Memo

TO:	Rob Perissinotti, P.Eng.
FROM:	Aakash Bagchi, P.Eng. Madi Mercier Kailee Dickson, P.Eng.
DATE:	February 6, 2024
SUBJECT:	200 Morton Drive: Sanitary Flow Assessment and Storm Servicing Feasibility Memo
OUR FILE:	24-7338

1.0 Introduction

Dillon Consulting Limited (Dillon) was retained by Windsor Salt Ltd. to perform a sanitary flow assessment and storm servicing feasibility study in support of planning applications for the proposed industrial development to be located at 200 Morton Drive. The proposed site is currently owned by Windsor Salt Ltd., and proposed to be severed for future development purposes.

1.1 Background

As shown on the reference plan in **Appendix B,** the proposed industrial parcel is located in Part 1, 2 and 3, which is bounded by lands owned by Windsor Salt Ltd. on the west and Ojibway Parkway to the east. The site is bounded by existing industrial development to the north and south within the geographic limits of the City of Windsor and Town of Lasalle, respectively. The proposed development includes 20.2 ha of area (refer to reference plan, **Appendix B**).

The following reference documents were referred to for this analysis:

- City of Windsor Development Manual (2015);
- City of Windsor Sewer Mapping portal; and
- Severance Sketch, 200 Morton Dr (Verhaegen Land Surveyors, 2023).

The objective of this memo is to perform a comparative study on the existing and proposed sanitary flow conditions in the sanitary sewer system along Sprucewood Avenue and Maplewood Drive. The assessment was performed using a sanitary sewer design sheet to evaluate expected flows in the downstream municipal sanitary sewers under existing and proposed conditions. The following existing sanitary sewers were evaluated for the sanitary assessment (**Appendix A – Windsor Salt Map**):

- Sanitary sewer system along Sprucewood Avenue, from Ojibway Parkway to Maplewood Drive and;
- Sanitary sewer along Maplewood Drive, from Sprucewood Avenue to the Sanitary Pump Station, located at 5555 Maplewood Drive.

In addition, this memo will review the existing stormwater drainage patterns for the proposed industrial parcel and provide recommendations for future stormwater servicing. The methods and results of our analysis are summarized below.

1.2 Correspondence with the City

A pre-consultation meeting was scheduled with the City of Windsor to discuss the methodology of the sanitary assessment and alternatives for stormwater servicing for the site.

It was confirmed by the City that the sanitary sewer system on Sprucewood Avenue will provide an outlet for sanitary flows from the proposed development on 200 Morton Drive. Therefore, the current analysis has been completed to assess the impacts on the sanitary sewer system due to additional sanitary flows from the proposed development.

It was also proposed by Dillon, and confirmed by the City, that a static sanitary design sheet analysis for evaluating sewer capacities in the existing municipal sanitary sewers would be completed, and a dynamic modelling analysis would not be necessary.

Possible stormwater servicing alternatives for the proposed site were discussed with the City. It was agreed that due to the proximity of the site to a large waterbody (Detroit River), quantity control of stormwater runoff would most likely not be necessary. Quality control of stormwater runoff to meet locally relevant guidelines would be required.

2.0 Sanitary Flow Assessment

The extents of the study area were defined through the City's Sewer Mapping portal as shown in **Figure 1** below. The study area extends west from the sanitary sewer maintenance hole 8S2002 located on Sprucewood Avenue and ends at 8PS1630 located at 5555 Maplewood Drive.

The City's Sewer Mapping portal was used for measuring the areas of individual land parcels.

