

# **FUNCTIONAL SERVICING REPORT**

## **130 HUNTMAR DRIVE**

**Prepared for:  
LIONESS DEVELOPMENT INC.**

**PROJECT No: 191002**

**CITY OF OTTAWA**

**SEPTEMBER 2021**



**REVISION 2**

**FUNCTIONAL SERVICING REPORT  
130 HUNTMAR DRIVE**

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# FUNCTIONAL SERVICING REPORT 130 HUNTMAR DRIVE

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## 1.0 BACKGROUND

### 1.1 General

Atriel Engineering Ltd. has been retained by Lioness Development Inc. to complete an Functional Servicing Report (FSR) in support of a Major Zoning By-Law Amendment and a Plan of Subdivision Application for 130 Huntmar Drive. The development consists of approximately 26 ha. of vacant land and is located within the City of Ottawa’s urban boundary.

The proposed development is located north of Maple Grove Road and east of Huntmar Drive, as illustrated in **Figure 1**. The proposed site, known as 130 Huntmar Drive, wraps around an existing school located at 180 Huntmar Drive, known as Kanata Academy Private School. The subject property is currently zoned as a Development Reserve (DR) Zone. A detailed sketch SK-1 is provided in Appendix “A” which shows the streets to which the development will be connected.



Figure 1 – Location Map

The proposed Draft Plan of Subdivision (see Appendix A) allows for residential mid-density (apartments), residential low density (singles / townhouses), a school site, a commercial block and a park. A concept plan is attached in Appendix “A” showing the different types of developments within the site. The proposed Draft Plan demonstrates the road network layout within the subject land and particularly the North-South Arterial road in a perpendicular alignment with a proposed round-about. The purpose of this Functional Servicing Report is to demonstrate that there is sufficient capacity in the watermain, the wastewater and stormwater systems to accommodate the proposed development and to show that the proposed draft plan can accommodate all the proposed roads, lots and blocks and can accommodate all proposed infrastructures. The SWM Pond 4 will need to be upsized and designed for this development.

## **1.2 Existing Studies and Reports**

The following studies and reports have been used to prepare this Functional Servicing Report for 130 Huntmar Drive:

- Kanata West Master Servicing Study (KWMSS), by Stantec, CCL, IBI, dated June 2006.
- Infrastructure Master Plan (IMP), dated November 2013.
- Design Brief for Pond 4 Kanata West, by DSEL, JFSA, revised August 25, 2014, 3rd submission.
- Functional Servicing and Stormwater Management Report for 173 Huntmar Road, City of Ottawa, by DSEL, dated March 2015, Revision 2,.
- Functional Servicing Report for 2325483 Ontario Inc. 195 Huntmar Drive, City of Ottawa, by DSEL, dated May 2019.

## **1.3 Existing Services**

The site can be physically connected at the following locations (please refer to Appendix “A” – Location Map for existing street locations):

- there is an existing 300 mm diameter watermain on Maple Grove Road
- there is an existing 400mm diameter watermain stub on Huntmar Drive, just north of Maple Grove Road
- there is an existing 400mm diameter watermain within the development along the future Robert Grant Avenue (Street No. 1)
- there is an existing 825mm diameter sanitary sewer on Maple Grove Road
- there is an existing 500mm and 600mm diameter sanitary sewer within the development along the future Robert Grant Avenue (Street No. 1)
- there is an existing pumping station on Maple Grove Road known as the Kanata West Pumping Station (KWPS)
- there is an existing 2400mm storm sewer on Maple Grove Road
- there is an existing pond east of the site known as Pond 4
- road connections are available on Huntmar Drive and Maple Grove Road
- Hydro, Bell Cable and Gas was not part of this Functional Servicing Report; it will be verified during the design process.

## **1.4 Required Permits/Approvals**

Development of the site will be subject to the City of Ottawa planning and development approval process. The City of Ottawa and the Mississippi Valley Conservation Authority (MVCA) must approve the detailed engineering design drawings and reports prepared to support the proposed development prior to construction. Environment Compliance Approvals (ECA) from the Ministry of Environment, Conservation and Parks (MOECP) will need to be obtained in order to construct the sanitary sewers, storm sewers and watermain. Also, an amendment to the existing pond ECA will be required prior to the pond expansion.

## **1.5 Pre-consultation**

A pre-consultation meeting was carried out on July 19, 2019 with the City of Ottawa. The Pre-Consultation Meeting Minutes and concept plan can be found in Appendix “A”.

## **1.6 Proposed Streets**

As previously mentioned, the proposed development is located north of Maple Grove Road and east of Huntmar Drive which are both arterials. Within the proposed 130 Huntmar development, a proposed arterial is proposed from Huntmar Drive to Maple Grove Road along Street No. 1 (Robert Grant Avenue) and is known as the North-South arterial. Furthermore, all other proposed roads within the proposed development will be local roads.

## **2.0 PROPOSED SERVICES**

### **2.1 Grading Plan - Geotechnical Investigation**

A geotechnical investigation was carried out in order to assess the possible design constraints. Maximum grade raises are tabulated in the report by Golder Associates.

These maximum grade raises were respected in the preparation of a macro grading plan (See Appendix “B” – 191002-GRM). As per Golder Associates, no unusual problems are anticipated during the site servicing with excavating the overburden using conventional hydraulic excavating equipment. The impact of raising the grades along neighbouring properties’ boundaries will need to be looked at during detailed design. The grading around the existing school will be done by respecting the existing conditions, drainage and ensuring the grading does not impede the existing major flow route.

#### **2.1.1 Major Flow Route and LRT**

The proposed draft plan was design in conjunction with the LRT preliminary design. The future LRT is proposed to run along the east boundary of the development with an overpass at the Maple Grove Station (see Appendix A for LRT detail). The draft plan features the North-South arterial which runs from Huntmar Drive and connects to Maple Grove Road. The major flow route is proposed to cross under the future elevated LRT structure.

The overflow will then be conveyed via a temporary ditch to the SWM facility, known as Pond 4, for quantity and quality treatment. It is expected that the major

flow will be conveyed via pathways, road systems or parking lots to reach pond 4 through the City own land.

## **2.2 Sediment and Erosion Control**

Straw bales will be placed on-site at every definable swale in order to control runoff. These controls will be cleaned and maintained during the course of the construction. Before construction, silt fence barriers will be installed, where necessary, along the perimeter of the site as well as along the perimeter of the existing stormwater pond (see Appendix “B” – 191002-ESCM).

## **2.3 Watermain**

The watermain analysis was conducted using the H2ONET v.5.0 program as a design aid. Water supply to the 130 Huntmar Drive development will be provided through the installation of watermains.

As per the Kanata West Master Servicing Study Watermain Sizing -2013 Watermain Master Plan Update, dated December 16, 2013 by Stantec, (refer to Appendix C for excerpt) a 600mm diameter watermain along Campeau Drive from Terry Fox Drive to Palladium Drive is planned to service the Kanata West area. The 600mm diameter feedermain was installed in 2014 and extends on Huntmar Drive from Campeau Drive to Cyclone Taylor Boulevard. A 400mm diameter watermain is planned to extend from Cyclone Taylor Boulevard to Maple Grove Road.

Since the 400mm diameter watermain is not yet installed on Huntmar Drive between Cyclone Taylor Boulevard and Maple Grove Road, the analysis was carried out with connections available only on Maple Grove Road. It is also understood that the 400mm watermain link between Palladium Drive and Maple Grove Road is for redundancy purposes. It is also not desirable, nor ideal, at this time to be working within the Huntmar ROW. It is understood that the City is currently initiating a MECA for the Huntmar widening, which will provide an opportunity for future underground infrastructure works which at that time could be paired with the watermain. It is in the opinion of the applicant that the watermain on Huntmar is not necessary for the 130 Huntmar development or the 195 Huntmar development as per the reasons stated above and should be installed with the future Huntmar widening.

This preliminary analysis was carried out with the use of hydraulic grade line elevations at various known connection points located at the boundaries of the proposed site. Hydraulic grade line elevations for the aforementioned connection points were provided by the City (see E-mail Correspondence with the City of Ottawa in Appendix “C”).

The existing private school located at 180 Huntmar Drive is included in the analysis to be serviced through the proposed 130 Huntmar development with a service from Street No. 10.

The site will connect onto the Maple Grove Road watermain at 3 different locations. Refer to Table 1 in Appendix “C” for the Boundary Condition Data at connection points No.1, No.2 and No.3 supplied by the City of Ottawa.

It is to be noted that the 400mm watermain is installed along Robert Grant Avenue and

is connected to point No. 3 on Maple Grove Road and connected to the 195 Huntmar Drive development, west of Huntmar Drive.

In this analysis, no connections to Huntmar Drive were used. The analysis makes use of three connections on Maple Grove Road as mentioned above, the future connection will only improve the overall system, thus, this analysis provides conservative results in comparison to the ultimate built out scenario of the local region.

Typical values for average daily water consumption were taken from the City of Ottawa's Water Distribution Guidelines. The following table summarizes the average daily consumption rates, maximum daily rates as well as peak hourly factors for each type of land use.

Water Supply Design Criteria

<b>Type of development</b>	<b>Average daily demand</b>	<b>Maximum daily</b>	<b>Peak hourly</b>
Residential	350 l/c·d	2.5 x avg. day	2.2 x max day
Commercial	28,000 l/ha./d	1.5 x avg. day	1.8 x max day
Institutional	28,000 l/ha./d	1.5 x avg. day	1.8 x max day



Total demands for the three different demand scenarios were calculated using the aforementioned consumption rates as well as population densities of 3.4 persons per unit for single family dwellings, 2.7 persons per unit for townhouses and 2.1 persons per unit for apartments or stacked residences.

The following table summarizes the anticipated water demand for the proposed development.

Average daily demand	Maximum daily	Peak hourly
8.6143 l/s	20.1882 l/s	42.6883 l/s

The studied water supply network was verified under the average day demand and the peak hourly demand with a minimum pressure of 276 kPa (See Tables 2 to 4 in Appendix “C” for details). Fire flows of 167 l/s (single dwellings), 167 l/s (townhouses), 283 l/s (apartments) and 300 l/s (back to backs) were also analyzed during maximum day conditions with a required minimum residual pressure of 140 kPa.

It is to be noted that pressure reducing valves will be required for all services as static pressures within the system are higher than 552 kPa.

### **2.3.1 Fire Underwriters Survey**

Section 4.2.11 of the City of Ottawa Guidelines for water distribution offers guidance for the calculation of fire demand.

Furthermore, the Ontario Building Code (OBC) provides minimum requirements for fire protection on private properties. In particular, Section 7.2.11 of the OBC provides detailed steps for the installation of water service pipes and fire service mains. Part 3 of the OBC offers requirements for fire protection, sub-section A3.2.5.7 provides standards for firefighting.

Table 5 (Appendix “C”) provides the detailed fire flow calculations as per the Fire Underwriters Survey (FUS) for each typical unit. Table 6 (Appendix “C”) provides the fire flow analysis results during maximum day demand for each node within the system. During the analysis each node is verified with the highest fire flow in its surrounding.

The analysis was carried out to ensure the water quantity would be sufficient for firefighting purposes.

As mentioned above, preliminary calculations under the FUS show that the required fire flows are 167 l/s (single dwellings), 167 l/s (townhouses), 283 l/s (apartments) and 300 l/s (back to backs).

At the time of the analysis, boundary conditions for fire flows of 167 l/s and 283 l/s were provided. Under current conditions, some fire flows may not be met by the proposed system, in such cases, concessions might be required in the form of firewalls for example. The system will be further analyzed with updated boundary conditions during the detailed design process.

Furthermore, as per the Technical Bulletin ISTB-2018-02, 10m setback separation between back walls of units to either other back wall to sidewall of unit or back wall to back wall for lots which are backing onto the back or side of another lot shall be verified at the detailed design.

## **2.4 Sanitary Sewer**

The 130 Huntmar Drive site is located in close proximity to the Kanata West Pumping Station (KWPS), which is located on Maple Grove Road. The Kanata West Master Servicing Study (KWMSS), dated June 2006, includes the 130 Huntmar Drive site to be serviced by the KWPS. It proposes that the southeast portion of the development (shown in green) be serviced by the existing Maple Grove Road sanitary trunk sewer, while the northwest portion (shown in yellow) be serviced by a future 675mm diameter trunk sewer (refer to Appendix “D” for the “Preferred Waste Water Option – Drawing S-1” from the KWMSS). The KWMSS is also in agreement with the IMP (2013) which identifies a trunk sewer running along the north side of the property (refer to an excerpt from the IMP in Appendix “D”). The future 675mm diameter trunk sewer in the KWPS was intended to service the land west of Huntmar Drive (shown in blue), which includes the development of 195 Huntmar Drive.

It is proposed to direct the entire sanitary runoff of 130 Huntmar, 195 Huntmar and a few adjacent external areas to the Maple Grove trunk at sanitary maintenance hole 96 at the intersection of Maple Grove Road and Robert Grant Avenue. In addition, the system downstream of MH 96 has been designed and accounts for the lands west of Huntmar.

The school block at the corner of Huntmar Drive and Maple Grove is proposed to drain to the existing sanitary sewer on Maple Grove Road. Furthermore, the existing private school located at 180 Huntmar Drive is proposed to be serviced through the proposed 130 Huntmar development. A service is proposed on street No. 10 to service the property of the existing private school.

The upstream flows west of the 130 Huntmar development can be directed to the proposed system via two entrances; one at the intersection of Huntmar Drive and Street No. 6, and, the other, at the intersection of Huntmar Drive and Robert Grant Avenue (refer to the drawing 191002-SANM - Macro Sanitary Drainage Plan in Appendix “D”).

### **2.4.1 Upstream Flow to Huntmar Drive and Street No. 6 (MH 215A)**

Upstream of MH 215A are tributary areas that are designed to drain to MH 215A. Those areas are shown on the sanitary drainage plan from 195 Huntmar Drive, Drawing Sheet No. 92, located in Appendix D. A summary of the tributary areas and populations is shown below:

<b>Location</b>	<b>Type</b>	<b>Area (ha)</b>	<b>Population</b>
<b>To MH 215A</b>	Infiltration	2.07	0
	Commercial	6.95	695
	Institutional	0	0
	Green Space	5.89	196

DSEL’s sewer computation sheets (attached in Appendix “D”) which correlate with drawing No.92 show the total tributary areas and population listed above.

### **2.4.2 Upstream Flow to Huntmar Drive and Robert Grant Avenue (MH 217A)**

Again, upstream of MH 217A are tributary areas that are designed to drain to MH 217A. Those areas are shown on the sanitary drainage plan from 195 Huntmar Drive, Drawing Sheet No. 87 to 93, located in Appendix D. A summary of the tributary areas and populations is shown below:

<b>Location</b>	<b>Type</b>	<b>Area (ha)</b>	<b>Population</b>
<b>To MH 217A</b>	Residential	104.77	7061
	Commercial	39.64	3964
	Institutional	7.46	746
	Green Space	0.53	17.6

DSEL’s sewer computation sheets (attached in Appendix “D”) which correlate with drawing No.87 to 93 show the total tributary areas and population listed above.

### **2.4.3 Outlet on Maple Grove Road**

The sanitary sewers within 130 Huntmar Drive development are sized to accommodate the runoff from the areas mentioned above and outlet to ex. SAN MH 96 on Maple Grove Road (refer to drawing 191002-SANM in Appendix “D”). The proposed sewer alignment corresponds, in part, with Figure 1 from the “Proposed Alignments for Kanata West Development North-South Sanitary Collector Sewers Functional Design Study” by IBI Group.

The preliminary sanitary system was designed using the City of Ottawa Sewer Design Guidelines dated October 2012. Section 4.3 provides standards for population densities in Ottawa. The following table shows the “Per Unit Populations” used:

Per Unit Populations

Unit Type	Persons per unit
Single Family	3.4
Townhouses	2.7
Apartments: 2 bedroom	2.1

City of Ottawa has provided a technical bulletin (ISTB-2018-01) with updated sanitary design parameters for flows and overflow criteria. The design parameters used for this analysis are tabulated below:

Design Parameters

Parameter	Design
Residential Flow Rate (l/d/cap)	280
Commercial Flow Rate (l/d/gross ha.)	28,000
Institutional Flow Rate (l/d/gross ha.)	28,000
Industrial Flow Rate (l/d/gross ha.)	35,000
Green Space Flow Rate (l/d/gross ha.)	9,300
Infiltration Rate – Dry Weather (l/s/ha.)	0.05
Infiltration Rate – Wet Weather (l/s/ha.)	0.28
Total Infiltration Rate (l/s/ha.)	0.33
Harmon Correction Factor	0.8
Institutional / Commercial / Industrial Peak Factor	1.5/1*

\*Peak factor = 1.5 if contributing area >20%, 1.0 if contributing area <20%

Sanitary flows and peaking factors were calculated using the above values during this analysis.

The proposed sanitary system within 130 Huntmar has been designed to accommodate runoff from 195 Huntmar Drive, the Mion land and other surrounding lands as described in the previous sections.

Using the Maple Grove Sanitary Sewer Capacity Analysis (10/MH91-SANMH 3)(DSEL, May 2019) which is a modified version of IBI’s drawing S-1 mentioned in the previous section and the corresponding Sanitary Sewer Calculation Sheet, tributary areas and populations were taken and used to analyze the capacity of the existing Maple Grove trunk sewer (refer to Appendix “D” for both excerpts of plans and calculation sheets).

It was determined that a 500mm and 600mm diameter trunk sewer along Robert Grant Avenue is adequate to service the subject land. The 500mm and 600mm diameter trunk sewer along Robert Grant Avenue was recently installed (summer 2021).

Using the current recommended wastewater parameters, the total peak flow to ex. MH 96 is 532.13 l/s (refer to the Sanitary Sewer Computation Form, Table 7A in Appendix “D”). The downstream sewers on Maple Grove road are all 900mm diameter sewers down to the existing 1200mm diameter sewer, and the slightest sewer slope is 0.38%, refer to the as-built drawings in Appendix “E”. The sewer from Ex. MH 96 to Ex. MH 97 is shown with a slope of 0.38%, while its actual pipe slope is 0.44%, to show the remaining capacity in the sewer of 54%.

#### **2.4.4 Sanitary HGL Analysis**

In the event of a failure at the KWPS during the annual event, the sanitary HGL is required to stay at least 0.3m below the underside of footings. As per the email sent by Eric Surprenant, (refer to correspondence in Appendix “D”) the HGL along Maple Grove during the annual event and at catastrophic failure at the KWPS is 94.40m. The HGL slope was assumed in the 1200mm diameter sanitary sewer on Maple Grove Road to be 0.32% and the 900mm diameter from the KWPS was calculated to 0.05% which brings the HGL to 95.54m at the connection of existing MH 96. A column shows the approximate USF elevation based on being approximately 2.00m below the proposed grade. It was found that a minimum of 0.3m freeboard is maintained throughout the proposed development. The sanitary HGL during the annual event, the USF and the freeboard are shown in Table 7B in Appendix “D”.

### **2.5 Storm Sewer and Stormwater Management**

The 130 Huntmar Drive storm water servicing was designed in relation to the KWMS and the Pond 4 study to be directed to the Pond 4, located north of the site. A portion of the site was designed to be directed to the Maple Grove Road existing storm trunk sewer while the remaining of the site was designed to outlet to a future trunk that ultimately connects to the north forebay of the pond. Refer to an excerpt Storm Drainage plan from the Pond 4 study by DSEL/JFSA for the previous concept.

The “Design Brief for Pond 4 Kanata West” report by DSEL/JFSA dated August 25, 2014, recommends that the storm water of 130 Huntmar Drive be conveyed to the existing Storm Water Management Pond 4 located northeast of the proposed site (See Appendix “E” – 191002-STMM for the site’s proposed storm sewer system). This existing SWM facility controls both the quantity and quality of the storm water for more than 278ha of land which includes the proposed site.

With the development of 130 and 195 Huntmar, Pond 4 needs to be expanded to control both the quantity and quality. Once the pond is expanded and the new inlet is constructed in the new forebay, the portion of the site to be directed to the new trunk and the areas to the west, including the east side of 195 Huntmar Drive, can be developed.

The attenuated flow is then discharged to Poole Creek, which ultimately reaches the Carp River. According to JFSA’s memorandum the maximum pond level for the 100 year storm event will be at 94.68 m.

Drawing 191002-STMM shows the overall system layout, runoff coefficient, drainage areas and obvert elevations. Using zoning setbacks of the surrounding neighbourhood, the runoff coefficient for singles was calculated at  $\pm 0.65$  and at  $\pm 0.70$  for townhouses; sample runoff coefficient calculations are shown in Appendix “E”. As a conservative approach the C value was taken at 0.70 for all the residential areas. The C values will be revised during the detailed design with the revised drainage areas. In order to analyze the minor system, the tributary areas from 195 Huntmar Drive have been taken from the 195 Huntmar Drive Storm Sewer Calculation Sheet and the Storm Drainage Area to Pond 4 Figure 1 provided by DSEL (refer to excerpt in Appendix “E”). Additionally, Table 8 provide details of the minor system.

The south portion of the site is surrounded by arterial roads and is proposed with a minor system capture rate of 340 l/s/ha for residential areas, 220 l/s/ha for the proposed school and 250 l/s/ha for the medium density residential and commercial while providing above ground storage on site. The north portion of the site is proposed with a capture rate of 220 l/s/ha for both residential area, 220 l/s/ha for medium density residential and 115 l/s/ha for the park. The existing private school located at 180 Huntmar Drive is proposed to be serviced through Street No. 9 and designed for a release rate of 220 L/s/ha. The City own land east of 130 Huntmar Drive and west of Pond 4 and the land north of the proposed site was designed assuming a runoff coefficient of 0.80 and at minor system capture rate of 220 l/s/ha. The parcel of land surrounded by Maple Grove Road, Huntmar Drive and the North-South arterial shall provide on-site storage for the 100 year storm event, an overland route is proposed for events exceeding the 100 year storm event.

During the detailed design, surface storage will be utilized in order to store the necessary volumes as per JFSA’s memorandum and release what is necessary in the minor system to respect all City of Ottawa guidelines.

The main storm drainage design constraints can be summarized as follows:

a) Minor System

- 1) Inflow rates into the minor system is detailed in JFSA’s memorandum and are as follows:
  - i. Park = 115 L/s/ha
  - ii. School = 220 L/s/ha
  - iii. Site Plans = 250 L/s/ha
  - iv. Residential north of the North-South arterial = 220 L/s/ha
  - v. Residential south of the North-South arterial = 340 L/s/ha
- 2) Inflow rate into the existing south trunk minor system (Maple Grove Road) should be limited to 1,723 L/s as per the KWMSS.
- 3) All inlets will be equipped with inlet control devices. The term “inlet” means “a single catch basin” or “a group of interconnected catchbasins” connected by a single lead into the minor system.
- 4) The hydraulic grade line shall be computed, and the maximum permitted hydraulic grade line elevation is to be 0.30m below the underside of footing.

b) Major System

- 1) Grading design is to be based on split lot drainage.
- 2) On site detention storage may be provided in the following areas:

- i. Road low points (Sawtooth design)
  - ii. Parking Areas on private sites
  - iii. In parks and schools.
- c) Street and Rear Yard Emergency Overflow
- 1) On street routing to emergency storage area must be provided and illustrated on the grade control plan. This routing must incorporate a maximum 0.35m flow depth on street under either static or dynamic conditions. An overall positive slope of 0.10% will be required across consecutive high points for routing purposes.
  - 2) A maximum ponding depth of 0.30m will be allowed in the rear yards.
  - 3) A ponding area plan that includes an identification number, the area, the depth, the volume and an elevation will be provided.
- d) Water Quality
- 1) A Normal Level of Protection (70 % removal of Total Suspended Solids) needs to be achieved in the stormwater management wet pond. The Best Management Practices should also be implemented within the subdivision design and during construction.

The storm flows will be captured into the minor system using road catch basins at road sags and releasing the control rate as indicated in JFSA's memorandum. During the detailed design single or twin catch basins will be chosen depending on the designed release rate and the ICDs orifice will need to be designed accordingly.

The City of Ottawa provides requirements for minor system capture depending on the road's and development's type ranging from an equivalent 2 year, 5 year and 10 year storm event. Table 8 in Appendix "E" shows the proposed minor system under such conditions.

Additionally, Table 9 shows the calculations for the minor system under various restricted flows and includes the hydraulic grade line calculation results to ensure that a freeboard of 0.30 m is provided with the calculated underside of footings.

The minor system will be modeled during the detailed design stage to ensure adequate freeboard is provided throughout the development.

JFSA was retained to complete a preliminary stormwater analysis for 130 Huntmar Drive and to assess the existing Pond 4. It was determined that the pond needs to be upsized by 25,600m<sup>3</sup> for a total storage volume of 72,100m<sup>3</sup>, refer to JFSA's memorandum in Appendix "E" of this report.

The pond expansion was assessed at a high level and the proposed pond expansion can be found on the Storm Drainage Area Plan. The pond expansion will be further assessed during the detailed design.

### **2.5.1 Storm to Maple Grove Road**

As mentioned previously, it was determined that inflow rate into the existing storm trunk on Maple Grove Road shall be limited to 1,723 L/s as per the KWMSS. An excerpt drawing from the KWMSS, ST-PS located in Appendix “E”, shows the 4 drainage areas that were designed to drain into the Maple Grove storm trunk sewer. A portion of area A-8 is within the proposed development and was calculated at 0.53ha. Area A-22 was allocated for the future LRT but that area is now proposed to drain into the proposed north storm trunk sewer since the grades of the LRT and the adjacent North-South arterial are sloping down towards the north. The proposed entry points on Maple Grove are not the same as the KWMSS but the allowable flow into the storm sewer is the same. JFSA has modeled the trunk sewer on Maple Grove Road with the proposed flows and found that the existing sewer is adequately sized to take the proposed flows.

### **2.5.2 Carp River**

The SWM Pond 4 discharges into the Carp River located east of the pond. JFSA as modelled the Carp River at 4 key locations on the Carp River downstream of Pond 4. It was found the proposed Pond 4 upgrade results in water levels on the Carp River to be either equal to or slightly less than that set by the City’s Ultimate condition model. The proposed discharge peak flows of the 2 year to the 100 year storm event can be found in Appendix “E”, refer to JFSA’s memorandum Model Results Carp River for more details.

### **2.5.3 Low Impact Development (LIDs)**

As per the KWMSS the proposed development is considered to be in an area of moderate groundwater recharge and will need to meet the proposed infiltration rates of 104 mm/Year. It is proposed to use an infiltration system using the road catchbasins and infiltration trenches on both sides to infiltrate the 104mm/year requirement. The proposed LID measure is proposed to have perforated pipes connected to the road catchbasins. The perforated pipes obvert will be set to the invert of the catchbasin outlet lead pipes connected to the main storm sewer. The perforated pipe will be surrounded by 25 mm clear stone infiltration trench. Refer to Infiltration Detail sketch SK2 in Appendix E for details. Refer to JFSA’s memorandum in Appendix E for detail calculation of the pre and post-development water balance.



### 3.0 CONCLUSION

This report has demonstrated that the proposed 130 Huntmar Drive site can be serviced by extending the existing sanitary sewers and watermain adjacent to the proposed development. The storm sewer system will be designed in conformance with the City of Ottawa standards and outlet to the Pond 4 SWM Facility. The Pond 4 SWM Facility can be expanded to service the site and satisfy the required water quality and water quantity criteria.

Based on the information provided in this report, the 130 Huntmar Drive site can be serviced to meet the City of Ottawa requirements.

Prepared by:

**ATREL ENGINEERING LTD**

**ATREL ENGINEERING LTD**



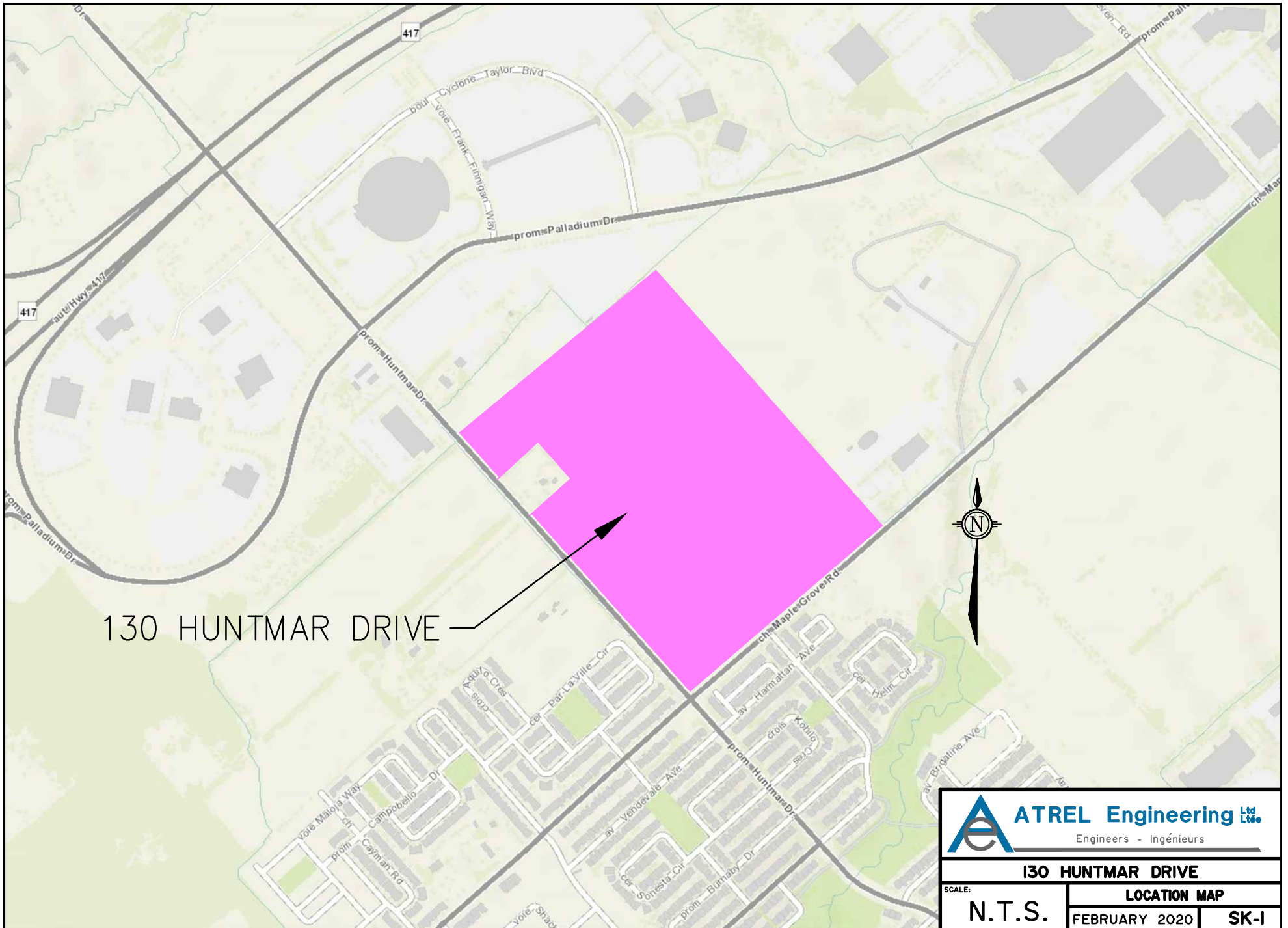
André Sauvé, P. Eng.



Jean Décoeur, P. Eng.

## **APPENDIX "A"**

- SK-1 Location Map
- 130 Huntmar Drive – Draftplan of Subdivision
- 130 Huntmar Drive – Pre-Consultation Meeting Minutes
- 130 Huntmar Drive – Concept Plan
- LRT Extension – Plan and Profile (Parsons)



130 HUNTMAR DRIVE

 **ATREL Engineering Ltd.**  
Engineers - Ingénieurs

<b>130 HUNTMAR DRIVE</b>		
SCALE:	<b>LOCATION MAP</b>	
<b>N.T.S.</b>	FEBRUARY 2020	<b>SK-I</b>



**130 Huntmar**  
**Pre-Consultation Meeting Minutes**

Location: Room 4103E, City Hall  
Date: July 8, 10 to 11am

<b>Attendee</b>	<b>Role</b>	<b>Organization</b>
Stream Shen	Planner	City of Ottawa
Eric Surprenant	Project Manager (Engineer)	
Melanie Knight	Urban Designer	
Rosanna Baggs	Project Manager (Transportation)	
Neeti Paudel	Project Manager (Transportation)	
Mike Russett	Parks Planner	
Samantha Gatchene	Planning Assistant	
Miguel Tremblay	Planner	Fotenn Consultants
Matt McElligott	Planner	
Jacob Bolduc	Planner	
Marcel Denomme	Developer	Urbandale
Jean Decoeur	Engineer	Atrel

**Comments from Applicant**

1. The applicant is proposing a residential subdivision with 188 singles, 488 towns and 580 apartment units. Also included in the subdivision is a French public elementary school block, a neighbourhood park, and a commercial block.
2. Applicant explained the project history and indicated that the long dormant period is to wait for the completion of the Kanata LRT EA project to clarify the LRT alignment.
3. Proposing to realign the NS Arterial (Robert Grant) into a perpendicular alignment to provide better developable blocks. The applicant is proposing a round-about at the bend similar to the geometry of the road within the Cavanagh/Shenkman subdivision at 195 Huntmar.
4. The applicant indicate that all the local roads will be 18m right-of-way and all local access to Huntmar Drive will be right-in right-out.

**Planning Comments**

1. This is a pre-consultation for a Major Zoning By-law Amendment and Plan of Subdivision Application. Application form, timeline and fees can be found [here](#).

2. Commercial and higher density residential uses should be located beside the Huntmar/NS Arterial intersection and the NS Arterial/Maple Grove intersection.
3. The site is designated as Mixed-Use Centre within the Official Plan. Section 3.6.2 Policy 10 (e) require residential uses in the form of apartments and other multiples at a medium or high density. As a result, single-detached homes is not permitted in this subdivision.
4. The Kanata West Secondary Plan's height schedule indicate that this parcel has a maximum height limit of 4 stories.
5. The development of window streets along the future arterial road is encouraged.
6. Please consider a further mix of different residential housing types within the subdivision.
7. There is a requirement for a minimum of 5,000 jobs within a Mixed-Use Centre, the applicant will need to demonstrate how this subdivision contributes to the minimum requirement in the planning rationale.
8. Section 3.6.2 (MUC) Policy 14(e) relating to an intensification/redevelopment plan is not required for this subdivision.
9. This project is not subject to UDRP.
10. Please consult with the Ward Councillor prior to submission.

### **Engineering Comments**

1. Please coordinate the installation of trunk sewers with adjacent property owners.
2. Given the redirection of some stormwater flow within the Cavanagh/Shenkman subdivision to pond 7, the interim condition of pond 4 may be sufficient to accommodate this proposed development. This requires further investigation by the applicant.

### **Transportation Comments**

1. Follow Traffic Impact Assessment Guidelines
  - a. Traffic Impact Assessment will be required.
  - b. Start this process asap.
  - c. Applicant advised that their application will not be deemed complete until the submission of the draft step 1-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable).
2. Geometric Road Design (GRD) drawings will be required with the first submission of underground infrastructure and grading drawings. These drawings should include such items as, but is not limited to:
  - a. Road Signage and Pavement Marking for the subdivision;

- b. Intersection control measure at new internal intersections; and
  - c. Location of depressed curbs and TWSIs;
  - d. More details can be provided upon request
3. A pedestrian and traffic calming plan will be required prior to the submission of the GRD.
4. Include traffic calming measures on roads within the limits of their subdivision to limit vehicular speed and improve pedestrian safety. Traffic calming measures shall reference best management practices from the Canadian Guide to Neighbourhood Traffic Calming, published by the Transportation Association of Canada, and/or Ontario Traffic Manual, and/or the City of Ottawa's Draft Traffic Calming Design Guidelines. These measures may include either vertical or horizontal features (such measures shall not interfere with stormwater management and overland flow routing), including but not limited to:
  - a. intersection or mid block narrowings, chicanes, medians;
  - b. speed humps, speed tables, raised intersections, raised pedestrian crossings;
  - c. road surface alterations (for example, use of pavers or other alternate materials, provided these are consistent with the City's Official Plan polices related to Design Priority Areas);
  - d. pavement markings/signage; and
  - e. temporary/seasonal installations such as flexi posts or removable bollards.
5. Refer to the Kanata West CDP and supporting TMP for guidance on the above.
6. Cross-sections shown in the TMP are dated and the City may require that these be revised to align with current design trends and practices, ie on-street cycle facilities vs off road facilities.
7. N-S Arterial (aka Robert Grant Extension between Huntmar and Maple Grove is to have a ROW of 37.5m for a four-lane divided arterial (4-UAD) cross-section.
8. The Major collector between Huntmar and Palladium will not be constructed.
9. Maple Grove Road (Terry Fox Drive to Huntmar Drive) proposed to be widened equally on both sides of the existing centerline; 37.5m ROW required.
10. Huntmar ROW protection of 37.5m.
11. Reduce the number of local road connections to the arterials.
12. Reconfigure the house orientation to reduce the number and need of noise barriers.
13. Ensure to pair driveways where possible; consideration for fire hydrant placement should be included in this exercise.
14. Corner triangles as per OP Annex 1 - Road Classification and Rights-of-Way at the following locations on the final plan will be required:

- a. Local Road to Local Road: 3 metre x 3 metres
  - b. Local Road to Collector Road: 5 metre x 5 metres
  - c. Collector Road to Collector Road: 5 metre x 5 metres
  - d. Collector Road to Arterial Road: 5 metre x 5 metres
15. Noise Impact Studies required:
- i. Feasibility before draft approval
  - ii. Detailed before registration
- b. Road
  - c. LRT

### **Park Comments**

1. 50/50 target split in accordance with KWCP for parkland dedication v.s. CIL contribution to Kanata West District Park is still applicable, however, only a guideline. Proposed park block is in keeping with this target.
2. Orientation of proposed park block is suitable for development.
3. Park block co-location with school block not preferred
4. Given that one of the park frontages is along the future north-south arterial road, question on how to allow for safe/controlled pedestrian movement to the park from the southern portion of the future community across the future north-south arterial. Controlled/safe crossing required in the future north-south arterial design.

### **CEPEO Comments**

1. Please shift the school block towards the east so that it has frontage along Maple Grove and a local road.
2. Please consider the integration of a bus lay-by in the City easement along this site. We typically request a bus drop-off area sized for 6 to 8 buses along the frontage of all new school sites.

### **MVCA Comments**

The attached mapping indicates that the subject lands are not subject to our regulation – we do not identify any natural hazards or natural heritage features within the scope of our review being associated with these lands.

We note that the lands are within the boundary of the Carp River Watershed/Subwatershed Study (CRWSS) and the Kanata West Implementation Plan.

The required targets as per the CRWSS are:

- Infiltration requirement based on moderate recharge area: 104mm/yr



- Water quality might be taken care of by the SWMF: 10% normal level of WQ, 10l/s (7day) low flow augmentation.
- Max temperature in Carp river: 30°C, Carp river has moderately tolerant warm water fisheries community.

We understand that runoff from these lands would be directed towards Pond 4, which outlets to the Carp River. We understand that Phase 1 of this pond has been constructed. Confirmation should be provided on whether the existing pond has capacity for the subject lands, or whether this development would trigger an expansion to the pond. Should an expansion to the pond be required, a permit from us under O.Reg 153/06 will be required.

### **Forestry Comments**

1. a Tree Conservation Report (TCR) must be supplied for review along with the various other plans/reports required by the City; an approved TCR is a requirement for Site Plan approval
2. any removal of privately-owned trees 10cm or larger in diameter requires a tree permit issued under the Urban Tree Conservation Bylaw; the permit is based on the approved TCR
3. the removal of City-owned trees will require the permission of Forestry Services who will also review the submitted TCR
4. the TCR must list all trees on site by species, diameter and health condition; similar groupings (stands) of trees can be combined using averages by species, diameter class
5. the TCR must address all trees with a critical root zone that extends into the developable area – all trees that could be impacted by the construction that are outside the developable area need to be addressed.
6. Trees with a trunk that crosses/touches a property line are considered co-owned by both property owners; permission from the adjoining property owner must be obtained prior to the removal of co-owned trees
7. If trees are to be removed, the TCR must clearly show where they are, and document the reason they can not be retained – please provide a plan showing retained and removed tree areas
8. All retained trees must be shown and all retained trees within the area impacted by the development process must be protected as per City guidelines listed on Ottawa.ca
9. Please ensure newly planted trees have an adequate soil volume for their size at maturity. The following is a table of recommended minimum soil volumes:

Tree Type/Size	Single Tree Soil Volume (m3)	Multiple Tree Soil Volume (m3/tree)
Ornamental	15	9
Columnar	15	9
Small	20	12
Medium	25	15
Large	30	18
Conifer	25	15

10. The City requests that all efforts are made to retain trees – trees should be healthy, and of a size and species that can grow into the site and contribute to Ottawa’s urban forest canopy
11. For more information on the TCR process or help with tree retention options, contact Mark Richardson [mark.richardson@ottawa.ca](mailto:mark.richardson@ottawa.ca)

Please refer to the links to “[Guide to preparing studies and plans](#)” and [fees](#) for general information. Additional information is available related to [building permits, development charges, and the Accessibility Design Standards](#). Be aware that other fees and permits may be required, outside of the development review process. You may obtain background drawings by contacting [informationcentre@ottawa.ca](mailto:informationcentre@ottawa.ca).

These pre-con comments are valid for one year. If you submit a development application(s) after this time, you may be required to meet for another pre-consultation meeting and/or the submission requirements may change. You are as well encouraged to contact us for a follow-up meeting if the plan/concept will be further refined.

Please contact me at [stream.shen@ottawa.ca](mailto:stream.shen@ottawa.ca) or at 613-580-2424 extension 24488 if you have any questions.

