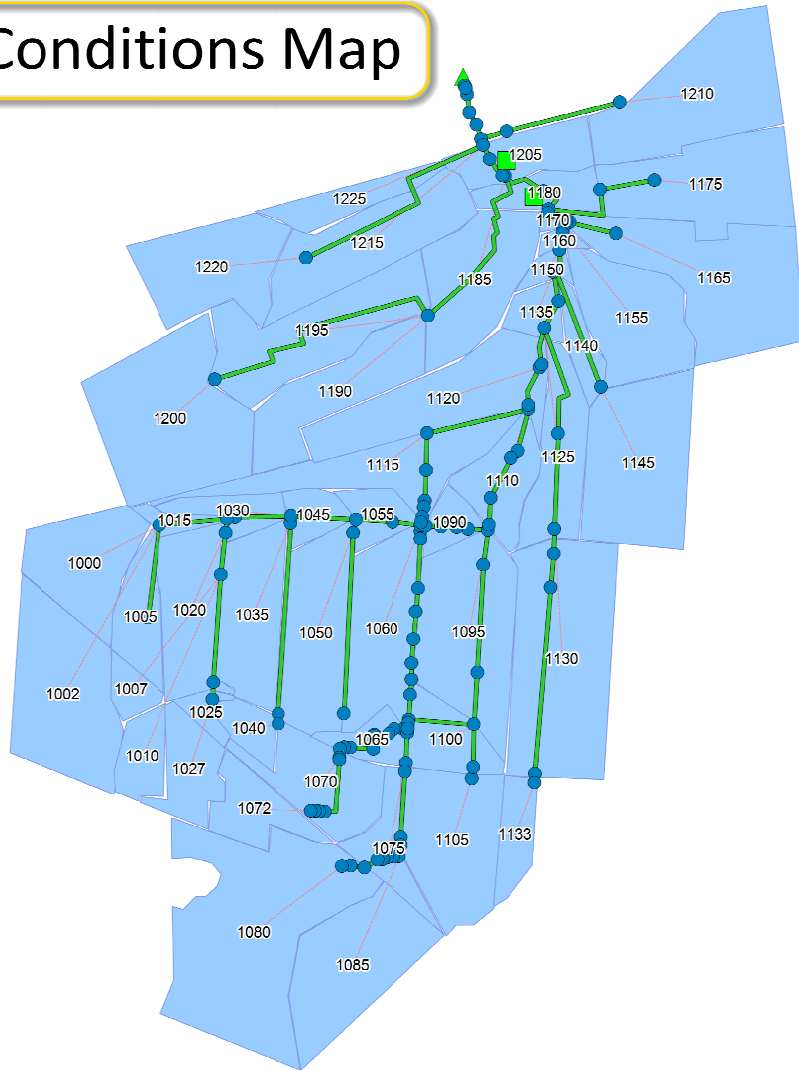
Oldcastle Hamlet Settlement Area



Maidstone Hamlet Settlement Area

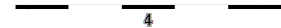


Existing Conditions Map



Legend

- Junctions
- ▲ Outfalls
- Storages
- Conduits
- Orifices
- Subcatchments



[TITLE]
Upper Little River Model.

```

[OPTIONS]
;;Options          Value
;;-----
FLOW_UNITS         CMS
INFILTRATION       GREEN AMPT
FLOW_ROUTING       DYNWAVE
START_DATE         12/14/2011
START_TIME         00:00:00
REPORT_START_DATE  12/14/2011
REPORT_START_TIME  00:00:00
END_DATE           12/17/2011
END_TIME           00:00:00
SWEEP_START        01/01
SWEEP_END          12/31
DRY_DAYS           0
REPORT_STEP        00:05:00
WET_STEP           00:05:00
DRY_STEP           00:05:00
ROUTING_STEP       30
ALLOW_PONDING     YES
INERTIAL_DAMPING   FULL
VARIABLE_STEP      0.75
LENGTHENING_STEP  0
MIN_SURFAREA      0
NORMAL_FLOW_LIMITED BOTH
SKIP_STEADY_STATE NO
FORCE_MAIN_EQUATION H-W
LINK_OFFSETS       ELEVATION
MIN_SLOPE          0
  
```

```

[EVAPORATION]
;;Type             Parameters
;;-----
CONSTANT           0.0
DRY_ONLY           NO
  
```

```

[RAINGAGES]
;;
;;Name             Rain      Time      Snow      Data
;;Type            Type      Intrvl   Catch    Source
;;-----
24HR              INTENSITY 0:10  1.0      TIMESERIES 100yr_24hr-chi
;Continuous Simulation
  
```

```

1072 24HR J74 53.57 90 700 0.15 0
;To Little River, south of 401
1075 24HR J5075 38.55 5 1100 0.15 0
;Large catchment to 9th Conc Drain south of Division Rd.
1080 24HR J90 279.42 10 2500 0.15 0
;To Little River Drain, south of North Talbot Rd.
1085 24HR J81 134.98 5 1500 0.15 0
;Little River, at Baseline
1090 24HR J5090 24.78 5 600 0.15 0
;Large catchment draining to Little River, north of 401
1095 24HR J5090 161.18 5 1700 0.15 0
;To Little River, north of 401, south of catchment
1100 24HR J20 53.81 5 600 0.15 0
;To Little River, south of 401
1105 24HR J5100 138.19 25 1300 0.15 0
;To Little River, south of County Rd 42, north of Baseline
1110 24HR J5110 59.53 5 1000 0.15 0
;To Little River, south of County Rd 42
1115 24HR J30 113.74 10 3000 0.15 0
;To Little River, north of County Rd 42
1120 24HR J12 142 5 2500 0.15 0
;Lower Watson Drain, north of 401
1125 24HR J5120 87.31 5 1500 0.15 0
;To Watson Drain, north of 401
1130 24HR J103 226.54 5 2200 0.15 0
;To Watson Drain, south of 401
1133 24HR J11 35.33 5 1000 0.15 0
;Little River, between Lauzon Pkwy and Lauzon Rd
1135 24HR J9 24.41 5 500 0.15 0
;To Little River, Lauzon Rd
1140 24HR J23 25.79 25 1000 0.15 0
;To Little River; south of County Rd 42
;Outlet to J8; 10th Concession Drain
1145 24HR J8 161.89 10 1500 0.15 0
;To Little River, at Junction of Soulliere and Little River
1150 24HR J5135 13.24 25 300 0.15 0
;To Little River, Soulliere drain
1155 24HR J5150 110.49 5 1500 0.15 0
1160 24HR J5160 7.83 5 200 0.15 0
;Desjardeins Drain
1165 24HR J4.5 188.42 5 2400 0.15 0
;To Little River, south of CP line
1170 24HR J24 4.65 5 200 0.15 0
;Lachance Drain
1175 24HR J0.9 144.97 10 2000 0.15 0
;To Little River; d/s end of Lachance drain
  
```

Cont INTENSITY 1:00 1.0 FILE "N:\active\160311265\design\analysis\PCSWMM(windsor-hly03-123_26012012_151422
#48 hour Regional Storm event; 285 mm total precipitation
Hurricane_Hazel INTENSITY 0:15 1.0 TIMESERIES Hazel

```

[SUBCATCHMENTS]
;;
;;Name             Raingage      Outlet      Total      Pcnt.      Width      Pcnt.      Curb      Snow
;;-----
;6th Conc Road Drain North of 401
1000 24HR J29 96.43 75 1000 0.15 0
;6th Conc including south of 401
1002 24HR J29 158.41 50 1400 0.15 0
;East of 6th Conc Drain, between Baseline and Division Rd
1005 24HR J6 51.55 75 1300 0.15 0
;East of 6th Conc Drain, north of 401
1007 24HR J58.5 21.04 50 300 0.15 0
;East of 6th Conc Drain, south of 401
1010 24HR J58.5 38.43 50 800 0.15 0
;Drains to 7th Conc Road Drain
1015 24HR J5015 14.34 50 700 0.15 0
;7th Conc Drain north of 401
1020 24HR J58 92.94 5 1500 0.15 0
;To 7th Conc drain; at 401 and Provincial Rd
1025 24HR J58.7 13.92 25 300 0.15 0
;7th Conc Drain south of 401
1027 24HR J58.7 56.51 90 900 0.15 0
;8th Conc Drain, along Baseline
1030 24HR J5030 33.41 75 1000 0.15 0
;8th Conc Drain, north of 401
1035 24HR J55 105.23 5 1800 0.15 0
;8th Conc Drain, between 401 and Division Rd.
1040 24HR J25 27.35 90 500 0.15 0
;Hayes Drain at Baseline
1045 24HR J5045 26.73 5 600 0.15 0
;To Hayes Drain, north of 401
1050 24HR J53 122.6 10 1900 0.15 0
;9th Conc Drain, at Baseline
1055 24HR J5055 31.97 5 600 0.15 0
;9th Conc Drain, north of 401
1060 24HR J5055 115.34 5 1600 0.15 0
;Hurley Drain, north of 401
;No information available on culvert under 401
1065 24HR J5060 29.03 20 700 0.15 0
;9th Conc Drain south of 401
1070 24HR J72 87.98 5 800 0.15 0
;To Hurley Drain (?), south of 401
  
```

```

1180 24HR s5180 43.8 75 300 0.15 0
1185 24HR J46102 131.45 25 1300 0.15 0
;To Little River; u/s of 1185
1190 24HR J5190 107.84 5 2000 0.15 0
;To Little River; drains to 1185
1195 24HR J5190 147.79 5 2300 0.15 0
;To Little River; furthest catchment west
1200 24HR J13 198.52 50 1400 0.15 0
;To Little River; intersection of Hwy 2 and Lauzon Pkwy; furthest upstream section
;White Oaks Buissness Parl
1205 24HR s5205 59.57 75 400 0.15 0
;Gouin Drain
1210 24HR J0.75 161.84 20 2000 0.15 0
;To Little River; at intersection of Hwy 2 and Lauzon Pkwy
1215 24HR J17 127.92 20 2000 0.15 0
;To Little River; just south of Hwy 2
1220 24HR J3 117.69 75 800 0.15 0
;To Little River; at intersection of Hwy 2 and Lauzon Pkwy
1225 24HR J17 40.51 75 2000 0.15 0
  
```

```

[SUBAREAS]
;;
;;Subcatchment    N-Imperv    N-Perv    S-Imperv    S-Perv    PctZero    RouteTo    PctRouted
;;-----
1000 0.013 0.25 1 2.5 0 OUTLET
1002 0.013 0.25 1 2.5 0 OUTLET
1005 0.013 0.25 1 2.5 0 OUTLET
1007 0.013 0.25 1 2.5 0 OUTLET
1010 0.013 0.25 1 2.5 0 OUTLET
1015 0.013 0.25 1 2.5 0 OUTLET
1020 0.013 0.25 1 2.5 0 OUTLET
1025 0.013 0.25 1 2.5 0 OUTLET
1027 0.013 0.25 1 2.5 0 OUTLET
1030 0.013 0.25 1 2.5 0 OUTLET
1035 0.013 0.25 1 2.5 0 OUTLET
1040 0.013 0.25 1 2.5 0 OUTLET
1045 0.013 0.25 1 2.5 0 OUTLET
1050 0.013 0.25 1 2.5 0 OUTLET
1055 0.013 0.25 1 2.5 0 OUTLET
1060 0.013 0.25 1 2.5 0 OUTLET
1065 0.013 0.25 1 2.5 0 OUTLET
1070 0.013 0.25 1 2.5 0 OUTLET
1072 0.013 0.25 1 2.5 0 OUTLET
1075 0.013 0.25 1 2.5 0 OUTLET
1080 0.013 0.25 1 2.5 0 OUTLET
1085 0.013 0.25 1 2.5 0 OUTLET
1090 0.013 0.25 1 2.5 0 OUTLET
  
```

1095	0.013	0.25	1	2.5	0	OUTLET
1100	0.013	0.25	1	2.5	0	OUTLET
1105	0.013	0.25	1	2.5	0	OUTLET
1110	0.013	0.25	1	2.5	0	OUTLET
1115	0.013	0.25	1	2.5	0	OUTLET
1120	0.013	0.25	1	2.5	0	OUTLET
1125	0.013	0.25	1	2.5	0	OUTLET
1130	0.013	0.25	1	2.5	0	OUTLET
1133	0.013	0.25	1	2.5	0	OUTLET
1135	0.013	0.25	1	2.5	0	OUTLET
1140	0.013	0.25	1	2.5	0	OUTLET
1145	0.013	0.25	1	2.5	0	OUTLET
1150	0.013	0.25	1	2.5	0	OUTLET
1155	0.013	0.25	1	2.5	0	OUTLET
1160	0.013	0.25	1	2.5	0	OUTLET
1165	0.013	0.25	1	2.5	0	OUTLET
1170	0.013	0.25	1	2.5	0	OUTLET
1175	0.013	0.25	1	2.5	0	OUTLET
1180	0.013	0.25	1	2.5	0	OUTLET
1185	0.013	0.25	1	2.5	0	OUTLET
1190	0.013	0.25	1	2.5	0	OUTLET
1195	0.013	0.25	1	2.5	0	OUTLET
1200	0.013	0.25	1	2.5	0	OUTLET
1205	0.013	0.25	1	2.5	0	OUTLET
1210	0.013	0.25	1	2.5	0	OUTLET
1215	0.013	0.25	1	2.5	0	OUTLET
1220	0.013	0.25	1	2.5	0	OUTLET
1225	0.013	0.25	1	2.5	0	OUTLET

```

[INFILTRATION]
;;Subcatchment Suction HydCon IMDmax
;;-----
1000 320 0.254 0.265
1002 320 0.254 0.265
1005 320 0.254 0.265
1007 320 0.254 0.265
1010 320 0.254 0.265
1015 320 0.254 0.265
1020 320 0.254 0.265
1025 320 0.254 0.265
1027 320 0.254 0.265
1030 320 0.254 0.265
1035 320 0.254 0.265
1040 320 0.254 0.265
1045 320 0.254 0.265
1050 320 0.254 0.265

```

```

;River: Gouin
;Reach: Gouin
;Transect: 0.75
J0.75 178.4 3.6 0 5 0
;River: Lachance
;Reach: Lachance
;Transect: 0.8
J0.8 178.1 3.6 0 5 0
;River: Lachance
;Reach: Lachance
;Transect: 0.9
J0.9 178.6 3.6 0 5 0
J1 185 2.7 0 5 0
;River: Little River
;Reach: Watson to Desjar
;Transect: 10
J10 178.819 5 0 5 0
;River: Watson Drain
;Reach: Watson Drain
;Transect: 102
J102 180.729 2.1 0 5 0
;River: Watson Drain
;Reach: Watson Drain
;Transect: 103
J103 181.937 2.7 0 5 0
;River: Watson Drain
;Reach: Watson Drain
;Transect: 105
J105 182.202 2.1 0 5 0
;River: Watson Drain
;Reach: Watson Drain
;Transect: 106
J106 182.812 1.739 0 5 0
;River: Watson Drain
;Reach: Watson Drain
;Transect: 107
J107 184.192 2.055 0 5 0
;Upstream end of Watson Drain underpass culvert
;Information from SWMRVMO model (MTO)
J11 184.2 2 0 5 0
;River: Little River
;Reach: Watson to Desjar
;Transect: 12
J12 179.1 5.2 0 5 0
J13 182.998 2 0 5 0
;River: Little River

```

1055	320	0.254	0.265
1060	320	0.254	0.265
1065	320	0.254	0.265
1070	320	0.254	0.265
1072	320	0.254	0.265
1075	320	0.254	0.265
1080	320	0.254	0.265
1085	320	0.254	0.265
1090	320	0.254	0.265
1095	320	0.254	0.265
1100	320	0.254	0.265
1105	320	0.254	0.265
1110	320	0.254	0.265
1115	320	0.254	0.265
1120	320	0.254	0.265
1125	320	0.254	0.265
1130	320	0.254	0.265
1133	320	0.254	0.265
1135	320	0.254	0.265
1140	320	0.254	0.265
1145	320	0.254	0.265
1150	320	0.254	0.265
1155	320	0.254	0.265
1160	320	0.254	0.265
1165	320	0.254	0.265
1170	320	0.254	0.265
1175	320	0.254	0.265
1180	320	0.254	0.265
1185	320	0.254	0.265
1190	320	0.254	0.265
1195	320	0.254	0.265
1200	320	0.254	0.265
1205	320	0.254	0.265
1210	320	0.254	0.265
1215	320	0.254	0.265
1220	320	0.254	0.265
1225	320	0.254	0.265

```

[JUNCTIONS]
;Name Invert Max. Init. Surcharged Ponded
;Elev. Depth Area
;;-----
;River: Gouin
;Reach: Gouin
;Transect: 0.5
J0.5 177.9 3.6 0 5 0

```

```

;Reach: Baseline to Wats
;Transect: 14
J14 180.062 4.238 0 5 0
;River: Little River
;Reach: Baseline to Wats
;Transect: 15
J15 180.175 4.238 0 5 0
;River: Little River
;Reach: Baseline to Wats
;Transect: 16
J16 180.509 4.291 0 5 0
J17 177.208 5.7 0 5 0
;River: Little River
;Reach: Little River
;Transect: 18
J18 181.636 2.8 0 5 0
;River: Little River
;Reach: Little River
;Transect: 19
J19 183.2 2.1 0 5 0
;River: Little River
;Reach: Desjardeins to Lachance
;Transect: 2
J2 177.865 6 0 5 0
;Junction of Desjardeins and Little River
;River: Little River
;Reach: Little River
;Transect: 20
J20 184 2.7 0 5 0
J21 179.754 4.246 0 5 0
J22 179.1 5.2 0 5 0
J23 178.684 5.4 0 5 0
J24 177.865 6 0 5 0
;Created to include culvert d/s of 1040
J25 187.154 2 0 5 0
J26 180.916 4 0 5 0
J27 177.1 5.6 0 5 0
J28 182.2 4 0 5 0
J29 186.6 5 0 5 0
J3 180.95 2 0 5 0
J30 182.5 3 0 0 0
J31 182.8 3 0 5 0
;River: 9th Concession
;Reach: 9th Concession
;Transect: 32
J32 182.219 3.381 0 5 0

```

```

;River: 9th Concession
;Reach: 9th Concession
;Transect: 33
J33      182.74    2.67    0    5    0
;River: 9th Concession
;Reach: 9th Concession
;Transect: 34
J34      183.49    2.45    0    5    0
;River: 9th Concession
;Reach: 9th Concession
;Transect: 35
J35      183.81    2.38    0    5    0
;River: 9th Concession
;Reach: 9th Concession
;Transect: 36
J36      184.19    2.46    0    5    0
;River: 9th Concession
;Reach: 9th Concession
;Transect: 37
J37      184.29    2.35    0    5    0
;River: Little River
;Reach: Gouin to DS end
;Transect: 37500
J37500   176.8     5.1     0    5    0
;River: 9th Concession
;Reach: 9th Concession
;Transect: 38
J38      184.45    2.49    0    5    0
;River: 9th Concession
;Reach: 9th Concession
;Transect: 39
J39      184.53    2.69    0    5    0
;River: Little River
;Reach: Gouin to DS end
;Transect: 39001
J39001   176.9     7.9     0    5    0
;River: Desjardeins
;Reach: Desjardeins
;Transect: 4
J4       178.1     3.6     0    5    0
;River: Desjardeins
;Reach: Desjardeins
;Transect: 4.5
J4.5     178.7     3.4     0    5    0
;River: 9th Concession
;Reach: 9th Concession

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;Transect: 40
J40      184.637    2.817    0    5    0
;River: Little River
;Reach: Gouin to DS end
;Transect: 40323
J40323   177         5.3     0    5    0
;River: 9th Concession
;Reach: 9th Concession
;Transect: 41
J41      184.838    2.262    0    5    0
;River: Little River
;Reach: Lachance to Goui
;Transect: 41106
J41106   177.1     5.7     0    5    0
J42      183         3         0    5    0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 43
J43      184.9     2.451    0    5    0
;River: Little River
;Reach: Lachance to Goui
;Transect: 43501
J43501   176.9     5.5     0    5    0
J44      183.1     3         0    5    0
J45      183.5     3         0    5    0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 46
J46      185.72    2.9     0    5    0
;River: Little River
;Reach: Lachance to Goui
;Transect: 46102
J46102   177.1     5.6     0    5    0
;River: Little River
;Reach: Lachance to Goui
;Transect: 46203
J46203   177.7     5.6     0    5    0
;River: 6th Concession D
;Reach: 9th to Little Ri
;Transect: 47
J47      181.22    3.77    0    5    0
;River: 6th Concession D
;Reach: 9th to Little Ri
;Transect: 48
J48      181.43    3.52    0    5    0
;River: 6th Concession D

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;Reach: 9th to Little Ri
;Transect: 49
J49      181.69    3.77    0    5    0
J5       176.8     5.1     0    5    0
J50      183.5     2         0    5    0
;River: 6th Concession D
;Reach: 7th to 8th
;Transect: 57
J5015    186.55    1.555   0    5    0
J5025    190.33    2         0    5    0
;River: 6th Concession D
;Reach: 8th to 9th
;Transect: 54
J5030    184.8     2.3     0    5    0
;River: Baseline Drain
;Reach: Hayes to 9th
;Transect: 52
J5045    184.25    2.15    0    5    0
;River: 6th Concession D
;Reach: 9th to Little River
;Transect: 50
;Junction of 9th Concession Drain and 6th Concession Drain
;Slope of 9th Concession Drain (C6060a-k) updated to reflect survey information, 0.16%
J5055    182.2     4         0    5    0
;River: 9th Concession
;Reach: 9th Concession
;Transect: 42
;Junction of Hurley Relief Drain and southern portion of 9th Concession
;Channels assumed to be at same elevation
J5060    184.846   2.354   0    5    0
;River: Hurley Drain
;Reach: Hurley Drain
;Transect: 77
;Outlet of catchments 1065, 1070, and 1072
J5065    187.6     1.5     0    5    0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 44
J5075    185.582    2.6     0    5    0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 79
J5080    186.5     2         0    5    0
;River: Little River
;Reach: Baseline to Wats
;Transect: 17

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```

;Junction of upper reach of Little River and 6th Concession
;Slope of 6th Concession (C6055a-d) updated to reflect survey information-0.11%
J5090    180.916   4.084   0    5    0
;River: Baseline Drain
;Reach: Hayes to 9th
;Transect: 51
J51      183.2     3.6     0    5    0
;River: Little River
;Reach: Little River
;Transect: 21
J5100    185         2.7     0    5    0
;River: Little River
;Reach: Baseline to Watson
;Transect: 13
;County Road 42
;Junction of catchments 1110,1115
J5110    179.754   4.246   0    5    0
;River: Little River
;Reach: Watson to Desjardeins
;Transect: 11
;Junction of Watson Drain and Little River
J5120    178.67    5.329   0    5    0
;River: Little River
;Reach: Watson to Desjar
;Transect: 8
;Junction of catchments 1135 and 1140
J5135    178.8     4.6     0    5    0
;River: Little River
;Reach: Watson to Desjar
;Transect: 5
J5150    178.261    5         0    5    0
;River: Little River
;Reach: Watson to Desjar
;Transect: 3
J5160    178         7         0    5    0
;River: Little River
;Reach: Lachance to Goui
;Transect: 42000
;Junction of McGill Drain and Little River (Node 5180 in Stantec SWHMYO model)
J5180    177.208   5.7     0    5    0
J5190    178.948   2         0    5    0
;River: Hayes Drain
;Reach: Hayes Drain;Transect: 53
J53      184.55    2.167   0    5    0
;River: Hayes Drain
;Reach: Hayes Drain

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;Transect: 53.5
J53.5      186.831  2.167  0    5    0
;River: 8th Concession D
;Reach: 8th Concession
;Transect: 55
J55        184.5   2.8    0    5    0
;River: 8th Concession D
;Reach: 8th Concession
;Transect: 55.5
;Invert from topo - approximate
J55.5      187.104  2.8    0    5    0
;River: 6th Concession D
;Reach: 7th to 8th
;Transect: 56
J56        186.09  2.31   0    5    0
J58        187.7   1.26   0    5    0
;River: 7th Concession D
;Reach: 7th Concession
;Transect: 58.5
J58.5      188.2   1.26   0    5    0
;River: 7th Concession D
;Transect: 58.7
J58.7      190.27  5.31   0    5    0
J6         187.18  5       0    5    0
;River: Hurley Drain
;Reach: Hurley Drain
;Transect: 62
J62        185.013 2.257  0    5    0
;River: Hurley Drain
;Reach: Hurley Drain
;Transect: 63
J63        185.1   2.3    0    5    0
;River: Hurley Drain
;Reach: Hurley Drain
;Transect: 64
J64        185.1   2.2    0    5    0
;River: Hurley Drain
;Reach: Hurley Drain
;Transect: 65
J65        185.4   2.3    0    5    0
;River: Hurley Drain
;Reach: Hurley Drain
;Transect: 66
J66        185.4   2.4    0    5    0
;River: Hurley Drain

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```

;Reach: Hurley Drain
;Transect: 67
J67        186.2   1.9    0    5    0
;River: Hurley Drain
;Reach: Hurley Drain
;Transect: 68
J68        185.8   2.3    0    5    0
;River: Hurley Drain
;Reach: Hurley Drain
;Transect: 69
J69        186.1   2.3    0    5    0
;River: Little River
;Reach: Watson to Desjar
;Transect: 7
J7         178.8   4.6    0    5    0
;River: Hurley Drain
;Reach: Hurley Drain
;Transect: 70
J70        186.2   2.3    0    5    0
;River: Hurley Drain
;Reach: Hurley Drain
;Transect: 71
J71        186.3   1.8    0    5    0
;River: Hurley Drain
;Reach: Hurley Drain
;Transect: 72
J72        186.6   1.5    0    5    0
;River: Hurley Drain
;Reach: Hurley Drain
;Transect: 73
J73        186.6   1.5    0    5    0
;River: Hurley Drain
;Reach: Hurley Drain
;Transect: 74
J74        187     2.3    0    5    0
;River: Hurley Drain
;Reach: Hurley Drain
;Transect: 75
J75        187.7   1.3    0    5    0
;River: Hurley Drain
;Reach: Hurley Drain
;Transect: 76
J76        187.7   1.3    0    5    0
J8         179.557  2       0    5    0
;River: Washbrooke
;Reach: Washbrooke

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;Transect: 80
J80        186.5   2       0    5    0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 81
J81        186.5   1.5    0    5    0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 84
J84        186.5   1.3    0    5    0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 85
J85        186.6   2.3    0    5    0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 86
J86        187     2.11   0    5    0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 87
J87        186.791 1.949  0    5    0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 88
J88        187.546 1.454  0    5    0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 89
J89        187.555 2.095  0    5    0
;River: Little River
;Reach: Watson to Desjar
;Transect: 9
J9         178.684  5.4    0    5    0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 90
J90        187.777 1.713  0    5    0

[OUTFALLS]
;Name      Invert  Outfall  Stage/Table  Tide
;Name      Elev.    Type     Time Series  Gate
;-----
;River: Little River
;Reach: Gouin to DS end
;Transect: 36000

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J5205      176.7   NORMAL      NO

[STORAGE]
;Name      Invert  Max.  Init.  Storage  Curve  Ponded  Evap.  Infiltration
;Name      Elev.   Depth Depth  Curve    Params Area  Frac.  parameters
;-----
S5180      178.7   5     0     TABULAR  5180   0       0
S5205      177.9   5     0     TABULAR  5205   0       0

[CONDUITS]
;Name      Inlet  Outlet  Length  Manning  Inlet  Outlet  Init.  Max.
;Name      Node   Node    Length  N        Offset Offset  Flow  Flow
;-----
;Forest Glade Crossing
C1         J5     J37500  18.1    0.015   176.8  176.8  0     0
C10        J9     J23    14     0.015   178.684 178.684 0     0
C11        J17    J5180  50     0.015   181.4  181.4  0     0
C12        J24    J2     10     0.015   177.865 177.865 0     0
C13        J5     J37500  18.1    0.015   180.5  180.5  0     0
C14        J1     J20    450    0.045   184    185    0     0
C15        J40    J20    660    0.045   185.14 184.4  0     0
C16        J5090  J26    10     0.015   184.5  184.5  0     0
C17        J5090  J26    10     0.015   180.916 180.916 0     0
C18        J46102 J27    10     0.015   177.1  177.1  0     0
C19        J46102 J27    10     0.015   180.8  180.8  0     0
C2         J5110  J21    14     0.015   183.1  183.1  0     0
C20        J5055  J28    10     0.015   182.2  182.2  0     0
C21        J5055  J28    10     0.015   184.8  184.8  0     0
C22        J30    J5110  1050   0.045   182.5  181.24 0     0
C23        J50    J45    130    0.01    183.5  183.5  0     0
C24        J44    J42    90     0.01    183.1  183    0     0
C25        J31    J30    320    0.01    182.8  182.5  0     0
C26        J42    J31    280    0.01    183    182.8  0     0
C27        J45    J44    190    0.01    183.5  183.1  0     0
C28        J5055  J50    6       0.015   183.5  183.5  0     0
C3         J55    J5030  20     0.045   184.5  184.8  0     0
C4         J17    J5180  50     0.015   177.208 177.208 0     0
C5         J12    J21    15     0.015   182.4  182.4  0     0
C6         J5110  J21    14     0.015   179.754 179.754 0     0
C6000     J29    J5015  700    0.045   186.6  186.55 0     0
;7th Street Drain; transect copied from 6th Concession drain
;Slope, Length, Manning's n from SWMRYMO
C6007     J6     J29    835    0.045   187.18 186.6  0     0
;River: 6th Concession D
;Reach: 7th to 8th
C6015a    J5015  J56    100    0.045   186.55 186.09 0     0

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;River: 6th Concession D
;Reach: 7th to 8th
C6015b      J56      J5030      580      0.045      186.09      184.8      0      0
;River: 7th Concession D
;Reach: 7th Concession
;COPIED SECTION FROM SEC 58
;Slope, Length, Manning's n from SWMHYMO
C6025a      J5025      J58.5      1380      0.045      190.27      188.2      0      0
;River: 7th Concession D
;Reach: 7th Concession
;COPIED SECTION FROM SEC 58
C6025b      J58.5      J58      390      0.045      188.2      187.7      0      0
C6025c      J59      J5015      110      0.045      187.7      186.55      0      0
;River: 6th Concession D
;Reach: 8th to 9th
C6030      J5030      J5045      750      0.045      184.8      184.25      0      0
;River: 8th Concession D
;Reach: 8th Concession
;COPIED SECTION FROM SEC 55
;Slope, Length, Manning's n from SWMHYMO
C6040      J55      J51      1860      0.045      187.104      184.5      0      0
;River: Baseline Drain
;Reach: Hayes to 9th
C6045a      J5045      J51      520      0.045      184.25      183.2      0      0
;River: Baseline Drain
;Reach: Hayes to 9th
C6045b      J51      J5055      150      0.045      183.2      182.2      0      0
;River: 6th Concession D
;Reach: 9th to Little Ri
C6055a      J28      J49      115      0.045      181.7      181.69      0      0
;River: 6th Concession D
;Reach: 9th to Little Ri
C6055b      J49      J48      180      0.045      181.69      181.43      0      0
;River: 6th Concession D
;Reach: 9th to Little Ri
C6055c      J48      J47      180      0.045      181.43      181.22      0      0
;Upstream of Little River and Baseline junction (J17) Outlet set to invert of Junction 17; length adjusted correctly.
C6055d      J47      J5090      250      0.045      181.22      180.916      0      0
C6060a      J41      J41      30      0.045      184.846      184.838      0      0
;River: 9th Concession
;Reach: 9th Concession
C6060b      J41      J40      60      0.045      184.838      184.637      0      0
;River: 9th Concession
;Reach: 9th Concession

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C6060e      J40      J39      230      0.045      184.637      184.53      0      0
;River: 9th Concession
;Reach: 9th Concession
C6060d      J39      J38      150      0.045      184.53      184.45      0      0
;River: 9th Concession
;Reach: 9th Concession
C6060e      J38      J37      150      0.045      184.45      184.29      0      0
;River: 9th Concession
;Reach: 9th Concession
C6060f      J37      J36      205      0.045      184.29      184.19      0      0
;River: 9th Concession
;Reach: 9th Concession
C6060g      J36      J35      240      0.045      184.19      183.81      0      0
;River: 9th Concession
;Reach: 9th Concession
C6060h      J35      J34      230      0.045      183.81      183.49      0      0
;River: 9th Concession
;Reach: 9th Concession
C6060i      J34      J33      505      0.045      183.49      182.74      0      0
;River: 9th Concession
;Reach: 9th Concession
C6060j      J33      J32      80      0.045      182.74      182.219      0      0
;River: 9th Concession
;Reach: 9th Concession
;Adjusted from HEC-RAS import; automatically created junction deleted and lengths adjusted accordingly.
;Outlet set to invert of J50
C6060k      J32      J5055      45      0.045      182.219      181.7      0      0
;River: Washbrooke
;Reach: Washbrooke
;Channel length longer than SWMHYMO model based on available surveyed cross section information.
C6075a      J5075      J43      455      0.045      185.582      184.9      0      0
;River: Washbrooke
;Reach: Washbrooke
C6075b      J43      J5060      35      0.045      184.9      184.846      0      0
;River: Washbrooke
;Reach: Washbrooke
C6080      J5080      J46      650      0.045      186.5      185.72      0      0
;River: Little River
;Reach: Baseline to Wats
;Bridge: Little River
C6090a      J26      J16      310      0.045      180.916      180.509      0      0
;River: Little River
;Reach: Baseline to Wats
C6090b      J16      J15      340      0.045      180.509      180.175      0      0
;River: Little River
;Reach: Baseline to Watson

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;2 elevation points changed to reflect more accurate values (2996.5 and 3004.5).
C6090c      J15      J14      135      0.045      180.175      180.062      0      0
;River: Little River
;Reach: Baseline to Wats
C6090d      J14      J5110      320      0.045      180.062      179.754      0      0
;River: Little River
;Reach: Little River
C6100a      J20      J19      545      0.045      184      183.2      0      0
;River: Little River
;Reach: Little River
C6100b      J19      J18      850      0.045      183.2      181.636      0      0
;River: Little River
;Reach: Little River
;Outlet set to invert of Junction 17
C6100c      J18      J5090      450      0.045      181.636      180.916      0      0
;River: Little River
;Reach: Baseline to Wats
C6110a      J21      J12      470      0.045      179.754      179.1      0      0
;River: Little River
;Reach: Watson to Desjar
;Bridge: Little River, Lauzon Pkwy Bridge
C6110b      J22      J5120      320      0.045      179.1      178.67      0      0
;River: Little River
;Reach: Watson to Desjar
C6120a      J10      J10      280      0.045      178.67      178.819      0      0
;River: Little River
;Reach: Watson to Desjar
C6120b      J10      J9      150      0.045      178.819      178.684      0      0
;River: Little River
;Reach: Watson to Desjar
C6120c      J23      J5135      170      0.045      178.684      178.8      0      0
;River: Watson Drain
;Reach: Watson Drain
;COPY OF SEC 20 FROM LITTLE RIVER DRAIN
C6130b      J103      J102      805      0.045      181.937      180.729      0      0
;River: Watson Drain
;Reach: Watson Drain
;COPY OF SEC 19 FROM LITTLE RIVER DRAIN
C6130c      J102      J5120      1105      0.045      180.729      178.67      0      0
;River: Watson Drain
;Reach: Watson Drain
;COPY OF SEC 24 FROM LITTLE RIVER DRAIN
;Length, Slope, Manning's n from SWMHYMO
C6133a      J107      J106      1380      0.045      184.192      182.812      0      0
;River: Watson Drain
;Reach: Watson Drain

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;COPY OF SEC 23 FROM LITTLE RIVER DRAIN
;Length, Slope, Manning's n from SWMHYMO
C6133b      J106      J105      610      0.045      182.812      182.202      0      0
;River: Watson Drain
;Reach: Watson Drain
;COPY OF SEC 22 FROM LITTLE RIVER DRAIN
;Length, Slope, Manning's n from SWMHYMO
C6133c      J105      J103      250      0.045      182.202      181.937      0      0
;River: Little River
;Reach: Watson to Soulliere
C6135a      J5135      J7      215      0.045      178.8      178.8      0      0
;River: Little River
;Reach: Watson to Soulliere
C6135b      J7      J5150      85      0.045      178.8      178.261      0      0
;10th Concession Drain
;Transect copied from Transect 102 from adjacent Watson Drain
;Conduit copied to provide outlet for Catchment 1145
;Slope, Length, Manning's n from SWMHYMO
C6145      J8      J23      1140      0.045      181.557      180.684      0      0
;River: Little River
;Reach: Watson to Desjardeins
;Copy of Transect 7; survey info for transect 5 not good
C6150      J5150      J5160      160      0.045      178.261      178      0      0
;River: Little River
;Reach: Desjardeins to Little River
;Adjusted from HEC-RAS import; automatically created junction deleted and lengths adjusted accordingly.
C6160a      J5160      J24      270      0.045      178      177.865      0      0
;River: Little River
;Reach: Desjardeins to L
C6160b      J2      J46203      410      0.045      177.865      177.7      0      0
;River: Little River
;Reach: Lachance to Goui
;This is a REPEATED section.
C6170e      J46203      J46102      426      0.045      177.7      177.1      0      0
;River: Little River
;Reach: Lachance to Goui
C6170f      J27      J43501      194      0.045      177.1      176.9      0      0
;River: Little River
;Reach: Lachance to Goui
C6170l      J43501      J17      122      0.045      176.9      177.208      0      0
;River: Little River
;Reach: Lachance to Goui
C6180a      J5180      J41106      90      0.045      177.2      177.1      0      0
;River: Little River
;Reach: Lachance to Goui
C6180b      J41106      J40323      78.2      0.045      177.1      177      0      0

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;River: Little River
;Reach: Gouin to DS end
;This is a REPEATED section.
C6180c J40323 J39001 132 0.045 177 176.9 0 0
;River: Little River
;Reach: Gouin to DS end
C6180d J39001 J5 150 0.045 176.9 176.8 0 0
;River: Little River
;Reach: Gouin to DS end
;This is a REPEATED section.
C6180e J37500 J5205 150 0.045 176.8 176.7 0 0
;McGill Drain downstream of junction with Lappan Drain
;Transect copied from Desjardeins Drain
;Elevations adjusted to match SWMHYMO channel slope
C6190 J5190 J46102 2060 0.045 179.948 178.208 0 0
;Lappan Drain to junction with McGill Drain
;No information on cross sections, transect copied from Desjardeins Drain
;Upstream reach of Lappan Drain is in the Windsor Airport property
;Elevations adjusted to match SWMHYMO channel slope
C6200 J13 J5190 2700 0.045 184.998 179.948 0 0
;Russette Drain
;No information available, transect copied from Desjardeins Drain,
;all other details copied from McGill drain info from SWMHYMO model
C6220 J17 J3 2700 0.045 179.5 178 0 0
C7 J9 J23 14 0.015 181.8 181.8 0 0
;MTO Plate No. 118-401/A05-0; WP No. 170-99-00; STA 12+065 to STA 13+055, 2002
C7025 J58.7 J5025 30.29 0.015 190.33 190.27 0 0
;From 8th Concession North and Demonte Branch; Drainage Area Plan - Sheet 2
C7040 J25 J55.5 55 0.015 187.154 187.104 0 0
;From MTO, Engineering and Plans Office, Surveys; Kings Hwy 401-Twp of Sandwich South, County of Essex, from file 401SAS WP 60-00
C7075 J46 J5075 50.6 0.015 185.72 185.582 0 0
;River: Little River, Reach: Little River: Culvert under 401; from MTO Engineering and Plans Office-Surveys; Kings Hwy 401, Twp o
C7105 J5100 J1 50.54 0.015 184 183.988 0 0
;From MTO, Engineering and Plans Office, Surveys; Kings Hwy 401-Twp of Sandwich South, County of Essex, from file 401SAS WP 60-00
C7123 J11 J107 50.69 0.015 184.2 184.192 0 0
C8 J12 J22 19 0.015 179.1 179.1 0 0
C9 J24 J2 10 0.015 182.5 182.5 0 0
;River: Gouin
;Reach: Gouin
;COPY OF DESJARDEINS DRAIN SECTION 4
CJ0.5 J0.5 J5180 10 0.045 178.9 178.7 0 0
;River: Gouin
;Reach: Gouin
;COPY OF DESJARDEINS DRAIN SECTION 4
;Slope, Length, Manning's n from SWMHYMO
CJ0.75 J0.75 J0.5 500 0.045 179.4 178.9 0 0

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;River: Lachance
;Reach: Lachance
;COPY OF DESJARDEINS DRAIN SECTION 4 - based on 1997 SWM report, dimensions of the drain are accurate; 3 m bottom, 2:1 side slope:
CJ0.8 J0.8 J2 500 0.045 178.1 177.879 0 0
;River: Lachance
;Reach: Lachance
;COPY OF DESJARDEINS DRAIN SECTION 4 - based on 1997 SWM report, dimensions of the drain are accurate; 3 m bottom, 2:1 side slope:
CJ0.9 J0.9 J0.8 500 0.045 178.6 178.1 0 0
;River: Desjardeins
;Reach: Desjardeins
CJ4 J4 J5160 35 0.045 178.1 178 0 0
;River: Desjardeins
;Reach: Desjardeins
CJ4.5 J4.5 J4 500 0.045 178.7 178.2 0 0
;River: Hayes Drain
;Reach: Hayes Drain
CJ53 J53 J5045 120 0.045 184.55 184.25 0 0
;River: Hayes Drain
;Reach: Hayes Drain
;THIS IS A COPIED SECTION OF 53
;Slope, Length, Manning's n from SWMHYMO
CJ53.5 J53.5 J53 1720 0.045 186.831 184.55 0 0
;River: Hurley Drain
;Reach: Hurley Drain
CJ62 J62 J5060 55 0.045 185.013 184.846 0 0
;River: Hurley Drain
;Reach: Hurley Drain
CJ63 J63 J62 110 0.045 185.1 185.013 0 0
;River: Hurley Drain
;Reach: Hurley Drain
CJ64 J64 J63 80 0.045 185.1 185.1 0 0
;River: Hurley Drain
;Reach: Hurley Drain
CJ65 J65 J64 150 0.045 185.4 185.1 0 0
;River: Hurley Drain
;Reach: Hurley Drain
CJ66 J66 J65 20 0.045 185.4 185.4 0 0
;River: Hurley Drain
;Reach: Hurley Drain
CJ67 J67 J66 100 0.045 186.2 185.4 0 0
;River: Hurley Drain
;Reach: Hurley Drain
CJ68 J68 J67 60 0.045 185.8 186.2 0 0
;River: Hurley Drain
;Reach: Hurley Drain
CJ69 J69 J68 275 0.045 187.1 185.8 0 0

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;River: Hurley Drain
;Reach: Hurley Drain
CJ70 J70 J69 40 0.045 186.2 186.1 0 0
;River: Hurley Drain
;Reach: Hurley Drain
CJ71 J71 J70 50 0.045 186.3 186.2 0 0
;River: Hurley Drain
;Reach: Hurley Drain
CJ72 J72 J71 55 0.045 186.6 186.3 0 0
;River: Hurley Drain
;Reach: Hurley Drain
CJ73 J73 J72 20 0.045 186.6 186.6 0 0
;River: Hurley Drain
;Reach: Hurley Drain
CJ74 J74 J73 650 0.045 187 186.6 0 0
;River: Hurley Drain
;Reach: Hurley Drain
CJ75 J75 J74 30 0.045 187.7 187 0 0
;River: Hurley Drain
;Reach: Hurley Drain
CJ76 J76 J75 30 0.045 187.7 187.7 0 0
;River: Hurley Drain
;Reach: Hurley Drain
CJ77 J5065 J76 10 0.045 187.6 187.7 0 0
;River: Washbrooke
;Reach: Washbrooke
CJ80 J80 J5080 55 0.045 186.5 186.5 0 0
;River: Washbrooke
;Reach: Washbrooke
CJ81 J81 J80 90 0.045 186.5 186.5 0 0
;River: Washbrooke
;Reach: Washbrooke
CJ84 J84 J81 30 0.045 186.5 186.5 0 0
;River: Washbrooke
;Reach: Washbrooke
CJ85 J85 J84 30 0.045 186.6 186.5 0 0
;River: Washbrooke
;Reach: Washbrooke
CJ86 J86 J85 80 0.045 187 186.6 0 0
;River: Washbrooke
;Reach: Washbrooke
CJ87 J87 J86 90 0.045 186.79 187 0 0
;River: Washbrooke
;Reach: Washbrooke
CJ88 J88 J87 170 0.045 187.546 186.79 0 0
;River: Washbrooke

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;Reach: Washbrooke
CJ89 J89 J88 215 0.045 187.555 187.546 0 0
;River: Washbrooke
;Reach: Washbrooke
CJ90 J90 J89 30 0.045 187.777 187.555 0 0

[ORIFICES]
;;
;;Name Inlet Node Outlet Node Orifice Crest Disch. Flap Open/Close
;;----- Type Height Coeff. Gate Time -----
OR1180-1 S5180 J46203 SIDE 0 0.6 NO 0
OR1205-1 S5205 J43501 SIDE 0 0.6 NO 0

[XSECTIONS]
;;Link Shape Geom1 Geom2 Geom3 Geom4 Barrels
;;-----
C1 RECT_CLOSED 3.25 14.8 0 0 1 15
C10 RECT_CLOSED 2.5 11 0 0 1 15
C11 IRREGULAR ECRow@LR 0 0 0 1
C12 RECT_CLOSED 3.7 14.9 0 0 1 15
C13 IRREGULAR ForestGlenDR 0 0 0 1
C14 Irregular 22 0 0 0 1
C15 IRREGULAR 61 0 0 0 1
C16 Irregular LR@baseline 0 0 0 1
C17 RECT_CLOSED 2.7 6.2 0 0 1 15
C18 RECT_CLOSED 3 20 0 0 1 15
C19 IRREGULAR LR@Twin Oaks 0 0 0 1
C2 IRREGULAR LittleRiver@42 0 0 0 1
C20 RECT_CLOSED 2.1 3 0 0 1
C21 IRREGULAR 6th@9th 0 0 0 1
C22 IRREGULAR Townline 0 0 0 1
C23 IRREGULAR 31 0 0 0 1
C24 IRREGULAR 30 0 0 0 1
C25 IRREGULAR 25 0 0 0 1
C26 IRREGULAR 29 0 0 0 1
C27 IRREGULAR 31 0 0 0 1
C28 RECT_CLOSED 1.2 1.8 0 0 1
C3 Irregular 55 0 0 0 1
C4 RECT_CLOSED 5.2 12.3 0 0 1 15
C5 IRREGULAR Lauzonpky@LR 0 0 0 1
C6 RECT_CLOSED 2.5 7.1 0 0 1 15
C6000 IRREGULAR 59 0 0 0 1
C6007 IRREGULAR 59 0 0 0 1
C6015a IRREGULAR 57 0 0 0 1
C6015b IRREGULAR 56 0 0 0 1
C6025a IRREGULAR 58.7 0 0 0 1

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C6025b	IRREGULAR	58.5	0	0	0	1
C6025c	Irregular	58.5	0	0	0	1
C6030	IRREGULAR	54	0	0	0	1
C6040	IRREGULAR	55.5	0	0	0	1
C6045a	IRREGULAR	52	0	0	0	1
C6045b	IRREGULAR	51	0	0	0	1
C6055a	IRREGULAR	50	0	0	0	1
C6055b	IRREGULAR	49	0	0	0	1
C6055c	IRREGULAR	48	0	0	0	1
C6055d	IRREGULAR	47	0	0	0	1
C6060a	Irregular	42	0	0	0	1
C6060b	IRREGULAR	41	0	0	0	1
C6060c	IRREGULAR	40	0	0	0	1
C6060d	IRREGULAR	39	0	0	0	1
C6060e	IRREGULAR	38	0	0	0	1
C6060f	IRREGULAR	37	0	0	0	1
C6060g	IRREGULAR	36	0	0	0	1
C6060h	IRREGULAR	35	0	0	0	1
C6060i	IRREGULAR	34	0	0	0	1
C6060j	IRREGULAR	33	0	0	0	1
C6060k	IRREGULAR	32	0	0	0	1
C6075a	IRREGULAR	44	0	0	0	1
C6075b	IRREGULAR	43	0	0	0	1
C6090	IRREGULAR	46	0	0	0	1
C6090a	Irregular	17	0	0	0	1
C6090b	IRREGULAR	16	0	0	0	1
C6090c	Irregular	15	0	0	0	1
C6090d	IRREGULAR	14	0	0	0	1
C6100a	IRREGULAR	20	0	0	0	1
C6100b	IRREGULAR	19	0	0	0	1
C6100c	IRREGULAR	18	0	0	0	1
C6110a	IRREGULAR	12	0	0	0	1
C6110b	IRREGULAR	12	0	0	0	1
C6120a	IRREGULAR	10	0	0	0	1
C6120b	IRREGULAR	9	0	0	0	1
C6120c	IRREGULAR	8A	0	0	0	1
C6130b	IRREGULAR	112	0	0	0	1
C6130c	IRREGULAR	111	0	0	0	1
C6133a	IRREGULAR	112	0	0	0	1
C6133b	IRREGULAR	112	0	0	0	1
C6133c	IRREGULAR	112	0	0	0	1
C6135a	Irregular	8A	0	0	0	1
C6135b	Irregular	7	0	0	0	1
C6145	IRREGULAR	110	0	0	0	1
C6150	Irregular	7	0	0	0	1
C6160a	IRREGULAR	2	0	0	0	1

C6160b	IRREGULAR	TwinOaks742	0	0	0	1
C6170e	Irregular	TwinOaks742	0	0	0	1
C6170f	IRREGULAR	TwinOaks316	0	0	0	1
C6170l	IRREGULAR	TwinOaks122	0	0	0	1
C6180a	IRREGULAR	40323	0	0	0	1
C6180b	IRREGULAR	39001	0	0	0	1
C6180c	IRREGULAR	37500	0	0	0	1
C6180d	IRREGULAR	36000	0	0	0	1
C6180e	Irregular	35002	0	0	0	1
C6190	Irregular	115	0	0	0	1
C6200	Irregular	116	0	0	0	1
C6220	IRREGULAR	113	0	0	0	1
C7	IRREGULAR	Launonrd@LR	0	0	0	1
C7025	RECT_CLOSED	1.52	1.52	0	0	15
C7040	RECT_CLOSED	1.22	1.52	0	0	15
C7075	RECT_CLOSED	1.55	2.45	0	0	15
C7105	RECT_CLOSED	1.52	1.83	0	0	15
C7133	RECT_CLOSED	1.52	1.52	0	0	15
C8	RECT_CLOSED	3.5	10.9	0	0	15
C9	IRREGULAR	Rail@LR	0	0	0	1
CJ0.5	IRREGULAR	117	0	0	0	1
CJ0.75	IRREGULAR	117	0	0	0	1
CJ0.8	IRREGULAR	114	0	0	0	1
CJ0.9	IRREGULAR	114	0	0	0	1
CJ4	IRREGULAR	4	0	0	0	1
CJ4.5	IRREGULAR	113	0	0	0	1
CJ53	IRREGULAR	53	0	0	0	1
CJ53.5	IRREGULAR	53.5	0	0	0	1
CJ62	IRREGULAR	62	0	0	0	1
CJ63	IRREGULAR	63	0	0	0	1
CJ64	IRREGULAR	64	0	0	0	1
CJ65	IRREGULAR	65	0	0	0	1
CJ66	IRREGULAR	66	0	0	0	1
CJ67	IRREGULAR	67	0	0	0	1
CJ68	IRREGULAR	68	0	0	0	1
CJ69	IRREGULAR	69	0	0	0	1
CJ70	IRREGULAR	70	0	0	0	1
CJ71	IRREGULAR	71	0	0	0	1
CJ72	IRREGULAR	72	0	0	0	1
CJ73	IRREGULAR	73	0	0	0	1
CJ74	IRREGULAR	74	0	0	0	1
CJ75	IRREGULAR	75	0	0	0	1
CJ76	IRREGULAR	76	0	0	0	1
CJ77	IRREGULAR	77	0	0	0	1
CJ80	IRREGULAR	46	0	0	0	1
CJ81	IRREGULAR	46	0	0	0	1

CJ84	IRREGULAR	79	0	0	0	1
CJ85	IRREGULAR	80	0	0	0	1
CJ86	IRREGULAR	86	0	0	0	1
CJ87	IRREGULAR	87	0	0	0	1
CJ88	Irregular	88	0	0	0	1
CJ89	IRREGULAR	89	0	0	0	1
CJ90	IRREGULAR	89	0	0	0	1
OR1180-1	CIRCULAR	1	0	0	0	1
OR1205-1	CIRCULAR	1	0	0	0	1
[TRANSECTS]						
;COPY OF DESJARDEINS DRAIN SECTION 4						
NC 0.1	0.1	0.045				
X1 0.3	8	3005.457 3024.75	0.0	0	0	0
GR 180.9	2605 180.5	3005.457 177.8	3009.33 177.6	3014.085 177.7	3017.186	
GR 180.7	3024.75 180.8	3038.397 181.2	3438			
;High-chord transect for bridge 0.35 (River: Gouin; Reach: Gouin).						
;COPY OF DESJARDEINS DRAIN SECTION 4						
NC 0.1	0.1	0.045				
X1 0.35 HC	3	0	0	0	0	0
GR 181.505	2605 181.9	3018 181.502	3438			
;COPY OF DESJARDEINS DRAIN SECTION 4						
NC 0.1	0.1	0.045				
X1 0.4	8	3005.457 3024.75	0.0	0	0	0
GR 181	2605 180.6	3005.457 177.9	3009.33 177.7	3014.085 177.8	3017.186	
GR 180.8	3024.75 180.9	3038.397 181.3	3438			
;COPY OF DESJARDEINS DRAIN SECTION 4						
NC 0.1	0.1	0.045				
X1 0.5	8	3005.457 3024.75	0.0	0	0	0
GR 181.2	2605 180.8	3005.457 178.1	3009.33 177.9	3014.085 178	3017.186	
GR 181	3024.75 181.1	3038.397 181.5	3438			
;COPY OF DESJARDEINS DRAIN SECTION 4						
NC 0.1	0.1	0.045				
X1 0.75	8	3005.457 3024.75	0.0	0	0	0
GR 181.7	2605 181.3	3005.457 178.6	3009.33 178.4	3014.085 178.5	3017.186	
GR 181.5	3024.75 181.6	3038.397 182	3438			
;COPY OF DESJARDEINS DRAIN SECTION 4 - based on 1997 SWM report, dimensions of the drain are accurate; 3 m bottom, 2:1 side slope.						
NC 0.1	0.1	0.045				
X1 0.8	8	3005.457 3024.75	0.0	0	0	0
GR 181.4	2605 181	3005.457 178.3	3009.33 178.1	3014.085 178.2	3017.186	

GR 181.2	3024.75	181.3	3038.397	181.7	3438				
;COPY OF DESJARDEINS DRAIN SECTION 4 - based on 1997 SWM report, dimensions of the drain are accurate; 3 m bottom, 2:1 side slope.									
NC 0.1	0.1	0.045							
X1 0.9	8	3005.457 3024.75	0.0	0	0	0	0	0	0
GR 181.9	2605 181.5	3005.457 178.8	3009.33 178.6	3014.085 178.7	3017.186				
GR 181.7	3024.75 181.8	3038.397 182.2	3438						
NC 0.1	0.1	0.045							
X1 1	22	2993 3012.47	0.0	0	0	0	0	0	0
GR 184	2295 181.5	2300 181.5	2525 181.5	2700 181.5	2800				
GR 181.3	2850 181.1	2925 181	2990.2 180.5	2991.5 180.5	2992				
GR 181.5	2993 179.6	2994.91 179.3	2995.65 178.5	2997.625 178.1	3000.09				
GR 178.6	3002.54 181.9	3012.47 181.4	3140 181.5	3250 181.6	3450				
GR 181.7	3650 182	4000							
;High-chord transect for bridge 1.5 (River: Little River; Reach: Desjardeins to L).									
NC 0.1	0.1	0.045							
X1 1.5 HC	7	0	0	0	0	0	0	0	0
GR 184	2295 182.5	2300 182.5	2991 183.4	2991.1 183.4	3009.1				
GR 182.5	3009.2 182.5	3140							
NC 0.1	0.1	0.045							
X1 1.6	19	2993 3012.47	0.0	0	0	0	0	0	0
GR 184	2295 181.5	2300 181.5	2525 181.5	2700 181.5	2800				
GR 181.3	2850 181.1	2925 181	2990.2 180.5	2991.5 180.5	2992				
GR 181.5	2993 179.6	2994.91 179.3	2995.65 178.5	2997.625 178.1	3000.09				
GR 178.6	3002.54 181.9	3012.47 181.4	3140 181.5	3250					
NC 0.1	0.1	0.045							
X1 10	21	2994 3017.014	0.0	0	0	0	0	0	0
GR 184	1900 184	1940 184	2000 184	2300 184	2630				
GR 184	2800 184	2875 184	2949.9 182	2950 181.6	2994				
GR 179.8	3001.004 179	3005.344 179.7	3010.779 181.6	3017.014 182	3050				
GR 184	3050.1 184	3150 184	3300 184	3500 184	3750				
GR 184	4300								
; [LE: 2950] [RE: 3050]									
NC 0.045	0.045	0.03							
X1 10 (orig)	19	2994 3017.014	0.0	0	0	0	0	0	0
GR 184	1900 182	1940 182	2000 182	2300 182	2630				
GR 182	2800 182	2875 182	2950 181.6	2994 179.8	3001.004				
GR 179	3005.344 179.7	3010.779 181.6	3017.014 182	3050 182	3150				
GR 182	3300 182.5	3500 182.9	3750 184	4300					
;COPY OF SEC 18 FROM LITTLE RIVER DRAIN									

NC 0.1 0.1 0.045
 X1 101 9 2994 3003.494 0.0 0.0 0 0 0
 GR 185 2530 184.5 2800 184.3 2994 182.4 2997.988 182.4 3000.058
 GR 182.5 3002.045 185.2 3003.494 184.5 3300 185 4000

;COPY OF SEC 20 FROM LITTLE RIVER DRAIN
 NC 0.1 0.1 0.045
 X1 103 7 2994 3001.563 0.0 0.0 0 0 0
 GR 186.5 2594 186.1 2994 185.3 2995.615 184 2997.731 185 2999.748
 GR 186.3 3001.563 186.7 3401

;COPY OF SEC 21 FROM LITTLE RIVER DRAIN
 NC 0.1 0.1 0.045
 X1 104 7 2994 3001.563 0.0 0.0 0 0 0
 GR 186.5 2594 186.1 2994 185.3 2995.615 184 2997.731 185 2999.748
 GR 186.3 3001.563 186.7 3401

;COPY OF SEC 22 FROM LITTLE RIVER DRAIN
 NC 0.1 0.1 0.045
 X1 105 8 2994 3005.278 0.0 0.0 0 0 0
 GR 186.7 2594 186.3 2994 184.9 2998.669 184.6 3001.978 185.1 3004.914
 GR 186.2 3005.278 186.3 3006 186.6 3406

;COPY OF SEC 23 FROM LITTLE RIVER DRAIN
 NC 0.1 0.1 0.045
 X1 106 7 3015.126 3025.443 0.0 0.0 0 0 0
 GR 186.85 2615 186.455 3015.126 185.3 3019.358 185.111 3021.732 185.3 3023.129
 GR 186.4 3025.443 186.8 3425

;COPY OF SEC 24 FROM LITTLE RIVER DRAIN
 NC 0.1 0.1 0.045
 X1 107 7 2994 3005.566 0.0 0.0 0 0 0
 GR 187.28 2594 186.88 2994 185.555 2996.426 185.225 2998.403 185.666 3001.084
 GR 186.75 3005.566 187.15 3405

NC 0.1 0.1 0.045
 X1 11 21 2994 3006.235 0.0 0.0 0 0 0
 GR 184 1900 184 1940 184 2000 184 2300 184 2630
 GR 184 2800 184 2875 184 2949.9 182.5 2950 182.159 2994
 GR 179.562 2998.875 178.671 3000.754 179.666 3003.937 182.09 3006.235 182.5 3050
 GR 184 3050.1 184 3150 184 3300 184 3500 184 3750
 GR 184 4300

;[LE: 2950][RE: 3050]
 NC 0.045 0.045 0.03
 X1 11(orig) 19 2994 3006.235 0.0 0.0 0 0 0

GR 184 1900 182.5 1940 182.5 2000 182.5 2300 182.5 2630
 GR 182.5 2800 182.5 2875 182.5 2950 182.159 2994 179.562 2998.875
 GR 178.671 3000.754 179.666 3003.937 182.09 3006.235 182.5 3050 182.5 3150
 GR 182.5 3300 3300 182.5 3500 182.9 3750 184 4300

;High-chord transect for bridge 11.5 (River: Little River; Reach: Watson to Desjar).
 NC 0.1 0.1 0.045
 X1 11.5.HC 20 0 0 0.0 0.0 0 0 0
 GR 184.3 1900 182.3 1940 181.4 2000 181.9 2300 182.2 2630
 GR 182.3 2800 182.3 2875 182.3 2950 183 2994 180.1 3003.342
 GR 180 3006.565 179.1 3009.925 180.1 3014.217 180.4 3015.716 183.2 3023.947
 GR 182.3 3050 182.3 3150 182.3 3300 182.8 3500 183.2 3750

;From Little Tenth Concession Drain Plan and Profile Drawing
 NC 0.1 0.1 0.045
 X1 110 8 3001 3006.5 0.0 0.0 0 0 0
 GR 186.4 2900 186.2 3000 186 3001 184.5 3003.25 184.5 3004.25
 GR 186 3006.5 186.2 3007 186.4 3107

;From Plan and Profile of the Watson Drain
 NC 0.1 0.1 0.045
 X1 111 6 3000 3007.1 0.0 0.0 0 0 0
 GR 185.2 2900 185 3000 182.5 3003.1 182.5 3004.1 185 3007.1
 GR 185.2 3107

;From Watson Drain Plan and Profile Drawing
 NC 0.1 0.1 0.045
 X1 112 6 3000 3004.8 0.0 0.0 0 0 0
 GR 185.2 2900 185 3000 183.5 3001.9 183.5 3002.9 185 3004.8
 GR 185.2 3105

;From Desjardin Drain Plan and Profile
 NC 0.1 0.1 0.045
 X1 113 6 3000 30010.5 0.0 0.0 0 0 0
 GR 185.2 2900 185 3000 182 3004.5 182 3006 185 3010.5
 GR 185.2 3110

;From Twin Oaks Business Park SWM Report
 NC 0.1 0.1 0.045
 X1 114 6 3000 3013 0.0 0.0 0 0 0
 GR 185.2 2900 185 3000 182 3006 182 3007 185 3013
 GR 185.2 3113

;From Profile Drawing of the Lappan Drain and McGill Outlet
 NC 0.1 0.1 0.045
 X1 115 6 3000 3007.5 0.0 0.0 0 0 0

GR 185.2 2900 185 3000 183 3003 185 3004.5 185 3007.5
 GR 185.2 3108

;From Profile Drawing of the Lappan Drain and McGill Outlet
 NC 0.1 0.1 0.045
 X1 116 6 3000 3005.9 0.0 0.0 0 0 0
 GR 185.2 2900 185 3000 183.5 3002.2 183.5 3003.7 185 3005.9
 GR 185.2 3106

;From Plan, Profile, and Cross Section of the Gouin Drain
 NC 0.1 0.1 0.045
 X1 117 6 3000 3007 0.0 0.0 0 0 0
 GR 185.2 2900 185 3000 183 3003 183 3004 185 3007
 GR 185.2 3107

NC 0.1 0.1 0.045
 X1 12 20 2994 3023.947 0.0 0.0 0 0 0
 GR 184.3 1900 183 1940 183 2000 183 2300 183 2630
 GR 183 2800 183 2875 183 2950 183 2994 180.1 3003.342
 GR 180 3006.565 179.1 3009.925 180.1 3014.217 180.4 3015.716 183.2 3023.947
 GR 183 3050 183 3150 183 3300 183 3500 183.2 3750

NC 0.1 0.1 0.045
 X1 13 18 2994 3017.137 0.0 0.0 0 0 0
 GR 183.9 2250 183.4 2350 183.7 2480 183.1 2620 183 2675
 GR 183 2830 183 2890 183 2950 182.835 2994 180.583 3003.421
 GR 179.754 3007.359 180.617 3010.645 182.914 3017.137 183 3040 183 3240
 GR 183.2 3270 183.4 3350 184 4000

;High-chord transect for bridge 13.25 (River: Little River; Reach: Baseline to Wats).
 NC 0.1 0.1 0.045
 X1 13.25.HC 10 0 0 0.0 0.0 0 0 0
 GR 183.9 2250 183.6 2830 183.4 2950 183.895 2994 183.9 2994.4
 GR 183.9 3006 183.1 3040 183.2 3270 183.4 3350 184 4000

NC 0.1 0.1 0.045
 X1 13.5 18 2994 3017.137 0.0 0.0 0 0 0
 GR 183.9 2250 183.4 2350 183.7 2480 183.1 2620 183 2675
 GR 183 2830 183 2890 182.5 2950 182.835 2994 180.583 3003.421
 GR 179.754 3007.359 180.617 3010.645 182.914 3017.137 182.5 3040 182.5 3240
 GR 183.2 3270 183.4 3350 184 4000

NC 0.1 0.1 0.045
 X1 14 19 2994 3015.242 0.0 0.0 0 0 0
 GR 184.2 2250 183.7 2350 184 2480 183.4 2620 183.3 2675
 GR 183.3 2830 183.3 2890 183.3 2950 183.268 2994 180.87 3001.339

GR 180.062 3004.032 180.699 3006.356 183.031 3009.792 183.047 3015.242 183.3 3040
 GR 183.3 3240 183.5 3270 183.7 3350 184.3 4000

;High-chord transect for bridge 14.5 (River: Little River; Reach: Baseline to Wats).
 NC 0.1 0.1 0.045
 X1 14.5.HC 27 2994.2 3009.792 0.0 0.0 0 0 0
 GR 184.2 2250 183.7 2350 184 2480 183.4 2620 183.3 2675
 GR 183.3 2775 183.4 2850 183.1 2950 183.01 2969.787 183.268 2994
 GR 183.203 2994.2 183.073 2994.597 182.9 2996.5 182.9 3004.5 182.9 3006.8
 GR 182.907 3009.609 183.031 3009.792 183.047 3015.242 182.944 3025.612 183 3050
 GR 183 3100 183.5 3105 183.8 3180 184.1 3370 184.4 3900
 GR 184.208 3900 184.3 4000

NC 0.1 0.1 0.045
 X1 15 19 2994 3015.242 0.0 0.0 0 0 0
 GR 184.2 2250 183.7 2350 184 2480 183.4 2620 183.3 2675
 GR 183.3 2830 183.3 2890 183.3 2950 183.268 2994 180.87 3001.339
 GR 180.062 3004.032 180.699 3006.356 183.031 3009.792 183.047 3015.242 183.3 3040
 GR 183.3 3240 183.5 3270 183.7 3350 184.3 4000

NC 0.1 0.1 0.045
 X1 16 18 2993 3007.155 0.0 0.0 0 0 0
 GR 183.8 2380 183.7 2575 183.6 2720 183.6 2825 183.5 2925
 GR 183.5 2975 183.477 2993 181.681 2997.937 180.509 3001.337 180.512 3002.636
 GR 183.126 3007.155 183.5 3010 183.6 3025 183.8 3075 184 3130
 GR 184 3210 184.8 3260 184.8 3450

;High-chord transect for bridge 16.5 (River: Little River; Reach: Baseline to Wats).
 NC 0.1 0.1 0.045
 X1 16.5.HC 12 0 0 0.0 0.0 0 0 0
 GR 186.2 1000 185.2 2000 185.2 2300 184.6 2710 184.6 3003.1
 GR 184.5 3006 184.6 3050 184.5 3170 184.6 3225 184.6 3700
 GR 185 4000 186 5000

NC 0.1 0.1 0.045
 X1 17 16 2993 3050 0.0 0.0 0 0 0
 GR 185 2000 184.7 2300 184.5 2550 184.2 2710 184 2880
 GR 183.7 2950 183.938 2993 180.916 2997.879 180.961 2999.52 180.944 3001.733
 GR 183.6 3050 183.9 3170 184.1 3225 184.3 3425 184.6 3700
 GR 185 4000

NC 0.1 0.1 0.045
 X1 18 7 2999 3009.5 0.0 0.0 0 0 0
 GR 185.5 2990 185.2 2999 184.3 3000 182.4 3004 181.6 3006.1
 GR 182.5 3008 185.2 3009.5

GR 178.1 2993 178.1 2993.1 177.2 2993.9 177.2 2994 177.2 3000
GR 177.2 3006.1 177.2 3006.2 178 3007 178 3007.1 179.9 3009
GR 180.5 3060 181 3220 181 3300 181.5 3450

;High-chord transect for bridge 40573.5 (River: Little River; Reach: Gouin to DS end).

;This is a REPEATED section.
NC 0.1 0.1 0.045
X1 40573.5_HC 12 0 0 0.0 0.0 0 0 0
GR 182.5 2730 182.6 2750 183 2920 183 2993 183.8 2993.1
GR 183.8 2994 183 3000 183.8 3006.1 183.8 3007 183 3007.1
GR 183 3009 181.4 3220

;This is a REPEATED section.
NC 0.1 0.1 0.045
X1 40824 18 2993.9 3006.2 0.0 0.0 0 0 0
GR 182.5 2730 180.5 2750 180.5 2825 180.5 2920 179.9 2991
GR 178.1 2993 178.1 2993.1 177.2 2993.9 177.2 2994 177.2 3000
GR 177.2 3006.1 177.2 3006.2 178 3007 178 3007.1 179.9 3009
GR 180.5 3060 181 3220 181 3300

NC 0.1 0.1 0.045
X1 41 9 2994 3001.712 0.0 0.0 0 0 0
GR 187.1 2893 186.9 2993 186.575 2994 185.38 2996.371 184.838 2996.838
GR 185.186 2999.93 186.677 3001.712 186.9 3002 187.1 3102

NC 0.1 0.1 0.045
X1 41106 16 2950.3 2965.7 0.0 0.0 0 0 0
GR 183 2860 181.5 2874 180.7 2923 181.3 2946.1 179.4 2950.3
GR 177.3 2954.36 177.3 2961.64 179.4 2965.7 181 3000 181 3045.5
GR 181 3112 181.1 3203 181.2 3308 181.5 3413 181.8 3658
GR 182.3 4148

NC 0.1 0.1 0.045
X1 42 9 2994 3002.342 0.0 0.0 0 0 0
GR 187.1 2893 186.9 2993 186.75 2994 185.322 2995.817 184.846 2997.942
GR 185.148 2999.934 186.801 3002.342 186.9 3003 187.1 3103

NC 0.1 0.1 0.045
X1 42000 16 2989 3011 0.0 0.0 0 0 0
GR 183 2860 181.5 2880 180.7 2950 181.3 2983 179.4 2989
GR 177.3 2994.8 177.3 3005.2 179.4 3011 181 3060 181 3125
GR 181 3220 181.1 3350 181.2 3500 181.5 3650 181.8 4000
GR 182.3 4700

NC 0.1 0.1 0.045
X1 43 8 2994 3001.123 0.0 0.0 0 0 0

GR 187.2 2893 187 2993 186.941 2994 184.889 2995.821 185.528 2998.6
GR 186.865 3001.123 187 3002 187.2 3102

NC 0.1 0.1 0.045
X1 44 8 2994 3003.375 0.0 0.0 0 0 0
GR 188 2893 187.8 2993 187.6 2994 186.2 2997.03 185.6 2998.694
GR 186.2 2999.884 187.8 3003.375 188 3103

;Location of Twin Oaks Drive Structure
NC 0.1 0.1 0.045
X1 44302 20 2989.8 3010.4 0.0 0.0 0 0 0
GR 183 2660 182 2680 181 2790 180.5 2820 180.5 2840
GR 181 2860 181 2950 180 2989.8 178.9 2991.5 177.5 2993.6
GR 177.5 3006.2 178.9 3008.5 180.1 3010.4 181 3060 181 3150
GR 181.2 3250 181.2 3350 181.4 3600 181.7 4000 182.2 4600

;Location of Twin Oaks Drive Structure
;This is a REPEATED section.
NC 0.1 0.1 0.045
X1 44323 20 2989.8 3010.4 0.0 0.0 0 0 0
GR 183 2660 182 2680 181 2790 180.5 2820 180.5 2840
GR 181 2860 181 2950 180 2989.8 178.9 2991.5 177.5 2993.6
GR 177.5 3006.2 178.9 3008.5 180.1 3010.4 181 3060 181 3150
GR 181.2 3250 181.2 3350 181.4 3600 181.7 4000 182.2 4600

;This is a REPEATED section.
NC 0.1 0.1 0.045
X1 44704 20 2989.8 3010.4 0.0 0.0 0 0 0
GR 183.2 2660 182.2 2680 181.2 2790 180.7 2820 180.7 2840
GR 181.2 2860 181.2 2950 180.2 2989.8 179.1 2991.5 177.7 2993.6
GR 177.7 3006.2 179.1 3008.5 180.3 3010.4 181.2 3060 181.2 3150
GR 181.4 3250 181.4 3350 181.6 3600 181.9 4000 182.4 4600

NC 0.1 0.1 0.045
X1 45 7 2994 2999.9 0.0 0.0 0 0 0
GR 187.7 2894 187.5 2994 185.8 2997.66 185.6 2998.61 185.8 2999.9
GR 187.5 3000 187.7 3100

;This is a REPEATED section.
NC 0.1 0.1 0.045
X1 45100 20 2989.8 3010.4 0.0 0.0 0 0 0
GR 183.4 2660 182.4 2680 181.4 2790 180.9 2820 180.9 2840
GR 181.4 2860 181.4 2950 180.4 2989.8 179.3 2991.5 177.9 2993.6
GR 177.9 3006.2 179.3 3008.5 180.5 3010.4 181.4 3060 181.4 3150
GR 181.6 3250 181.6 3350 181.8 3600 182.1 4000 182.6 4600

NC 0.1 0.1 0.045
X1 45601 20 2989.8 3010.4 0.0 0.0 0 0 0
GR 183 2200 182 2250 181 2300 181 2825 181 2840
GR 181 2860 181 2950 180 2989.8 178.9 2991.5 178.2 2993.6
GR 178.2 3006.2 178.9 3008.5 180.1 3010.4 181 3060 181 3150
GR 181.2 3250 181.2 3350 181.4 3600 181.7 4000 182.2 4600

NC 0.1 0.1 0.045
X1 46 8 2994 3001.45 0.0 0.0 0 0 0
GR 188.3 2894 188.1 2994 186 2996.006 185.6 2996.766 185.7 2998.427
GR 187.8 3001.45 188.1 3008.62 188.3 3109

NC 0.1 0.1 0.045
X1 46102 18 2995 3005.7 0.0 0.0 0 0 0
GR 184 2240 181 2250 181 2500 181 2700 181 2850
GR 181 2992 181 2992.1 178.9 2995 178.9 2995.1 178.4 3000
GR 178.4 3005.6 178.4 3005.7 181 3008 181 3008.1 181 3025
GR 181 3200 181 3600 182 4250

;This is a REPEATED section.
NC 0.1 0.1 0.045
X1 46203 18 2995 3005.7 0.0 0.0 0 0 0
GR 184 2240 181 2250 181 2500 181 2700 181 2850
GR 181 2992 181 2992.1 178.9 2995 178.9 2995.1 178.4 3000
GR 178.4 3005.6 178.4 3005.7 181 3008 181 3008.1 181 3025
GR 181 3200 181 3600 182 4250

NC 0.1 0.1 0.045
X1 46304 18 2992.1 3008 0.0 0.0 0 0 0
GR 184 2240 181 2250 181 2500 181 2700 181 2850
GR 181 2992 181 2992.1 178.9 2995 178.9 2995.1 178.4 3000
GR 178.4 3005.6 178.4 3005.7 181 3008 181 3008.1 181 3025
GR 181 3200 181 3600 182 4250

;Upstream of Little River and Baseline junction
NC 0.1 0.1 0.045
X1 47 12 2994 3011.01 0.0 0.0 0 0 0
GR 184.79 2894 184.59 2994 184.41 2997.573 184.23 2998.34 182.32 3002
GR 181.23 3003.576 181.24 3004.4 181.22 3005.132 182.32 3006.611 184.39 3011.01
GR 184.59 3011.5 184.79 3111

;This is a REPEATED section.
NC 0.1 0.1 0.045
X1 47100 18 2766.47 2777.6 0.0 0.0 0 0 0
GR 183.9 2240 180.9 2247 180.9 2422 180.9 2562 180.9 2667
GR 180.9 2766.4 180.9 2766.47 178.8 2768.5 178.8 2768.57 178.3 2772

GR 178.3 2775.92 178.3 2775.99 180.9 2777.6 180.9 2777.67 180.9 2789.5
GR 180.9 2912 180.9 3192 181.9 3647

NC 0.1 0.1 0.045
X1 48 11 2994 3008.902 0.0 0.0 0 0 0
GR 184.75 2894 184.55 2994 184.4 2995.178 182.28 2999.297 181.47 3001.113
GR 181.43 3001.905 181.57 3002.728 184.31 3006.35 184.41 3008.902 184.55 3009
GR 184.75 3109

NC 0.1 0.1 0.045
X1 48500 14 2992 3008 0.0 0.0 0 0 0
GR 184.9 2300 181.4 2310 181.4 2650 181.4 2810 181.2 2850
GR 180.9 2980 180.7 2992 178.2 2997 178.2 3003 180.7 3008
GR 180.9 3035 181.1 3150 181.5 3500 181.9 4000

NC 0.1 0.1 0.045
X1 49 11 2994 3016.678 0.0 0.0 0 0 0
GR 185.26 2894 185.06 2994 184.94 2997.328 184.76 2997.913 181.84 3004.357
GR 181.69 3004.762 181.81 3005.941 184.42 3008.955 184.6 3016.678 185.06 3017
GR 185.26 3117

NC 0.1 0.1 0.045
X1 49000 16 2991 3009 0.0 0.0 0 0 0
GR 184 2295 181.5 2300 181.5 2525 181.5 2700 181.5 2800
GR 181.3 2850 181.1 2925 181 2991 178.2 2996.7 178.2 3003.3
GR 181 3009 181.2 3075 181.4 3140 181.5 3250 181.6 3450
GR 182 4000

NC 0.1 0.1 0.045
X1 5 20 2952 2971.34 0.0 0.0 0 0 0
GR 185 2280 182 2290 181.2 2300 181.1 2550 181 2750
GR 181 2850 181 2950 181.3 2952 180.1 2959.032 180 2961.837
GR 180.1 2964.914 181.2 2971.34 181 3050 181.1 3150 181.3 3250
GR 181.6 3450 181.9 3750 182 4000 182.4 4650 182.9 5500

NC 0.1 0.1 0.045
X1 50 10 2998.084 3009.343 0.0 0.0 0 0 0
GR 185.5 2894 185.3 2994 185.2 2997.059 184.9 2998.084 182.8 3003.172
GR 182.3 3004.059 181.7 3007.922 184.8 3009.343 185.3 3010 185.5 3109

;This is a REPEATED section.
NC 0.1 0.1 0.045
X1 50350 16 2991 3009 0.0 0.0 0 0 0
GR 184 2295 181.5 2300 181.5 2525 181.5 2700 181.5 2800
GR 181.3 2850 181.1 2925 181 2991 178.2 2996.7 178.2 3003.3
GR 181 3009 181.2 3075 181.4 3140 181.5 3250 181.6 3450

GR 182 4000

NC 0.1 0.1 0.045
 X1 51 9 2994 3009.177 0.0 0.0 0 0 0
 GR 185.6 2894 185.4 2994 185.3 2997.858 183.2 3001.878 182.2 3003.71
 GR 183.4 3005.171 185.1 3009.177 185.4 3010 185.6 3110

NC 0.1 0.1 0.045
 X1 51701 16 2991 3009 0.0 0.0 0 0 0
 GR 184 2295 181.5 2300 181.5 2525 181.5 2700 181.5 2800
 GR 181.3 2850 181.1 2925 181 2991 178.2 2996.7 178.2 3003.3
 GR 181 3009 181.2 3075 181.4 3140 181.5 3250 181.6 3450
 GR 182 4000

NC 0.1 0.1 0.045
 X1 52 9 2994 3002.636 0.0 0.0 0 0 0
 GR 186.7 2893 186.5 2993 185.908 2994 184.55 2996.693 184.25 2997.187
 GR 184.45 2999.299 186 3002.636 186.5 3003 186.7 3103

NC 0.1 0.1 0.045
 X1 53 9 100 108.721 0.0 0.0 0 0 0
 GR 186.5 -1 186.3 99 185.907 100 184.55 103.803 184.331 103.804
 GR 184.666 106.431 185.998 108.721 186.3 109 186.5 209

;THIS IS A COPIED SECTION OF 53
 NC 0.1 0.1 0.045
 X1 53.5 7 100 108.721 0.0 0.0 0 0 0
 GR 188.607 0 188.407 100 187.05 103.803 186.831 103.804 187.166 106.431
 GR 188.498 108.721 188.698 208.721

NC 0.1 0.1 0.045
 X1 54 8 2994 3005.29 0.0 0.0 0 0 0
 GR 187.5 2893 187.3 2993 186.7 2994 184.8 2996.638 184.9 3003.237
 GR 186.7 3005.29 187.3 3006 187.5 3106

NC 0.1 0.1 0.045
 X1 54.5 6 2994 3005.29 0.0 0.0 0 0 0
 GR 188.68 2594 188.28 2994 186.58 2996.638 186.68 3003.237 188.48 3005.29
 GR 188.88 3405

NC 0.1 0.1 0.045
 X1 55 8 2994 3001.572 0.0 0.0 0 0 0
 GR 187.1 2894 186.9 2994 184.8 2995.71 184.5 2996.6 184.7 2997.64
 GR 186.7 3001.572 186.9 3002 187.1 3102

;COPIED SECTION FROM SEC 55

NC 0.1 0.1 0.045
 X1 55.5 8 2994 3001.572 0.0 0.0 0 0 0
 GR 187.6 2894 187.4 2994 185.3 2995.71 185 2996.6 185.2 2997.64
 GR 187.2 3001.572 187.4 3002 187.6 3102

NC 0.1 0.1 0.045
 X1 56 9 2994 3001.675 0.0 0.0 0 0 0
 GR 188.7 2893 188.5 2993 187.66 2994 186.555 2996.174 186.09 2998.433
 GR 186.66 2999.644 187.999 3001.675 188.5 3002 188.7 3102

NC 0.1 0.1 0.045
 X1 57 9 2994 3008.541 0.0 0.0 0 0 0
 GR 188.9 2893 188.7 2993 187.8 2994 187.088 2998.621 186.755 2999.555
 GR 187 3001.32 187.911 3008.541 188.7 3010 188.9 3110

NC 0.1 0.1 0.045
 X1 58 7 2994 3008.551 0.0 0.0 0 0 0
 GR 188.95 2594 188.555 2994 187.7 2998.05 187.701 2999.828 187.8 3002.522
 GR 188.565 3008.551 188.96 3408

;COPIED SECTION FROM SEC 58
 NC 0.1 0.1 0.045
 X1 58.5 9 2994 3008.551 0.0 0.0 0 0 0
 GR 189.5 2894 189.3 2993 189.055 2994 188.2 2998.05 188.201 2999.828
 GR 188.3 3002.522 189.065 3008.551 189.3 3009 189.5 3109

;COPIED SECTION FROM SEC 58
 NC 0.1 0.1 0.045
 X1 58.7 7 2994 3008.551 0.0 0.0 0 0 0
 GR 194.1 2894 193.905 2994 189 2998.05 193.051 2999.828 193.15 3002.522
 GR 193.915 3008.551 194.11 3108

;High-chord transect for bridge 58.74 (River: 7th Concession D; Reach: 7th Concession).
 ;COPIED SECTION FROM SEC 58
 NC 0.1 0.1 0.045
 X1 58.74 HC 3 0 0 0.0 0.0 0 0 0
 GR 194.45 2594 194.4 3347.324 194.46 3408

;COPIED SECTION FROM SEC 58
 NC 0.1 0.1 0.045
 X1 58.745 7 2994 3008.551 0.0 0.0 0 0 0
 GR 194.45 2594 194.055 2994 189 2998.05 193.201 2999.828 193.3 3002.522
 GR 194.065 3008.551 194.46 3408

;COPIED SECTION FROM SEC 58
 NC 0.1 0.1 0.045

X1 58.75 7 2994 3008.551 0.0 0.0 0 0 0
 GR 194.45 2594 194.055 2994 189 2998.05 193.201 2999.828 193.3 3002.522
 GR 194.065 3008.551 194.46 3408

;High-chord transect for bridge 58.76 (River: 7th Concession D; Reach: 7th Concession).
 ;COPIED SECTION FROM SEC 58
 NC 0.1 0.1 0.045
 X1 58.76 HC 3 0 0 0.0 0.0 0 0 0
 GR 194.75 2594 194.6 3246.198 194.76 3408

;COPIED SECTION FROM SEC 58
 NC 0.1 0.1 0.045
 X1 58.8 7 2994 3008.551 0.0 0.0 0 0 0
 GR 194.75 2594 194.355 2994 189 2998.05 193.501 2999.828 193.6 3002.522
 GR 194.365 3008.551 194.76 3408

NC 0.1 0.1 0.045
 X1 59 9 2994 2999.957 0.0 0.0 0 0 0
 GR 189.4 2794 189 2993 188.333 2994 186.811 2995.149 186.666 2996.75
 GR 186.788 2997.321 188.456 2999.957 189 3000 189.4 3200

NC 0.1 0.1 0.045
 X1 59.5 7 2994 2999.957 0.0 0.0 0 0 0
 GR 189.23 2594 188.833 2994 187.311 2995.149 187.166 2996.75 187.288 2997.321
 GR 188.956 2999.957 189.36 3400

NC 0.1 0.1 0.045
 X1 61 10 3.3 7.8 0.0 0.0 0 0 0
 GR 187.6 -101 187.5 -1 186.65 0 185.45 3.3 185.14 4.3
 GR 185.24 6.1 186.36 7.8 186.65 10 187.5 11 187.6 111

NC 0.1 0.1 0.045
 X1 62 9 2994 3001.735 0.0 0.0 0 0 0
 GR 187.1 2893 186.9 2993 186.869 2994 185.364 2996.285 185.013 2998.603
 GR 185.033 2999.523 186.729 3001.735 186.9 3002 187.1 3102

NC 0.1 0.1 0.045
 X1 63 8 2994 3001.767 0.0 0.0 0 0 0
 GR 187.2 2893 187 2993 186.8 2994 185.7 2995.663 185.1 2996.67
 GR 186 2999.277 187 3001.767 187.1 3102

NC 0.1 0.1 0.045
 X1 64 11 2995.257 3009.048 0.0 0.0 0 0 0
 GR 187.1 2894 186.9 2994 186.6 2995.257 187.1 2997.217 187.1 3000.509
 GR 187.1 3003.395 185.7 3005.348 185.1 3006.053 186 3007.491 186.9 3009.048
 GR 187.1 3109

NC 0.1 0.1 0.045
 X1 65 7 2994 2997.22 0.0 0.0 0 0 0
 GR 187.7 2894 187.5 2994 186.1 2995.73 185.6 2996.45 186.1 2996.97
 GR 187.5 2997.22 187.7 3100

NC 0.1 0.1 0.045
 X1 66 7 2994 3000.208 0.0 0.0 0 0 0
 GR 187.6 2894 187.4 2994 186 2996.55 185.4 2997.568 185.6 2998.625
 GR 187.4 3000.208 187.6 3100

NC 0.1 0.1 0.045
 X1 67 8 2994 3000.472 0.0 0.0 0 0 0
 GR 187.9 2894 187.7 2994 186.4 2994.948 186.3 2995.615 186.2 2997.818
 GR 186.5 2998.54 187.7 3000.472 187.9 3100

NC 0.1 0.1 0.045
 X1 69 9 2994 3001.43 0.0 0.0 0 0 0
 GR 187.9 2894 187.7 2994 186.5 2996.165 185.8 2997.276 186 2998.469
 GR 186.4 2999.253 187.5 3001.43 187.7 3002 187.9 3102

NC 0.1 0.1 0.045
 X1 69 7 2994 3001.454 0.0 0.0 0 0 0
 GR 188.2 2894 188 2994 186.4 2996.488 186.1 2998.293 186.6 3000.357
 GR 188 3001.454 188.2 3101

;^th Conc Drain at 9th Conc Road
 NC 0.015 0.015 0.015
 X1 6th9th 4 0 0 184.8 70 185 130 0 0 0
 GR 185.1 0 184.8 30 184.8 70 185 130

NC 0.1 0.1 0.045
 X1 7 22 2952 2968 0.0 0.0 0 0 0
 GR 185 2010 185 2020 185 2499.9 182.8 2500 181.8 2675
 GR 181.8 2790 181.7 2880 181.6 2950 181.3 2952 179.3 2958.017
 GR 178.8 2960.989 179.7 2963.107 180.8 2967.952 181.3 2968 181.6 2975
 GR 181.8 3050 182.2 3110 185 3110.1 185 3200 185 3350
 GR 185 3600 185 4000

;[LE: 2500][RE: 3110]
 NC 0.045 0.045 0.03
 X1 7(orig) 20 2952 2968 0.0 0.0 0 0 0
 GR 185 2010 182.2 2020 182.8 2500 181.8 2675 181.8 2790
 GR 181.7 2880 181.6 2950 181.3 2952 179.3 2958.017 178.8 2960.989
 GR 179.7 2963.107 180.8 2967.952 181.3 2968 181.6 2975 181.8 3050
 GR 182.2 3110 181.8 3200 181.7 3350 181.7 3600 182.1 4000

NC 0.1 0.1 0.045
X1 70 6 2994 3002.143 0.0 0.0 0 0 0
GR 188.3 2894 188.1 2994 186.2 2997.78 186.5 2998.886 188.1 3002.143
GR 188.3 3102
NC 0.1 0.1 0.045
X1 71 7 2994 3003.477 0.0 0.0 0 0 0
GR 188.5 2893 188.3 2993 187.7 2994 186.3 2998.576 187.7 3003.477
GR 188.3 3004 188.5 3103
NC 0.1 0.1 0.045
X1 72 9 2994 3002.905 0.0 0.0 0 0 0
GR 188.8 2893 188.6 2993 187.7 2994 186.7 2997.097 186.6 2998.564
GR 186.9 3000.554 187.7 3002.905 188.6 3003 188.8 3103
NC 0.1 0.1 0.045
X1 73 9 2994 3003.75 0.0 0.0 0 0 0
GR 188.8 2893 188.6 2993 187.7 2994 186.8 2995.924 186.6 2997.34
GR 187 3000.72 187.7 3003.75 188.6 3004 188.8 3104
NC 0.1 0.1 0.045
X1 74 8 2990.574 2995.317 0.0 0.0 0 0 0
GR 189.1 2890 188.9 2990 188.6 2990.574 187.6 2991.996 187 2993.222
GR 187.6 2994 188.9 2995.317 189.1 3095
NC 0.1 0.1 0.045
X1 75 10 2994 2997.53 0.0 0.0 0 0 0
GR 189.9 2893 189.7 2993 188.6 2994 187.8 2994.993 187.7 2995.466
GR 187.7 2995.627 187.9 2996.195 188.6 2997.53 189.7 2998 189.9 3097
NC 0.1 0.1 0.045
X1 76 9 2994 2997.74 0.0 0.0 0 0 0
GR 189.9 2893 189.7 2993 188.6 2994 187.9 2995.14 187.7 2996.1
GR 187.8 2996.67 188.6 2997.74 189.7 2998 189.9 3098
NC 0.1 0.1 0.045
X1 77 9 2994 2997.89 0.0 0.0 0 0 0
GR 189.8 2893 189.6 2993 188.7 2994 187.6 2996.208 187.8 2997.425
GR 187.9 2997.477 188.7 2997.89 189.6 2998 189.8 3098
NC 0.1 0.1 0.045
X1 79 10 2994 3000.879 0.0 0.0 0 0 0
GR 189 2893 188.8 2993 188.1 2994 186.9 2997.613 186.5 2998.752
GR 186.9 2999.409 188.2 3000.308 188.1 3000.879 188.8 3001 189 3101

NC 0.1 0.1 0.045
X1 8 19 2994 3015.8 0.0 0.0 0 0 0
GR 184.2 2000 182 2035 181.5 2250 181.5 2500 181.7 2700
GR 181.9 2850 181.6 2950 181.6 2994 179.6 3001.177 179.8 3007.135
GR 179.8 3009.548 181.4 3015.8 181.5 3050 181.5 3100 182 3105
GR 182.3 3180 182.6 3370 182.7 3600 182.9 3900
NC 0.1 0.1 0.045
X1 80 9 2994 3000.407 0.0 0.0 0 0 0
GR 189 2893 188.8 2993 188.1 2994 187.1 2996.175 186.5 2997.781
GR 187.1 2998.638 188.1 3000.407 188.8 3001 189 3101
NC 0.1 0.1 0.045
X1 81 7 2994 2999.293 0.0 0.0 0 0 0
GR 188.9 2594 188.5 2994 187.7 2996.045 187.4 2996.891 187.6 2997.571
GR 188.5 2999.293 188.9 3399
NC 0.1 0.1 0.045
X1 84 7 2994 2998.552 0.0 0.0 0 0 0
GR 188.8 2594 188.4 2994 187.7 2995.499 187.5 2995.925 187.6 2996.651
GR 188.4 2998.552 188.8 3398
NC 0.1 0.1 0.045
X1 85 7 2994 3001.561 0.0 0.0 0 0 0
GR 188.9 2594 188.5 2994 186.6 2994.908 187.1 2997.794 187.6 2998.696
GR 188.5 3001.561 188.9 3401
NC 0.1 0.1 0.045
X1 86 9 2994 2999.067 0.0 0.0 0 0 0
GR 189.5 2893 189.2 2993 188.711 2994 187 2994.034 187.255 2994.987
GR 188.45 2996.398 188.711 2999.067 189.2 3000 189.5 3100
NC 0.1 0.1 0.045
X1 87 12 2994 2997.967 0.0 0.0 0 0 0
GR 189.3 2893 189.1 2993 188.336 2994 188.366 2994.583 187.525 2995.032
GR 187.401 2995.783 186.791 2995.793 187.611 2997.225 188.362 2997.446 188.35 2997.967
GR 189.1 2999 189.3 3099
NC 0.1 0.1 0.045
X1 88 9 2994 2998.364 0.0 0.0 0 0 0
GR 190 2893 189.8 2993 188.599 2994 187.755 2995.171 187.546 2996.074
GR 187.711 2996.87 188.535 2998.364 189.8 2999 190 3098
NC 0.1 0.1 0.045
X1 89 9 2994 3000.356 0.0 0.0 0 0 0
GR 190.2 2893 190 2993 189.09 2994 187.888 2995.606 187.555 2996.413

GR 187.75 2998.017 189.25 3000.356 190 3001 190.2 3101
;High-chord transect for bridge 7.5 (River: Little River; Reach: Watson to Desjar).
NC 0.1 0.1 0.045
X1 8A 21 2994 3015.8 0.0 0.0 0 0 0
GR 184.2 2000 184.2 2035 184.2 2250 184.2 2500 184.2 2700
GR 184.2 2850 184.2 2984.9 182.5 2985 181.6 2994 179.6 3001.177
GR 179.8 3007.135 179.8 3009.548 181.4 3015.8 182.5 3020 184.2 3020.1
GR 184.2 3100 184.2 3105 184.2 3180 184.2 3370 184.2 3600
GR 184.2 3900
;[LE: 2985] [RE: 3020]
NC 0.045 0.045 0.03
X1 8A(orig) 19 2994 3015.8 0.0 0.0 0 0 0
GR 184.2 2000 182.5 2035 182.5 2250 182.5 2500 182.5 2700
GR 182.5 2850 182.5 2985 181.6 2994 179.6 3001.177 179.8 3007.135
GR 179.8 3009.548 181.4 3015.8 182.5 3020 182.5 3100 182.5 3105
GR 182.5 3180 182.6 3370 182.7 3600 182.9 3900
NC 0.1 0.1 0.045
X1 9 21 2994 3015.387 0.0 0.0 0 0 0
GR 184.2 2000 184.2 2035 184.2 2250 184.2 2500 184.2 2700
GR 184.2 2850 184.2 2949.9 182 2950 181.7 2994 179.6 3000.144
GR 178.8 3003.25 180.4 3009.303 181.6 3015.387 182 3050 184.2 3050.1
GR 184.2 3100 184.2 3105 184.2 3180 184.2 3370 184.2 3600
GR 184.2 3900
;[LE: 2950] [RE: 3050]
NC 0.045 0.045 0.03
X1 9(orig) 19 2994 3015.387 0.0 0.0 0 0 0
GR 184.2 2000 182 2035 182 2250 182 2500 182 2700
GR 182 2850 182 2950 181.7 2994 179.6 3000.144 178.8 3003.25
GR 180.4 3009.303 181.6 3015.387 182 3050 182 3100 182 3105
GR 182.3 3180 182.6 3370 182.7 3600 182.9 3900
NC 0.1 0.1 0.045
X1 90 10 2994 3000.348 0.0 0.0 0 0 0
GR 190.5 1594 189.99 2094 189.49 2594 189.087 2994 187.777 2995.854
GR 187.9 2998.618 189.001 3000.348 189.4 3400 189.9 3900 190.4 4400
;EC Row at Little River
NC 0.015 0.015 0.015
X1 ECRow@LR 22 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
GR 182.5 2730 182.6 2750 182.8 2825 183 2920 183 2991
GR 183 2993 183 2993.1 183 2993.9 183 2994 183 3000
GR 183 3006.1 183 3006.2 183 3007 183 3007.1 183 3009

GR 182.6 3060 181.4 3220 182 3300 182 3450 182 4000
GR 182.1 4700 182.9 5500
;Forest Glen Drive
NC 0.015 0.015 0.015
X1 ForestGlenDR 27 0.0 0.0 0.0 0.0 0.0 0.0 0.0
GR 183 2500 180.6 2630 180.5 2830 180.8 2900 181 2950
GR 181.4 2983 181.4 2989.2 182 2989.3 182 2992.7 182 2992.8
GR 182 2994.6 182 3000 182 3007.4 182 3007.5 182 3013.9
GR 181.4 3014 181.4 3015.3 181.4 3018 181 3065 180.9 3085
GR 180.7 3145 180.6 3170 180.7 3275 181 3430 181.5 4000
GR 182 4750 182.9 5500
;Lauzon Parkway at Little River
NC 0.015 0.015 0.015
X1 Lauzonpkwy@LR 28 0.0 0.0 0.0 0.0 0.0 0.0 0.0
GR 183 1350 183 1760 182.4 1840 182.5 2230 182.7 2500
GR 182.7 2700 182.9 2880 183 2920 183.3 2950 183.9 2984.4
GR 185.1 2984.5 185.1 2988 185.1 2994.6 185.1 2994.7 185.1 2996.8
GR 185.1 3000 185.1 3003.8 185.1 3005.4 185.1 3005.5 185.1 3012
GR 185.1 3015.9 183.9 3016 183.4 3050 182.8 3150 182.7 3200
GR 183 3290 183.2 3330 183.4 3400
;Little River at Lauzon road
NC 0.015 0.015 0.015
X1 Lauzonrd@LR 26 0.0 0.0 0.0 0.0 0.0 0.0 0.0
GR 185 2010 182 2020 182 2500 181.8 2530 181.9 2675
GR 181.9 2790 181.9 2880 182 2950 182 2992.4 182.2 2992.5
GR 182.2 2995 182.2 2995.1 182.2 2996.1 182.2 3000.4 182.2 3003.9
GR 182.2 3005.9 182.2 3006 182.2 3007.8 182 3008.4 182 3050
GR 182 3110 182.1 3200 182.3 3275 182.3 3430 182.6 3600
GR 181.9 4100
;Little River at County road 42
NC 0.015 0.015 0.015
X1 LittleRiver@42 19 0.0 0.0 0.0 0.0 0.0 0.0 0.0
GR 183.9 2250 183.9 2350 183.8 2480 183.7 2620 183.7 2675
GR 183.6 2830 183.5 2890 183.4 2950 183.9 2994.4 183.9 2996
GR 183.9 2996.1 183.9 3003 183.9 3003.1 183.9 3006 183.1 3040
GR 183.2 3240 183.2 3270 183.4 3350 184 4000
;Little River at Baseline Road
NC 0.015 0.015 0.015
X1 LR@baseline 19 0.0 0.0 0.0 0.0 0.0 0.0 0.0
GR 185.2 2000 185.2 2300 184.8 2550 184.6 2710 184.6 2880
GR 184.6 2950 184.6 2994.3 184.6 2996.9 184.6 2997 184.6 3000