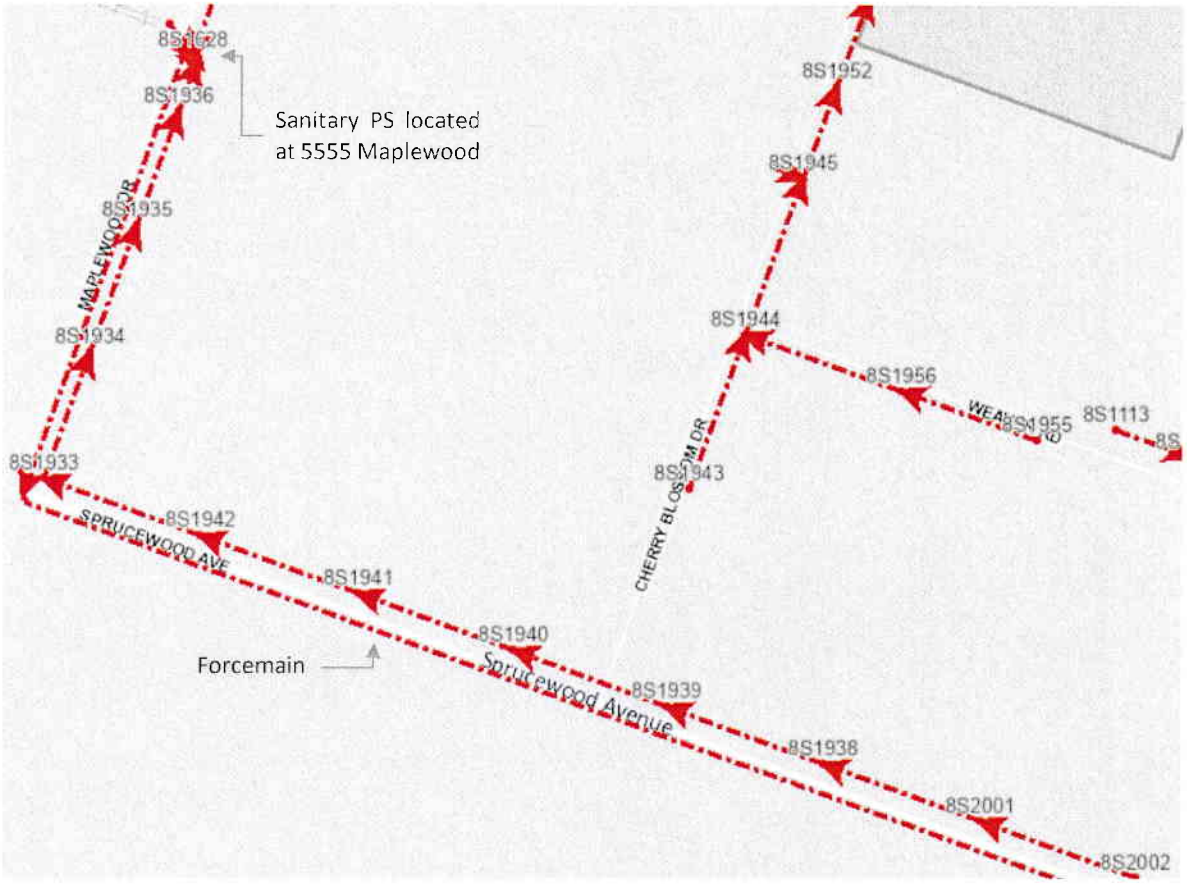


FIGURE 1: CITY OF WINDSOR SEWER MAPPING

2.1 Existing Conditions Analysis

The existing condition sanitary design sheet, or baseline for this analysis, included the sanitary sewer system from 8S2002 to 8PS1630. (**Figure 1**). 8PS1630 was assumed to be the most downstream node in the analysis. The sanitary design sheet estimates expected flow in the sanitary sewer system from the existing land parcels, that are assumed to be assessed to the existing sanitary sewer providing outlet for the proposed site, based on parameters provided in City's Development Manual. The sewer analysis map is presented in **Appendix A.**

2.2 Proposed Conditions Analysis

The sanitary sewer between sewer maintenance hole 8S1941 and 8S1942 was assumed to be the sanitary outlet for the proposed industrial area. The proposed site will contribute wastewater and infiltration flows to the sanitary sewer between sewer maintenance hole 8S1941 and 8S1942, as shown in **Figure 2**, in addition to any existing flows in the sewers.

The existing condition sanitary design sheet was modified to reflect the proposed development. For the purposes of this analysis, the proposed conditions sanitary demands for the proposed property were estimated based on the parameters listed in **Table 1**. The population for the proposed development was determined based on the information provided in the City of Windsor's Sewer Mapping portal and the City of Windsor Development Manual (2015). The development area is 20.2 ha and the proposed land-use is expected to remain industrial.

TABLE 1: PROPOSED CONDITION SANITARY FLOW PARAMETERS

Parameter	Value
Population	62 person/ha[1]
Sewage Flow Rate	0.0042 L/second-capita[1]
Peak Flow Factor	4.92[1]
Infiltration	1 L/s/ha[2]

[1] *Based on City of Windsor Development Manual (Section 9.1.2 (c)), 2015*
[2] *Based on City's Sewer and Coastal Flooding Protection Master Plan (Dillon, 2020)*

The design criteria used to estimate sanitary flows for the proposed development are summarized in **Table 2**.

