

Serviceability Report
Caron Street Subdivision
Part 1 of RP 50R-9754, Part 1 of RP 50R-11600
Part of Lots 21, 22 and 23, Concession 2 (Old Survey)
Geographic Township of Clarence
City of Clarence-Rockland, Ontario
United Counties of Prescott and Russell

Prepared for

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1 INTRODUCTION

Lascelles Engineering and Associates Ltd. (Lascelles) was retained by SACA Land Developments (Rockland) Inc. (the Client) to prepare a Serviceability Report in support of an Official Plan Amendment for a mixed density residential housing development to be constructed in the City of Clarence-Rockland, Ontario. The purpose of this report is to demonstrate the manner in which a residential development on the subject property can be serviced by the existing municipal infrastructure, while conforming with local and provincial guidelines.

This report complies with the Official Plan of the Urban Area of the City of Clarence-Rockland, including the Expansion Lands Secondary Plan (SSA), subdivision design guidelines, and by-laws. Where no local guidelines are available, the City of Ottawa guidelines and/or the Ministry of the Environment, Conservation and Parks (MECP) guidelines were used.

1.1 Study Area

The proposed subdivision is located southeast of the existing urban area, immediately adjacent to Caron Street as illustrated in **Figure 1**. The area is comprised of approximately 112.6 hectares (ha) of land that area currently undeveloped or in use for agricultural purposes, where approximately 108.4 ha fall within the urban boundary.

Figure 1: Site Location



Ref: UCPR – GIS – Aerial photograph date – 2019-2020

Yellow highlight indicates the property

The legal description of the proposed subdivision can be described as Part of Lots 21, 22 and 23, Concession 2, within the Geographic Township of Clarence, now in the City of Clarence-Rockland and within the United Counties of Prescott-Russell (UCPR). The subject site is situated east of Caron Street, bound by Clarence Creek to the east, David Road to the north, and Baseline Road to the south. A portion of the property fronting Caron Street south of Rockland's urban boundary is planned to be developed in the future, separate from the proposed subdivision. Additionally, a

portion of the property known as Civic Number 1446 David Road has been severed, where the undeveloped lands on this property have been retained by the Client for development as part of the proposed subdivision and the developed lands fronting David Road maintained as Civic Number 1446 David Road.

The Rockland Golf Club and the residential neighbourhood of Rockland East are located to the north of the proposed subdivision. West of the proposed subdivision is the residential neighbourhood of Morris Village, with the future phase of this neighbourhood fronting Caron Street. The Lot Subdivision Concept Plan prepared by Fotenn Planning+Design (Fotenn) is presented in **Appendix A**.

1.2 Background Documents

The following background drawings, studies and guidance documents were obtained as part of this Serviceability Report:

- City of Clarence-Rockland Design Guidelines for Subdivisions and Site Plans, dated December 2023;
- City of Clarence-Rockland existing infrastructure as-built plans in PDF form for the sanitary network, storm network and water distribution network adjacent to the proposed subdivision;
- City of Clarence-Rockland Official Plan of The Urban Area of The City of Clarence-Rockland, dated November 19, 2013, consolidated up to April 2021;
- City of Clarence-Rockland Amendment Number 13 to The Official Plan of The Urban Area of The City of Clarence-Rockland, Expansion Lands Secondary Plan, dated December 19, 2019;
- City of Clarence-Rockland Expansion Lands Secondary Plan – Master Servicing Study, Revision 01 prepared by CIMA+, dated July 2019;
- OCWA Quarterly Operations Report Card for the City of Clarence-Rockland Water and Wastewater Facilities, 4th Quarter 2024;
- City of Clarence-Rockland Wastewater Master Plan Update prepared by Jacobs, dated June 30, 2022;
- Design Brief for Sewage Pumping Station No. 9, Revision 3 prepared by Atriel Engineering Ltd., dated July 2020;
- Pumping Station No. 9 Issued for Approval Drawings, Revision 4 prepared by Atriel Engineering Ltd., dated May 26, 2020;
- Plan of Survey of Part of Lot 21 and 22 Concession 2 (Old Survey) prepared by Annis, O’Sullivan, Vollebakk Ltd., Job No. E-2218-22;
- Plan of Survey of Part of Lot 22 Concession 2 (Old Survey), Plan 50R-11600 prepared by Annis, O’Sullivan, Vollebakk Ltd., Job No. E-3459-23;
- Plan of Survey of Part of Lot 23 Concession 2 (Old Survey) prepared by Arpentages SCHULTZ BARRETTE Surveying, Ref. No. CON. 2(O.S.)-28;

- Topographic Survey for Part of Lots 21, 22 and 23 Concession 2 (Old Survey) prepared by Annis, O’Sullivan, Vollebekk Ltd., Job No. E-2217-22;
- Lot Subdivision Concept Plan prepared by Fotenn Planning+Design, Revision 11 dated April 22, 2025.

1.3 Design Criteria

This section provides an overview of the design criteria for the proposed subdivision based on the City of Clarence-Rockland (CCR), Ministry of the Environment, Conservation and Parks (MECP), and South Nation Conservation Authority (SNCA) guidelines.

1.3.1 City of Clarence-Rockland Design Guidelines

Part 4 – Design Requirements of the City of Clarence-Rockland Guidelines for Subdivisions and Site Plans was utilized for this report and should be followed in the development of the proposed subdivision. A brief summary of the key design criteria is provided below:

Watermains

- Fire protection demand shall be per the requirements of the Fire Underwriters Survey;
- An average flow of 350 L/person/day and the per unit population provided in Table 4-12 of the design guidelines was used to develop flows for residential land use areas;
- An average flow of 28 m³/ha per day was used to develop flows for commercial and community facility land use areas;
- Domestic peaking factors used for minimum hour, maximum day and peak hour were obtained from Table 4-14 of the design guidelines; and
- The watermain system shall be designed to meet the pressure requirements outlined in Table 4-15 in the design guidelines.

Sanitary Sewers

- An average flow of 350 L/person/day and the per unit population provided in Table 4-1 of the design guidelines was used to develop flows for the residential land use areas;
- An average flow of 28 m³/ha per day was used to develop flows for commercial and community facility land use areas;
- An allowance of 0.28 L/s/ha for infiltration and inflow was used throughout;
- The peaking factor for residential areas was determined using the Harmon formula and a peaking factor of 1.5 was used for commercial and community facility areas;
- Full flow velocity in sanitary sewers shall be a minimum of 0.6 m/s and a maximum of 3.0 m/s; and
- Actual velocities have been considered to ensure self-cleaning velocities are achieved.

Storm Sewers and Stormwater Management

- Storm sewers were designed to convey a 5-year return frequency storm and sized using the Rational Method;

- An inlet time of 15 minutes was utilized;
- Runoff coefficients used for sewer sizing were obtained from Table 4-5 of the design guidelines;
- IDF curves based on Ottawa rainfall intensities and the Ottawa Sewer Design Guidelines were used;
- Depth of rainfall data was obtained from MTO's IDF Curve Lookup tool for the project site;
- The 100-year post-development peak flow shall not exceed the 100-year pre-development peak flow, and the 5-year post-development peak flow shall not exceed the 5-year pre-development peak flow;
- A minimum of 80% total suspended solids (TSS) removal shall be provided;
- The SCS Type II storm event distribution for the 24-hour storm event duration was used to estimate the size of the SWM pond; and
- Full flow velocity in storm sewers is to be a minimum of 0.8 m/s and a maximum of 3.0 m/s.

1.3.2 Ministry of Environment, Conservation and Parks (MECP)

Quality and quantity control measures to treat stormwater runoff were considered for all new impervious areas and, where possible, existing surfaces. A Stormwater Management Plan will be prepared in accordance with the MECP Stormwater Management Planning and Design Manual dated March 2003.

The MECP Design Criteria for Sanitary Sewers, Storm Sewers and Force mains for Alterations Authorized under an Environmental Compliance Approval dated May 31, 2023, and Design Guidelines for Drinking-Water Systems 2008 are referenced where applicable.

1.3.3 South Nation Conservation Authority (SNCA)

No specific design criteria were identified by SNCA at the time of this serviceability report. However, the following documents will be considered at the detailed design stage:

- Clarence Creek Flood Hazard Map prepared by SNCA, dated March 29, 2019; and
- UCPR Stormwater Facilities Planning and Maintenance Guide DRAFT 2 prepared by SNCA, dated May 27, 2019.

2 EXISTING CONDITIONS

This section is provided to summarize key components of CCR's existing infrastructure which will be utilized to support the proposed subdivision. The following observations are based on a review of as-built drawings as well as background reports and documents supplied by CCR.

This is a preliminary review of existing water, sanitary and stormwater servicing. Prior to development, the exact location and capacity of relevant services shall be determined.

2.1 Water Distribution System

CCR's water distribution system consists of a water treatment plant, transmission mains, distribution mains, reservoirs and pump stations. The sections below provide further details regarding existing capacities and any significant constraints.

2.1.1 Water Treatment Plant Capacity and Demand

Based on the information presented in the Expansion Lands Secondary Plan – Master Servicing Study prepared by CIMA+, the following existing capacities have been identified for the Clarence-Rockland Water Treatment Plant (WTP):

- Existing WTP capacity is 13,500 m³/day; and the
- Existing WTP high lift pumping capacity is 13,500 m³/day.

These values represent the maximum amount of treated water that the WTP can produce using existing equipment and processes.

Consumption rates were compiled into the 2024 Summary Report by Ontario Clean Water Agency (OCWA). The 2024 Summary Report can be found in **Appendix B**. Key items drawn from this report include:

- The highest value of the Daily Flow Maximums for 2024 was 8,950 m³/day. This represents the highest water demand day during the year;
- The average of the Daily Flow Averages for 2024 was 7,649 m³/day. This represents an average day of water consumption over the year.

Based on this information, it is observed that the water treatment plant capacity (13,500 m³/day) exceeds 2024 average day usage (7,649 m³/day) and peak water consumption (8,950 m³/day). Not considering any on-going or other future development within the City, the available information suggests that an additional 4,550 m³/day of treated water can be produced by the WTP in support of the proposed subdivision.

Although the WTP appears to have capacity, the excerpt from the Final Report for the Clarence-Rockland and Limoges Water Servicing Study appended to the Expansion Lands Secondary Plan – Master Servicing Study prepared by CIMA+ recommends that by the year 2027, to be able to meet future water demand based on estimated growth, the existing WTP will have to undertake capacity upgrades. The capacity upgrades identified in the report are listed below:

- Acquire land adjacent to the existing WTP to expand the WTP;
- Increase the WTP treatment capacity;
- Increase the WTP high lift pumping capacity;
- Increase the clear well storage volume at the WTP;
- Replace existing 300 mm diameter Edwards St. watermain with a new 500 mm diameter watermain; and
- Increase Caron Booster Station capacity.

It is understood that a new water master plan and servicing study are underway, however at the time of this report the study was not completed. The information provided above is the best available to Lascelles' knowledge.

2.1.2 Water Distribution Mains and Transmission Mains

Based on water distribution system model information presented in the Expansion Lands Secondary Plan – Master Servicing Study prepared by CIMA+, the proposed subdivision area is currently not serviced by CCR's water distribution system. The proposed subdivision will be located within the existing Pressure Zone 2 and have the following water infrastructure nearby to service the proposed subdivision area:

- Existing 200 mm diameter watermain on David Road;
- Existing high pressure 300 mm diameter transmission main on Caron Street; and the
- Caron Street Booster Station.

It is expected that the proposed subdivision can be serviced by the Caron Street Booster Station. Based on the Master Servicing Study, the existing capacity of the Caron Street Booster Station is 3,975 m³/day. Currently, the existing capacity exceeds the monthly maximum usage which was measured at 3,445 m³/day in 2024. Based on this information, it is estimated that the available capacity in the Caron Street Booster Station is 530 m³/day.

Although the Caron Street Booster Station appears to have capacity, the Expansion Lands Secondary Plan – Master Servicing Study prepared by CIMA+ recommends that by the year 2027, to be able to meet future water demand based on growth estimated in the study, the existing Caron Street Booster Station will have to undertake capacity upgrades.

It is understood that a new water master plan and servicing study are underway, however at the time of this report the study was not completed. The information provided above is the best available to Lascelles' knowledge.

2.2 Sanitary Sewer System

CCR's sanitary sewer system consists of sewers, numerous pumping stations and a wastewater treatment plant (WWTP). The sections below provide further details regarding existing capacities and any significant constraints.

2.2.1 Sanitary Sewers

Based on CCR provided as-built drawings from the Caron Street Reconstruction project, existing sanitary sewers adjacent to the proposed subdivision development consist of the following:

- A 300 mm diameter sanitary sewer on Caron Street flowing to the south, which starts as a 200 mm diameter sewer north of Fairway Drive. This sewer terminates in a manhole approximately 35 m south of David Road;
- A 450 mm diameter forcemain on Caron Street, capped south of David Road and connected to the deep sanitary sewer beginning at SANMH201, at the intersection of Caron Street and Darquise Street; and

- A 250 mm diameter sanitary sewer on David Road, from Caron Street to the capped location approximately 20 m east of the sanitary sewer in Caron Street.

As part of the Caron Street Reconstruction project, the deep sanitary trunk sewer beginning at the intersection of Caron Street and Darquise Street was upgraded to accommodate future flows from on-going and identified development areas. The sanitary sewer calculation sheet for the deep sanitary trunk sewer along with a sketch showing the sanitary servicing areas can be found in the **Appendix C**. Based on this information, the deep sanitary trunk sewer along Caron Street considers future development in the proposed subdivision area as well as other development areas. In ultimate build out conditions the deep sanitary trunk sewer along Caron Street will be operating with a theoretical 10% reserve capacity.

2.2.2 Sanitary Pumping Stations

CCR has constructed several sanitary pumping stations in the existing urban area to pump sanitary sewage flows towards the WWTP. Currently, a total of nine existing sanitary pumping stations are in operation.

Sanitary Pumping Station No. 1 (SPS#1) is the City's largest pumping station, as it transfers collected sewage from the full urban service area to the Clarence-Rockland WWTP. It is located south of Highway 17, next to Caron Street, and would collect flow from the proposed subdivision. The following list of information for SPS#1 is identified in the Expansion Lands Secondary Plan – Master Servicing Study prepared by CIMA+:

- Existing average daily flow is 44.14 L/s (estimated 2013 flows from 2005 data);
- Existing maximum daily flow is 82.19 L/s (estimated 2013 flows from 2005 data);
- Existing peak instantaneous sewage flow is 203.91 L/s (estimated 2013 flows from 2005 data);
- Existing firm rated capacity is 200 L/s; and
- Flows more than 200L/s from SPS#1 have been reported by O.W.C.A. in the past 5 years (2014 to 2019).

Since the completion of the Expansion Lands Secondary Plan – Master Servicing Study prepared by CIMA+, a Wastewater Master Plan Update was prepared by Jacobs, dated June 30, 2022. The following list of additional information for SPS#1 is identified in the Wastewater Master Plan Update:

- Existing average daily flow equivalent capacity is 10,485 m³/day (121.35 L/s) using peak instantaneous flow factor of 3.3;
- Existing peak instantaneous sewage flow is 241.3 L/s (estimated under AES 5-year design storm);
- Upgrades being performed at the time of reporting will increase the firm rated capacity from 200 L/s to 400 L/s; and
- SPS#1 will need to be expanded to a firm rated capacity of 670 L/s to accommodate ultimate flows resulting from the full build-out of known developments.

Based on this information, it appears that SPS#1 was operating at or beyond its firm capacity and upgrades have been performed to accommodate additional flows from future developments. Further upgrades to the capacity of SPS#1 will be required before the firm rated capacity of 400 L/s is exceeded and to accommodate the full build-out of the proposed subdivision.

According to the Design Brief for Sewage Pumping Station No. 9, Revision 3 prepared by Atriel Engineering Ltd., dated July 2020, the sanitary drainage area for Sanitary Pumping Station No. 9 (SPS#9) accounts for a portion of the Expansion Lands on the west side of Caron Street. In consultation with CCR, it was confirmed that the Expansion Lands and all future development lands west of Caron Street will be serviced by SPS#9 and future sanitary pumping stations.

A new Sanitary Pumping Station No. 10 (SPS#10) will be located within the proposed subdivision lands to service the Expansion Lands on the east side of Caron Street. All future development lands outside the urban boundary east of Caron Street, north of Baseline Road, and west of Clarence Creek will also be serviced by SPS#10. The sanitary flows from SPS#10 will be discharged to the deep sanitary trunk sewer beginning at the intersection of Caron Street and Darquise Street via a twin 450 mm diameter forcemain.

2.2.3 Wastewater Treatment Plant

The system of sanitary sewers and pumping stations collectively direct sanitary flows to a single WWTP that supports the Clarence-Rockland serviced area. CCR's WWTP is a secondary treatment facility based on sequencing batch reactor technology. Disinfection is provided by chlorination prior to discharge to the Ottawa River. Sludge is stabilized through an aerobic digestion process prior to storage on site and land application.

According to the Expansion Lands Secondary Plan – Master Servicing Study prepared by CIMA+, the current rated capacity of the WWTP is as follows:

- Rated Average Daily Flow Capacity of 6,800 m³/day;
- Rated Maximum Daily Flow Capacity of 17,340 m³/day; and a
- Rated Peak Flow Capacity of 20,400 m³/day.

Under existing peak flow conditions, the WWTP does not provide enough retention time for chlorination prior to discharging to the Ottawa River.

The Master Servicing Study states that CCR is undertaking the following upgrades to the WWTP to address capacity issues and provide for future growth:

- Increase the pumping capacity and conveyance capacity of Pumping Station No. 1 to 400 L/s; and
- Twinning the forcemain to convey an ultimate peak flow capacity of 850 L/s and for operation redundancy.
- Construction of a new headworks facility, complete with fine screening and grit removal system to improve both pre-treatment and secondary treatment effectiveness; and,
- Design and construction of an equalization tank, as previously identified within the longterm plan for the WWTP, to normalize peak flows from inflow and infiltration.

Since the completion of the Expansion Lands Secondary Plan – Master Servicing Study prepared by CIMA+, a Wastewater Master Plan Update was prepared by Jacobs, dated June 30, 2022. The Wastewater Master Plan Update states that at the time of reporting SPS#1 was under construction to install new pumps and a twinned forcemain to increase the firm rated capacity from 200 L/s to 400 L/s and to convey an ultimate peak flow capacity of 850 L/s respectively. The Wastewater Master Plan Update also states that the construction of a new headworks building including screening, grit removal, and an equalization tank was under construction, anticipated to be completed by 2024. Currently, it has been observed that the upgrades to SPS#1 and the construction of the new headworks facility have been completed. Confirmation of these upgrades and the capacity of the WWTP will be required prior to the development of the proposed subdivision.

2.3 Drainage and Storm Sewer System

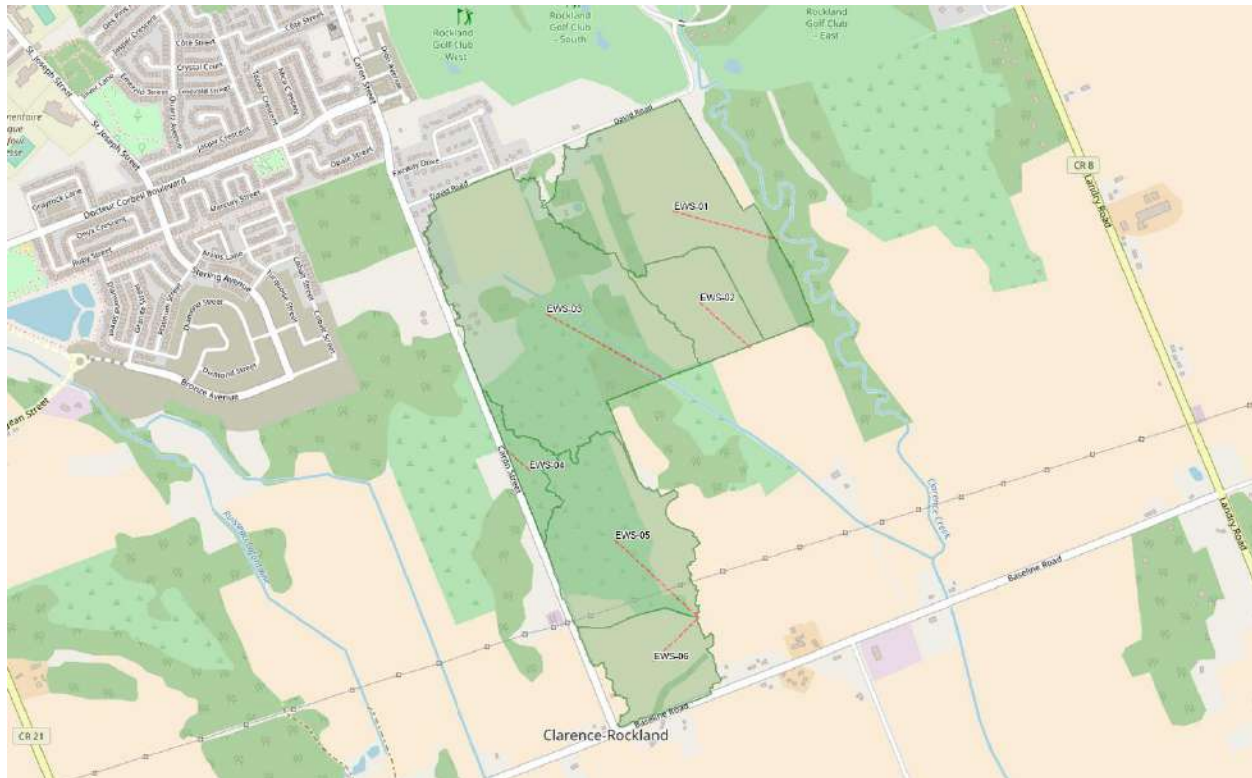
The pre-development condition of the proposed subdivision development area is rolling cultivated fields which drain to low areas and eventually to adjacent ditches and creeks. Clarence Creek is adjacent to the proposed subdivision and is a tributary to the Ottawa River.

Caron Street (north of David Road) has an urban cross section and manages runoff from the roadway through catch basins and storm sewers. Caron Street (south of David Road) and David Road have a rural cross section and handle runoff from the roadway by roadside ditches and culverts until a stormwater outfall is reached. Runoff from the cultivated lands flow overland and through drainage ditches until Clarence Creek is reached. No existing stormwater management (SWM) facilities were observed in the review of infrastructure servicing the proposed subdivision lands.

Pre-development storm watershed plans were prepared using the Topographic Survey for Part of Lots 21, 22 and 23 Concession 2 (Old Survey) prepared by Annis, O'Sullivan, Vollebakk Ltd. (AOV). The pre-development area consists of six (6) existing watersheds (EWS) that ultimately discharge to Clarence Creek in the East. For the development of the lands within the urban boundary, only EWS-01 through EWS-04 and a portion of EWS-05 are considered. EWS-06 represent lands outside the urban boundary planned for future development. See **Appendix D** for the Topographic Survey prepared by AOV and the Preliminary Pre-Development Storm Watershed Plans (SWM-1 and SWM-2) prepared by Lascelles.

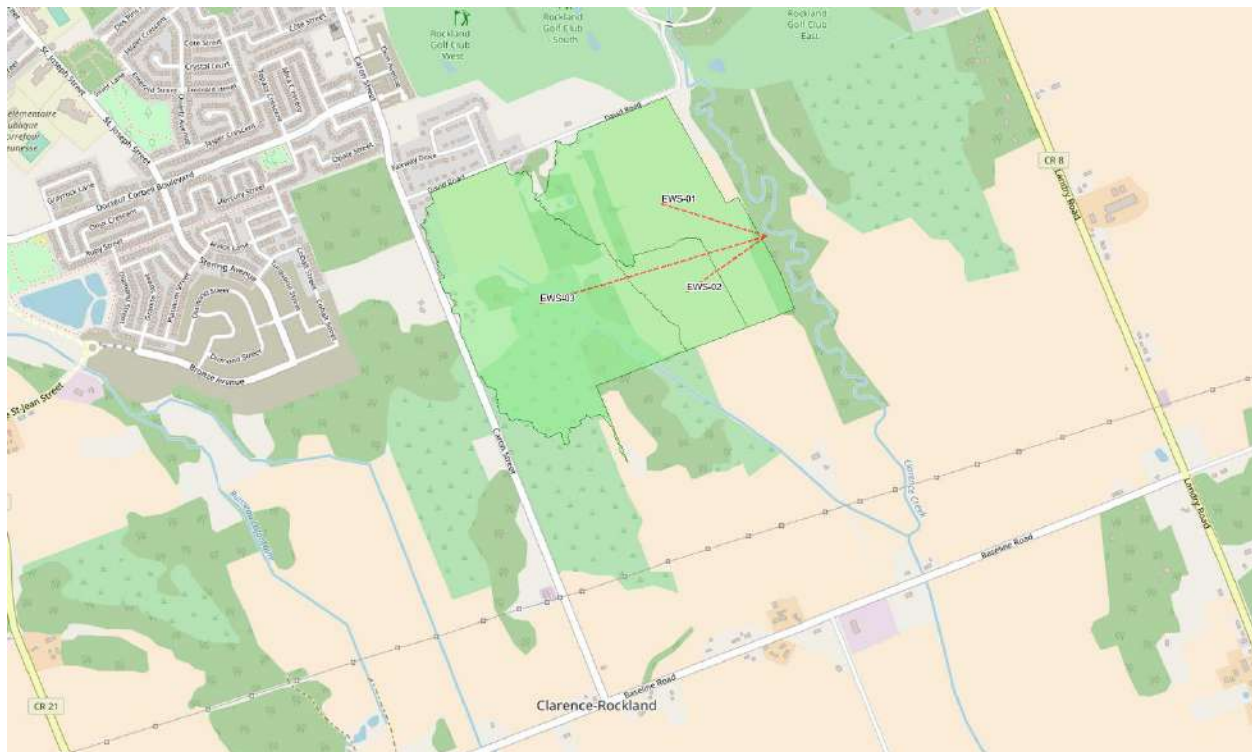
Preliminary stormwater runoff calculations were completed for the proposed subdivision under pre-development conditions using the parameters listed in Section 1.3.1 and from the City of Ottawa Sewer Design Guidelines. It was determined that pre-development lands ranged from approximately 0.03% to 6.79% impervious surfaces. Percent impervious parameters were estimated by measuring impervious areas (i.e. roofs, driveways and roadways) and comparing them to the total existing watershed areas. **Figure 2** below is a screenshot from the PCSWMM model used to estimate peak runoff. The peak runoff was estimated using the 24 hour 100-year SCS Type II design storm. The existing watersheds are labeled EWS-01 through EWS-06. Each watershed drains to an outlet which is identified by a red dashed line.

Figure 2: Pre-Development Model Existing Watersheds



For the purposes of this report, only the lands within the current urban boundary north of a natural topographic high point in the land will be included in the design of a SWM facility with an outlet into Clarence Creek. A SWM facility for the lands south of the natural topographic high point in the land will need to be designed as part of a separate Draft Plan of Subdivision once the urban boundary has been extended to Baseline Road. Therefore, for the design of a SWM facility with an outlet into Clarence Creek only the estimated peak runoff from existing watersheds EWS-01 through EWS-03 are required. To better reflect the actual peak flow that would be observed at an outlet into Clarence Creek, routing of EWS-02 and EWS-03 through drainage ditches and upstream of Clarence Creek was accounted for. **Figure 3** below is a screenshot from the PCSWMM model used to estimate the peak runoff to an outlet into Clarence Creek.

Figure 3: Pre-Development Model Existing Watersheds for SWM Facility Design



The resulting estimated pre-development peak flow for the design of a SWM facility managing flows from lands within the current urban boundary north of a natural topographic high point in the land is **6.38 m³/s**.

3 PROPOSED CONDITIONS

From a servicing perspective, this report will address how the proposed subdivision will increase water and wastewater demands, and how these demands will be accommodated by the municipal system. From a stormwater management perspective, this report will address how increased impervious surfaces and runoff will be conveyed and controlled to meet quantity, quality and erosion control criteria.

This section is provided to identify critical infrastructure required to service the proposed subdivision as it relates to the Lot Subdivision Concept Plan prepared by Fotenn presented in **Appendix A**. The following estimates are based on a high-level analysis of projected land use areas and densities as well as background reports and documents supplied by CCR.

At this time, the future population and demands for the proposed subdivision are not certain, but they have been estimated for the purposes of this report. Further analysis will be performed during the detailed design and approvals stage that will quantify water, sanitary and stormwater demands based on proposed phasing. These demands will be used to determine how the new development can be serviced through the existing infrastructure.

3.1 Population Estimate

Table 1 below shows the estimated population for the proposed subdivision used to develop water demands and sanitary flows.

Table 1: Development Population Estimate

| SSA Sewershed | Description of Area | Net Area (ha) | Net Density (units/ha) | Total Units | Persons per Unit | Population |
|---------------|---------------------------------------------------------|---------------|------------------------|-------------|------------------|-------------|
| SS-33A | Low Density Residential - Single/Semi Detached | 41.09 | 28 | 1151 | 3.4 | 3914 |
| SS-33A | Medium Density Residential - Traditional Townhouses | 13.47 | 39 | 530 | 2.7 | 1431 |
| SS-33A | High Density Residential - Stacked Townhouses | 6.51 | 100 | 651 | 2.1 | 1368 |
| SS-33A | High Density Residential - 4 Storey Apartment Buildings | 2.49 | 125 | 311 | 1.8 | 560 |
| SS-33A | Mixed Use - 4 Storey Apartment Building | 1.91 | 100 | 191 | 1.8 | 344 |
| TOTAL | | 65.46 | N/A | 2834 | N/A | 7617 |

The development population presented above is based on projected densities for specific land use areas provided by Fotenn and person per unit ratios as identified in CCR's design guidelines.

In addition to the residential population above, the proposed subdivision will also include commercial and institutional lands. Those lands are summarized in **Table 2** below.

Table 2: Development Commercial and Institutional Area

| SSA Sewershed | Description of Area | Net Area (ha) | Average Flow (m ³ /ha/day) | Peaking Factor |
|---------------|---------------------------------|---------------|---------------------------------------|----------------|
| SS-33A | Commercial & Services | 1.91 | 28 | 1.5 |
| SS-33A | Institutional (Community) Lands | 1.82 | 28 | 1.5 |
| SS-33A | Commercial Block | 4.31 | 28 | 1.5 |

In addition to the proposed subdivision, the developer also owns lands adjacent to the development. The population of these lands as well as the lands adjacent to the proposed subdivision must be accounted for in the sanitary flow calculation to ensure the flows can be accommodated by the existing municipal system. **Table 3** below shows the estimated population for the external lands adjacent to the proposed subdivision used to develop sanitary flows.

Table 3: External Population Estimate

| SSA Sewershed | Description of Area | Net Area (ha) | Net Density (units/ha) | Total Units | Persons per Unit | Population |
|---------------|--------------------------------------------------------------------------------------------------------|---------------|------------------------|-------------|------------------|------------|
| SS-32A | Existing Single-Family Homes on David Road, Green Avenue, Clubhouse Drive, Fairway Drive, Eagle Street | 18.00 | 3 | 58 | 3.4 | 198 |
| SS-32B | Townhomes - Future Golf Ridge Subdivision | N/A | N/A | 100 | 2.7 | 270 |
| SS-32B | 2BR Apartments - Future Golf Ridge Subdivision | N/A | N/A | 134 | 2.1 | 281.4 |
| SS-33C | Existing Single-Family Homes on David Road, adjacent to Expansion Lands | 1.30 | 5 | 6 | 3.4 | 21 |

| | | | | | | |
|--------------|-------------------------------------------------------------------------------------------|--------------|------------|-------------|------------|-------------|
| SS-33D | David Road CN 1446 & 1472 - Future High Density | 3.34 | 125 | 417 | 1.8 | 751 |
| SS-33E | Existing Single- Family Homes on Caron Street, adjacent to Expansion Lands | 2.89 | 4 | 12 | 3.4 | 41 |
| SS-36 | Mixed Density Residential - Land Outside Urban Boundary | 8.29 | 43 | 359 | 2.7 | 965 |
| TOTAL | | 33.82 | N/A | 1086 | N/A | 2527 |

The external population presented above is based on existing land use observed through UCPR GIS, projected high density and mixed density development areas and person per unit ratios as identified in CCR’s design guidelines, including known populations for newly constructed and future development areas received from local developers. The sanitary sewersheds noted in the tables above are shown on the SSA Sanitary Sewersheds (SAN-1) prepared by Lascelles in **Appendix C**.

3.2 Water Servicing

Future water demands for the proposed subdivision were estimated using the design criteria for watermains listed in Section 1.3.1, the Lot Subdivision Concept Plan prepared by Fotenn and the population estimate above. To ensure future water demands are accurately estimated for the proposed subdivision, the future high density external population that falls within the original Expansion Lands Secondary Plan is included in the water demand calculations. The future development south of the established utility easement is not included in the water demand calculations since this area is outside the urban boundary and is currently not considered in the total site area for the proposed subdivision. **Table 4** below summarises the person per unit type that was used for each land use presented in Section 3.1.

Table 4: Average Persons Per Unit

| Land Use Type | Unit Type | Persons Per Unit |
|----------------|-------------------------------------------------------|------------------|
| Low Density | Residential, Single & Semi-Detached | 3.4 |
| Medium Density | Residential, Traditional Townhouses | 2.7 |
| High Density | Residential, 2BR Stacked Townhouses, 2BR Apartment | 2.1 |
| High Density | Residential, Average Apartment | 1.8 |

Persons Per Unit as per City of Clarence-Rockland Design Guidelines (2023) Table 4-12, Average Persons per Unit (Residential Uses)

Based on the criteria above, the ultimate build out population of the proposed subdivision is approximately 7,617 persons. The following **Table 5** summarizes the design criteria used for the proposed subdivision. **Table 6** summarizes the expected domestic water demands for the proposed subdivision.

Table 5: Potable Water Supply Design Criteria - Subdivision

| Design Parameter | Value |
|------------------------------------------------|-----------------------------|
| Residential average daily demand | 350 L/d/person |
| Residential minimum hourly demand* | 0.50 x average daily demand |
| Residential maximum daily demand* | 2.00 x average daily demand |
| Residential peak hourly demand* | 3.00 x average daily demand |
| Commercial/Community average daily demand | 28,000 L/gross ha/d |
| Commercial maximum daily demand** | 1.5 x average daily demand |
| Commercial peak hourly demand** | 1.8 x maximum daily demand |
| Operating pressure range at peak hourly demand | 40 PSI to 100 PSI |
| Minimum operating pressure for domestic flow | 50 PSI |
| Minimum pressure under fire flow | 20 PSI |

* Residential max. daily & peak hour demand factors as per MECP Design Guidelines, Drinking Water System (2008) Table 3-1, Peaking Factors

** Commercial/Community max. daily & peak hour demand factors as City of Ottawa Design Guidelines – Water Distribution Table 4.2, Consumption Rates for Subdivisions of 501 to 3,000 Persons.