```

GR 184.6 3003 184.6 3003.1 184.5 3006 184.6 3050 184.5 3170
GR 184.6 3225 184.6 3425 184.6 3700 185 4000

;Little River at Twin Oaks
NC 0.015 0.015 0.015
X1 LR@TwinOaks 4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
GR 181 0 180.8 60 180.8 80 181 160

;Rail Line at Little River
NC 0.015 0.015 0.015
X1 Rail@LR 28 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
GR 184 2295 182.5 2300 182.5 2525 182.5 2700 182.5 2800
GR 182.5 2850 182.5 2925 182.5 2990.2 182.5 2991 183.4 2991.1
GR 183.4 2992.6 183.4 2992.7 183.4 2996.6 183.4 3002.1 183.4 3003.4
GR 183.4 3007.4 183.4 3007.5 183.4 3008.3 183.4 3009.1 182.5 3009.2
GR 182.5 3075 182.5 3140 182.5 3250 182.6 3450 182.9 3650
GR 183 4000 183 4650 183 5500

NC 0.1 0.1 0.045
X1 Townline 6 1000 1006.5 0.0 0.0 0.0 0.0 0.0 0.0
GR 100.2 900 100 1000 98.3 1002.5 98.3 1004 100 1006.5
GR 100.2 1106

;Cross Section from Twin Oak Buisness Park Station 0+122
NC 0.1 0.1 0.045
X1 TwinOaks122 17 38 39.5 0.0 0 0 0
GR 181 4 181 5.5 179.4 13.5 179.4 17.5 178.2 22.5
GR 178.2 25.5 177.2 30.5 177.2 36.5 177.2 38 177 38.5
GR 177.2 39.5 177.2 41.3 179 49 179 51.5 180.8 61.5
GR 181 67.5 181 69

;Twin Oaks Buisness Park Station 0+316
NC 0.1 0.1 0.045
X1 TwinOaks316 17 43.5 45 0.0 0.0 0 0 0
GR 181 0 181 7 178.5 17 178.5 29 178.5 33.5
GR 178.5 35 177.4 39 177.4 43.5 177 44 177.4 45
GR 177.4 53 178.5 57 178.5 58.5 178.5 63 178.5 75
GR 181 85 181 92

;Twin Oak Buisness Park Station 0+742
NC 0.1 0.1 0.045
X1 TwinOaks742 17 32 33.5 0.0 0.0 0 0 0
GR 181.6 2.5 181.6 4 179.9 12 179.8 17.5 178.8 21.5
GR 178.7 24 177.9 29 177.9 32 177.6 32.5 177.9 33.5
GR 177.9 36.8 179.6 44.5 179.6 47 181 54.5 181.1 55
GR 181.6 63 181.6 64.5

```

```

[LOSSES]
;;Link Inlet Outlet Average Flap Gate
;;-----
C1 0.5 1 0 NO
C10 0.5 1 0 NO
C11 0.3 0.5 0 NO
C12 0.5 1 0 NO
C13 0.3 0.5 0 NO
C14 0.3 0.5 0 NO
C15 0.1 0.3 0 NO
C16 0.3 0.5 0 NO
C17 0.5 1 0 NO
C18 0.5 1 0 NO
C19 0.3 0.5 0 NO
C2 0.3 0.5 0 NO
C20 0.5 1 0 NO
C21 0.3 0.5 0 NO
C22 0.3 0.5 0 NO
C23 0.3 0.5 0 NO
C24 0.1 0.3 0 NO
C25 0.3 0.5 0 NO
C26 0.3 0.5 0 NO
C27 0.1 0.3 0 NO
C28 0.5 1 0 NO
C3 0.1 0.3 0 NO
C4 0.5 1 0 NO
C5 0.3 0.5 0 NO
C6 0.5 1 0 NO
C6000 0.1 0.3 0 NO
C6007 0.3 0.5 0 NO
C6015a 0.1 0.3 0 NO
C6015b 0.1 0.3 0 NO
C6025a 0.3 0.5 0 NO
C6025b 0.1 0.3 0 NO
C6025c 0.1 0.3 0 NO
C6030 0.1 0.3 0 NO
C6040 0.3 0.5 0 NO
C6045a 0.1 0.3 0 NO
C6045b 0.3 0.5 0 NO
C6055a 0.3 0.5 0 NO
C6055b 0.1 0.3 0 NO
C6055c 0.1 0.3 0 NO
C6055d 0.3 0.5 0 NO
C6060a 0.1 0.3 0 NO
C6060b 0.1 0.3 0 NO

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C6060c 0.1 0.3 0 NO
C6060d 0.1 0.3 0 NO
C6060e 0.1 0.3 0 NO
C6060f 0.1 0.3 0 NO
C6060g 0.1 0.3 0 NO
C6060h 0.1 0.3 0 NO
C6060i 0.1 0.3 0 NO
C6060j 0.1 0.3 0 NO
C6060k 0.3 0.5 0 NO
C6075a 0.3 0.5 0 NO
C6075b 0.1 0.3 0 NO
C6080 0.3 0.5 0 NO
C6090a 0.3 0.5 0 NO
C6090b 0.1 0.3 0 NO
C6090c 0.1 0.3 0 NO
C6090d 0.3 0.5 0 NO
C6100a 0.1 0.3 0 NO
C6100b 0.1 0.3 0 NO
C6100c 0.3 0.5 0 NO
C6110a 0.3 0.5 0 NO
C6110b 0.3 0.5 0 NO
C6120a 0.1 0.3 0 NO
C6120b 0.3 0.5 0 NO
C6120c 0.3 0.5 0 NO
C6130b 0.1 0.3 0 NO
C6130c 0.1 0.3 0 NO
C6133a 0.3 0.5 0 NO
C6133b 0.1 0.3 0 NO
C6133c 0.1 0.3 0 NO
C6135a 0.1 0.3 0 NO
C6135b 0.1 0.3 0 NO
C6145 0.1 0.3 0 NO
C6150 0.1 0.3 0 NO
C6160a 0.3 0.5 0 NO
C6160b 0.3 0.5 0 NO
C6170e 0.3 0.5 0 NO
C6170f 0.3 0.5 0 NO
C6170l 0.3 0.5 0 NO
C6180a 0.3 0.5 0 NO
C6180b 0.1 0.3 0 NO
C6180c 0.1 0.3 0 NO
C6180d 0.3 0.5 0 NO
C6180e 0.3 0.5 0 NO
C6190 0.3 0.5 0 NO
C6200 0.1 0.3 0 NO
C6220 0.3 0.5 0 NO

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C7 0.3 0.5 0 NO
C7025 0.5 1 0 NO
C7040 0.5 1 0 NO
C7075 0.5 1 0 NO
C7105 0.5 1 0 NO
C7133 0.5 1 0 NO
C8 0.5 1 0 NO
C9 0.3 0.5 0 NO
C30.5 0.1 0.3 0 NO
C30.75 0.1 0.3 0 NO
C30.8 0.1 0.3 0 NO
C30.9 0.1 0.3 0 NO
C34 0.1 0.3 0 NO
C34.5 0.1 0.3 0 NO
C353 0.1 0.3 0 NO
C353.5 0.1 0.3 0 NO
C362 0.1 0.3 0 NO
C363 0.1 0.3 0 NO
C364 0.1 0.3 0 NO
C365 0.1 0.3 0 NO
C366 0.1 0.3 0 NO
C367 0.1 0.3 0 NO
C368 0.1 0.3 0 NO
C369 0.1 0.3 0 NO
C370 0.1 0.3 0 NO
C371 0.1 0.3 0 NO
C372 0.1 0.3 0 NO
C373 0.1 0.3 0 NO
C374 0.1 0.3 0 NO
C375 0.1 0.3 0 NO
C376 0.1 0.3 0 NO
C377 0.1 0.3 0 NO
C380 0.1 0.3 0 NO
C381 0.1 0.3 0 NO
C384 0.1 0.3 0 NO
C385 0.1 0.3 0 NO
C386 0.1 0.3 0 NO
C387 0.1 0.3 0 NO
C388 0.1 0.3 0 NO
C389 0.1 0.3 0 NO
C390 0.1 0.3 0 NO

```

```

[CURVES]
;;Name Type X-Value Y-Value
;;-----
;Bridge and crossing at EC Row - culvert size 6 x 1.8 according to 1997 SWM report

```

```

;Original area=20.065, shape curve area=20.069
0.35      Shape      0
0.35      0.043      2.382
0.35      0.087      3.525
0.35      0.336      4.512
0.35      0.577      4.568
0.35      1          2.609

;Original area=38.697, shape curve area=38.7
1.5       Shape      0
1.5       0.108      1.196
1.5       0.135      1.395
1.5       0.324      2.431
1.5       0.405      2.875
1.5       0.572      3.543
1.5       0.838      3.81
1.5       0.919      3.973
1.5       1          3.973

;Original area=23.477, shape curve area=23.473
11.5      Shape      0
11.5      0.018      0.578
11.5      0.771      3.002
11.5      0.96      3.002
11.5      0.888      2.708
11.5      0.916      1.964
11.5      1          0

;Original area=6.498, shape curve area=6.5
13.25     Shape      0
13.25     0.26      1.188
13.25     0.292      1.313
13.25     1          1.181

;Original area=6.024, shape curve area=6.025
14.5      Shape      0
14.5      0.414      1.38
14.5      1          3.173

;Original area=8.915, shape curve area=8.917
16.5      Shape      0
16.5      0.072      1.309
16.5      0.713      1.145
16.5      1          1.04

;Bridge #6-Forest Glade Drive

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```

;Original area=47.004, shape curve area=47.001
35092.5   Shape      0
35092.5   0.174      4.287
35092.5   0.176      4.295
35092.5   0.912      4.294
35092.5   0.941      3.039
35092.5   1          0

;Bridge #7-Hwy 2
;Original area=62.934, shape curve area=62.943
40573.5   Shape      0
40573.5   0.926      2.241
40573.5   1          0

;Original area=7.936, shape curve area=7.936
7.5       Shape      0
7.5       0.143      4.768
7.5       0.144      5.246
7.5       0.158      5.301
7.5       0.714      5.286
7.5       0.857      2.786
7.5       0.858      1.5
7.5       1          0

5002      Storage    0      100000
5002      2          100000

5005      Storage    0      25000
5005      2          25000

5180      Storage    0      10000
5180      2          10000

5205      Storage    0      15000
5205      2          15000

{TIMESERIES}
;Name      Date      Time      Value
;-----
100yr_24hr-chi 12/14/2011 0:00:00 0
100yr_24hr-chi 12/14/2011 0:10:00 0.66
100yr_24hr-chi 12/14/2011 0:20:00 0.67
100yr_24hr-chi 12/14/2011 0:30:00 0.69
100yr_24hr-chi 12/14/2011 0:40:00 0.7
100yr_24hr-chi 12/14/2011 0:50:00 0.72
100yr_24hr-chi 12/14/2011 1:00:00 0.73

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```

100yr_24hr-chi 12/14/2011 1:10:00 0.75
100yr_24hr-chi 12/14/2011 1:20:00 0.77
100yr_24hr-chi 12/14/2011 1:30:00 0.78
100yr_24hr-chi 12/14/2011 1:40:00 0.8
100yr_24hr-chi 12/14/2011 1:50:00 0.82
100yr_24hr-chi 12/14/2011 2:00:00 0.84
100yr_24hr-chi 12/14/2011 2:10:00 0.87
100yr_24hr-chi 12/14/2011 2:20:00 0.89
100yr_24hr-chi 12/14/2011 2:30:00 0.91
100yr_24hr-chi 12/14/2011 2:40:00 0.94
100yr_24hr-chi 12/14/2011 2:50:00 0.97
100yr_24hr-chi 12/14/2011 3:00:00 1
100yr_24hr-chi 12/14/2011 3:10:00 1.03
100yr_24hr-chi 12/14/2011 3:20:00 1.07
100yr_24hr-chi 12/14/2011 3:30:00 1.1
100yr_24hr-chi 12/14/2011 3:40:00 1.14
100yr_24hr-chi 12/14/2011 3:50:00 1.19
100yr_24hr-chi 12/14/2011 4:00:00 1.23
100yr_24hr-chi 12/14/2011 4:10:00 1.28
100yr_24hr-chi 12/14/2011 4:20:00 1.34
100yr_24hr-chi 12/14/2011 4:30:00 1.4
100yr_24hr-chi 12/14/2011 4:40:00 1.47
100yr_24hr-chi 12/14/2011 4:50:00 1.54
100yr_24hr-chi 12/14/2011 5:00:00 1.62
100yr_24hr-chi 12/14/2011 5:10:00 1.71
100yr_24hr-chi 12/14/2011 5:20:00 1.82
100yr_24hr-chi 12/14/2011 5:30:00 1.94
100yr_24hr-chi 12/14/2011 5:40:00 2.07
100yr_24hr-chi 12/14/2011 5:50:00 2.23
100yr_24hr-chi 12/14/2011 6:00:00 2.42
100yr_24hr-chi 12/14/2011 6:10:00 2.64
100yr_24hr-chi 12/14/2011 6:20:00 2.92
100yr_24hr-chi 12/14/2011 6:30:00 3.25
100yr_24hr-chi 12/14/2011 6:40:00 3.68
100yr_24hr-chi 12/14/2011 6:50:00 4.25
100yr_24hr-chi 12/14/2011 7:00:00 5.03
100yr_24hr-chi 12/14/2011 7:10:00 6.18
100yr_24hr-chi 12/14/2011 7:20:00 8
100yr_24hr-chi 12/14/2011 7:30:00 11.31
100yr_24hr-chi 12/14/2011 7:40:00 18.95
100yr_24hr-chi 12/14/2011 7:50:00 50.14
100yr_24hr-chi 12/14/2011 8:00:00 171.94
100yr_24hr-chi 12/14/2011 8:10:00 66.41
100yr_24hr-chi 12/14/2011 8:20:00 33.95
100yr_24hr-chi 12/14/2011 8:30:00 21.97
100yr_24hr-chi 12/14/2011 8:40:00 15.98

```

```

100yr_24hr-chi 12/14/2011 8:50:00 12.47
100yr_24hr-chi 12/14/2011 9:00:00 10.18
100yr_24hr-chi 12/14/2011 9:10:00 8.59
100yr_24hr-chi 12/14/2011 9:20:00 7.42
100yr_24hr-chi 12/14/2011 9:30:00 6.53
100yr_24hr-chi 12/14/2011 9:40:00 5.84
100yr_24hr-chi 12/14/2011 9:50:00 5.27
100yr_24hr-chi 12/14/2011 10:00:00 4.81
100yr_24hr-chi 12/14/2011 10:10:00 4.42
100yr_24hr-chi 12/14/2011 10:20:00 4.09
100yr_24hr-chi 12/14/2011 10:30:00 3.81
100yr_24hr-chi 12/14/2011 10:40:00 3.57
100yr_24hr-chi 12/14/2011 10:50:00 3.35
100yr_24hr-chi 12/14/2011 11:00:00 3.16
100yr_24hr-chi 12/14/2011 11:10:00 2.99
100yr_24hr-chi 12/14/2011 11:20:00 2.84
100yr_24hr-chi 12/14/2011 11:30:00 2.71
100yr_24hr-chi 12/14/2011 11:40:00 2.59
100yr_24hr-chi 12/14/2011 11:50:00 2.47
100yr_24hr-chi 12/14/2011 12:00:00 2.37
100yr_24hr-chi 12/14/2011 12:10:00 2.28
100yr_24hr-chi 12/14/2011 12:20:00 2.19
100yr_24hr-chi 12/14/2011 12:30:00 2.11
100yr_24hr-chi 12/14/2011 12:40:00 2.04
100yr_24hr-chi 12/14/2011 12:50:00 1.97
100yr_24hr-chi 12/14/2011 13:00:00 1.91
100yr_24hr-chi 12/14/2011 13:10:00 1.85
100yr_24hr-chi 12/14/2011 13:20:00 1.79
100yr_24hr-chi 12/14/2011 13:30:00 1.74
100yr_24hr-chi 12/14/2011 13:40:00 1.69
100yr_24hr-chi 12/14/2011 13:50:00 1.65
100yr_24hr-chi 12/14/2011 14:00:00 1.6
100yr_24hr-chi 12/14/2011 14:10:00 1.56
100yr_24hr-chi 12/14/2011 14:20:00 1.52
100yr_24hr-chi 12/14/2011 14:30:00 1.48
100yr_24hr-chi 12/14/2011 14:40:00 1.45
100yr_24hr-chi 12/14/2011 14:50:00 1.42
100yr_24hr-chi 12/14/2011 15:00:00 1.38
100yr_24hr-chi 12/14/2011 15:10:00 1.35
100yr_24hr-chi 12/14/2011 15:20:00 1.33
100yr_24hr-chi 12/14/2011 15:30:00 1.3
100yr_24hr-chi 12/14/2011 15:40:00 1.27
100yr_24hr-chi 12/14/2011 15:50:00 1.25
100yr_24hr-chi 12/14/2011 16:00:00 1.22
100yr_24hr-chi 12/14/2011 16:10:00 1.2
100yr_24hr-chi 12/14/2011 16:20:00 1.18

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100yr_24hr-chi	12/14/2011	16:30:00	1.15
100yr_24hr-chi	12/14/2011	16:40:00	1.13
100yr_24hr-chi	12/14/2011	16:50:00	1.11
100yr_24hr-chi	12/14/2011	17:00:00	1.09
100yr_24hr-chi	12/14/2011	17:10:00	1.08
100yr_24hr-chi	12/14/2011	17:20:00	1.06
100yr_24hr-chi	12/14/2011	17:30:00	1.04
100yr_24hr-chi	12/14/2011	17:40:00	1.02
100yr_24hr-chi	12/14/2011	17:50:00	1.01
100yr_24hr-chi	12/14/2011	18:00:00	0.99
100yr_24hr-chi	12/14/2011	18:10:00	0.98
100yr_24hr-chi	12/14/2011	18:20:00	0.96
100yr_24hr-chi	12/14/2011	18:30:00	0.95
100yr_24hr-chi	12/14/2011	18:40:00	0.94
100yr_24hr-chi	12/14/2011	18:50:00	0.92
100yr_24hr-chi	12/14/2011	19:00:00	0.91
100yr_24hr-chi	12/14/2011	19:10:00	0.9
100yr_24hr-chi	12/14/2011	19:20:00	0.89
100yr_24hr-chi	12/14/2011	19:30:00	0.87
100yr_24hr-chi	12/14/2011	19:40:00	0.86
100yr_24hr-chi	12/14/2011	19:50:00	0.85
100yr_24hr-chi	12/14/2011	20:00:00	0.84
100yr_24hr-chi	12/14/2011	20:10:00	0.83
100yr_24hr-chi	12/14/2011	20:20:00	0.82
100yr_24hr-chi	12/14/2011	20:30:00	0.81
100yr_24hr-chi	12/14/2011	20:40:00	0.8
100yr_24hr-chi	12/14/2011	20:50:00	0.79
100yr_24hr-chi	12/14/2011	21:00:00	0.78
100yr_24hr-chi	12/14/2011	21:10:00	0.77
100yr_24hr-chi	12/14/2011	21:20:00	0.76
100yr_24hr-chi	12/14/2011	21:30:00	0.75
100yr_24hr-chi	12/14/2011	21:40:00	0.75
100yr_24hr-chi	12/14/2011	21:50:00	0.74
100yr_24hr-chi	12/14/2011	22:00:00	0.73
100yr_24hr-chi	12/14/2011	22:10:00	0.72
100yr_24hr-chi	12/14/2011	22:20:00	0.71
100yr_24hr-chi	12/14/2011	22:30:00	0.71
100yr_24hr-chi	12/14/2011	22:40:00	0.7
100yr_24hr-chi	12/14/2011	22:50:00	0.69
100yr_24hr-chi	12/14/2011	23:00:00	0.68
100yr_24hr-chi	12/14/2011	23:10:00	0.67
100yr_24hr-chi	12/14/2011	23:20:00	0.67
100yr_24hr-chi	12/14/2011	23:30:00	0.67
100yr_24hr-chi	12/14/2011	23:40:00	0.66
100yr_24hr-chi	12/14/2011	23:50:00	0.65
100yr_24hr-chi	12/15/2011	0:00:00	0.65

100yr_24hr-chi+	12/14/2011	0:10:00	0.792
100yr_24hr-chi+	12/14/2011	0:20:00	0.804
100yr_24hr-chi+	12/14/2011	0:30:00	0.828
100yr_24hr-chi+	12/14/2011	0:40:00	0.84
100yr_24hr-chi+	12/14/2011	0:50:00	0.864
100yr_24hr-chi+	12/14/2011	1:00:00	0.876
100yr_24hr-chi+	12/14/2011	1:10:00	0.9
100yr_24hr-chi+	12/14/2011	1:20:00	0.924
100yr_24hr-chi+	12/14/2011	1:30:00	0.936
100yr_24hr-chi+	12/14/2011	1:40:00	0.96
100yr_24hr-chi+	12/14/2011	1:50:00	0.984
100yr_24hr-chi+	12/14/2011	2:00:00	1.008
100yr_24hr-chi+	12/14/2011	2:10:00	1.044
100yr_24hr-chi+	12/14/2011	2:20:00	1.068
100yr_24hr-chi+	12/14/2011	2:30:00	1.092
100yr_24hr-chi+	12/14/2011	2:40:00	1.128
100yr_24hr-chi+	12/14/2011	2:50:00	1.164
100yr_24hr-chi+	12/14/2011	3:00:00	1.2
100yr_24hr-chi+	12/14/2011	3:10:00	1.236
100yr_24hr-chi+	12/14/2011	3:20:00	1.284
100yr_24hr-chi+	12/14/2011	3:30:00	1.32
100yr_24hr-chi+	12/14/2011	3:40:00	1.368
100yr_24hr-chi+	12/14/2011	3:50:00	1.428
100yr_24hr-chi+	12/14/2011	4:00:00	1.476
100yr_24hr-chi+	12/14/2011	4:10:00	1.536
100yr_24hr-chi+	12/14/2011	4:20:00	1.608
100yr_24hr-chi+	12/14/2011	4:30:00	1.68
100yr_24hr-chi+	12/14/2011	4:40:00	1.764
100yr_24hr-chi+	12/14/2011	4:50:00	1.848
100yr_24hr-chi+	12/14/2011	5:00:00	1.944
100yr_24hr-chi+	12/14/2011	5:10:00	2.052
100yr_24hr-chi+	12/14/2011	5:20:00	2.184
100yr_24hr-chi+	12/14/2011	5:30:00	2.328
100yr_24hr-chi+	12/14/2011	5:40:00	2.484
100yr_24hr-chi+	12/14/2011	5:50:00	2.676
100yr_24hr-chi+	12/14/2011	6:00:00	2.904
100yr_24hr-chi+	12/14/2011	6:10:00	3.168
100yr_24hr-chi+	12/14/2011	6:20:00	3.504
100yr_24hr-chi+	12/14/2011	6:30:00	3.9
100yr_24hr-chi+	12/14/2011	6:40:00	4.416
100yr_24hr-chi+	12/14/2011	6:50:00	5.1
100yr_24hr-chi+	12/14/2011	7:00:00	6.036
100yr_24hr-chi+	12/14/2011	7:10:00	7.416
100yr_24hr-chi+	12/14/2011	7:20:00	9.6
100yr_24hr-chi+	12/14/2011	7:30:00	13.572

100yr_24hr-chi+	12/14/2011	7:40:00	22.74
100yr_24hr-chi+	12/14/2011	7:50:00	60.168
100yr_24hr-chi+	12/14/2011	8:00:00	206.328
100yr_24hr-chi+	12/14/2011	8:10:00	79.692
100yr_24hr-chi+	12/14/2011	8:20:00	40.74
100yr_24hr-chi+	12/14/2011	8:30:00	26.364
100yr_24hr-chi+	12/14/2011	8:40:00	19.176
100yr_24hr-chi+	12/14/2011	8:50:00	14.964
100yr_24hr-chi+	12/14/2011	9:00:00	12.216
100yr_24hr-chi+	12/14/2011	9:10:00	10.308
100yr_24hr-chi+	12/14/2011	9:20:00	8.904
100yr_24hr-chi+	12/14/2011	9:30:00	7.836
100yr_24hr-chi+	12/14/2011	9:40:00	7.008
100yr_24hr-chi+	12/14/2011	9:50:00	6.324
100yr_24hr-chi+	12/14/2011	10:00:00	5.772
100yr_24hr-chi+	12/14/2011	10:10:00	5.304
100yr_24hr-chi+	12/14/2011	10:20:00	4.908
100yr_24hr-chi+	12/14/2011	10:30:00	4.572
100yr_24hr-chi+	12/14/2011	10:40:00	4.284
100yr_24hr-chi+	12/14/2011	10:50:00	4.02
100yr_24hr-chi+	12/14/2011	11:00:00	3.792
100yr_24hr-chi+	12/14/2011	11:10:00	3.588
100yr_24hr-chi+	12/14/2011	11:20:00	3.408
100yr_24hr-chi+	12/14/2011	11:30:00	3.252
100yr_24hr-chi+	12/14/2011	11:40:00	3.108
100yr_24hr-chi+	12/14/2011	11:50:00	2.964
100yr_24hr-chi+	12/14/2011	12:00:00	2.844
100yr_24hr-chi+	12/14/2011	12:10:00	2.736
100yr_24hr-chi+	12/14/2011	12:20:00	2.628
100yr_24hr-chi+	12/14/2011	12:30:00	2.532
100yr_24hr-chi+	12/14/2011	12:40:00	2.448
100yr_24hr-chi+	12/14/2011	12:50:00	2.364
100yr_24hr-chi+	12/14/2011	13:00:00	2.292
100yr_24hr-chi+	12/14/2011	13:10:00	2.22
100yr_24hr-chi+	12/14/2011	13:20:00	2.148
100yr_24hr-chi+	12/14/2011	13:30:00	2.088
100yr_24hr-chi+	12/14/2011	13:40:00	2.028
100yr_24hr-chi+	12/14/2011	13:50:00	1.98
100yr_24hr-chi+	12/14/2011	14:00:00	1.92
100yr_24hr-chi+	12/14/2011	14:10:00	1.872
100yr_24hr-chi+	12/14/2011	14:20:00	1.824
100yr_24hr-chi+	12/14/2011	14:30:00	1.776
100yr_24hr-chi+	12/14/2011	14:40:00	1.74
100yr_24hr-chi+	12/14/2011	14:50:00	1.704
100yr_24hr-chi+	12/14/2011	15:00:00	1.656
100yr_24hr-chi+	12/14/2011	15:10:00	1.62

100yr_24hr-chi+	12/14/2011	15:20:00	1.596
100yr_24hr-chi+	12/14/2011	15:30:00	1.56
100yr_24hr-chi+	12/14/2011	15:40:00	1.524
100yr_24hr-chi+	12/14/2011	15:50:00	1.5
100yr_24hr-chi+	12/14/2011	16:00:00	1.464
100yr_24hr-chi+	12/14/2011	16:10:00	1.44
100yr_24hr-chi+	12/14/2011	16:20:00	1.416
100yr_24hr-chi+	12/14/2011	16:30:00	1.38
100yr_24hr-chi+	12/14/2011	16:40:00	1.356
100yr_24hr-chi+	12/14/2011	16:50:00	1.332
100yr_24hr-chi+	12/14/2011	17:00:00	1.308
100yr_24hr-chi+	12/14/2011	17:10:00	1.296
100yr_24hr-chi+	12/14/2011	17:20:00	1.272
100yr_24hr-chi+	12/14/2011	17:30:00	1.248
100yr_24hr-chi+	12/14/2011	17:40:00	1.224
100yr_24hr-chi+	12/14/2011	17:50:00	1.212
100yr_24hr-chi+	12/14/2011	18:00:00	1.188
100yr_24hr-chi+	12/14/2011	18:10:00	1.176
100yr_24hr-chi+	12/14/2011	18:20:00	1.152
100yr_24hr-chi+	12/14/2011	18:30:00	1.14
100yr_24hr-chi+	12/14/2011	18:40:00	1.128
100yr_24hr-chi+	12/14/2011	18:50:00	1.104
100yr_24hr-chi+	12/14/2011	19:00:00	1.092
100yr_24hr-chi+	12/14/2011	19:10:00	1.08
100yr_24hr-chi+	12/14/2011	19:20:00	1.068
100yr_24hr-chi+	12/14/2011	19:30:00	1.044
100yr_24hr-chi+	12/14/2011	19:40:00	1.032
100yr_24hr-chi+	12/14/2011	19:50:00	1.02
100yr_24hr-chi+	12/14/2011	20:00:00	1.008
100yr_24hr-chi+	12/14/2011	20:10:00	0.996
100yr_24hr-chi+	12/14/2011	20:20:00	0.984
100yr_24hr-chi+	12/14/2011	20:30:00	0.972
100yr_24hr-chi+	12/14/2011	20:40:00	0.96
100yr_24hr-chi+	12/14/2011	20:50:00	0.948
100yr_24hr-chi+	12/14/2011	21:00:00	0.936
100yr_24hr-chi+	12/14/2011	21:10:00	0.924
100yr_24hr-chi+	12/14/2011	21:20:00	0.912
100yr_24hr-chi+	12/14/2011	21:30:00	0.9
100yr_24hr-chi+	12/14/2011	21:40:00	0.9
100yr_24hr-chi+	12/14/2011	21:50:00	0.888
100yr_24hr-chi+	12/14/2011	22:00:00	0.876
100yr_24hr-chi+	12/14/2011	22:10:00	0.864
100yr_24hr-chi+	12/14/2011	22:20:00	0.852
100yr_24hr-chi+	12/14/2011	22:30:00	0.852
100yr_24hr-chi+	12/14/2011	22:40:00	0.84
100yr_24hr-chi+	12/14/2011	22:50:00	0.828

Hazel	12/14/2011	17:00:00	2
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Hazel	12/14/2011	17:30:00	2
Hazel	12/14/2011	17:45:00	2
Hazel	12/14/2011	18:00:00	2
Hazel	12/14/2011	18:15:00	2
Hazel	12/14/2011	18:30:00	2
Hazel	12/14/2011	18:45:00	2
Hazel	12/14/2011	19:00:00	2
Hazel	12/14/2011	19:15:00	2
Hazel	12/14/2011	19:30:00	2
Hazel	12/14/2011	19:45:00	2
Hazel	12/14/2011	20:00:00	2
Hazel	12/14/2011	20:15:00	2
Hazel	12/14/2011	20:30:00	2
Hazel	12/14/2011	20:45:00	2
Hazel	12/14/2011	21:00:00	2
Hazel	12/14/2011	21:15:00	2
Hazel	12/14/2011	21:30:00	2
Hazel	12/14/2011	21:45:00	2
Hazel	12/14/2011	22:00:00	2
Hazel	12/14/2011	22:15:00	2
Hazel	12/14/2011	22:30:00	2
Hazel	12/14/2011	22:45:00	2
Hazel	12/14/2011	23:00:00	2
Hazel	12/14/2011	23:15:00	2
Hazel	12/14/2011	23:30:00	2
Hazel	12/14/2011	23:45:00	2
Hazel	12/15/2011	00:00:00	2
Hazel	12/15/2011	00:15:00	2
Hazel	12/15/2011	00:30:00	2
Hazel	12/15/2011	00:45:00	2
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Hazel	12/15/2011	01:15:00	2
Hazel	12/15/2011	01:30:00	2
Hazel	12/15/2011	01:45:00	2
Hazel	12/15/2011	02:00:00	2
Hazel	12/15/2011	02:15:00	2
Hazel	12/15/2011	02:30:00	2
Hazel	12/15/2011	02:45:00	2
Hazel	12/15/2011	03:00:00	2
Hazel	12/15/2011	03:15:00	2
Hazel	12/15/2011	03:30:00	2
Hazel	12/15/2011	03:45:00	2
Hazel	12/15/2011	04:00:00	2
Hazel	12/15/2011	04:15:00	2

Hazel	12/15/2011	04:30:00	2
Hazel	12/15/2011	04:45:00	2
Hazel	12/15/2011	05:00:00	2
Hazel	12/15/2011	05:15:00	2
Hazel	12/15/2011	05:30:00	2
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Hazel	12/15/2011	07:30:00	2
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Hazel	12/15/2011	08:00:00	2
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Hazel	12/15/2011	08:45:00	2
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Hazel	12/15/2011	09:15:00	2
Hazel	12/15/2011	09:30:00	2
Hazel	12/15/2011	09:45:00	2
Hazel	12/15/2011	10:00:00	2
Hazel	12/15/2011	10:15:00	2
Hazel	12/15/2011	10:30:00	2
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Hazel	12/15/2011	11:45:00	3
Hazel	12/15/2011	12:00:00	6
Hazel	12/15/2011	12:15:00	6
Hazel	12/15/2011	12:30:00	6
Hazel	12/15/2011	12:45:00	6
Hazel	12/15/2011	13:00:00	4
Hazel	12/15/2011	13:15:00	4
Hazel	12/15/2011	13:30:00	4
Hazel	12/15/2011	13:45:00	4
Hazel	12/15/2011	14:00:00	6
Hazel	12/15/2011	14:15:00	6
Hazel	12/15/2011	14:30:00	6
Hazel	12/15/2011	14:45:00	6
Hazel	12/15/2011	15:00:00	13
Hazel	12/15/2011	15:15:00	13
Hazel	12/15/2011	15:30:00	13
Hazel	12/15/2011	15:45:00	13

Hazel	12/15/2011	16:00:00	17
Hazel	12/15/2011	16:15:00	17
Hazel	12/15/2011	16:30:00	17
Hazel	12/15/2011	16:45:00	17
Hazel	12/15/2011	17:00:00	13
Hazel	12/15/2011	17:15:00	13
Hazel	12/15/2011	17:30:00	13
Hazel	12/15/2011	17:45:00	13
Hazel	12/15/2011	18:00:00	23
Hazel	12/15/2011	18:15:00	23
Hazel	12/15/2011	18:30:00	23
Hazel	12/15/2011	18:45:00	23
Hazel	12/15/2011	19:00:00	13
Hazel	12/15/2011	19:15:00	13
Hazel	12/15/2011	19:30:00	13
Hazel	12/15/2011	19:45:00	13
Hazel	12/15/2011	20:00:00	13
Hazel	12/15/2011	20:15:00	13
Hazel	12/15/2011	20:30:00	13
Hazel	12/15/2011	20:45:00	13
Hazel	12/15/2011	21:00:00	53
Hazel	12/15/2011	21:15:00	53
Hazel	12/15/2011	21:30:00	53
Hazel	12/15/2011	21:45:00	53
Hazel	12/15/2011	22:00:00	38
Hazel	12/15/2011	22:15:00	38
Hazel	12/15/2011	22:30:00	38
Hazel	12/15/2011	22:45:00	38
Hazel	12/15/2011	23:00:00	13
Hazel	12/15/2011	23:15:00	13
Hazel	12/15/2011	23:30:00	13
Hazel	12/15/2011	23:45:00	13

[REPORT]
INPUT NO
CONTROLS NO
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]				
DIMENSIONS	8.90075	-15.0871	22.15025	2.5371
UNITS	None			

[COORDINATES]		
;;Node	X-Coord	Y-Coord
;;-----	-----	-----
J0.5	16.985	-0.152
J0.75	18.692	0.284
J0.8	18.395	-1.031
J0.9	19.214	-0.89
J1	16.485	-9.729
J10	17.767	-2.714
J102	17.763	-4.705
J103	17.705	-6.139
J105	17.695	-6.512
J106	17.65	-7.016
J107	17.413	-9.822
J11	17.41	-9.958
J12	17.483	-3.714
J13	12.599	-3.886
J14	17.152	-4.96
J15	17.05	-5.072
J16	16.744	-5.673
J17	16.635	-0.364
J18	16.638	-6.682
J19	16.55	-8.295
J2	17.618	-1.327
J20	16.497	-9.079
J21	17.319	-4.274
J22	17.511	-3.663
J23	17.718	-2.233
J24	17.612	-1.387
J25	13.555	-9.073
J26	16.72	-6.073
J27	16.925	-0.818
J28	15.777	-6.089
J29	11.758	-6.079
J3	13.979	-2.058
J30	15.796	-4.698
J31	15.782	-5.253
J32	15.698	-6.176
J33	15.699	-6.284
J34	15.662	-7.031
J35	15.631	-7.385
J36	15.597	-7.798
J37	15.565	-8.154
J37500	16.359	0.531
J38	15.567	-8.402
J39	15.545	-8.633

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J39001 16.396 0.396
J4 17.936 -1.525
J4.5 18.632 -1.692
J40 15.521 -9.008
J40323 16.428 0.126
J41 15.519 -9.054
J41106 16.537 -6.946
J42 15.764 -5.714
J43 15.499 -9.204
J43501 16.736 -0.577
J44 15.746 -5.816
J45 15.725 -5.962
J46 15.465 -9.789
J46102 16.964 -0.828
J46203 17.543 -1.049
J47 16.408 -6.135
J48 16.243 -6.107
J49 16.01 -6.102
J5 16.374 0.493
J50 15.704 -6.039
J5015 12.783 -5.986
J5025 12.576 -8.444
J5030 13.752 -5.942
J5045 14.722 -5.995
J5055 15.7 -6.081
J5060 15.506 -9.144
J5065 14.046 -10.388
J5075 15.481 -9.664
J5080 15.401 -10.779
J5090 16.707 -6.157
J51 15.279 -6.032
J5100 16.463 -9.891
J5110 17.318 -4.34
J5120 17.555 -3.114
J5125 17.78 -1.936
J5150 17.84 -1.619
J5160 17.885 -1.514
J5180 16.606 -0.27
J5190 15.81 -2.931
J53 14.678 -6.196
J53.5 14.541 -8.92
J55 13.747 -6.048
J55.5 13.552 -8.923
J56 12.902 -5.96
J58 12.759 -6.192
J58.5 12.687 -6.83

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J58.7 12.563 -8.703
J6 11.587 -7.473
J62 15.445 -9.149
J63 15.299 -9.146
J64 15.224 -9.22
J65 14.994 -9.231
J66 14.987 -9.254
J67 14.982 -9.377
J68 14.979 -9.449
J69 14.638 -9.43
J7 17.83 -1.691
J70 14.545 -9.424
J71 14.485 -9.441
J72 14.478 -9.576
J73 14.474 -9.615
J74 14.26 -10.398
J75 14.175 -10.397
J76 14.107 -10.384
J8 18.404 -4.002
J80 15.407 -10.899
J81 15.377 -11.069
J84 15.289 -11.079
J85 15.199 -11.085
J86 15.123 -11.108
J87 15.043 -11.115
J88 14.846 -11.24
J89 14.645 -11.209
J9 17.693 -2.274
J90 14.513 -11.216
J5205 16.337 0.656
S5180 17.403 -1.147
S5205 16.988 -0.595

```

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[VERTICES]
;;Link X-Coord Y-Coord
;;-----
C11 16.596 -0.357
C11 16.574 -0.31
C12 16.346 0.493
C12 16.336 0.51
C16 16.66 -6.133
C16 16.67 -6.09
C19 16.951 -0.841
C19 16.933 -0.838
C2 17.289 -4.326
C2 17.288 -4.289

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```

C21 15.727 -6.044
C21 15.778 -6.046
C5 17.462 -3.692
C5 17.479 -3.659
C6110a 17.299 -4.065
C6110b 17.478 -3.401
C6120c 17.795 -2.157
C6130c 17.773 -4.171
C6130c 17.911 -4.119
C6135a 17.842 -1.81
C6160a 17.884 -1.459
C6160a 17.824 -1.42
C6160a 17.662 -1.445
C6160b 17.738 -1.18
C6160b 17.709 -1.053
C6170e 17.26 -0.872
C6170e 17.067 -0.929
C6170f 16.832 -0.732
C6190 16.415 -2.397
C6190 16.802 -1.945
C6190 16.783 -1.728
C6190 16.844 -1.678
C6190 16.787 -1.473
C6190 16.857 -1.444
C6190 16.774 -1.209
C6190 17.054 -1.073
C6200 13.471 -3.615
C6200 13.407 -3.468
C6200 13.934 -3.246
C6200 13.857 -3.14
C6200 15.643 -2.658
C6220 15.668 -1.235
C6220 15.51 -0.866
C7 17.683 -2.257
C7 17.696 -2.231
C9 17.583 -1.371
C9 17.589 -1.332
CJ0.8 18.44 -1.425
CJ0.8 18.027 -1.38
CJ64 15.226 -0.147
CJ74 14.414 -10.4

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[POLYGONS]
;;Subcatchment X-Coord Y-Coord
;;-----
1000 11.615 -6.067

```

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1000 11.188 -6.906
1000 11.02 -7.929
1000 9.677 -6.784
1000 9.753 -6.143
1000 11.294 -5.777
1000 11.615 -6.067
1002 11.075 -10.137
1002 9.503 -9.504
1002 9.686 -6.809
1002 11.034 -7.932
1002 11.054 -8.667
1002 11.218 -9.157
1002 11.075 -10.137
1005 11.641 -6.132
1005 11.716 -6.236
1005 11.671 -6.727
1005 11.78 -7.128
1005 11.824 -8.636
1005 11.479 -8.339
1005 11.03 -7.935
1005 11.056 -7.407
1005 11.299 -6.678
1005 11.641 -6.132
1007 11.205 -9.023
1007 11.022 -8.696
1007 11.041 -7.952
1007 11.83 -8.612
1007 11.8 -8.75
1007 11.205 -9.023
1010 11.83 -10.163
1010 11.463 -10.149
1010 11.443 -10.238
1010 11.094 -10.096
1010 11.071 -9.787
1010 11.261 -9.042
1010 11.864 -8.757
1010 11.83 -10.163
1015 12.651 -5.92
1015 12.741 -6.046
1015 11.749 -6.263
1015 11.637 -6.066
1015 11.318 -5.817
1015 11.57 -5.758
1015 11.823 -5.896
1015 12.651 -5.92
1020 12.962 -8.559

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1020	11.845	-8.741
1020	11.788	-7.104
1020	11.694	-6.784
1020	11.763	-6.263
1020	12.701	-6.046
1020	12.599	-8.359
1020	12.896	-10.577
1020	12.881	-8.631
1020	12.562	-8.559
1025	11.964	-8.716
1025	12.516	-8.556
1025	12.89	-8.652
1025	12.87	-8.713
1025	12.6	-8.724
1025	12.516	-8.858
1025	12.834	-9.243
1025	12.734	-9.427
1025	11.964	-8.716
1027	12.751	-9.443
1027	12.634	-9.828
1027	12.747	-9.96
1027	12.752	-10.248
1027	12.489	-10.228
1027	12.494	-10.655
1027	11.458	-10.258
1027	11.483	-10.169
1027	11.889	-10.213
1027	11.847	-8.791
1027	11.981	-8.724
1027	12.751	-9.443
1030	12.73	-6.346
1030	12.671	-5.94
1030	11.857	-5.902
1030	11.665	-5.806
1030	12.182	-5.632
1030	12.452	-5.614
1030	13.606	-5.577
1030	13.696	-5.992
1030	12.73	-6.346
1035	13.691	-5.981
1035	12.518	-8.518
1035	12.876	-8.652
1035	12.893	-8.548
1035	12.598	-8.375
1035	12.72	-6.37
1035	13.691	-5.981

1040	12.639	-8.741
1040	12.894	-8.673
1040	13.552	-8.964
1040	13.466	-9.797
1040	12.813	-9.281
1040	12.529	-8.9
1040	12.639	-8.741
1045	14.76	-5.992
1045	13.714	-6.461
1045	13.684	-5.892
1045	13.606	-5.596
1045	14.057	-5.505
1045	14.417	-5.614
1045	14.76	-5.992
1050	14.502	-9.207
1050	14.141	-9.207
1050	14.039	-9.248
1050	13.539	-8.989
1050	13.705	-6.508
1050	14.697	-5.981
1050	14.502	-9.207
1055	14.381	-5.577
1055	15.265	-5.505
1055	15.752	-6.01
1055	14.702	-6.502
1055	14.706	-5.956
1055	14.381	-5.577
1055	15.728	-6.075
1060	15.492	-9.17
1060	15.189	-8.771
1060	14.7	-9.199
1060	14.499	-9.199
1060	14.681	-6.554
1060	15.704	-6.017
1060	15.728	-6.075
1065	14.709	-9.181
1065	15.198	-8.771
1065	15.512	-9.19
1065	15.434	-9.714
1065	14.747	-9.605
1065	14.034	-9.257
1065	14.112	-9.196
1065	14.709	-9.181
1070	12.752	-9.422
1070	12.851	-9.24
1070	13.5	-9.822

1070	13.567	-9.013
1070	14.814	-9.622
1070	15.163	-9.722
1070	15.113	-10.437
1070	14.814	-10.719
1070	14.431	-10.852
1070	12.752	-9.422
1072	13.414	-10.577
1072	13.396	-10.994
1072	12.5	-10.68
1072	12.531	-10.238
1072	12.746	-10.258
1072	12.754	-9.901
1072	12.633	-9.797
1072	12.772	-9.45
1072	14.385	-10.855
1072	14.12	-10.845
1072	13.414	-10.577
1075	15.417	-9.73
1075	15.37	-10.977
1075	16.04	-12.236
1075	14.428	-10.874
1075	14.861	-10.705
1075	15.088	-10.488
1075	15.154	-9.712
1075	15.417	-9.73
1080	13.436	-10.6
1080	14.135	-10.864
1080	14.406	-11.881
1080	15.132	-11.437
1080	14.965	-11.671
1080	14.672	-11.793
1080	13.872	-12.253
1080	13.702	-13.175
1080	13.885	-14.286
1080	11.781	-13.439
1080	11.983	-12.926
1080	11.961	-11.825
1080	12.12	-11.865
1080	12.315	-11.672
1080	12.459	-11.668
1080	12.631	-11.513
1080	12.693	-11.343
1080	12.552	-11.17
1080	12.246	-11.087
1080	11.954	-11.1

1080	11.944	-10.488
1080	13.401	-10.999
1080	13.436	-10.6
1085	13.709	-13.171
1085	13.88	-12.27
1085	14.634	-11.813
1085	14.956	-11.674
1085	15.147	-11.437
1085	16.052	-12.253
1085	13.892	-14.286
1085	13.709	-13.171
1090	16.184	-6.371
1090	15.734	-6.569
1090	15.77	-6.046
1090	16.094	-5.469
1090	16.405	-5.725
1090	16.688	-6.127
1090	16.184	-6.371
1095	16.694	-6.121
1095	17.164	-6.721
1095	16.952	-9.661
1095	16.393	-8.99
1095	15.565	-8.401
1095	15.725	-6.573
1095	16.694	-6.121
1100	15.576	-8.43
1100	16.452	-9.005
1100	16.956	-9.658
1100	16.927	-9.836
1100	16.467	-9.836
1100	15.453	-9.717
1100	15.576	-8.43
1105	16.081	-12.268
1105	15.37	-10.948
1105	15.435	-9.732
1105	16.956	-9.821
1105	16.793	-11.852
1105	16.482	-12.105
1105	16.23	-12.105
1105	16.081	-12.268
1110	16.104	-5.442
1110	16.149	-5.345
1110	16.704	-4.994
1110	17.229	-4.397
1110	17.355	-4.481
1110	17.516	-4.922

1110	17.481	-5.308
1110	17.253	-5.71
1110	17.176	-6.072
1110	17.182	-6.327
1110	17.074	-6.464
1110	17.013	-6.485
1110	16.475	-5.809
1110	16.104	-5.442
1115	13.451	-5.608
1115	12.071	-5.665
1115	11.642	-5.799
1115	11.605	-5.73
1115	16.762	-4.404
1115	17.295	-4.376
1115	16.716	-4.999
1115	16.135	-5.332
1115	15.814	-5.976
1115	15.72	-6.017
1115	15.279	-5.528
1115	13.933	-5.528
1115	13.451	-5.608
1120	16.917	-3.109
1120	17.559	-3.273
1120	17.611	-3.785
1120	17.484	-4.945
1120	17.32	-4.333
1120	16.812	-4.408
1120	14.095	-5.14
1120	13.9	-4.632
1120	16.26	-3.631
1120	16.917	-3.109
1125	17.261	-5.703
1125	17.476	-5.342
1125	17.523	-4.427
1125	17.617	-3.979
1125	17.578	-3.304
1125	17.798	-3.351
1125	17.931	-3.531
1125	18.237	-4.325
1125	18.065	-6.296
1125	17.648	-6.466
1125	17.11	-6.466
1125	17.175	-6.349
1125	17.18	-6.073
1125	17.261	-5.703
1130	17.029	-6.506

1130	17.668	-6.28
1130	18.667	-6.357
1130	18.446	-9.909
1130	16.984	-9.846
1130	17.157	-6.732
1130	17.029	-6.506
1133	16.784	-11.82
1133	16.952	-9.845
1133	17.454	-9.895
1133	17.37	-11.201
1133	16.985	-11.706
1133	16.784	-11.82
1135	17.51	-3.255
1135	16.904	-3.101
1135	17.102	-2.616
1135	17.764	-2.374
1135	17.797	-2.803
1135	17.841	-3.344
1135	17.51	-3.255
1140	17.764	-2.34
1140	17.973	-2.495
1140	18.271	-3.344
1140	18.546	-3.685
1140	18.426	-4.029
1140	18.23	-4.316
1140	17.885	-3.366
1140	17.764	-2.34
1145	19.649	-6.445
1145	18.093	-6.299
1145	18.23	-4.33
1145	18.433	-4.036
1145	19.806	-3.734
1145	19.649	-6.445
1150	17.653	-2.385
1150	17.102	-2.572
1150	17.433	-2.076
1150	17.643	-1.935
1150	17.863	-1.922
1150	18.006	-2.484
1150	17.83	-2.363
1150	17.653	-2.385
1155	17.886	-1.879
1155	18.212	-1.931
1155	18.538	-2.113
1155	19.41	-2.308
1155	19.657	-2.53

1155	19.657	-3.012
1155	19.827	-3.272
1155	19.814	-3.715
1155	18.45	-4.022
1155	18.485	-3.624
1155	18.173	-3.064
1155	18.004	-2.491
1155	17.886	-1.879
1160	17.91	-1.905
1160	17.663	-1.939
1160	17.459	-2.032
1160	17.51	-1.7
1160	17.876	-1.598
1160	18.258	-1.913
1160	17.91	-1.905
1165	19.844	-1.776
1165	20.322	-1.765
1165	20.276	-1.526
1165	21.339	-1.591
1165	21.369	-2.169
1165	21.548	-3.284
1165	19.81	-3.689
1165	19.844	-3.324
1165	19.662	-3.074
1165	19.696	-2.607
1165	19.457	-2.334
1165	18.523	-2.118
1165	17.905	-1.588
1165	17.988	-1.9
1165	19.821	-1.514
1165	19.844	-1.776
1170	17.884	-1.598
1170	17.493	-1.666
1170	17.467	-1.136
1170	17.978	-1.386
1170	17.884	-1.598
1175	19.607	-0.514
1175	19.632	-0.529
1175	19.616	-0.389
1175	19.745	-1.95
1175	21.158	-0.077
1175	21.337	-1.589
1175	20.304	-1.534
1175	20.317	-1.783
1175	19.832	-1.801
1175	19.818	-1.506

1175	18.418	-1.438
1175	18.313	-0.664
1175	18.61	-0.65
1175	19.607	-0.514
1180	18.043	-0.762
1180	18.295	-0.661
1180	18.456	-1.365
1180	16.544	-1.311
1180	16.434	-1.054
1180	16.787	-0.953
1180	17.068	-0.953
1180	17.531	-0.742
1180	18.043	-0.762
1185	17.483	-1.722
1185	17.386	-2.134
1185	17.095	-2.558
1185	16.841	-3.079
1185	16.405	-3.503
1185	15.766	-3.799
1185	15.789	-2.97
1185	15.859	-2.776
1185	15.703	-1.903
1185	16.284	-1.638
1185	16.574	-1.335
1185	17.459	-1.371
1185	17.483	-1.722
1190	14.543	-3.616
1190	14.892	-3.2
1190	11.4	-2.942
1190	15.636	-2.976
1190	15.775	-3.804
1190	15.757	-4.614
1190	13.863	-5.095
1190	14.035	-5.319
1190	13.154	-4.378
1190	13.184	-3.975
1190	13.632	-3.616
1190	14.543	-2.813
1195	12.54	-2.643
1195	12.976	-3.128
1195	13.255	-1.911
1195	15.696	-2.772
1195	15.854	-2.96
1195	15.773	-2.922
1195	15.641	-3.176
1195	14.951	-3.54
1195	14.66	

1195	13.715	-3.903
1195	13.109	-4.339
1195	12.479	-3.879
1195	12.637	-3.479
1195	12.54	-2.813
1200	10.585	-3.93
1200	12.497	-2.885
1200	12.631	-3.497
1200	12.482	-3.93
1200	13.184	-4.378
1200	13.139	-5.334
1200	11.287	-5.812
1200	10.585	-3.93
1205	17.507	-0.715
1205	17.037	-0.941
1205	16.41	-1.037
1205	16.284	-0.8
1205	16.297	-0.803
1205	16.097	-0.724
1205	16.081	-0.698
1205	16.013	-0.578
1205	16.993	-0.219
1205	18.19	0.084
1205	19.307	-0.663
1205	18.029	-0.785
1205	17.507	-0.715
1210	18.824	0.295
1210	20.184	1.621
1210	20.898	1.736
1210	21.163	-0.039
1210	19.619	-0.373
1210	19.621	-0.485
1210	18.599	-0.646
1210	18.309	-0.652
1210	18.213	0.076
1210	18.824	0.295
1215	15.58	-1.051
1215	16.072	-0.697
1215	16.237	-0.764
1215	16.36	-0.905
1215	16.557	-1.384
1215	16.273	-1.623
1215	14.972	-2.299
1215	13.298	-3.114
1215	13.455	-2.757
1215	13.432	-2.366

1215	13.778	-1.619
1215	14.035	-1.708
1215	14.102	-1.719
1215	15.106	-1.206
1215	15.58	-1.051
1220	13.767	-1.595
1220	13.403	-2.372
1220	13.45	-2.818
1220	13.297	-3.124
1220	12.862	-2.665
1220	12.239	-2.948
1220	11.874	-3.136
1220	11.26	-1.877
1220	13.203	-1.384
1220	13.767	-1.595
1225	13.189	-1.362
1225	16.008	-0.6
1225	16.087	-0.692
1225	15.936	-0.83
1225	15.647	-1.02
1225	15.114	-1.204
1225	13.932	-1.71
1225	13.603	-1.5
1225	13.189	-1.362

```

[SYMBOLS]
;;Gage      X-Coord      Y-Coord
;;-----

```

Upper Little River Model.

NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.

Analysis Options

Flow Units CMS
Process Models:
Rainfall/Runoff YES
Snowmelt NO
Groundwater NO
Flow Routing YES
Ponding Allowed YES
Water Quality NO
Infiltration Method GREEN AMPPT
Flow Routing Method DYNWAVE
Starting Date DEC-14-2011 00:00:00
Ending Date DEC-17-2011 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:05:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00
Routing Time Step 30.00 sec

WARNING 04: minimum elevation drop used for Conduit C1
WARNING 04: minimum elevation drop used for Conduit C10
WARNING 04: minimum elevation drop used for Conduit C11
WARNING 04: minimum elevation drop used for Conduit C12
WARNING 04: minimum elevation drop used for Conduit C13
WARNING 03: negative offset ignored for Link C14

WARNING 04: minimum elevation drop used for Conduit C14
WARNING 04: minimum elevation drop used for Conduit C16
WARNING 04: minimum elevation drop used for Conduit C17
WARNING 04: minimum elevation drop used for Conduit C18
WARNING 04: minimum elevation drop used for Conduit C19
WARNING 04: minimum elevation drop used for Conduit C2
WARNING 04: minimum elevation drop used for Conduit C20
WARNING 04: minimum elevation drop used for Conduit C21
WARNING 04: minimum elevation drop used for Conduit C23
WARNING 04: minimum elevation drop used for Conduit C28
WARNING 04: minimum elevation drop used for Conduit C4
WARNING 04: minimum elevation drop used for Conduit C5
WARNING 04: minimum elevation drop used for Conduit C6
WARNING 03: negative offset ignored for Link C6025a
WARNING 03: negative offset ignored for Link C6055a
WARNING 03: negative offset ignored for Link C6060k
WARNING 04: minimum elevation drop used for Conduit C6135a
WARNING 03: negative offset ignored for Link C6180a
WARNING 03: negative offset ignored for Link C6220
WARNING 04: minimum elevation drop used for Conduit C7
WARNING 03: negative offset ignored for Link C7025
WARNING 04: minimum elevation drop used for Conduit C7025
WARNING 03: negative offset ignored for Link C7105

WARNING 03: negative offset ignored for Link C7105
WARNING 04: minimum elevation drop used for Conduit C7105
WARNING 04: minimum elevation drop used for Conduit C8
WARNING 04: minimum elevation drop used for Conduit C9
WARNING 04: minimum elevation drop used for Conduit CJ64
WARNING 04: minimum elevation drop used for Conduit CJ66
WARNING 04: minimum elevation drop used for Conduit CJ73
WARNING 04: minimum elevation drop used for Conduit CJ76
WARNING 04: minimum elevation drop used for Conduit CJ80
WARNING 04: minimum elevation drop used for Conduit CJ81
WARNING 04: minimum elevation drop used for Conduit CJ84
WARNING 03: negative offset ignored for Link CJ87
WARNING 03: negative offset ignored for Link CJ88
WARNING 03: negative offset ignored for Link OR1180-1
WARNING 03: negative offset ignored for Link OR1205-1
WARNING 02: maximum depth increased for Node J10
WARNING 02: maximum depth increased for Node J102
WARNING 02: maximum depth increased for Node J12
WARNING 02: maximum depth increased for Node J13
WARNING 02: maximum depth increased for Node J14
WARNING 02: maximum depth increased for Node J15
WARNING 02: maximum depth increased for Node J16
WARNING 02: maximum depth increased for Node J17

WARNING 02: maximum depth increased for Node J18
WARNING 02: maximum depth increased for Node J19
WARNING 02: maximum depth increased for Node J2
WARNING 02: maximum depth increased for Node J20
WARNING 02: maximum depth increased for Node J21
WARNING 02: maximum depth increased for Node J22
WARNING 02: maximum depth increased for Node J23
WARNING 02: maximum depth increased for Node J24
WARNING 02: maximum depth increased for Node J26
WARNING 02: maximum depth increased for Node J3
WARNING 02: maximum depth increased for Node J33
WARNING 02: maximum depth increased for Node J37500
WARNING 02: maximum depth increased for Node J38
WARNING 02: maximum depth increased for Node J40
WARNING 02: maximum depth increased for Node J40323
WARNING 02: maximum depth increased for Node J41
WARNING 02: maximum depth increased for Node J41106
WARNING 02: maximum depth increased for Node J48
WARNING 02: maximum depth increased for Node J49
WARNING 02: maximum depth increased for Node J5
WARNING 02: maximum depth increased for Node J5015
WARNING 02: maximum depth increased for Node J5025
WARNING 02: maximum depth increased for Node J5030

WARNING 02: maximum depth increased for Node J5045
 WARNING 02: maximum depth increased for Node J5065
 WARNING 02: maximum depth increased for Node J5080
 WARNING 02: maximum depth increased for Node J5090
 WARNING 02: maximum depth increased for Node J5110
 WARNING 02: maximum depth increased for Node J5150
 WARNING 02: maximum depth increased for Node J5180
 WARNING 02: maximum depth increased for Node J5190
 WARNING 02: maximum depth increased for Node J53
 WARNING 02: maximum depth increased for Node J56
 WARNING 02: maximum depth increased for Node J58
 WARNING 02: maximum depth increased for Node J58.5
 WARNING 02: maximum depth increased for Node J67
 WARNING 02: maximum depth increased for Node J69
 WARNING 02: maximum depth increased for Node J7
 WARNING 02: maximum depth increased for Node J71
 WARNING 02: maximum depth increased for Node J72
 WARNING 02: maximum depth increased for Node J73
 WARNING 02: maximum depth increased for Node J75
 WARNING 02: maximum depth increased for Node J76
 WARNING 02: maximum depth increased for Node J8
 WARNING 02: maximum depth increased for Node J80
 WARNING 02: maximum depth increased for Node J81

Storage Losses 0.000 0.000
 Initial Stored Volume 0.000 0.001
 Final Stored Volume 0.648 6.479
 Continuity Error (%) 0.228

 Highest Continuity Errors

 Node J5190 (20.78%)
 Node J102 (5.64%)
 Node J29 (4.81%)
 Node J103 (-4.30%)
 Node J58.5 (-3.99%)

 Time-Step Critical Elements

 Link C12 (38.45%)
 Link C18 (34.36%)
 Link C17 (9.09%)
 Link C20 (7.09%)
 Link C1 (3.12%)

 Highest Flow Instability Indexes

 Link CJ64 (8)
 Link CJ66 (6)
 Link C7025 (5)
 Link CJ65 (4)
 Link C8 (4)

 Routing Time Step Summary

 Minimum Time Step : 0.50 sec
 Average Time Step : 2.64 sec
 Maximum Time Step : 30.00 sec
 Percent in Steady State : 0.00
 Average Iterations per Step : 2.28

WARNING 02: maximum depth increased for Node J84
 WARNING 02: maximum depth increased for Node J85
 WARNING 02: maximum depth increased for Node J86
 WARNING 02: maximum depth increased for Node J87
 WARNING 02: maximum depth increased for Node J88
 WARNING 02: maximum depth increased for Node J89
 WARNING 02: maximum depth increased for Node J9
 WARNING 02: maximum depth increased for Node J90

 Rainfall File Summary

Station ID	First Date	Last Date	Recording Frequency	Periods w/Precip	Periods Missing	Periods Malfunc.
6139525	APR-02-1960	OCT-31-2007	60 min	19633	4280	0

	Volume hectare-m	Depth mm
Runoff Quantity Continuity	-----	-----
Total Precipitation	485.751	108.167
Evaporation Loss	0.000	0.000
Infiltration Loss	169.983	37.852
Surface Runoff	314.985	70.141
Final Surface Storage	1.055	0.235
Continuity Error (%)	-0.056	

	Volume hectare-m	Volume 10^6 ltr
Flow Routing Continuity	-----	-----
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	314.985	3149.884
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	313.621	3136.238
Internal Outflow	0.000	0.000

 Subcatchment Runoff Summary

Subcatchment	Total Precip mm	Total Runoff mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
1000	108.17	0.00	0.00	10.02	97.43	93.95	14.22	0.901
1002	108.17	0.00	0.00	23.53	84.19	133.37	17.76	0.778
1005	108.17	0.00	0.00	9.05	98.53	50.80	12.26	0.911
1007	108.17	0.00	0.00	21.36	86.40	18.18	3.09	0.799
1010	108.17	0.00	0.00	20.03	87.77	33.73	6.77	0.811
1015	108.17	0.00	0.00	18.15	89.74	12.87	3.46	0.830
1020	108.17	0.00	0.00	45.09	63.06	58.61	3.29	0.583
1025	108.17	0.00	0.00	32.00	76.02	10.58	1.63	0.703
1027	108.17	0.00	0.00	3.52	103.84	58.68	11.32	0.960
1030	108.17	0.00	0.00	8.94	98.67	32.97	8.60	0.912
1035	108.17	0.00	0.00	44.53	63.63	66.96	3.80	0.588
1040	108.17	0.00	0.00	3.50	103.89	28.41	5.94	0.960
1045	108.17	0.00	0.00	42.09	66.07	17.66	1.07	0.611
1050	108.17	0.00	0.00	42.59	65.53	80.34	6.89	0.606
1055	108.17	0.00	0.00	43.66	64.50	20.62	1.19	0.596
1060	108.17	0.00	0.00	46.63	61.52	70.96	3.88	0.569
1065	108.17	0.00	0.00	33.84	74.23	21.55	3.02	0.686
1070	108.17	0.00	0.00	51.40	49.92	49.92	2.60	0.525
1072	108.17	0.00	0.00	3.56	103.76	55.59	9.55	0.959
1075	108.17	0.00	0.00	40.21	67.95	26.20	1.71	0.628
1080	108.17	0.00	0.00	48.27	59.84	167.22	13.28	0.553
1085	108.17	0.00	0.00	49.05	59.10	79.77	4.23	0.546
1090	108.17	0.00	0.00	41.46	66.69	16.53	1.02	0.617
1095	108.17	0.00	0.00	49.65	58.50	94.29	4.97	0.541
1100	108.17	0.00	0.00	49.01	59.14	31.82	1.69	0.547
1105	108.17	0.00	0.00	38.10	69.89	96.56	11.65	0.646
1110	108.17	0.00	0.00	44.70	63.45	37.77	2.14	0.587
1115	108.17	0.00	0.00	38.26	69.87	79.47	7.49	0.646
1120	108.17	0.00	0.00	44.25	63.90	90.74	5.18	0.591
1125	108.17	0.00	0.00	44.48	63.67	55.59	3.16	0.589
1130	108.17	0.00	0.00	50.61	57.53	130.34	6.82	0.532
1133	108.17	0.00	0.00	40.26	67.89	23.99	1.56	0.628
1135	108.17	0.00	0.00	42.87	65.28	15.94	0.94	0.604
1140	108.17	0.00	0.00	29.13	78.93	20.36	3.60	0.730
1145	108.17	0.00	0.00	47.87	60.24	97.52	7.78	0.557
1150	108.17	0.00	0.00	31.71	76.32	10.10	1.57	0.706
1155	108.17	0.00	0.00	46.85	61.30	67.73	3.69	0.567

1160	108.17	0.00	0.00	41.04	67.12	5.26	0.33	0.620
1165	108.17	0.00	0.00	47.53	60.62	114.21	6.16	0.560
1170	108.17	0.00	0.00	37.59	70.58	3.28	0.25	0.652
1175	108.17	0.00	0.00	43.70	64.43	93.40	7.87	0.596
1180	108.17	0.00	0.00	10.76	96.62	42.32	5.28	0.893
1185	108.17	0.00	0.00	37.67	70.31	92.43	11.34	0.650
1190	108.17	0.00	0.00	43.77	64.39	69.44	4.01	0.595
1195	108.17	0.00	0.00	45.45	62.70	92.67	5.16	0.580
1200	108.17	0.00	0.00	24.73	82.96	164.70	19.79	0.767
1205	108.17	0.00	0.00	10.80	96.57	57.53	7.11	0.893
1210	108.17	0.00	0.00	38.77	69.26	112.10	13.47	0.640
1215	108.17	0.00	0.00	36.85	71.20	91.08	11.60	0.658
1220	108.17	0.00	0.00	10.78	96.60	113.69	14.14	0.893
1225	108.17	0.00	0.00	8.71	98.98	40.10	12.71	0.915

Node Depth Summary

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min
J0.5	JUNCTION	1.93	2.80	180.70	0 18:12
J0.75	JUNCTION	1.84	3.39	181.79	0 08:30
J0.8	JUNCTION	2.05	3.49	181.59	0 17:25
J0.9	JUNCTION	1.61	3.00	181.60	0 17:25
J1	JUNCTION	1.71	1.85	186.85	0 08:23
J10	JUNCTION	1.96	3.34	182.16	0 15:49
J102	JUNCTION	0.88	1.79	182.52	0 14:07
J103	JUNCTION	0.81	1.67	183.61	0 10:03
J105	JUNCTION	0.59	1.45	183.65	0 09:57
J106	JUNCTION	0.34	1.12	183.93	0 09:33
J107	JUNCTION	0.32	1.19	185.38	0 08:45
J11	JUNCTION	0.32	1.23	185.43	0 08:45
J12	JUNCTION	1.91	3.42	182.52	0 15:33
J13	JUNCTION	2.61	3.69	186.69	0 09:12
J14	JUNCTION	1.80	3.36	183.42	0 14:56
J15	JUNCTION	1.75	3.36	183.54	0 14:44
J16	JUNCTION	1.75	3.24	183.75	0 14:06
J17	JUNCTION	2.28	3.60	180.81	0 18:08
J18	JUNCTION	1.27	2.67	184.30	0 13:44
J19	JUNCTION	0.83	1.59	184.79	0 13:11
J2	JUNCTION	2.27	3.73	181.59	0 17:25

J20	JUNCTION	1.38	2.75	186.75	0 10:10
J21	JUNCTION	1.66	3.12	182.87	0 15:29
J22	JUNCTION	1.88	3.35	182.45	0 15:35
J23	JUNCTION	1.94	3.30	181.98	0 16:03
J24	JUNCTION	2.29	3.78	181.64	0 17:21
J25	JUNCTION	0.29	2.51	189.66	0 08:20
J26	JUNCTION	1.43	2.87	183.79	0 13:58
J27	JUNCTION	2.51	3.83	180.93	0 18:06
J28	JUNCTION	1.38	3.07	185.27	0 12:59
J29	JUNCTION	1.10	3.05	189.65	0 09:15
J3	JUNCTION	0.56	2.71	183.66	0 08:44
J30	JUNCTION	0.72	1.87	184.37	0 10:34
J31	JUNCTION	0.61	1.80	184.60	0 14:40
J32	JUNCTION	1.49	3.09	185.31	0 13:02
J33	JUNCTION	1.04	2.58	185.32	0 13:04
J34	JUNCTION	0.97	2.08	185.57	0 13:11
J35	JUNCTION	0.97	2.01	185.82	0 12:29
J36	JUNCTION	0.97	1.87	186.06	0 12:15
J37	JUNCTION	0.97	2.07	186.36	0 12:07
J37500	JUNCTION	2.32	3.52	180.32	0 18:27
J38	JUNCTION	1.00	2.15	186.60	0 11:55
J39	JUNCTION	1.14	2.26	186.79	0 11:27
J39001	JUNCTION	2.32	3.58	180.48	0 18:24
J4	JUNCTION	2.14	3.60	181.70	0 17:09
J4.5	JUNCTION	1.62	3.01	181.71	0 17:06
J40	JUNCTION	1.26	2.37	187.01	0 09:30
J40323	JUNCTION	2.33	3.59	180.59	0 18:19
J41	JUNCTION	1.10	2.23	187.07	0 09:30
J41106	JUNCTION	2.30	3.56	180.66	0 18:15
J42	JUNCTION	0.55	1.74	184.74	0 14:23
J43	JUNCTION	1.11	2.25	187.15	0 09:29
J43501	JUNCTION	2.65	3.98	180.88	0 18:07
J44	JUNCTION	0.52	1.71	184.81	0 14:13
J45	JUNCTION	0.40	1.39	184.89	0 13:57
J46	JUNCTION	1.00	2.57	189.29	0 09:08
J46102	JUNCTION	2.52	3.87	180.97	0 18:05
J46203	JUNCTION	2.17	3.57	181.27	0 17:39
J47	JUNCTION	1.59	3.32	184.54	0 13:26
J48	JUNCTION	1.59	3.31	184.74	0 13:20
J49	JUNCTION	1.59	3.34	185.03	0 13:07
J5	JUNCTION	2.36	3.61	180.41	0 18:26
J50	JUNCTION	0.43	1.45	184.95	0 13:35
J5015	JUNCTION	0.74	2.30	188.85	0 09:39
J5025	JUNCTION	1.41	4.98	195.31	0 08:35
J5030	JUNCTION	0.93	2.67	187.47	0 10:25
J5045	JUNCTION	1.11	2.72	186.97	0 12:01

J5055	JUNCTION	1.44	3.10	185.30	0 12:58
J5060	JUNCTION	1.12	2.25	187.10	0 09:30
J5065	JUNCTION	0.29	2.05	189.65	0 08:44
J5075	JUNCTION	1.06	2.20	187.78	0 09:05
J5080	JUNCTION	0.95	2.33	188.83	0 08:45
J5090	JUNCTION	1.51	3.21	184.13	0 13:33
J51	JUNCTION	1.81	2.72	185.92	0 12:30
J5100	JUNCTION	0.81	3.76	188.76	0 08:10
J5110	JUNCTION	1.75	3.45	183.20	0 15:27
J5120	JUNCTION	2.16	3.58	182.25	0 15:45
J5135	JUNCTION	1.79	3.10	181.90	0 16:11
J5150	JUNCTION	2.08	3.47	181.73	0 17:01
J5160	JUNCTION	2.24	3.70	181.70	0 17:10
J5180	JUNCTION	2.23	3.49	180.70	0 18:12
J5190	JUNCTION	2.88	3.20	182.14	0 15:41
J53	JUNCTION	0.88	2.42	186.97	0 12:02
J53.5	JUNCTION	0.06	0.14	186.98	0 12:07
J55	JUNCTION	1.23	2.97	187.47	0 10:25
J55.5	JUNCTION	0.32	1.58	188.68	0 08:33
J56	JUNCTION	1.00	2.64	188.73	0 09:44
J58	JUNCTION	0.28	1.29	188.99	0 09:20
J58.5	JUNCTION	0.31	1.41	189.61	0 08:38
J58.7	JUNCTION	1.52	7.57	197.84	0 08:20
J6	JUNCTION	0.67	2.48	189.66	0 09:24
J62	JUNCTION	0.96	2.08	187.10	0 09:30
J63	JUNCTION	0.94	2.00	187.10	0 10:07
J64	JUNCTION	1.04	2.49	187.59	0 09:31
J65	JUNCTION	0.96	2.20	187.60	0 10:16
J66	JUNCTION	1.10	4.57	189.97	0 10:16
J67	JUNCTION	0.47	1.95	188.15	0 10:26
J68	JUNCTION	0.95	2.37	188.17	0 10:27
J69	JUNCTION	1.43	2.25	188.35	0 10:16
J7	JUNCTION	1.72	2.99	181.79	0 16:37
J70	JUNCTION	1.33	2.16	188.36	0 11:17
J71	JUNCTION	1.23	2.07	188.37	0 10:17
J72	JUNCTION	0.94	1.78	188.38	0 09:15
J73	JUNCTION	0.94	1.79	188.39	0 09:15
J74	JUNCTION	0.69	2.64	189.64	0 08:44
J75	JUNCTION	0.18	1.95	189.65	0 08:44
J76	JUNCTION	0.19	1.95	189.65	0 08:44
J8	JUNCTION	2.84	3.82	183.37	0 09:33
J80	JUNCTION	1.00	2.40	188.90	0 08:43
J81	JUNCTION	1.07	2.49	188.99	0 08:41
J84	JUNCTION	1.09	2.50	189.00	0 08:40
J85	JUNCTION	1.03	2.41	189.01	0 08:39
J86	JUNCTION	0.99	2.26	189.26	0 08:26

J87	JUNCTION	1.39	2.79	189.58	0 08:23
J88	JUNCTION	0.77	2.19	189.74	0 08:22
J89	JUNCTION	0.94	2.47	190.03	0 08:11
J9	JUNCTION	1.97	3.33	182.01	0 16:00
J90	JUNCTION	0.76	2.31	190.09	0 08:10
J5205	OUTFALL	2.31	3.52	180.22	0 18:27
S5180	STORAGE	1.37	2.56	181.28	0 17:45
S5205	STORAGE	1.78	2.99	180.89	0 18:14

Node Inflow Summary

Node	Type	Maximum		Time of Max days hr:min	Lateral		Total Volume
		Lateral Inflow CMS	Total Inflow CMS		Inflow 10 ⁶ ltr	Total Inflow 10 ⁶ ltr	
J0.5	JUNCTION	0.000	6.809	0 09:00	0.000	112.419	
J0.75	JUNCTION	13.471	13.471	0 08:10	112.101	112.097	
J0.8	JUNCTION	0.000	6.841	0 08:13	0.000	94.419	
J0.9	JUNCTION	7.874	7.874	0 08:10	93.400	93.398	
J1	JUNCTION	0.000	11.645	0 08:10	0.000	96.562	
J10	JUNCTION	0.000	43.512	0 15:33	0.000	1834.770	
J102	JUNCTION	0.000	4.925	0 10:55	0.000	161.007	
J103	JUNCTION	6.818	6.818	0 08:10	130.337	156.424	
J105	JUNCTION	0.000	1.918	0 08:10	0.000	26.717	
J106	JUNCTION	0.000	1.367	0 08:31	0.000	24.890	
J107	JUNCTION	0.000	1.546	0 08:10	0.000	23.987	
J11	JUNCTION	1.561	1.561	0 08:10	23.987	23.987	
J12	JUNCTION	5.181	40.111	0 15:24	90.743	1627.994	
J13	JUNCTION	19.786	19.786	0 08:20	164.702	164.696	
J14	JUNCTION	0.000	39.937	0 13:57	0.000	1300.558	
J15	JUNCTION	0.000	34.463	0 13:50	0.000	1303.762	
J16	JUNCTION	0.000	34.653	0 13:26	0.000	1300.589	
J17	JUNCTION	24.299	50.618	0 17:50	131.184	3033.369	
J18	JUNCTION	0.000	9.047	0 10:22	0.000	334.362	
J19	JUNCTION	0.000	9.049	0 10:13	0.000	333.692	
J20	JUNCTION	0.000	45.428	0 16:45	0.000	2261.941	
J22	JUNCTION	1.688	12.624	0 08:32	31.823	333.641	
J21	JUNCTION	0.000	38.930	0 15:26	0.000	1537.103	
J221	JUNCTION	0.000	40.093	0 15:26	0.000	1627.783	
J23	JUNCTION	3.597	45.046	0 15:33	20.357	1964.707	
J24	JUNCTION	0.252	45.405	0 16:08	3.282	2170.300	

J25	JUNCTION	5.937	5.937	0	08:10	28.415	28.413
J26	JUNCTION	0.000	34.713	0	13:19	0.000	1300.287
J27	JUNCTION	0.000	49.074	0	17:59	0.000	2726.468
J28	JUNCTION	0.000	24.444	0	12:42	0.000	856.043
J29	JUNCTION	31.636	38.724	0	08:17	227.330	286.186
J3	JUNCTION	14.135	14.135	0	08:20	113.691	113.687
J30	JUNCTION	7.486	7.486	0	08:10	79.477	194.004
J31	JUNCTION	0.000	4.246	0	14:05	0.000	116.185
J32	JUNCTION	0.000	5.736	0	14:05	0.000	195.275
J33	JUNCTION	0.000	5.361	0	13:28	0.000	192.820
J34	JUNCTION	0.000	5.441	0	12:13	0.000	190.860
J35	JUNCTION	0.000	5.449	0	12:09	0.000	190.495
J36	JUNCTION	0.000	5.451	0	12:05	0.000	190.510
J37	JUNCTION	0.000	5.465	0	11:05	0.000	190.508
J37500	JUNCTION	0.000	51.353	0	18:21	0.000	3136.391
J38	JUNCTION	0.000	5.512	0	11:01	0.000	190.500
J39	JUNCTION	0.000	6.093	0	10:24	0.000	191.390
J39001	JUNCTION	0.000	51.414	0	18:01	0.000	3136.606
J4	JUNCTION	0.000	5.256	0	08:13	0.000	114.404
J4.5	JUNCTION	6.162	6.162	0	08:10	114.214	114.213
J40	JUNCTION	0.000	11.735	0	09:13	0.000	395.836
J40323	JUNCTION	0.000	51.445	0	17:54	0.000	3136.652
J41	JUNCTION	0.000	12.111	0	09:11	0.000	395.801
J41106	JUNCTION	0.000	51.480	0	17:47	0.000	3136.703
J42	JUNCTION	0.000	4.266	0	13:53	0.000	114.191
J43	JUNCTION	0.000	9.611	0	09:09	0.000	273.237
J43501	JUNCTION	0.000	49.301	0	18:01	0.000	2796.503
J44	JUNCTION	0.000	4.312	0	13:29	0.000	114.226
J45	JUNCTION	0.000	4.449	0	12:40	0.000	114.275
J46	JUNCTION	0.000	8.858	0	08:41	79.000	247.154
J46102	JUNCTION	11.338	49.521	0	17:05	92.429	2674.169
J46203	JUNCTION	0.000	45.407	0	17:09	0.000	2306.298
J47	JUNCTION	0.000	24.318	0	12:59	0.000	856.148
J48	JUNCTION	0.000	24.428	0	12:45	0.000	856.062
J49	JUNCTION	0.000	24.440	0	12:43	0.000	856.036
J5	JUNCTION	0.000	51.372	0	18:12	0.000	3136.498
J50	JUNCTION	0.000	4.469	0	12:33	0.000	114.022
J5015	JUNCTION	3.459	27.441	0	08:29	12.870	464.562
J5025	JUNCTION	0.000	12.947	0	08:10	0.000	69.260
J5030	JUNCTION	8.603	28.946	0	13:20	32.969	600.506
J5045	JUNCTION	1.070	29.638	0	10:15	17.661	720.672
J5055	JUNCTION	5.071	28.920	0	12:39	91.585	973.199
J5060	JUNCTION	3.020	12.585	0	09:10	21.550	395.852
J5065	JUNCTION	0.000	0.080	0	08:44	0.000	0.061
J5075	JUNCTION	1.710	9.606	0	09:00	26.196	273.099
J5080	JUNCTION	0.000	9.112	0	08:33	0.000	246.923

J5090	JUNCTION	5.996	34.721	0	13:17	110.821	1300.332
J51	JUNCTION	0.000	22.335	0	11:54	0.000	692.293
J5100	JUNCTION	11.646	11.646	0	08:10	96.565	96.561
J5110	JUNCTION	2.136	39.810	0	14:46	37.775	1538.577
J5120	JUNCTION	3.157	43.713	0	15:20	55.591	1835.424
J5135	JUNCTION	1.574	45.095	0	15:34	10.105	1974.841
J5150	JUNCTION	3.698	45.869	0	15:33	67.729	2042.758
J5160	JUNCTION	0.331	46.534	0	15:37	5.255	2163.156
J5180	JUNCTION	0.000	51.500	0	17:43	0.000	3136.706
J5190	JUNCTION	9.173	14.064	0	08:10	162.108	340.171
J53	JUNCTION	6.889	7.951	0	08:59	80.344	104.771
J53.5	JUNCTION	0.000	0.156	0	11:07	0.000	0.399
J55	JUNCTION	2.800	9.951	0	08:21	66.957	101.965
J55.5	JUNCTION	0.000	5.937	0	08:10	0.000	28.415
J56	JUNCTION	0.000	24.826	0	09:16	0.000	463.067
J58	JUNCTION	3.288	15.161	0	08:51	58.612	184.535
J58.5	JUNCTION	9.855	15.130	0	08:20	51.912	121.095
J58.7	JUNCTION	12.948	12.948	0	08:10	69.266	69.265
J6	JUNCTION	12.262	12.262	0	08:10	50.799	52.533
J62	JUNCTION	0.000	4.977	0	12:50	0.000	101.163
J63	JUNCTION	0.000	6.982	0	12:24	0.000	100.558
J64	JUNCTION	0.000	5.464	0	09:17	0.000	102.775
J65	JUNCTION	0.000	17.572	0	10:03	0.000	104.606
J66	JUNCTION	0.000	13.937	0	10:28	0.000	105.429
J67	JUNCTION	0.000	5.903	0	09:21	0.000	105.416
J68	JUNCTION	0.000	6.039	0	09:19	0.000	105.625
J69	JUNCTION	0.000	6.069	0	09:09	0.000	105.698
J7	JUNCTION	0.000	45.064	0	15:36	0.000	1974.773
J70	JUNCTION	0.000	6.615	0	08:47	0.000	101.876
J71	JUNCTION	0.000	6.760	0	08:47	0.000	106.015
J72	JUNCTION	2.596	6.786	0	08:47	49.923	106.116
J73	JUNCTION	0.000	5.929	0	08:45	0.000	56.791
J74	JUNCTION	9.550	9.650	0	08:19	55.590	56.133
J75	JUNCTION	0.000	0.544	0	08:43	0.000	0.813
J76	JUNCTION	0.000	0.193	0	08:04	0.000	0.328
J8	JUNCTION	7.780	7.780	0	08:10	97.525	97.523
J80	JUNCTION	0.000	9.187	0	08:31	0.000	246.930
J81	JUNCTION	4.231	9.486	0	08:28	79.775	246.932
J84	JUNCTION	0.000	7.459	0	08:27	0.000	167.161
J85	JUNCTION	0.000	8.082	0	08:26	0.000	167.266
J86	JUNCTION	0.000	8.218	0	08:23	0.000	167.157
J87	JUNCTION	0.000	11.714	0	08:11	0.000	167.235
J88	JUNCTION	0.000	12.365	0	08:11	0.000	167.252
J89	JUNCTION	0.000	13.253	0	08:10	0.000	167.220
J9	JUNCTION	0.942	43.665	0	15:36	15.936	1851.098
J90	JUNCTION	13.274	13.274	0	08:10	167.222	167.218

J5205	OUTFALL	0.000	51.349	0	18:27	0.000	3136.224
S5180	STORAGE	5.282	5.282	0	08:20	42.319	42.340
S5205	STORAGE	7.107	8.687	0	08:20	57.529	64.900

Node Surcharge Summary

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J0.75	JUNCTION	0.81	0.195	0.205
J0.8	JUNCTION	9.16	0.295	0.105
J25	JUNCTION	1.25	1.287	0.000
J29	JUNCTION	2.40	0.316	1.950
J4	JUNCTION	1.02	0.003	0.000
J50	JUNCTION	4.03	0.053	0.547
J5045	JUNCTION	0.71	0.018	0.000
J5100	JUNCTION	5.94	2.235	0.000
J53	JUNCTION	3.73	0.251	0.000
J55	JUNCTION	4.58	0.374	0.000
J56	JUNCTION	0.82	0.035	0.000
J58.7	JUNCTION	12.25	5.990	0.000
J64	JUNCTION	3.48	0.394	0.000
J65	JUNCTION	2.59	0.003	0.000
J66	JUNCTION	2.74	2.372	0.000
J68	JUNCTION	1.97	0.271	0.000
J74	JUNCTION	0.88	0.443	0.000
J87	JUNCTION	0.91	0.283	0.000
S5180	STORAGE	19.40	1.580	2.420
S5205	STORAGE	22.84	1.994	2.006

Node Flooding Summary

No nodes were flooded.