TABLE 2: SANITARY SEWER DESIGN CHART

Condition	Land Use	Basis for Determining Population[1]	Population Density[2]	Total Population	Peak Domestic Sanitary Flow[2] (L/s)	Infiltration Flow (L/s)	Peak Sanitary Sewer Flow (L/s)
Proposed	Industrial	20.2 hectares	62 person/ha	1252	25.9	20.2	46.1

[1] *Severance Sketch*
[2] *City of Windsor Development Manual (Section 9.1.2).*

The peak design flows in the sanitary sewer system for development were calculated in the sanitary design sheet. The design sheet results are provided in **Appendix C**.

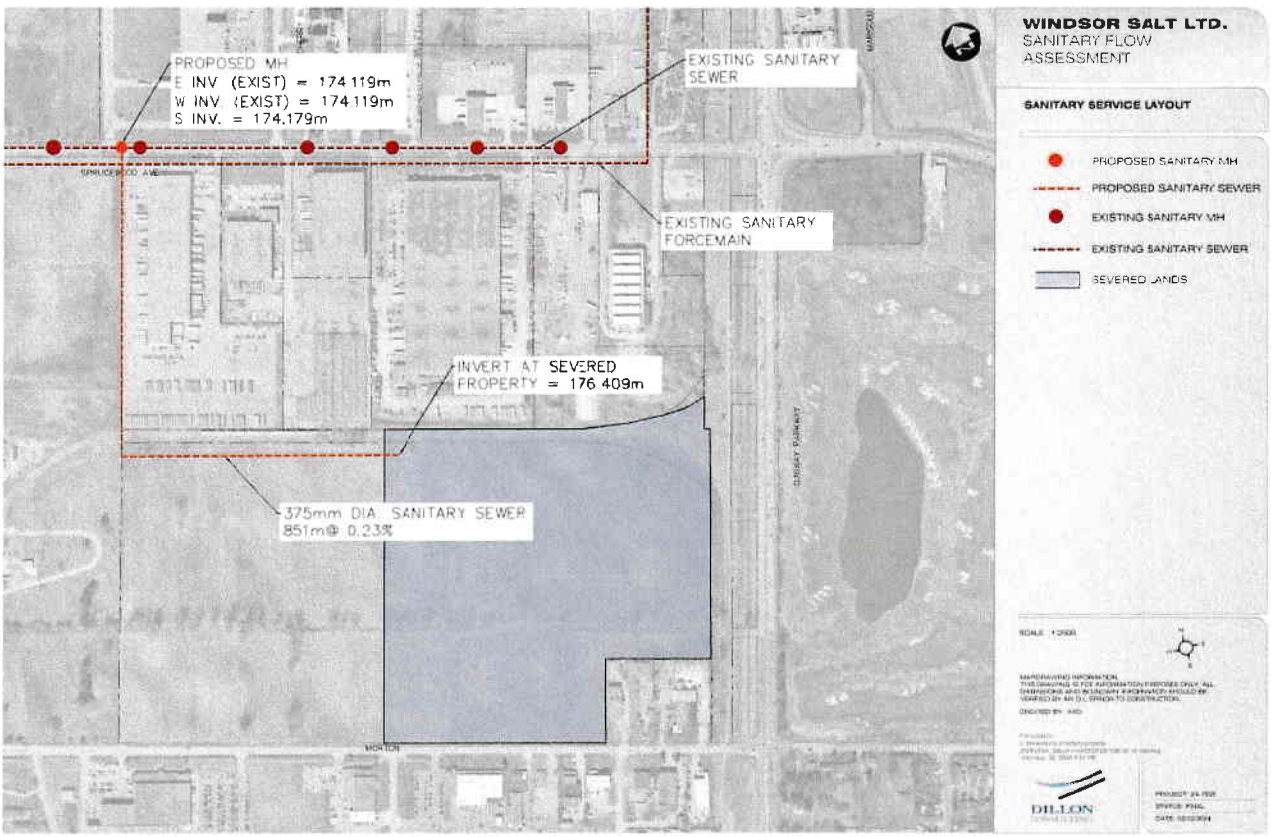


FIGURE 2: SANITARY SERVICE LAYOUT

DILLON CONSULTING LIMITED

www.dillon.ca

3.0 Sanitary Flow Assessment Results

The design sheet assessment was utilized to assess the flows in the sanitary sewer system for the existing and proposed development conditions.