Residential

Average daily demand, $Q_{avg} = 350 \text{ L/d/person} \times 7,617 \text{ persons} = \mathbf{2,665,950 \text{ L/d}}$

Minimum hourly demand, $Q_{max} = 0.50 \times Q_{avg} = 0.50 \times 2,665,950 \text{ L/d} \times \text{d}/24\text{hr} = \mathbf{55,541 \text{ L/hr}}$

Maximum daily demand, $Q_{max} = 2.00 \times Q_{avg} = 2.00 \times 2,665,950 \text{ L/d} = \mathbf{5,331,900 \text{ L/d}}$

Maximum hourly demand, $Q_{peak} = 3.00 \times Q_{avg} = 3.00 \times 2,665,950 \text{ L/d} \times \text{d}/24\text{hr} = \mathbf{333,244 \text{ L/hr}}$

Commercial/Community

Average daily demand, $Q_{avg} = 28,000 \text{ L/gross ha/d} \times 8.03 \text{ ha} = \mathbf{224,840 \text{ L/d}}$

Maximum daily demand, $Q_{max} = 1.5 \times Q_{avg} = 1.5 \times 224,840 \text{ L/d} = \mathbf{337,260 \text{ L/d}}$

Maximum hourly demand, $Q_{peak} = 1.8 \times Q_{max} = 1.8 \times 337,260 \text{ L/d} \times \text{d}/24\text{hr} = \mathbf{24,295 \text{ L/hr}}$

Table 6: Domestic Water Demand Summary

| Residential | | |
|-----------------------------------|------------------|------------------------|
| Demand | Flow Rate | Flow Rate (L/s) |
| Average daily demand, Q_{avg} | 2,665,950 L/d | 30.9 |
| Minimum hourly demand, Q_{min} | 55,541 L/hr | 15.4 |
| Maximum daily demand, Q_{max} | 5,331,900 L/d | 61.7 |
| Maximum hourly demand, Q_{peak} | 333,244 L/hr | 92.6 |
| Commercial/Community | | |
| Demand | Flow Rate | Flow Rate (L/s) |
| Average daily demand, Q_{avg} | 224,840 L/d | 2.6 |
| Maximum daily demand, Q_{max} | 337,260 L/d | 3.9 |
| Maximum hourly demand, Q_{peak} | 24,295 L/hr | 7.0 |

Refer to **Appendix B** for details about the water demand calculations described herein.

As indicated in Section 2.1.2 above, it is estimated that the available capacity of the Caron Street Booster Station is 1,412 m³/day. When comparing the estimated Average Daily Consumption of the proposed subdivision, 33.5 L/s (2,890.79 m³/day), to the available capacity of the Caron Street Booster Station it appears there is insufficient capacity of the Caron Street Booster Station to meet the estimated water demand of the ultimate build out. The Expansion Lands Secondary Plan – Master Servicing Study prepared by CIMA+ recommends that by the year 2027, to be able to meet future water demand, the existing Caron Street Booster Station will have to undertake capacity upgrades.

It should be noted that the ultimate build out population of the proposed subdivision as estimated by CIMA+ in the Master Servicing Study was approximately 3,067 persons. This population appears to have been grossly underestimated based on the mixed density proposed in this study. The resulting Average Daily Consumption for a population of 3,067 persons is 12.4 L/s (1,073.95 m³/day). Furthermore, the Average Daily Consumption for the proposed commercial/community land uses in the Master Servicing Study as estimate by CIMA+ was 16.60 L/s. When comparing this value to the calculated demands for commercial/community land uses in the appendix to the study, it appears that a decimal place was incorrectly transposed from the appendix to the study. The calculated demand for commercial/community land uses in the study should be 1.66 L/s. Therefore, due to the gross underestimation of residential demands and the gross overestimation of commercial/community demands the resulting total Average Daily Consumption estimated by CIMA+ was 29.03 L/s (2,508.19 m³/day). Compared to the Average Daily Consumption of the proposed subdivision estimated by Lascelles, the Average Daily Consumption estimated by CIMA+ is only slightly less than what would realistically be expected for this development.

At the time of detailed design, the water system will be looped through the proposed subdivision. The specific connections and extensions of the water infrastructure to create a looped system will be determined at the detailed design stage. Furthermore, this development may be serviced by

a high pressure watermain. Individual services to each unit will likely require pressure reducing valves (PRVs) or PRVs will likely be required on the watermain within the right-of-way. See the Preliminary Water Distribution Plan (WM-1) prepared by Lascelles in **Appendix B** for a conceptual layout.

Fire flow requirements are not evaluated as part of this serviceability report. A fire flow analysis will be conducted at the time of detailed design.

Preliminary analysis and hydrant flow tests were performed to determine existing capacities and servicing opportunities for the proposed subdivision development. Based on this analysis and the hydrant flow tests performed, it does appear that there is currently insufficient capacity to meet the estimated water demand for the proposed subdivision development's ultimate build out. Therefore, Lascelles has requested aid from CCR to validate the approach / methodology to service this development within the greater context of all other proposed and on-going developments, capital upgrades, and demand from adjacent villages serviced by CCR's water distribution system. CCR's detailed water distribution system hydraulic model is maintained by their peer review consulting engineer, Jacobs. Collaboration with Jacobs, given their knowledge and experience with CCR's existing water distribution system and their ongoing mandates to improve the water distribution system's capacity, flows, and pressures for future developments, will ensure that the proposed subdivision development can meet the estimated water demand for the proposed subdivision development's ultimate build out. Lascelles will continue to collaborate with Jacobs during all stages of the proposed subdivision development's design so that CCR's hydraulic model can remain up to date with the development's requirements and objectives.

3.3 Sanitary Servicing

Preliminary sanitary demand calculations were completed for the proposed subdivision assuming ultimate build out, including future development areas. Demand was calculated by using the design criteria for sanitary sewers listed in Section 1.3.1, the Lot Subdivision Concept Plan prepared by Fotenn and the population estimate above.

In addition to the proposed subdivision, the developer also owns lands adjacent to the development. The population of these lands as well as the lands adjacent to the proposed subdivision must be accounted for in the sanitary flow calculation to ensure the flows can be accommodated by the existing municipal system. To ensure the proposed subdivision sanitary flows can be accommodated by the existing municipal system, the population of the developed lands adjacent to the proposed development and all known future development areas that contribute to the sanitary sewer beginning at SANMH201, at the intersection of Caron Street and Darquise Street, are accounted for.

The existing sanitary sewer on Caron Street, from SANMH201 onwards, was designed by WSP (Genivar) in 2013. This sanitary sewer was designed to accommodate six (6) proposed sanitary sewersheds represented by the names 26, 32, 33, 33b, 34 and 35 in the Proposed Sanitary Servicing Area (SK1.23) plan prepared by Genivar and dated January 23, 2013. The Sanitary Sewer Calculation Sheet prepared by WSP accompanying the Proposed Sanitary Servicing Areas plan (SK1.23) as well as the As-Built drawings are presented in **Appendix C**.

Since there has been development within the 2013 Genivar sewersheds noted above, Lascelles collected information from CCR, the UCPR GIS and the developers of neighbouring lands to determine how much external sanitary flow will be accepted at SANMH201. The results are summarized below:

- Sewershed 26 – represents the Clément Cove Subdivision which will contribute flow to SANMH201
- Sewershed 32 – has been split into 32A and 32B, where 32A represents the existing residential lots on Green Avenue, Clubhouse Drive, Fairway Drive, Eagle Street and the north side of David Road, and where 32B represents the future Golf Ridge Subdivision which will contribute flow to the new Sanitary Pumping Station No. 10
- Sewershed 33 – has been split into 33A, 33C, 33D and 33E, where 33A represents the proposed subdivision, 33C represents the existing residential lots on the south side of David Road, 33D represents CN 1446 & 1472 which are assumed to be developed into a high-density development in the future, and 33E represents the existing residential lots on the east side of Caron Street
- Sewershed 33b – per discussions with CCR, sewershed 33b will be developed with individual private septic systems and will not contribute to SANMH201
- Sewershed 34 – has been accounted for in the Design Brief for Sewage Pumping Station No. 9, Revision 3 prepared by Atriel Engineering Ltd., dated July 2020 and will not contribute to SANMH201
- Sewershed 35 – has been accounted for in the Design Brief for Sewage Pumping Station No. 9, Revision 3 prepared by Atriel Engineering Ltd., dated July 2020 and will not contribute to SANMH201

SK1.23 has been recreated with the updated sewersheds shown above and presented on SSA Sanitary Sewersheds (SAN-1) in **Appendix C**. Peak flows for these sewersheds are also shown on SAN-1 based on the populations in **Table 3** from Section 3.1 and the sanitary sewer design sheet (SAN-1) provided in **Appendix C**.

Due to the topography of the proposed subdivision, a new Sanitary Pumping Station No. 10 (SPS#10) will be required to service the proposed development. SPS#10 is proposed to be located in the eastern corner of the proposed subdivision, within the stormwater management block west of Clarence Creek. This location is the lowest point within the proposed subdivision, reducing the need for long deep sanitary sewers and a deep sanitary pumping station.

Based on the criteria above, the area that contributes sanitary flow to SPS#10 consists of the proposed subdivision, adjacent developed lands, and future development areas identified in the Preliminary Sanitary Sewershed Plan (SAN-2) prepared by Lascelles. The resulting population that contributes sanitary flow to SPS#10 is approximately **10,145 persons**. The population sanitary flow to SPS#10 is calculated to be **121.2 L/s** using the Harmon Peaking Factor Formula for residential land use. The gross commercial and community area within the proposed subdivision is approximately **8.03 ha**. The resulting commercial/community sanitary flow to SPS#10 is calculated to be **3.9 L/s** using a peaking factor of 1.5 for commercial/community land use. Lastly, the gross area of the lands that contribute sanitary flow to SPS#10 is approximately **141.57 ha**. The resulting infiltration into the system at SPS#10 is **39.6 L/s** using a general

allowance of 0.28 L/s/effective gross ha for new developments to account for wet-weather inflow into maintenance holes (MH) located outside of sag areas, and for infiltration into pipes and maintenance holes.

Therefore, the estimated peak sanitary flow to SPS#10 from the proposed subdivision, adjacent developed lands, and future development is calculated to be **164.7 L/s**.

As part of the Caron Street Reconstruction Project, a 450 mm diameter sanitary forcemain was installed in Caron Street. The existing forcemain is capped south of David Road and connected to the deep sanitary sewer at SAMH201. A new twin 450 mm diameter sanitary forcemain is proposed to convey the peak sanitary flow from SPS#10 to the existing forcemain installed in Caron Street. Currently, the existing forcemain is not in use and studies supporting its size were not provided with the Expansion Lands Secondary Plan – Master Servicing Study prepared by CIMA+. Further analysis will be performed at the detailed design stage to assess the capacity of the 450 mm diameter sanitary forcemain.

The population from the newly constructed Clément Cove Subdivision that contribute sanitary flow to SAMH201 is approximately **162 persons**. The population sanitary flow to SAMH201 from Clément Cove is calculated to be **1.9 L/s** using the Harmon Peaking Factor Formula for residential land use. The gross area of the lands that contribute sanitary flow to SANMH201 from Clément Cove is approximately **2.54 ha**. The resulting infiltration into the system at SAMH201 is **0.7 L/s** using a general allowance of 0.28 L/s/effective gross ha for new developments to account for wet-weather inflow into maintenance holes (MH) located outside of sag areas, and for infiltration into pipes and maintenance holes.

Therefore, the estimated peak sanitary flow to SAMH201 from the newly constructed Clément Cove Subdivision is calculated to be **2.6 L/s**.

Combining the results presented above, it is observed that the ultimate build out population that would contribute sanitary flow to SAMH201 is approximately **10,307 persons**. The population sanitary flow to SAMH201 is calculated to be **123.1 L/s**. The gross commercial and community area is approximately **13.82 ha**. The commercial/community sanitary flow to SAMH201 is calculated to be **6.7 L/s**. Lastly, the gross area that would contribute sanitary flow to SAMH201 is approximately **144.11 ha**. The resulting infiltration into the system at SAMH201 is **44.2 L/s**.

From discussions with CCR, no more than ninety percent (90%) of the installed capacity of the existing 750 mm diameter sanitary sewer between SANMH201 and SANMH202 can be used to service the proposed subdivision and adjacent developments.

Therefore, the estimated peak sanitary flow to SAMH201 from the proposed subdivision, adjacent developed lands, and future development is calculated to be **164.7 L/s**. Based on the information presented in the Caron Street Reconstruction Project As-Built Plans, a 750 mm diameter sanitary sewer with a 0.08% slope conveys sanitary flow from SAMH201 to the next downstream manhole (SAMH202) at the intersection of Caron Street and Docteur Corbeil Boulevard. The sanitary sewer system then continues north along Caron Street until it ultimately arrives at Pumping Station No. 1. The as constructed full flow capacity of the sanitary sewer from SAMH201 to SAMH202 is **314.9 L/s**. Accounting for a 10% factor of safety, the sanitary sewer from SAMH201 to SAMH202 can accommodate a peak flow no greater than **283.4 L/s**. Since the estimated peak

flow of **164.7 L/s** is lower than the maximum peak flow of **283.4 L/s**, to accommodate future growth in the City SPS#10 will be designed to accommodate an additional **109.4 L/s** designated for future development. Therefore, with the estimated peak flow of **164.7 L/s** plus an additional **109.4 L/s** for future development, the total peak sanitary flow that will be sent to SANMH201 is **283.4 L/s**.

For more details, refer to the sanitary design sheet SAN-1 in **Appendix C**.

The proposed subdivision has been subdivided into smaller sewersheds to estimate the size of the trunk sewer that will service the development into SPS#10. The sewersheds, manholes, sewers, pipe inverts, and twin 450mm diameter forcemain have been provided on the Preliminary Sanitary Sewershed Plan (SAN-2) in **Appendix C**. Proposed connection details into and out of SPS#10 are also shown on the Municipal Block Details (CD-1) drawing in **Appendix C**.

As indicated in Section 2.2 above, the WWTP and SPS#1 require capacity improvements to support the proposed subdivision. Currently, it has been observed that the upgrades to the WWTP and SPS#1 have been completed. Confirmation of these upgrades and the capacity of the WWTP will be required prior to the development of the proposed subdivision.

3.4 Storm Servicing and Stormwater Management

To direct drainage from future developed lots and roadways, a storm sewer system will need to be designed and constructed. The Rational Method was used to conduct a preliminary analysis for storm sewer sizing of the trunk sewers. Future runoff for the ultimate build out of the proposed subdivision was estimated using the design criteria for storm sewers and stormwater management listed in Section 1.3.1 and the Lot Subdivision Concept Plan prepared by Fotenn. Runoff coefficients used in this analysis are shown in **Table 7** below:

Table 7: Runoff Coefficients by Land Use

| Land Use | Runoff Coefficient |
|-------------------------------------------------------------|--------------------|
| Softscape (i.e. Parkland, grass, forest) | 0.20 |
| Single Dwelling Lot (ie. Existing single-family dwellings) | 0.40 |
| Low Density Area (ie. Single family (urban), semi-detached) | 0.40 |
| Medium Density Area (ie. Row housing, townhouses) | 0.60 |
| High Density Area (ie. Stacked townhomes) | 0.70 |
| High Density Area (ie. Apartment Buildings) | 0.70 |
| Typical Right-Of-Way (incl. sidewalks and boulevards) | 0.70 |
| Gravel (i.e. pathways, shoulders) | 0.70 |
| Commercial & Institutional (incl. mixed use blocks) | 0.80 |
| Hardscape (i.e. asphalt, buildings, concrete) | 0.90 |

The results of the preliminary analysis for storm sewer sizing of the trunk sewers can be found in **Appendix D** and are shown on the Preliminary Storm Watershed Plans (SWM-4) in **Appendix D**.

SWM facilities will be required within the proposed subdivision to meet quantity, quality, and erosion control criteria defined in CCR's design guidelines. As identified in Section 2.3, six (6) existing watersheds were identified from existing topographical information during a pre-development catchment analysis. Generally, the existing watersheds outlet near low spots within the proposed subdivision land but only three (3) have suitable outlets for future SWM facilities, EWS-01, EWS-05 and EWS-06, where EWS-05 and EWS-06 share the same suitable outlet.

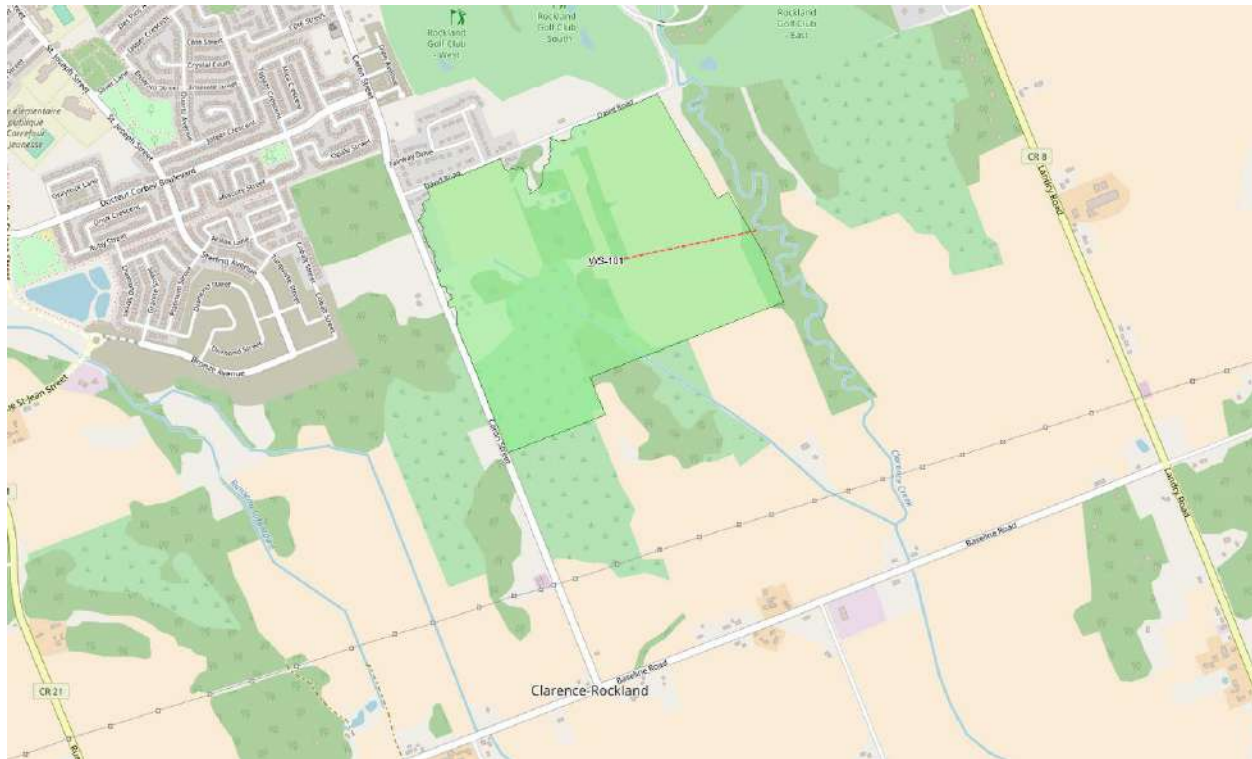
It was decided in the Master Servicing Study to limit the number of SWM facilities servicing the proposed subdivision to two facilities to reduce the future operation and maintenance costs. Furthermore, each facility would provide quality control for the entire catchment area serviced by it, but only quantity control for the low and medium density land use areas would be serviced by it. On-site quantity controls for the high density and commercial/community land use areas would be required at detailed design. However, to ensure SWM facilities are sufficiently sized for the proposed subdivision, the entire catchment area serviced by a SWM facility is included regardless of land use.

For the purposes of this report, only the lands within the current urban boundary north of a natural topographic high point in the land will be included in the design of a SWM facility. This SWM facility will be located adjacent to Clarence Creek at the lowest point of the development. The area that will be serviced by this facility is represented by watershed WS-101, consisting of the existing watersheds EWS-01 through EWS-03. The SWM facility for the lands south of the natural topographic high point in the land within EWS-04 through EWS-06, represented as WS-102, will need to be designed as part of a separate Draft Plan of Subdivision once the urban boundary has been extended to Baseline Road.

Preliminary stormwater runoff calculations were completed for the proposed subdivision under pre and post development conditions. Post development lands will increase to approximately 47% impervious surfaces based on the post development runoff coefficient of 0.53 determined for storm sewer sizing of the trunk sewers. Impervious surface area will be refined for the detailed design required for Draft Plan of Subdivision.

The computer software PCSWMM was used to model the estimated runoff and determine approximate storage volumes for the 24 hour 100-year SCS Type II design storm. **Figure 4** below is a screenshot from the PCSWMM model used to estimate the peak runoff for the post development scenario.

Figure 4: Post Development Model Watershed for SWM Facility Design



The estimated post development runoff from WS-101 is **17.709 m³/s**. The total estimated storage requirement for WS-101 to control the post development peak runoff rate to the pre-development peak runoff rate is approximately **28,639 m³**.

A SWM Facility meeting the following volumetric water quality criteria from the MECP Stormwater Management Planning and Design Manual is proposed:

- Enhanced Protection Level, 80% long-term S.S. removal;
- SWMP Type - Wet Pond; and
- 47% impervious level.

Based on these criteria, the total estimated storage requirement for WS-101 to provide enhanced stormwater protection is approximately **12,828 m³**, where this volume is provided within the permanent pool of the proposed wet pond. The extended detention storage required per SCS Method is estimated to be **10,579 m³**, where this volume is accounted for within the extended detention portion of the pond and making up part of the active storage volume required for the 24 hour 100-year SCS Type II design storm.

The total storage requirements are preliminary and will be confirmed/further optimized during the detailed design stage. The hydrograph produced by the PCSWMM model which shows the estimated storage volumes and respective release rates can be found in **Appendix D**.

4 DRY UTILITIES

The term dry utilities commonly refer to hydro, gas and communication infrastructure. Currently, there has been no correspondence with Owners of dry utility infrastructure that service the area. At the submission of the Draft Plan of Subdivision, the Owners of dry utility infrastructure will be consulted to determine design requirements and layout.

5 IMPLEMENTATION, PHASING AND COSTING

Based on the estimated demands for water and sanitary services, the ultimate buildout scenario for the proposed subdivision requires CCR to implement capacity upgrades to the following critical infrastructure:

- Water Treatment Plant;
- Caron Street Booster Station;
- Wastewater Treatment Plant; and
- Pumping Station No. 1.

Preliminary phasing of the proposed development sees the development being constructed through an 8-phase development strategy. For analysis purposes, three build-out horizons are considered; a 5-year horizon, a 10-year horizon, and an ultimate 17-year horizon.

Horizon #1 would see the construction of Phase 1 through Phase 2. In the first five years approximately 118 residential units/year (588 units) and 25,830 ft² gross floor area (GFA) of mixed use building commercial space would be constructed. To accommodate the proposed residential and commercial development in the first five years a SWM facility and sanitary pumping station, including deep trunk sewers and sanitary forcemain, would need to be constructed during this horizon. It is anticipated that the cost of this development would be “front loaded” since critical infrastructure that services the whole development up until ultimate buildout would need to be constructed within the first five years.

Horizon #2 would see the construction of Phase 1 through Phase 5. In ten years approximately 135 residential units/year (1,350 units) and 38,750 ft² GFA of mixed use building commercial space would be constructed. Since critical infrastructure would already be constructed within the first five years, the continued development would simply infill around this infrastructure, keeping development costs lower. By the end of this horizon, capacity upgrades to critical CCR infrastructure should be complete or nearing completion to ensure ultimate buildout can be achieved and serviced.

Horizon #3 would see the construction of Phase 1 through Phase 8. In seventeen years approximately 167 residential units/year (2,840 units), 73,190 ft² GFA of mixed use building commercial space, 60,820 ft² GFA of local node commercial plaza space, 101,000 ft² GFA of community node commercial plaza space, and a community / institutional facility (ie. high school) would be constructed. Before ultimate buildout and occupancy of the proposed development, capacity upgrades to critical CCR infrastructure must be complete to ensure ultimate buildout can be achieved and serviced.

The phasing of the proposed subdivision poses implications on the cost of developing the lands. Development considerations such as the design of stormwater management facilities, significant grading (cut and/or fill), sanitary pumping station and forcemain, and deep trunk sewers will require optimization during detailed design. A detailed Class "D" Cost Estimate will be developed during the detailed design of the proposed subdivision.

Following approval of the Lot Subdivision Concept Plan prepared by Fotenn and a Draft Plan of Subdivision, detailed phasing for the proposed subdivision can be confirmed. Preliminary phasing of the proposed development can be found in **Appendix A**.

6 CONCLUSIONS AND RECOMMENDATIONS

The report has described the existing conditions with respect to municipal infrastructure and the proposed municipal infrastructure for implementation of the proposed subdivision. The findings of this report are summarized as follows:

1. The proposed subdivision projected population used to estimate water demand was estimated at 7,617 people, and the proposed subdivision projected population used to estimate sanitary demand contributing to SAMH201 was estimated at 10,145 people.
2. Based on the Expansion Lands Secondary Plan – Master Servicing Study prepared by CIMA+, around the year 2027 CCR's WTP will be required to undertake capacity upgrades to meet further demand.
3. It appears there is insufficient capacity of the Caron Street Booster Station to meet the estimated water demand of the ultimate build out. Further investigation and analysis prior to development of the proposed subdivision is required to determine the appropriate capacity improvements and timing of the capacity improvements to support the proposed subdivision.
4. At the time of detailed design, the water system will be looped through the proposed subdivision. The specific connections and extensions of the water infrastructure to create a looped system shall be determined at the detailed design stage. Further analysis will be required to calculate individual fire flow rates and confirm that minimum and maximum pressure requirements are maintained under the various demand scenarios (i.e. maximum day + fire flow).
5. Accounting for a 10% factor of safety, the sanitary sewer from SAMH201 to SAMH202 can accommodate the estimated peak flow of 164.7 L/s plus an additional 109.4 L/s for future development, for a total of 283.4 L/s.
6. Confirmation of the capacity of Pumping Station No. 1 is required before development of the proposed subdivision.
7. A new Sanitary Pumping Station No. 10 will be required to provide sanitary servicing for the proposed subdivision. The flows from the pumping station will be discharged to a deep sanitary trunk sewer on Caron Street via a twin 450 mm diameter forcemain. The pumping station is planned to be located in the eastern corner of the proposed subdivision, within the stormwater management block west of Clarence Creek. Further analysis will be

required at the detailed design stage to assess the capacity of the existing 450 mm diameter forcemain in Caron Street.

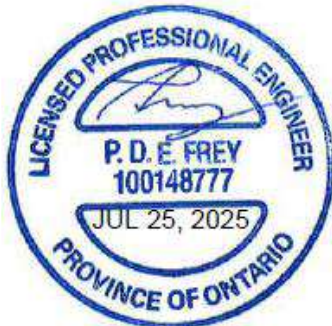
8. A flushing program for the proposed upstream sewers in the sanitary network may be required as a result of the sewers not achieving self cleansing velocity.
9. CCR is undertaking upgrades to the WWTP. It is anticipated that these modifications will improve the WWTP's ability to accommodate future growth within the City. Confirmation of the capacity of the WWTP is required before development of the proposed subdivision.
10. A SWM facility will be required to meet quality, quantity and erosion control criteria to comply with CCR's design guidelines. Significant grading (cut and fill) will be required to have the proposed subdivision drain to the SWM facility.

7 REPORT CONDITIONS AND LIMITATIONS

The conclusions and recommendations presented in this report are only applicable to the proposed subdivision as described in the report. Any changes to the proposed subdivision will require a review by Lascelles Engineering and Associates Ltd., to ensure compatibility of the design as well as the conclusions and recommendations presented for the proposed subdivision.

We trust this report provides sufficient information demonstrating the potential for an urban residential subdivision to be constructed in the City of Clarence-Rockland, Ontario. If you have any questions concerning this report or if we may be of further services to you, please do not hesitate to contact our office.

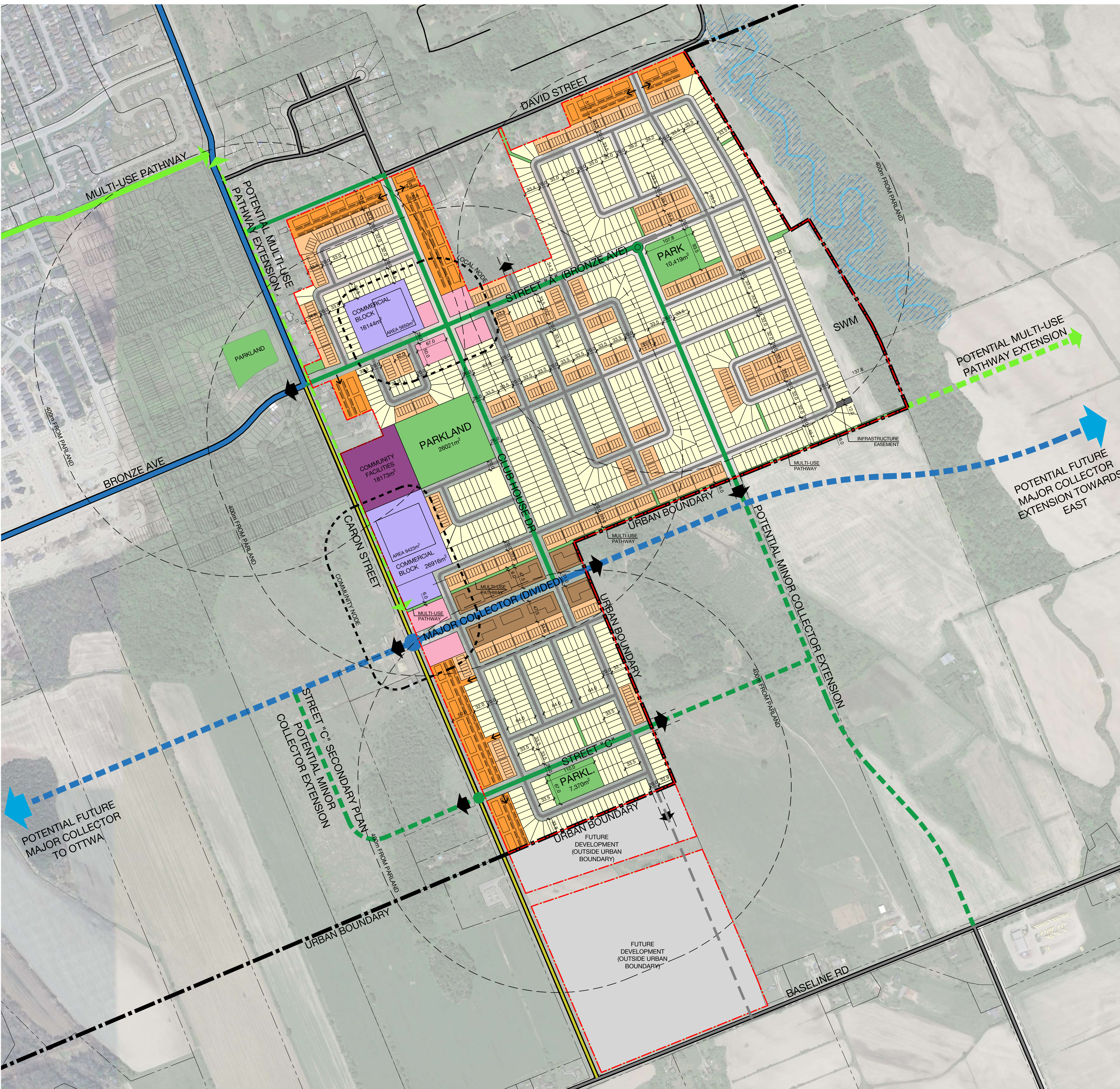
Prepared by:
Lascelles Engineering and Associates Ltd.



Paul Frey, P.Eng.
Civil Engineer

APPENDIX A

Lot Subdivision Concept Plan (Fotenn)
Draft Preliminary Phasing Plan



SITE INFORMATION

| | |
|-----------------------------|-----------------------------------|
| TOTAL SITE AREA: | 1,126,026m ² (112.6ha) |
| TOTAL SITE AREA (URBAN B.): | 1,084,353m ² (108.4ha) |
| GROSS LAND AREA*: | 801,816m ² (80.18ha) |
| NET DEVELOPABLE AREA**: | 697,632m ² (69.76ha) |

DEVELOPMENT STATISTICS

| | |
|---------------------------------|---------------------|
| SINGLE / SEMI-DETACHED | ~1,160 units |
| TRADITIONAL TOWNHOUSES | ~530 units |
| STACKED TOWNHOUSES | ~650 units |
| 4-STOREY APARTMENTS RESIDENTIAL | ~310 units |
| 4-STOREY APARTMENTS MIXED-USE | ~190 units |
| TOTAL | ~2,840 units |

PARKLAND DEDICATION

| | |
|-------------------------------|--------------------------------------|
| Required if density < 35u/Ha: | 40,209m ² (5%) |
| Required if density > 35u/Ha: | 94,667m ² (1Ha/300units*) |
| Maximum Provincial Bill 23: | 47,333m ² (1Ha/600units) |
| Provided: | ~43,811m ² (5.45%) |

*limited to 10% of the gross land area.

DENSITY PROVIDED

| | |
|-----------------|-------------------|
| Average: | Gross: 35.4 u/ha* |
| Low Density: | 62.8% |
| Medium Density: | 20.6% |
| High Density: | 16.6% |

*Total number of units divided by the gross land area.

STREET NETWORK LENGTH*

| | |
|-------------------|----------------|
| Local Streets: | 10,583m |
| Minor Collectors: | 2,644m |
| Major Collector: | 396m |
| Total: | 13,623m |

*Measured from street centerline.

STREET LENGTH x FRONTAGE RATIO

| | |
|-----------------------------------|---------|
| Total Frontage Length at Setback: | 21,580m |
| Frontage to Road Length Ratio*: | 1.26 |

*(Street length) / (frontage length at setback / 2)

NOTES

- The base plan (lot lines, existing roads and surrounding areas) is based on the City's Open Data and aerial images. The site area is approximate and all dimensions need to be confirmed by a legal survey.
- For the purpose of this concept, an average of 90m² (970sf) unit size is used to calculate approximate total number of units for apartment buildings.
- This concept makes assumptions based on preliminary environmental studies. Further environmental studies are required to validate and identify the qualities of the wetland and wooded areas shown and their potential development.
- Location of the stormwater management facilities is conceptual and should be confirmed by servicing studies.

*As per the By-law 2022-115, GROSS LAND AREA means the land area of the entire development site, including the parcel of land which is to be dedicated for park purposes, including any easements, driveways, parking areas, and stormwater management facilities etc., but excluding public and private roads, road rights-of-way, hazard lands, and areas that have been dedicated to the local municipality or other public agency for conservation or environmental protection.

**The NET DEVELOPABLE AREA assumes the total area of the site, excluding the space occupied by streets, parklands, environmentally sensitive areas, storm water ponds, pedestrian connections and community facilities.