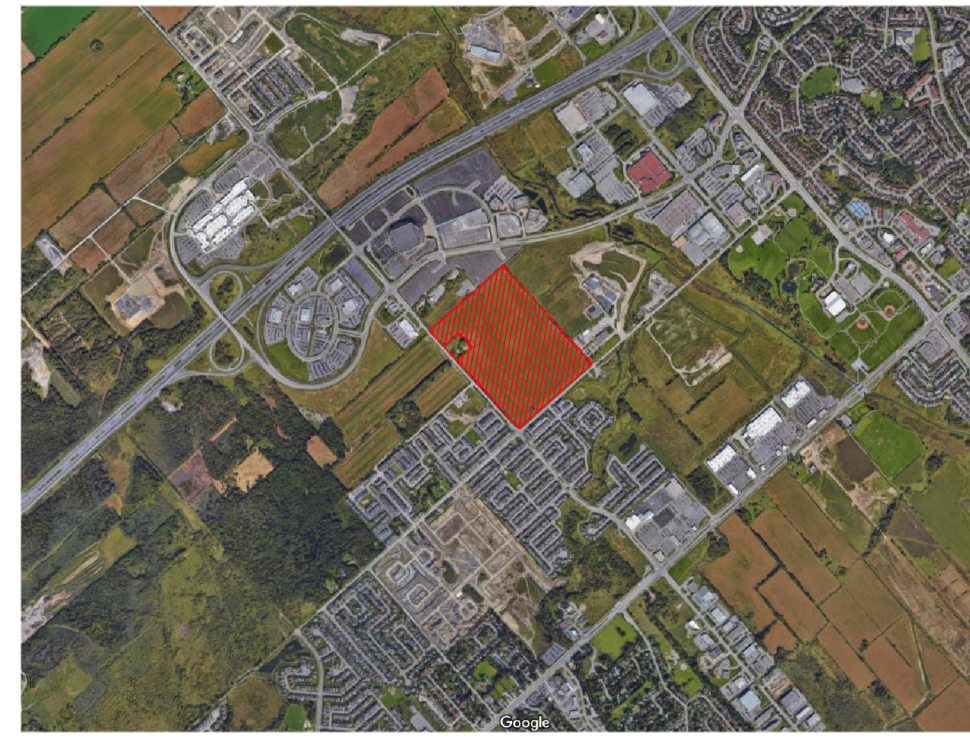
Sincerely,



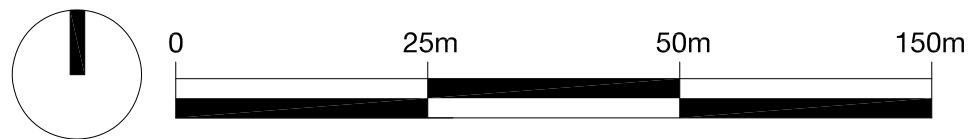
Stream Shen MCIP RPP  
Planner II  
Development Review - West



# 130 HUNTMAR DR OTTAWA CONCEPT BLOCK PLAN



- LEGEND**
- RESIDENTIAL MID-DENSITY (~ 300 to 350 units)
  - RESIDENTIAL LOW DENSITY (TOWNHOUSES)
  - RESIDENTIAL LOW DENSITY (SINGLE DETACHED)
  - SCHOOL SITE - 6ac
  - COMMERCIAL
  - PARKLAND DEDICATION
  - EASEMENT
  - PROPERTY BOUNDARY
  - SETBACKS



No.	REVISION	DATE	BY
12	UPDATE CONCEPT	2021.03.18	EL
11	UPDATE CONCEPT	2021.03.15	EL
10	REVISE CONCEPT	2021.03.04	EL
9	UPDATE CONCEPT	2020.10.22	EL
8	REMOVE 10m BUFFER	2020.09.25	RP
7	UPDATE CONCEPT	2020.09.17	RP
6	REVISE SIDEWALKS	2020.09.02	RP
5	FOR 1ST RESUBMISSION	2020.08.24	RP
4	FOR OPA SUBMISSION	2020.02.19	RP
3	OPTION 4	2019.03.14	RP
2	FOR CLIENT REVIEW	2019.01.22	EL
1	DRAFT	2018.12.20	RP

**CLIENT**  
**URBANDALE**

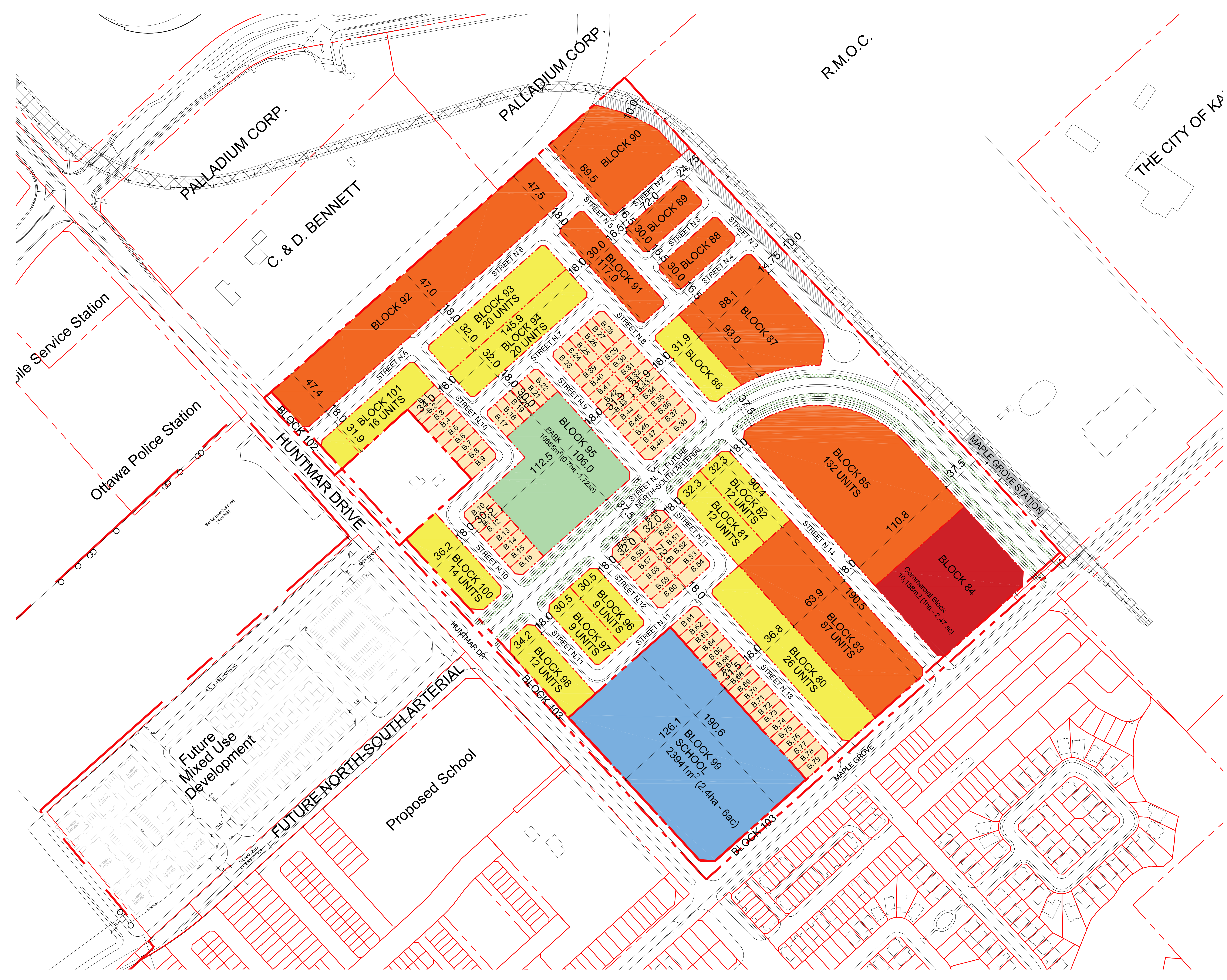
# FOTENN

Planning + Design

223 McLeod Street, Ottawa ON K2P 0Z8  
613.730.5709 www.fotenn.com

DESIGNED	RP
REVIEWED	MT
DATE	2018.12.20

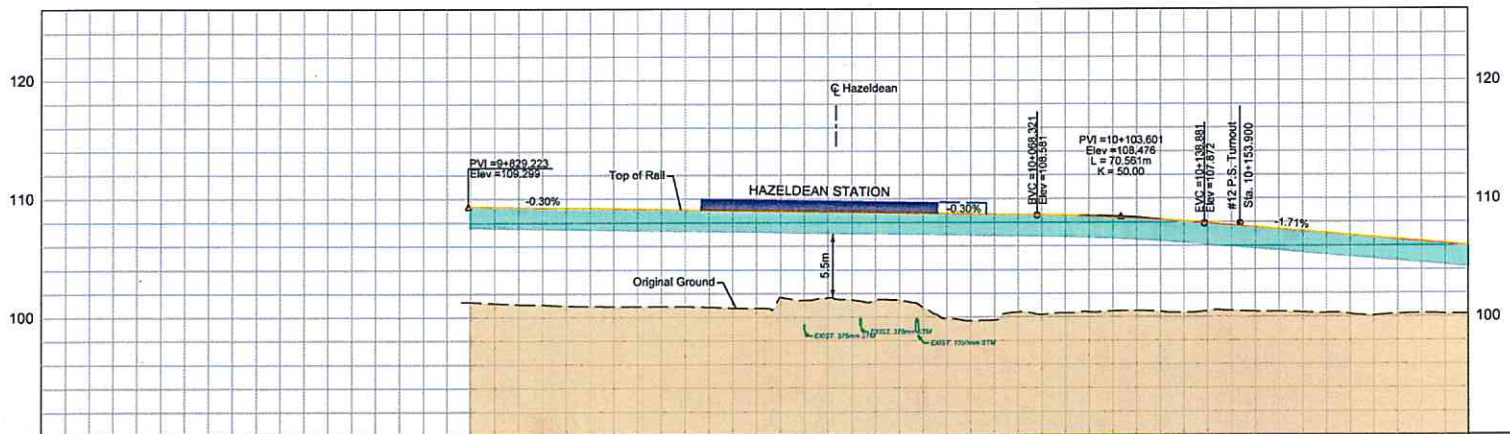
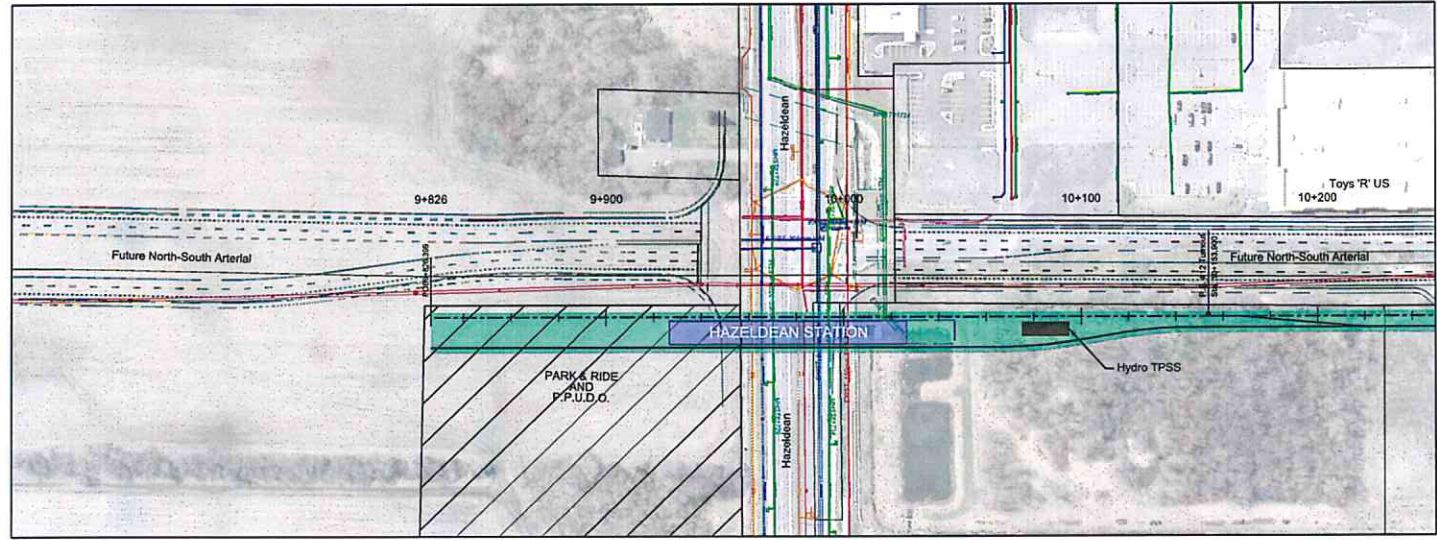
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Note:  
Pathways are conceptual  
and are subject to change.

- Legend:**
- Hydro
  - Sanitary Sewer
  - Storm Sewer
  - Watermain
  - - - C Track 1-Alignment
  - C Track 2
  - Underground Structure
  - Open Trench Structure
  - Top of Rail
  - - - Original Ground
  - Platform
  - Property Line
  - Turnout
  - Ballasted Track
  - Existing Ground Material
  - Fill Material
  - Direct Fixation on Concrete Slab
  - Portal
  - Rail Tunnel Allowance
  - Aboveground Allowance
  - Elevated Structure Allowance



Original Ground	109.27	107.16	109.21	107.07	109.15	103.92	109.09	102.69	109.03	102.49	108.97	102.74	108.91	101.69	108.85	101.67	108.79	101.47	108.73	102.25	108.67	99.89	108.61	102.38	108.55	102.32	108.49	102.46	108.43	102.44	107.85	102.45	107.51	102.40	107.17	102.54	106.48	102.27	105.14	102.27	Original Ground		
Top of Rail	109.27	107.16	109.21	107.07	109.15	103.92	109.09	102.69	109.03	102.49	108.97	102.74	108.91	101.69	108.85	101.67	108.79	101.47	108.73	102.25	108.67	99.89	108.61	102.38	108.55	102.32	108.49	102.46	108.43	102.44	107.85	102.45	107.51	102.40	107.17	102.54	106.48	102.27	105.14	102.27	Top of Rail		
Station																																											Station

**DRAFT FOR INFORMATION ONLY**  
March 13, 2018

March 13, 2018



**Confederation Line Kanata LRT Extension  
Hazeldean Road to Moodie Drive**

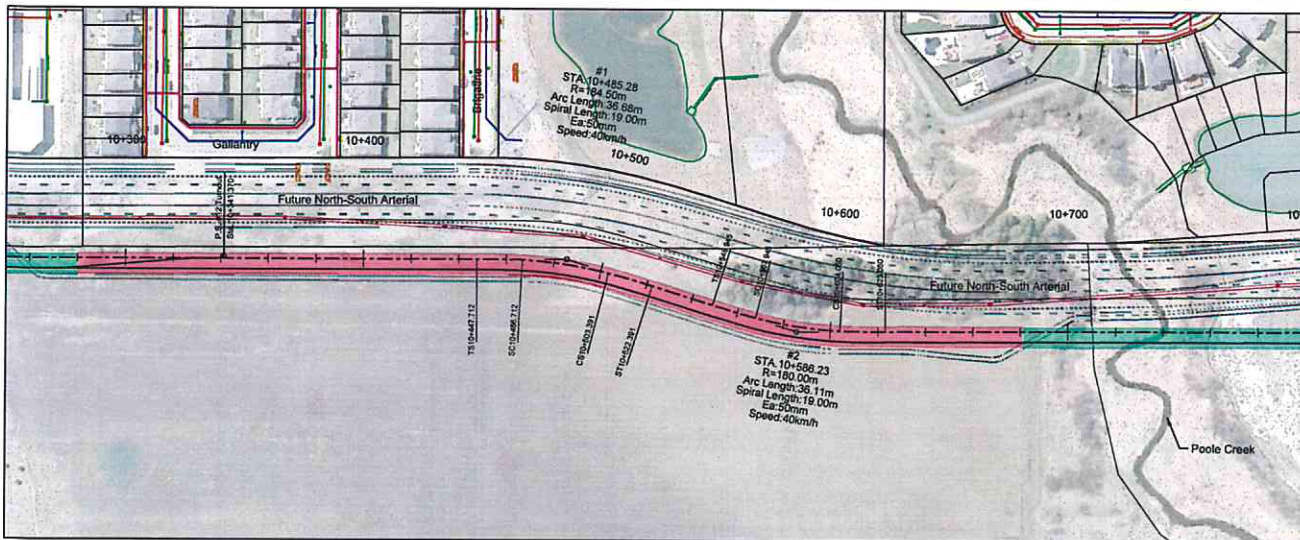


**Plan and Profile**

Hazeldean Station  
Limit of Kanata  
LRT to 10+250

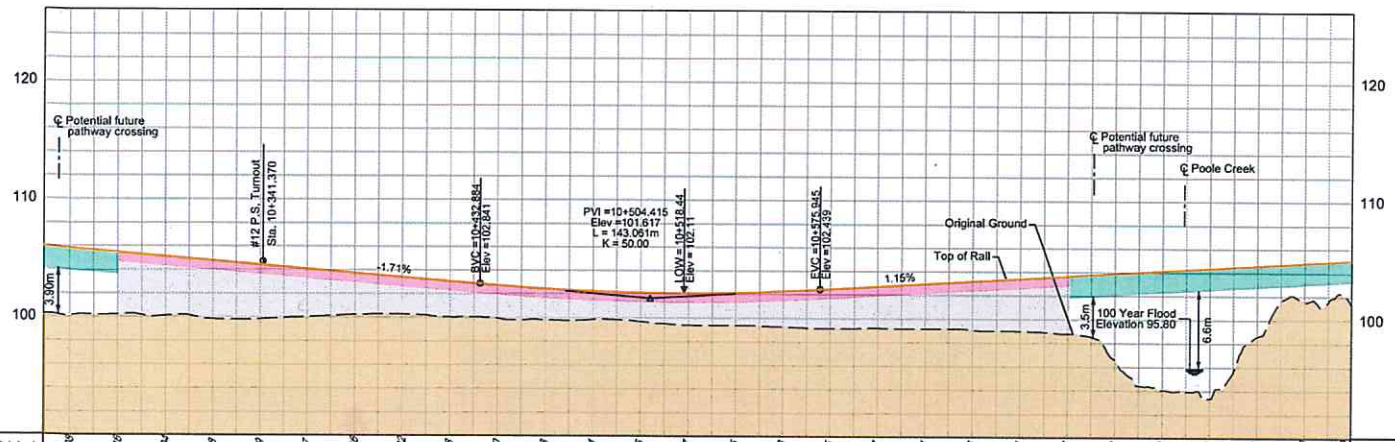
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Note:  
Pathways are conceptual  
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- Legend:**
- Hydro
  - Sanitary Sewer
  - Storm Sewer
  - Watermain
  - Track 1-Alignment
  - Track 2
  - Underground Structure
  - Open Trench Structure
  - Top of Rail
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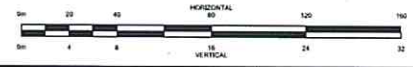


Station	Top of Rail	Original Ground
10+300	105.88702226	105.46702276
10+350	105.11702204	104.71702272
10+400	104.48702273	104.08702297
10+450	103.74702276	103.41702276
10+500	103.06702298	102.74702297
10+550	102.26702297	102.45702273
10+600	102.48702297	102.26702297
10+650	102.75702297	102.16702297
10+700	103.04702297	102.26702297
10+750	103.33702297	102.41702297
10+800	103.64702297	102.70702297

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FOR INFORMATION ONLY  
March 13, 2018

March 13, 2018

### Confederation Line Kanata LRT Extension Hazeldean Road to Moodie Drive

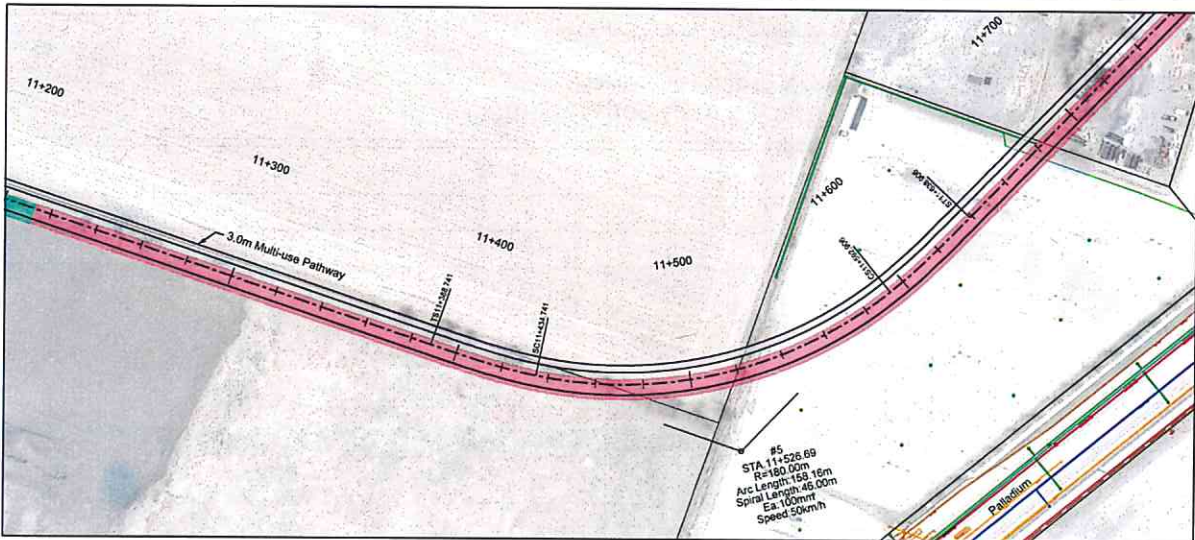


Plan and Profile

10+250 to 10+800

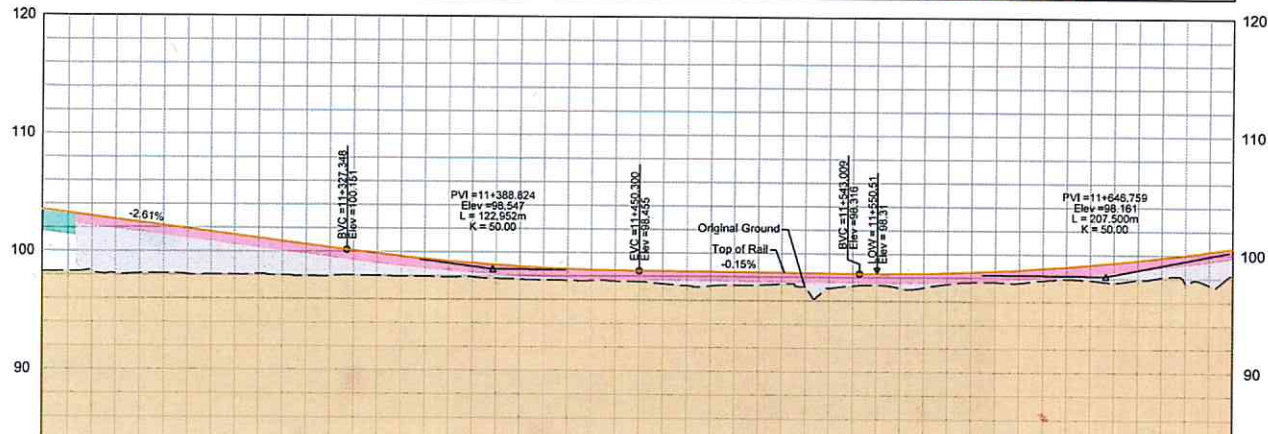
Revision:	
Drawn:	2





Note:  
Pathways are conceptual  
and are subject to change.

- Legend:**
- Hydro
  - Sanitary Sewer
  - Storm Sewer
  - Watermain
  - Track 1-Alignment
  - Track 2
  - Underground Structure
  - Open Trench Structure
  - Top of Rail
  - Original Ground
  - Platform
  - Property Line
  - Turnout
  - Ballasted Track
  - Existing Ground Material
  - Fill Material
  - Direct Fixation on Concrete Slab
  - Portal
  - Rail Tunnel Allowance
  - Aboveground Allowance
  - Elevated Structure Allowance



Original Ground	114.22	102.95	102.43	101.89	101.35	100.86	100.34	99.84	99.41	99.05	98.78	98.59	98.46	98.44	98.41	98.38	98.35	98.32	98.32	98.40	98.56	98.79	99.11	99.51	99.99	Original Ground
Top of Rail	103.47	102.95	102.43	101.89	101.35	100.86	100.34	99.84	99.41	99.05	98.78	98.59	98.46	98.44	98.41	98.38	98.35	98.32	98.32	98.40	98.56	98.79	99.11	99.51	99.99	Top of Rail
Station	11+200					11+300					11+400					11+500					11+600				11+700	Station

**DRAFT**  
FOR INFORMATION ONLY  
March 13, 2018

March 13, 2018



**Confederation Line Kanata LRT Extension**  
Hazledean Road to Moodie Drive



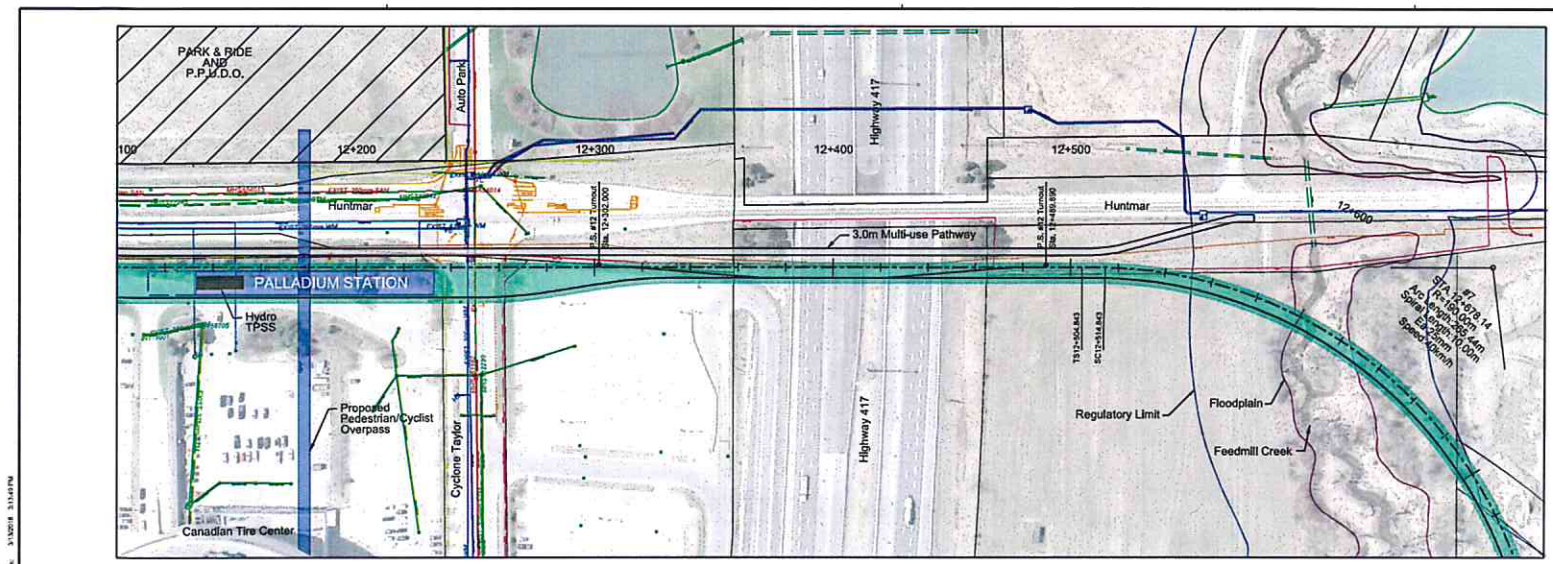
**Plan and Profile**

Revision:	
Sheet:	<b>4</b>

11+200 to 11+700



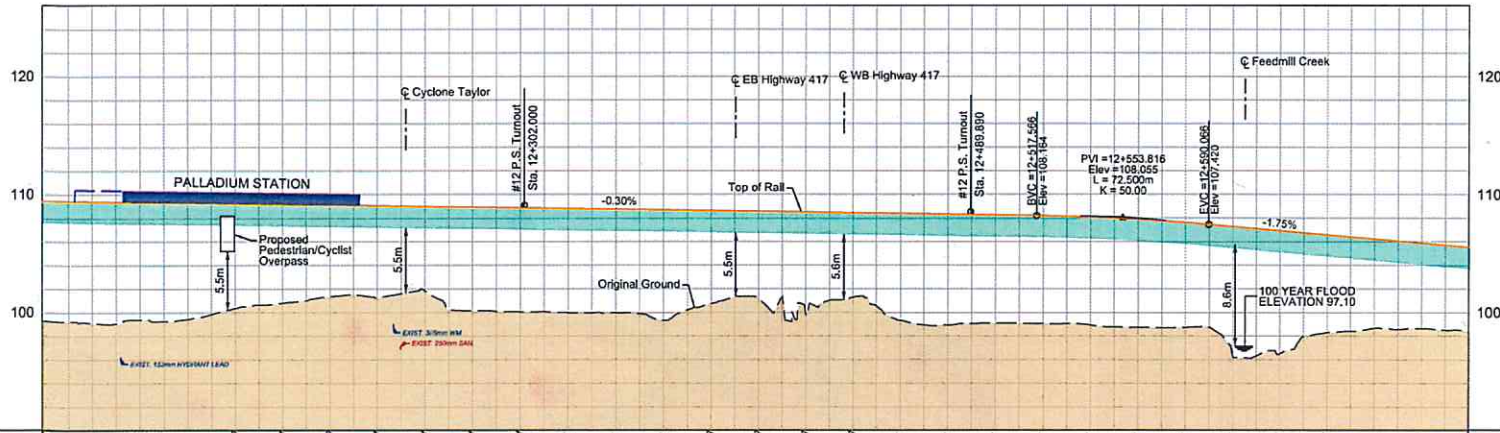




Note:  
Pathways are conceptual  
and are subject to change.

Legend:

- Hydro
- Sanitary Sewer
- Storm Sewer
- Watermain
- 10" P.S.
- Track 1-Alignment
- Track 2
- Underground Structure
- Open Trench Structure
- Top of Rail
- Original Ground
- Platform
- Property Line
- Turnout
- Ballasted Track
- Existing Ground Material
- Fill Material
- Direct Fixation on Concrete Slab
- Portal
- Rail Tunnel Allowance
- Aboveground Allowance
- Elevated Structure Allowance



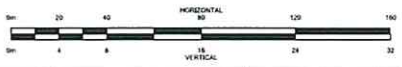
Original Ground	109.43	109.29	109.38	109.28	109.31	109.27	109.24	109.39	109.18	109.29	12+200	109.12	109.74	109.06	107.29	109.00	107.21	108.94	107.64	108.88	109.17	12+300	108.82	109.07	108.76	109.89	108.70	109.64	108.64	109.39	108.58	107.75	12+400	108.52	107.19	108.49	107.25	108.34	109.37	108.28	108.99	108.22	109.09	108.16	109.04	108.05	109.97	107.88	109.73	107.58	109.73	12+600	107.25	109.49	106.90	109.44	106.55	109.27	106.20	109.63	105.85	109.62	Original Ground
Top of Rail	109.43	109.29	109.38	109.28	109.31	109.27	109.24	109.39	109.18	109.29	12+200	109.12	109.74	109.06	107.29	109.00	107.21	108.94	107.64	108.88	109.17	12+300	108.82	109.07	108.76	109.89	108.70	109.64	108.64	109.39	108.58	107.75	12+400	108.52	107.19	108.49	107.25	108.34	109.37	108.28	108.99	108.22	109.09	108.16	109.04	108.05	109.97	107.88	109.73	107.58	109.73	12+600	107.25	109.49	106.90	109.44	106.55	109.27	106.20	109.63	105.85	109.62	Original Ground
Station	12+100										12+200											12+300																																	12+700	105.58	109.29	Original Ground					

DRAFT  
FOR INFORMATION ONLY  
March 13, 2018

March 13, 2018



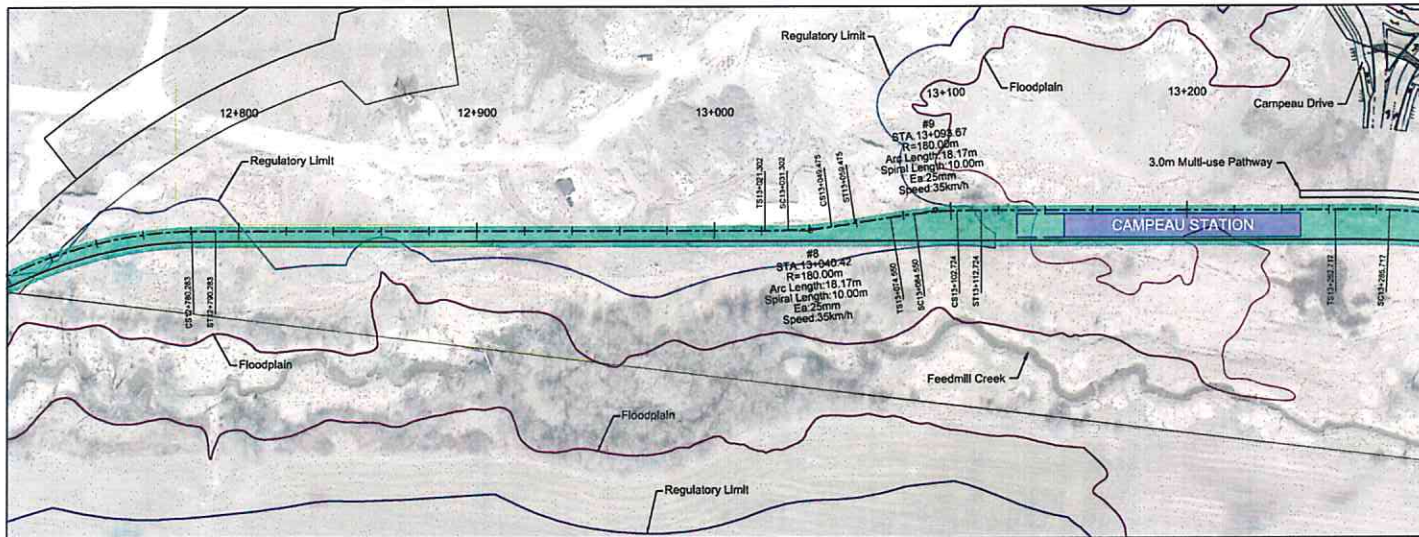
### Confederation Line Kanata LRT Extension Hazledan Road to Moodie Drive



### Plan and Profile

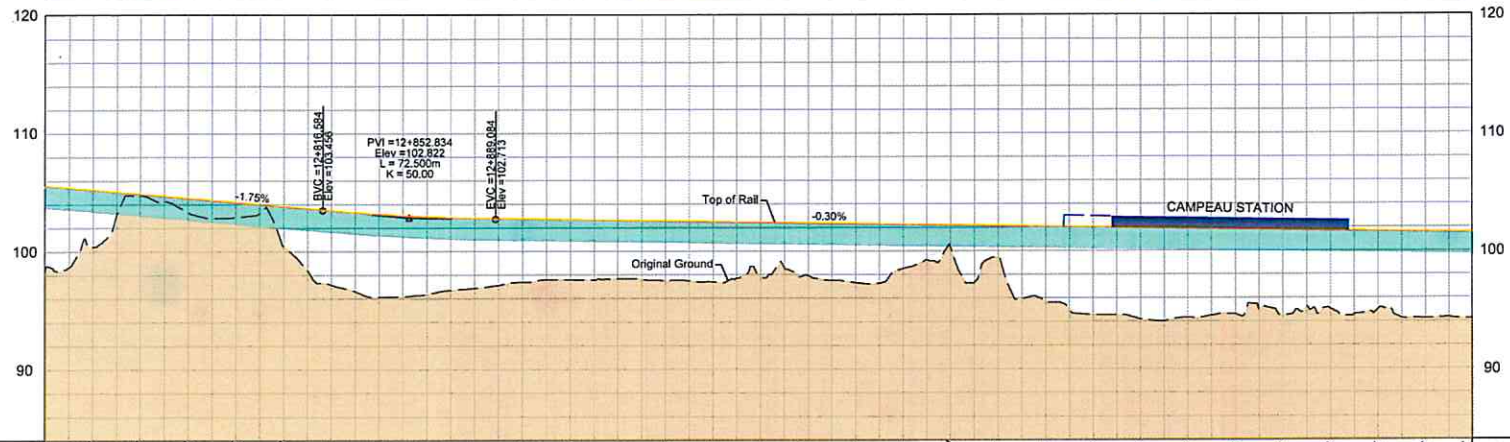
Palladium Station  
12+100 to 12+700

Revision:	
Date:	
	6



Note:  
Pathways are conceptual  
and are subject to change.

- Legend:
- Hydro
  - Sanitary Sewer
  - Storm Sewer
  - Watermain
  - - - C Track 1-Alignment
  - - - C Track 2
  - Underground Structure
  - Open Trench Structure
  - Top of Rail
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  - Aboveground Allowance
  - Elevated Structure Allowance



Station	Original Ground	Top of Rail
12+700	105.54	105.29
12+800	103.75	103.44
12+900	102.68	102.88
13+000	102.38	102.94
13+100	102.08	102.65
13+200	101.78	102.36
13+300	101.48	102.07

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March 13, 2018

March 13, 2018



### Confederation Line Kanata LRT Extension Hazeldean Road to Moodie Drive



Plan and Profile

Campeau Station  
12+700 to 13+300

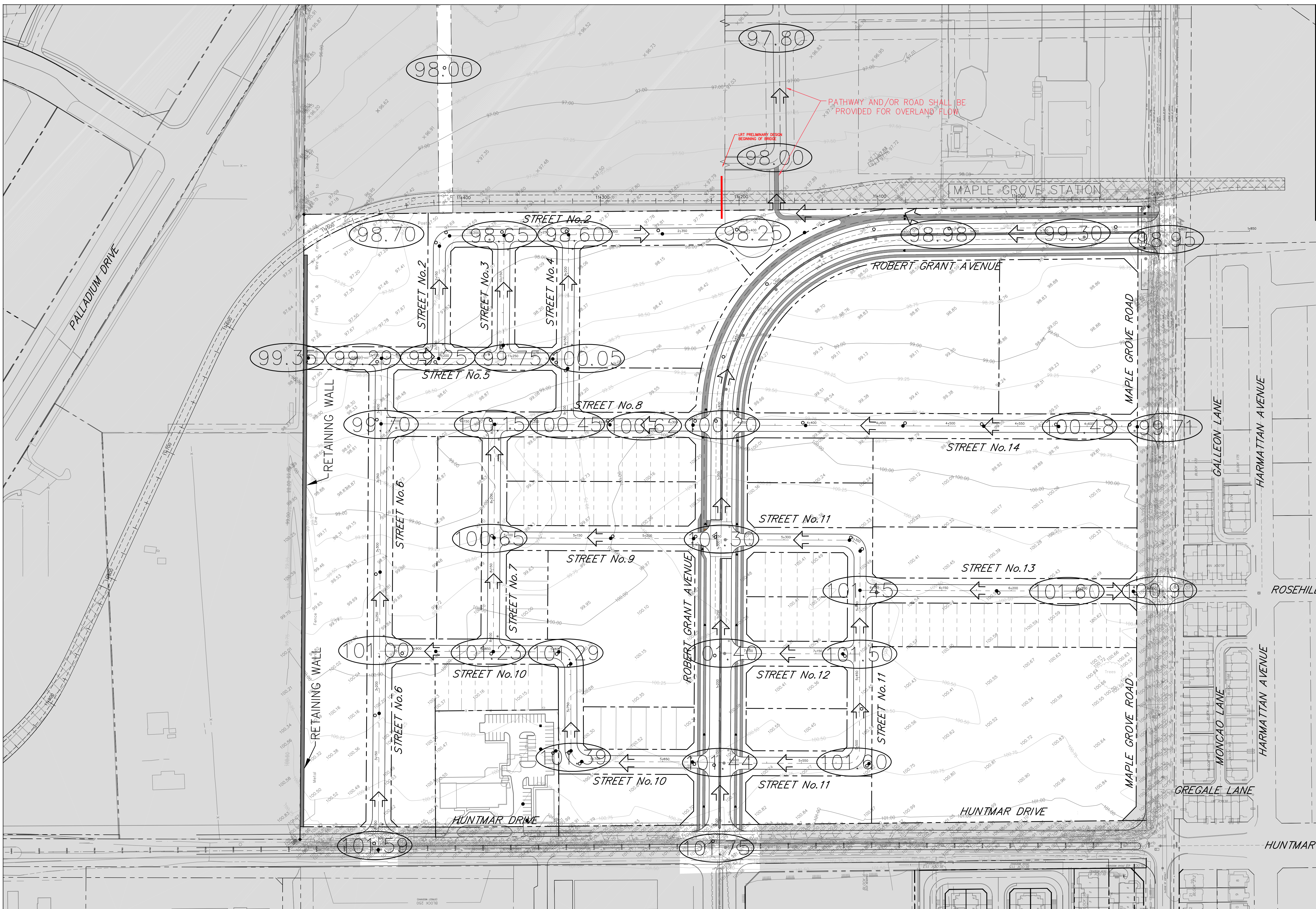
Revision:	
Sheet:	7

## **APPENDIX "B"**

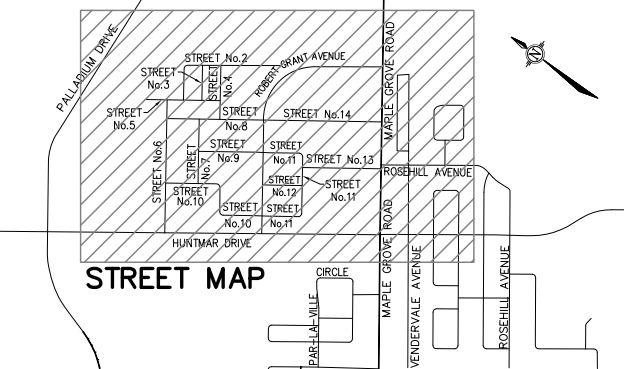
- 191002-GRM - Macro Grading Plan
- 191002-ESCM - Macro Erosion and Sediment Control Plan

**LEGEND**

- 99.00 CONTOURS AT 0.25m INTERVAL
- x 89.81 EXISTING SPOT ELEVATION
- (87.09) PROPOSED ELEVATION
- ← MAJOR DRAINAGE SYSTEM
- OUTSIDE PROPOSED DEVELOPMENT



THE POSITION OF ALL POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.



No.	REVISION	APPLIES WHEN DRAWING MODIFIED	DATE	BY
1	ISSUED FOR SANITARY TRUNK MOECC APPROVAL		JULY 6/20	AGS
2	ISSUED FOR SANITARY TRUNK MOECC APPROVAL		AUG. 4/20	AGS
3	REVISED AS PER CITY COMMENTS		OCT. 7/20	AGS
4	REVISED AS PER NEW ROAD ALIGNMENT		MAR. 4/21	AGS
5	REVISED AS PER CITY COMMENTS		MAR. 30/21	AGS
6	RECORD DRAWING		AUG. 15/21	AGS
7	REVISED AS PER CITY COMMENTS		SEP. 20/21	AGS

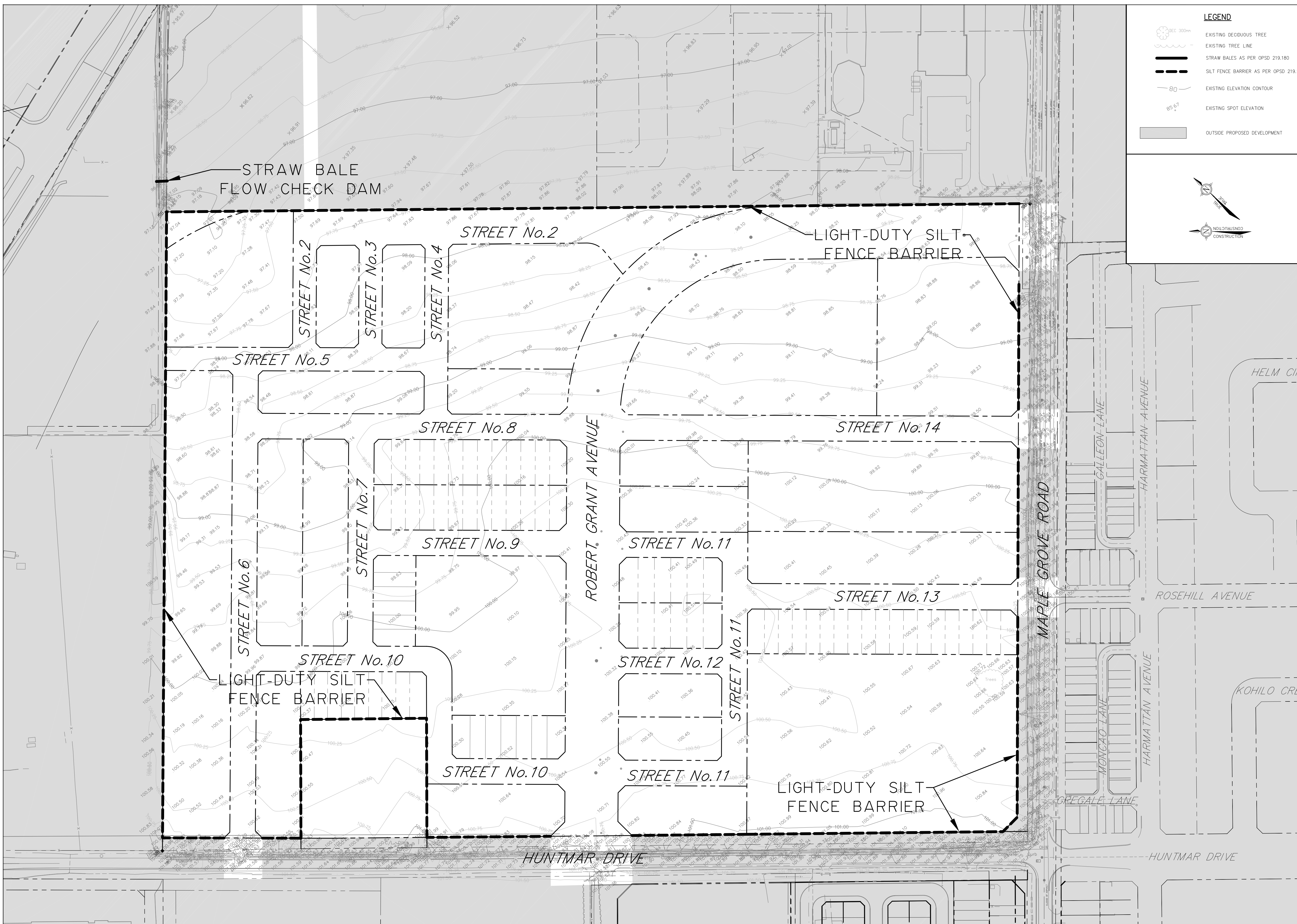
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 HORIZONTAL

DESIGN: AGS  
 CHECKED: JMD  
 DRAWN: CED  
 CHECKED: AGS  
 APPROVED: JMD

**ATREL Engineering Inc.**  
 Engineers - Ingénieurs  
 1-2884 CHAMBERLAND STREET, ROCKLAND, ONTARIO K4K 1M6  
 TEL.: (613) 446-7423

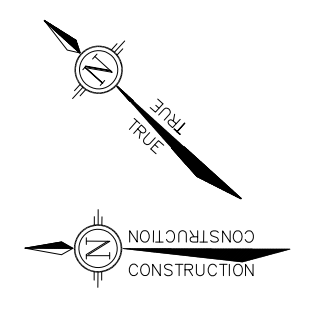
CITY OF OTTAWA  
 130 HUNTMAR DR.  
 PLAN  
 MACRO GRADING PLAN

LIONESS DEVELOPMENT INC.  
 PROJECT No. 191002  
 DATE: JANUARY 2020  
 DRAWING No. 191002-GRM

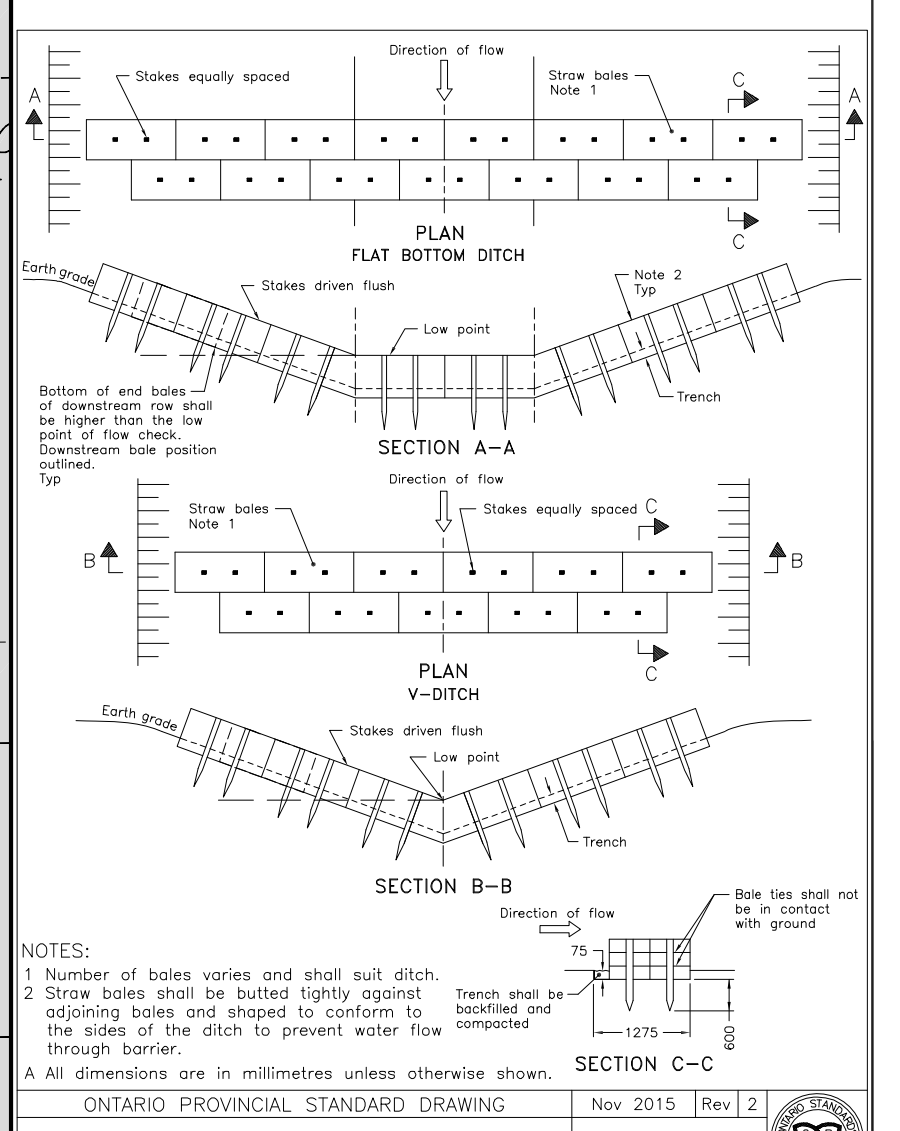


**LEGEND**

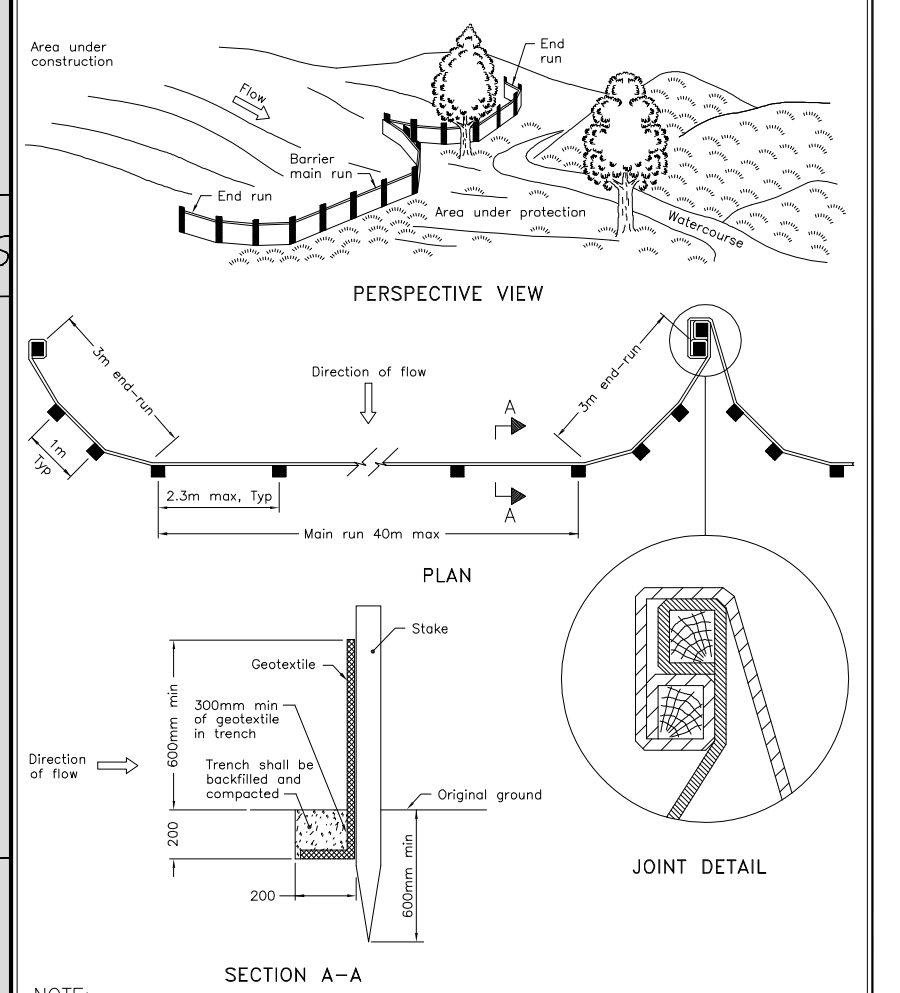
	EXISTING DECIDUOUS TREE
	EXISTING TREE LINE
	STRAW BALES AS PER OPSD 219.180
	SILT FENCE BARRIER AS PER OPSD 219.110
	EXISTING ELEVATION CONTOUR
	EXISTING SPOT ELEVATION
	OUTSIDE PROPOSED DEVELOPMENT



- NOTES**
- ADDITIONAL TO THIS PLAN, THE CONTRACTOR SHALL IMPLEMENT THE "BEST MANAGEMENT PRACTICE" ALL ALONG CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE TO INSTALL, INSPECT, REPAIR AND REMOVE THE SEDIMENT AND EROSION CONTROL METHODS.
  - A SUMP OF 600mm IN DEPTH WILL BE PROVIDED IN ALL CATCHBASINS IN ORDER TO MINIMIZE THE AMOUNT OF SUSPENDED SOLIDS FROM ENTERING THE SEWER SYSTEM.
  - DURING CONSTRUCTION, FILTER CLOTH WILL BE PLACED UNDER ALL CATCHBASIN AND MANHOLE FRAMES AND COVERS AND STRAW BALES WILL BE PLACED WHERE WATER RUNOFF CAN CARRY EXCESSIVE SEDIMENTS INTO THE SEWER SYSTEM.
  - STRAW BALES SHALL BE INSTALLED ALONG THE VARIOUS SWALES (MAN MADE OR EXISTING) WHERE JUDGED NECESSARY BY THE ENGINEER AND/OR THE CITY OF OTTAWA'S INSPECTOR.
  - STRAW BALES SHOULD BE INSTALLED AS PER OPSD 219.100 AND OPSD 219.180 AS APPROPRIATE.
  - STRAW BALES SHALL BE INSTALLED AT EVERY MAJOR POINT OF WATER ENTRY INCLUDING DITCH INLET CATCHBASINS AND CULVERTS.
  - ALL SEDIMENT CONTROL LOCATIONS MUST BE INSPECTED ON A REGULAR BASIS ESPECIALLY FOLLOWING A RAINFALL EVENT. SEDIMENTS SHALL BE REMOVED AND CONTROLS REINSTALLED AS NECESSARY.
  - SHOULD IT BE IMPOSSIBLE TO PREVENT OVERLAND SHEET FLOW TO AN EXTERNAL AREA DURING THE CONSTRUCTION PHASE, SUCH AREA SHALL BE PROTECTED WITH A SILT FENCE AS PER OPSD 219.110 AND/OR FILTER CLOTH IN CATCHBASINS.
  - FILTER CLOTH IN CBs SHOULD BE INSTALLED WITH GENEROUS EXCESS OF MATERIAL AROUND PERIMETER TO FACILITATE REMOVAL. FOR CBs POTENTIALLY SUBJECTED TO HEAVY SEDIMENT LOADING, A GRANULAR "PRE-FILTERED" SHOULD BE PROVIDED AROUND PERIMETER OF CB OR AT INTERVALS ALONG THE CURB.
  - ANY MATERIAL STOCKPILES SHOULD BE LOCATED ON FLAT AREAS WELL AWAY FROM ANY DRAINAGE INLETS.
  - NO SEDIMENT CONTROL STRUCTURES SHALL BE REMOVED UNLESS FOUND UNNECESSARY OR ANOTHER SEDIMENT CONTROL POINT IS INSTALLED ELSEWHERE TO REPLACE THE LATTER.
  - THE SEDIMENT AND EROSION CONTROL MEASURES MAY BE MODIFIED IN THE FIELD AT THE DISCRETION OF THE CITY OF OTTAWA SITE INSPECTOR OR CONSERVATION AUTHORITY.
  - THIS PLAN IS A "LIVING DOCUMENT" AND THAT ANY MODIFICATION TO THE PLAN SHALL BE SUBMITTED TO THE SATISFACTION OF MVCA AND MAY BE MODIFIED BY MVCA STAFF.