3.1 Evaluation of Impacts of Proposed Development on Sanitary Sewer Infrastructure

The sanitary flow comparison for the existing and proposed site conditions is found in **Appendix C**.

Under existing conditions, the sanitary sewers along Sprucewood Avenue and Maplewood Drive show expected flow of 126.9 L/s being conveyed to the existing sanitary PS on Maplewood Avenue. Under existing conditions, a number of sewers are estimated to have a peak design flow greater than the sewer capacity.

Increases in peak design flows in the sanitary sewers on Sprucewood Avenue and Maplewood Drive are expected under proposed conditions due to the sanitary flows contributed by the proposed development to the sanitary sewers. The peak expected flow being conveyed to the existing sanitary PS on Maplewood Avenue under proposed conditions is 169 L/s.

The existing sanitary PS on Maplewood Avenue contains two pumps, providing a combined installed capacity of 252.4 L/s. The estimated proposed expected flow of 169 L/s indicates that the additional flow can be accommodated within the existing sanitary sewer along Sprucewood Avenue and Maplewood Drive. Importantly, this ensures that the Sanitary Pump Station's capacity is not approached or exceeded, thus, negative impacts are not expected.

4.0 Stormwater Servicing for Proposed Site

The proposed site is currently assessed to the Morton Drain which currently runs through the site draining easterly toward Ojibway Parkway and ultimately outlets into Turkey Creek in the Town of LaSalle. It is suggested that the future development will outlet into the Morton Drain under pre-development conditions. If realignment of the Morton Drain is required for development, a municipal Drainage Study under the Ontario Drainage Act will need to be initiated.

5.0 Conclusions and Recommendations

Dillon was retained by Windsor Salt Ltd. to complete a stormwater servicing feasibility, and sanitary sewer capacity assessment for the sanitary sewers on Sprucewood Avenue and Maplewood Drive for the proposed industrial development on 200 Morton Drive. The development of 20.2 ha of area is proposed from a severed parcel owned by Windsor Salt Ltd. The existing sanitary sewer on Sprucewood Avenue, flowing west towards Maplewood Drive and on Maplewood Drive flowing North towards Ironwood Drive, will be the outlet for only sanitary flows from the proposed development.

The proposed development at 200 Morton Drive estimated to result in a peak sanitary flow rate of approximately 46 L/s from the drainage area containing the development area. The Sanitary Pump Station contains two pumps resulting in a total installed capacity of 252.4 L/s. The additional flow can be accommodated within the existing sanitary sewer along Sprucewood Avenue and Maplewood Drive without reaching the Sanitary Pump Station capacity.

Accordingly, the increased sanitary sewer flows from the proposed development can be accommodated with negligible impacts to the existing sanitary sewer system and risk of exceeding the Sanitary Pump Station capacity. The sanitary flows from the site are recommended to be monitored so as to not exceed design flows during less frequent wet-weather events.

It is suggested that the proposed industrial development will outlet into the Morton Drain under pre-development conditions. If drain realignment is required, Drainage Act work will need to be initiated.

We trust that this evaluation provides the necessary information to consider the approval of the proposed severance along 200 Morton.