Caron St Clarence- Rockland Lot Subdivision Concept Plan



LEGEND

- LOW DENSITY RESIDENTIAL - 28 unit/ha
- MEDIUM DENSITY RESIDENTIAL - 39 unit/ha STACKED TOWNHOUSES
- HIGH DENSITY RESIDENTIAL - 100 unit/ha 4-STOREY APARTMENT BUILDINGS
- HIGH DENSITY - RESIDENTIAL - 125 unit/ha 4-STOREY APARTMENT BUILDINGS
- HIGH DENSITY - MIXED-USE - 100 unit/ha COMMERCIAL & SERVICES + 4-STOREY APARTMENT BUILDING
- COMMUNITY FACILITIES SCHOOL, ARENA, OTHERS
- COMMERCIAL BLOCKS
- 30m BUFFER FROM CREEK
- WATER COURSE / CREEK
- STORMWATER MANAGEMENT POND APPROXIMATE LOCATION
- PARKLAND DEDICATION
- PROPERTY LINE
- URBAN BOUNDARY
- EXISTING MAJOR COLLECTOR
- PROPOSED MAJOR COLLECTOR
- POTENTIAL MAJOR COLLECTOR EXTENSION
- EXISTING MINOR COLLECTOR
- PROPOSED MINOR COLLECTOR
- POTENTIAL MINOR COLLECTOR EXTENSION
- EXISTING RURAL ARTERIAL
- EXISTING LOCAL STREET
- PROPOSED LOCAL STREET

| | | | | | |
|-----|--------------|------------|------|------|--|
| 0 | 50m | 100m | 200m | 350m | |
| 11 | REVISIONS | 2025.04.22 | DM | | |
| 10 | REVISIONS | 2025.02.11 | MZ | | |
| 01 | CONCEPT PLAN | 2024.05.13 | RG | | |
| No. | REVISION | DATE | BY | | |

CLIENT
MAISONS SACA HOMES
FOTENN
Planning + Design

420 O'Connor St, Ottawa ON K2P 1W4
613.730.5709 www.fotenn.com

DESIGNED RG
REVIEWED TS
DATE 2024.11.05

Caron St Clarence- Rockland Lot Subdivision Concept Plan



LEGEND

- 30m BUFFER FROM CREEK
- WATER COURSE / CREEK
- STORMWATER MANAGEMENT POND APPROXIMATE LOCATION
- PROPERTY LINE
- URBAN BOUNDARY
- EXISTING MAJOR COLLECTOR
- PROPOSED MAJOR COLLECTOR
- POTENTIAL MAJOR COLLECTOR EXTENSION
- EXISTING MINOR COLLECTOR
- PROPOSED MINOR COLLECTOR
- POTENTIAL MINOR COLLECTOR EXTENSION
- EXISTING RURAL ARTERIAL
- EXISTING LOCAL STREET
- PROPOSED LOCAL STREET
- PHASE 1
- PHASE 2
- PHASE 3A
- PHASE 3B
- PHASE 4
- PHASE 5
- PHASE 6
- PHASE 7

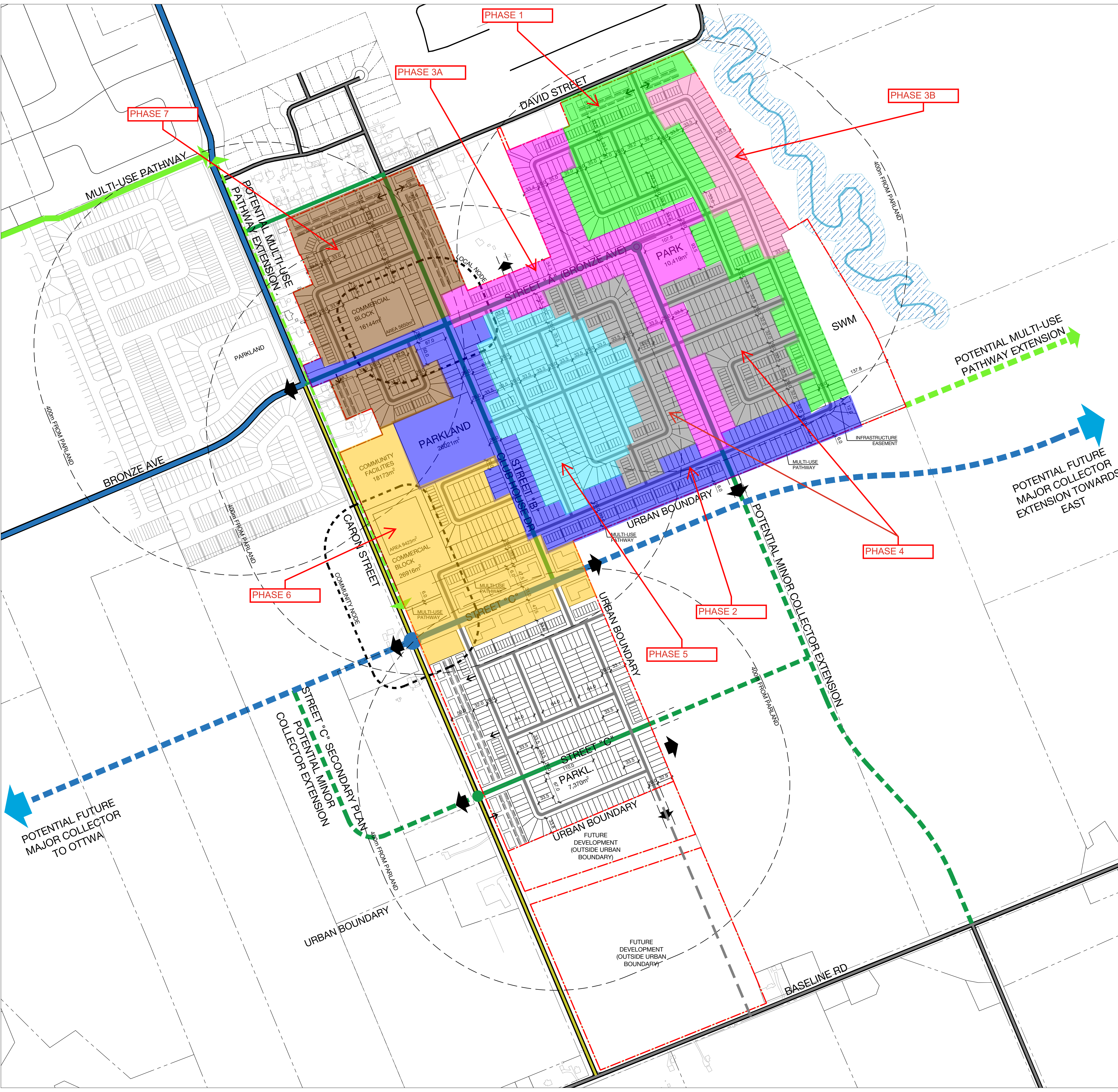
| | | | |
|-----|----------|------------|----|
| 02 | PHASING | 2025.01.30 | MZ |
| 01 | PHASING | 2025.01.20 | MZ |
| No. | REVISION | DATE | BY |

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| | |
|----------|------------|
| DESIGNED | RG |
| REVIEWED | TS |
| DATE | 2024.11.05 |

P2



APPENDIX B

Water Distribution System

2024 Summary Report by Ontario Clean Water Agency (OCWA)
Preliminary Water Distribution Plan (WM-1)
Water Demand Calculations (Residential and Commercial/Institutional)
Hydrant Flow Test Results

Rockland Drinking Water System

Waterworks # 21000639
System Category – Large Municipal Residential

Annual Water Report

Prepared For:
The Corporation of the City of Clarence Rockland

Reporting Period of January 1st – December 31st 2024

Issued: February 24, 2025

Revision: 0



This report has been prepared to satisfy the annual reporting requirements in O.Reg 170/03 Section 11 and Schedule 22

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Revision History

| Date | Revision # | Revision Notes |
|-------------------|------------|----------------------|
| February 24, 2025 | 0 | Issued Annual Report |

Report Availability

This system serves more than 10,000 residents therefore the annual reports shall be made available publicly to residents of The Corporation of the City of Clarence-Rockland. Notification should be made available on the municipal website and copies provided free of charge if requested at the Municipal Office located at, 1560 Laurier St. Rockland On. K4K 1P7.

Compliance Report Card

| Compliance Event | # of Events |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Ministry of Environment Inspections | Inspection - January 24, 2024 – Reported in 2023 Annual Report Inspection – January 28, 2025 – Report not received |
| Ministry of Labour Inspections | 0 |
| QEMS External Audit | 1 Desktop Audit |
| AWQIs | 0 |
| Non-Compliance | 0 |
| Community Complaints | 12 |
| Watermain Breaks & Service Repairs | 5 |

System Process Description

Raw Source

Raw water source for the Rockland Drinking Water System is the Ottawa River as per Permit to Take Water #3168-B2JK5N expiring on June 30th 2028. Raw water intake facility consists of a 630mm HDP# Series 45 pipe extending approximately 126 meters from the low lift pumping station into the Ottawa river. Water is conveyed to the water treatment facility by one of 3 vertical turbine pumps.

Treatment

The Clarence Rockland Water Treatment Plant is a 13,500 m³/day conventional filtration type treatment plant with Actiflo® pre-treatment. The Plant is located at 125 Edwards Street in Rockland and services the City of Clarence Rockland and five Hamlets (Clarence Creek, St-Pascal Baylon, Hammond, Bourget and Cheney). The facility consists of the following components; Raw water intake obtained from the Ottawa River. A low lift pumping station including three vertical turbine pumps. Water is directed to two Actiflo® units followed by two rapid dual media gravity filters of sand and anthracite. Filtered water is disinfected and passed through a UV system consisting of two units. A baffled chlorine contact tank of 233.5 m³ and two reservoirs having a total capacity of 471 m³. Secondary disinfection is achieved via chloramination at the discharge of the plant.

Treatment Chemicals used during the reporting year:

| Chemical Name | Use | Supplier |
|---------------------------------------|--------------------------------------------|---------------------|
| Sodium Hydroxide 50% | Pre and Post pH adjustment | Sodrox |
| Aluminium Chloride Sulphate (PAX-XL6) | Coagulant | Kemira |
| Polymer - Praestol DW27AG | Flocculation Agent | Northland chemicals |
| Sodium Hypochlorite | Post Disinfection | UBA |
| Ammonium Sulphate | Secondary Disinfection "Chloramination" | Brenntag |

Distribution

Water is pumped into the distribution system by four centrifugal high lift pumps. A Booster Station with three centrifugal pumps is used for the water demand of the Hamlets. The rate of water supplied is based on the three elevated water tower storage tanks and demand from the City of Clarence-Rockland and its Hamlets.

Summary of Non-Compliance

Adverse Water Quality Incidents

| Date | AWQI # | Issue |
|------------------------------|--------|-------|
| No AWQI Issued for this year | | |

Non-Compliance

| Legislation | requirement(s) system failed to meet | Details | Corrective Action | Status |
|----------------------------------------|--------------------------------------------|---------|-------------------|--------|
| No Non-Compliance Issued for this year | | | | |

Non-Compliance Identified in a Ministry Inspection:

| Legislation | requirement(s) system failed to meet | duration of the failure (i.e. date(s)) | Corrective Action | Status |
|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------|----------------------------------------|-------------------|--------|
| Inspection - January 24, 2024 – Reported in 2023 Annual Report Inspection – January 28, 2025 – Report not received | | | | |

Flows

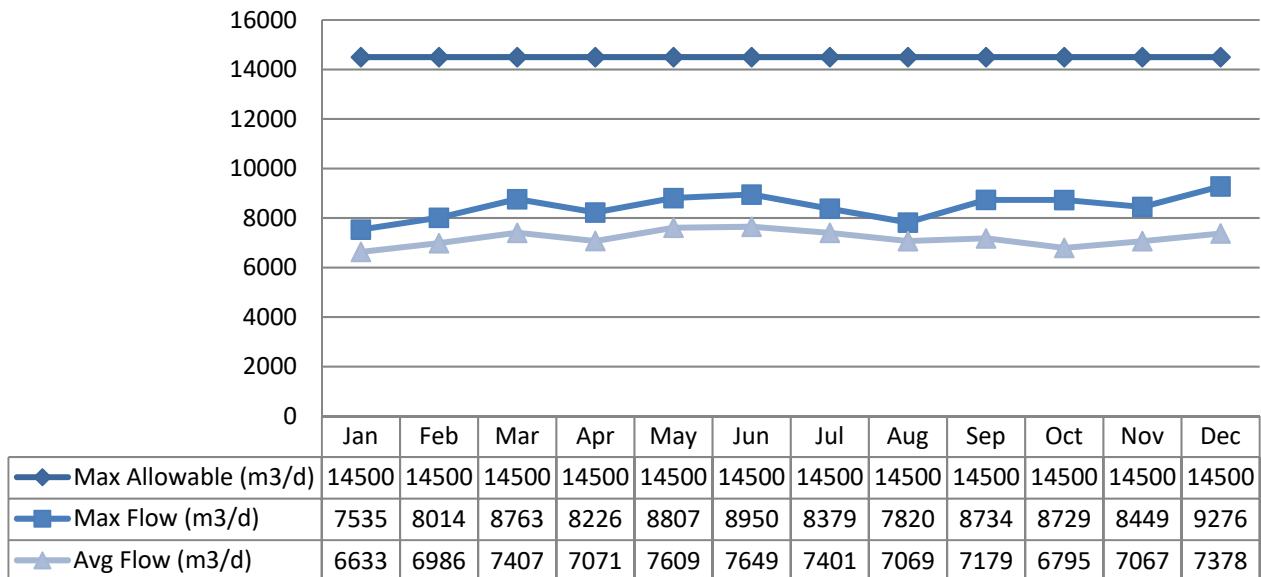
The Rockland Drinking Water System is operating on average under half the rated capacity. During summer peak demands both actiflo units are required to work in order to meet demand and fire capacity levels in the water tower reservoirs.

Raw Water Flows

The Raw Water flows are regulated under the Permit to Take Water Ontario Regulation 387/04. Water Taking and Transfers requires all water takers to report daily water taking amounts to the Water Taking Reporting System (WTRS) electronic database. The 2024 Raw Flow Data was submitted to the Ministry electronically under permit PTTW #3168-B2JK5N. The confirmation and a copy of the data that was submitted are attached in Appendix A.

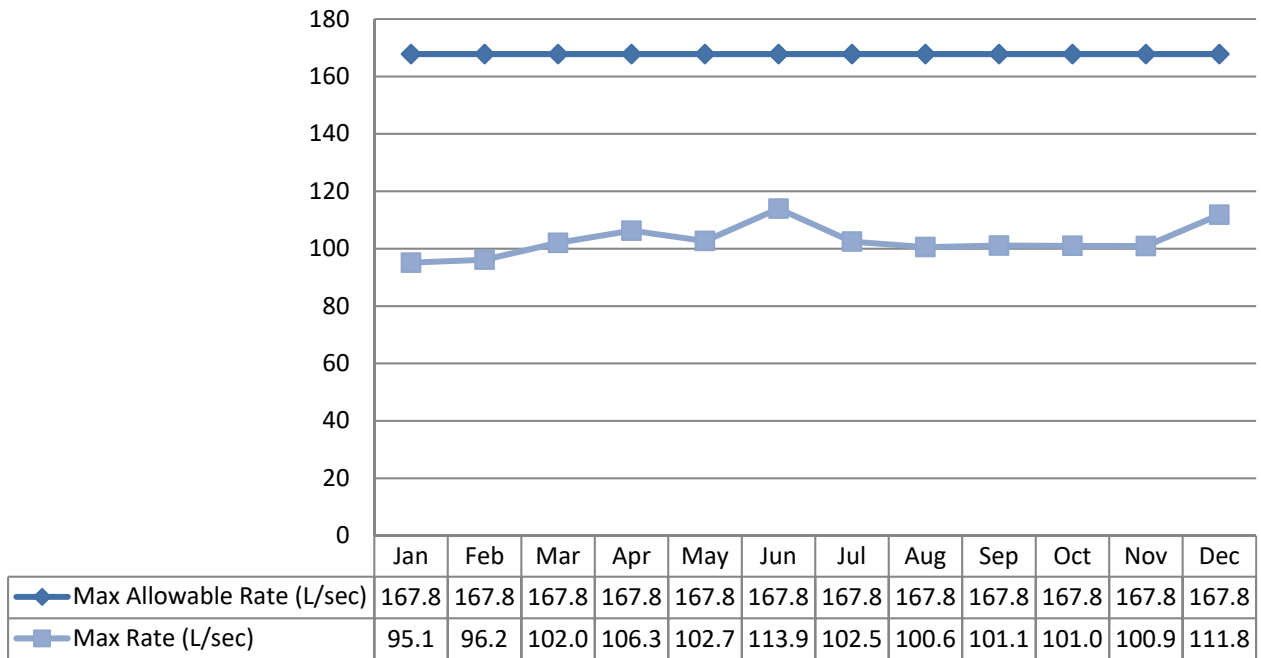
Total Monthly Flows (m3/d)

Max Allowable PTTW 14500 m3/d



Monthly Rated Flows (L/s)

Max allowable rate - PTTW 167.8 L/sec

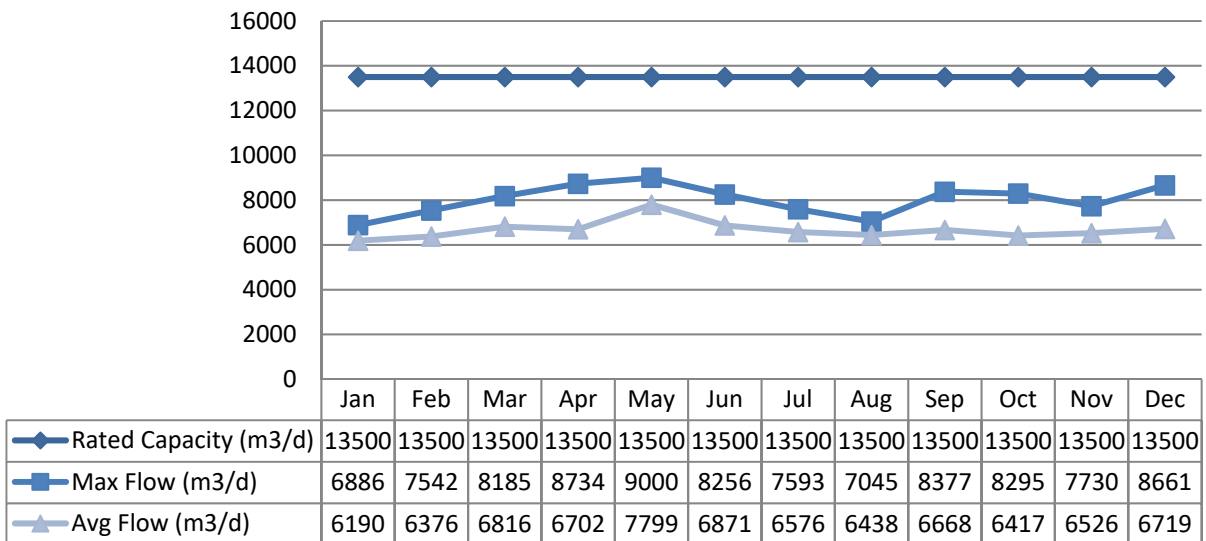


Treated Water Flows

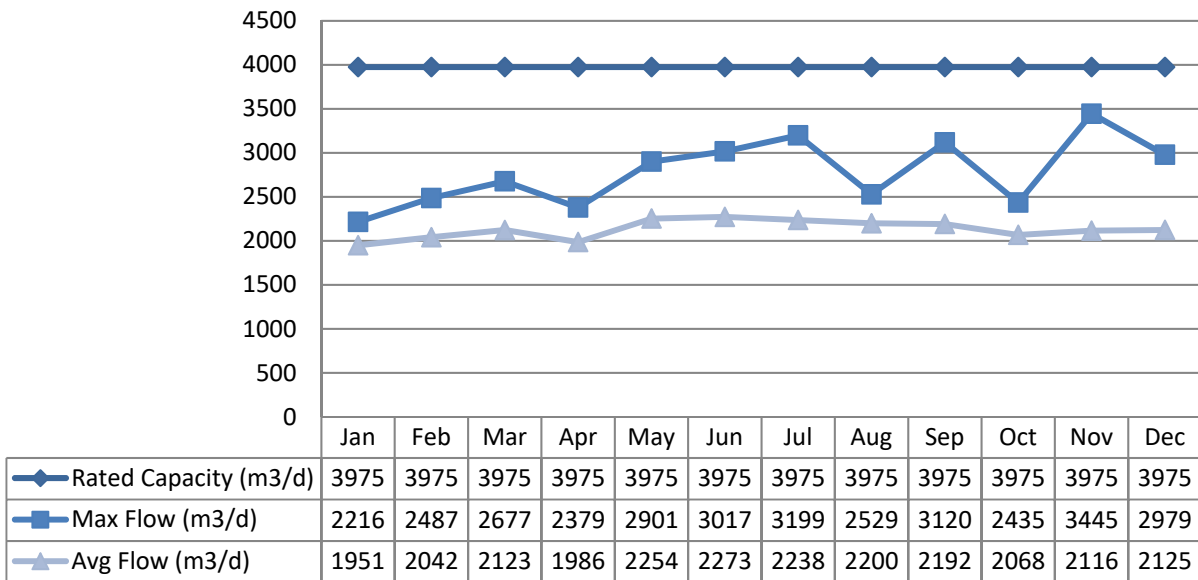
The Treated Water flows are regulated under the Municipal Drinking Water Licence Number: 175-101 Issue Number: 5

Monthly Rated Flows

Rated Capacity – MDWL WTP 13,500m³/day



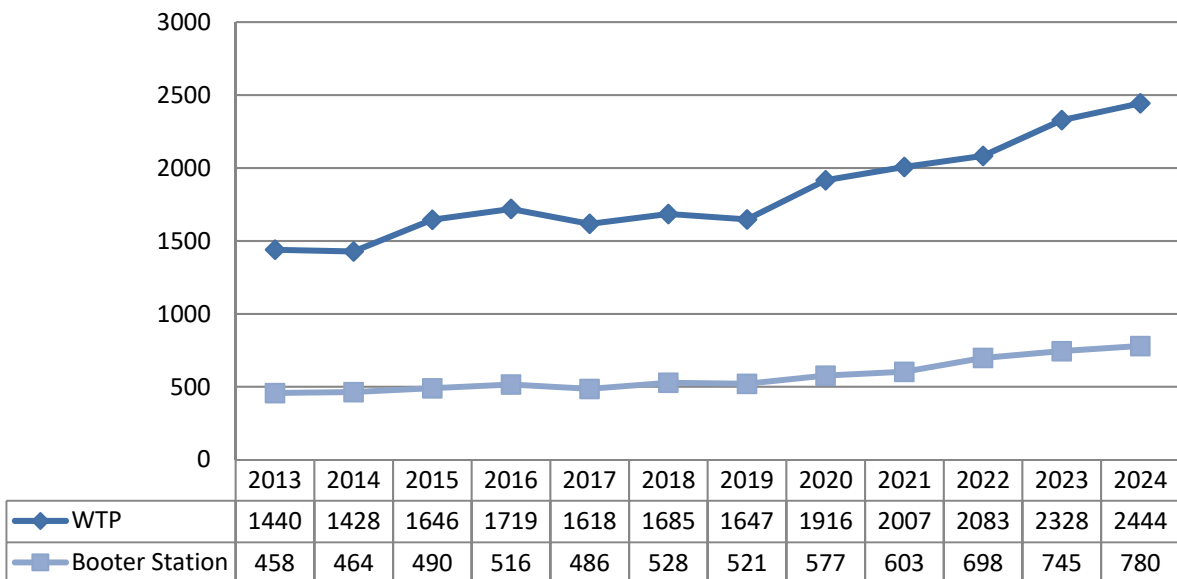
Rated Capacity – MDWL Booster Pumping Station 3,975 m3/day



Annual Total Flow Comparison

Please note that the booster station flows are included in the treated water WTP flows, and all flows are represented here as megalitres.

Total Annual ML



Regulatory Sample Results Summary

Microbiological Testing

| | No. of Samples Collected | Range of E.Coli Results | | Range of Total Coliform Results | | Range of HPC Results | |
|--------------------|--------------------------|-------------------------|-----|---------------------------------|-------|----------------------|-----|
| | | Min | Max | Min | Max | Min | Max |
| Raw Water | 53 | 0 | 168 | 40 | 11200 | N/A | N/A |
| Treated Water | 53 | 0 | 0 | 0 | 0 | 2 | 6 |
| Distribution Water | 447 | 0 | 0 | 0 | 11 | 2 | 4 |

Operational Testing

| | No. of Samples Collected | Range of Results | |
|---------------------------------------------------------------|--------------------------|------------------|---------|
| | | Minimum | Maximum |
| Turbidity, In-House (NTU) - RW | 157 | 2.5 | 34.5 |
| Turbidity, On-Line (NTU) - TW | 8760 | 0.16 | 0.29 |
| Turbidity, On-Line (NTU) – Filter #1 | 8760 | 0.02 | 0.71 |
| Turbidity, On-Line (NTU) – Filter #2 | 8760 | 0.01 | 0.62 |
| Free Chlorine Residual, On-Line (mg/L) - TW | 8760 | 1 | 2.31 |
| Combined Chlorine Secondary Disinfection, On-Line (mg/L) – TW | 8760 | 0.82 | 3.03 |
| Combined Chlorine Residual, On-Line (mg/L) – DW | 8760 | 0.91 | 2.3 |

NOTE: spikes recorded by on-line instrumentation were a result of air bubbles and various maintenance/calibration activities. All spikes are reviewed for compliance with O.Reg 170/03

Inorganic Parameters

These parameters are tested as a requirement under 170/03. Sodium and Fluoride are required to be tested every 5 years. Nitrate and Nitrite are tested quarterly and the metals are tested annually as required under 170/03. In the event any of the parameters exceed half of the maximum allowable concentration the parameter is required to be sampled quarterly.

- MAC = Maximum Allowable Concentration as per O.Reg 169/03
- <MDL = Below the laboratory detection level

| | Sample Date (yyyy/mm/dd) | Sample Result | MAC | No. of Exceedances | |
|--------------------------|--------------------------|---------------|--------|--------------------|---------|
| | | | | MAC | 1/2 MAC |
| Treated Water | | | | | |
| Antimony: Sb (ug/L) - TW | 2024/07/16 | <MDL 0.1 | 6.0 | No | No |
| Arsenic: As (ug/L) - TW | 2024/07/16 | 0.2 | 25.0 | No | No |
| Barium: Ba (ug/L) - TW | 2024/07/16 | 16.0 | 1000.0 | No | No |
| Boron: B (ug/L) - TW | 2024/07/16 | 8.0 | 5000.0 | No | No |
| Cadmium: Cd (ug/L) - TW | 2024/07/16 | <MDL 0.015 | 5.0 | No | No |
| Chromium: Cr (ug/L) - TW | 2024/07/16 | <MDL 1.0 | 50.0 | No | No |
| Mercury: Hg (ug/L) - TW | 2024/07/16 | <MDL 0.02 | 1.0 | No | No |
| Selenium: Se (ug/L) - TW | 2024/07/16 | <MDL 1.0 | 50.0 | No | No |

| | Sample Date (yyyy/mm/dd) | Sample Result | MAC | No. of Exceedances | |
|------------------------------|-----------------------------|---------------|------|--------------------|---------|
| | | | | MAC | 1/2 MAC |
| Uranium: U (ug/L) - TW | 2024/07/16 | <MDL 0.05 | 20.0 | No | No |
| Additional Inorganics | | | | | |
| Fluoride (mg/L) - TW | 2024/04/02 | <MDL 0.1 | 1.5 | No | No |
| Nitrite (mg/L) - TW | 2024/01/22 | <MDL 0.05 | 1.0 | No | No |
| Nitrite (mg/L) - TW | 2024/04/02 | <MDL 0.05 | 1.0 | No | No |
| Nitrite (mg/L) - TW | 2024/07/02 | <MDL 0.05 | 1.0 | No | No |
| Nitrite (mg/L) - TW | 2024/10/8 | <MDL 0.05 | 1.0 | No | No |
| Nitrate (mg/L) - TW | 2024/01/22 | 0.23 | 10.0 | No | No |
| Nitrate (mg/L) - TW | 2024/04/02 | 0.25 | 10.0 | No | No |
| Nitrate (mg/L) - TW | 2024/07/02 | 0.31 | 10.0 | No | No |
| Nitrate (mg/L) - TW | 2024/10/8 | 0.16 | 10.0 | No | No |
| Sodium: Na (mg/L) - TW | 2024/04/02 | 10.9 | 20* | N/A | N/A |

*There is no "MAC" for Sodium. The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified mg/L when the sodium concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium restricted diets.

Schedule 15 Sampling:

The Schedule 15 Sampling is required under O.Reg 170/03. This system is under reduced sampling. No plumbing samples were collected.

| Distribution System | Number of Sampling Points | Number of Samples | Range of Results | | MAC (ug/L) | Number of Exceedances |
|---------------------|---------------------------|-------------------|------------------|---------|------------|-----------------------|
| | | | Minimum | Maximum | | |
| Alkalinity (mg/L) | 4 | 8 | 25 | 41 | N/A | N/A |
| pH | 4 | 8 | 6.9 | 7.3 | N/A | N/A |
| Lead (mg/L) | 4 | 8 | N/A | N/A | 10 | N/A |

Organic Parameters

These parameters are tested annually as a requirement under O.Reg 170/03. In the event any of the parameters exceed half of the maximum allowable concentration the parameter is required to be sampled quarterly.

| TREATED WATER | Sample Date (yyyy/mm/dd) | Sample Result | MAC | No. of Exceedances | |
|---------------------------------------------------|-----------------------------|---------------|------|--------------------|---------|
| | | | | MAC | 1/2 MAC |
| Alachlor (ug/L) - TW1 | 2024/07/16 | < 0.3 | 5.0 | No | No |
| Atrazine + N-dealkylated metabolites (ug/L) - TW1 | 2024/07/16 | < 0.5 | 5.0 | No | No |
| Azinphos-methyl (ug/L) – TW1 | 2024/07/16 | < 1.0 | 20.0 | No | No |
| Benzene (ug/L) - TW1 | 2024/07/16 | < 0.5 | 1.0 | No | No |
| Benzo(a)pyrene (ug/L) - TW1 | 2024/07/16 | < 0.006 | 0.01 | No | No |
| Bromoxynil (ug/L) - TW1 | 2024/07/16 | < 0.5 | 5.0 | No | No |
| Carbaryl (ug/L) - TW1 | 2024/07/16 | < 3.0 | 90.0 | No | No |
| Carbofuran (ug/L) - TW1 | 2024/07/16 | < 1.0 | 90.0 | No | No |
| Carbon Tetrachloride (ug/L) - TW1 | 2024/07/16 | < 0.2 | 2.0 | No | No |
| Chlorpyrifos (ug/L) - TW1 | 2024/07/16 | < 0.5 | 90.0 | No | No |

| TREATED WATER | Sample Date (yyyy/mm/dd) | Sample Result | MAC | No. of Exceedances | |
|---------------------------------------------------------|-----------------------------|------------------|-------|--------------------|---------|
| | | | | MAC | 1/2 MAC |
| Diazinon (ug/L) - TW1 | 2024/07/16 | < 1.0 | 20.0 | No | No |
| Dicamba (ug/L) - TW1 | 2024/07/16 | < 1.0 | 120.0 | No | No |
| 1,2-Dichlorobenzene (ug/L) - TW1 | 2024/07/16 | < 0.5 | 200.0 | No | No |
| 1,4-Dichlorobenzene (ug/L) - TW1 | 2024/07/16 | < 0.5 | 5.0 | No | No |
| 1,2-Dichloroethane (ug/L) - TW1 | 2024/07/16 | < 0.5 | 5.0 | No | No |
| 1,1-Dichloroethylene (ug/L) - TW1 | 2024/07/16 | < 0.5 | 14.0 | No | No |
| Dichloromethane (Methylene Chloride) (ug/L) - TW1 | 2024/07/16 | < 5.0 | 50.0 | No | No |
| 2,4-Dichlorophenol (ug/L) - TW1 | 2024/07/16 | < 0.2 | 900.0 | No | No |
| 2,4-Dichlorophenoxy acetic acid (2,4-D) (ug/L) - TW1 | 2024/07/16 | < 1.0 | 100.0 | No | No |
| Diclofop-methyl (ug/L) - TW1 | 2024/07/16 | < 0.9 | 9.0 | No | No |
| Dimethoate (ug/L) - TW1 | 2024/07/16 | < 1.0 | 20.0 | No | No |
| Diquat (ug/L) - TW1 | 2024/07/16 | < 5.0 | 70.0 | No | No |
| Diuron (ug/L) - TW1 | 2024/07/16 | < 5.0 | 150.0 | No | No |
| Glyphosate (ug/L) - TW1 | 2024/07/16 | < 25.0 | 280.0 | No | No |
| Malathion (ug/L) - TW1 | 2024/07/16 | < 5.0 | 190.0 | No | No |
| Metolachlor (ug/L) - TW1 | 2024/07/16 | < 3.0 | 50.0 | No | No |
| Metribuzin (ug/L) - TW1 | 2024/07/16 | < 3.0 | 80.0 | No | No |
| Monochlorobenzene (Chlorobenzene) (ug/L) - TW1 | 2024/07/16 | < 0.5 | 80.0 | No | No |
| Paraquat (ug/L) - TW1 | 2024/07/16 | < 1.0 | 10.0 | No | No |
| PCB (ug/L) - TW1 | 2024/07/16 | < 0.05 | 3.0 | No | No |
| Pentachlorophenol (ug/L) - TW1 | 2024/07/16 | < 0.2 | 60.0 | No | No |
| Phorate (ug/L) - TW1 | 2024/07/16 | < 0.3 | 2.0 | No | No |
| Picloram (ug/L) - TW1 | 2024/07/16 | < 5.0 | 190.0 | No | No |
| Prometryne (ug/L) - TW1 | 2024/07/16 | < 0.1 | 1.0 | No | No |
| Simazine (ug/L) - TW1 | 2024/07/16 | < 0.5 | 10.0 | No | No |
| Terbufos (ug/L) - TW1 | 2024/07/16 | < 0.5 | 1.0 | No | No |
| Tetrachloroethylene (ug/L) - TW1 | 2024/07/16 | < 0.5 | 10.0 | No | No |
| 2,3,4,6-Tetrachlorophenol (ug/L) - TW1 | 2024/07/16 | < 0.2 | 100.0 | No | No |
| Triallate (ug/L) - TW1 | 2024/07/16 | < 10.0 | 230.0 | No | No |
| Trichloroethylene (ug/L) - TW1 | 2024/07/16 | < 0.5 | 5.0 | No | No |
| 2,4,6-Trichlorophenol (ug/L) - TW1 | 2024/07/16 | < 0.2 | 5.0 | No | No |
| 2-methyl-4-chlorophenoxyacetic acid (MCPA) (ug/L) - TW1 | 2024/07/16 | < 10.0 | 100.0 | No | No |
| Trifluralin (ug/L) - TW1 | 2024/07/16 | < 0.5 | 45.0 | No | No |
| Vinyl Chloride (ug/L) - TW1 | 2024/07/16 | < 0.2 | 1.0 | No | No |

| DISTRIBUTION WATER | Sample Date (yyyy/mm/dd) | Sample Result | MAC | Number of Exceedances | |
|----------------------------------------------------------|-----------------------------|------------------|-------|-----------------------|---------|
| | | | | MAC | 1/2 MAC |
| Trihalomethane: Total (ug/L) Annual Running Average - DW | 2024 | 43.5 | 100.0 | No | No |
| HAA Total (ug/L) Annual Running Average - DW | 2024 | 29.7 | 80.0 | No | No |

MAC = Maximum Allowable Concentration as per O.Reg 169/03

BDL = Below the laboratory detection level

Additional Legislated Samples

Summary of additional testing and sampling carried out in accordance with the requirement of an approval or order.

| Date of order or Municipal Drinking Water Licence | Parameter | Date Sampled | Result | Total Chlorine Residual | Unit of Measure |
|---------------------------------------------------|------------------|---------------|-------------|-------------------------|-----------------|
| Municipal Drinking Water Licence #175-101 | Suspended Solids | Jan 15, 2024 | 3 | 0.0 | mg/L |
| | | Feb 6, 2024 | 12 | 0.0 | mg/L |
| | | Mar 19, 2024 | 8 | 0.0 | mg/L |
| | | April 9, 2024 | 5 | 0.0 | mg/L |
| | | May 7, 2024 | 12 | 0.0 | mg/L |
| | | June 4, 2024 | 4 | 0.0 | mg/L |
| | | July 2, 2024 | 5 | 0.0 | mg/L |
| | | Aug 6, 2024 | 7 | 0.0 | mg/L |
| | | Sep 3, 2024 | 9 | 0.0 | mg/L |
| | | Oct 8, 2024 | 3 | 0.0 | mg/L |
| | | Nov 5, 2024 | 4 | 0.0 | mg/L |
| | | Dec 2, 2024 | 3 | 0.0 | mg/L |
| Annual Average | | | 6.25 | - | mg/L |

Major Maintenance Summary

Water Treatment Plant Maintenance



| Date | Details |
|--------------|------------------------------------------------------------------------------------------|
| 2024 | Various small modifications to the PLCs throughout the 2024 reporting year |
| Jan 11 | Changed overload on actiflo #2 |
| Apr 9 | Replacement of tank liners for sodium hypochlorite, coagulant, sodium hydroxide storage. |
| Apr 22 | Cut trees beside clearwell for future expansion |
| May 5 | Replacement of Cyclone Sand Recirculation Pump |
| May 23 | Took Ammonia motor #112 to repair brushes - Ordered a new motor |
| May 23 | Replacement of Cyclone Sand Recirculation Pump |
| June 13 | Install security camera |
| July 3 | Chlorine pump # 92 Repair |
| July 3 | Change Poly piping |
| July 25 | Back Wash Waste pump # 45 repaired |
| Aug 20 | Chlorine system repairs to piping |
| September 26 | Fix chlorine Pump #93 |
| Oct 10 | Clean low lift pump well |

| Date | Details |
|--------|-------------------------------------------------------|
| Nov 2 | Lifted low lift pump #1 and sent for repair in Ottawa |
| Nov 12 | Low lift pump #1 rebuild and reinstall |
| Dec 12 | Replacement of Filter 1 Media |
| Dec 27 | Upgrade Outpost 5 |

Distribution System Maintenance

| Date | Location Reference | Details |
|------------|--------------------------|------------------------------------------------------------------------------|
| Jan 11 | Rockland Distribution | Watermain break repair 194 A Edward St |
| Feb 1 | Rockland Distribution | Watermain break repair 194 C Edward St |
| March 12 | Rockland Distribution | Watermain break repair Patricia St |
| March 18 | Rockland Distribution | Watermain break repair 844 St-Jean |
| May 9 | Clarence Creek/St-Pascal | Flush distribution dead end hydrants in Clarence Creek and St-Pascal |
| May 10 | Rockland Distribution | Flush distribution dead end hydrants in Rockland |
| July 23 | Rockland Distribution | Watermain repair on Laurier/Outaouais |
| Oct 16 | St-Pascal Distribution | St-Pascal fire hydrants system operation check list, flush and winterizing |
| Oct 24 | Bourget Distribution | Bourget fire hydrants system operation check list, flushing and winterizing |
| Oct 28 | Hammond Distribution | Hammond fire hydrants system operation check list, flushing and winterizing. |
| Oct 29 | Cheney Distribution | Cheney fire hydrants system operation check list, flushing and winterizing |
| October 30 | Bouvier Tower | Cleaned Bouvier Tower clogged drains |
| Nov 27 | Rockland Distribution | fire hydrants system operation check list, flushing and winterizing |

Appendix A - WTRS Data and Submission Confirmation



Ministry of the Environment,
Conservation and Parks

| [WT DATA](#) | [USER PROFILE](#) | [CONTACT US](#) | [HELP](#) | [HOME](#) | [LOGOUT](#) |

Location: [WTRS](#) / [WT DATA](#) / [Input WT Record](#) WTRS-WT-008

Water Taking Data submitted successfully.