Storage Volume Summary

Storage Unit	Average Volume 1000 m3	Avg Pcnt	E&I Pcnt	Maximum Volume 1000 m3	Max Pcnt	Time of Max Occurrence days hr:min	Maximum Outflow CMS
S5180	13.660	27	0	25.802	52	0 17:45	0.798
S5205	26.652	36	0	44.914	60	0 18:14	1.173

Outfall Loading Summary

Outfall Node	Flow Pcnt.	Avg. Flow CMS	Max. Flow CMS	Total Flow Volume 10^6 ltr
J5205	99.47	25.064	51.349	3136.224
System	99.47	25.064	51.349	3136.224

Link Flow Summary

Link	Type	Maximum Flow CMS	Time of Max Occurrence days hr:min	Maximum Veloc m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	51.353	0 18:21	1.07	3.22	1.00
C10	CONDUIT	33.462	0 11:08	1.22	3.86	1.00
C11	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C12	CONDUIT	44.556	0 16:45	0.81	1.69	1.00
C13	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C14	CHANNEL	8.459	0 08:17	0.86	24.10	0.93
C15	CHANNEL	6.310	0 09:23	0.46	0.50	0.85
C16	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C17	CONDUIT	34.713	0 13:19	2.07	5.87	1.00
C18	CONDUIT	43.453	0 14:56	0.72	1.65	1.00
C19	CHANNEL	6.709	0 18:05	0.65	4.36	0.73
C2	CHANNEL	2.846	0 15:27	0.38	0.03	0.10

C20	CONDUIT	13.511	0	08:40	2.14	8.03	1.00		
C21	CHANNEL	20.590	0	12:42	0.86	5.41	1.00		
C22	CHANNEL	6.664	0	11:41	0.82	0.83	0.97		
C23	CHANNEL	4.449	0	12:40	0.56	14.12	1.00		
C24	CHANNEL	4.266	0	13:53	0.42	0.45	0.91		
C25	CHANNEL	4.210	0	14:46	0.50	0.64	0.95		
C26	CHANNEL	4.246	0	14:05	0.41	0.60	0.93		
C27	CHANNEL	4.312	0	13:29	0.51	0.46	1.00		
C28	CONDUIT	4.469	0	12:33	2.07	8.60	1.00		
C3	CHANNEL	5.711	0	13:39	0.54	0.12	1.00		
C4	CONDUIT	50.605	0	17:53	1.16	3.22	0.68		
C5	CHANNEL	7.013	0	15:34	0.38	0.00	0.04		
C6	CONDUIT	36.402	0	14:10	2.05	6.95	1.00		
C6000	CHANNEL	14.292	0	08:38	1.12	2.49	0.92		
C6007	CHANNEL	7.308	0	08:24	0.46	0.41	0.95		
C6015a	CHANNEL	24.826	0	09:16	0.78	0.51	1.00		
C6015b	CHANNEL	23.696	0	09:27	1.40	1.00	1.00		
C6025a	CHANNEL	9.057	0	08:36	1.25	0.35	0.62		
C6025b	CHANNEL	12.981	0	08:52	0.86	1.04	0.99		
C6025c	CHANNEL	13.237	0	09:13	0.94	0.37	1.00		
C6030	CHANNEL	26.016	0	10:09	1.06	1.00	0.98		
C6040	CHANNEL	3.802	0	08:33	0.45	0.27	0.80		
C6045a	CHANNEL	22.335	0	11:54	1.12	1.00	1.00		
C6045b	CHANNEL	21.971	0	12:22	1.50	0.45	0.86		
C6055a	CHANNEL	24.440	0	12:43	1.17	0.36	0.84		
C6055b	CHANNEL	24.428	0	12:45	1.05	0.73	0.93		
C6055c	CHANNEL	24.318	0	12:59	1.01	0.97	1.00		
C6055d	CHANNEL	24.247	0	13:21	1.15	0.81	0.91		
C6060a	CHANNEL	12.711	0	09:11	0.91	1.82	0.98		
C6060b	CHANNEL	11.735	0	09:13	0.94	0.54	0.99		
C6060c	CHANNEL	6.093	0	10:24	0.75	1.34	1.00		
C6060d	CHANNEL	5.512	0	11:01	0.78	0.85	0.89		
C6060e	CHANNEL	5.465	0	11:05	0.80	0.67	0.92		
C6060f	CHANNEL	5.451	0	12:05	0.76	0.95	0.92		
C6060g	CHANNEL	5.449	0	12:09	0.70	0.42	0.84		
C6060h	CHANNEL	5.441	0	12:13	0.63	0.54	0.93		
C6060i	CHANNEL	5.361	0	13:28	0.51	0.42	0.95		
C6060j	CHANNEL	5.736	0	14:05	0.28	0.08	0.90		
C6060k	CHANNEL	5.796	0	14:11	0.55	0.57	0.94		
C6075a	CHANNEL	9.611	0	09:09	0.87	0.67	0.52		
C6075b	CHANNEL	5.903	0	09:26	0.95	0.78	0.97		
C6080	CHANNEL	8.858	0	08:41	0.91	0.58	0.90		
C6090a	CHANNEL	34.653	0	13:26	0.38	0.07	0.75		
C6090b	CHANNEL	34.463	0	13:50	0.94	0.10	0.77		
C6090c	CHANNEL	33.937	0	13:57	0.93	0.12	0.79		
C6090d	CHANNEL	33.697	0	14:52	0.97	0.11	0.80		

C6100a	CHANNEL	9.049	0	10:13	1.23	0.74	0.82		
C6100b	CHANNEL	9.047	0	10:22	0.76	0.36	0.86		
C6100c	CHANNEL	8.570	0	13:59	0.57	0.24	0.75		
C6110a	CHANNEL	38.926	0	15:28	0.85	0.03	0.63		
C6110b	CHANNEL	40.085	0	15:27	0.78	0.03	0.67		
C6120a	CHANNEL	43.512	0	15:33	0.48	0.37	0.69		
C6120b	CHANNEL	43.472	0	15:39	0.78	0.29	0.62		
C6120c	CHANNEL	45.008	0	15:35	0.69	0.37	0.69		
C6130b	CHANNEL	4.925	0	10:55	0.80	0.83	0.98		
C6130c	CHANNEL	3.461	0	09:45	0.46	0.23	0.83		
C6133a	CHANNEL	1.342	0	09:02	0.52	0.28	0.65		
C6133b	CHANNEL	1.210	0	09:32	0.36	0.25	0.75		
C6133c	CHANNEL	1.918	0	08:10	0.65	0.38	0.92		
C6135a	CHANNEL	45.064	0	15:36	0.76	8.07	0.66		
C6135b	CHANNEL	44.964	0	15:37	0.98	0.02	0.52		
C6145	CHANNEL	2.865	0	10:27	0.70	0.49	0.74		
C6150	CHANNEL	45.448	0	15:39	0.73	0.04	0.58		
C6160a	CHANNEL	45.381	0	16:08	0.74	0.04	0.62		
C6160b	CHANNEL	45.236	0	17:08	0.46	1.15	0.91		
C6170e	CHANNEL	45.361	0	17:16	0.45	0.61	0.93		
C6170f	CHANNEL	49.071	0	18:01	0.64	0.47	0.98		
C6170l	CHANNEL	49.298	0	18:04	0.49	0.44	0.95		
C6180a	CHANNEL	51.480	0	17:47	0.61	0.07	0.67		
C6180b	CHANNEL	51.445	0	17:54	1.08	0.02	0.45		
C6180c	CHANNEL	51.414	0	18:01	0.87	0.12	0.70		
C6180d	CHANNEL	51.372	0	18:12	0.67	0.11	0.70		
C6180e	CHANNEL	51.349	0	18:27	0.78	0.03	0.56		
C6190	CHANNEL	3.476	0	14:52	0.55	0.83	1.00		
C6200	CHANNEL	7.959	0	09:12	0.80	0.96	1.00		
C6220	CHANNEL	10.726	0	08:55	0.91	1.09	0.75		
C7	CONDUIT	26.630	0	15:57	>50.00	0.01	0.06		
C7025	CONDUIT	12.947	0	08:10	5.60	50.50	1.00		
C7040	CONDUIT	5.937	0	08:10	3.46	3.28	1.00		
C7075	CONDUIT	8.279	0	09:10	2.18	1.03	1.00		
C7105	CONDUIT	11.645	0	08:10	4.19	45.94	1.00		
C7133	CONDUIT	1.546	0	08:10	1.31	1.52	0.80		
C8	CONDUIT	36.245	0	11:36	1.01	2.95	0.97		
C9	CHANNEL	0.000	0	00:00	0.00	0.00	0.00		
CJ0.5	CHANNEL	6.762	0	08:33	2.32	0.18	0.86		
CJ0.75	CHANNEL	6.809	0	09:00	1.15	0.79	0.81		
CJ0.8	CHANNEL	3.822	0	08:23	0.49	0.24	1.00		
CJ0.9	CHANNEL	6.841	0	08:13	0.91	0.28	0.97		
CJ4	CHANNEL	4.637	0	08:14	0.29	0.03	1.00		
CJ4.5	CHANNEL	5.256	0	08:13	0.85	0.56	0.97		
CJ53	CHANNEL	7.396	0	14:40	0.61	0.38	1.00		
CJ53.5	CHANNEL	0.156	0	11:07	0.05	0.01	0.54		

C362	CHANNEL	5.044	0	12:53	0.20	0.27	1.00		
C363	CHANNEL	4.977	0	12:50	0.39	0.62	0.97		
C364	CHANNEL	6.982	0	12:24	0.62	21.79	1.00		
C365	CHANNEL	5.464	0	09:17	0.80	1.02	1.00		
C366	CHANNEL	17.572	0	10:03	0.62	19.20	1.00		
C367	CHANNEL	13.937	0	10:28	0.68	0.67	1.00		
C368	CHANNEL	5.903	0	09:21	0.97	0.27	0.96		
C369	CHANNEL	6.039	0	09:19	0.83	0.27	0.80		
C370	CHANNEL	6.069	0	09:09	0.49	0.45	1.00		
C371	CHANNEL	6.615	0	08:47	0.45	0.33	0.96		
C372	CHANNEL	6.760	0	08:47	0.51	0.17	0.88		
C373	CHANNEL	5.446	0	08:47	0.42	2.38	0.81		
C374	CHANNEL	5.929	0	08:45	1.04	1.31	0.93		
C375	CHANNEL	0.544	0	08:43	0.10	0.01	0.94		
C376	CHANNEL	0.193	0	08:04	0.10	0.23	0.89		
C377	CHANNEL	0.109	0	08:45	0.20	0.00	0.91		
C380	CHANNEL	9.112	0	08:33	1.11	8.79	0.88		
C381	CHANNEL	9.187	0	08:31	1.01	11.34	0.90		
C384	CHANNEL	6.929	0	08:30	0.57	5.98	1.00		
C385	CHANNEL	7.459	0	08:27	0.62	0.35	0.98		
C386	CHANNEL	8.082	0	08:26	1.11	0.47	0.93		
C387	CHANNEL	8.218	0	08:23	0.99	0.87	0.95		
C388	CHANNEL	11.714	0	08:11	1.26	0.51	0.95		
C389	CHANNEL	12.365	0	08:11	1.14	4.15	0.86		
C390	CHANNEL	13.253	0	08:10	1.13	0.33	0.90		
OR1180-1	ORIFICE	0.798	1	02:08			1.00		
OR1205-1	ORIFICE	1.597	0	08:29			1.00		

Flow Classification Summary

Conduit	Adjusted /Actual Length	--- Fraction of Time in Flow Class ---					Avg. Froude Number	Avg. Flow Change		
		Up Dry	Down Dry	Sub Dry	Sup Crit	Up Crit				
C1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.05	0.0002	
C10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.0003	
C11	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	
C12	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.06	0.0002	
C13	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	
C14	1.00	0.00	0.00	0.00	0.58	0.00	0.00	0.42	0.10	0.0005
C15	1.00	0.10	0.01	0.00	0.83	0.00	0.00	0.07	0.12	0.0000
C16	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000

C17	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.13	0.0001
C18	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.02	0.0008
C19	1.00	0.73	0.00	0.00	0.06	0.00	0.00	0.00	0.21	0.17	0.0001
C20	1.00	0.87	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.06	0.0000
C22	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.15	0.0007
C21	1.00	0.76	0.00	0.00	0.20	0.00	0.00	0.05	0.00	0.13	0.0001
C22	1.00	0.00	0.00	0.00	0.27	0.00	0.00	0.00	0.53	0.21	0.0000
C23	1.00	0.05	0.00	0.00	0.95	0.00	0.00	0.00	0.00	0.09	0.0003
C24	1.00	0.05	0.00	0.00	0.95	0.00	0.00	0.00	0.00	0.12	0.0000
C25	1.00	0.00	0.04	0.00	0.96	0.00	0.00	0.00	0.00	0.11	0.0000
C26	1.00	0.04	0.01	0.00	0.95	0.00	0.00	0.00	0.00	0.09	0.0000
C27	1.00	0.05	0.00	0.00	0.95	0.00	0.00	0.00	0.00	0.10	0.0000
C28	1.00	0.05	0.00	0.00	0.47	0.00	0.00	0.48	0.00	0.05	0.0002
C3	1.00	0.00	0.00	0.00	1.00						

C6090a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.09	0.0000
C6090b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.19	0.0000
C6090c	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.22	0.0000
C6090d	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.22	0.0000
C6100a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.28	0.0000
C6100b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.15	0.0000
C6100c	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.17	0.0000
C6110a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.18	0.0000
C6110b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.13	0.0000
C6120a	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.10	0.0000
C6120b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.20	0.0000
C6120c	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.10	0.0000
C6130b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.22	0.0000
C6130c	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.07	0.0000
C6133a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.12	0.0000
C6133b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.08	0.0000
C6133c	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.05	0.0000
C6135a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.12	0.0002
C6135b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.25	0.0000
C6145	1.00	0.00	0.00	0.00	0.44	0.00	0.00	0.55	0.17	0.0000
C6150	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.14	0.0000
C6160a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.13	0.0000
C6160b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.10	0.0000
C6170e	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.08	0.0000
C6170f	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.06	0.0000
C6170i	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.08	0.0000
C6180a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.14	0.0000
C6180b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.23	0.0000
C6180c	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.22	0.0000
C6180d	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.17	0.0000
C6180e	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.19	0.0000
C6190	1.00	0.00	0.00	0.00	0.65	0.00	0.00	0.35	0.17	0.0000
C6200	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.11	0.0000
C6220	1.00	0.00	0.00	0.00	0.78	0.00	0.00	0.22	0.08	0.0000
C7	1.00	0.74	0.00	0.00	0.09	0.00	0.00	0.17	9.52	0.0000
C7025	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0012
C7040	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.08	0.0001
C7075	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.10	0.0000
C7105	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.08	0.0009
C7133	1.00	0.00	0.03	0.00	0.97	0.00	0.00	0.00	0.10	0.0000
C8	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.09	0.0001
C9	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
C30.5	1.00	0.00	0.00	0.00	0.63	0.00	0.00	0.37	0.29	0.0000
C30.75	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.13	0.0000
C30.8	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.02	0.0000
C30.9	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0000

C34	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0000
C34.5	1.00	0.00	0.00	0.00	0.98	0.00	0.00	0.02	0.04	0.0000
C353	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.08	0.0000
C353.5	1.00	0.00	0.13	0.00	0.87	0.00	0.00	0.00	0.01	0.0000
C362	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.05	0.0000
C363	1.00	0.01	0.01	0.00	0.99	0.00	0.00	0.00	0.13	0.0000
C364	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.15	0.3421
C365	1.00	0.02	0.01	0.00	0.98	0.00	0.00	0.00	0.17	0.0001
C366	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.10	0.0863
C367	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.10	0.0004
C368	1.00	0.01	0.01	0.00	0.98	0.00	0.00	0.00	0.19	0.0000
C369	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.11	0.0000
C370	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0000
C371	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.0000
C372	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0000
C373	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0001
C374	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.08	0.0000
C375	1.00	0.00	0.03	0.00	0.97	0.00	0.00	0.00	0.00	0.0000
C376	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.09	0.0003
C377	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.01	0.0000
C380	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.17	0.0002
C381	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.15	0.0002
C384	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.16	0.0001
C385	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.18	0.0000
C386	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.31	0.0000
C387	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.23	0.0000
C388	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.11	0.0000
C389	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.16	0.0001
C390	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.16	0.0000

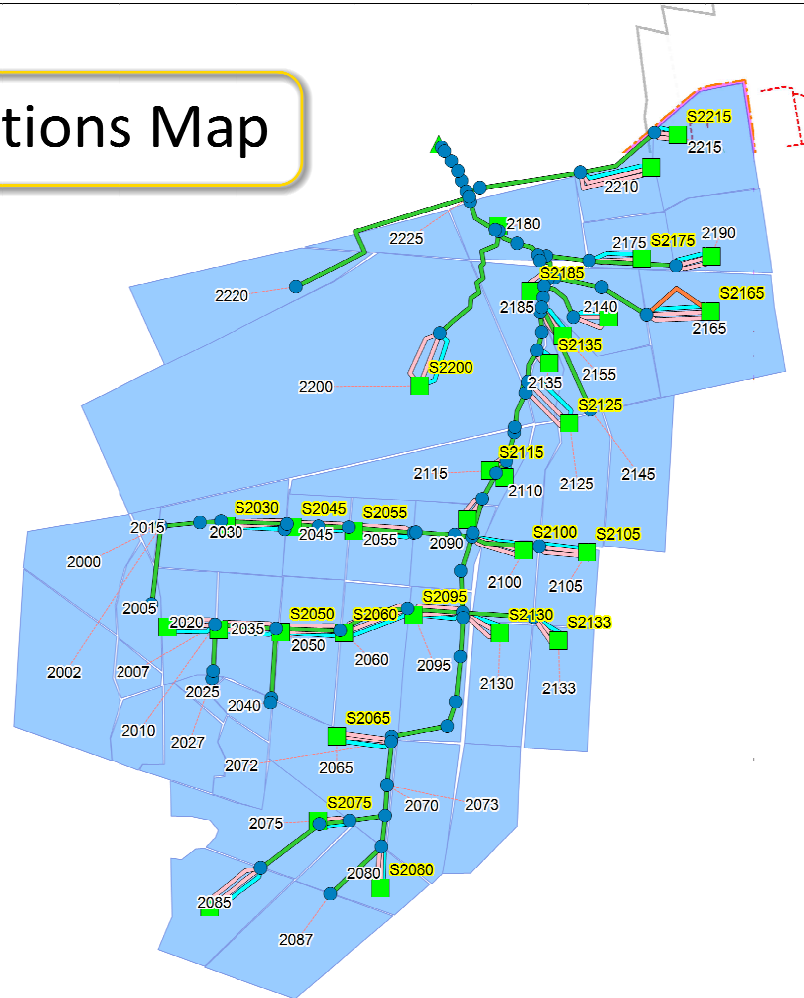
Conduit Surcharge Summary

Conduit	Hours Full			Hours	Hours
	Both Ends	Upstream	Dnstream	Above Full	Capacity Limited
C1	12.84	12.84	12.84	18.85	12.84
C10	13.77	13.77	13.77	16.10	13.77
C12	2.86	2.86	2.86	11.21	2.86
C14	0.01	0.01	0.01	17.04	0.01
C17	6.90	6.90	6.90	16.05	6.90
C18	16.39	16.39	16.39	14.38	16.39

C19	0.01	0.01	0.01	6.11	0.01
C20	8.54	8.54	8.55	20.69	8.54
C21	4.81	4.81	4.81	7.21	0.01
C23	0.01	0.01	0.01	10.19	0.01
C28	7.87	7.87	7.87	9.12	7.87
C3	2.32	2.32	2.32	0.01	0.01
C4	0.01	0.01	0.01	18.56	0.01
C6	9.41	9.41	9.41	17.77	9.41
C6000	0.01	0.01	0.01	4.95	0.01
C6015a	1.95	1.95	1.95	0.01	0.01
C6015b	0.63	0.63	0.63	0.29	0.29
C6025b	0.01	0.01	0.01	0.54	0.01
C6030	0.01	0.01	0.01	0.29	0.01
C6045a	3.91	3.91	3.91	0.01	0.27
C6060a	0.01	0.01	0.01	5.93	0.01
C6060c	0.03	0.03	0.06	4.05	0.03
C6135a	0.01	0.01	0.01	19.77	0.01
C6160b	0.01	0.01	0.01	7.03	0.01
C6220	0.01	0.01	0.01	0.56	0.01
C7025	12.23	12.23	12.23	11.00	12.23
C7040	1.07	1.07	1.07	1.04	1.07
C7075	6.66	6.66	6.66	0.90	5.27
C7105	5.71	5.71	5.71	19.08	5.71
C7133	0.01	0.01	0.01	1.80	0.01
C8	0.01	0.01	0.01	11.46	0.01
C30.8	9.16	9.16	9.16	0.01	0.01
C34	1.01	1.01	1.02	0.01	0.01
C353	3.73	3.73	3.73	0.01	0.01
C364	1.16	1.16	2.06	18.05	1.16
C365	3.24	3.24	3.24	0.07	0.01
C366	1.86	1.86	2.20	8.09	1.86
C367	1.86	1.86	1.86	0.01	0.01
C370	1.86	1.86	1.86	0.01	0.01
C373	0.01	0.01	0.01	2.32	0.01
C374	0.01	0.01	0.01	0.82	0.01
C380	0.01	0.01	0.01	17.72	0.01
C381	0.01	0.01	0.01	19.37	0.01
C384	0.01	0.01	0.01	13.48	0.01
C389	0.01	0.01	0.01	4.65	0.01

Analysis begun on: Thu Sep 07 16:26:59 2017
Analysis ended on: Thu Sep 07 16:27:22 2017
Total elapsed time: 00:00:23

Proposed Conditions Map



Legend

- Junctions
- ▲ Outfalls
- Storages
- Conduits
- Pumps
- Orifices
- Weirs
- Subcatchments



5

[TITLE]
 Upper Little River Model.
 All slopes are assumed to be 0.15% (from Turkey Creek and Little River Subwatershed Study -
 Dillon Consulting Limited, June 1998).

```

[OPTIONS]
;;Options      Value
;-----
FLOW_UNITS     CMS
INFILTRATION   GREEN AMPT
FLOW_ROUTING   DINWAVE
START_DATE     12/14/2011
START_TIME     00:00:00
REPORT_START_DATE 12/14/2011
REPORT_START_TIME 00:00:00
END_DATE       12/17/2011
END_TIME       00:00:00
SWEEP_START    01/01
SWEEP_END      12/31
DRY_DAYS       0
REPORT_STEP    01:00:00
WET_STEP       00:05:00
DRY_STEP       00:05:00
ROUTING_STEP   30
ALLOW_PONDING YES
INERTIAL_DAMPING FULL
VARIABLE_STEP  0.75
LENGTHENING_STEP 0
MIN_SURFAREA  0
NORMAL_FLOW_LIMITED BOTH
SKIP_STEADY_STATE NO
FORCE_MAIN_EQUATION H-W
LINK_OFFSETS   ELEVATION
MIN_SLOPE      0
  
```

```

[EVAPORATION]
;;Type      Parameters
;-----
CONSTANT    0.0
DRY_ONLY    NO
  
```

```

[RAINGAGES]
;;
;;Name      Rain      Time      Snow      Data
;;Type      Type      Intrvl   Catch   Source
;-----
  
```

```

2073      24hr      j44      80.41    5      1300    0.15    0
;Large catchment to 9th Conc Drain south of Division Rd.
2075      24hr      s2075    117.69   47     1000    0.15    0
;To Little River Drain, south of North Talbot Rd.
2080      24hr      S2080    69.76   11     1000    0.15    0
2085      24hr      s2085    100.9   35     800     0.15    0
2087      24hr      j41      133.74  5      1000    0.15    0
;Little River, at Baseline
2090      24hr      S2090    72.83   31     600     0.15    0
;Large catchment draining to Little River, north of 401
2095      24hr      s2095    117.98  47     700     0.15    0
;To Little River, south of 401
2100      24hr      s2100    50.57   56     700     0.15    0
;To Watson Drain, north of 401
2105      24hr      s2105    60.91   50     700     0.15    0
;To Little River, south of County Rd 42, north of Baseline
2110      24hr      S2110    49.79   52     1000    0.15    0
;To Little River, south of County Rd 42
2115      24hr      S2115    113.58  37     700     0.15    0
;Lower Watson Drain, north of 401
2125      24hr      S2125    93.38   55     700     0.15    0
;To Little River, north of 401, south of catchment
2130      24hr      s2130    80.55   80     700     0.15    0
;To Watson Drain, south of 401
2133      24hr      s2133    93.08   65     700     0.15    0
;Little River, between Lauzon Pkwy and Lauzon Rd
2135      24hr      S2135    22.82   50     500     0.15    0
;To Little River, Lauzon Rd
2140      24hr      S2140    82.1    33     1000    0.15    0
;To Little River: south of County Rd 42
;Outlet to J8; 10th Concession Drain
2145      24hr      j8       104.35  10     700     0.15    0
;To Little River, Soulliere drain
2155      24hr      S2155    77.27   50     1000    0.15    0
;Desjardeins Drain
2165      24hr      s2165    179.12  53     1400    0.15    0
;Lachance Drain
2175      24hr      S2175    47.3    66     800     0.15    0
;To Little River; d/s end of Lachance drain
2180      24hr      s2180    102     57     900     0.15    0
2185      24hr      S2185    65.4    55     700     0.15    0
2190      24hr      S2190    84.96   54     900     0.15    0
;To Little River, furthest catchment west
2200      24hr      S2200    784.14  36     2000    0.15    0
;Gouin Drain
2210      24hr      s2210    58.24   63     800     0.15    0
  
```

24HR INTENSITY 0:10 1.0 TIMESERIES 100yr-24hr-chi
 #48 hour Regional Storm event; 285 mm total precipitation
 Hurricane_Hazel INTENSITY 0:15 1.0 TIMESERIES Hazel

```

[SUBCATCHMENTS]
;;
;;Name      Raingage      Outlet      Total      Pcnt.      Width      Pcnt.      Curb      Snow
;;Type      Type      Type      Area      Imperv      Slope      Length     Pack
;-----
;6th Conc Road Drain North of 401
2000      24hr      j37      91.38    60      1000    0.15    0
;6th Conc including south of 401
2002      24hr      j37      156.4    60      1400    0.15    0
;East of 6th Conc Drain, between Baseline and Division Rd
2005      24hr      j6       48.04    60      1300    0.15    0
;East of 6th Conc Drain, north of 401
2007      24hr      j31      20.71    60      300     0.15    0
;East of 6th Conc Drain, south of 401
2010      24hr      j31      40.96    60      800     0.15    0
;Drains to 7th Conc Road Drain
2015      24hr      J54      10.55    60      700     0.15    0
;7th Conc Drain north of 401
2020      24hr      s2020    66.13    67      1400    0.15    0
;To 7th Conc drain; at 401 and Provincial Rd
2025      24hr      J58.7    12.64    60      300     0.15    0
;7th Conc Drain south of 401
2027      24hr      J58.7    59.42    60      900     0.15    0
;8th Conc Drain, along Baseline
2030      24hr      s2030    117.58   49      1000    0.15    0
;8th Conc Drain, north of 401
2035      24hr      s2035    81.42    63      1400    0.15    0
;8th Conc Drain, between 401 and Division Rd.
2040      24hr      J25      25.6     60      500     0.15    0
;Hayes Drain at Baseline
2045      24hr      s2045    63.81    43      900     0.15    0
;To Hayes Drain, north of 401
2050      24hr      s2050    97.34    47      1200    0.15    0
;9th Conc Drain, at Baseline
2055      24hr      s2055    65.11    50      900     0.15    0
;9th Conc Drain, north of 401
2060      24hr      s2060    112.73   57      700     0.15    0
;9th Conc Drain south of 401
2065      24hr      S2065    116.33   77      1000    0.15    0
;To Little River, south of 401
2070      24hr      j44      94.85    5      1300    0.15    0
;To Hurley Drain (?), south of 401
2072      24hr      J46      42.27    60      700     0.15    0
  
```

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2215      24hr      S2215    106.67   57     900     0.15    0
;To Little River; just south of Hwy 2
2220      24hr      J3       144.51   62     800     0.15    0
;To Little River; at intersection of Hwy 2 and Lauzon Pkwy
2225      24hr      J17      42.22    60     500     0.15    0
  
```

```

[SUBAREAS]
;;Subcatchment N-Imperv N-Perv S-Imperv S-Perv PctZero RouteTo PctRouted
;-----
2000      0.013  0.25  1      2.5  0      OUTLET
2002      0.013  0.25  1      2.5  0      OUTLET
2005      0.013  0.25  1      2.5  0      OUTLET
2007      0.013  0.25  1      2.5  0      OUTLET
2010      0.013  0.25  1      2.5  0      OUTLET
2015      0.013  0.25  1      2.5  0      OUTLET
2020      0.013  0.25  1      2.5  0      OUTLET
2025      0.013  0.25  1      2.5  0      OUTLET
2027      0.013  0.25  1      2.5  0      OUTLET
2030      0.013  0.25  1      2.5  0      OUTLET
2035      0.013  0.25  1      2.5  0      OUTLET
2040      0.013  0.25  1      2.5  0      OUTLET
2045      0.013  0.25  1      2.5  0      OUTLET
2050      0.013  0.25  1      2.5  0      OUTLET
2055      0.013  0.25  1      2.5  0      OUTLET
2060      0.013  0.25  1      2.5  0      OUTLET
2065      0.013  0.25  1      2.5  0      OUTLET
2070      0.013  0.25  1      2.5  0      OUTLET
2072      0.013  0.25  1      2.5  0      OUTLET
2073      0.013  0.25  1      2.5  0      OUTLET
2075      0.013  0.25  1      2.5  0      OUTLET
2080      0.013  0.25  1      2.5  0      OUTLET
2085      0.013  0.25  1      2.5  0      OUTLET
2087      0.013  0.25  1      2.5  0      OUTLET
2090      0.013  0.25  1      2.5  0      OUTLET
2095      0.013  0.25  1      2.5  0      OUTLET
2100      0.013  0.25  1      2.5  0      OUTLET
2105      0.013  0.25  1      2.5  0      OUTLET
2110      0.013  0.25  1      2.5  0      OUTLET
2115      0.013  0.25  1      2.5  0      OUTLET
2125      0.013  0.25  1      2.5  0      OUTLET
2130      0.013  0.25  1      2.5  0      OUTLET
2133      0.013  0.25  1      2.5  0      OUTLET
2135      0.013  0.25  1      2.5  0      OUTLET
2140      0.013  0.25  1      2.5  0      OUTLET
2145      0.013  0.25  1      2.5  0      OUTLET
2155      0.013  0.25  1      2.5  0      OUTLET
  
```

2165	0.013	0.25	1	2.5	0	OUTLET
2175	0.013	0.25	1	2.5	0	OUTLET
2180	0.013	0.25	1	2.5	0	OUTLET
2185	0.013	0.25	1	2.5	0	OUTLET
2190	0.013	0.25	1	2.5	0	OUTLET
2200	0.013	0.25	1	2.5	0	OUTLET
2210	0.013	0.25	1	2.5	0	OUTLET
2215	0.013	0.25	1	2.5	0	OUTLET
2220	0.013	0.25	1	2.5	0	OUTLET
2225	0.013	0.25	1	2.5	0	OUTLET

[INFILTRATION]

Subattachment	Suction	HydCon	IMDmax
2000	320	0.254	0.265
2002	320	0.254	0.265
2005	320	0.254	0.265
2007	320	0.254	0.265
2010	320	0.254	0.265
2015	320	0.254	0.265
2020	320	0.254	0.265
2025	320	0.254	0.265
2027	320	0.254	0.265
2030	320	0.254	0.265
2035	320	0.254	0.265
2040	320	0.254	0.265
2045	320	0.254	0.265
2050	320	0.254	0.265
2055	320	0.254	0.265
2060	320	0.254	0.265
2065	320	0.254	0.265
2070	320	0.254	0.265
2072	320	0.254	0.265
2073	320	0.254	0.265
2075	320	0.254	0.265
2080	320	0.254	0.265
2085	320	0.254	0.265
2087	320	0.254	0.265
2090	320	0.254	0.265
2095	320	0.254	0.265
2100	320	0.254	0.265
2105	320	0.254	0.265
2110	320	0.254	0.265
2115	320	0.254	0.265
2125	320	0.254	0.265
2130	320	0.254	0.265

2133	320	0.254	0.265
2135	320	0.254	0.265
2140	320	0.254	0.265
2145	320	0.254	0.265
2155	320	0.254	0.265
2165	320	0.254	0.265
2175	320	0.254	0.265
2180	320	0.254	0.265
2185	320	0.254	0.265
2190	320	0.254	0.265
2200	320	0.254	0.265
2210	320	0.254	0.265
2215	320	0.254	0.265
2220	320	0.254	0.265
2225	320	0.254	0.265

[JUNCTIONS]

Name	Invert Elev.	Max. Depth	Init. Depth	Surcharge Depth	Ponded Area
J1	185	2.7	0	5	0
;River: Little River					
;Reach: Watson to Desjar					
;Transect: 10					
J10	178.819	5	0	5	0
;River: Gouin					
;Reach: Gouin					
;Transect: 0.5					
J108	177.9	3.6	0	5	0
;River: Gouin					
;Reach: Gouin					
;Transect: 0.75					
J109	178.4	3.6	0	5	0
J11	182.4	2	0	0	0
;River: Lachance					
;Reach: Lachance					
;Transect: 0.8					
J110	178.1	3.6	0	5	0
;River: Lachance					
;Reach: Lachance					
;Transect: 0.9					
J111	178.3	3.6	0	5	0
;River: Little River					
;Reach: Watson to Desjar					
;Transect: 12					
J12	179.1	5.2	0	5	0

J13	181.9	3	0	5	0
;River: Little River					
;Reach: Baseline to Wats					
;Transect: 14					
J14	180.062	4.238	0	5	0
;River: Little River					
;Reach: Baseline to Wats					
;Transect: 15					
J15	180.175	4.238	0	5	0
;River: Little River					
;Reach: Baseline to Wats					
;Transect: 16					
J16	180.509	4.291	0	5	0
J17	177.208	5.7	0	5	0
;River: Little River					
;Reach: Little River					
;Transect: 18					
J18	181.636	2.8	0	5	0
;River: Little River					
;Reach: Little River					
;Transect: 19					
J19	183.2	2.1	0	5	0
;River: Little River					
;Reach: Desjardeins to Lachance					
;Transect: 2					
;Junction of Desjardeins and Little River					
J2	177.865	6	0	5	0
;River: Little River					
;Reach: Little River					
;Transect: 20					
J20	184	2.7	0	5	0
J21	179.754	4.246	0	5	0
J22	179.1	5.2	0	5	0
J23	178.684	5.4	0	5	0
J24	177.865	6	0	5	0
;Created to include culvert d/s of 1040					
J25	187.154	2	0	5	0
J26	187	3	0	5	0
J27	182.4	2	0	0	0
J28	183.4	3	0	5	0
J29	184.4	3	0	5	0
J3	180.95	2	0	5	0
J30	185.4	3	0	5	0
J31	186.4	3	0	5	0
J32	179	2	0	0	0
J33	178.75	3.6	0	5	0

J34	183.4	3	0	5	0
J35	179.8	3.4	0	5	0
J36	180.916	4	0	5	0
J37	186.6	5	0	5	0
;River: Little River					
;Reach: Gouin to DS end					
;Transect: 37500					
J37500	176.8	5.1	0	5	0
J38	182.2	4	0	5	0
J39	177.1	5.6	0	5	0
;River: Little River					
;Reach: Gouin to DS end					
;Transect: 39001					
J39001	176.9	7.9	0	5	0
;River: Desjardeins					
;Reach: Desjardeins					
;Transect: 4					
J4	178.1	3.6	0	5	0
;River: Little River					
;Reach: Gouin to DS end					
;Transect: 40323					
J40323	177	5.3	0	5	0
J41	187.5	1.5	0	5	0
;River: Little River					
;Reach: Lachance to Goui					
;Transect: 41106					
J41106	177.1	5.7	0	5	0
J42	188	1.5	0	5	0
;River: Little River					
;Reach: Lachance to Goui					
;Transect: 43501					
J43501	176.9	5.5	0	5	0
J44	186.21	3	0	5	0
;River: Desjardeins					
;Reach: Desjardeins					
;Transect: 4.5					
J45	178.7	3.4	0	5	0
;River: Washbrooke					
;Reach: Washbrooke					
;Transect: 46					
J46	185.72	2.9	0	5	0
;River: Little River					
;Reach: Lachance to Goui					
;Transect: 46102					
J46102	177.1	5.6	0	5	0
;River: Little River					

```

;Reach: Lachance to Goui
;Transect: 46203
J46203 177.7 5.6 0 5 0
;River: 6th Concession D
;Reach: 9th to Little Ri
;Transect: 47
J47 181.22 3.77 0 5 0
J5 176.8 5.1 0 5 0
;River: Baseline Drain
;Reach: Hayes to 9th
;Transect: 51
J51 183.2 3.6 0 5 0
;River: 6th Concession D
;Reach: 7th to 8th
;Transect: 57
J54 186.55 1.555 0 5 0
;River: 8th Concession D
;Reach: 8th Concession
;Transect: 55
J55 184.5 2.8 0 5 0
;River: 8th Concession D
;Reach: 8th Concession
;Transect: 55.5
;Invert from topo - approximate
J55.5 187.104 2.8 0 5 0
;River: 6th Concession D
;Reach: 7th to 8th
;Transect: 56
J56 186.09 2.31 0 5 0
J57 190.33 2 0 5 0
;River: 7th Concession D
;Reach: 7th Concession
;Transect: 58.7
J58.7 190.27 5.31 0 5 0
J6 187.18 2 0 5 0
;River: 6th Concession D
;Reach: 8th to 9th
;Transect: 54
J60 184.8 2.3 0 5 0
;River: Baseline Drain
;Reach: Hayes to 9th
;Transect: 52
J61 184.25 2.15 0 5 0
;River: Little River
;Reach: Watson to Desjar
;Transect: 7

```

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J7 178.8 4.6 0 5 0
;River: 6th Concession D
;Reach: 9th to Little River
;Transect: 50
;Junction of 9th Concession Drain and 6th Concession Drain
;Slope of 9th Concession Drain (C6060a-k) updated to reflect survey information, 0.16%
J77 182.2 4 0 5 0
J8 179.557 2 0 5 0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 44
J80 185.582 2.6 0 5 0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 81
J81 186.5 1.5 0 5 0
;River: Little River
;Reach: Baseline to Wats
;Transect: 17
;Junction of upper reach of Little River and 6th Concession
;Slope of 6th Concession (C6055a-d) updated to reflect survey information-0.11%
J82 180.916 4.084 0 5 0
J83 179.4 3 0 5 0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 88
J88 187 3 0 5 0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 89
J89 187.555 2.095 0 5 0
;River: Little River
;Reach: Watson to Desjar
;Transect: 9
J9 178.684 5.4 0 5 0
;River: Little River
;Reach: Baseline to Watson
;Transect: 13
;County Road 42
;Junction of catchments 1110,1115
J92 179.754 4.246 0 5 0
;River: Little River
;Reach: Watson to Desjardeins
;Transect: 11
;Junction of Watson Drain and Little River
J93 178.67 5.329 0 5 0

```

```

;River: Little River
;Reach: Watson to Desjar
;Transect: 8
;Junction of catchments 1135 and 1140
J94 178.8 4.6 0 5 0
;River: Little River
;Reach: Watson to Desjar
;Transect: 5
J95 178.8 5 0 5 0
;River: Little River
;Reach: Watson to Desjar
;Transect: 3
J96 178 7 0 5 0
;River: Little River
;Reach: Lachance to Goui
;Transect: 42000
;Junction of McGill Drain and Little River (Node 5180 in Insteelc SWMRHYMO model)
J98 177.208 5.7 0 5 0
J99 178.948 2 0 5 0

```

```

[OUTFALLS]
;;
;;Name Invert Outfall Stage/Table Tide
;;Elev. Type Time Series Gate
;-----
;River: Little River
;Reach: Gouin to DS end
;Transect: 36000
J5205 176.7 NORMAL NO

```

```

[STORAGE]
;;
;;Name Invert Max. Init. Storage Curve Curve Poned Evap.
;;Elev. Depth Depth Curve Params Area Frac. Infiltration parameters
;-----
S2020 186.9 5 0 TABULAR 5020 0 0
S2030 185.3 5 0 TABULAR 5030 0 0
S2035 185.9 5 0 TABULAR 5035 0 0
S2045 183.7 5 0 TABULAR 5045 0 0
S2050 184.9 5 0 TABULAR 5050 0 0
S2055 182.7 5 0 TABULAR 5055 0 0
S2060 183.9 5 0 TABULAR 5060 0 0
S2065 186.22 5 0 TABULAR 5065 0 0
S2075 187.5 5 0 TABULAR 5075 0 0
S2080 187.5 5 0 TABULAR 5080 0 0
S2085 187.75 5 0 TABULAR 5085 0 0
S2090 182.42 5 0 TABULAR 5090 0 0
S2095 182.9 5 0 TABULAR 5095 0 0

```

```

S2100 181.92 5 0 TABULAR 5100 0 0
S2105 182.4 5 0 TABULAR 5105 0 0
S2110 181.56 5 0 TABULAR 5110 0 0
S2115 181.56 5 0 TABULAR 5115 0 0
S2125 180.6 5 0 TABULAR 5125 0 0
S2130 182.9 5 0 TABULAR 5130 0 0
S2133 183.9 5 0 TABULAR 5133 0 0
S2135 180.17 5 0 TABULAR 5135 0 0
S2140 179.7 5 0 TABULAR 5140 0 0
S2155 180.18 5 0 TABULAR 5155 0 0
S2165 179.9 5 0 TABULAR 5165 0 0
S2175 178.8 5 0 TABULAR 5175 0 0
S2180 178.1 5 0 TABULAR 5180 0 0
S2185 179.5 5 0 TABULAR 5185 0 0
S2190 179.25 5 0 TABULAR 5190 0 0
S2200 179.45 5 0 TABULAR 5200 0 0
S2210 178.9 5 0 TABULAR 5210 0 0
S2215 179.5 5 0 TABULAR 5215 0 0

```

```

[CONDUITS]
;;
;;Name Inlet Outlet Manning Inlet Outlet Init. Max.
;;Node Node Length N Offset Offset Flow Flow
;-----
;Forest Glade Crossing
C1 J5 J37500 18.1 0.013 176.8 176.8 0 0
C10 J9 J23 14 0.013 178.38 178.38 0 0
C11 J81 J44 295 0.03 186.5 186.21 0 0
C12 J24 J2 10 0.013 177.865 177.865 0 0
C13 J83 J45 800 0.03 179.7 178.7 0 0
C14 J1 J20 450 0.045 185 184 0 0
C15 J35 J7 500 0.045 0 178.8 0 0
C16 J28 J27 400 0.01 183.4 182.4 0 0
C17 J29 J28 400 0.01 184.4 183.4 0 0
C18 J30 J29 650 0.03 185.4 184.4 0 0
C19 J31 J30 650 0.03 186.4 185.4 0 0
C2 J2 J111 600 0.01 182.1 181.1 0 0
C20 J33 J111 900 0.045 179.75 179.3 0 0
C21 J32 J109 400 0.045 180 179.4 0 0
C22 J82 J36 10 0.015 180.916 180.916 0 0
C23 J82 J36 10 0.015 184.5 184.5 0 0
C24 J92 J21 14 0.015 183.1 183.1 0 0
C25 J9 J23 14 0.015 181.8 181.8 0 0
C26 J24 J2 10 0.015 182.5 182.5 0 0
C27 J17 J98 50 0.015 181.4 181.4 0 0
C28 J5 J37500 400 0.01 180.5 180.5 0 0
C29 J12 J22 19 0.015 182.43 182.43 0 0

```


C3	J55	J60	20	0.045	184.5	184.8	0	0
C30	J77	J38	10	0.015	182.2	182.2	0	0
C31	J77	J38	10	0.015	184.8	184.8	0	0
C32	J46102	J39	10	0.015	177.1	177.1	0	0
C33	J46102	J39	10	0.015	180.8	180.8	0	0
;E-W Arterial Culvert								
C34	J11	J27	10	0.01	0	182.4	0	0
C35	J34	J27	600	0.01	183.4	182.4	0	0
C37	J41	J26	700	0.01	0	187	0	0
C38	J42	J89	700	0.01	0	187.555	0	0
C4	J17	J98	50	0.013	177.208	177.208	0	0
C5	J26	J81	400	0.03	187.77	186.5	0	0
C6	J92	J21	14	0.013	179.754	179.754	0	0
C6000	J37	J54	700	0.045	186.6	186.55	0	0
;7th Street Drain; transect copied from 6th Concession drain								
;Slope, Length, Manning's n from SWMHYMO								
C6007	J6	J37	835	0.045	187.18	186.6	0	0
;River: 6th Concession D								
;Reach: 7th to 8th								
C6015a	J54	J56	100	0.045	186.55	186.09	0	0
;River: 6th Concession D								
;Reach: 7th to 8th								
C6015b	J56	J60	580	0.045	186.09	184.8	0	0
;River: 7th Concession D								
;Reach: 7th Concession								
;COPIED SECTION FROM SEC 58								
;Slope, Length, Manning's n from SWMHYMO								
C6025a	J57	J31	550	0.045	190.27	188.7	0	0
;River: 6th Concession D								
;Reach: 8th to 9th								
C6030	J60	J61	750	0.045	184.8	184.25	0	0
;River: 8th Concession D								
;Reach: 8th Concession								
;COPIED SECTION FROM SEC 55								
;Slope, Length, Manning's n from SWMHYMO								
C6040	J55.5	J30	800	0.045	187.104	186	0	0
;River: Baseline Drain								
;Reach: Hayes to 9th								
C6045a	J61	J51	520	0.045	184.25	183.2	0	0
;River: Baseline Drain								
;Reach: Hayes to 9th								
C6045b	J51	J77	150	0.045	183.2	182.2	0	0
;River: 6th Concession D								
;Reach: 9th to Little Ri								
C6055a	J38	J47	475	0.045	181.7	181.69	0	0
;River: 6th Concession D								

;Reach: 9th to Little Ri								
;Upstream of Little River and Baseline junction (J17) Outlet set to invert of Junction 17; length adjusted correctly.								
C6055d	J47	J82	250	0.045	181.22	180.916	0	0
;River: Little River								
;Reach: Baseline to Wats								
;Bridge: Little River								
C6090a	J36	J16	310	0.045	180.916	180.509	0	0
;River: Little River								
;Reach: Baseline to Wats								
C6090b	J16	J15	340	0.045	180.509	180.175	0	0
;River: Little River								
;Reach: Baseline to Watson								
;2 elevation points changed to reflect more accurate values (2996.5 and 3004.5).								
C6090c	J15	J14	135	0.045	180.175	180.062	0	0
;River: Little River								
;Reach: Baseline to Wats								
C6090d	J14	J92	320	0.045	180.062	179.754	0	0
;River: Little River								
;Reach: Little River								
C6100a	J20	J19	545	0.045	184	183.2	0	0
;River: Little River								
;Reach: Little River								
C6100b	J19	J11	440	0.045	183.2	182.4	0	0
;River: Little River								
;Reach: Little River								
;Outlet set to invert of Junction 17								
C6100c	J18	J82	450	0.045	181.636	180.916	0	0
;River: Little River								
;Reach: Baseline to Wats								
C6110a	J21	J12	470	0.045	179.754	179.1	0	0
;River: Little River								
;Reach: Watson to Desjar								
;Bridge: Little River, Lauzon Pkwy Bridge								
C6110b	J22	J93	320	0.045	179.1	178.67	0	0
;River: Little River								
;Reach: Watson to Desjar								
C6120a	J93	J10	280	0.045	178.67	178.49	0	0
;River: Little River								
;Reach: Watson to Desjar								
C6120b	J10	J9	150	0.045	178.49	178.38	0	0
;River: Little River								
;Reach: Watson to Desjar								
C6120c	J23	J94	170	0.045	178.39	178.29	0	0
;River: Little River								
;Reach: Watson to Soulliere								
C6135a	J94	J7	215	0.045	178.29	178.15	0	0

;River: Little River								
;Reach: Watson to Soulliere								
C6135b	J7	J95	85	0.045	178.15	178.1	0	0
;10th Concession Drain								
;Transect copied from Transect 102 from adjacent Watson Drain								
;Conduit copied to provide outlet for Catchment 1145								
;Slope, Length, Manning's n from SWMHYMO								
C6145	J8	J23	1140	0.045	179.557	178.864	0	0
;River: Little River								
;Reach: Watson to Desjardeins								
;Copy of Transect 7; survey info for transect 5 not good								
C6150	J95	J96	160	0.045	178.1	178	0	0
;River: Little River								
;Reach: Desjardeins to Little River								
;Adjusted from HEC-RAS import; automatically created junction deleted and lengths adjusted accordingly.								
C6160a	J96	J24	270	0.045	178	178	0	0
;River: Little River								
;Reach: Desjardeins to L								
C6160b	J2	J46203	410	0.045	178	177.7	0	0
;River: Little River								
;Reach: Lachance to Goui								
;This is a REPEATED section.								
C6170e	J46203	J46102	426	0.045	177.7	177.1	0	0
;River: Little River								
;Reach: Lachance to Goui								
C6170f	J39	J43501	194	0.045	177.1	176.9	0	0
;River: Little River								
;Reach: Lachance to Goui								
C6170l	J43501	J17	122	0.045	176.9	177.208	0	0
;River: Little River								
;Reach: Lachance to Goui								
C6180a	J98	J41106	90	0.045	177.2	177.1	0	0
;River: Little River								
;Reach: Lachance to Goui								
C6180b	J41106	J40323	78.2	0.045	177.1	177	0	0
;River: Little River								
;Reach: Gouin to DS end								
;This is a REPEATED section.								
C6180c	J40323	J39001	132	0.045	177	176.9	0	0
;River: Little River								
;Reach: Gouin to DS end								
C6180d	J39001	J5	150	0.045	176.9	176.8	0	0
;River: Little River								
;Reach: Gouin to DS end								
;This is a REPEATED section.								
C6180e	J37500	J5205	150	0.045	176.8	176.7	0	0

;McGill Drain downstream of junction with Lappan Drain								
;Transect copied from Desjardeins Drain								
;Elevations adjusted to match SWMHYMO channel slope								
C6190	J99	J46102	2060	0.045	178.948	177.1	0	0
;Russette Drain								
;No information available, transect copied from Desjardeins Drain,								
;all other details copied from McGill drain info from SWMHYMO model								
C6220	J3	J17	2700	0.045	179.5	178	0	0
C7	J80	J1	660	0.03	185.582	185	0	0
;MTO Plate No. 118-401/A05-0; WP No. 170-99-00; STA 12+065 to STA 13+055, 2002								
C7025	J58.7	J57	30.29	0.013	190.33	190.27	0	0
;From 8th Concession North and Demonte Branch; Drainage Area Plan - Sheet 2								
C7040	J25	J55.5	55	0.013	187.154	187.104	0	0
;From MTO, Engineering and Plans Office, Surveys; Kings Hwy 401-Twp of Sandwich South, County of Essex, from file 401SAS WP 60-00-								
C7075	J46	J80	50.6	0.013	185.72	185.582	0	0
C8	J12	J22	19	0.013	179.1	179.1	0	0
C9	J27	J18	400	0.03	182.4	181.636	0	0
;River: Gouin								
;Reach: Gouin								
;COPY OF DESJARDEINS DRAIN SECTION 4								
CJ0.5	J108	J98	10	0.045	178.9	178.7	0	0
;River: Gouin								
;Reach: Gouin								
;COPY OF DESJARDEINS DRAIN SECTION 4								
;Slope, Length, Manning's n from SWMHYMO								
CJ0.75	J109	J108	500	0.045	179.4	178.9	0	0
;River: Lachance								
;Reach: Lachance								
;COPY OF DESJARDEINS DRAIN SECTION 4 - based on 1997 SWM report, dimensions of the drain are accurate; 3 m bottom, 2:1 side slope:								
CJ0.8	J110	J2	50	0.045	178.1	177.879	0	0
;River: Lachance								
;Reach: Lachance								
;COPY OF DESJARDEINS DRAIN SECTION 4 - based on 1997 SWM report, dimensions of the drain are accurate; 3 m bottom, 2:1 side slope:								
CJ0.9	J111	J110	450	0.045	178.6	178.1	0	0
;River: Desjardeins								
;Reach: Desjardeins								
CJ4	J4	J96	35	0.045	178.1	178	0	0
;River: Desjardeins								
;Reach: Desjardeins								
CJ4.5	J45	J4	500	0.045	178.7	178.1	0	0
;River: Washbrooke								
;Reach: Washbrooke								
CJ81	J44	J46	795	0.045	186.21	185.72	0	0
;River: Washbrooke								
;Reach: Washbrooke								
CJ88	J88	J81	400	0.045	187.546	186.5	0	0

```

;River: Washbrooke
;Reach: Washbrooke
CJ89 J89 J88 215 0.045 187.555 187.546 0 0

```

[PUMPS]

```

;;Name Inlet Outlet Pump Init. Startup Shutoff
;;Node Node Node Curve Status Depth Depth
P1 S2165 J83 Pump2165 ON 300 300

```

[ORIFICES]

```

;;Name Inlet Outlet Orifice Crest Disch. Flap Open/Close
;;Node Node Node Type Height Coeff. Gate Time
OR2020-1 S2020 J31 SIDE 186.9 0.6 NO 0
OR2020-2 S2020 J31 SIDE 187.1 0.6 NO 0
OR2030-1 S2030 J60 SIDE 185.3 0.6 NO 0
OR2030-2 S2030 J60 SIDE 185.5 0.6 NO 0
OR2035-1 S2035 J30 SIDE 185.9 0.6 NO 0
OR2035-2 S2035 J30 SIDE 186.1 0.6 NO 0
OR2045-1 S2045 J51 SIDE 183.7 0.6 NO 0
OR2045-2 S2045 J51 SIDE 183.9 0.6 NO 0
OR2050-1 S2050 J29 SIDE 184.9 0.6 NO 0
OR2050-2 S2050 J29 SIDE 185.1 0.6 NO 0
OR2055-1 S2055 J77 SIDE 182.7 0.6 NO 0
OR2055-2 S2055 J77 SIDE 182.9 0.6 NO 0
OR2060-1 S2060 J28 SIDE 183.9 0.6 NO 0
OR2060-2 S2060 J28 SIDE 184.1 0.6 NO 0
OR2065-1 S2065 J46 SIDE 186.22 0.6 NO 0
OR2065-2 S2065 J46 SIDE 186.42 0.6 NO 0
OR2075-1 S2075 J88 SIDE 187.5 0.6 NO 0
OR2075-2 S2075 J88 SIDE 187.7 0.6 NO 0
OR2080-1 S2080 J26 SIDE 187.5 0.6 NO 0
OR2080-2 S2080 J26 SIDE 187.7 0.6 NO 0
OR2085-1 S2085 J42 SIDE 187.75 0.6 NO 0
OR2085-2 S2085 J42 SIDE 187.95 0.6 NO 0
OR2090-1 S2090 J16 SIDE 182.416 0.6 NO 0
OR2090-2 S2090 J16 SIDE 182.616 0.6 NO 0
OR2095-1 S2095 J27 SIDE 182.9 0.6 NO 0
OR2095-2 S2095 J27 SIDE 183.1 0.6 NO 0
OR2100-1 S2100 J82 SIDE 181.916 0.6 NO 0
OR2100-2 S2100 J82 SIDE 182.116 0.6 NO 0
OR2105-1 S2105 J13 SIDE 182.4 0.6 NO 0
OR2105-2 S2105 J13 SIDE 182.6 0.6 NO 0
OR2110-1 S2110 J14 SIDE 181.562 0.6 NO 0
OR2110-2 S2110 J14 SIDE 181.762 0.6 NO 0

```

[XSECTIONS]

```

;;Link Shape Geom1 Geom2 Geom3 Geom4 Barrels
C1 RECT_CLOSED 3.25 14.8 0 0 1 15
C10 RECT_CLOSED 2.5 11 0 0 1 15
C11 IRREGULAR 1001 0 0 0 1 1
C12 RECT_CLOSED 3.7 14.9 0 0 1 15
C13 IRREGULAR 113 0 0 0 1 1
C14 Irregular 1001 0 0 0 1 1
C15 IRREGULAR 1001 0 0 0 1 1
C16 IRREGULAR 1001 0 0 0 1 1
C17 IRREGULAR 1001 0 0 0 1 1
C18 IRREGULAR 1001 0 0 0 1 1
C19 IRREGULAR 1001 0 0 0 1 1
C2 IRREGULAR 1001 0 0 0 1 1
C20 IRREGULAR 1001 0 0 0 1 1
C21 IRREGULAR 1001 0 0 0 1 1
C22 RECT_CLOSED 2.7 3.2 0 0 1 15
C23 IRREGULAR LR@baseline 0 0 0 0 1 1
C24 IRREGULAR LittleRiver#42 0 0 0 0 1 1
C25 IRREGULAR Lauzon@ER 0 0 0 0 1 1
C26 IRREGULAR Rail@LR 0 0 0 0 1 1
C27 IRREGULAR ECRow@LR 0 0 0 0 1 1
C28 IRREGULAR ForestGlenDR 0 0 0 0 1 1
C29 IRREGULAR Lauzon@py@LR 0 0 0 0 1 1
C3 Irregular 55 0 0 0 1 1
C30 RECT_CLOSED 2.1 3 0 0 1 15

```

```

OR2115-1 S2115 J14 SIDE 181.562 0.6 NO 0
OR2115-2 S2115 J14 SIDE 181.762 0.6 NO 0
OR2125-1 S2125 J22 SIDE 180.6 0.6 NO 0
OR2125-2 S2125 J22 SIDE 180.8 0.6 NO 0
OR2130-1 S2130 J27 SIDE 182.9 0.6 NO 0
OR2130-2 S2130 J27 SIDE 183.1 0.6 NO 0
OR2133-1 S2133 J34 SIDE 183.9 0.6 NO 0
OR2133-2 S2133 J34 SIDE 184.1 0.6 NO 0
OR2135-1 S2135 J93 SIDE 180.17 0.6 NO 0
OR2135-2 S2135 J93 SIDE 180.37 0.6 NO 0
OR2140-1 S2140 J35 SIDE 179.7 0.6 NO 0
OR2140-2 S2140 J35 SIDE 179.9 0.6 NO 0
OR2155-1 S2155 J23 SIDE 180.184 0.6 NO 0
OR2155-2 S2155 J23 SIDE 180.384 0.6 NO 0
OR2165-1 S2165 J83 SIDE 179.9 0.6 NO 0
OR2165-2 S2165 J83 SIDE 180.1 0.6 NO 0
OR2175-1 S2175 J111 SIDE 178.8 0.6 NO 0
OR2175-2 S2175 J111 SIDE 179.0 0.6 NO 0
OR2180-1 S2180 J39 SIDE 178.1 0.6 NO 0
OR2185-1 S2185 J96 SIDE 179.5 0.6 NO 0
OR2185-2 S2185 J96 SIDE 179.7 0.6 NO 0
OR2190-1 S2190 J33 SIDE 179.25 0.6 NO 0
OR2190-2 S2190 J33 SIDE 179.95 0.6 NO 0
OR2200-1 S2200 J99 SIDE 179.448 0.6 NO 0
OR2200-2 S2200 J99 SIDE 179.648 0.6 NO 0
OR2210-1 S2210 J109 SIDE 178.9 0.6 NO 0
OR2210-2 S2210 J109 SIDE 179.1 0.6 NO 0
OR2215-1 S2215 J32 SIDE 179.5 0.6 NO 0
OR2215-2 S2215 J32 SIDE 179.7 0.6 NO 0

```

[WEIRS]

```

;;Name Inlet Outlet Weir Crest Disch. Flap End End
;;Node Node Node Type Height Coeff. Gate Con. Coeff.
W2020 S2020 J31 TRANSVERSE 188.9 1.7 NO 0 1.3
W2030 S2030 J60 TRANSVERSE 187.3 1.7 NO 0 1.3
W2035 S2035 J30 TRANSVERSE 187.9 1.7 NO 0 1.3
W2045 S2045 J51 TRANSVERSE 185.7 1.7 NO 0 1.3
W2050 S2050 J29 TRANSVERSE 186.9 1.7 NO 0 1.3
W2055 S2055 J77 TRANSVERSE 184.7 1.7 NO 0 1.3
W2060 S2060 J28 TRANSVERSE 185.9 1.7 NO 0 1.3
W2065 S2065 J46 TRANSVERSE 188.22 1.7 NO 0 1.3
W2075 S2075 J88 TRANSVERSE 189.5 1.7 NO 0 1.3
W2080 S2080 J26 TRAPEZOIDAL 189.5 1.7 NO 0 1.3
W2085 S2085 J42 TRANSVERSE 189.75 1.7 NO 0 1.3
W2090 S2090 J16 TRANSVERSE 184.42 1.7 NO 0 1.3

```

```

C31 IRREGULAR 6th@9th 0 0 0 1
C32 RECT_CLOSED 3 20 0 0 1 15
C33 IRREGULAR LT@Twin Oaks 0 0 0 1
C34 RECT_CLOSED 2.4 3 0 0 1
C35 IRREGULAR 1001 0 0 0 1
C37 IRREGULAR 1001 0 0 0 1
C38 IRREGULAR 1001 0 0 0 1
C4 RECT_CLOSED 5.2 12.3 0 0 1 15
C5 IRREGULAR 1001 0 0 0 1
C6 RECT_CLOSED 2.5 7.1 0 0 1
C6000 IRREGULAR 59 0 0 0 1
C6007 IRREGULAR 59 0 0 0 1
C6015a IRREGULAR 57 0 0 0 1
C6015b IRREGULAR 1001 0 0 0 1
C6025a IRREGULAR 58.7 0 0 0 1
C6030 IRREGULAR 1001 0 0 0 1
C6040 IRREGULAR 55.5 0 0 0 1
C6045a IRREGULAR 1001 0 0 0 1
C6045b IRREGULAR 1001 0 0 0 1
C6055a IRREGULAR 1001 0 0 0 1
C6055d IRREGULAR 1001 0 0 0 1
C6090a Irregular 1002 0 0 0 1
C6090b IRREGULAR 1002 0 0 0 1
C6090c Irregular 1002 0 0 0 1
C6090d IRREGULAR 1002 0 0 0 1
C6100a IRREGULAR 1001 0 0 0 1
C6100b IRREGULAR 1001 0 0 0 1
C6100c IRREGULAR 1002 0 0 0 1
C6110a IRREGULAR 1002 0 0 0 1
C6110b IRREGULAR 1002 0 0 0 1
C6120a Irregular 1002 0 0 0 1
C6120b IRREGULAR 1002 0 0 0 1
C6120c IRREGULAR 1002 0 0 0 1
C6135a Irregular 1002 0 0 0 1
C6135b Irregular 1002 0 0 0 1
C6145 IRREGULAR 1001 0 0 0 1
C6150 Irregular 1002 0 0 0 1
C6160a IRREGULAR 1002 0 0 0 1
C6160b IRREGULAR TwinOaks742 0 0 0 1
C6170a Irregular TwinOaks742 0 0 0 1
C6170f IRREGULAR TwinOaks316 0 0 0 1
C6170l IRREGULAR TwinOaks122 0 0 0 1
C6180a IRREGULAR 40323 0 0 0 1
C6180b IRREGULAR 39001 0 0 0 1
C6180c IRREGULAR 37500 0 0 0 1
C6180d IRREGULAR 36000 0 0 0 1

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C6180e	IRREGULAR	35002	0	0	0	1	
C6190	IRREGULAR	1001	0	0	0	1	
C6220	IRREGULAR	113	0	0	0	1	
C7	IRREGULAR	1001	0	0	0	1	
C7025	RECT_CLOSED	1.52	1.52	0	0	1	15
C7040	IRREGULAR	55.5	0	0	0	1	
C7075	RECT_CLOSED	2.4	4.8	0	0	1	15
C8	RECT_CLOSED	3.5	10.9	0	0	1	15
C9	IRREGULAR	1002	0	0	0	1	
CJ0.5	IRREGULAR	117	0	0	0	1	
CJ0.75	IRREGULAR	117	0	0	0	1	
CJ0.8	IRREGULAR	1001	0	0	0	1	
CJ0.9	IRREGULAR	1001	0	0	0	1	
CJ4	IRREGULAR	4	0	0	0	1	
CJ4.5	IRREGULAR	113	0	0	0	1	
CJ81	IRREGULAR	1001	0	0	0	1	
CJ88	Irregular	1001	0	0	0	1	
CJ89	IRREGULAR	1001	0	0	0	1	
OR2020-1	CIRCULAR	0.2	0	0	0		
OR2020-2	CIRCULAR	0.36	0	0	0		
OR2030-1	CIRCULAR	0.27	0	0	0		
OR2030-2	CIRCULAR	0.48	0	0	0		
OR2035-1	CIRCULAR	0.23	0	0	0		
OR2035-2	CIRCULAR	0.39	0	0	0		
OR2045-1	CIRCULAR	0.2	0	0	0		
OR2045-2	CIRCULAR	0.35	0	0	0		
OR2050-1	CIRCULAR	0.25	0	0	0		
OR2050-2	CIRCULAR	0.43	0	0	0		
OR2055-1	CIRCULAR	0.2	0	0	0		
OR2055-2	CIRCULAR	0.35	0	0	0		
OR2060-1	CIRCULAR	0.27	0	0	0		
OR2060-2	CIRCULAR	0.47	0	0	0		
OR2065-1	CIRCULAR	0.27	0	0	0		
OR2065-2	CIRCULAR	0.47	0	0	0		
OR2075-1	CIRCULAR	0.27	0	0	0		
OR2075-2	CIRCULAR	0.48	0	0	0		
OR2080-1	CIRCULAR	0.21	0	0	0		
OR2080-2	CIRCULAR	0.37	0	0	0		
OR2085-1	CIRCULAR	0.25	0	0	0		
OR2085-2	CIRCULAR	0.44	0	0	0		
OR2090-1	CIRCULAR	0.21	0	0	0		
OR2090-2	CIRCULAR	0.36	0	0	0		
OR2095-1	CIRCULAR	0.27	0	0	0		
OR2095-2	CIRCULAR	0.46	0	0	0		
OR2100-1	CIRCULAR	0.18	0	0	0		
OR2100-2	CIRCULAR	0.34	0	0	0		

OR2105-1	CIRCULAR	0.2	0	0	0		
OR2105-2	CIRCULAR	0.34	0	0	0		
OR2110-1	CIRCULAR	0.18	0	0	0		
OR2110-2	CIRCULAR	0.31	0	0	0		
OR2115-1	CIRCULAR	0.27	0	0	0		
OR2115-2	CIRCULAR	0.48	0	0	0		
OR2125-1	CIRCULAR	0.24	0	0	0		
OR2125-2	CIRCULAR	0.42	0	0	0		
OR2130-1	CIRCULAR	0.23	0	0	0		
OR2130-2	CIRCULAR	0.41	0	0	0		
OR2133-1	CIRCULAR	0.24	0	0	0		
OR2133-2	CIRCULAR	0.42	0	0	0		
OR2135-1	CIRCULAR	0.12	0	0	0		
OR2135-2	CIRCULAR	0.22	0	0	0		
OR2140-1	CIRCULAR	0.23	0	0	0		
OR2140-2	CIRCULAR	0.4	0	0	0		
OR2155-1	CIRCULAR	0.22	0	0	0		
OR2155-2	CIRCULAR	0.37	0	0	0		
OR2165-1	CIRCULAR	0.34	0	0	0		
OR2165-2	CIRCULAR	0.58	0	0	0		
OR2175-1	CIRCULAR	0.17	0	0	0		
OR2175-2	CIRCULAR	0.29	0	0	0		
OR2180-1	CIRCULAR	1	0	0	0		
OR2185-1	CIRCULAR	0.2	0	0	0		
OR2185-2	CIRCULAR	0.35	0	0	0		
OR2190-1	CIRCULAR	0.23	0	0	0		
OR2190-2	CIRCULAR	0.4	0	0	0		
OR2200-1	CIRCULAR	0.72	0	0	0		
OR2200-2	CIRCULAR	1.24	0	0	0		
OR2210-1	CIRCULAR	0.19	0	0	0		
OR2210-2	CIRCULAR	0.33	0	0	0		
OR2215-1	CIRCULAR	0.26	0	0	0		
OR2215-2	CIRCULAR	0.45	0	0	0		
W2020	RECT_OPEN	1	5	5	5		
W2030	RECT_OPEN	1	5	5	5		
W2035	RECT_OPEN	1	5	5	5		
W2045	RECT_OPEN	1	5	5	5		
W2050	RECT_OPEN	1	5	5	5		
W2055	RECT_OPEN	1	5	5	5		
W2060	RECT_OPEN	1	5	5	5		
W2065	RECT_OPEN	1	5	5	5		
W2075	RECT_OPEN	1	5	5	5		
W2080	TRAPEZOIDAL	1	5	5	5		
W2085	RECT_OPEN	1	5	5	5		
W2090	RECT_OPEN	1	5	5	5		
W2095	RECT_OPEN	1	5	5	5		

W2100	RECT_OPEN	1	5	5	5		
W2105	RECT_OPEN	1	5	5	5		
W2110	RECT_OPEN	1	5	5	5		
W2115	RECT_OPEN	1	5	5	5		
W2125	RECT_OPEN	1	5	5	5		
W2130	RECT_OPEN	1	5	5	5		
W2135	RECT_OPEN	1	5	5	5		
W2135	RECT_OPEN	1	5	5	5		
W2140	RECT_OPEN	1	5	5	5		
W2155	RECT_OPEN	1	5	5	5		
W2165	RECT_OPEN	1	5	5	5		
W2175	RECT_OPEN	1	5	5	5		
W2185	RECT_OPEN	1	5	5	5		
W2190	RECT_OPEN	1	5	5	5		
W2200	RECT_OPEN	1	5	5	5		
W2210	RECT_OPEN	1	5	5	5		
W2215	RECT_OPEN	1	5	5	5		

[TRANSECTS]

;COPY OF DESJARDEINS DRAIN SECTION 4

NC 0.1 0.1 0.045

X1 0.3 8 3005.457 3024.75 0.0 0.0 0 0 0

GR 180.9 2605 180.5 3005.457 177.8 3009.33 177.6 3014.085 177.7 3017.186

GR 180.7 3024.75 180.8 3038.397 181.2 3438

;High-chord transect for bridge 0.35 (River: Gouin; Reach: Gouin).

;COPY OF DESJARDEINS DRAIN SECTION 4

NC 0.1 0.1 0.045

X1 0.35_HC 3 0 0 0.0 0.0 0 0 0

GR 181.505 2605 181.9 3018 181.502 3438

;COPY OF DESJARDEINS DRAIN SECTION 4

NC 0.1 0.1 0.045

X1 0.4 8 3005.457 3024.75 0.0 0.0 0 0 0

GR 181 2605 180.6 3005.457 177.9 3009.33 177.7 3014.085 177.8 3017.186

GR 180.8 3024.75 180.9 3038.397 181.3 3438

;COPY OF DESJARDEINS DRAIN SECTION 4

NC 0.1 0.1 0.045

X1 0.5 8 3005.457 3024.75 0.0 0.0 0 0 0

GR 181.2 2605 180.8 3005.457 178.1 3009.33 177.9 3014.085 178 3017.186

GR 181 3024.75 181.1 3038.397 181.5 3438

;COPY OF DESJARDEINS DRAIN SECTION 4

NC 0.1 0.1 0.045

X1 0.75 8 3005.457 3024.75 0.0 0.0 0 0 0

GR 181.7 2605 181.3 3005.457 178.6 3009.33 178.4 3014.085 178.5 3017.186

GR 181.5 3024.75 181.6 3038.397 182 3438

;COPY OF DESJARDEINS DRAIN SECTION 4 - based on 1997 SWM report, dimensions of the drain are accurate; 3 m bottom, 2:1 side slope:

NC 0.1 0.1 0.045

X1 0.8 8 3005.457 3024.75 0.0 0.0 0 0 0

GR 181.4 2605 181 3005.457 178.3 3009.33 178.1 3014.085 178.2 3017.186

GR 181.2 3024.75 181.3 3038.397 181.7 3438

;COPY OF DESJARDEINS DRAIN SECTION 4 - based on 1997 SWM report, dimensions of the drain are accurate; 3 m bottom, 2:1 side slope:

NC 0.1 0.1 0.045

X1 0.9 8 3005.457 3024.75 0.0 0.0 0 0 0

GR 181.9 2605 181.5 3005.457 178.8 3009.33 178.6 3014.085 178.7 3017.186

GR 181.7 3024.75 181.8 3038.397 182.2 3438

NC 0.1 0.1 0.045

X1 1 22 2993 3012.47 0.0 0.0 0 0 0

GR 184 2295 181.5 2300 181.5 2525 181.5 2700 181.5 2800

GR 181.3 2850 181.1 2925 181 2990.2 180.5 2991.5 180.5 2992

GR 181.5 2993 179.6 2994.91 179.3 2995.65 178.5 2997.625 178.1 3000.09

GR 178.6 3002.54 181.9 3012.47 181.4 3140 181.5 3250 181.6 3450

GR 181.7 3650 182 4000

;High-chord transect for bridge 1.5 (River: Little River; Reach: Desjardeins to L).

NC 0.1 0.1 0.045

X1 1.5_HC 7 0 0 0.0 0.0 0 0 0

GR 184 2295 182.5 2300 182.5 2991 183.4 2991.1 183.4 3009.1

GR 182.5 3009.2 182.5 3140

NC 0.1 0.1 0.045

X1 1.6 19 2993 3012.47 0.0 0.0 0 0 0

GR 184 2295 181.5 2300 181.5 2525 181.5 2700 181.5 2800

GR 181.3 2850 181.1 2925 181 2990.2 180.5 2991.5 180.5 2992

GR 181.5 2993 179.6 2994.91 179.3 2995.65 178.5 2997.625 178.1 3000.09

GR 178.6 3002.54 181.9 3012.47 181.4 3140 181.5 3250

NC 0.1 0.1 0.045

X1 10 21 2994 3017.014 0.0 0.0 0 0 0

GR 184 1900 184 1940 184 2000 184 2300 184 2630

GR 184 2800 184 2875 184 2949.9 182 2950 181.6 2994

GR 179.8 3001.004 179 3005.344 179.7 3010.779 181.6 3017.014 182 3050

GR 184 3050.1 184 3150 184 3300 184 3500 184 3750

GR 184 4300

;[LE: 2950][RE: 3050]

NC 0.045 0.045 0.03
 X1 10(orig) 19 2994 3017.014 0.0 0.0 0 0 0
 GR 184 1900 182 1940 182 2000 182 2300 182 2630
 GR 182 2800 182 2875 182 2950 181.6 2994 179.8 3001.004
 GR 179 3005.344 179.7 3010.779 181.6 3017.014 182 3050 182 3150
 GR 182 3300 182.5 3500 182.9 3750 184 4300

;Proposed Channel Section with SWM
 NC 0.1 0.1 0.045
 X1 1001 10 78.5 82.5 0.0 0.0 0 0 0
 GR 100 63.5 99.5 63.5 97 76 97 78.5 96.7 80
 GR 96.7 81 97 82.5 97 85 99.5 97.5 100 100

;ULR between Baseline Road and CP Rail

NC 0.1 0.1 0.045
 X1 1002 12 86 90 0.0 0.0 0 0 0
 GR 100 51 97 66 97 76 96 81 96 91
 GR 95.7 92.5 95.7 93.5 96 95 96 105 97 110
 GR 97 120 100 135

;COPY OF SEC 18 FROM LITTLE RIVER DRAIN

NC 0.1 0.1 0.045
 X1 101 9 2994 3003.494 0.0 0.0 0 0 0
 GR 185 2530 184.5 2800 184.3 2994 182.4 2997.988 182.4 3000.058
 GR 182.5 3002.045 185.2 3003.494 184.5 3300 185 4000

;COPY OF SEC 20 FROM LITTLE RIVER DRAIN

NC 0.1 0.1 0.045
 X1 103 7 2994 3001.563 0.0 0.0 0 0 0
 GR 186.5 2594 186.1 2994 185.3 2995.615 184 2997.731 185 2999.748
 GR 186.3 3001.563 186.7 3401

;COPY OF SEC 21 FROM LITTLE RIVER DRAIN

NC 0.1 0.1 0.045
 X1 104 7 2994 3001.563 0.0 0.0 0 0 0
 GR 186.5 2594 186.1 2994 185.3 2995.615 184 2997.731 185 2999.748
 GR 186.3 3001.563 186.7 3401

;COPY OF SEC 22 FROM LITTLE RIVER DRAIN

NC 0.1 0.1 0.045
 X1 105 8 2994 3005.278 0.0 0.0 0 0 0
 GR 186.7 2594 186.3 2994 184.9 2998.669 184.6 3001.978 185.1 3004.914
 GR 186.2 3005.278 186.3 3006 186.6 3406

;COPY OF SEC 23 FROM LITTLE RIVER DRAIN

NC 0.1 0.1 0.045

;From Watson Drain Plan and Profile Drawing

NC 0.1 0.1 0.045
 X1 112 6 3000 3004.8 0.0 0.0 0 0 0
 GR 185.2 2900 185 3000 183.5 3001.9 183.5 3002.9 185 3004.8
 GR 185.2 3105

;From Desjardins Drain Plan and Profile

NC 0.1 0.1 0.045
 X1 113 6 3000 30010.5 0.0 0.0 0 0 0
 GR 185.2 2900 185 3000 182 3004.5 182 3006 185 3010.5
 GR 185.2 3110

;From Twin Oaks Buisness Park SWM Report

NC 0.1 0.1 0.045
 X1 114 6 3000 3013 0.0 0.0 0 0 0
 GR 185.2 2900 185 3000 182 3006 182 3007 185 3013
 GR 185.2 3113

;From Profile Drawing of the Lappan Drain and McGill Outlet

NC 0.1 0.1 0.045
 X1 115 6 3000 3007.5 0.0 0.0 0 0 0
 GR 185.2 2900 185 3000 183 3003 185 3004.5 185 3007.5
 GR 185.2 3108

;From Profile Drawing of the Lappan Drain and McGill Outlet

NC 0.1 0.1 0.045
 X1 116 6 3000 3005.9 0.0 0.0 0 0 0
 GR 185.2 2900 185 3000 183.5 3002.2 183.5 3003.7 185 3005.9
 GR 185.2 3106

;From Plan, Profile, and Cross Section of the Gouin Drain

NC 0.1 0.1 0.045
 X1 117 6 3000 3007 0.0 0.0 0 0 0
 GR 185.2 2900 185 3000 183 3003 183 3004 185 3007
 GR 185.2 3107

NC 0.1 0.1 0.045

X1 12 20 2994 3023.947 0.0 0.0 0 0 0
 GR 184.3 1900 183 1940 183 2000 183 2300 183 2630
 GR 183 2800 183 2875 183 2950 183 2994 180.1 3003.342
 GR 180 3006.565 179.1 3009.925 180.1 3014.217 180.4 3015.716 183.2 3023.947
 GR 183 3050 183 3150 183 3300 183 3500 183.2 3750

NC 0.1 0.1 0.045

X1 13 18 2994 3017.137 0.0 0.0 0 0 0
 GR 183.9 2250 183.4 2350 183.7 2480 183.1 2620 183 2675

X1 106 7 3015.126 3025.443 0.0 0.0 0 0 0
 GR 186.85 2615 186.455 3015.126 185.3 3019.358 185.111 3021.732 185.3 3023.129
 GR 186.4 3025.443 186.8 3425

;COPY OF SEC 24 FROM LITTLE RIVER DRAIN

NC 0.1 0.1 0.045
 X1 107 7 2994 3005.566 0.0 0.0 0 0 0
 GR 187.28 2594 186.88 2994 185.555 2996.426 185.225 2998.403 185.666 3001.084
 GR 186.75 3005.566 187.15 3405

NC 0.1 0.1 0.045

X1 11 21 2994 3006.235 0.0 0.0 0 0 0
 GR 184 1900 184 1940 184 2000 184 2300 184 2630
 GR 184 2800 184 2875 184 2950 184 2993.9 182.159 2994
 GR 179.562 2998.875 178.671 3000.754 179.666 3003.937 182.09 3006.235 184 3006.335
 GR 184 3050 184 3150 184 3300 184 3500 184 3750
 GR 184 4300

;[LE: 2994][RE: 3006.235]

NC 0.045 0.045 0.03
 X1 11(orig) 19 2994 3006.235 0.0 0.0 0 0 0
 GR 184 1900 182 1940 182 2000 182 2300 182 2630
 GR 182 2800 182 2875 182 2950 182 2994 179.562 2998.875
 GR 178.671 3000.754 179.666 3003.937 182.09 3006.235 182 3050 182 3150
 GR 182 3300 182.5 3500 182.9 3750 184 4300

;High-chord transect for bridge 11.5 (River: Little River; Reach: Watson to Desjar).
 NC 0.1 0.1 0.045

X1 11.5_HC 20 0 0 0.0 0.0 0 0 0
 GR 184.3 1900 182.3 1940 181.4 2000 181.9 2300 182.2 2630
 GR 182.3 2800 182.3 2875 182.3 2950 183 2994 180.1 3003.342
 GR 180 3006.565 179.1 3009.925 180.1 3014.217 180.4 3015.716 183.2 3023.947
 GR 182.3 3050 182.3 3150 182.3 3300 182.8 3500 183.2 3750

;From Little Tenth Concession Drain Plan and Profile Drawing

NC 0.1 0.1 0.045
 X1 110 8 3001 3006.5 0.0 0.0 0 0 0
 GR 186.4 2900 186.2 3000 186 3001 184.5 3003.25 184.5 3004.25
 GR 186 3006.5 186.2 3007 186.4 3107

;From Plan and Profile of the Watson Drain

NC 0.1 0.1 0.045
 X1 111 6 3000 3007.1 0.0 0.0 0 0 0
 GR 185.2 2900 185 3000 182.5 3003.1 182.5 3004.1 185 3007.1
 GR 185.2 3107

GR 183 2830 183 2890 183 2950 182.835 2994 180.583 3003.421
 GR 179.754 3007.359 180.617 3010.645 182.914 3017.137 183 3040 183 3240
 GR 183.2 3270 183.4 3350 184 4000

;High-chord transect for bridge 13.25 (River: Little River; Reach: Baseline to Wats).
 NC 0.1 0.1 0.045

X1 13.25_HC 10 0 0 0.0 0.0 0 0 0
 GR 183.9 2250 183.6 2830 183.4 2950 183.895 2994 183.9 2994.4
 GR 183.9 3006 183.1 3040 183.2 3270 183.4 3350 184 4000

NC 0.1 0.1 0.045

X1 13.5 18 2994 3017.137 0.0 0.0 0 0 0
 GR 183.9 2250 183.4 2350 183.7 2480 183.1 2620 183 2675
 GR 183 2830 182.5 2890 182.5 2950 182.835 2994 180.583 3003.421
 GR 179.754 3007.359 180.617 3010.645 182.914 3017.137 182.5 3040 182.5 3240
 GR 183.2 3270 183.4 3350 184 4000

NC 0.1 0.1 0.045

X1 14 19 2994 3015.242 0.0 0.0 0 0 0
 GR 184.2 2250 183.7 2350 184 2480 183.4 2620 183.3 2675
 GR 183.3 2830 183.3 2890 183.3 2950 183.268 2994 180.87 3001.339
 GR 180.062 3004.032 180.699 3006.356 183.031 3009.792 183.047 3015.242 183.3 3040
 GR 183.3 3240 183.5 3270 183.7 3350 184.3 4000

;High-chord transect for bridge 14.5 (River: Little River; Reach: Baseline to Wats).
 NC 0.1 0.1 0.045

X1 14.5_HC 27 2994.2 3009.792 0.0 0.0 0 0 0
 GR 184.2 2250 183.7 2350 184 2480 183.4 2620 183.3 2675
 GR 183.3 2775 183.4 2850 183.1 2950 183.01 2969.787 183.268 2994
 GR 183.203 2994.2 183.073 2994.597 182.9 2996.5 182.9 3004.5 182.9 3006.8
 GR 182.907 3009.609 183.031 3009.792 183.047 3015.242 182.944 3025.612 183 3050
 GR 183 3100 183.5 3105 183.8 3180 184.1 3370 184.4 3900
 GR 184.208 3900 184.3 4000

NC 0.1 0.1 0.045

X1 15 19 2994 3015.242 0.0 0.0 0 0 0
 GR 184.2 2250 183.7 2350 184 2480 183.4 2620 183.3 2675
 GR 183.3 2830 183.3 2890 183.3 2950 183.268 2994 180.87 3001.339
 GR 180.062 3004.032 180.699 3006.356 183.031 3009.792 183.047 3015.242 183.3 3040
 GR 183.3 3240 183.5 3270 183.7 3350 184.3 4000

NC 0.1 0.1 0.045

X1 16 18 2993 3007.155 0.0 0.0 0 0 0
 GR 183.8 2380 183.7 2575 183.6 2720 183.6 2825 183.5 2925
 GR 183.5 2975 183.477 2993 181.681 2997.937 180.509 3001.337 180.512 3002.636
 GR 183.126 3007.155 183.5 3010 183.6 3025 183.8 3075 184 3130

GR 184 3210 184.8 3260 184.8 3450

;High-chord transect for bridge 16.5 (River: Little River; Reach: Baseline to Wats).

NC 0.1 0.1 0.045

X1 16.5_HC 12 0 0 0.0 0.0 0 0 0

GR 186.2 1000 185.2 2000 185.2 2300 184.6 2710 184.6 3003.1

GR 184.5 3006 184.6 3050 184.5 3170 184.6 3225 184.6 3700

GR 185 4000 186 5000

NC 0.1 0.1 0.045

X1 17 16 2993 3050 0.0 0.0 0 0 0

GR 185 2000 184.7 2300 184.5 2550 184.2 2710 184 2880

GR 183.7 2950 183.938 2993 180.916 2997.879 180.961 2999.52 180.944 3001.733

GR 183.6 3050 183.9 3170 184.1 3225 184.3 3425 184.6 3700

GR 185 4000

NC 0.1 0.1 0.045

X1 18 7 2999 3009.5 0.0 0.0 0 0 0

GR 185.5 2990 185.2 2999 184.3 3000 182.4 3004 181.6 3006.1

GR 182.5 3008 185.2 3009.5

NC 0.1 0.1 0.045

X1 19 9 2994 3008.988 0.0 0.0 0 0 0

GR 186.4 2899 186.2 2993 185.7 2994 185 2996.861 184.2 2999.958

GR 185 3003.863 185.9 3008.988 186.2 3009 186.4 3100

NC 0.1 0.1 0.045

X1 2 14 2925 2944.65 0.0 0.0 0 0 0

GR 184 2295 181.5 2300 181.5 2525 181.5 2700 181.5 2800

GR 181.3 2850 181.1 2925 178.6 2928.98 178 2932.22 178.5 2935.995

GR 181.6 2944.65 181.2 3075 181.4 3140 181.5 3250

NC 0.1 0.1 0.045

X1 20 8 2994 3001.563 0.0 0.0 0 0 0

GR 186.5 2893 186.3 2993 186.1 2994 185.3 2995.615 184 2997.731

GR 185 2999.748 186.3 3001.563 186.5 3101

NC 0.1 0.1 0.045

X1 21 7 2994 3001.563 0.0 0.0 0 0 0

GR 186.5 2594 186.1 2994 185.3 2995.615 184 2997.731 185 2999.748

GR 186.3 3001.563 186.7 3401

NC 0.1 0.1 0.045

X1 22 8 2994 3005.278 0.0 0.0 0 0 0

GR 186.5 2894 186.3 2994 184.9 2998.669 184.6 3001.978 185.1 3004.914

GR 186.2 3005.278 186.3 3006 186.5 3106

GR 183.81 2997.366 184.08 2997.831 184.35 2998.831 185.41 3000.464 185.63 3003.071

GR 185.72 3005.411 185.79 3008.799 185.8 3009 186 3109

NC 0.1 0.1 0.045

X1 35002 19 2990 3010 0.0 0.0 0 0 0

GR 183 2900 182 2590 181 2600 180.8 2700 180.6 2830

GR 180 2500 179.9 2990 176.7 2998 176.7 3002 179.9 3010

GR 179.5 3018 179.5 3065 180 3085 180.5 3145 180.7 3275

GR 181 3430 181.5 4000 182 4750 182.9 5500

;High-chord transect for bridge 35092.5 (River: Little River; Reach: Gouin to DS end).

;This is a REPEATED section.

NC 0.1 0.1 0.045

X1 35092.5_HC 13 0 0 0.0 0.0 0 0 0

GR 183 2500 180.6 2630 180.5 2830 181 2950 181.4 2983

GR 181.4 2989.2 182 2989.3 182 3013.9 181.4 3014 181.4 3018

GR 181 3065 180.9 3085 180.6 3170

;This is a REPEATED section.

NC 0.1 0.1 0.045

X1 35183 23 2992.7 3007.5 0.0 0.0 0 0 0

GR 183 2500 180.6 2630 180.5 2830 180 2900 179.4 2950

GR 179.9 2983 177.9 2989.2 177.9 2989.3 176.8 2992.7 177.4 2992.8

GR 176.8 2994.6 176.8 3000 176.8 3007.4 176.8 3007.5 179.3 3013.9

GR 179.3 3014 179.9 3015.3 179.5 3018 179.5 3065 180 3085

GR 180.5 3145 180.6 3170 180.7 3275

NC 0.1 0.1 0.045

X1 25404 11 2991 3009 0.0 0.0 0 0 0

GR 181.9 2640 180.4 2665 180.4 2800 180.4 2920 179.9 2991

GR 176.8 2996 176.8 3004 179.4 3009 179.9 3035 180.4 3175

GR 180.9 3370

NC 0.1 0.1 0.045

X1 36 12 2994 3007.976 0.0 0.0 0 0 0

GR 186.5 2893 186.3 2993 185.85 2994 184.35 2996.702 184.19 2997.51

GR 184.33 2998.331 185.76 3000.603 186.01 3002.265 186.18 3004.351 186.25 3007.976

GR 186.3 3008 186.5 3108

NC 0.1 0.1 0.045

X1 36000 11 2991 3009 0.0 0.0 0 0 0

GR 182 2640 180.5 2665 180.5 2800 180.5 2920 180 2991

GR 176.9 2996 176.9 3004 179.5 3009 180 3035 180.5 3175

GR 181 3370

NC 0.1 0.1 0.045

NC 0.1 0.1 0.045

X1 23 7 3015.126 3025.443 0.0 0.0 0 0 0

GR 186.85 2615 186.455 3015.126 185.3 3019.358 185.111 3021.732 185.3 3023.129

GR 186.4 3025.443 186.8 3425

NC 0.1 0.1 0.045

X1 24 7 2994 3005.566 0.0 0.0 0 0 0

GR 187.28 2594 186.88 2994 185.555 2996.426 185.225 2998.403 185.666 3001.084

GR 186.75 3005.566 187.15 3405

;Upstream of Desjardins junction

NC 0.1 0.1 0.045

X1 3 18 2950 2981.62 0.0 0.0 0 0 0

GR 185 2280 182 2290 181.2 2300 181.1 2550 181 2750

GR 181 2850 181 2950 180.4 2950 178 2955.12 178 2964.396

GR 178 2977.105 181.2 2981.62 181.3 3250 181.6 3450 181.9 3750

GR 182 4000 182.4 4650 182.9 5500

NC 0.1 0.1 0.045

X1 32 13 2994 3010.776 0.0 0.0 0 0 0

GR 185.5 2893 185.3 2993 185 2994 184.726 2996.364 182.329 2999.636

GR 182.219 3000.193 183.425 3000.857 184.746 3004.58 184.978 3005.949 185.093 3007.195

GR 185.209 3010.776 185.3 3011 185.5 3111

NC 0.1 0.1 0.045

X1 33 12 2994 3007.807 0.0 0.0 0 0 0

GR 185.9 2893 185.7 2993 184.69 2994 184.46 2995.61 182.81 2999.114

GR 182.74 3000.114 182.76 3001.067 184.75 3004.397 184.92 3005.992 185.01 3007.807

GR 185.7 3008 185.9 3108

NC 0.1 0.1 0.045

X1 34 13 2994 3008.898 0.0 0.0 0 0 0

GR 185.8 2893 185.6 2993 185.21 2994 185.08 2995.761 183.56 2998.015

GR 183.49 2998.82 183.76 2999.824 185.12 3001.947 185.38 3004.25 185.48 3005.229

GR 185.54 3008.898 185.6 3009 185.8 3109

NC 0.1 0.1 0.045

X1 34001 15 2990 3010 0.0 0.0 0 0 0

GR 182 2590 181 2600 180.8 2700 180.6 2830 180 2900

GR 179.9 2990 176.7 2998 176.7 3002 179.9 3010 179.5 3018

GR 179.5 3065 180 3085 180.5 3145 180.7 3275 181 3430

NC 0.1 0.1 0.045

X1 35 14 2994 3008.799 0.0 0.0 0 0 0

GR 186 2893 185.8 2993 185.54 2994 184.41 2996.028 183.85 2996.871

X1 37 10 2994 3007.845 0.0 0.0 0 0 0

GR 186.44 2894 186.24 2994 184.35 2996.135 184.29 2996.867 184.4 2997.792

GR 185.74 2999.714 186.01 3002.317 186.16 3004.275 186.24 3007.845 186.44 3108

;This is a REPEATED section.

NC 0.1 0.1 0.045

X1 37500 11 2920.8 2956 0.0 0.0 0 0 0

GR 182.1 2640 180.6 2660 180.6 2768 180.6 2864 180.1 2920.8

GR 177 2924.8 177 2931.2 179.6 2935.2 180.1 2956 180.6 3068

GR 181.1 3224

NC 0.1 0.1 0.045

X1 38 10 2994 3007.657 0.0 0.0 0 0 0

GR 186.74 2894 186.54 2994 184.48 2996.273 184.45 2996.733 184.49 2997.226

GR 186.15 2999.756 186.35 3002.261 186.47 3004.185 186.54 3007.657 186.74 3108

NC 0.1 0.1 0.045

GR 187.02 2894 186.82 2994 184.61 2996.225 184.53 2996.573 186.41 3000.479

GR 186.57 3002.393 186.76 3004.342 186.82 3007.859 187.02 3108

NC 0.1 0.1 0.045

X1 39001 11 2994.3 3005.8 0.0 0.0 0 0 0

GR 185 2710 180.5 2750 180.5 2825 180.5 2920 179.9 2994.3

GR 177.1 2997.3 177.1 3002.8 179.9 3005.8 180.5 3060 181 3210

GR 181 3450

NC 0.1 0.1 0.045

X1 4 9 3005.457 3024.75 0.0 0.0 0 0 0

GR 181.7 2604 181.3 3004 181 3005.457 178.3 3009.33 178.1 3014.085

GR 178.2 3017.186 181.2 3024.75 181.3 3038.397 181.7 3438

NC 0.1 0.1 0.045

X1 4.5 9 3005.457 3024.75 0.0 0.0 0 0 0

GR 181.7 2604 181.3 3004 181 3005.457 178.3 3009.33 178.1 3014.085

GR 178.2 3017.186 181.2 3024.75 181.3 3038.397 181.6 3300

NC 0.1 0.1 0.045

X1 40 10 2994 3014.272 0.0 0.0 0 0 0

GR 186.9 2893 186.7 2993 186.457 2994 185.294 2994.891 184.637 2996.625

GR 185.546 2997.316 186.637 2999.988 186.637 3014.272 186.7 3015 186.9 3115

;This is a REPEATED section.

NC 0.1 0.1 0.045

X1 40323 19 2993.9 3006.2 0.0 0.0 0 0 0

GR 182.5 2730 180.5 2750 180.5 2825 180.5 2920 179.9 2991

GR 178.1 2993 178.1 2993.1 177.2 2993.9 177.2 2994 177.2 3000
GR 177.2 3006.1 177.2 3006.2 178 3007 178 3007.1 179.9 3009
GR 180.5 3060 181 3220 181 3300 181.5 3450

;High-chord transect for bridge 40573.5 (River: Little River; Reach: Gouin to DS end).

;This is a REPEATED section.
NC 0.1 0.1 0.045
X1 40573.5_HC 12 0 0 0.0 0.0 0 0 0
GR 182.5 2730 182.6 2750 183 2920 183 2993 183.8 2993.1
GR 183.8 2994 183 3000 183.8 3006.1 183.8 3007 183 3007.1
GR 183 3009 181.4 3220

;This is a REPEATED section.
NC 0.1 0.1 0.045
X1 40824 18 2993.9 3006.2 0.0 0.0 0 0 0
GR 182.5 2730 180.5 2750 180.5 2825 180.5 2920 179.9 2991
GR 178.1 2993 178.1 2993.1 177.2 2993.9 177.2 2994 177.2 3000
GR 177.2 3006.1 177.2 3006.2 178 3007 178 3007.1 179.9 3009
GR 180.5 3060 181 3220 181 3300

NC 0.1 0.1 0.045
X1 41 9 2994 3001.712 0.0 0.0 0 0 0
GR 187.1 2893 186.9 2993 186.575 2994 185.38 2996.371 184.838 2996.838
GR 185.186 2999.93 186.677 3001.712 186.9 3002 187.1 3102

NC 0.1 0.1 0.045
X1 41106 16 2950.3 2965.7 0.0 0.0 0 0 0
GR 183 2860 181.5 2874 180.7 2923 181.3 2946.1 179.4 2950.3
GR 177.3 2954.36 177.3 2961.64 179.4 2965.7 181 3000 181 3045.5
GR 181 3112 181.1 3203 181.2 3308 181.5 3413 181.8 3658
GR 182.3 4148

NC 0.1 0.1 0.045
X1 42 9 2994 3002.342 0.0 0.0 0 0 0
GR 187.1 2893 186.9 2993 186.75 2994 185.322 2995.817 184.846 2997.942
GR 185.148 2999.934 186.801 3002.342 186.9 3003 187.1 3103

NC 0.1 0.1 0.045
X1 42000 16 2989 3011 0.0 0.0 0 0 0
GR 183 2860 181.5 2880 180.7 2950 181.3 2983 179.4 2989
GR 177.3 2994.8 177.3 3005.2 179.4 3011 181 3060 181 3125
GR 181 3220 181.1 3350 181.2 3500 181.5 3650 181.8 4000
GR 182.3 4700

NC 0.1 0.1 0.045
X1 43 8 2994 3001.123 0.0 0.0 0 0 0

GR 187.2 2893 187 2993 186.941 2994 184.889 2995.821 185.528 2998.6
GR 186.865 3001.123 187 3002 187.2 3102

NC 0.1 0.1 0.045
X1 44 8 2994 3003.375 0.0 0.0 0 0 0
GR 188 2893 187.8 2993 187.6 2994 186.2 2997.03 185.6 2998.694
GR 186.2 2999.884 187.8 3003.375 188 3103

;Location of Twin Oaks Drive Structure
NC 0.1 0.1 0.045
X1 44302 20 2989.8 3010.4 0.0 0.0 0 0 0
GR 183 2660 182 2680 181 2790 180.5 2820 180.5 2840
GR 181 2860 181 2950 180 2989.8 178.9 2991.5 177.5 2993.6
GR 177.5 3006.2 178.9 3008.5 180.1 3010.4 181 3060 181 3150
GR 181.2 3250 181.2 3350 181.4 3600 181.7 4000 182.2 4600

;Location of Twin Oaks Drive Structure
;This is a REPEATED section.
NC 0.1 0.1 0.045
X1 44323 20 2989.8 3010.4 0.0 0.0 0 0 0
GR 183 2660 182 2680 181 2790 180.5 2820 180.5 2840
GR 181 2860 181 2950 180 2989.8 178.9 2991.5 177.5 2993.6
GR 177.5 3006.2 178.9 3008.5 180.1 3010.4 181 3060 181 3150
GR 181.2 3250 181.2 3350 181.4 3600 181.7 4000 182.2 4600

;This is a REPEATED section.
NC 0.1 0.1 0.045
X1 44704 20 2989.8 3010.4 0.0 0.0 0 0 0
GR 183.2 2660 182.2 2680 181.2 2790 180.7 2820 180.7 2840
GR 181.2 2860 181.2 2950 180.2 2989.8 179.1 2991.5 177.7 2993.6
GR 177.7 3006.2 179.1 3008.5 180.3 3010.4 181.2 3060 181.2 3150
GR 181.4 3250 181.4 3350 181.6 3600 181.9 4000 182.4 4600

NC 0.1 0.1 0.045
X1 45 7 2994 2999.9 0.0 0.0 0 0 0
GR 187.7 2894 187.5 2994 185.8 2997.66 185.6 2998.61 185.8 2999.9
GR 187.5 3000 187.7 3100

;This is a REPEATED section.
NC 0.1 0.1 0.045
X1 45100 20 2989.8 3010.4 0.0 0.0 0 0 0
GR 183.4 2660 182.4 2680 181.4 2790 180.9 2820 180.9 2840
GR 181.4 2860 181.4 2950 180.4 2989.8 179.3 2991.5 177.9 2993.6
GR 177.9 3006.2 179.3 3008.5 180.5 3010.4 181.4 3060 181.4 3150
GR 181.6 3250 181.6 3350 181.8 3600 182.1 4000 182.6 4600

NC 0.1 0.1 0.045
X1 45601 20 2989.8 3010.4 0.0 0.0 0 0 0
GR 183 2200 182 2250 181 2300 181 2825 181 2840
GR 181 2860 181 2950 180 2989.8 178.9 2991.5 178.2 2993.6
GR 178.2 3006.2 178.9 3008.5 180.1 3010.4 181 3060 181 3150
GR 181.2 3250 181.2 3350 181.4 3600 181.7 4000 182.2 4600

NC 0.1 0.1 0.045
X1 46 8 2994 3001.45 0.0 0.0 0 0 0
GR 188.3 2894 188.1 2994 186 2996.006 185.6 2996.766 185.7 2998.427
GR 187.8 3001.45 188.1 3008.62 188.3 3109

NC 0.1 0.1 0.045
X1 46102 18 2995 3005.7 0.0 0.0 0 0 0
GR 184 2240 181 2250 181 2500 181 2700 181 2850
GR 181 2992 181 2992.1 178.9 2995 178.9 2995.1 178.4 3000
GR 178.4 3005.6 178.4 3005.7 181 3008 181 3008.1 181 3025
GR 181 3200 181 3600 182 4250

;This is a REPEATED section.
NC 0.1 0.1 0.045
X1 46203 18 2995 3005.7 0.0 0.0 0 0 0
GR 184 2240 181 2250 181 2500 181 2700 181 2850
GR 181 2992 181 2992.1 178.9 2995 178.9 2995.1 178.4 3000
GR 178.4 3005.6 178.4 3005.7 181 3008 181 3008.1 181 3025
GR 181 3200 181 3600 182 4250

NC 0.1 0.1 0.045
X1 46304 18 2992.1 3008 0.0 0.0 0 0 0
GR 184 2240 181 2250 181 2500 181 2700 181 2850
GR 181 2992 181 2992.1 178.9 2995 178.9 2995.1 178.4 3000
GR 178.4 3005.6 178.4 3005.7 181 3008 181 3008.1 181 3025
GR 181 3200 181 3600 182 4250

;Upstream of Little River and Baseline junction
NC 0.1 0.1 0.045
X1 47 12 2994 3011.01 0.0 0.0 0 0 0
GR 184.79 2894 184.59 2994 184.41 2997.573 184.23 2998.34 182.32 3002
GR 181.23 3003.576 181.24 3004.4 181.22 3005.132 182.32 3006.611 184.39 3011.01
GR 184.59 3011.5 184.79 3111

;This is a REPEATED section.
NC 0.1 0.1 0.045
X1 47100 18 2766.47 2777.6 0.0 0.0 0 0 0
GR 183.9 2240 180.9 2247 180.9 2422 180.9 2562 180.9 2667
GR 180.9 2766.4 180.9 2766.47 178.8 2768.5 178.8 2768.57 178.3 2772

GR 178.3 2775.92 178.3 2775.99 180.9 2777.6 180.9 2777.67 180.9 2789.5
GR 180.9 2912 180.9 3192 181.9 3647

NC 0.1 0.1 0.045
X1 48 11 2994 3008.902 0.0 0.0 0 0 0
GR 184.75 2894 184.55 2994 184.4 2995.178 182.28 2999.297 181.47 3001.113
GR 181.43 3001.905 181.57 3002.728 184.31 3006.35 184.41 3008.902 184.55 3009
GR 184.75 3109

NC 0.1 0.1 0.045
X1 48500 14 2992 3008 0.0 0.0 0 0 0
GR 184.9 2300 181.4 2310 181.4 2650 181.4 2810 181.2 2850
GR 180.9 2980 180.7 2992 178.2 2997 178.2 3003 180.7 3008
GR 180.9 3035 181.1 3150 181.5 3500 181.9 4000

NC 0.1 0.1 0.045
X1 49 11 2994 3016.678 0.0 0.0 0 0 0
GR 185.26 2894 185.06 2994 184.94 2997.328 184.76 2997.913 181.84 3004.357
GR 181.69 3004.762 181.81 3005.941 184.42 3008.955 184.6 3016.678 185.06 3017
GR 185.26 3117

NC 0.1 0.1 0.045
X1 49000 16 2991 3009 0.0 0.0 0 0 0
GR 184 2295 181.5 2300 181.5 2525 181.5 2700 181.5 2800
GR 181.3 2850 181.1 2925 181 2991 178.2 2996.7 178.2 3003.3
GR 181 3009 181.2 3075 181.4 3140 181.5 3250 181.6 3450
GR 182 4000

NC 0.1 0.1 0.045
X1 5 20 2952 2971.34 0.0 0.0 0 0 0
GR 185 2280 182 2290 181.2 2300 181.1 2550 181 2750
GR 181 2850 181 2950 181.3 2952 180.1 2959.032 180 2961.837
GR 180.1 2964.914 181.2 2971.34 181 3050 181.1 3150 181.3 3250
GR 181.6 3450 181.9 3750 182 4000 182.4 4650 182.9 5500

NC 0.1 0.1 0.045
X1 50 10 2998.084 3009.343 0.0 0.0 0 0 0
GR 185.5 2894 185.3 2994 185.2 2997.059 184.9 2998.084 182.8 3003.172
GR 182.3 3004.059 181.7 3007.922 184.8 3009.343 185.3 3010 185.5 3109

;This is a REPEATED section.
NC 0.1 0.1 0.045
X1 50350 16 2991 3009 0.0 0.0 0 0 0
GR 184 2295 181.5 2300 181.5 2525 181.5 2700 181.5 2800
GR 181.3 2850 181.1 2925 181 2991 178.2 2996.7 178.2 3003.3
GR 181 3009 181.2 3075 181.4 3140 181.5 3250 181.6 3450

GR 182 4000

NC 0.1 0.1 0.045
 X1 51 9 2994 3009.177 0.0 0.0 0 0 0
 GR 185.6 2894 185.4 2994 185.3 2997.858 183.2 3001.878 182.2 3003.71
 GR 183.4 3005.171 185.1 3009.177 185.4 3010 185.6 3110

NC 0.1 0.1 0.045
 X1 51701 16 2991 3009 0.0 0.0 0 0 0
 GR 184 2295 181.5 2300 181.5 2525 181.5 2700 181.5 2800
 GR 181.3 2850 181.1 2925 181 2991 178.2 2996.7 178.2 3003.3
 GR 181 3009 181.2 3075 181.4 3140 181.5 3250 181.6 3450
 GR 182 4000

NC 0.1 0.1 0.045
 X1 52 9 2994 3002.636 0.0 0.0 0 0 0
 GR 186.7 2893 186.5 2993 185.908 2994 184.55 2996.693 184.25 2997.187
 GR 184.45 2999.299 186 3002.636 186.5 3003 186.7 3103

NC 0.1 0.1 0.045
 X1 53 9 100 108.721 0.0 0.0 0 0 0
 GR 186.5 -1 186.3 99 185.907 100 184.55 103.803 184.331 103.804
 GR 184.666 106.431 185.998 108.721 186.3 109 186.5 209

;THIS IS A COPIED SECTION OF 53
 NC 0.1 0.1 0.045
 X1 53.5 7 100 108.721 0.0 0.0 0 0 0
 GR 188.607 0 188.407 100 187.05 103.803 186.831 103.804 187.166 106.431
 GR 188.498 108.721 188.698 208.721

NC 0.1 0.1 0.045
 X1 54 8 2994 3005.29 0.0 0.0 0 0 0
 GR 187.5 2893 187.3 2993 186.7 2994 184.8 2996.638 184.9 3003.237
 GR 186.7 3005.29 187.3 3006 187.5 3106

NC 0.1 0.1 0.045
 X1 54.5 6 2994 3005.29 0.0 0.0 0 0 0
 GR 188.68 2594 188.28 2994 186.58 2996.638 186.68 3003.237 188.48 3005.29
 GR 188.88 3405

NC 0.1 0.1 0.045
 X1 55 8 2994 3001.572 0.0 0.0 0 0 0
 GR 187.1 2894 186.9 2994 184.8 2995.71 184.5 2996.6 184.7 2997.64
 GR 186.7 3001.572 186.9 3002 187.1 3102

;COPIED SECTION FROM SEC 55

NC 0.1 0.1 0.045
 X1 55.5 8 2994 3001.572 0.0 0.0 0 0 0
 GR 187.6 2894 187.4 2994 185.3 2995.71 185 2996.6 185.2 2997.64
 GR 187.2 3001.572 187.4 3002 187.6 3102

NC 0.1 0.1 0.045
 X1 56 9 2994 3001.675 0.0 0.0 0 0 0
 GR 188.7 2893 188.5 2993 187.66 2994 186.555 2996.174 186.09 2998.433
 GR 186.66 2999.644 187.999 3001.675 188.5 3002 188.7 3102

NC 0.1 0.1 0.045
 X1 57 9 2994 3008.541 0.0 0.0 0 0 0
 GR 188.9 2893 188.7 2993 187.8 2994 187.088 2998.621 186.755 2999.555
 GR 187 3001.32 187.911 3008.541 188.7 3010 188.9 3110

NC 0.1 0.1 0.045
 X1 58 7 2994 3008.551 0.0 0.0 0 0 0
 GR 188.95 2594 188.555 2994 187.7 2998.05 187.701 2999.828 187.8 3002.522
 GR 188.565 3008.551 188.96 3408

;COPIED SECTION FROM SEC 58
 NC 0.1 0.1 0.045
 X1 58.5 9 2994 3008.551 0.0 0.0 0 0 0
 GR 189.5 2894 189.3 2993 189.055 2994 188.2 2998.05 188.201 2999.828
 GR 188.3 3002.522 189.065 3008.551 189.3 3009 189.5 3109

;COPIED SECTION FROM SEC 58
 NC 0.1 0.1 0.045
 X1 58.7 7 2994 3008.551 0.0 0.0 0 0 0
 GR 194.1 2894 193.905 2994 189 2998.05 193.051 2999.828 193.15 3002.522
 GR 193.915 3008.551 194.11 3108

;High-chord transect for bridge 58.74 (River: 7th Concession D; Reach: 7th Concession).
 ;COPIED SECTION FROM SEC 58
 NC 0.1 0.1 0.045
 X1 58.74 HC 3 0 0 0.0 0.0 0 0 0
 GR 194.45 2594 194.4 3347.324 194.46 3408

;COPIED SECTION FROM SEC 58
 NC 0.1 0.1 0.045
 X1 58.745 7 2994 3008.551 0.0 0.0 0 0 0
 GR 194.45 2594 194.055 2994 189 2998.05 193.201 2999.828 193.3 3002.522
 GR 194.065 3008.551 194.46 3408

;COPIED SECTION FROM SEC 58
 NC 0.1 0.1 0.045

X1 58.75 7 2994 3008.551 0.0 0.0 0 0 0
 GR 194.45 2594 194.055 2994 189 2998.05 193.201 2999.828 193.3 3002.522
 GR 194.065 3008.551 194.46 3408

;High-chord transect for bridge 58.76 (River: 7th Concession D; Reach: 7th Concession).
 ;COPIED SECTION FROM SEC 58
 NC 0.1 0.1 0.045
 X1 58.76 HC 3 0 0 0.0 0.0 0 0 0
 GR 194.75 2594 194.6 3246.198 194.76 3408

;COPIED SECTION FROM SEC 58
 NC 0.1 0.1 0.045
 X1 58.8 7 2994 3008.551 0.0 0.0 0 0 0
 GR 194.75 2594 194.355 2994 189 2998.05 193.501 2999.828 193.6 3002.522
 GR 194.365 3008.551 194.76 3408

NC 0.1 0.1 0.045
 X1 59 9 2994 2999.957 0.0 0.0 0 0 0
 GR 189.4 2794 189 2993 188.333 2994 186.811 2995.149 186.666 2996.75
 GR 186.788 2997.321 188.456 2999.957 189 3000 189.4 3200

NC 0.1 0.1 0.045
 X1 59.5 7 2994 2999.957 0.0 0.0 0 0 0
 GR 189.23 2594 188.833 2994 187.311 2995.149 187.166 2996.75 187.288 2997.321
 GR 188.956 2999.957 189.36 3400

NC 0.1 0.1 0.045
 X1 61 10 3.3 7.8 0.0 0.0 0 0 0
 GR 187.6 -101 187.5 -1 186.65 0 185.45 3.3 185.14 4.3
 GR 185.24 6.1 186.36 7.8 186.65 10 187.5 11 187.6 111

NC 0.1 0.1 0.045
 X1 62 9 2994 3001.735 0.0 0.0 0 0 0
 GR 187.1 2893 186.9 2993 186.869 2994 185.364 2996.285 185.013 2998.603
 GR 185.033 2999.523 186.729 3001.735 186.9 3002 187.1 3102

NC 0.1 0.1 0.045
 X1 63 8 2994 3001.767 0.0 0.0 0 0 0
 GR 187.2 2893 187 2993 186.8 2994 185.7 2995.663 185.1 2996.67
 GR 186 2999.277 187 3001.767 187.1 3102

NC 0.1 0.1 0.045
 X1 64 11 2995.257 3009.048 0.0 0.0 0 0 0
 GR 187.1 2894 186.9 2994 186.6 2995.257 187.1 2997.217 187.1 3000.509
 GR 187.1 3003.395 185.7 3005.348 185.1 3006.053 186 3007.491 186.9 3009.048
 GR 187.1 3109

NC 0.1 0.1 0.045
 X1 65 7 2994 2997.22 0.0 0.0 0 0 0
 GR 187.7 2894 187.5 2994 186.1 2995.73 185.6 2996.45 186.1 2996.97
 GR 187.5 2997.22 187.7 3100

NC 0.1 0.1 0.045
 X1 66 7 2994 3000.208 0.0 0.0 0 0 0
 GR 187.6 2894 187.4 2994 186 2996.55 185.4 2997.568 185.6 2998.625
 GR 187.4 3000.208 187.6 3100

NC 0.1 0.1 0.045
 X1 67 8 2994 3000.472 0.0 0.0 0 0 0
 GR 187.9 2894 187.7 2994 186.4 2994.948 186.3 2995.615 186.2 2997.818
 GR 186.5 2998.54 187.7 3000.472 187.9 3100

NC 0.1 0.1 0.045
 X1 69 9 2994 3001.43 0.0 0.0 0 0 0
 GR 187.9 2894 187.7 2994 186.5 2996.165 185.8 2997.276 186 2998.469
 GR 186.4 2999.253 187.5 3001.43 187.7 3002 187.9 3102

NC 0.1 0.1 0.045
 X1 69 7 2994 3001.454 0.0 0.0 0 0 0
 GR 188.2 2894 188 2994 186.4 2996.488 186.1 2998.293 186.6 3000.357
 GR 188 3001.454 188.2 3101

;6th Concessio Drain at 9th Conc Road
 NC 0.015 0.015 0.015
 X1 6th9th 4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 GR 185.1 0 184.8 30 184.8 70 185 130

NC 0.1 0.1 0.045
 X1 7 22 2952 2968 0.0 0.0 0 0 0
 GR 185 2010 185 2020 185 2499.9 182.8 2500 181.8 2675
 GR 181.8 2790 181.7 2880 181.6 2950 181.3 2952 179.3 2958.017
 GR 178.8 2960.989 179.7 2963.107 180.8 2967.952 181.3 2968 181.6 2975
 GR 181.8 3050 182.2 3110 185 3110.1 185 3200 185 3350
 GR 185 3600 185 4000

;[LE: 2500] [RE: 3110]
 NC 0.045 0.045 0.03
 X1 7(orig) 20 2952 2968 0.0 0.0 0 0 0
 GR 185 2010 182.2 2020 182.8 2500 181.8 2675 181.8 2790
 GR 181.7 2880 181.6 2950 181.3 2952 179.3 2958.017 178.8 2960.989
 GR 179.7 2963.107 180.8 2967.952 181.3 2968 181.6 2975 181.8 3050
 GR 182.2 3110 181.8 3200 181.7 3350 181.7 3600 182.1 4000