Yours sincerely,

DILLON CONSULTING LIMITED

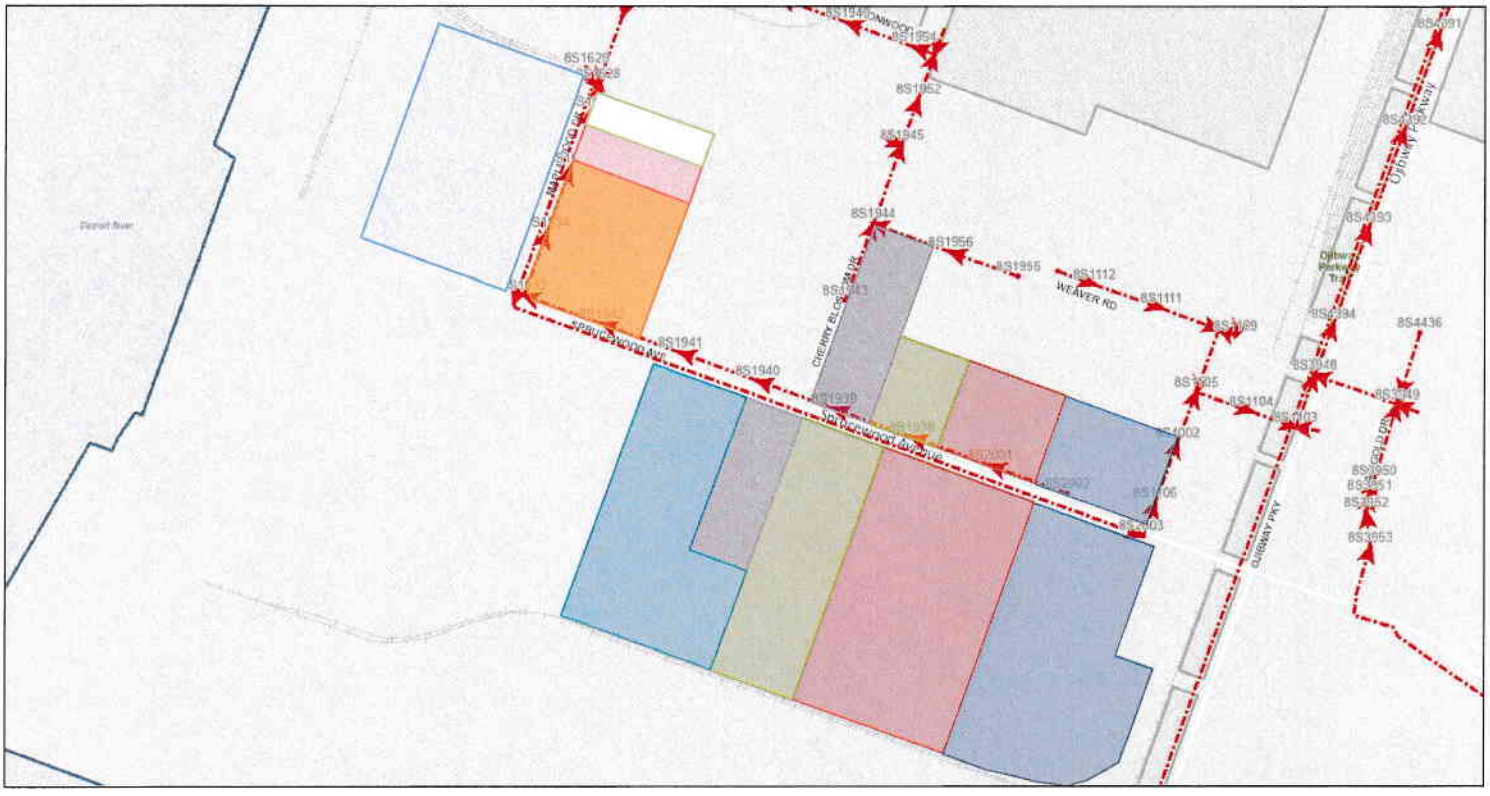
Aakash Bagchi, P.Eng.
Water Resources Engineer