Confirmation:


Thank you for submitting your water taking data online.

Permit Number: 3168-B2JK5N
Permit Holder: THE CORPORATION OF THE CITY OF CLARENCE-ROCKLAND.
Received on: Feb 5, 2025 1:39 PM

This confirmation indicates that your data has been received by the Ministry, but should not be construed as acceptance of this data if it differs from that specified on the Permit Number, assigned to the Permit Holder stated above.

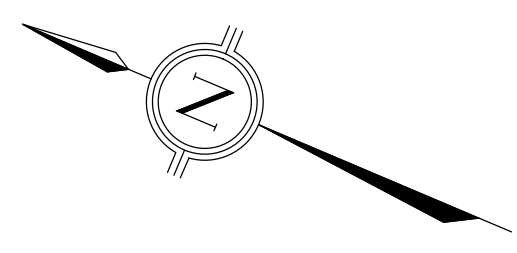
[Print Confirmation](#) [Return to Main Page](#)

VERONIQUE VANDERGOTEN | 2025/02/05
version: v4.5.0.21 (build#: 22)
Last modified: 2018/09/18

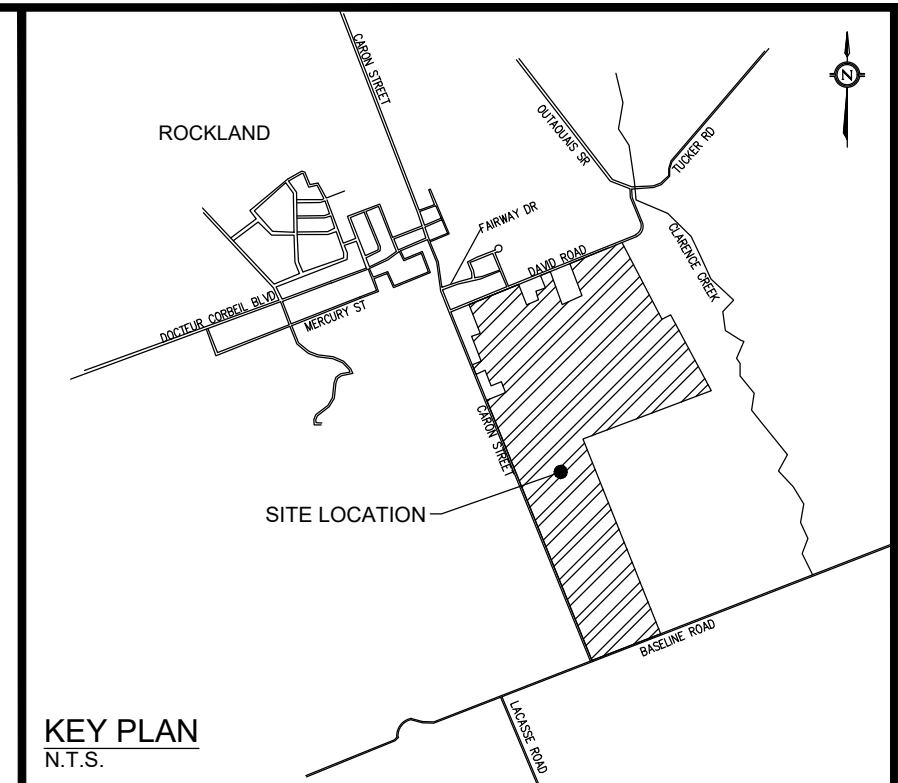
 This site maintained by
the Government of Ontario ©2025 [Queen's Printer for Ontario](#)

ROCKLAND DRINKING WATER SYSTEM / Raw Water

| Annual Values and Summary | | | | | | | | | | | | Units: | cubic meter per day | |
|---------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|------------|-----------------------|--|
| Station: | | | | | | | | | | | | Daily Max: | 9275.7 on December 08 | |
| Day | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | | |
| 1 | 6540.60 | 7054.00 | 7198.70 | 7336.10 | 7781.80 | 8464.00 | 7640.00 | 7615.10 | 6428.60 | 6830.80 | 7345.70 | 8197.70 | | |
| 2 | 6275.90 | 6729.80 | 7653.10 | 6698.70 | 7204.30 | 8222.00 | 8078.10 | 7542.10 | 6833.60 | 7140.50 | 8448.70 | 5967.60 | | |
| 3 | 5577.40 | 5796.30 | 8762.70 | 6699.10 | 7463.50 | 8221.70 | 6507.40 | 7401.40 | 7219.10 | 7079.70 | 7191.20 | 5305.40 | | |
| 4 | 6933.80 | 6826.60 | 7927.50 | 6903.60 | 7306.80 | 8949.70 | 8259.10 | 6446.50 | 7444.00 | 6627.70 | 6913.80 | 5644.60 | | |
| 5 | 6171.30 | 7949.20 | 7698.50 | 6626.70 | 8095.50 | 8906.40 | 7430.30 | 7094.30 | 7020.70 | 7160.80 | 7271.50 | 5587.50 | | |
| 6 | 6167.80 | 5660.70 | 8040.70 | 7226.40 | 7762.50 | 8573.50 | 7063.90 | 6979.40 | 6893.10 | 6686.40 | 7048.80 | 5474.90 | | |
| 7 | 7534.50 | 6911.20 | 8399.40 | 6768.30 | 7322.90 | 8392.70 | 6880.00 | 6984.80 | 7090.90 | 6755.50 | 6517.20 | 7943.30 | | |
| 8 | 6927.50 | 7623.10 | 8577.70 | 7680.00 | 6603.40 | 6975.90 | 7207.70 | 7607.70 | 6229.10 | 7277.20 | 6702.20 | 9275.70 | | |
| 9 | 6481.90 | 6783.50 | 7078.30 | 7057.20 | 7749.50 | 6031.00 | 7854.60 | 6492.60 | 7395.80 | 6101.70 | 6792.50 | 8505.60 | | |
| 10 | 5753.40 | 6874.80 | 6656.20 | 7440.90 | 7305.20 | 8027.30 | 6485.90 | 6520.00 | 7409.60 | 7221.90 | 7046.60 | 7125.20 | | |
| 11 | 5994.40 | 8014.00 | 8706.80 | 7050.10 | 7534.50 | 7601.00 | 6888.50 | 6697.60 | 6303.80 | 7063.10 | 7285.10 | 7163.80 | | |
| 12 | 6585.30 | 6835.80 | 7211.30 | 7165.70 | 7489.40 | 7601.30 | 7454.80 | 6662.70 | 7714.50 | 6735.50 | 6881.20 | 6676.40 | | |
| 13 | 6332.30 | 6866.50 | 7122.20 | 6828.30 | 7858.10 | 6935.40 | 7415.50 | 7244.50 | 7283.80 | 6726.20 | 7129.70 | 7619.70 | | |
| 14 | 6428.60 | 7322.80 | 8352.60 | 7705.30 | 7022.60 | 7128.60 | 7698.70 | 7354.30 | 7205.00 | 6496.90 | 6050.30 | 8115.70 | | |
| 15 | 6486.90 | 6616.30 | 7633.80 | 7381.90 | 7506.60 | 7332.40 | 8040.30 | 7208.80 | 7786.50 | 7319.50 | 7414.40 | 7066.20 | | |
| 16 | 6598.70 | 7283.80 | 7622.60 | 6655.30 | 7344.10 | 6593.00 | 7165.20 | 7250.20 | 7317.10 | 6910.90 | 5916.00 | 7905.00 | | |
| 17 | 6753.70 | 6266.30 | 7003.50 | 7469.90 | 8234.60 | 8363.50 | 7176.10 | 6818.90 | 5729.60 | 6330.10 | 8163.20 | 8069.90 | | |
| 18 | 7058.10 | 7796.90 | 8416.00 | 6700.50 | 7371.20 | 7915.00 | 6985.10 | 7128.60 | 5918.60 | 4787.40 | 7181.30 | 7581.10 | | |
| 19 | 6523.00 | 6099.60 | 7106.50 | 7605.00 | 8514.30 | 8198.60 | 7092.20 | 6651.20 | 7582.70 | 5950.10 | 7050.90 | 7604.80 | | |
| 20 | 6485.00 | 6744.90 | 7068.40 | 5565.10 | 8430.90 | 8118.70 | 7829.30 | 7097.50 | 8171.60 | 8728.70 | 7086.10 | 7805.50 | | |
| 21 | 7103.10 | 7204.60 | 6972.20 | 7944.40 | 8481.60 | 8454.00 | 6757.60 | 6827.80 | 8662.70 | 6988.50 | 6902.90 | 7947.60 | | |
| 22 | 6923.60 | 6756.70 | 6575.00 | 8043.80 | 8806.70 | 7623.90 | 8343.00 | 7024.70 | 8734.20 | 7273.50 | 6181.50 | 8373.60 | | |
| 23 | 7302.40 | 6996.40 | 6444.50 | 7002.60 | 7687.40 | 7300.40 | 8378.80 | 6992.70 | 7744.00 | 6942.00 | 7738.40 | 7623.20 | | |
| 24 | 5852.60 | 7221.80 | 7248.60 | 5884.90 | 8364.10 | 7030.80 | 7709.10 | 7397.00 | 7033.30 | 6523.90 | 6914.40 | 7588.80 | | |
| 25 | 6840.50 | 7393.00 | 6662.90 | 8225.50 | 7533.80 | 7655.80 | 7204.70 | 7272.50 | 7683.70 | 6312.80 | 7414.90 | 7218.70 | | |
| 26 | 7291.60 | 7701.30 | 7264.20 | 7754.70 | 8401.90 | 6804.30 | 7377.80 | 6439.80 | 6735.40 | 6861.70 | 7084.70 | 7530.10 | | |
| 27 | 7134.90 | 6580.30 | 6681.10 | 6828.50 | 7583.20 | 7779.10 | 7303.10 | 7572.60 | 5691.40 | 6972.20 | 7144.50 | 7292.90 | | |
| 28 | 6728.20 | 7550.20 | 6754.90 | 7060.10 | 7073.40 | 7267.70 | 6801.20 | 7819.50 | 6953.10 | 7482.20 | 6574.60 | 7633.30 | | |
| 29 | 6930.50 | 7140.90 | 7390.40 | 7507.70 | 6856.30 | 7017.50 | 8162.40 | 6998.80 | 7585.40 | 6221.70 | 7352.00 | 7530.30 | | |
| 30 | 7393.40 | | 6765.10 | 5327.30 | 6530.60 | 6512.80 | 7373.10 | 7208.60 | 7562.20 | 6102.40 | 7274.30 | 7136.50 | | |
| 31 | 6506.80 | | 6608.30 | | 6652.00 | | 6858.50 | 6788.50 | | 7028.10 | | 8197.70 | | |
| Min | 5577.40 | 5660.70 | 6444.50 | 5327.30 | 6530.60 | 6031.00 | 6485.90 | 6439.80 | 5691.40 | 4787.40 | 5916.00 | 5305.40 | | |
| Mean | 6632.83 | 6986.25 | 7406.57 | 7071.45 | 7608.80 | 7666.60 | 7400.71 | 7069.05 | 7178.77 | 6794.83 | 7067.29 | 7377.69 | | |
| Max | 7534.50 | 8014.00 | 8762.70 | 8225.50 | 8806.70 | 8949.70 | 8378.80 | 7819.50 | 8734.20 | 8728.70 | 8448.70 | 9275.70 | | |



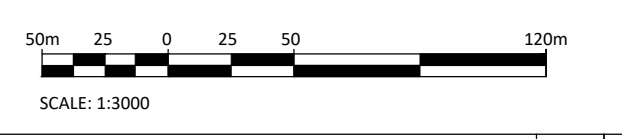
**NOT FOR
CONSTRUCTION
TENDER OR
PERMIT**



KEY PLAN
N.T.S.

LEGEND:

- DEVELOPMENT BOUNDARY
- EXISTING LEGAL LIMIT
- PROPOSED WATERMAIN
- EXISTING WATERMAIN
- EXISTING BUILDING STRUCTURE
- PROPOSED LOW DENSITY AREA
- PROPOSED MEDIUM DENSITY AREA
- PROPOSED HIGH DENSITY AREA - STACKED TOWNHOUSES
- PROPOSED HIGH DENSITY AREA - 4-STORY APARTMENT BUILDINGS
- PROPOSED HIGH DENSITY MIXED USE AREA - COMMERCIAL & SERVICES + 4-STORY APARTMENT BUILDING
- PROPOSED COMMUNITY FACILITIES AREA
- PROPOSED COMMERCIAL BLOCKS
- PROPOSED PARKLAND
- PROPOSED STORMWATER MANAGEMENT BLOCK
- PROPOSED MUNICIPAL INFRASTRUCTURE BLOCK
- WM-XX
--- PROPOSED WATER SERVICING AREA
- ANTICIPATED POPULATION
- AVERAGE DAILY FLOW (L/s)



| No. | REVISIONS | P.F. | DATE |
|-----|------------------------------------|--------------|------|
| 00 | ISSUED FOR OFFICIAL PLAN AMENDMENT | JUL 25, 2025 | |

1010 SPENCE AVENUE
SUITE 14
HAWKESBURY, ONTARIO
K6A 3H9
OFFICE: (613) 632-0241

LASCHELLES
ENGINEERING AND ASSOCIATES LTD.

PROFESSIONAL ENGINEER
P. D. & FREY
10014877
JUL 25, 2025
PROVINCE OF ONTARIO

MAISONS SACA HOMES

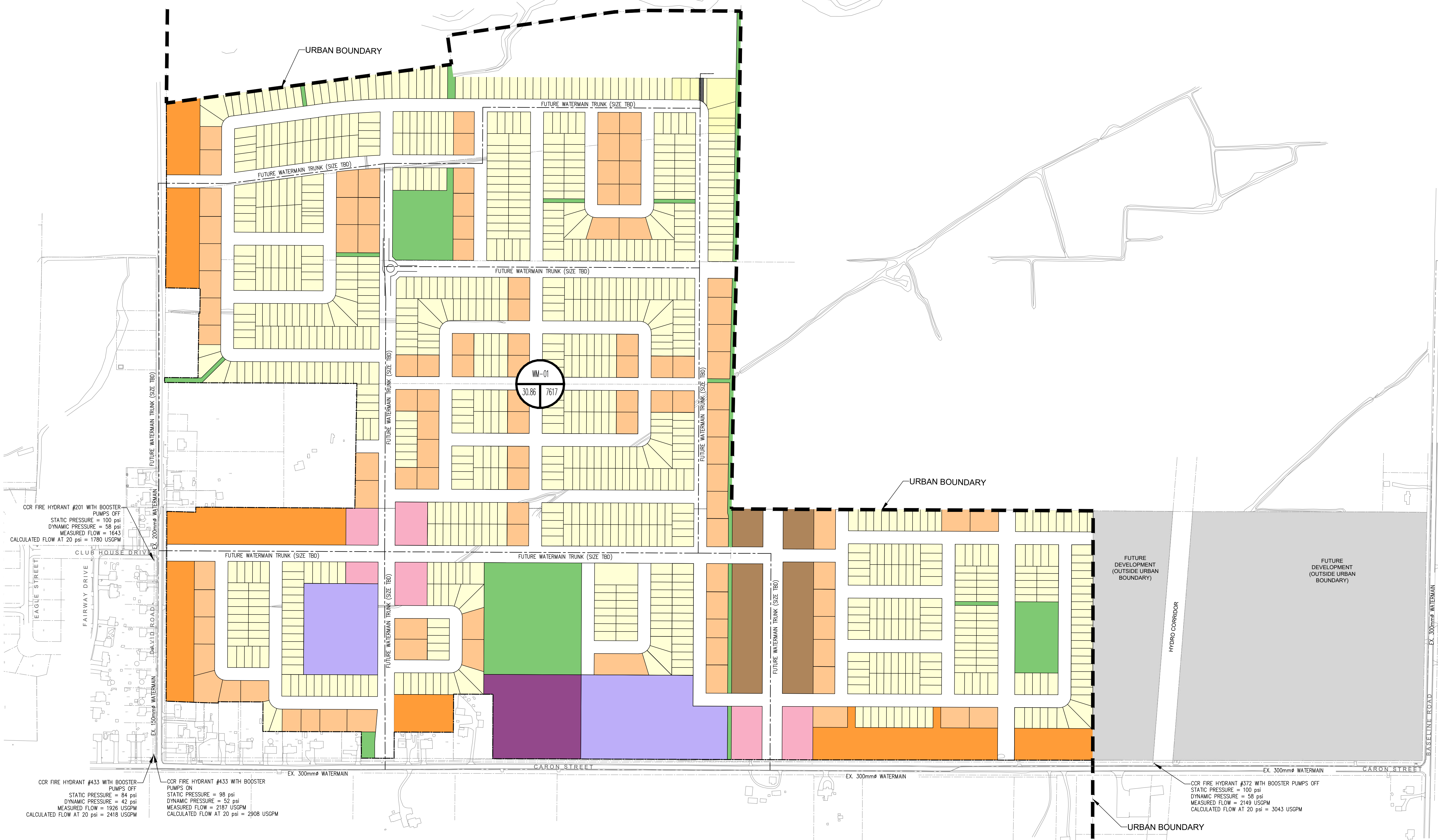
401 BRUGES STREET
EMBRUN, ONTARIO
K0A 1H0
OFFICE: (613) 443-2206

CLIENT:
SACA LAND DEVELOPMENTS (ROCKLAND) INC.

PROJECT:
CARON SUBDIVISION - OFFICIAL PLAN AMENDMENT
PART 1 OF RP 50R-0754, PART 1 OF RP 50R-11600,
PART OF LOT 21, LOT 22 & LOT 23, CONCESSION 2 (OLD SURVEY)
GEOGRAPHIC TOWNSHIP OF CLARENCE
CITY OF CLARENCE-ROCKLAND

DRAWING TITLE:
PRELIMINARY WATER DISTRIBUTION PLAN

| | | | |
|----------------------|------------------------------|---------------------|-----------------------|
| DESIGNED BY: K.S. | DRAWN BY: K.S. | CHECKED BY: P.F. | CHECKED BY: B.M.S. |
| FILE No.: 200459 | DRAWING / SHEET No.: WM-1 | REV: 00 | |



CCR FIRE HYDRANT #201 WITH BOOSTER PUMPS OFF
STATIC PRESSURE = 100 psi
DYNAMIC PRESSURE = 58 psi
MEASURED FLOW = 1643 USGPM
CALCULATED FLOW AT 20 psi = 1780 USGPM

CCR FIRE HYDRANT #433 WITH BOOSTER PUMPS ON
STATIC PRESSURE = 84 psi
DYNAMIC PRESSURE = 42 psi
MEASURED FLOW = 1926 USGPM
CALCULATED FLOW AT 20 psi = 2418 USGPM

CCR FIRE HYDRANT #433 WITH BOOSTER PUMPS ON
STATIC PRESSURE = 98 psi
DYNAMIC PRESSURE = 52 psi
MEASURED FLOW = 2187 USGPM
CALCULATED FLOW AT 20 psi = 2908 USGPM

CCR FIRE HYDRANT #372 WITH BOOSTER PUMPS OFF
STATIC PRESSURE = 100 psi
DYNAMIC PRESSURE = 58 psi
MEASURED FLOW = 2149 USGPM
CALCULATED FLOW AT 20 psi = 3043 USGPM

File Location: D:\OneDrive\OneDrive - Lascelles Engineering\Projects\2025\200459 - SACA Land Developments (Rockland) Inc. - Sarge - S\Scheme\CIVIL\Drawings\Civil\Revised\200459 - Revis1.dwg (VW4-1)



Water Demand Calculation Sheet

Project: Caron Street Subdivision
Location: Rockland, Ontario
Date: May 2025
Completed By: VL
Checked By: PF

Domestic Flow Calculations - RESIDENTIAL

| Design Parameter | Value |
|-----------------------------------|----------------------------|
| Residential average daily demand | 350 L/d/person |
| Residential maximum daily demand* | 2.0 x average daily demand |
| Residential peak hourly demand* | 3.0 x average daily demand |

* Residential max. daily & peak hour demand factors as MECP Design Guidelines, Drinking Water System (2008) Table 3-1

Subdivision Population = 7617 persons (from Sanitary Services Design)

Avg. Daily Demand, Q_{avg} = 350 L/d/person x 7617 persons
 = 2665950 L/d
 = 30.86 L/s
 = 488.8 USGPM

Max. Daily Demand, Q_{max} = 2.0 x Q_{avg}
 = 5331900 L/d
 = 61.71 L/s
 = 977.5 USGPM

Max. Hourly Demand, Q_{peak} = 3.0 x Q_{avg}
 = 7997850 L/d
 = 92.57 L/s
 = 1466.3 USGPM



Hydrant Flow Test

Project: Caron Street Subdivision
Location: Rockland, Ontario
Date: May 13, 2025
Completed By: V.Lalonde
Checked By: P.Frey

Hydrant Flow Tests Raw Data

THE FORMULA IS WRITTEN AS FOLLOWS:

$$\begin{aligned}
 \text{GPM} \quad Q_r &= 29.83 \times C_d \times D^2 \times \sqrt{P_p} \\
 \text{L/min} \quad Q_r &= 0.0667766 \times C_d \times D^2 \times \sqrt{P_p}
 \end{aligned}$$

$$Q_f = Q_r \left[\frac{P_s - 20}{P_s - P_r} \right]^{0.54}$$

WHERE:

- 29.83 or (0.0667766) are constants.
- "C_d" is the friction loss coefficient (*usually 0.90 for a smooth 2-1/2" opening*)
- "D" is the actual diameter (measured) of the hydrant or nozzle in inches (mm)
- "P_p" is the *Pitot* pressure reading in PSI (kPa)
- "Q_r" is the *Fire Flow* in GPM (L/min)
- "P_s" is the *Static* pressure in PSI (kPa)
- "P_r" is the *Residual* pressure in PSI (kPa)

| TEST 1 | | CCR Hydrant No.372 | 1880 Caron Street | Notes: with Booster Pumps CLOSED | |
|------------------|---------------------|--------------------|-------------------|-----------------------------------------|--|
| Test Condition | Pitot Gauge Reading | Measured Flow Rate | Residual Pressure | Available flow at 20psi | |
| Unit | PSI | USGPM | PSI | USGPM | |
| Static (no flow) | NA | 0 | 100 | NA | |
| Flow Hydrant 1 | 40 | 1061 | 58 | 3043 | |
| Flow Hydrant 2 | 42 | 1087 | | | |

| TEST 2 | | CCR Hydrant No.433 | 1350 David Street | Notes: with Booster Pumps CLOSED | |
|------------------|---------------------|--------------------|-------------------|-----------------------------------------|--|
| Test Condition | Pitot Gauge Reading | Measured Flow Rate | Residual Pressure | Available flow at 20psi | |
| Unit | PSI | USGPM | PSI | USGPM | |
| Static (no flow) | NA | 0 | 84 | NA | |
| Flow Hydrant 1 | 36 | 1007 | 42 | 2418 | |
| Flow Hydrant 2 | 30 | 919 | | | |

| TEST 3 | | CCR Hydrant No.433 | 1350 David Street | Notes: with Booster Pumps OPEN | |
|------------------|---------------------|--------------------|-------------------|---------------------------------------|--|
| Test Condition | Pitot Gauge Reading | Measured Flow Rate | Residual Pressure | Available flow at 20psi | |
| Unit | PSI | USGPM | PSI | USGPM | |
| Static (no flow) | NA | 0 | 98 | NA | |
| Flow Hydrant 1 | 45 | 1126 | 52 | 2908 | |
| Flow Hydrant 2 | 40 | 1061 | | | |

| TEST 4 | | CCR Hydrant No.201 | 1427 David Street | Notes: with Booster Pumps CLOSED | |
|------------------|---------------------|--------------------|-------------------|-----------------------------------------|--|
| Test Condition | Pitot Gauge Reading | Measured Flow Rate | Residual Pressure | Available flow at 20psi | |
| Unit | PSI | USGPM | PSI | USGPM | |
| Static (no flow) | NA | 0 | 78 | NA | |
| Flow Hydrant 1 | 26 | 856 | 28 | 1780 | |
| Flow Hydrant 2 | 22 | 787 | | | |

APPENDIX C

Sanitary Sewer System

Proposed Sanitary Servicing Areas (SK1.23) (Genivar)

Sanitary Sewer Calculation Sheet (WSP)

SSA Sanitary Sewersheds (SAN-1)

Sanitary Sewer Design Sheet, SAN-1

Preliminary Sanitary Sewershed Plan (SAN-2)

Sanitary Sewer Design Sheet, SAN-2

Municipal Block Details (CD-1)



1224 GARDINERS ROAD, SUITE 201
 KINISTON, ONTARIO
 CANADA K7P 0G2
 PHONE: 613-634-7333 FAX: 613-634-3523
 WWW.GENIVAR.COM

CLIENT:

CITY OF
 CLARENCE-ROCKLAND

CLIENT REF. #:

PROJECT:

CARON STREET
 RECONSTRUCTION

ISSUED FOR - REVISION:

| IS | RE | DATE | DESCRIPTION |
|----|----|------------|----------------|
| 1 | | 2013/01/23 | ISSUED FOR ECA |

PROJECT NO:

DATE:

065038

MAY, 2010

ORIGINAL SCALE:

1:20000

DESIGNED BY:

MS

DRAWN BY:

MF/MS

CHECKED BY:

MM

DISCIPLINE:

CIVIL

TITLE:

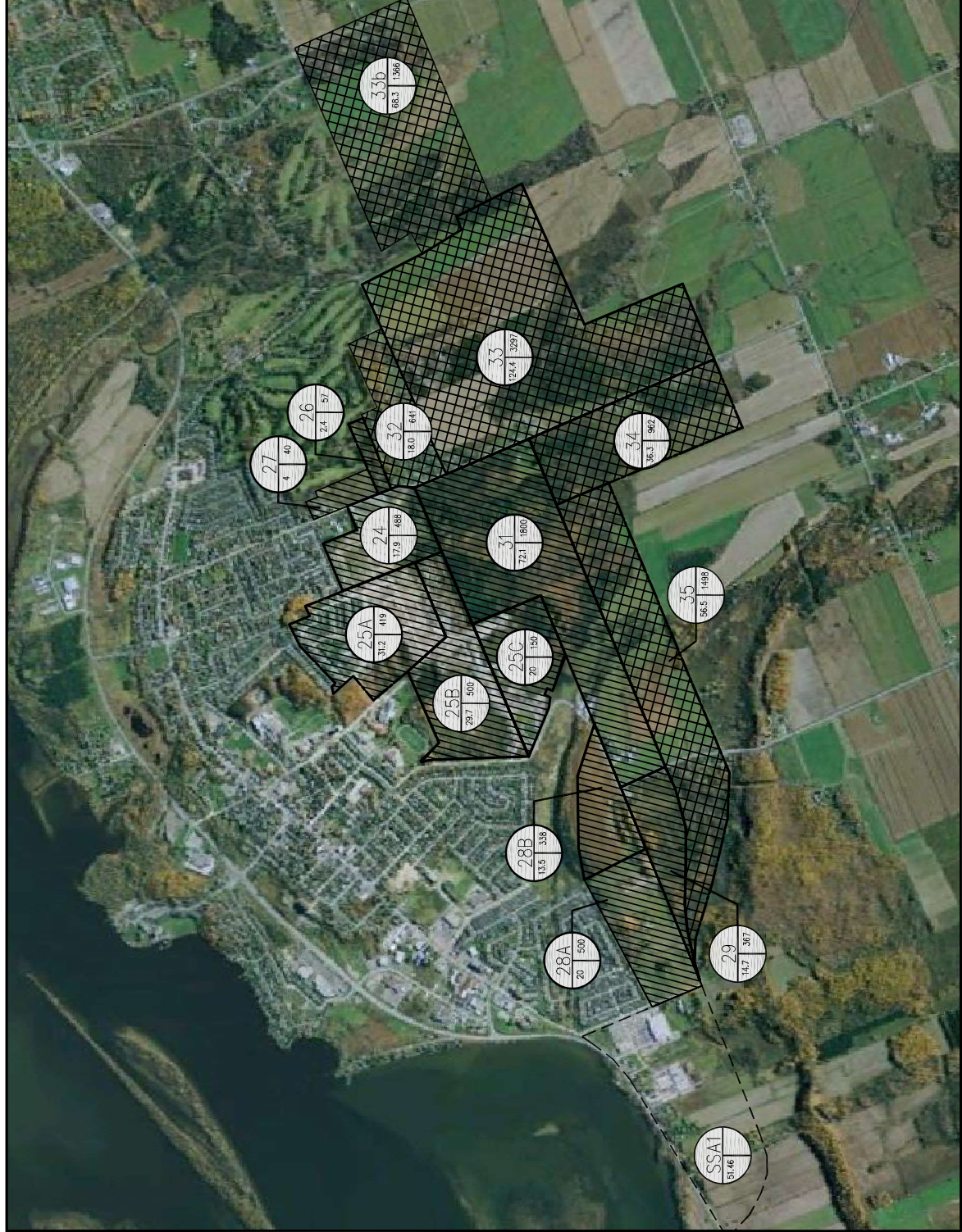
PROPOSED SANITARY
 SERVICING AREAS

SHEET NUMBER:

SK1.23

OF

1 2 3 4 5



2 3 4 5

C

B

A

ISSUED FOR ECA
 DATE OF: JANUARY 23, 2013

REV #

0

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Sanitary Sewer Calculation Sheet