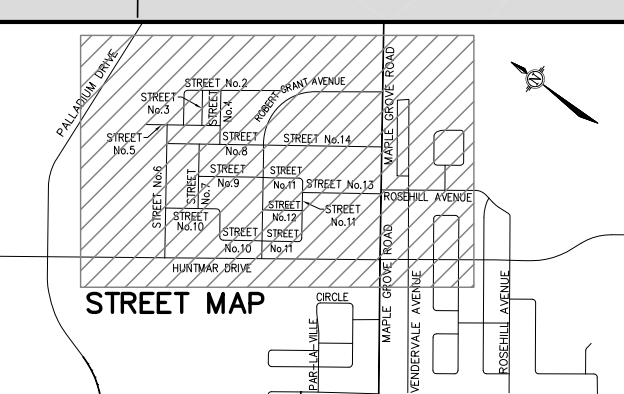


ONTARIO PROVINCIAL STANDARD DRAWING Nov 2015 Rev 2  
STRAW BALE FLOW CHECK DAM OPSD 219.180



ONTARIO PROVINCIAL STANDARD DRAWING Nov 2015 Rev 2  
LIGHT-DUTY SILT FENCE BARRIER OPSD 219.110

THE POSITION OF ALL POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.



No.	REVISION	APPLIES WHEN DRAWING MODIFIED	DATE	BY
1	ISSUED FOR SANITARY TRUNK MOECC APPROVAL		JULY 6/20	AGS
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	RECORD DRAWING		AUG. 15/21	AGS
	REVISED AS PER CITY COMMENTS		SEP. 20/21	AGS

SCALE: 1 : 1 250  
10m 0 10 20 30 40m  
HORIZONTAL

DESIGN: AGS  
CHECKED: JMD  
DRAWN: CED  
CHECKED: AGS  
APPROVED: JMD

LICENSED PROFESSIONAL ENGINEER  
A. G. Y. SAUVE  
100142393  
Sept 26, 2021  
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER  
J. M. DECOEUR  
PROVINCE OF ONTARIO

**ATREL Engineering Inc.**  
Engineers - Ingénieurs  
1-2884 CHAMBERLAND STREET, ROCKLAND, ONTARIO K4K 1M6  
TEL.: (613) 446-7423

CITY OF OTTAWA  
130 HUNTMAR DR.  
PLAN MACRO EROSION AND SEDIMENT CONTROL PLAN

LIONESS DEVELOPMENT INC.  
PROJECT No. 191002  
DATE: JANUARY 2020  
DRAWING No. 191002-ESCM

## **APPENDIX "C"**

- Excerpt from Infrastructure Master Plan (2013), Kanata West Feedermain
- City of Ottawa – Boundary Conditions for 130 Huntmar Drive
- 191002-WM1 - Watermain Layout and Demand
- Table 1: Boundary Condition Data
- Table 2: Node Data
- Table 3: Pipe Data
- Table 4: Average Day and Peak Hour Demand Results
- Table 5: Fire Flow Calculations
- Table 6: Maximum Day plus Fire Flow Results

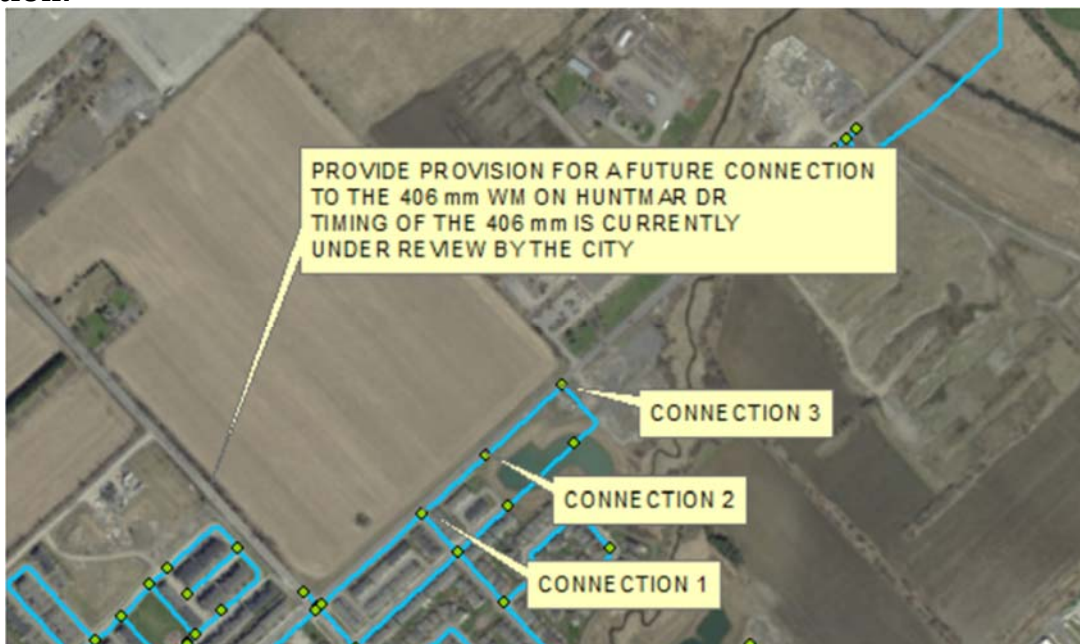
## Boundary Conditions for 130 Huntmar Drive

**Provided Information:**

Date Provided December-19

Scenario	Demand	
	L/min	L/s
Average Daily Demand	469	7.81
Maximum Daily Demand	1,172	19.54
Peak Hour	2,580	43.00
Fire Flow Demand #1	10,020	167.00
Fire Flow Demand #2	16,980	283.00

**Location:**



**Results:**

**Connection 1 - Maple Grove Road**

Demand Scenario	Head (m)	Pressure <sup>1</sup> (psi)
Maximum HGL	161.0	85.5
Peak Hour	156.3	78.7
Max Day plus Fire 1	153.2	74.3
Max Day plus Fire 2	150.8	70.9

<sup>1</sup> Ground Elevation = 100.9m



### Connection 2 - Maple Grove Road

Demand Scenario	Head (m)	Pressure <sup>1</sup> (psi)
Maximum HGL	161.0	86.9
Peak Hour	156.3	80.1
Max Day plus Fire 1	151.8	73.9
Max Day plus Fire 2	147.5	67.7

<sup>1</sup> Ground Elevation = 99.9m

### Connection 3 - Maple Grove Road

Demand Scenario	Head (m)	Pressure <sup>1</sup> (psi)
Maximum HGL	161.0	88.7
Peak Hour	156.3	81.9
Max Day plus Fire 1	150.6	73.9
Max Day plus Fire 2	144.3	65.0

<sup>1</sup> Ground Elevation = 98.6m

### Notes:

1. Pressure reducing valves are required since pressures are greater than 80 psi.
2. Looping of the watermain is required to decrease vulnerability of the water system in case of breaks.
3. Provide provision for a future connection to the 406mm watermain on Huntmar Drive. Timing of the 406mm watermain is currently under review by the City.

### Disclaimer

*The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.*



**TABLE 1: Boundary Condition Data**

DATE: **September 2021**  
DESIGNED BY: AGS  
CHECKED BY: AGS

PROJECT: **130 Huntmar Drive**  
CLIENT: **Urbandale Corporation**  
PROJECT #: **191002**  
BY: **Atriel Engineering Ltd**

Connection	X COORDINATE (m)	Y COORDINATE (m)	HEAD				LOCATION
			AVERAGE DAY (m)	MAX. DAY + 167 l/s (m)	MAX. DAY + 283 l/s (m)	PEAK HOUR (m)	
1	350409.33	4016841.56	161.00	153.20	150.80	156.30	Rosehill Ave
2	350495.71	5016913.83	161.00	151.80	147.50	156.30	120m East of Rosehill Ave
3	350597.88	5017004.74	161.00	150.60	144.30	156.30	250m East of Rosehill Ave

**TABLE 2: NODE DATA**PROJECT: **130 Huntmar Drive**DATE: **September 2021**CLIENT: **Urbandale Corporation**DESIGNED BY: **AGS**PROJECT #: **191002**CHECKED BY: **AGS**BY: **Atrrel Engineering Ltd**

<b>NODE. NO.</b>	<b>AVERAGE DAY DEMAND (l/s)</b>	<b>ELEVATION (m)</b>	<b>X COORDINATE (m)</b>	<b>Y COORDINATE (m)</b>
J100	0.0000	98.25	350425.07	5017187.20
J102	0.2767	100.20	350285.80	5017143.79
J104	1.8630	100.40	350390.47	5017026.64
J106	0.1098	101.45	350265.64	5016998.93
J108	0.1288	101.40	350291.86	5017022.75
J110	0.1539	101.30	350229.14	5017093.34
J112	0.0851	101.40	350167.90	5017038.81
J114	0.0960	101.50	350231.04	5016967.49
J116	0.8981	101.60	350173.74	5016915.43
J118	0.1944	101.44	350108.91	5016986.27
J120	0.4043	101.39	350032.73	5017068.84
J122	0.2544	101.29	350093.36	5017122.24
J124	0.1815	101.23	350056.19	5017163.84
J126	0.2828	100.65	350117.48	5017218.32
J128	0.1807	100.15	350174.19	5017268.71
J130	0.1094	98.65	350277.79	5017358.18
J134	0.4934	99.70	350118.34	5017332.16
J136	0.5432	101.00	350001.56	5017224.99
J138	0.2406	101.59	349909.39	5017142.94
J140	0.1483	100.45	350208.24	5017230.60
J142	0.0875	100.05	350244.65	5017265.69
J148	0.3596	99.71	350483.55	5016927.66
J150	0.2909	101.60	350331.80	5016925.33
J152	0.1454	100.90	350397.96	5016851.72
J154	0.0000	98.95	350585.39	5017018.96
J158	0.0547	98.70	350249.55	5017394.03
J160	0.0328	99.29	350157.34	5017366.29
J162	0.1094	99.25	350185.18	5017335.39
J164	0.2078	99.75	350213.65	5017303.78
J166	0.5530	99.35	350121.06	5017408.01
J170	0.6502	98.60	350309.78	5017321.52

**TABLE 3: AVERAGE DAY AND PEAK HOUR DEMAND RESULTS**

DATE: **September 2021**  
DESIGNED BY: AGS  
CHECKED BY: AGS

PROJECT: **130 Huntmar Drive**  
CLIENT: Urbandale Corporation  
PROJECT #: 191002  
BY: Atrel Engineering Ltd

NODE NO.	Elevation (m)	AVERAGE DAY DEMAND			PEAK HOUR DEMAND		
		Demand (l/s)	HGL (m)	Pressure (kPa)	Demand (l/s)	HGL (m)	Pressure (kPa)
J100	98.25	0.0000	160.90	613.90	0.0000	157.50	580.60
J102	100.20	0.2767	160.90	594.77	1.5219	157.49	561.39
J104	100.40	1.8630	160.89	592.73	10.2464	157.49	559.43
J106	101.45	0.1098	160.89	582.51	0.6039	157.50	549.25
J108	101.40	0.1288	160.89	583.00	0.7084	157.50	549.70
J110	101.30	0.1539	160.89	583.98	0.8465	157.49	550.60
J112	101.40	0.0851	160.89	583.00	0.4681	157.49	549.61
J114	101.50	0.0960	160.89	582.02	0.5280	157.49	548.67
J116	101.60	0.8981	160.89	581.04	2.0617	157.49	547.64
J118	101.44	0.1944	160.89	582.61	1.0692	157.49	549.21
J120	101.39	0.4043	160.89	583.09	1.3364	157.46	549.40
J122	101.29	0.2544	160.89	584.06	1.3992	157.44	550.26
J124	101.23	0.1815	160.89	584.65	0.9983	157.44	550.80
J126	100.65	0.2828	160.89	590.34	1.5554	157.44	556.52
J128	100.15	0.1807	160.89	595.24	0.9939	157.44	561.38
J130	98.65	0.1094	160.89	609.94	0.6017	157.44	576.07
J134	99.70	0.4934	160.89	599.64	2.7137	157.43	565.70
J136	101.00	0.5432	160.89	586.90	2.9876	157.43	552.96
J138	101.59	0.2406	160.89	581.12	1.3233	157.43	547.15
J140	100.45	0.1483	160.89	592.30	0.8157	157.44	558.49
J142	100.05	0.0875	160.89	596.22	0.4813	157.44	562.38
J148	99.71	0.3596	160.89	599.49	0.9709	157.61	567.40
J150	101.60	0.2909	160.89	581.04	1.6000	157.57	548.43
J152	100.90	0.1454	160.89	587.90	0.7997	157.66	556.17
J154	98.95	0.0000	160.90	607.09	0.0000	157.53	574.03
J158	98.70	0.0547	160.89	609.45	0.3009	157.44	575.57
J160	99.29	0.0328	160.89	603.66	0.6017	157.43	569.72
J162	99.25	0.1094	160.89	604.05	0.1804	157.43	570.17
J164	99.75	0.2078	160.89	599.16	1.1429	157.44	565.29
J166	99.35	0.5530	160.89	603.07	3.0415	157.42	569.09
J170	98.60	0.6502	160.89	610.43	3.5761	157.44	576.59
Total =		9.1357	l/s	Total =		45.4747	l/s

**TABLE 4: PIPE DATA**

DATE: **September 2021**  
 DESIGNED BY: AGS  
 CHECKED BY: AGS

PROJECT: **130 Huntmar Drive**  
 CLIENT: **Urbandale Corporation**  
 PROJECT #: **191002**  
 BY: **Atriel Engineering Ltd**

PIPE NO.	FROM	TO	LENGTH (m)	INSIDE DIAMETER (mm)	ROUGHNESS	AVERAGE DAY DEMAND				PEAK HOUR DEMAND			
						FLOW (L/S)	VELOCITY (m/s)	HEADLOSS (m)	HL/1000 (m/km)	FLOW (L/S)	VELOCITY (m/s)	HEADLOSS (m)	HL/1000 (m/km)
P300	J100	J154	232.39	393	120	-9.1313	0.0753	0.0055	0.0238	-22.3629	0.1844	0.0290	0.1248
P302	J104	J148	135.87	204	110	0.3597	0.0110	0.0002	0.0016	-10.6627	0.3262	0.1233	0.9074
P304	J152	J150	98.97	204	110	-0.1455	0.0045	0.0000	0.0002	10.6737	0.3266	0.0900	0.9092
P306	J106	J150	98.97	204	110	0.4364	0.0134	0.0002	0.0024	-9.0738	0.2776	0.0666	0.6730
P308	J106	J108	35.42	204	110	-0.4564	0.0140	0.0001	0.0026	3.6823	0.1127	0.0045	0.1266
P310	J104	J102	157.10	204	110	-2.2226	0.0680	0.0078	0.0497	0.4163	0.0127	0.0004	0.0023
P312	J108	J110	94.43	204	110	-0.5852	0.0179	0.0004	0.0043	2.9739	0.0910	0.0081	0.0853
P314	J114	J106	46.76	204	110	0.0898	0.0027	0.0000	0.0004	-4.7876	0.1465	0.0096	0.2057
P316	J114	J112	95.25	204	110	-0.5279	0.0162	0.0003	0.0033	1.8914	0.0579	0.0035	0.0369
P318	J114	J116	77.42	204	110	0.3421	0.0105	0.0001	0.0017	2.3681	0.0725	0.0043	0.0560
P320	J116	J118	96.03	204	110	-0.5560	0.0170	0.0004	0.0039	0.3064	0.0094	0.0001	0.0014
P322	J118	J112	79.00	393	120	-1.7047	0.0141	0.0001	0.0009	-6.2782	0.0518	0.0009	0.0120
P324	J112	J110	82.00	393	120	-2.3176	0.0191	0.0002	0.0020	-4.8549	0.0400	0.0006	0.0073
P326	J110	J102	75.86	393	120	-3.9630	0.0327	0.0004	0.0049	-8.3094	0.0685	0.0015	0.0201
P328	J102	J100	152.83	393	120	-7.6247	0.0629	0.0026	0.0170	-16.1871	0.1334	0.0105	0.0687
P330	J170	J100	180.08	204	110	-1.5065	0.0461	0.0044	0.0242	-6.1758	0.1889	0.0594	0.3301
P332	J102	J140	116.41	204	110	1.1624	0.0356	0.0017	0.0149	6.7721	0.2072	0.0456	0.3915
P334	J110	J126	167.59	204	110	0.9063	0.0277	0.0016	0.0094	5.5819	0.1708	0.0459	0.2736
P338	J122	J124	55.79	204	110	0.3000	0.0092	0.0001	0.0010	2.7844	0.0852	0.0042	0.0754
P340	J118	J120	112.34	204	110	0.9587	0.0293	0.0012	0.0104	5.5200	0.1689	0.0301	0.2679
P342	J120	J122	80.80	204	110	0.5544	0.0170	0.0003	0.0039	4.1836	0.1280	0.0130	0.1605
P344	J128	J164	52.79	204	110	0.0349	0.0011	0.0000	0.0000	1.1665	0.0357	0.0008	0.0152
P346	J128	J126	75.86	204	110	-0.1784	0.0055	0.0000	0.0005	-2.1545	0.0659	0.0036	0.0468
P348	J126	J124	82.00	204	110	0.4451	0.0136	0.0002	0.0025	1.8720	0.0573	0.0030	0.0361
P350	J128	J134	84.52	204	110	0.6110	0.0187	0.0004	0.0046	3.3229	0.1017	0.0089	0.1048
P352	J124	J136	82.00	204	110	0.5636	0.0172	0.0003	0.0041	3.6581	0.1119	0.0103	0.1252
P354	J134	J136	158.51	204	110	0.2201	0.0067	0.0001	0.0007	0.6527	0.0200	0.0008	0.0052
P356	J136	J138	123.40	204	110	0.2406	0.0074	0.0001	0.0008	1.3233	0.0405	0.0023	0.0190
P370	J164	J162	42.55	204	110	0.5107	0.0156	0.0001	0.0035	2.5732	0.0787	0.0028	0.0652
P372	J162	J158	87.08	204	110	-0.2870	0.0088	0.0001	0.0013	-1.2939	0.0396	0.0016	0.0182
P376	J160	J162	41.59	204	110	-0.6883	0.0211	0.0002	0.0054	-3.6867	0.1128	0.0053	0.1270
P378	J164	J130	84.11	204	110	-0.1537	0.0047	0.0000	0.0002	-0.1860	0.0057	0.0000	0.0004
P382	J158	J130	45.64	204	110	-0.3417	0.0105	0.0001	0.0012	-1.5948	0.0488	0.0012	0.0269
P384	J140	J128	51.10	204	110	0.6482	0.0198	0.0003	0.0051	3.3288	0.1018	0.0054	0.1048
P386	J170	J130	48.66	204	110	0.6049	0.0185	0.0002	0.0046	2.3825	0.0729	0.0028	0.0566
P388	J170	J142	85.79	204	110	0.2515	0.0077	0.0001	0.0009	0.2172	0.0066	0.0001	0.0007
P390	J164	J142	49.11	204	110	-0.5298	0.0162	0.0002	0.0034	-2.3635	0.0723	0.0027	0.0557
P392	J142	J140	50.56	204	110	-0.3659	0.0112	0.0001	0.0018	-2.6276	0.0804	0.0034	0.0677
P394	J166	J160	55.29	204	110	-0.5530	0.0169	0.0002	0.0040	-3.0415	0.0931	0.0049	0.0888
P396	J134	J160	51.82	204	110	-0.1025	0.0031	0.0000	0.0004	-0.0435	0.0013	0.0000	0.0000

**FIRE FLOW CALCULATIONS**

Table 5

CONSULTANT: Atriel Engineering Ltd  
 BY: AGS  
 DATE: September 20, 2021

CLIENT: Urbandale Corporation  
 191002  
 PROJECT NAME: 130 Huntmar Drive

**C = Coefficient related to type of construction**

· wood frame	1.5	<u>X</u>
· ordinary construction	1.0	_____
· non-combustible construction	0.8	_____
· fire resistive construction (<2 hrs.)	0.7	_____
· fire resistive construction (>2 hrs.)	0.6	_____
· Interpolation		_____

**A = Area of structure considered (m²)**

Building No.	Singles	Townhouses	Back to Backs	Apartments		
Location No.						
Combined ground floor area	2850	535	510	730		
Number of storeys	2	2	3	2		
Total floor area	5700	1070	1530	1460		

**(1) F = The required flow in litres per minutes (L/min)**

= 220·C·(A) <sup>½</sup>	24914	10795	12908	12609	0	0
--------------------------	-------	-------	-------	-------	---	---

**(2) Occupancy hazard reduction or surcharge (contents, L/min)**

· non-combustible	- 25%					
· limited combustible	- 15%					
· combustible	- 0%	-15	-15	-15	-15	
· free burning	+ 15%					
· rapid burning	+ 25%					

Required Flow (L/min)	21177	9176	10972	10718	0	0
-----------------------	-------	------	-------	-------	---	---

**(3) Sprinkler protection reduction (entire building, % of (2), L/min)**

· non-comb. - fire resistive construction with very low fire hazard (- 75%)						
· other	0	0	0	0		

Reduction (L/min)	0	0	0	0		
-------------------	---	---	---	---	--	--

**(4) Exposure surcharge (% of 2, L/min)**

· PW( Unpierced boundary party wall) 10%	North	24.0	10	2118	22.0	10	918	3.1	20	2194	25.0	10	1072			0			0
· 0 to 3.0 m 25 %																			
· 3.1 to 10.0 m 20 %	East	30.0	10	2118	3.1	20	1835	22.0	10	1097	5.0	20	2144			0			0
· 10.1 to 20.0 m 15 %																			
· 20.1 to 30.0 m 10 %	South	>45	0	0	15.0	15	1376	3.1	20	2194	25.0	10	1072			0			0
· 30.1 to 45.0 m 5 %																			
· Maximum 75 %	West	>45	0	0	3.1	20	1835	PW	10	1097	5.0	20	2144			0			0

Exposure surcharge total	4235	5964	6583	6431	0	0
--------------------------	------	------	------	------	---	---

**(5) Fire Flow**

= (2) - (3) + (4)	25412	15140	17555	17149	0	0
-------------------	-------	-------	-------	-------	---	---

**(6) Round off fire flow (L/min) Fc**

· to nearest 1,000 L/min if less than 10,000 L/min.	25000	15000	18000	17000	0	0
	( 417 l/s)	( 250 l/s)	( 300 l/s)	( 283 l/s)	( 0 l/s)	( 0 l/s)
Fire Flow Required	( 167 l/s)	( 167 l/s)	( 300 l/s)	( 283 l/s)	( 0 l/s)	( 0 l/s)

As per the "Technical Bulletin ISDTB-2014-02 - Revisions to Ottawa Design Guidelines - Water", the single detached dwellings or traditional side-by-side town comply with the provision of the Bulletin; therefore the required fire flow is 10,000 l/min (167 l/s)

**TABLE 6: MAXIMUM DAY PLUS FIRE-FLOW RESULTS**

DATE: September 2021  
 DESIGNED BY: AGS  
 CHECKED BY: AGS

PROJECT: 130 Huntmar Drive  
 CLIENT: Urbandale Corporation  
 PROJECT #: 191002  
 BY: Atrel Engineering Ltd

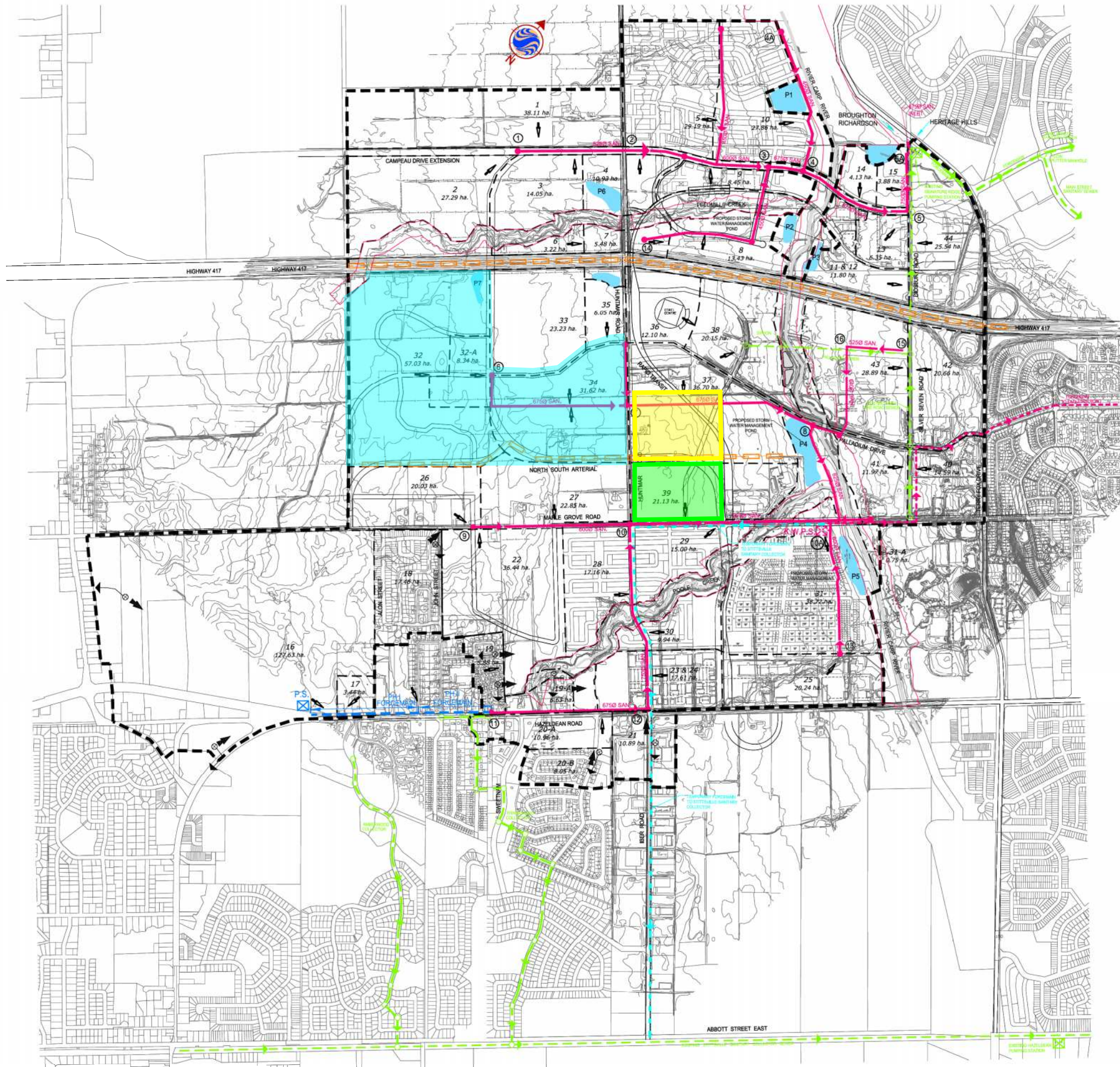
NODE NO.	Static Demand (L/s)	Static Pressure (kPa)	Static Head (m)	Fire-Flow Demand (L/s)	Residual Pressure (kPa)	Available Flow @ Hydrant (L/s)	Available Flow Pressure (kPa)	Total Demand (L/s)	Available Flow @ Hydrant (L/s)	Critical NODE ID	Critical Node Pressure (kPa)	Critical Node Head (m)	Adjusted Available Flow (L/s)	Design Flow (L/s)
J100	0.0000	596.79	159.15	283.00	376.24	518.12	140.0	282.9980	518.1202	J138	109.86	112.80	600.61	600.59
J102	0.6918	577.62	159.15	283.00	350.37	482.42	140.0	283.6898	482.4246	J150	126.25	114.48	573.13	573.12
J104	4.6575	575.67	159.15	283.00	263.33	359.14	140.0	287.6555	359.1406	J104	139.96	114.68	420.74	420.74
J106	0.2745	565.33	159.14	167.00	397.42	326.36	140.0	167.2733	326.3561	J150	138.48	115.73	386.17	385.98
J108	0.3220	565.82	159.14	167.00	397.02	324.87	140.0	167.3208	324.8661	J108	139.96	115.68	384.89	384.71
J110	0.3848	566.82	159.14	167.00	441.26	455.14	140.0	167.3836	455.1449	J150	137.02	115.58	549.68	549.62
J112	0.2128	565.83	159.14	167.00	437.26	439.47	140.0	167.2116	439.4701	J112	139.96	115.68	531.59	531.55
J114	0.2400	564.84	159.14	167.00	410.82	354.80	140.0	167.2388	354.8008	J114	139.96	115.78	422.66	422.66
J116	1.4675	563.85	159.14	167.00	393.52	322.46	140.0	168.4663	322.4637	J116	139.96	115.88	382.01	381.84
J118	0.4860	565.43	159.14	167.00	434.34	428.13	140.0	167.4848	428.1322	J118	139.96	115.72	516.72	516.69
J120	0.7710	565.86	159.14	167.00	380.75	300.09	140.0	167.7698	300.0929	J120	139.96	115.67	354.20	354.12
J122	0.6360	566.82	159.13	167.00	381.73	300.78	140.0	167.6348	300.7834	J122	139.96	115.57	355.02	354.94
J124	0.4538	567.40	159.13	167.00	398.53	327.14	140.0	167.4526	327.1422	J124	139.96	115.51	387.74	387.53
J126	0.7070	573.09	159.13	167.00	415.83	353.86	140.0	167.7058	353.8623	J126	139.96	114.93	419.97	419.58
J128	0.4518	577.99	159.13	300.00	248.97	369.50	140.0	300.4497	369.4985	J128	139.96	114.43	438.84	438.80
J130	0.2735	592.68	159.13	300.00	222.44	345.54	140.0	300.2714	345.5448	J130	139.96	112.93	406.25	406.24
J134	1.2335	582.37	159.13	300.00	201.56	334.20	140.0	301.2314	334.1961	J134	139.96	113.98	393.82	393.81
J136	1.3580	569.64	159.13	283.00	142.18	285.34	140.0	284.3560	285.3361	J138	134.18	115.28	333.33	333.16
J138	0.6015	563.85	159.13	283.00	-341.23	179.43	140.0	283.5995	179.4347	J138	139.96	115.87	208.93	208.80
J140	0.3708	575.06	159.13	300.00	243.59	365.42	140.0	300.3687	365.4167	J140	139.96	114.73	434.23	434.20
J142	0.2188	578.97	159.13	300.00	230.41	353.71	140.0	300.2167	353.7068	J142	139.96	114.33	418.86	418.84
J148	0.5394	582.76	159.18	283.00	375.03	519.69	140.0	283.5374	519.6944	J148	139.96	113.99	622.47	622.47
J150	0.7273	563.84	159.14	167.00	250.55	202.90	140.0	167.7261	202.9016	J150	139.96	115.88	236.77	236.77
J152	0.3635	570.70	159.14	167.00	113.18	161.37	140.0	167.3623	161.3727	J152	139.96	115.18	187.07	187.06
J154	0.0000	590.08	159.17	283.00	383.21	562.72	140.0	282.9980	562.7247	J138	122.94	114.14	679.03	678.89
J158	0.1368	592.19	159.13	300.00	174.14	316.56	140.0	300.1347	316.5627	J158	139.96	112.98	370.75	370.75
J160	0.2735	586.39	159.13	300.00	185.41	323.21	140.0	300.2714	323.2132	J166	139.36	113.57	379.57	379.57
J162	0.0820	586.80	159.13	300.00	217.43	342.85	140.0	300.0799	342.8531	J162	139.96	113.53	404.01	404.00
J164	0.5195	581.90	159.13	300.00	241.42	362.15	140.0	300.5174	362.1476	J164	139.96	114.03	428.82	428.79
J166	1.3825	585.80	159.13	283.00	2.14	239.88	140.0	284.3805	239.8792	J166	139.96	113.63	278.89	278.89
J170	1.6255	593.18	159.13	300.00	238.04	358.05	140.0	301.6234	358.0524	J170	139.96	112.88	421.32	421.30

Total = 21.4626 l/s



## **APPENDIX "D"**

- KWMSS – Preferred Waste-Water Option – Drawing S-1
- Infrastructure Master Plan – Kanata West Sewers Page 200 (2013)
- 195 Huntmar - External San Drainage Plan – Sheet No. 87 (DSEL) (Nov 9, 2020)
- 195 Huntmar - Sanitary Drainage Plan – Sheet No. 88 to 93 (DSEL) (Nov 9, 2020)
- 195 Huntmar - Sanitary Sewer Calculation Sheet (DSEL) (Nov 9, 2020)
- 191002-SANM - Macro Sanitary Drainage Area Plan
- Proposed Alignments for Kanata West Development North-South Sanitary Collector Sewers Functional Design Study (IBI Group)
- Maple Grove San Sewer Capacity Analysis (10/MH91 – SAMH3) (DSEL)
- Maple Grove Sanitary Sewer Capacity Analysis Calculation Sheets
- Table 7A - Sanitary Sewer Computation Form
- Correspondence annual event and at catastrophic failure HGL at the KWPS
- Table 7B - Sanitary Sewer Computation Form – Annual Event



Stantec Consulting Ltd.  
 1505 Laprieville Avenue  
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 K1Z 7T1  
 Tel: 613.722.4420  
 Fax: 613.722.2799  
 www.stantec.com

**Stantec**

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 1775 WOODBINE BL., OTTAWA, ONTARIO M1S 3S1

Legend

- ULTIMATE MAJOR DRAINAGE LIMIT
- - - SUBCATCHMENT AREAS
- PROPOSED TRUNK SEWER
- - - PROPOSED FORCEMAIN
- TEMPORARY FORCEMAIN
- PROPOSED STITTVILLE PUMPING STATION AND FORCEMAIN
- EXISTING TRUNK SEWER
- MAJOR DRAINAGE SPLIT
- ① NODES
- EXISTING PUMPING STATION AND FORCEMAIN (TO BE DECOMMISSIONED)
- ← 44 INPUT POINT AND AREA IN HECTARES
- ← 1 EXISTING PUMPING STATION GRAVITY OUTLET

Revision	By	Appr.	Date	
8	REVISED FOR DEC 21/03 SUBMISSION	G.R.A.	J.J.P.	03-12-21
4	REVISED TRUNK SEWER FROM 16 TO KWPS	R.M.M.	R.M.M.	05-10-05
3	ARROWS FOR EXIST. PUMP STATIONS ADDED	R.M.M.	R.M.M.	05-08-08
2	REPORT JUNE 2005	R.M.M.	R.M.M.	05-06-07
1	REPORT APR. 2005	R.M.M.	R.M.M.	05-04-05

File Name: \_\_\_\_\_  
 Des. Chd. Dgn. Date

Client/Project

Kanata West Concept Plan  
 Master Servicing Study

Ottawa, Ontario

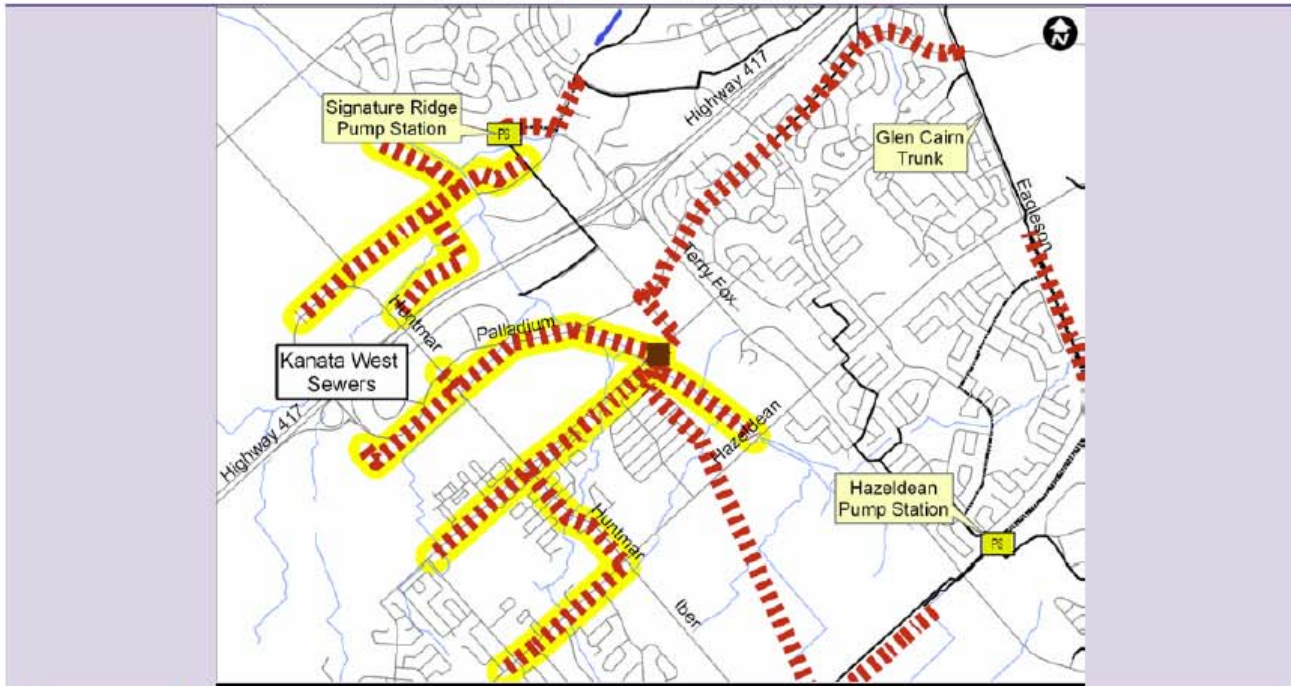
Title

Preferred Waste-Water  
 Option

Project No. 60400406 Scale: 1:7500  
 Drawing No. \_\_\_\_\_ Sheet \_\_\_\_\_ Revision \_\_\_\_\_

I:\Projects\60400406\Drawings\DWG\60400406-01-01-01-01.dwg  
 Date Plotted: 2005-05-06 10:31:38  
 Plotter: HP DesignJet 5000

## Kanata West Sewers



### **Scope and Justification**

To service new development in Kanata West area, construct new collector sewers to provide outlet for new subdivisions. These collectors were identified in the Kanata West Master Servicing Study (Stantec 2006). The construction of collector sanitary sewers servicing the Kanata West development area will, for the most part, occur as part of the construction of local subdivisions. This budget item accounts for the cost of over-sizing local sewers which will be recovered by local developers.

### **Timing**

2013 - 2024: Construction of collector sewers.  
(Rate of development will determine the exact timing).