Madi Mercier

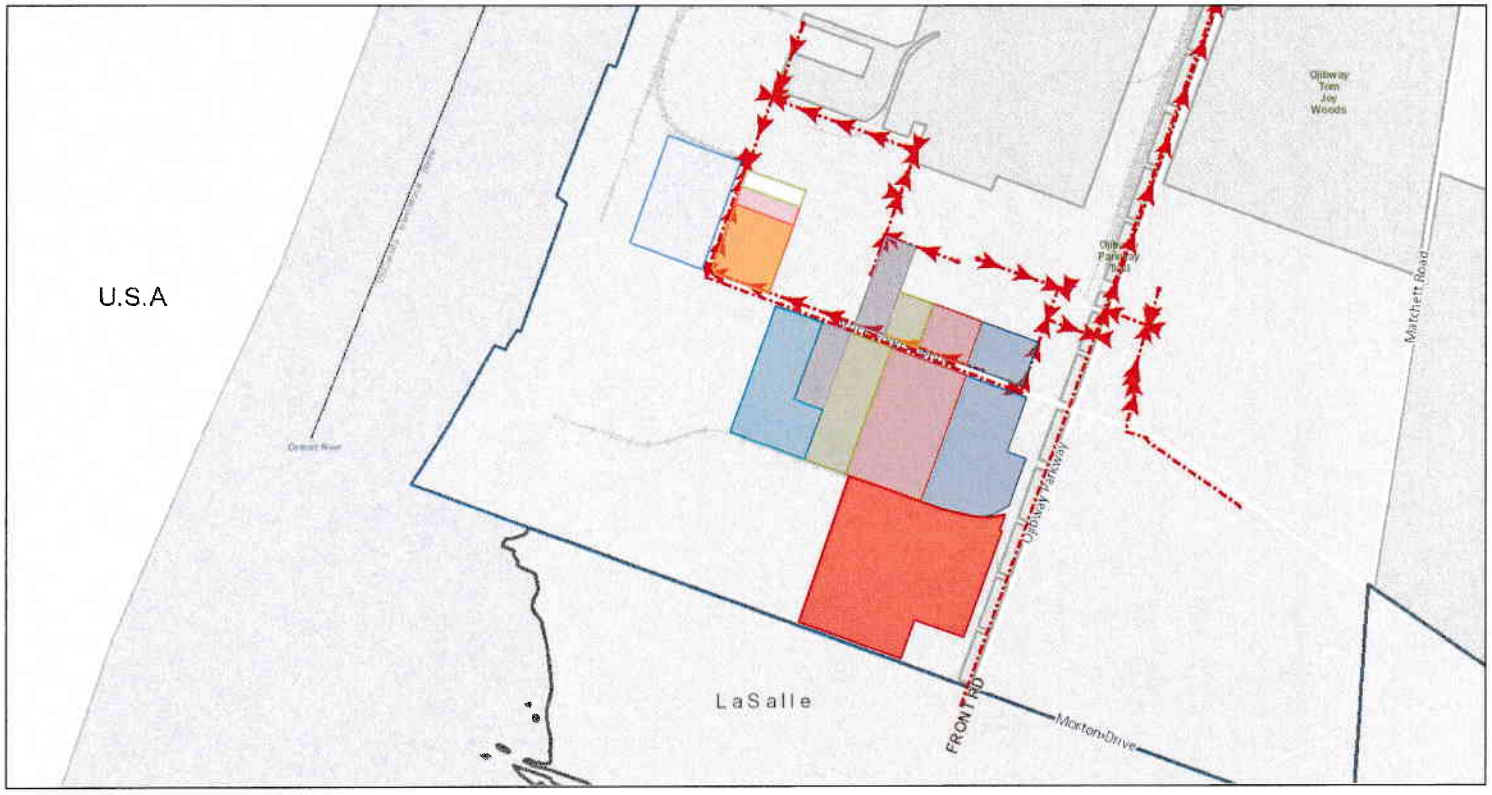
Kailee Dickson, P.Eng.

APPENDIX A

Windsor Salt Ltd Sanitary Assessment - Existing



Windsor Salt Ltd Sanitary Assessment - Proposed



8S2002-8S2001
8S2001-8S1938
8S1938-8S1939
8S1939-8S1940
8S1940-8S1941
8S1941-8S1942
8S1933-8S1934
8S1934-8S1935
8S1935-8S1936
8S1936-8S1937
Sanitary Sewers
Sanitary Sewer Manholes