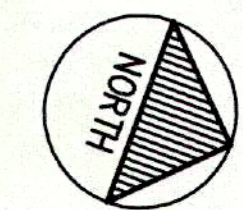
| DRAINAGE AREA DESCRIPTION | | | | | | | | | | OUTLET PIPE DATA | | | | | | | | | | |
|---------------------------------------------|------------|------------|--------------------|------------|---------|---------|-----|------|-----------------|--------------------------|----------|-------------------------------------|-----|-----------|-----------|-----------|---------|-----------|------------|----------|
| LOCATION | MANHOLE | | CONTRIBUTING AREAS | POPULATION | | | q | M | Peak Flow (l/s) | Σ AREA (ha) | IA (l/s) | Q (INCOMING FROM SIDE STREET) (l/s) | Q | SIZE (mm) | Slope (%) | CAP (l/s) | Q/Qfull | VEL (m/s) | LENGTH (m) | FALL (m) |
| | FROM | TO | | No. | Ha | P | | | | | | | | | | | | | | |
| Caron St | SAM250 | SAM251 | 26 | 2.40 | 162 | 0.162 | 400 | 4.00 | 3.00 | 2.4 | 0.67 | 3.83 | 200 | 2.10% | 47.53 | 0.08 | 1.51 | 22.8 | 0.479 | |
| Caron St | SAM251 | SAM252 | 32 | 24.20 | 1633.5 | 1.6335 | 400 | 3.62 | 30.11 | 26.6 | 7.45 | 38.97 | 250 | 1.16% | 64.05 | 0.61 | 1.30 | 55.5 | 0.644 | |
| Caron St | SAM252 | SAM253 | | | | | 400 | 3.62 | 30.11 | 26.6 | 7.45 | 38.97 | 250 | 1.29% | 67.54 | 0.58 | 1.38 | 33.8 | 0.436 | |
| Caron St | SAM253 | SAM254 | | | | | 400 | 3.62 | 30.11 | 26.6 | 7.45 | 38.97 | 250 | 0.60% | 46.06 | 0.85 | 0.94 | 62.5 | 0.375 | |
| Caron St | SAM254 | SAM255 | | | | | 400 | 3.62 | 30.11 | 26.6 | 7.45 | 38.97 | 300 | 0.40% | 61.16 | 0.64 | 0.87 | 96.7 | 0.387 | |
| Caron St | SAMH201 | SAMH202 | 26,32,33,33b,34,35 | 312.10 | 21066.8 | 21.0668 | 400 | 2.63 | 256.49 | 312.1 | 87.39 | - | 750 | 0.15% | 431.17 | 0.80 | 0.98 | 95.1 | 0.143 | |
| Caron St | SAMH202 | SAMH203 | | | | | 400 | 2.63 | 256.49 | 312.1 | 87.39 | 241.00 | 750 | 0.40% | 704.10 | 0.83 | 1.59 | 100.2 | 0.401 | |
| Caron St | SAMH203 | SAMH204 | | | | | 400 | 2.63 | 256.49 | 312.1 | 87.39 | 0.00 | 750 | 0.40% | 704.10 | 0.83 | 1.59 | 100.2 | 0.401 | |
| Caron St | SAMH204 | SAMH205 | | | | | 400 | 2.63 | 256.49 | 312.1 | 87.39 | 0.00 | 750 | 0.40% | 704.10 | 0.83 | 1.59 | 99.9 | 0.400 | |
| Caron St | SAMH205 | SAMH206 | | | | | 400 | 2.63 | 256.49 | 312.1 | 87.39 | 0.00 | 750 | 0.40% | 704.10 | 0.83 | 1.59 | 99.8 | 0.399 | |
| Caron St | SAMH206 | SAMH207 | | | | | 400 | 2.63 | 256.49 | 312.1 | 87.39 | 0.00 | 750 | 0.50% | 787.20 | 0.74 | 1.78 | 100.1 | 0.501 | |
| Caron St | SAMH207 | SAMH208 | | | | | 400 | 2.63 | 256.49 | 312.1 | 87.39 | 0.00 | 750 | 0.50% | 787.20 | 0.76 | 1.78 | 100.1 | 0.501 | |
| Caron St | SAMH208 | SAMH209 | | | | | 400 | 2.63 | 256.49 | 312.1 | 87.39 | 16.00 | 750 | 0.50% | 787.20 | 0.76 | 1.78 | 100.2 | 0.501 | |
| Caron St | SAMH209 | SAMH210 | | | | | 400 | 2.63 | 256.49 | 312.1 | 87.39 | 1.00 | 750 | 0.50% | 787.20 | 0.76 | 1.78 | 75.8 | 0.379 | |
| Caron St | SAMH210 | SAMH211 | | | | | 400 | 2.63 | 256.49 | 312.1 | 87.39 | 8.00 | 750 | 0.50% | 787.20 | 0.77 | 1.78 | 105.0 | 0.525 | |
| Caron St | SAMH211 | SAMH212 | | | | | 400 | 2.63 | 256.49 | 312.1 | 87.39 | 1.00 | 750 | 0.50% | 787.20 | 0.78 | 1.78 | 99.8 | 0.499 | |
| Caron St | SAMH212 | SAMH213 | | | | | 400 | 2.63 | 256.49 | 312.1 | 87.39 | 1.00 | 750 | 0.50% | 787.20 | 0.75 | 1.27 | 102.3 | 0.205 | |
| Caron St | SAMH213 | SAMH214 | | | | | 400 | 2.63 | 256.49 | 312.1 | 87.39 | 92.00 | 900 | 0.20% | 809.59 | 0.87 | 1.27 | 70.7 | 0.141 | |
| Caron St | SAMH214 | SAMH215 | | | | | 400 | 2.63 | 256.49 | 312.1 | 87.39 | 21.00 | 675 | 1.00% | 840.59 | 0.86 | 2.35 | 93.3 | 0.933 | |
| EXISTING PIPE | SAMH215 | EX SAMH216 | | | | | 400 | 2.63 | 256.49 | 312.1 | 87.39 | 0.00 | 750 | 0.50% | 787.20 | 0.76 | 1.78 | 100.2 | 0.501 | |
| EXISTING PIPE | EX SAMH216 | EX SAMH217 | | | | | 400 | 2.63 | 256.49 | 312.1 | 87.39 | 0.00 | 750 | 0.50% | 787.20 | 0.76 | 1.78 | 100.2 | 0.501 | |
| EXISTING PIPE | EX SAMH217 | MH608 | | | | | 400 | 2.63 | 256.49 | 312.1 | 87.39 | 0.00 | 750 | 0.50% | 787.20 | 0.76 | 1.78 | 100.2 | 0.501 | |
| Caron St | MH608 | PS1 | | | | | 400 | 2.63 | 256.49 | 312.1 | 87.39 | 0.00 | 750 | 0.50% | 787.20 | 0.76 | 1.78 | 100.2 | 0.501 | |
| Existing Pipes (Covered Under Seperate ECA) | | | | | | | | | | | | | | | | | | | | |
| DESIGN PARAMETER | | | | | | | | | | PROJECT: | | | | | | | | | | |
| Mannings n = 0.0130 | | | | | | | | | | 732.80 | | | | | | | | | | |
| Average Daily Flow (q)= 400 l/cap/d | | | | | | | | | | 675 | | | | | | | | | | |
| Infiltration Rate (I) = 0.28 l/s/ha | | | | | | | | | | 1.00% | | | | | | | | | | |
| | | | | | | | | | | 840.59 | | | | | | | | | | |
| | | | | | | | | | | 0.87 | | | | | | | | | | |
| | | | | | | | | | | 2.35 | | | | | | | | | | |
| | | | | | | | | | | 94.9 | | | | | | | | | | |
| | | | | | | | | | | 0.949 | | | | | | | | | | |
| Designed By: | | | | | | | | | | Caron St. Reconstruction | | | | | | | | | | |
| Matt Scanlan, EIT | | | | | | | | | | LOCATION: | | | | | | | | | | |
| Checked By: | | | | | | | | | | Rockland, Ontario | | | | | | | | | | |
| Matt Morkem, P.Eng | | | | | | | | | | Project Number: | | | | | | | | | | |
| Dwg. Reference: | | | | | | | | | | 65038 | | | | | | | | | | |
| SK1-23rev1 -Sanitary Area | | | | | | | | | | Date: | | | | | | | | | | |
| | | | | | | | | | | 29-Apr-13 | | | | | | | | | | |

- NOTES:**
- CONTRACTOR TO VERIFY LOCATION OF ALL BURIED SERVICES PRIOR TO START OF CONSTRUCTION.
 - TOPOGRAPHIC INFORMATION PROVIDED BY APPURTAGE DUTRISAC SURVEYING INC.
 - ALL DISTURBED AREAS TO BE REINSTATED USING 100mm OF TOP SOIL AND SOO (UNLESS OTHERWISE NOTED).
 - SEE DRAWINGS C1.11 TO C1.15 FOR LINE PAINTING AND SIGNAGE DETAILS.

- LEGEND:**
- EXISTING PROPERTY LINE
 - NEW CENTERLINE OF ROAD
 - NEW EDGE OF PAVEMENT
 - EXISTING EDGE OF PAVEMENT
 - NEW CURB
 - NEW DEPRESSED CURB
 - EXISTING CURB
 - NEW EDGE OF SHOULDER
 - EXISTING EDGE OF SHOULDER
 - NEW DITCH
 - EXISTING DITCH
 - NEW BOTTOM OF SLOPE
 - EXISTING BOTTOM OF SLOPE
 - EXISTING TOP OF SLOPE
 - EXISTING FENCE
 - FM NEW SANITARY FORCEMAIN
 - SA NEW SANITARY SEWER
 - SA EXISTING SANITARY SEWER
 - ST NEW STORM SEWER
 - ST EXISTING STORM SEWER
 - W NEW WATERMAIN
 - W EXISTING WATERMAIN
 - COMB EXISTING COMBINED SEWER
 - EXISTING GAS LINE
 - EXISTING BELL LINE
 - NEW GUIDERAIL
 - EXISTING GUIDERAIL
 - NEW SANITARY MANHOLE
 - EXISTING SANITARY MANHOLE
 - NEW STORM MANHOLE
 - EXISTING STORM MANHOLE
 - NEW CATCHBASIN
 - NEW DOUBLE CATCHBASIN
 - NEW CATCHBASIN DITCH INLET
 - EXISTING CATCHBASIN
 - NEW HYDRANT
 - EXISTING HYDRANT
 - NEW VALVE
 - EXISTING VALVE
 - EXISTING REDUCER
 - EXISTING UTILITY POLE
 - NEW UTILITY POLE
 - UTILITY POLE TO BE RELOCATED
 - NEW LIGHT STANDARD
 - EXISTING LIGHT STANDARD
 - NEW HAND HOLE
 - EXISTING HAND HOLE
 - EXISTING GAS VALVE
 - EXISTING BELL MANHOLE
 - EXISTING BELL/CABLE PEDESTAL
 - BELL PEDESTAL TO BE MOVED (BY OTHERS)
 - EXISTING TREES/HEDGES
 - NEW TREES/HEDGES
 - NEW BACKFLOW PREVENTOR ON STORM SERVICE
 - EXISTING BORE HOLE
 - SANITARY & WATER SERVICE
 - STORM, SANITARY & WATER SERVICE
 - NEW TOP OF WALL GRADE
 - NEW BOTTOM OF WALL GRADE
 - NEW CULVERT
 - EXISTING CULVERT
 - NEW SIDEWALK
 - EXISTING SIDEWALK
 - NEW ASPHALT ROADWAY
 - NEW ASPHALT DRIVEWAY / PATH
 - NEW GRANULAR DRIVEWAY
 - NEW FROST TAPER

CITY OF CLARENCE-ROCKLAND

RECONSTRUCTION OF CARON STREET



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ISSUED FOR - REVISION:

| IS | RE | DATE | DESCRIPTION |
|----|----|--------------|-------------------------|
| 2 | | NOV 25, 2015 | AS-BUILTS |
| 1 | | AUG 22, 2013 | ISSUED FOR CONSTRUCTION |

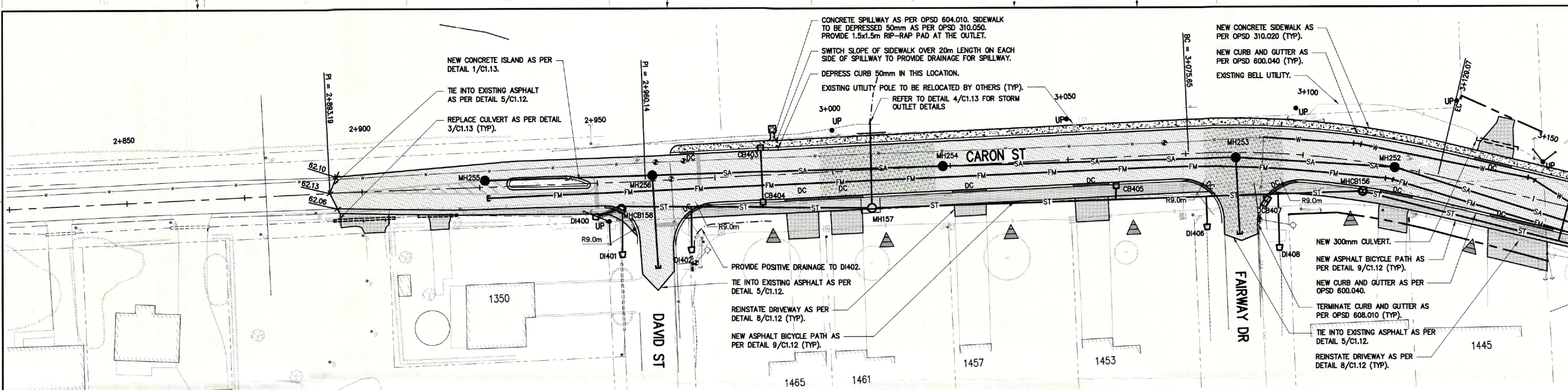
PROJECT NO: 065038/111-55504-00 DATE: NOVEMBER 2015

ORIGINAL SCALE: H: 1:500 V: 1:50
 DESIGNED BY: MM/MS
 DRAWN BY: MS/STR
 CHECKED BY: MM

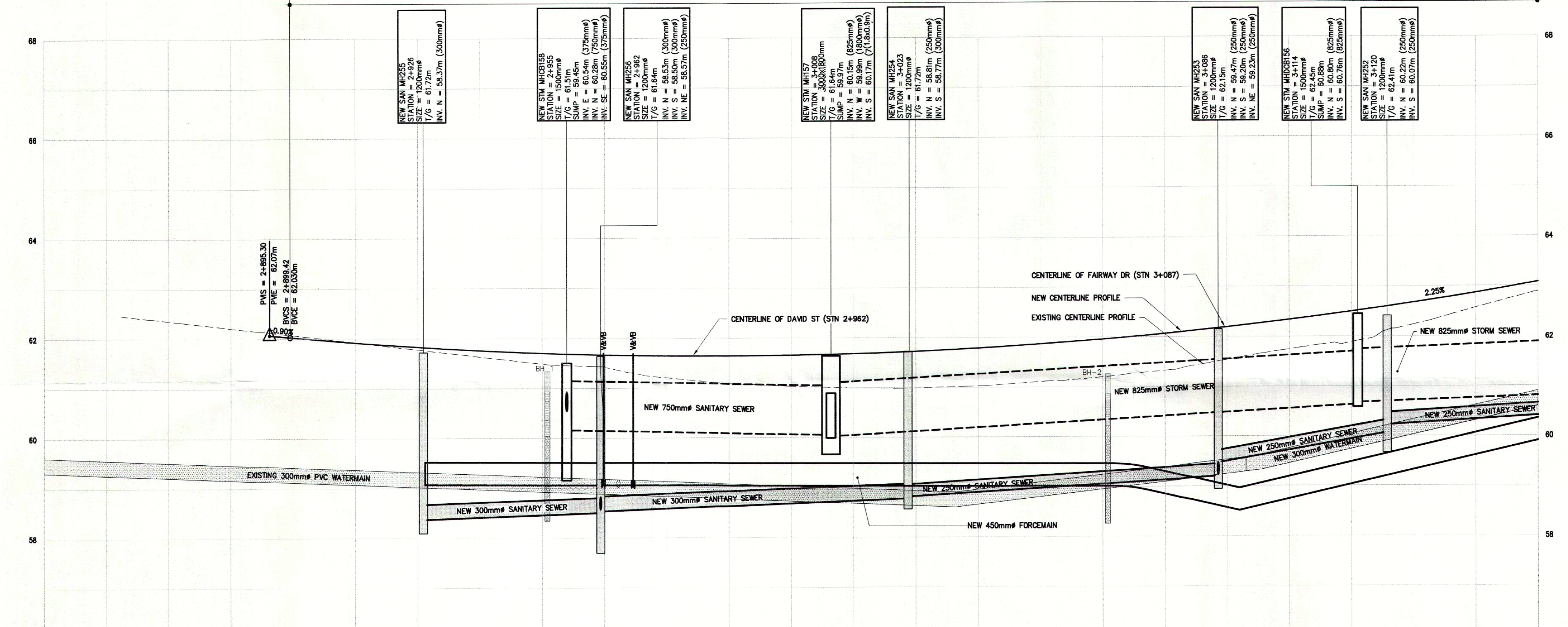
DISCIPLINE: MUNICIPAL

TITLE: PLAN & PROFILE OF CARON STREET FROM STA. 2+850 TO STA. 3+150

SHEET NUMBER: C1.1
 SHEET # 1 OF 13
 AS-BUILTS
 DATE OF: 11/25/2015



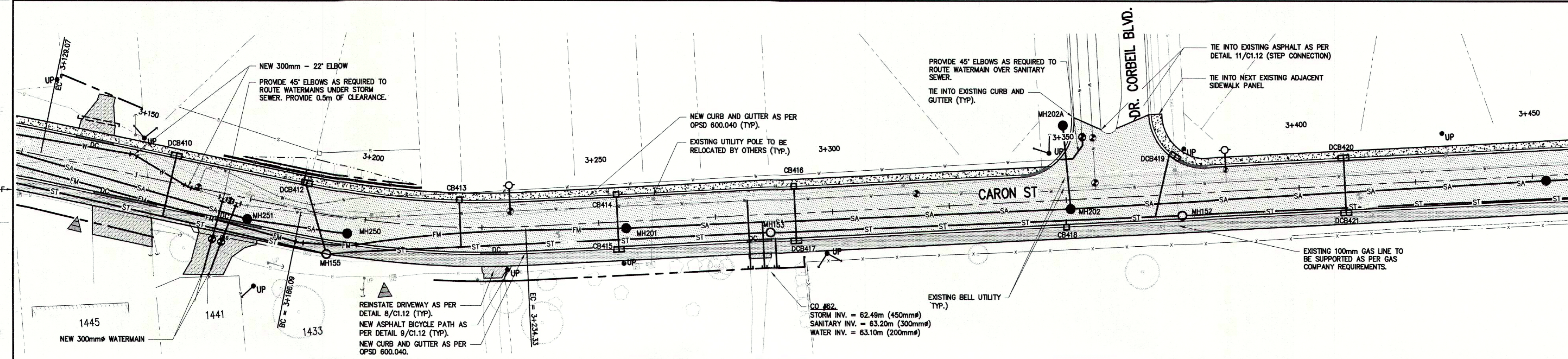
VERTICAL CURVE No. 1
 A = 3.15%
 K = 95.000
 L = 299.25m



| STATION | 2+875 | 2+900 | 2+925 | 2+950 | 2+975 | 3+000 | 3+025 | 3+050 | 3+075 | 3+100 | 3+125 | 3+150 | |
|-----------------------|-------|----------------|------------------------------------------------------|------------------------------------------|----------------|---------------------------------------------|----------------|---------------------------------------------|----------------|---------------------------------------------|----------------|---------------------------------------------|-------|
| CENTERLINE GRADE | 62.36 | 62.02 62.07 | 61.83 61.78 | 61.71 61.69 | 61.65 61.21 | 61.68 61.33 | 61.73 60.99 | 61.87 61.11 | 62.07 61.33 | 62.34 61.75 | 62.68 62.24 | 63.08 62.90 | |
| SANITARY SEWER INVERT | | | 58.37 NEW 35.55m 300mm# SANITARY SEWER @ 0.37% | 58.92 58.92 | | NEW 61.71m 300mm# SANITARY SEWER @ 0.39% | 58.77 58.61 | NEW 62.27m 250mm# SANITARY SEWER @ 0.63% | 59.20 58.47 | NEW 33.86m 250mm# SANITARY SEWER @ 1.77% | 60.07 60.22 | NEW 55.56m 250mm# SANITARY SEWER @ 0.61% | 60.95 |
| STORM SEWER INVERT | | | 60.28 | NEW 53.00m 750mm# STORM SEWER @ 0.21% | 60.17 60.15 | NEW 51.76m 825mm# STORM SEWER @ 0.58% | 60.45 60.40 | NEW 52.57m 825mm# STORM SEWER @ 0.58% | 60.78 60.80 | NEW 78.96m 825mm# STORM SEWER @ 0.38% | 61.10 | | |
| TOP OF FORCEMAIN | | | 58.51 | 58.50 | 58.48 | 58.48 | 58.47 | 58.30 | 58.19 | 58.77 | 60.35 | | |
| SUPERELEVATION | | | | | | CURVE 1 -3.00% -3.00% 3+021.25 | | CURVE 1 0.00% -3.00% 3+055.25 | | CURVE 1 3.00% -3.00% 3+089.25 | | CURVE 1 3.00% -3.00% 3+115.46 | |

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@ DAVID ST.



NOTES:

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- ALL DISTURBED AREAS TO BE REINSTATED USING 100mm OF TOP SOIL AND 500 (UNLESS OTHERWISE NOTED).
- SEE DRAWINGS C1.11 TO C1.15 FOR LINE PAINTING AND SIGNAGE DETAILS.

LEGEND:

- EXISTING PROPERTY LINE
- NEW CENTERLINE OF ROAD
- NEW EDGE OF PAVEMENT
- EXISTING EDGE OF PAVEMENT
- NEW CURB
- NEW DEPRESSED CURB
- EXISTING CURB
- NEW EDGE OF SHOULDER
- EXISTING EDGE OF SHOULDER
- NEW DITCH
- EXISTING DITCH
- NEW BOTTOM OF SLOPE
- EXISTING BOTTOM OF SLOPE
- EXISTING TOP OF SLOPE
- EXISTING FENCE
- NEW SANITARY FORCEMAIN
- NEW SANITARY SEWER
- EXISTING SANITARY SEWER
- NEW STORM SEWER
- EXISTING STORM SEWER
- NEW WATERMAIN
- EXISTING WATERMAIN
- EXISTING COMBINED SEWER
- EXISTING GAS LINE
- EXISTING BELL LINE
- NEW GUIDERAIL
- EXISTING GUIDERAIL
- NEW SANITARY MANHOLE
- EXISTING SANITARY MANHOLE
- NEW STORM MANHOLE
- EXISTING STORM MANHOLE
- NEW CATCHBASIN
- NEW DOUBLE CATCHBASIN
- NEW CATCHBASIN DITCH INLET
- EXISTING CATCHBASIN
- NEW HYDRANT
- EXISTING HYDRANT
- NEW VALVE
- EXISTING VALVE
- EXISTING REDUCER
- EXISTING UTILITY POLE
- NEW UTILITY POLE
- UTILITY POLE TO BE RELOCATED
- NEW LIGHT STANDARD
- EXISTING LIGHT STANDARD
- NEW HAND HOLE
- EXISTING HAND HOLE
- EXISTING GAS VALVE
- EXISTING BELL MANHOLE
- EXISTING BELL/CABLE PEDESTAL
- BELL PEDESTAL TO BE MOVED (BY OTHERS)
- EXISTING TREES/HEDGES
- NEW TREES/HEDGES
- NEW BACKFLOW PREVENTOR ON STORM SERVICE
- EXISTING BORE HOLE
- SANITARY & WATER SERVICE STORM, SANITARY & WATER SERVICE
- NEW TOP OF WALL GRADE
- NEW BOTTOM OF WALL GRADE
- NEW CULVERT
- EXISTING CULVERT
- NEW SIDEWALK
- EXISTING SIDEWALK
- NEW ASPHALT ROADWAY
- NEW ASPHALT DRIVEWAY / PATH
- NEW GRANULAR DRIVEWAY
- NEW FROST TAPER

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 OTTAWA, ONTARIO
 CANADA K7P 0Z2
 PHONE: 613-829-2800 FAX: 613-829-8299
 WWW.GENIVAR.COM

CONSULTANT:
 SEAL:
 CLIENT:
 CITY OF CLARENCE-ROCKLAND

CLIENT REF. #:
 PROJECT:
RECONSTRUCTION OF CARON STREET

KEY PLAN:

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ISSUED FOR - REVISION:

| NO. | DATE | DESCRIPTION |
|-----|--------------|-------------------------|
| 2 | NOV 25, 2015 | AS-BUILTS |
| 1 | AUG 22, 2013 | ISSUED FOR CONSTRUCTION |

PROJECT NO: 085038/1111-55504-00 DATE: NOVEMBER 2015

ORIGINAL SCALE: H: 1:500 V: 1:50

DESIGNED BY: MM/MS

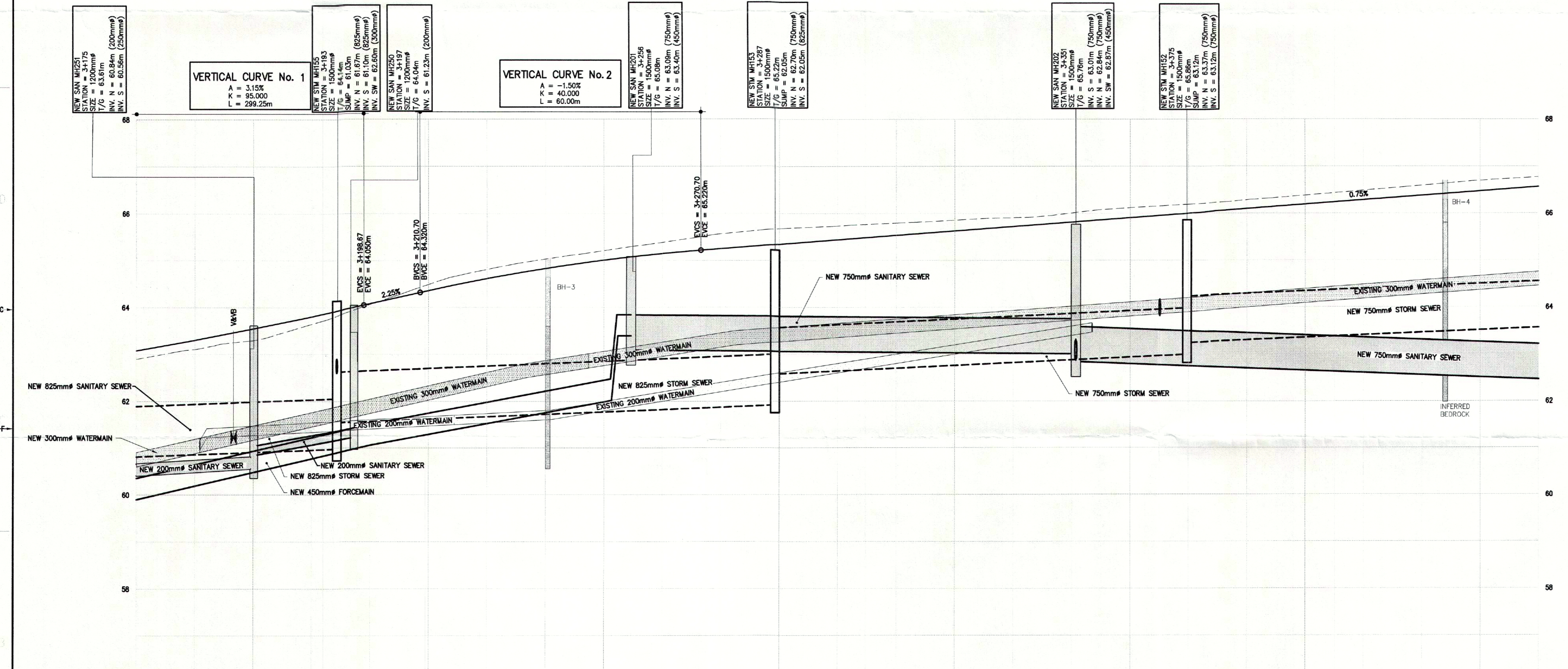
DRAWN BY: MS/STR

CHECKED BY: MM

DISCIPLINE: MUNICIPAL

TITLE:
PLAN & PROFILE OF CARON STREET FROM STA. 3+150 TO STA. 3+450

SHEET NUMBER: C1.2
 SHEET # 2 OF 13
 AS-BUILTS
 DATE OF: 11/25/2015



| STATION | 3+175 | 3+200 | 3+225 | 3+250 | 3+275 | 3+300 | 3+325 | 3+350 | 3+375 | 3+400 | 3+425 | 3+450 | STATION |
|-----------------------|------------------------------------------------------|------------------------------------------------------|-------------------------------------|-------------------------------------|--------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|--------------------------------|
| CENTERLINE GRADE | FINISHED 63.08 EXISTING 62.90 | 63.55 63.30 | 64.08 64.00 | 64.62 64.81 | 65.01 65.21 | 65.25 65.57 | 65.44 65.73 | 65.63 65.96 | 65.82 66.01 | 66.00 66.19 | 66.38 66.59 | 66.57 66.77 | CENTERLINE GRADE |
| SANITARY SEWER INVERT | 66.22 NEW 55.56m 250mm# SANITARY SEWER @ 0.61% | 60.56 NEW 21.68m 200mm# SANITARY SEWER @ 1.80% | 60.23 | 63.08 | 63.08 | 63.08 | 63.08 | 63.08 | 63.01 63.01 | 63.01 | 63.01 | 63.01 | 63.45 SANITARY SEWER INVERT |
| STORM SEWER INVERT | 60.86 NEW 78.96m 825mm# STORM SEWER @ 0.38% | 61.10 61.07 | 61.10 | 61.10 | 61.10 | 61.10 | 61.10 | 61.10 | 61.10 | 61.10 | 61.10 | 61.10 | 63.82 STORM SEWER INVERT |
| TOP OF FORCEMAIN | 61.85 | 62.24 | 62.80 | 63.35 | 63.79 | 63.84 | 63.84 | 63.84 | 63.84 | 63.84 | 63.84 | 63.84 | TOP OF FORCEMAIN |
| SUPERELEVATION | CURVE 1/2 0.00% 0.00% 3+157.58 | CURVE 2 -3.00% 3.00% 3+199.69 | CURVE 2 -3.00% 3.00% 3+220.72 | CURVE 2 -3.00% 0.00% 3+254.72 | CURVE 2 -3.00% -3.00% 3+288.72 | | | | | | | | SUPERELEVATION |

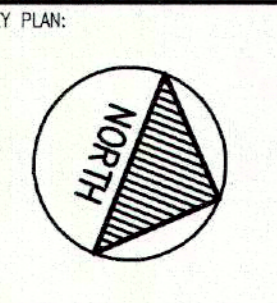
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DR. COASED ILVO

- NOTES:**
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 - SEE DRAWINGS C1.11 TO C1.15 FOR LINE PAINTING AND SIGNAGE DETAILS.

- LEGEND:**
- EXISTING PROPERTY LINE
 - NEW CENTERLINE OF ROAD
 - NEW EDGE OF PAVEMENT
 - EXISTING EDGE OF PAVEMENT
 - NEW DEPRESSED CURB
 - EXISTING CURB
 - NEW EDGE OF SHOULDER
 - EXISTING EDGE OF SHOULDER
 - NEW DITCH
 - EXISTING DITCH
 - NEW BOTTOM OF SLOPE
 - EXISTING BOTTOM OF SLOPE
 - EXISTING TOP OF SLOPE
 - EXISTING FENCE
 - NEW SANITARY FORCEMAIN
 - NEW SANITARY SEWER
 - EXISTING SANITARY SEWER
 - NEW STORM SEWER
 - EXISTING STORM SEWER
 - NEW WATERMAIN
 - EXISTING WATERMAIN
 - EXISTING COMBINED SEWER
 - EXISTING GAS LINE
 - EXISTING BELL LINE
 - NEW GUIDERAIL
 - EXISTING GUIDERAIL
 - NEW SANITARY MANHOLE
 - EXISTING SANITARY MANHOLE
 - NEW STORM MANHOLE
 - EXISTING STORM MANHOLE
 - NEW CATCHBASIN
 - NEW DOUBLE CATCHBASIN
 - NEW CATCHBASIN DITCH INLET
 - EXISTING CATCHBASIN
 - NEW HYDRANT
 - EXISTING HYDRANT
 - NEW VALVE
 - EXISTING VALVE
 - EXISTING REDUCER
 - EXISTING UTILITY POLE
 - NEW UTILITY POLE
 - UTILITY POLE TO BE RELOCATED
 - EXISTING LIGHT STANDARD
 - NEW HAND HOLE
 - EXISTING HAND HOLE
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 - BELL PEDESTAL TO BE MOVED (BY OTHERS)
 - EXISTING TREES/HEDGES
 - NEW TREES/HEDGES
 - NEW BACKFLOW PREVENTOR ON STORM SERVICE
 - EXISTING BORE HOLE
 - EXISTING BORE HOLE
 - SANITARY & WATER SERVICE
 - STORM, SANITARY & WATER SERVICE
 - NEW TOP OF WALL GRADE
 - NEW BOTTOM OF WALL GRADE
 - NEW CULVERT
 - EXISTING CULVERT
 - NEW SIDEWALK
 - EXISTING SIDEWALK
 - NEW ASPHALT ROADWAY
 - NEW ASPHALT DRIVEWAY / PATH
 - NEW GRANULAR DRIVEWAY
 - NEW FROST TAPER

CITY OF CLARENCE-ROCKLAND
 CLIENT REF. #
 PROJECT:
RECONSTRUCTION OF CARON STREET



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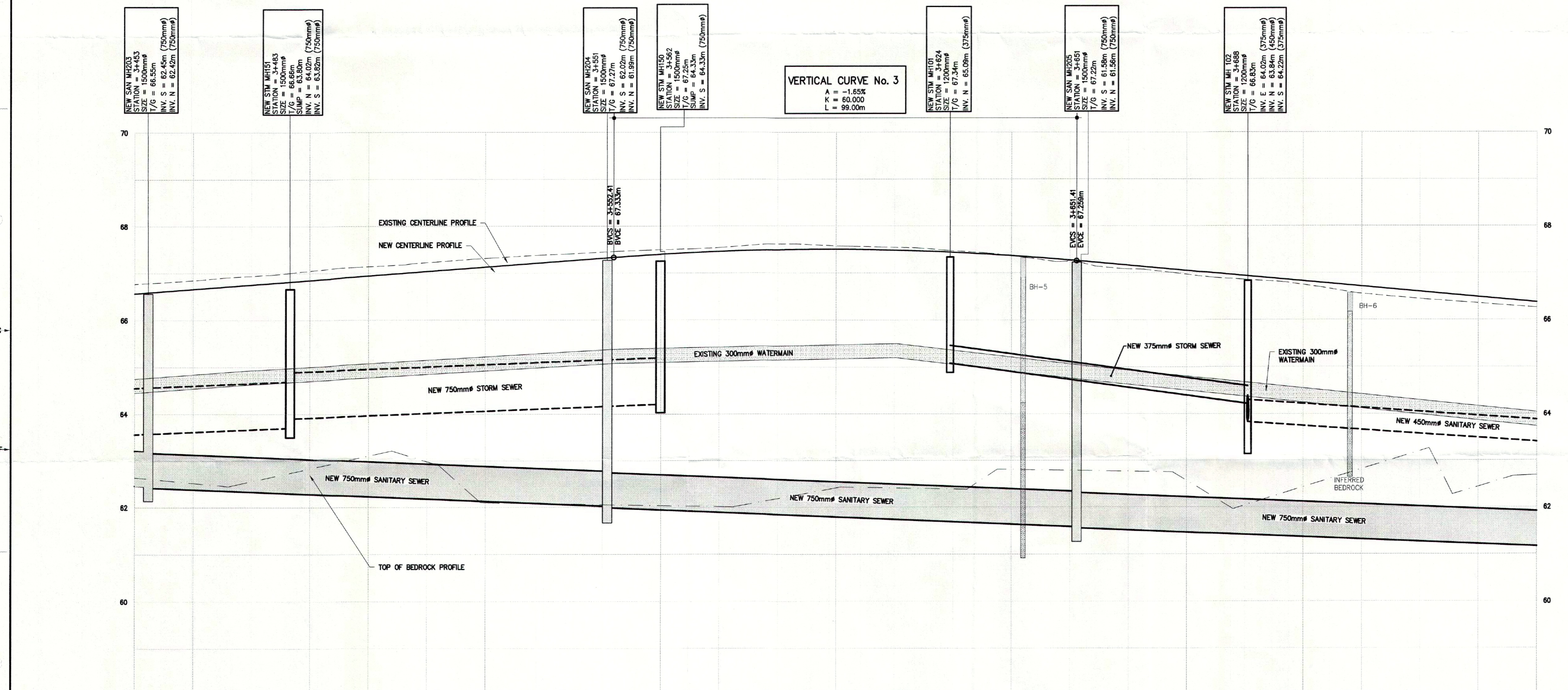
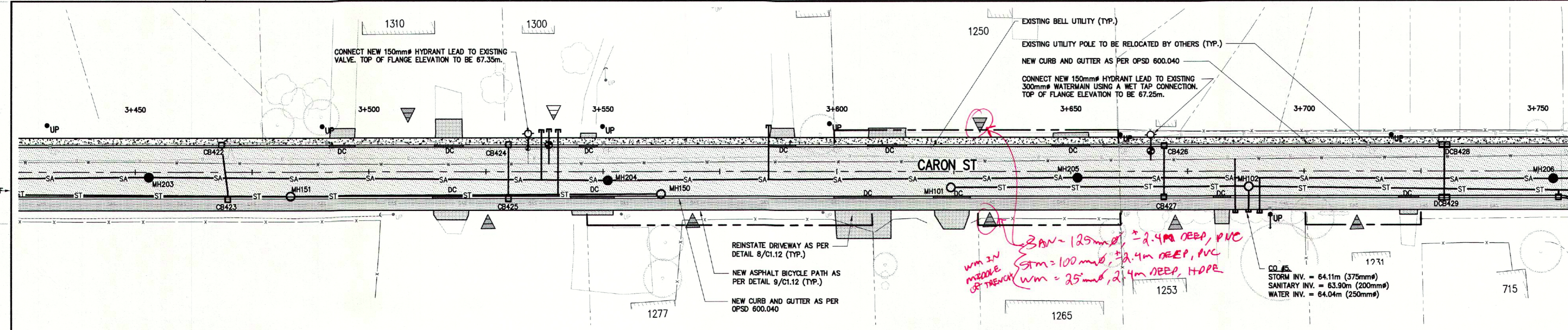
ISSUED FOR - REVISION:

| | | |
|---|--------------|-------------------------|
| 2 | NOV 25, 2015 | AS-BUILTS |
| 1 | AUG 22, 2013 | ISSUED FOR CONSTRUCTION |

| | | | |
|-----------------|---------------------|-----------------------------------------------------------|---------------|
| PROJECT NO: | 065038/111-55504-00 | DATE: | NOVEMBER 2015 |
| ORIGINAL SCALE: | H: 1:500 V: 1:50 | IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE. | |
| DESIGNED BY: | MM/MS | | |
| DRAWN BY: | MS/SJR | | |
| CHECKED BY: | MM | | |