```

GR 184.6 3003 184.6 3003.1 184.5 3006 184.6 3050 184.5 3170
GR 184.6 3225 184.6 3425 184.6 3700 185 4000

;Little River at Twin Oaks
NC 0.015 0.015 0.015
X1 LT@Twin Oaks 4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
GR 181 0 180.8 60 180.8 80 181 160

;Rail Line at Little River
NC 0.015 0.015 0.015
X1 Rail@LR 28 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
GR 184 2295 182.5 2300 182.5 2525 182.5 2700 182.5 2800
GR 182.5 2850 182.5 2925 182.5 2990.2 182.5 2991 183.4 2991.1
GR 183.4 2992.6 183.4 2992.7 183.4 2996.6 183.4 3002.1 183.4 3003.4
GR 183.4 3007.4 183.4 3007.5 183.4 3008.3 183.4 3009.1 182.5 3009.2
GR 182.5 3075 182.5 3140 182.5 3250 182.6 3450 182.9 3650
GR 183 4000 183 4650 183 5500

;Cross Section from Twin Oak Buisness Park Station 0+122
NC 0.1 0.1 0.045
X1 TwinOaks122 17 38 39.5 0.0 0.0 0 0 0
GR 181 4 181 5.5 179.4 13.5 179.4 17.5 178.2 22.5
GR 178.2 25.5 177.2 30.5 177.2 36.5 177.2 38 177 38.5
GR 177.2 39.5 177.2 41.3 179 49 179 51.5 180.8 61.5
GR 181 67.5 181 69

;Twin Oaks Buisness Park Station 0+316
NC 0.1 0.1 0.045
X1 TwinOaks316 17 43.5 45 0.0 0.0 0 0 0
GR 181 0 181 7 178.5 17 178.5 29 178.5 33.5
GR 178.5 35 177.4 39 177.4 43.5 177 44 177.4 45
GR 177.4 53 178.5 57 178.5 58.5 178.5 63 178.5 75
GR 181 85 181 92

;Twin Oak Buisness Park Station 0+742
NC 0.1 0.1 0.045
X1 TwinOaks742 17 32 33.5 0.0 0.0 0 0 0
GR 181.6 2.5 181.6 4 179.9 12 179.8 17.5 178.8 21.5
GR 178.7 24 177.9 29 177.9 32 177.6 32.5 177.9 33.5
GR 177.9 36.8 179.6 44.5 179.6 47 181 54.5 181.1 55
GR 181.6 63 181.6 64.5

[LOSSES]
;;Link Inlet Outlet Average Flap Gate
;;-----
C1 0.5 1 0 NO

```

```

C10 0.5 1 0 NO
C11 0.1 0.3 0 NO
C12 0.5 1 0 NO
C14 0.1 0.3 0 NO
C15 0.1 0.3 0 NO
C18 0.1 0.3 0 NO
C19 0.1 0.3 0 NO
C2 0.3 0.5 0 NO
C20 0.1 0.3 0 NO
C21 0.1 0.3 0 NO
C22 0.5 1 0 NO
C23 0.3 0.5 0 NO
C24 0.3 0.5 0 NO
C25 0.3 0.5 0 NO
C27 0.3 0.5 0 NO
C28 0.3 0.5 0 NO
C29 0.3 0.5 0 NO
C3 0.1 0.3 0 NO
C30 0.5 1 0 NO
C31 0.3 0.5 0 NO
C32 0.5 1 0 NO
C33 0.3 0.5 0 NO
C35 0.3 0.5 0 NO
C4 0.5 1 0 NO
C5 0.1 0.3 0 NO
C6 0.5 1 0 NO
C6000 0.1 0.3 0 NO
C6007 0.3 0.5 0 NO
C6015a 0.1 0.3 0 NO
C6015b 0.1 0.3 0 NO
C6025a 0.3 0.5 0 NO
C6030 0.1 0.3 0 NO
C6040 0.3 0.5 0 NO
C6045a 0.1 0.3 0 NO
C6045b 0.3 0.5 0 NO
C6055a 0.3 0.5 0 NO
C6055d 0.3 0.5 0 NO
C6090a 0.3 0.5 0 NO
C6090b 0.1 0.3 0 NO
C6090c 0.1 0.3 0 NO
C6090d 0.3 0.5 0 NO
C6100a 0.1 0.3 0 NO
C6100b 0.3 0.5 0 NO
C6100c 0.3 0.5 0 NO
C6110a 0.3 0.5 0 NO
C6110b 0.3 0.5 0 NO

```

```

C6120a 0.1 0.3 0 NO
C6120b 0.3 0.5 0 NO
C6120c 0.3 0.5 0 NO
C6125a 0.1 0.3 0 NO
C6125b 0.1 0.3 0 NO
C6145 0.1 0.3 0 NO
C6150 0.1 0.3 0 NO
C6160a 0.3 0.5 0 NO
C6160b 0.3 0.5 0 NO
C6170e 0.3 0.5 0 NO
C6170f 0.3 0.5 0 NO
C6170i 0.3 0.5 0 NO
C6180a 0.3 0.5 0 NO
C6180b 0.1 0.3 0 NO
C6180c 0.1 0.3 0 NO
C6180d 0.3 0.5 0 NO
C6180e 0.3 0.5 0 NO
C6190 0.1 0.3 0 NO
C6220 0.3 0.5 0 NO
C7 0.3 0.5 0 NO
C7025 0.5 1 0 NO
C7040 0.5 1 0 NO
C7075 0.5 1 0 NO
C8 0.5 1 0 NO
C9 0.3 0.5 0 NO
CJ0.5 0.1 0.3 0 NO
CJ0.75 0.1 0.3 0 NO
CJ0.8 0.1 0.3 0 NO
CJ0.9 0.1 0.3 0 NO
CJ4 0.1 0.3 0 NO
CJ4.5 0.1 0.3 0 NO
CJ81 0.3 0.5 0 NO
CJ88 0.1 0.3 0 NO
CJ89 0.1 0.3 0 NO

[CURVES]
;;Name Type X-Value Y-Value
;;-----
Pump2165 Pump4 0 0
Pump2165 0.01 0.83
Pump2165 10 0.83
Pump2165 1000 0.83

;Bridge and crossing at EC Row - culvert size 6 x 1.8 according to 1997 SWM report
;Original area=20.065, shape curve area=20.069
0.35 Shape 0 0

```

```

0.35 0.043 2.382
0.35 0.087 3.525
0.35 0.336 4.512
0.35 0.577 4.568
0.35 1 2.609

;Original area=38.697, shape curve area=38.7
1.5 Shape 0 0
1.5 0.108 1.196
1.5 0.135 1.395
1.5 0.324 2.431
1.5 0.405 2.875
1.5 0.572 3.543
1.5 0.838 3.81
1.5 0.919 3.973
1.5 1 3.973

;Original area=23.477, shape curve area=23.473
11.5 Shape 0 0
11.5 0.018 0.578
11.5 0.771 3.002
11.5 0.86 3.002
11.5 0.888 2.708
11.5 0.916 1.964
11.5 1 0

;Original area=6.498, shape curve area=6.5
13.25 Shape 0 0
13.25 0.26 1.188
13.25 0.292 1.313
13.25 1 1.181

;Original area=6.024, shape curve area=6.025
14.5 Shape 0 0
14.5 0.414 1.38
14.5 1 3.173

;Original area=8.915, shape curve area=8.917
16.5 Shape 0 0
16.5 0.072 1.309
16.5 0.713 1.145
16.5 1 1.04

;Bridge #6-Forest Glade Drive
;Original area=47.004, shape curve area=47.001
35092.5 Shape 0 3.765

```

35092.5	0.174	4.287
35092.5	0.176	4.295
35092.5	0.912	4.294
35092.5	0.941	3.039
35092.5	1	0

```
;Bridge #7-Hwy 2
;Original area=62.934, shape curve area=62.943
40573.5 Shape 0 2.242
40573.5 0.926 2.241
40573.5 1 0
```

```
;Original area=7.936, shape curve area=7.936
7.5 Shape 0 0
7.5 0.143 4.768
7.5 0.144 5.246
7.5 0.158 5.301
7.5 0.714 5.286
7.5 0.857 2.786
7.5 0.858 1.5
7.5 1 0
```

```
;Control upstream flows to 2-year predevelopment flow
5002 Storage 0 100000
5002 2 100000

5005 Storage 0 25000
5005 2 25000

5020 Storage 0 25616
5020 2 35198

5030 Storage 0 34160
5030 2 46370

5035 Storage 0 29698
5035 2 40536

5045 Storage 0 16735
5045 2 23584

5050 Storage 0 27179
5050 2 37242

5055 Storage 0 19063
5055 2 26629
```

5130	Storage	0	37637
5130		2	50917
5133	Storage	0	35074
5133		2	47566
5135	Storage	0	6656
5135		2	10403
5140	Storage	0	17819
5140		2	25002
5145	Storage	0	33029
5145		2	44892
5155	Storage	0	22536
5155		2	31170
5165	Storage	0	54873
5165		2	73457
5175	Storage	0	17966
5175		2	25194

```
;Control Twin Oaks flows to existing rates
5180 Storage 0 20000
5180 2 20000

5185 Storage 0 20799
5185 2 28899

5190 Storage 0 26315
5190 2 36112

5200 Storage 0 181716
5200 2 239329

5210 Storage 0 21243
5210 2 29480

5215 Storage 0 35210
5215 2 47744
```

```
[TIMESERIES]
;;Name Date Time Value
;-----
```

5060	Storage	0	37211
5060		2	50360
5065	Storage	0	51900
5065		2	69569
5070	Storage	0	33882
5070		2	46007
5073	Storage	0	28724
5073		2	39262
5075	Storage	0	32728
5075		2	44498
5080	Storage	0	8201
5080		2	12425
5085	Storage	0	22812
5085		2	31531
5087	Storage	0	50395
5087		2	67601
5090	Storage	0	15066
5090		2	21402
5095	Storage	0	32809
5095		2	44604
5100	Storage	0	16388
5100		2	23130
5105	Storage	0	17765
5105		2	24931
5110	Storage	0	15140
5110		2	21499
5115	Storage	0	26706
5115		2	36623
5125	Storage	0	29557
5125		2	40351

100yr-24hr-chi	12/14/2011	0:00:00	0
100yr-24hr-chi	12/14/2011	0:10:00	0.66
100yr-24hr-chi	12/14/2011	0:20:00	0.67
100yr-24hr-chi	12/14/2011	0:30:00	0.69
100yr-24hr-chi	12/14/2011	0:40:00	0.7
100yr-24hr-chi	12/14/2011	0:50:00	0.72
100yr-24hr-chi	12/14/2011	1:00:00	0.73
100yr-24hr-chi	12/14/2011	1:10:00	0.75
100yr-24hr-chi	12/14/2011	1:20:00	0.77
100yr-24hr-chi	12/14/2011	1:30:00	0.78
100yr-24hr-chi	12/14/2011	1:40:00	0.8
100yr-24hr-chi	12/14/2011	1:50:00	0.82
100yr-24hr-chi	12/14/2011	2:00:00	0.84
100yr-24hr-chi	12/14/2011	2:10:00	0.87
100yr-24hr-chi	12/14/2011	2:20:00	0.89
100yr-24hr-chi	12/14/2011	2:30:00	0.91
100yr-24hr-chi	12/14/2011	2:40:00	0.94
100yr-24hr-chi	12/14/2011	2:50:00	0.97
100yr-24hr-chi	12/14/2011	3:00:00	1
100yr-24hr-chi	12/14/2011	3:10:00	1.03
100yr-24hr-chi	12/14/2011	3:20:00	1.07
100yr-24hr-chi	12/14/2011	3:30:00	1.1
100yr-24hr-chi	12/14/2011	3:40:00	1.14
100yr-24hr-chi	12/14/2011	3:50:00	1.19
100yr-24hr-chi	12/14/2011	4:00:00	1.23
100yr-24hr-chi	12/14/2011	4:10:00	1.28
100yr-24hr-chi	12/14/2011	4:20:00	1.34
100yr-24hr-chi	12/14/2011	4:30:00	1.4
100yr-24hr-chi	12/14/2011	4:40:00	1.47
100yr-24hr-chi	12/14/2011	4:50:00	1.54
100yr-24hr-chi	12/14/2011	5:00:00	1.62
100yr-24hr-chi	12/14/2011	5:10:00	1.71
100yr-24hr-chi	12/14/2011	5:20:00	1.82
100yr-24hr-chi	12/14/2011	5:30:00	1.94
100yr-24hr-chi	12/14/2011	5:40:00	2.07
100yr-24hr-chi	12/14/2011	5:50:00	2.23
100yr-24hr-chi	12/14/2011	6:00:00	2.42
100yr-24hr-chi	12/14/2011	6:10:00	2.64
100yr-24hr-chi	12/14/2011	6:20:00	2.92
100yr-24hr-chi	12/14/2011	6:30:00	3.25
100yr-24hr-chi	12/14/2011	6:40:00	3.68
100yr-24hr-chi	12/14/2011	6:50:00	4.25
100yr-24hr-chi	12/14/2011	7:00:00	5.03
100yr-24hr-chi	12/14/2011	7:10:00	6.18
100yr-24hr-chi	12/14/2011	7:20:00	8
100yr-24hr-chi	12/14/2011	7:30:00	11.31

100yr-24hr-chi	12/14/2011	7:40:00	18.95
100yr-24hr-chi	12/14/2011	7:50:00	50.14
100yr-24hr-chi	12/14/2011	8:00:00	171.94
100yr-24hr-chi	12/14/2011	8:10:00	66.41
100yr-24hr-chi	12/14/2011	8:20:00	33.95
100yr-24hr-chi	12/14/2011	8:30:00	21.97
100yr-24hr-chi	12/14/2011	8:40:00	15.98
100yr-24hr-chi	12/14/2011	8:50:00	12.47
100yr-24hr-chi	12/14/2011	9:00:00	10.18
100yr-24hr-chi	12/14/2011	9:10:00	8.59
100yr-24hr-chi	12/14/2011	9:20:00	7.42
100yr-24hr-chi	12/14/2011	9:30:00	6.53
100yr-24hr-chi	12/14/2011	9:40:00	5.84
100yr-24hr-chi	12/14/2011	9:50:00	5.27
100yr-24hr-chi	12/14/2011	10:00:00	4.81
100yr-24hr-chi	12/14/2011	10:10:00	4.42
100yr-24hr-chi	12/14/2011	10:20:00	4.09
100yr-24hr-chi	12/14/2011	10:30:00	3.81
100yr-24hr-chi	12/14/2011	10:40:00	3.57
100yr-24hr-chi	12/14/2011	10:50:00	3.35
100yr-24hr-chi	12/14/2011	11:00:00	3.16
100yr-24hr-chi	12/14/2011	11:10:00	2.99
100yr-24hr-chi	12/14/2011	11:20:00	2.84
100yr-24hr-chi	12/14/2011	11:30:00	2.71
100yr-24hr-chi	12/14/2011	11:40:00	2.59
100yr-24hr-chi	12/14/2011	11:50:00	2.47
100yr-24hr-chi	12/14/2011	12:00:00	2.37
100yr-24hr-chi	12/14/2011	12:10:00	2.28
100yr-24hr-chi	12/14/2011	12:20:00	2.19
100yr-24hr-chi	12/14/2011	12:30:00	2.11
100yr-24hr-chi	12/14/2011	12:40:00	2.04
100yr-24hr-chi	12/14/2011	12:50:00	1.97
100yr-24hr-chi	12/14/2011	13:00:00	1.91
100yr-24hr-chi	12/14/2011	13:10:00	1.85
100yr-24hr-chi	12/14/2011	13:20:00	1.79
100yr-24hr-chi	12/14/2011	13:30:00	1.74
100yr-24hr-chi	12/14/2011	13:40:00	1.69
100yr-24hr-chi	12/14/2011	13:50:00	1.65
100yr-24hr-chi	12/14/2011	14:00:00	1.6
100yr-24hr-chi	12/14/2011	14:10:00	1.56
100yr-24hr-chi	12/14/2011	14:20:00	1.52
100yr-24hr-chi	12/14/2011	14:30:00	1.48
100yr-24hr-chi	12/14/2011	14:40:00	1.45
100yr-24hr-chi	12/14/2011	14:50:00	1.42
100yr-24hr-chi	12/14/2011	15:00:00	1.38
100yr-24hr-chi	12/14/2011	15:10:00	1.35

100yr-24hr-chi	12/14/2011	15:20:00	1.33
100yr-24hr-chi	12/14/2011	15:30:00	1.3
100yr-24hr-chi	12/14/2011	15:40:00	1.27
100yr-24hr-chi	12/14/2011	15:50:00	1.25
100yr-24hr-chi	12/14/2011	16:00:00	1.22
100yr-24hr-chi	12/14/2011	16:10:00	1.2
100yr-24hr-chi	12/14/2011	16:20:00	1.18
100yr-24hr-chi	12/14/2011	16:30:00	1.15
100yr-24hr-chi	12/14/2011	16:40:00	1.13
100yr-24hr-chi	12/14/2011	16:50:00	1.11
100yr-24hr-chi	12/14/2011	17:00:00	1.09
100yr-24hr-chi	12/14/2011	17:10:00	1.08
100yr-24hr-chi	12/14/2011	17:20:00	1.06
100yr-24hr-chi	12/14/2011	17:30:00	1.04
100yr-24hr-chi	12/14/2011	17:40:00	1.02
100yr-24hr-chi	12/14/2011	17:50:00	1.01
100yr-24hr-chi	12/14/2011	18:00:00	0.99
100yr-24hr-chi	12/14/2011	18:10:00	0.98
100yr-24hr-chi	12/14/2011	18:20:00	0.96
100yr-24hr-chi	12/14/2011	18:30:00	0.95
100yr-24hr-chi	12/14/2011	18:40:00	0.94
100yr-24hr-chi	12/14/2011	18:50:00	0.92
100yr-24hr-chi	12/14/2011	19:00:00	0.91
100yr-24hr-chi	12/14/2011	19:10:00	0.9
100yr-24hr-chi	12/14/2011	19:20:00	0.89
100yr-24hr-chi	12/14/2011	19:30:00	0.87
100yr-24hr-chi	12/14/2011	19:40:00	0.86
100yr-24hr-chi	12/14/2011	19:50:00	0.85
100yr-24hr-chi	12/14/2011	20:00:00	0.84
100yr-24hr-chi	12/14/2011	20:10:00	0.83
100yr-24hr-chi	12/14/2011	20:20:00	0.82
100yr-24hr-chi	12/14/2011	20:30:00	0.81
100yr-24hr-chi	12/14/2011	20:40:00	0.8
100yr-24hr-chi	12/14/2011	20:50:00	0.79
100yr-24hr-chi	12/14/2011	21:00:00	0.78
100yr-24hr-chi	12/14/2011	21:10:00	0.77
100yr-24hr-chi	12/14/2011	21:20:00	0.76
100yr-24hr-chi	12/14/2011	21:30:00	0.75
100yr-24hr-chi	12/14/2011	21:40:00	0.75
100yr-24hr-chi	12/14/2011	21:50:00	0.74
100yr-24hr-chi	12/14/2011	22:00:00	0.73
100yr-24hr-chi	12/14/2011	22:10:00	0.72
100yr-24hr-chi	12/14/2011	22:20:00	0.71
100yr-24hr-chi	12/14/2011	22:30:00	0.71
100yr-24hr-chi	12/14/2011	22:40:00	0.7
100yr-24hr-chi	12/14/2011	22:50:00	0.69

100yr-24hr-chi	12/14/2011	23:00:00	0.69
100yr-24hr-chi	12/14/2011	23:10:00	0.68
100yr-24hr-chi	12/14/2011	23:20:00	0.67
100yr-24hr-chi	12/14/2011	23:30:00	0.67
100yr-24hr-chi	12/14/2011	23:40:00	0.66
100yr-24hr-chi	12/14/2011	23:50:00	0.65
100yr-24hr-chi	12/15/2011	0:00:00	0.65
100yr-24hr-chi+	12/14/2011	0:00:00	0
100yr-24hr-chi+	12/14/2011	0:10:00	0.792
100yr-24hr-chi+	12/14/2011	0:20:00	0.804
100yr-24hr-chi+	12/14/2011	0:30:00	0.828
100yr-24hr-chi+	12/14/2011	0:40:00	0.84
100yr-24hr-chi+	12/14/2011	0:50:00	0.864
100yr-24hr-chi+	12/14/2011	1:00:00	0.876
100yr-24hr-chi+	12/14/2011	1:10:00	0.9
100yr-24hr-chi+	12/14/2011	1:20:00	0.924
100yr-24hr-chi+	12/14/2011	1:30:00	0.936
100yr-24hr-chi+	12/14/2011	1:40:00	0.96
100yr-24hr-chi+	12/14/2011	1:50:00	0.984
100yr-24hr-chi+	12/14/2011	2:00:00	1.008
100yr-24hr-chi+	12/14/2011	2:10:00	1.044
100yr-24hr-chi+	12/14/2011	2:20:00	1.068
100yr-24hr-chi+	12/14/2011	2:30:00	1.092
100yr-24hr-chi+	12/14/2011	2:40:00	1.128
100yr-24hr-chi+	12/14/2011	2:50:00	1.164
100yr-24hr-chi+	12/14/2011	3:00:00	1.2
100yr-24hr-chi+	12/14/2011	3:10:00	1.236
100yr-24hr-chi+	12/14/2011	3:20:00	1.284
100yr-24hr-chi+	12/14/2011	3:30:00	1.32
100yr-24hr-chi+	12/14/2011	3:40:00	1.368
100yr-24hr-chi+	12/14/2011	3:50:00	1.428
100yr-24hr-chi+	12/14/2011	4:00:00	1.476
100yr-24hr-chi+	12/14/2011	4:10:00	1.536
100yr-24hr-chi+	12/14/2011	4:20:00	1.608
100yr-24hr-chi+	12/14/2011	4:30:00	1.68
100yr-24hr-chi+	12/14/2011	4:40:00	1.764
100yr-24hr-chi+	12/14/2011	4:50:00	1.848
100yr-24hr-chi+	12/14/2011	5:00:00	1.944
100yr-24hr-chi+	12/14/2011	5:10:00	2.052
100yr-24hr-chi+	12/14/2011	5:20:00	2.184
100yr-24hr-chi+	12/14/2011	5:30:00	2.328
100yr-24hr-chi+	12/14/2011	5:40:00	2.484
100yr-24hr-chi+	12/14/2011	5:50:00	2.676
100yr-24hr-chi+	12/14/2011	6:00:00	2.904
100yr-24hr-chi+	12/14/2011	6:10:00	3.168

100yr-24hr-chi+	12/14/2011	6:20:00	3.504
100yr-24hr-chi+	12/14/2011	6:30:00	3.9
100yr-24hr-chi+	12/14/2011	6:40:00	4.416
100yr-24hr-chi+	12/14/2011	6:50:00	5.1
100yr-24hr-chi+	12/14/2011	7:00:00	6.036
100yr-24hr-chi+	12/14/2011	7:10:00	7.416
100yr-24hr-chi+	12/14/2011	7:20:00	9.6
100yr-24hr-chi+	12/14/2011	7:30:00	13.572
100yr-24hr-chi+	12/14/2011	7:40:00	22.74
100yr-24hr-chi+	12/14/2011	7:50:00	60.168
100yr-24hr-chi+	12/14/2011	8:00:00	206.328
100yr-24hr-chi+	12/14/2011	8:10:00	79.692
100yr-24hr-chi+	12/14/2011	8:20:00	40.74
100yr-24hr-chi+	12/14/2011	8:30:00	26.364
100yr-24hr-chi+	12/14/2011	8:40:00	19.176
100yr-24hr-chi+	12/14/2011	8:50:00	14.964
100yr-24hr-chi+	12/14/2011	9:00:00	12.216
100yr-24hr-chi+	12/14/2011	9:10:00	10.308
100yr-24hr-chi+	12/14/2011	9:20:00	8.904
100yr-24hr-chi+	12/14/2011	9:30:00	7.836
100yr-24hr-chi+	12/14/2011	9:40:00	7.008
100yr-24hr-chi+	12/14/2011	9:50:00	6.324
100yr-24hr-chi+	12/14/2011	10:00:00	5.772
100yr-24hr-chi+	12/14/2011	10:10:00	5.304
100yr-24hr-chi+	12/14/2011	10:20:00	4.908
100yr-24hr-chi+	12/14/2011	10:30:00	4.572
100yr-24hr-chi+	12/14/2011	10:40:00	4.284
100yr-24hr-chi+	12/14/2011	10:50:00	4.02
100yr-24hr-chi+	12/14/2011	11:00:00	3.792
100yr-24hr-chi+	12/14/2011	11:10:00	3.588
100yr-24hr-chi+	12/14/2011	11:20:00	3.408
100yr-24hr-chi+	12/14/2011	11:30:00	3.252
100yr-24hr-chi+	12/14/2011	11:40:00	3.108
100yr-24hr-chi+	12/14/2011	11:50:00	2.964
100yr-24hr-chi+	12/14/2011	12:00:00	2.844
100yr-24hr-chi+	12/14/2011	12:10:00	2.736
100yr-24hr-chi+	12/14/2011	12:20:00	2.628
100yr-24hr-chi+	12/14/2011	12:30:00	2.532
100yr-24hr-chi+	12/14/2011	12:40:00	2.448
100yr-24hr-chi+	12/14/2011	12:50:00	2.364
100yr-24hr-chi+	12/14/2011	13:00:00	2.292
100yr-24hr-chi+	12/14/2011	13:10:00	2.22
100yr-24hr-chi+	12/14/2011	13:20:00	2.148
100yr-24hr-chi+	12/14/2011	13:30:00	2.088
100yr-24hr-chi+	12/14/2011	13:40:00	2.028
100yr-24hr-chi+	12/14/2011	13:50:00	1.98

[TAGS]

[MAP]
DIMENSIONS 8.83084069503604 -15.1842304473221 23.7571876936715 2.55315070351585
UNITS None

[COORDINATES]

Table with columns: Node, X-Coord, Y-Coord. Lists nodes J1 through J37500 with their respective X and Y coordinates.

Table with columns: Node, X-Coord, Y-Coord. Lists nodes J38 through J2030 with their respective X and Y coordinates.

Table with columns: Node, X-Coord, Y-Coord. Lists nodes S2035 through S2215 with their respective X and Y coordinates.

[VERTICES]

Table with columns: Link, X-Coord, Y-Coord. Lists vertices C15 through C26 with their respective X and Y coordinates.

Table with columns: Node, X-Coord, Y-Coord. Lists nodes C27 through OR2065-2 with their respective X and Y coordinates.

OR2075-2	14.935	-11.218
OR2075-2	15.218	-11.195
OR2080-2	15.892	-12.232
OR2080-2	15.939	-11.803
OR2085-2	12.985	-12.601
OR2085-2	13.591	-12.125
OR2090-2	17.446	-5.787
OR2090-2	17.613	-5.597
OR2095-2	16.617	-7.46
OR2095-2	17.304	-7.498
OR2100-2	18.348	-6.552
OR2100-2	17.67	-6.355
OR2105-2	19.534	-6.57
OR2105-2	18.842	-6.515
OR2110-2	18.098	-5.141
OR2110-2	18.11	-5.008
OR2115-2	17.897	-4.997
OR2115-2	18.083	-4.861
OR2125-2	19.116	-4.286
OR2125-2	18.567	-3.723
OR2130-2	17.865	-8.002
OR2133-2	18.964	-8.111
OR2135-2	18.82	-3.196
OR2135-2	19.736	-3.081
OR2140-2	19.824	-2.552
OR2155-2	19.075	-2.724
OR2155-2	18.887	-2.488
OR2165-2	21.701	-2.389
OR2165-2	20.8	-2.424
OR2175-2	20.503	-1.431
OR2175-2	19.909	-1.414
OR2185-2	18.589	-1.765
OR2185-2	18.805	-1.613
OR2190-2	21.794	-1.41
OR2190-2	21.311	-1.523
OR2200-2	16.471	-3.36
OR2200-2	16.749	-2.754
OR2210-1	19.611	-0.016
OR2210-2	20.681	0.149
OR2210-2	19.524	-0.108
OR2215-2	21.129	0.762
OR2215-2	20.843	0.782
W2020	12.379	-7.903
W2020	12.896	-7.911
W2030	14.183	-6.099
W2035	14.003	-7.96

W2045	15.249	-6.132
W2050	15.167	-7.985
W2055	16.413	-6.239
W2060	15.415	-7.99
W2060	16.351	-7.638
W2065	15.307	-9.843
W2065	16.026	-9.936
W2075	14.938	-11.338
W2075	15.349	-11.293
W2080	16.001	-12.316
W2080	16.016	-11.805
W2085	13.152	-12.724
W2085	13.819	-12.238
W2090	17.613	-5.896
W2090	17.728	-5.677
W2095	17.25	-7.676
W2100	18.448	-6.368
W2100	17.752	-6.263
W2105	19.575	-6.455
W2105	18.865	-6.373
W2110	18.216	-5.118
W2110	18.22	-4.971
W2115	17.95	-5.13
W2125	19.304	-4.012
W2125	18.748	-3.484
W2130	18.12	-7.828
W2133	19.105	-7.918
W2135	18.941	-3.075
W2135	18.784	-2.948
W2140	19.499	-2.292
W2155	19.184	-2.573
W2155	18.935	-2.264
W2165	21.648	-2.189
W2165	20.782	-2.236
W2175	20.481	-1.273
W2175	19.953	-1.251
W2185	18.74	-1.91
W2190	21.641	-1.252
W2190	21.173	-1.371
W2200	16.906	-3.484
W2200	17.13	-2.798
W2210	20.725	0.326
W2210	19.65	0.08
W2215	21.158	0.9
W2215	20.883	0.959

{POLYGONS}		
::Subcatchment	X-Coord	Y-Coord
::-----	-----	-----
2000	11.736	-6.304
2000	11.463	-6.789
2000	11.276	-7.443
2000	11.301	-7.96
2000	9.677	-6.784
2000	9.753	-6.143
2000	11.538	-5.845
2000	11.736	-6.304
2002	11.222	-10.181
2002	9.509	-9.58
2002	9.686	-6.809
2002	11.306	-7.992
2002	11.24	-8.724
2002	11.389	-9.122
2002	11.193	-9.777
2002	11.222	-10.181
2005	11.758	-6.333
2005	11.877	-6.565
2005	11.978	-6.797
2005	12.091	-7.32
2005	12.109	-8.605
2005	11.698	-8.284
2005	11.335	-8.01
2005	11.294	-7.457
2005	11.502	-6.731
2005	11.758	-6.333
2007	11.401	-9.075
2007	11.27	-8.712
2007	11.335	-8.016
2007	12.115	-8.647
2007	12.097	-8.849
2007	11.401	-9.075
2010	12.138	-10.247
2010	11.776	-10.235
2010	11.698	-10.342
2010	11.234	-10.169
2010	11.199	-9.789
2010	11.437	-9.11
2010	12.121	-8.867
2010	12.138	-10.247
2015	11.573	-5.82
2015	12.093	-5.717
2015	11.962	-6.704

2015	11.573	-5.82
2020	13.001	-8.647
2020	12.144	-8.837
2020	12.097	-7.32
2020	11.996	-6.791
2020	13.084	-6.862
2020	13.025	-8.123
2020	13.001	-8.647
2025	12.317	-8.795
2025	12.721	-8.67
2025	12.983	-8.67
2025	13.185	-8.718
2025	13.013	-8.861
2025	12.977	-8.98
2025	13.031	-9.116
2025	13.251	-9.36
2025	13.191	-9.503
2025	12.317	-8.795
2027	13.167	-9.539
2027	13.084	-9.854
2027	13.209	-10.134
2027	13.197	-10.443
2027	13.025	-10.455
2027	12.989	-10.746
2027	11.728	-10.348
2027	11.77	-10.247
2027	12.156	-10.241
2027	12.15	-8.843
2027	12.323	-8.807
2027	13.167	-9.539
2030	14.236	-6.937
2030	11.99	-6.764
2030	12.096	-5.731
2030	14.349	-5.226
2030	14.236	-6.937
2035	14.244	-6.945
2035	14.054	-9.075
2035	13.334	-8.742
2035	13.049	-8.664
2035	13.114	-6.868
2035	14.244	-6.945
2040	13.001	-8.902
2040	13.203	-8.73
2040	14.06	-9.081
2040	13.994	-9.836
2040	13.286	-9.384

2040	13.007	-9.069
2040	13.001	-8.902
2045	15.318	-6.998
2045	14.233	-6.92
2045	14.356	-5.399
2045	15.442	-5.512
2045	15.318	-6.998
2050	15.097	-9.577
2050	14.085	-9.098
2050	14.26	-6.935
2050	15.316	-7.009
2050	15.097	-9.577
2055	16.574	-5.583
2055	16.464	-7.097
2055	15.34	-6.998
2055	15.463	-5.505
2055	16.574	-5.583
2060	16.49	-7.135
2060	16.28	-9.833
2060	15.459	-9.696
2060	15.131	-9.599
2060	15.338	-7.035
2060	16.49	-7.135
2065	13.994	-10.157
2065	14.079	-9.123
2065	14.779	-9.446
2065	15.411	-9.695
2065	16.232	-9.841
2065	16.038	-11.732
2065	13.994	-10.157
2065	16.853	-12.353
2070	16.056	-11.745
2070	16.257	-9.823
2070	17.351	-9.899
2070	17.089	-11.984
2070	17.047	-12.17
2070	16.853	-12.353
2072	13.994	-9.878
2072	13.893	-11.05
2072	13.001	-10.764
2072	13.025	-10.485
2072	13.215	-10.461
2072	13.221	-10.122
2072	13.09	-9.854
2072	13.263	-9.39
2072	13.994	-9.878

2073	17.43	-9.877
2073	18.428	-9.932
2073	18.362	-11.335
2073	17.538	-12.158
2073	17.047	-12.17
2073	17.43	-9.877
2075	13.879	-11.033
2075	14.012	-10.151
2075	15.466	-11.276
2075	14.462	-12.268
2075	12.881	-11.702
2075	13.051	-11.532
2075	13.1	-11.398
2075	12.948	-11.228
2075	12.632	-11.161
2075	12.273	-11.155
2075	12.255	-10.534
2075	13.392	-10.911
2075	13.879	-11.033
2080	14.462	-12.298
2080	15.49	-11.319
2080	16.816	-12.359
2080	16.196	-12.894
2080	14.462	-12.298
2085	12.048	-13.514
2085	12.255	-12.991
2085	12.291	-12.924
2085	12.267	-11.89
2085	12.455	-11.915
2085	12.705	-11.738
2085	12.863	-11.726
2085	14.438	-12.28
2085	12.857	-13.8
2085	12.048	-13.514
2087	14.456	-14.378
2087	12.857	-13.812
2087	14.444	-12.298
2087	16.178	-12.912
2087	14.456	-14.378
2090	17.538	-7.181
2090	16.463	-7.107
2090	16.524	-6.248
2090	16.577	-5.603
2090	18.002	-5.714
2090	17.605	-6.716
2090	17.558	-7.181

2095	17.555	-7.219
2095	17.355	-9.854
2095	16.259	-9.812
2095	16.353	-8.526
2095	16.501	-7.103
2095	17.555	-7.219
2100	18.734	-6.347
2100	18.623	-7.758
2100	17.552	-7.726
2100	17.749	-6.3
2100	18.734	-6.347
2105	18.762	-6.368
2105	19.808	-6.471
2105	19.711	-7.834
2105	18.647	-7.779
2105	18.762	-6.368
2110	18.032	-5.701
2110	18.592	-4.661
2110	18.678	-4.283
2110	19.064	-4.228
2110	19.112	-4.575
2110	18.844	-5.063
2110	18.749	-6.324
2110	17.78	-6.261
2110	18.032	-5.701
2115	14.404	-5.238
2115	17.344	-4.574
2115	18.63	-4.289
2115	18.514	-4.827
2115	18.05	-5.691
2115	16.564	-5.607
2115	14.361	-5.491
2115	14.404	-5.238
2125	18.852	-5.063
2125	19.143	-4.591
2125	19.112	-4.228
2125	19.852	-4.023
2125	20.002	-4.504
2125	19.876	-6.418
2125	18.773	-1.635
2125	18.852	-5.063
2130	17.607	-7.73
2130	18.622	-7.791
2130	18.428	-9.932
2130	17.43	-9.877
2130	17.607	-7.73

2133	18.641	-7.803
2133	19.717	-7.858
2133	19.596	-10.017
2133	18.489	-9.95
2133	18.641	-7.803
2135	19.032	-4.19
2135	19.671	-4.244
2135	18.545	-3.685
2135	18.653	-3.204
2135	18.876	-2.88
2135	18.852	-2.508
2135	19.194	-3.313
2135	19.014	-4.04
2135	19.032	-4.19
2140	18.992	-1.812
2140	19.015	-1.5
2140	20.499	-1.529
2140	20.639	-2.854
2140	19.787	-3.072
2140	19.145	-2.412
2140	18.927	-2.289
2140	18.903	-1.924
2140	18.992	-1.812
2145	20.958	-6.502
2145	19.894	-6.398
2145	20.033	-4.477
2145	19.875	-4.014
2145	21.128	-3.747
2145	20.958	-6.502
2155	18.915	-2.295
2155	19.133	-2.418
2155	19.775	-3.066
2155	20.717	-2.872
2155	20.888	-3.785
2155	19.056	-4.179
2155	19.027	-4.002
2155	19.186	-3.29
2155	18.886	-2.536
2155	18.915	-2.295
2165	20.499	-1.535
2165	22.831	-1.635
2165	22.884	-2.194
2165	23.079	-3.325
2165	20.894	-3.79
2165	20.499	-1.535
2175	19.513	-0.72

2175	20.966	-0.528
2175	21.139	-1.548
2175	19.663	-1.5
2175	19.513	-0.72
2180	17.737	-0.275
2180	19.374	0.102
2180	19.581	-1.388
2180	17.519	-1.358
2180	17.172	-0.475
2180	17.737	-0.275
2185	18.866	-1.939
2185	18.874	-2.244
2185	18.826	-2.614
2185	18.842	-2.871
2185	18.641	-3.177
2185	18.521	-3.619
2185	17.548	-1.384
2185	18.963	-1.505
2185	18.866	-1.939
2190	21.139	-1.533
2190	20.956	-0.509
2190	21.38	-0.277
2190	22.626	-0.115
2190	22.853	-1.597
2190	21.139	-1.533
2200	10.684	-3.932
2200	15.121	-1.754
2200	15.925	-1.24
2200	17.532	-1.384
2200	18.537	-3.755
2200	18.649	-4.238
2200	11.536	-5.837
2200	10.684	-3.932
2210	20.076	0.304
2210	20.784	0.9
2210	20.75	0.447
2210	20.873	-0.046
2210	20.966	-0.519
2210	20.398	-0.572
2210	19.535	-0.706
2210	19.371	0.085
2210	20.076	0.304
2215	20.942	-0.504
2215	20.75	0.422
2215	20.764	0.905
2215	21.577	1.599

2215	22.326	1.747
2215	22.616	-0.1
2215	21.355	-0.277
2215	20.942	-0.504
2220	14.568	-1.162
2220	15.824	-1.246
2220	15.127	-1.739
2220	12.934	-2.844
2220	12.159	-3.216
2220	11.546	-1.847
2220	13.27	-1.444
2220	14.568	-1.162
2225	14.628	-1.144
2225	17.139	-0.495
2225	17.518	-1.354
2225	14.628	-1.144