### **Action Item Funding**

Construction Cost Estimate = \$7.1 M

Capital Cost Estimate\* = \$11.3 M (100% Development Charges, 0% Rate)

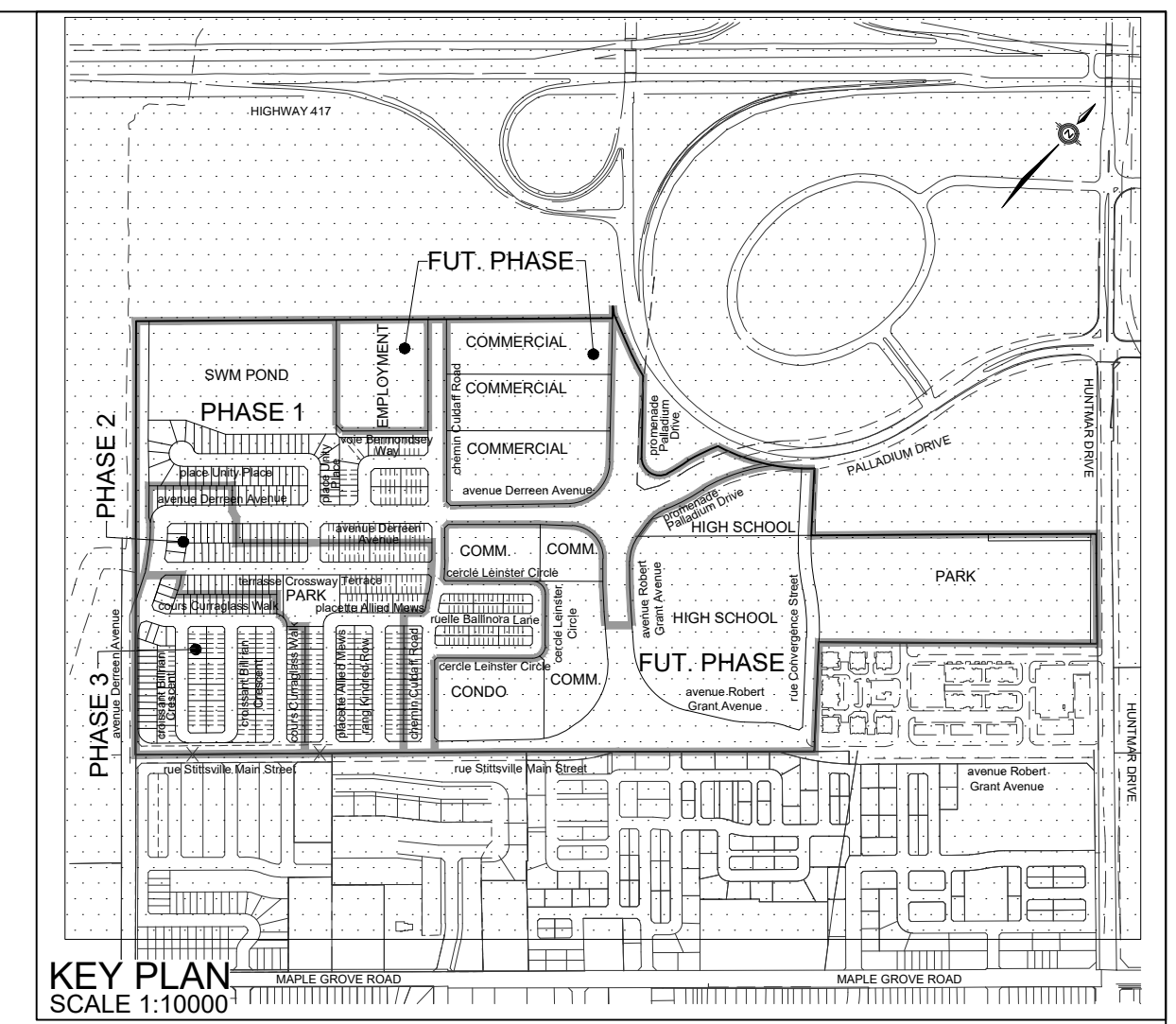
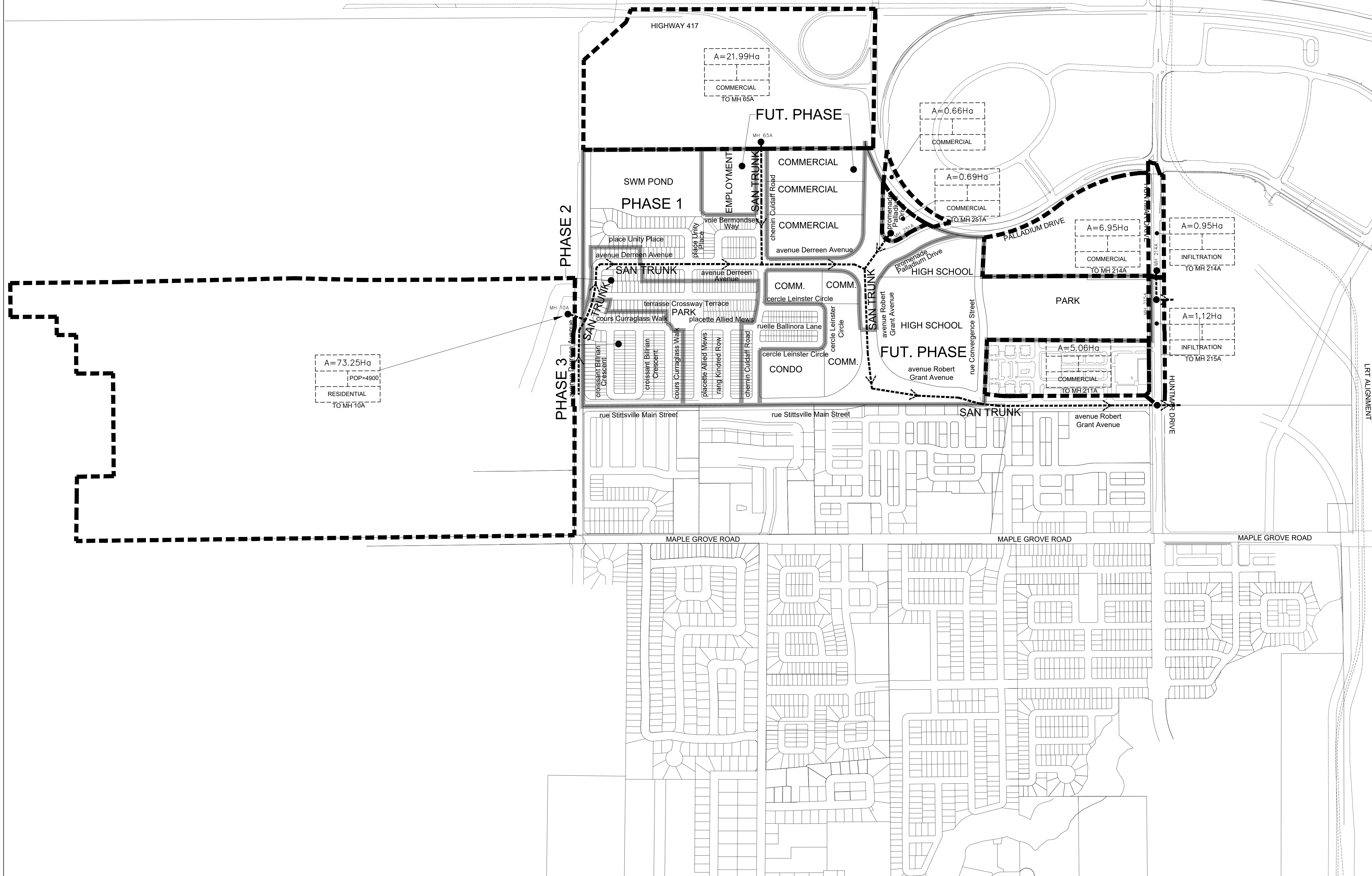
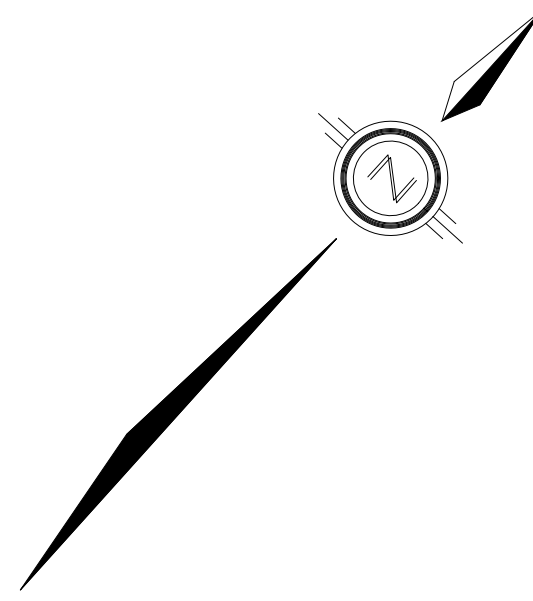
*\*Including construction cost, engineering, city internal costs and contingency allowance.*

### **EA Requirements and Consultation**

Schedule B Class EA has been completed and the project is approved.

### **Follow Up Actions**

Coordinate design and construction with local subdivision development.



KEY PLAN  
SCALE 1:10000

LEGEND

- SANITARY DRAINAGE BOUNDARY
- EXTERNAL AREA IN HECTARES A=53.63
- EXTERNAL POPULATION DENSITY (PERSONS/HECTARE) POP=5739
- EXTERNAL LAND USE RESIDENTIAL

**TOPOGRAPHIC INFORMATION**  
CITY OF OTTAWA 1:K MAPPING, RECEIVED ON OCTOBER 4, 2016. FEEDMILL CREEK TOPOGRAPHIC SURVEY (JULY 26, 2019) AND PALLADIUM DRIVE TOPOGRAPHIC SURVEY (JUNE 23, 2020) PROVIDED BY STANTEC (PROJECT No. 161613545-111)

**LEGAL INFORMATION**  
M-PLAN PROVIDED BY STANTEC GEOMATICS LTD., PROJECT No. 16-16-135-45 (195 HUNTMAR ROAD), RECEIVED ON OCTOBER 16, 2020.  
4th SUBMISSION 20-11-09

ELEVATION NOTE

ELEVATIONS SHOWN HEREON ARE GEODETIC (CGVD-1928:1978) AND ARE DERIVED FROM THE CAN-NET VRS NETWORK MONUMENT: OTTAWA

ELEVATION = 96.205m

No.	BY	DATE	DESCRIPTION
4	W.L.	20-11-09	4th SUBMISSION
3	W.L.	20-07-09	3rd SUBMISSION
2	W.L.	20-04-03	2nd SUBMISSION
1	W.L.	19-12-23	1st SUBMISSION

**Ottawa** CITY OF OTTAWA



PROJECT No. 12-624

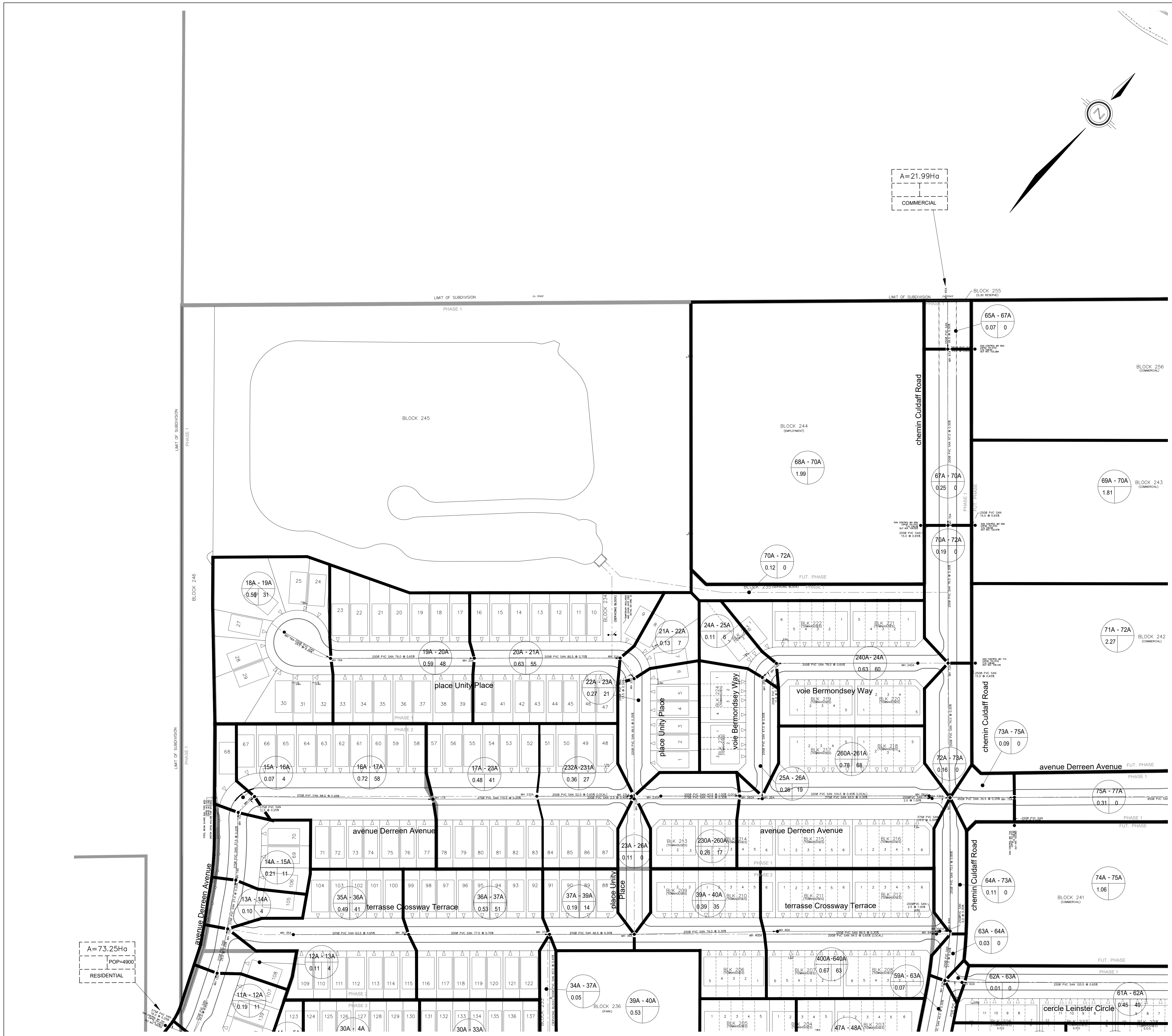
EXTERNAL SAN DRAINAGE PLAN

2325483 ONTARIO LTD. 195 HUNTMAR DRIVE



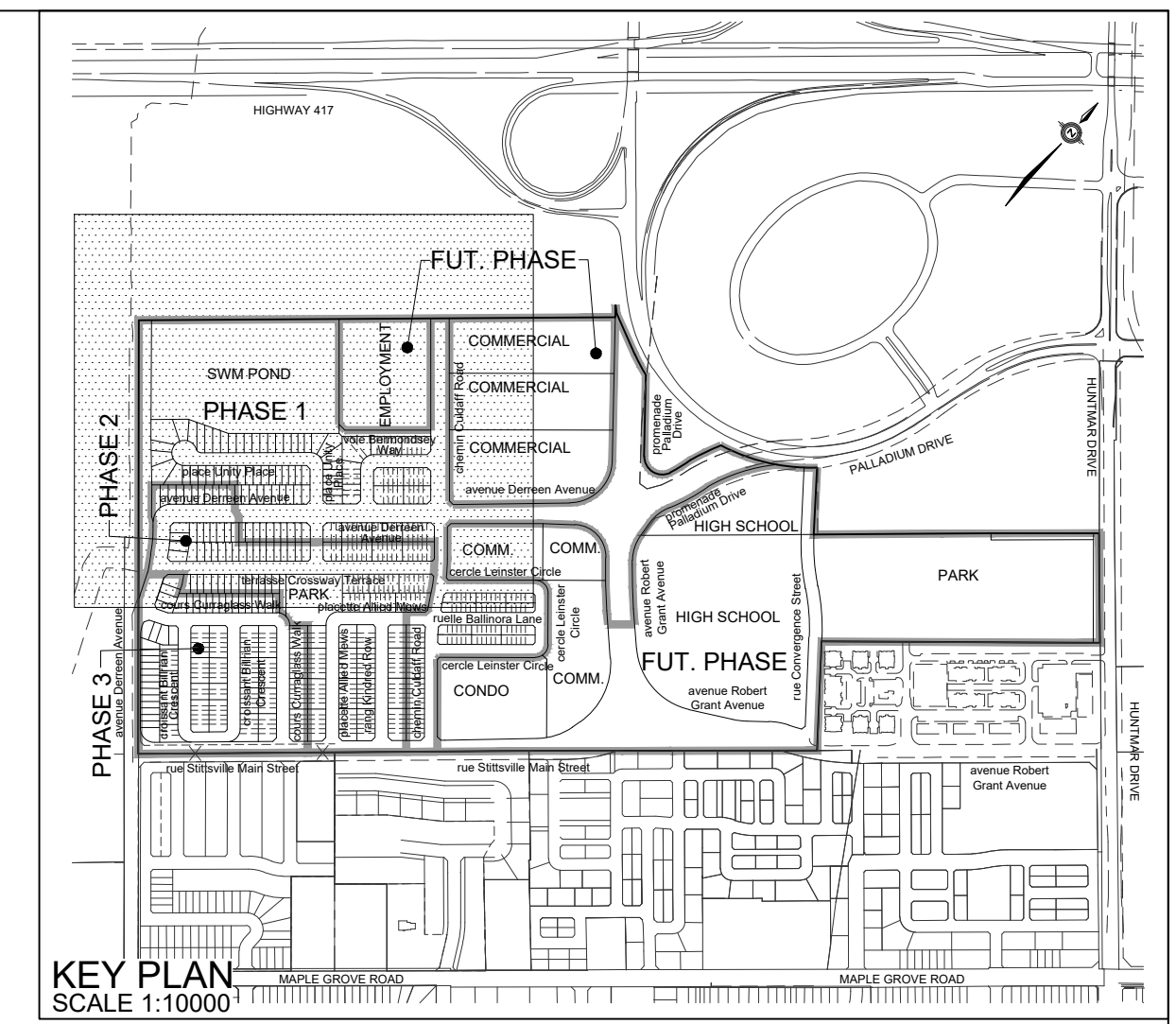
120 Iker Road, Unit 103  
Stittsville, ON K2S 1E9  
Tel: (613) 836-0856  
Fax: (613) 836-7153  
www.DSEL.ca

DRAWN BY: R.A./A.K.	CHECKED BY: W.L.	SHEET No.
DESIGNED BY: W.L.	CHECKED BY: C.M.	87
SCALE: 1:5000	DATE: DECEMBER 2019	



A=73.25Ha  
POP=4900  
RESIDENTIAL

A=21.99Ha  
COMMERCIAL



**KEY PLAN**  
SCALE 1:10000

**LEGEND**

- SANITARY DRAINAGE BOUNDARY
- SANITARY SUB-DRAINAGE BOUNDARY
- SANITARY DRAINAGE BOUNDARY (OTHER PHASES)
- UPSTREAM MH TO DOWNSTREAM MH (43A-44A)
- AREA IN HECTARES (0.78 61)
- POPULATION
- UPSTREAM MH TO DOWNSTREAM MH (43A-44A)
- AREA IN OTHER PHASES IN HECTARES (0.78 61)
- POPULATION
- EXTERNAL AREA IN HECTARES (A=53.63)
- EXTERNAL POPULATION (POP=5739)
- DENSITY (PERSONS/HECTARE)
- EXTERNAL LAND USE (RESIDENTIAL)
- MAINTENANCE HOLE (MH202A)
- CAP

**TOPOGRAPHIC INFORMATION**  
CITY OF OTTAWA 1K MAPPINGS, RECEIVED ON OCTOBER 4, 2016. FEEDMILL CREEK TOPOGRAPHIC SURVEY (JULY 26, 2019) AND PALLADIUM DRIVE TOPOGRAPHIC SURVEY (JUNE 23, 2020) PROVIDED BY STANTEC (PROJECT No. 161613545-111)

**LEGAL INFORMATION**  
M-PLAN PROVIDED BY STANTEC GEOMATICS LTD., PROJECT No. 16-16-135-45 (195 HUNTMAR ROAD), RECEIVED ON OCTOBER 16, 2020. 4th SUBMISSION 20-11-09

**ELEVATION NOTE**  
ELEVATIONS SHOWN HEREON ARE GEODETIC (CGVD-1928:1978) AND ARE DERIVED FROM THE CAN-NET VRS NETWORK MONUMENT: OTTAWA

ELEVATION = 96.205m

No.	BY	DATE	DESCRIPTION
4	W.L.	20-11-09	4th SUBMISSION
3	W.L.	20-07-09	3rd SUBMISSION
2	W.L.	20-04-03	2nd SUBMISSION
1	W.L.	19-12-23	1st SUBMISSION



PROJECT No. 12-624

W. LIU  
100167932  
20-11-09  
PROVINCE OF ONTARIO  
LICENSED PROFESSIONAL ENGINEER

**SANITARY DRAINAGE PLAN**

2325483  
ONTARIO LTD.

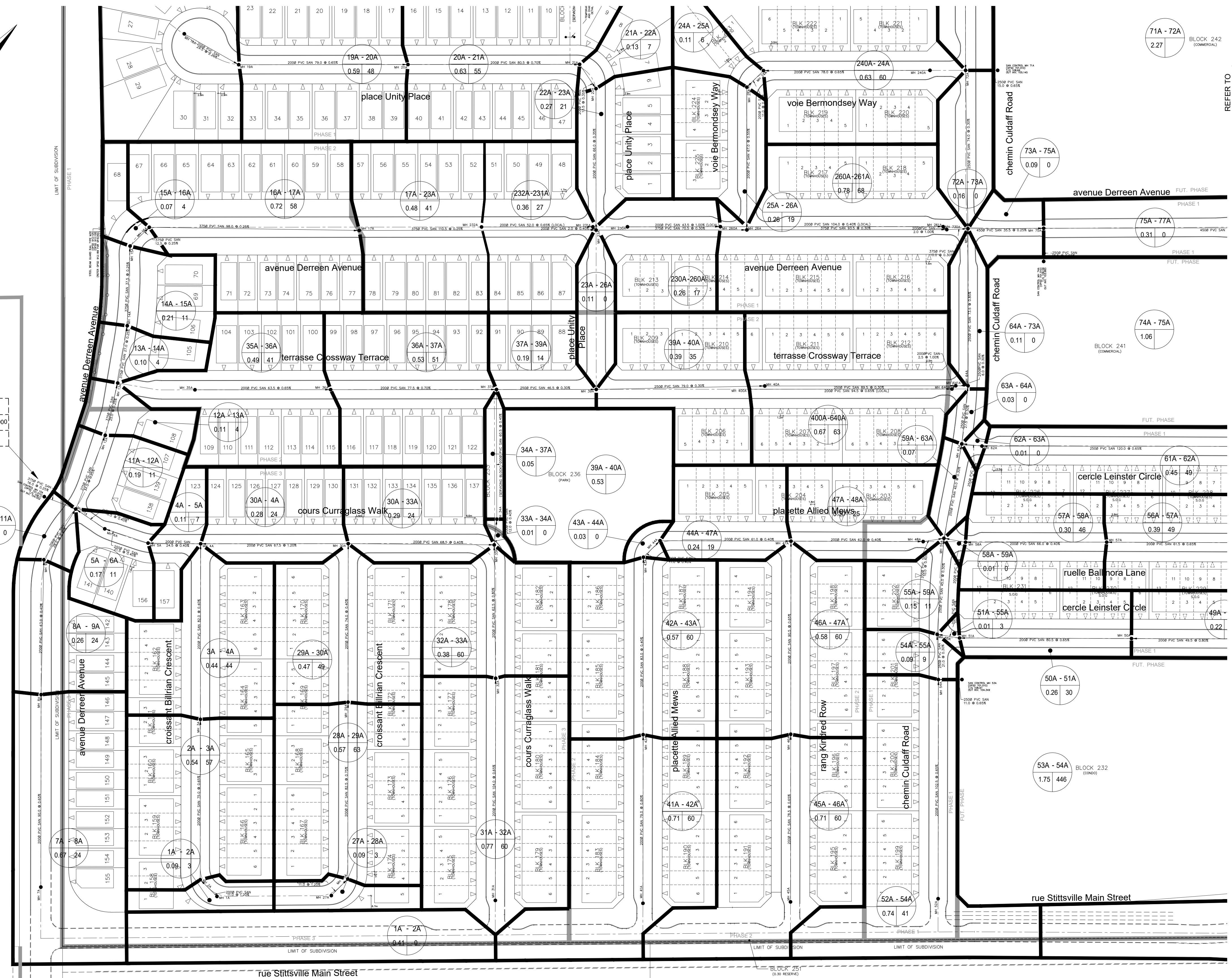
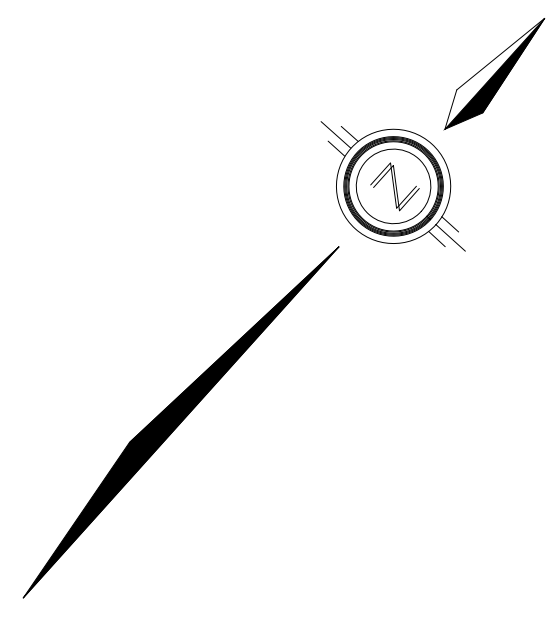
195 HUNTMAR DRIVE

**DSEL**  
david schaeffer engineering ltd

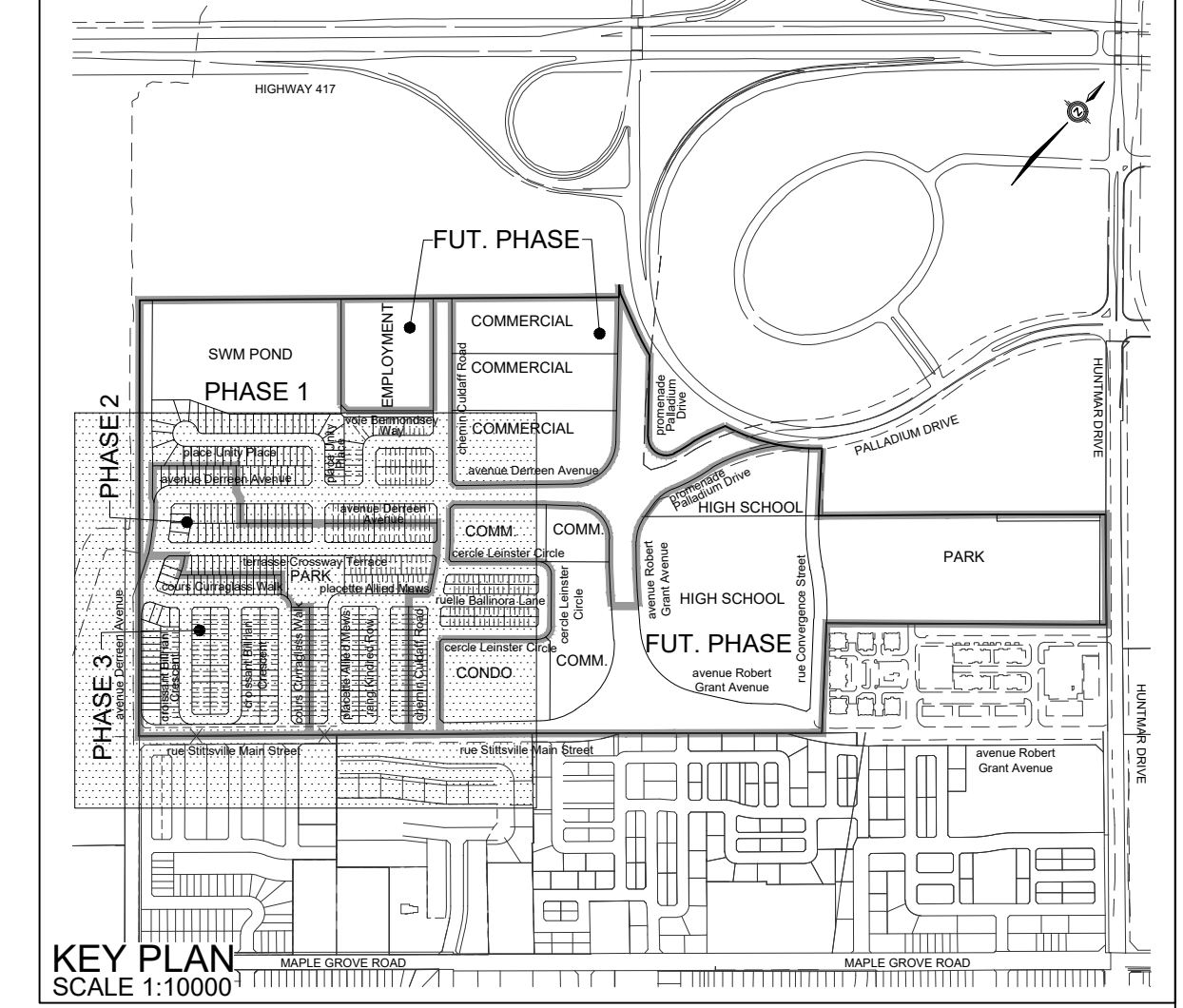
120 Iber Road, Unit 103  
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Tel: (613) 836-0856  
Fax: (613) 836-7153  
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DRAWN BY: R.A./A.K.	CHECKED BY: W.L.	SHEET NO.
DESIGNED BY: W.L.	CHECKED BY: C.M.	88
SCALE: 1:1000	DATE: DECEMBER 2019	

CITY PLAN No. 18059  
CITY FILE No. D07-16-16-0011



A=73.25Ha  
POP=4900  
RESIDENTIAL



**LEGEND**

- SANITARY DRAINAGE BOUNDARY
- SANITARY SUB-DRAINAGE BOUNDARY
- SANITARY DRAINAGE BOUNDARY (OTHER PHASES)

UPSTREAM MH TO DOWNSTREAM MH → 43A - 44A  
 AREA IN HECTARES → 0.78 61  
 POPULATION →

UPSTREAM MH TO DOWNSTREAM MH → 43A - 44A  
 AREA IN OTHER PHASES IN HECTARES → 0.78 61  
 POPULATION →

EXTERNAL AREA IN HECTARES → A=53.63  
 EXTERNAL POPULATION → POP=5739  
 DENSITY (PERSONS/HECTARE) → 107  
 EXTERNAL LAND USE → RESIDENTIAL

MAINTENANCE HOLE → MH202A

CAP →

**TOPOGRAPHIC INFORMATION**  
 CITY OF OTTAWA 1K MAPPINGS, RECEIVED ON OCTOBER 4, 2016. FEEDMILL CREEK TOPOGRAPHIC SURVEY (JULY 26, 2019) AND PALLADIUM DRIVE TOPOGRAPHIC SURVEY (JUNE 23, 2020) PROVIDED BY STANTEC (PROJECT No. 161613545-11)  
**LEGAL INFORMATION**  
 M-PLAN PROVIDED BY STANTEC GEOMATICS LTD., PROJECT No. 16-16-135-45 (195 HUNTMAR ROAD), RECEIVED ON OCTOBER 16, 2020.  
 4th SUBMISSION 20-11-09

**ELEVATION NOTE**  
 ELEVATIONS SHOWN HEREON ARE GEODETIC (CGVD-1928:1978) AND ARE DERIVED FROM THE CAN-NET VRS NETWORK MONUMENT: OTTAWA

ELEVATION = 95.205m

No.	BY	DATE	DESCRIPTION
4	W.L.	20-11-09	4th SUBMISSION
3	W.L.	20-07-09	3rd SUBMISSION
2	W.L.	20-04-03	2nd SUBMISSION
1	W.L.	19-12-23	1st SUBMISSION

**Ottawa CITY OF OTTAWA**

PROJECT No. 12-624

W. LIU  
100167932  
20-11-09  
PROVINCE OF ONTARIO

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**SANITARY DRAINAGE PLAN**

2325483  
ONTARIO LTD.

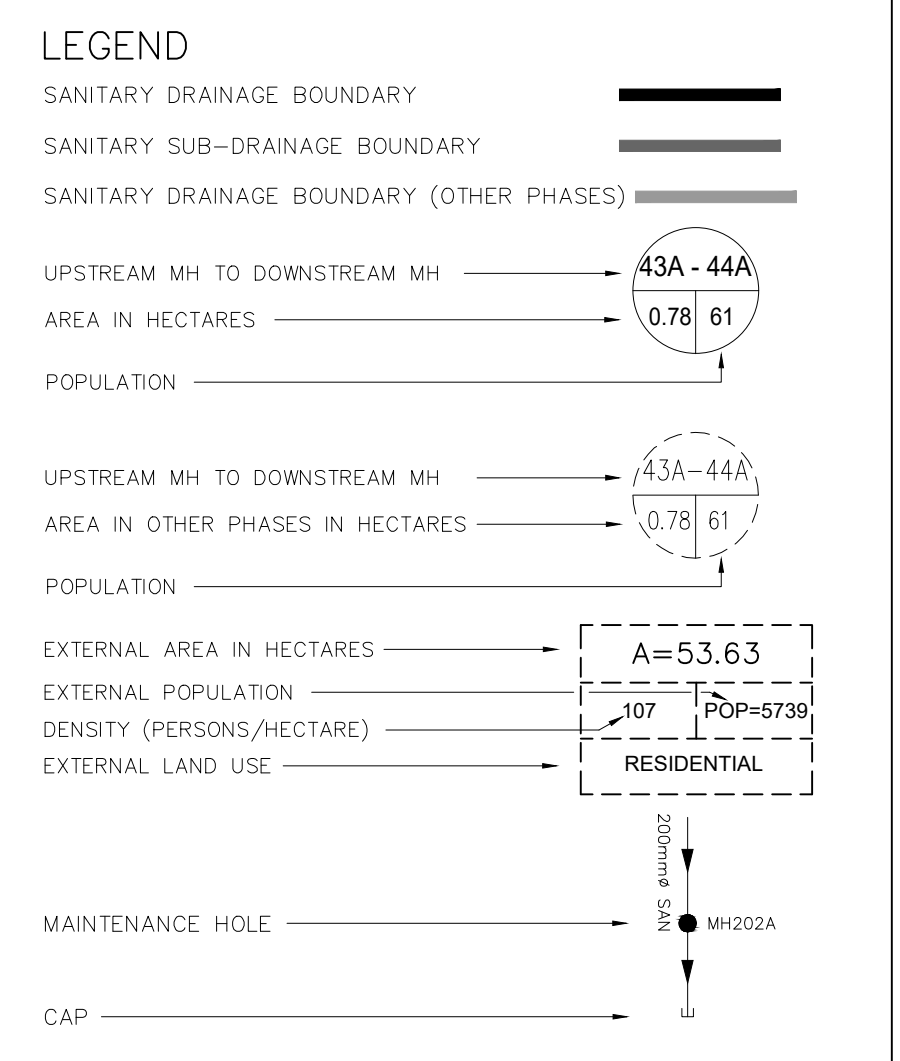
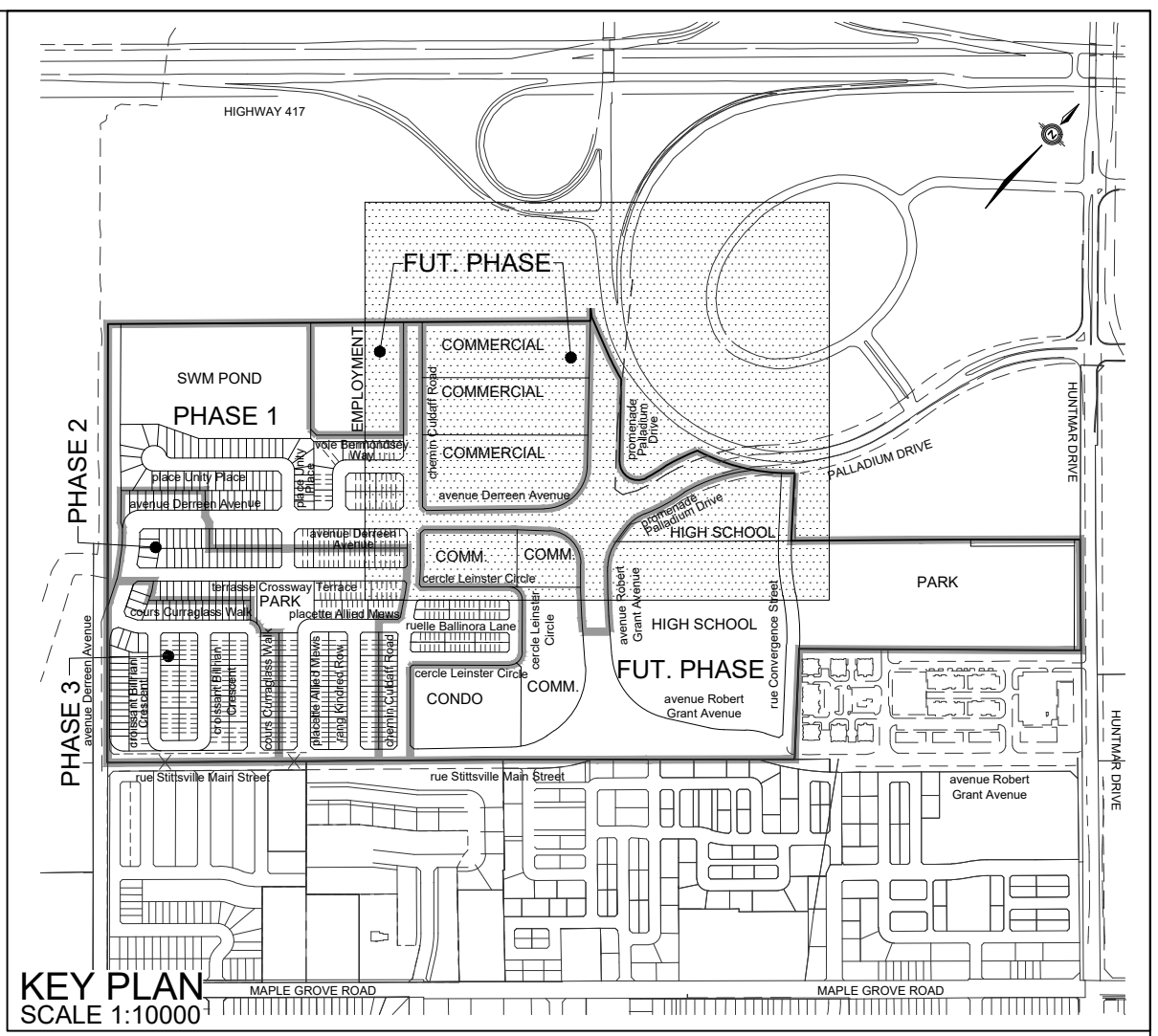
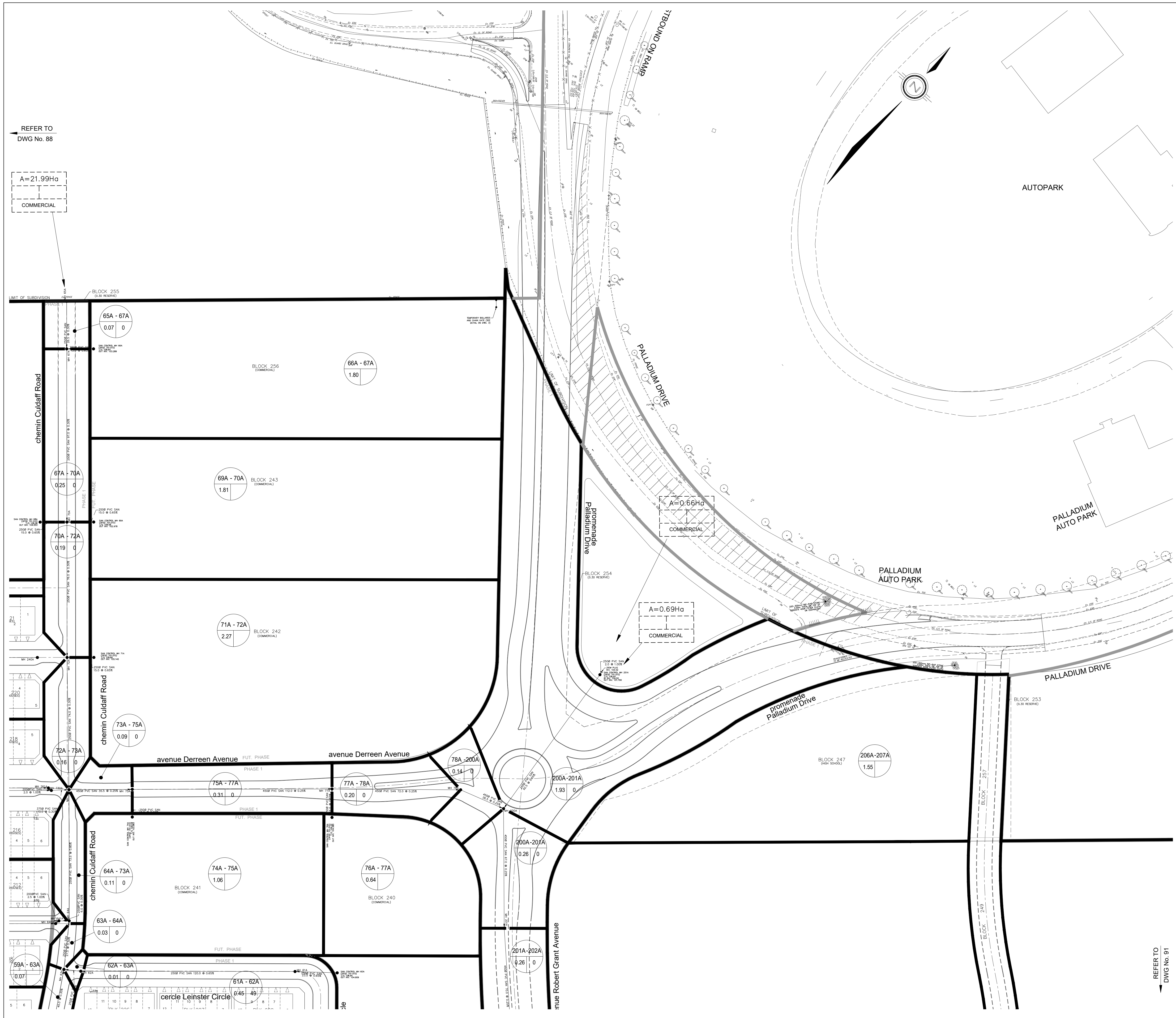
195 HUNTMAR DRIVE

**DSEL**  
david schaeffer engineering ltd

120 Iber Road, Unit 103  
Stittsville, ON K2S 1E9  
Tel: (613) 836-0856  
Fax: (613) 836-7183  
www.DSEL.ca

DRAWN BY: R.A./A.K.	CHECKED BY: W.L.	SHEET No.
DESIGNED BY: W.L.	CHECKED BY: C.M.	89
SCALE: 1:1000	DATE: DECEMBER 2019	

CITY PLAN No. 18059  
 CITY FILE No. D07-16-16-0011



**TOPOGRAPHIC INFORMATION**  
CITY OF OTTAWA 1:K MAPPINGS, RECEIVED ON OCTOBER 4, 2016, FEEDMILL CREEK TOPOGRAPHIC SURVEY (JULY 26, 2019) AND PALLADIUM DRIVE TOPOGRAPHIC SURVEY (JUNE 23, 2020) PROVIDED BY STANTEC (PROJECT No. 161613545-111)

**LEGAL INFORMATION**  
M-PLAN PROVIDED BY STANTEC GEOMATICS LTD., PROJECT No. 16-16-135-45 (195 HUNTMAR ROAD), RECEIVED ON OCTOBER 16, 2020, 4th SUBMISSION 20-11-09

**ELEVATION NOTE**  
ELEVATIONS SHOWN HEREON ARE GEODETIC (CGVD-1928:1978) AND ARE DERIVED FROM THE CAN-NET VRS NETWORK MONUMENT: OTTAWA

ELEVATION = 95.205m

No.	BY	DATE	DESCRIPTION
4	W.L.	20-11-09	4th SUBMISSION
3	W.L.	20-07-09	3rd SUBMISSION
2	W.L.	20-04-03	2nd SUBMISSION
1	W.L.	19-12-23	1st SUBMISSION



PROJECT No. 12-624

W. LIU  
100167932  
20-11-09  
PROVINCE OF ONTARIO  
LICENSED PROFESSIONAL ENGINEER

**SANITARY DRAINAGE PLAN**

2325483  
ONTARIO LTD.

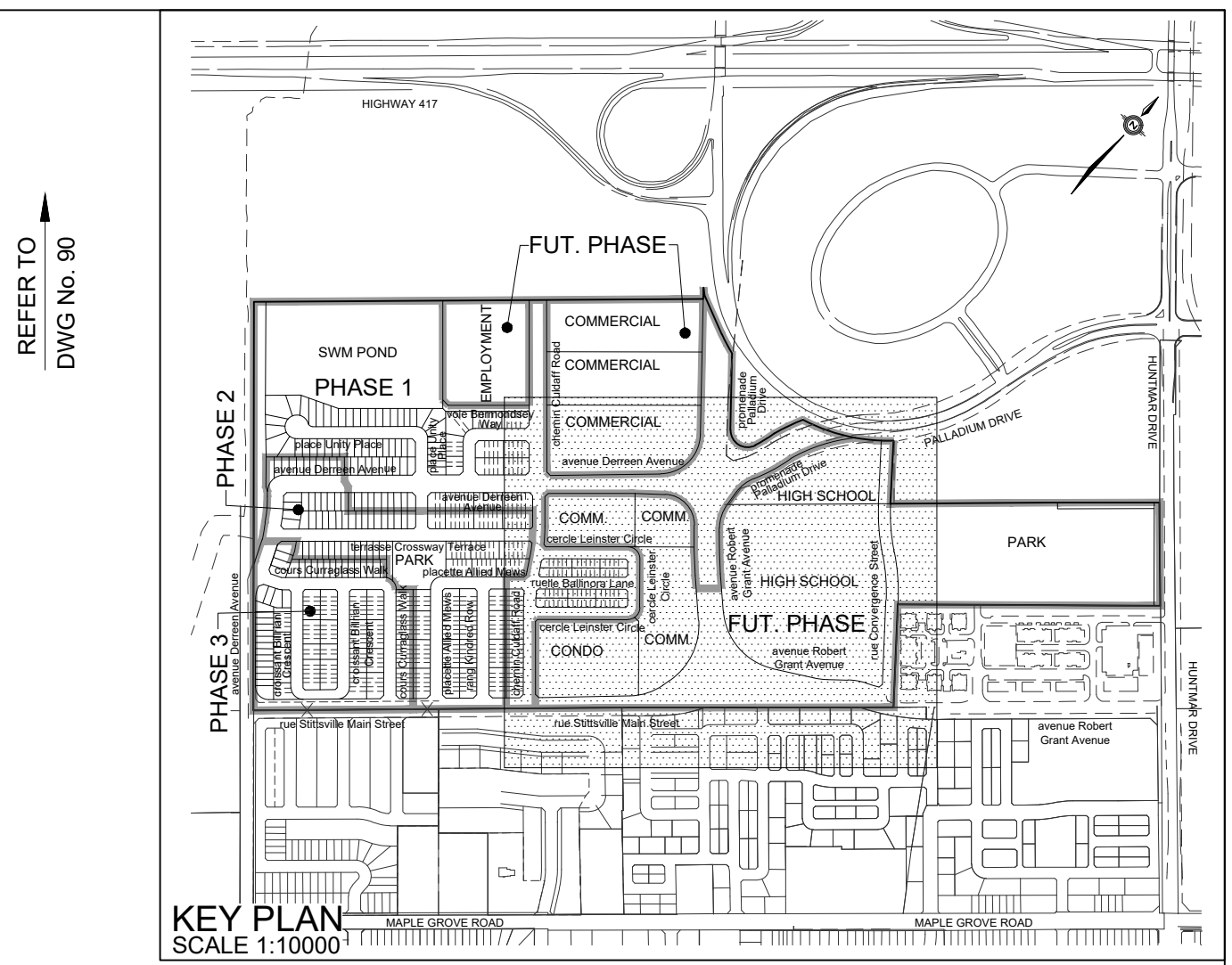
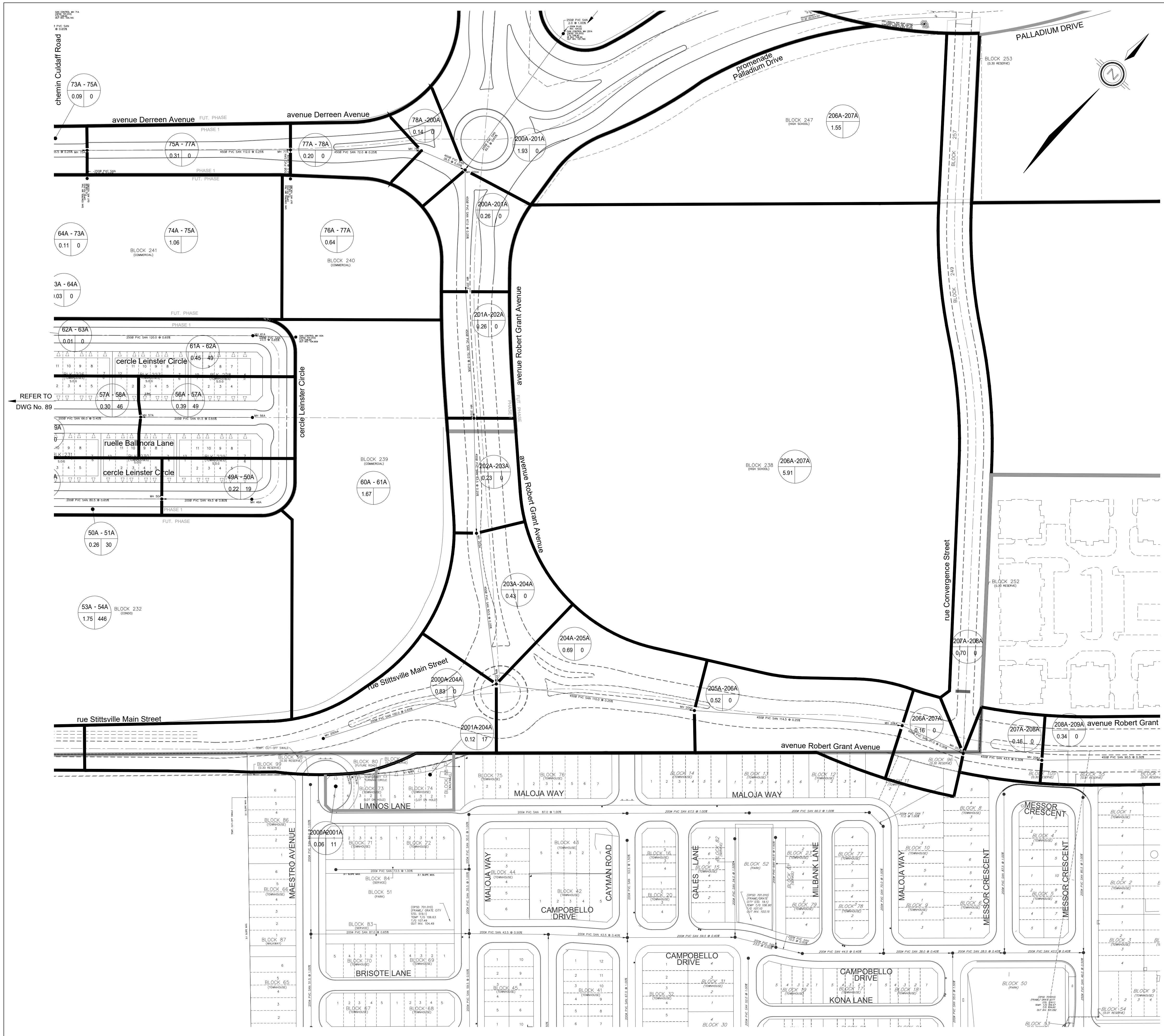
195 HUNTMAR DRIVE