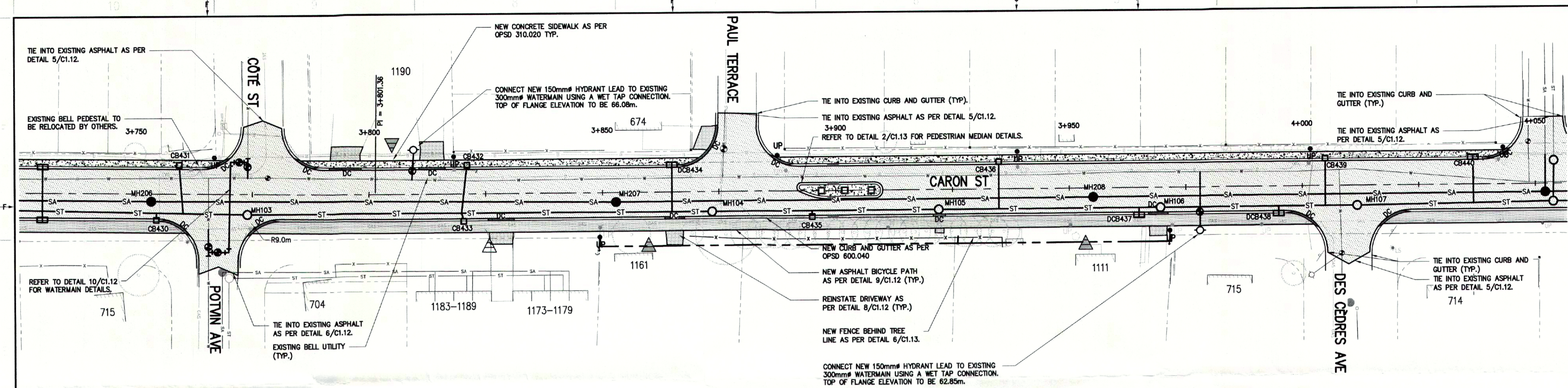
DISCIPLINE: MUNICIPAL
 TITLE:
PLAN & PROFILE OF CARON STREET FROM STA. 3+450 TO STA. 3+750

| | |
|---------------------|---------|
| SHEET NUMBER: | C1.3 |
| ISSUE #: | 3 OF 13 |
| AS-BUILTS | 0 |
| DATE OF: 11/25/2015 | |



| STATION | 3+450 | 3+475 | 3+500 | 3+525 | 3+550 | 3+575 | 3+600 | 3+625 | 3+650 | 3+675 | 3+700 | 3+725 | 3+750 | STATION |
|-----------------------|----------------|---------------------------------------------|----------------|----------------|----------------------------------------------|----------------|----------------|----------------------------------------------|----------------|----------------|-----------------------|----------------|----------------|------------------|
| CENTERLINE GRADE | 66.57 66.77 | 66.75 66.94 | 66.94 67.14 | 67.13 67.31 | 67.32 67.44 | 67.46 67.54 | 67.50 67.58 | 67.44 67.47 | 67.27 67.26 | 67.05 66.97 | 66.82 66.74 | 66.60 66.44 | 66.37 66.32 | CENTERLINE GRADE |
| SANITARY SEWER INVERT | 62.45 62.42 | NEW 98.15m 750mm# SANITARY SEWER @ 0.41% | | 62.02 61.89 | NEW 100.42m 750mm# SANITARY SEWER @ 0.40% | | 61.82 61.69 | NEW 101.86m 750mm# SANITARY SEWER @ 0.40% | | 61.15 | SANITARY SEWER INVERT | | | |
| STORM SEWER INVERT | 63.37 | NEW 108.57m 750mm# STORM SEWER @ 0.41% | | 63.82 64.02 | NEW 79.18m 750mm# STORM SEWER @ 0.39% | | 64.33 | NEW 63.75m 375mm# STORM SEWER @ 1.36% | | 64.22 | STORM SEWER INVERT | | | |
| SUPERELEVATION | | | | | | | | | | | | | | |

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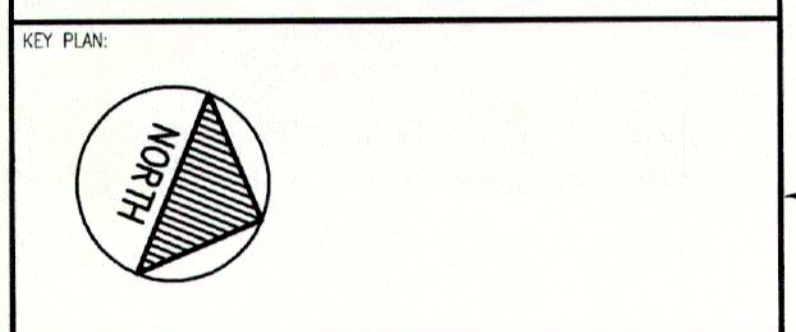


- NOTES:**
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 - SEE DRAWINGS C/1.1 TO C/1.15 FOR LINE PAINTING AND SIGNAGE DETAILS.
- LEGEND:**
- EXISTING PROPERTY LINE
 - NEW CENTERLINE OF ROAD
 - NEW EDGE OF PAVEMENT
 - EXISTING EDGE OF PAVEMENT
 - NEW CURB
 - NEW DEPRESSED CURB
 - EXISTING CURB
 - NEW EDGE OF SHOULDER
 - EXISTING EDGE OF SHOULDER
 - NEW DITCH
 - EXISTING DITCH
 - NEW BOTTOM OF SLOPE
 - EXISTING BOTTOM OF SLOPE
 - EXISTING TOP OF SLOPE
 - EXISTING FENCE
 - FM - NEW SANITARY FORCE MAIN
 - SA - NEW SANITARY SEWER
 - ST - NEW SANITARY SEWER
 - ST - NEW STORM SEWER
 - ST - EXISTING STORM SEWER
 - W - NEW WATERMAIN
 - W - EXISTING WATERMAIN
 - COMB - EXISTING COMBINED SEWER
 - EXISTING GAS LINE
 - EXISTING BELL LINE
 - NEW GUIDERAIL
 - EXISTING GUIDERAIL
 - NEW SANITARY MANHOLE
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 - NEW CATCHBASIN
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 CANADA K7P 0G2
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 WWW.GENIVAR.COM

CONSULTANT:
 CLIENT:
 CITY OF CLARENCE-ROCKLAND

CLIENT REF. #:
 PROJECT:
 RECONSTRUCTION OF CARON STREET



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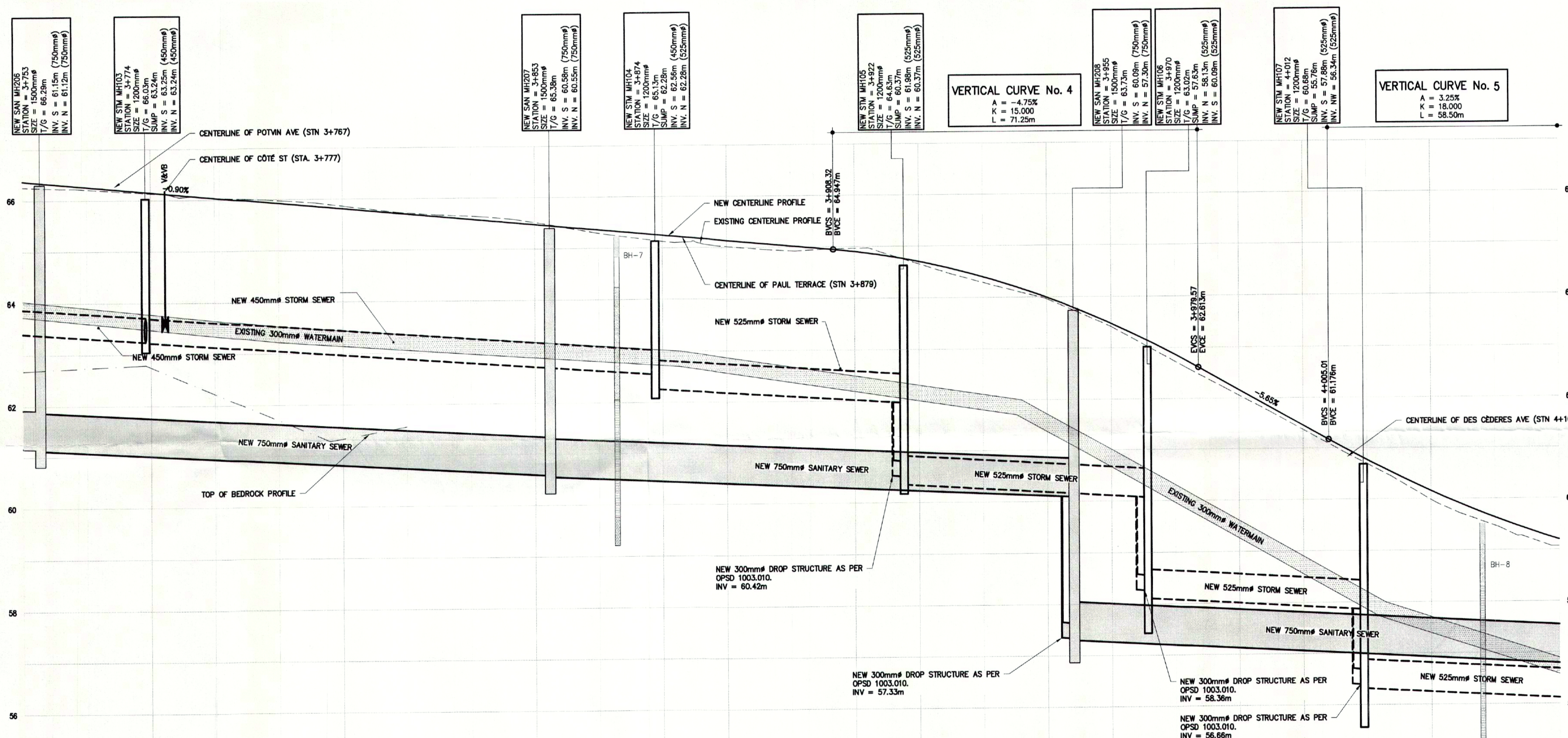
ISSUED FOR - REVISION:

| NO. | DATE | DESCRIPTION |
|-----|--------------|-------------------------|
| 2 | NOV 25, 2015 | AS-BUILTS |
| 1 | AUG 22, 2013 | ISSUED FOR CONSTRUCTION |

PROJECT NO: 065038/111-55504-00
 ORIGINAL SCALE: H: 1:500 V: 1:50
 DATE: NOVEMBER 2015
 DRAWN BY: MM/MS
 CHECKED BY: MS/STR
 TITLE: MUNICIPAL

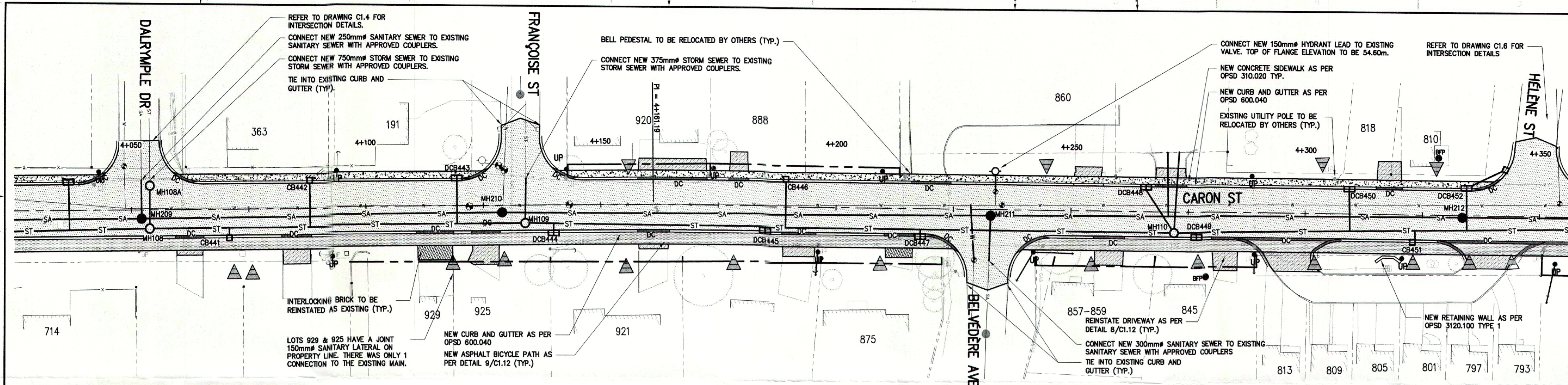
PLAN & PROFILE OF CARON STREET FROM STA. 3+750 TO STA. 4+050

SHEET NUMBER: C1.4
 ISSUE: AS-BUILTS
 DATE OF: 11/26/2015



| STATION | CENTERLINE GRADE | SANITARY SEWER INVERT | STORM SEWER INVERT | SUPERELEVATION |
|---------|------------------|----------------------------------------------|--------------------------------------------------------------------|----------------|
| 3+775 | 66.37 66.26 | 61.15 61.12 | 63.24 | |
| 3+800 | 66.02 65.97 | NEW 99.60m 750mm# SANITARY SEWER @ 0.55% | NEW 99.64m 450mm# STORM SEWER @ 0.68% | |
| 3+825 | 65.70 65.72 | | | |
| 3+850 | 65.47 65.51 | 60.55 60.55 | | |
| 3+875 | 65.25 65.13 | | | |
| 3+900 | 65.02 64.92 | NEW 102.23m 750mm# SANITARY SEWER @ 0.45% | NEW 48.51m 525mm# STORM SEWER @ 0.82% | |
| 3+925 | 64.70 64.65 | | | |
| 3+950 | 63.99 63.95 | 60.08 60.08 | | |
| 3+975 | 63.68 62.73 | NEW 47.51m 525mm# STORM SEWER @ 0.59% | NEW 300mm# DROP STRUCTURE AS PER OPSD 1003.010. INV = 56.36m | |
| 4+000 | 61.48 61.37 | NEW 97.01m 750mm# SANITARY SEWER @ 0.53% | NEW 42.21m 525mm# STORM SEWER @ 0.59% | |
| 4+025 | 60.18 59.98 | | NEW 42.08m 525mm# STORM SEWER @ 0.52% | |
| 4+050 | 59.20 59.08 | 66.78 | 66.12 | |

M:\2009\065038\MAIN\Complete_Caron\065038C1_1_7_combined.dwg - 18.09.13 12:47pm



- NOTES:**
- CONTRACTOR TO VERIFY LOCATION OF ALL BURIED SERVICES PRIOR TO START OF CONSTRUCTION.
 - TOPOGRAPHIC INFORMATION PROVIDED BY APPROPRIATE DUTRISAC SURVEYING INC.
 - ALL DISTURBED AREAS TO BE REINSTATED USING 100mm OF TOP SOIL AND SOO (UNLESS OTHERWISE NOTED).
 - SEE DRAWINGS C1.11 TO C1.15 FOR LINE PAINTING AND SIGNAGE DETAILS.

- LEGEND:**
- EXISTING PROPERTY LINE
 - NEW CENTERLINE OF ROAD
 - NEW EDGE OF PAVEMENT
 - EXISTING EDGE OF PAVEMENT
 - NEW CURB
 - NEW DEPRESSED CURB
 - EXISTING CURB
 - NEW EDGE OF SHOULDER
 - EXISTING EDGE OF SHOULDER
 - NEW DITCH
 - EXISTING DITCH
 - NEW BOTTOM OF SLOPE
 - EXISTING BOTTOM OF SLOPE
 - EXISTING TOP OF SLOPE
 - EXISTING FENCE
 - NEW SANITARY FORCEMAIN
 - NEW SANITARY SEWER
 - EXISTING SANITARY SEWER
 - NEW STORM SEWER
 - EXISTING STORM SEWER
 - NEW WATERMAIN
 - EXISTING WATERMAIN
 - EXISTING COMBINED SEWER
 - EXISTING GAS LINE
 - EXISTING BELL LINE
 - NEW GUIDELINE
 - EXISTING GUIDELINE
 - NEW SANITARY MANHOLE
 - EXISTING SANITARY MANHOLE
 - NEW STORM MANHOLE
 - EXISTING STORM MANHOLE
 - NEW CATCHBASIN
 - NEW DOUBLE CATCHBASIN
 - NEW CATCHBASIN DITCH INLET
 - EXISTING CATCHBASIN
 - NEW HYDRANT
 - EXISTING HYDRANT
 - NEW VALVE
 - EXISTING VALVE
 - EXISTING REDUCER
 - EXISTING UTILITY POLE
 - NEW UTILITY POLE
 - UTILITY POLE TO BE RELOCATED
 - NEW LIGHT STANDARD
 - EXISTING LIGHT STANDARD
 - NEW HAND HOLE
 - EXISTING HAND HOLE
 - EXISTING GAS VALVE
 - EXISTING BELL/CABLE PEDESTAL
 - BELL PEDESTAL TO BE MOVED (BY OTHERS)
 - EXISTING TREES/HEDGES
 - NEW TREES/HEDGES
 - NEW BACKFLOW PREVENTOR ON STORM SERVICE
 - EXISTING BORE HOLE
 - SANITARY & WATER SERVICE
 - STORM, SANITARY & WATER SERVICE
 - NEW TOP OF WALL GRADE
 - NEW BOTTOM OF WALL GRADE
 - NEW CULVERT
 - EXISTING CULVERT
 - EXISTING SIDEWALK
 - NEW ASPHALT ROADWAY
 - NEW ASPHALT DRIVEWAY / PATH
 - NEW GRANULAR DRIVEWAY
 - NEW FROST TAPER

GENIVAR
 2611 QUEENSWAY DRIVE
 OTTAWA, ONTARIO
 CANADA K7P 0G2
 PHONE: 613-829-2800 FAX: 613-829-8299
 WWW.GENIVAR.COM

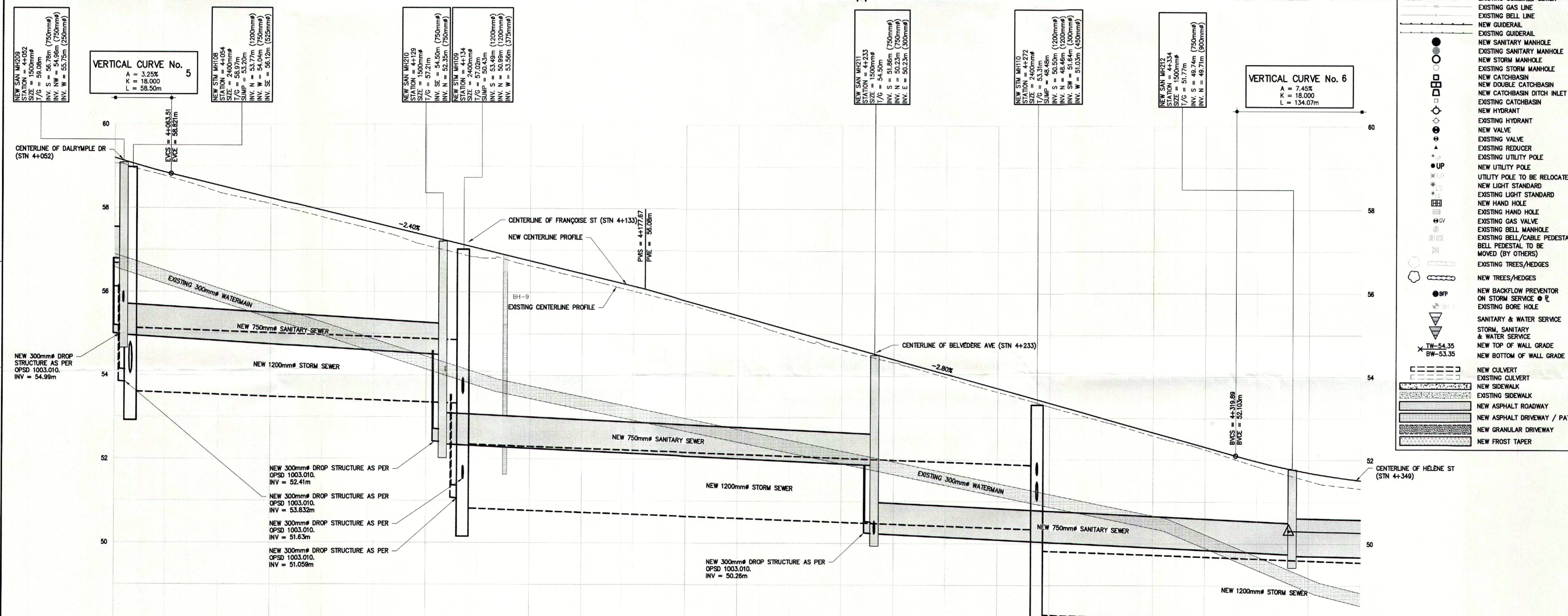
CONSULTANT:
 SEAL:
 CLIENT:
CITY OF CLARENCE-ROCKLAND
 CLIENT REF. #:
 PROJECT:
RECONSTRUCTION OF CARON STREET
 KEY PLAN:

DISCLAIMER:
 THIS DRAWING AND DESIGN IS COPYRIGHT PROTECTED WHICH SHALL NOT BE REPRODUCED OR REVISED WITHOUT WRITTEN PERMISSION BY GENIVAR. THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AND UTILITY LOCATIONS AND REPORT ALL ERRORS AND OMISSIONS PRIOR TO COMMENCING WORK. THIS DRAWING IS NOT TO BE SCALED.

ISSUED FOR - REVISION:

| NO. | DATE | DESCRIPTION |
|-----|--------------|-------------------------|
| 2 | NOV 25, 2015 | AS-BUILTS |
| 1 | AUG 22, 2013 | ISSUED FOR CONSTRUCTION |

PROJECT NO: 065038/111-55504-00
 DATE: NOVEMBER 2015
 ORIGINAL SCALE: H: 1:500 V: 1:50
 DESIGNED BY: MM/MS
 DRAWN BY: MS/STR
 CHECKED BY: MM
 DISCIPLINE: MUNICIPAL
 TITLE: PLAN & PROFILE OF CARON STREET FROM STA. 4+050 TO STA. 4+350
 SHEET NUMBER: C1.5
 SHEET #: 5 OF 13
 ISSUE: AS-BUILTS
 DATE OF: 11/25/2015



| STATION | CENTERLINE GRADE FINISHED | EXISTING CENTERLINE GRADE | SANITARY SEWER INVERT | STORM SEWER INVERT | SUPERELEVATION | STATION | CENTERLINE GRADE FINISHED | EXISTING CENTERLINE GRADE | SANITARY SEWER INVERT | STORM SEWER INVERT | SUPERELEVATION |
|---------|---------------------------|---------------------------|-----------------------|--------------------|---------------------------------------|---------|---------------------------|---------------------------|-----------------------|--------------------|----------------|
| 4+075 | 58.65 | 58.37 | 56.78 | 56.34 | NEW 42.08m 525mm# STORM SEWER @ 0.52% | 4+100 | 57.95 | 57.78 | 56.78 | 56.34 | |
| 4+125 | 57.35 | 57.11 | 54.50 | 54.06 | | 4+150 | 56.75 | 56.52 | 54.50 | 54.06 | |
| 4+175 | 56.15 | 56.02 | 54.50 | 54.06 | | 4+200 | 55.48 | 55.37 | 54.50 | 54.06 | |
| 4+225 | 54.76 | 54.64 | 54.50 | 54.06 | | 4+250 | 54.08 | 53.98 | 54.50 | 54.06 | |
| 4+275 | 53.36 | 53.27 | 54.50 | 54.06 | | 4+300 | 52.66 | 52.58 | 54.50 | 54.06 | |
| 4+325 | 51.67 | 51.63 | 54.50 | 54.06 | | 4+350 | 51.51 | 51.32 | 54.50 | 54.06 | |

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- NOTES:**
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 - TOPOGRAPHIC INFORMATION PROVIDED BY APPENTAGE DUTRISAC SURVEYING INC.
 - ALL DISTURBED AREAS TO BE REINSTATED USING 100mm OF TOP SOIL AND SOO (UNLESS OTHERWISE NOTED).
 - SEE DRAWINGS C1.11 TO C1.15 FOR LINE PAINTING AND SIGNAGE DETAILS.

- LEGEND:**
- EXISTING PROPERTY LINE
 - NEW CENTERLINE OF ROAD
 - NEW EDGE OF PAVEMENT
 - EXISTING EDGE OF PAVEMENT
 - NEW CURB
 - NEW DEPRESSED CURB
 - EXISTING CURB
 - NEW EDGE OF SHOULDER
 - EXISTING EDGE OF SHOULDER
 - NEW DITCH
 - EXISTING DITCH
 - NEW BOTTOM OF SLOPE
 - EXISTING BOTTOM OF SLOPE
 - EXISTING TOP OF SLOPE
 - EXISTING FENCE
 - FM
 - NEW SANITARY FORCEMAIN
 - NEW SANITARY SEWER
 - EXISTING SANITARY SEWER
 - NEW STORM SEWER
 - EXISTING STORM SEWER
 - NEW WATERMAIN
 - EXISTING WATERMAIN
 - EXISTING COMBINED SEWER
 - EXISTING GAS LINE
 - EXISTING BELL LINE
 - NEW GUIDEWALL
 - EXISTING GUIDEWALL
 - NEW SANITARY MANHOLE
 - EXISTING SANITARY MANHOLE
 - NEW STORM MANHOLE
 - EXISTING STORM MANHOLE
 - NEW CATCHBASIN
 - NEW DOUBLE CATCHBASIN
 - NEW CATCHBASIN DITCH INLET
 - EXISTING CATCHBASIN
 - NEW HYDRANT
 - EXISTING HYDRANT
 - NEW VALVE
 - EXISTING VALVE
 - EXISTING REDUCER
 - EXISTING UTILITY POLE
 - NEW UTILITY POLE
 - UTILITY POLE TO BE RELOCATED
 - NEW LIGHT STANDARD
 - EXISTING LIGHT STANDARD
 - NEW HAND HOLE
 - EXISTING HAND HOLE
 - EXISTING GAS VALVE
 - EXISTING BELL MANHOLE
 - EXISTING BELL/CABLE PEDESTAL
 - BELL PEDESTAL TO BE MOVED (BY OTHERS)
 - EXISTING TREES/HEDGES
 - NEW TREES/HEDGES
 - NEW BACKFLOW PREVENTOR ON STORM SERVICE
 - EXISTING BORE HOLE
 - SANITARY & WATER SERVICE
 - STORM, SANITARY & WATER SERVICE
 - NEW TOP OF WALL GRADE
 - NEW BOTTOM OF WALL GRADE
 - NEW CULVERT
 - EXISTING CULVERT
 - NEW SIDEWALK
 - EXISTING SIDEWALK
 - NEW ASPHALT ROADWAY
 - NEW ASPHALT DRIVEWAY / PATH
 - NEW GRANULAR DRIVEWAY
 - NEW FROST TAPER

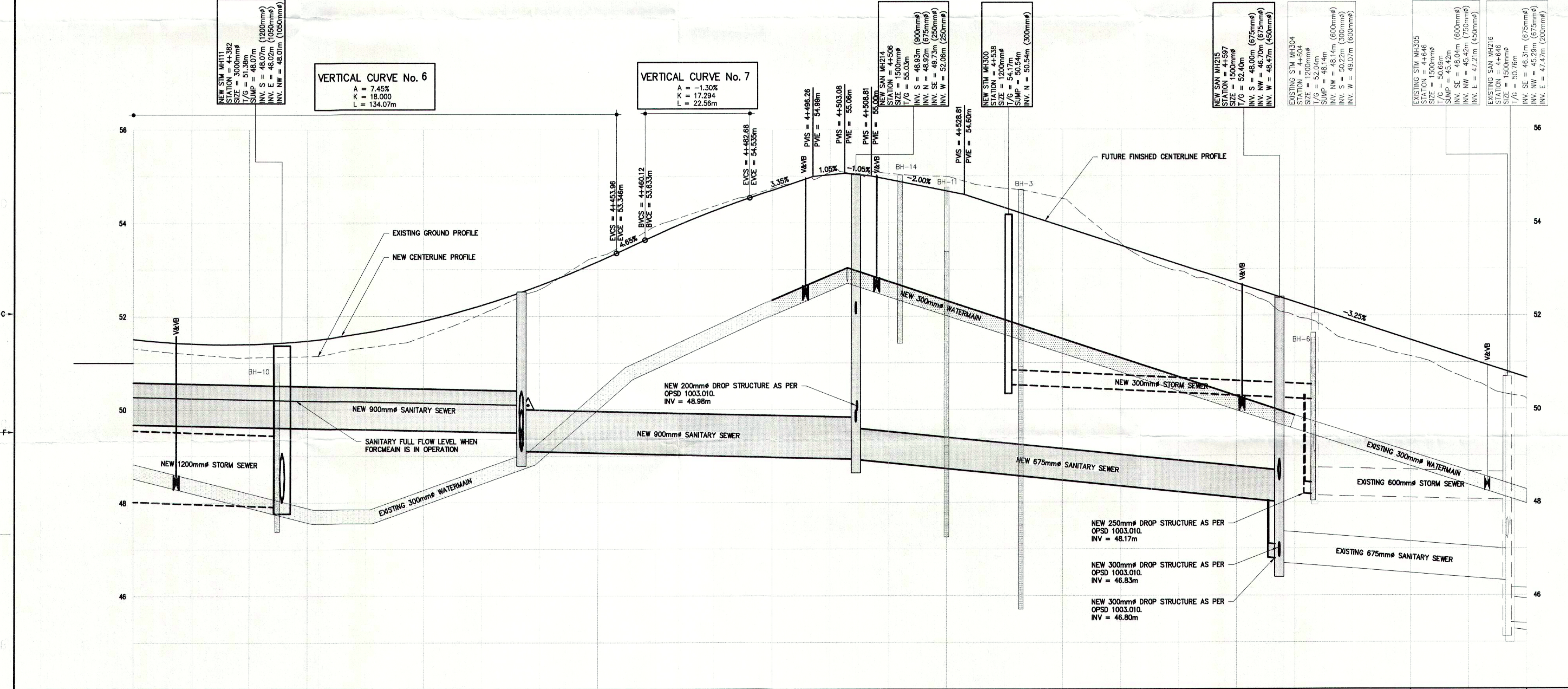
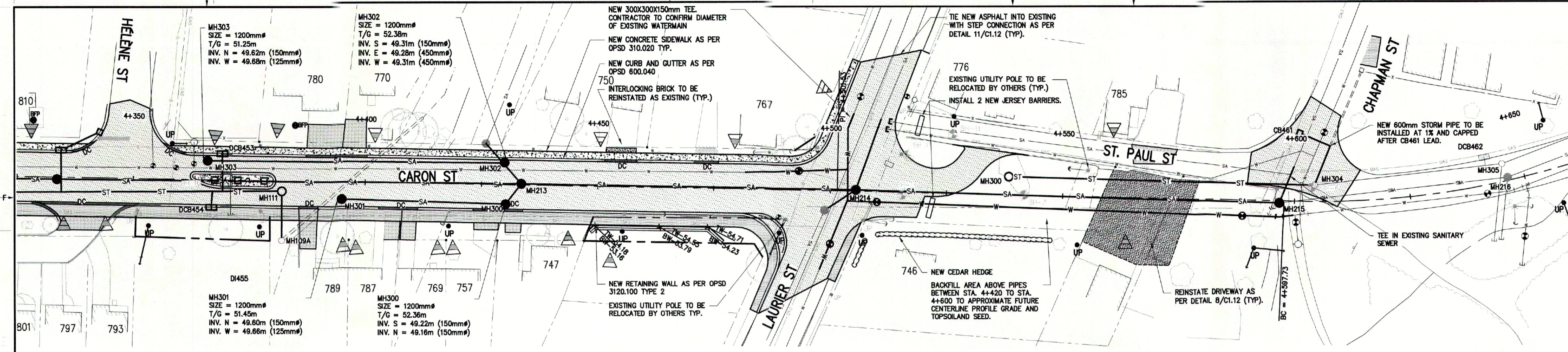
CITY OF CLARENCE-ROCKLAND
 RECONSTRUCTION OF CARON STREET