```

[SYMBOLS]
;;Gage      X-Coord      Y-Coord
;;-----

```

Upper Little River Model.

All slopes are assumed to be 0.15% (from Turkey Creek and Little River Subwatershed Study - Dillon Consulting Limited, June 1998).

NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.

Analysis Options

Flow Units CMS
Process Models:
Rainfall/Runoff YES
Snowmelt NO
Groundwater NO
Flow Routing YES
Ponding Allowed YES
Water Quality NO
Infiltration Method GREEN AMPT
Flow Routing Method DYNWAVE
Starting Date DEC-14-2011 00:00:00
Ending Date DEC-17-2011 00:00:00
Antecedent Dry Days 0.0
Report Time Step 01:00:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00
Routing Time Step 30.00 sec

WARNING 04: minimum elevation drop used for Conduit C1
WARNING 03: negative offset ignored for Link C10
WARNING 03: negative offset ignored for Link C10
WARNING 04: minimum elevation drop used for Conduit C10
WARNING 04: minimum elevation drop used for Conduit C12

WARNING 03: negative offset ignored for Link C15
WARNING 04: minimum elevation drop used for Conduit C22
WARNING 04: minimum elevation drop used for Conduit C23
WARNING 04: minimum elevation drop used for Conduit C24
WARNING 04: minimum elevation drop used for Conduit C25
WARNING 04: minimum elevation drop used for Conduit C26
WARNING 04: minimum elevation drop used for Conduit C27
WARNING 04: minimum elevation drop used for Conduit C28
WARNING 04: minimum elevation drop used for Conduit C29
WARNING 04: minimum elevation drop used for Conduit C30
WARNING 04: minimum elevation drop used for Conduit C31
WARNING 04: minimum elevation drop used for Conduit C32
WARNING 04: minimum elevation drop used for Conduit C33
WARNING 03: negative offset ignored for Link C34
WARNING 04: minimum elevation drop used for Conduit C34
WARNING 03: negative offset ignored for Link C37
WARNING 03: negative offset ignored for Link C38
WARNING 04: minimum elevation drop used for Conduit C4
WARNING 04: minimum elevation drop used for Conduit C6
WARNING 03: negative offset ignored for Link C6025a
WARNING 03: negative offset ignored for Link C6055a
WARNING 03: negative offset ignored for Link C6120a
WARNING 03: negative offset ignored for Link C6120b

WARNING 03: negative offset ignored for Link C6120b
WARNING 03: negative offset ignored for Link C6120c
WARNING 03: negative offset ignored for Link C6120c
WARNING 03: negative offset ignored for Link C6135a
WARNING 03: negative offset ignored for Link C6135a
WARNING 04: minimum elevation drop used for Conduit C6135a
WARNING 03: negative offset ignored for Link C6135b
WARNING 03: negative offset ignored for Link C6135b
WARNING 04: minimum elevation drop used for Conduit C6135b
WARNING 03: negative offset ignored for Link C6150
WARNING 04: minimum elevation drop used for Conduit C6160a
WARNING 03: negative offset ignored for Link C6180a
WARNING 03: negative offset ignored for Link C6220
WARNING 03: negative offset ignored for Link C7025
WARNING 04: minimum elevation drop used for Conduit C7025
WARNING 04: minimum elevation drop used for Conduit C8
WARNING 03: negative offset ignored for Link P1
WARNING 03: negative offset ignored for Link OR2090-1
WARNING 03: negative offset ignored for Link OR2100-1
WARNING 03: negative offset ignored for Link OR2200-1
WARNING 02: maximum depth increased for Node J1
WARNING 02: maximum depth increased for Node J109
WARNING 02: maximum depth increased for Node J11

WARNING 02: maximum depth increased for Node J111
WARNING 02: maximum depth increased for Node J12
WARNING 02: maximum depth increased for Node J13
WARNING 02: maximum depth increased for Node J14
WARNING 02: maximum depth increased for Node J15
WARNING 02: maximum depth increased for Node J16
WARNING 02: maximum depth increased for Node J17
WARNING 02: maximum depth increased for Node J18
WARNING 02: maximum depth increased for Node J19
WARNING 02: maximum depth increased for Node J2
WARNING 02: maximum depth increased for Node J20
WARNING 02: maximum depth increased for Node J21
WARNING 02: maximum depth increased for Node J22
WARNING 02: maximum depth increased for Node J23
WARNING 02: maximum depth increased for Node J24
WARNING 02: maximum depth increased for Node J25
WARNING 02: maximum depth increased for Node J26
WARNING 02: maximum depth increased for Node J27
WARNING 02: maximum depth increased for Node J28
WARNING 02: maximum depth increased for Node J29
WARNING 02: maximum depth increased for Node J3
WARNING 02: maximum depth increased for Node J30
WARNING 02: maximum depth increased for Node J31

WARNING 02: maximum depth increased for Node J32
 WARNING 02: maximum depth increased for Node J33
 WARNING 02: maximum depth increased for Node J34
 WARNING 02: maximum depth increased for Node J36
 WARNING 02: maximum depth increased for Node J37500
 WARNING 02: maximum depth increased for Node J40323
 WARNING 02: maximum depth increased for Node J41
 WARNING 02: maximum depth increased for Node J41106
 WARNING 02: maximum depth increased for Node J42
 WARNING 02: maximum depth increased for Node J44
 WARNING 02: maximum depth increased for Node J46
 WARNING 02: maximum depth increased for Node J5
 WARNING 02: maximum depth increased for Node J54
 WARNING 02: maximum depth increased for Node J56
 WARNING 02: maximum depth increased for Node J57
 WARNING 02: maximum depth increased for Node J6
 WARNING 02: maximum depth increased for Node J60
 WARNING 02: maximum depth increased for Node J61
 WARNING 02: maximum depth increased for Node J8
 WARNING 02: maximum depth increased for Node J80
 WARNING 02: maximum depth increased for Node J81
 WARNING 02: maximum depth increased for Node J82
 WARNING 02: maximum depth increased for Node J83

WARNING 02: maximum depth increased for Node J88
 WARNING 02: maximum depth increased for Node J89
 WARNING 02: maximum depth increased for Node J9
 WARNING 02: maximum depth increased for Node J92
 WARNING 02: maximum depth increased for Node J98
 WARNING 02: maximum depth increased for Node J99

	Volume	Depth
Runoff Quantity Continuity	hectare-m	mm
Total Precipitation	482.374	108.167
Evaporation Loss	0.000	0.000
Infiltration Loss	123.341	27.658
Surface Runoff	357.132	80.083
Final Surface Storage	2.236	0.501
Continuity Error (%)	-0.070	

	Volume	Volume
Flow Routing Continuity	hectare-m	10 ⁶ ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	357.132	3571.353
Groundwater Inflow	0.000	0.000
RDI Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	309.509	3095.121
Internal Outflow	0.000	0.000
Storage Losses	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	47.213	472.131
Continuity Error (%)	0.115	

Highest Continuity Errors

 Node J55 (10.62%)
 Node J55.5 (4.63%)
 Node J26 (2.08%)
 Node J33 (1.91%)

Node J110 (1.90%)

 Time-Step Critical Elements

 Link C22 (48.59%)
 Link C32 (45.66%)
 Link C30 (2.89%)
 Link C12 (1.64%)
 Link C7025 (1.05%)

 Highest Flow Instability Indexes

Link C6180e (9)
 Link C1 (2)
 Link OR2190-1 (2)
 Link OR2210-1 (2)
 Link OR2215-1 (2)

 Routing Time Step Summary

Minimum Time Step : 0.96 sec
 Average Time Step : 1.58 sec
 Maximum Time Step : 30.00 sec
 Percent in Steady State : 0.00
 Average Iterations per Step : 2.01

 Subcatchment Runoff Summary

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10 ⁶ ltr	Peak Runoff CMS	Runoff Coeff
2000	108.17	0.00	0.00	17.22	90.41	82.62	12.52	0.836
2002	108.17	0.00	0.00	17.91	89.69	140.28	19.13	0.829
2005	108.17	0.00	0.00	15.03	92.71	44.54	10.50	0.857
2007	108.17	0.00	0.00	16.39	91.28	18.90	3.33	0.844

2010	108.17	0.00	0.00	15.66	92.04	37.70	7.70	0.851
2015	108.17	0.00	0.00	14.04	93.81	9.90	3.14	0.867
2020	108.17	0.00	0.00	12.48	95.16	62.93	13.66	0.880
2025	108.17	0.00	0.00	15.26	92.46	11.69	2.61	0.855
2027	108.17	0.00	0.00	16.27	91.40	54.31	9.80	0.845
2030	108.17	0.00	0.00	24.30	83.42	98.09	12.77	0.771
2035	108.17	0.00	0.00	14.58	93.07	75.78	14.69	0.860
2040	108.17	0.00	0.00	15.66	92.04	23.56	4.81	0.851
2045	108.17	0.00	0.00	25.02	82.81	52.84	8.65	0.766
2050	108.17	0.00	0.00	23.55	84.23	81.99	12.85	0.779
2055	108.17	0.00	0.00	21.49	86.27	56.17	9.40	0.798
2060	108.17	0.00	0.00	21.16	86.44	97.44	11.35	0.799
2065	108.17	0.00	0.00	9.37	98.02	114.03	15.96	0.906
2070	108.17	0.00	0.00	46.75	61.40	58.24	3.18	0.568
2072	108.17	0.00	0.00	16.04	91.64	38.74	7.31	0.847
2073	108.17	0.00	0.00	45.07	63.08	50.72	2.85	0.583
2075	108.17	0.00	0.00	25.48	82.27	96.82	12.57	0.761
2080	108.17	0.00	0.00	42.74	65.38	45.61	4.10	0.604
2085	108.17	0.00	0.00	33.24	74.63	75.31	9.16	0.690
2087	108.17	0.00	0.00	53.84	54.31	72.63	3.73	0.502
2090	108.17	0.00	0.00	35.46	72.46	52.77	6.39	0.670
2095	108.17	0.00	0.00	27.64	80.07	94.46	10.52	0.740
2100	108.17	0.00	0.00	18.47	89.23	45.13	7.70	0.825
2105	108.17	0.00	0.00	22.27	85.47	52.06	7.96	0.790
2110	108.17	0.00	0.00	19.22	88.56	44.10	8.81	0.819
2115	108.17	0.00	0.00	33.91	73.92	83.95	9.09	0.683
2125	108.17	0.00	0.00	21.45	86.19	80.49	10.08	0.797
2130	108.17	0.00	0.00	7.96	99.40	80.07	11.32	0.919
2133	108.17	0.00	0.00	15.81	91.72	85.37	11.00	0.848
2135	108.17	0.00	0.00	19.88	87.93	20.07	4.11	0.813
2140	108.17	0.00	0.00	31.34	76.58	62.87	9.05	0.708
2145	108.17	0.00	0.00	51.67	56.44	58.89	4.48	0.522
2155	108.17	0.00	0.00	21.76	86.00	66.45	10.77	0.795
2165	108.17	0.00	0.00	22.41	85.26	152.72	19.28	0.788
2175	108.17	0.00	0.00	13.27	94.35	44.63	8.64	0.872
2180	108.17	0.00	0.00	20.10	87.53	89.28	11.46	0.809
2185	108.17	0.00	0.00	19.91	87.77	57.40	8.54	0.811
2190	108.17	0.00	0.00	20.48	87.21	74.09	10.94	0.806
2200	108.17	0.00	0.00	42.54	65.22	511.45	39.34	0.603
2210	108.17	0.00	0.00	15.10	92.53	53.89	9.29	0.855
2215	108.17	0.00	0.00	19.79	87.85	93.71	12.36	0.812
2220	108.17	0.00	0.00	18.66	88.85	128.40	14.26	0.821
2225	108.17	0.00	0.00	16.97	90.67	38.28	6.06	0.838

Node Depth Summary

Node	Type	Average	Maximum	Maximum	Time of Max
		Depth Meters	Depth Meters	HGL Meters	Occurrence days hr:min
J1	JUNCTION	0.67	1.14	186.14	0 11:15
J10	JUNCTION	1.61	2.44	181.26	0 16:13
J108	JUNCTION	1.53	2.24	180.14	0 18:28
J109	JUNCTION	1.68	1.88	180.28	0 12:50
J11	JUNCTION	0.93	1.64	184.04	09:34
J110	JUNCTION	1.83	2.73	180.83	0 17:29
J111	JUNCTION	1.66	2.53	180.83	0 17:29
J12	JUNCTION	1.51	2.39	181.49	0 15:41
J13	JUNCTION	0.74	1.77	183.67	0 12:40
J14	JUNCTION	1.30	2.10	182.16	0 14:13
J15	JUNCTION	1.29	2.08	182.26	0 14:02
J16	JUNCTION	1.26	2.02	182.53	0 13:34
J17	JUNCTION	2.01	2.97	180.18	0 18:27
J18	JUNCTION	1.08	2.08	183.72	0 12:37
J19	JUNCTION	0.70	1.20	184.40	0 11:42
J2	JUNCTION	2.06	2.96	180.83	0 17:29
J20	JUNCTION	0.75	1.27	185.27	0 11:26
J21	JUNCTION	1.23	2.00	181.75	0 15:03
J22	JUNCTION	1.49	2.32	181.42	0 15:48
J23	JUNCTION	1.69	2.48	181.16	0 16:29
J24	JUNCTION	2.07	2.99	180.85	0 17:27
J25	JUNCTION	0.22	1.73	188.48	0 08:23
J26	JUNCTION	1.06	1.36	188.36	0 10:50
J27	JUNCTION	0.93	1.63	184.03	0 09:35
J28	JUNCTION	0.60	1.71	185.11	0 08:59
J29	JUNCTION	0.54	1.67	186.07	0 08:52
J3	JUNCTION	0.44	2.64	183.59	09:19
J30	JUNCTION	0.52	1.99	187.39	0 08:40
J31	JUNCTION	0.41	2.05	188.45	0 08:23
J32	JUNCTION	1.32	1.41	180.41	0 17:40
J33	JUNCTION	1.54	2.08	180.83	0 17:32
J34	JUNCTION	0.35	0.64	184.04	0 09:38
J35	JUNCTION	0.55	1.19	180.99	0 17:02
J36	JUNCTION	1.18	1.92	182.83	0 13:08
J37	JUNCTION	0.79	3.15	189.75	0 08:53
J37500	JUNCTION	2.11	3.01	179.81	0 17:15
J38	JUNCTION	0.81	1.78	183.98	0 12:06
J39	JUNCTION	2.22	3.16	180.26	0 18:24

J39001	JUNCTION	2.09	3.00	179.90	0 17:16
J4	JUNCTION	1.89	2.79	180.89	0 17:22
J40323	JUNCTION	2.09	3.03	180.03	0 17:16
J41	JUNCTION	0.59	0.94	188.44	0 10:26
J41106	JUNCTION	2.07	3.00	180.10	0 18:29
J42	JUNCTION	0.38	0.49	188.49	0 18:08
J43501	JUNCTION	2.37	3.33	180.23	0 18:25
J44	JUNCTION	0.77	1.41	187.62	0 11:01
J45	JUNCTION	1.34	2.20	180.90	0 17:23
J46	JUNCTION	0.76	1.39	187.11	0 10:57
J46102	JUNCTION	2.23	3.18	180.28	0 18:23
J46203	JUNCTION	1.89	2.81	180.51	0 17:51
J47	JUNCTION	1.20	2.49	183.71	0 12:38
J5	JUNCTION	2.13	3.04	179.84	0 17:15
J51	JUNCTION	0.48	1.23	184.43	0 11:16
J54	JUNCTION	0.39	1.28	187.83	0 08:53
J55	JUNCTION	0.99	2.08	186.58	0 10:03
J55.5	JUNCTION	0.25	1.71	188.82	0 08:24
J56	JUNCTION	0.35	1.42	187.51	0 08:59
J57	JUNCTION	0.69	4.21	194.54	0 08:21
J58.7	JUNCTION	0.77	6.52	196.79	0 08:12
J6	JUNCTION	0.47	2.55	189.73	0 09:37
J60	JUNCTION	0.70	1.78	186.58	0 10:03
J61	JUNCTION	1.50	1.95	185.75	0 09:55
J7	JUNCTION	1.39	2.19	180.99	0 17:02
J77	JUNCTION	0.88	2.06	184.26	0 11:33
J8	JUNCTION	0.89	1.61	181.16	0 16:30
J80	JUNCTION	0.86	1.44	187.02	0 10:59
J81	JUNCTION	0.66	1.19	187.69	0 11:13
J82	JUNCTION	1.47	2.76	183.67	0 12:40
J83	JUNCTION	1.00	1.52	180.92	0 17:25
J88	JUNCTION	0.94	1.06	188.06	0 17:47
J89	JUNCTION	0.46	0.59	188.14	0 18:19
J9	JUNCTION	1.71	2.53	181.21	0 16:20
J92	JUNCTION	1.30	2.19	181.95	0 14:36
J93	JUNCTION	1.82	2.66	181.33	0 16:02
J94	JUNCTION	1.52	2.30	181.10	0 16:40
J95	JUNCTION	1.29	2.14	180.94	0 17:13
J96	JUNCTION	1.99	2.89	180.89	0 17:22
J98	JUNCTION	1.59	2.93	180.14	0 18:28
J99	JUNCTION	0.85	1.37	180.92	0 18:36
J5205	OUTFALL	2.10	3.18	179.88	0 22:36
S2020	STORAGE	1.00	1.65	188.55	0 14:00
S2030	STORAGE	1.06	1.82	187.12	0 16:02
S2035	STORAGE	1.03	1.70	187.60	0 14:31
S2045	STORAGE	0.99	1.81	185.51	0 15:30

S2050	STORAGE	1.01	1.78	186.68	0 15:33
S2055	STORAGE	1.13	1.94	184.64	0 16:14
S2060	STORAGE	0.96	1.58	185.48	0 16:13
S2065	STORAGE	1.02	1.53	187.75	0 16:16
S2075	STORAGE	1.02	1.67	189.17	0 16:36
S2080	STORAGE	1.05	2.09	189.59	0 14:11
S2085	STORAGE	1.09	1.92	181.52	0 17:45
S2090	STORAGE	0.92	1.68	184.10	0 17:06
S2095	STORAGE	1.06	1.71	184.61	0 18:01
S2100	STORAGE	1.13	1.90	183.82	0 16:44
S2105	STORAGE	1.04	1.81	184.21	0 16:41
S2110	STORAGE	0.99	1.77	183.33	0 15:02
S2115	STORAGE	0.87	1.56	183.12	0 16:51
S2125	STORAGE	1.00	1.63	182.23	0 17:30
S2130	STORAGE	1.00	1.50	184.40	0 16:16
S2133	STORAGE	0.95	1.51	185.41	0 16:00
S2135	STORAGE	1.05	1.76	181.93	0 16:21
S2140	STORAGE	1.14	1.92	181.62	0 18:41
S2155	STORAGE	1.10	1.79	181.97	0 17:21
S2165	STORAGE	1.09	1.68	181.58	0 18:23
S2175	STORAGE	1.53	1.95	180.75	0 23:25
S2180	STORAGE	1.37	2.19	180.29	0 19:02
S2185	STORAGE	1.17	1.74	181.24	0 19:37
S2190	STORAGE	1.38	1.86	181.11	0 20:11
S2200	STORAGE	0.99	1.42	180.87	0 20:24
S2210	STORAGE	1.41	1.77	180.67	0 18:38
S2215	STORAGE	1.21	1.69	181.19	0 17:30

Node Inflow Summary

Node	Type	Maximum	Maximum	Time of Max Occurrence	Lateral Inflow Volume 10 ⁶ ltr	Total Inflow Volume 10 ⁶ ltr
		Lateral Inflow CMS	Total Inflow CMS			
J1	JUNCTION	0.000	6.182	0 11:02	0.000	503.522
J10	JUNCTION	0.000	23.405	0 14:32	0.000	1947.849
J108	JUNCTION	0.000	0.735	0 14:08	0.000	97.770
J109	JUNCTION	0.000	0.700	0 15:52	0.000	98.390
J11	JUNCTION	0.000	6.847	0 11:42	0.000	502.731
J110	JUNCTION	0.000	2.260	0 13:12	0.000	114.924
J111	JUNCTION	0.000	1.806	0 12:42	0.000	94.580

J12	JUNCTION	0.000	23.634	0 13:46	0.000	1861.991
J13	JUNCTION	0.000	2.158	0 09:45	0.000	52.584
J14	JUNCTION	0.000	23.939	0 13:14	0.000	1866.152
J15	JUNCTION	0.000	23.142	0 13:01	0.000	1749.533
J16	JUNCTION	0.000	23.221	0 12:47	0.000	1751.722
J17	JUNCTION	6.060	26.808	0 17:59	38.284	3016.779
J18	JUNCTION	0.000	19.246	0 19:44	0.000	1152.901
J19	JUNCTION	0.000	6.860	0 11:29	0.000	502.426
J20	JUNCTION	0.000	24.067	0 16:10	0.000	2377.938
J22	JUNCTION	0.000	6.868	0 11:15	0.000	502.881
J21	JUNCTION	0.000	23.766	0 13:35	0.000	1862.495
J23	JUNCTION	0.000	23.816	0 14:01	0.000	1930.741
J24	JUNCTION	0.000	23.998	0 15:03	0.000	2062.275
J25	JUNCTION	0.000	24.122	0 16:07	0.000	2281.222
J26	JUNCTION	4.810	4.810	0 08:10	23.566	23.563
J27	JUNCTION	0.000	2.252	0 08:24	0.000	115.408
J28	JUNCTION	0.000	18.183	0 09:28	0.000	1156.554
J29	JUNCTION	0.000	16.882	0 08:43	0.000	429.258
J30	JUNCTION	0.000	17.616	0 08:43	0.000	342.812
J31	JUNCTION	14.257	14.257	0 08:19	128.408	128.397
J33	JUNCTION	0.000	22.399	0 08:26	0.000	268.377
J30	JUNCTION	11.028	19.700	0 08:18	56.611	178.328
J32	JUNCTION	0.000	0.499	0 17:29	0.000	68.014
J33	JUNCTION	0.000	0.655	0 13:17	0.000	50.769
J34	JUNCTION	0.000	1.131	0 09:06	0.000	74.905
J35	JUNCTION	0.000	0.721	0 12:03	0.000	58.249
J36	JUNCTION	0.000	22.836	0 12:40	0.000	1702.212
J37	JUNCTION	31.446	37.807	0 08:13	222.915	280.947
J37500	JUNCTION	0.000	27.570	0 17:17	0.000	3095.589
J38	JUNCTION	0.000	10.852	0 10:37	0.000	467.204
J39	JUNCTION	0.000	25.941	0 18:00	0.000	2885.910
J39001	JUNCTION	0.000	27.427	0 18:18	0.000	3097.796
J4	JUNCTION	0.000	0.909	1 02:29	0.000	132.830
J40323	JUNCTION	0.000	27.435	0 18:14	0.000	3098.548
J41	JUNCTION	3.724	3.724	0 18:09	72.631	72.629
J41106	JUNCTION	0.000	27.446	0 18:10	0.000	3099.348
J42	JUNCTION	0.000	0.532	0 17:43	0.000	65.446
J43501	JUNCTION	0.000	25.924	0 18:03	0.000	2875.363
J44	JUNCTION	6.020	6.020	0 08:09	108.964	375.061
J45	JUNCTION	0.000	6.948	1 25:52	0.000	133.379
J46	JUNCTION	7.305	8.676	0 08:11	38.741	504.416
J46102	JUNCTION	0.000	25.840	0 17:43	0.000	2803.830
J46203	JUNCTION	0.000	23.689	0 16:29	0.000	2355.265
J47	JUNCTION	0.000	10.712	0 10:58	0.000	465.017
J5	JUNCTION	0.000	27.419	0 18:23	0.000	3096.524
J51	JUNCTION	0.000	10.908	0 10:20	0.000	416.458

J54	JUNCTION	3.140	10.996	0	08:51	9.898	278.961
J55	JUNCTION	0.000	0.027	0	08:22	0.000	0.084
J55.5	JUNCTION	0.000	4.764	0	08:10	0.000	23.569
J56	JUNCTION	0.000	10.979	0	08:52	0.000	278.969
J57	JUNCTION	0.000	12.397	0	08:10	0.000	65.998
J58.7	JUNCTION	12.397	12.397	0	08:10	66.005	65.998
J6	JUNCTION	10.485	10.485	0	08:09	44.541	52.512
J60	JUNCTION	0.000	10.899	0	08:59	0.000	369.517
J61	JUNCTION	0.000	10.555	0	10:03	0.000	367.607
J7	JUNCTION	0.000	23.833	0	15:36	0.000	2107.893
J77	JUNCTION	0.000	10.892	0	10:33	0.000	467.566
J8	JUNCTION	4.480	4.480	0	08:09	58.894	60.113
J80	JUNCTION	0.000	6.885	0	10:52	0.000	503.823
J81	JUNCTION	0.000	2.980	0	14:10	0.000	266.536
J82	JUNCTION	0.000	24.420	0	09:50	0.000	1711.083
J83	JUNCTION	0.000	0.952	0	12:54	0.000	133.458
J88	JUNCTION	0.000	1.197	0	17:38	0.000	151.614
J89	JUNCTION	0.000	0.532	0	18:08	0.000	65.730
J9	JUNCTION	0.000	23.170	0	14:51	0.000	1947.955
J92	JUNCTION	0.000	23.853	0	13:26	0.000	1864.414
J93	JUNCTION	0.000	23.752	0	14:11	0.000	1949.555
J94	JUNCTION	0.000	23.717	0	15:22	0.000	2051.961
J95	JUNCTION	0.000	23.612	0	15:48	0.000	2104.799
J96	JUNCTION	0.000	24.330	0	15:58	0.000	2266.065
J98	JUNCTION	0.000	27.453	0	18:08	0.000	3100.116
J99	JUNCTION	0.000	3.142	0	14:27	0.000	432.878
J5205	OUTFALL	0.000	28.913	0	17:16	0.000	3095.107
S2020	STORAGE	13.655	13.927	0	08:10	62.940	63.601
S2030	STORAGE	12.773	12.845	0	08:10	98.095	99.291
S2035	STORAGE	14.682	14.682	0	08:10	75.787	76.522
S2045	STORAGE	8.642	8.642	0	08:10	52.846	52.842
S2050	STORAGE	12.843	12.843	0	08:10	81.995	82.233
S2055	STORAGE	9.394	9.394	0	08:10	56.179	56.369
S2060	STORAGE	11.353	11.353	0	08:19	97.448	98.113
S2065	STORAGE	15.960	16.181	0	08:19	114.042	114.465
S2075	STORAGE	12.570	12.570	0	08:10	96.832	96.824
S2080	STORAGE	4.094	4.094	0	08:09	45.609	45.606
S2085	STORAGE	9.154	9.154	0	08:10	75.311	75.305
S2090	STORAGE	6.388	6.388	0	08:10	52.774	52.771
S2095	STORAGE	10.524	10.524	0	08:19	94.470	94.578
S2100	STORAGE	7.694	7.694	0	08:10	45.130	45.668
S2105	STORAGE	7.953	7.953	0	08:10	52.065	52.061
S2110	STORAGE	8.805	8.805	0	08:10	44.100	44.096
S2115	STORAGE	9.089	9.089	0	08:10	83.960	83.954
S2125	STORAGE	10.080	10.080	0	08:19	80.494	80.487
S2130	STORAGE	11.317	11.317	0	08:19	80.075	80.300

S2133	STORAGE	10.998	10.998	0	08:19	85.378	85.371
S2135	STORAGE	4.108	4.108	0	08:09	20.068	20.066
S2140	STORAGE	9.039	9.039	0	08:10	62.878	62.873
S2155	STORAGE	10.766	10.766	0	08:10	66.456	66.450
S2165	STORAGE	19.276	19.276	0	08:19	152.730	152.717
S2175	STORAGE	8.638	8.638	0	08:10	44.632	47.031
S2180	STORAGE	11.456	11.456	0	08:19	89.286	91.738
S2185	STORAGE	8.536	8.536	0	08:10	57.410	57.405
S2190	STORAGE	10.939	10.939	0	08:10	74.101	74.094
S2200	STORAGE	39.339	39.339	0	08:20	511.473	511.444
S2210	STORAGE	9.291	9.291	0	08:10	53.896	53.890
S2215	STORAGE	12.358	12.358	0	08:19	93.713	93.705

Node Surcharge Summary

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J37	JUNCTION	3.83	0.416	1.850
J58.7	JUNCTION	7.03	4.943	0.000
S2180	STORAGE	40.95	1.193	2.807

Node Flooding Summary

No nodes were flooded.

Storage Volume Summary

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	E&I Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
S2020	28.636	15	0	48.904	26	0 14:00	0.409

S2030	40.766	16	0	72.110	29	0 16:02	0.742
S2035	34.099	16	0	58.299	27	0 14:31	0.498
S2045	18.901	15	0	35.880	28	0 15:30	0.413
S2050	30.918	16	0	56.362	28	0 15:33	0.615
S2055	24.744	17	0	44.211	31	0 16:14	0.399
S2060	39.579	15	0	66.837	25	0 16:13	0.667
S2065	58.191	16	0	89.463	24	0 16:16	0.503
S2075	37.063	16	0	62.965	27	0 16:36	0.668
S2080	10.299	15	0	21.812	32	0 14:11	0.686
S2085	27.900	17	0	46.051	27	0 17:45	0.532
S2090	15.701	14	0	29.680	26	0 17:06	0.424
S2095	38.933	16	0	64.853	27	0 18:01	0.618
S2100	21.223	17	0	37.298	30	0 16:44	0.299
S2105	21.072	16	0	37.991	28	0 16:41	0.371
S2110	17.118	15	0	31.696	27	0 15:02	0.313
S2115	25.884	13	0	47.727	24	0 16:51	0.673
S2125	32.918	15	0	55.287	26	0 17:30	0.505
S2130	41.340	15	0	63.978	24	0 16:16	0.426
S2133	36.732	14	0	60.064	24	0 16:00	0.528
S2135	8.333	15	0	14.620	26	0 16:21	0.151
S2140	23.353	17	0	40.870	31	0 18:41	0.482
S2155	28.046	17	0	47.159	28	0 17:21	0.436
S2165	66.152	17	0	105.593	27	0 18:23	0.952
S2175	31.948	24	0	41.839	31	0 23:25	0.254
S2180	27.327	27	0	43.868	44	0 19:02	2.371
S2185	27.721	18	0	42.393	27	0 19:37	0.374
S2190	41.363	21	0	57.558	30	0 20:11	0.377
S2200	194.896	15	0	286.867	23	0 20:24	3.142
S2210	34.326	17	0	43.912	28	0 18:38	0.205
S2215	47.689	19	0	68.457	27	0 17:30	0.499

Outfall Loading Summary

Outfall Node	Flow Freq. Pcnt	Avg. Flow CMS	Max. Flow CMS	Total Volume CMS
J5205	99.40	14.391	28.913	3095.107
System	99.40	14.391	28.913	3095.107

Link Flow Summary

Link	Type	Maximum Flow CMS	Time of Max Occurrence days hr:min	Maximum Velocity m/sec	Max/ Full	Max/ Full
C1	CONDUIT	27.570	0 17:17	0.62	1.50	0.93
C10	CONDUIT	23.089	0 14:57	0.88	2.31	1.00
C11	CHANNEL	3.032	0 14:20	0.27	0.07	0.39
C12	CONDUIT	24.067	0 16:10	0.55	0.79	0.80
C13	CHANNEL	0.948	0 12:52	0.47	0.09	0.53
C14	CHANNEL	6.868	0 11:15	0.56	0.10	0.37
C15	CHANNEL	0.476	0 11:54	0.32	0.01	0.51
C16	CHANNEL	16.019	0 09:03	0.84	0.22	0.48
C17	CHANNEL	16.482	0 08:53	0.77	0.22	0.51
C18	CHANNEL	17.616	0 08:43	0.71	0.30	0.55
C19	CHANNEL	18.833	0 08:26	0.74	0.33	0.58
C20	CHANNEL	1.861	0 09:45	0.24	0.03	0.63
C22	CHANNEL	0.511	0 12:13	0.21	0.02	0.40
C21	CHANNEL	0.499	0 17:40	0.21	0.01	0.19
C22	CONDUIT	22.836	0 12:40	3.09	8.84	0.86
C23	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C24	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C25	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C26	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C27	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C28	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C29	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C3	CHANNEL	0.027	0 08:22	0.20	0.00	0.74
C30	CONDUIT	10.852	0 10:37	1.98	6.45	0.91
C31	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C32	CONDUIT	25.659	0 17:51	0.43	0.97	1.00
C33	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C34	CONDUIT	6.839	0 11:46	1.50	2.25	0.68
C35	CHANNEL	0.754	0 09:05	0.09	0.01	0.34
C37	CHANNEL	2.071	0 08:26	0.29	0.05	0.35
C38	CHANNEL	0.532	0 18:08	0.20	0.01	0.16
C4	CONDUIT	26.775	0 18:06	0.74	1.47	0.57
C5	CHANNEL	1.859	0 10:50	0.25	0.02	0.27
C6	CONDUIT	23.766	0 13:35	1.63	3.93	0.84
C6000	CHANNEL	10.326	0 08:54	1.24	1.80	0.73
C6007	CHANNEL	6.571	0 08:18	0.44	0.37	0.97
C6015a	CHANNEL	10.979	0 08:52	1.17	0.23	0.63

C38	1.00	0.02	0.01	0.00	0.98	0.00	0.00	0.00	0.10	0.0000
C4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.12	0.0000
C5	1.00	0.01	0.01	0.00	0.98	0.00	0.00	0.00	0.08	0.0000
C6	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.24	0.0000
C6000	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.12	0.0000
C6007	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0000
C6015a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.34	0.0000
C6015b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.07	0.0000
C6025a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	1.00	0.21	0.0000
C6030	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.15	0.0000
C6040	1.00	0.00	0.00	0.00	0.08	0.00	0.00	0.92	0.18	0.0000
C6045a	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.25	0.0000
C6045b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.16	0.0000
C6055a	1.00	0.00	0.00	0.00	0.71	0.00	0.00	0.29	0.17	0.0000
C6055d	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.04	0.0000
C6090a	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.09	0.0000
C6090b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.09	0.0000
C6090c	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.08	0.0000
C6090d	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.09	0.0000
C6100a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.20	0.0000
C6100b	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.14	0.0000
C6100c	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.06	0.0000
C6110a	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.08	0.0000
C6110b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0000
C6120a	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.05	0.0000
C6120b	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.05	0.0000
C6120c	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.06	0.0000
C6135a	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.07	0.0000
C6135b	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.10	0.0000
C6145	1.00	0.00	0.00	0.00	0.98	0.00	0.00	0.01	0.01	0.0000
C6150	1.00	0.00	0.02	0.00	0.98	0.00	0.00	0.00	0.06	0.0000
C6160a	1.00	0.00	0.00	0.00	0.97	0.00	0.00	0.02	0.04	0.0001
C6160b	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.10	0.0000
C6170e	1.00	0.00	0.02	0.00	0.97	0.00	0.00	0.00	0.09	0.0000
C6170f	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.06	0.0000
C6170l	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.08	0.0000
C6180a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.12	0.0000
C6180b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.23	0.0000
C6180c	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.18	0.0000
C6180d	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.14	0.0000
C6180e	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.19	0.0000
C6190	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0000
C6220	1.00	0.00	0.00	0.00	0.93	0.00	0.00	0.07	0.05	0.0000
C7	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.17	0.0000
C7025	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0005
C7040	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.06	0.0000

C7075	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.18	0.0000
C8	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.12	0.0000
C9	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.10	0.0000
CJ0.5	1.00	0.03	0.00	0.00	0.65	0.00	0.00	0.33	0.40	0.0000
CJ0.75	1.00	0.02	0.00	0.00	0.97	0.00	0.00	0.00	0.19	0.0000
CJ0.8	1.00	0.01	0.00	0.00	0.98	0.00	0.00	0.00	0.01	0.0000
CJ0.9	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0000
CJ4	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.01	0.0000
CJ4.5	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.04	0.0000
CJ81	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.13	0.0000
CJ88	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.15	0.0000
CJ89	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.09	0.0000

Conduit Surcharge Summary

Conduit	Hours Full			Hours Above Full Normal Flow	Hours Capacity Limited
	Both Ends	Upstream	Dnstream		
C1	0.01	0.01	0.01	18.39	0.01
C10	0.01	0.01	0.01	21.85	0.01
C22	0.01	0.01	0.01	47.12	0.01
C30	0.01	0.01	0.01	20.06	0.01
C32	9.19	9.19	9.19	0.01	9.19
C34	0.01	0.01	0.01	17.31	0.01
C4	0.01	0.01	0.01	17.73	0.01
C6	0.01	0.01	0.01	33.19	0.01
C6000	0.01	0.01	0.01	6.31	0.01
C6135a	0.01	0.01	0.01	38.63	0.01
C6135b	0.01	0.01	0.01	28.75	0.01
C6160a	0.01	0.01	0.01	44.25	0.01
C7025	6.99	6.99	6.99	10.05	6.99
C8	0.01	0.01	0.01	10.76	0.01

Pumping Summary

Percent	Number of	Min	Avg	Max	Total Volume	Power Usage	% Time Off Pump Curve
		Flow	Flow	Flow			

Pump	Utilized	Start-Ups	CMS	CMS	CMS	10^6 ltr	Kw-hr	Low	High
P1	0.00	0	0.00	0.00	0.00	0.0000	0.00	0.0	0.0

Analysis begun on: Thu Sep 07 16:31:45 2017
Analysis ended on: Thu Sep 07 16:32:17 2017
Total elapsed time: 00:00:32

APPENDIX I

Hydraulics

1603-11265 Upper Little River
 Flood Elevations
 2017-09-01

Road	ERCA Floodplain Mapping		Twin Oaks Business Park		Current PC-SWMM model						Survey Data			
	By MacLaren (1985)		by Lafontaine, etc. (1997)		Existing			Proposed			Ground u/s of road crossing (m)	Road Spill (m)	Road at Crossing (m)	Proposed Conditions Flooding (m)
	100 yr Water Level (m)	Flow (m ³ /s)	100 yr Water Level (m)	Flow (m ³ /s)	100 yr Water Level (m)	Change in WL relative to ERCA (m)	Flow (m ³ /s)	100 yr Water Level (m)	Change in WL relative to ERCA (m)	Flow (m ³ /s)				
Baseline Road	184.04	24.4			184.13	0.09	34.7	183.67	-0.37	24.4	183.9	184.3	184.5	-0.2
Country Road 42	182.63	24.4			183.20	0.57	39.8	181.95	-0.68	23.9	182.2	182.6	182.9	-0.3
Lauzon Parkway	182.12	24.4			182.52	0.40	40.1	181.49	-0.63	23.6	182.2	182.3	183.7	-0.7
Lauzon Road	181.72	27.7			182.01	0.29	43.7	181.21	-0.51	23.2	181.3	181.6	182.0	-0.1
Railway	181.56	34.0	181.13	39.4	181.64	0.08	45.4	180.85	-0.71	24.1	181.1	182.4	182.4	-0.3
Twin Oaks Drive	180.91	39.5	180.86	39.6	180.97	0.06	49.5	180.28	-0.63	25.8	180.5			-0.2
E.C. Row Expressway	180.72	42.8	180.77	40.5	180.81	0.09	50.6	180.18	-0.54	26.8	180.0	181.4	183.0	0.2
Forest Glade Drive	180.39	42.8			180.41	0.02	51.4	179.84	-0.55	27.4	179.5	180.5	181.0	0.3

Existing

Location	ERCA Floodplain Mapping		Twin Oaks Business Park		Current Study			Elevation Data		
	By MacLaren (1985)		by Lafontaine, etc. (1997)		By Stantec (2017)			Windsor Airport (1990)		
	100 yr Water Level (m)	Flow (m ³ /s)	100 yr Water Level (m)	Flow (m ³ /s)	100 yr Water Level (m)	Change in WL relative to ERCA (m)	Flow (m ³ /s)	Ground u/s of road crossing (m)	Road Spill (m)	Road at Crossing (m)
Baseline Road	184.04	24.4			184.13	0.09	34.7	183.9	184.3	184.5
Country Road 42	182.63	24.4			183.20	0.57	39.8	182.2	182.6	182.9
Lauzon Parkway	182.12	24.4			182.52	0.40	40.1	182.2	182.3	183.7
Lauzon Road	181.72	27.7			182.01	0.29	43.7	181.3	181.6	182.0
Railway	181.56	34.0	181.13	39.4	181.64	0.08	45.4	181.1	182.4	182.4
Twin Oaks Drive	180.91	39.5	180.86	39.6	180.97	0.06	49.5	180.5		
E.C. Row Expressway	180.72	42.8	180.77	40.5	180.81	0.09	50.6	180.0	181.4	183.0
Forest Glade Drive	180.39	42.8			180.41	0.02	51.4	179.5	180.5	181.0

Proposed

Road	Current PC-SWMM model				Survey Data				
	Existing		Proposed		Ground u/s of road crossing (m)	Road Spill (m)	Road at Crossing (m)	Proposed Conditions Flooding (m)	
	100 yr Water Level (m)	Flow (m ³ /s)	100 yr Water Level (m)	Flow (m ³ /s)					
Baseline Road (J5090/J82)	184.13	34.7	183.67	24.4	183.9	184.3	184.5	-0.2	
Country Road 42 (J5110/J92)	183.20	39.8	181.95	23.9	182.2	182.6	182.9	-0.3	
Lauzon Parkway (J12)	182.52	40.1	181.49	23.6	182.2	182.3	183.7	-0.7	
Lauzon Road (J9)	182.01	43.7	181.21	23.2	181.3	181.6	182.0	-0.1	
Railway (J24)	181.64	45.4	180.85	24.1	181.1	182.4	182.4	-0.3	
Twin Oaks Drive (J46102)	180.97	49.5	180.28	25.8	180.5			-0.2	
E.C. Row Expressway (J17)	180.81	50.6	180.18	26.8	180.0	181.4	183.0	0.2	
Forest Glade Drive (J5)	180.41	51.4	179.84	27.4	179.5	180.5	181.0	0.3	

APPENDIX J

Fluvial Geomorphology

DRAFT REPORT

Sandwich South Employment Lands Upper Little River Existing Conditions

Date: February 2012

Ref: 01-11-46





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1. Introduction

Property is currently being developed for mixed land uses in Windsor between Highway 401, the E.C. Row Expressway, Walker Road, and Banwell Road. Due to the proposal for future development and the anticipated decrease of permeable surfaces in the watershed, a geomorphic assessment was required. This study builds upon a previous report from 2004, in which, a detailed desktop analysis of the study area was conducted and monitoring cross-sections were installed to establish a baseline of conditions in the area. This study entails:

- A field reconnaissance of the study area using rapid channel assessments to confirm the findings of the background review. The site reconnaissance also serves to identify and confirm any physical rates of channel adjustments;
- Establishment of meander belt widths;
- Detailed geomorphic field assessments including collection of cross-sectional and survey data and re-monitoring of the historic channel cross-sections established in 2004;
- Detailed geomorphic analyses to determine erosion threshold assessments;
- Restoration recommendations for the channels areas;



2. Background Review

In 2004/2005, a desktop analysis was initially conducted to determine the general characteristics of watercourses in the study area. The amount and size of sediment inputs, valley shape, land use or vegetation cover, and other parameters that influence channel form often change as you move downstream along a waterway. In order to account for these changes, channels are often separated into “reaches”. Reaches can be defined as stretches of channel that flow through a nearly constant valley setting and incorporate similar physical characteristics along their lengths. Thus, reaches experience similar controlling and modifying influences, which are reflected in similar geomorphological form, function, and process. Watercourses within the subject area were divided into reaches, as illustrated in **Figure 2.1**. Reach lengths were measured and are provided in **Table 2.1**.

The study area is located in the physiographic region known as the St. Clair Clay Plain which contains both the Essex and Lambton Clay Plains. Little River is located on the Essex Clay Plain which ranges in thickness from 30 to 60 meters (Chapman and Putnam, 1984). The till is described as clayey-silt and glaciolacustrine clay. The underlying bedrock surface consists of sedimentary rocks such as limestone and dolostone. Some small areas of glaciolacustrine sand are also found bordering Little River, but the Quaternary geology of the area is primarily till. Two tills have been identified in the area, Catfish Creek and the overlying Tavistock till.

A historic analysis was also conducted for each reach using aerial photographs from 1955 and 1978 as well as digital imagery from 2004 to document changes in land use and channel planform. It was noted that the surrounding land use was predominantly agriculture and most of the study reaches had been altered or straightened – most before 1955. A description of observed changes is outlined in **Table 2.2**. Seven monitoring cross-sections were installed following the desktop assessment in order to establish baseline conditions within the study area. An initial draft of the current document was prepared in 2007, but it did not include meander belt information or erosion threshold values.



Table 2.1: Summary of delineated reaches and measured lengths.

Watercourse Name	Reach	Length (m)
Little River	LR-2	1865.33
	LR-3	1208.62
	LR-4	1181.89
	LR-5	378
	LR-6	1383.74
Little River Drain	LRD-1	754.38
	LRD-2	922.33
	LRD-3	407.62
	LRD-4	1282.56
Rusette Drain	RD-1	1218.19
	RD-2	4010.88
McGill Drain	MD-1	1249.44
	MD-2	645.53
	MD-3	1821.31
Lappan Drain	LD-1	1979.61
	LD-2	870.43
Rivard Drain	RID-1	NA
Lachance Drain	LAD-1	1362.32
Desjardein Drain	DD-1	2151.23
Soulliere Drain	SD-1	1582.87
	SD-2	666.03
Baseline Road Drain	BRD-1	682.37
Ninth Concession Drain	NCD-1	2228.24
Sixth Concession Drain	SCD-1	1053.01
	SCD-2	1027.2
	SCD-3	1516.11
Hurley Relief Drain	HR-1	992.97

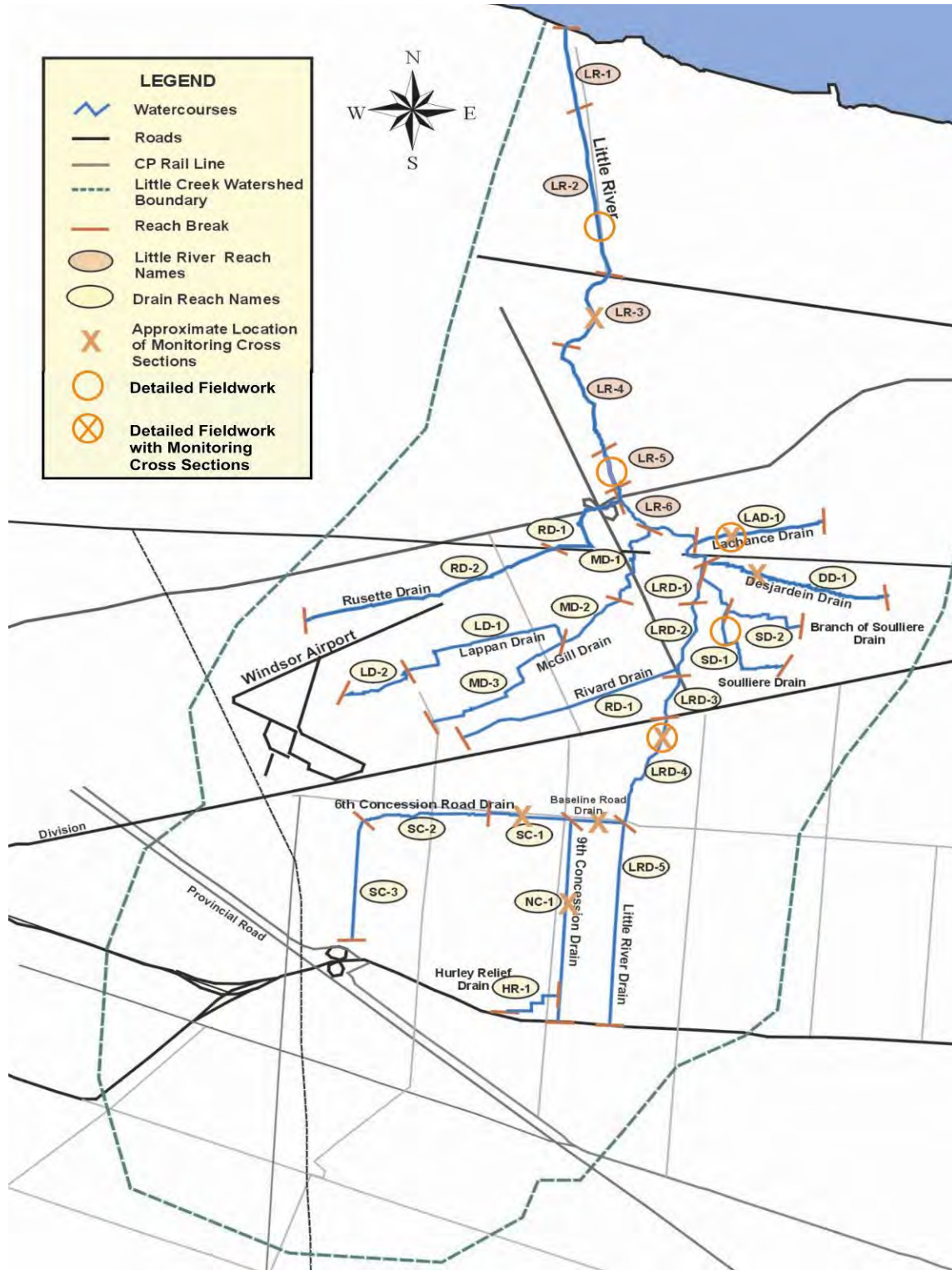
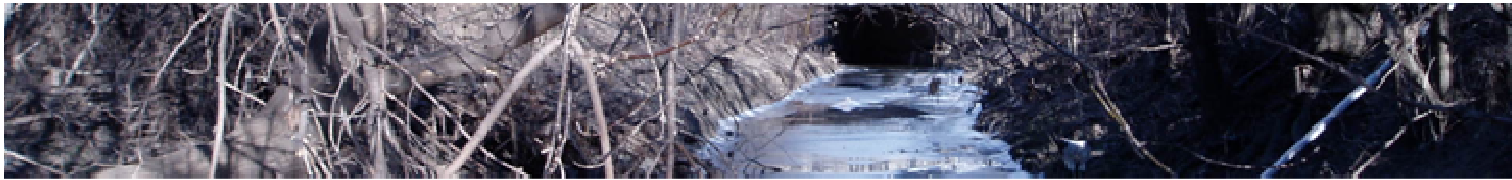


Figure 2.1: Delineated reaches and locations of monitoring cross-sections and detailed fieldwork.

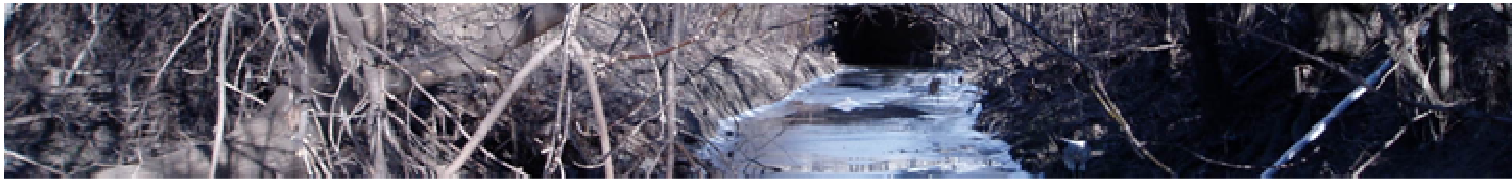


Table 2.2: Historical Analysis Summary

Watercourse Name	Reach Name	Land Use Change	Channel Change
Little River	LR-1	1955 - agricultural on both banks, some residential development on western side of channel	1955 - straightened prior to this date, no observable bar formations or islands
		1978 - significant increase in residential development along western side of channel, also increase in residential development on eastern side of channel, nursery located on eastern side of channel has matured from 1954	1978 - channel still straight, no apparent changes in channel form or function, vegetation has matured along top of banks
		2004 - no coverage for this reach	2004 - no coverage for this reach
	LR-2	1955 - agricultural on both banks with a little residential land use on the western bank	1955 - straightened prior to 1954 with no bar formations or island apparent
		1978 - significant increase in residential development along the western bank, development of water treatment facility on eastern bank, lots of vegetation removed when development occurred	1978 - no apparent change in channel form, still straight with no bars are islands, no additional road crossings constructed since 1954
		2004 - no coverage	2004 - no coverage
	LR-3	1955 - mainly agricultural with a few crossings and associated buildings	1955 - appears to have been altered prior to 1954, engineered
		1978 - increase in the amount of industrial land use with associated parking lots and impermeable surface, some agricultural land use still being worked	1978 - does not appear to be any significant changes in channel form since 1954, no increase in bar formations or islands of any kind
		2004 - incomplete mapping available, no apparent changes in land use except for a small increase in the amount of residential development present since 1978	2004 - because of the incomplete coverage it is hard to distinguish if channel changes have occurred



LR-4	1955 - land use appears to be a golf course with very little bank coverage	1955 - channel appears in natural state with no straightening obvious
	1978 - land use remains a golf course, vegetation has grown in and was maintained, minor increase in residential development near upstream portion of reach break	1978 - no change in channel form, no new crossings added, vegetation more mature on banks
	2004 - remains a golf course, no apparent change in land use or increase in residential development past 1978	2004 - no apparent change in channel form, no straightening or engineering obvious from photo
LR-5	1955 - mainly agricultural land use with associated out buildings	1955 - no evidence of channel alterations prior to 1955
	1978 - remains agricultural land use with a little more vegetative cover compared with 1954	1978 - channel does not appear to have been changes since 1955, no increase in crossings etc.
	2004 - change in land use from agricultural to parkland and residential/commercial with a new crossing constructed prior to 2004	2004 - channel appears to have been straightened slightly since the installation of the new crossing and change to parkland
LR-6	1955 - mostly agricultural land use along both banks, some forested area on the western bank	1955 - channel appears in natural state with only on road crossing in centre of reach
	1978 - land use changed to a golf course prior to 1978 aerial photograph with associated buildings and parking area, few new residential buildings as well	1978 - channel does not appear to be altered however there were at least 6 new cart path crossings over the watercourse prior to 1978
	2004 - land use changed again to industrial with associated large impervious areas (parking lots and buildings) with the removal of the road crossing in centre of reach, and removal of foot bridges installed for the golf course prior to 1978	2004 - channel appears to have been altered/engineered prior to 2004, cart path bridges have been removed, road crossing present in existing years has been removed, and the banks look to be armoured/altered throughout most of the reach



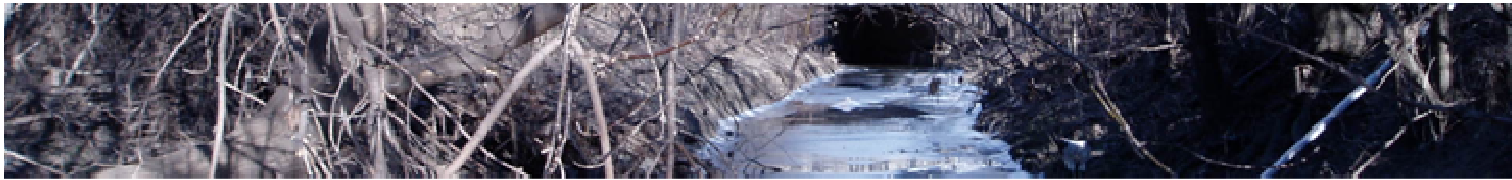
Little River Drain	LRD-1	1955 - agricultural land use through all of reach	1955 - channel appears to be in natural state with no bar formations or islands, some erosion along outside of meander bends obvious
		1978 - mainly agricultural land use with a slight increase in the residential development along western portion of the watercourse	1978 - does not appear to be any changes in channel form, erosion still evident on outside of meander bends, no bar formations or islands obvious
		2004 - agricultural remains the dominant land use with no increase in the residential development along watercourse	2004 - no apparent change in channel form noted, no increase in erosion along bends, no obvious signs of bar formation or islands
	LRD-2	1955 - mainly agricultural land use with some scrub forest in upstream portion of reach	1955 - channel appears to have been altered prior to 1955, more like a drain through agricultural fields
		1978 - mainly agricultural land use with an obvious increase in the maturity of the scrub forest in the upstream portion of the reach	1978 - no apparent change in channel form but most of reach obscured by vegetation and poor quality of aerial photograph
		2004 - mixture of agricultural land use and forested area with the construction of a new road along the forested area, also a slight increase in the residential land use along this reach	2004 - no apparent change in channel form except for the installation of the new road crossing prior to 2004
	LRD-3	1955 - mainly agricultural lands inter-mixed with some scrub forest to road crossing	1955 - downstream portion of the reach appears to have been altered prior to 1955, upstream portion appears natural
		1978 - land use remained agricultural with a slight increase in the density of the scrub forest prior to 1978	1978 - no apparent change in the channel form from 1955, only addition of a new crossing in the downstream portion of reach
		2004 - no apparent change in the land use for this reach, the forest continued to increase in density	2004 - no apparent change in channel form from 1978
	LRD-4	1955 - majority of the reach is surrounded by agricultural land use with some scrub forest	1955 - channel appears in natural state but may be ephemeral with an undefined channel through the upstream portion of the reach
		1978 - remained agricultural	1978 - channel appears to have been straightened and now flows along the roadway
		2004 - remained agricultural	2004 - no apparent change in channel form since 1978
Baseline Road Drain	BRD-1	1955 - not apparent in aerial photograph	1955 - if present it appears to flow along the roadside as a ditch
		1978 - not obvious in aerial photograph	1978 - if present flows along roadside as a ditch



		2004 - agricultural land use for entire reach	2004 - flows along the roadside as a ditch with no apparent changes in channel form
9th Concession Drain	NCD-1	1955 - not apparent	1955 - channel ditches prior to 1955
		1978 - not apparent	1978 - no apparent changes in channel form
		2004 - mainly agricultural land use with the roadside and residential land uses as well	2004 - no apparent changes in channel form, a roadside ditch
6th Concession Drain	SCD-1	1955 - mainly agricultural with roadside and residential development as well	1955 - channel straightened into roadside ditch prior to 1955
		1978 - mainly agricultural with residential and infrastructure, no apparent change from 1955	1978 - no obvious change in channel form since 1955
		2004 - no apparent change from 1955	2004 - no obvious change in channel form since 1955
	SCD-2	1955 - mainly agricultural land use with residential back yards fronting onto watercourse	1955 - channel appears to have been altered prior to 1955, into a drainage channel along the backside of the residential properties
		1978 - no aerial photo coverage of this reach	1978 - no aerial photo coverage of this reach
		2004 - remained agricultural for the most part with a slight increase in infrastructure (road crossing) prior to 2004	2004 - no obvious changes in channel form except the road crossing
	SCD-3	1955 - no aerial photo coverage	1955 - no aerial photo coverage
		1978 - no aerial photo coverage	1978 - no aerial photo coverage
		2004 - surrounding land use is agricultural	2004 - ditched prior to 2004, straightened channel into ditch
Hurley Relief Drain	HR-1	1955 - no aerial photo coverage	1955 - no aerial photo coverage
		1978 - no aerial photo coverage	1978 - no aerial photo coverage
		2004 - mixture of agricultural, residential/parkland and water storage facilities	2004 - nothing to compare the channel to, however it does appear to have been altered prior to 2004 into a drainage feature
Rusette Drain	RD-1 and RD-2	1955 - mainly agricultural lands with a few road crossings and a nursery in the upstream end of the reach, airport was just being build so there was some clearing of the lands surrounding the channel for this development	1955 - appears to have been a dug ditch prior to this aerial photograph
		1978 - surrounding land use remained agricultural with road crossings and the rail line, airport runway now fully developed , nursery in the upstream area of the reach was removed and	1978 - channel appears as a well defined ditch with little vegetation around banks



		scrubland now in its place, large reservoir was constructed on the north side of RD-2	
		2004 - only a small portion of the channel remains agricultural, now a lot of residential development built up along the ditch in the upstream portion of the channel on the northern bank and the airport on the southern bank with some scrub meadow	2004 - not a lot of vegetation has grown in since the digging, development now right up to the top of bank of portions of the drain
Lappan Drain	LD-1 and LD-2	1955 - not well defined channel however land use is mainly agricultural in the area where the land looks wet	1955 - no defined channel clear in aerial photograph
		1978 - well defined channel that has been dug, ditched, , land use is mainly agricultural with some scrub forest in the upstream portion of the channel, few road crossings	1978 - well defined channel appears and dug prior to 1978
		2004 - now all agricultural lands, forest has been removed and all land receives run off from the airport	2004 - well defined channel, no apparent changes in channel planform from 1978
McGill Drain	MD-1	1955 - agricultural lands, with some scrub forest in the downstream portion	1955 - appears to have been ditched prior to 1955
		1978 - agricultural lands, and a golf course in the downstream portion	1978 - remains straightened without obvious changes to the planform
		2004 - remains agricultural with some urbanization in the form of industrial parklands in the downstream portion of the channel	2004 - channel is still straight with a few extra crossings over it, otherwise unchanged
	MD-2	1955 - agricultural lands with little other vegetation present	1955 - Channel appears to have been ditched prior to 1955
		1978 - remains agricultural with some trees maturing on the banks	1978 - no apparent changes in channel planform, banks have become more defined
		2004 - continues to be agricultural land use with a few trees and scrubland immediately adjacent to channel	2004 - very well defined drainage ditch but no apparent changes in channel planform
	MD-3	1955 - agriculture appears to be the dominant land use but the channel is hard to see, mainly looks like a drainage swale	1955 - cannot make a lot of the channel out so it is assumed that the drainage was ditched after 1955
		1978 - agricultural land use dominates with a few scrub forest areas present along its length	1978 - channel ditched prior to 1978, well established with vegetation on the banks
		2004 - remains agricultural for extent of the reach	2004 - does not appear to be any channel changes from 1978
Rivard Drain	RID-1	1955 - mainly agricultural with some scrub forest	1955 - channel was ditches prior to 1955



		1978 - mainly agricultural with some scrub forest and new crossings	1978 - does not appear to be any channel changes since before 1955
		2004 - a mixture of agricultural and scrub forest	2004 - channel remains straightened with no apparent changes in channel planform
Lachance Drain	LAD-1	1955 - mainly agricultural land use with a small portion of scrub forest at the confluence with Little River	1955 - channel appears to have been dug prior to 1955
		1978 - mainly agricultural land use with a small portion of the drain in the downstream end near the confluence located in a golf course	1978 - downstream portion of the channel was altered when the golf course was built, prior to 1978, appears to be straightened and foot bridges cross over it
		2004 - the upstream portion is all agricultural land use but the downstream portion near the confluence is surrounded by scrubland and industrial parkland	2004 - upstream portion appears to not have been altered at all, however the downstream portion appears to have been moved prior to 2004 as there is now an industrial building where the channel used to be and the channel is no longer well defined in this area
Desjardein Drain	DD-1	1955 - agricultural land use dominated this reach with one road crossing	1955 - channel appears to have been ditched prior to 1955
		1978 - agricultural land use dominates with minor residential development and back yard, one road crossing	1978 - no apparent change in channel planform since 1955
		2004 - dominated by agricultural land use	2004 - no obvious channel changes since before 1955
Soulliere Drain	SD-1	1955 - agricultural land use most dominant	1955 - channel not well defined in the upstream portion of the channel, downstream looks natural
		1978 - agricultural land use remains most dominant	1978 - channel more defined with clear banks in upstream portion and natural in the downstream portion
		2004 - remains agricultural throughout most of the channel	2004 - channel does not appear to have changes since 1978
	SD-2	1955 - agricultural land use is dominant	1955 - channel not well defined but portions that are visible appear to be ditched prior to 1955
		1978 - agricultural land use remains dominant	1978 - channel still not well defined in this photograph but portions of it remained ditched
		2004 - agricultural land use remains dominant	2004 - channel was well defined with clear banks, ditched throughout whole reach



3. Synoptic Surveys

3.1 Rapid Assessment

In order to provide insight regarding existing geomorphic conditions and document any evidence of active erosion, site visits were conducted in 2007. During the visit, channel conditions along the study reaches were evaluated using two established synoptic surveys: the Rapid Geomorphic Assessment and the Rapid Stream Assessment Technique.

Rapid Geomorphic Assessment

The Rapid Geomorphic Assessment (RGA) was designed by the Ontario Ministry of Environment (1999) to assess urban stream channels. It is a qualitative technique based on the presence and (or) absence of key indicators of channel instability such as exposed tree roots, bank failure, excessive deposition, etc. The various indicators are grouped into four categories representing specific geomorphic process: 1) Aggradation, 2) Degradation, 3) Channel Widening, and 3) Planimetric Form Adjustment. Over the course of the survey, the existing geomorphic conditions of each reach are noted and the presence or absence of the specific geomorphic indicators is documented. Upon completion of the field inspection, the indicators are tallied within each category and the subsequent results are used to calculate an overall reach stability index. This index value corresponds to one of three stability classes representing the relative degree of channel adjustment and (or) sensitivity to altered sediment and flow regimes (**Table 3.1**).



Table 3.1: RGA Classification

Index	Classification	Interpretation
≤0.20	In Regime or Stable (Least Sensitive)	The channel morphology is within a range of variance for streams of similar hydrographic characteristics – evidence of instability is isolated or associated with normal river meander propagation processes
0.21-0.40	Transitional/Stressed (Moderately Sensitive)	Channel morphology is within the range of variance for streams of similar hydrographic characteristics but the evidence of instability is frequent
≥0.41	In Adjustment (Most Sensitive)	Channel morphology is not within the range of variance and evidence of instability is wide spread

(Source: Ontario Ministry of Environment, 2003 – Appendix C3)

Rapid Stream Assessment Technique

The Rapid Stream Assessment Technique (RSAT; Galli, 1996) provides a purely qualitative assessment of the overall health and function of a reach in order to provide a quick assessment of local stream conditions and to identify and prioritize restoration needs on a watershed scale. This system integrates visual estimates of channel conditions and numerical scoring of stream parameters using six categories:

- Channel Stability
- Erosion and Deposition
- Instream Habitat
- Water Quality
- Riparian Conditions
- Biological Indicators

Once each condition has been assigned a score, values are totaled to produce an overall stream stability score, or health rating, based on a 50 point total. The recommended value is then categorized into one of three classes: low (poor health), moderate (moderate health), and high (good health).



- <20 Low (Poor Health)
- 20-35 Moderate
- >35 High (Good Health)

Although the RSAT grades streams from a more biological and water quality perspective than the RGA, this information is still relevant within a geomorphic context. In general, the types of physical features that generate good habitat for aquatic organisms tend to represent healthy geomorphic systems as well (e.g., native fish may prefer a well established riffle-pool sequence with little fine material on the riffles, quality riparian conditions provide food and shade to streams, woody debris and overhanging banks provide habitat structure, etc).

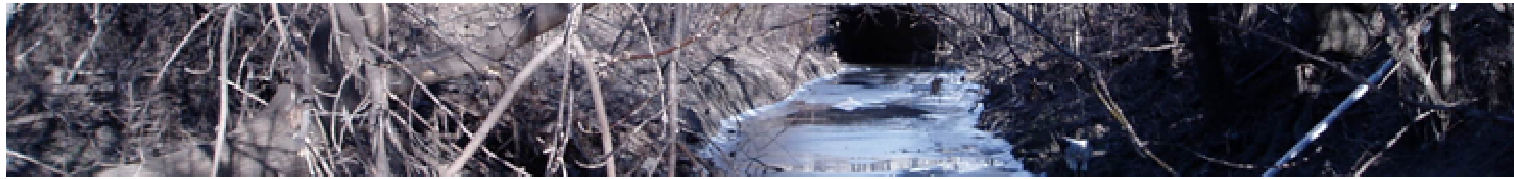
Along with the above mentioned stream assessment protocols, the Evaluation, Classification and Management of Headwater Drainage Features: Interim Guidelines were taken into consideration in identifying the headwater drainage features. Bank and bed substrates, channel stability, morphology and any discharge points were noted during the field survey.

The results (**Table 3.1**) classified all the reaches included in the rapid assessments as either 'transitional/stressed' or 'in adjustment'. The main mode of adjustment is widening, followed by aggradation. These processes were indicated by woody debris jams, bank erosion/slumping, and bar formation. Reaches were characterized by common elements of urban channels such as road crossings, stormwater outfalls, and bank protection/modification. Evidence of modification and straightening was also prevalent, such as the steel walls bordering the downstream Little River reaches (LR-1 and LR-2). Channel dimensions were largest for the main channel reaches ranging from 6-30 m in bankfull width and 1-2.5 m for bankfull depth. While the drain reaches were much narrower, 2-8 m bankfull width, they were somewhat comparable in depth with a range of 0.3-1.2 m. This is indicative of the entrenchment that can occur in straightened agricultural drains.



Table 3.1: Summary of RGA results

Reach	Stability Index (RGA)	Condition (RGA)	Dominant Process (RGA)	Assessment Score (RSAT)	Stability Ranking (RSAT)	Bankfull Width (m)	Bankfull Depth (m)	Comments
LR-3	0.41	In Adjustment	Aggradation Widening	22	Moderate	18-26	0.8-1.8	road crossings, weir, storm drainage, woody debris, sandbag with concrete lining on right bank, concrete cinder blocks on left bank, metal retaining wall acting as weir, lateral bar formation, channel migration to right bank
LR-5	0.29	Transitional/Stressed	Widening	23	Moderate	6-12	0.8-1.6	tile drain, man-made riffles, slumped banks, road crossings, turbid, culvert, stagnant water, densely vegetated
LAD-1	0.34	Transitional/Stressed	Widening	24.5	Moderate	3-6	0.6-1.2	culvert, road crossing and surrounding concrete drainage outfalls, failing concrete walls, channel highly entrenched, "U" shaped agricultural drain, little riparian cover, soft unconsolidated bed, ducks and 2 dead turtles
SD-1	0.29	Transitional/Stressed	Widening Aggradation	---	---	2-4	0.3-0.6	culvert, confluence, cinder blocks, very little water, upstream vegetation controlled
DD-1	0.34	Transitional/Stressed	Widening	24	Moderate	4-8	0.6-1.2	woody debris jams, densely vegetated, stagnant water not connected to main flow, channel appeared natural but altered
MD-1	0.26	Transitional/Stressed	Aggradation Widening	22	Moderate	2-5	0.4-0.8	road crossings, rail line, riprap, woody debris jams, lined bed, very thin riparian corridor, channel flows as an altered drain through agricultural fields
LRD-4	0.3	Transitional/Stressed	Widening	31	Moderate	4-6	0.6-1.2	road crossings, urban debris, tile drainage, right bank bridge abutment was exposed, wide straight reach with good riffle-pool delineation, majority of bed consisted of beach sands, ripples forming along bed, scour observed along rocks
LRD-1	0.3	Transitional/Stressed	Widening Aggradation	27	Moderate	4-8	0.6-1	stormwater outfalls, urban debris, road crossings, gabions, man-made riffles, terra blocks, woody debris jams, two



								retention ponds, thatch on banks, urban debris, terraced banks
LR-6	0.31	Transitional/ Stressed	Aggradation	21	Moderate	6-15	0.8-1.2	vegetation controlled, road crossings, terra blocks, thatch on banks, vegetation in channel
LRD-2	0.31	Transitional/ Stressed	Widening	32	Moderate	4-6	0.6-1	road crossings, riprap, urban debris, erosion on banks, densely vegetated, thalweg out of alignment, bridge
LRD-3	0.26	Transitional/ Stressed	Widening	33	Moderate	4-7	0.6-1	road crossings, woody debris, terraced banks, erosion on banks, exposed roots
6th Concession	0.22	Transitional/ Stressed	Widening	26	Moderate	2-6	0.8-1.2	road crossings, urban debris, roadside ditch, basal scour on banks
Baseline Drain	0.34	Transitional/ Stressed	Widening	---	---	2-6	0.4-1.2	road crossings, bank slumping, islands in channel
LRD-5	0.32	Transitional/ Stressed	Widening	24	Moderate	2-4	0.4-0.8	road crossings, woody debris jams, densely vegetated, narrow straight drain with little bar formation, exposed clay along bank, exposed tree roots, leaning trees, groundwater seepage from right bank at crossing
9th Concession	0.26	Transitional/ Stressed	Aggradation Widening	22.5	Moderate	3-6	0.6-1.2	road crossings, woody debris jams, bar formations, extensive basal scour, roadside ditch, good riffle-pool spacing, numerous freeway crossings
LR-1	0.25	Transitional/ Stressed	Aggradation	30	Moderate	18-30	1.0-2.5	riprap, bridges, outfalls, steel wall, marine/docks, residential land uses, algae, overhanging vegetation
LR-2	0.22	Transitional/ Stressed	Aggradation	30	Moderate	17-25	1.0-2.0	road & rail crossings, urban debris, outfalls, riprap, steel wall, stagnant water, sediment accumulation mid-channel



4. Meander Belt Width Assessment

4.1 Meander Belt Width Delineation

Streams and rivers are dynamic features on the landscape. Changes in configuration and position occur through the development and evolution of meanders, and migration processes. Erosion and deposition of sediment is a key component of channel migration, enabling changes in shape and shifts in the position of a watercourse. These changes may cause loss or damage to private property and/or structures located too close to the transitioning watercourse. It is for this reason that, when infrastructure, development or other activities are proposed near a watercourse, it is desirable to designate a corridor intended to contain all of the existing and expected meander development and migration processes. Outside of this corridor, it is assumed that private property and structures will be safe from the erosion potential of the watercourse. The space that a meandering watercourse occupies on its floodplain, and in which all of the natural channel processes occur, is commonly referred to as the meander belt. Due to the spatial variability of modifying and controlling influences on channel form, two reaches situated immediately up/downstream of each other could show marked differences in planform configuration. It is for this reason that meander belt width delineation occurs on a reach-by-reach basis.

4.2 Preliminary Meander Belt Width

A preliminary meander belt width was delineated for each reach in the study area (**Table 4.2**). Standard methods for delineating meander belt widths rely on air photo analysis. First, a meander belt axis was identified, following the general down-valley orientation of the meander pattern. The meander belt is essentially centered along the meander axis. Second, the preliminary meander belt is established by drawing lines parallel to the governing outermost meanders of the existing channel planform, following the meander axis. This methodology is not applicable when a channel has been altered or straightened, erasing any indication of natural planform configuration. Historical analysis of aerial photos revealed that most of the reaches within the study area have been altered and exhibit very little natural change in planform between 1955 and 2004. A small number of reaches retained planform characteristics which allowed the traditional methodology to be applied. These reaches are labeled 'planform' in **Table 4.2**.



In the event that a watercourse has been altered and/or necessary data is insufficient, a meander belt width can be derived by means of an empirical analysis based on channel parameters. This involves basic field data collection to quantify channel dimensions for use in calculating an appropriate belt width, such as channel width, depth, or cross-sectional area. The following selected equations (**Table 4.1**) provide an estimate of meander belt width dimensions. These empirical relations are based on measurements of real watercourses; however, their transferability to watercourses situated within southern Ontario may be limited due to differences in hydrologic regime, drainage area, and general controlling factors compared to the areas where the formulas were developed. Reviewed collectively, they provide results that are typically comparable to results attained through use of the standard belt width delineation procedures. Because most of the channels in the study area are straight agricultural drains, the empirical method was used for the majority of the reaches. Where field data was not obtained, meander belt widths were estimated using similar, nearby reaches as references. Reaches that required this method are identified in **Table 4.2** as ‘reference’.

4.3 Erosion Setbacks

From a geomorphic perspective, the 100-year migration rate typically represents the erosion setback to be applied to either side of the meander belt width in order to account for bank erosion and channel migration over time (100 years). However, due to the high degree of planform alteration, 100-year migration rates could not be quantified for this channel. In lieu of applying the 100-year migration rate, an erosion setback representing 10% of the preliminary meander belt width was applied to either side of the channel. The preliminary and final belt width results are given in **Table 4.2** and illustrated in **Figure 4.1 – Figure 4.4**.

Belt widths are the smallest for the agricultural drain reaches which are primarily draining headwater areas where small channel dimensions and relatively low gradients limit migration. These conditions result in belt widths between 24 to 35 m. Further downstream, some planform characteristics have been retained



(such as SD-3) and these channels have slightly larger belt widths to encompass a more sinuous pattern. The Little River drain reaches (LRD) have belt widths in the range of 40-80 m. The surrounding smaller drains converge with the LRD reaches providing more flow with which to alter channel dimensions resulting in the need for larger belt widths. The main channel reaches (LR) have belt width values that range from 100-200 m. These values result from the increased channel dimensions as well as some large meanders which have been preserved in the channel planform. While these meanders are unlikely to change significantly due to heavy alteration, they are indicative of the channels past migration based on its flow capacity.

Table 4.1: Empirical formulas for estimating meander belt width dimensions (Reach LAD-1 values provided as an example).

Meander Belt Empirical Analysis			
Source	Equation		Meander Belt Width (m)
Williams (1986) – channel area (m ²)	$18Ac^{0.65}$	=	33.3
Williams (1986) – width (m)	$4.3W^{1.12}$	=	22.0
Ward (2002) - width (ft) - no factor of safety	$4.8W^{1.08}$	=	25.5
Lorenz et al. (1985) - width (m)	$7.53W^{1.01}$	=	32.9
AVERAGE		=	28.4
STANDARD DEVIATION		=	5.56



Table 4.2: Summary of Meander Belt Width Results

Reach	Preliminary MBW	Final MBW for adjusted (add 10% setback)	Method
LR-1	128	154	Reference
LR-2	128	154	Field
LR-3	120	143	Field
LR-4	85	102	Reference
LR-5	85	102	Field
LR-6	180	216	Planform
LRD-1	41	50	Field
LRD-2	50	60	Planform
LRD-3	50	60	Field
LRD-4	72	86	Planform
LRD-5	30	36	Planform
LAD-1	28	34	Field
DD-1	36	42	Field
SD-3	60	72	Planform
SD-1	20	24	Field
SD-2	20	24	Reference
RD-1	60	72	Planform
RD-2	23	30	Reference
MD-1	23	28	Field
MD-2	23	28	Reference
MD-3	23	28	Reference
LD-1	23	28	Reference
LD-2	23	28	Reference
RD-1	23	28	Reference
BRD-1	28	32	Field
NC-1	28	32	Field
SC-1	28	32	Field
SC-2	28	32	Reference
SC-3	28	32	Reference

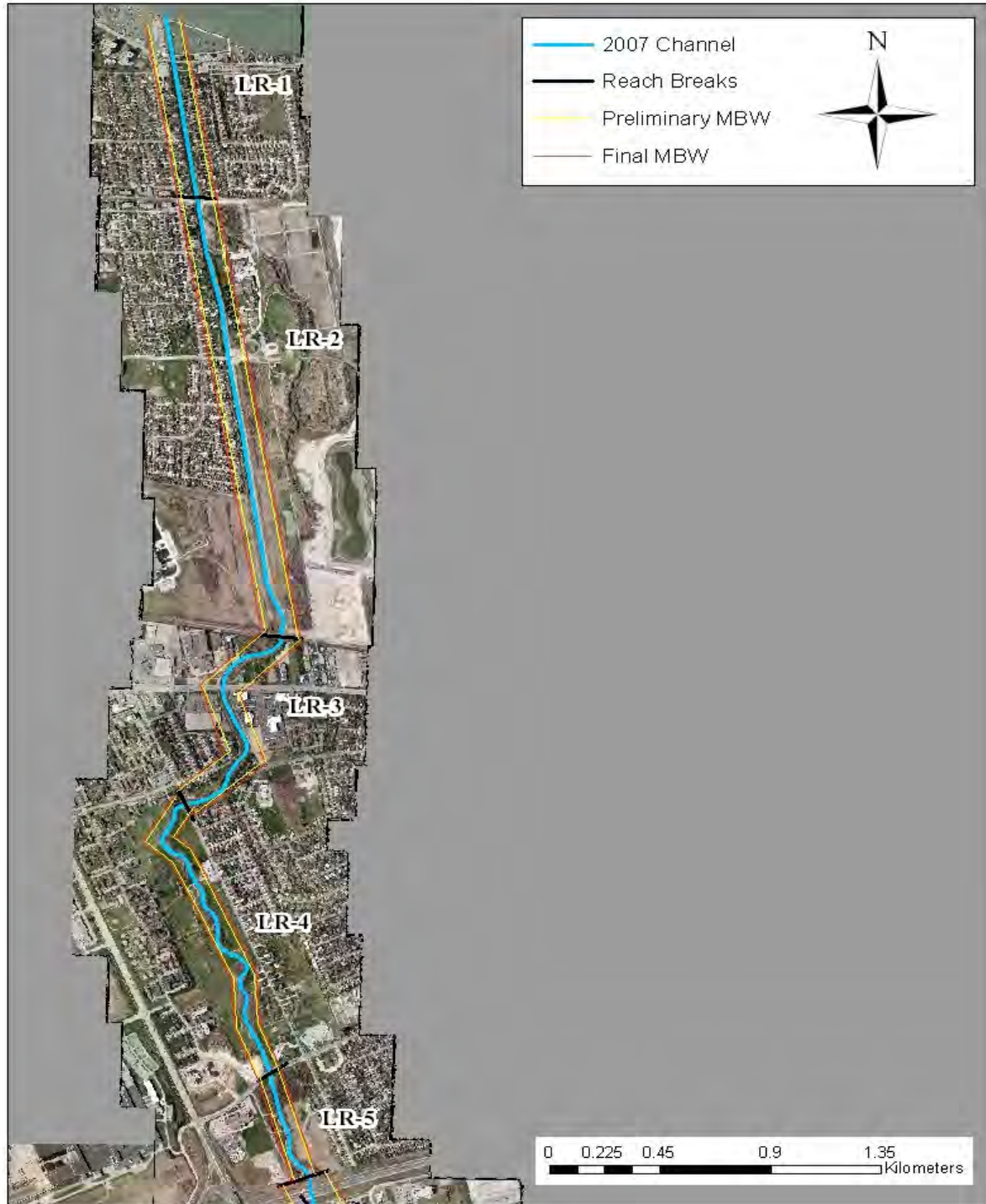


Figure 4.1: Meander Belt Width Map – North Reaches



Figure 4.2: Meander Belt Width Map – Central and Eastern Reaches



Figure 4.3: Meander Belt Width Map – Western Reaches



Figure 4.4: Meander Belt Width Map: Southern Reaches



5. Detailed Field Data Collection

5.1 Monitoring Cross-Section Sites (2004, 2007, 2011)

Once the desktop analysis of the study area was completed in 2004, a monitoring program was established to track changes in the channels over time. This activity involved the installation of seven cross sections throughout the study area so that historical data could be collected. By monitoring the cross sections over a period of time, historical trends and channel changes can be observed and inferences can be made pertaining to development impacts on the watercourses in the subject area. The locations of the detailed sites were determined to provide a representative coverage of the study area, both from a spatial and morphologic perspective. Monitoring provides frequent, “low-tech” observations which enhance our understanding of a river system. It also enables direct measurements of a channel changes, such as bank erosion and bed scour, which can be linked to the historic assessment and provide a clearer picture of channel dynamics. The seven sites were located in Reaches LR-3, LRD-4, LAD-1, DD-1, BRD-1, NC-1, and SC-1 (**Figure 2.1**). The cross-sections were benchmarked by installing monuments on the top of both banks such that topographic detail between the pins could be accurately measured on a recurring basis. The cross-sections were again measured in May 2007, but not all cross-sections could be relocated, in some cases, because maintenance along the drain had stripped or buried the monitoring pins. An attempt was also made in September 2011 to update the monitoring, but the field crew was only able to relocate one of the sites (NC-1). Below are brief descriptions of the general characteristics at each site and the results of the cross-section monitoring. If monitoring is planned for the future, new monitoring locations will need to be established at the sites.

Reach LR-3

Reach LR – 3 is situated in an urban parkland area surrounded by residential development and associated infrastructure. The banks were covered by reeds, trees, an understory of shrubs, and groundcover of grasses and herbaceous vegetation. Reeds extended into the channel along the right bank. There appeared to be a high flow channel along the right bank below the bankfull elevation that was dry during the site visit in December 2004. The estimated bankfull width was 18.20m with a bankfull depth of 1.06m.



The average water depth for this monitoring cross section was measured at 0.15m with a wetted width of approximately 6.80m. Channel substrate consisted of a mixture of gravel and pebble sized particles. During the 2004 site visit a medial bar was observed upstream of the monitoring cross section that was also composed of a gravel and pebble mixture. One erosion pin was installed in the right bank of the monitoring cross section to measure changes in bank stability and mobility over the course of the monitoring program. A wetland was also noted along the right bank of the cross section. Below, are some monumented photographs that were taken at this monitoring location (**Figure 5.2**). Comparison of the cross sections from 2004 and 2007 show only a minor change in shape (**Figure 5.3**). The right bank shows slight aggradation.



Figure 5.2: Example photographs for monitoring location at LR-3 (Dec 2004).

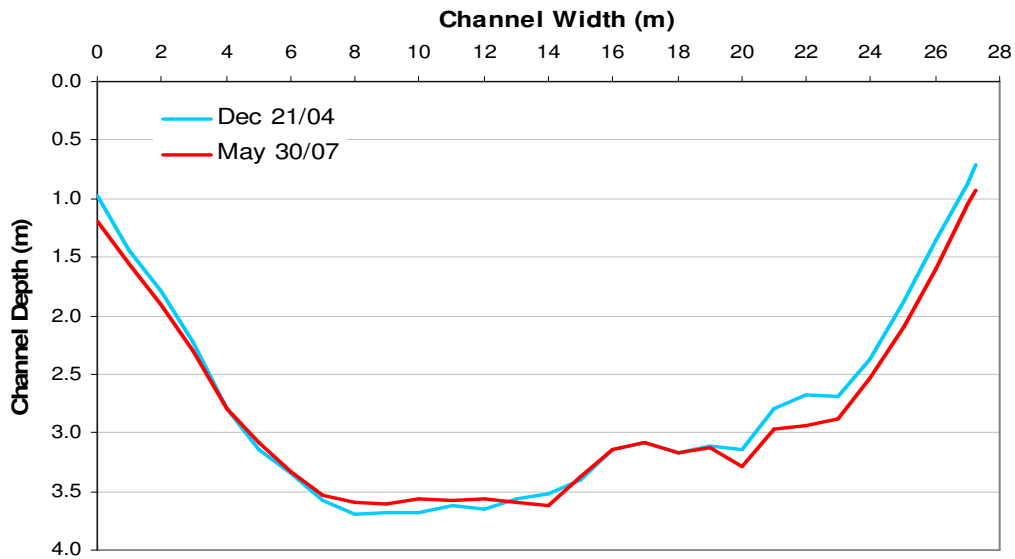


Figure 5.3: Monitoring cross section overlay for Reach LR-3.

Reach LRD-4

Reach LRD-4 is located in a residential parkland area with some commercial/industrial land use. This portion of Little River Drain appears to have been previously straightened as the channel has a wide 'U'-shape. The banks appeared to be eroding evidenced by exposed tree roots. Sparse vegetation was present on the banks during the site visit with little evidence of growth in the summer. The bank vegetation consisted of mature trees and shrubs growing out of a sand-silt soil. The soil appears to have been deposited during high flows. Channel substrate consisted of a pebble-sand-silt mixture with little-to-no channel vegetation present. Bankfull width was estimated to be 6.15 m with a depth of 0.67m, and a wetted width of 4.04m and depth of 0.20 m. There were no erosion pins installed at this monitoring cross section during the site visit. Below are the monumented photographs taken for this monitoring site (**Figure 5.4**). The channel bed has been elevated due to aggradation between the monitoring in December 2004 and May 2007 (**Figure 5.5**). Minor changes in bank shape support the contention that bank soil is being deposited during high flows.



Figure 5.4: Example photographs for monitoring location at LRD-4 (Dec 2004).

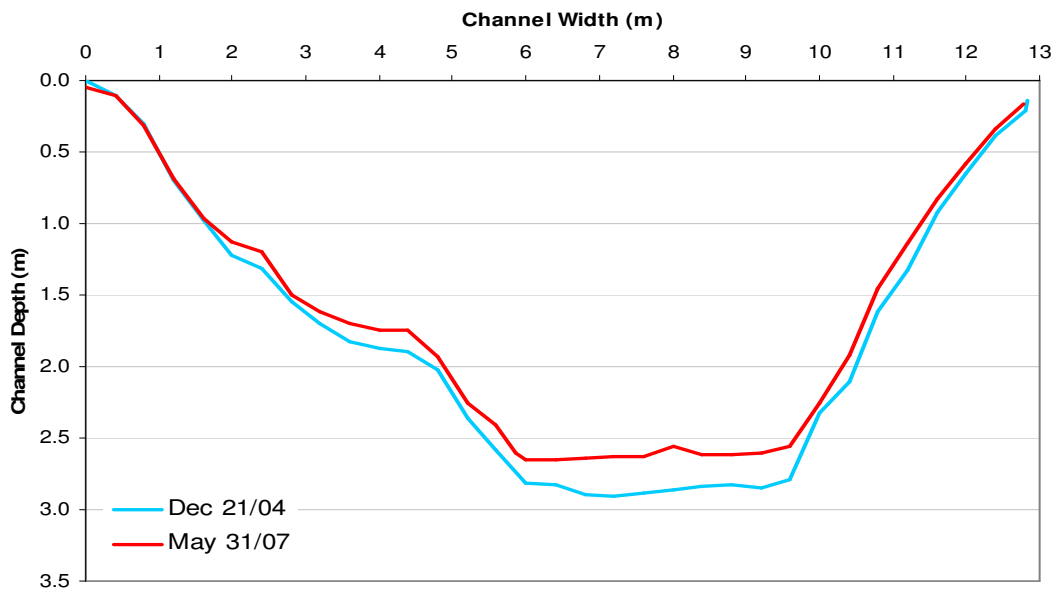


Figure 5.5: Monitoring cross section overlay for Reach LRD-4.



Reach LAD-1

Reach LAD-1 is a tributary of Little River known as Lachance Drain. It appears to be a straight, dug drainage ditch flowing through mainly agricultural land with some commercial/industrial land uses in the downstream portion. The downstream portion of the reach is also located near the rail line servicing the northern portion of Windsor. The channel appeared to be highly entrenched with a distinctive 'v'-shape to the valley. There was no noticeable bank erosion and the channel appears to convey low flows only. The bankfull width calculated for this site was 8.5m with a bankfull depth of 0.78m. The channel was at low flow during the site visit. The wetted width was 2.56m with an average depth of 0.035m. Bed substrate consisted of a mixture of silt and fine sands with a lot of vegetation (cattails) growing throughout most of the reach. Below are the monumented photographs taken for this monitoring cross section (**Figure 5.6**). Field crews were unable to relocate the monitoring cross section in 2007; therefore comparative cross section overlays cannot be shown (

Figure 5.7).



Figure 5.6: Example photographs for monitoring location at LAD-1 (Dec 2004).

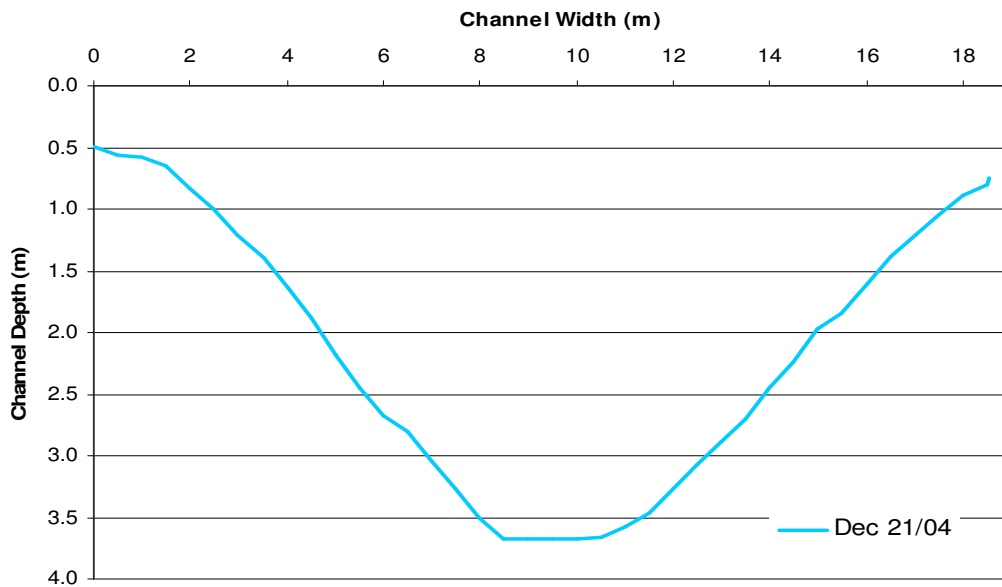


Figure 5.7: Monitoring cross section overlay for Reach LAD-1.

Reach DD-1

This reach flows as an agricultural drain into the eastern edge of Little River upstream of Lachance Drain. The surrounding land use is dominated by agricultural fields and scrub lands. Bank vegetation consisted of trees, shrubs (raspberry bushes), and tall and short herbaceous vegetation. During the site inspection, there was sufficient woody debris in the channel to create barriers to flow and backwater. Bank erosion that extended to the top of bank in some areas was also noted along a portion of the reach. There did not appear to be a lot of under-story vegetation present near the monitoring cross section and the trees located along the bank did not appear to be leaning, suggesting that the bank erosion is slow. Channel substrate consisted of sandy silt to sand mixture. Estimated bankfull width for this monumented site was 5.1m and the bankfull depth was 0.88m. The wetted width observed for this site was 1.21m with an average wetted depth of 0.07m. One erosion pin was installed at this cross section in the left bank approximately 5m downstream of the monitoring cross section. Monumented photographs for this reach can be found below (**Figure 5.8**). Field crews were unable to relocate the monitoring cross section in 2007; therefore comparative cross section overlays cannot be shown (**Figure 5.9**).

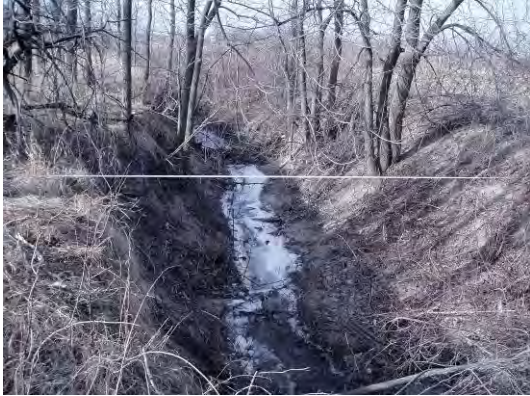


Figure 5.8: Example photographs for monitoring location at DD-1 (Dec 2004).

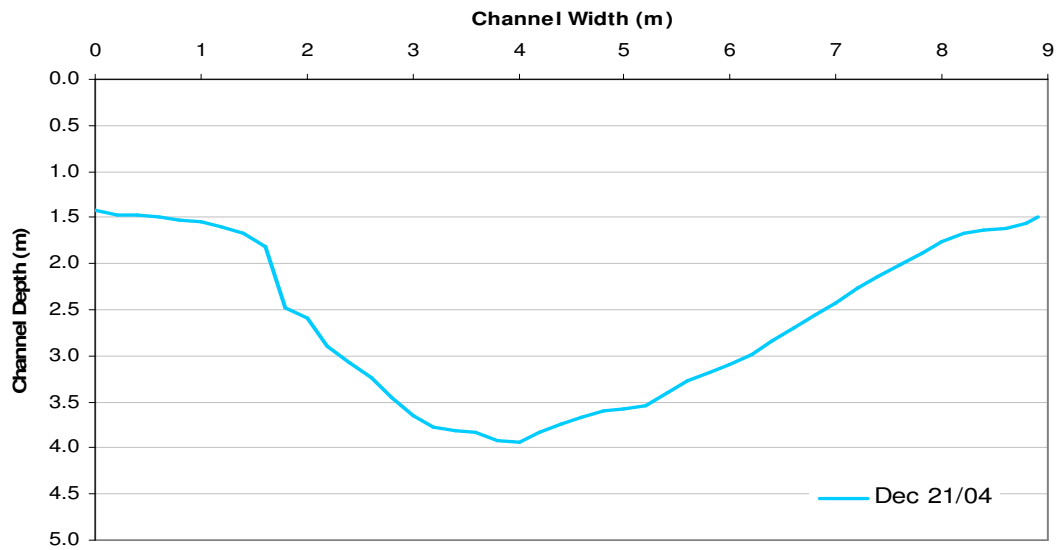


Figure 5.9: Monitoring cross section overlay for Reach DD-1.



Reach BRD-1

Baseline Road Drain (BRD-1) joins the Little River Drain near 6th Concession Road. The entire reach is surrounded by agricultural land and appears to flow as a drainage ditch along 6th Concession Road. Bank vegetation consisted of a mix of shrubs with tall and short herbaceous vegetation. Channel substrate consisted of a mixture of fine sand and silt. There did not appear to be woody debris in the channel during this site visit. Bankfull was estimated to be 4.6m width, with a depth of 0.59m, a wetted width of 1.42m and an average wetted depth of 0.19m. Two erosion pins were installed at this monitoring cross section. The first was installed in the left bank approximately 2.0m upstream of the monitoring cross section, and the other one was installed approximately 8.5 m downstream of the cross section. The photographs below illustrate the site characteristics (**Figure 5.10**). The site was re-measured in May 2007 (**Figure 5.11**). The changes in channel shape suggest that the ditch was cleaned out with the help of a backhoe. This is a standard practice in rural areas when municipal drains become overgrown with channel and bank vegetation.

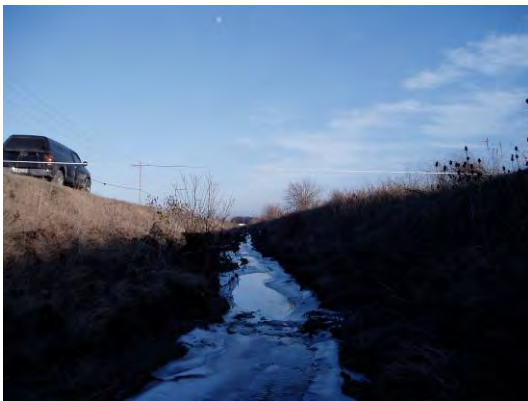


Figure 5.10: Example photographs for monitoring location at LRD-4 (Dec 2004).

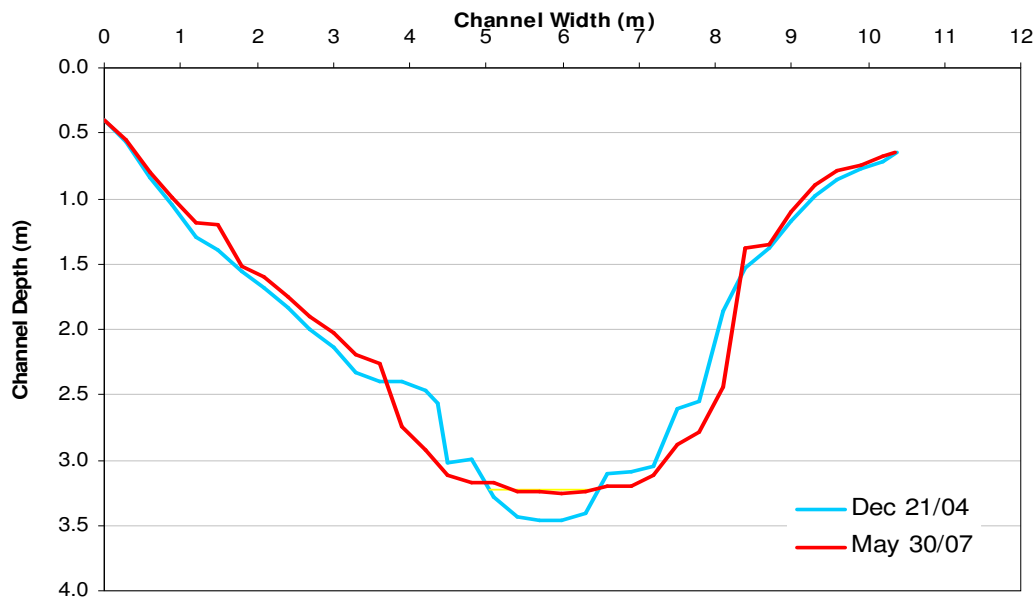


Figure 5.11: Monitoring cross section overlay for the Baseline Road Drain Reach 1.

Reach SC-1

This reach is the terminal section of the 6th Concession Road drain before it becomes the Baseline Road Drain which ultimately flows into the Little River Drain. The surrounding land use for this portion of the 6th Concession drain consisted mainly of residential development and associated infrastructure, with some agricultural land use still visible. The left bank of the channel abuts 6th Concession Road. Bank vegetation consisted of a mixture of tall and short grasses and herbaceous vegetation with some trees and shrubs along the residential side of the channel. The left bank appeared to be slumping with some scars visible along the bank. Channel substrate consisted of a mixture of silt and fines. Observed bankfull width was 3.7m with a bankfull depth of 0.43m. The wetted width was not that deep during the site visit with a wetted width of 1.32m and an average wetted depth of 0.12m. Two erosion pins were installed at this monitoring cross section, one in the right bank and the other in the left bank, both immediately at the cross section. The monumented photographs taken for this reach are below (**Figure 5.12**). Cross-section measurement was repeated in May 2007 (**Figure 5.13**). Change in cross-sectional shape indicates slumping of the left bank and toe erosion of the right bank.



Figure 5.12: Example photographs for monitoring location at SC-1 (Dec 2004).

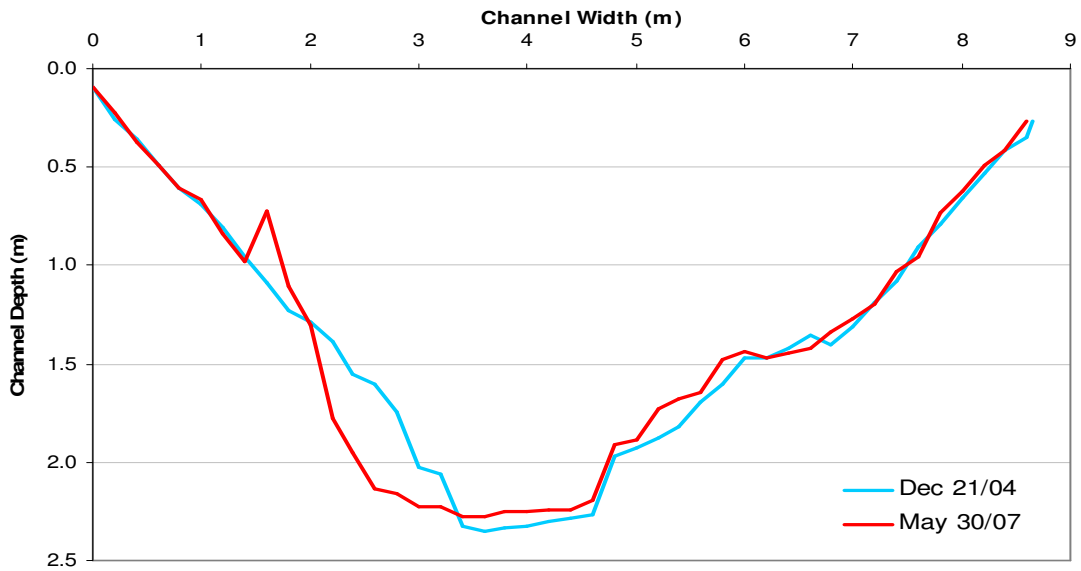


Figure 5.13: Monitoring cross section overlay for the Sixth Concession Drain Reach 1.



Reach NC-1

This reach flows along the 9th Concession Roadway as a roadside ditch, before joining with 6th Concession Drain (SC-1) and becoming the Little River Drain (LRD). Surrounding land use consists mainly of agricultural fields with some residential development and associated infrastructure. Bank vegetation consisted of a mixture of tall and short grasses and herbaceous vegetation. Channel substrate consisted of a pebble-sand mixture with some large boulders in the channel near the cross section. Bankfull width was estimated to be 4.3m with a bankfull depth of 0.57m. The wetted width from this cross section was observed to be 1.34m width with an average depth of 0.12m. There were no erosion pins installed at this monitoring cross section. The monumented photographs below highlight the findings for this reach (**Figure 5.14**). The cross section for Reach NC-1 was the only monitoring site that could be re-located in both 2007 and 2011 (**Figure 5.15**). Between December 2004 and May 2007 the channel appears to have been cleaned out creating more of a “U-shape”. There also appears to have been some slumping along the left bank during that time period. The shape does not seem to have changed significantly between May 2007 and September 2011. The left bank has eroded to create a gentler bank profile, while the right bank has remained relatively stable.