**DSEL**  
david schaeffer engineering ltd

120 Iber Road, Unit 103  
Siltville, ON K2S 1E9  
Tel: (613) 836-0866  
Fax: (613) 836-7183  
www.DSEL.ca

DRAWN BY: R.A./A.K.	CHECKED BY: W.L.	SHEET NO.
DESIGNED BY: W.L.	CHECKED BY: C.M.	90
SCALE: 1:1000	DATE: DECEMBER 2019	

CITY PLAN No. 18059  
CITY FILE No. D07-16-16-0011



**LEGEND**

- SANITARY DRAINAGE BOUNDARY
- SANITARY SUB-DRAINAGE BOUNDARY
- SANITARY DRAINAGE BOUNDARY (OTHER PHASES)
- UPSTREAM MH TO DOWNSTREAM MH
- AREA IN HECTARES
- POPULATION
- UPSTREAM MH TO DOWNSTREAM MH
- AREA IN OTHER PHASES IN HECTARES
- POPULATION
- EXTERNAL AREA IN HECTARES
- EXTERNAL POPULATION
- DENSITY (PERSONS/HECTARE)
- EXTERNAL LAND USE
- MAINTENANCE HOLE
- CAP

**TOPOGRAPHIC INFORMATION**  
 CITY OF OTTAWA 1K MAPPINGS, RECEIVED ON OCTOBER 4, 2016. FEEDMILL CREEK TOPOGRAPHIC SURVEY (JULY 26, 2019) AND PALLADIUM DRIVE TOPOGRAPHIC SURVEY (JUNE 23, 2020) PROVIDED BY STANTEC (PROJECT No. 161613545-111)  
**LEGAL INFORMATION**  
 M-PLAN PROVIDED BY STANTEC GEOMATICS LTD., PROJECT No. 16-16-135-45 (195 HUNTMAR ROAD), RECEIVED ON OCTOBER 16, 2020.  
 4th SUBMISSION 20-11-09

**ELEVATION NOTE**  
 ELEVATIONS SHOWN HEREON ARE GEODETIC (CGVD-1928:1978) AND ARE DERIVED FROM THE CAN-NET VRS NETWORK MONUMENT: OTTAWA

ELEVATION = 95.205m

No.	BY	DATE	DESCRIPTION
4	W.L.	20-11-09	4th SUBMISSION
3	W.L.	20-07-09	3rd SUBMISSION
2	W.L.	20-04-03	2nd SUBMISSION
1	W.L.	19-12-23	1st SUBMISSION

**Ottawa CITY OF OTTAWA**

PROJECT No. 12-624

**SANITARY DRAINAGE PLAN**

2325483  
ONTARIO LTD.

195 HUNTMAR DRIVE

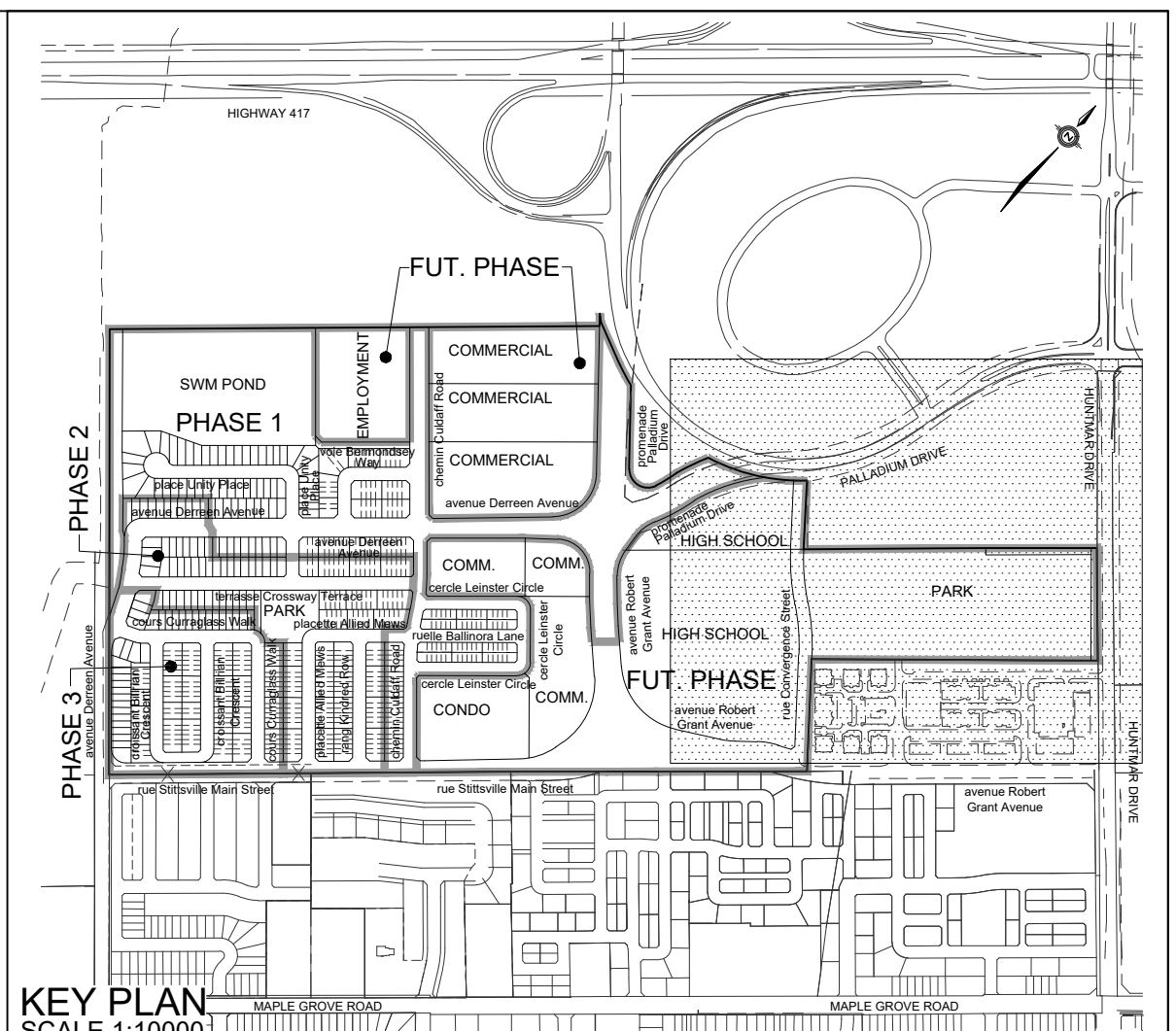
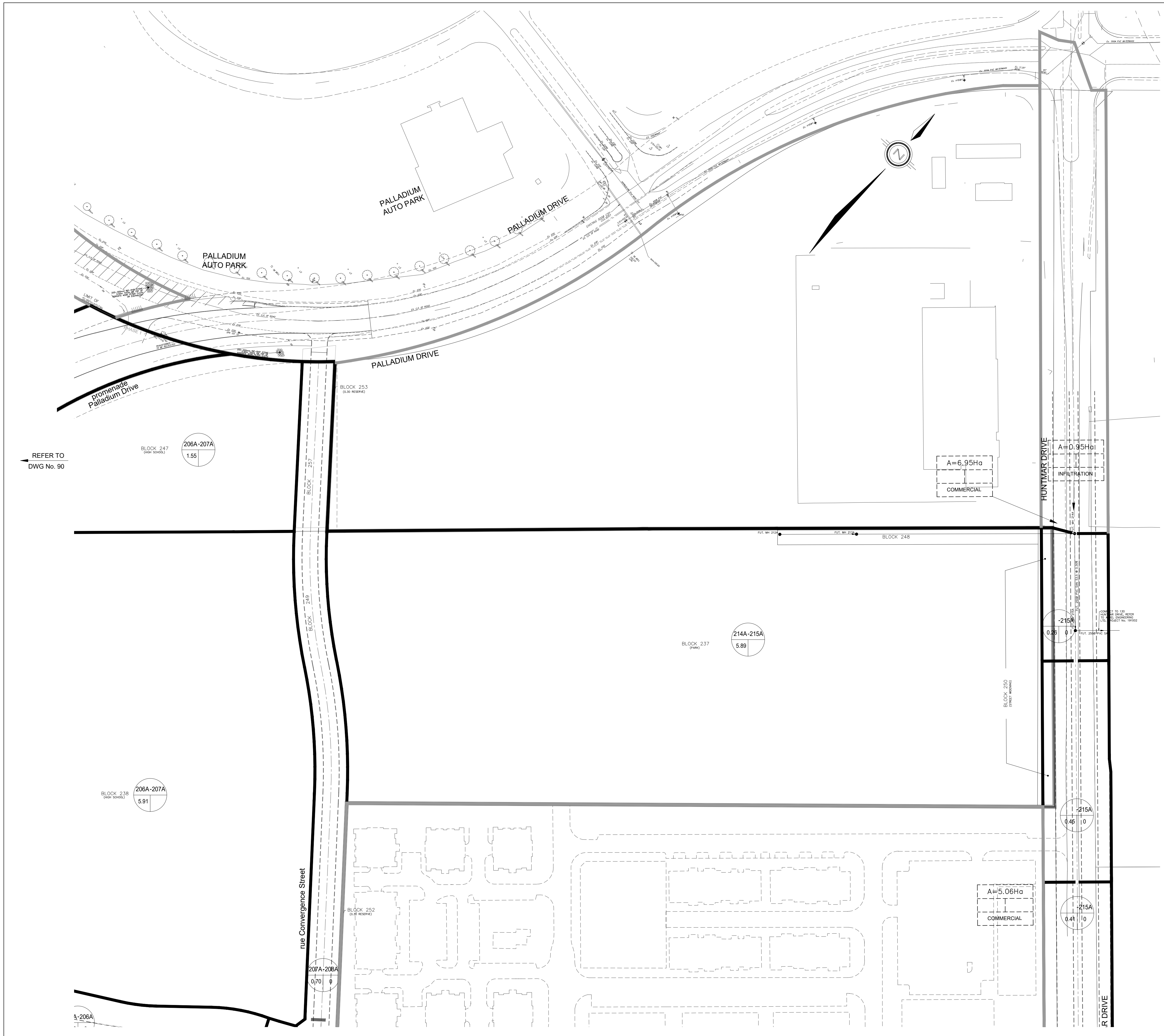
**DSEL**  
david schaeffer engineering ltd

120 Iber Road, Unit 103  
Stittsville, ON K2S 1E9  
Tel: (613) 836-0856  
Fax: (613) 836-7153  
www.DSEL.ca

DRAWN BY: R.A./A.K. CHECKED BY: W.L. SHEET No. 91  
 DESIGNED BY: W.L. DATE: DECEMBER 2019

CITY PLAN No. 18059  
 CITY FILE No. D07-16-16-0011





**LEGEND**

- SANITARY DRAINAGE BOUNDARY
- SANITARY SUB-DRAINAGE BOUNDARY
- SANITARY DRAINAGE BOUNDARY (OTHER PHASES)
- UPSTREAM MH TO DOWNSTREAM MH (43A - 44A)
- AREA IN HECTARES (0.78 61)
- POPULATION
- UPSTREAM MH TO DOWNSTREAM MH (43A - 44A)
- AREA IN OTHER PHASES IN HECTARES (0.78 61)
- POPULATION
- EXTERNAL AREA IN HECTARES (A=53.63)
- EXTERNAL POPULATION (107 POP=5739)
- DENSITY (PERSONS/HECTARE)
- EXTERNAL LAND USE (RESIDENTIAL)
- MAINTENANCE HOLE (MH202A)
- CAP

**TOPOGRAPHIC INFORMATION**  
 CITY OF OTTAWA 1K MAPPINGS, RECEIVED ON OCTOBER 4, 2016, FEEDMILL CREEK TOPOGRAPHIC SURVEY (JULY 26, 2019) AND PALLADIUM DRIVE TOPOGRAPHIC SURVEY (JUNE 23, 2020) PROVIDED BY STANTEC (PROJECT No. 161613545-111)  
**LEGAL INFORMATION**  
 M-PLAN PROVIDED BY STANTEC GEOMATICS LTD., PROJECT No. 16-16-135-45 (195 HUNTMAR ROAD), RECEIVED ON OCTOBER 16, 2020.  
 4th SUBMISSION 20-11-09

**ELEVATION NOTE**  
 ELEVATIONS SHOWN HEREON ARE GEODETIC (CGVD-1928:1978) AND ARE DERIVED FROM THE CAN-NET VRS NETWORK MONUMENT: OTTAWA

ELEVATION = 96.205m

No.	BY	DATE	DESCRIPTION
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3	W.L.	20-07-09	3rd SUBMISSION
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1	W.L.	19-12-23	1st SUBMISSION

**Ottawa CITY OF OTTAWA**

PROJECT No. 12-624

**SANITARY DRAINAGE PLAN**

2325483 ONTARIO LTD. 195 HUNTMAR DRIVE

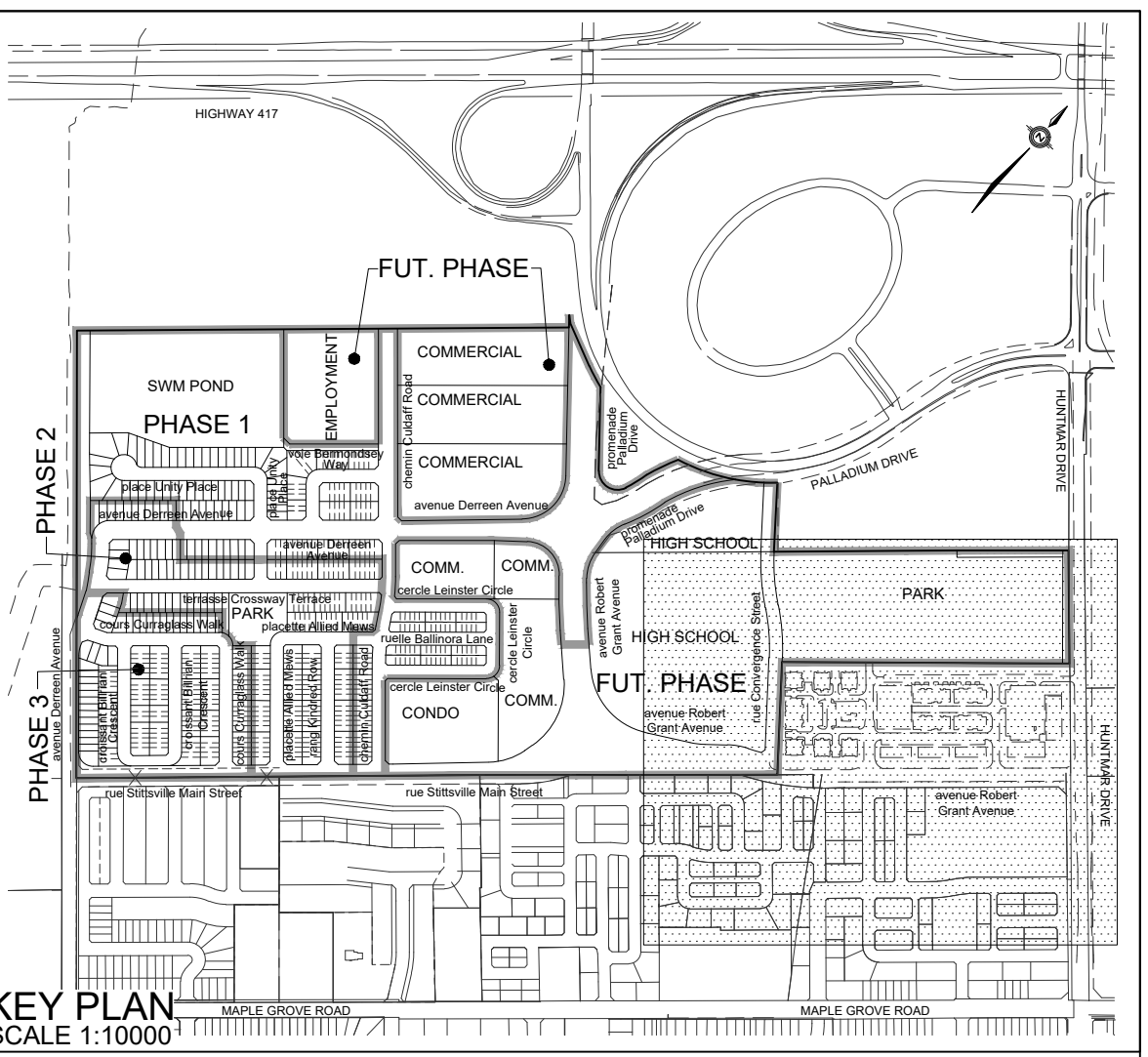
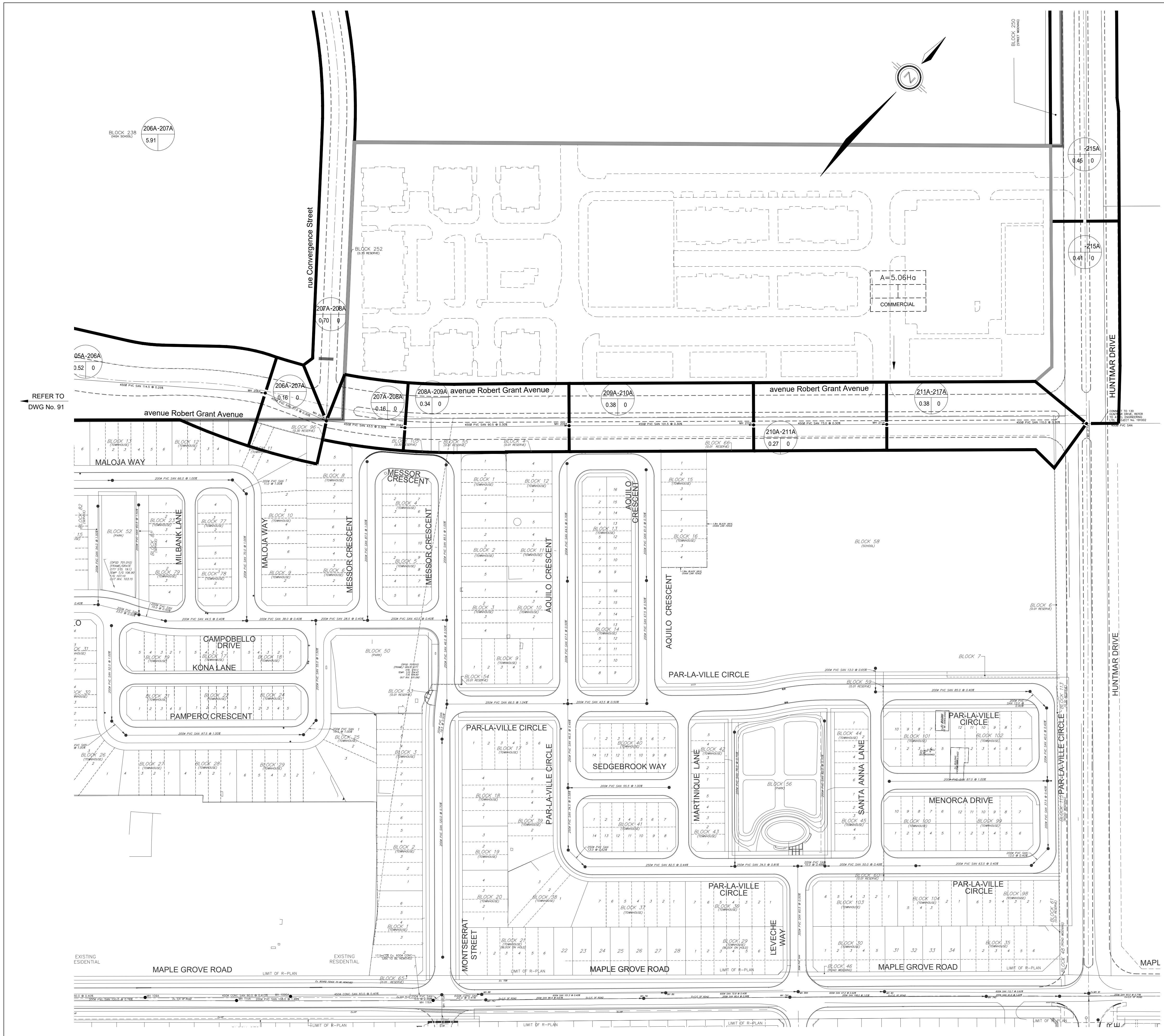
**DSEL** david schaeffer engineering ltd

120 Iber Road, Unit 103  
 Stittsville, ON K2S 1E9  
 Tel: (613) 836-0866  
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 www.DSEL.ca

DRAWN BY: R.A./A.K.	CHECKED BY: W.L.	SHEET NO.
DESIGNED BY: W.L.	CHECKED BY: C.M.	92
SCALE: 1:1000	DATE: DECEMBER 2019	

REFER TO DWG No. 90

REFER TO DWG No. 93



LEGEND

SANITARY DRAINAGE BOUNDARY

SANITARY SUB-DRAINAGE BOUNDARY

SANITARY DRAINAGE BOUNDARY (OTHER PHASES)

UPSTREAM MH TO DOWNSTREAM MH

AREA IN HECTARES

POPULATION

UPSTREAM MH TO DOWNSTREAM MH

AREA IN OTHER PHASES IN HECTARES

POPULATION

EXTERNAL AREA IN HECTARES

EXTERNAL POPULATION

DENSITY (PERSONS/HECTARE)

EXTERNAL LAND USE

MAINTENANCE HOLE

CAP

TOPOGRAPHIC INFORMATION  
CITY OF OTTAWA 1/K MAPS, RECEIVED ON OCTOBER 4, 2016. FEEDMILL CREEK TOPOGRAPHIC SURVEY (JULY 26, 2019) AND PALLADIUM DRIVE TOPOGRAPHIC SURVEY (JUNE 23, 2020) PROVIDED BY STANTEC (PROJECT No. 161613545-11)

LEGAL INFORMATION  
M-PLAN PROVIDED BY STANTEC GEOMATICS LTD., PROJECT No. 16-16-135-45 (195 HUNTMAR ROAD), RECEIVED ON OCTOBER 16, 2020. 4th SUBMISSION 20-11-09

ELEVATION NOTE

ELEVATIONS SHOWN HEREON ARE GEODETIC (CGVD-1928:1978) AND ARE DERIVED FROM THE CAN-NET VRS NETWORK MONUMENT: OTTAWA

ELEVATION = 95.205m

No.	BY	DATE	DESCRIPTION
4	W.L.	20-11-09	4th SUBMISSION
3	W.L.	20-07-09	3rd SUBMISSION
2	W.L.	20-04-03	2nd SUBMISSION
1	W.L.	19-12-23	1st SUBMISSION



PROJECT No. 12-624

© DSEL

## SANITARY DRAINAGE PLAN

2325483  
ONTARIO LTD.

195 HUNTMAR DRIVE

**DSEL**  
david schaeffer engineering ltd

120 River Road, Unit 103  
Stittsville, ON K2S 1E9  
Tel: (613) 836-0886  
Fax: (613) 836-7183  
www.DSEL.ca

DRAWN BY: R.A./A.K.	CHECKED BY: W.L.	SHEET No.
DESIGNED BY: W.L.	CHECKED BY: C.M.	93
SCALE: 1:1000	DATE: DECEMBER 2019	

REFER TO  
DWG No. 91

BLOCK 238  
HIGH SCHOOL  
206A-207A  
5.91

REFER TO  
DWG No. 92



**SANITARY SEWER CALCULATION SHEET**

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION						COMM		INSTIT		PARK		C+H		INFILTRATION			PIPE								
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE		PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL.		
								AREA (ha)	POP.																	(FULL) (m/s)	(ACT.) (m/s)	
<b>Block 240 (Commercial)</b>																												
	76A	77A						0.00				0.64	0.64		0.00	0.00	0.31	0.64	0.64	0.21	0.52	16.0	250	0.65	47.94	0.01	0.98	0.31
To avenue Derreen Avenue, Pipe 77A - 78A								0.00	0			0.64	0.64		0.00	0.00		0.64										
<b>Block 241 (Commercial)</b>																												
	74A	75A						0.00				1.06	1.06		0.00	0.00	0.52	1.06	1.06	0.35	0.87	15.5	250	0.65	47.94	0.02	0.98	0.37
To avenue Derreen Avenue, Pipe 75A - 77A								0.00	0			1.06	1.06		0.00	0.00		1.06										
<b>Block 244 (Employment)</b>																												
	68A	70A						0.00				1.99	1.99		0.00	0.00	0.97	1.99	1.99	0.66	1.62	15.0	250	0.65	47.94	0.03	0.98	0.45
To chemin Cudaff Road, Pipe 70A - 72A								0.00	0			1.99	1.99		0.00	0.00		1.99										
<b>Block 243 (Commercial)</b>																												
	69A	70A						0.00				1.81	1.81		0.00	0.00	0.88	1.81	1.81	0.60	1.48	15.0	250	0.65	47.94	0.03	0.98	0.44
To chemin Cudaff Road, Pipe 70A - 72A								0.00	0			1.81	1.81		0.00	0.00		1.81										
<b>Block 256 (Commercial)</b>																												
	66A	67A						0.00				1.80	1.80		0.00	0.00	0.88	1.80	1.80	0.59	1.47	15.0	250	0.65	47.94	0.03	0.98	0.44
To chemin Cudaff Road, Pipe 67A - 70A								0.00	0			1.80	1.80		0.00	0.00		1.80										
<b>Block 233 (Servicing Block)</b>																												
Contribution From cours Curraglass Walk, Pipe 30A - 33A								1.42	139			0.00	0.00		0.00			1.42	1.42									
Contribution From cours Curraglass Walk, Pipe 32A - 33A								1.15	120			0.00	0.00		0.00			1.15	1.15									
	33A	34A	0.01				0	2.58	259	3.48	2.92	0.00	0.00		0.00	0.00	0.01	2.58	0.85	3.78	12.0	200	0.40	20.74	0.18	0.66	0.50	
	34A	37A	0.05				0	2.63	259	3.48	2.92	0.00	0.00		0.00	0.00	0.05	2.63	0.87	3.79	60.5	200	0.45	22.00	0.17	0.70	0.52	
To terrasse Crossway Terrace, Pipe 37A - 39A								2.63	259			0.00	0.00		0.00			2.63										
<b>terrasse Crossway Terrace</b>																												
	35A	36A	0.49	12	12		41	0.49	41	3.67	0.49	0.00	0.00		0.00	0.00	0.49	0.49	0.16	0.65	63.5	200	0.65	26.44	0.02	0.84	0.35	
	36A	37A	0.53	15	15		51	1.02	92	3.60	1.07	0.00	0.00		0.00	0.00	0.53	1.02	0.34	1.41	77.5	200	0.70	27.44	0.05	0.87	0.45	
Contribution From Block 223, Pipe 34A - 37A								2.63	259			0.00	0.00		0.00		2.63	2.63										
	37A	39A	0.19	4	4		14	3.84	365	3.43	4.06	0.00	0.00		0.00	0.00	0.19	3.84	1.27	5.33	46.5	250	0.30	32.57	0.16	0.66	0.49	
Contribution From Block 236 (Park)								0.00	0			0.00	0.00		0.53		0.53	0.53	0.17	0.17								
	400A	640A	0.67	23		23	63	0.67	63	3.63	0.74	0.00	0.00		0.00	0.00	0.67	0.67	0.22	0.96	94.5	200	0.65	26.44	0.04	0.84	0.40	
	640A	641A						0.67	63	3.63	0.74	0.00	0.00		0.00	0.00	0.67	0.22	0.96	2.5	200	1.00	32.80	0.03	1.04	0.46		
	39A	40A	0.39	13		13	35	4.23	400	3.42	4.43	0.00	0.00		0.53	0.09	0.39	4.76	1.57	6.09	79.0	250	0.30	32.57	0.19	0.66	0.51	
	40A	641A						4.23	400	3.42	4.43	0.00	0.00		0.53	0.00	0.00	4.76	1.57	6.00	89.5	250	0.30	32.57	0.18	0.66	0.51	
	641A	64A						4.90	463	3.39	5.09	0.00	0.00		0.53	0.00	0.00	5.43	1.79	6.88	6.0	250	0.30	32.57	0.21	0.66	0.52	
To chemin Cudaff Road, Pipe 64A - 73A								4.90	463			0.00	0.00		0.53			5.43										
<b>rang Kindred Row</b>																												
	45A	46A	0.71	22		22	60	0.71	60	3.64	0.71	0.00	0.00		0.00	0.00	0.71	0.71	0.23	0.94	78.5	200	0.65	26.44	0.04	0.84	0.39	
	46A	47A	0.58	22		22	60	1.29	120	3.58	1.39	0.00	0.00		0.00	0.00	0.58	1.29	0.43	1.82	90.5	200	0.65	26.44	0.07	0.84	0.48	
To placette Allied Mews, Pipe 47A - 48A								1.29	120			0.00	0.00		0.00			1.29										
<b>ruelle Ballinora Lane</b>																												
	56A	57A	0.39	18		18	49	0.39	49	3.65	0.58	0.00	0.00		0.00	0.00	0.39	0.39	0.13	0.71	61.5	200	0.65	26.44	0.03	0.84	0.36	
	57A	58A	0.30			17	46	0.69	95	3.60	1.11	0.00	0.00		0.00	0.00	0.30	0.69	0.23	1.34	66.0	200	0.40	20.74	0.06	0.66	0.37	
	58A	59A	0.01					0.70	95	3.60	1.11	0.00	0.00		0.00	0.00	0.01	0.70	0.23	1.34	10.5	200	0.40	20.74	0.06	0.66	0.37	
To chemin Cudaff Road, Pipe 59A - 63A								0.70	95			0.00	0.00		0.00			0.70										

DESIGN PARAMETERS						Designed:			PROJECT:				
Park Flow =	9300	L/ha/da	0.10764	I/s/ha		R.A.			<b>195 Huntmar Drive</b>				
Average Daily Flow =	280	l/p/day			Industrial Peak Factor = as per MOE Graph	Checked:			<b>City of Ottawa</b>				
Comm/Inst Flow =	28000	L/ha/da	0.3241	I/s/ha	Extraneous Flow = 0.330 L/s/ha	W.L.							
Industrial Flow =	35000	L/ha/da	0.40509	I/s/ha	Minimum Velocity = 0.600 m/s								
Max Res. Peak Factor =	4.00				Manning's n = (Conc) 0.013 (Pvc) 0.013								
Commercial/Inst./Park Peak Factor =	1.50				Townhouse coeff= 2.7	Dwg. Reference:							
Institutional =	0.32	I/s/ha			Single house coeff= 3.4	Sanitary Drainage Plan, Dwgs. No. 87-93	File Ref:	12-624	Date:	November 2020	Sheet No.	1	
											of	5	



# SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION						COMM		INSTIT		PARK		C+H		INFILTRATION			PIPE																
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE		PEAK FLOW (l/s)	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL.										
								AREA (ha)	POP.																	(FULL) (m/s)	(ACT.) (m/s)									
<b>placette Allied Mews</b>																																				
	41A	42A	0.71	22		22	60	0.71	60	3.64	0.71																									
	42A	43A	0.57	22		22	60	1.28	120	3.58	1.39																									
	43A	44A	0.03				0	1.31	120	3.58	1.39																									
	44A	47A	0.24	7		7	19	1.55	139	3.56	1.60																									
Contribution From rang Kindred Row, Pipe 46A - 47A								1.29	120																											
	47A	48A	0.30	9		9	25	3.14	284	3.47	3.19																									
	48A	59A						3.14	284	3.47	3.19																									
To chemin Culdaff Road, Pipe 59A - 63A								3.14	284																											
<b>cercle Leinster Circle</b>																																				
	49A	50A	0.22	7		7	19	0.22	19	3.71	0.23																									
	50A	51A	0.26	11		11	30	0.48	49	3.65	0.58																									
	51A	55A	0.01					0.49	49	3.65	0.58																									
To chemin Culdaff Road, Pipe 55A - 59A								0.49	49																											
	60A	61A						0.00				1.67	1.67																							
	61A	62A	0.45	18		18	49	0.45	49	3.65	0.58																									
	62A	63A	0.01				0	0.46	49	3.65	0.58																									
To chemin Culdaff Road, Pipe 63A - 64A								0.46	49																											
<b>Block 232 (Condo)</b>																																				
	53A	54A	1.75				446	1.75	446	3.40	4.91																									
To chemin Culdaff Road, Pipe 54A - 55A								1.75	446																											
<b>chemin Culdaff Road</b>																																				
	65A	67A	0.07				0	0.07	0			21.99	21.99																							
Contribution From Block 256, Pipe 66A - 67A								0.00	0																											
	67A	70A	0.25				0	0.32	0			23.79																								
Contribution From Block 244, Pipe 68A - 70A								0.00	0																											
Contribution From Block 243, Pipe 69A - 70A								0.00	0																											
	70A	72A	0.12				0	0.44	0			27.59																								
	70A	72A	0.19				0	0.63	0			27.59																								
Contribution From Block 242, Pipe 71A - 72A								0.00	0																											
	72A	73A	0.16				0	0.79	0			29.86																								
To avenue Derreen Avenue, Pipe 73A - 75A								0.79	0																											
<b>chemin Culdaff Road</b>																																				
	52A	54A	0.74	15		15	41	0.74	41	3.67	0.49																									
Contribution From Block 232, Pipe 53A - 54A								1.75	446																											
	54A	55A	0.09	3		3	9	2.58	496	3.38	5.43																									
Contribution From cercle Leinster Circle, Pipe 51A - 55A								0.49	49																											
	55A	59A	0.15	4		4	11	3.22	556	3.36	6.05																									
Contribution From placette Allied Mews, Pipe 48A - 59A								3.14	284																											
Contribution From ruelle Ballinora Lane, Pipe 58A - 59A								0.70	95																											
	59A	63A	0.07				0	7.13	935	3.25	9.86																									
Contribution From cercle Leinster Circle, Pipe 62A - 63A								0.46	49																											
	63A	64A	0.03				0	7.62	984	3.24	10.34																									

DESIGN PARAMETERS										Designed:		PROJECT:							
Park Flow =	9300	L/ha/da	0.10764							R.A.		195 Huntmar Drive							
Average Daily Flow =	280	l/p/day									Checked:		City of Ottawa						
Comm/Inst Flow =	28000	L/ha/da	0.3241							W.L.		LOCATION:							
Industrial Flow =	35000	L/ha/da	0.40509							Dwg. Reference:		File Ref:		Date:		Sheet No.			
Max Res. Peak Factor =	4.00									Sanitary Drainage Plan, Dwgs. No. 87-93		12-624		November 2020		2			
Commercial/Inst./Park Peak Factor =	1.50									Manning's n =						of			
Institutional =	0.32	L/ha									(Conc)						5		
										Townhouse coeff=									
										Single house coeff=									





**SANITARY SEWER CALCULATION SHEET**

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION						COMM		INSTIT		PARK		C+H		INFILTRATION			PIPE									
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE		PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL.				
								AREA (ha)	POP.																(FULL) (m/s)	(ACT.) (m/s)			
	30A	4A	0.28	7	7		24	0.28	24	3.70	0.29		0.00	0.00	0.00	0.00	0.00	0.28	0.28	0.09	0.38	67.5	200	1.20	35.93	0.01	1.14	0.37	
Contribution From croissant Billrian Crescent, Pipe 3A - 4A								1.48	104			0.00	0.00	0.00	1.48	1.48													
	4A	5A	0.11	2	2		7	1.87	135	3.56	1.56		0.00	0.00	0.00	0.00	0.00	0.11	1.87	0.62	2.18	24.5	200	0.40	20.74	0.10	0.66	0.42	
	5A	6A	0.17	3	3		11	2.04	146	3.56	1.68		0.00	0.00	0.00	0.00	0.00	0.17	2.04	0.67	2.36	21.5	200	0.40	20.74	0.11	0.66	0.44	
	6A	11A						2.04	146	3.56	1.68		0.00	0.00	0.00	0.00	0.00	0.00	2.04	0.67	2.36	16.5	200	0.40	20.74	0.11	0.66	0.44	
To avenue Derreen Avenue, Pipe 11A - 12A								2.04	146			0.00	0.00	0.00			2.04												
<b>Future Development</b>												0.66			0.66	0.66													
	251A	200A						0.00				0.69	1.35	0.00	0.00	0.66	0.69	1.35	0.45	1.10	92.5	250	0.65	47.94	0.02	0.98	0.39		
To avenue Robert Grant Avenue, Pipe 200A - 201A								0.00	0			1.35		0.00	0.00		1.35												
<b>avenue Derreen Avenue</b>																													
	7A	8A	0.67	7	7		24	0.67	24	3.70	0.29		0.00	0.00	0.00	0.00	0.67	0.67	0.22	0.51	90.0	200	0.65	26.44	0.02	0.84	0.33		
	8A	9A	0.26	7	7		24	0.93	48	3.65	0.57		0.00	0.00	0.00	0.00	0.26	0.93	0.31	0.88	63.0	200	0.40	20.74	0.04	0.66	0.33		
	9A	11A	0.07					1.00	48	3.65	0.57		0.00	0.00	0.00	0.00	0.07	1.00	0.33	0.90	28.0	200	0.40	20.74	0.04	0.66	0.33		
Contribution From Future Development, Pipe 10A - 11A								73.25	4900			0.00	0.00	0.00	73.25	73.25													
Contribution From cours Curraglass Walk, Pipe 6A - 11A								2.04	146			0.00	0.00	0.00	2.04	2.04													
	11A	12A	0.19	3	3		11	76.48	5105	2.79	46.15		0.00	0.00	0.00	0.00	0.19	76.48	25.24	71.38	37.0	375	0.25	87.67	0.81	0.79	0.88		
	12A	13A	0.11	1	1		4	76.59	5109	2.79	46.18		0.00	0.00	0.00	0.00	0.11	76.59	25.27	71.45	25.0	375	0.25	87.67	0.82	0.79	0.88		
	13A	14A	0.10	1	1		4	76.69	5113	2.79	46.21		0.00	0.00	0.00	0.00	0.10	76.69	25.31	71.52	27.0	375	0.25	87.67	0.82	0.79	0.88		
	14A	15A	0.21	3	3		11	76.90	5124	2.79	46.30		0.00	0.00	0.00	0.00	0.21	76.90	25.38	71.67	37.5	375	0.25	87.67	0.82	0.79	0.88		
	15A	16A	0.07	1	1		4	76.97	5128	2.79	46.33		0.00	0.00	0.00	0.00	0.07	76.97	25.40	71.73	12.5	375	0.25	87.67	0.82	0.79	0.88		
	16A	17A	0.72	17	17		58	77.69	5186	2.78	46.79		0.00	0.00	0.00	0.00	0.72	77.69	25.64	72.43	98.0	375	0.25	87.67	0.83	0.79	0.89		
	17A	23A	0.48	12	12		41	78.17	5227	2.78	47.12		0.00	0.00	0.00	0.00	0.48	78.17	25.80	72.92	110.5	375	0.25	87.67	0.83	0.79	0.89		
Contribution From place Unity Place, Pipe 22A - 23A								2.21	162			0.00	0.00	0.00	2.21	2.21													
	232A	231A	0.36	8	8		27	0.36	27	3.69	0.32		0.00	0.00	0.00	0.00	0.36	0.36	0.12	0.44	52.0	200	0.65	26.44	0.02	0.84	0.32		
	231A	23A						0.36	27	3.69	0.32		0.00	0.00	0.00	0.00	0.36	0.12	0.44	2.0	200	0.40	20.74	0.02	0.66	0.26			
To avenue Derreen Avenue, Pipe 23A - 26A								0.36	27			0.00	0.00	0.00	0.36														
	230A	260A	0.26	6		6	17	0.26	17	3.71	0.20		0.00	0.00	0.00	0.00	0.26	0.26	0.09	0.29	43.5	200	1.00	32.80	0.01	1.04	0.32		
	260A	261A	0.78	25		25	68	1.04	85	3.61	0.99		0.00	0.00	0.00	0.00	0.78	1.04	0.34	1.34	104.0	200	0.40	20.74	0.06	0.66	0.37		
	261A	730A						1.04	85	3.61	0.99		0.00	0.00	0.00	0.00	1.04	0.34	1.34	2.0	200	1.00	32.80	0.04	1.04	0.51			
To avenue Derreen Avenue, Pipe 730A - 73A								1.04	85			0.00	0.00	0.00	1.04														
	23A	26A	0.11				0	80.85	5416	2.77	48.62		0.00	0.00	0.00	0.00	0.11	80.85	26.68	75.30	70.5	375	0.30	96.03	0.78	0.87	0.96		
Contribution From voie Bermondsey Way, Pipe 25A - 26A								1.00	85			0.00	0.00	0.00	1.00	1.00													
	26A	730A						81.85	5501	2.77	49.29		0.00	0.00	0.00	0.00	81.85	27.01	76.30	93.5	375	0.30	96.03	0.79	0.87	0.96			
	730A	73A						82.89	5586	2.76	49.96		0.00	0.00	0.00	0.00	82.89	27.35	77.32	10.0	375	0.30	96.03	0.81	0.87	0.97			
Contribution From chemin Culdaff Road, Pipe 64A - 73A								12.63	1447			1.67	0.00	0.53	14.83	14.83													
Contribution From chemin Culdaff Road, Pipe 72A - 73A								0.79	0			29.86	0.00	0.00	30.65	30.65													
	73A	75A	0.09				0	96.40	7033	2.68	61.17		31.53	0.00	0.53	15.41	0.09	128.46	42.39	118.97	35.5	450	0.25	142.55	0.83	0.90	1.00		
Contribution From Block 241, Pipe 74A - 75A								0.00	0			1.06	0.00	0.00	1.06	129.52													
	75A	77A	0.31				0	96.71	7033	2.68	61.17		32.59	0.00	0.53	15.93	0.31	129.83	42.84	119.94	112.0	450	0.25	142.55	0.84	0.90	1.00		
Contribution From Block 240, Pipe 76A - 77A								0.00	0			0.64	0.00	0.00	0.64	130.47													
	77A	78A	0.20				0	96.91	7033	2.68	61.17		33.23	0.00	0.53	16.24	0.20	130.67	43.12	120.53	72.0	450	0.25	142.55	0.85	0.90	1.01		
	78A	200A	0.14				0	97.05	7033	2.68	61.17		33.23	0.00	0.53	16.24	0.14	130.81	43.17	120.57	26.5	450	0.25	142.55	0.85	0.90	1.01		
To avenue Robert Grant Avenue, Pipe 200A - 201A								97.05	7033			33.23	0.00	0.53		130.81													
<b>avenue Robert Grant Avenue</b>																													
Contribution From Future Development, Pipe 251A - 200A								0.00	0			1.35	0.00	0.00	1.35	1.35													
Contribution From avenue Derreen Avenue, Pipe 78A - 200A								97.05	7033			33.23	0.00	0.53	130.81	130.81													
			0.26				0	97.31	7033			34.58	0.00	0.53	132.42														
	200A	201A	1.93				0	99.24	7033	2.68	61.17		34.58	0.00	0.53	16.90	1.93	134.35	44.34	122.40	67.0	450	0.25	142.55	0.86	0.90	1.01		