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| IS | RE | DATE | DESCRIPTION |
|----|----|--------------|-------------------------|
| 2 | | NOV 25, 2015 | AS-BUILTS |
| 1 | | AUG 22, 2013 | ISSUED FOR CONSTRUCTION |

| | | | |
|-----------------|--------------------------------------------------------------|-----------------------------------------------------------|---------------|
| PROJECT NO: | 065038/111-55504-00 | DATE: | NOVEMBER 2015 |
| ORIGINAL SCALE: | H: 1:500 V: 1:50 | IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE. | |
| DESIGNED BY: | MM/MS | | |
| DRAWN BY: | MS/STR | | |
| CHECKED BY: | | | |
| DISCIPLINE: | MUNICIPAL | | |
| TITLE: | PLAN & PROFILE OF CARON STREET FROM STA. 4+350 TO STA. 4+650 | | |
| SHEET NUMBER: | C1.6 | | |
| SHEET #: | 6 OF 13 | | |
| ISSUE: | AS-BUILTS | | |
| DATE OF: | 11/25/2015 | | |
| REV #: | 0 | | |



| STATION | CENTERLINE GRADE | TOP OF WATERMAIN | SANITARY SEWER INVERT | STORM SEWER INVERT | SUPERELEVATION |
|---------|------------------|------------------|-----------------------|--------------------|----------------|
| 4+350 | 51.21 | 48.82 | 48.71 | 48.48 | |
| 4+400 | 51.12 | 48.20 | | | |
| 4+425 | 51.32 | 47.85 | | | |
| 4+450 | 52.05 | 48.72 | | | |
| 4+475 | 53.17 | 50.39 | | | |
| 4+500 | 54.26 | 51.78 | | | |
| 4+525 | 54.88 | 52.33 | | | |
| 4+550 | 55.03 | 52.88 | | | |
| 4+575 | 54.88 | 52.33 | | | |
| 4+600 | 53.91 | 51.51 | | | |
| 4+625 | 53.10 | 50.89 | | | |
| 4+650 | 52.29 | 50.06 | | | |

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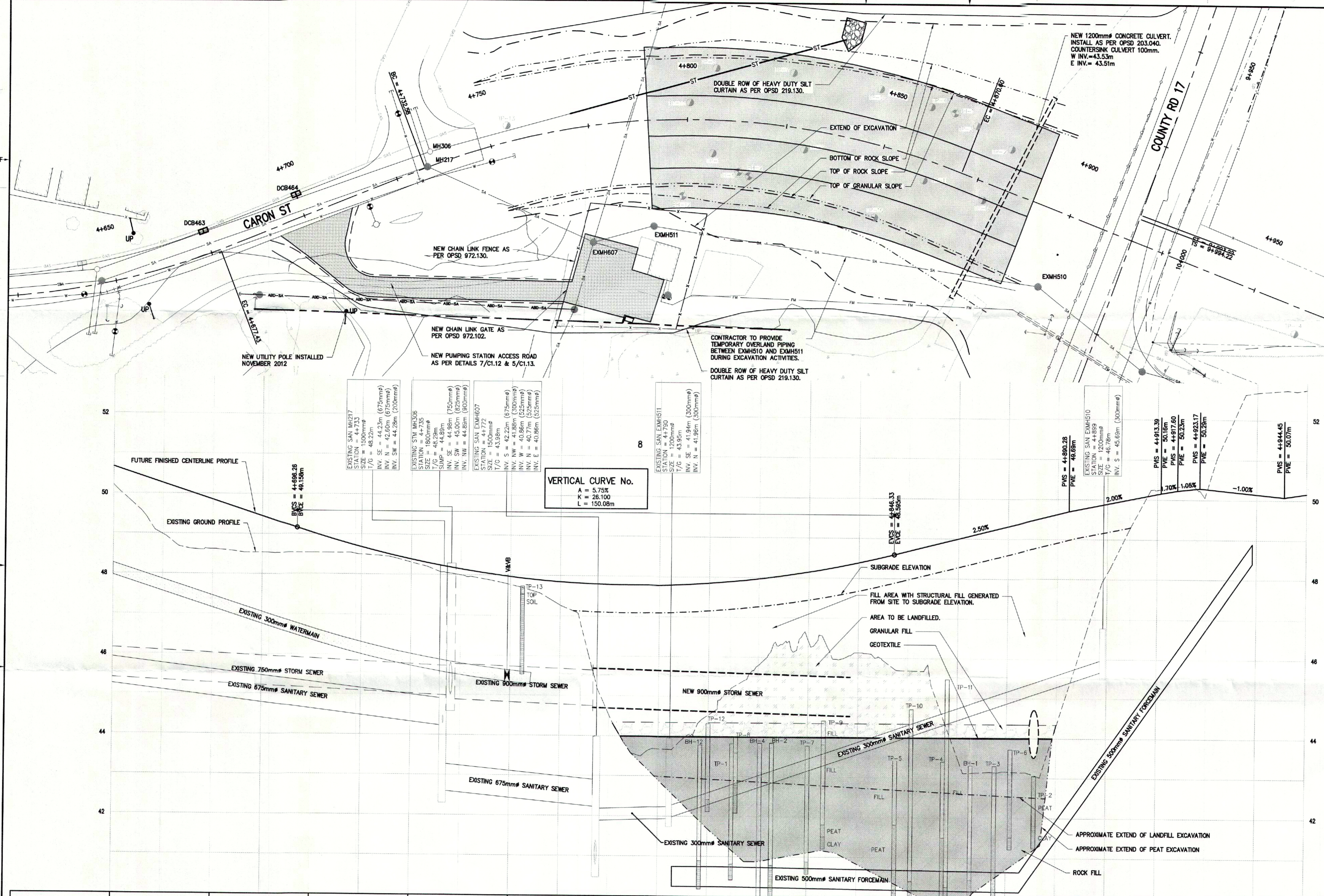
@ LANDEA

NOTES:
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 2. TOPOGRAPHIC INFORMATION PROVIDED BY APPURTAGE DUTIRASAC SURVEYING INC.
 3. ALL DISTURBED AREAS TO BE REINSTATED USING 100mm OF TOP SOIL AND SOO (UNLESS OTHERWISE NOTED).
 4. SEE DRAWINGS C1.11 TO C1.15 FOR LINE PAINTING AND SIGNAGE DETAILS.

LEGEND:

- EXISTING PROPERTY LINE
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- EXISTING EDGE OF PAVEMENT
- NEW CURB
- NEW DEPRESSED CURB
- EXISTING CURB
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- EXISTING EDGE OF SHOULDER
- NEW DITCH
- EXISTING DITCH
- NEW BOTTOM OF SLOPE
- EXISTING BOTTOM OF SLOPE
- EXISTING TOP OF SLOPE
- EXISTING FENCE
- NEW SANITARY FOREMAN
- NEW SANITARY SEWER
- EXISTING SANITARY SEWER
- NEW STORM SEWER
- EXISTING STORM SEWER
- NEW WATERMAIN
- EXISTING WATERMAIN
- EXISTING COMBINED SEWER
- EXISTING GAS LINE
- EXISTING BELL LINE
- NEW GUIDERAIL
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- EXISTING TREES/HEDGES
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- NEW SIDEWALK
- NEW ASPHALT ROADWAY
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CONSULTANT:
 SEAL:
 CLIENT:
CITY OF CLARENCE-ROCKLAND
 CLIENT REF. #:
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RECONSTRUCTION OF CARON STREET
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| STATION | CENTERLINE GRADE | TOP OF WATERMAIN | SANITARY SEWER INVERT | STORM SEWER INVERT | SUPERELEVATION | STATION | CENTERLINE GRADE | TOP OF WATERMAIN | SANITARY SEWER INVERT | STORM SEWER INVERT | SUPERELEVATION |
|---------|------------------|------------------|-----------------------|--------------------|----------------|---------|------------------|------------------|-----------------------|--------------------|----------------|
| 4+650 | 48.85 | 48.82 | 46.29 | 45.42 | CURVE 3 | 4+700 | 48.04 | 48.53 | 46.29 | 45.42 | TIE-IN |
| 4+725 | 48.38 | 48.31 | 46.29 | 45.42 | CURVE 3/4 | 4+775 | 47.78 | 48.54 | 46.29 | 45.42 | CURVE 4 |
| 4+750 | 47.98 | 47.76 | 46.29 | 45.42 | CURVE 4 | 4+800 | 47.85 | 48.53 | 46.29 | 45.42 | CURVE 4 |
| 4+825 | 48.15 | 48.42 | 46.29 | 45.42 | CURVE 4 | 4+875 | 48.31 | 48.16 | 46.29 | 45.42 | CURVE 4 |
| 4+900 | 48.89 | 48.83 | 46.29 | 45.42 | CURVE 4 | 4+950 | 50.16 | 52.76 | 46.29 | 45.42 | CURVE 4 |

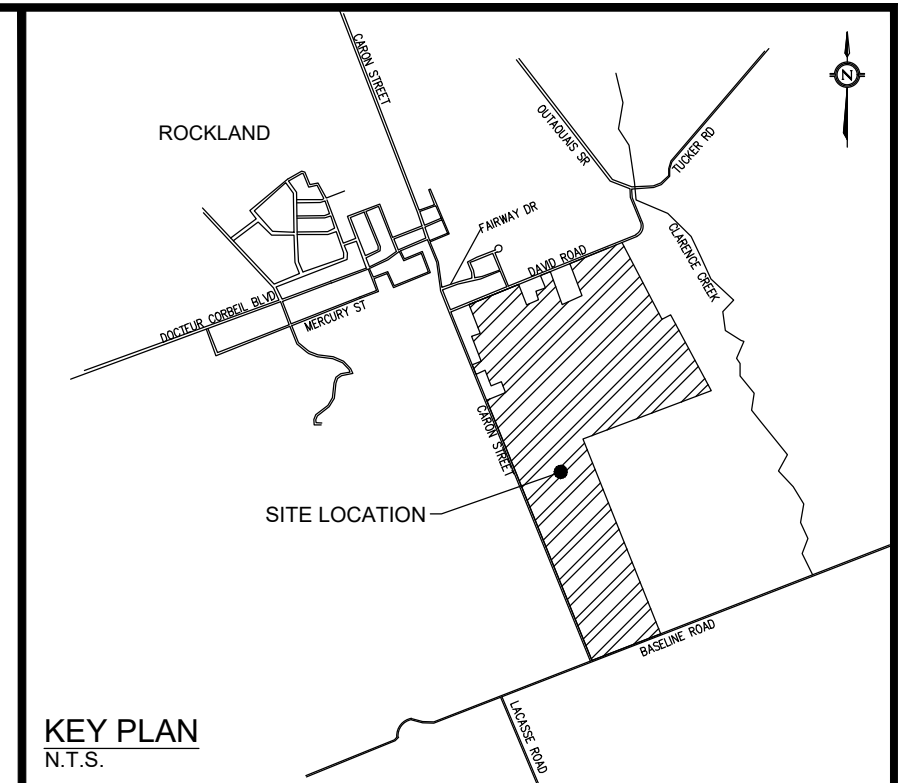
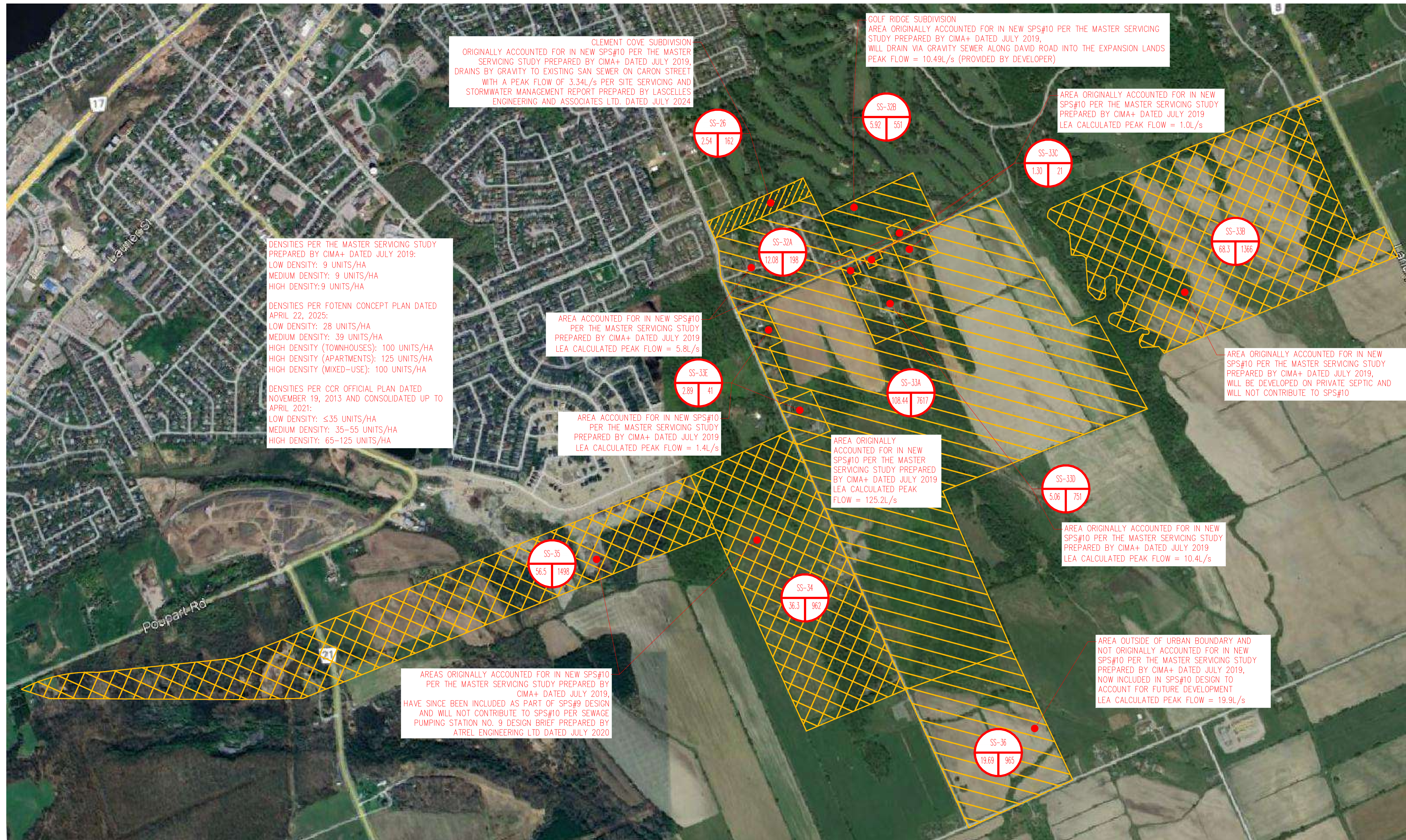
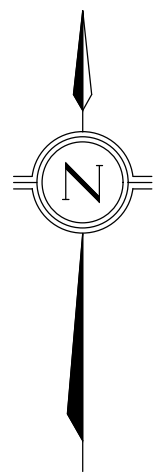
VERTICAL CURVE #8

| STA. | ELEVATION |
|----------|-----------|
| 4+694.89 | 49.221 |
| 4+700 | 49.06 |
| 4+710 | 48.77 |
| 4+720 | 48.53 |
| 4+730 | 48.32 |
| 4+740 | 48.15 |
| 4+750 | 48.01 |
| 4+760 | 47.92 |
| 4+770 | 47.86 |
| 4+780 | 47.84 |
| 4+790 | 47.86 |
| 4+800 | 47.92 |
| 4+810 | 48.02 |
| 4+820 | 48.16 |
| 4+830 | 48.33 |
| 4+840 | 48.54 |
| 4+844.89 | 48.658 |

LOW POINT

| STA. | ELEVATION |
|----------|-----------|
| 4+700 | 48.06 |
| 4+710 | 48.77 |
| 4+720 | 48.53 |
| 4+730 | 48.32 |
| 4+740 | 48.15 |
| 4+750 | 48.01 |
| 4+760 | 47.92 |
| 4+770 | 47.86 |
| 4+780 | 47.84 |
| 4+790 | 47.86 |
| 4+800 | 47.92 |
| 4+810 | 48.02 |
| 4+820 | 48.16 |
| 4+830 | 48.33 |
| 4+840 | 48.54 |
| 4+844.89 | 48.658 |

PROJECT NO: 065038/111-55504-00
 ORIGINAL SCALE: H: 1:500 V: 1:50
 DESIGNED BY: MM/MS
 DRAWN BY: MS/STR
 CHECKED BY: MM
 DISCIPLINE: MUNICIPAL
 TITLE: **PLAN & PROFILE OF CARON STREET FROM STA. 4+650 TO STA. 4+950**
 SHEET NUMBER: C1.7
 SHEET # 7 OF 13
 ISSUE: AS-BUILTS
 DATE OF: 11/25/2015
 REV # 0



LEGEND:

- SEWERSHED NAME
- ANTICIPATED POPULATION
- AREA IN HECTARES
- SANITARY SEWERSHED
- SANITARY SEWERSHED CONTRIBUTING TO NEW SPS#10
- SANITARY SEWERSHED CONTRIBUTING TO EXISTING GRAVITY SEWER ON CARON STREET
- SANITARY SEWERSHED NOT CONTRIBUTING TO NEW SPS#10

NOT FOR CONSTRUCTION TENDER OR PERMIT

| No. | REVISIONS | P.F. | DATE |
|-----|------------------------------------|------|--------------|
| 00 | ISSUED FOR OFFICIAL PLAN AMENDMENT | P.F. | JUL 25, 2025 |

1010 SPENCE AVENUE
 SUITE 14
 HAWKESBURY, ONTARIO
 K6A 3H9
 OFFICE: (613) 832-0241

LASCELLES
 ENGINEERING AND ASSOCIATES LTD.

LICENCED PROFESSIONAL ENGINEER
P. D. E. FREY
 100148777
 JUL 25, 2025
 PROVINCE OF ONTARIO

CLIENT:
SACA LAND DEVELOPMENTS (ROCKLAND) INC.

PROJECT:
CARON SUBDIVISION - OFFICIAL PLAN AMENDMENT
 PART 1 OF RP 50R-0754, PART 1 OF RP 50R-11600,
 PART OF LOT 21, LOT 22 & LOT 23, CONCESSION 2 (OLD SURVEY)
 GEOGRAPHIC TOWNSHIP OF CLARENCE
 CITY OF CLARENCE-ROCKLAND

DRAWING TITLE:
SSA SANITARY SEWERSHEDS

| | | | |
|----------------------|-------------------------------|-----------------------|---------------------|
| DESIGNED BY: K.S. | DRAWN BY: K.S. | CHECKED BY: B.M.S. | CHECKED BY: P.F. |
| FILE No.: 200459 | DRAWING / SHEET No.: SAN-1 | REV: 00 | |

File Location: D:\OneDrive\OneDrive - Lascelles Engineering\Projects\2025\20250720\20459 - SACA Land Developments (Rockland) Inc. - Sewer SPS#10\Drawings\City\SSA\Legal Plan\20459 - Legal Plan.dwg (SAN-1)

SANITARY SEWER DESIGN SHEET

Caron Subdivision, City of Clarence-Rockland - SAN-2

Project #: 200459
 Date: July 25, 2025
 Designed: K.S.
 Checked P.F.

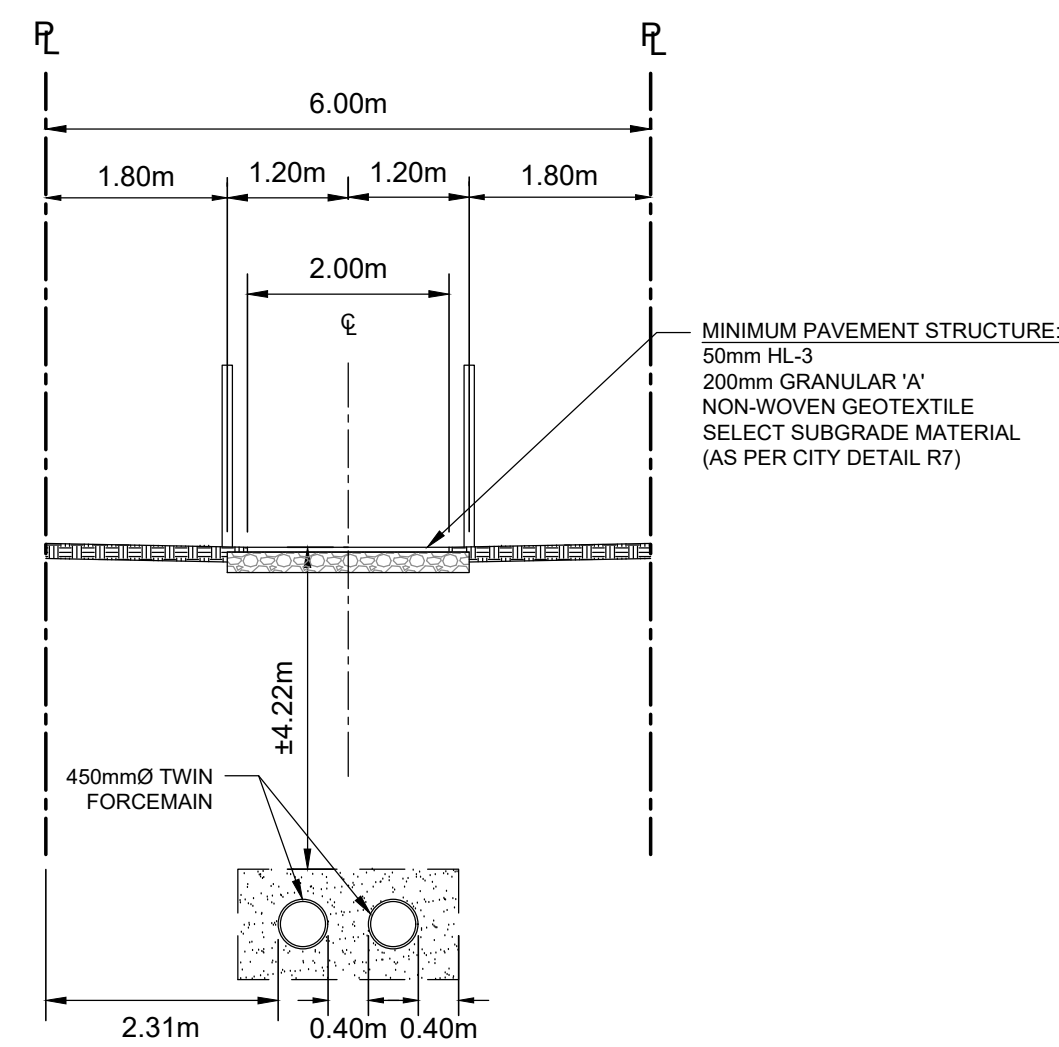
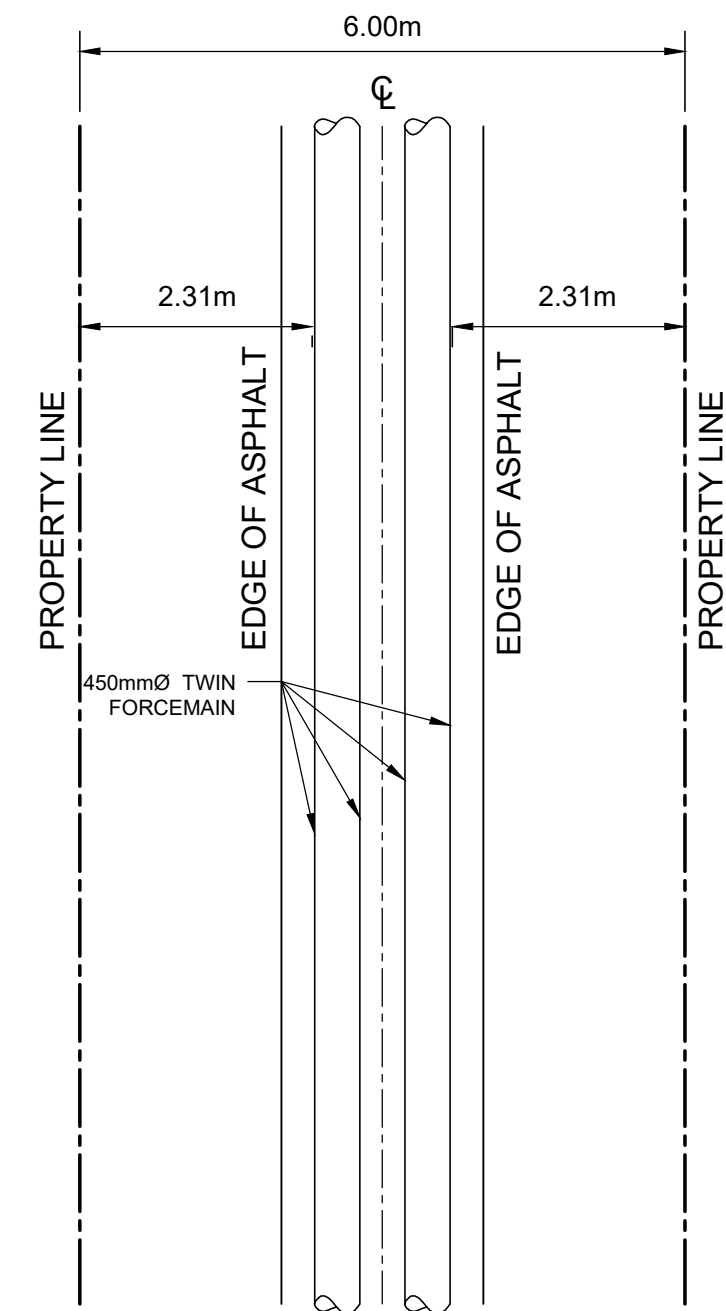
Persons per Unit Type
 Low Density 3.4
 Medium Density 2.7
 High Density 1.8

Max. Commercial Peaking Factor = 1.50
 Avg. Domestic Flow = 350.0 L/c/d
 New Development Infiltration = 0.280 L/s/ha
 Existing Development Infiltration = 0.280 L/s/ha
 Max. Peaking Factor = 4.00
 Min. Peaking Factor = 2.00
 Factor of Safety = 10 %



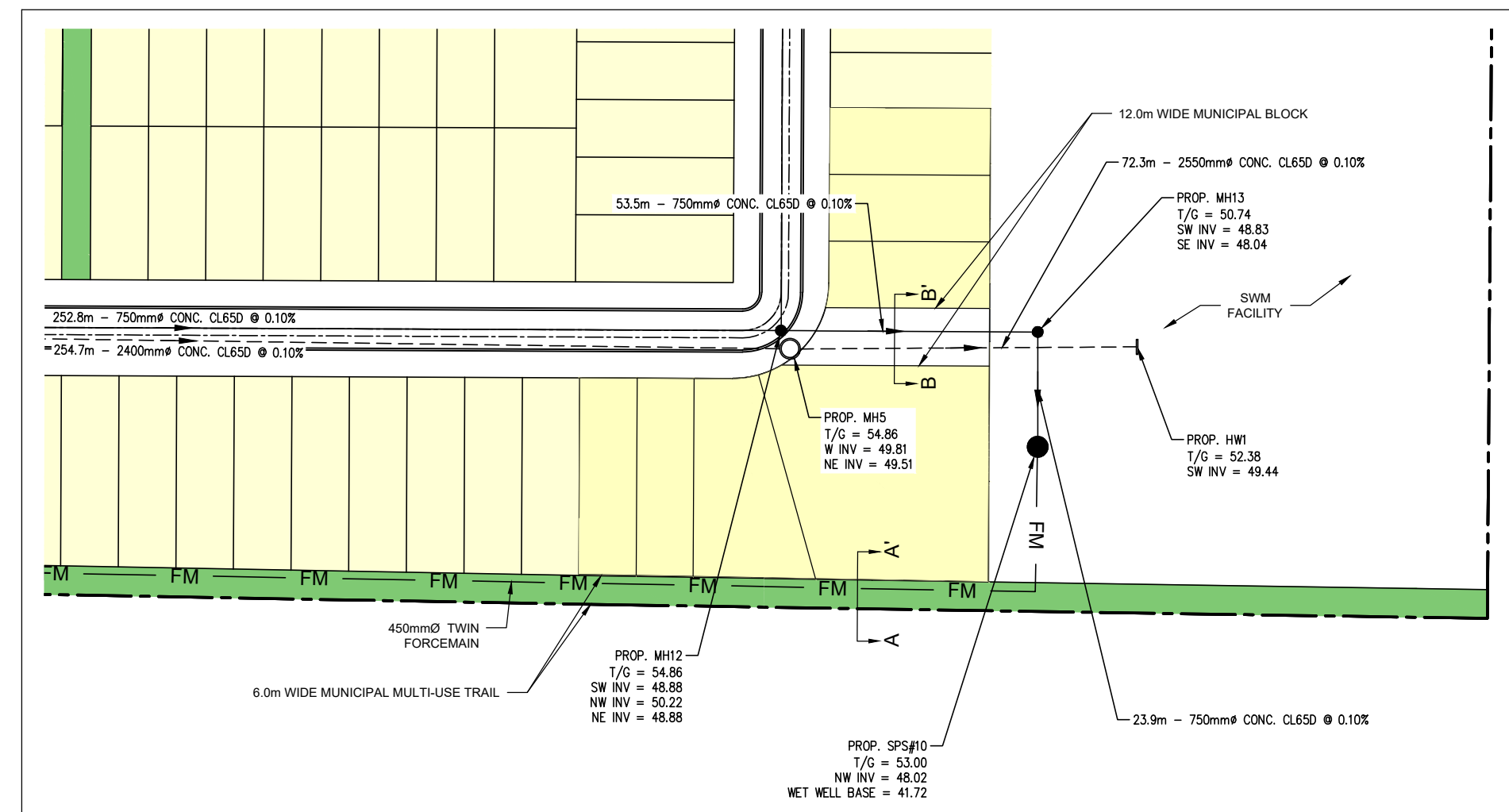
NOMINAL PIPE SIZE USED

| DESCRIPTION | FROM MH | TO MH | RESIDENTIAL | | | | | | | | COMMERCIAL/INDUSTRIAL/INSTITUTIONAL | | | | | | | | FLOW CALCULATIONS | | | | | | PIPE DATA | | | | | | |
|----------------------------|-----------|-----------|-------------|----------------|-------------|------------------|------|------------------|-----------|----------------|-------------------------------------|--------------------|---------------------------|-------------|--------------------|--------------------|-------------------|----------------|-------------------|---------------------------|-------------------------|------------------|-----------|--------------------|--------------------------|--------------------------|-----------------------|------------------|-----|-----|--|
| | | | AREA (ha) | ACC. AREA (ha) | TOTAL UNITS | DENSITY (P/unit) | POP | ACCUM. RES. POP. | AREA (ha) | ACC. AREA (ha) | EQUIV. POP. (p/ha) | FLOW RATE (L/s/ha) | COMMERCIAL PEAKING FACTOR | EQUIV. POP. | ACCUM. EQUIV. POP. | INFILTRATION (L/s) | TOTAL ACCUM. POP. | PEAKING FACTOR | POP. FLOW (L/s) | CONSTANT COMM. FLOW (L/s) | ACCUM. COMM. FLOW (l/s) | TOTAL FLOW (L/s) | SLOPE (%) | PIPE DIAMETER (mm) | FULL FLOW CAPACITY (l/s) | FULL FLOW VELOCITY (m/s) | ACTUAL VELOCITY (m/s) | PERCENT FULL (%) | | | |
| SS-36-2 | MH1 | MH2 | 5.62 | 5.62 | 155 | 2.69 | 417 | 417 | 5.79 | 5.79 | | | | 0.324 | 1.50 | | | 3.2 | 417 | 4.00 | 6.8 | 2.8 | 2.8 | 12.8 | 0.32 | 200 | 18.6 | 0.6 | 0.6 | 69% | |
| SS-36-1 | MH2 | MH3 | 8.29 | 13.91 | 204 | 2.69 | 548 | 965 | | 5.79 | | | | | 1.50 | | | 5.5 | 965 | 3.81 | 14.9 | | 2.8 | 23.2 | 0.24 | 250 | 29.1 | 0.6 | 0.7 | 80% | |
| | MH3 | MH4 | | 13.91 | | | | 965 | | 5.79 | | | | | 1.50 | | | 5.5 | 965 | 3.81 | 14.9 | | 2.8 | 23.2 | 0.24 | 250 | 29.1 | 0.6 | 0.7 | 80% | |
| SS-33A-8 | MH4 | MH5 | 2.55 | 16.46 | 43 | 3.42 | 147 | 1112 | | 5.79 | | | | | 1.50 | | | 6.2 | 1112 | 3.77 | 17.0 | | 2.8 | 26.0 | 0.24 | 250 | 29.1 | 0.6 | 0.7 | 89% | |
| SS-33A-7 | MH5 | MH6 | 18.26 | 34.72 | 830 | 2.26 | 1878 | 2990 | 0.78 | 6.57 | | | | 0.324 | 1.50 | | | 11.6 | 2990 | 3.44 | 41.7 | 0.4 | 3.2 | 56.5 | 0.14 | 375 | 65.6 | 0.6 | 0.7 | 86% | |
| SS-33A-6 | MH6 | MH7 | 1.94 | 36.66 | 42 | 2.98 | 125 | 3115 | 4.50 | 11.08 | | | | 0.324 | 1.50 | | | 13.4 | 3115 | 3.43 | 43.3 | 2.2 | 5.4 | 62.0 | 0.11 | 450 | 95.0 | 0.6 | 0.6 | 65% | |
| SS-32A | EX. MH256 | EX. MH255 | 12.08 | 12.08 | 58 | 3.41 | 198 | 198 | | | | | | | | | | 3.4 | 198 | 4.00 | 3.2 | | | 6.6 | 0.36 | 300 | 58.0 | 0.8 | 0.6 | 11% | |
| SS-33E-1 | EX. MH255 | MH9 | 1.91 | 13.99 | 8 | 3.50 | 28 | 226 | | | | | | | | | | 3.9 | 226 | 4.00 | 3.7 | | | 7.6 | 1.58 | 300 | 121.6 | 1.7 | 1.0 | 6% | |
| SS-33E-2 | MH8 | MH9 | 0.98 | 0.98 | 4 | 3.50 | 14 | 14 | | | | | | | | | | 0.3 | 14 | 4.00 | 0.6 | | | 0.9 | 0.65 | 200 | 26.4 | 0.8 | 0.4 | 3% | |
| SS-33A-5 | MH9 | MH10 | 12.35 | 27.32 | 594 | 2.34 | 1390 | 1630 | 2.74 | 2.74 | | | | 0.324 | 1.50 | | | 8.4 | 1630 | 3.65 | 24.1 | 1.3 | 1.3 | 33.9 | 0.19 | 300 | 41.7 | 0.6 | 0.7 | 81% | |
| SS-33A-4 | MH10 | MH7 | 11.57 | 38.89 | 173 | 3.18 | 551 | 2181 | | 2.74 | | | | | 1.50 | | | 11.7 | 2181 | 3.56 | 31.4 | | 1.3 | 44.4 | 0.14 | 375 | 65.6 | 0.6 | 0.6 | 68% | |
| SS-33A-3 & SS-33D & SS-33C | MH7 | MH11 | 22.52 | 98.06 | 776 | | 1869 | 7165 | | 13.81 | | | | | 1.50 | | | 31.3 | 7165 | 3.10 | 89.9 | | 6.7 | 127.9 | 0.10 | 600 | 194.2 | 0.7 | 0.7 | 66% | |
| Future Development | | MH11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SS-33A-2 | MH11 | MH12 | 10.16 | 108.23 | 185 | 3.36 | 621 | 7786 | | 13.81 | | | | | 1.50 | | | 34.2 | 7786 | 3.06 | 96.6 | | 6.7 | 246.8 | 0.10 | 750 | 352.0 | 0.8 | 0.9 | 70% | |
| SS-32B & SS-33A-1 | | MH12 | 29.21 | 29.21 | 848 | | 2359 | 2359 | | | | | | | | | | 8.2 | 2359 | 3.53 | 33.7 | | | 41.9 | | | | | | | |
| | MH12 | MH13 | | 137.44 | | | | 10145 | | 13.81 | | | | | 1.50 | | | 42.4 | 10145 | 2.95 | 121.2 | | 6.7 | 279.6 | 0.10 | 750 | 352.0 | 0.8 | 0.9 | 79% | |
| SS-33A-9 | MH13 | SPS#10 | 4.14 | 141.58 | | | | 10145 | | 13.81 | | | | | 1.50 | | | 43.5 | 10145 | 2.95 | 121.2 | | 6.7 | 280.7 | 0.10 | 750 | 352.0 | 0.8 | 0.9 | 80% | |

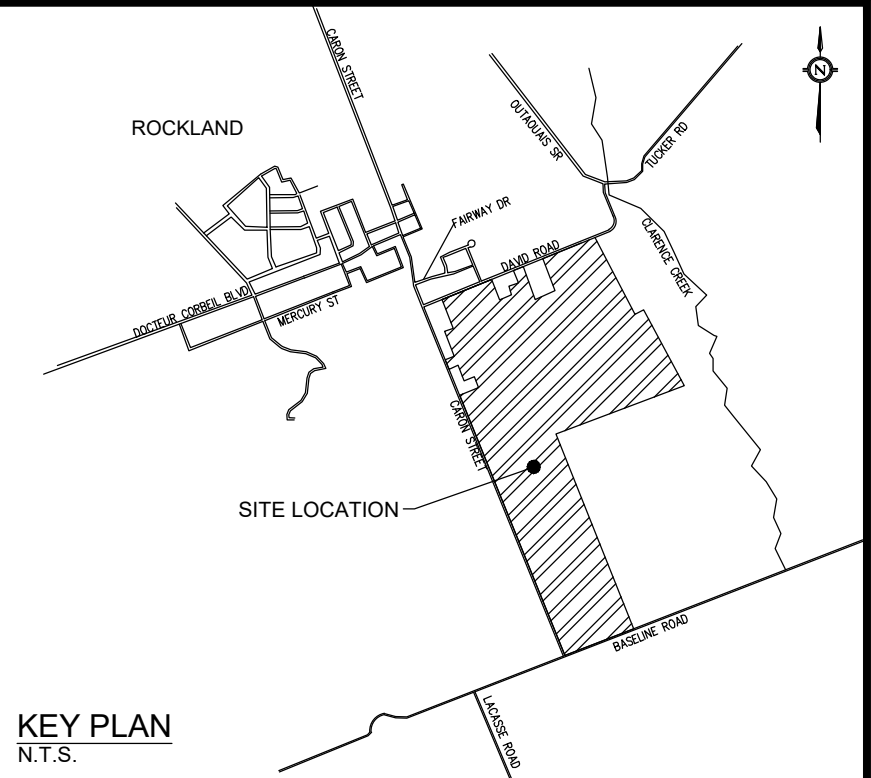


CROSS-SECTION A-A' - 6.0m WIDE MUNICIPAL MULTI-USE TRAIL
SCALE: NTS

CROSS-SECTION B-B' - 12.0m WIDE MUNICIPAL BLOCK
SCALE: NTS



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LEGEND:

| | |
|----------------|-------------------------------------------------------------------------------------------|
| [Yellow] | DEVELOPMENT BOUNDARY |
| [Orange] | EXISTING LEGAL LIMIT |
| [Light Yellow] | PROPOSED LOW DENSITY AREA |
| [Light Orange] | PROPOSED MEDIUM DENSITY AREA |
| [Orange] | PROPOSED HIGH DENSITY AREA - STACKED TOWNHOUSES |
| [Dark Orange] | PROPOSED HIGH DENSITY AREA - 4-STORY APARTMENT BUILDINGS |
| [Pink] | PROPOSED HIGH DENSITY MIXED USE AREA - COMMERCIAL & SERVICES + 4-STORY APARTMENT BUILDING |
| [Purple] | PROPOSED COMMUNITY FACILITIES AREA |
| [Light Purple] | PROPOSED COMMERCIAL BLOCKS |
| [Green] | PROPOSED PARKLAND |
| [Light Green] | PROPOSED STORMWATER MANAGEMENT BLOCK |
| [Dark Green] | PROPOSED MUNICIPAL INFRASTRUCTURE BLOCK |

| | | | |
|-----|------------------------------------|------|--------------|
| 00 | ISSUED FOR OFFICIAL PLAN AMENDMENT | P.F. | JUL 25, 2025 |
| No. | REVISIONS | BY | DATE |

LASCHELLES
ENGINEERING AND ASSOCIATES LTD.