Figure 5.14: Example photographs for monitoring location at ND-1 (Dec 2004).

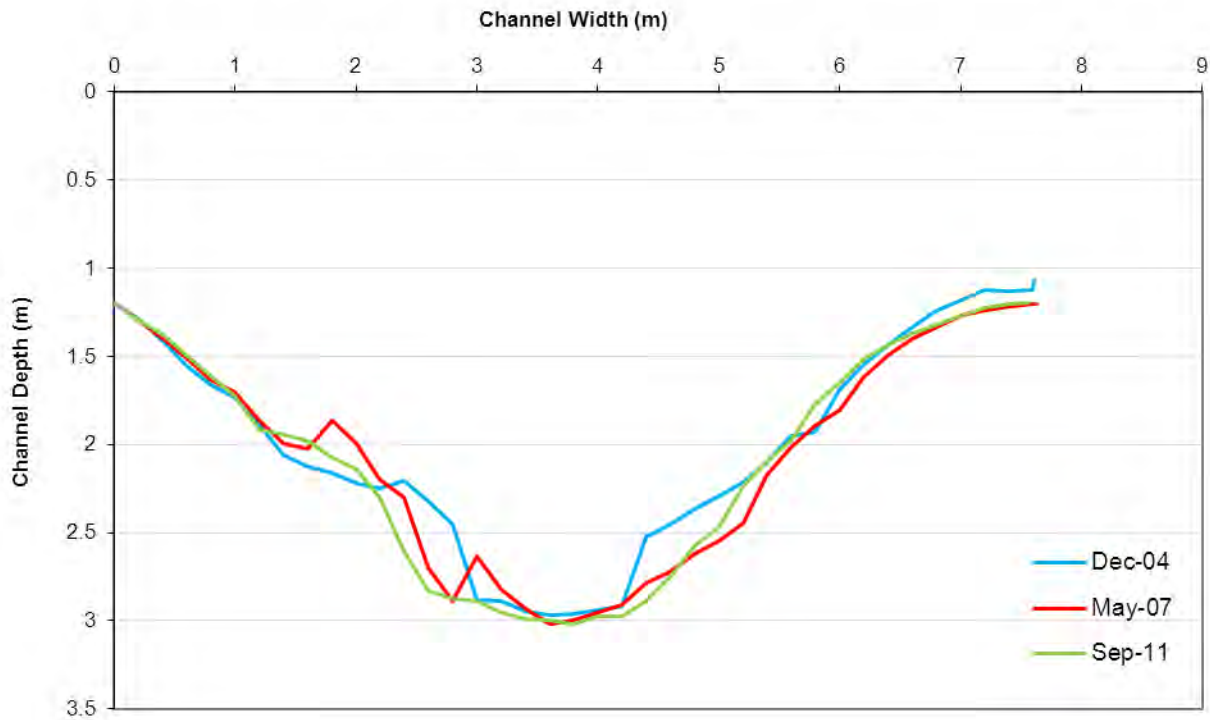


Figure 5.15: Monitoring cross section overlay for the Ninth Concession Drain Reach 1.

5.2 Detailed Sites (2007)

Detailed work was carried out in May 2007 at five sites selected to provide representative coverage of the study area, both from a spatial and morphologic perspective. The selected reaches included Reach LR-2, LR-5, LAD-1, SD-1 and LRD-4 (**Figure 2.1**). Three of these sites were new to the study and two were already included as part of the monitoring program (LRD-4 and LAD-1). Detailed field assessments involved standard protocols and known field indicators used to quantify bankfull cross-sectional dimensions (e.g. bankfull depth and width) at five representative locations. A modified pebble count based on Wolman (1954) was used to characterize the surficial channel bed materials, whereby approximately 40 particles were randomly sampled and the length of the median axis was recorded. Sub-pavement materials were also characterized by separating a sub-surface sample qualitatively by particle size, and evaluating each fraction as a percentage of the overall sample. Note that the channel bed surface is defined



in thickness as two diameters of the largest sediments. In addition to noting bank characteristics, an *in situ* shear stress test was performed on bank materials. Finally, a level survey of the channel bottom and bankfull elevations provided a measure of the local energy gradient.

A description of each reach is provided below including general characteristics and bankfull geometry. Channel form is thought to be a response to the water and sediment supplied to the system, coupled with valley constraints, such as bedrock and vegetation. The bankfull channel dimensions (**Table 5.1**) likely formed to carry a certain discharge. Therefore, bankfull discharge and other important flow characteristics, including the main driver of sediment entrainment, shear stress (**Table 5.2**), can be estimated using channel gradient and bankfull channel cross-sections measured in the field.

Reach LR-2

Reach LR-2 is a straight, dug canal that leads into Lake St. Clair. There are berms that are built on both sides of the channel with retaining walls sporadically found throughout the reach. A storm outlet and floodgate contribute to flows in the channel during high flow periods. The bankfull width ranged from 18.47 m to 19.16 m with an average bankfull depth of 1.08 m. The banks were uniform in height at 4 m, composed of silt and clay supported by riprap or retaining walls. The water was relatively deep at time of measurement, with no defined pool-riffle sequences observed. The bed substrate varied from clay to riprap material, believed to have come from the riprap lining of the banks. The median grain size (D_{50}) was 5.30 mm and the D_{84} (ie., size where 84% of the samples are finer) was 49.28 mm. This indicates that while the substrate spans the range of clay to riprap most of the bed material is classified as pebbles/fine gravel with the largest material being mostly very coarse gravel. Average bankfull discharge is estimated to be 21.92 m³/s which moves at an average rate of 0.88 m/s, producing an average shear stress of 8.42 N/m².



Table 5.1: Average bankfull geometry results from the 5 detailed study sites

<i>Cross-section Name:</i>	<i>SD-1</i>	<i>LAD-1</i>	<i>LRD-4</i>	<i>LR-5</i>	<i>LR-2</i>
Bankfull Width (m)	2.59	4.34	5.39	7.72	18.84
Average Bankfull Depth (m)	0.34	0.59	0.57	0.85	1.08
Maximum Bankfull Depth (m)	0.51	0.89	0.78	1.05	1.51
Bankfull Width:Depth	7.71	7.31	9.52	9.23	17.52
Cross-sectional Area (m ²)	0.89	2.55	3.12	6.60	20.96
Wetted Perimeter (m)	2.92	4.82	5.85	8.74	19.53
Hydraulic Radius (m)	0.30	0.52	0.53	0.76	1.07
Left Bank Angle (°)	36.98	34.77	31.77	45.69	19.31
Right Bank Angle (°)	31.43	29.57	30.25	54.24	22.81
Gradient	0.43%	0.11%	0.07%	0.06%	0.08%

Table 5.2: Average bankfull hydraulics results from the 5 detailed study sites

<i>Cross-section Name:</i>	<i>SD-1</i>	<i>LAD-1</i>	<i>LRD-4</i>	<i>LR-5</i>	<i>LR-2</i>
Bankfull Discharge (m ³ /s)	0.87	1.84	1.76	4.31	20.02
Average Bankfull Velocity (m/s)	0.83	0.61	0.49	0.59	0.80
Maximum Bankfull Velocity (m/s)	1.17	0.86	0.63	0.72	1.07
Average Shear Velocity [u*] (m/s)	0.11	0.08	0.06	0.07	0.09
Stream Power (W/m)	36.87	19.89	12.06	25.36	157.15
Stream Power per unit Width (W/m ²)	14.20	4.55	2.22	3.33	8.34
Average Shear Stress (N/m ²)	12.82	5.66	3.64	4.46	8.42
Maximum Shear Stress (N/m ²)	21.00	9.48	5.32	6.14	11.76
Left Bank Shear Stress (N/m ²)	8.61	4.03	2.43	3.08	6.15
Right Bank Shear Stress (N/m ²)	8.14	4.05	2.52	3.14	6.28
Critical Particle Diameter for Analysis (m)	clay	clay	0.0032	0.0057	0.0049
Hydraulic Roughness	0.035	0.035	0.035	0.035	0.035

Reach LR-5

Reach LR-5 was located in a parkland area behind residential buildings south of Forest Glade Drive and east of Lauzen Parkway. It is a straight reach with no natural pool-riffle sequences; however, there were some man-made riffle features at an outlet of a storm drain. The bankfull width ranged from 6.89 m to 9.90 m with an average bankfull depth of 0.85 m. The water was turbid at the time of the field investigation with nearly stagnant flow. The bed substrate was composed of clay to cobble within this range most



sediment was classified as very coarse sand as the median grain size was 4.0 mm. The larger material (D_{84}) was classified as coarse gravel. The banks consisted of steep berms varying in height from 1 m to 4 m and were composed of clay, silt and very fine sand. The banks were heavily vegetated, but were experiencing basal scour (slumping) the length of the reach. There was urban debris found in the middle of the reach. The reach was heavily influenced by widening processes undermining the banks with basal scour leaving leaning/fallen trees and exposed roots. Average bankfull discharge is estimated to be 4.31 m^3/s which moves at an average rate of 0.59 m/s, producing an average shear stress of 4.46 N/m^2 .

Reach LAD-1

Reach LAD-1 was a man-made ditch draining the surrounding agricultural fields. The straight channel lacks natural features including riffle-pool sequencing and a meandering planform. The channel was very entrenched with a distinctive “U”-shape. The bank heights were fairly uniform averaging 2.8 m and were composed of silt and very fine sands. The bankfull width ranged from 3.56 m to 4.76 m with an average bankfull depth of 0.59 m. The bed composition varied from clay to very coarse sand. The bulk of the material is silt with a median grain size of 0.0068 mm and the largest particles are classified as coarse sand with a D_{84} of 0.098 mm. The banks support a thin grass cover while the channel is nearly free of vegetation. Several relatively new culverts drained into the reach. A concrete wall surrounding the culvert road crossing at the upstream end of the reach had failed and fallen into the channel. Significant evidence of basal scour, siltation and scour pools downstream of culverts suggest a reach that is heavily stressed. Average bankfull discharge based on channel dimensions is estimated to be 1.84 m^3/s which moves at an average rate of 0.61 m/s, producing an average shear stress of 5.66 N/m^2 .

Reach SD-1

Reach SD-1 was a man-made drainage ditch located amidst fallow agricultural fields. The channel was straight, turned only at right angles and was very entrenched. It lacked natural features like riffle-pool sequencing and a meander planform. The bankfull width ranged from 2.40 m to 2.97 m with an average bankfull depth of 0.34 m. The bank heights were fairly uniform averaging 1.8 m and were composed of



clay and silt. The bed composition varied from clay to gravel with a median grain size of 0.003 mm (clay) and a D_{84} of 0.326 (very fine sand). The upstream end of the reach was controlled by the abundant channel vegetation, which thinned out towards the downstream end. Water was located in isolated depressions in the bed. Average bankfull discharge based on channel dimensions is estimated to be 0.87 m^3/s which moves at an average rate of 0.83 m/s, producing an average shear stress of 12.82 N/m^2 .

Reach LRD-4

Reach LRD-4 was a relatively wide, straight drainage ditch. The bankfull width ranged from 4.47 m to 5.98 m with an average bankfull depth of 0.55 m. The banks varied in height from 1 m to 3 m and were composed of clay, silt and very fine sand. The bed composition varied from clay to gravel with sand dominant and sporadic cobble bars. The grain size distribution indicated that most material was classified as coarse sand with a median grain size of 0.56 mm. The larger fraction (D_{84}) consisted mostly of very coarse sand. The bed also had a well defined riffle-pool sequence. The channel was littered with urban debris. Based on cross-sectional dimensions, average bankfull discharge was estimated to be 1.62 m^3/s which moves at an average rate of 0.47 m/s, producing an average shear stress of 3.52 N/m^2 .



5.3 Erosion Threshold Analysis

In essence, an erosion threshold analysis determines the hydraulics, such as discharge, channel depth, or average channel velocity, at which the channel produces enough shear stress to initiate the mobilization of sediment of a given size, usually the D_{50} . The analysis also helps to evaluate a reach's erosion sensitivity by comparing the boundary shear stress associated with modeled flows to the critical shear stress required to entrain sediment. Nine different models were used to perform erosion threshold analysis for the Sandwich South Employment Lands, including models based on critical shear stress and permissible velocity, in order to consider a range of results. The model results were examined for convergence and compatibility with field observations. Selection of appropriate thresholds was also based on an understanding of site conditions and the assumptions and ranges of conditions under which the models are applicable.

The watercourses within the study area are mostly straightened constructed channels with relatively low gradients and finer bed materials. Providing erosion thresholds under these conditions is generally difficult, as most flows will move sand and finer materials, and there generally aren't enough true gravels to justify using the D_{65} or D_{84} (65th or 84th percentile grain size) as often done with bimodal sediment distributions. In this case, the median grain sizes for the entire sediment distribution in each reach (D_{50}) were used to estimate the erosion thresholds, including the cohesive clays at LAD-1 and SD-1. The Fischenich 2001 entrainment relationships provide reasonable results when dealing with the fine gravels found at the non-clay sites, but for the clays, the Shields equation was used, albeit modified by setting the critical shear to a given number based on estimates of cohesiveness and strength of the clay (Chow 1959, 4-9N/m²). The calculated erosion threshold discharge values varied between 16% and 55% of estimated bankfull flows, with an average of 33%. Sediment generally begins moving at flows around 1/3 to 1/2 of bankfull, so the estimated values suggest that the entrenched channels with fine grained beds and banks might be relatively sensitive to increases in flows. LR-5 and LAD-1 appear to be less sensitive, whereas SD-1, which is steeper and flows through sandy clay, is expected to be the most sensitive.



In addition, it appears that many of the drains within the study site are maintained. Channel widening, bank steepening, and further entrenchment, which may or may not be associated with in-channel maintenance work, could alter the erosion threshold values, channel sensitivity, and the morphology in general (e.g., over steepened banks tend to fail, wider channel tend to have higher threshold discharges.) The current values are based on conditions over the last 5 years, and although we tried to be conservative, sites may have been altered more recently.

Table 5.3: Erosion Threshold Analysis Values

Parameter	LR-2	LR-5	LAD-1	SD-1	LRD-4
The Bankfull Geometry					
Average Bankfull Width (m)	18.84	7.72	4.34	2.59	5.20
Average Bankfull Depth (m)	1.08	0.85	0.59	0.34	0.55
Bankfull Gradient (%)	0.08	0.06	0.11	0.43	0.07
Bed Material					
D ₅₀ (mm)	5.30	4.0	0.0068	0.003	0.56
D ₈₄ (mm)	49.28	23.90	0.098	0.326	2.72
Bankfull Hydraulics					
Manning's n (estimate)	0.035	0.035	0.035	0.035	0.035
Average Bankfull Velocity (m/s)	0.88	0.59	0.61	0.83	0.47
Average Bankfull Discharge (m ³ /s)	20.02	4.31	1.84	0.87	1.76
Thresholds					
Critical Particle Size	5mm	4mm	Clay	Clay	4mm
Method of analysis	Fischenich (2001)	Fischenich (2001)	Shields/Chow (1959)	Shields/Chow (1959)	Fischenich (2001)
Critical Discharge (m ³ s ⁻¹)	5.46	2.35	0.85	0.14	0.4
Average Critical Velocity (ms ⁻¹)	0.54	0.48	0.51	0.49	0.31
Critical/Bankfull Discharge	28%	55%	46%	16%	23%



6. Restoration/Remediation Opportunities

1. Restoration of altered channels

Previously altered channel sections could be restored and rehabilitated to channels that exhibit natural functions. The majority of the study areas are drains where natural channel design principals can be implemented. A lot of these channels are deep with high steep banks that are exhibiting erosion. Bank restructuring and floodplain terracing is an option for these entrenched watercourses, as the channels currently cannot access their floodplains due to the high banks. The result of the existing condition is greater stress being exerted on the bed during higher flows. The work should include re-grading the banks to create benches or terraces, which would help dissipate energy and re-connect the bankfull channel to a floodplain area. The re-graded banks should be re-vegetated to help stabilize the banks and create floodplain habitat.

2. Re-establish riparian vegetation

Re-establishing a healthy riparian vegetation community will not only increase bank stability, but will also provide shading to the creek, contributing to aquatic habitat through the contribution of organic debris. It also contributes to the overall aesthetic impact of the system.

3. Construct channel bed morphology for fish habitat

Many of the channels in the study area lack bed morphology to support any fish habitat due to over-widened channel widths and sediment accumulation. By constructing structures to narrow cross-sectional area (i.e. wood deflectors sticking out of the banks) to promote bed morphology and re-grade the banks to create benches or terraces to help dissipate energy and help sediment transport, fish may have a healthy habitat.

4. Removal of hard structures – bed and banks



There are reaches and portions of reaches in the Windsor Annex Lands that have hardened banks (e.g. LR-2, LRD-1 and MD-1). The conditions of the hard structures (concrete and retaining walls) vary with some failing and others being undermined and may eventually fail. By replacing these structures with a 'softer' bio-engineered approach such as vegetated riprap or brush layering, it offers the stability and erosion protection of an engineered structure with the aesthetic and ecological benefits of incorporated plantings. These techniques are ideal for the treatment of localized scour issues where lateral expansion or channel migration is undesirable.

5. Local bank stabilization area

The majority of the reaches in the study area are experiencing bank erosion. In these areas, localized bank treatment could be considered to dissipate the expected increase in flow regime. Bio-engineering techniques such as brush layering and crib walls effectively increase the shear strength of the banks, allowing them to withstand higher flows than those tolerated by existing bare soils.



7. Conclusions

This report presents the findings of geomorphological reach characterization, meander belt width assessment, erosion threshold analysis at selected fieldwork sites, and cross-sectional monitoring. The report is intended to provide a characterization of existing conditions for Upper Little River and its associated drains contained within the Sandwich South Employment lands. Based on the report findings the following key conclusions can be drawn:

- **Meander belt widths**

Meander belt widths were delineated for all reaches based on either current channel planform or current channel dimensions. Due to a history of alteration and straightening traditional methods of meander belt width delineation could not be used in which case channel dimensions (from field data) were used in conjunction with empirical relationships to calculate an appropriate belt width. Erosion setbacks were calculated as 10% of the preliminary belt width as historical migration rates could not be determined. Final belt widths ranged from a minimum of 28 m to a maximum of 216 m. Larger belt widths were determined for reaches with a more sinuous planform and larger channel dimensions. Any future development of the study area should occur outside of the meander belt widths to ensure channel stability.

- **Reach characterization**

Within the study area, reaches can be grouped into three different categories: the main Little River channel (LR-1 to LR-6), the Little River drain (LRD-1 to LRD-5), and the agricultural drains (all remaining reaches). While the reaches differ widely in channel dimensions, characteristics are similar. The majority of the reaches have been straightened or altered in some way. Banks are protected by various structures ranging from gabions and terra blocks, to large steel retaining walls on the main Little River reaches. The agricultural drains appear to be mostly man-made straight ditches, lacking any natural geomorphic features. Bank erosion is prevalent in the entrenched, agricultural drains as well as in some of the larger reaches where bank protection is slightly undermined. Based on these characteristics noted during rapid assessments, all reaches were classified as in transition or adjustment. Most channels were widening with a secondary process of aggradation. As the channels widen and erode the banks, trees lean and fall into the channel creating woody debris which traps sediment leading to the secondary process of aggradation. Cross section monitoring results support this characterization as well. Both LR-3 and LRD-4 showed slight aggradation between the two times of measurement. Reaches BRD-1, NC-1, and SC-1 had evidence of bank slumping and erosion over the monitoring period.

- **Erosion thresholds**

Erosion thresholds were done for five reaches: two on the Little River main channel, one on the Little River drain, and two on agricultural drains. This selection gave a representative sample of the reaches within the study area. The critical discharge was on average 33% of the bankfull discharge which is



relatively low. This is attributed to the entrenched nature of the majority of the reaches, resulting in a high bankfull discharge relative to grain size within the channel.



8. References

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Appendix A: Photographic Record of Reaches



Sixth Concession (SCD-1)
Looking downstream at right bank toe erosion



Sixth Concession (SCD-2)
Looking downstream at reach break and bank



Ninth Concession Drain (NCD-1)
Looking upstream from near middle of reach



Baseline Road Drain (BRD-1)
Looking downstream from end of reach at bank erosion



Lachance Drain Reach (LAD-1)
Cross section 6 looking upstream



Little River Reach (LR-1)
Looking downstream at retaining walls



Little River Reach (LR-2)
Cross section 2 looking downstream



Little River Reach (LR-3)
Looking at downstream end of reach at toe erosion of right bank



Little River Reach (LR-4)
Looking downstream from road crossing



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APPENDIX K

Preliminary Opinion of Probable Costs

Upper Little River Watershed Master Drainage and Stormwater Management Plan
Preliminary Opinion of Probable Costs

Description	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
	Do-Nothing	Off-Line Water Quality and no Water Quantity Control	On-line Water Quality and Quantity Controls Communal On-Line SWM	On-line Water Quantity and Off-line Water Quality Controls	Distributed Off-line Water Quality and Quantity Controls	Grouped Off-line Water Quality and Quantity Controls
Channel Improvements (\$/m)	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000
Pond (\$/ha of drainage area)	\$ 5,000	\$ 5,000	\$ 7,000	\$ 11,000	\$ 11,000	\$ 10,000
Improved Channel length (m)	-	28,000	28,000	28,000	28,000	28,000
Proposed area requiring SWM Facilities (ha)	-	3,000	3,000	3,000	3,000	3,000
Channel Improvements	\$ -	\$ 28,000,000	\$ 28,000,000	\$ 28,000,000	\$ 28,000,000	\$ 28,000,000
SWM Facilities	\$ -	\$ 15,000,000	\$ 21,000,000	\$ 33,000,000	\$ 33,000,000	\$ 30,000,000
Subtotal	\$ -	\$ 43,000,000	\$ 49,000,000	\$ 61,000,000	\$ 61,000,000	\$ 58,000,000
Allowance/Contingency (15%)	\$ -	\$ 6,450,000	\$ 7,350,000	\$ 9,150,000	\$ 9,150,000	\$ 8,700,000
Design/Construction Administration (10%)	\$ -	\$ 4,300,000	\$ 4,900,000	\$ 6,100,000	\$ 6,100,000	\$ 5,800,000
Grand Total	\$ -	\$ 53,750,000	\$ 61,250,000	\$ 76,250,000	\$ 76,250,000	\$ 72,500,000

Notes Alternatives 3 to 5 assume proposed flows are attenuated to the capacity of the existing municipal drain network
Alternatives 2 to 5 assume the existing municipal drain network is abandoned and offsetting measures are required
Costs include excavation, fine grading, hard servicing (headwalls, pipes, rip-rap, etc.), and landscaping
Costs do not include property or pump stations

APPENDIX L

Stage 1 Archaeology Assessment

Ministry of Tourism, Culture and Sport

Archaeology Programs Unit
Programs and Services Branch
Culture Division
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Ministère du Tourisme, de la Culture et du Sport

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Direction des programmes et des services
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May 16, 2016

Walter Frank McCall (P389)
Stantec Consulting
48 Charles Brantford ON N3T 1B3

RE: Review and Entry into the Ontario Public Register of Archaeological Reports: Archaeological Assessment Report Entitled, "Stage 1 Archaeological Assessment: Upper Little River Watershed Master Plan and Stormwater Management Plan Various Lots and Concessions, Geographic Townships of Sandwich East and South, now City of Windsor and Town of Tecumseh, Essex County, Ontario ", Dated Apr 8, 2015, Filed with MTCS Toronto Office on Apr 22, 2015, MTCS Project Information Form Number P389-0040-2014

Dear Dr. McCall:

This office has reviewed the above-mentioned report, which has been submitted to this ministry as a condition of licensing in accordance with Part VI of the Ontario Heritage Act, R.S.O. 1990, c 0.18.¹ This review has been carried out in order to determine whether the licensed professional consultant archaeologist has met the terms and conditions of their licence, that the licensee assessed the property and documented archaeological resources using a process that accords with the 2011 Standards and Guidelines for Consultant Archaeologists set by the ministry, and that the archaeological fieldwork and report recommendations are consistent with the conservation, protection and preservation of the cultural heritage of Ontario.

The report documents the assessment of the study area as depicted in Figure 4 of the above titled report and recommends the following:

Stantec was retained by the City of Windsor to complete a Stage 1 archaeological assessment for a study area, measuring approximately 225 hectares in size, located on various Lots and Concessions, Townships of Sandwich East and South, now City of Windsor and Town of Tecumseh, Essex County, Ontario (Figure 1).

The Stage 1 archaeological assessment, involving background research and a property inspection, resulted in the determination that portions of the study area exhibit a moderate to high potential for the identification and recovery of archaeological resources. As such, a Stage 2 archaeological assessment will be required for portions of the study area (Figure 4).

The Stage 2 archaeological assessment will include the systematic walking of open ploughed fields at five metre intervals as outlined in Section 2.1.1 of the MTCS; 2011 Standards and Guidelines for Consultant Archaeologists (Government of Ontario 2011). The MTCS standards further require that all agricultural

land, both active and inactive, be recently ploughed and sufficiently weathered to improve the visibility of archaeological resources. Ploughing must be deep enough to provide total topsoil exposure, but not deeper than previous ploughing, and must be able to ensure at least 80% ground surface visibility.

Moreover, the Stage 2 archaeological assessment will include a test pit survey at five metre intervals in areas inaccessible for ploughing as outlined in Section 2.1.2 of the MTCS; 2011 Standards and Guidelines for Consultant Archaeologists (Government of Ontario 2011). The MTCS standards require that each test pit be approximately 30 centimetres in diameter, excavated to at least five centimetres in to subsoil, and have all soil screened through six millimetre hardware cloth to facilitate the recovery of any cultural material that may be present. Prior to backfilling, each test pit will be examined for stratigraphy, cultural features, or evidence of fill.

Should any areas of disturbance or features indicating that archaeological potential have been removed, including permanently wet areas, not previously identified during the Stage 1 property inspection be encountered during the Stage 2 archaeological assessment, they will be documented as outlined in Section 2.1.8 of the MTCS; 2011 Standards and Guidelines for Consultant Archaeologists (Government of Ontario 2011).

Additional archaeological assessment is required; hence the study area remains subject to Section 48(1) of the Ontario Heritage Act and may not be altered, or have artifacts removed from them, except by a person holding an archaeological license.

Based on the information contained in the report, the ministry is satisfied that the fieldwork and reporting for the archaeological assessment are consistent with the ministry's 2011 Standards and Guidelines for Consultant Archaeologists and the terms and conditions for archaeological licences. This report has been entered into the Ontario Public Register of Archaeological Reports. Please note that the ministry makes no representation or warranty as to the completeness, accuracy or quality of reports in the register.

Should you require any further information regarding this matter, please feel free to contact me.

Sincerely,

Kaye Boucher
Archaeology Review Officer

cc. Archaeology Licensing Officer
Anna Godo, City of Windsor
Craig Newton, a. Environmental Approvals Branch Ministry of the Environment

¹In no way will the ministry be liable for any harm, damages, costs, expenses, losses, claims or actions that may result: (a) if the Report(s) or its recommendations are discovered to be inaccurate, incomplete, misleading or fraudulent; or (b) from the issuance of this letter. Further measures may need to be taken in the event that additional artifacts or archaeological sites are identified or the Report(s) is otherwise found to be inaccurate, incomplete, misleading or fraudulent.

**Stage 1 Archaeological
Assessment:
Upper Little River Watershed
Master Plan and Stormwater
Management Plan**

Various Lots and Concessions,
Geographic Townships of
Sandwich East and South, now
City of Windsor and Town of
Tecumseh, Essex County, Ontario



Prepared for:
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City of Windsor
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Licensee: Walter McCall, Ph.D.
License #: P389
PIF #: P389-0040-2014
Project #: 160311265

ORIGINAL REPORT

April 8, 2015

**STAGE 1 ARCHAEOLOGICAL ASSESSMENT:
UPPER LITTLE RIVER WATERSHED
MASTER PLAN AND STORMWATER MANAGEMENT PLAN**

Project Context
April 8, 2015

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Project Personnel

Archaeology Lead:	Walter McCall, Ph.D. (P389)
Licensed Archaeologist:	Walter McCall, Ph.D. (P389)
Licensed Field Director:	Darren Kipping, MA (422)
Report Writer:	Gemma Calgie, B.Sc. (R472)
Technical Review:	Jeffrey Muir, BA (R304)
Licensee Review:	Walter McCall, Ph.D. (P389)
Senior Review:	Jim Wilson, MA (P001)

Acknowledgements

Proponent Contact:	Ms. Anna Godo, P.Eng.
Ministry of Tourism, Culture and Sport:	Robert von Bitter



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Executive Summary

Stantec Consulting Ltd. (Stantec) was retained by the City of Windsor to conduct a Stage 1 archaeological assessment on various Lots and Concessions, Geographic Townships of Sandwich East and South, now City of Windsor and Town of Tecumseh, Essex County, Ontario prior to the construction of the stormwater management system within the study area.

This assessment serves to meet the requirements of the Master Plan Municipal Class Environmental Assessment under the *Environmental Assessment Act* (Government of Ontario 1990a: Schedule 6.1). These guidelines require that an archaeological assessment be conducted prior to any infrastructure projects. The Stage 1 archaeological assessment was conducted in accordance with the Ministry of Tourism, Culture and Sport's (MTCS) 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011).

The objectives of the Stage 1 assessment were to compile all available information about the known and potential archaeological heritage resources within the study area and to provide specific direction for the protection, management and/or recovery of these resources. This Stage 1 archaeological assessment was conducted under archaeological consulting license P389 issued to Walter McCall, Ph.D., of Stantec by the MTCS. A site visit was undertaken on April 17, 2014 as per Section 1.2 of the *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011)

The Stage 1 archaeological assessment, involving background research and a property inspection, resulted in the determination that portions of the study area exhibit a moderate to high potential for the identification and recovery of archaeological resources. As such, a Stage 2 archaeological assessment will be required for portions of the study area.

The Stage 2 archaeological assessment will include the systematic walking of open ploughed fields at five metre intervals as outlined in Section 2.1.1 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). All agricultural land, both active and inactive, should be recently ploughed and sufficiently weathered to improve the visibility of archaeological resources. Ploughing must be deep enough to provide total topsoil exposure, but not deeper than previous ploughing, with at least 80% ground surface visibility.

Moreover, the Stage 2 archaeological assessment will include a test pit survey at five metre intervals in areas inaccessible for ploughing as outlined in Section 2.1.2 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). The MTCS standards require that each test pit be approximately 30 centimetres in diameter, excavated to at least five centimetres in to subsoil, and have all soil screened through six



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millimetre hardware cloth to facilitate the recovery of any cultural material that may be present. Prior to backfilling, each test pit will be examined for stratigraphy, cultural features, or evidence of fill.

The MTCS is asked to review the results presented and to accept this report into the Ontario Public Register of Archaeological Reports. Additional archaeological assessment is required; hence the study area remains subject to Section 48(1) of the *Ontario Heritage Act* and may not be altered, or have artifacts removed from them, except by a person holding an archaeological license.

The Executive Summary highlights key points from the report only; for complete information and findings, the reader should examine the complete report.

**STAGE 1 ARCHAEOLOGICAL ASSESSMENT:
UPPER LITTLE RIVER WATERSHED
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Project Context
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1.0 PROJECT CONTEXT

1.1 DEVELOPMENT CONTEXT

Stantec Consulting Ltd. (Stantec) was retained by the City of Windsor to conduct a Stage 1 archaeological assessment on various Lots and Concessions, Geographic Townships of Sandwich East and South, now City of Windsor and Town of Tecumseh, Essex County, Ontario prior to the construction of the stormwater management system within the study area.

This assessment serves to meet the requirements of the Master Plan Municipal Class Environmental Assessment under the *Environmental Assessment Act* (Government of Ontario 1990a: Schedule 6.1). These guidelines require that an archaeological assessment be conducted prior to any infrastructure projects. The Stage 1 archaeological assessment was conducted in accordance with the Ministry of Tourism, Culture and Sport's (MTCS) 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011).

The objectives of the Stage 1 assessment were to compile all available information about the known and potential archaeological heritage resources within the study area and to provide specific direction for the protection, management and/or recovery of these resources. In compliance with the provincial standards and guidelines set out in the MTCS' *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), the objectives of the Stage 1 Archaeological Overview/Background Study are as follows:

- To provide information about the study area's geography, history, previous archaeological fieldwork and current land conditions;
- To evaluate in detail the study area's archaeological potential which will support recommendations for Stage 2 survey for all or parts of the property; and
- To recommend appropriate strategies for Stage 2 survey.

To meet these objectives Stantec archaeologists employed the following research strategies:

- A review of relevant archaeological, historic and environmental literature pertaining to the study area;
- A review of the land use history, including pertinent historic maps;
- An examination of the Ontario Archaeological Sites Database (ASDB) to determine the presence of known archaeological sites in and around the project area; and
- Documentation of the study area during a property inspection.

Permission to enter and document the study area was provided by Ms. Anna Godo, P.Eng.

**STAGE 1 ARCHAEOLOGICAL ASSESSMENT:
UPPER LITTLE RIVER WATERSHED
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1.2 HISTORICAL CONTEXT

1.2.1 Post-Contact Aboriginal Resources

The post-contact Aboriginal occupation of Southern Ontario was heavily influenced by the dispersal of various Iroquoian-speaking communities by the New York State Iroquois and the subsequent arrival of Algonkian-speaking groups from northern Ontario at the end of the 17th century and beginning of the 18th century (Konrad 1981; Schmalz 1991). By 1690, Algonkian speakers from the north appear to have begun to repopulate Bruce County (Rogers 1978:761). This is the period in which the Mississaugas are known to have moved into southern Ontario and the lower Great Lakes watersheds (Konrad 1981). In southwestern Ontario, however, members of the Three Fires Confederacy (Chippewa, Ottawa, and Potawatomi) were immigrating from Ohio and Michigan in the late 1700s (Feest and Feest 1978:778-779).

The nature of Aboriginal settlement size, population distribution, and material culture shifted as European settlers encroached upon their territory. Despite this shift, however, “written accounts of material life and livelihood, the correlation of historically recorded villages to their archaeological manifestations, and the similarities of those sites to more ancient sites have revealed an antiquity to documented cultural expressions that confirms a deep historical continuity to Iroquoian systems of ideology and thought” (Ferris 2009:114). As a result, First Nations peoples of Southern Ontario have left behind archaeologically significant resources throughout Southern Ontario which show continuity with past peoples, even if they have not been recorded in historical Euro-Canadian documentation.

The study area first enters the Euro-Canadian historic record on May 19, 1790 as part of Treaty Number 2, which details the surrender of land to the Crown by the Odawa, Chippewa, Pottawatomi, and Huron. Treaty Number 2:

... was made with the O[dawa], Chippew[a], Pottawatom[i] and Huro[n] May 19th, 1790, portions of which nations had established themselves on the Detroit River all of whom had been driven by the Iroquois from the northern and eastern parts of the Province, from the Detroit River easterly to Catfish Creek and south of the river La Tranche [Thames River] and Chenail Ecarte, and contains Essex County except Anderdon Township and Part of West Sandwich; Kent County except Zone Township, and Gores of Camden and Chatham; Elgin County except Bayham Township and parts of South Dorchester and Malahide. In Middlesex County, Del[a]ware and Westminster Townships and part of North Dorchester [are included].

Morris 1943:17

While it is difficult to exactly delineate treaty boundaries today, Figure 2 provides an approximate outline of Treaty Number 2.

**STAGE 1 ARCHAEOLOGICAL ASSESSMENT:
UPPER LITTLE RIVER WATERSHED
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1.2.2 Euro-Canadian Resources

The study area falls within the Geographic Townships of Sandwich East and South, Essex County, Ontario. Present day Essex County was originally part of the District of Hesse, one of four districts founded in 1788 after the British came into possession of most of North America. The District of Hesse comprised all British territories west of Long Point, which makes up most of Western Ontario. In 1792, Upper Canada re-organized into 19 counties. The District of Hesse was renamed the Western District and contained two counties, Kent and Essex. The original Township of Sandwich was first constituted in 1788, but was subdivided into municipalities alongside the growth of regional towns, until in 1861 the area comprised the Town of Sandwich, City of Windsor, Town of Walkerville, and Sandwich West, East, and South (Neal 1909: 12).

In 1615, the French merchant and navigator Samuel De Champlain conducted an expedition from Quebec to the Detroit River, where he launched an attack on an Iroquoian village, believed to have stood at the location of present day Detroit. However, his forces were repelled, and Euro-Canadian settlement in the region did not take hold until after 1701, when M. de la Motte Cadillac, commissioned by the French Governor of Canada, established a military and trading post at the site. This initial outpost became known as Fort Pontchartrain, and attracted further domestic settlement for several miles along both banks of the Detroit River.

Settlement on the eastern bank of the river, from the southern shore of Lake St. Clair to the Canard River in what would later become the Township of Sandwich, intensified after 1750 when the French began to assign land near frontier posts to military veterans. The region, known as the parish of L'Assomption (associated with a Jesuit mission built in 1748), was laid out into long, narrow lots of 180 acres. These ran perpendicular to the waterfront, extending several miles inland (Neal 1909: 6), and are still visible in present day street plans.

Fort Pontchartrain was captured by Major Robert Rodgers for the British in 1760. Even though Detroit was officially surrendered to the newly-formed United States in 1783, the British maintained effective control until 1796, when the regional seat of government was transferred to the new county town of Sandwich. During this interval Loyalists who wished to remain under the British Crown began to settle the Canadian side of the Detroit River (Neal 1909: 12). In order to assist with new settlement and distribution of land in the District of Hesse, the Land Board of the Western District was created in 1788 to facilitate a survey of the region. British land surveyor Patrick McNiff was charged with the task in Sandwich Township, and completed his survey in 1793.

The study area lies in the vicinity of two major historic communities, Sandwich and Windsor. Planning work on the village of Sandwich began in 1788, when a one square mile block of land was acquired by the British from the Chiefs of the Wyandottes/Huron, the Chippewa, and Ottawa for the price of three hundred pounds worth of supplies. It was laid out into one acre sections and 24 acre residential lots, and named for the English borough of Sandwich in Kent. Sandwich was established as the new county town by the Honourable Peter Russell in 1796, and

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its administrative function stimulated rapid growth. Industries included fur, salt, brick manufacturing, and fish hatcheries. The village was the first to see action during the War of 1812, when General Hull crossed from Detroit with a force of over 2,000 men, and played an important role in the Underground Railroad after the abolition of slavery by the British in 1833. Sandwich was incorporated as a town in 1858 (Neal 1909: 133-134).

Although the village of Sandwich was chosen as the location of Essex County offices, the town of Windsor eventually outstripped the former in size and industry. Windsor was originally founded as South Detroit by James Dougall of Paisley, Scotland, who bought the land, laid it out as a village plot, and opened a store in 1830. In 1846, Windsor had a population of only 300. In 1853, the Great Western Railway had reached the village, and chose to terminate the line there rather than at Sandwich, as originally planned. Windsor was incorporated as a town in 1854 and by 1866, its population had increased to 4,500 (Neal 1909:136). The arrival of the railway marked the beginning of significant industrial development in Windsor. Several areas that are now within the city limits, such as Walkerville and Ford City, were developed in the late 1800s and early 1900s as industrial and commercial companies set up operations in the region (Archaeological Services Inc. 2008).

The Windsor Subdivision of the Canadian Pacific Railway runs east - west across the northern portion of the study area. This railway is present on McPhillips' 1898 *Plan of the Township of Sandwich* (McPhillips 1898). Part of the Trans-Canada railway commissioned by the government in 1880, it reached Windsor in 1890, and the line is still in operation today. (Andreae 1997).

The 1881 *Illustrated Historical Atlas of Essex County, Ont.'s* (Belden & Co. 1881) map of the Townships of East and South Sandwich (Figure 3) identifies landowners for ten of the 66 lots within the Stage 1 assessment area, as listed in Table 1. Within the boundary of the study area there are three homesteads and one schoolhouse visible on the map. The road system as depicted on the map still exists today.

Table 1: Landowner Information from the 1881 *Illustrated Historical Atlas of Essex County*

Lot	Concession	Owner	Comment
142	2	H. Morand	Owner of 50 acres. A small structure visible at the northern end of the lot, fronting Tecumseh Rd.
143	2	none	No structures visible.
115 - 125	3	none	No structures visible.
126 - 127	3	none	Schoolhouse depicted straddling the northern end of both lots.
134 - 140	3	none	No structures visible.
141	3	James Ross	Owner of 75 acres. No structures visible.
142 - 149	3	none	No structures visible.
16	6	none	No structures visible.

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Lot	Concession	Owner	Comment
14-17	7	none	No structures visible.
10 - 14	8	none	No structures visible.
15	8	William Lyons	Owner of entire 200 acre lot. A small structure is visible in the northwest corner of the lot.
16	8	Jonathan Plant	Owner of 55 acres. A small structure is visible in the southeast corner of the lot, within the study area boundary.
17	8	none	Schoolhouse depicted in the southeast corner of the lot, within the study area boundary.
18	8	none	No structures visible.
10	9	none	No structures visible.
11	9	Robert Watson	Owner of 125 acres. A small structure is visible at the eastern end of the lot, near Pike Creek, and within the study area boundary.
12 - 14	9	none	No structures visible.
15	9	George Hurst	Owner of 75 acres. Two small structures are visible in the southwest corner of the lot, within the study area boundary.
16 - 18	9	none	No structures visible.
11 - 15	10	none	No structures visible.
16	10	Samuel McKenzie	Owner of entire 158 acre lot. A small structure is visible at the eastern end of the lot. During Stage 1 fieldwork, a heritage barn was noticed in the northwest corner of the lot.
17	10	none	No structures visible.
18	10	George Little	Owner of 115 acres. A small structure is visible in the northwestern corner of the lot.
19	10	none	No structures visible.
300	N/A	Alfred Renshaw	Owner of 50 acres. A small structure is visible on the eastern side of the lot.
301	N/A	Jeremiah McCarthy and James McCarthy	Jeremiah McCarthy is listed as the owner of 110 acres on the eastern side of the lot, and James McCarthy, 75 acres on the western side. A small structure is visible for each, both at the southern end of the lot.
302	N/A	none	A small structure labeled "Oldcastle P.O. Toll Gate" is depicted in the southwest corner of the lot, at a Talbot Road intersection.

Historical county atlases were produced primarily to identify factories, offices, residences and landholdings of subscribers and were funded by subscription fees. Landowners who did not

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subscribe were not always listed on the maps (Caston 1997:100). As such, all structures were not necessarily depicted or placed accurately (Gentilcore and Head 1984).

The majority of the region surrounding the study area has been subject to European-style agricultural practices for over 100 years, with Euro-Canadian farmers in the area by the mid-19th century. Much of the region today continues to be used for agricultural purposes, despite the urban spread of Windsor to the north and west of the study area.

1.3 ARCHAEOLOGICAL CONTEXT

The study area occupies all or part of Lots 10 to 19, Concessions 6 to 10, and singular Lots 300-302, Geographic Township of Sandwich South, and Lots 115 to 149, Concessions 2 to 3, Township of Sandwich East, Essex County, Ontario. It comprises approximately 225 hectares of active and inactive agricultural lands, woodlots, manicured lawns, commercial and residential properties, paved roads and highways, industrial installations, a railway, and land incorporated within the boundaries of Windsor Airport.

1.3.1 The Natural Environment

The study area is situated within the St. Clair Clay Plain (Chapman & Putnam 1986:146-147).

Adjoining Lake St. Clair in Essex and Kent County Counties and the St. Clair River in Lambton County are extensive clay plains covering 2,270 square miles. The region is one of little relief, lying between 575 and 700 feet a.s.l., except for the moraine at Ridgetown and Blenheim which rises 50 to 500 feet higher....Glacial Lake Whittlesey, which deeply covered all of these lands, and Lake Warren which subsequently covered nearly the whole area, failed to leave deep stratified beds of sediment on the underlying clay till except around Chatham, between Blenheim and the Rondeau marshes, and in a few other smaller areas. Most of Lambton and Essex Counties, therefore, are essentially till plains smoothed by shallow deposits of lacustrine clay which settled in the depressions while the knolls were being lowered by wave action.

Chapman & Putnam 1986:147

Two soil series are present within the Study Area. The primary soil series is Brookston Clay, a shaley and imperfectly drained clay till with medium lime content. Present also are small pockets of Brookston Clay Sand, a mixture of sand and Brookston Clay, which appears intermittently in areas of shallow sand knolls. Although not ideal, Brookston Clay and Brookston Clay Sand are suitable for pre-contact Aboriginal agriculture.

The closest extant sources of potable water are Little River, Pike Creek, and Canard River. These rivers and their sources bound the edges of the study area; Little River to the north, Pike Creek to the east, and Canard River to the southwest. The source of Little River lies within the study area itself. Further to these, the Detroit River runs 6.3 kilometres to the north and west of the study area, while the southern shore of Lake St. Clair is located 2.6 kilometres northeast.

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1.3.2 Pre-contact Aboriginal Archaeological Resources

This portion of southwestern Ontario has been demonstrated to have been occupied by people as far back as 11,000 years ago as the glaciers retreated. For the majority of this time, people were practicing hunter gatherer lifestyles with a gradual move towards more extensive farming practices. Given the length of occupation of the study area prior to the arrival of Euro-Canadian settlers, the pre-contact Aboriginal archaeological potential of the study area is judged to be moderate to high. Table 2 provides a general outline of the cultural chronology of Essex County, based on Ellis and Ferris (1990).

Table 2: Cultural Chronology of Essex County

Period	Characteristics	Time Period	Comments
Early Paleo-Indian	Fluted Projectiles	9000 - 8400 B.C.	spruce parkland/caribou hunters
Late Paleo-Indian	Hi-Lo Projectiles	8400 - 8000B.C.	smaller but more numerous sites
Early Archaic	Kirk and Bifurcate Base Points	8000 - 6000 B.C.	slow population growth
Middle Archaic	Brewerton-like points	6000 - 2500 B.C.	environment similar to present
Late Archaic	Lamoka (narrow points)	2000 - 1800 B.C.	increasing site size
	Broad Points	1800 - 1500 B.C.	large chipped lithic tools
	Small Points	1500 - 1100B.C.	introduction of bow hunting
Terminal Archaic	Hind Points	1100 - 950 B.C.	emergence of true cemeteries
Early Woodland	Meadowood Points	950 - 400 B.C.	introduction of pottery
Middle Woodland	Dentate/Pseudo-Scallop Pottery	400 B.C. - A.D.500	increased sedentism
	Princess Point	A.D. 550 - 900	introduction of corn
Late Woodland	Early Ontario Iroquoian	A.D. 900 - 1300	emergence of agricultural villages
	Middle Ontario Iroquoian	A.D. 1300 - 1400	long longhouses (100m +)
	Late Ontario Iroquoian	A.D. 1400 - 1650	tribal warfare and displacement
Contact Aboriginal	Various Algonkian Groups	A.D. 1700 - 1875	early written records and treaties
Late Historic	Euro-Canadian	A.D. 1796 - present	European settlement

1.3.3 Previously Known Archaeological Sites and Surveys

In order to compile an inventory of archaeological resources, the registered archaeological site records kept by the MTCS were consulted. In Ontario, information concerning archaeological sites stored in the ASDB (Government of Ontario n.d.) is maintained by the MTCS. This database

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contains archaeological sites registered according to the Borden system. Under the Borden system, Canada is divided into grid blocks based on latitude and longitude. A Borden Block is approximately 13 kilometres east to west and approximately 18.5 kilometres north to south. Each Borden Block is referenced by a four-letter designator and sites within a block are numbered sequentially as they are found. The study area under review is within Borden Block AbHr.

Information concerning specific site locations is protected by provincial policy, and is not fully subject to the *Freedom of Information and Protection of Privacy Act*. The release of such information in the past has led to looting or various forms of illegally conducted site destruction. Confidentiality extends to all media capable of conveying location, including maps, drawings, or textual descriptions of a site location. The MTCS will provide information concerning site location to the party or an agent of the party holding title to a property, or to a licensed archaeologist with relevant cultural resource management interests.

An examination of the ASDB has shown that there are three archaeological sites registered within a one-kilometre radius of the study area (Table 3): one is multi – component and two are Euro - Canadian (Government of Ontario n.d.). The multi – component site, AbHr-4, is located within the current study area on Lot 145, Concession 3. It comprised a 30 metre scatter of Euro – Canadian artifacts and one side notched point, and was observed and recorded by Mr. Frank Dieterman in 1991.

Table 3: Archaeological Sites Registered within One-Kilometre of Study Area

Borden Number	Site Name	Site Type	Cultural Affiliation
AbHr-17	-	Findspot	Euro-Canadian
AbHr-18	-	Homestead	Euro-Canadian
AbHr-4	-	Findspot	Multi – component

A total of six archaeological studies have been conducted within 50 metres of the study area (personal communication, Robert von Bitter, April 16, 2014; Government of Ontario n.d.), as summarized in Table 4.

Table 4: Archaeological Assessments Completed Within 50 metres of Study Area

Year	Title	Author
2010	Archaeological Assessment (Stages 1 and 2), Windsor Annex Sanitary Sewer Servicing, City of Windsor, Essex County, Ontario	Mayer Heritage Consultants Inc.
2011	Stage 1 Archaeological Assessment County Road 43/Banwell Road Improvements Class EA and Preliminary Design, County Road 42 northerly to CP Rail Line, County of Essex,	Archaeological Services Inc.

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Year	Title	Author
	Ontario	
2012	Stage 2 Archaeological Assessment (AA): Windsor Railway Spur Extension within Part of Lots 136-140, Concession 3, McNiff's Survey, Geographic Township of Sandwich East, City of Windsor, Ontario	Archaeoworks
2013	Stage 1 Assessment of the Lauzon Parkway, County Road 17, County Road 42, Future East-West Arterial Road From Walker Road to County Road 17 Corridors, and the Sandwich South Secondary Plan, City of Windsor, County of Essex.	Woodley
2013	Stage 1: Background Study Tecumseh Hamlet Servicing Plan Between County Roads 22 & 42 (Geographic Township of Sandwich East), Town of Tecumseh, Essex County, Ontario	Woodley
2014a	Stage 1 Archaeological Assessment: Windsor Solar Project, Part of Lots 105 to 123, Concession 3 Petite Cote, Geographic Township of Sandwich, Now City of Windsor, Ontario	Stantec

The Stage 1-2 assessment above, conducted by Mayer Heritage Consultants Inc. (MHC) in 2010, and the Stage 2 assessment conducted by Archaeoworks in 2012, were undertaken within the limits of the current study area (see Figure 4).

MHC determined that the Stage 1-2 assessment area had cultural heritage value for both Aboriginal and Euro-Canadian sites. However, no artifacts or other archaeological resources were recovered during the Stage 2 fieldwork, and no further archaeological assessment was recommended (Mayer Heritage Consultants Inc. 2010).

The Stage 2 assessment conducted by Archaeoworks in 2012 revealed one small Euro-Canadian artifact scatter consisting of eight artifacts. However, this scatter was determined to have low cultural heritage value, and no further work was recommended (Archaeoworks 2012).

The Stage 1 assessment conducted by Stantec in 2014 on behalf of Windsor Solar Ltd. overlaps the current study area on Lots 116 to 123, Concession 3. The Stage 1 report is still forthcoming, but concludes that the area had cultural heritage value for both Aboriginal and Euro-Canadian sites and Stage 2 assessment was recommended.

In addition to the assessments discussed above, the City of Windsor's *Archaeological Master Plan Study Report* (CRM Group Limited *et al.* 2005) discusses the City of Windsor's archaeological context in general. As of 2005, archaeologists had registered only 23 archaeological sites within the city limits or within the immediate vicinity. However, the authors of the archaeological

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management plan recognized that a number of poorly documented sites exist and there are many sites still to be documented especially since the majority of the archaeological studies discussed in the archaeological management plan maps are concentrated along the Detroit River or in southwest Windsor (CRM Group Limited *et al.* 2005:3-1 to 3-23).

In addition, the northern portion of the Study Area is depicted in the archaeological management plan's archaeological potential mapping. Those portions identified as having archaeological potential are noted as such due to the present of existing water sources, presumably the municipal drains (CRM Group Limited *et al.* 2005:Figure 1). Ultimately, approximately half of the Study Area retains high archaeological potential according to the 2005 mapping (CRM Group Limited *et al.* 2005:Figure 4). The archaeological management plan's evaluation of archaeological potential is further discussed in Section 3.0.

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2.0 FIELD METHODS

The Stage 1 archaeological assessment compiled the available information concerning any known and/or potential archaeological heritage resources within the study area. A property inspection was conducted under PIF P389-0040-2014 issued to Walter McCall, Ph.D., of Stantec by the MTCS. The property inspection was completed on April 17, 2014. In accordance with Section 1.2 of the MTCS' *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), the property inspection involved random spot-checking of the entire property and its periphery to identify the presence or absence of any features of archaeological potential (Figure 4). During the property inspection the weather was warm and sunny, and visibility of land features was excellent. At no time were field or weather conditions detrimental to the identification of features of archaeological potential.

The study area occupies all or part of Lots 10 to 19, Concessions 6 to 10, and singular Lots 300-302, Geographic Township of Sandwich South, and Lots 115 to 149, Concessions 2 to 3, Township of Sandwich East, Essex County, Ontario. It comprises approximately 225 hectares of active and inactive agricultural lands, woodlots, manicured lawns, commercial and residential properties, paved roads and highways, industrial installations, a railway, and land incorporated within the boundaries of Windsor Airport.

The majority of the study area (80%) consists of active and inactive agricultural land accessible for ploughing. A smaller portion of the Study Area comprises woodlots (10%) and manicured lawns (5%) that are unable to be ploughed. The remaining 5 percent of the Study Area consists of roads and highway, a railway line, and private laneways. These areas are previously disturbed and are unable to be assessed.

The photography from the property inspection is presented in Section 7.1 and confirm that the requirement for a Stage 1 property inspection were met, as per Section 1.2 and Section 7.7.2 Standard 1 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011).

Photos 1 to 8 demonstrate that the study area is primarily composed of relatively flat agricultural fields. In accordance with Section 2.1.1 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), these areas will require Stage 2 physical inspection using the pedestrian survey method at a five metre interval. Photos 9 to 11 depict areas of woodlot within the study area and Photos 12 and 13, examples of manicured lawns. Both are inaccessible for ploughing and, in accordance with Section 2.1.2 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), will require Stage 2 physical inspection using the test pit survey method at a five metre interval.

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A possible heritage property, a wooden barn, was noticed during fieldwork at the intersection of Concession Road 10 and Baseline Road. It is located in the northwest corner of Lot 16, Concession 10 (Table 1).

Photos 14 - 16 depict the Windsor Subdivision of the Canadian Pacific Railway running east - west across the northern portion of the study area. Although this railway is a historic transportation route, having been completed in 1890, and appearing on McPhillips' 1898 *Plan of the Township of Sandwich* (McPhillips 1898), previous disturbance due to maintenance and expansion designates it an area of low archaeological potential.

Photos 17 - 19 provide examples of the various paved roads that cross the Study Area as well as their associated right-of-ways and culvert systems. As per Section 2.1, Standard 2b of the *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011) these areas have also been evaluated as having low potential due to deep land alteration that has severely damaged the integrity of archaeological resources and as such, Stage 2 survey is not required.

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3.0 ANALYSIS AND CONCLUSIONS

Archaeological potential is established by determining the likelihood that archaeological resources may be present on a subject property. Stantec applied archaeological potential criteria commonly used by MTCS (Government of Ontario 2011) to determine areas of archaeological potential within the region under study. These variables include proximity to previously identified archaeological sites, distance to various types of water sources, soil texture and drainage, glacial geomorphology, elevated topography and the general topographic variability of the area.

Potable water is the single most important resource for any extended human occupation or settlement and since water sources in southwestern Ontario have remained relatively stable over time, proximity to drinkable water is regarded as a useful index for the evaluation of archaeological site potential. In fact, distance to water is one of the most commonly used variables for predictive modeling of archaeological site location in Ontario. Distance to modern or ancient water sources is generally accepted as the most important determinant of past human settlement patterns and, considered alone, may result in a determination of archaeological potential. However, any combination of two or more other criteria, such as well-drained soils or topographic variability, may also indicate archaeological potential. Finally, extensive land disturbance can eradicate archaeological potential (Wilson and Horne 1995).

As discussed above, distance to water is an essential factor in archaeological potential modeling. When evaluating distance to water it is important to distinguish between water and shoreline, as well as natural and artificial water sources, as these features affect sites locations and types to varying degrees. The MTCS categorizes water sources in the following manner:

- Primary water sources: lakes, rivers, streams, creeks;
- Secondary water sources: intermittent streams and creeks, springs, marshes and swamps;
- Past water sources: glacial lake shorelines, relic river or stream channels, cobble beaches, shorelines of drained lakes or marshes; and
- Accessible or inaccessible shorelines: high bluffs, swamp or marshy lake edges, sandbars stretching into marsh.

The closest extant sources of potable water are Little River, Pike Creek, and Canard River. These rivers and their sources bound the edges of the study area; Little River to the north, Pike Creek to the east, and Canard River to the southwest. The Little River originates in the northern portion of the study area. Further to these, the Detroit River runs 6.3 kilometres to the north and west of the study area, while the southern shore of Lake St. Clair is located 2.6 kilometres northeast of the latter. Moreover, additional ancient and/or relic tributaries of the Little River may have existed but are not identifiable today and are not indicated on historic mapping. These watercourses are also reflected in the archaeological potential mapping produced for the City of Windsor's archaeological management plan (CRM Group Limited *et al.* 2005). Furthermore, as

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indicated previously, although not ideal, Brookston Clay and Brookston Clay Sand are suitable for pre-contact and post-contact Aboriginal agriculture. Add to these observations the presence of one registered multi - component site within one kilometre of the study area, and the pre-contact Aboriginal archaeological potential of the study area is judged to be high.

For Euro-Canadian sites, archaeological potential can be extended to areas of early Euro-Canadian settlement, including places of military or pioneer settlements; early transportation routes; and properties listed on the municipal register or designated under the *Ontario Heritage Act* or property that local histories or informants have identified with possible historical events. The 1881 *Illustrated Historical Atlas of Essex County, Ont.* (Belden & Co. 1881) demonstrates that the study area and its environs were densely occupied by Euro-Canadian farmers by the later 19th century. Much of the established road system and agricultural settlement from that time is still visible today. Moreover, the ASDB recognizes two registered historic Euro-Canadian sites within one kilometre of the study area (Government of Ontario n.d.). Therefore, the Euro-Canadian archaeological potential of the study area is judged to be moderate to high.

The archaeological management plan for the City of Windsor (CRM Group *et al.* 2005) differs slightly from the archaeological potential determination here in that some portions of the Study Area are determined to have low archaeological potential. Examining the plan's mapping, it appears that the presence of watercourses is the factor that takes precedence in the weighting used to score archaeological potential in this area. However, the discussions in Section 1.2 and 1.3 above demonstrate the presence of First Nations groups in the area and a lack of documentation concerning possibly present Euro-Canadian structures in the historic mapping. These additional factors lend reason to believe that the majority of the Study Area could retain archaeological potential. Otherwise, some areas of low archaeological potential do exist within the Study Area, to include modern paved roads and railways, and various modern buildings and laneways, which exhibit disturbance from their construction. The municipal drains are natural watercourses that have been modified within the last century and retain low archaeological either due to the low, wet nature of the area or due to modern ditching and culvert construction.

When the above listed criteria are applied to the study area, the archaeological potential for pre-contact Aboriginal, post-contact Aboriginal, and historic Euro-Canadian sites is deemed to be moderate to high. Thus, in accordance with Section 1.3.1 of the *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), the Stage 1 archaeological assessment of the Upper Little River Watershed Master Plan and Stormwater Management Plan has determined that the study area exhibits moderate to high potential for the identification and recovery of archaeological resources (Figure 4).

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Recommendations
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4.0 RECOMMENDATIONS

Stantec was retained by the City of Windsor to complete a Stage 1 archaeological assessment for a study area, measuring approximately 225 hectares in size, located on various Lots and Concessions, Townships of Sandwich East and South, now City of Windsor and Town of Tecumseh, Essex County, Ontario (Figure 1).

The Stage 1 archaeological assessment, involving background research and a property inspection, resulted in the determination that portions of the study area exhibit a moderate to high potential for the identification and recovery of archaeological resources. As such, a Stage 2 archaeological assessment will be required for portions of the study area (Figure 4).

The Stage 2 archaeological assessment will include the systematic walking of open ploughed fields at five metre intervals as outlined in Section 2.1.1 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). The MTCS standards further require that all agricultural land, both active and inactive, be recently ploughed and sufficiently weathered to improve the visibility of archaeological resources. Ploughing must be deep enough to provide total topsoil exposure, but not deeper than previous ploughing, and must be able to ensure at least 80% ground surface visibility.

Moreover, the Stage 2 archaeological assessment will include a test pit survey at five metre intervals in areas inaccessible for ploughing as outlined in Section 2.1.2 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). The MTCS standards require that each test pit be approximately 30 centimetres in diameter, excavated to at least five centimetres in to subsoil, and have all soil screened through six millimetre hardware cloth to facilitate the recovery of any cultural material that may be present. Prior to backfilling, each test pit will be examined for stratigraphy, cultural features, or evidence of fill.

Should any areas of disturbance or features indicating that archaeological potential have been removed, including permanently wet areas, not previously identified during the Stage 1 property inspection be encountered during the Stage 2 archaeological assessment, they will be documented as outlined in Section 2.1.8 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011).

The Ministry of Tourism, Culture and Sport is asked to review the results presented and to accept this report into the Ontario Public Register of Archaeological Reports. Additional archaeological assessment is required; hence the study area remains subject to Section 48(1) of the *Ontario Heritage Act* and may not be altered, or have artifacts removed from them, except by a person holding an archaeological license.



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Advice on Compliance with Legislation
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5.0 ADVICE ON COMPLIANCE WITH LEGISLATION

This report is submitted to the Ontario Minister of Tourism, Culture and Sport as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c 0.18. The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Tourism, Culture and Sport, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

It is an offence under Sections 48 and 69 of the *Ontario Heritage Act* for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeology Reports referred to in Section 65.1 of the *Ontario Heritage Act*.

Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48(1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48(1) of the *Ontario Heritage Act*.

The *Cemeteries Act*, R.S.O. 1990 c. C.4 and the *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 (when proclaimed in force) require that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ontario Ministry of Consumer Services.

Archaeological sites recommended for further archaeological fieldwork or protection remain subject to Section 48(1) of the *Ontario Heritage Act* and may not be altered, or have artifacts removed from them, except by a person holding an archaeological license.

**STAGE 1 ARCHAEOLOGICAL ASSESSMENT:
UPPER LITTLE RIVER WATERSHED
MASTER PLAN AND STORMWATER MANAGEMENT PLAN**

Bibliography and Sources
April 8, 2015

6.0 BIBLIOGRAPHY AND SOURCES

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**STAGE 1 ARCHAEOLOGICAL ASSESSMENT:
UPPER LITTLE RIVER WATERSHED
MASTER PLAN AND STORMWATER MANAGEMENT PLAN**

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**STAGE 1 ARCHAEOLOGICAL ASSESSMENT:
UPPER LITTLE RIVER WATERSHED
MASTER PLAN AND STORMWATER MANAGEMENT PLAN**

Images
April 8, 2015

7.0 IMAGES

7.1 PHOTOS

Photo 1: Agricultural Field, facing west



Photo 2: Agricultural Field, facing east



**Photo 3: Agricultural Field with Road and
Municipal ROW in
foreground, facing north
west**



**Photo 4: Agricultural Field with Road and
Municipal ROW in
foreground, facing east**



**STAGE 1 ARCHAEOLOGICAL ASSESSMENT:
UPPER LITTLE RIVER WATERSHED
MASTER PLAN AND STORMWATER MANAGEMENT PLAN**

Images
April 8, 2015

Photo 5: Agricultural Field, facing west



Photo 6: Agricultural Field with Municipal ROW in the foreground, facing west



Photo 7: Agricultural Field, facing northeast



Photo 8: Fallow Inactive Agricultural Field, facing north west



**STAGE 1 ARCHAEOLOGICAL ASSESSMENT:
UPPER LITTLE RIVER WATERSHED
MASTER PLAN AND STORMWATER MANAGEMENT PLAN**

Images

April 8, 2015

Photo 9: Woodlot, facing north



Photo 10: Inactive Agricultural Field with Woodlot in the background, facing south west



Photo 11: Woodlot with Little River flowing through, facing north east



Photo 12: Manicured Lawn, facing south



**STAGE 1 ARCHAEOLOGICAL ASSESSMENT:
UPPER LITTLE RIVER WATERSHED
MASTER PLAN AND STORMWATER MANAGEMENT PLAN**

Images
April 8, 2015

Photo 13: Manicured Lawn, facing south



Photo 14: Intersection of Lauzon Parkway and the railway, facing north



Photo 15: Railway and transmission lines, showing location of Union Gas pipeline, facing east



Photo 16: Railway, facing north west



**STAGE 1 ARCHAEOLOGICAL ASSESSMENT:
UPPER LITTLE RIVER WATERSHED
MASTER PLAN AND STORMWATER MANAGEMENT PLAN**

Images
April 8, 2015

Photo 17: Concession Road 9 and Highway 401 with Municipal ROW in the background, facing north



Photo 18: Intersection of Concession Road 9 and Baseline Road with Municipal ROW, facing north



Photo 19: Lauzon Road with Municipal ROW, showing culvert over Little River, facing south east



**STAGE 1 ARCHAEOLOGICAL ASSESSMENT:
UPPER LITTLE RIVER WATERSHED
MASTER PLAN AND STORMWATER MANAGEMENT PLAN**

Maps
April 8, 2015

8.0 MAPS

All maps will follow on succeeding pages.

Legend

- Study Area
- Municipal Boundary - Upper Tier
- Municipal Boundary - Lower or Single Tier
- Watercourse
- Waterbody

- A Treaty No. 381, May 9th, 1781 (Mississauga and Chippewa)
- B Crawford's Purchase, October 9th, 1783 (Algonquin and Iroquois)
- B1 Crawford's Purchase, October 9th, 1783 (Mississauga)
- B2 Crawford's Purchases, 1784, 1787 And 1788 (Mississauga)
- A2 John Collins' Purchase, 1785 (Chippewa)
- C Treaty No. 2, May 19th, 1790 (Odawa, Chippewa, Pottawatomie, and Huron)
- D Treaty No. 3, December 2nd, 1792 (Mississauga)
- E Haldimand Tract: from the Crown to the Mohawk, 1793
- F Tyendinaga: from the Crown to the Mohawk, 1793
- G Treaty No. 3 3/4: from the Crown to Joseph Brant, October 24th, 1795
- H Treaty No. 5, May 22nd, 1798 (Chippewa)
- I Treaty No. 6, September 7th, 1796 (Chippewa)
- J Treaty No. 7, September 7th, 1796 (Chippewa)
- L Treaty No. 13, August 1st, 1805 (Mississauga)
- M Treaty No. 13A, August 2nd, 1805 (Mississauga)
- N Treaty No. 16, November 18th, 1815 (Chippewa)
- O Treaty No. 18, October 17th, 1818 (Chippewa)
- P Treaty No. 19, October 28th 1818 (Chippewa)
- Q Treaty No. 20, November 5th, 1818 (Chippewa)
- R Treaty No. 21, March 9th, 1819 (Chippewa)
- S Treaty No. 27, May 31st, 1819 (Mississauga)
- T Treaty No. 27½, April 25th, 1825 (Ojibwa and Chippewa)
- U Treaty No. 35, August 13th, 1833 (Wyandot or Huron)
- V Treaty No. 45, August 9th, 1836 (Chippewa and Odawa, "For All Indians To Reside Thereon")
- W Treaty No. 45½, August 9th, 1836 (Saugeen)
- X Treaty No. 57, June 1st, 1847 (Iroquois of St. Regis)
- Z Treaty No. 61, September 9th, 1850 (Robinson Treaty: Ojibwa)
- AA Treaty No. 72, October 30th, 1854 (Chippewa)
- AB Treaty No. 82, February 9th, 1857 (Chippewa)
- AF Williams Treaty, October 31st and November 15th, 1923 (Chippewa and Mississauga)
- AG Williams Treaty, October 31st, 1923 (Chippewa)

Notes

1. Coordinate System: NAD 1983 Statistics Canada Lambert
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2012.
3. Treaty boundaries adapted from Morris 1943 (1964 reprint). For cartographic representation only.

Client/Project

City of Windsor
Upper Little River Stormwater
and Drainage Master Plan

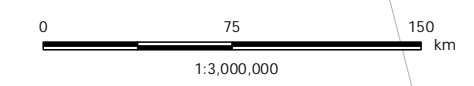
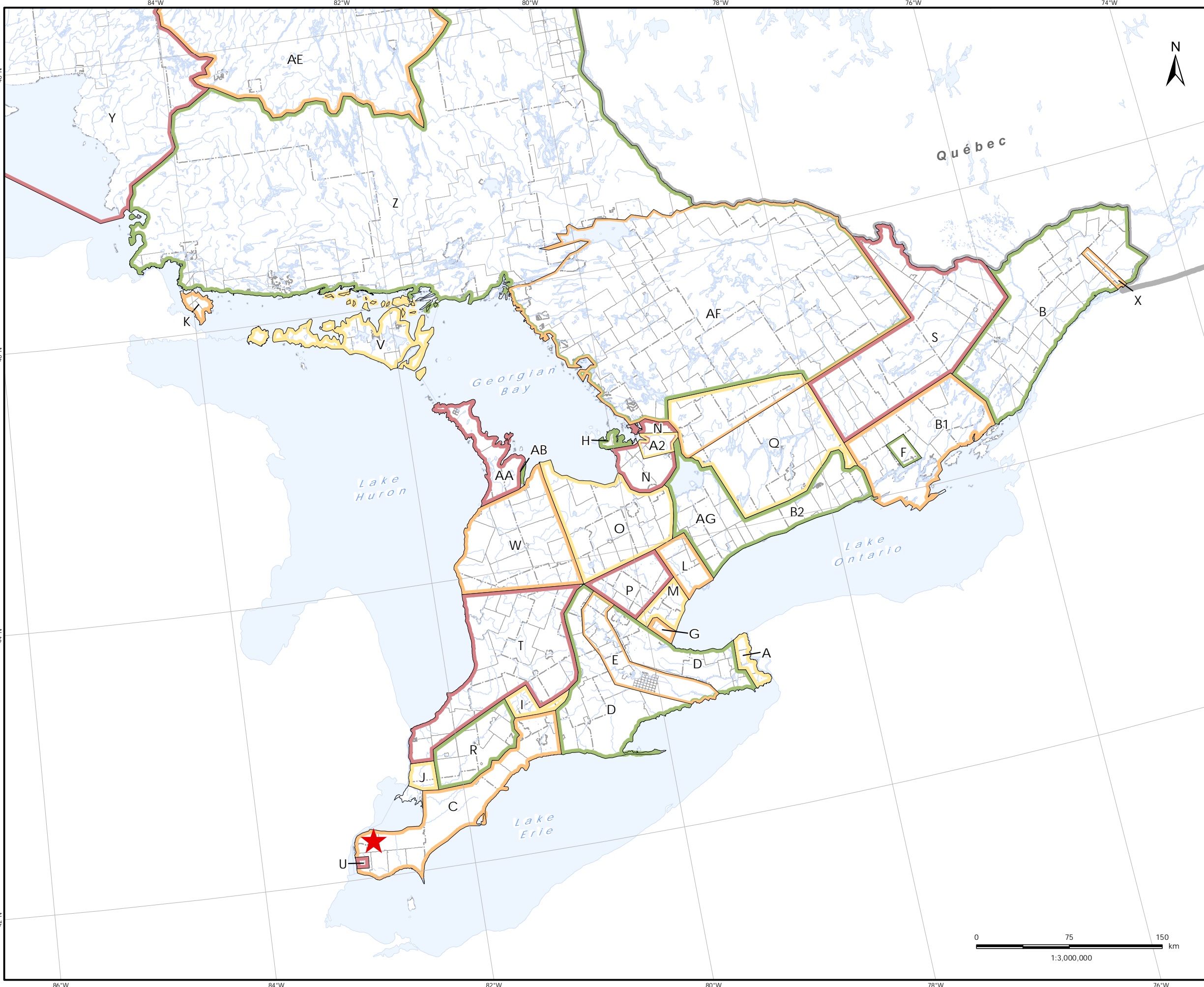
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2

Title

Treaties and Purchases
(Adapted from Morris 1943)

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Revised: 2014-05-22 By: sallen





- Legend
- Project Area
 - Archaeology Study Area



- Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