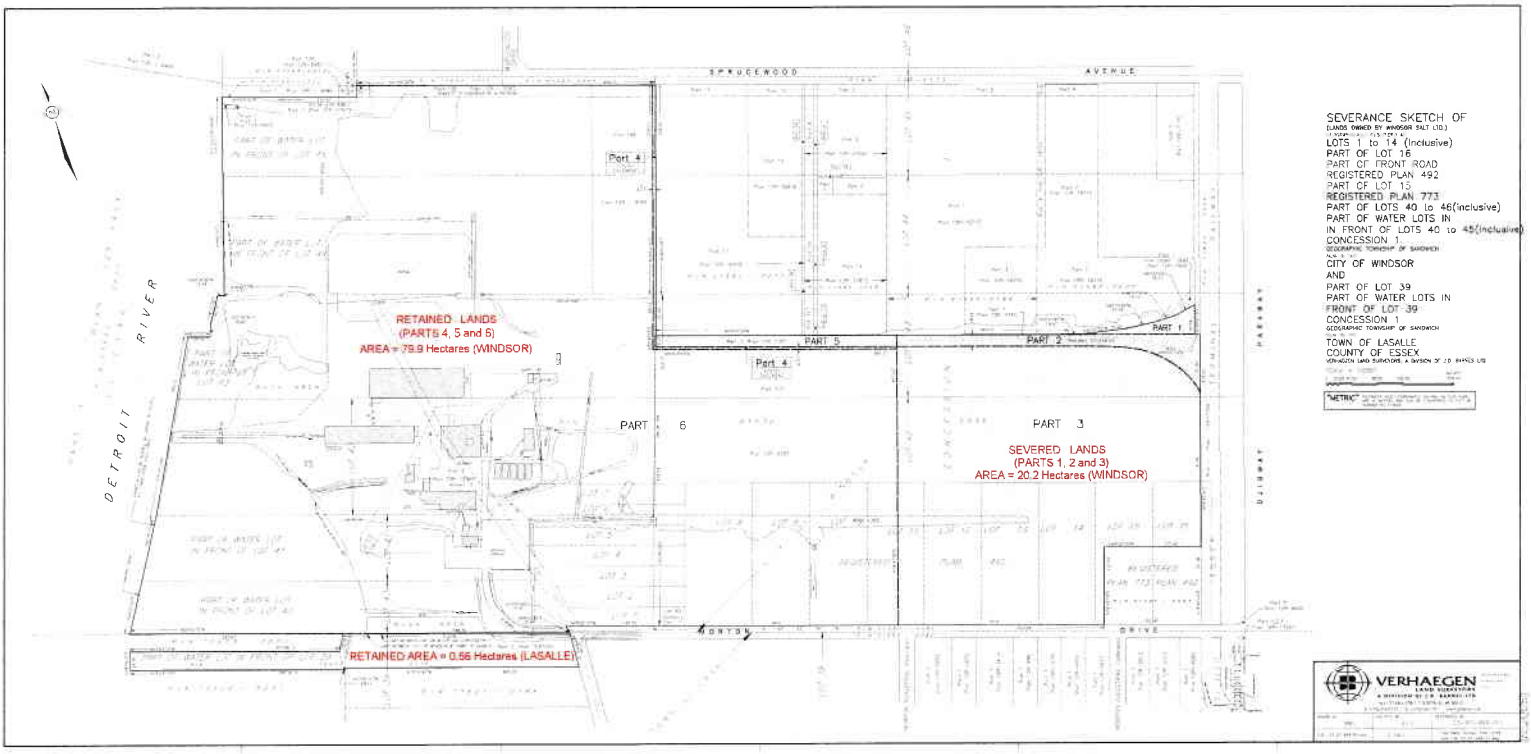
1:10,872

0 0.13 0.25 0.5 mi
0 0.2 0.4 0.8 km

City of Windsor

ArcGIS Web AppBuilder
City of Windsor |

APPENDIX B


SPRUCEWOOD AVENUE
DETROIT RIVER
RETAINED LANDS
(PARTS 4, 5 and 6)
AREA = 79.9 Hectares (WINDSOR)
Part 4
PART 5
PART 2
PART 1
Part 4
PART 6
PART 3
SEVERED LANDS
(PARTS 1, 2 and 3)
AREA = 20.2 Hectares (WINDSOR)
RETAINED AREA = 0.56 Hectares (LASALLE)
DRIVE
SEVERANCE SKETCH OF
(LANDS OWNED BY WINDSOR SALT LTD.)
LOTS 1 to 14 (Inclusive)
PART OF LOT 16
PART OF FRONT ROAD
REGISTERED PLAN 492
PART OF LOT 15
REGISTERED PLAN 773
PART OF LOTS 40 to 46(Inclusive)
PART OF WATER LOTS IN
IN FRONT OF LOTS 40 to 45(Inclusive)
CONCESSION 1
GEOGRAPHIC TOWNSHIP OF SANDWICH
CITY OF WINDSOR
AND
PART OF LOT 39
PART OF WATER LOTS IN
FRONT OF LOT 39
CONCESSION 1
GEOGRAPHIC TOWNSHIP OF SANDWICH
TOWN OF LASALLE
COUNTY OF ESSEX
VERHAEGEN LAND SURVEYORS, A DIVISION OF J.D. BARNES LTD
"METRIC"
VERHAEGEN
LAND SURVEYORS

APPENDIX C

WINDSOR SALT
SANITARY SEWER DESIGN SHEET

Project Name: Windsor Salt
Project No: 24-7338

The Peaking Factor was derived Using Harmon Formula= N (Y or N)
From a Table= Y
Value from table= 4.920