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LICENCED PROFESSIONAL ENGINEER
P. D. & FREY
10014877
JUL 25, 2025
PROVINCE OF ONTARIO

MAISONS SACA HOMES

401 BRUGES STREET
EMBRUN, ONTARIO
K0A 1H0
OFFICE: (613) 443-2206

CLIENT:
SACA LAND DEVELOPMENTS (ROCKLAND) INC.

PROJECT:
CARON SUBDIVISION -
OFFICIAL PLAN AMENDMENT
PART 1 OF RP 50R-0754, PART 1 OF RP 50R-11600,
PART OF LOT 21, LOT 22 & LOT 23, CONCESSION 2 (OLD SURVEY)
GEOGRAPHIC TOWNSHIP OF CLARENCE
CITY OF CLARENCE-ROCKLAND

DRAWING TITLE:
MUNICIPAL BLOCK DETAILS

| | | | |
|----------------------|----------------------|---------------------|-----------------------|
| DESIGNED BY: K.S. | DRAWN BY: K.S. | CHECKED BY: P.F. | CHECKED BY: B.M.S. |
| FILE No.: | DRAWING / SHEET No.: | REV: | |
| 200459 | CD-1 | 00 | |

APPENDIX D

Stormwater Management

Topographic Survey (AOV)

Pre-Development Storm Watershed Plan (SWM-1)

Pre-Development Storm Watershed Plan (SWM-2)

Post-Development Storm Watershed Plan (SWM-3)

Post-Development Storm Watershed Plan (SWM-4)

Storm Sewer Design Sheet

Stormwater Management Calculations

PCSWMM Hydrograph

SKETCH SHOWING TOPOGRAPHICAL INFORMATION

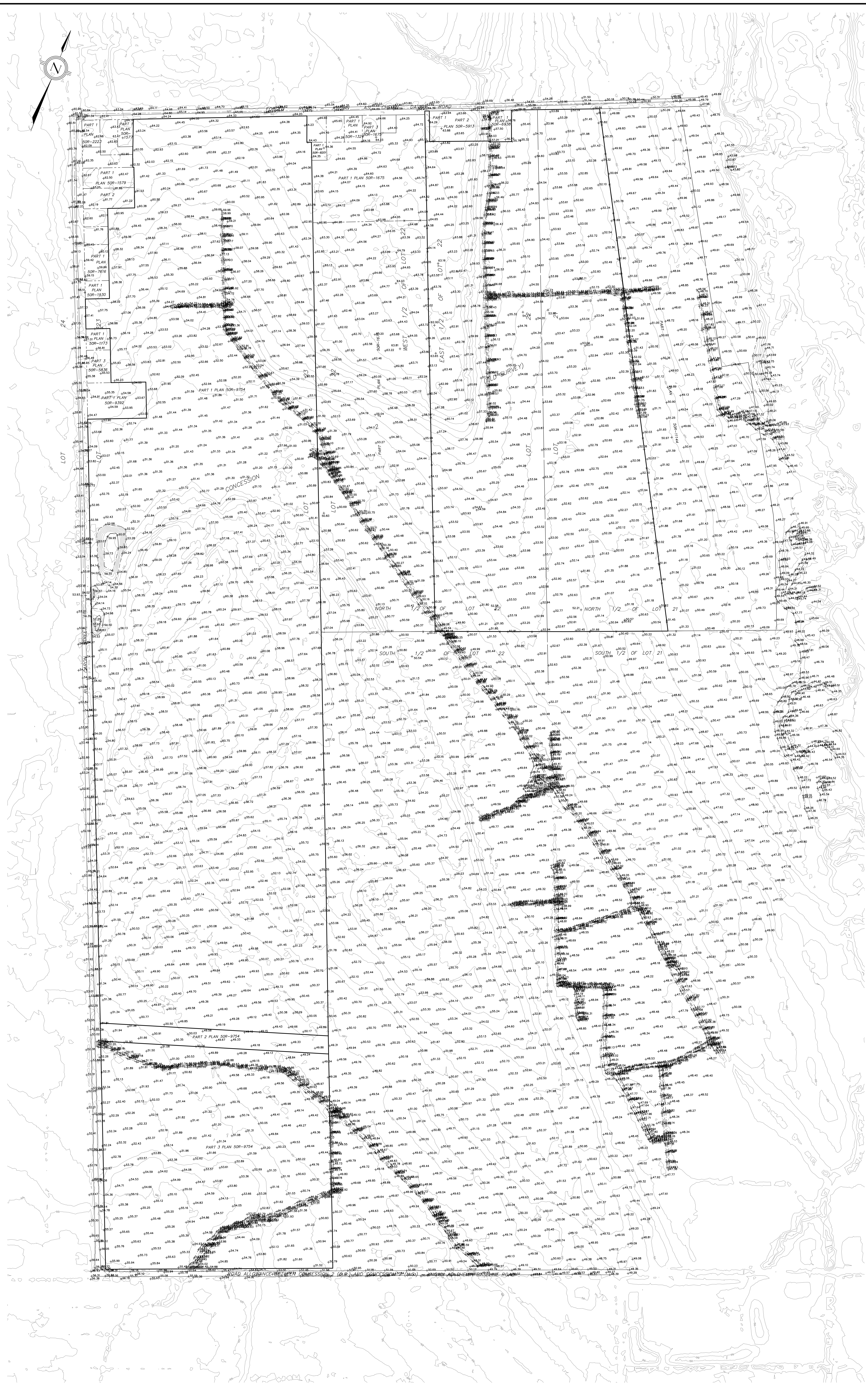
PART OF LOTS 21, 22 AND 23
CONCESSION 2 (OLD SURVEY)
CITY OF CLARENCE-ROCKLAND
COUNTY OF RUSSELL

Prepared by Annis, O'Sullivan, Vollebek Ltd.

Scale 1:2000



Metric
DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND
CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048



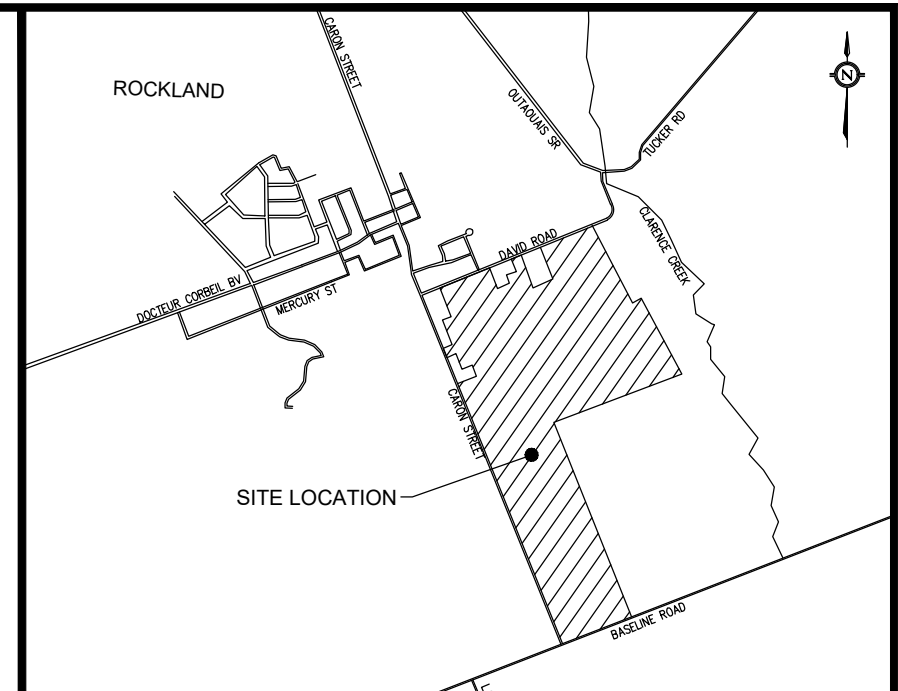
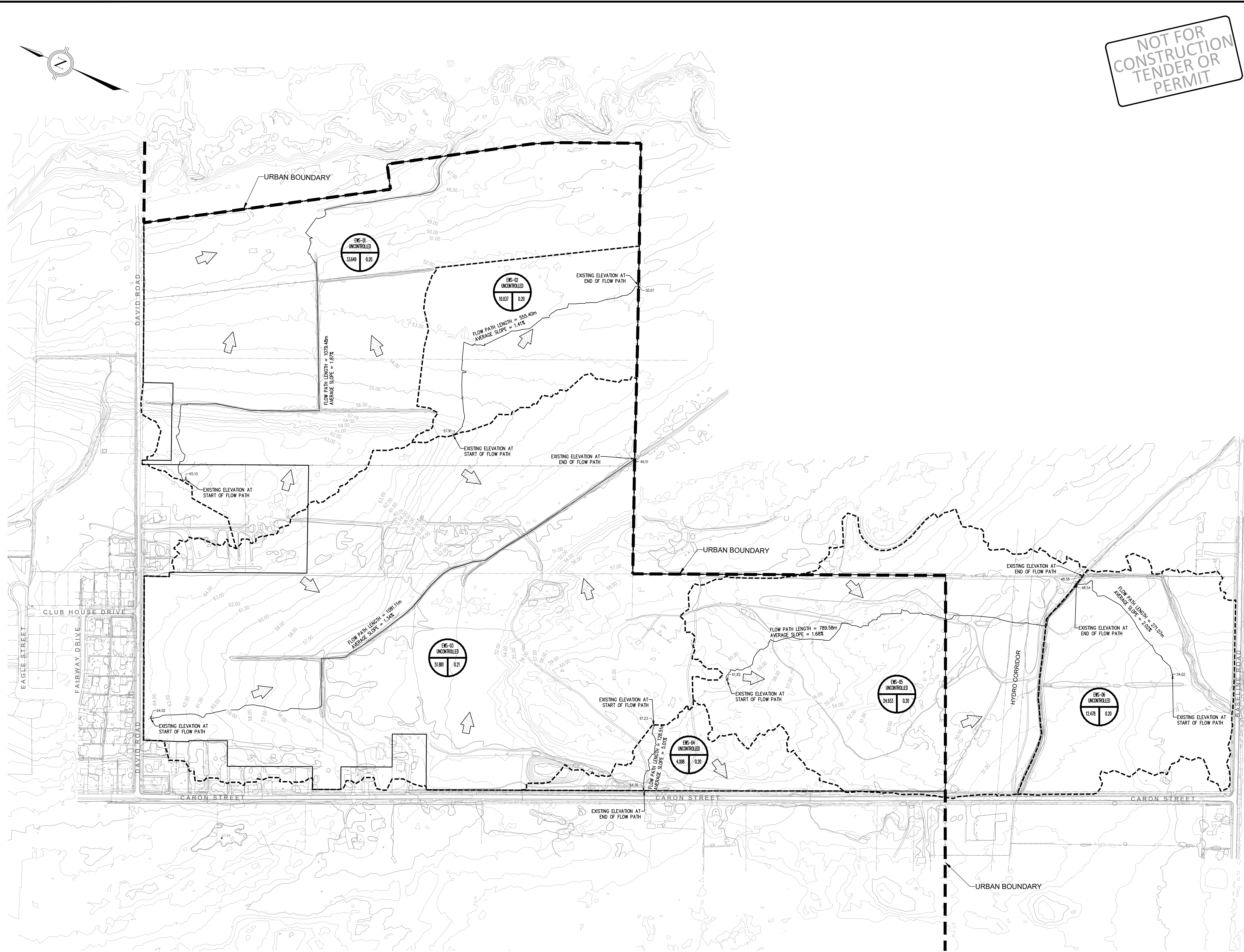
| No. | REVISION | DATE | INITIALS |
|-----|-----------------------------|-----------------|----------|
| 1 | Topo Sketch Using UPR LIDAR | August 16, 2022 | CS |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |

CAUTION
THIS IS NOT A PLAN OF SURVEY
AND SHALL NOT BE USED EXCEPT
FOR THE PURPOSE INDICATED
IN THE TITLE BLOCK.

ELEVATION NOTES
1. Elevations shown are geoidic and are referred to the CGVD28 geoidic datum.
2. It is the responsibility of the user of this information to verify that the job benchmark has not been altered or disturbed and that its relative elevation and description agrees with the information shown on this drawing.
3. Elevations have been derived from LIDAR data obtained from the United Counties of Prescott and Russell. The data is provided on "as is" basis and the UCPRS (ARCO) makes no guarantee, representation or warranty regarding the data. The date of data acquisition is May, 2014. The quoted vertical precision of the data is 0.15m (open areas) and 0.25m (roaded areas). Our field measurements confirm the general accuracy of the data (refer to the plan).

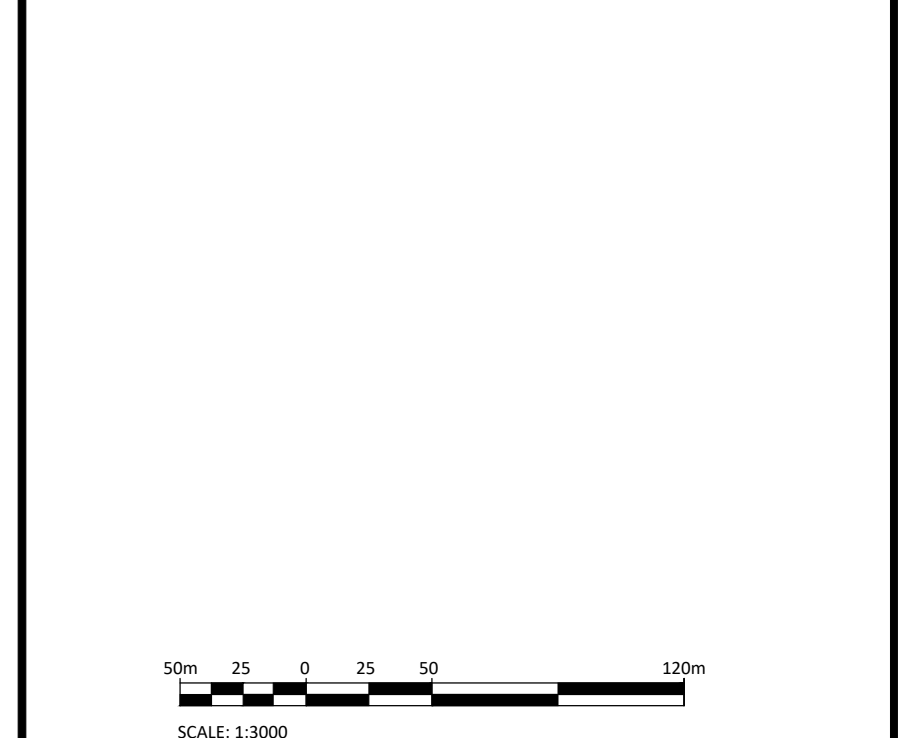
UTILITY NOTES
1. This drawing cannot be accepted as acknowledging all of the utilities and it will be the responsibility of the user to contact the respective utility authorities for confirmation.
2. Only visible surface utilities were located.
3. A field location of underground plant by the pertinent utility authority is mandatory before any work involving breaking ground, probing, excavating etc.

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KEY PLAN
N.T.S.

- LEGEND:**
- DEVELOPMENT BOUNDARY
 - - - EXISTING LEGAL LIMIT
 - EXISTING ELEVATION
 - - - EXISTING DITCH CENTERLINE AND FLOW DIRECTION
 - - - EXISTING CULVERT
 - - - EXISTING CHAIN LINK FENCE
 - - - OUTER EDGE OF FORESTED AREA
 - - - 1.0m MINOR CONTOUR LINE
 - - - 5.0m MAJOR CONTOUR LINE
 - ⊗ X.XXX EXISTING FIRE HYDRANT
 - ⊗ X.XXX EXISTING GROUND ELEVATION
 - EXISTING BUILDING FOOTPRINT
 - - - EXISTING STORM WATERSHED
 - ⊗ X.XXX EXISTING WATERSHED NAME
 - ⊗ X.XXX RUNOFF COEFFICIENT
 - ⊗ X.XXX AREA IN HECTARES
 - ➔ EXISTING MAJOR OVERLAND FLOW ROUTE



| | | | |
|-----|------------------------------------|------|--------------|
| 00 | ISSUED FOR OFFICIAL PLAN AMENDMENT | P.F. | JUL 25, 20XX |
| No. | REVISIONS | BY | DATE |

1010 SPENCE AVENUE
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LASCELLES
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PROFESSIONAL ENGINEER
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100148717
JUL 25, 2025
PROVINCE OF ONTARIO

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PROJECT:
**CARON SUBDIVISION -
OFFICIAL PLAN AMENDMENT -
PART 1 OF RP 50R-0754, PART 1 OF RP 50R-11600,
PART OF LOT 21 & LOT 22, CONCESSION 2 (OLD SURVEY)
GEOGRAPHIC TOWNSHIP OF CLARENCE
CITY OF CLARENCE-ROCKLAND**

DRAWING TITLE:
**PRELIMINARY STORM WATERSHED PLAN
PRE-DEVELOPMENT - OVERALL SITE**

| | | | |
|----------------------|-------------------------------|---------------------|-----------------------|
| DESIGNED BY: K.S. | DRAWN BY: K.S. | CHECKED BY: P.F. | CHECKED BY: B.M.S. |
| FILE No.: 200459 | DRAWING / SHEET No.: SWM-1 | REV: 00 | |

File Location: D:\OneDrive\OneDrive - Lascelles Engineering Inc\Lascelles\PROJECTS\2020\200459 - SACA Land Developments (Rockland) Inc - Storm Watershed\DWG\Existing Surface\200459 - Existing (SWM-1)



Lascelles File No. 200459

Project: Proposed Caron Street Subdivision
Location: Clarence-Rockland, Ontario
Date: July 25, 2025
Completed By: K.Sharpe
Checked By: P.Frey

Storm Design Parameters

Rational Method Q = 2.78CIA
 Runoff Coefficient
 Q = Peak Flow Rate (L/s) Landscape 0.2 IDF Ottawa Macdonald-Cartier International Airport
 A = Drainage area (ha) Gravel 0.7 Return Period 5 year
 C = Runoff coefficient Hardscape 0.9 Intensity $I = a / (T_c + b)^c$
 I = Rainfall Intensity (mm/hr) Single Dwelling 0.4 b = 6.053 c = 0.814
 Semi Dwelling 0.5
 Townhouse 0.5
 Apartment 0.6
 Commercial 0.75

Pipe Design Parameters

Minimum Velocity = 0.80 m/s
 Maximum Velocity = 3.00 m/s
 Manning's Coeff. "n" = 0.013

| LOCATION | | | AREA (ha) | | | | | | | | | | FLOW | | | | | STORM SEWER | | | | | | | MANHOLE | | | | | | | |
|-----------|------|-----|---------------------------------|-------------------------------|----------------------------|--------------------------------------|---------------------------------|----------------------|------------------------------------|---------------------------------------------|------|--------|---------------|---------------|----------------------|----------------------------|-------------------|----------------------------|-------|-----------|------------|----------------|----------------|---------------------|------------------------------|---------------|-----------------|-------------------|---------------------|------------------|------------------|--------------------|
| CATCHMENT | FROM | TO | Softscape Area (ha) with C=0.20 | Single Dwelling Lot (ha) with | Low Density Area (ha) with | Medium Density Area (ha) with C=0.50 | High Density - Stacked Townhous | ROW (ha) with C=0.50 | High Density - Apartment Area (ha) | Commercial/C ommunity Area (ha) with C=0.80 | ΣC | ΣA | Indiv. 2.78AC | Accum. 2.78AC | Time of Conc. (min.) | Rainfall Intensity (mm/hr) | Peak Flow Q (L/s) | Pipe Diameter (mm, actual) | Type | Slope (%) | Length (m) | Capacity (L/s) | Velocity (m/s) | Time of flow (min.) | Ratio (Q/Q _{FULL}) | UP INVERT (m) | DOWN INVERT (m) | T/G Up Stream (m) | T/G Down Stream (m) | Up Depth Obv (m) | Up Depth Inv (m) | Down Depth Obv (m) |
| WS-05 | MH1 | MH3 | 0.169 | 0.000 | 0.571 | 0.671 | 0.000 | 1.653 | 1.918 | 2.350 | 0.69 | 7.332 | 14.02 | 14.02 | 16.29 | 79.60 | 1116.32 | 1200 | CONC. | 0.10% | 220.4 | 1232.89 | 1.09 | 3.37 | 90.5% | 51.80 | 51.58 | 58.47 | 58.13 | 5.47 | 6.67 | 5.35 |
| WS-04 | MH2 | MH3 | 2.688 | 4.464 | 6.507 | 3.018 | 3.019 | 6.094 | 0.000 | 5.678 | 0.56 | 31.470 | 49.09 | 49.09 | 17.36 | 76.63 | 3761.87 | 1950 | CONC. | 0.10% | 484.5 | 4499.86 | 1.51 | 5.36 | 83.6% | 51.31 | 50.83 | 57.77 | 58.13 | 4.51 | 6.46 | 5.35 |
| WS-03 | MH3 | MH4 | 0.271 | 0.000 | 7.872 | 3.831 | 0.000 | 5.517 | 0.570 | 0.000 | 0.54 | 18.060 | 27.14 | 90.25 | 22.72 | 64.79 | 5847.77 | 2250 | CONC. | 0.10% | 442.5 | 6590.62 | 1.66 | 4.45 | 88.7% | 50.53 | 50.09 | 58.13 | 53.02 | | | |
| WS-02 | MH4 | MH5 | 0.905 | 3.251 | 6.760 | 0.735 | 0.000 | 3.500 | 0.000 | 0.000 | 0.47 | 15.151 | 19.67 | 109.93 | 27.17 | 57.64 | 6335.74 | 2250 | CONC. | 0.10% | 254.7 | 6590.62 | 1.66 | 2.56 | 96.1% | 50.06 | 49.81 | 55.29 | 54.86 | 2.98 | 5.23 | 2.80 |
| WS-01 | MH5 | HW1 | 0.572 | 0.000 | 11.813 | 3.573 | 1.395 | 5.941 | 0.000 | 0.000 | 0.52 | 23.294 | 33.69 | 143.62 | 29.73 | 54.26 | 7791.97 | 2550 | CONC. | 0.10% | 72.3 | 9201.96 | 1.80 | 0.67 | 84.7% | 49.51 | 49.44 | 54.86 | -- | 2.80 | 5.35 | -- |



Stormwater Calculation Sheet

Project: Proposed Caron Street Subdivision
Location: Clarence-Rockland, Ontario
Date: July 25, 2025
Completed By: K.Sharpe
Checked By: P.Frey

Runoff Equation

$Q = 2.78CIA$ (L/s)
 C = Runoff Coefficient
 I = Rainfall Intensity (mm/hr)
 A = Area (ha)

Intensity Equations

$I_5 = 998.07 / (Tc+6.053)^{0.814}$ (mm/hr)
 $I_{100} = 1735.688 / (Tc+6.014)^{0.820}$ (mm/hr)
 T_c = Time of Concentration (min)

Time of Concentration Equations

Bransby Williams formula (where $C > 0.40$)

$t_c = \frac{0.057 L}{(s^{0.2} A^{0.1})}$ (min)
 L = Length of watershed (m)
 s = Average slope of watershed (%)
 A = Area of watershed (ha)

Airport formula (where $C < 0.40$)

$t_c = \frac{3.26 (1.1-C) L^{0.5}}{(s^{0.33})}$ (min)
 L = Length of watershed (m)
 s = Average slope of watershed (%)
 C = Runoff Coefficient

Pre Development Watershed Area and Runoff Coefficient

| Watershed | Total Area (ha) | Softscape Area (ha) with C=0.20 | Single Dwelling Lot (ha) with C=0.40 | Gravel Area (ha) with C=0.70 | Hardscape Area (ha) with C=0.90 | Minor Runoff Coefficient, C | Major Runoff Coefficient, C |
|--------------|-----------------|---------------------------------|--------------------------------------|------------------------------|---------------------------------|-----------------------------|-----------------------------|
| EWS-01 | 33.649 | 33.649 | 0.000 | 0.000 | 0.000 | 0.20 | 0.25 |
| EWS-02 | 10.037 | 10.037 | 0.000 | 0.000 | 0.000 | 0.20 | 0.25 |
| EWS-03 | 51.881 | 48.584 | 3.297 | 0.000 | 0.000 | 0.21 | 0.27 |
| EWS-04 | 4.008 | 4.008 | 0.000 | 0.000 | 0.000 | 0.20 | 0.25 |
| EWS-05 | 24.933 | 24.933 | 0.000 | 0.000 | 0.000 | 0.20 | 0.25 |
| EWS-06 | 12.478 | 12.478 | 0.000 | 0.000 | 0.000 | 0.20 | 0.25 |
| TOTAL | 136.985 | 133.689 | 3.297 | 0.000 | 0.000 | 0.20 | 0.26 |

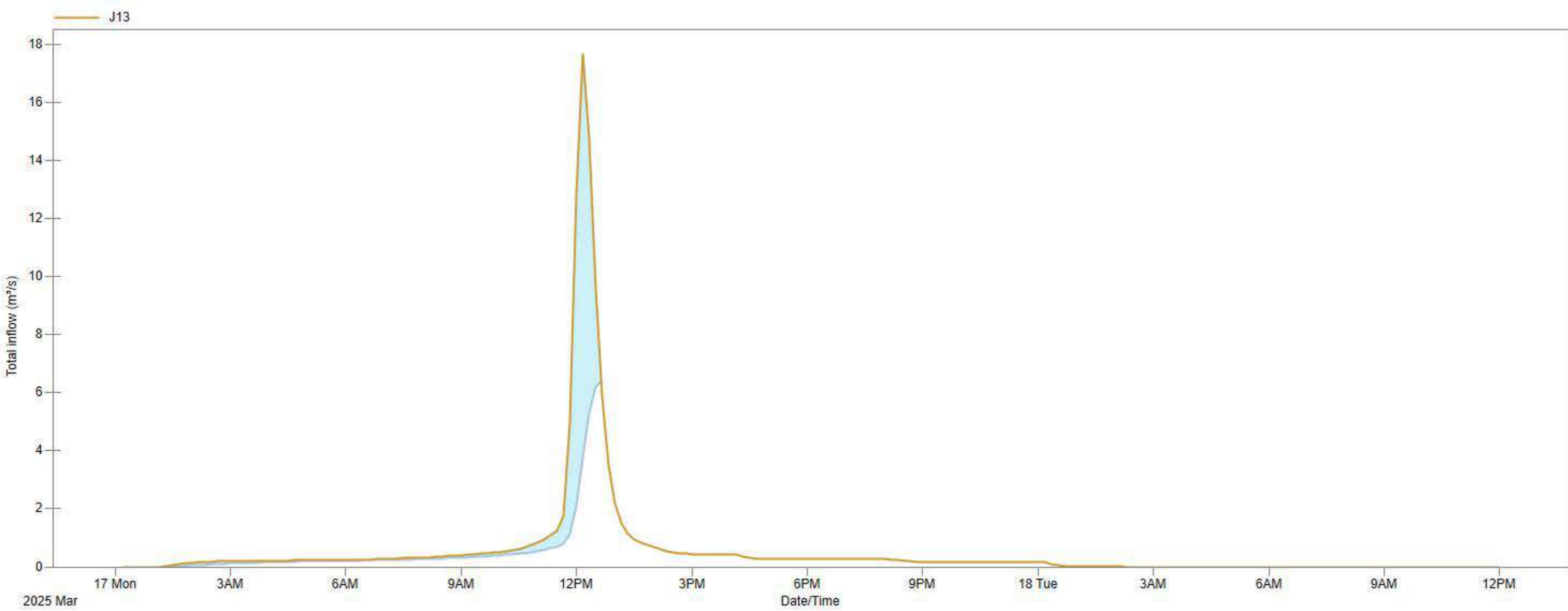


Stormwater Calculation Sheet

Project: Proposed Caron Street Subdivision
 Location: Clarence-Rockland, Ontario
 Date: July 25, 2025
 Completed By: K.Sharpe
 Checked By: P.Frey

Post Development Watershed Areas and Runoff Coefficients

| Watershed | Total Area (ha) | Softscape Area (ha) with C=0.20 | Single Dwelling Lot (ha) with C=0.40 | Low Density Area (ha) with C=0.40 | Medium Density Area (ha) with C=0.50 | High Density - Stacked Townhouse Area (ha) with C=0.50 | ROW (ha) with C=0.50 | High Density - Apartment Area (ha) with C=0.60 | Commercial/Institutional Area (ha) with C=0.80 | Hardscape Area (ha) with C=0.90 | Minor Runoff Coefficient, C | Major Runoff Coefficient, C | Controlled / Uncontrolled |
|--------------|-----------------|---------------------------------|--------------------------------------|-----------------------------------|--------------------------------------|--------------------------------------------------------|----------------------|------------------------------------------------|------------------------------------------------|---------------------------------|-----------------------------|-----------------------------|---------------------------|
| WS-01 | 23.294 | 0.572 | 0.000 | 11.813 | 3.573 | 1.395 | 5.941 | 0.000 | 0.000 | 0.000 | 0.52 | 0.65 | C |
| WS-02 | 15.151 | 0.905 | 3.251 | 6.780 | 0.735 | 0.000 | 3.500 | 0.000 | 0.000 | 0.000 | 0.47 | 0.58 | C |
| WS-03 | 18.060 | 0.271 | 0.000 | 7.872 | 3.831 | 0.000 | 5.517 | 0.570 | 0.000 | 0.000 | 0.54 | 0.68 | C |
| WS-04 | 31.470 | 2.688 | 4.464 | 6.507 | 3.018 | 3.019 | 6.094 | 0.000 | 5.678 | 0.000 | 0.56 | 0.70 | C |
| WS-05 | 7.332 | 0.169 | 0.000 | 0.571 | 0.671 | 0.000 | 1.653 | 1.918 | 2.350 | 0.000 | 0.69 | 0.86 | C |
| WS-06 | 4.136 | 4.136 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.20 | 0.25 | C |
| TOTAL | 99.443 | 8.741 | 7.715 | 33.522 | 11.828 | 4.414 | 22.706 | 2.488 | 8.028 | 0.000 | 0.53 | 0.66 | |



Data Objectives Error Storage Patterns Edit Derive Audit Events Scatter Duration IDF

Storage required for J13 Total inflow (m^3/s)

From Mar 16, 2025 10:22 PM to Mar 18, 2025 1:47 PM (39.42 hours)

Available storage before outflow: m^3

Maximum design outflow: m^3/s

Storage volume required to obtain a peak flow of 6.382 m^3/s at location J13 is 28639.08 m^3 .