DESIGN PARAMETERS										Designed: R.A.					PROJECT: <b>195 Huntmar Drive</b>					
Park Flow =	9300	L/ha/da	0.10764	I/s/ha		Industrial Peak Factor = as per MOE Graph					Checked: W.L.					LOCATION: <b>City of Ottawa</b>				
Average Daily Flow =	280	I/p/day				Extraneous Flow = 0.330 L/s/ha					Dwg. Reference: Sanitary Drainage Plan, Dwgs. No. 87-93					File Ref: 12-624				
Comm/Inst Flow =	28000	L/ha/da	0.3241	I/s/ha		Minimum Velocity = 0.600 m/s					Date: November 2020					Sheet No				

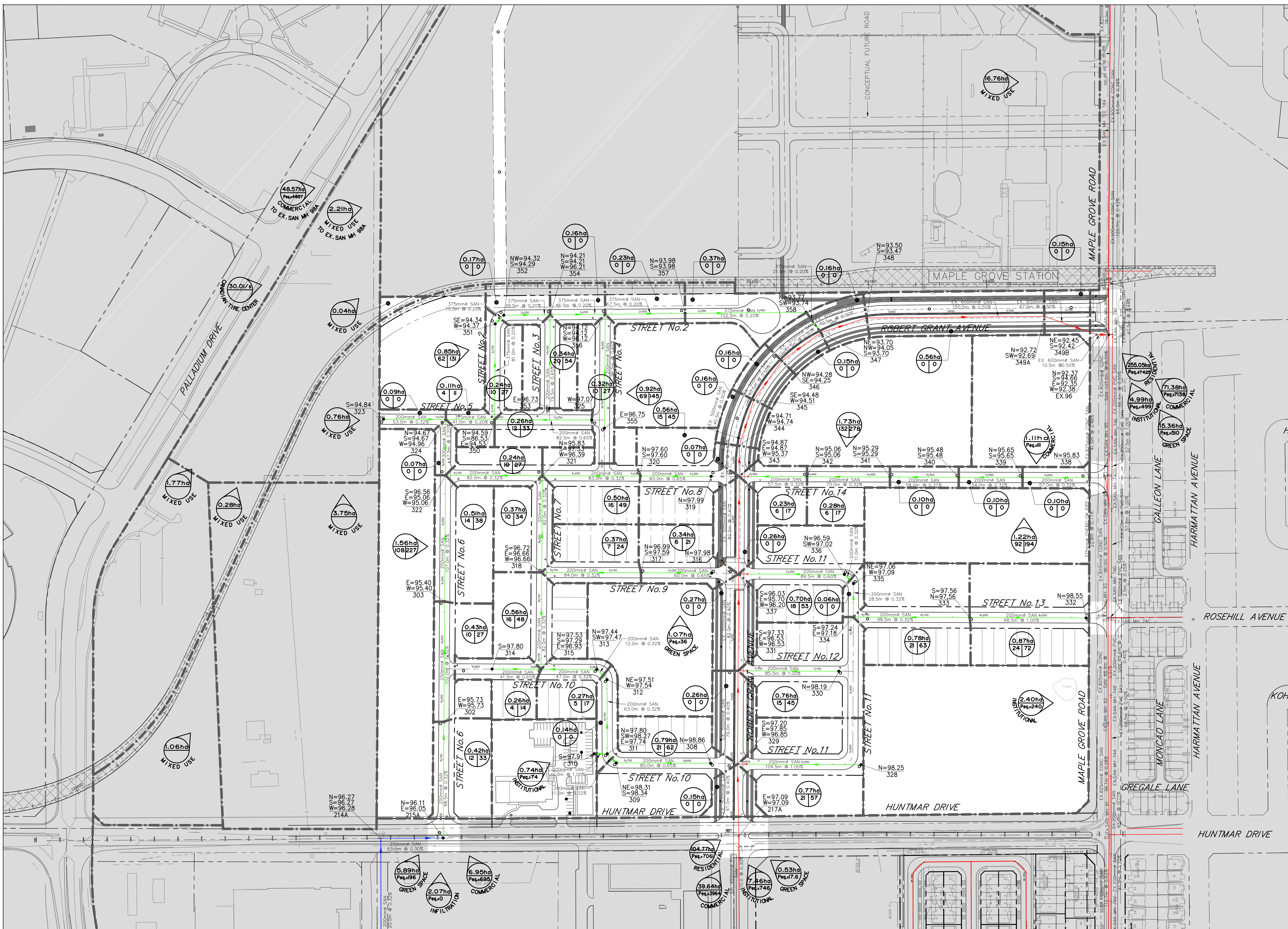


# SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION						COMM	INSTIT	PARK	C+H	INFILTRATION			PIPE													
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE		PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL.			
								AREA (ha)	POP.																	(FULL) (m/s)	(ACT.) (m/s)		
	201A	202A	0.26				0	99.50	7033	2.68	61.17		34.58		0.00	0.53	16.90	0.26	134.61	44.42	122.48	70.0	450	0.25	142.55	0.86	0.90	1.01	
	202A	203A	0.23				0	99.73	7033	2.68	61.17		34.58		0.00	0.53	16.90	0.23	134.84	44.50	122.56	63.5	450	0.25	142.55	0.86	0.90	1.01	
	203A	204A	0.43				0	100.16	7033	2.68	61.17		34.58		0.00	0.53	16.90	0.43	135.27	44.64	122.70	83.5	450	0.25	142.55	0.86	0.90	1.01	
To rue Stittsville Main Street, Pipe 204A - 205A								100.16	7033				34.58		0.00	0.53			135.27										
<b>rue Stittsville Main Street</b>																													
			0.06				11												0.06	0.06									
			0.12				17												0.12	0.18									
	2000A	204A	0.83				0	1.01	28	3.69	0.33		0.00		0.00	0.00	0.83	1.01	0.33	0.67	100.0	200	0.65	26.44	0.03	0.84	0.35		
Contribution From avenue Robert Grant Avenue, Pipe 203A - 204A								100.16	7033				34.58		0.00	0.53			135.27	136.28									
	204A	205A	0.69				0	101.86	7061	2.68	61.38		34.58		0.00	0.53	16.90	0.69	136.97	45.20	123.48	110.0	450	0.25	142.55	0.87	0.90	1.01	
	205A	206A	0.52				0	102.38	7061	2.68	61.38		34.58		0.00	0.53	16.90	0.52	137.49	45.37	123.65	114.5	450	0.25	142.55	0.87	0.90	1.01	
			0.16				0	102.54	7061				34.58	1.55	1.55			1.71	139.20										
	206A	207A					0	102.54	7061	2.68	61.38		34.58	5.91	7.46		0.53	20.52	5.91	145.11	47.89	129.79	37.0	450	0.30	156.16	0.83	0.98	1.10
			0.16				0	102.70	7061				34.58		7.46		0.53		0.16	145.27									
	207A	208A	0.70				0	103.40	7061	2.68	61.38		34.58		7.46		0.53	20.52	0.70	145.97	48.17	130.07	43.5	450	0.30	156.16	0.83	0.98	1.10
	208A	209A	0.34				0	103.74	7061	2.68	61.38		34.58		7.46		0.53	20.52	0.34	146.31	48.28	130.18	90.5	450	0.30	156.16	0.83	0.98	1.10
	209A	210A	0.38				0	104.12	7061	2.68	61.38		34.58		7.46		0.53	20.52	0.38	146.69	48.41	130.31	101.5	450	0.30	156.16	0.83	0.98	1.10
	210A	211A	0.27				0	104.39	7061	2.68	61.38		34.58		7.46		0.53	20.52	0.27	146.96	48.50	130.40	73.0	450	0.30	156.16	0.84	0.98	1.10
	211A	217A	0.38				0	104.77	7061	2.68	61.38	5.06	39.64		7.46		0.53	22.98	5.44	152.40	50.29	134.65	110.0	450	0.30	156.16	0.86	0.98	1.10
	217A	130 Huntmar Drive						104.77	7061	2.68	61.38		39.64		7.46		0.53	22.98	0.00	152.40	50.29	134.65	110.0	450	0.30	156.16	0.86	0.98	1.10
To 130 Huntmar Drive by Atril Engineering Ltd.								104.77	7061				39.64		7.46		0.53			152.40									
<b>Huntmar Drive</b>																													
			0.00				0	0.00	0			6.95	6.95		0.00	5.89	5.89		12.84	12.84									
	Fut. 214A	Fut. 215A	0.95				0	0.95	0			6.95	6.95		0.00	5.89	4.33	0.95	13.79	4.55	8.88	70.0	250	0.30	32.57	0.27	0.66	0.56	
			1.12				0	2.07	0			6.95	6.95		0.00	5.89	4.33	1.12	14.91										
	Fut. 215A	130 Huntmar Drive					0	2.07	0			0.00	6.95		0.00	5.89	4.33	0.00	14.91	4.92	9.25								
To 130 Huntmar Drive by Atril Engineering Ltd.								2.07	0			6.95	6.95		0.00	5.89				14.91									

DESIGN PARAMETERS										Designed:		PROJECT:						
Park Flow =	9300	L/ha/da	0.10764	I/s/ha							R.A.	195 Huntmar Drive						
Average Daily Flow =	280	I/p/day										City of Ottawa						
Comm/Inst Flow =	28000	L/ha/da	0.3241	I/s/ha							Checked:	LOCATION:						
Industrial Flow =	35000	L/ha/da	0.40509	I/s/ha							W.L.							
Max Res. Peak Factor =	4.00											Dwg. Reference:	File Ref:	12-624	Date:	November 2020	Sheet No.	5
Commercial/Inst./Park Peak Factor =	1.50											Sanitary Drainage Plan, Dwgs. No. 87-93					of	5
Institutional =	0.32	I/s/ha																

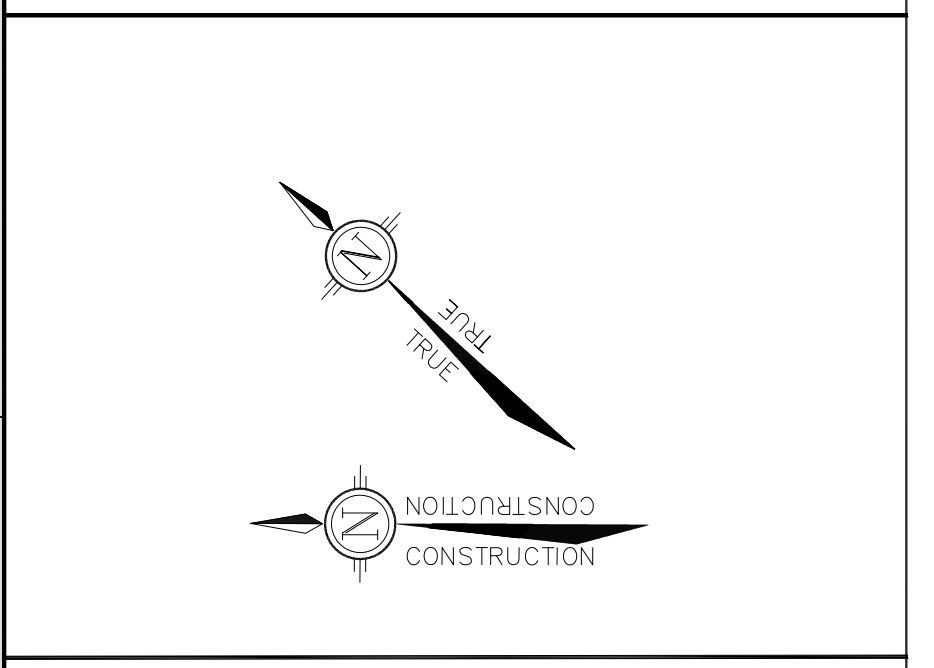


**LEGEND**

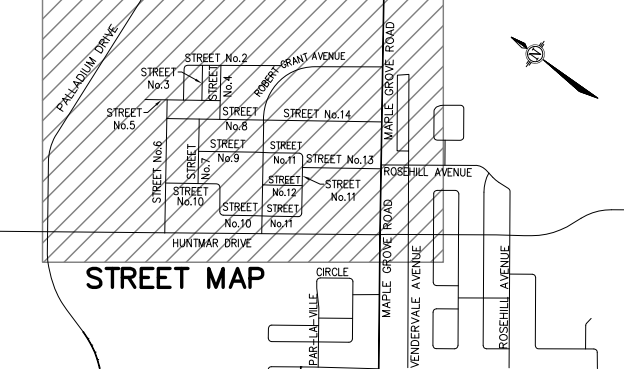
- SANITARY DRAINAGE SUB AREA
- POPULATION EQUIVALENT
- NUMBER OF UNITS IN SUB AREA
- DRAINAGE AREA BOUNDARY
- PROPOSED SANITARY SEWER
- PROPOSED SANITARY SEWER BY OTHERS
- EXISTING SANITARY SEWER
- OUTSIDE PROPOSED DEVELOPMENT

NW=93.94  
SE=93.94  
SW=96.18  
348

- PROPOSED OBVERT ELEVATION
- PROPOSED MANHOLE NUMBER



THE POSITION OF ALL POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.



No.	REVISION	APPLIES WHEN DRAWING MODIFIED	DATE	BY
1	ISSUED FOR SANITARY TRUNK MOECC APPROVAL		JULY 6/20	AGS
2	ISSUED FOR SANITARY TRUNK MOECC APPROVAL		AUG. 4/20	AGS
	REVISED AS PER CITY COMMENTS		OCT. 7/20	AGS
	REVISED AS PER NEW ROAD ALIGNMENT		MAR. 4/21	AGS
	REVISED AS PER CITY COMMENTS		MAR. 30/21	AGS
	RECORD DRAWING		AUG. 15/21	AGS
	REVISED AS PER CITY COMMENTS		SEP. 20/21	AGS

SCALE: 1:500

DESIGN: AGS  
CHECKED: JMD  
DRAWN: CED  
CHECKED: AGS  
APPROVED: JMD

PROFESSIONAL ENGINEER  
A. G. Y. SAUVE  
100142393  
SEP 20, 2021  
PROVINCE OF ONTARIO

PROFESSIONAL ENGINEER  
J.M. JOUCOUR  
PROVINCE OF ONTARIO

**ATREL Engineering Inc.**  
Engineers - Ingénieurs

1-2884 CHAMBERLAND STREET, ROCKLAND, ONTARIO K4K 1M6  
TEL.: (613) 446-7423

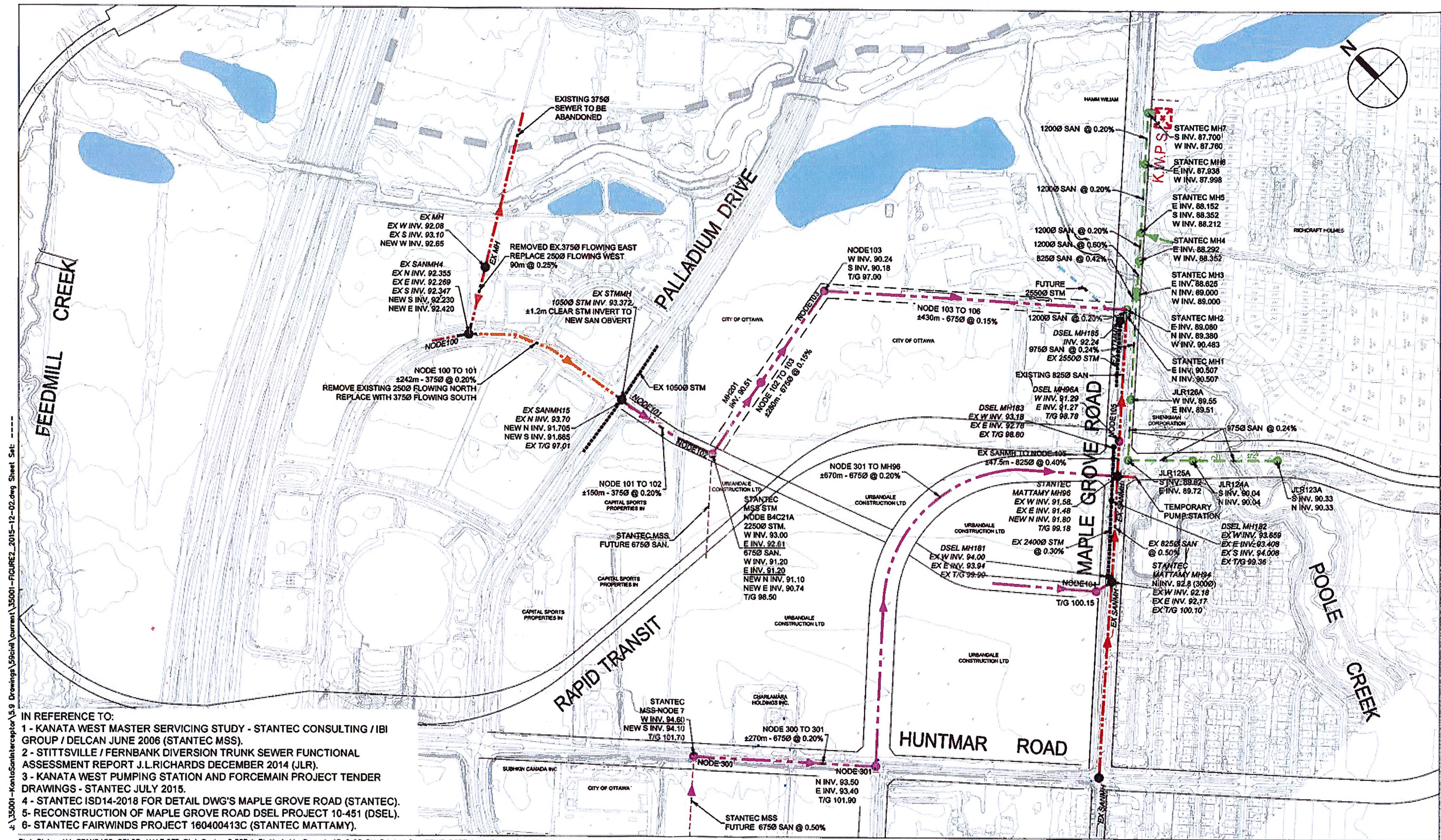
CITY OF OTTAWA  
130 HUNTMAR DR.

PLAN  
MACRO SANITARY  
DRAINAGE AREA PLAN

LIONESS DEVELOPMENT INC.

PROJECT No. 191002  
DATE JANUARY 2020  
DRAWING No. 191002-SANM





J:\35001-KanataSanInterceptor\5.9 Drawings\5901-12-02.dwg Sheet Set  
 IN REFERENCE TO:  
 1 - KANATA WEST MASTER SERVICING STUDY - STANTEC CONSULTING / IBI GROUP / DELCAN JUNE 2006 (STANTEC MSS).  
 2 - STITTVILLE / FERNBANK DIVERSION TRUNK SEWER FUNCTIONAL ASSESSMENT REPORT J.L.RICHARDS DECEMBER 2014 (JLR).  
 3 - KANATA WEST PUMPING STATION AND FORCEMAIN PROJECT TENDER DRAWINGS - STANTEC JULY 2015.  
 4 - STANTEC ISD14-2018 FOR DETAIL DWG'S MAPLE GROVE ROAD (STANTEC).  
 5 - RECONSTRUCTION OF MAPLE GROVE ROAD DSEL PROJECT 10-451 (DSEL).  
 6 - STANTEC FAIRWINDS PROJECT 160400413C (STANTEC MATTAMY).  
 Plot Style: AIA STANDARD COLOR-HALF.CTB Plot Scale: 0.387:1 Plotted At: Dec. 4, 15 2:03 PM Printed By: DENIS DORE Last Saved By: DDORE Last Saved At: Dec. 4, 15



Scale  
N.T.S.

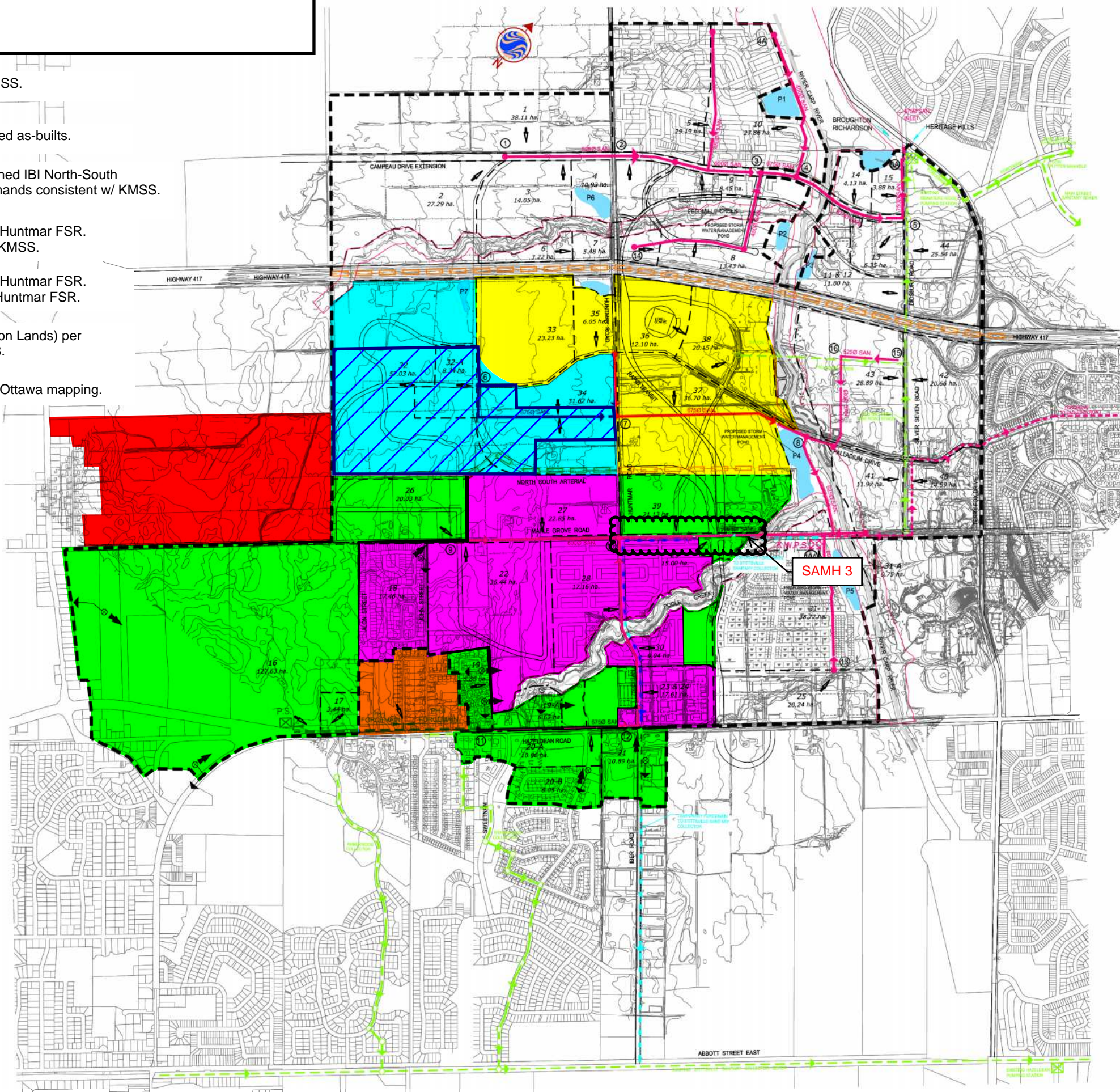
Project Title  
**KANATA WEST  
NORTH SOUTH  
SANITARY INTERCEPTOR**

Drawing Title  
**PROPOSED ALIGNMENTS FOR KANATA WEST  
DEVELOPMENT NORTH-SOUTH SANITARY COLLECTOR  
SEWERS FUNCTIONAL DESIGN STUDY**

Sheet No.  
**FIGURE 1  
(2015-12-02)**

# Maple Grove San Sewer Capacity Analysis (10/MH91 - SAMH 3) DSEL, May 2019

- Area consistent w/ KWMSS.
- Area updated per attached as-builts.
- Area redirected per attached IBI North-South Sanitary Interceptor. Demands consistent w/ KMSS.
- Area redirected per 195 Huntmar FSR. Demands consistent w/ KMSS.
- Area redirected per 195 Huntmar FSR. Demands also per 195 Huntmar FSR.
- Future development (Mion Lands) per attached Novatech 2018.
- Additional Area per GeoOttawa mapping.
- Analysis location.



Stantec Consulting Ltd.  
1505 Laperriere Avenue  
Ottawa ON Canada  
K1Z 7T1  
Tel: 613.722.4420  
Fax: 613.722.2799  
www.stantec.com

**Stantec**

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1776 Woodbine Ave., Ottawa, ON K2H 1P1

**Legend**

- ULTIMATE MAJOR DRAINAGE LIMIT
- SUBCATCHMENT AREAS
- PROPOSED TRUNK SEWER
- PROPOSED FORCEMAIN
- TEMPORARY FORCEMAIN
- PROPOSED STITTSVILLE PUMPING STATION AND FORCEMAIN
- EXISTING TRUNK SEWER
- MAJOR DRAINAGE SPLIT
- 1 NODES
- P EXISTING PUMPING STATION AND FORCEMAIN (TO BE DECOMMISSIONED)
- 44 INPUT POINT AND AREA IN HECTARES
- 1 EXISTING PUMPING STATION GRAVITY OUTLET

3	REVISED FOR DEC 21/05 SUBMISSION	G.B.A.	J.J.P.	05-12-21
4	REVISED TRUNK SEWER FROM 16 TO 10 MPS	R.W.M.	R.W.M.	05-10-05
3	ARROWS FOR EXIST. PUMP STATIONS ADDED	R.W.M.	R.W.M.	05-08-08
2	REPORT JUNE 2005	R.W.M.	R.W.M.	05-06-07
1	REPORT APR. 2005	R.W.M.	R.W.M.	05-04-25
Revision	By	Appr.	Date	
File Name:				
Scale:	Des.	Chk.	Appr.	Date

Client/Project  
**Kanata West Concept Plan  
Master Servicing Study**

Ottawa, Ontario

Title  
**Preferred Waste-Water  
Option**

Project No. 60400406	Scale 1:7500	Sheet S-1	Revision 7 of 7
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C:\Users\jgibson\Documents\Projects\10100000-00-01\Maple Grove San Sewer Capacity Analysis.dwg 31-May-2019 10:51 AM



# SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION		RESIDENTIAL AREA AND POPULATION						COMM		INSTIT		PARK		C+I+I		INFILTRATION			PIPE														
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	POP.	CUMULATIVE		PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL.							
						AREA (ha)	POP.																			(FULL) (m/s)	(ACT.) (m/s)						
195 Huntmar FSR		10	104.82		6981	104.82	6981	2.69	60.77	48.42	48.42	7.48	7.48	6.35	6.35	28.20	167.07	167.07	55.13	144.10													
	Area 33 Mod					0.00	0			22.37	22.37		0.00		0.00	10.87	22.37	22.37	7.38	18.25													
Corel Cente Etc (Existing Sewer)	Area 35 HP Employment					0.00	0			6.05	28.42		0.00		0.00	13.82	6.05	28.42	9.38	23.20													
	Area 36 (Corel Centre)																			30.00													
	Area 37 Mixed Use		15.60		2340	15.60	2340	3.03	22.98	21.10	49.52		0.00		0.00	24.07	36.70	65.12	21.49	68.54													
	Area 38 Extend. Employment	10				15.60	2340	3.03	22.98	20.15	69.67		0.00		0.00	33.87	20.15	85.27	28.14	114.99													
Maple Grove Road Trunk Sewer	Area 18		17.46		1129	17.46	1129	3.21	11.74		0.00		0.00		0.00	0.00	17.46	17.46	5.76	17.50													
	Area 19		5.88	112	336	23.34	1465	3.15	14.96		0.00		0.00		0.00	0.00	5.88	23.34	7.70	22.66													
	Area 27		20.83		2025	44.17	3490	2.91	32.91		0.00	2.52	2.52		0.00	1.22	23.35	46.69	15.41	49.54													
	Area 26		20.03	601	1803	64.20	5293	2.78	47.69		0.00	2.52	2.52		0.00	1.22	20.03	66.72	22.02	70.93													
	Area 22	9	32.33		2122	96.53	7415	2.67	64.16		0.00	2.47	4.99	1.23	1.23	2.62	36.03	102.75	33.91	100.69													
Hazeldean/Huntmar Trunk Sewer	Area 16/20 Residential		99.01		5644	99.01	5644	2.76	50.48	33.50	33.50		0.00	14.13	14.13	18.57	146.64	146.64	48.39	117.44													
	Area 17 Ex. Commercial	11		12		99.01	5644	2.76	50.48	3.44	36.94		0.00	14.13	14.13	20.24	3.44	150.08	49.53	120.25													
	Additional Area*		10.80	86	292	109.81	5936	2.74	52.71	6.70	43.64		0.00	14.13	14.13	23.50	17.50	167.58	55.30	131.51													
	Area 21 Exist. Employment					109.81	5936	2.74	52.71	10.89	54.53		0.00	14.13	14.13	28.79	10.89	178.47	58.90	140.40													
	Area 19A Exist. Residential		6.63		378	116.44	6314	2.72	55.66		54.53		0.00	14.13	14.13	28.79	6.63	185.10	61.08	145.53													
	5075 Hazeldean Rd					116.44	6314	2.72	55.66	8.45	62.98		0.00	14.13	14.13	32.90	8.45	193.55	63.87	152.43													
	15 Huntmar Restaurant		0.76		381	117.20	6695	2.70	58.58		62.98		0.00	14.13	14.13	32.90	0.76	194.31	64.12	155.60													
	Area 23/24 Mod					117.20	6695	2.70	58.58	8.40	71.38		0.00	14.13	14.13	36.98	8.40	202.71	66.89	162.45													
	Area 29 Mod		7.12	214	642	124.32	7337	2.67	63.49		71.38		0.00	14.13	14.13	36.98	7.12	209.83	69.24	169.71													
	Area 30 Mod		3.87	116	348	128.19	7685	2.65	66.00		71.38		0.00	14.13	14.13	36.98	3.87	213.70	70.52	173.50													
	Area 28 & Portions of 29 & 30	12	30.33		2325	158.52	10010	2.56	83.05		71.38		0.00	14.13	14.13	36.98	30.33	244.03	80.53	200.56													
Maple Grove Road Trunk Sewer	Area 39 Mixed Use		8.98		1347	8.98	1347	3.17	13.84	12.15	12.15		0.00		0.00	5.91	21.13	21.13	6.97	26.72													
		10/MH91		MH92																	96.10	825	0.28	759.56	0.71	1.42	1.53						
		MH92		MH93																	88.90	825	0.51	1025.11	0.53	1.92	1.94						
		MH94		MH94																	96.00	825	0.30	786.22	0.69	1.47	1.59						
		MH94		MH95																	41.50	825	0.46	973.56	0.56	1.82	1.87						
		MH95		MH96																	107.20	825	0.39	896.43	0.61	1.68	1.76						
		MH96		MH96A																	47.50	825**	0.44	952.16	0.57	1.78	1.83						
		MH96A		MH97A																	120.00	825**	0.44	952.16	0.57	1.78	1.83						
		MH97A		MH98A/SAMH1																	65.00	825**	0.38	884.86	0.61	1.66	1.74						
		MH98A/SAMH1		SAMH2																	6.70	825	0.36	861.26	0.63	1.61	1.71						
		SAMH2		SAMH3																	18.90	825	0.42	930.27	0.58	1.74	1.81						

DESIGN PARAMETERS										Designed: B.K.					PROJECT: 195 Huntmar Drive				
Park Flow =	9300	L/ha/da	0.108	Harmon Correction Factor =		0.800		Checked:					LOCATION: City of Ottawa						
Average Daily Flow =	280	I/p/day		Industrial Peak Factor =		as per MOE Graph		Dwg. Reference:					File Ref: 14-624		Date: May-19		Sheet No. 1		
Comm/Inst Flow =	28000	L/ha/da	0.405	Extraneous Flow =		0.330 L/s/ha													
Industrial Flow =	28000	L/ha/da	0.405	Minimum Velocity =		0.600 m/s													
Max Res. Peak Factor =	4.00			Manning's n =		(Conc) 0.013 (Pvc) 0.013													
Commercial/Inst./Park Peak Factor =	1.50	if ICI >20%	1.00	if ICI <20%															
Mixed Use	28000.00	L/ha/da																	
Institutional =	0.324	I/s/Ha																	

\*Additional area outside of MSS study area but directing wastewater to Maple Grove Road trunk sewer via Hazeldean Road. Areas and unit count taken from GeoOttawa mapping. 3.4 pop/unit applied.  
 \*\*825mm dia. per Stantec Kanata West Pump Station and Forcemain Nov 2015 Issued for Construction drawings. 900mm dia. per DSEL Reconstruction of Maple Grove Road Sept 2013 As-built drawings.

EX. SANMH 96



## Andre Sauve

---

**From:** Surprenant, Eric <Eric.Surprenant@ottawa.ca>  
**Sent:** Tuesday, September 15, 2020 11:59 AM  
**To:** Andre Sauve  
**Subject:** Re: 130 Huntmar Drive  
**Attachments:** Kanata LRT EA.pdf

Hello Andre,

Sorry for the delay in responding to your inquiry.

The HGL along Maple Grove during the annual event and a catastrophic failure at the KWPS is 94.4 m.

Also, please find attached the information related to the LRT EA.

Thanks

Eric Surprenant, CET  
Sr, Project Manager, Infrastructure Projects, West  
Planning, Infrastructure & Economic Development  
613 580-2424 ext.: 27794

Please take note that due to current COVID situation, I am working remotely and Phone communication and messaging may not be reliable at this time. Preferred method of communications will be e-mails during this period. If your preference is telephone communication, please indicate this via e-mail and provide a contact telephone number.

Absence alert:

I apologize for any inconvenience.

---

**From:** Andre Sauve <andresauve@atrel.com>  
**Sent:** Friday, September 4, 2020 10:35 AM  
**To:** Surprenant, Eric <Eric.Surprenant@ottawa.ca>  
**Subject:** 130 Huntmar Drive

**CAUTION: This email originated from an External Sender. Please do not click links or open attachments unless you recognize the source.**

**ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.**

Hi Eric,

One of the comments is to verify the sanitary HGL in the event of a failure during the Annual Event. Can you provide the modeling file.

Also, would you have any concept drawings of the future LRT that you could share with us.

Thank you,

**André Sauvé, P.Eng.**

Atrél Engineering Ltd

1-2884 Chamberland Street | Rockland, ON K4K 1M6

Tel: (613) 446-7423 ext. 30 | Cell: (613) 857-8426

Email [andresauve@atrel.com](mailto:andresauve@atrel.com)

'  
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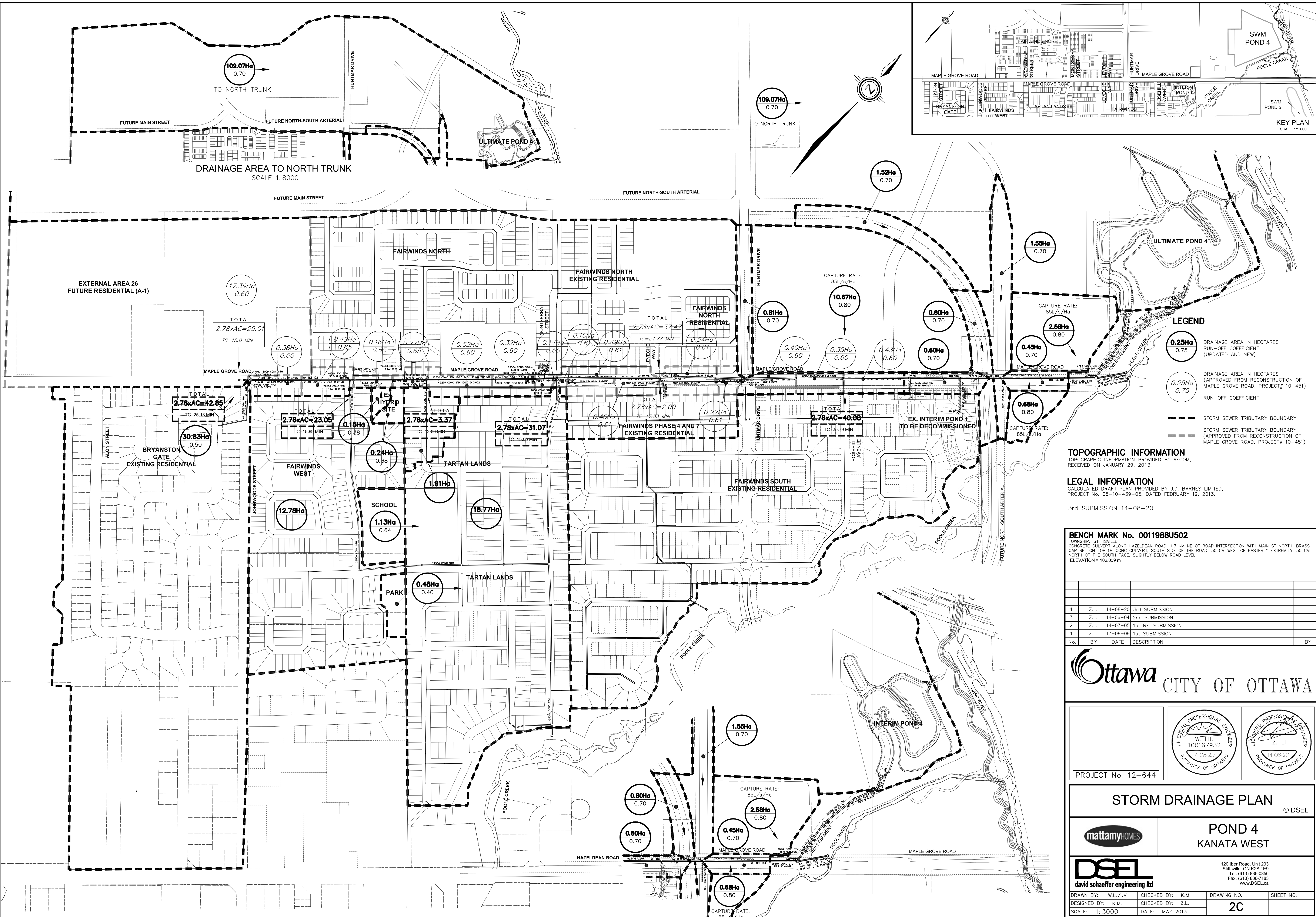
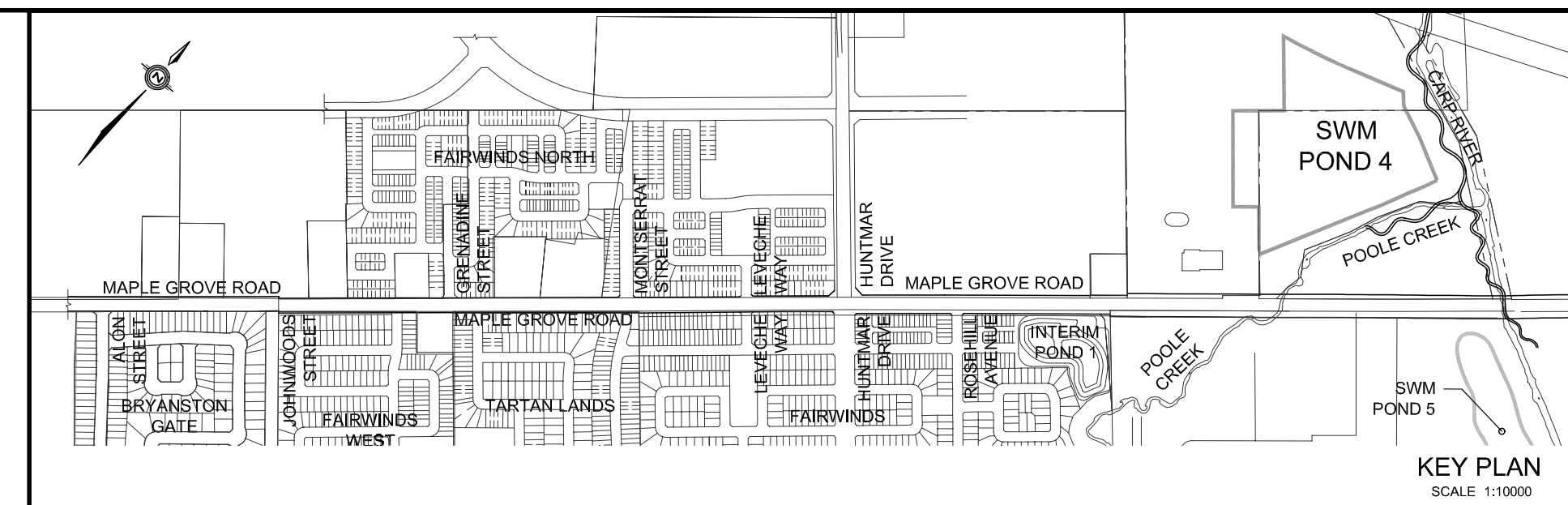
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## **APPENDIX "E"**

- Storm Drainage Plan – Pond 4 Kanata West (DSEL)
- 191002-STMM - Macro Storm Drainage Area Plan
- 191002-RC1 – Runoff Coefficient Detail Calculations
- Storm Sewer Calculation Sheet (DSEL)
- 195 Huntmar Drive Storm Drainage Area to Pond 4 Figure 1 (DSEL)
- Table 8 - Storm Sewer Design Sheet (Rational Method)
- Table 9 - Storm Sewer Design Sheet (Restricted)
- 130 Huntmar Drive / Preliminary Kanata West Pond 4 Sizing (JFSA)
- KWMSS - Storm Drainage Area Plan South Ponds – Drawing ST-PS
- Road Catchbasin Detail Sketch SK2





- LEGEND**
- 0.25Ha 0.75 DRAINAGE AREA IN HECTARES  
RUN-OFF COEFFICIENT  
(UPDATED AND NEW)
  - 0.25Ha 0.75 DRAINAGE AREA IN HECTARES  
(APPROVED FROM RECONSTRUCTION OF  
MAPLE GROVE ROAD, PROJECT# 10-451)
  - STORM SEWER TRIBUTARY BOUNDARY  
(APPROVED FROM RECONSTRUCTION OF  
MAPLE GROVE ROAD, PROJECT# 10-451)

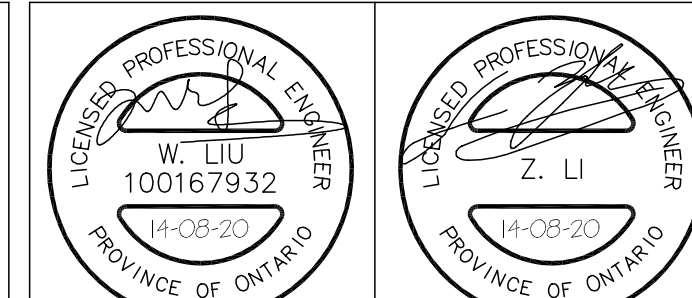
**TOPOGRAPHIC INFORMATION**  
TOPOGRAPHIC INFORMATION PROVIDED BY AECOM,  
RECEIVED ON JANUARY 29, 2013.

**LEGAL INFORMATION**  
CALCULATED DRAFT PLAN PROVIDED BY J.D. BARNES LIMITED,  
PROJECT No. 05-10-439-05, DATED FEBRUARY 19, 2013.

3rd SUBMISSION 14-08-20

**BENCH MARK No. 0011988U502**  
TOWNSHIP: STITTSVILLE  
CONCRETE CULVERT ALONG HAZELDEAN ROAD, 1.3 KM NE OF ROAD INTERSECTION WITH MAIN ST NORTH, BRASS  
CAP SET ON TOP OF CONC CULVERT, SOUTH SIDE OF THE ROAD, 30 CM WEST OF EASTERLY EXTREMITY, 30 CM  
NORTH OF THE SOUTH FACE, SLIGHTLY BELOW ROAD LEVEL.  
ELEVATION = 106.039 m

No.	BY	DATE	DESCRIPTION	BY
4	Z.L.	14-08-20	3rd SUBMISSION	
3	Z.L.	14-06-04	2nd SUBMISSION	
2	Z.L.	14-03-05	1st RE-SUBMISSION	
1	Z.L.	13-08-09	1st SUBMISSION	



PROJECT No. 12-644

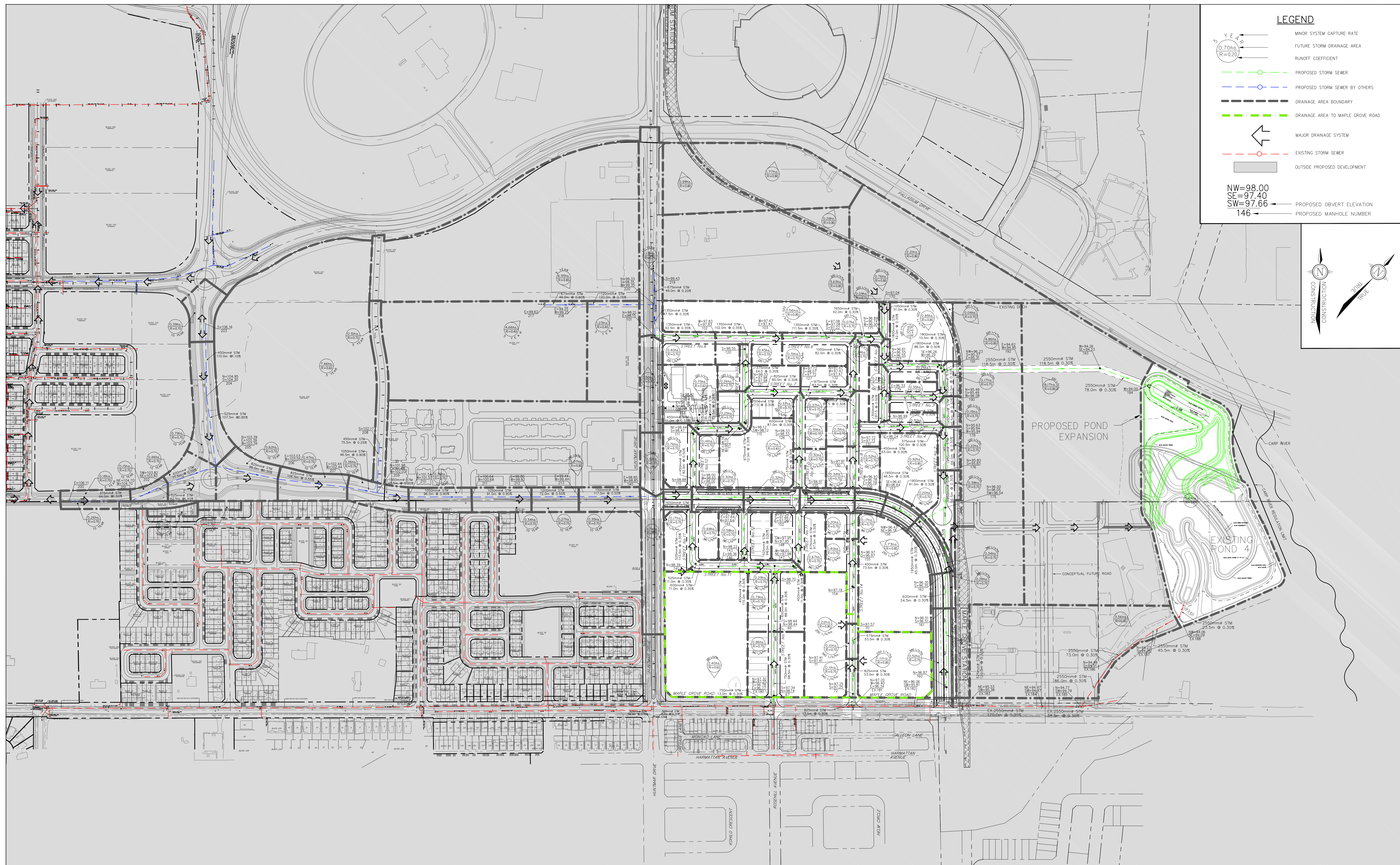
**STORM DRAINAGE PLAN** © DSEL

**POND 4**  
KANATA WEST

**DSEL**  
david schaeffer engineering ltd

120 Ibor Road, Unit 203  
Stittsville, ON K2S 1E9  
Tel: (613) 836-8556  
Fax: (613) 836-7183  
www.DSEL.ca

DRAWN BY: W.L./V.	CHECKED BY: K.M.	DRAWING NO.	SHEET NO.
DESIGNED BY: K.M.	CHECKED BY: Z.L.	12-644	2C
SCALE: 1:3000	DATE: MAY 2013		



THE POSITION OF ALL POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.