 2. Essex County (Ontario Map Ref #1)
Essex supplement in Illustrated atlas of the Dominion of Canada.
Toronto : H. Belden & Co., 1881.

Client/Project

City of Windsor
Upper Little River Stormwater
and Drainage Master Plan

Figure No.
3

Title
Portion of 1881 Belden
Historic Map of Essex County

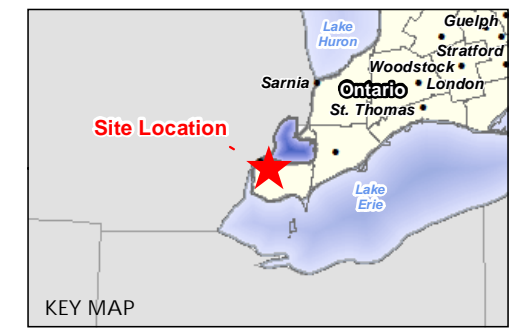
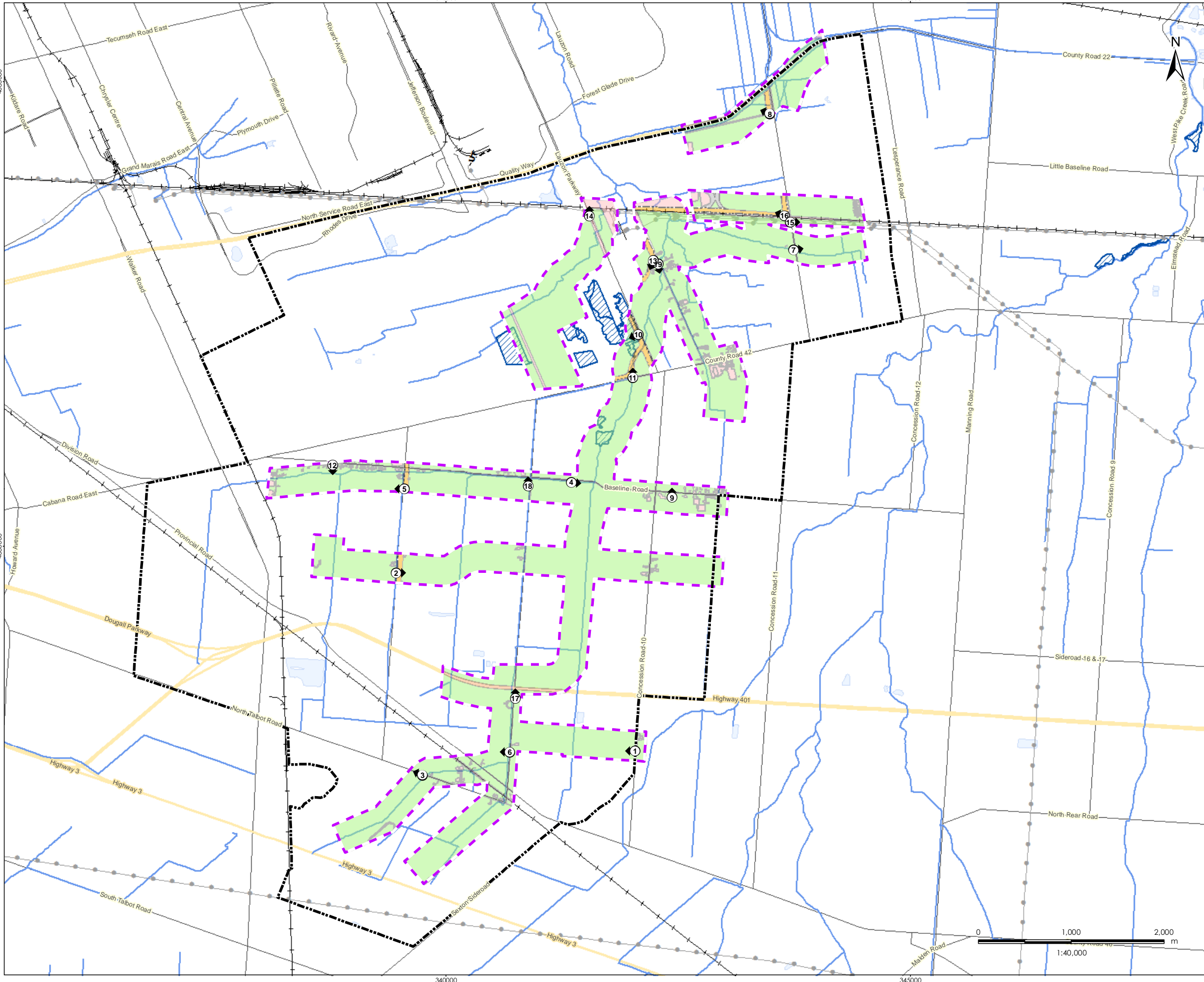
340000

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Legend

- Photo Location
- Project Area
- Archaeology Study Area
- Moderate - High Archaeological Potential
- Previously Assessed, Mayer Heritage Consultants Inc. 2010
- Previously Assessed, Archaeoworks 2012
- Previously Disturbed
- Provincially Significant Wetland
- Watercourse
- Railway, Active
- Transmission Line
- Unknown Pipeline



Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2013.
3. Orthoimagery © SWOOP Imagery, 2006.

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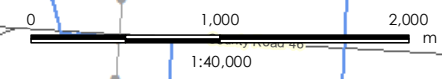
City of Windsor
Upper Little River Stormwater
and Drainage Master Plan

Figure No.

4

Title

Archaeological Potential



340000

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Revised: 2014-06-24 By: sallen

**STAGE 1 ARCHAEOLOGICAL ASSESSMENT:
UPPER LITTLE RIVER WATERSHED
MASTER PLAN AND STORMWATER MANAGEMENT PLAN**

Closure
April 8, 2015

9.0 CLOSURE

This report has been prepared for the sole benefit of the City of Windsor and may not be used by any third party without the express written consent of Stantec Consulting Ltd. and the City of Windsor. Any use which a third party makes of this report is the responsibility of such third party.

We trust this report meets your current requirements. Please do not hesitate to contact us should you require further information or have additional questions about any facet of this report.

STANTEC CONSULTING LTD.



Licensee Review _____
(signature)

Walter McCall, Ph.D., Director of Archaeological Field Operations



Senior Review _____
(signature)

Jim Wilson, MA, Principal, Regional Discipline Lead, Archaeology



APPENDIX M
Source Water Protection

ERCA Vulnerable Areas



Essex Region
Conservation
Authority

Public Interactive Mapping

Legend

Surface Water Intake Protection Zone

- 1
- 2
- 3

Significant Groundwater Recharge Areas

- 2
- 4
- 6



Location



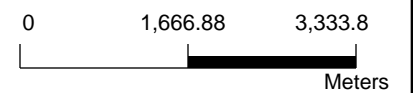
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Notes



1: 75,000




12/11/2017

ERCA Event Based Areas




Legend

-  Event Based Area (EBA)

Location



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Notes



1: 75,000



12/11/2017



Essex Region Source Protection Area Assessment Report Map 4.24b

Legend

- Intake - Type B
- Drinking Water System
- Municipal, Lower Tier
- International Boundary
- Road
- Railway
- ~ Water and Drainage
- ~ Water Body

Intake Protection Zones

- IPZ-1
- IPZ-2
- IPZ-3

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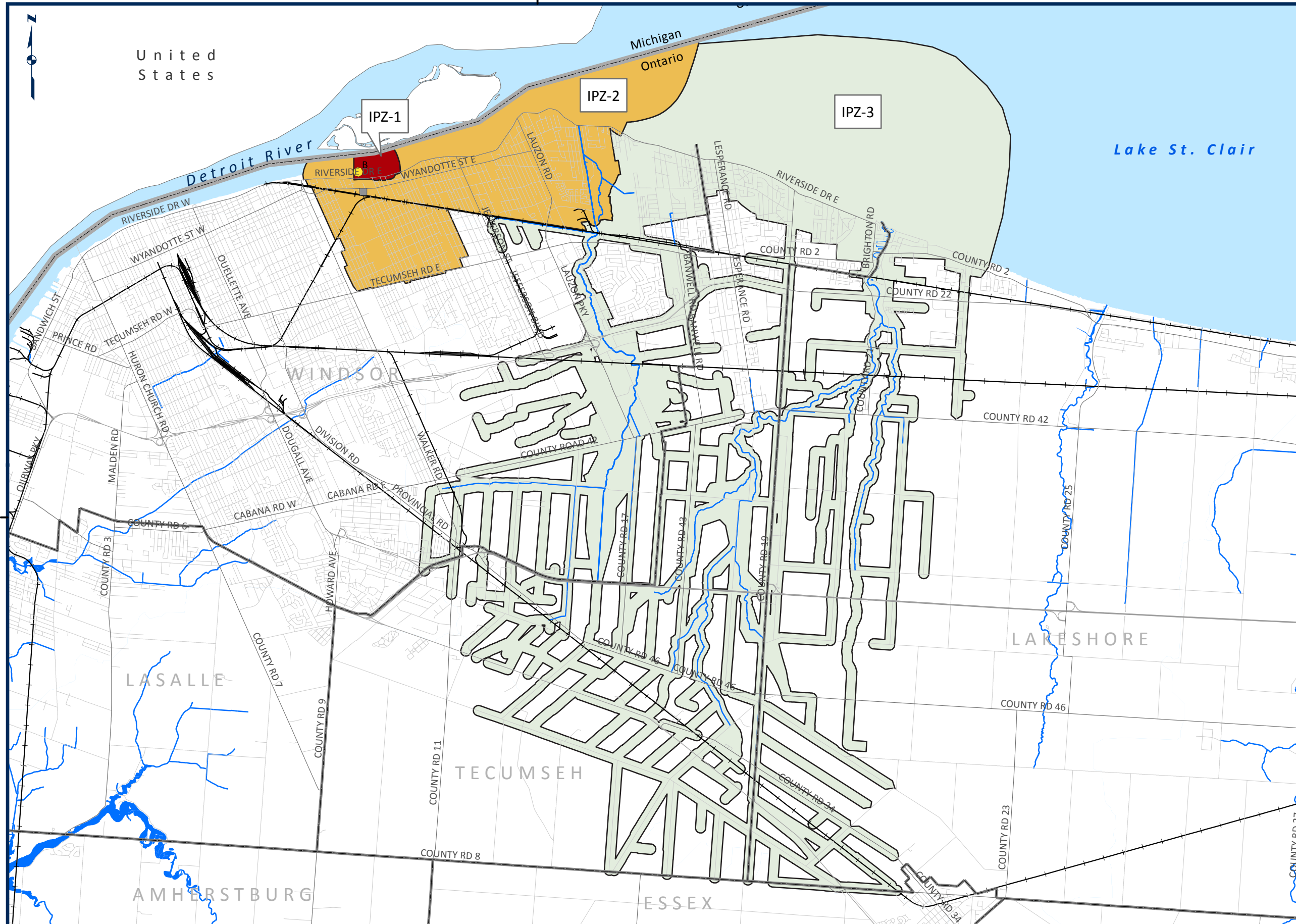
Sources: ERCA, County of Essex, City of Windsor, MNR, MOE, Stantec Consultants, StatsCanada

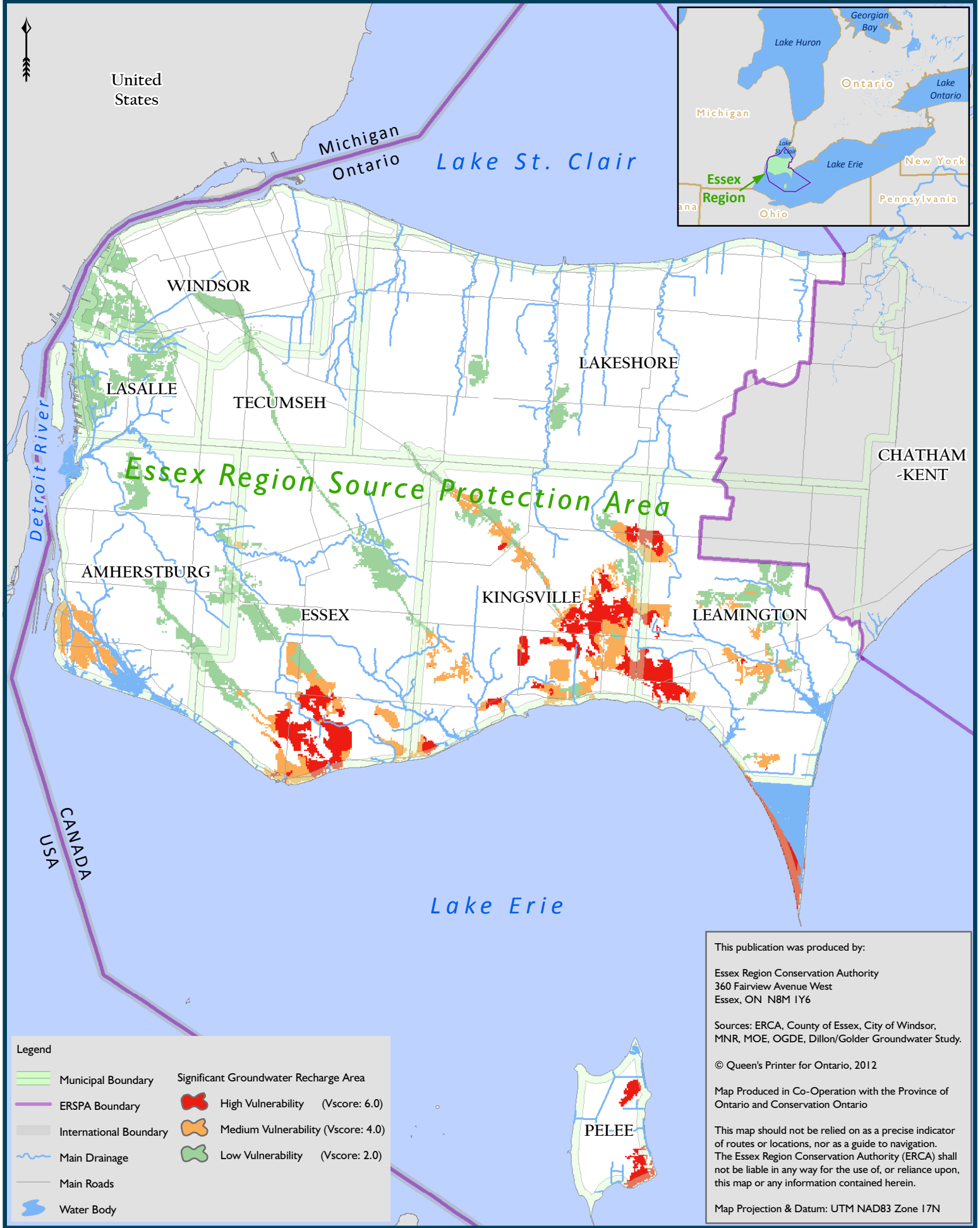
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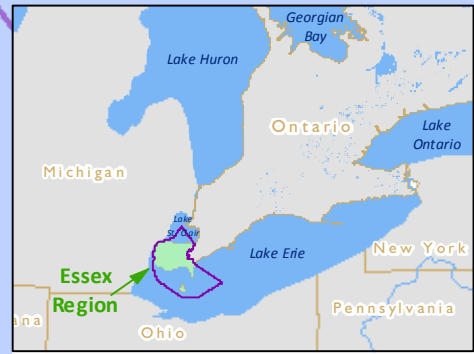
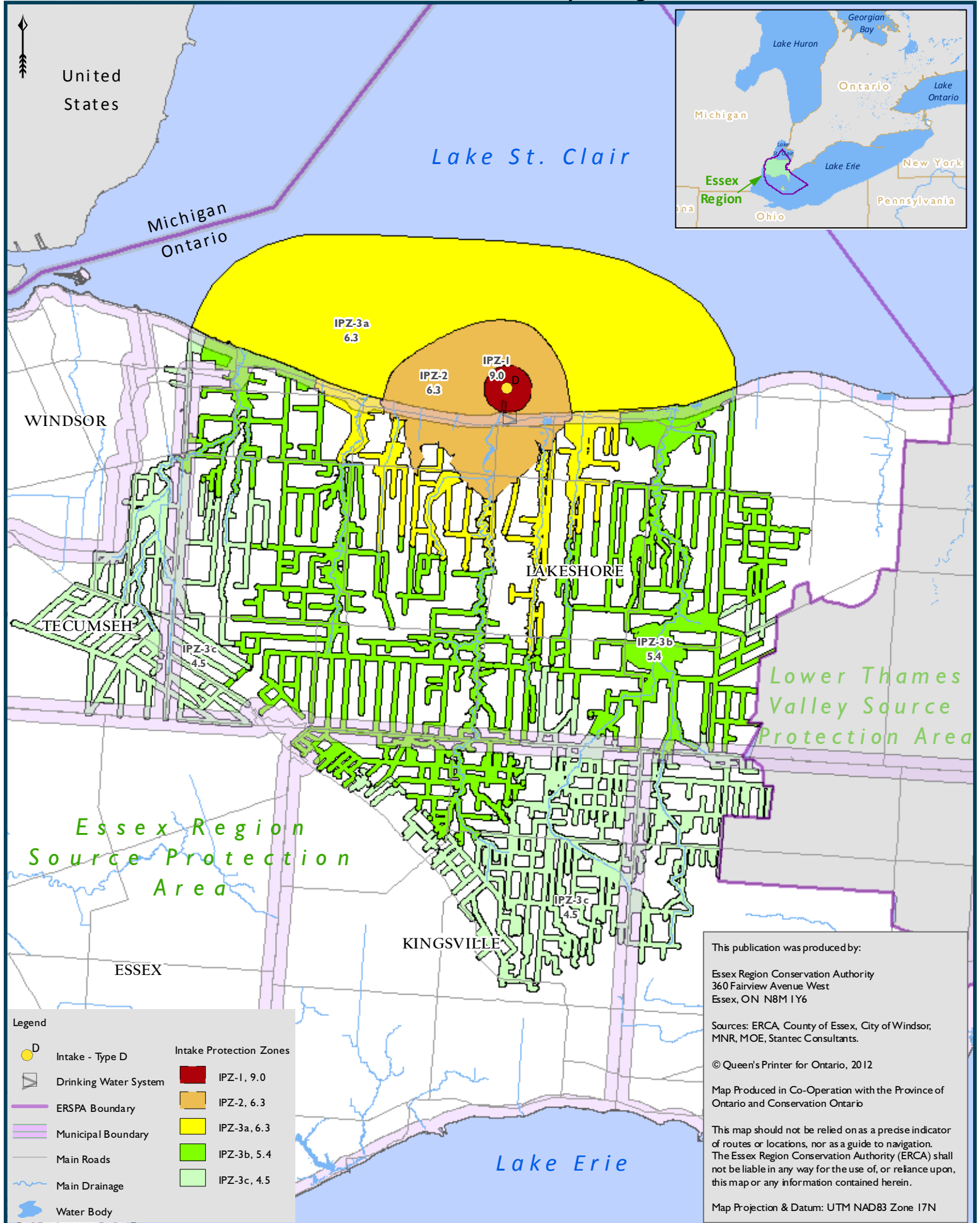
Sources: ERCA, County of Essex, City of Windsor, MNR, MOE, OGDE, Dillon/Golder Groundwater Study.

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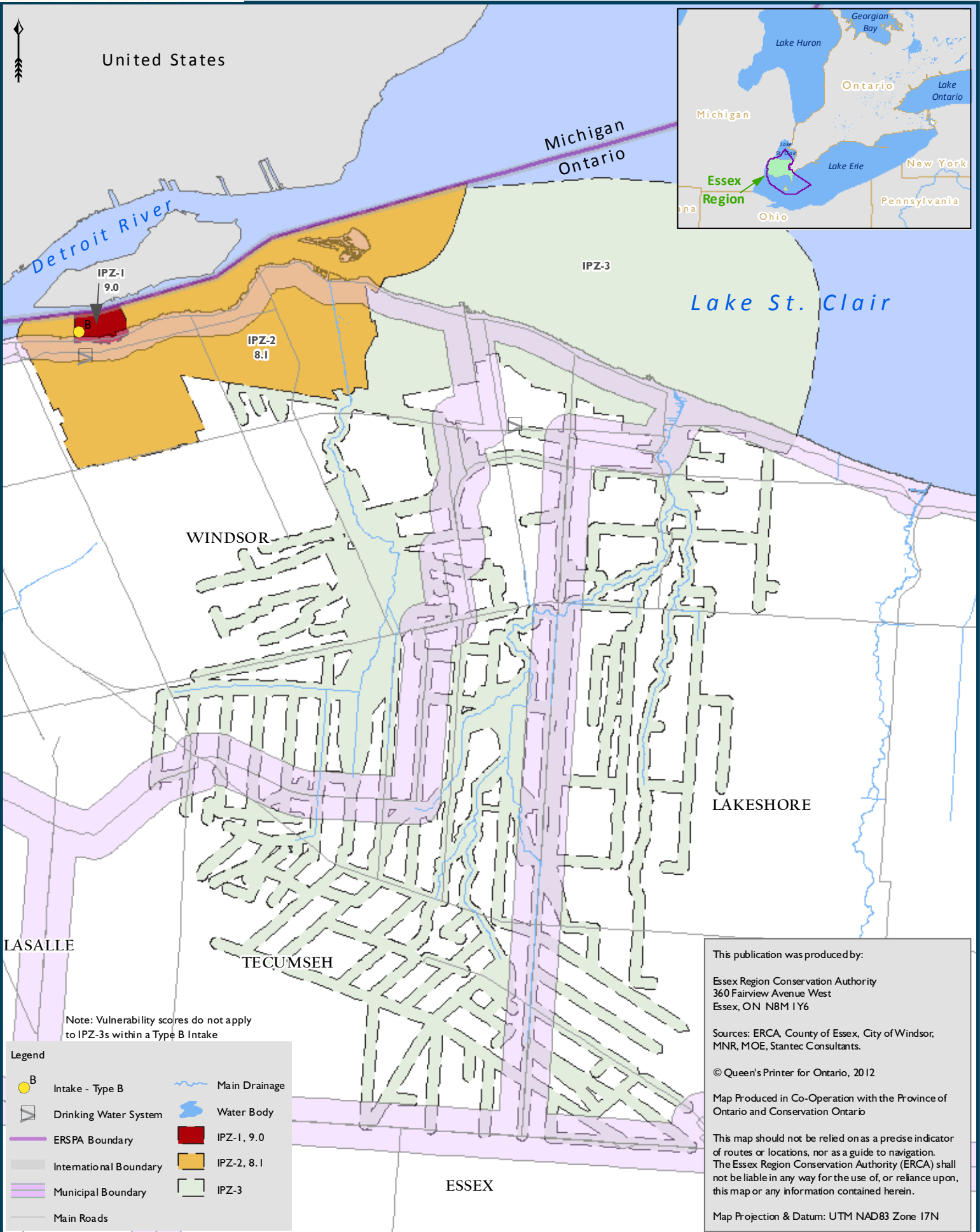
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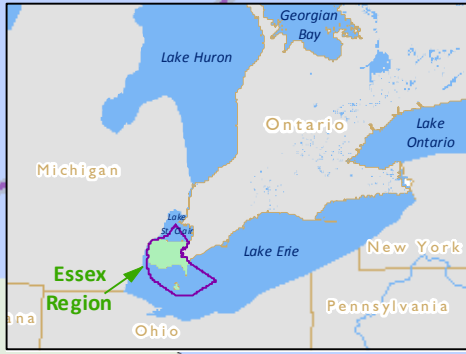
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United States

Michigan
Ontario



Lake St. Clair

IPZ-1
9.0

IPZ-2
8.1

IPZ-3

WINDSOR

LAKESHORE

LASALLE

TECUMSEH

ESSEX

Note: Vulnerability scores do not apply to IPZ-3s within a Type B Intake

Legend	
	Intake - Type B
	Drinking Water System
	ERSPA Boundary
	International Boundary
	Municipal Boundary
	Main Roads
	Main Drainage
	Water Body
	IPZ-1, 9.0
	IPZ-2, 8.1
	IPZ-3

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Map Projection & Datum: UTM NAD83 Zone 17N



Essex Region Source Protection Area Assessment Report Map 4.18b

Legend

- Intake - Type D
- Drinking Water System
- Source Protection Area Boundary
- Municipal, Lower Tier
- International Boundary
- Road
- Railway
- Water and Drainage
- Water Body
- Intake Protection Zones**
- IPZ-1
- IPZ-2
- IPZ-3

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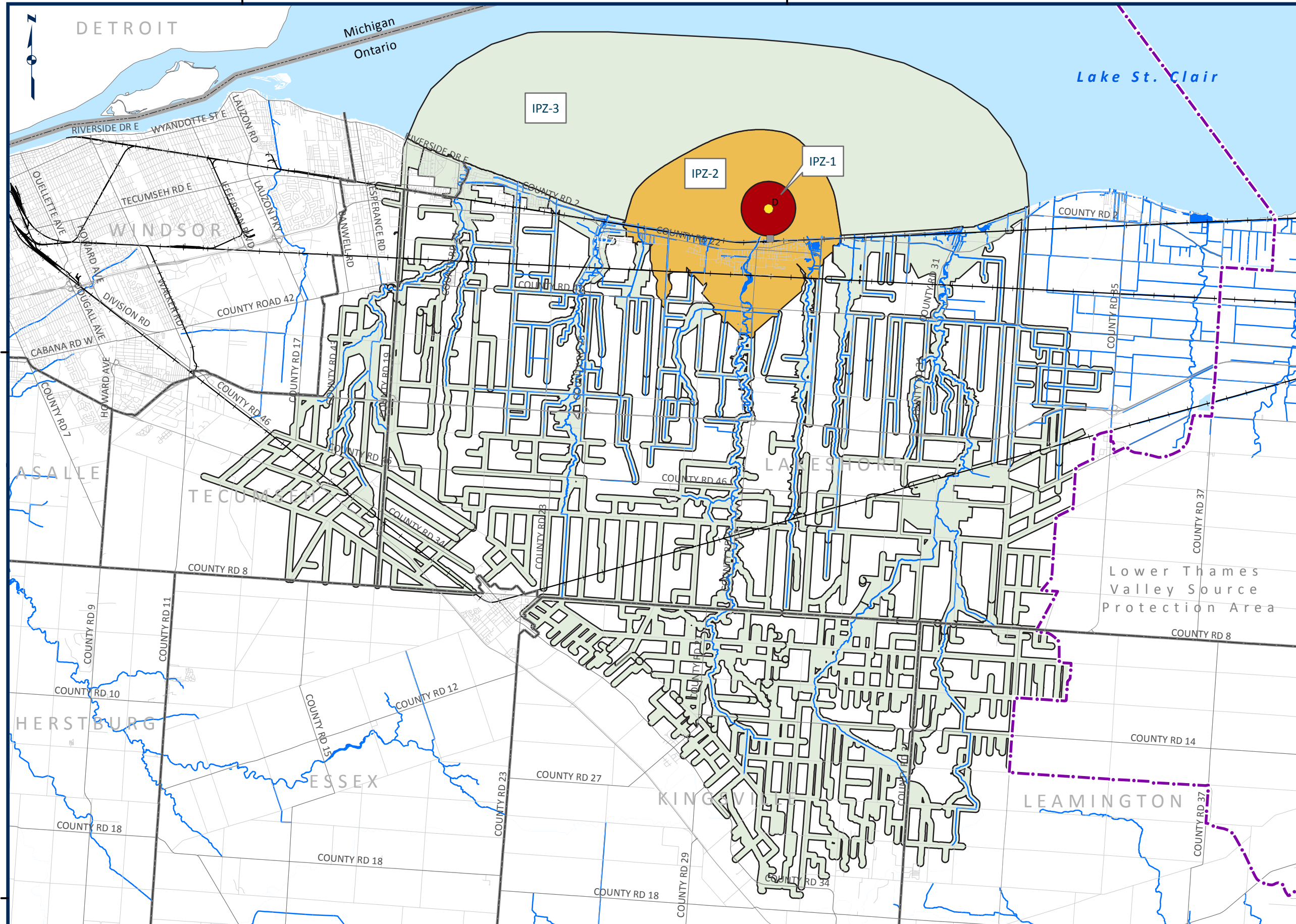
Sources: ERCA, County of Essex, City of Windsor, MNR, MOE, Stantec Consultants, StatsCanada

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Map Projection & Datum: UTM NAD83 Zone 17N



From: Katie Stammler <KStammler@erca.org>
Sent: 2017-12-07 5:06 PM
To: Innes, Jayson
Cc: John Henderson
Subject: RE: Source water protection in Essex Region
Attachments: A Guide to Using the ERCA Online Interactive Mapping Tool.pdf

Hi Jason,

Thanks for your call. I've attached a document that our Risk Management Official prepared to help with the use of our online mapping tool. Please feel free to share it with your colleagues. Our Source Water Protection Plan can be accessed here: http://essexregionsourcewater.org/resources/source_water_protection.cfm and the two policies that apply to the area in question are policy 31 and 32 – these are the policies that apply to the Event Based Area that the MOECC specifically asked about. You would address these policies by ensuring that any existing storage of fuel above the threshold limit (15,000L) has a Risk Management Plan and that ERCA is informed of the installation of any future fuel storage that exceeds these limits.

I noticed that their letter also asks that your EA consider other sources of drinking water that aren't covered by the Source Protection Plan. Our SPP only includes policies for municipal intakes, so this would be referring to any private source of drinking water in the area, which would be well water. I believe this could be addressed with the mapping of the Highly Vulnerable Aquifers and Significant Groundwater Recharge Areas that I showed you. While we have no policies that apply to these areas, you may need to show that you are at least aware of whether your study area is within these boundaries.

Provided that your project does not include installing or altering a municipal drinking water intake, no new technical work nor amendments to the SPP will be required.

Katie



KATIE STAMMLER, PHD
Water Quality Scientist/Source Water Protection Project Manager
Essex Region Conservation Authority
360 Fairview Avenue West, Suite 311 • Essex, Ontario • N8M 1Y6
P. 519-776-5209 x 342 • F. 519-776-8688
kstammler@erca.org www.essexregionconservation.ca

Follow us on Twitter: [@essexregionca](https://twitter.com/essexregionca)

From: Innes, Jayson [mailto:jayson.innes@stantec.com]
Sent: Thursday, December 7, 2017 4:42 PM
To: Katie Stammler <KStammler@erca.org>
Cc: John Henderson <JHenderson@erca.org>
Subject: Source water protection in Essex Region

As a follow up to our phone call I have included a map of the study area and the letter from the MOECC discussing source water protection.

I will use the web sites you directed me to show that the site is in IPZ-3

The 3rd paragraph on page 3 of the MOECC letter says
For assistance in determining whether the proposed project will require new technical work and potentially require amendments to the source protection plan for this area please contact the Project Manager for Drinking Water Source

Protection at the local source protection authority which coincidentally in this case, is the Essex Region Conservation Authority itself.

Can you please confirm that no new technical work or potential amendments to the source water protection plan are required from this study. I can provide additional project details if required.

Thanks

Jayson Innes, M.A.Sc., P.Eng.
Senior Water Resources Engineer
Direct: (519) 585-7282
Mobile: (519) 569-0518

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4 CA



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From: John Henderson <JHenderson@erca.org>
Sent: 2017-12-19 4:09 PM
To: Katie Stammler; Innes, Jayson
Subject: ULR - Source Protection

Thanks Katie.

Jayson – Please include the additional information included in Katie’s e-mail below regarding the need to update the IPZ-3 and Event Based Area when drains are altered in the future. If you have any questions, please provide them directly to Katie with a copy to me.

Thank you,



John Henderson, P. Eng.
Essex Region Conservation Authority (ERCA)
360 Fairview Avenue West, Suite 311
Essex, Ontario N8M 1Y6
519-776-5209 ext. 246
Fax: 519-776-8688



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From: Katie Stammler
Sent: Tuesday, December 19, 2017 4:03 PM
To: John Henderson <JHenderson@erca.org>
Subject: RE: ULR - Next Steps

Hi John,
Just got a chance to read this over. Given the statement below, I would like to add some additional information via email for their records. Sorry for the jargon, but the references should make sense to any ministry reviewer focussed on Source Water. Please let me know if you require anything further.

“Discussions with the Project Manager for Drinking Water Source Protection for Essex Region identified policies and vulnerable areas within the study limits (refer to attached email from Katie Stammler). Since the project does not include installing or altering a municipal drinking water intake no new technical work nor amendments to the source protection plan are required.”

Upon further discussion with John Henderson, it has come to my attention that the proposal includes changes to the drainage network. This will eventually lead to the need for an update to the IPZ-3 and Event Based Area. Some portions of these vulnerable areas may be removed through a s.51 amendment to the SPP and AR if drains are removed. If new drains are installed or are relocated, the vulnerable areas will need to be extended, which will require either a s.34 amendment to the SPP and AR or would be included in the Essex Region SPA s.36 work plan. We would ask that the proponent provide mapping of the final changes to the drainage network to ERCA so that the changes to vulnerable areas can be made appropriately.



KATIE STAMMLER, PHD
Water Quality Scientist/Source Water Protection Project Manager
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Follow us on Twitter: @essexregionca

From: John Henderson
Sent: Friday, December 15, 2017 11:28 AM
To: Katie Stammler <KStammler@erca.org>
Subject: FW: ULR - Next Steps

Hi Katie,

Please look at Jayson response to the Source Protection section in attached Table B and provide your comments.

Thank you,



John Henderson, P. Eng.
Essex Region Conservation Authority (ERCA)
360 Fairview Avenue West, Suite 311
Essex, Ontario N8M 1Y6
519-776-5209 ext. 246
Fax: 519-776-8688



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From: Innes, Jayson [<mailto:jayson.innes@stantec.com>]
Sent: Thursday, December 14, 2017 9:32 AM
To: John Henderson <JHenderson@erca.org>
Cc: Godo, Anna <agodo@citywindsor.ca>; Phil Bartnik <pbartnik@tecumseh.ca>; Vendrasco, Wira H.D. <wvendrasco@citywindsor.ca>; Winterton, Mark <mwinterton@citywindsor.ca>; Richard Wyma <RWyma@erca.org>; Tim Byrne <TByrne@erca.org>
Subject: RE: ULR - Next Steps

Attached is a draft version of MOECC Table B for internal review.

APPENDIX N

Cultural Heritage Resources



**Cultural Heritage Resource
Assessment, Upper Little River
Watershed Environmental
Assessment**

FINAL REPORT

June 24, 2021

Prepared for:

Essex Region Conservation Authority
360 Fairview Avenue West, Suite 311
Essex, ON N8M 1Y6

Prepared by:

Stantec Consulting Ltd.
300W-675 Cochrane Drive
Markham, ON L3R 0B8

File: 160311265

**CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED
ENVIRONMENTAL ASSESSMENT**

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**CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED
ENVIRONMENTAL ASSESSMENT**

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Executive Summary

Stantec Consulting Ltd. (Stantec) was retained by Essex Region Conservation Authority (ERCA), in conjunction with the City of Windsor and the Town of Tecumseh, to prepare a Cultural Heritage Resources Assessment (CHRA) report as part of the Upper Little Watershed Environmental Assessment (EA) (the Project). The purpose of the Project is to determine a preferred approach to providing stormwater management control measures for the developing lands upstream of the E.C. Row Expressway and contributing to Upper Little River. The Study Area is contained partially within the City of Windsor and partially within the Town of Tecumseh, Ontario. It extends roughly from west to east from Concession Road 6, in the City of Windsor to Lesperance Road in the Town of Tecumseh, and north to south from the E.C. Row Expressway to the South Talbot Road.

As part of the Upper Little Watershed EA a CHRA has been completed to identify heritage resources, including built heritage and cultural heritage landscapes, present within, and adjacent to, the Study Area. Potential heritage resources were identified through consultation and a windshield survey, inventoried, and evaluated according to *Ontario Regulation (O. Reg.) 9/06*, the criteria for determining cultural heritage value or interest (CHVI) (Government of Ontario 2006a). Where CHVI was identified, the resource was mapped, and recommendations made for further study.

In order to identify protected properties, the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI), the Ontario Heritage Trust (OHT), City of Windsor, and Town of Tecumseh were consulted. As a result of the consultation, eight previously recognized properties were identified in relation to the Study Area. Four of these properties were determined to be situated within the CHRA Study Area.

A windshield survey was undertaken to identify potential heritage resources within, and adjacent to, the Study Area and confirm the presence of previously identified potential heritage properties. Where identified, the potential heritage properties were photographed from the public right-of-way. A total of 72 properties were identified as potential heritage properties. In each case evaluation of the CHVI of the property was undertaken according to O. Reg. 9/06. Each potential heritage resource was considered both as an individual structure and as a landscape. Following evaluation, 14 cultural heritage resources (CHRs) were identified within the Study Area.

This CHRA provides general measures to avoid potential impacts to the CHRs. The preferred alternative should be designed to avoid the identified CHRs. Project components should be planned and undertaken in a manner to avoid the built heritage and cultural heritage landscape attributes of the identified CHRs. Site plan controls are recommended to be put in place prior to construction activities. This includes mapping of CHRs on construction maps, communication to the construction team leads on their locations, and physical protective measures such as temporary fencing. If Project work occurs within 50 metres of CHRs, it is recommended that a qualified building conditions specialist or geotechnical engineer with previous experience working with heritage structures be consulted to identify appropriate vibration mitigation measures in advance of construction. Mitigation measures for vibration may include developing



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

an appropriate vibration setback distance, a vibration attenuation study, and/or a construction monitoring program.

The Executive Summary highlights key points from the report only; for complete information and findings, the reader should examine the complete report.



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

Project Personnel

Project Manager: Jayson Innes, M.A.Sc. (Eng.), P.Eng.

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Independent Reviewer: Tracie Carmichael, BA, B.Ed.

Acknowledgments

Proponent Contact: John Henderson, Essex Region Conservation Authority



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

Abbreviations

BHR	Built Heritage Resource
CHL	Cultural Heritage Landscape
CHR	Cultural Heritage Resource
CHRA	Cultural Heritage Resource Assessment
CHVI	Cultural Heritage Value or Interest
EA	Environmental Assessment
ERCA	Essex Region Conservation Authority
MTCS	Ministry of Tourism, Culture and Sport
OHA	Ontario Heritage Act
OHT	Ontario Heritage Trust
O. Reg.	Ontario Regulation
PPS	Provincial Policy Statement
RoW	Right-of-Way
SWM	Stormwater Management



Glossary

Built Heritage Resource	(BHR) Refers to a single building, structure, monument, installation or remains determined to be of cultural heritage value or interest (CHVI) following evaluation according to <i>Ontario Regulation</i> (O. Reg.) 9/06. In addition, this includes properties protected under the <i>Ontario Heritage Act</i> (OHA) or listed by local, provincial, or federal jurisdictions. This may include residences, barns, bridges, and similar features (based on definition provided in the 2020 Provincial Policy Statement (PPS) (Government of Ontario 2020)).
Cultural Heritage Landscape	(CHL) Refers to a defined geographical area modified by human activities and determined to be of CHVI following evaluation according to O. Reg. 9/06. In addition, this includes properties protected under the OHA or listed by local, provincial, or federal jurisdictions. This may include grouping(s) of individual heritage features such as structures, spaces, archaeological sites, and natural elements, which together form an important type of heritage form, distinctive from that of its constituent elements or parts (based on definition provided in the PPS) (Government of Ontario 2020).
Cultural Heritage Resource	(CHR) Refers to built or cultural resources where CHVI has been determined according to O. Reg. 9/06. Prior to evaluation, resources identified to be 40 years of age or older are considered to be <i>potential</i> heritage resources. There are two categories of heritage resources: Built Heritage Resources (BHR) and Cultural Heritage Landscapes (CHL). For the purposes of this report, the term heritage resource is used exclusively unless assessing the CHVI of a potential heritage resource.
Heritage attributes	Refers to the components of a heritage resource that define its CHVI. These may include, but are not limited to, principal features, characteristics, context, and appearance of a heritage resource (based on definition provided in the PPS) (Government of Ontario 2020).
Potential Heritage Property	Refers to any property previously identified by municipal staff or provincial agencies as containing, or having the potential to contain, CHVI. This includes properties identified on municipal registers, lists, or inventories of potential heritage resources. It may also include properties identified during the site assessment that are over 40 years of age.



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

Project Location	Refers to the stormwater management (SWM) corridor boundary.
Protected Heritage Property	Refers to properties which are designated under, or subject to an easement made under, the OHA, as well as properties identified by provincial authorities and prescribed public bodies as a provincial heritage property. In addition, protected heritage property includes those identified by federal or international authorities as such including, but not limited to, Parks Canada or UNESCO (based on definition provided in the PPS) (Government of Ontario 2020).
Study Area	Refers to all properties through which the Project Location is proposed to pass through plus a 50-metre area surrounding the SWM corridor boundary. This area was used to define the limit of site investigations and is based on an understanding of property parcel boundaries.



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

Introduction
June 24, 2021

1.0 INTRODUCTION

1.1 STUDY PURPOSE AND OBJECTIVES

As part of the Upper Little Watershed Environmental Assessment (EA) (the Project), a Cultural Heritage Resource Assessment (CHRA) has been completed to identify heritage resources, including built heritage and cultural heritage landscapes, present within, and adjacent to, the Study Area. The purpose of the project is to determine a preferred approach to providing stormwater management (SWM) control measures for the developing lands upstream of the E.C. Row Expressway and contributing to Upper Little River. The objective of the Project is to ensure that urbanization of the watershed can occur in a fashion that will not lead to negative impacts on the receiving systems including increased flood risk and the impairment of natural watercourse features. The Project would allow for future enhancement of the watercourse, stream margins, and wetlands. The SWM system should minimize the impact of urban development on the natural environment and be integrated as an amenity within the existing drain system and the open space system. It should also be capable of meeting applicable water quality and quantity requirements while minimizing any potential impacts on waterfowl within the vicinity of the Windsor International Airport related to waterfowl.

The Study Area is contained partially within the City of Windsor and partially within the Town of Tecumseh, Ontario (Figure 1 and Figure 2). It extends roughly from west to east from Concession Road 6, in the City of Windsor to Lesperance Road in the Town of Tecumseh, and north to south from the E.C. Row Expressway to the South Talbot Road. The main branch of Little River originates south of Highway 401 and generally flows north through a well-defined system of municipal drains and channels towards the Detroit River and Lake St. Clair. The drainage area contributing to Upper Little River upstream of the E.C. Row Expressway is approximately 45 square kilometres.

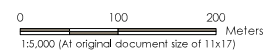
As part of the CHRA report, potential heritage resources were identified through consultation and a windshield survey, inventoried, and evaluated according to *Ontario Regulation (O. Reg.) 9/06*, the criteria for determining cultural heritage value or interest (CHVI) (Government of Ontario 2006a). A land use history was completed to provide a cultural context for the Study Area and to provide a background upon which to base evaluations. Where CHVI was identified, the resource was mapped and recommendations made for further study. The objectives of the CHRA are summarized below:

- Prepare a land use history of the Study Area for use in the identification and evaluation of heritage resources;
- Identify potential heritage resources within the Study Area through a preliminary property inspection from the public right-of-way (RoW);
- Evaluate the CHVI of the potential heritage resources to determine the number of heritage resources present; and
- Prepare recommendations for future work where heritage resources were identified.

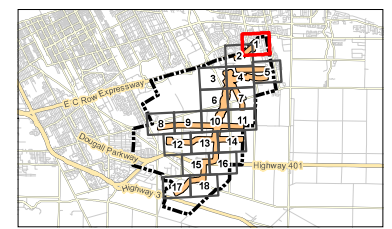




- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road
- Watercourse
- Waterbody
- Municipal Boundary - Lower Tier



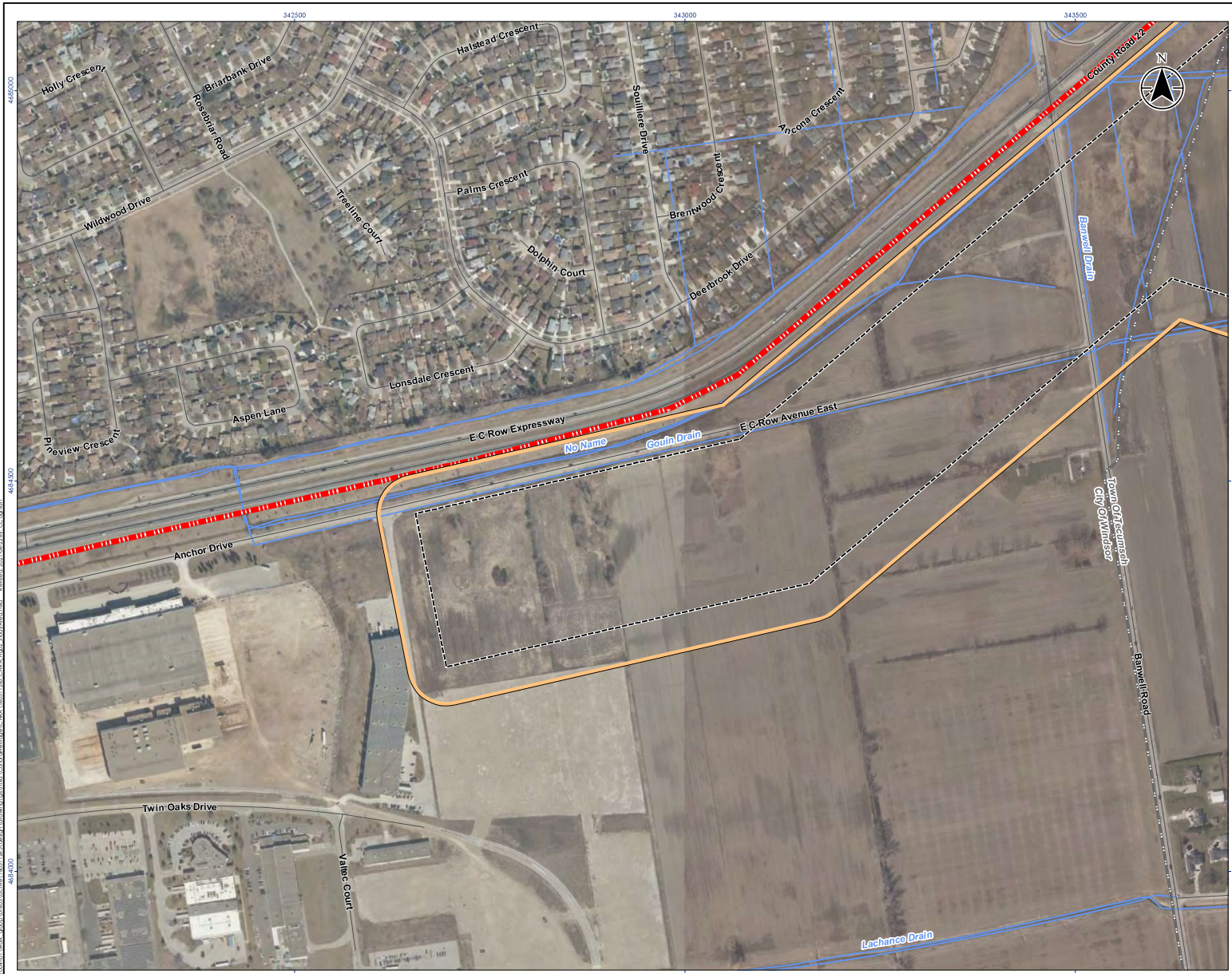
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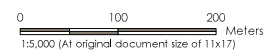
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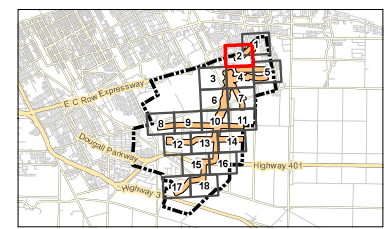
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- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road
- Watercourse
- Municipal Boundary - Lower Tier



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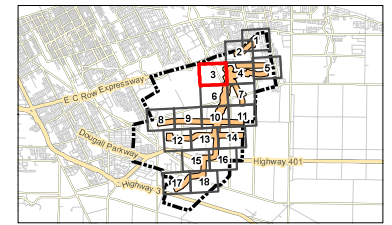
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Study Area - Tile 2



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Railway - Operational
- Road
- Watercourse
- Waterbody
- Municipal Boundary - Lower Tier



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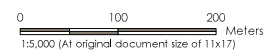
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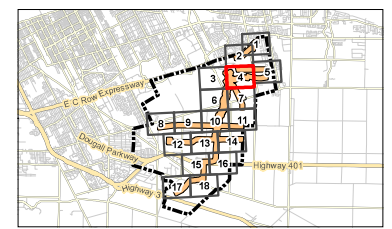
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Study Area - Tile 3



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Railway - Operational
- Road
- Watercourse
- Municipal Boundary - Lower Tier



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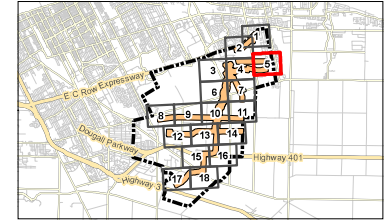
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- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Railway - Operational
- Road
- Watercourse
- Municipal Boundary - Lower Tier



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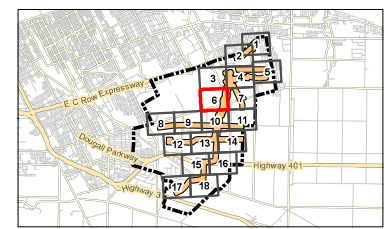
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Study Area - Tile 5



-  Cultural Heritage Study Area
-  Upper Little River Study Area
-  SWM Corridor Boundary
-  Road
-  Watercourse
-  Municipal Boundary - Lower Tier



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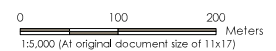
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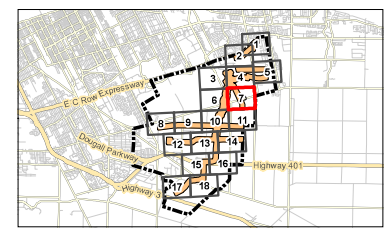
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Study Area - Tile 6



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road
- Watercourse
- Municipal Boundary - Lower Tier



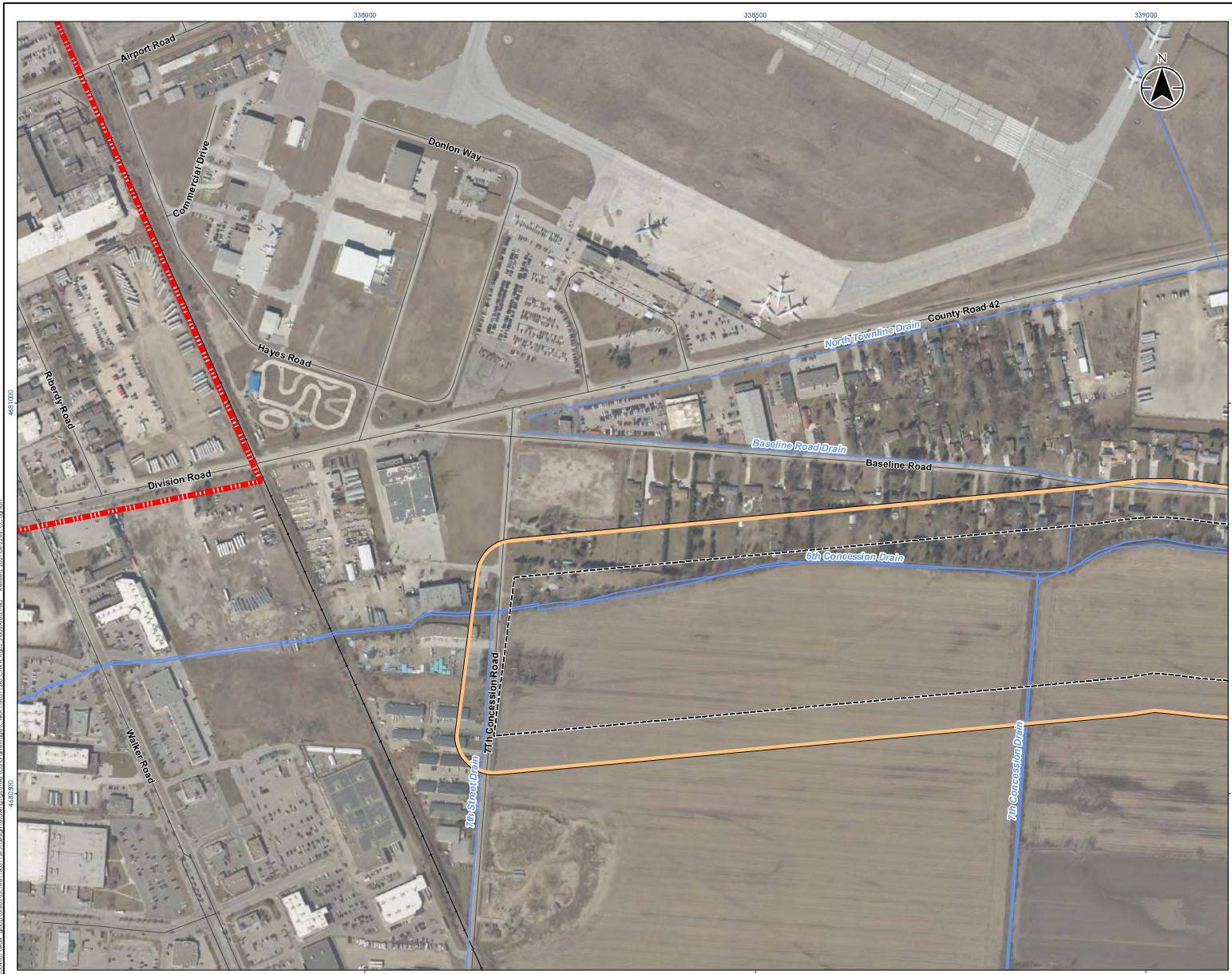
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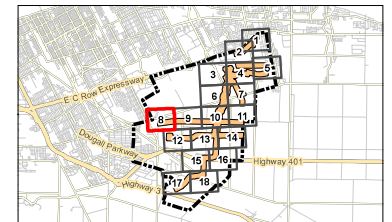
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Study Area - Tile 7



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road - Operational
- Road
- Watercourse
- Municipal Boundary - Lower Tier



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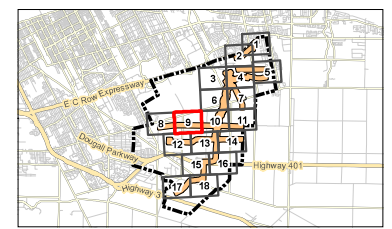
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Study Area - Tile 8



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road
- Watercourse
- Municipal Boundary - Lower Tier



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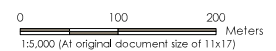
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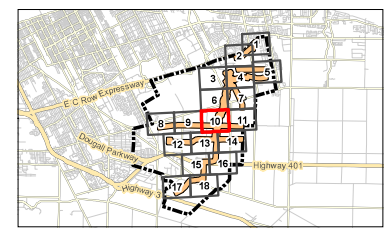
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- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road
- Watercourse
- Municipal Boundary - Lower Tier



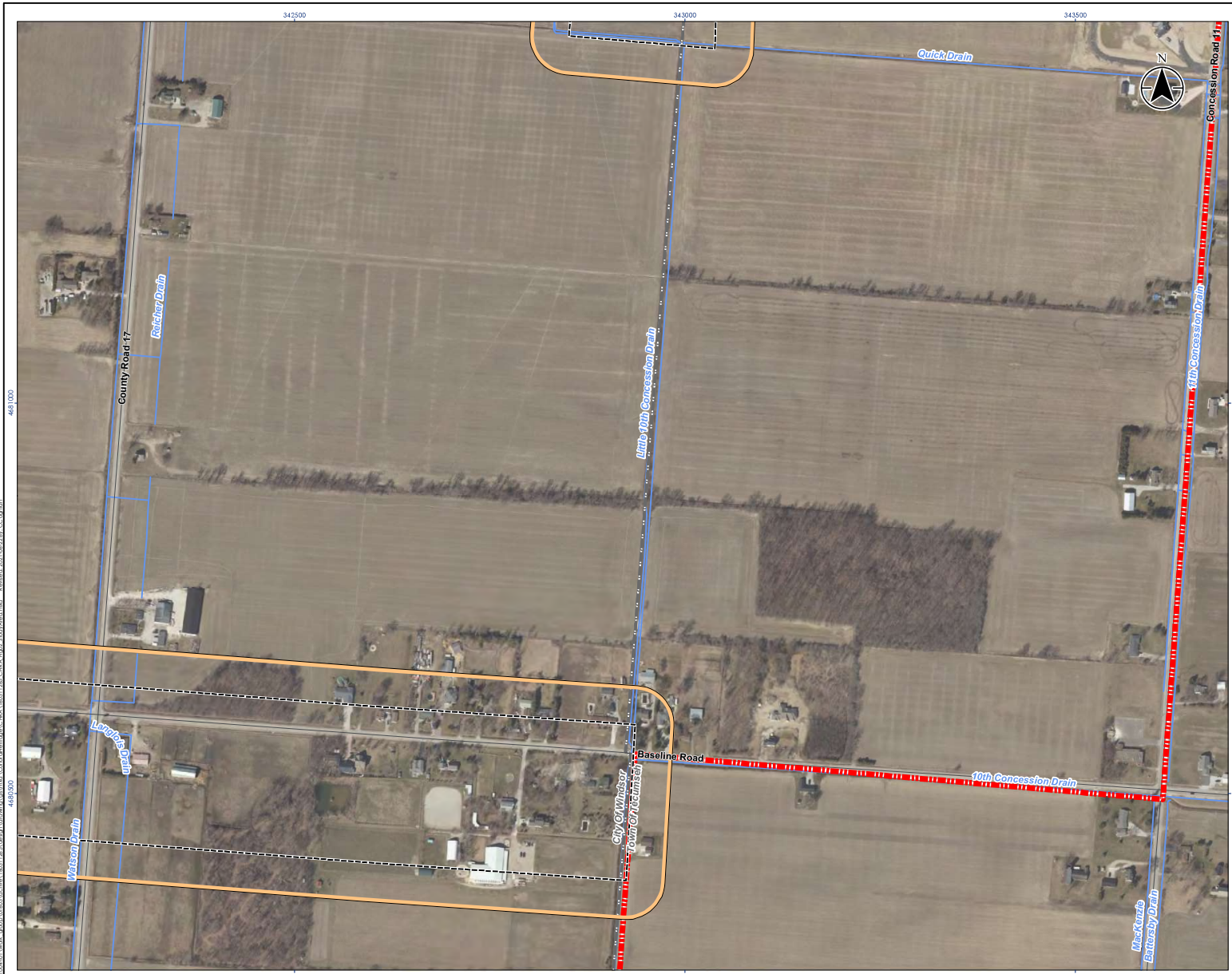
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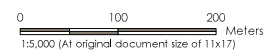
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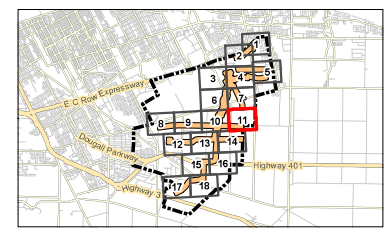
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Study Area - Tile 10



-  Cultural Heritage Study Area
-  Upper Little River Study Area
-  SWM Corridor Boundary
-  Road
-  Watercourse
-  Municipal Boundary - Lower Tier



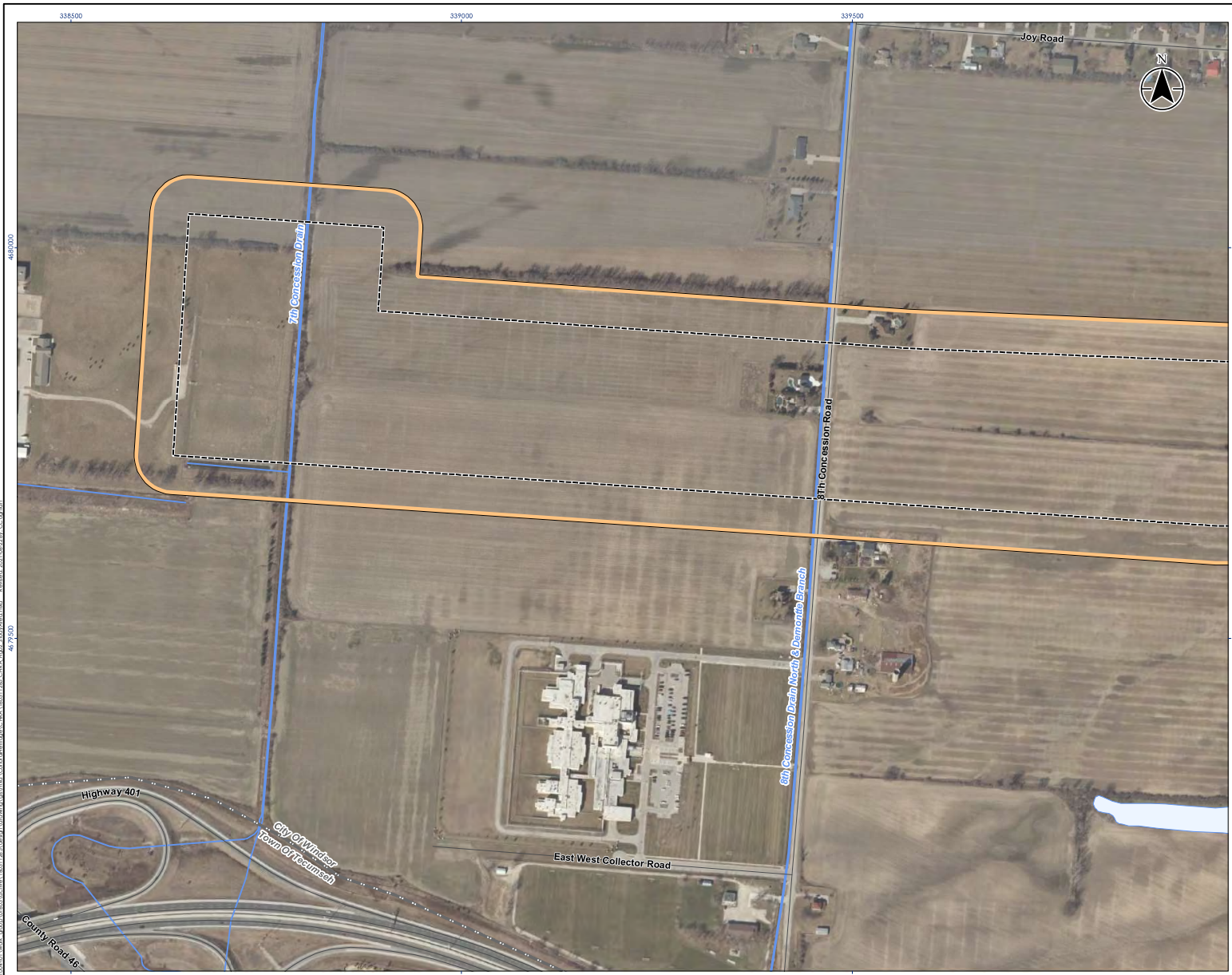
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CULTURAL HERITAGE RESOURCES ASSESSMENT

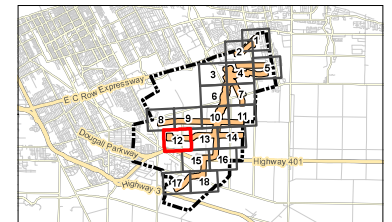
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2k
 Title:
Study Area - Tile 11



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road
- Watercourse
- Waterbody
- Municipal Boundary - Lower Tier



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CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT








Figure No.

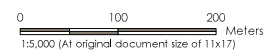
21

Title

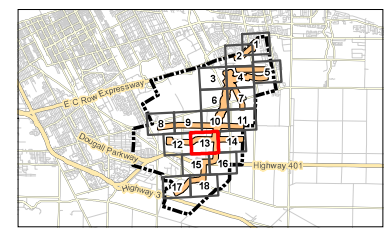
Study Area - Tile 12



-  Cultural Heritage Study Area
-  Upper Little River Study Area
-  SWM Corridor Boundary
-  Road
-  Watercourse
-  Waterbody
-  Municipal Boundary - Lower Tier



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 17N
 2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2014.
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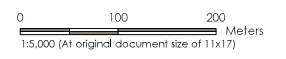
Project Location: Windsor, Ontario
 Prepared by CMC on 2021-06-22
 Technical Review by ABC on xxxx-xx-xx

Client/Project:
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

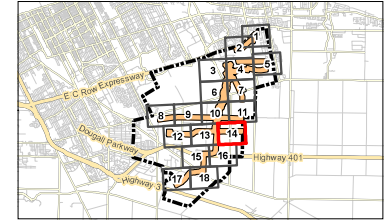
Figure No.
2m
 Title
Study Area - Tile 13



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road
- Watercourse
- Municipal Boundary - Lower Tier



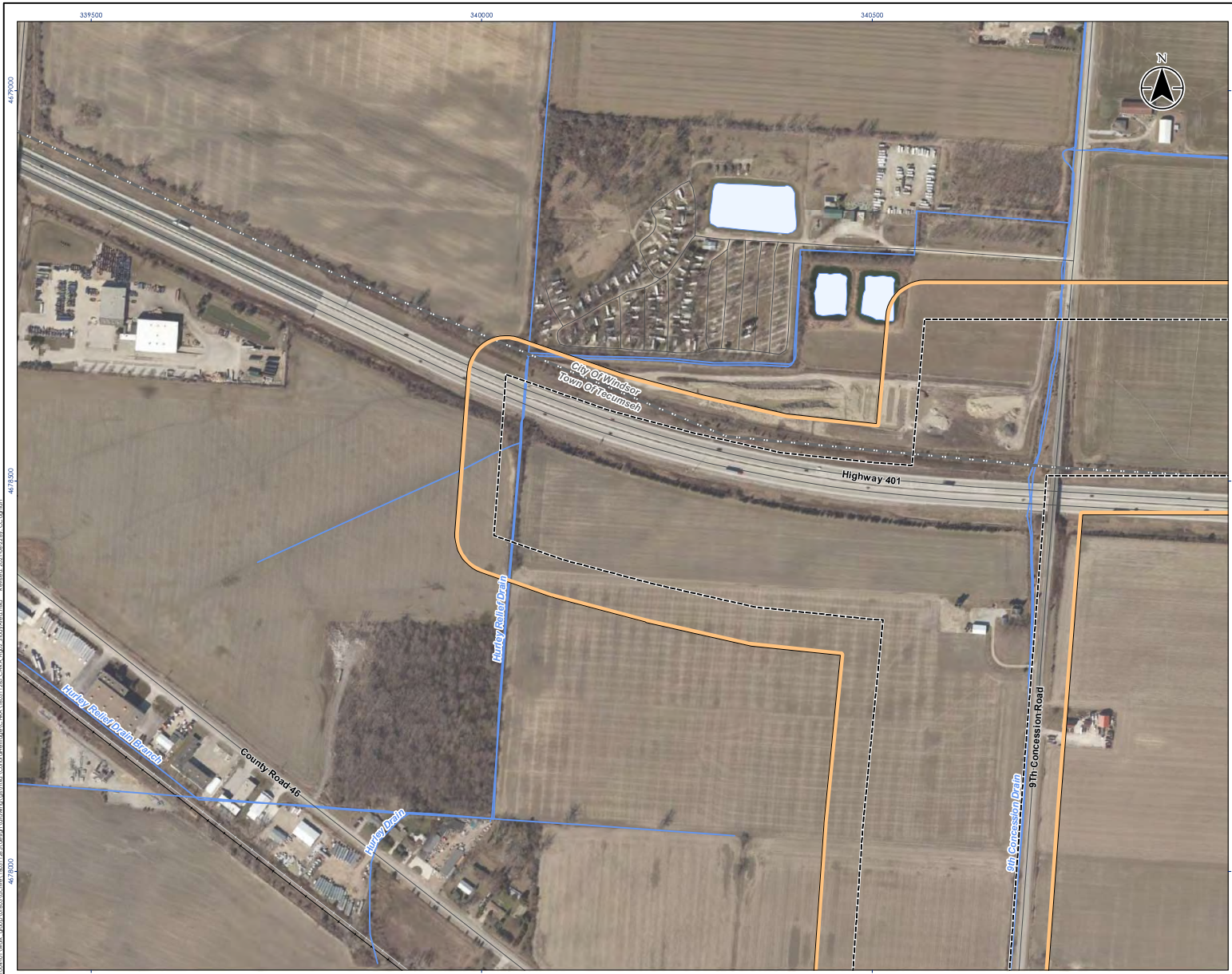
- Notes**
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Project Location: Windsor, Ontario
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Client/Project:
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

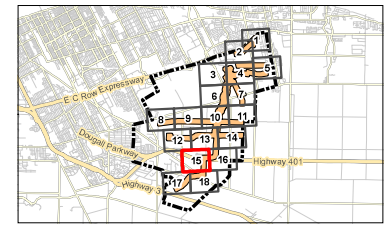
Figure No.
2n
 Title
Study Area - Tile 14



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Railway - Operational
- Railway - Discontinued
- Road
- Watercourse
- Waterbody
- Municipal Boundary - Lower Tier



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 17N
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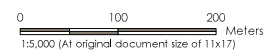
Project Location: Windsor, Ontario
 Prepared by CMC on 2021-06-22
 Technical Review by ABC on xxxx-xx-xx

Client/Project:
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

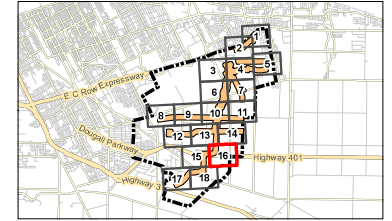
Figure No.
20
 Title
Study Area - Tile 15



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road
- Watercourse
- Waterbody
- Municipal Boundary - Lower Tier



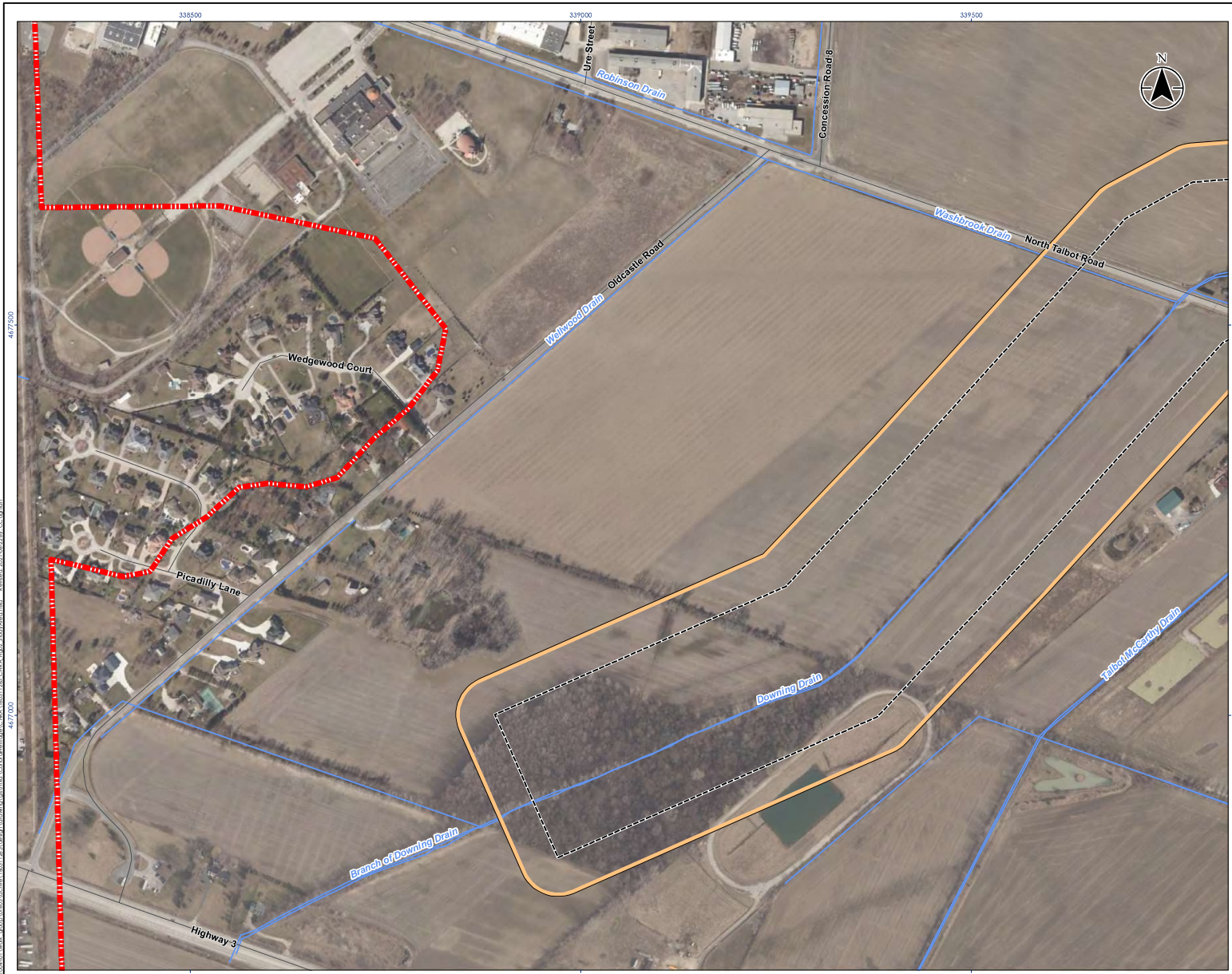
- Notes**
1. Coordinate System: NAD 1983 UTM Zone 17N
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Project Location: Windsor, Ontario
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Client/Project:
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

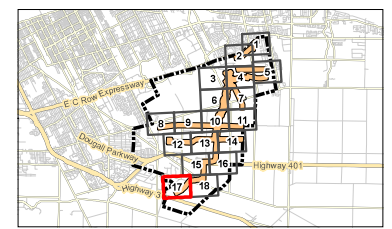
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2p
 Title:
Study Area - Tile 16



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road
- Watercourse
- Municipal Boundary - Lower Tier



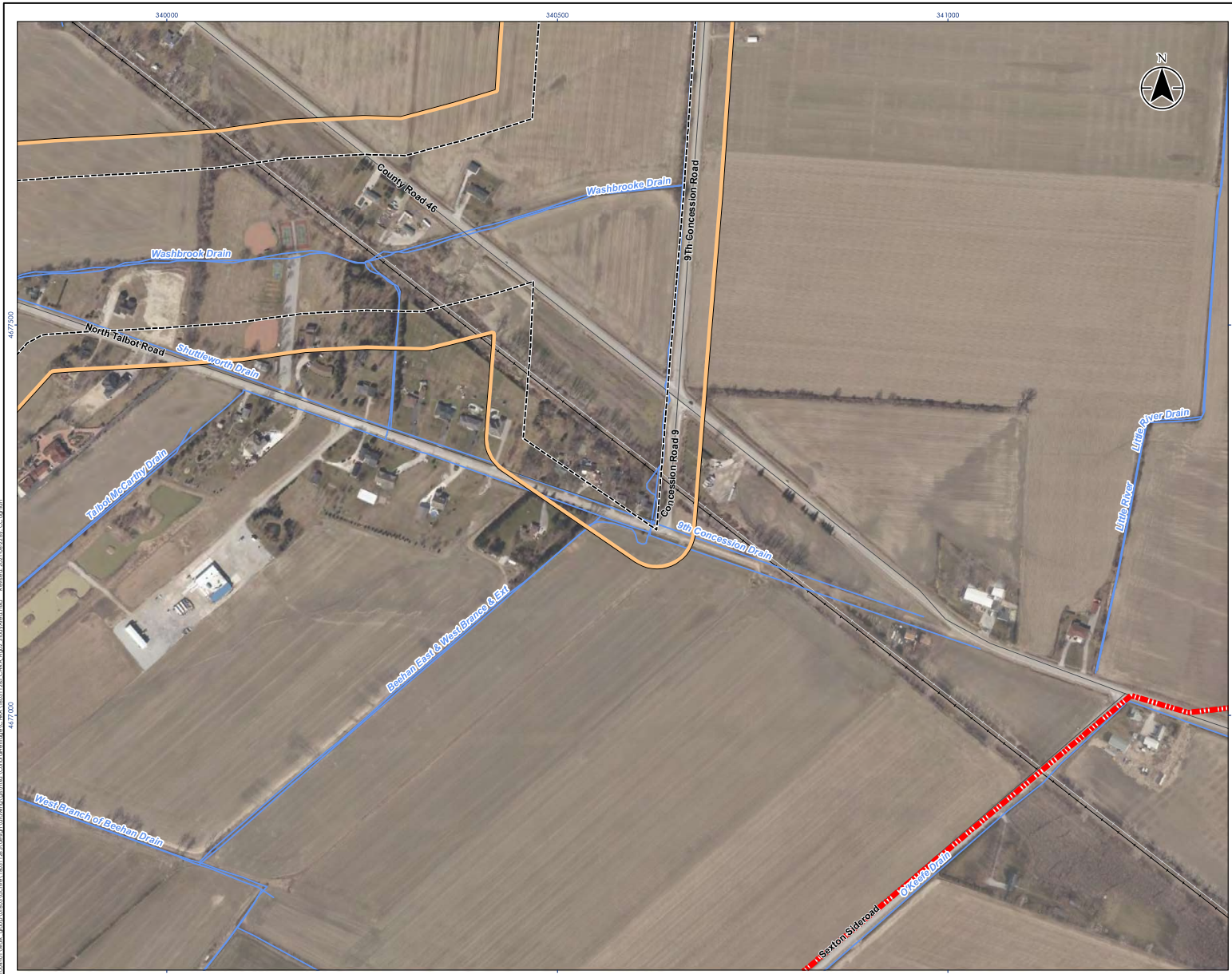
- Notes**
1. Coordinate System: NAD 1983 UTM Zone 17N
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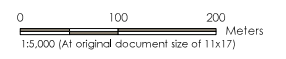
Project Location: Windsor, Ontario
 Prepared by CMC on 2021-06-22
 Technical Review by ABC on xxxx-xx-xx

Client/Project:
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

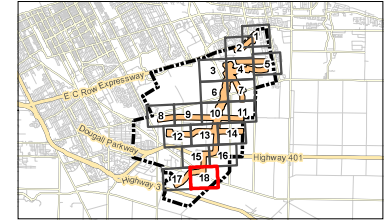
Figure No.
2q
 Title
Study Area - Tile 17



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Railway - Operational
- Railway - Discontinued
- Road
- Watercourse
- Municipal Boundary - Lower Tier



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 17N
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Project Location: Windsor, Ontario
 Prepared by CMC on 2021-06-22
 Technical Review by ABC on xxxx-xx-xx

Client/Project:
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.: **2r**
 Title: **Study Area - Tile 18**

CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

Methodology
June 24, 2021

2.0 METHODOLOGY

The requirement to consider cultural heritage in Municipal Class EAs is discussed in the Municipal Class Environmental Assessment Manual (MCEA Manual) (Municipal Engineers Association 2015) and the revised 2020 Provincial Policy Statement (PPS) (Government of Ontario 2020). The MCEA Manual considers cultural environment heritage, including built heritage resources and cultural heritage landscapes as well as archaeological resources, as one in a series of environmental factors to be considered when undertaking an MCEA, particularly when describing existing and future conditions, development alternatives, and determination of the preferred alternative.

The MCEA Manual further suggests that cultural heritage resources that retain heritage attributes should be identified early in the EA process and avoided where possible. Where avoidance is not possible, potential effects to these attributes should be identified and minimized. Adverse impacts should be mitigated according to provincial and municipal guidelines. It is suggested that this happen early in the process so that potential impacts to significant features can be included in an understanding of project impacts and plans established to mitigate these impacts.

In addition to requirements outlined in the MCEA Manual, provisions made under the PPS were also considered in the preparation of the study. Section 2.6 of the PPS addresses cultural heritage in the land use planning process and as such was considered. The applicable provisions include:

2.6.1 - Significant built heritage resources and significant cultural heritage landscapes shall be conserved.

2.6.3 - Planning authorities shall not permit development and site alteration on adjacent lands to protected heritage property except where the proposed development and site alteration has been evaluated and it has been demonstrated that the heritage attributes of the protected heritage property will be conserved.

(Government of Ontario 2020: 31)

2.1 BACKGROUND HISTORY

The CHRA was composed of a program of archival research focused on the Study Area. To familiarise the study team with the Study Area, local historical resources were consulted, archival documents were reviewed, and a summary of the historical background of the local area was prepared. Specifically, historical mapping from 1877, 1881, 1912, 1913, 1920, 1931, 1936, 1940, 1961, 1962, and 1975 was consulted to identify the presence of structures, settlements, and other potential heritage resources in advance of the field program.



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

Methodology
June 24, 2021

2.2 MUNICIPAL AND AGENCY CONSULTATION

Listings of provincially and locally designated properties, districts, and easements for each municipality were collected from the Ontario Heritage Trust (OHT), the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI), the City of Windsor, and the Town of Tecumseh. Consultation with these interested agencies and municipalities within which the project is proposed was undertaken to determine the presence of designated, listed, or registered heritage properties within the Study Area.

Recognition of protected properties varies greatly and is dependent on the level of CHVI identified or, in some cases, the level of investigation undertaken. For the purpose of this study, any property previously identified by municipal staff or provincial agencies as containing, or having the potential to contain, CHVI was determined to be a protected property.

2.3 FIELD PROGRAM

A vehicular windshield survey was conducted on April 19, 2018 and May 11, 2018 from the RoW. At this time, the Study Area was surveyed for potential heritage resources, including both potential built heritage resources and cultural heritage landscapes. Where identified, these were photographed, and their locations recorded. Characteristics of each potential heritage resource were noted while in the field and recorded.

In general, heritage resources of more than 40 years of age were evaluated during the survey for their potential to satisfy O. Reg. 9/06 criteria. The use of the 40-year threshold is generally accepted by both the federal and provincial authorities as a preliminary screening measure for CHVI. This practice does not imply that all properties more than 40 years of age are inherently of significant heritage value, nor does it exclude exceptional examples constructed within the past 40 years of being of significant cultural heritage value.

2.4 EVALUATION OF CULTURAL HERITAGE VALUE OR INTEREST

The criteria for determining CHVI is defined by O. Reg. 9/06. Each potential heritage resource was considered both as an individual structure and as cultural landscape. Where CHVI was identified, a structure or landscape was assigned a cultural heritage resource (CHR) number and the property was determined to contain a heritage resource. Evaluations for each property are contained in Appendix A.

2.4.1 Ontario Regulation 9/06

In order to identify CHVI at least one of the following criteria must be met:

1. *The property has design value or physical value because it,*
 - i. *is a rare, unique, representative or early example of a style, type, expression, material or construction method,*
 - ii. *displays a high degree of craftsmanship or artistic merit, or*



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

Historical Development
June 24, 2021

3.0 HISTORICAL DEVELOPMENT

3.1 INTRODUCTION

The Study Area is located within the City of Windsor and the Town of Tecumseh, Ontario. It extends roughly from west to east from Concession Road 6, in the City of Windsor to Lesperance Road in the Town of Tecumseh, and north to south from the E.C. Row Expressway to the South Talbot Road.

Specifically, the Study Area spans across the following historical lots and concessions of the former Township of Sandwich, within the County of Essex, Ontario.

- Lots 141 to 150, Concession 1, Petit Cote
- Lots 98 to 150, Concession 3, Petit Cote
- Lots 12 to 16, Concession 6
- Lots 11 to 17, Concession 7
- Lots 10 to 18, Concession 8
- Lots 10 to 18, Concession 9
- Lots 13 to 19, Concession 10
- Lots 300 to 304, Talbot Road North Side
- Lots 300 to 302, Talbot Road South Side

The following sections outline the historical development of the Study Area from the period of settlement to the 20th century.

3.2 PHYSIOGRAPHY

The Study Area is situated within the St. Clair Clay Plains physiographic region of southwestern Ontario (Chapman and Putnam 1984: 113). The physiography of the region highly influenced the late settlement and farming in the County of Essex, until more advanced artificial drainage was implemented in the late 19th and early 20th centuries.

The St. Clair Clay Plains is an extensive area of clay plains covering 5,880 square kilometres in Counties of Essex, Kent, and Lambton. The region is fairly flat with little relief, lying between approximately 175 to 215 metres above sea level. The area during the glacial period was covered by Glacial Lake Whittlesey and Lake Warren, which failed to leave deep stratified beds of sediment on the underlying clay. The majority of Essex County is till plains smoothed by shallow deposits of lacustrine clay which settled in the depressions while the knolls were being lowered by wave action. Within Essex County, the underlying rock is limestone (Chapman and Putnam 1984: 147).



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

Historical Development
June 24, 2021

The majority of the region has a history of poor drainage, which required the installation of dredged ditches and tile underdrains to have satisfactory conditions for crop growth and tillage (Chapman and Putnam 1984: 149). The issue of drainage was addressed beginning in 1869 with the first *Ontario Drainage Act*. The act provided municipal and provincial funding to land owners for the construction of drains in southwestern Ontario (Burr 2014: 22). Throughout the late 19th to the early 20th century new innovations established effective drainage throughout the county to facilitate improved agriculture. Still seen on the landscape today within the Study Area are deep ditches, with large culverts as part of driveways (Plate 1). There are also several different drains within the Study Area, including for example the Little River Drain which crosses Baseline Road (Plate 2).



Plate 1: Deep ditch and culvert driveway example on EC Row Avenue East



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

Historical Development
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Plate 2: Little River Drain

3.3 SURVEY AND SETTLEMENT

On January 1, 1800, in the *Act for the Better Division of the Province*, the Townships of Rochester, Mersea, Gosfield, Maidstone, Sandwich, and Malden were created as part of the County of Essex. The townships of Essex County were surveyed by Patrick McNiff, Abraham Iredell, and Thomas Smith (Clarke 2001: 60, 70).

Among the counties in Ontario, Essex County was the first to be settled (Corporation of the County of Essex 1992: 1). Euro-Canadian settlement in the area of Essex County began as early as 1747 as French settlers began living along the banks of the Detroit River (County of Essex 2019). Following the American War of Independence (1775-1783), settlers began to settle further east of the Detroit River along the north shore of Lake Erie (Corporation of the County of Essex 1992: 2).

The Township of Sandwich was surveyed between 1792 and 1793 by Patrick McNiff. McNiff did not complete the full survey of the township, with additional surveys undertaken by Abraham Iredell in 1796-1797, and Mahlon Burwell in 1824 (Clarke 2001: 67). Due to the township's location bordered on the north by Lake St. Clair and the west by the Detroit River, its French settlers prior to survey, and swamp areas, the township lots are irregularly laid out. Adjacent to the watercourses, in Concessions 1 to 3



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Historical Development
June 24, 2021

Petite Cote, the township has long narrow lots, while the remaining south and east portions of the township utilize the double-front survey system. This survey system created a rectangular pattern of 100-acre lot allowances surrounded by road allowances (Plate 3).



Plate 3: Double-Front Survey System (Dean 1969)

The village of Sandwich began to develop in 1788 to the northwest of the Study Area when a one square mile block of land was acquired by the British from the Chiefs of the Wyandottes/Huron, the Chippewa, and Ottawa for the price of three hundred pounds worth of supplies. It was laid out into one-acre sections and 24-acre residential lots. It was named for the English borough of Sandwich in Kent. Sandwich was established as the new county town by the Honourable Peter Russell in 1796 and its administrative function stimulated rapid growth. Industries included fur, salt, brick manufacturing, and fish hatcheries (Neal 1909: 133-134).

3.4 19TH CENTURY DEVELOPMENT

In the early 19th century, road development helped to increase accessibility in the Study Area and the spread of settlers throughout the township. In 1811, Colonel Talbot commissioned Mahlon Burwell to survey the Talbot Road along the north shore of Lake Erie. The construction of the roadway was interrupted by the War of 1812, before reaching Essex County in 1818 (County of Essex 2019). The Talbot Road was completed through the Study Area between the hamlet of Maidstone and the Village of Sandwich.



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

Historical Development
June 24, 2021

Northwest of the Study Area, in July 1812, the village of Sandwich was the first community in Upper Canada to be attacked by American forces. That month, under General Hull, 2,000 men crossed the Detroit River, forcing residents and British army in Sandwich to abandon the community. The following month, under the command of General Isaac Brock, the British army, and First Nations warriors, retaliated and the American forces were overtaken. Sandwich was attacked again in September 1813, by the American Forces under General William Henry Harrison. When peace came in 1814, the Crown compensated Sandwich for their losses during the conflict (City of Windsor 2021a).

In 1817, Sandwich was formally incorporated as a police village (County of Essex 2019). In the 1830s, the town became an important terminal on the Underground Railroad following the *Emancipation Act* in 1833. Refugees numbering between 30,000 and 100,000 made their journey into Upper Canada by way of Sandwich, with many settling in the town (City of Windsor 2021a). North of the Study Area, the Tecumseh Road was constructed in 1838, running parallel to Lake St. Clair and Detroit River between the community of Ryegate (now Tecumseh) and Sandwich (Tecumseh 2019).

Sandwich was incorporated as a town in 1858, with Charles Baby as the first mayor (Neal 1909: 133-134). By the mid-19th century Sandwich was a well-established town, with a grist and carding mill, two tanneries, a door and blind factory, a saw mill, a foundry, a brick yard, a shingle factory, two wagon shops, a bakery, a gunsmith, seven general stores, four groceries, five hotels, five saloons, a boot and shoe factory, two potash factories, and a brewery (Sutherland & Co. 1866: 93).

Although the village of Sandwich was chosen as the location of Essex County offices, the Town of Windsor eventually outstripped the former in size and industry. Windsor, situated on the banks of the Detroit River, northwest of the Study Area, was originally founded as South Detroit by James Dougall of Paisley, Scotland, who bought the land, laid it out as a village plot, and opened a store in 1830. Early settlers in Windsor included a number of families: Baby, Dumouchelle, Goyeau, Jannesse, Langlois, Marentette, Meloche, and Oullette (Belden 1881: 7). In 1846, Windsor had a population of only 300 (Smith 1846: 221).

In 1844, the township population was 3,624, outside of the towns on the Detroit River. Agriculture remained the main industry in the township in the mid-19th century, with residents supplying products such as poultry to Windsor and the City of Detroit. By 1846, the township had 10,797 acres under cultivation out of a total of 51,476 acres (Smith 1846: 104).

After the *Municipal Corporations Act* of 1850, which provided a means of government for towns and counties, Essex was united with the Counties of Kent and Lambton. In June 1853, Essex became an independent county (County of Essex 2019). In 1853, the Great Western Railway was constructed through the township, with the line running through Ryegate and terminating at Windsor. Windsor was incorporated as a town in 1854, with S.S. Macdonnell as the first reeve (Belden 1881: 7). By 1866, its population had increased to 4,500 (Neal 1909:136). The arrival of the railway and the development of a port marked the beginning of significant industrial development in Windsor. Several areas that are now within the city limits, such as Walkerville and Ford City, were developed in the late 19th century (Archaeological Services Inc. 2008). In 1892, Windsor was incorporated as a City (County of Essex 2019).



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

Historical Development
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By the late 19th century, the Town of Sandwich had become a suburb of Windsor, with a population in 1881 of 1,054 (Belden 1881: 9). Outside the town, in 1861, the township had been divided into two distinct east and west municipalities. The Study Area fell within the Township of Sandwich East (County of Essex 2019). By 1881, the Township of Sandwich East was well settled with a population of 3,837 (Belden 1881: 9). The 1881 township map within the *Illustrated Historical Atlas of the Counties Essex and Kent*, shows the rural Study Area (Figure 3). The majority of development in the Study Area is along the Talbot Road, with a few farmsteads north of the main roadway. In 1893, the Township of Sandwich East was further subdivided, with the creation of the Township of Sandwich South, with the Study Area within both boundaries (Town of Tecumseh 2019).

The Windsor Subdivision of the Canadian Pacific Railway runs east - west across the northern portion of the Study Area. This railway is present on McPhillips' 1898 *Plan of the Township of Sandwich* (McPhillips 1898). Part of the Trans-Canada railway commissioned by the government in 1880, it reached Windsor in 1890, and the line is still in operation today (Andreae 1997).

3.5 20TH CENTURY DEVELOPMENT

In the early 20th century, the Study Area remained within a rural part of the Townships of Sandwich East and Sandwich South, until the development of better roadways and an airport in the 1920s. In 1920, the Department of Public Highways (DPHO) assumed ownership of roadways between Windsor and Niagara Falls for the creation of Highway 3. Within the County of Essex, the highway remained under municipal authority. The Highway was designated as Provincial Highway 3 in 1925, and re-designated as King's Highway in 1930 (Bever 2020).

Major development occurred adjacent to the Study Area with the opening of the Walker Airport on September 8, 1928. Following the Great Depression in the 1930s, the airport was purchased in 1940 by the City of Windsor. The City also purchased surrounding lands for the construction of three permanent runways, administration buildings, and a control tower (Weeks 2015).

North of the Study Area, the former community of Ryegate had been incorporated in 1921 as the Town of Tecumseh, a municipality separate from the Township of Sandwich East. That year, the town had a population of 978. The town grew in the 1930s with the establishment of the Green Giant Factory (Town of Tecumseh 2019). Northwest of the Study Area, the Ambassador Bridge was opened in 1929 between Canada and the United States and became a vital trade link between the two nations. The high trade aspirations were short lived with the onset of the Great Depression. Windsor and Sandwich were hit hard by the depression and it resulted in the loss of thousands of heavy industry and manufacturing jobs. The provincial government, in an effort to save tax dollars, passed a bill to streamline municipal governments. As a result, Sandwich, East Windsor, and Walkerville, were annexed by the City of Windsor in 1935 (City of Windsor 2021a).

In the late 1950s, properties within and adjacent to the Study Area were purchased for the construction of a new highway into the City of Windsor. Construction of the E.C. Row Expressway, named for the President of Chrysler Canada, began in 1970. Construction and expansion contracts to the highway continued into the late 20th century (Oiamo *et al* 2016:189).



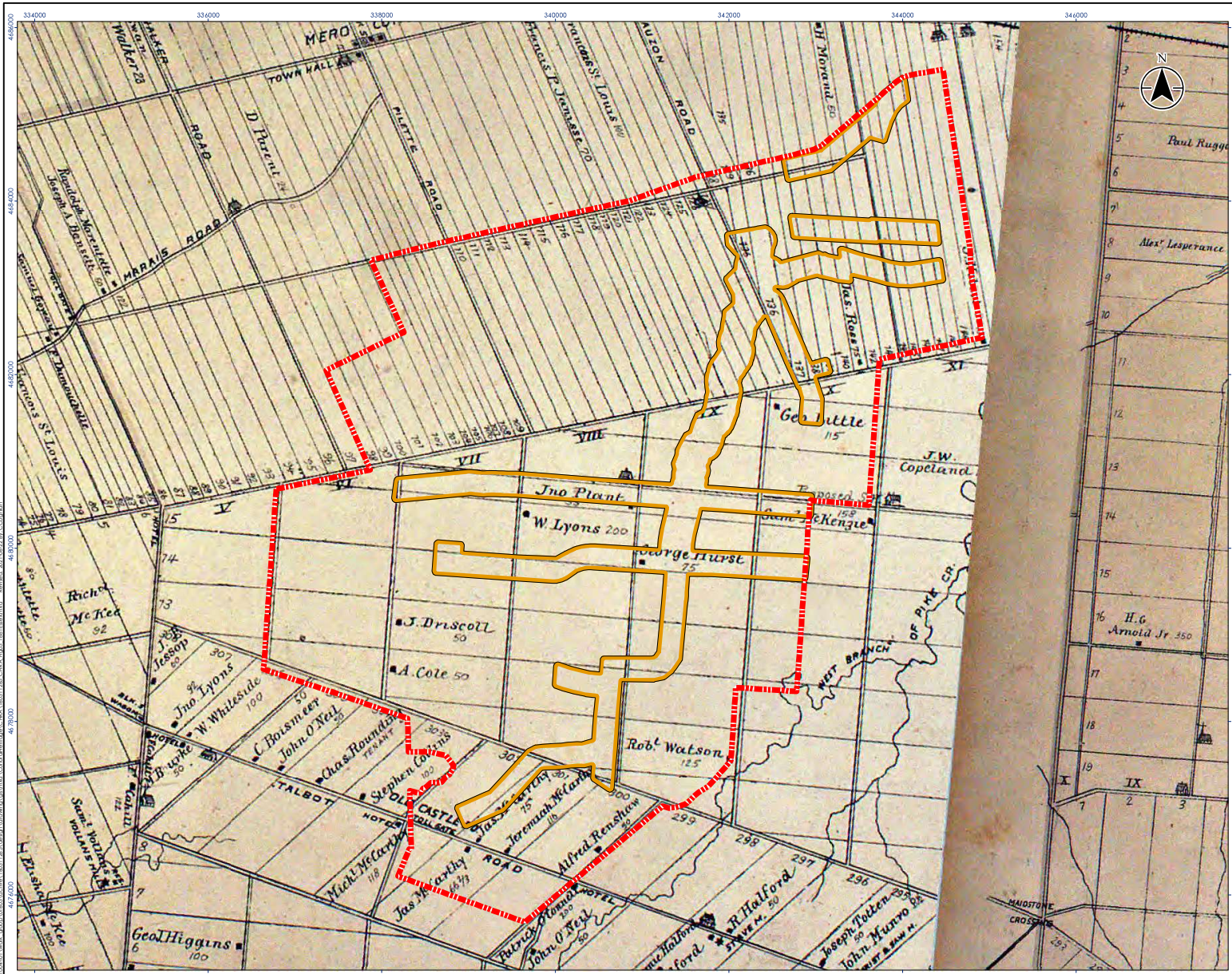
CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

Historical Development
June 24, 2021

In the 1960s, the City of Windsor continued to expand through annexations of surrounding towns and townships. In 1966, the City of Windsor annexed the Townships of Sandwich East and Sandwich South (Town of Tecumseh 2019). The City of Windsor had a stable population between 1966 and 1996, with an average population of about 195,000 (City of Windsor 2021b).

In 1999, the east portion of the Study Area was annexed by the Town of Tecumseh as part of the reorganization of Essex County (Town of Tecumseh 2019). In 2003, the City of Windsor annexed 23 square kilometres from the Town of Tecumseh (City of Windsor 2021c). With its location adjacent to the City of Windsor, and the City's airport, Tecumseh is a suburban community. In 2006, the town had a population 24, 224 (Statistics Canada 2017).

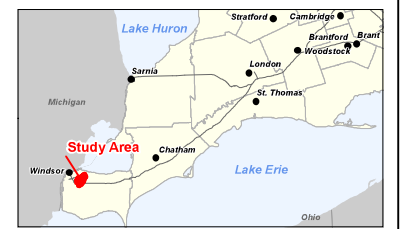




- Cultural Heritage Study Area
- Upper Little River Study Area



- Notes**
1. Coordinate System: NAD 1983 Ontario MNR Lambert
 2. Essex County (Ontario Map Ref # 1) Essex supplement in Illustrated atlas of the Dominion of Canada. Toronto: H. Balden & Co., 1881.



Project Location: Windsor, Ontario
 160311265 REVA
 Prepared by CMC on 2021-06-22
 Technical Review by ABC on xxxx-xx-xx

Client/Project:
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.:
3
 Title:
Township of Sandwich 1881

CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

Results

June 24, 2021

4.0 RESULTS

4.1 AGENCY AND MUNICIPAL CONSULTATION

In order to identify heritage resources within the Study Area, the MHSTCI, OHT, City of Windsor, and Town of Tecumseh were consulted.

At the provincial level, Karla Barboza, Team Lead, Heritage, with the MHSTCI, confirmed that there are no provincial heritage properties within or adjacent to the Study Area. Thomas Wicks, Heritage Planner with the OHT, reported that there are no OHT conservation easement sites or OHT-owned properties within or adjacent to the Study Area.

At the municipal level, staff were consulted to determine the presence of municipally protected heritage properties. Table 4-1 provides an overview of the identified heritage resources in relation to the Study Area. Kristina Tang, Planner II - Revitalization & Policy Initiatives, Planning & Building Services, City of Windsor, identified five properties as heritage resources in relation to the Study Area. Three of the properties were determined to be situated within the Study Area. Chad Jeffery, Manager Planning, Town of Tecumseh, provided a map of heritage resources in the Town of Tecumseh which identified three properties as heritage resources in relation to the Study Area. One of the properties was determined to be situated within the Study Area.

Table 4-1: Identified and Protected Heritage Resources within the Study Area

Municipality	Location/Municipal Address	Level of Recognition	Relationship to the Study Area
City of Windsor	2600 Airport Rd (3200 County Rd 42)	Listed on municipal register	Outside the Study Area
City of Windsor	5680 Baseline Rd	Listed on municipal register	Inside the Study Area
City of Windsor	4639 9th Concession Rd	Listed on municipal register	Inside the Study Area
City of Windsor	4799 9th Concession Rd	Listed on municipal register	Outside the Study Area
City of Windsor	4601 County Rd 17 (10th Concession)	Listed on municipal register	Inside the Study Area
Town of Tecumseh	2300 Banwell Road	Designated Heritage Property	Inside the Study Area
Town of Tecumseh	11945 Intersection Road	Listed on municipal register	Inside the Study Area
Town of Tecumseh	2725 Highway 3 (Talbot Road)	Heritage Property Candidate	Outside the Study Area



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

Results

June 24, 2021

4.2 FIELD PROGRAM

4.2.1 Potential Heritage Resources

As described in Section 2.3, a windshield survey was undertaken to identify potential heritage resources situated within, and adjacent to, the Study Area and confirm the presence of previously identified protected properties. Where identified, the potential heritage resource was photographically documented from the public RoW.

During the course of the survey, 72 individual sites were identified as containing potential heritage resources (Figure 4). Of those identified, five had been previously recognized by municipal heritage staff through listing on their municipal heritage register. A summary of these potential heritage resources is contained in Table 4-2 and Appendix A.

The Study Area contains a mixture of residential and commercial structures. The majority of the potential heritage resources date to the mid-20th century, between approximately 1940 to 1975, based on topographic mapping. Eight properties date to the late 19th to early 20th century, specifically between 1882 and 1912, determined through historic and topographic mapping. Six of these eight properties display a similar one and a half storey structure with a T-shaped plan, while the remaining two are red brick two storey structures. Two of the eight properties are farmsteads.

4.3 EVALUATION OF CULTURAL HERITAGE VALUE OF INTEREST




Where a potential heritage resource was identified within the Study Area, an evaluation of the CHVI of the property was undertaken. As described in Section 2.5, each potential heritage resource was evaluated according to O. Reg. 9/06, the criteria for determining CHVI. Detailed evaluations for each property are contained within Appendix A. In addition, each potential heritage resource was considered both as an individual structure and as part of a landscape. Where CHVI was identified, a structure or landscape was assigned a CHR number and the property was determined to contain a heritage resource. There were 72 potential heritage resources identified (Figure 4), 14 of which were determined to be cultural heritage resources (Figure 5). Table 4-2 summarizes the findings.



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

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Table 4-2: Summary of Determination of CHVI




Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
1667 Shawnee Road	4a	No	Residence		None identified	No	N/A
3780 Lauzon Road	4d	No	Farmstead		None identified	No	N/A
3805 Lauzon Road	4d	No	Residence		None identified	No	N/A



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

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Table 4-2: Summary of Determination of CHVI




Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
Banwell Road (railway line)	4e	No	Railway Line		Railway line: Layout of the railway line.	Yes	CHR-1
2300 Banwell Road	4e	Yes	Cemetery		Cemetery: Grave markers, provincial plaque, and mature deciduous trees.	Yes	CHR-2
11945 Intersection Road	4e	Yes	Farmstead		Residence: Two storey structure, high-pitched hip roof, brick chimney, hip dormer, symmetrical exterior, red brick exterior, covered full width porch, 3/1 wood windows, and stone foundation. Barn: Timber frame structure and side gable roof. Landscape: Tree-lined laneway, mature maple and white pines.	Yes	CHR-3



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

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Table 4-2: Summary of Determination of CHVI




Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
3945 Lauzon Road	4g	No	Residence		None identified	No	N/A
7816 County Road 42	4g	No	Residence		None identified	No	N/A
7955 County Road 42	4g	No	Residence		Associative: Connection to the Sikh community in Windsor and the local area, potential to yield information about the Sikh community and their influence on Windsor. Contextual: Guardwara Khalsa Parkash Windsor temple which acts as a landmark along County Road 42.	Yes	CHR-4



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

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Table 4-2: Summary of Determination of CHVI




Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
8421 County Road 42	4g	No	Residence/Commercial		None identified	No	N/A
8667 County Road 42	4g	No	Residence		None identified	No	N/A
9244 County Road 42	4g	No	Residence		None identified	No	N/A



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

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Table 4-2: Summary of Determination of CHVI


Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
4120 7 th Concession Road	4h	No	Residence		None identified	No	N/A
4178 7 th Concession Road	4h	No	Residence		None identified	No	N/A
4140 7 th Concession Road	4h	No	Residence		None identified	No	N/A



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

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Table 4-2: Summary of Determination of CHVI

Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
3255 Baseline Road	4h	No	Residence		None identified	No	N/A
3225 Baseline Road	4h	No	Residence		None identified	No	N/A
3325 Baseline Road	4h	No	Residence		None identified	No	N/A



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

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Table 4-2: Summary of Determination of CHVI




Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
3277 Baseline Road	4h	No	Residence		None identified	No	N/A
3355 Baseline Road	4h	No	Residence		None identified	No	N/A
3415 Baseline Road	4h	No	Residence		None identified	No	N/A



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

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Table 4-2: Summary of Determination of CHVI




Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
3465 Baseline Road	4h	No	Residence		None identified	No	N/A
3483 Baseline Road	4h	No	Residence		None identified	No	N/A
3567 Baseline Road	4h	No	Residence		None identified	No	N/A



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

Results
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Table 4-2: Summary of Determination of CHVI




Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
3605 Baseline Road	4h	No	Residence		None identified	No	N/A
3635 Baseline Road	4h	No	Residence		None identified	No	N/A
3665 Baseline Road	4h	No	Residence		None identified	No	N/A



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

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Table 4-2: Summary of Determination of CHVI




Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
3685 Baseline Road	4h	No	Residence		None identified	No	N/A
3745 Baseline Road	4h	No	Residence		None identified	No	N/A
3765 Baseline Road	4h	No	Residence		None identified	No	N/A



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

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Table 4-2: Summary of Determination of CHVI




Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
3825 Baseline Road	4h	No	Residence		None identified	No	N/A
3915 Baseline Road	4h	No	Residence		None identified	No	N/A
3965 Baseline Road	4h	No	Residence		None identified	No	N/A



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

Results
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Table 4-2: Summary of Determination of CHVI




Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
3985 Baseline Road	4i	No	Residence		None identified	No	N/A
4085 Baseline Road	4i	No	Residence		None identified	No	N/A
4095 Baseline Road	4i	No	Residence		None identified	No	N/A



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

Results
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Table 4-2: Summary of Determination of CHVI




Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
4145 Baseline Road	4i	No	Residence		None identified	No	N/A
4175 Baseline Road	4i	No	Residence		None identified	No	N/A
4245 Baseline Road	4i	No	Residence		None identified	No	N/A



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

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Table 4-2: Summary of Determination of CHVI




Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
4367 Baseline Road	4i	No	Cemetery		Cemetery: Grave markers and brick piers with metal gates.	Yes	CHR-5
4489 Baseline Road	4i	No	Residence		None identified	No	N/A
4441 Baseline Road	4i	No	Residence		None identified	No	N/A



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

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Table 4-2: Summary of Determination of CHVI



Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
4475 Baseline Road	4i	No	Residence		None identified	No	N/A
4435 8 th Concession Road	4i	No	Residence		None identified	No	N/A
4440 8 th Concession Road	4i	No	Residence		None identified	No	N/A



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

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Table 4-2: Summary of Determination of CHVI




Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
5680 Baseline Road	4i	Yes	Farmstead		Residence: One and a half storey structure, medium-pitched cross gable roof, brick chimney, and T-shaped plan. Barn: Timber frame structure, side gable roof, salt box side, wood paneled door, and wood multi-paned windows. Driveshed: one storey structure, side gable roof, and wood 2/2 fixed windows. Smaller barn: side gable roof and rusticated concrete foundation. Outbuilding: horizontal wood siding, side gable roof, and wood 2/2 fixed windows.	Yes	CHR-6
7295 Baseline Road	4k	No	Residence		Residence: One and a half storey structure, medium-pitched cross gable roof, gabled dormers, and T-shaped plan.	Yes	CHR-7



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

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Table 4-2: Summary of Determination of CHVI




Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
4310 County Road 17	4k	No	Outbuilding		None identified	No	N/A
8360 Baseline Road	4k	No	Residence		None identified	No	N/A
8780 Baseline Road	4k	No	Residence		None identified	No	N/A



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

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Table 4-2: Summary of Determination of CHVI




Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
3850 County Road 17	4k	No	Residence		Residence: One and a half storey structure, medium-pitched side gable roof, three-bay front façade, and stone foundation. Landscape: mature spruce trees.	Yes	CHR-8
4721 8 th Concession Road	4l	No	Residence		None identified	No	N/A
4727 8 th Concession Road	4l	No	Residence		None identified	No	N/A



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

Results
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Table 4-2: Summary of Determination of CHVI




Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
4774 8 th Concession Road	4l	No	Residence		None identified	No	N/A
4824 8 th Concession Road	4l	No	Outbuildings		None identified	No	N/A
4639 9 th Concession Road	4m	Yes	Residence		Residence: Two storey structure, medium-pitched hip roof, gabled dormers, red brick exterior, covered wraparound brick, concrete and wood porch, 3/1 and 4/1 windows, and wood paneled door.	Yes	CHR-9



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

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Table 4-2: Summary of Determination of CHVI




Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
4665 9 th Concession Road	4m	No	Residence		None identified	No	N/A
4445 9 th Concession Road	4m	No	Residence		None identified	No	N/A
4979 9 th Concession Road	4o	No	Residence		None identified	No	N/A



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

Results
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Table 4-2: Summary of Determination of CHVI




Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
5012 9 th Concession Road	4o	No	Residence		None identified	No	N/A
4610 County Road 17	4n	No	Residence		None identified	No	N/A
4601 County Road 17	4n	Yes	Residence		Residence: One and a half storey structure, medium-pitched side gable roof, stone clad exterior, three-bay front façade, and stone clad front porch.	Yes	CHR-10



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

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Table 4-2: Summary of Determination of CHVI




Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
4500 County Road 17	4n	No	Residence		Residence: One and a half storey structure, medium-pitched cross gable roof, T-shaped plan, and gabled dormer.	Yes	CHR-11
4521 County Road 17	4n	No	Residence		Residence: One and a half storey structure, medium-pitched cross gable roof, and gabled dormers. Outbuilding: vertical wood boards and side gable roof.	Yes	CHR-12
5284 North Talbot Road	4r	No	Park		None identified	No	N/A



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

Results
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Table 4-2: Summary of Determination of CHVI




Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
5648 North Talbot Road	4r	No	Residence		Residence: One and a half storey structure, medium-pitched cross gable roof, and T-shaped plan.	Yes	CHR-13
5700 North Talbot Road	4r	No	Residence		None identified	No	N/A
5760 North Talbot Road	4r	No	Residence		None identified	No	N/A



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

Results
June 24, 2021

Table 4-2: Summary of Determination of CHVI


Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
5790 North Talbot Road	4r	No	Residence		None identified	No	N/A
9 th Concession Road (former railway line)	4r	No	Former railway line		Recreational Trail: Layout of the former Canada Southern Railway Line including linear corridor lined with naturalized vegetation.	Yes	CHR-14
3940 Highway 3	4q	No	Residence		None identified	No	N/A



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

Results
June 24, 2021

Table 4-2: Summary of Determination of CHVI

Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
5075 North Talbot Road	4r	No	Residence		None identified	No	N/A

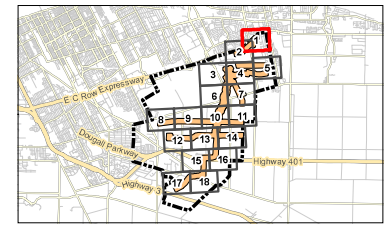




- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Potential Heritage Resource
- Road
- Watercourse
- Waterbody
- Municipal Boundary - Lower Tier



- Notes**
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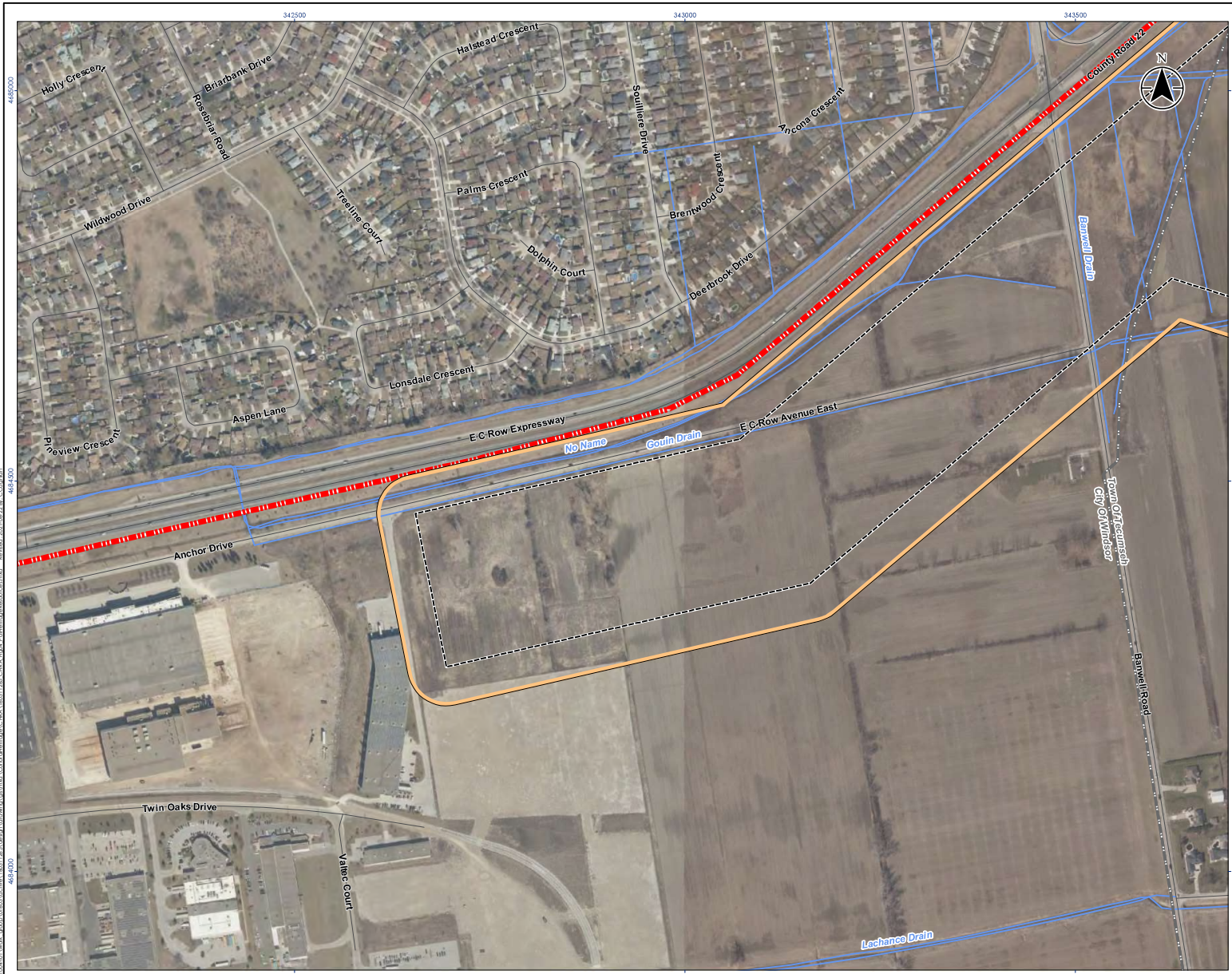
Project Location: Windsor, Ontario
 Prepared by CMC on 2021-06-22
 Technical Review by ABC on xxxx-xx-xx

Client/Project: CITY OF WINDSOR
 UPPER LITTLE RIVER
 CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.:

4a

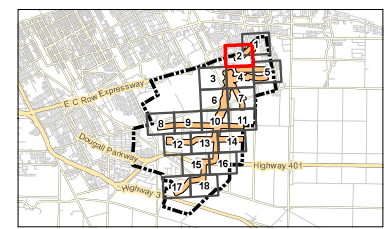
Title: **Potential and Previously Identified Cultural Heritage Resources - Tile 1**



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road
- Watercourse
- Municipal Boundary - Lower Tier



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Project Location: Windsor, Ontario
 Prepared by CMC on 2021-06-22
 Technical Review by ABC on xxxx-xx-xx

Client/Project: CITY OF WINDSOR
 UPPER LITTLE RIVER
 CULTURAL HERITAGE RESOURCES ASSESSMENT

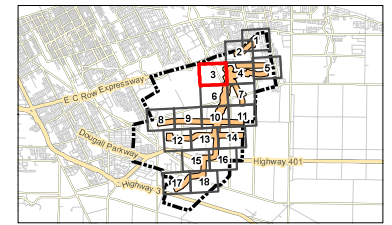
Figure No.: **4b**
 Title: **Potential and Previously Identified Cultural Heritage Resources - Tile 2**



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Railway - Operational
- Road
- Watercourse
- Waterbody
- Municipal Boundary - Lower Tier



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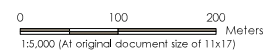
Project Location: Windsor, Ontario
 Prepared by CMC on 2021-06-22
 Technical Review by ABC on xxxx-xx-xx

Client/Project:
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

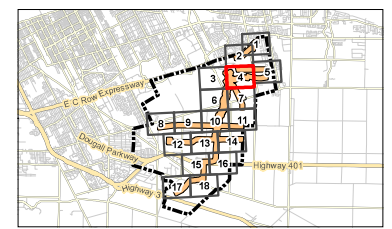
Figure No. **4c**
 Title **Potential and Previously Identified Cultural Heritage Resources - Tile 3**



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Potential Heritage Resource
- Railway - Operational
- Road
- Watercourse
- Municipal Boundary - Lower Tier



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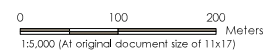
Project Location: Windsor, Ontario
 Prepared by CMC on 2021-06-22
 Technical Review by ABC on xxxx-xx-xx

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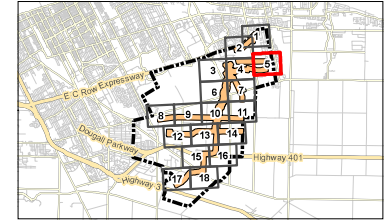
Figure No.
4d
 Title
Potential and Previously Identified Cultural Heritage Resources - Tile 4



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Protected and Previously Identified Heritage Resources
- Potential Heritage Resource
- Railway - Operational
- Road
- Watercourse
- Municipal Boundary - Lower Tier



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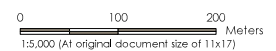
Project Location: Windsor, Ontario
 Prepared by CMC on 2021-06-22
 Technical Review by ABC on xxxx-xx-xx

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 UPPER LITTLE RIVER
 CULTURAL HERITAGE RESOURCES ASSESSMENT

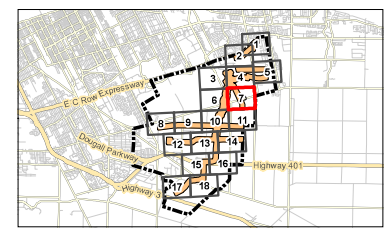
Figure No.: **4e**
 Title: **Potential and Previously Identified Cultural Heritage Resources - Tile 5**



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Potential Heritage Resource
- Road
- Watercourse
- Municipal Boundary - Lower Tier



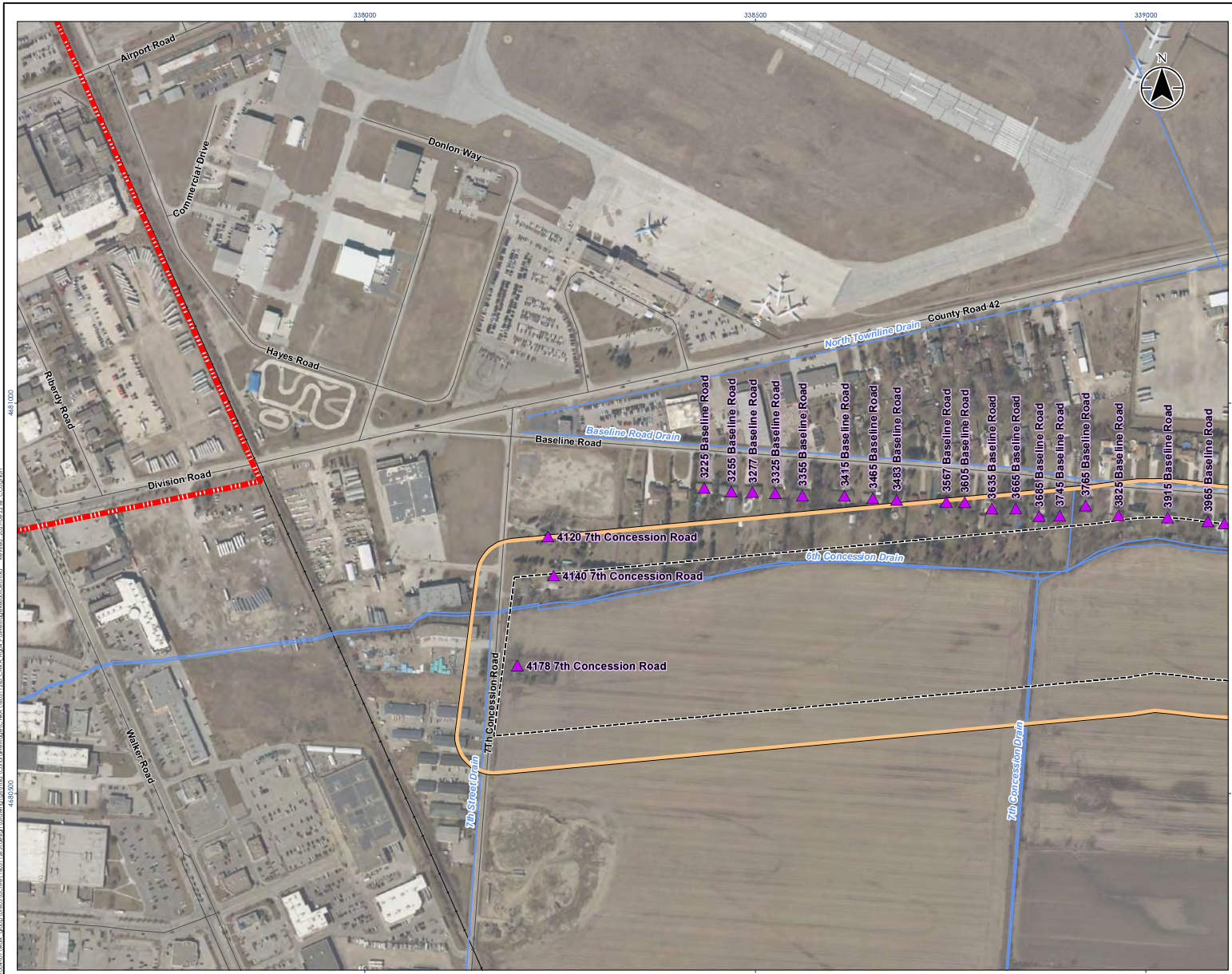
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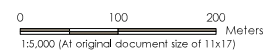
Project Location: Windsor, Ontario
 Prepared by CMC on 2021-06-22
 Technical Review by ABC on xxxx-xx-xx

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CULTURAL HERITAGE RESOURCES ASSESSMENT

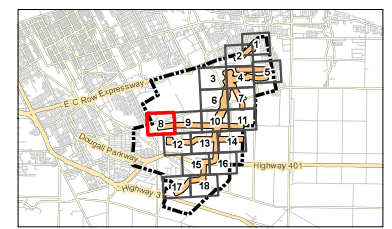
Figure No.
4g
 Title
Potential and Previously Identified Cultural Heritage Resources - Tile 7



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Potential Heritage Resource
- Railway - Operational
- Road
- Watercourse
- Municipal Boundary - Lower Tier



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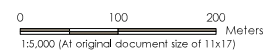
Project Location: Windsor, Ontario
 Prepared by CMC on 2021-04-22
 Technical Review by ABC on xxxx-xx-xx

Client/Project:
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CULTURAL HERITAGE RESOURCES ASSESSMENT

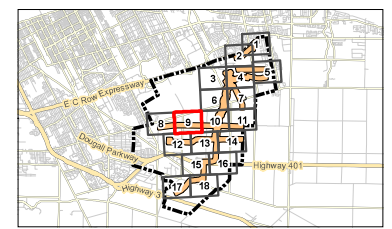
Figure No. **4h**
 Title **Potential and Previously Identified Cultural Heritage Resources - Tile 8**



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Protected and Previously Identified Heritage Resources
- Potential Heritage Resource
- Road
- Watercourse
- Municipal Boundary - Lower Tier



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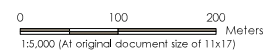
Project Location: Windsor, Ontario
 Prepared by CMC on 2021-06-22
 Technical Review by ABC on xxxx-xx-xx

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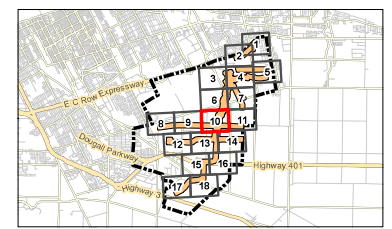
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 Title:
Potential and Previously Identified Cultural Heritage Resources - Tile 9



-  Cultural Heritage Study Area
-  Upper Little River Study Area
-  SWM Corridor Boundary
-  Road
-  Watercourse
-  Municipal Boundary - Lower Tier



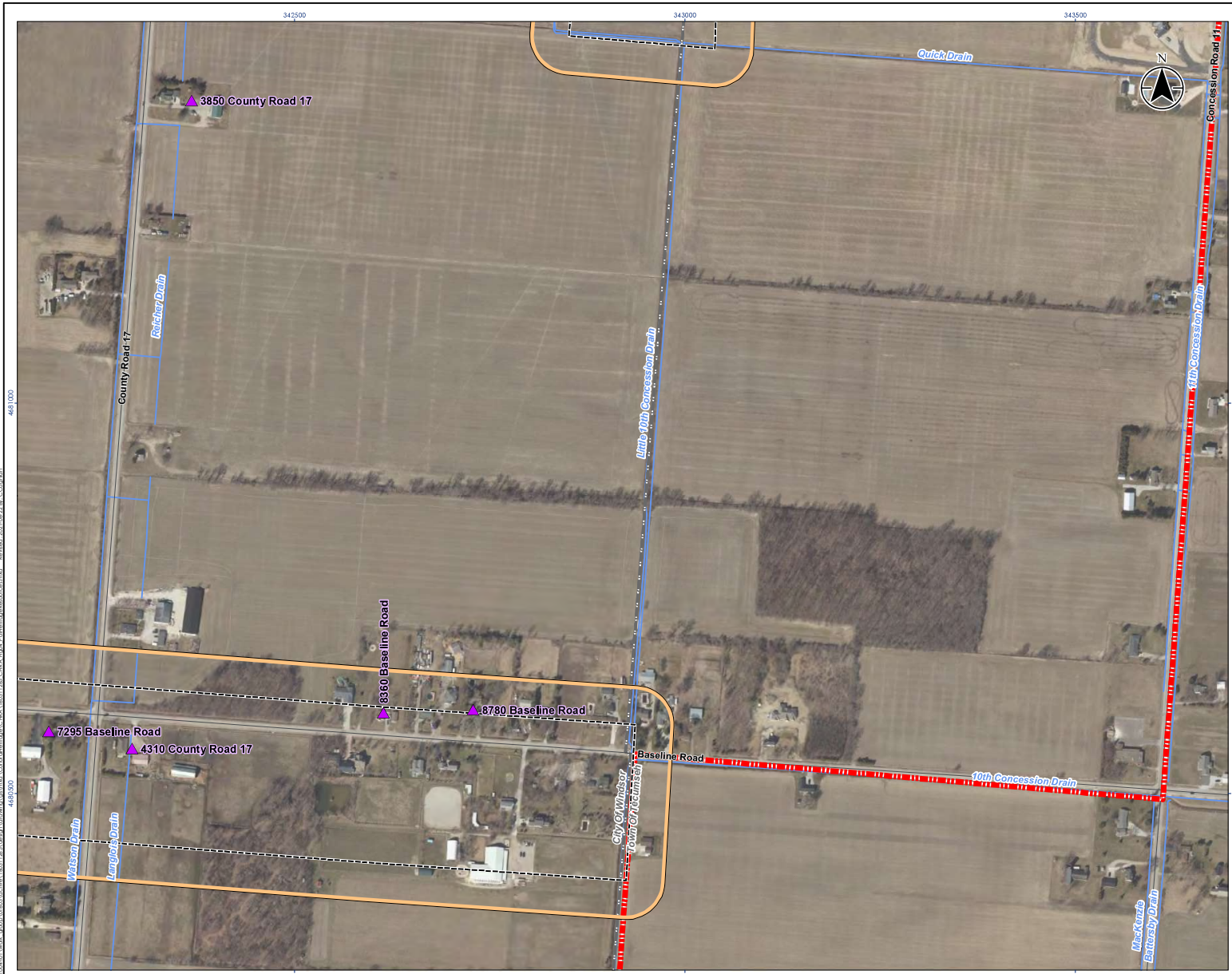
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 3. Orthoimagery © First Base Solutions, 2018. Imagery flown in 2017.



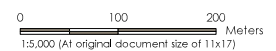
Project Location: Windsor, Ontario
 Prepared by CMC on 2021-06-22
 Technical Review by ABC on xxxx-xx-xx

Client/Project:
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

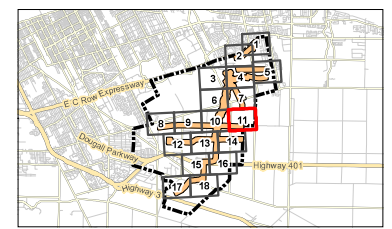
Figure No.:
4j
 Title:
Potential and Previously Identified Cultural Heritage Resources - Tile 10



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Potential Heritage Resource
- Road
- Watercourse
- Municipal Boundary - Lower Tier



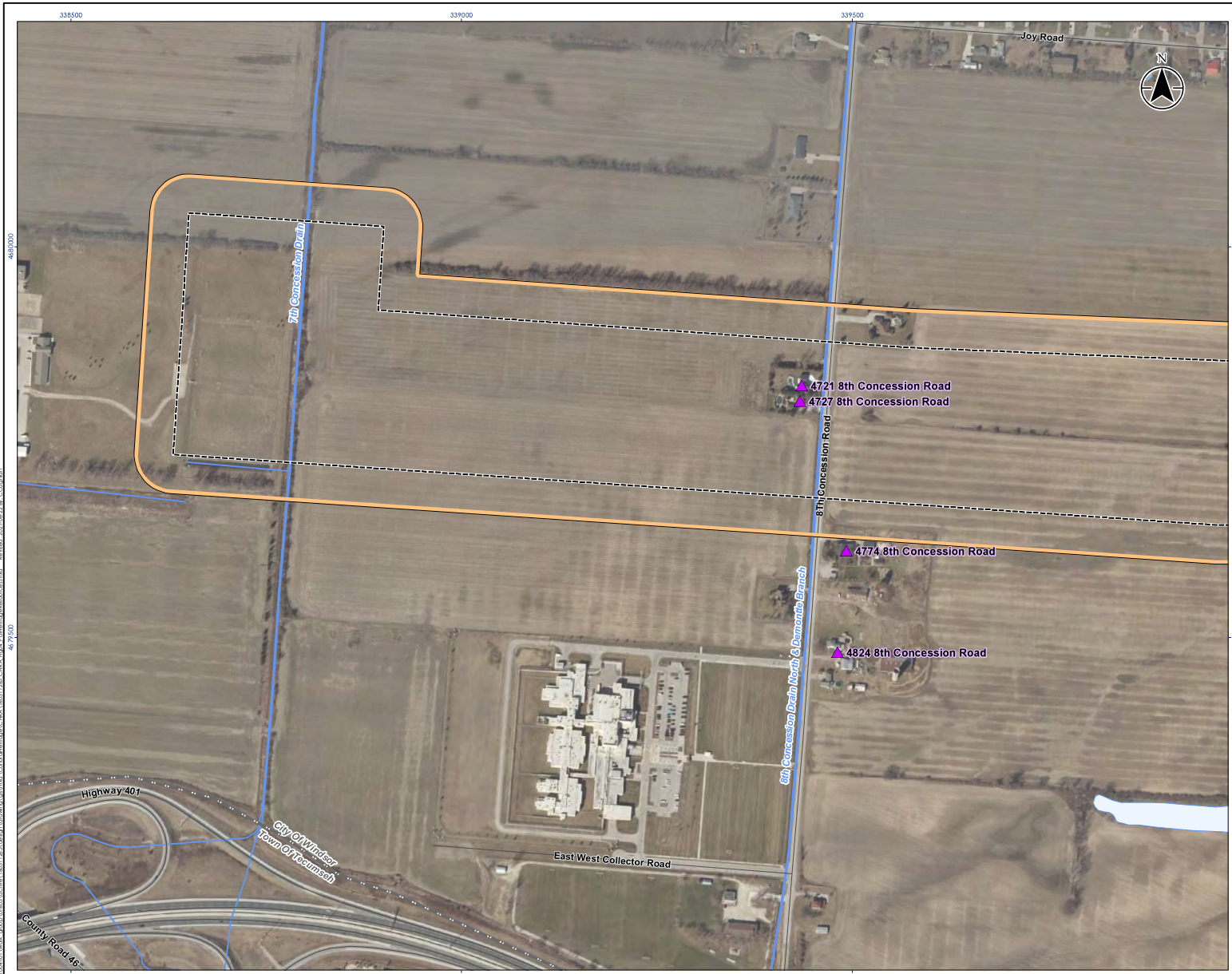
- Notes**
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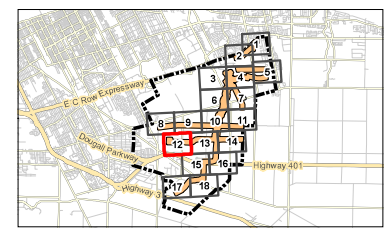
Figure No. **4k**
 Title
Potential and Previously Identified Cultural Heritage Resources - Tile 11



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Potential Heritage Resource
- Road
- Watercourse
- Waterbody
- Municipal Boundary - Lower Tier



- Notes**
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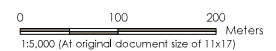
Client/Project:
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Figure No. **41**
 Title
Potential and Previously Identified Cultural Heritage Resources - Tile 12

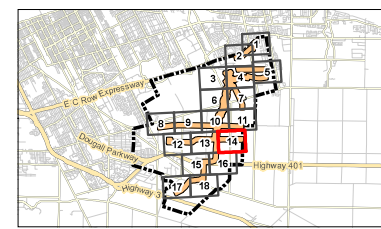


Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Protected and Previously Identified Heritage Resources
- Potential Heritage Resource
- Road
- Watercourse
- Municipal Boundary - Lower Tier



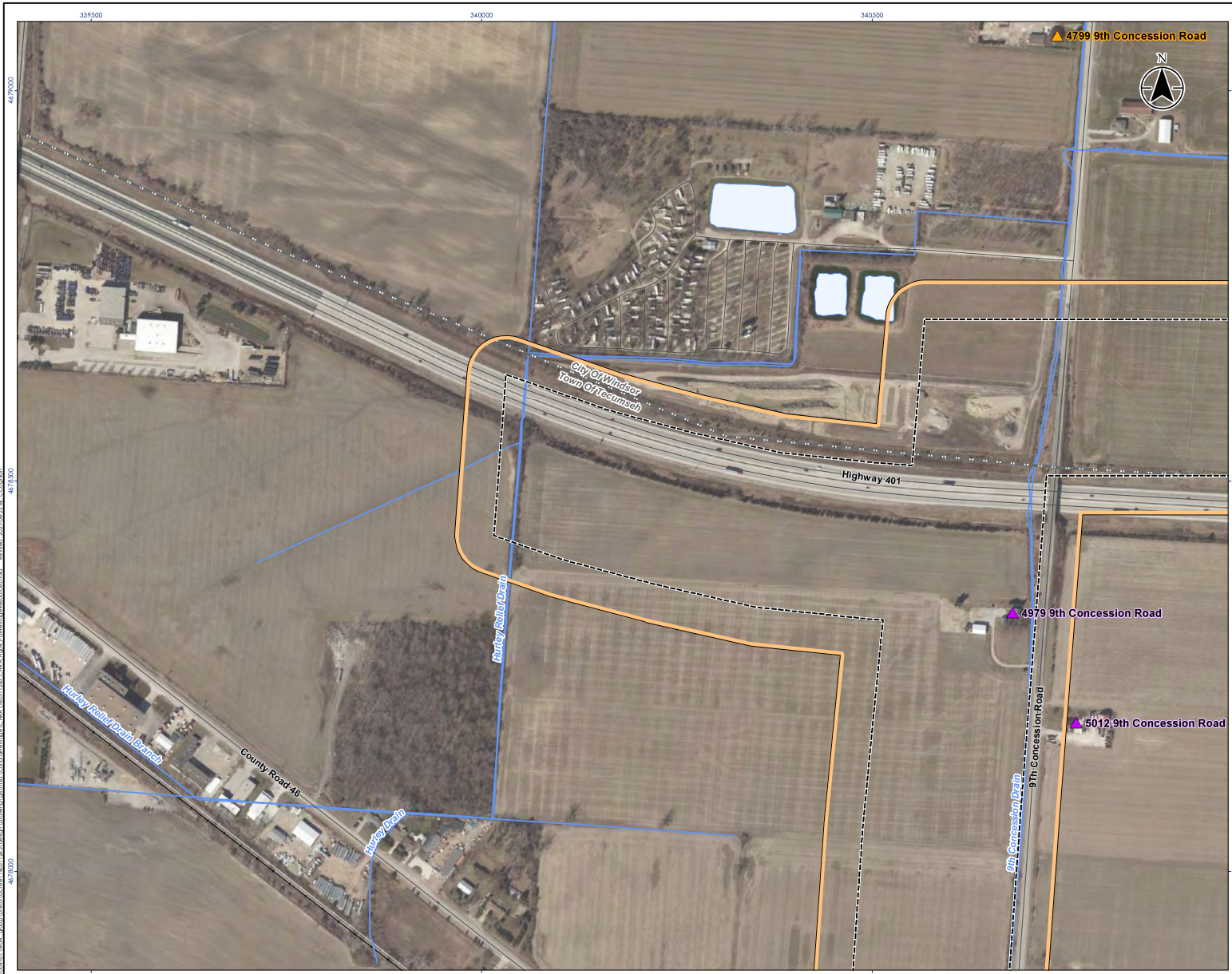
- Notes**
1. Coordinate System: NAD 1983 UTM Zone 17N
 2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2014.
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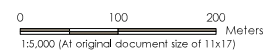
Project Location: Windsor, Ontario
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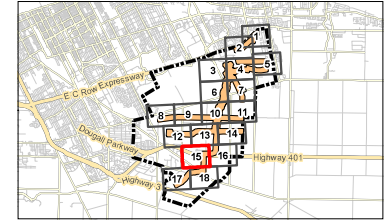
Figure No.
4n
 Title
Potential and Previously Identified Cultural Heritage Resources - Tile 14



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Protected and Previously Identified Heritage Resources
- Potential Heritage Resource
- Railway - Operational
- Railway - Discontinued
- Road
- Watercourse
- Waterbody
- Municipal Boundary - Lower Tier



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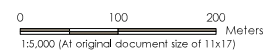
Project Location: Windsor, Ontario
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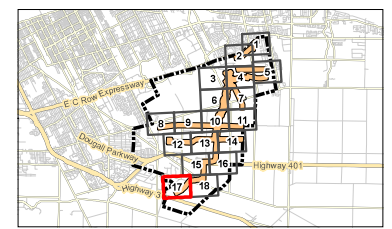
Figure No.: **4o**
 Title:
Potential and Previously Identified Cultural Heritage Resources - Tile 15



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Potential Heritage Resource
- Road
- Watercourse
- Municipal Boundary - Lower Tier



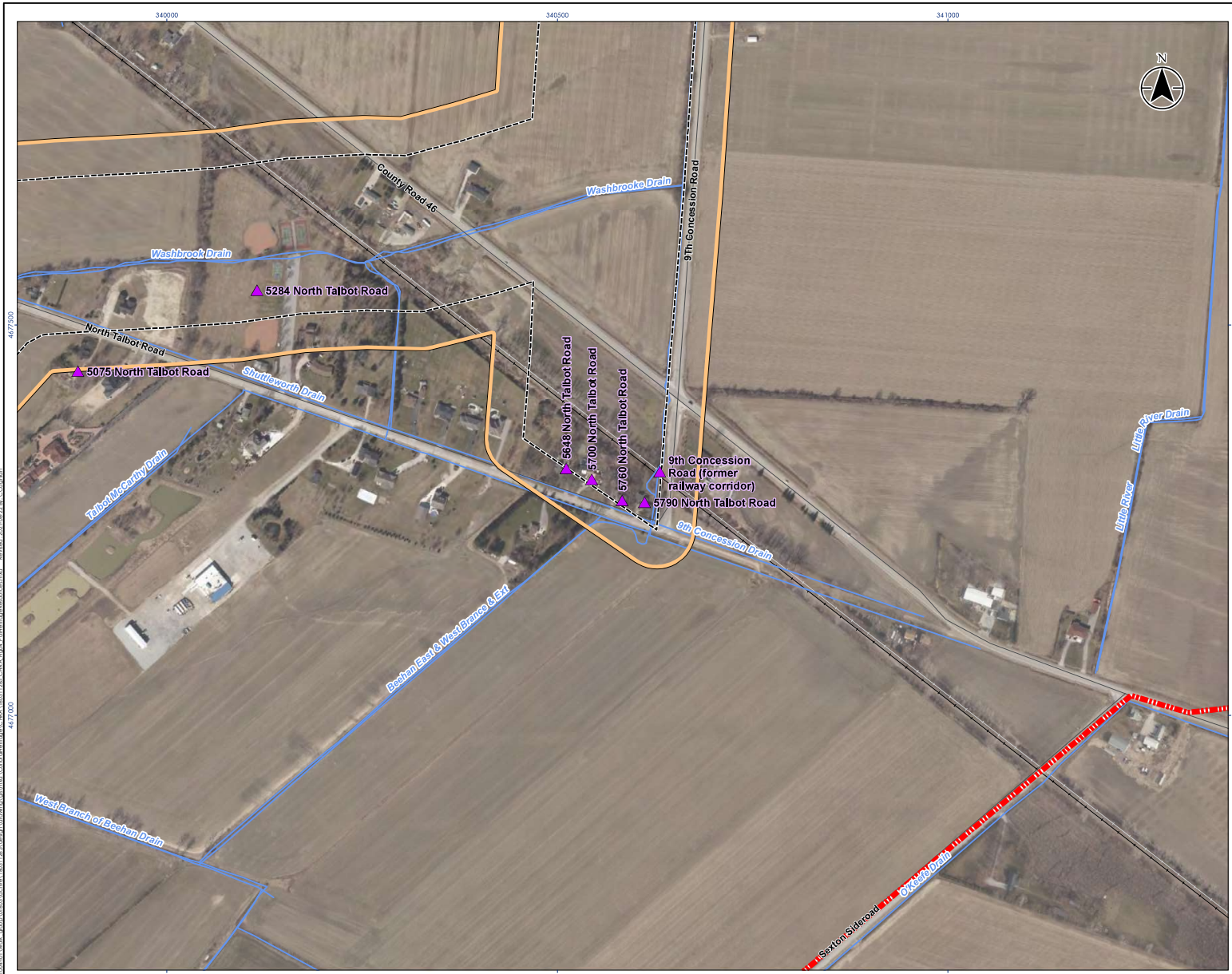
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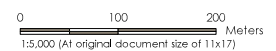
Project Location: Windsor, Ontario
 Prepared by CMC on 2021-06-22
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Client/Project:
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CULTURAL HERITAGE RESOURCES ASSESSMENT

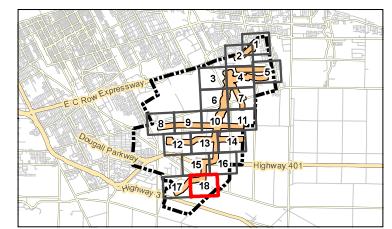
Figure No.
4q
 Title
Potential and Previously Identified Cultural Heritage Resources - Tile 17



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Potential Heritage Resource
- Railway - Operational
- Railway - Discontinued
- Road
- Watercourse
- Municipal Boundary - Lower Tier



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 17N
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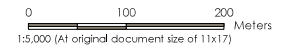
Project Location: Windsor, Ontario
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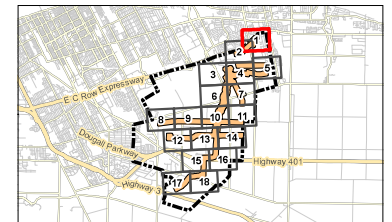
Figure No. **4r**
 Title **Potential and Previously Identified Cultural Heritage Resources - Tile 18**



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road
- Watercourse
- Waterbody
- Municipal Boundary - Lower Tier



- Notes**
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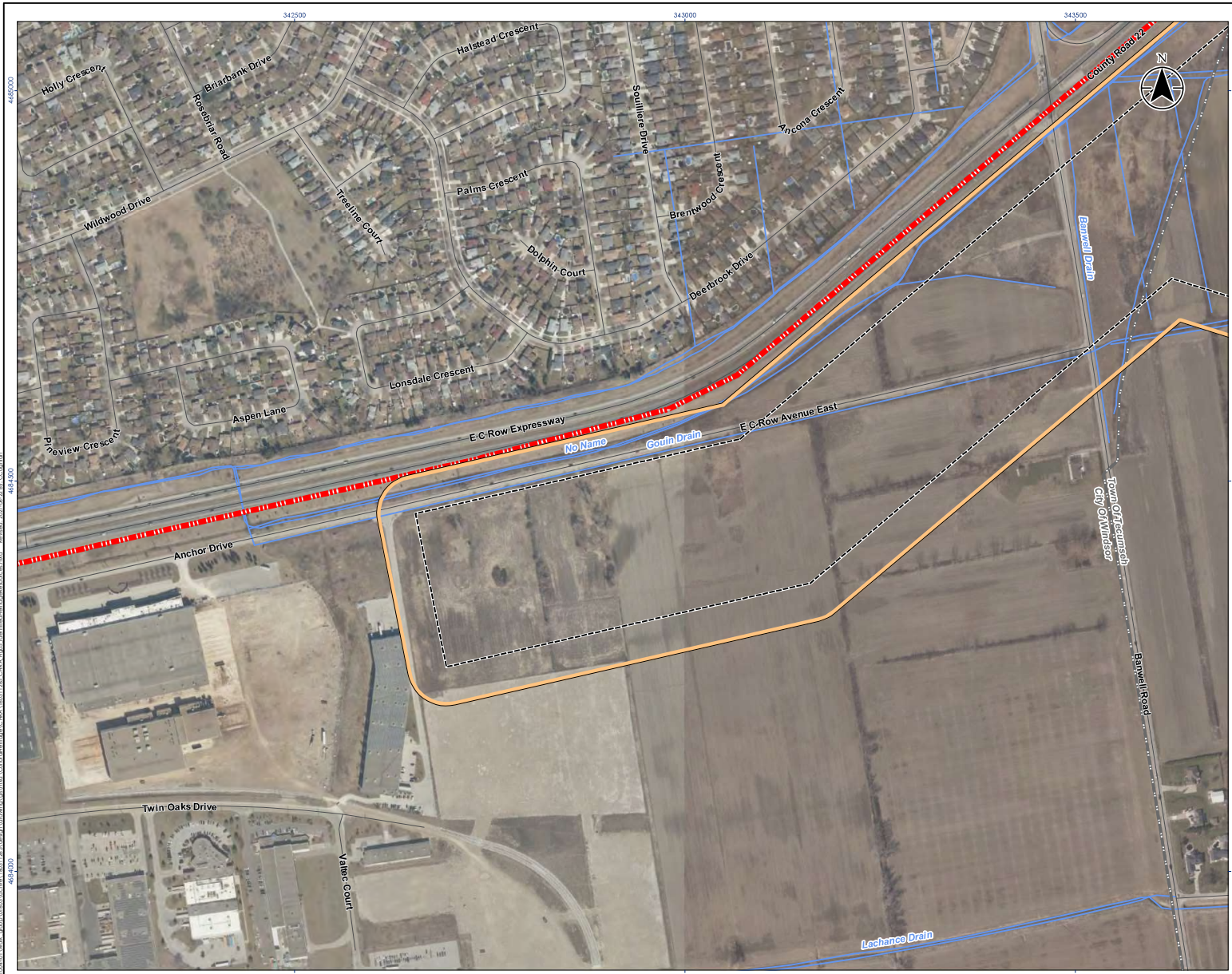
Project Location: Windsor, Ontario
 Prepared by CMC on 2021-06-22
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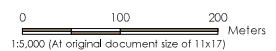
Figure No.

5a

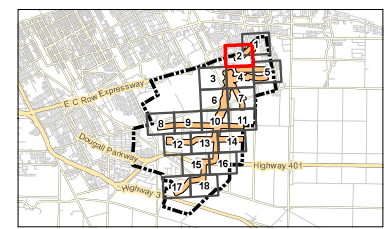
Title
**Identified Cultural Heritage Resources -
 Tile 1**



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road
- Watercourse
- Municipal Boundary - Lower Tier



- Notes**
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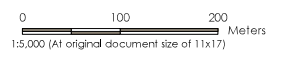
Project Location: Windsor, Ontario
 Prepared by CMC on 2021-06-22
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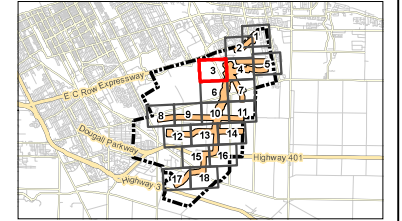
Figure No. **5b**
 Title **Identified Cultural Heritage Resources - Tile 2**



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Railway - Operational
- Road