Residential Average Daily Flow= 353 L/Cap D
Peak Extraneous Flow= 1.000 L/Ha S

Outlet Invert Elevation= 172.600
Mannings n = 0.013
Total Area= 84.359

Basement Floor Elevation =
or
Hydraulic Grade Line Cover = 2.40

Ground El

City of Windsor

Location			Flow Characteristics							Sewer Design/Profile										Cover		
	LOCATION		INDIVIDUAL		CUMULATIVE		PEAKING	POPULATION	PEAK EXTR	PEAK DESIGN												
ROAD/STN	FROM MH	TO MH	POP	AREA (ha)	POP	AREA (ha)	FACTOR M	Q(p) (L/s)	FLOW Q(e) (L/s)	FLOW Q(d) (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE DIA. (mm)	Wall Thickness (mm)	SLOPE (%)	UPPER INVERT (m)	LOWER INVERT (m)	FALL (m)	VELOCITY (m/s)	DROP IN LOWER MANHOLE (m)	Ground Elevation Upper MH	Cover @ Up MH (m)	Cover @ Low MH (m)
Sprucewood Ave	BS2001	BS2001	369.6	18.80	879	18.80	4.920	13.837	15.600	**29.64**	**84.27**	121.5	375	11	0.23	175.393	175.113	0.281	0.76	0.053	178.580	3.801	3.171
Sprucewood Ave	BS2001	BS1938	706.8	11.40	1376	22.20	4.920	28.440	22.200	**50.64**	**84.27**	122.5	375	11	0.23	175.110	174.827	0.283	0.76	0.053	178.670	3.174	3.397
Sprucewood Ave	BS1938	BS1939	409.2	8.60	1786	30.80	4.920	38.899	26.800	**65.70**	**84.45**	122.5	375	11	0.23	174.824	174.539	0.284	0.76	0.053	178.610	3.400	3.665
Sprucewood Ave	BS1939	BS1940	285.2	4.60	2071	33.40	4.920	42.791	33.400	**76.19**	**83.90**	119.8	375	11	0.23	174.536	174.262	0.274	0.76	0.012	178.610	3.688	3.982
Sprucewood Ave	BS1940	BS1941	440.2	7.10	2511	40.50	4.920	51.887	46.500	**92.39**	**83.90**	121.3	375	11	0.23	174.250	173.972	0.278	0.76	0.006	178.610	3.974	4.182
Sprucewood Ave	BS1941	BS1942	1252.4	20.20	3763	60.70	4.920	77.757	60.700	**138.47**	**84.09**	123.2	375	11	0.23	173.966	173.683	0.283	0.76	0.006	178.540	4.188	4.761
Sprucewood Ave	BS1942	BS1933	0.0	0.00	3763	60.70	4.920	77.757	60.700	**138.47**	**84.09**	122.0	375	11	0.23	173.677	173.396	0.280	0.76	0.016	178.530	4.757	4.858
Maplewood Dr	BS1933	BS1934	241.9	3.90	4005	64.60	4.920	82.753	64.600	**147.36**	**84.36**	98.6	375	11	0.24	173.380	173.148	0.232	0.77	0.010	178.540	4.874	4.955
Maplewood Dr	BS1934	BS1935	471.3	7.60	4476	72.20	4.920	92.500	72.200	**164.70**	**83.90**	99.8	375	11	0.23	173.139	172.910	0.229	0.76	0.009	177.590	4.065	4.894
Maplewood Dr	BS1935	BS1936	62.0	1.00	4538	73.20	4.920	93.741	73.200	**166.95**	**83.35**	84.6	375	11	0.23	172.901	172.700	0.201	0.75	0.005	176.180	4.903	5.082
Maplewood Dr	BS1936	BS1937	55.8	0.90	4594	74.10	4.920	94.935	74.100	**169.03**	**83.54**	34.9	375	11	0.23	172.694	172.606	0.088	0.78	0.006	176.166	5.066	5.509
Maplewood Dr	BS1937	#PS163C	0.0	0.00	4594	74.10	4.920	94.935	74.100	**169.03**	**0.00**	12.2	450	11	0.00	172.600	172.600	0.000	0.00		176.500	5.439	5.439
Proposed Outlet	BS1941	BS1942	1252.4	20.20	1252	20.20	4.920	25.880	20.200	**46.08**	**84.09**	122.6	375	11	0.23			0.280	0.76	0.016	178.530		