No.	REVISION	APPLIES WHEN DRAWING MODIFIED	DATE	BY
1	ISSUED FOR SANITARY TRUNK MOECC APPROVAL		JULY 6/20	AGS
2	ISSUED FOR SANITARY TRUNK MOECC APPROVAL		AUG. 4/20	AGS
3	REVISED AS PER CITY COMMENTS		OCT. 7/20	AGS
4	REVISED AS PER NEW ROAD ALIGNMENT		MAR. 4/21	AGS
5	REVISED AS PER CITY COMMENTS		MAR. 30/21	AGS
6	RECORD DRAWING		AUG. 25/21	AGS
7	REVISED AS PER CITY COMMENTS		SEP. 20/21	AGS

SCALE  
1 : 2 500  
40m 0 40m 80m  
HORIZONTAL

DESIGN AGS  
CHECKED JMD  
DRAWN CED  
CHECKED AGS  
APPROVED JMD

LICENSED PROFESSIONAL ENGINEER  
A. G. Y. SAUVE  
100142393  
Sept 26, 2021  
PROVINCE OF ONTARIO

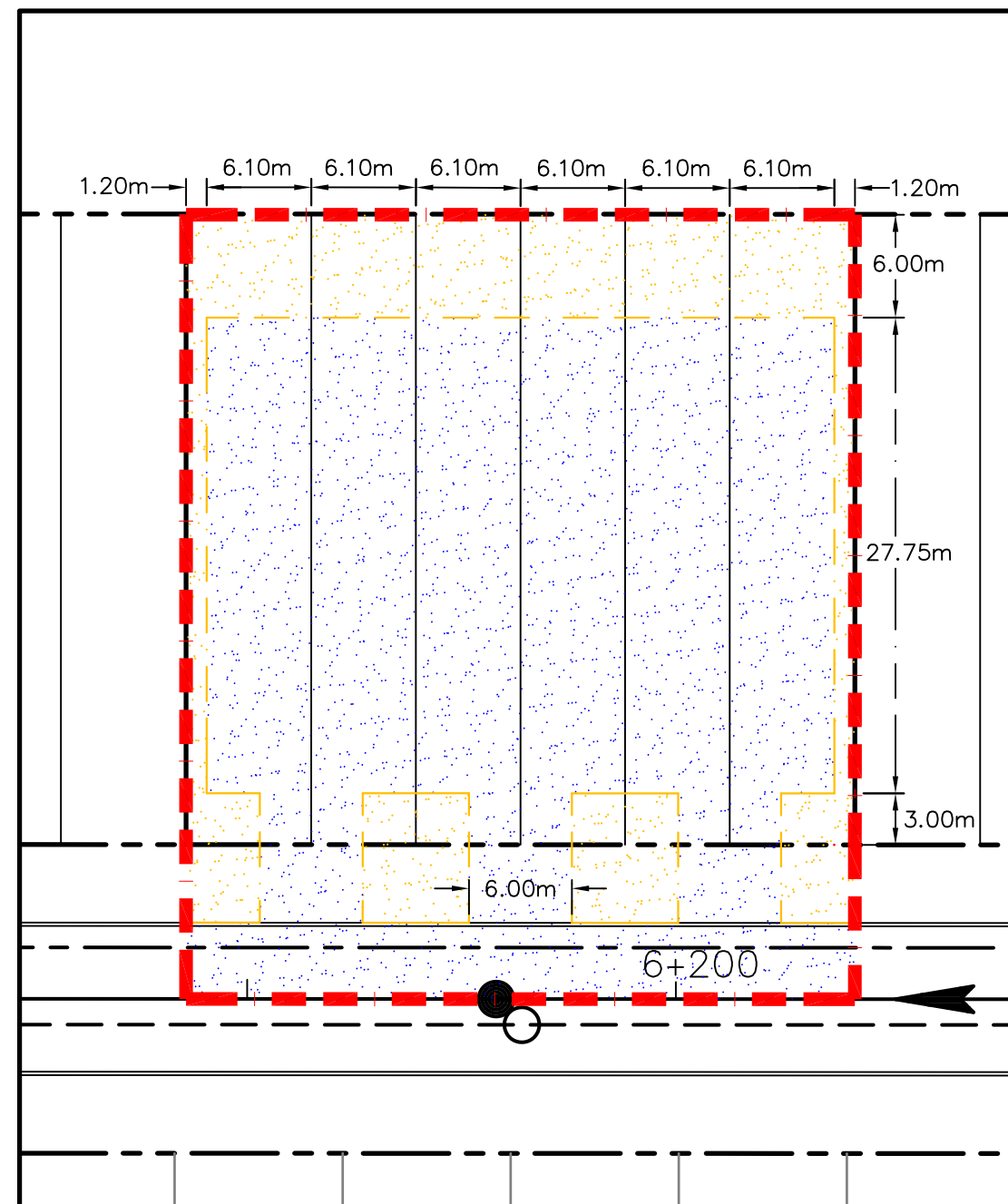
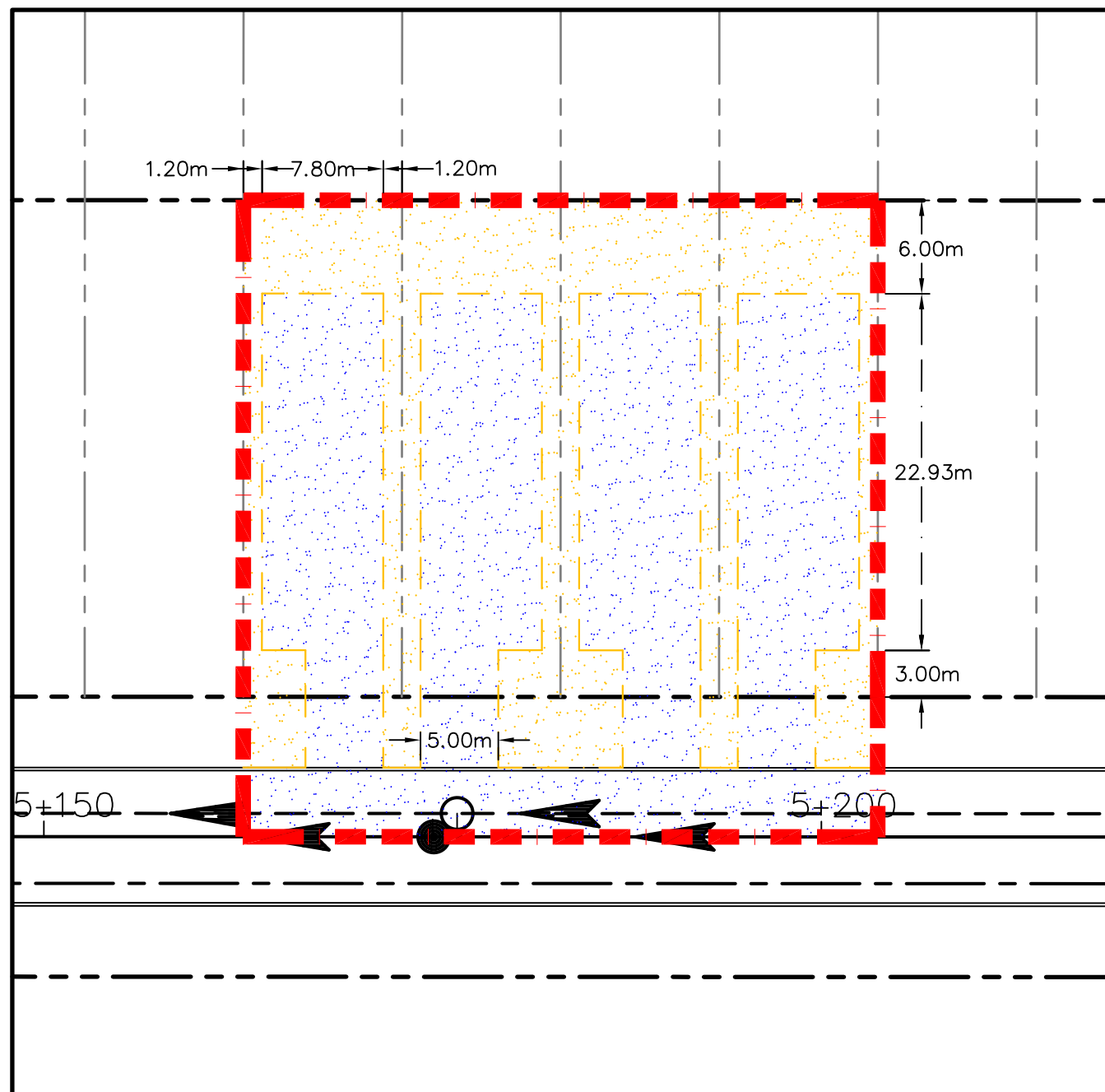
LICENSED PROFESSIONAL ENGINEER  
J.M. DECOEUR  
PROVINCE OF ONTARIO

**ATREL Engineering**  
Engineers - Ingénieurs  
1-2884 CHAMBERLAND STREET, ROCKLAND, ONTARIO K4K 1M6  
TEL.: (613) 446-7423

CITY OF OTTAWA  
130 HUNTMAR DR.  
PLAN  
MACRO STORM  
DRAINAGE AREA PLAN

LIONESS  
DEVELOPMENT  
INC.

PROJECT No. 191002  
DATE JANUARY 2020  
DRAWING No. 191002-STMM



**LEGEND**

AREA ■ 0.20 RUNOFF COEFFICIENT

AREA ■ 0.90 RUNOFF COEFFICIENT

R<sub>Ave</sub> AVERAGE RUNOFF COEFFICIENT

**TYPICAL SINGLE DWELLING**

AREA	RUNOFF COEFFICIENT
0.1047 ha.	0.90
0.0621 ha.	0.20

$$R_{Ave} = \frac{(0.1047\text{ha.} \times 0.90) + (0.0621\text{ha.} \times 0.20)}{(0.1047 + 0.0621)\text{ ha.}}$$

R<sub>Ave</sub> = 0.639 ---> 0.65

**TYPICAL TOWNHOUSE**

AREA	RUNOFF COEFFICIENT
0.1324 ha.	0.90
0.0459 ha.	0.20

$$R_{Ave} = \frac{(0.1324\text{ha.} \times 0.90) + (0.0459\text{ha.} \times 0.20)}{(0.1324 + 0.0459)\text{ ha.}}$$

R<sub>Ave</sub> = 0.720 ---> 0.70



**RUNOFF COEFFICIENT DETAIL CALCULATIONS**

SCALE:	1:400	130 HUNTMAR
		OCT. / 2020   I91002-RCI

**STORM SEWER CALCULATION SHEET (RATIONAL METHOD)**

Local Roads Return Frequency = 2 years  
 Collector Roads Return Frequency = 5 years  
 Arterial Roads Return Frequency = 10 years

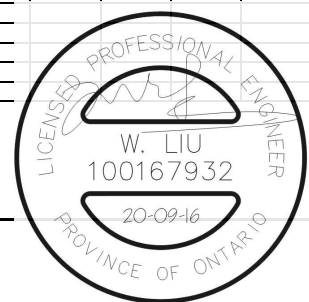


Manning 0.013

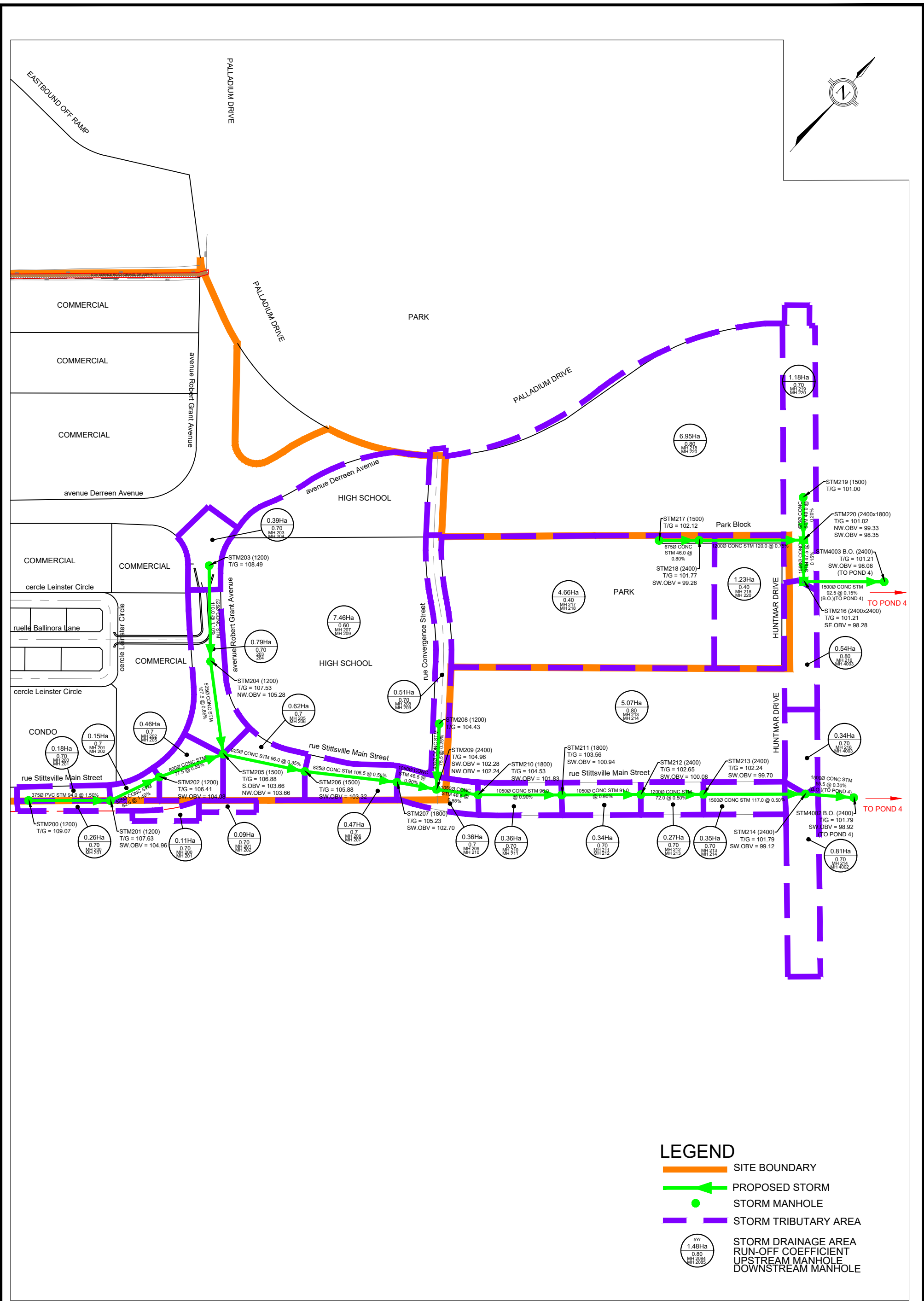
Location	LOCATION From Node To Node		AREA (Ha)																FLOW						SEWER DATA													
			2 YEAR				5 YEAR				10 YEAR				100 YEAR				Time of	Intensity	Intensity	Intensity	Intensity	Intensity	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO				
			AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	Conc. (min)	2 Year (mm/h)	5 Year (mm/h)	10 Year (mm/h)	100 Year (mm/h)	Q (l/s)	(actual)	(nominal)	(%)	(m)	(l/s)	(m/s)	LOW (min)	Q/Q full						
<b>rue Convergence Street</b>																																						
	208	209					0.00	0.00	0.51	0.70	0.99	0.99					0.00	0.00																				
To rue Stittsville Main Street, Pipe 209 - 210												0.99					0.00																					
<b>avenue Robert Grant Avenue</b>																																						
	203	204					0.00	0.00			0.00	0.00	0.39	0.70	0.76	0.76																						
	204	205					0.00	0.00			0.00	0.00	0.79	0.70	1.54	2.30																						
To rue Stittsville Main Street, Pipe 205 - 206												0.00					0.00																					
<b>rue Stittsville Main Street</b>																																						
							0.00	0.00			0.00	0.00	0.11	0.70	0.21	0.21																						
							0.00	0.00	0.18	0.70	0.35	0.35			0.00	0.21																						
	200	201					0.00	0.00			0.00	0.35	0.26	0.70	0.51	0.72																						
							0.00	0.00			0.00	0.35	0.09	0.70	0.18	0.90																						
	201	202					0.00	0.00			0.00	0.35	0.15	0.70	0.29	1.19																						
	202	205					0.00	0.00			0.00	0.35	0.46	0.70	0.90	2.08																						
Contribution From avenue Robert Grant Avenue, Pipe 204 - 205												0.00				2.30																						
	205	206					0.00	0.00			0.00	0.35	0.62	0.70	1.21	5.59																						
	206	207					0.00	0.00			0.00	0.35	0.47	0.70	0.91	6.50																						
	207	209					0.00	0.00	7.46	0.60	12.44	12.79			0.00	6.50																						
Contribution From rue Convergence Street, Pipe 208 - 209												0.99				0.00																						
	209	210					0.00	0.00			0.00	13.79	0.36	0.70	0.70	7.20																						
	210	211					0.00	0.00			0.00	13.79	0.36	0.70	0.70	7.90																						
	211	212					0.00	0.00			0.00	13.79	0.34	0.70	0.66	8.56																						
	212	213					0.00	0.00			0.00	13.79	0.27	0.70	0.53	9.09																						
							0.00	0.00			0.00	13.79	0.35	0.70	0.68	9.77																						
	213	214					0.00	0.00	5.07	0.80	11.28	25.06			0.00	9.77																						
	214	4002 (B.O.)					0.00	0.00			0.00	25.06	0.81	0.70	1.58	11.35																						
												25.06				11.35																						
<b>Park Block</b>																																						
	217	218					0.00	0.00	4.66	0.40	5.18	5.18			0.00	0.00																						
							0.00	0.00	1.23	0.40	1.37	6.55			0.00	0.00																						
	218	220	6.95	0.80	15.46	15.46					0.00	6.55			0.00	0.00																						
To HUNTMAR DRIVE, Pipe 220 - 216												6.55				0.00																						
<b>HUNTMAR DRIVE</b>																																						
	219	220					0.00	0.00			0.00	0.00	1.18	0.70	2.30	2.30																						
Contribution From Park Block, Pipe 218 - 220												6.55				0.00																						
	220	216					0.00	0.00			0.00	6.55			0.00	2.30																						
To ROBERT GRANT AVENUE, Pipe 216 - 4003 (B.O.)												6.55				2.30																						
<b>ROBERT GRANT AVENUE</b>																																						
Contribution From HUNTMAR DRIVE, Pipe 220 - 216												6.55				2.30																						
							0.00	0.00			0.00	6.55	0.34	0.70	0.66	2.96																						
	216	4003 (B.O.)					0.00	0.00			0.00	6.55	0.54	0.80	1.20	4.16																						
												6.55				4.16																						

Definitions:  
 Q = 2.78 AIR, where  
 Q = Peak Flow in Litres per second (L/s)  
 A = Areas in hectares (ha)  
 I = Rainfall Intensity (mm/h)  
 R = Runoff Coefficient

Notes:  
 1) Ottawa Rainfall-Intensity Curve  
 2) Min. Velocity = 0.80 m/s



Designed: A.K.  
 Checked: W.L.  
 Dwg. Reference:  
 PROJECT: 195 Huntmar Drive (Pond 4 Drainage Area)  
 LOCATION: City of Ottawa  
 File Ref: 12-624  
 Date: Sep 2020  
 Sheet No. SHEET 1 OF 1



**LEGEND**

- SITE BOUNDARY
- PROPOSED STORM
- STORM MANHOLE
- STORM TRIBUTARY AREA
- SYR  
1.48Ha  
0.80  
MH 2085 STORM DRAINAGE AREA  
RUN-OFF COEFFICIENT  
UPSTREAM MANHOLE  
DOWNSTREAM MANHOLE



KANATA WEST  
195 HUNTMAR DRIVE  
STORM DRAINAGE AREA  
TO POND 4  
CITY OF OTTAWA

DATE:  
SEP 2020

SCALE: 1:4000

PROJECT No.:  
12-624

FIGURE: 01

**STORM SEWER COMPUTATION FORM**

DESIGNED BY: AGS  
CHECKED BY: AGS

LOCAL ROADS STORM FREQUENCY : 2 YEAR  
COLECTOR ROADS STORM FREQUENCY : 5 YEAR  
ARTERIAL ROADS STORM FREQUENCY :10 YEAR

**130 Huntmar Drive**  
Lioness Development Inc.  
191002  
Atrel Engineering Ltd  
September, 2021

Rational Method  
RATIONAL METHOD Q= 2.78 AIR  
PVC/CONC N= 0.013  
CSP N= 0.024  
CORR N= 0.021

Table 8

LOCATION				AREA (ha.) RUNOFF COEFFICIENT								Rational Method						TIME CONC. (MIN)	RAINF. INTENS. 2 Year (MM/HR)	RAINF. INTENS. 5 Year (MM/HR)	RAINF. INTENS. 10 Year (MM/HR)	2 Year Flow (L/S)	5 Year Flow (L/S)	10 Year Flow (L/S)	ACTUAL PIPE FLOW (L/S)	PIPE SEWER DATA							UpStream		DwStream					
												2 Year		5 Year		10 Year										INDIV.	ACCUM.	INDIV.	ACCUM.	INDIV.	ACCUM.	TYPE	DIA. (NOM)	(ACT)	SLOPE (%)	LENGTH (M)	CAP. (L/S)	Remaining Capacity (%)	VEL. (M/S)	TIME OF FLOW (MIN)
				FROM (Up)	TO (Down)	0.40	0.60	0.70	0.80	0.40	0.60	0.70	0.80	0.70	0.80	2.78AR	2.78AR									2.78AR	2.78AR	2.78AR	2.78AR		(mm)									
MH 217	MH 218					4.66								5.18	5.18			10.00	76.81	104.19	122.14			539.90	539.90	CONC	675	685.8	0.80	46.0	784.35	31%	2.12	0.36	99.62	98.95	99.25	98.58		
MH 218	MH 220					1.23								16.82	22.01			10.36	75.45	102.32	119.94			2251.70	2251.70	CONC	1200	1219.2	0.75	120.0	3522.39	36%	3.02	0.66	99.25	98.05	98.35	97.15		
MH 219	MH 220									1.13								11.02	76.81	104.19	122.14			268.58	268.58	CONC	675	685.8	0.20	49.0	392.18	32%	1.06	0.77	99.43	98.76	99.33	98.66		
MH 220	MH 101													22.01	2.20			11.02	73.08	99.08	116.12			2180.40	255.35	2435.75	CONC	1350	1371.6	0.30	47.5	3049.82	20%	2.06	0.38	98.35	97.00	98.21	96.86	
MH 101	MH 102			0.40						0.50								11.41	71.79	97.30	114.03			55.88	2141.23	361.70	2558.81	CONC	1350	1371.6	0.35	92.5	3294.18	22%	2.23	0.69	98.15	96.80	97.83	96.48
MH 102	MH 103			0.45														12.10	69.59	94.28	110.46			115.11	2074.77	350.38	2540.26	CONC	1350	1371.6	0.35	102.0	3294.18	23%	2.23	0.76	97.83	96.48	97.47	96.12
MH 103	MH 133			0.51														12.86	67.32	91.17	106.81			178.17	2006.33	338.80	2523.30	CONC	1350	1371.6	0.35	111.5	3294.18	23%	2.23	0.83	97.47	96.12	97.08	95.73
MH 110	MH 111			0.76														13.70	76.81	104.19	122.14			113.60	113.60	CONC	450	457.2	0.50	82.5	210.32	46%	1.28	1.07	98.88	98.43	98.47	98.02		
MH 111	MH 113																	11.07	72.92	98.85	115.84			107.85	107.85	CONC	450	457.2	0.50	11.0	210.32	49%	1.28	0.14	98.44	97.99	98.38	97.93		
MH 112	MH 113			0.75														11.22	76.81	104.19	122.14			96.09	96.09	CONC	525	533.4	0.30	11.5	245.74	61%	1.10	0.17	98.41	97.89	98.38	97.86		
MH 113	MH 114			0.14														10.17	72.43	98.18	115.06			217.46	217.46	CONC	675	685.8	0.30	62.5	480.32	55%	1.30	0.80	98.38	97.71	98.19	97.52		
MH 114	MH 115																	12.02	69.84	94.62	110.87			209.69	209.69	CONC	675	685.8	0.30	12.0	480.32	56%	1.30	0.15	98.16	97.49	98.12	97.45		
MH 115	MH 121			0.25														12.17	69.36	93.97	110.10			241.99	241.99	CONC	750	762.0	0.30	47.0	636.13	62%	1.39	0.56	98.12	97.37	97.98	97.23		
MH 120	MH 121			0.26														12.73	76.81	104.19	122.14			38.86	38.86	PVC	375	366.4	0.35	64.0	97.52	60%	0.92	1.15	98.55	98.18	98.33	97.96		
MH 121	MH 127			0.57														11.15	67.69	91.68	107.41			345.50	345.50	CONC	825	838.2	0.30	85.0	820.21	58%	1.49	0.95	97.98	97.16	97.72	96.90		
MH 125	MH 126			0.30														13.69	76.81	104.19	122.14			44.84	44.84	PVC	375	366.4	0.30	60.0	90.28	50%	0.86	1.17	98.51	98.14	98.33	97.96		
MH 126	MH 127	1.07		0.39														10.00	72.59	98.40	115.32			183.84	183.84	CONC	600	609.6	0.30	87.0	350.85	48%	1.20	1.21	98.33	97.73	98.07	97.47		
MH 127	MH 132			0.37														11.17	72.59	98.40	115.32			183.84	183.84	CONC	600	609.6	0.30	87.0	350.85	48%	1.20	1.21	98.33	97.73	98.07	97.47		
MH 130	MH 131			0.52														12.37	65.05	88.06	103.15			543.60	543.60	CONC	975	990.6	0.30	83.5	1280.55	58%	1.66	0.84	97.72	96.75	97.47	96.50		
MH 131	MH 132			0.51														14.52	76.81	104.19	122.14			77.73	77.73	CONC	450	457.2	0.30	63.0	162.91	52%	0.99	1.06	97.91	97.46	97.72	97.27		
MH 132	MH 133			0.24														11.06	72.97	98.92	115.93			146.26	146.26	CONC	525	533.4	0.30	84.5	245.74	40%	1.10	1.28	97.72	97.20	97.47	96.95		
MH 133	MH 171			0.07														12.34	62.92	85.13	99.70			681.30	681.30	CONC	1050	1066.8	0.30	82.0	1560.35	56%	1.75	0.78	97.47	96.42	97.22	96.17		
MH 170	MH 171			0.09	5.95													15.31	61.05	82.58	96.70			830.94	1817.30	306.73	2954.97	CONC	1650	1676.4	0.30	42.0	5208.04	43%	2.36	0.30	97.08	95.43	96.95	95.30
MH 171	MH 173			0.10														15.60	60.38	81.66	95.62			1643.15	1797.05	303.30	3743.50	CONC	1800	1828.8	0.30	42.0	6568.16	43%	2.50	0.28	96.74	94.94	96.61	94.81
MH 172	MH 173			0.27														15.88	76.81	104.19	122.14			40.36	40.36	PVC	300	299.2	0.50	87.5	67.90	41%	0.97	1.51	96.99	96.69	96.55	96.25		
MH 173	MH 174			0.25	0.85													11.51	59.76	80.81	94.62			1799.72	1778.34	300.13	3878.19	CONC	1800	1828.8	0.30	86.0	6568.16	41%	2.50	0.57	96.55	94.75	96.29	94.49
MH 174	MH 191																	16.46	58.53	79.13	92.65			1762.67	1741.37	293.88	3797.93	CONC	1800	1828.8	0.30	10.5	6568.16	42%	2.50	0.07	96.26	94.46	96.23	94.43
MH 200	MH 201									0.18								16.53	76.81	104.19	122.14			36.50	87.94	124.44	PVC	375	366.4	1.50	94.0	201.88	38%	1.91	0.82	106.11	105.74	104.70	104.33	
MH 201	MH 202																	10.00	73.80	100.06	117.27			35.05	139.21	174.26	CONC	525	533.4	1.40	62.5	530.86	67%	2.38	0.44	104.70	104.18	103.82	103.30	
MH 202	MH 205																	10.82	72.29	97.99	114.84			34.32	239.12	273.45	CONC	600	609.6	0.55	77.5	475.05	42%	1.63	0.79	103.82	103.22	103.39	102.79	
MH 203	MH 204																	12.05	76.81	104.19	122.14			92.70	92.70	CONC	450	457.2	1.10	110.0	311.95	70%	1.90	0.96	106.16	105.71	104.95	104.50		
MH 204	MH 205																	10.96	73.29	99.36	116.45			267.40	267.40	CONC	525	533.4	0.85	107.5	413.64	35%	1.85	0.97	104.30	103.78	103.39	102.87		
MH 205	MH 206																	11.93	69.74	94.48	110.71			33.09	618.32	651.41	CONC	825	838.2	0.35	96.0	885.93	26%	1.61	1.00	103.39	102.57	103.05	102.23	
MH 206	MH 207																	12.05	66.80	90.45	105.96																			



**STORM SEWER COMPUTATION FORM**

DESIGNED BY: AGS  
CHECKED BY: AGS

**130 Huntmar Drive**  
Lioness Development Inc. RATIONAL METHOD Q= 2.78 AIR  
191002  
Atrel Engineering Ltd  
September, 2021

Restricted Flow  
PVC/CONC N= 0.013  
CSP N= 0.024  
CORR N= 0.021

Table 9

LOCATION				AREA (ha.)								Restricted Flow (L/S)	ACTUAL PIPE FLOW (L/S)	PIPE SEWER DATA							UpStream		DwStream		UpStream		Down			
				RUNOFF COEFFICIENT										TYPE	DIA. (NOM) (mm)	(ACT)	SLOPE (%)	LENGTH (M)	CAP. (L/S)	Remaining Capacity (%)	VEL. (M/S)	Obv. (M)	Inv. (M)	Obv. (M)	Inv. (M)	Hgl at UP-MH (M)	Hgl Out UP-MH (M)	MH Hgl (M)	Up USF ELEV (M)	HGL FREEBOARD (M)
				2 Year		5 Year		10 Year																						
FROM (Up)	TO (Down)	0.40	0.60	0.70	0.80	0.40	0.60	0.70	0.80	0.70	0.80																			
MH 217	MH 218					4.66						539.90	539.90	CONC	675	685.8	0.80	46.0	784.35	31%	2.12	99.62	98.95	99.25	98.58	99.62	99.62	99.25	N/A	n/a
MH 218	MH 220					1.23				6.95		1752.95	2292.86	CONC	1200	1219.2	0.75	120.0	3522.39	35%	3.02	99.25	98.05	98.35	97.15	99.25	99.25	98.70	N/A	n/a
MH 219	MH 220										1.13	268.58	268.58	CONC	675	685.8	0.20	49.0	392.18	32%	1.06	99.43	98.76	99.33	98.66	99.43	99.43	99.33	N/A	n/a
MH 220	MH 101												2561.44	CONC	1350	1371.6	0.30	47.5	3049.82	16%	2.06	98.35	97.00	98.21	96.86	98.70	98.47	98.37	N/A	n/a
MH 101	MH 102			0.40							0.50	206.84	2768.28	CONC	1350	1371.6	0.35	92.5	3294.18	16%	2.23	98.15	96.80	97.83	96.48	98.37	98.15	97.83	99.59	1.44
MH 102	MH 103			0.45								99.00	2867.28	CONC	1350	1371.6	0.35	102.0	3294.18	13%	2.23	97.83	96.48	97.47	96.12	97.83	97.83	97.47	99.20	1.37
MH 103	MH 133			0.51								112.20	2979.48	CONC	1350	1371.6	0.35	111.5	3294.18	10%	2.23	97.47	96.12	97.08	95.73	97.47	97.47	97.10	98.15	0.68
MH 110	MH 111			0.76								167.20	167.20	CONC	450	457.2	0.50	82.5	210.32	21%	1.28	98.88	98.43	98.47	98.02	98.88	98.88	98.47	99.50	0.62
MH 111	MH 113											167.20	167.20	CONC	450	457.2	0.50	11.0	210.32	21%	1.28	98.44	97.99	98.38	97.93	98.46	98.44	98.38	99.39	0.95
MH 112	MH 113			0.75								165.00	165.00	CONC	525	533.4	0.30	11.5	245.74	33%	1.10	98.41	97.89	98.38	97.86	98.41	98.41	98.38	N/A	n/a
MH 113	MH 114			0.14								30.80	363.00	CONC	675	685.8	0.30	62.5	480.32	24%	1.30	98.38	97.71	98.19	97.52	98.38	98.38	98.19	99.39	1.01
MH 114	MH 115											363.00	363.00	CONC	675	685.8	0.30	12.0	480.32	24%	1.30	98.16	97.49	98.12	97.45	98.18	98.16	98.14	99.29	1.13
MH 115	MH 121			0.25								55.00	418.00	CONC	750	762.0	0.30	47.0	636.13	34%	1.39	98.12	97.37	97.98	97.23	98.14	98.12	98.05	99.29	1.17
MH 120	MH 121			0.26								57.20	57.20	PVC	375	366.4	0.35	64.0	97.52	41%	0.92	98.55	98.18	98.33	97.96	98.55	98.55	98.33	99.00	0.45
MH 121	MH 127			0.57								125.40	600.60	CONC	825	838.2	0.30	85.0	820.21	27%	1.49	97.98	97.16	97.72	96.90	98.05	97.98	97.73	99.23	1.25
MH 125	MH 126			0.30								66.00	66.00	PVC	375	366.4	0.30	60.0	90.28	27%	0.86	98.51	98.14	98.33	97.96	98.51	98.51	98.33	99.30	0.79
MH 126	MH 127		1.07	0.39								208.85	274.85	CONC	600	609.6	0.30	87.0	350.85	22%	1.20	98.33	97.73	98.07	97.47	98.33	98.33	98.07	98.90	0.57
MH 127	MH 132			0.37								81.40	956.85	CONC	975	990.6	0.30	83.5	1280.55	25%	1.66	97.72	96.75	97.47	96.50	97.73	97.73	97.59	98.65	0.92
MH 130	MH 131			0.52								114.40	114.40	CONC	450	457.2	0.30	63.0	162.91	30%	0.99	97.91	97.46	97.72	97.27	97.91	97.91	97.81	98.62	0.71
MH 131	MH 132			0.51								112.20	226.60	CONC	525	533.4	0.30	84.5	245.74	8%	1.10	97.72	97.20	97.47	96.95	97.81	97.81	97.59	98.50	0.69
MH 132	MH 133			0.24								52.80	1236.25	CONC	1050	1066.8	0.30	82.0	1560.35	21%	1.75	97.47	96.42	97.22	96.17	97.59	97.47	97.22	98.15	0.68
MH 133	MH 171			0.07								15.40	4231.13	CONC	1650	1676.4	0.30	42.0	5208.04	19%	2.36	97.08	95.43	96.95	95.30	97.10	97.10	97.02	97.70	0.60
MH 170	MH 171			0.09	5.95							1328.80	1328.80	CONC	1050	1066.8	0.30	51.0	1560.35	15%	1.75	97.04	95.99	96.89	95.84	97.13	97.13	97.02	97.65	0.52
MH 171	MH 173			0.10								22.00	5581.93	CONC	1800	1828.8	0.30	42.0	6568.16	15%	2.50	96.74	94.94	96.61	94.81	97.02	96.74	96.61	97.29	0.55
MH 172	MH 173			0.27								59.40	59.40	PVC	300	299.2	0.50	87.5	67.90	13%	0.97	96.99	96.69	96.55	96.25	96.99	96.99	96.57	98.05	1.06
MH 173	MH 174			0.25	0.85							242.00	5883.33	CONC	1800	1828.8	0.30	86.0	6568.16	10%	2.50	96.55	94.75	96.29	94.49	96.57	96.57	96.36	97.25	0.68
MH 174	MH 191											5883.33	5883.33	CONC	1800	1828.8	0.30	10.5	6568.16	10%	2.50	96.26	94.46	96.23	94.43	96.36	96.26	96.23	96.70	0.44
MH 200	MH 201									0.18		124.44	124.44	PVC	375	366.4	1.50	94.0	201.88	38%	1.91	106.11	105.74	104.70	104.33	106.11	106.11	104.72	N/A	n/a
MH 201	MH 202									0.24		57.04	181.48	CONC	525	533.4	1.40	62.5	530.86	66%	2.38	104.70	104.18	103.82	103.30	104.72	104.70	103.82	N/A	n/a
MH 202	MH 205									0.46		109.33	290.82	CONC	600	609.6	0.55	77.5	475.05	39%	1.63	103.82	103.22	103.39	102.79	103.82	103.82	103.48	N/A	n/a
MH 203	MH 204									0.39		92.70	92.70	CONC	450	457.2	1.10	110.0	311.95	70%	1.90	106.16	105.71	104.95	104.50	106.16	106.16	104.95	N/A	n/a
MH 204	MH 205									0.79		187.77	280.47	CONC	525	533.4	0.85	107.5	413.64	32%	1.85	104.30	103.78	103.39	102.87	104.30	104.30	103.48	N/A	n/a
MH 205	MH 206									0.62		147.36	718.65	CONC	825	838.2	0.35	96.0	885.93	19%	1.61	103.39	102.57	103.05	102.23	103.48	103.39	103.05	N/A	n/a
MH 206	MH 207									0.47		111.71	830.36	CONC	825	838.2	0.55	106.5	1110.58	25%	2.01	103.03	102.21	102.44	101.62	103.03	103.03	102.44	N/A	n/a
MH 207	MH 209									7.46		1296.47	2126.83	CONC	1050	1066.8	0.90	46.5	2702.60	21%	3.02	102.44	101.39	102.02	100.97	102.44	102.44	102.02	N/A	n/a
MH 208	MH 209									0.51		103.40	103.40	CONC	450	457.2	0.25	75.5	148.72	30%	0.91	102.17	101.72	101.98	101.53	102.17	102.17	101.98	N/A	n/a
MH 209	MH 210									0.36		85.57	2315.80	CONC	1050	1066.8	0.85	48.5	2626.46	12%	2.94	101.98	100.93	101.57	100.52	101.98	101.98	101.57	N/A	n/a
MH 210	MH 211									0.36		85.57	2401.36	CONC	1050	1066.8	0.90	96.0	2702.60	11%	3.02	101.54	100.49	100.68	99.63	101.54	101.54	100.68	N/A	n/a
MH 211	MH 212									0.34		80.81	2482.18	CONC	1050	1066.8	0.90	91.0	2702.60	8%	3.02	100.64	99.59	99.82	98.77	100.64	100.64	99.82	N/A	n/a
MH 212	MH 213									0.27		64.17	2546.35	CONC	1200	1219.2	0.50	72.0	2876.02	11%	2.46	99.80	98.60	99.44	98.24	99.80	99.80	99.44	N/A	n/a
MH 213	MH 140									5.07	0.35	1806.99	4353.34	CONC	1500	1524.0	0.50	117.0	5214.57	17%	2.86	99.44	97.94	98.85	97.35	99.44	99.44	98.85	N/A	n/a



**STORM SEWER COMPUTATION FORM**

DESIGNED BY: AGS  
CHECKED BY: AGS

**130 Huntmar Drive**  
Lioness Development Inc. RATIONAL METHOD Q= 2.78 A/R  
191002  
Atrel Engineering Ltd  
September, 2021

Restricted Flow  
PVC/CONC N= 0.013  
CSP N= 0.024  
CORR N= 0.021

Table 9

LOCATION				AREA (ha.) RUNOFF COEFFICIENT								Restricted Flow (L/S)	ACTUAL PIPE FLOW (L/S)	PIPE SEWER DATA							UpStream		DwStream		UpStream		Down				
														TYPE	DIA. (NOM) (mm)	(ACT)	SLOPE (%)	LENGTH (M)	CAP. (L/S)	Remaining Capacity (%)	VEL. (M/S)	Obv. (M)	Inv. (M)	Obv. (M)	Inv. (M)	Hgl at UP-MH (M)	Hgl Out UP-MH (M)	MH Hgl (M)	Up USF ELEV (M)	HGL FREEBOARD (M)	
				FROM (Up)	TO (Down)	0.40	0.60	0.70	0.80	0.40	0.60															0.70	0.80				0.70
MH	140	MH	142			0.17						1.06	288.44	4641.78	CONC	1650	1676.4	0.45	55.0	6378.52	27%	2.89	98.85	97.20	98.60	96.95	98.85	98.85	98.60	99.75	0.90
MH	141	MH	142			0.68							231.20	231.20	CONC	525	533.4	0.35	110.5	265.43	13%	1.19	98.39	97.87	98.00	97.48	98.39	98.39	98.00	99.70	1.31
MH	142	MH	144			0.30							102.00	4974.98	CONC	1650	1676.4	0.45	79.0	6378.52	22%	2.89	98.00	96.35	97.64	95.99	98.00	98.00	97.64	99.38	1.38
MH	143	MH	144			0.58							197.20	197.20	CONC	525	533.4	0.30	94.0	245.74	20%	1.10	98.22	97.70	97.94	97.42	98.22	98.22	97.94	99.28	1.06
MH	144	MH	152			0.32							108.80	5280.98	CONC	1650	1676.4	0.45	85.5	6378.52	17%	2.89	97.64	95.99	97.26	95.61	97.64	97.64	97.26	99.31	1.67
MH	146	MH	147			0.29							98.60	98.60	CONC	450	457.2	0.30	115.0	162.91	39%	0.99	98.36	97.91	98.01	97.56	98.36	98.36	98.01	99.18	0.82
MH	147	MH	148										98.60	98.60	CONC	450	457.2	0.30	11.5	162.91	39%	0.99	97.98	97.53	97.95	97.50	97.98	97.98	97.96	99.21	1.23
MH	148	MH	152			0.67							227.80	326.40	CONC	675	685.8	0.30	97.5	480.32	32%	1.30	97.95	97.28	97.66	96.99	97.96	97.95	97.66	99.15	1.20
MH	152	MH	156			0.31							105.40	5712.78	CONC	1800	1828.8	0.40	83.5	7584.26	25%	2.89	97.26	95.46	96.93	95.13	97.26	97.26	97.03	99.21	1.95
MH	154	MH	155			0.40							136.00	136.00	CONC	450	457.2	0.30	73.5	162.91	17%	0.99	97.19	96.74	96.97	96.52	97.29	97.29	97.14	99.21	1.92
MH	155	MH	156			0.20	1.73						500.50	636.50	CONC	825	838.2	0.30	63.0	820.21	22%	1.49	96.97	96.15	96.78	95.96	97.14	97.14	97.03	98.06	0.92
MH	156	MH	157			0.17							57.80	6407.08	CONC	1950	1981.2	0.30	46.5	8130.98	21%	2.64	96.78	94.83	96.64	94.69	97.03	97.03	96.94	98.27	1.24
MH	157	MH	158			0.20							68.00	6475.08	CONC	1950	1981.2	0.30	46.5	8130.98	20%	2.64	96.61	94.66	96.47	94.52	96.94	96.94	96.85	98.17	1.23
MH	158	MH	175											6475.08	CONC	1950	1981.2	0.30	45.0	8130.98	20%	2.64	96.18	94.23	96.04	94.09	96.85	96.76	96.67	97.63	0.87
MH	160	MH	161			0.52							176.80	176.80	CONC	525	533.4	0.30	120.0	245.74	28%	1.10	96.87	96.35	96.51	95.99	97.11	97.11	96.92	N/A	n/a
MH	161	MH	162			0.20							68.00	244.80	CONC	600	609.6	0.30	54.5	350.85	30%	1.20	96.51	95.91	96.35	95.75	96.92	96.92	96.84	N/A	n/a
MH	162	MH	175			0.34							115.60	360.40	CONC	675	685.8	0.30	99.0	480.32	25%	1.30	96.35	95.68	96.05	95.38	96.84	96.84	96.67	N/A	n/a
MH	175	MH	176			0.38							83.60	6919.08	CONC	1950	1981.2	0.30	56.5	8130.98	15%	2.64	96.00	94.05	95.83	93.88	96.67	96.58	96.46	N/A	n/a
MH	176	MH	178			0.22	0.92						48.40	6967.48	CONC	1950	1981.2	0.30	66.0	8130.98	14%	2.64	95.83	93.88	95.63	93.68	96.46	96.46	96.31	97.00	0.54
MH	177	MH	178			0.32							70.40	70.40	PVC	375	366.4	0.30	100.5	90.28	22%	0.86	96.24	95.87	95.94	95.57	96.49	96.49	96.31	98.05	1.56
MH	178	MH	190			0.15							33.00	7070.88	CONC	1950	1981.2	0.30	46.5	8130.98	13%	2.64	95.63	93.68	95.49	93.54	96.31	96.31	96.20	96.80	0.49
MH	179	MH	190			0.35							77.00	77.00	PVC	375	366.4	0.30	83.0	90.28	15%	0.86	96.33	95.96	96.08	95.71	96.38	96.38	96.20	97.75	1.37
MH	190	MH	191			0.17							37.40	7185.28	CONC	1950	1981.2	0.30	40.5	8130.98	12%	2.64	95.49	93.54	95.37	93.42	96.20	96.20	96.11	96.65	0.45
MH	191	MH	192			0.04	4.86						1078.00	14146.61	CONC	2550	2590.8	0.30	118.5	16627.39	15%	3.15	95.31	92.76	94.95	92.40	96.11	95.69	95.43	96.70	1.01
MH	192	MH	193				8.17						1797.40	15944.01	CONC	2550	2590.8	0.30	118.5	16627.39	4%	3.15	94.62	92.07	94.26	91.71	95.43	95.43	95.10	96.00	0.57
MH	193	MH	194											15944.01	CONC	2550	2590.8	0.30	78.0	16627.39	4%	3.15	94.23	91.68	94.00	91.45	95.10	94.92	94.70	95.20	0.28
MH	School	MH	ex 179			2.40							528.00	528.00	CONC	750	762.0	0.30	14.0	636.13	17%	1.39	97.64	96.89	97.60	96.85	97.64	97.64	97.60	99.20	1.56
MH	65	MH	66			0.79							268.60	268.60	CONC	600	609.6	0.30	88.0	350.85	23%	1.20	98.70	98.10	98.44	97.84	98.70	98.70	98.44	99.22	0.52
MH	66	MH	67			0.86							291.96	560.56	CONC	750	762.0	0.30	98.5	636.13	12%	1.39	98.44	97.69	98.14	97.39	98.44	98.44	98.14	99.31	0.87
MH	67	MH	ex 180											560.56	CONC	750	762.0	0.30	13.0	636.13	12%	1.39	97.34	96.59	97.30	96.55	97.34	97.34	97.30	99.06	1.72
MH	70	MH	71			0.10	1.22						337.88	337.88	CONC	675	685.8	0.30	53.5	480.32	30%	1.30	97.57	96.90	97.41	96.74	97.57	97.57	97.41	98.05	0.48
MH	71	MH	72			0.11	1.11						314.90	652.78	CONC	825	838.2	0.30	53.0	820.21	20%	1.49	97.41	96.59	97.25	96.43	97.41	97.41	97.25	98.33	0.92
MH	72	MH	ex 181											652.78	CONC	825	838.2	0.30	17.5	820.21	20%	1.49	97.25	96.43	97.20	96.38	97.25	97.25	97.20	97.94	0.69

FUTURE STORM SEWERS FOR 195 HUNTMAR DRIVE.  
PROPOSED STORM SEWERS TO NORTH FOREBAY  
PROPOSED STORM SEWERS TO SOUTH FOREBAY  
Area restricted to 220 l/s/ha  
Area restricted to 115 l/s/ha  
Area restricted to 340 l/s/ha  
Area restricted to 250 l/s/ha



September 20, 2021

Project Number: P1801

Atrél Engineering Ltd  
1-2884 Chamberland Street  
Rockland, ON  
K4K 1M6

**Attention: Jean Décoeur, P.Eng**

**Subject: 130 Huntmar Drive / Preliminary Kanata West Pond 4 Sizing**

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## Introduction

J.F. Sabourin and Associates Inc. (JFSA) was retained by Atrél Engineering Ltd. (Atrél) to complete a preliminary stormwater analysis for the proposed 26.63 ha residential/commercial development, located at 130 Huntmar Drive in Stittsville, Ontario. The following memo is an update of the original memo of the same name dated September 2020, which has been updated to reflect the latest development, address preliminary review comments from the City and include refinements to the proposed SWM pond design.