- Watercourse
- Waterbody
- Municipal Boundary - Lower Tier



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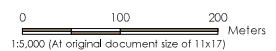
Project Location: Windsor, Ontario
 Prepared by CMC on 2021-06-22
 Technical Review by ABC on xxxx-xx-xx

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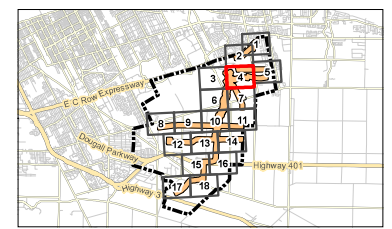
Figure No. **5c**
 Title **Identified Cultural Heritage Resources - Tile 3**



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Identified Cultural Heritage Resource
- Railway - Operational
- Road
- Watercourse
- Municipal Boundary - Lower Tier



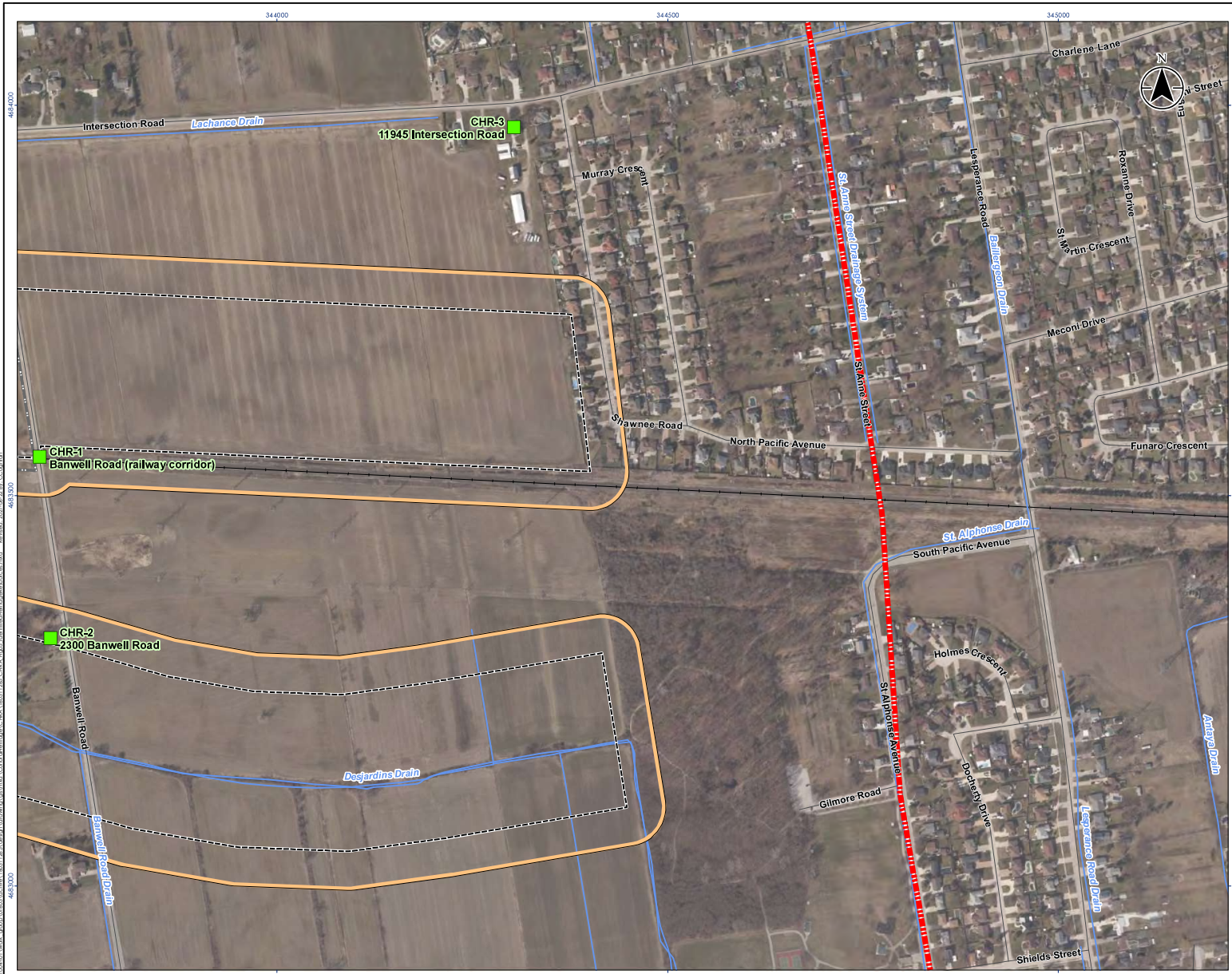
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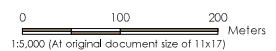
Project Location: Windsor, Ontario
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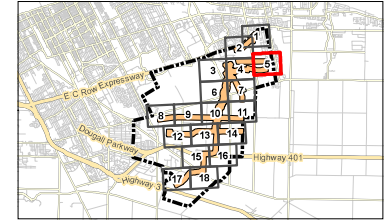
Figure No.
5d
 Title
Identified Cultural Heritage Resources - Tile 4



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Identified Cultural Heritage Resource
- Railway - Operational
- Road
- Watercourse
- Municipal Boundary - Lower Tier



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 17N
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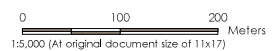
Project Location: Windsor, Ontario
 Prepared by CMC on 2021-06-22
 Technical Review by ABC on xxxx-xx-xx

Client/Project: CITY OF WINDSOR
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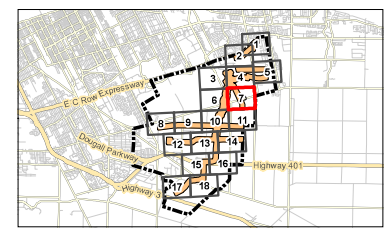
Figure No.: **5e**
 Title: **Identified Cultural Heritage Resources - Tile 5**



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Identified Cultural Heritage Resource
- Road
- Watercourse
- Municipal Boundary - Lower Tier



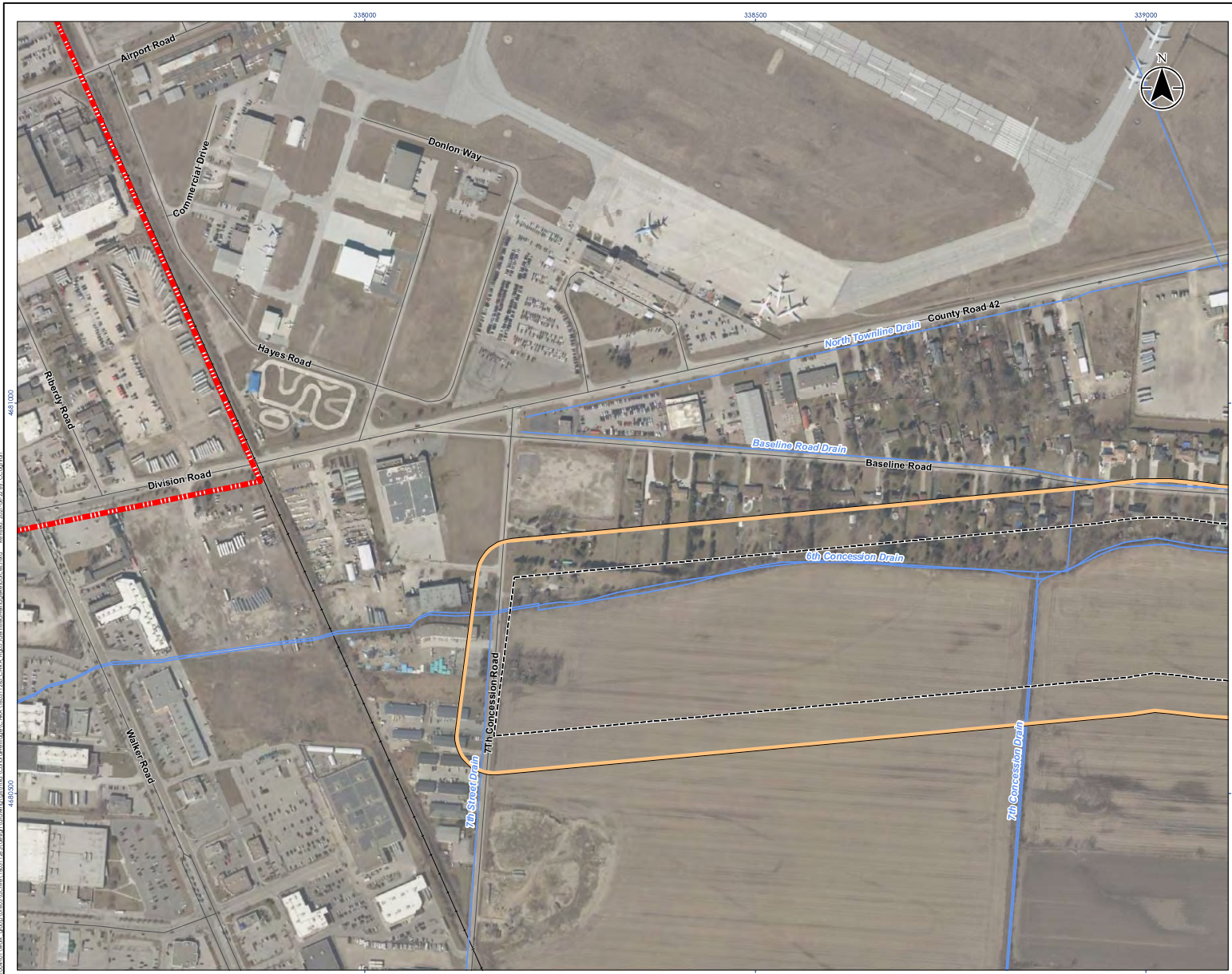
- Notes**
1. Coordinate System: NAD 1983 UTM Zone 17N
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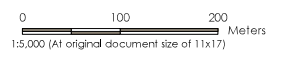
Project Location: Windsor, Ontario
 Prepared by CMC on 2021-06-22
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Client/Project:
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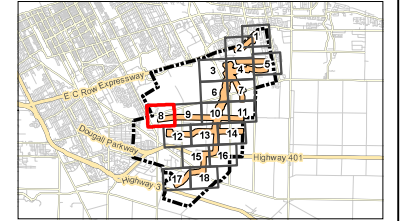
Figure No. **5g**
 Title **Identified Cultural Heritage Resources - Tile 7**



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road - Operational
- Road
- Watercourse
- Municipal Boundary - Lower Tier



- Notes**
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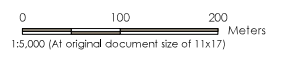
Project Location: Windsor, Ontario
 Prepared by CMC on 2021-06-22
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Client/Project:
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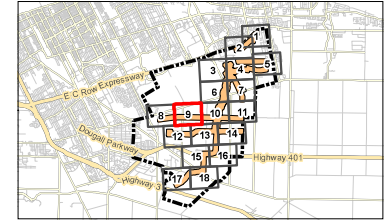
Figure No. **5h**
 Title
Identified Cultural Heritage Resources - Tile 8



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Identified Cultural Heritage Resource
- Road
- Watercourse
- Municipal Boundary - Lower Tier



- Notes**
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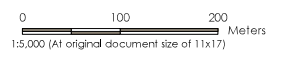
Project Location: Windsor, Ontario
 Prepared by CMC on 2021-06-22
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Client/Project:
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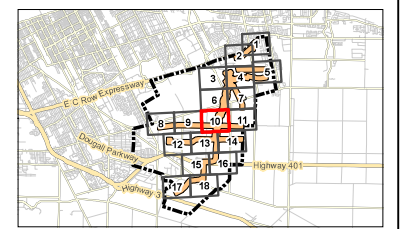
Figure No. **51**
 Title **Identified Cultural Heritage Resources - Tile 9**



-  Cultural Heritage Study Area
-  Upper Little River Study Area
-  SWM Corridor Boundary
-  Road
-  Watercourse
-  Municipal Boundary - Lower Tier



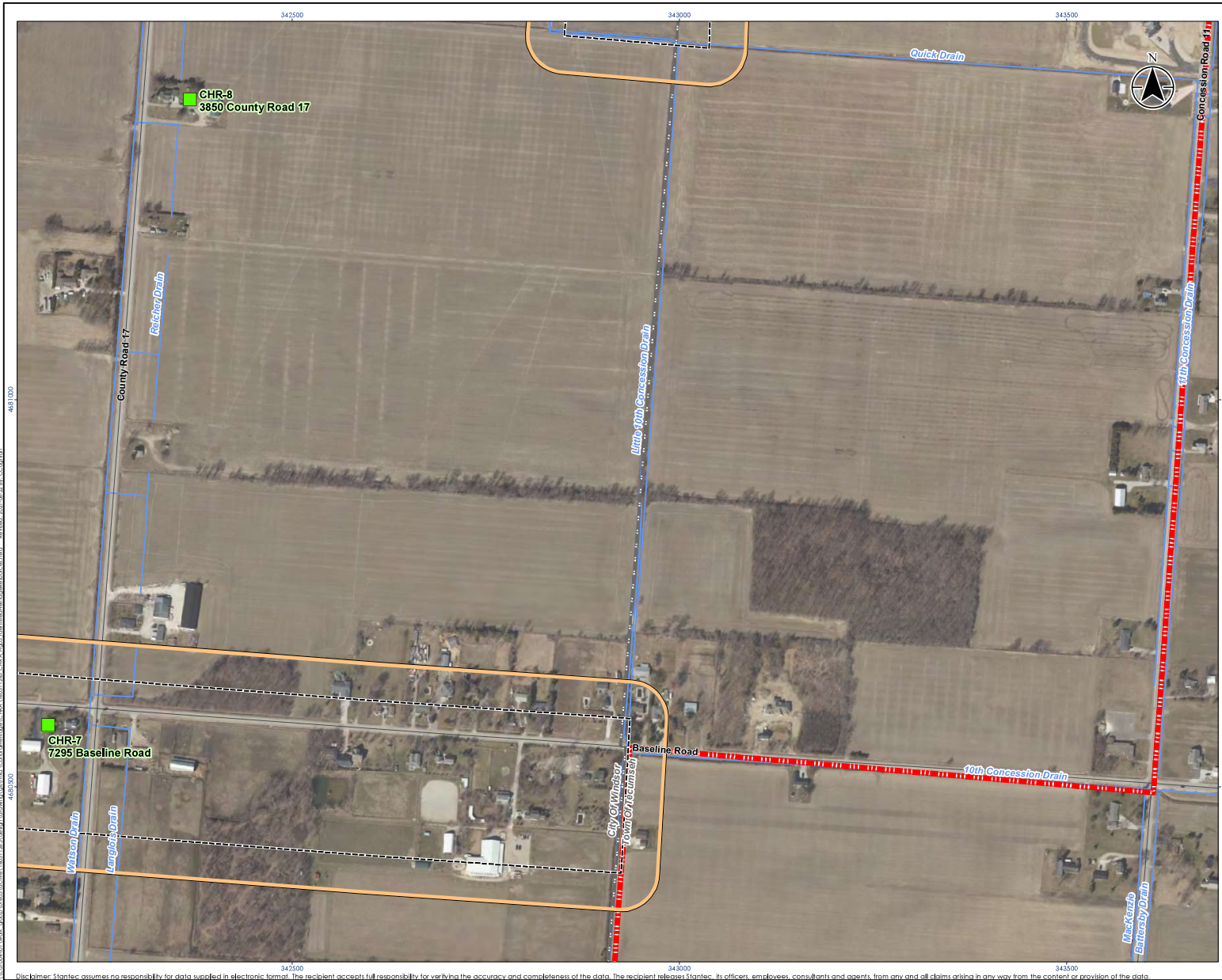
- Notes**
1. Coordinate System: NAD 1983 UTM Zone 17N
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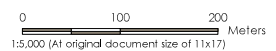
Project Location: Windsor, Ontario
 Prepared by CMC on 2021-06-22
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Client/Project:
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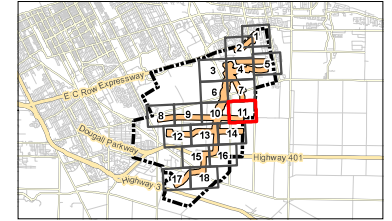
Figure No. **5j**
 Title
Identified Cultural Heritage Resources - Tile 10



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Identified Cultural Heritage Resource
- Road
- Watercourse
- Municipal Boundary - Lower Tier



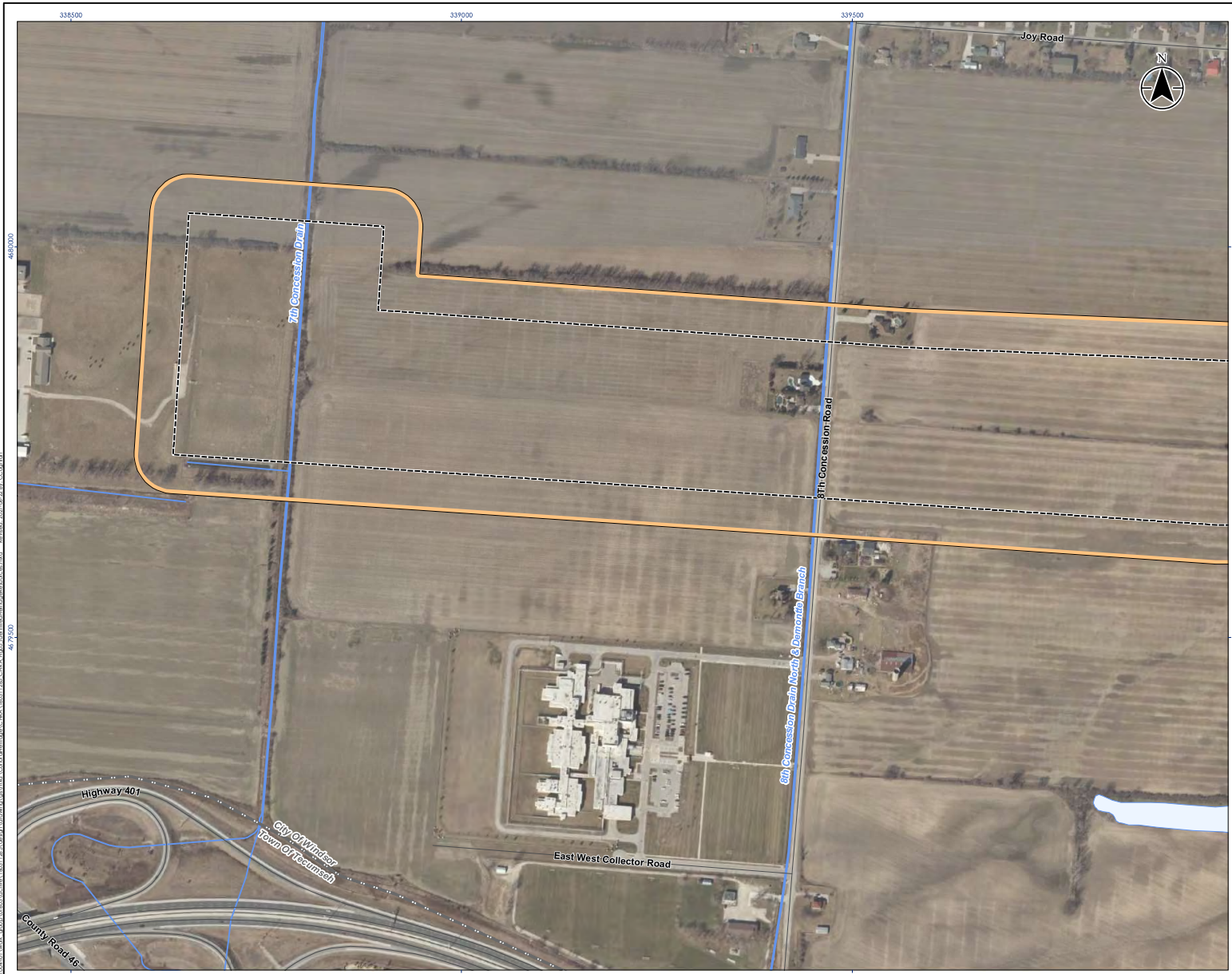
- Notes**
1. Coordinate System: NAD 1983 UTM Zone 17N
 2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2014.
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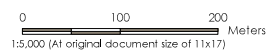
Project Location: Windsor, Ontario
 Prepared by CMC on 2021-06-22
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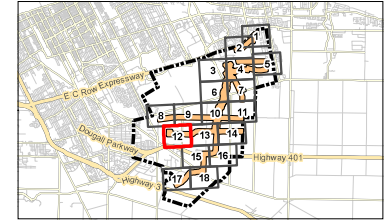
Figure No. **5k**
 Title **Identified Cultural Heritage Resources - Tile 11**



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road
- Watercourse
- Waterbody
- Municipal Boundary - Lower Tier



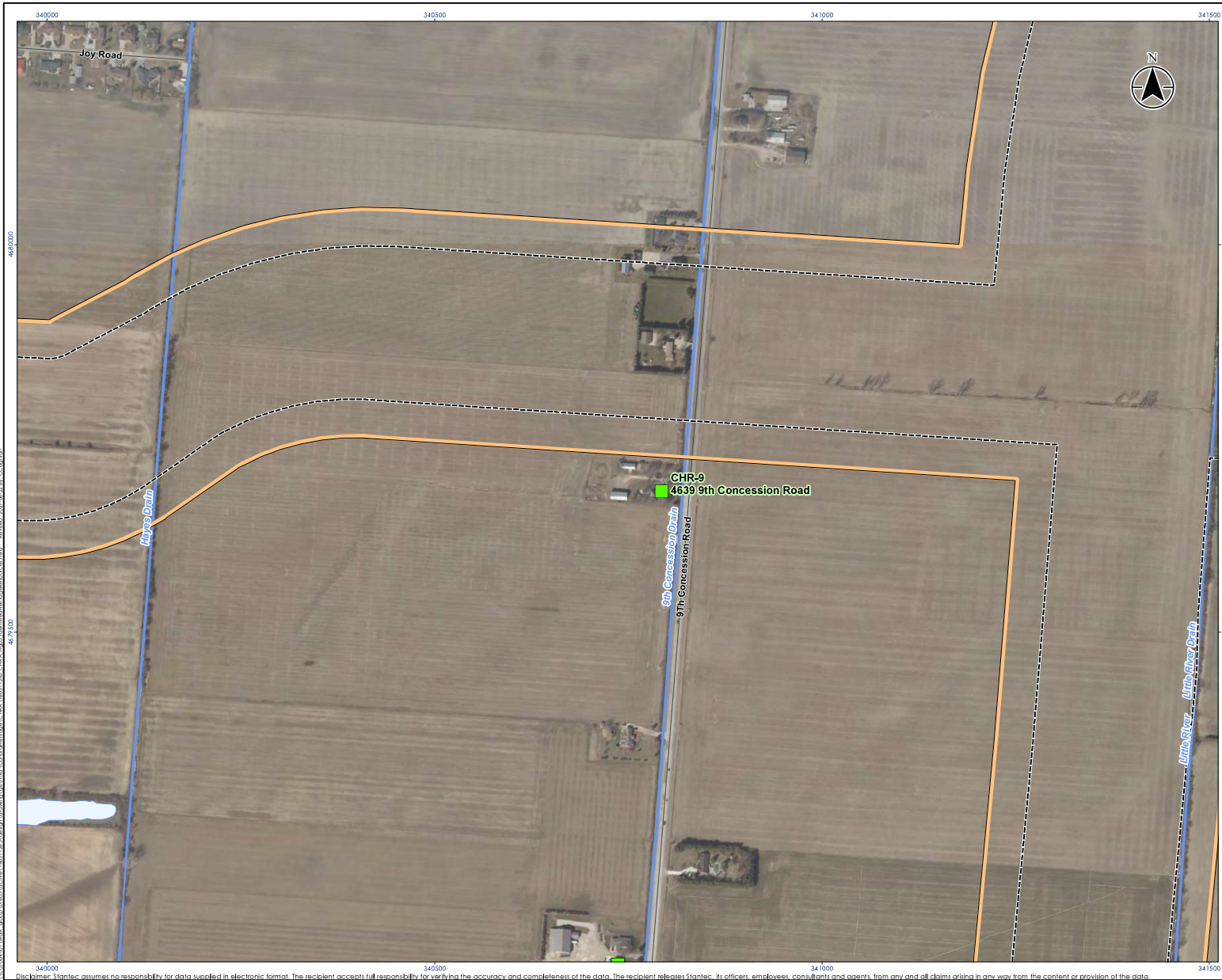
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1. Coordinate System: NAD 1983 UTM Zone 17N
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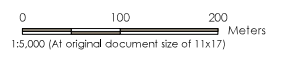
Project Location: Windsor, Ontario
 Prepared by: CMC on 2021-06-22
 Technical Review by: ABC on xxxx-xx-xx

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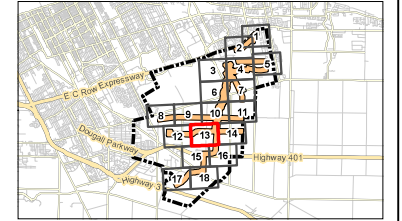
Figure No. **51**
 Title
Identified Cultural Heritage Resources - Tile 12



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Identified Cultural Heritage Resource
- Road
- Watercourse
- Waterbody
- Municipal Boundary - Lower Tier



- Notes**
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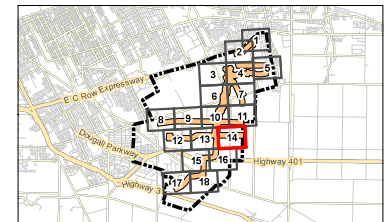
Figure No.:
5m
 Title:
Identified Cultural Heritage Resources - Tile 13



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Identified Cultural Heritage Resource
- Road
- Watercourse
- Municipal Boundary - Lower Tier

0 100 200 Meters
1:5,000 (At original document size of 11x17)

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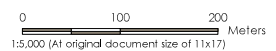
Project Location: Windsor, Ontario
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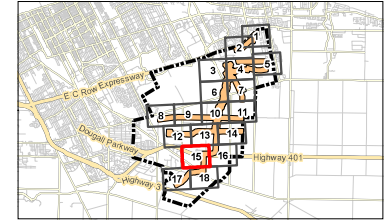
Figure No. **5n**
 Title **Identified Cultural Heritage Resources - Tile 14**



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Identified Cultural Heritage Resource
- Railway - Operational
- Railway - Discontinued
- Road
- Watercourse
- Waterbody
- Municipal Boundary - Lower Tier



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 17N
 2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2014.
 3. Orthomagery © First Base Solutions, 2018. Imagery flown in 2017.



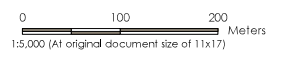
Project Location: Windsor, Ontario
 Prepared by CMC on 2021-06-22
 Technical Review by ABC on xxxx-xx-xx

Client/Project:
 CITY OF WINDSOR
 UPPER LITTLE RIVER
 CULTURAL HERITAGE RESOURCES ASSESSMENT

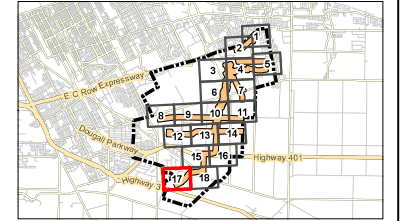
Figure No. **50**
 Title **Identified Cultural Heritage Resources - Tile 15**



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road
- Watercourse
- Municipal Boundary - Lower Tier



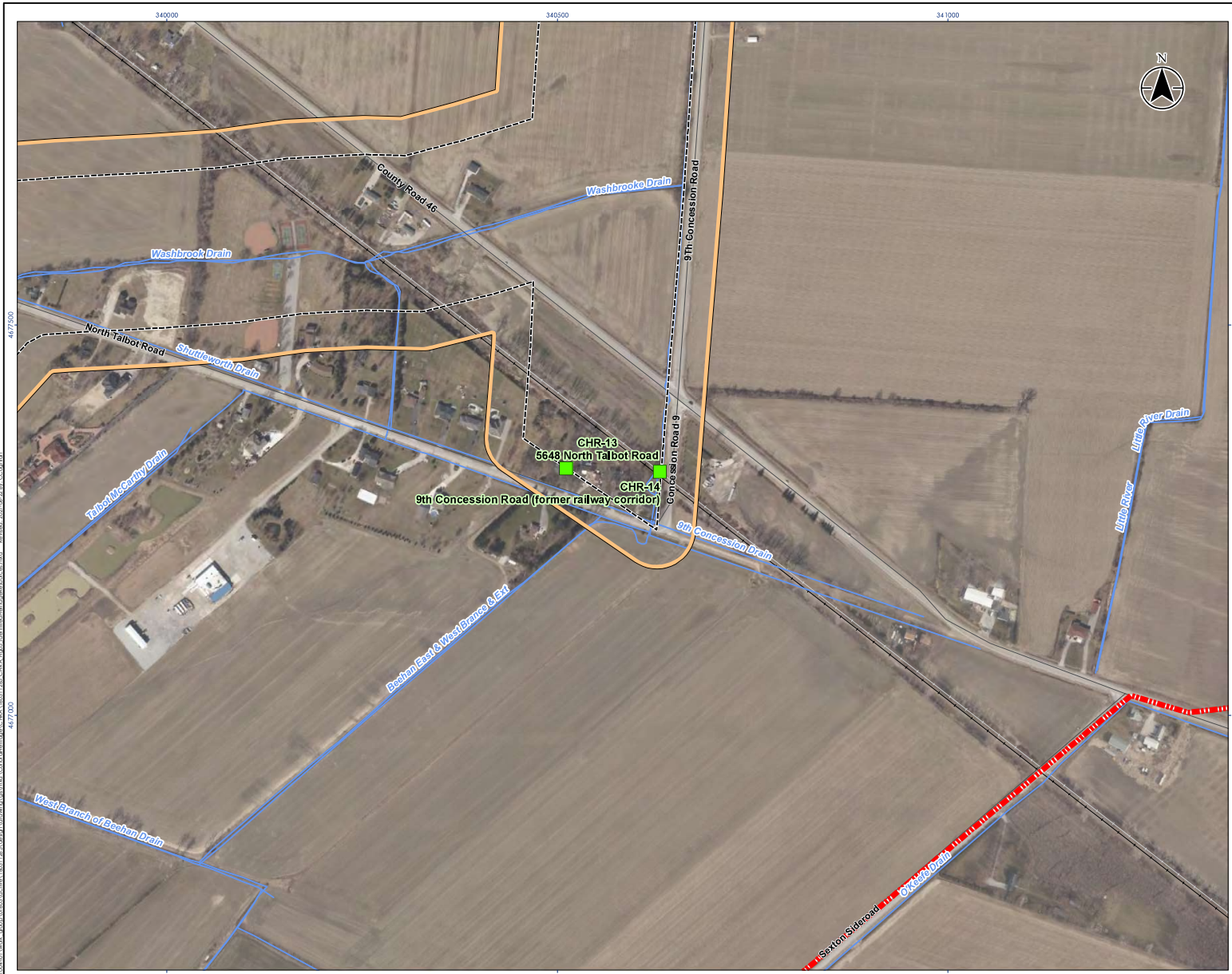
- Notes**
1. Coordinate System: NAD 1983 UTM Zone 17N
 2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2014.
 3. Orthoimagery © First Base Solutions, 2018. Imagery flown in 2017.



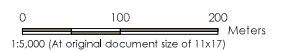
Project Location: Windsor, Ontario
 Prepared by CMC on 2021-06-22
 Technical Review by ABC on xxxx-xx-xx

Client/Project:
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

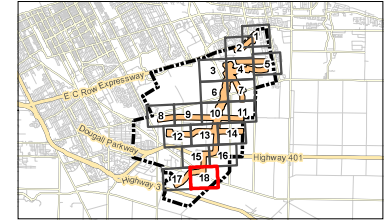
Figure No. **5q**
 Title **Identified Cultural Heritage Resources - Tile 17**



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Identified Cultural Heritage Resource
- Railway - Operational
- Railway - Discontinued
- Road
- Watercourse
- Municipal Boundary - Lower Tier



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 17N
 2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2014.
 3. Orthomagnery © First Base Solutions, 2018. Imagery flown in 2017.



Project Location: Windsor, Ontario
 Prepared by CMC on 2021-06-22
 Technical Review by ABC on xxxx-xx-xx

Client/Project:
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.: **5r**
 Title: **Identified Cultural Heritage Resources - Tile 18**

CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

Proposed Undertaking
June 24, 2021

5.0 PROPOSED UNDERTAKING

5.1 DESCRIPTION OF UNDERTAKING

The Upper Little River Watershed EA has been prepared to determine a preferred approach to providing SWM control measures for the developing lands upstream of the E.C. Row Expressway and contributing to Upper Little River. A Master Plan Approach 2 approach was completed for this EA study. This approach identified the problem (Phase 1), developed six alternative solutions (Phase 2), developed a design concept for a portion of the Study Area (Phase 3), and documented the process in the Environmental Study Report (Phase 4) (Stantec 2021). No Phase 5, Implementation, was completed as part of this Master Plan Approach 2.

The Environmental Study Report selected Alternative 6 as the preliminary preferred alternative as it provides all stormwater management controls before out-letting to the downstream watercourses. Each facility would be required to provide water quality, water quantity, and erosion controls on a standalone basis. In this alternative the SWM facilities are grouped into stormwater management corridors to promote natural linkages, recreational trails, and greenways. The SWM facilities can provide controls for more than one property and will be located adjacent to other facilities and a watercourse. It is anticipated that facilities would be designed and constructed as development proceeds. The Study Area for the SWM will be developed by multiple landowners and the preferred alternative supports the ability of individual landowners to proceed independently while minimizing the total number of SWM facilities.

The stormwater areas are proposed to be congregated into stormwater management corridors which can be combined with trail systems and amenity areas for the surrounding developments. The stormwater management corridor will be located beside watercourses which will accept drainage from the end-of-pipe facilities. Heavy vegetation adjacent to all water bodies and minimal open water will also be implemented in order to make water features less attractive to bird species, a specific request from the Windsor Airport. As part of this work, several of the existing municipal drains are proposed to be abandoned and several new channels will be created that align with the proposed development plan for the area. In addition, the work will include re-grading the stream channel banks to create benches or terraces, which will help dissipate energy and re-connect the bankfull channel to a floodplain area (Stantec 2021).



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

Evaluation of Anticipated Impacts and Mitigation Options
June 24, 2021

6.0 EVALUATION OF ANTICIPATED IMPACTS AND MITIGATION OPTIONS

The Upper Little River EA includes conceptual designs of the preferred alternative only for a section of the Study Area (Appendix B). Accordingly, an impact assessment cannot be completed since the relationship of Project Activities to identified CHRs is not known. Thus, general mitigation options have been prepared for future cultural heritage guidance in the Study Area including more detailed EAs and planning processes. The mitigation options were developed in accordance with the MHSTCI *InfoSheet #5: Heritage Impact Assessments and Conservation Plans from the Heritage Resources in the Land Use Planning Process Cultural Heritage and Archaeology Policies of the Ontario Provincial Policy Statement, 2005* (Government of Ontario 2006b). It is recommended that buffer zones, site plan controls, and other planning mechanisms be used as mitigation measures.

In general, for the Project, the following will need to be taken into account for each CHR to eliminate any potential impacts:

- The full design of Alternative 6 should be suitably planned in a manner that avoids any identified CHRs.
- All staging and construction activities should be planned and undertaken to avoid impacts to an identified CHR.
- Site plan controls should be put in place prior to construction to prevent potential Project impacts. Site plan controls include mapping CHRs on construction mapping and physically demarcating these properties to communicate the presence of these properties to construction crews. Physical protective measures should include at minimum the installation of temporary fencing around CHRs.
- If Project work is to occur within 50 metres of identified CHRs, it is recommended that a qualified building condition specialist or geotechnical engineer with previous experience working with heritage structures be consulted to identify appropriate vibration mitigation measures in advance of construction. Mitigation measures for vibration may include developing an appropriate vibration setback distance, a vibration attenuation study, and/or a construction monitoring program.
- Post-construction landscaping and rehabilitation plans should be undertaken in a manner that is sympathetic to the overall setting.



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

Recommendations
June 24, 2021

7.0 RECOMMENDATIONS

7.1 AVOIDANCE OF CULTURAL HERITAGE RESOURCES

The full design of Alternative 6 should be suitably planned in a manner that avoids any identified CHRs. Project components should be planned and undertaken in a manner to avoid the built heritage and cultural heritage landscape attributes of the identified CHRs.

7.2 SITE PLAN CONTROLS

It is recommended that site plan controls be put in place prior to construction activities to prevent potential impacts as a result of the Project. These controls should be indicated on all construction mapping and communicated to the construction team leads.

Site plan controls should include mapping CHRs within 50 metres of Project activities on construction maps and physically demarcating these properties to communicate the presence of these properties to construction crews. Physical protective measures should include at a minimum the installation of temporary fencing around CHRs. Depending on the proximity or Project activities, additional measures may be required such as stabilization of built heritage attributes in close proximity to construction work.

7.3 CONDITION SURVEYS AND VIBRATION MONITORING

If Project work is to occur within 50 metres of CHRs, it is recommended that a qualified building conditions specialist or geotechnical engineer with previous experience working with heritage structures be consulted to identify appropriate vibration mitigation measures in advance of construction. Mitigation measures for vibration may include developing an appropriate vibration setback distance, a vibration attenuation study, and/or a construction monitoring program.

7.4 DEPOSIT COPIES

To assist in the retention of historic information, copies of this report should be deposited with local repositories of historic material as well as with municipal and regional planning staff. Therefore, it is recommended that this report be deposited at the following locations:

City of Windsor Library

850 Ouellette Avenue
Windsor, ON
N9A 4M9

Essex County Library, Tecumseh Branch

13675 St. Gregory's Road
Windsor, ON
N8N 3E4

City of Windsor Heritage Committee

Suite 404, 400 City Hall Square East
Windsor, ON
N9A 7K6

Town of Tecumseh Municipal Heritage Committee

917 Lesperance Road
Tecumseh, ON
N8N 1W9



CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

Closure
June 24, 2021


8.0 CLOSURE

This report has been prepared for the sole benefit of Essex Region Conservation Authority, City of Windsor and Town of Tecumseh and may not be used by any third party without the express written consent of Stantec Consulting Ltd. Any use which a third party makes of this report is the responsibility of such third party.

We trust this report meets your current requirements. Please do not hesitate to contact us should you require further information or have additional questions about any facet of this report.

Yours truly,

STANTEC CONSULTING LTD.

 Digitally signed
by Walter, Laura
Date: 2021.06.25
09:36:15 -04'00'

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CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

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CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

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CULTURAL HERITAGE RESOURCE ASSESSMENT, UPPER LITTLE RIVER WATERSHED ENVIRONMENTAL ASSESSMENT

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APPENDIX A

Inventory of Heritage Resources

Municipal Address: 1667 Shawnee Road

Former Township: Township of Sandwich

Municipality: Town of Tecumseh

Resource Type: Residence

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached garage. The one storey structure has a low-pitched hip roof with asphalt shingles and a brick chimney. The residence is clad in vinyl siding and has 1/1 windows and a flat fixed wood window. The front entrance has a partial wood porch. The structure has a concrete foundation.



The residence sits on a large lot and has a mature maple tree on its front yard.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 3780 Lauzon Road
Former Township: Township of Sandwich
Municipality: City of Windsor
Resource Type: Farmstead
Associated Dates: 1962-1975



Relationship to Project: Within the Study Area

Description: The property contains a residence and several outbuildings. The residence is a one storey structure with a high-pitched side gable roof with asphalt shingles. The structure has a brick exterior with modern windows. The entrance has a partial brick and concrete porch. The residence has a concrete foundation.

Situated to the rear of the residence is farm associated outbuildings and four silos. The majority of the outbuildings are gable roof structures.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 5, 2018.



Municipal Address: 3805 Lauzon Road
Former Township or County: Township of Sandwich
Municipality: City of Windsor
Resource Type: Residence
Associated Dates: 1932-1940
Relationship to Project: Within the Study Area



Description: The property contains a laneway and a residence. The one storey structure has a high-pitched hip roof with asphalt shingles, and a central chimney. The exterior is clad in vinyl siding and has modern windows. The structure has a salt box side, and an undetermined foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: Banwell Road
Former Township: Township of Sandwich
Municipality: City of Windsor/Town of Tecumseh
Resource Type: Railway Line
Associated Dates: 1853
Relationship to Project: Within the Study Area



Description: The property contains the former Great Western Railway Line, now part of the Canadian National (CN) Railway.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,	✓	
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,	✓	
ii. Is physically, functionally, visually or historically linked to its surroundings, or	✓	
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: This railway corridor is associated with the Great Western Railway Line that was constructed through the Township of Sandwich in 1853. The railway line operated between Windsor and Niagara Falls. The line was taken over by the Grand Trunk Railway in 1882, and the CN Railway in 1923. The railway line had a large influence on industrial development in Windsor and Tecumseh, and thus is physically and historically linked to its surroundings.

Identified Heritage Attributes: Railway line: Layout of the railway line.

Identification of CHVI: Yes	Cultural Heritage Resource Number: CHR-1
Completed by (name): Laura Walter	Date Completed: September 14, 2017.



Municipal Address: 2300 Banwell Road
Former Township: Township of Sandwich
Municipality: Town of Tecumseh

Resource Type: Cemetery

Associated Dates: circa 1850

Relationship to Project: Within the Study Area

Description: The property contains the Banwell Road Black Cemetery. The cemetery has six grave markers that date to the early 20th century. The cemetery contains the graves of early black settlers to the Township of Sandwich, including those associated with the Underground Railroad. The property has a provincial plaque that marks the significance of The Banwell Road Area Black Settlement.



The property is designated under Part IV of the *Ontario Heritage Act* by the Town of Tecumseh.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,	✓	
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or	✓	
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,	✓	
ii. Is physically, functionally, visually or historically linked to its surroundings, or	✓	
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: This cemetery dates to the mid-19th century and is associated with the early black settlers in the Township of Sandwich. Beginning in the 1830s, at least 30 families fleeing enslavement and racial oppression in the United States settled in the Banwell Road area in the Township of Sandwich.

Identified Heritage Attributes: Cemetery: Grave markers, provincial plaque, and mature deciduous tree.

Identification of CHVI: Yes	Cultural Heritage Resource Number: CHR-2
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 11945 Intersection Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Farmstead

Associated Dates: 1882-1912

Relationship to Project: Within the Study Area

Description: The property contains a residence, a barn, and three outbuildings.

The residence is a two storey structure with a high-pitched hip roof with asphalt shingles and a brick chimney. The front (north) elevation has a central hip dormer. The structure has a symmetrical red brick exterior. The front elevation has a covered full width porch that is clad in stone and has brick piers. The upper exterior has 3/1 wood windows. The residence has a stone foundation.

At the rear of the residence is a timber frame barn with a side gable roof that is clad in metal. The property has a tree-lined laneway, and mature maple and white pine trees.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

	Yes	No
1. The property has design value or physical value because it,		
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method	✓	
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or	✓	
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,	✓	
ii. Is physically, functionally, visually or historically linked to its surroundings, or	✓	
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: The construction of this two storey residence dates to between approximately 1882 and 1912, determined through historic and topographic mapping. It is a representative example of a vernacular Ontario farmhouse with Edwardian design influences. This residence has the potential to yield information that contributes to an understanding of Township of Sandwich. This property supports the late 19th to the early 20th century rural character of the area and is physically and historically linked to its surroundings.

Identified Heritage Attributes: Residence: Two storey structure, high-pitched hip roof, brick chimney, hip dormer, symmetrical exterior, red brick exterior, covered full width porch, 3/1 wood windows, and stone foundation. Barn: Timber frame structure and side gable roof. Landscape: Tree-lined laneway, mature maple and white pines.

Identification of CHVI: Yes	Cultural Heritage Resource Number: CHR-3
------------------------------------	---



Completed by (name): Laura Walter

Date Completed: May 7, 2018.

Filepath: L:\01609\active\1609 Archaeology Internal\160311265 - Upper Little River Stage 1\work_program\report\draft\Heritage\CHRA



Client/Project	May 2018
Upper Little River Watershed	160311265
Environmental Assessment	

Appendix	Page
A	7 of 75

Title
CULTURAL HERITAGE RESOURCE/LANDSCAPE RECORD FORM

Municipal Address: 3945 Lauzon Road
Former Township: Township of Sandwich
Municipality: City of Windsor
Resource Type: Residence
Associated Dates: 1940-1961



Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached modern garage.

The residence is a one storey structure with a low-pitched hip roof with asphalt shingles. The structure has an asymmetrical exterior with vinyl cladding. The residence has modern windows and doors, and a concrete foundation. The property has a mature maple tree.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 7816 County Road 42

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is a one storey structure with a low-pitched side gable roof with asphalt shingles. The asymmetrical exterior is clad in vinyl siding and brick. The residence has modern windows and doors, and an attached single-car garage. The structure has a concrete foundation.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

	Yes	No
1. The property has design value or physical value because it,		
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 7955 County Road 42

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1940-1961 (residence), 1975-2004 (temple)

Relationship to Project: Within the Study Area

Description: The property contains the Gurdwara Khalsa Parkash Windsor a modern temple, as well as a separate residence, and detached garage. The property is bordered with a large concrete and metal fence.



The temple is a large three-storey massing with a flat roof. The structure has six corner towers, and one central larger tower. Each tower is top with a dome that is painted white and top with a finial. The central dome has gold paint embellishments. The concrete structure has rectangular window openings. The north and west elevations have covered carports.

The residence is a one storey structure with a low-pitched side gable roof with asphalt shingles and a brick chimney. The exterior is clad in vinyl siding. The front entrance has a partial porch and a wood paneled door. The residence appears abandoned as it is boarded up.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,	✓	
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or	✓	
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.	✓	

Draft Statement of Cultural Heritage Value or Interest: This late 20th to early 21st century structure is associated with the Sikh community in Windsor and has the potential to yield information that contributes to an understanding of the community's development in the City. This property acts as a landmark along County Road 42, and in the local area.

Identified Heritage Attributes: Associative: Connection to the Sikh community in Windsor and the local area, potential to yield information about the Sikh community and their influence on Windsor. Contextual: Gurdwara Khalsa Parkash Windsor temple which acts as a landmark along County Road 42.

Identification of CHVI: Yes	Cultural Heritage Resource Number: CHR-4
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 8421 County Road 42

Former Township: Township of Sandwich

Municipality: Town of Tecumseh

Resource Type: Residence/Commercial

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence that is situated on a commercial property, "Frank Dupuis Landscaping & Trucking Ltd." The residence is possibly used as commercial offices. The property contains modern outbuildings associated with the commercial business.



The residence is a one and a half storey structure with a medium-pitched side gable roof that has asphalt shingles and a concrete block chimney. The front (north) elevation has a shed dormer. The structure is clad in brick and has modern windows. The front elevation has a partial brick and concrete porch with metal railing. The structure has a concrete block foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 8667 County Road 42

Former Township: Township of Sandwich

Municipality: Town of Tecumseh

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence, and mature spruce and maple trees.

The residence is a one storey structure with a low-pitched side gable roof with asphalt shingles. The exterior is clad in brick and has modern windows and doors. The front (north) entrance has a partial concrete porch clad in brick. The structure has a concrete foundation.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 9244 County Road 42

Former Township: Township of Sandwich

Municipality: Town of Tecumseh

Resource Type: Residence

Associated Dates: 1932-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence. The property is bordered by a wood fence.

The residence is a one and a half storey structure with a medium-pitched side gable roof with asphalt shingles and a brick chimney. The front (south) elevation has a hip dormer. The structure is clad in vinyl siding and has modern windows and doors. The structure has a concrete block foundation.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 4120 7th Concession Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence and outbuilding. The property has mature deciduous and coniferous trees.



The residence is a one and a half storey structure and has a medium-pitched gambrel roof with a brick chimney. The north and south roof elevations have large shed dormers. The exterior is clad in vinyl siding and has modern windows. The entrance has a covered partial porch with concrete steps and brick piers. The structure has an undetermined foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

4. The property has design value or physical value because it,	Yes	No
iv. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
v. Displays a high degree of craftsmanship or artistic merit, or		✓
vi. Demonstrates a high degree of technical or scientific achievement.		✓
5. The property has historical value or associative value because it,		
iv. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
v. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
vi. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
6. The property has contextual value because it,		
iv. Is important in defining, maintaining or supporting the character of an area,		✓
v. Is physically, functionally, visually or historically linked to its surroundings, or		✓
vi. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 4178 7th Concession Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a laneway and residence.

The residence is a one storey structure with a high-pitched side gable roof with asphalt shingles and a brick chimney. The exterior is clad in stone and has modern windows. The structure has a projecting entrance with a partial concrete porch that is clad in stone and has a metal railing. The foundation is undetermined.



The residence is situated behind a cedar hedge and the property has mature deciduous trees.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 4140 7th Concession Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence and three outbuildings.

The residence is one storey structure with a low-pitched hip roof with asphalt shingles. The exterior is clad in vinyl siding and has modern windows and doors. The structure appears to have a north addition. The residence has a concrete foundation.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

	Yes	No
1. The property has design value or physical value because it,		
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 3255 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is a one and a half storey structure with a low-pitched side gable roof. The structure is clad in brick and has modern windows and doors. The residence has a single-car garage.



**Indicators of Cultural Heritage Value or Interest from O.
Reg. 9/06:**

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 3225 Baseline Road
Former Township: Township of Sandwich
Municipality: City of Windsor
Resource Type: Residence
Associated Dates: 1962-1975



Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is a one and a half storey structure with a low-pitched hip roof with asphalt shingles and a brick chimney. The structure is clad in brick and has modern windows and doors. The split-level residence has a single-car garage.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.

Municipal Address: 3325 Baseline Road
Former Township: Township of Sandwich
Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is a one and a half storey structure with a low-pitched hip roof with asphalt shingles. The structure is clad in brick and vinyl siding and has modern windows and doors. The split-level residence has a single-car garage.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.

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Municipal Address: 3277 Baseline Road
Former Township: Township of Sandwich
Municipality: City of Windsor
Resource Type: Residence
Associated Dates: 1962-1975



Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is a one and a half storey structure with a low-pitched hip roof with asphalt shingles and a brick chimney. The structure is clad in brick and has modern windows and doors. The split-level residence has a double-car garage.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.

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Municipal Address: 3355 Baseline Road
Former Township: Township of Sandwich
Municipality: City of Windsor
Resource Type: Residence
Associated Dates: 1962-1975



Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is a one and a half storey structure with a low-pitched cross gable roof with asphalt shingles. The structure is clad in brick and has modern windows and doors. The split-level residence has a double-car garage.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.

Municipal Address: 3415 Baseline Road
Former Township: Township of Sandwich
Municipality: City of Windsor
Resource Type: Residence
Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is a one storey structure with a low-pitched side gable roof with asphalt shingles and a brick chimney. The structure is clad in stone and has modern windows and doors. The residence has an attached double-car garage.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
iv. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
i. Displays a high degree of craftsmanship or artistic merit, or		✓
ii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.

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Municipal Address: 3465 Baseline Road
Former Township: Township of Sandwich
Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is a one storey structure with a low-pitched side gable roof with asphalt shingles and a brick chimney. The structure is clad in brick and has modern windows and doors. The residence has a covered partial porch and a single-car garage.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.

Municipal Address: 3483 Baseline Road
Former Township: Township of Sandwich
Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached double-car garage. The view of the residence is obstructed by vegetation.



The residence is a two storey structure with a low-pitched side gable roof. The front (north) elevation has a shed dormer. The structure is clad in vinyl siding and brick and has modern windows and doors. The front elevation has a partial porch clad in brick with a metal railing. The structure has an undetermined foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 3567 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1961-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached garage.

The residence is a one storey structure with a medium-pitched hip roof with asphalt shingles and a chimney. The structure is clad in vinyl siding and has modern windows and doors. The residence has a covered partial concrete porch and a concrete foundation.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 3605 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached double-car garage.

The residence is a one storey structure with a low-pitched hip roof with asphalt shingles. The structure is clad in brick and has modern windows and doors. The structure has a concrete foundation.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 3635 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1961-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached garage.

The residence is a one and a half storey structure with a low-pitched side gable roof with asphalt shingles and a brick chimney. The structure is clad in vinyl siding and has modern windows and doors. The front (north) elevation has a central projecting bay, and a covered partial porch. The side (west) elevation has a projecting entrance.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 3665 Baseline Road
Former Township: Township of Sandwich
Municipality: City of Windsor
Resource Type: Residence
Associated Dates: 1962-1975



Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is a one storey structure with a low-pitched side gable roof with asphalt shingles. The structure is clad in brick and has modern windows and doors. The residence has an attached double-car garage. The structure has an undetermined foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 3685 Baseline Road
Former Township: Township of Sandwich
Municipality: City of Windsor
Resource Type: Residence
Associated Dates: 1962-1975



Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is a one storey structure with a low-pitched front facing gable roof with asphalt shingles. The structure is clad in vinyl siding and has modern windows and doors. The residence has a double-car garage.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 3745 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached double-car garage.

The residence is a one storey structure with a low-pitched side gable roof with asphalt shingles and a concrete chimney. The structure is clad in vinyl siding and has modern windows and doors. The residence has a partial concrete porch and an undetermined foundation.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 3765 Baseline Road
Former Township: Township of Sandwich
Municipality: City of Windsor
Resource Type: Residence
Associated Dates: 1962-1975



Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is a one storey structure with a low-pitched side gable roof with asphalt shingles. The structure is clad in vinyl siding and has modern windows and doors. The front (north) elevation has a covered partial wood porch. The structure has an attached single-car garage and a concrete foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 3825 Baseline Road
Former Township: Township of Sandwich
Municipality: City of Windsor
Resource Type: Residence
Associated Dates: 1962-1975



Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is a one storey structure with a medium-pitched cross gable roof with asphalt shingles. The structure is clad in brick and stone and has modern windows and doors. The front (north) elevation has a modern addition that has a covered partial concrete entry porch. The structure has a concrete foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 3915 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached single-car garage.

The residence is a one storey structure with a medium-pitched cross gable roof with asphalt shingles. The structure is clad in brick and aluminum siding and has modern windows and doors. The residence has a concrete foundation.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 3965 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is a one storey structure with a medium-pitched side gable roof with asphalt shingles and a brick chimney. The structure is clad in brick and has modern windows and doors. The residence has a partial concrete porch and a concrete foundation.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.

Municipal Address: 3985 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached double-car garage.

The residence is a one and a half storey structure with a medium-pitched side gable roof with asphalt shingles and two concrete chimneys. The front (north) elevation has a central gabled dormer. The structure is clad in brick and has modern windows and doors. The front elevation has a covered full width concrete porch clad in brick. The residence has a concrete foundation.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 4085 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is a one storey structure with a medium-pitched side gable roof with asphalt shingles and a brick chimney. The structure is clad in vinyl siding and has modern windows and doors. The front (north) elevation has a partial wood porch and a front facing gable. The structure has a concrete foundation.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 4095 Baseline Road
Former Township: Township of Sandwich
Municipality: City of Windsor
Resource Type: Residence
Associated Dates: 1962-1975



Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is a one storey structure with a medium-pitched side gable roof with asphalt shingles. The structure is clad in vinyl siding and has modern windows and doors. The residence has a concrete foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.

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Municipal Address: 4145 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached single-car garage.

The residence is a one storey structure with a medium-pitched hip roof with asphalt shingles and a brick chimney. The structure is clad in brick and has modern windows and doors. The residence has a partial porch and a concrete foundation.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 4175 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is a one and a half storey structure with a medium-pitched side gable roof with asphalt shingles and a brick chimney. The front (north) elevation has two gabled dormers. The structure is clad in brick and has modern windows and doors. The front entrance has projecting entrance with an asymmetrical gable. The residence has an attached single-car garage, and a concrete foundation.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 4245 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is a one storey structure with a low-pitched cross gable roof with asphalt shingles. The structure is clad in vinyl siding and has modern windows and doors. The residence has a partial wood porch and a concrete foundation



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 4367 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Cemetery

Associated Dates: 1900

Relationship to Project: Within the Study Area

Description: The property contains Fairbairn Union Cemetery.

The cemetery was established in 1900. Thomas Fairbairn donated one acre of land from his farm for a cemetery, prior to his death on May 24, 1900. Thomas Fairbairn was the first burial in the cemetery.



The cemetery contains a mixture of grave markers from the early 20th century to the 21st century. The entrance to the cemetery is marked with brick piers with metal gates.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,	✓	
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,	✓	
ii. Is physically, functionally, visually or historically linked to its surroundings, or	✓	
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: The Fairbairn Cemetery established in 1900, has a direct association with a person in the community, Thomas Fairbairn, who donated the property for a public burying ground in 1900. Fairbairn was the first person laid to rest within the cemetery. The Fairbairn Cemetery supports the early 20th century rural character of the area and is physically and historically linked to its surroundings.

Identified Heritage Attributes: Cemetery: Grave markers and brick piers with metal gates.

Identification of CHVI: Yes	Cultural Heritage Resource Number: CHR-5
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 4489 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached double-car garage.

The residence is a one storey structure with a low-pitched hip roof with asphalt shingles and a brick chimney. The structure is clad in brick and has modern windows and doors. The residence has a partial concrete and porch and a concrete foundation.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 4441 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached single-car garage.



The residence is a one storey structure with a low-pitched hip roof with asphalt shingles and a brick chimney. The structure is clad in brick and has modern windows and doors. The residence has a partial wood porch and a concrete foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 4475 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached double-car garage.

The residence is a one storey structure with a low-pitched hip roof with asphalt shingles and a brick chimney. The structure is clad in brick and has modern windows and doors. The residence has a partial concrete porch and a concrete foundation.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 4435 8th Concession Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached single-car garage.

The residence is a one storey structure with a low-pitched side gable roof with asphalt shingles and a brick chimney. The structure is clad in vinyl siding and has modern windows and doors. The residence has a partial concrete porch and a concrete foundation.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 4440 8th Concession Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1920-1940

Relationship to Project: Within the Study Area

Description: The property contains a residence and modern outbuilding.

The residence is a one storey structure with a low-pitched side gable roof with asphalt shingles and a concrete chimney. The structure is clad in vinyl siding and has modern windows and doors. The residence has a partial concrete porch and an undetermined foundation.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 5680 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Farmstead

Associated Dates: circa 1875 (date from Municipal Heritage Register)

Relationship to Project: Within the Study Area

Description: The property contains two residences, several farm associated outbuildings, and four silos. The property contains mature maple trees.



The circa 1875 residence is a one and a half storey structure with a medium-pitched cross gable roof with asphalt shingles and a brick chimney. The structure has a T-shaped plan, with a covered wraparound verandah. The exterior is clad in vinyl siding and has modern windows and doors. The foundation was not visible from the roadway.



The second residence, that dates between 1962 and 1975, is a one storey structure with a medium-pitched side gable roof with asphalt shingles. The exterior is clad in vinyl siding and has modern windows and doors. The residence has partial wood entrance porch, an entrance gable, and a concrete foundation.

The property contains a timber frame barn that has a side gable roof that is clad with metal. The barn has a salt box side and is clad in metal. The south addition has a wood paneled door. The exterior has wood multi-pane windows. Adjacent to the barn is a mixture of late 19th to modern outbuildings including:

A one storey driveshed, with a side gable roof that is clad in metal. Its exterior is clad in metal and has 2/2 wood fixed windows.

A one storey outbuilding with a side gable roof, that is clad in metal and has a concrete chimney. It has a horizontal wood siding exterior, with 2/2 wood fixed windows.

An early 20th century barn, with a side gable roof that is clad in metal. The exterior of the barn is clad in metal and has a rusticated concrete block foundation.

The property is listed on the City of Windsor Municipal Heritage Register and is associated with the Ure family.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method	✓	
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,	✓	
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓



3. The property has contextual value because it,			
i.	Is important in defining, maintaining or supporting the character of an area,	✓	
ii.	Is physically, functionally, visually or historically linked to its surroundings, or	✓	
iii.	Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: The construction of this one and a half storey residence dates to about 1875. It is a representative example of a vernacular Ontario farmhouse. This residence has the potential to yield information that contributes to an understanding of Township of Sandwich through its connection to the Ure family. This property supports the late 19th century agricultural character of the area and is physically and historically linked to its surroundings.

Identified Heritage Attributes: Residence: One and a half storey structure, medium-pitched cross gable roof, brick chimney, and T-shaped plan. Barn: Timber frame structure, side gable roof, salt box side, wood paneled door, and wood multi-paned windows. Driveshed: one storey structure, side gable roof, and wood 2/2 fixed windows. Smaller barn: side gable roof and rusticated concrete foundation. Outbuilding: horizontal wood siding, side gable roof, and wood 2/2 fixed windows.

Identification of CHVI: Yes	Cultural Heritage Resource Number: CHR-6
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 7295 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1882-1912

Relationship to Project: Within the Study Area

Description: The property contains a residence and modern outbuildings. The property is bordered in wood fencing.

The residence is a one and a half storey structure with a medium-pitched cross gable roof with asphalt shingles. The roofline has two gabled dormers. The residence has a T-shaped plan. The exterior is clad in vinyl siding and has modern windows and doors. The north elevation has a covered partial wood porch. The structure has a rusticated concrete foundation.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method	✓	
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or	✓	
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,	✓	
ii. Is physically, functionally, visually or historically linked to its surroundings, or	✓	
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: The construction of this one and a half storey residence dates to between approximately 1882 and 1912, based on historic and topographic mapping. It is a representative example of a vernacular Ontario farmhouse. This residence has the potential to yield information that contributes to an understanding of Township of Sandwich. This property supports the late 19th to early 20th century agricultural character of the area and is physically and historically linked to its surroundings.

Identified Heritage Attributes: Residence: One and a half storey structure, medium-pitched cross gable roof, gabled dormers, and T-shaped plan.

Identification of CHVI: Yes	Cultural Heritage Resource Number: CHR-7
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 4310 County Road 17

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Outbuilding

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a modern house, barn, and outbuilding. The property is bordered by wood fencing.

The barn is a timber frame structure with a gambrel roof that is clad in metal and has hay hoods and two ventilators. The outbuilding is a timber frame structure with a side gable roof that is clad in metal.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 8360 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached single-car garage.



The residence is a one storey structure with a medium-pitched side gable roof with asphalt shingles and a brick chimney. The structure is clad in vinyl siding and has 1/1 metal windows. The front (south) elevation has projecting entry porch with an asymmetrical gable. The residence has a partial concrete porch and a concrete foundation. The structure has a rear addition with an attached single-car garage.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 8780 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached garage. The view of the residence is obstructed from the roadway by vegetation.

The residence is a one storey structure with a low-pitched side gable roof with asphalt shingles. The structure is clad in vinyl siding and has modern windows and doors. The residence has an undetermined foundation.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 3850 County Road 17

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1882-1912

Relationship to Project: Within the Study Area

Description: The property contains a residence and modern outbuildings. The property has mature spruce trees.

The residence is a one and a half storey structure with a medium-pitch side gable roof with asphalt shingles. The structure is clad in vinyl siding and has modern windows and doors. The front (west) three-bay façade has a covered partial wood porch. The residence has a south entry porch addition and a stone foundation.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method	✓	
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or	✓	
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,	✓	
ii. Is physically, functionally, visually or historically linked to its surroundings, or	✓	
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: The construction of this one and a half storey residence dates to between approximately 1882 and 1912, based on historic and topographic mapping. It is a representative example of a vernacular Ontario farmhouse. This residence has the potential to yield information that contributes to an understanding of Township of Sandwich. This property supports the late 19th to the early 20th century rural character of the area and is physically and historically linked to its surroundings.

Identified Heritage Attributes: Residence: One and a half storey structure, medium-pitched side gable roof, three-bay front façade, and stone foundation. Landscape: mature spruce trees.

Identification of CHVI: Yes	Cultural Heritage Resource Number: CHR-8
Completed by (name): Laura Walter	Date Completed: May 7, 2018.



Municipal Address: 4721 8th Concession Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is a one and a half storey structure with a medium-pitched side gable roof and concrete chimney. The front (east) elevation has a shed dormer. The structure is clad in vinyl siding and has modern windows and doors. The front elevation has a full width concrete porch with metal railings. The structure has a concrete foundation.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

	Yes	No
1. The property has design value or physical value because it,		
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		✓
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 14, 2018.



Municipal Address: 4727 8th Concession Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached double-car garage.

The residence is a one storey structure with a medium-pitched hip roof with brick chimney. The structure is clad in brick and has modern windows and doors. The front (east) elevation has a partial concrete porch. The structure has a concrete foundation.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

	Yes	No
1. The property has design value or physical value because it,		
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 14, 2018.



Municipal Address: 4774 8th Concession Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached garage.

The residence is a one storey structure with a medium-pitched side gable roof with asphalt shingles and a brick chimney. The structure is clad in brick and stone and has modern windows and doors. The front (west) elevation has a partial concrete porch with metal railings. The structure has a concrete foundation and an attached single-car garage.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

	Yes	No
1. The property has design value or physical value because it,		
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 14, 2018.



Municipal Address: 4824 8th Concession Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Outbuildings

Associated Dates: 1920-1961

Relationship to Project: Within the Study Area

Description: The property contains three outbuildings and a cast-in-place concrete silo.



The largest outbuilding has a side gable roof and is clad in metal. Attached to the outbuilding is the concrete silo. Adjacent to the outbuilding and silo, are two smaller outbuildings with side gable roofs. One has vertical wood boards, the other is clad in metal.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 14, 2018.



Municipal Address: 4639 9th Concession Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1912

Relationship to Project: Within the Study Area

Description: The property contains a laneway that leads to a residence and modern outbuildings.

The residence is a two and a half storey structure with a medium-pitched hip roof with asphalt shingles. The roofline has three gabled dormers. The structure has a red brick exterior. The majority of windows are modern except for some 4/1 and 3/1 windows on the lower storey. The residence has a covered wraparound brick, concrete, and wood verandah. The front (east) entrance has a wood paneled door. The structure has an undetermined foundation.

The residence is listed on the City of Windsor's Municipal Heritage Register. It is recognized as the John Hayes House.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

	Yes	No
1. The property has design value or physical value because it,		
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method	✓	
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or	✓	
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,	✓	
ii. Is physically, functionally, visually or historically linked to its surroundings, or	✓	
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: The construction of this two storey residence dates to 1912. It is a representative example of a vernacular Ontario farmhouse with Edwardian design influences. This residence has the potential to yield information that contributes to an understanding of Township of Sandwich. This property supports the early 20th century rural character of the area and is physically and historically linked to its surroundings.

Identified Heritage Attributes: Residence: Two storey structure, medium-pitched hip roof, gabled dormers, red brick exterior, covered wraparound brick, concrete and wood porch, 3/1 and 4/1 windows, and wood paneled door.

Identification of CHVI: Yes	Cultural Heritage Resource Number: CHR-9
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Municipal Address: 4465 9th Concession Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1940-1962

Relationship to Project: Within the Study Area

Description: The property contains a residence and modern outbuildings.

The residence is a one and a half storey structure with a medium-pitched front facing gable roof and a brick chimney. The north and south elevations have shed dormers. The exterior is clad in vinyl siding and stone and has modern windows and doors. The front (east)

elevation has a covered full width concrete porch with metal railings. The foundation was undetermined.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 14, 2018.



Municipal Address: 4445 9th Concession Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1940-1962

Relationship to Project: Within the Study Area

Description: The property contains a residence and a modern garage.

The residence is a one storey structure with a cross gable roof that has asphalt shingles. The structure is clad in stone and vinyl siding and has modern windows and doors. The residence has a concrete foundation.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

	Yes	No
1. The property has design value or physical value because it,		
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 14, 2018



Municipal Address: 4979 9th Concession Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1942-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence, two outbuildings and a concrete silo.

The residence is a one storey structure with a medium-pitched side gable roof with asphalt shingles and a brick chimney. The east elevation has a gabled dormer. The structure is clad in vinyl siding and has modern windows and doors. The residence has a concrete foundation.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 14, 2018.



Municipal Address: 5012 9th Concession Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence, a modern garage, and modern outbuilding.

The residence is a one and a half storey structure with a medium-pitched side gable roof with asphalt shingles and a stucco clad chimney. The exterior is clad in stucco and has modern windows and doors. The front (south) elevation has a partial concrete porch. The structure has a concrete foundation.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 14, 2018.



Municipal Address: 4610 County Road 17

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence and a modern garage.

The residence is a one storey structure with a medium-pitched side gable roof. The structure is clad in vinyl siding and has modern windows and doors. The residence has a concrete foundation.



**Indicators of Cultural Heritage Value or Interest from O.
Reg. 9/06:**

	Yes	No
1. The property has design value or physical value because it,		
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 14, 2018.



Municipal Address: 4601 County Road 17

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1932 (from the Municipal Heritage Register)

Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is a one and a half storey structure with a medium-pitched side gable roof with metal shingles and a brick chimney. The front (east) elevation has a gabled dormer. The structure is clad in stone and has modern windows and doors. The three-bay front façade has a covered full width concrete porch that is clad in stone. The structure has a concrete foundation.



The property is listed on the City of Windsor's Municipal Heritage Register. The residence is recognized as the Dolphice St. Louis house.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

	Yes	No
1. The property has design value or physical value because it,		
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method	✓	
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or	✓	
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,	✓	
ii. Is physically, functionally, visually or historically linked to its surroundings, or	✓	
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: The construction of this one and a half storey residence dates to 1932. It is a representative example of a vernacular Ontario farmhouse with Bungalow design influences. This residence has the potential to yield information that contributes to an understanding of Township of Sandwich. This property supports the early 20th century rural character of the area and is physically and historically linked to its surroundings.

Identified Heritage Attributes: Residence: One and a half storey structure, medium-pitched side gable roof, stone clad exterior, three-bay front façade, and stone clad front porch.

Identification of CHVI: Yes	Cultural Heritage Resource Number: CHR-10
Completed by (name): Laura Walter	Date Completed: May 14, 2018.



Municipal Address: 4500 County Road 17

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1940-1961 (according to topographic mapping), appears to be early 20th century

Relationship to Project: Within the Study Area

Description: The property contains a residence and two outbuildings.

The residence is a one and a half storey structure with a cross gable roof with asphalt shingles. The structure has a T-shaped plan. The exterior is clad in vinyl siding and has modern windows and doors. The front (west) elevation has an enclosed partial porch and a gabled dormer. The residence has an undetermined foundation.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

	Yes	No
1. The property has design value or physical value because it,		
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method	✓	
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or	✓	
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,	✓	
ii. Is physically, functionally, visually or historically linked to its surroundings, or	✓	
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: The construction of this one and a half storey residence dates to between approximately 1940 and 1961 according to topographic maps of the study area, but the design of the structure points to an early 20th century date. It is a representative example of a vernacular Ontario farmhouse. This residence has the potential to yield information that contributes to an understanding of Township of Sandwich. This property supports the early 20th century rural character of the area and is physically and historically linked to its surroundings.

Identified Heritage Attributes: Residence: One and a half storey structure, medium-pitched cross gable roof, T-shaped plan, and gabled dormer.

Identification of CHVI: Yes	Cultural Heritage Resource Number: CHR-11
Completed by (name): Laura Walter	Date Completed: May 14, 2018.



Municipal Address: 4521 County Road 17

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1882-1912

Relationship to Project: Within the Study Area

Description: The property contains a residence, modern outbuilding, and wood outbuilding. Between the residence and the roadway are two mature spruce trees.

The residence is a one and a half storey structure with a medium-pitched cross gable roof with asphalt shingles.

The roofline has three gabled dormers. The structure is clad in vinyl siding and has modern windows and doors.

The front (east) elevation has a partial wood porch. The residence has a rusticated concrete foundation.

At the rear of the property is a vertical wood outbuilding with a side gable roof that is clad with metal.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method	✓	
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or	✓	
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,	✓	
ii. Is physically, functionally, visually or historically linked to its surroundings, or	✓	
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: The construction of this one and a half storey residence dates to between approximately 1882 and 1912, based on historic and topographic mapping. It is a representative example of a vernacular Ontario farmhouse. This residence has the potential to yield information that contributes to an understanding of Township of Sandwich. This property supports the late 19th to early 20th century rural character of the area and is physically and historically linked to its surroundings.

Identified Heritage Attributes: Residence: One and a half storey structure, medium-pitched cross gable roof, and gabled dormers. Outbuilding: vertical wood boards and side gable roof.

Identification of CHVI: Yes	Cultural Heritage Resource Number: CHR-12
Completed by (name): Laura Walter	Date Completed: May 14, 2018.



Municipal Address: 5284 North Talbot Road

Former Township: Township of Sandwich

Municipality: Town of Tecumseh

Resource Type: Park

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a community park, the Weston Park. The park is approximately nine acres.

The park contains a playground, two baseball diamonds, basketball courts, two tennis courts, a parking area, soccer field, and an outbuilding.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 14, 2018.

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Municipal Address: 5648 North Talbot Road

Former Township: Township of Sandwich

Municipality: Town of Tecumseh

Resource Type: Residence

Associated Dates: 1882-1913

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached garage. The property has mature maple trees.

The residence is a one and a half storey structure with a medium-pitched cross gable roof with asphalt shingles. The structure has a T-shaped plan, with a front (south) one storey addition. The residence is clad in vinyl siding and brick and has modern windows and doors. The structure has a concrete foundation.

The single-car garage to the rear of the residence is a one storey structure with a gable roof. Its exterior is clad in brick and vinyl siding.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

	Yes	No
1. The property has design value or physical value because it,		
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method	✓	
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or	✓	
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,	✓	
ii. Is physically, functionally, visually or historically linked to its surroundings, or	✓	
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: The construction of this one and a half storey residence dates to between approximately 1882 and 1913, based on historic and topographic mapping. It is a representative example of a vernacular Ontario farmhouse. This residence has the potential to yield information that contributes to an understanding of Township of Sandwich. This property supports the late 19th to early 20th century rural character of the area and is physically and historically linked to its surroundings.

Identified Heritage Attributes: Residence: One and a half storey structure, medium-pitched cross gable roof, and T-shaped plan.

Identification of CHVI: Yes	Cultural Heritage Resource Number: CHR-13
Completed by (name): Laura Walter	Date Completed: May 14, 2018.



Municipal Address: 5700 North Talbot Road

Former Township: Township of Sandwich

Municipality: Town of Tecumseh

Resource Type: Residence

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached garage.

The residence is a one storey structure with a medium-pitched side gable roof with asphalt shingles. The exterior is clad in vinyl siding and has modern windows and doors. The structure has a concrete foundation.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

	Yes	No
1. The property has design value or physical value because it,		
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 14, 2018.



Municipal Address: 5760 North Talbot Road

Former Township: Township of Sandwich

Municipality: Town of Tecumseh

Resource Type: Residence

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence and outbuilding.

The residence is a one and a half storey structure with a high-pitched side gable roof with asphalt shingles. The front (south) elevation has two gabled dormers. The residence is clad in brick and vinyl siding and has modern windows and doors. The structure has an undetermined foundation.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 14, 2018.



Municipal Address: 5790 North Talbot Road

Former Township: Township of Sandwich

Municipality: Town of Tecumseh

Resource Type: Residence

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence and a garage.

The residence is a one storey structure with a low-pitched hip roof with asphalt shingles. The structure is clad in vinyl siding and has modern windows and doors. The residence has a concrete foundation.

The double-car garage to the rear of the residence is a one storey structure with a gable roof. Its exterior is clad in vinyl siding.



Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 14, 2018.



Municipal Address: 9th Concession Road (former railway line)

Former Township: Township of Sandwich

Municipality: Town of Tecumseh

Resource Type: Trail

Associated Dates: 1890

Relationship to Project: Within the Study Area

Description: The property contains the former railway corridor of the Michigan Central (M.C.) Railway. The rail line has been removed and is now a gravel path that is bordered by wood lots.



The railway line was between London and Windsor in 1890. The railway line was owned by M.C. until 1985, when it was taken over by the Canadian National Railway/Canadian Pacific Railway.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,	✓	
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,	✓	
ii. Is physically, functionally, visually or historically linked to its surroundings, or	✓	
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: This former railway corridor is associated with the M.C. line that operated across southwestern Ontario and connected to the United States. The line was completed through the Township of Sandwich in 1890. The line was removed in the late 20th century. This former railway corridor supports the 19th century rural character of the area and is physically and historically linked to its surroundings.

Identified Heritage Attributes: Recreational Trail: Layout of the former Canada Southern Railway Line including linear corridor lined with naturalized vegetation.

Identification of CHVI: Yes	Cultural Heritage Resource Number: CHR-14
Completed by (name): Laura Walter	Date Completed: May 14, 2018.



Municipal Address: 3940 Highway 3
Former Township: Township of Sandwich
Municipality: City of Windsor
Resource Type: Residence
Associated Dates: 1940-1961



Relationship to Project: Within the Study Area

Description: The property contains a residence, outbuildings, and a horse track. The front (south) yard has wood fencing.

The residence is a one and a half storey structure with a medium-pitched cross gable roof with asphalt shingles and a brick chimney. The front (south) elevation has a projecting one storey section with a gable roof. The structure is clad in vinyl siding and has modern windows and doors.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 14, 2018.



Municipal Address: 5075 North Talbot Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence, and two outbuildings. The view of the residence is obstructed by vegetation.



The residence is a one storey structure with a medium-pitched cross gable roof with asphalt shingles and a concrete chimney. The exterior is clad in vinyl and a mixture of 3/1 wood windows and modern windows. The structure has an undetermined foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

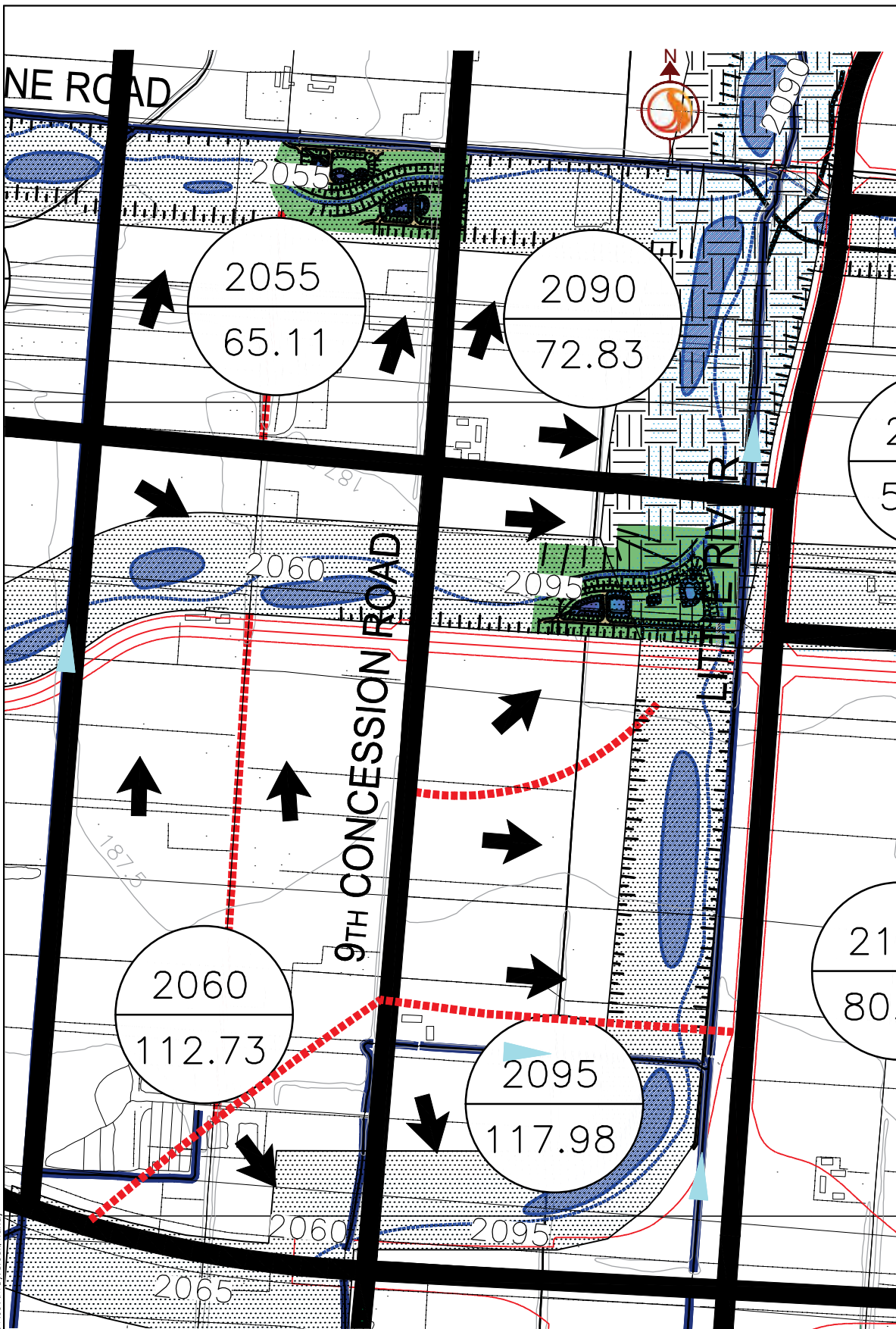
Identified Heritage Attributes: None identified.

Identification of CHVI: No	Cultural Heritage Resource Number: N/A
Completed by (name): Laura Walter	Date Completed: May 14, 2018.



APPENDIX B

Conceptual Project Drawings



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 2017/09/08 9:06 AM By: Brock, Randy

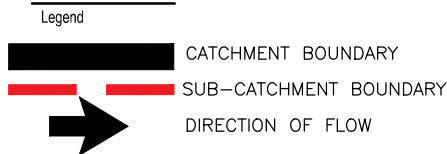
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SEPTEMBER 2016
160311265



Stantec

300 Hagey Blvd, Suite 100
 Waterloo, ON, N2L 0A4
 Tel. 519.579.4410
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Client/Project
 ESSEX REGIONAL CONSERVATION AUTHORITY
 UPPER LITTLE RIVER
 ENVIRONMENTAL ASSESSMENT
 Figure No.
 17
 Title
 CONCEPTUAL STORMWATER
 LAYOUT PLAN






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9/6/2017 3:28:08 PM By: Brook, Randy

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FEBRUARY 2012
1603-11265



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- Legend**
-  TRAIL / ACCESS ROAD
 -  CHANNEL
 -  PERMANENT POND

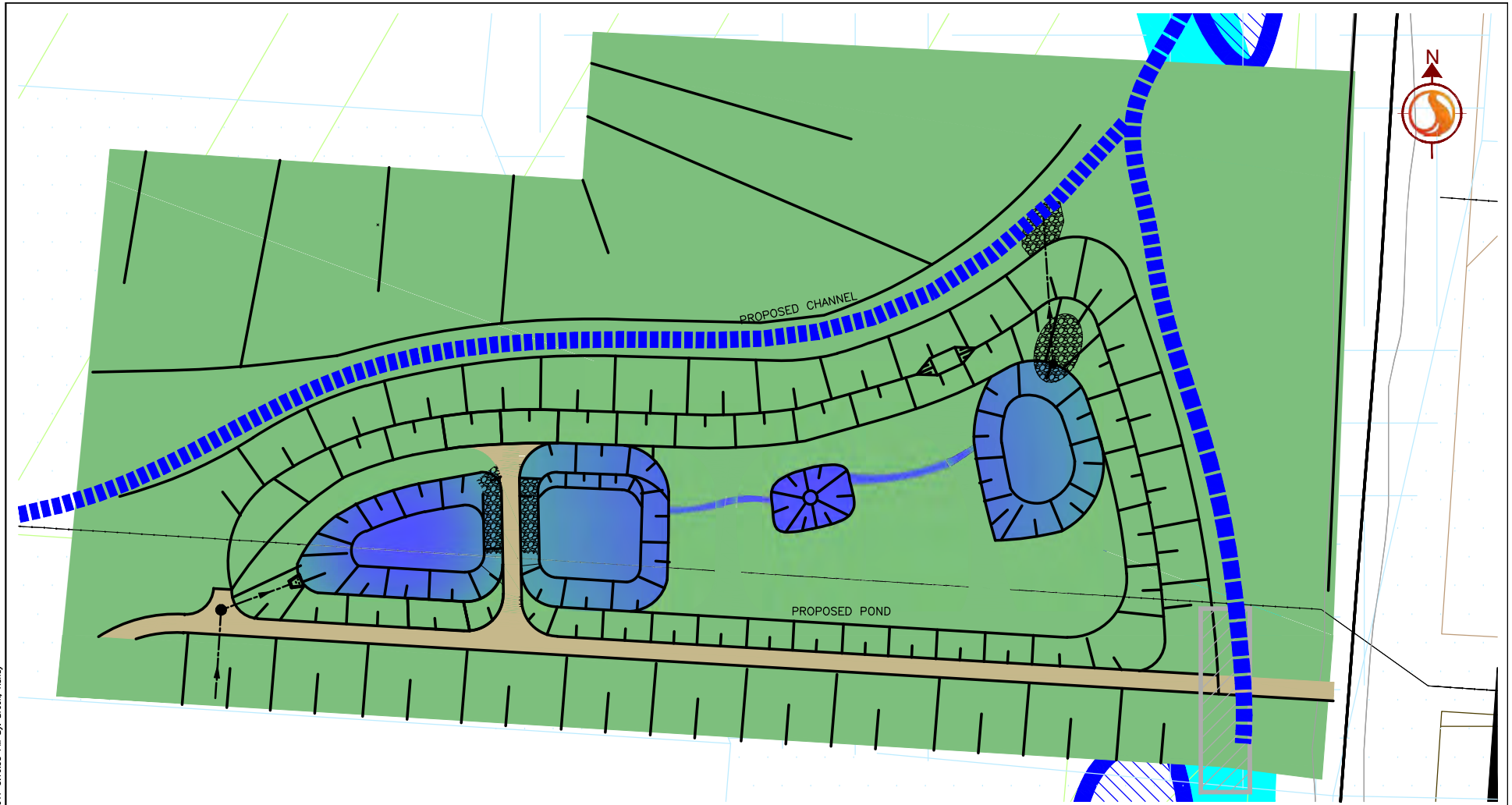


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ENVIROMENTAL ASSESSMENT

Figure No.
18

Title
STORMWATER MANAGEMENT
POND CONCEPT 1

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2/6/2017 3:16:38 PM By: Brook, Nancy






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Legend

-  TRAIL / ACCESS ROAD
-  CHANNEL
-  PERMANENT POND



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Figure No.

19

Title

STORMWATER MANAGEMENT
POND CONCEPT 2

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





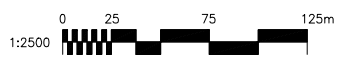
AUGUST 2012
1603-11265

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- Legend**
-  TRAIL / ACCESS ROAD
 -  ROAD
 -  CHANNEL
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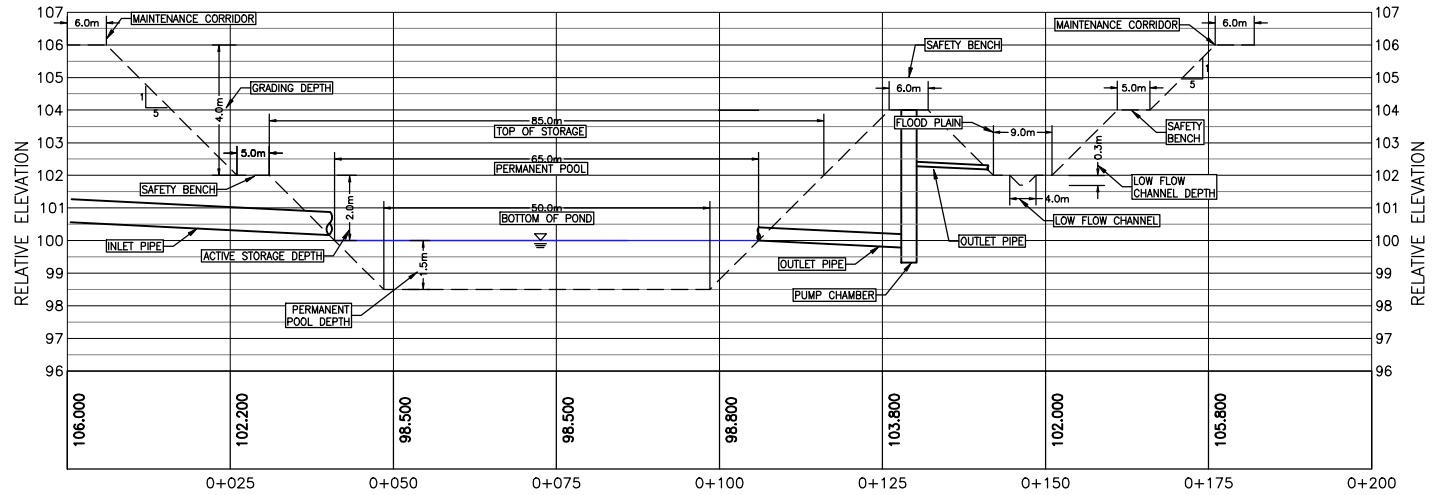


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 UPPER LITTLE RIVER
 ENVIROMENTAL ASSESSMENT

Figure No.
 20

Title
 STORMWATER MANAGEMENT
 POND CONCEPT 3

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 ENVIRONMENTAL ASSESSMENT

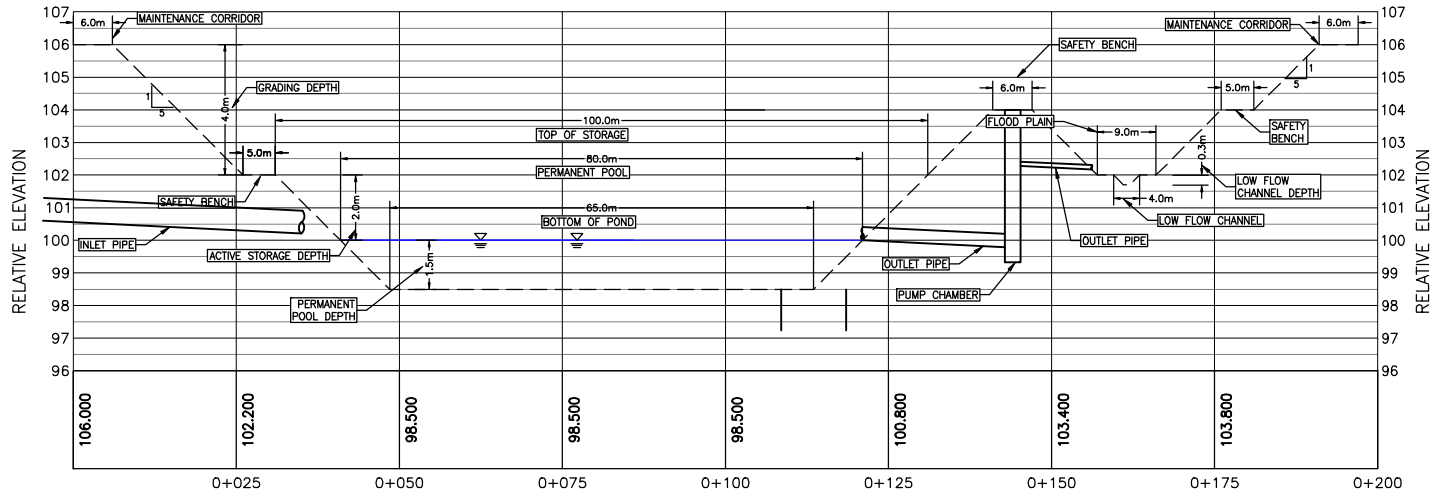
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21

Title

TYPICAL CROSS SECTION WITH ONE
 SWM FACILITY

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Figure No.

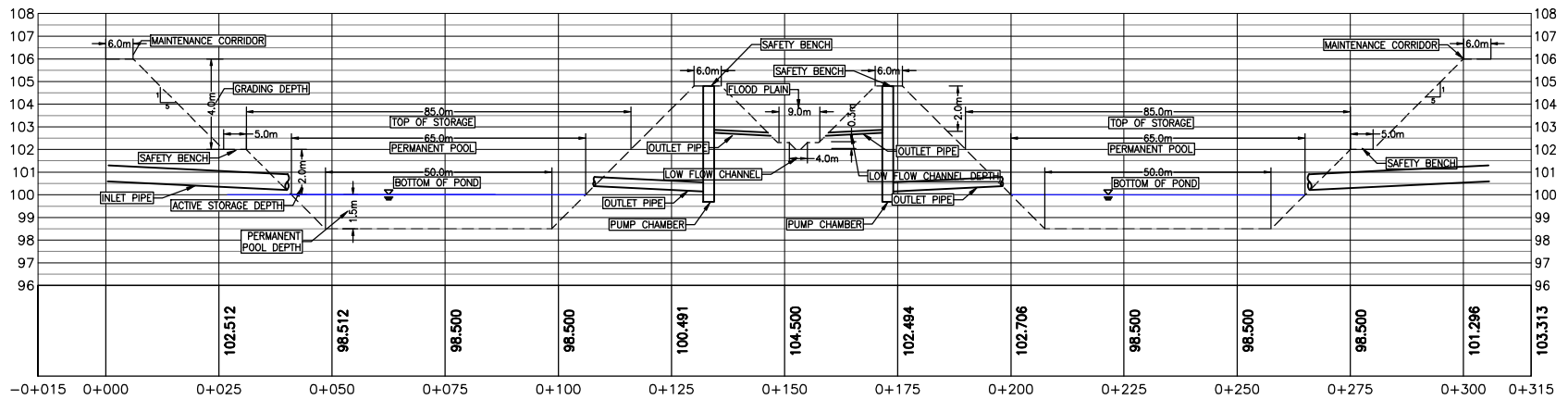
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Title

CROSS SECTION WITH ONE
 SWM FACILITY AND CONTINGENCY

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RELATIVE ELEVATION



RELATIVE ELEVATION



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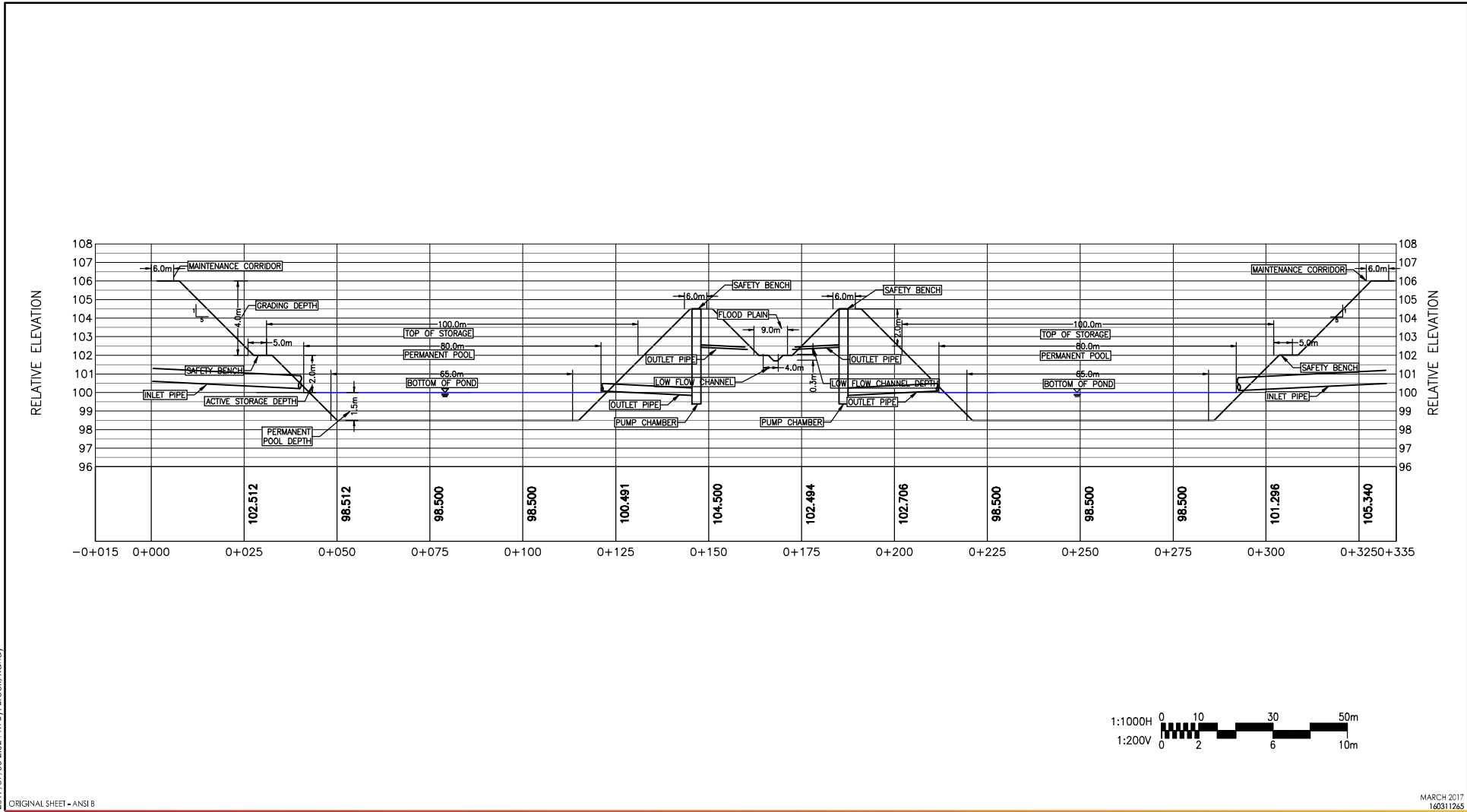
Figure No.

23

Title

TYPICAL CROSS SECTION WITH TWO
 SWM FACILITIES

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 2017/09/06 2:52 PM By: Brock, Randy



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 ENVIRONMENTAL ASSESSMENT

Figure No.

24

Title

TYPICAL CROSS SECTION WITH
 TWO SWM FACILITIES AND CONTINGENCIES