The proposed development will discharge to an existing Stormwater Management (SWM) pond, located on the west banks of the Carp River just south of Palladium Drive, which is commonly referred to as Pond 4. Runoff from the proposed development will be conveyed to Pond 4 through a proposed stormwater trunk sewer, in conjunction with major system flow routes directly from the development to the SWM pond. The proposed trunk sewer will also convey minor system flow from the approximately 31.08 ha future residential and commercial developments west of Huntmar Drive. As these lands will also discharge to Pond 4, they have also been included in this analysis. This memo intends to quantify the impacts that the proposed developments (both east and west of Huntmar Drive) will have on the operations of Pond 4 and on the greater Carp River watershed. It is anticipated that the abovementioned developments will require that the current Pond 4 SWM facility be upsized, and the proposed outlet configuration adjusted to ensure no adverse impacts to the surrounding area. As such the following memo details the proposed upgrading of the existing Pond 4 SWM facility.

## Model Overview

### Base Model

The proposed development sites are within the Carp River watershed and are captured in the City of Ottawa's existing PCSWMM models of the Carp River; these models were provided to JFSA by the City on May 11, 2017. It was confirmed by City staff that these models have not been officially updated by the City since February 24, 2017. For this study, the City's Ultimate conditions model has been set as the benchmark for future conditions modelling on the Carp River.

On February 6, 2019, JFSA updated the City's Ultimate conditions model as a part of a study for Kanata West Pond 7, full details of this analysis and changes made to the City's original PCSWMM model are documented in JFSA's report titled "Preliminary Kanata West Pond 7 Sizing". As this study proposed diverting a portion of the runoff from the developments west of Huntmar Drive to pond 7, which was originally earmarked to discharge to pond 4, the PCSWMM Model updated by JFSA in February 2019 (CarpUltimate\_FullRestoration\_D2) has been used as the base for developing the proposed conditions for the following study, to ensure continuity throughout the greater Carp River model.

### Subcatchments

The proposed development is contained within existing model subcatchments areas PS201, PS202 and PS20. These subcatchments were clipped and replaced with the smaller more refined subcatchments as outlined in Atriel's drawing titled "Macro Storm Drainage Area Plan" which has been provided in Attachment A. Also provided in Attachment A are the rational method Calculation sheets used to preliminary size the storm sewer network both east and west of Huntmar Drive.

Small refinements had to be made to neighbouring subcatchments within the PCSWMM model to ensure that the existing and proposed drainage boundaries conformed. The parameters of both the new and the existing subcatchments were updated accordingly. Attachment B provides figures outlining the updated PCSWMM model, along with the proposed subcatchment parameters.

In reviewing and updating the subcatchments in the PCSWMM model it was noted that approximately 5.7 ha of the existing Canadian Tire Centre Parking lot located southeast of the intersection of Huntmar Drive and Palladium Drive, was miss identified as draining to Pond 4 under the City's Ultimate conditions model. Based on the storm sewer data provided on GeoOttawa, this parking lot discharges to the existing storm sewer that runs west to east along Palladium Drive. It was also noted that the GIS area for this subcatchment (PS207) was approximately 5.58 ha smaller than what had been applied in the City's model. Indicating that the City may have already identified that this parking lot area drains to the storm sewer running along Palladium Drive but did not bother updating the GIS area in the model. As all the neighbouring GIS and modelled subcatchment areas match up well, this disconnect between GIS and modelled area for subcatchment PS207 results in the City's Carp River Ultimate model overestimating the total drainage area at this location by approximately 5.8 ha. Further investigation of the neighbouring subcatchments also found that the City's Ultimate model under-represented the total drainage area for the lands just south of Pond 4 (subcatchment PS207) by approximately 0.2 ha. Accordingly, all subcatchments surrounding the subject area have been rectified in the latest modelling work to ensure that the GIS and modelled subcatchment areas align.

Within the proposed development area, the runoff coefficients as indicated in the drawing by Atriel were converted to percent impervious values and applied to the latest model. For subcatchments less than 0.5 ha, the subcatchment width was calculated by taking the subcatchment area divided by the average maximum overland flow length. For subcatchments greater than 0.5 ha, the width was calculated as  $\sqrt{(Area/1.5)}$ . The depression storage, pervious and impervious manning's values, as well as soil parameters for all these subcatchments were set as per the original parameters specified in the City's Ultimate PCSWMM model at their respective locations. Full details of these subcatchment parameters have been provided in Attachment B.

### Minor System

The proposed storm trunk sewer that will pass through the proposed development to Pond 4 has been included in the latest modelling. All key pipe parameters such as length, diameter, slope, material, and loss coefficients have been included in this model, as per preliminary designs as provided by Atrel and DSEL in the rational method calculation sheets provided in Attachment A. Note that the current plan is a preliminary design and may be subject to future refinements.

Locations where the proposed development will connect to the existing trunk sewer along Maple Grove Road, draining to Pond 4, have also been included in the model. Provided in Attachment B is a markup of the storm drainage plan from the KWMSS completed by Stantec in June 2006, with annotations indicating deviations from this original drainage plan. Based on these markups the total allowable flow to the Maple Grove trunk sewer from the East Huntmar Development is 1,723 L/s. Under the latest design, a total of 6.504 ha will drain to the existing Maple Road Grove storm sewer, at a maximum total allowable release rate of 1,723 L/s (average release of 265 L/s/ha). Full details of the assumed release rates and on-site storage for these lands are documented in Attachment B, Tables B2 and B3. Note that the model used in this report is a simplistic lumped model, and a more detailed hydrologic and hydraulic analysis of the Maple Grove Road trunk sewer may need to be completed at detailed design.

### Major System

Major system conveyance routes and storage has been accounted for in this model based on preliminary site grading plans for both developments east and west of Huntmar Drive as per designs by Atrel and DSEL. Generic road cross-section profiles have been applied to the model, based on the proposed right-of-way widths allocated at the various locations. In locations where major system flow occurs through natural ditches, generic triangular cross-sections with 3:1 slopes have been assumed for all routes. As the lengths, slopes and cross-sectional profiles of all major system flow routes have been represented in the model, the model is inherently able to account for the storage volume within these segments. Localized low points within the development have been included in the road segments west of Huntmar Drive (DSEL design) but have not been included east of Huntmar Drive. The exclusion of this localized road storage east of Huntmar Drive ensures that the proposed design is conservative. Based on the latest modelling results, ponding depths on the road within the proposed developments for the 100-Year event are all less than 30 cm. Road catchbasins will be implemented within the development at required locations to ensure water levels on the major system meet City guidelines and will be assessed in detail at the detailed design stage.

### Major/Minor Linking

Runoff from the subcatchments was applied directly to the closest applicable major system node within the model. These nodes then have a depth/flow rating curve applied at this location (using an outlet link) connecting the flow from the streets to the minor system. The flow values applied in these rating curves were set based on the level of service provided at each respective location. For the lands east of Huntmar Drive the level of service is specified as per Atrel's design, with residential lands releasing at 340 L/s/ha or 220 L/s/ha (based on their location relative to the arterial road), commercial lands releasing at 250 L/s/ha with some on-site storage (assumed 50 m<sup>3</sup>/ha) and the proposed school blocks and parklands releasing at 220 L/s/ha and 115 L/s/ha respectively, with onsite storage controlling up to the 100-Year event at both locations. Refer to Atrel's stormwater drainage plan figure provided in Attachment A.

For the lands west of Huntmar Drive these rating curves were set based on the level of service provided at each respective location; with a 2-Year minor system level of service provided on local roads, 5-year on collector roads, and 10-Year on arterial. With the lumped areas (commercial schools and parks) having a 5-Year level of service with 100-year on-site control, except for the 5.07 ha commercial lands, which will release at 340 L/s/ha with 100-year on-site control. Refer to the stormwater drainage plan figure provided in Attachment A for more details. Note that capture rates outlined in this analysis are for preliminary design purposes and will be refined during the detail design stage using the current City of Ottawa design guidelines. Also note that as per City guidelines that the modelling assumes 100% capture of flows from the proposed development west of Huntmar Drive at the intersection with Huntmar Drive, to ensure that no major system flow from this development will cross Huntmar Drive, the same has been applied to the 130 Huntmar site in the central east most extent of the development where there is a major system flow link between 130 Huntmar and the City Lands to the East.

### On-Site Storage

On-site storage has been assumed for the large lumped development areas (schools, parks and commercial lands) and applied in the model. The on-site storage volumes have been calculated using the PCSWMM model based on the 100 Year 12 Hour SCS Storm (critical storm for the Carp River), and have been incorporated into the PCSWMM modelling, through the use of storage nodes. Table B2 in Attachment B outlines the allowable release rates for the various lumped areas and the required or assumed on-site storage volume for each location.

### SWM Pond

Based on the analysis provided from the JFSA memo of the same name submitted February 11, 2020, it was found that the existing SWM “Pond 4” will need to be upsized by approximately 55% to accommodate the proposed Huntmar developments, which equated to approximately 25,600 m<sup>3</sup> of additional active storage volume. The existing stage/storage curve that is currently physically in place at Pond 4 was developed by JFSA and DSEL, as an interim condition in December 2014, with full details of the design documented in JFSA’s December 2014 Pond 4 Pond Design brief.

Since the February 2020 study, Atrel has developed a detailed Pond 4 stage/storage curve that has been increased in volume to accommodate the proposed Huntmar developments. Detailed drawings of the proposed pond have been provided in Attachment C, which includes the current pond footprint. A comparison between the stage storage curves for the existing constructed pond, the pond assumed in the City’s Ultimate conditions modelling and the current proposed pond expansion have also been provided in Attachment C. This comparison indicates the latest proposed pond will need to be increased by approximately 25,932 m<sup>3</sup> to accommodate the proposed development but will be approximately 15,678 m<sup>3</sup> smaller than the volume assumed in the City’s Ultimate conditions modelling, due to the diversion of some drainage area to Pond 7, as discussed above.

To ensure that the proposed developments do not have any adverse impacts on existing stormwater infrastructure or on the greater Carp River watershed, the Pond 4 stage/storage curve and outlet rating curve have been adjusted to mitigate any impacts. This was completed through an iterative process, of adjusting the pond outlet structure sizes until all events were either under or closely matched the peak water levels from the City’s Carp River Ultimate Conditions model, at key locations along the watercourse. Based on the location of Pond 4 relative to the greater Carp River it was determined that it was best to control only up to the 10-Year event, as the peak flow into Pond 4 occurs approximately 5.5 hours before the peak flow on the Carp River at this location. Attenuating flows from this area in Pond 4 for the larger return periods (e.g. 100-Year event) would exacerbate the peak flows and flooding along the Carp River, due to the timing of peaks. The latest Pond 4 design has been developed to ensure that the peak flow out of the pond for the 10-Year event does not exceed 17.282 m<sup>3</sup>/s, as specified in the KWMSS. The latest modelling of Pond 4 indicated that the peak flow out of the pond for this event is 10.74 m<sup>3</sup>/s.

Note that the City PCSWMM models for the pond outlet used a single rating curve derived from the summation of various weir and orifice calculations. For transparency and ease for future updates, the latest model has been updated to represent each proposed orifice and weir out of Pond 4, through individual links in the model. Refer to Attachment C, for full details of the simulated water levels and flows in and out of the pond for the various return periods, along with the pond outlet structure details and hydraulic operations.

#### Boundary Conditions and Hotstart Files

As per the City of Ottawa’s “PCSWMM HotStart File Memo” dated April 17, 2015, HotStart files have been created and used for all model simulations documented in this memo. For all events, excluding the 100-year, a normal depth boundary condition has been applied at the downstream extent of the model on the Carp River (node CO001). For the 100-year event, a fixed water level of 92.50 m has been applied at the same location.

### Model Results

#### Carp River

Tables 1 to 4 outline the peak flows, total volumes and peak water levels on the Carp River presented in the City’s Ultimate Conditions and the updated proposed conditions models, at 4 key locations on the Carp River downstream of the Pond 4.

Table 1: Carp River at Palladium Drive  
(Node: CJ150 - 2977.8 ha)

Event	City Ultimate			Proposed Conditions			Difference		
	[1]			[2]			[2] - [1]		
	Peak Inflow (m <sup>3</sup> /s)	Total Inflow (1000 m <sup>3</sup> )	Peak WSE (m)	Peak Inflow (m <sup>3</sup> /s)	Total Inflow (1000 m <sup>3</sup> )	Peak WSE (m)	Peak Inflow (m <sup>3</sup> /s)	Total Inflow (1000 m <sup>3</sup> )	Peak WSE (m)
25mm Ch 3Hr	5.5	389	93.05	5.5	322	93.06	0.1	-67	0.00
2 Year SCS 12hr	24.0	669	93.37	21.2	657	93.36	-2.8	-12	-0.01
5 Year SCS 12hr	42.5	993	93.61	34.1	960	93.60	-8.4	-33	-0.01
10 Year SCS 12hr	47.0	1,220	93.75	49.2	1,224	93.74	2.1	4	-0.01
25 Year SCS 12hr	38.6	1,513	93.91	44.9	1,543	93.90	6.2	30	-0.01
50 Year SCS 12hr	42.1	1,727	94.02	37.8	1,693	94.01	-4.2	-34	-0.02
100 Year SCS 12hr	35.7	1,947	94.14	40.9	1,964	94.13	5.2	17	-0.02

**Table 2: Carp River at Highway 417**  
(Node: CJ120 - 3080.559 ha)

Event	City Ultimate Conditions			Proposed Conditions			Difference		
	[1]			[2]			[2] - [1]		
	Peak Inflow (m <sup>3</sup> /s)	Total Inflow (1000 m <sup>3</sup> )	Peak WSE (m)	Peak Inflow (m <sup>3</sup> /s)	Total Inflow (1000 m <sup>3</sup> )	Peak WSE (m)	Peak Inflow (m <sup>3</sup> /s)	Total Inflow (1000 m <sup>3</sup> )	Peak WSE (m)
25mm Ch 3Hr	5.2	455	92.66	5.2	372	92.67	0.0	-83	0.00
2 Year SCS 12hr	11.4	729	93.10	11.2	725	93.09	-0.2	-5	-0.01
5 Year SCS 12hr	17.1	1,063	93.39	16.9	1,053	93.38	-0.3	-10	-0.01
10 Year SCS 12hr	21.3	1,298	93.55	20.8	1,283	93.54	-0.5	-15	-0.01
25 Year SCS 12hr	26.0	1,606	93.73	25.5	1,588	93.72	-0.5	-18	-0.01
50 Year SCS 12hr	29.3	1,829	93.85	28.7	1,807	93.83	-0.6	-22	-0.01
100 Year SCS 12hr	32.4	2,057	93.98	31.7	2,032	93.96	-0.7	-25	-0.01

**Table 3: Carp River at Confluence with Feed Mill Creek**  
(Node: CJ108 - 4259.23 ha)

Event	City Ultimate Conditions			Proposed Conditions			Difference		
	[1]			[2]			[2] - [1]		
	Peak Inflow (m <sup>3</sup> /s)	Total Inflow (1000 m <sup>3</sup> )	Peak WSE (m)	Peak Inflow (m <sup>3</sup> /s)	Total Inflow (1000 m <sup>3</sup> )	Peak WSE (m)	Peak Inflow (m <sup>3</sup> /s)	Total Inflow (1000 m <sup>3</sup> )	Peak WSE (m)
25mm Ch 3Hr	6.0	546	92.46	6.0	457	92.46	0.0	-89	0.00
2 Year SCS 12hr	14.4	925	92.92	14.2	922	92.92	-0.2	-3	-0.01
5 Year SCS 12hr	22.3	1,365	93.21	22.1	1,357	93.20	-0.3	-8	-0.01
10 Year SCS 12hr	28.0	1,675	93.36	27.6	1,663	93.35	-0.4	-12	-0.01
25 Year SCS 12hr	34.9	2,080	93.54	34.4	2,066	93.53	-0.5	-14	-0.01
50 Year SCS 12hr	39.5	2,371	93.65	38.9	2,355	93.64	-0.6	-16	-0.01
100 Year SCS 12hr	44.4	2,674	93.78	43.8	2,643	93.77	-0.6	-31	-0.01

**Table 4: Carp River at Richardson Side Road**  
(Node: CJ050 - 4711.672 ha)

Event	City Ultimate Conditions			Proposed Conditions			Difference		
	[1]			[2]			[2] - [1]		
	Peak Inflow (m <sup>3</sup> /s)	Total Inflow (1000 m <sup>3</sup> )	Peak WSE (m)	Peak Inflow (m <sup>3</sup> /s)	Total Inflow (1000 m <sup>3</sup> )	Peak WSE (m)	Peak Inflow (m <sup>3</sup> /s)	Total Inflow (1000 m <sup>3</sup> )	Peak WSE (m)
25mm Ch 3Hr	5.7	685	92.12	5.7	553	92.12	0.0	-132	0.00
2 Year SCS 12hr	12.9	1,052	92.57	12.8	1,050	92.57	-0.1	-2	0.00
5 Year SCS 12hr	20.2	1,518	92.85	20.0	1,512	92.84	-0.2	-6	-0.01
10 Year SCS 12hr	25.0	1,851	93.03	24.6	1,841	93.03	-0.3	-10	-0.01
25 Year SCS 12hr	32.8	2,287	93.18	32.4	2,274	93.17	-0.4	-13	-0.01
50 Year SCS 12hr	37.4	2,601	93.29	37.1	2,585	93.28	-0.3	-16	-0.01
100 Year SCS 12hr	43.5	3,001	93.46	43.0	2,971	93.45	-0.5	-30	-0.01

From this analysis, it is seen that the proposed Pond 4 upgrade detailed in this report results in water levels on the Carp River to be either equal to or slightly less than that set by the City's Ultimate Condition model, at all key locations downstream of the proposed development. It should be noted that from this analysis it was found that for the 100-Year 12-hour SCS event peak flows out of the Pond 4 occurs at around 6 hours and 10 minutes into the event, while the peak flow on the Carp River at the Pond 4 outlet occurs at around 11 hours and 40 minutes into the event. Due to the 5.5-hour difference in timing of peaks between Pond 4 and the Carp River, there are no peak water level increases observed on the Carp River with the proposed pond and development implemented.

#### Pond 4

Tables 5 outlines the peak flows, total volumes and peak water levels in Pond 4 presented in the City's Ultimate conditions model and the latest proposed design. Full details of flows into and out of the pond have been provided in Attachment C.

Table 5: SWM Pond 4  
(Node: PSto201 - 239.305 ha)

Event	City Ultimate Conditions			Proposed Conditions			Difference		
	Peak Inflow (m <sup>3</sup> /s)	Total Inflow (1000 m <sup>3</sup> )	Peak WSE (m)	Peak Inflow (m <sup>3</sup> /s)	Total Inflow (1000 m <sup>3</sup> )	Peak WSE (m)	Peak Inflow (m <sup>3</sup> /s)	Total Inflow (1000 m <sup>3</sup> )	Peak WSE (m)
25mm Ch 3Hr	10.6	42	94.06	11.3	35	94.07	0.7	-7	0.01
2 Year SCS 12hr	15.2	85	94.35	15.0	72	94.32	-0.3	-13	-0.02
5 Year SCS 12hr	20.8	120	94.48	20.6	102	94.43	-0.2	-18	-0.05
10 Year SCS 12hr	23.3	143	94.57	24.3	121	94.49	0.9	-22	-0.08
25 Year SCS 12hr	26.3	172	94.63	29.0	145	94.57	2.7	-27	-0.06
50 Year SCS 12hr	28.1	192	94.66	32.2	161	94.63	4.1	-30	-0.03
100 Year SCS 12hr	31.0	211	94.70	34.7	177	94.68	3.7	-34	-0.01

From this analysis, it is seen that the peak flows into the pond are generally slightly higher than that approximated by the City's Ultimate model due to the greater discretization of subcatchment areas, with the total inflow volume less due to the reduction in total drainage area to the pond (approximately 34,000 m<sup>3</sup> less for the 100-year event). The pond has been sized to ensure that the peak proposed 100-Year water level in the pond does not exceed the elevation determined in the City's Ultimate condition. It is noted that there is a minor (1cm) increase in the pond peak water levels for the 25 mm event, which may be determined to be inconsequential or can be rectified at detailed design through slight adjustments to the pond stage/area curve or the outlet configuration.

#### Maple Grove Storm Sewer

The City's Ultimate condition model includes a simplistic representation of the existing stormwater trunk sewer to Pond 4 that runs west to east along Maple Grove Drive. Under the currently proposed design, approximately 6.52 ha of the Huntmar Development will discharge to this sewer and has been represented accordingly in this model.



The City's Ultimate conditions model assumed that approximately 14 ha of the proposed development would discharge to this trunk sewer. Table 6 below outlines the peak flows, total volumes and peak water levels on the existing storm sewer under the City's Ultimate Conditions and currently proposed conditions at model Node PJ206, which is located near the City of Ottawa's Maple Grove Depot at 1655 Maple Grove Road. Note that the results provided below are simply a comparison between the results outlined in the City's Ultimate condition model against the currently proposed conditions. A more comprehensive analysis of the lands draining to the Maple Grove Road trunk sewer and the trunk sewers hydraulic operation under future conditions may need to be completed at detailed design.

Table 6: Maple Grove Drive Existing Minor System  
(Node: PJ206 - 163.71 ha)

Event	City Ultimate Conditions			Proposed Conditions			Difference		
	[1]			[2]			[2] - [1]		
	Peak Inflow (m <sup>3</sup> /s)	Total Inflow (1000 m <sup>3</sup> )	Peak WSE (m)	Peak Inflow (m <sup>3</sup> /s)	Total Inflow (1000 m <sup>3</sup> )	Peak WSE (m)	Peak Inflow (m <sup>3</sup> /s)	Total Inflow (1000 m <sup>3</sup> )	Peak WSE (m)
25mm Ch 3Hr	6.8	23	94.17	6.2	22	94.07	-0.5	-1	-0.10
2 Year SCS 12hr	9.1	48	94.55	8.5	45	94.33	-0.6	-3	-0.23
5 Year SCS 12hr	12.5	68	94.95	11.1	64	94.48	-1.4	-4	-0.47
10 Year SCS 12hr	15.1	81	95.06	13.4	76	94.61	-1.7	-5	-0.45
25 Year SCS 12hr	17.8	97	95.31	15.5	91	95.04	-2.3	-6	-0.27
50 Year SCS 12hr	19.6	108	95.69	16.7	101	95.30	-2.8	-7	-0.39
100 Year SCS 12hr	22.3	119	96.11	18.3	111	95.62	-4.0	-7	-0.49

From this analysis, it was shown that under the proposed conditions for all events, the peak water levels and flows are lower than those simulated in the City of Ultimate conditions model. Again, this model is a simplistic representation of the Maple Grove trunk sewer and a more comprehensive analysis of the future operations of the Maple Grove trunk sewer may need to be completed at detailed design.

## Water Balance

A pre-and post-development water balance has been completed for the site based on the Ministry of the Environment, Conservation and Parks (MECP) SWM design guidelines; the following section outlines the approach and results of this analysis for the various site conditions.

### Pre-Development

As per the Kanata West Master Servicing Study (KWMSS) dated June 16, 2006, by Stantec Consulting Limited and Cumming Cockburn Limited, the subject lands are considered to be in an area of moderate groundwater recharge and will need to meet the proposed target infiltration rates of 104 mm/Year. Based on Table 3.1 - Hydrologic Cycle Component Values of the MECP's SWM Manual assuming Type D soils with shallow root crops the annual surplus (runoff + infiltration) will be 415mm/year, the infiltration factors (topography factor soil factor and cover factor) were adjusted within reasonable limits to obtain an annual infiltration value of 104 mm/year, matching the target set out in the KWMSS.

To determine the total water budget for the site, the proposed development lands have been broken into pervious and impervious areas. The annual evaporation, runoff and infiltration volumes were calculated for the impervious and pervious lands separately and summated to provide the overall water balance for the site, note that for pre-development conditions, this site is 0% impervious. Based on continuous hydrologic SWMHYMO model simulations using 39 years of historical rainfall data from the Ottawa Airport, City default impervious Initial Abstraction parameters and an impervious drying time of 45 minutes, it was found that for 100% impervious surfaces, on average, 26% of the annual precipitation will be lost due to evaporation with runoff making up the remaining 74%, these values have been adopted in the water balance calculations for impervious surfaces.

Tables B1-1 to B1-3 outline the calculations of each of these components. Based on this analysis it was found that this site on average, 55.9% of the annual precipitation will return to the atmosphere through evaporation and evapotranspiration, 11.0% will infiltrate and 33.1% will runoff. For the total site drainage area of 26.83 ha, the site will infiltrate approximately 104 mm/yr. (27,835 m<sup>3</sup>/yr.) of the total annual precipitation of 940 mm/yr. (252,202 m<sup>3</sup>/yr.).

### Post-Development-Without LIDs

Under post-development conditions, the site has been broken into 4 subcomponents based on the proposed land use type: Residential, Commercial, School and Park Lands. Note that the impervious area associated with the proposed roads has been included in the various development types outlined above. Based on the development conceptual plan, the 26.83 ha site will have a total imperviousness of 72%. The site's water budget parameters have been updated based on Table 3.1 - Hydrologic Cycle Component Values of the MECP's SWM Manual, assuming Urban Lawns and Type D hydrologic soil type. This analysis also assumes that the pervious surfaces within the development will be covered with imported topsoil, and as such a soil infiltration factor of 0.2 (reflective of a mix of clay and loam) was applied.

As completed under pre-development conditions, each of the land use types have been broken into pervious and impervious areas, and these resulting values summated. Tables D2-1 to D2-3 outline the calculations of each of these components. Based on this analysis it was found that, under post-development conditions (without any LID measures in place), this site on average will evaporate 34.4% of its annual precipitation while 5.0% will infiltrate and 60.6% will runoff. Based on the total development area of 26.83 ha, the site will infiltrate 47 mm/yr. (12,554 m<sup>3</sup>/yr.) of the total annual rainfall of 940 mm/yr., 57 mm/yr. (15,282 m<sup>3</sup>/yr.) short of the pre-development conditions.

### Post-Development – With LIDs

As indicated above, the increase in the impervious area due to the proposed development will result in a decrease in annual infiltration volume. To offset this deficit, it is proposed that LID measures will be implemented throughout the site to capture a portion of the additional runoff and allow it to infiltrate back into the soil. For this site, it is currently proposed that selected street catchbasins have LID measures implemented that will capture and infiltrate runoff through perforated pipe systems connected to the catchbasins. It is proposed that the perforated pipes be connected to catchbasins, set with the obverts of the perforated pipes at the inverts of the lead pipes connected to the main storm sewer. The perforated pipes will be surrounded by a 50 mm clear stone infiltration trench, constructed per City of Ottawa standard drawing S29.

As a part of the “Barrhaven South Urban Expansion Area Master Servicing Study” completed by J.L. Richards and Associates Inc. (JLR), a detailed historical rainfall analysis was completed to correlate the volume of a single rainfall event to an annual event percentile; for example, based on JLR’s study a 22 mm rainfall event correlates to the 95<sup>th</sup> percentile of all annual rainfall events in the Ottawa region. Similarly, the 85<sup>th</sup>, 75<sup>th</sup> and 65<sup>th</sup> percentile events correspond to 11.4 mm, 7.5 mm and 5.1 mm rainfall events. Using JLR’s data, further extrapolation/interpolation can be applied to determine the annual percentiles for particular rainfall events. JLR’s analysis helps determine how much of the annual rainfall volume will be dealt with but is missing a key piece of information; the runoff volume (in mm) generated by such rainfall events, which then can be used to conceptually size LID measures. To provide this missing information, a series of conceptual SWMHYMO models were prepared for various total imperviousness (TIMP) ranging from 40% to 95% with various degrees of directly connected imperviousness (XIMP), all with City Standard parameters. These models were run for the 5 mm, 10 mm, 15 mm, 20 mm, 22 mm, 25 mm and 30 mm design storms. From the results obtained (provided in Attachment C) it is possible to determine the runoff (in mm) generated from a given TIMP and XIMP, for any of these storms. For events with less than 5 mm of rainfall, the runoff volume can be computed by simply removing the initial abstraction (IA), from the total rainfall, over the impervious surfaces as the pervious surfaces will not generate any runoff.

It is noted that for the proposed development, with 72% total imperviousness (TIMP) and 62% directly connected imperviousness (XIMP), a 5 mm event would generate approximately 1.92 mm of runoff volume. If 50% of the development is designed to capture and infiltrate all runoff from the 5mm event (zero runoff for 64% of all annual rainfall events) these LIDs will be able to infiltrate 70 mm/yr. (18,913 m<sup>3</sup>/yr.) bring the site total infiltration rate (pervious surfaces & LIDs) to 117 mm/yr. (31,467 m<sup>3</sup>/yr.) exceeding the infiltration target set out in the KWMSS by 14mm/yr. (3,631 m<sup>3</sup>/yr.).

A conceptual drawing of the proposed Catchbasin Infiltration LID measures has been provided in Attachment D. Note that the exact location and configuration of each LID measure is dependent on the total drainage area and runoff volume to each LID and the location of each measure can be refined at detailed design through coordination with the City. Irrespective of these specific LID details that will be refined at the detailed design stage, the following calculations have shown that the proposed development can meet the required infiltration targets by implementing LIDs that will capture the runoff for the 5mm event within 50% of the development.

#### Development Water Budget Scenario Summary

Tables 7-9 summarize the annual average water balance under existing conditions and post-development conditions for the proposed development lands with and without LID measures in place, as m<sup>3</sup>/year, mm/year and % of total annual rainfall.

**Table 7: Pre-Development Water Balance**

Drainage Area (ha)		26.83	Imperviousness:	2%
Annual Average Volume	Precipitation	Evapotranspiration	Infiltration	Runoff
m <sup>3</sup>	252,202	140,858	27,836	83,508
mm	940	525	104	311
%	100%	55.9%	11.0%	33.1%

**Table 8: Post Development Water Balance – Without LIDs**

Drainage Area (ha)		26.83	Imperviousness:	72%
Annual Average Volume	Precipitation	Evapotranspiration	Infiltration	Runoff
m <sup>3</sup>	252,202	86,793	12,554	152,854
mm	940	323	47	570
%	100%	34.4%	5.0%	60.61%

**Table 9: Post Development Water Balance – With LIDs**

Drainage Area (ha)		59.26	Imperviousness:	72%
Annual Average Volume	Precipitation	Evapotranspiration	Infiltration	Runoff
m <sup>3</sup>	252,202	86,793	31,467	133,941
mm	940	323	117	499
%	100%	34.4%	12.5%	53.1%

Based on this analysis of pre-development conditions this site will evaporate 55.9%, infiltrate 11.0% and runoff 33.1% of all annual rainfall. Under Post-development conditions without LID, this site will evaporate 34.4%, infiltrate 5.0% and runoff 60.6% of all annual rainfall. Under post-development conditions with LIDs, this site will evaporate 34.4%, infiltrate 12.5% and runoff 53.1% of all annual rainfall, exceeding existing pre-development infiltration rates.

## Summary

The City of Ottawa's PCSWMM Ultimate conditions model of the Carp River has been updated to reflect the proposed developments east and west of Huntmar Drive. Detailed stage/storage curves have been developed for SWM "Pond 4" to accommodate this proposed development. To ensure that the proposed development and pond upsizing would not have any adverse impacts on the Carp River or the existing storm sewer infrastructure, comparisons were completed against the results obtained from the City's Ultimate condition model. This analysis confirmed that downstream of Pond 4 on the Carp River, there will be no increases in peak water levels for all design storms under the latest design.

The updated analysis indicated that the peak flows into Pond 4 are slightly higher than that approximated by the City's Ultimate model, with the total inflow volume lower due to the reduction in total drainage area to the pond than previously assumed, due to the proposed partial diversion of flows to Pond 7. Pond 4 has been sized to ensure that the peak proposed 100-Year water level in the pond does not exceed the elevation determined in the City's Ultimate conditions model. A full hydraulic summary of the proposed Pond 4 upgrades has been provided in Attachment C.

The City's Ultimate condition model includes a simplistic representation of the existing stormwater trunk sewer to Pond 4 that runs west to east along Maple Grove Drive. From this analysis, it was shown that under the proposed conditions water levels in this system are lower than that approximated from the City's Ultimate conditions model. Although, a more comprehensive analysis of the future operations of the Maple Grove trunk sewer may need to be completed at detailed design, using more detailed hydrologic and hydraulic models.

A pre-and post-development water balance has been completed for the site based on the Ministry of the Environment, Conservation and Parks (MECP) SWM design guidelines. As per the Kanata West Master Servicing Study (KWMSS) dated June 16, 2006, by Stantec Consulting Limited and Cumming Cockburn Limited, the subject lands are considered to be in an area of moderate groundwater recharge and will need to meet the proposed target infiltration rates of 104 mm/Year. Based on this analysis, under existing conditions it was found that this site on average, 55.9% of the annual precipitation will return to the atmosphere through evaporation and evapotranspiration, 11.0% will infiltrate and 33.1% will runoff. When the site is developed, it will infiltrate 47 mm/yr. of the total annual rainfall (5%), 57 mm/yr, short of the pre-development conditions. When Catchbasin Infiltration LID measures are implemented to infiltrate the 5mm event throughout 50% of the site, the annual infiltration rate will be 117 mm/yr, exceeding the pre-development targets of 104mm/yr by 14 mm/yr.

In summary, the City's Ultimate conditions PCSWMM model has been updated to reflect the proposed Huntmar development and proposed SWM pond 4 upsizing, which has concluded that there will be no adverse impacts within the existing infrastructure or on the greater Carp River.

Respectfully submitted,

**J.F Sabourin and Associates Inc.**



Jonathon Burnett, P.Eng  
Water Resources Engineer, JFSA

cc: J.F Sabourin, M.Eng, P.Eng  
Director of Water Resources Projects

**Attachment A:** Proposed Development Plan (Atrel & DSEL)

**Attachment B:** PCSWMM Model Overview

**Attachment C:** SWM Pond 4 Details

**Attachment D:** Water Budget



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Québec, QC

# Attachment A

Proposed Development Plan (Atrél & DSEL)







**STORM SEWER CALCULATION SHEET (RATIONAL METHOD)**

Local Roads Return Frequency = 2 years  
 Collector Roads Return Frequency = 5 years  
 Arterial Roads Return Frequency = 10 years

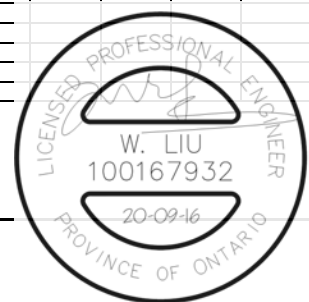


Manning 0.013

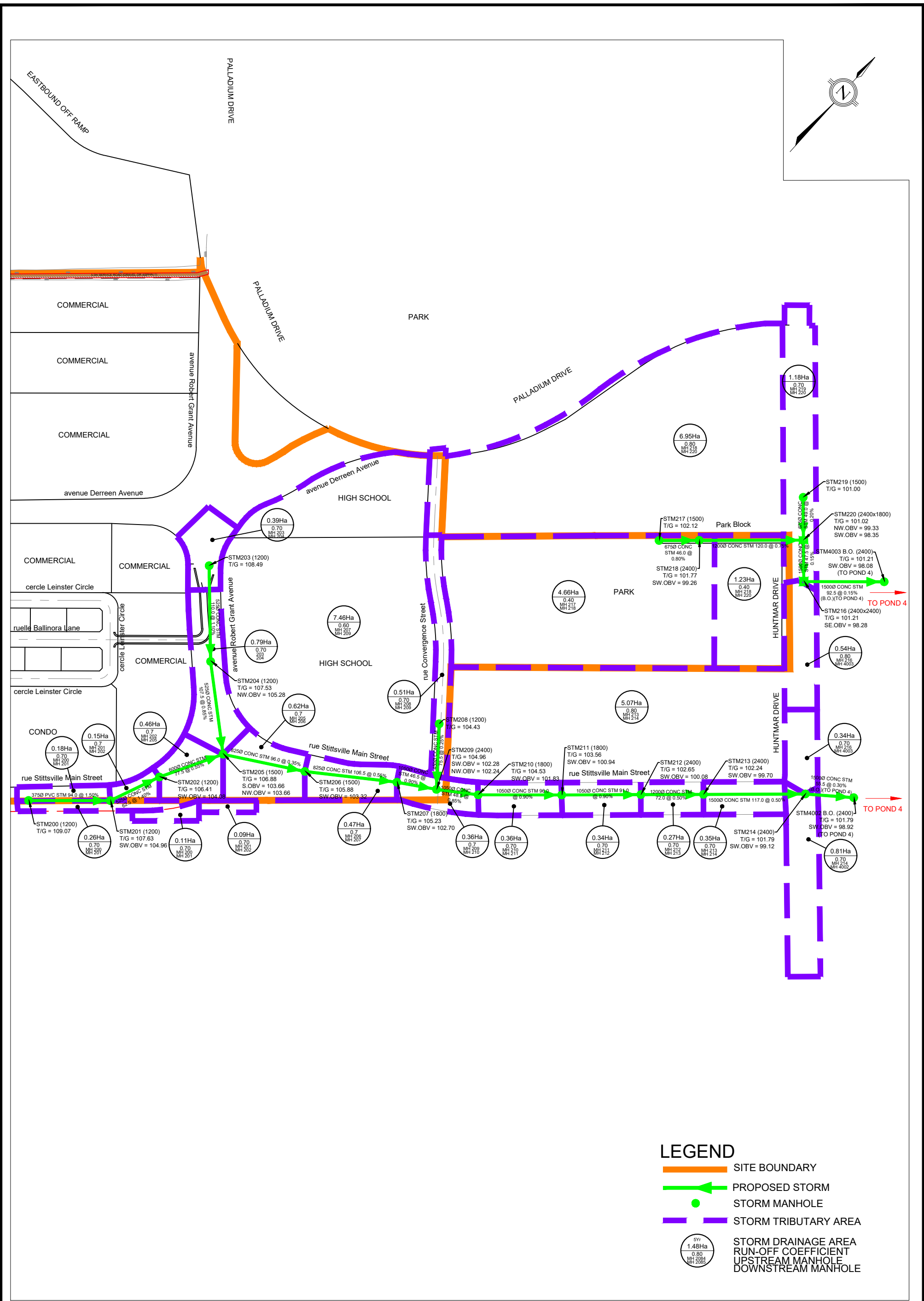
Location	From Node	To Node	AREA (Ha)																FLOW						SEWER DATA														
			2 YEAR				5 YEAR				10 YEAR				100 YEAR				Time of	Intensity	Intensity	Intensity	Intensity	Intensity	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO					
			AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	Conc. (min)	2 Year (mm/h)	5 Year (mm/h)	10 Year (mm/h)	100 Year (mm/h)	Q (l/s)	(actual)	(nominal)	(%)	(m)	(l/s)	(m/s)	LOW (min)	Q/Q full							
<b>rue Convergence Street</b>																																							
	208	209					0.00	0.00	0.51	0.70	0.99	0.99					0.00	0.00																					
To rue Stittsville Main Street, Pipe 209 - 210																																							
<b>avenue Robert Grant Avenue</b>																																							
	203	204					0.00	0.00			0.00	0.00	0.39	0.70	0.76	0.76																							
	204	205					0.00	0.00			0.00	0.00	0.79	0.70	1.54	2.30																							
To rue Stittsville Main Street, Pipe 205 - 206																																							
<b>rue Stittsville Main Street</b>																																							
							0.00	0.00			0.00	0.00	0.11	0.70	0.21	0.21																							
							0.00	0.00	0.18	0.70	0.35	0.35			0.00	0.21																							
	200	201					0.00	0.00			0.00	0.35	0.26	0.70	0.51	0.72																							
							0.00	0.00			0.00	0.35	0.09	0.70	0.18	0.90																							
	201	202					0.00	0.00			0.00	0.35	0.15	0.70	0.29	1.19																							
	202	205					0.00	0.00			0.00	0.35	0.46	0.70	0.90	2.08																							
Contribution From avenue Robert Grant Avenue, Pipe 204 - 205																																							
	205	206					0.00	0.00			0.00	0.35	0.62	0.70	1.21	5.59																							
	206	207					0.00	0.00			0.00	0.35	0.47	0.70	0.91	6.50																							
	207	209					0.00	0.00	7.46	0.60	12.44	12.79			0.00	6.50																							
Contribution From rue Convergence Street, Pipe 208 - 209																																							
	209	210					0.00	0.00			0.00	13.79	0.36	0.70	0.70	7.20																							
	210	211					0.00	0.00			0.00	13.79	0.36	0.70	0.70	7.90																							
	211	212					0.00	0.00			0.00	13.79	0.34	0.70	0.66	8.56																							
	212	213					0.00	0.00			0.00	13.79	0.27	0.70	0.53	9.09																							
							0.00	0.00			0.00	13.79	0.35	0.70	0.68	9.77																							
	213	214					0.00	0.00	5.07	0.80	11.28	25.06			0.00	9.77																							
	214	4002 (B.O.)					0.00	0.00			0.00	25.06	0.81	0.70	1.58	11.35																							
												25.06				11.35																							
<b>Park Block</b>																																							
	217	218					0.00	0.00	4.66	0.40	5.18	5.18			0.00	0.00																							
							0.00	0.00	1.23	0.40	1.37	6.55			0.00	0.00																							
	218	220	6.95	0.80	15.46	15.46					0.00	6.55			0.00	0.00																							
To HUNTMAR DRIVE, Pipe 220 - 216																																							
<b>HUNTMAR DRIVE</b>																																							
	219	220					0.00	0.00			0.00	0.00	1.18	0.70	2.30	2.30																							
Contribution From Park Block, Pipe 218 - 220																																							
	220	216					0.00	0.00			0.00	6.55			0.00	2.30																							
To ROBERT GRANT AVENUE, Pipe 216 - 4003 (B.O.)																																							
<b>ROBERT GRANT AVENUE</b>																																							
Contribution From HUNTMAR DRIVE, Pipe 220 - 216																																							
							0.00	0.00			0.00	6.55	0.34	0.70	0.66	2.96																							
	216	4003 (B.O.)					0.00	0.00			0.00	6.55	0.54	0.80	1.20	4.16																							
												6.55				4.16																							

Definitions:  
 Q = 2.78 AIR, where  
 Q = Peak Flow in Litres per second (L/s)  
 A = Areas in hectares (ha)  
 I = Rainfall Intensity (mm/h)  
 R = Runoff Coefficient

Notes:  
 1) Ottawa Rainfall-Intensity Curve  
 2) Min. Velocity = 0.80 m/s



Designed: A.K.  
 Checked: W.L.  
 Dwg. Reference:  
 PROJECT: 195 Huntmar Drive (Pond 4 Drainage Area)  
 LOCATION: City of Ottawa  
 File Ref: 12-624  
 Date: Sep 2020  
 Sheet No. SHEET 1 OF 1



**LEGEND**

- SITE BOUNDARY
- PROPOSED STORM
- STORM MANHOLE
- STORM TRIBUTARY AREA
- |      |         |
|------|---------|
| SYR  | 1.48Ha  |
| 0.80 | MH 2085 |

  
 STORM DRAINAGE AREA  
 RUN-OFF COEFFICIENT  
 UPSTREAM MANHOLE  
 DOWNSTREAM MANHOLE



KANATA WEST  
 195 HUNTMAR DRIVE  
 STORM DRAINAGE AREA  
 TO POND 4  
 CITY OF OTTAWA

DATE:  
 SEP 2020  
 SCALE: 1:4000  
 PROJECT No.:  
 12-624  
 FIGURE: 01



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# Attachment B

PCSWMM Model Overview



**Legend**  
 Existing Subcatchments

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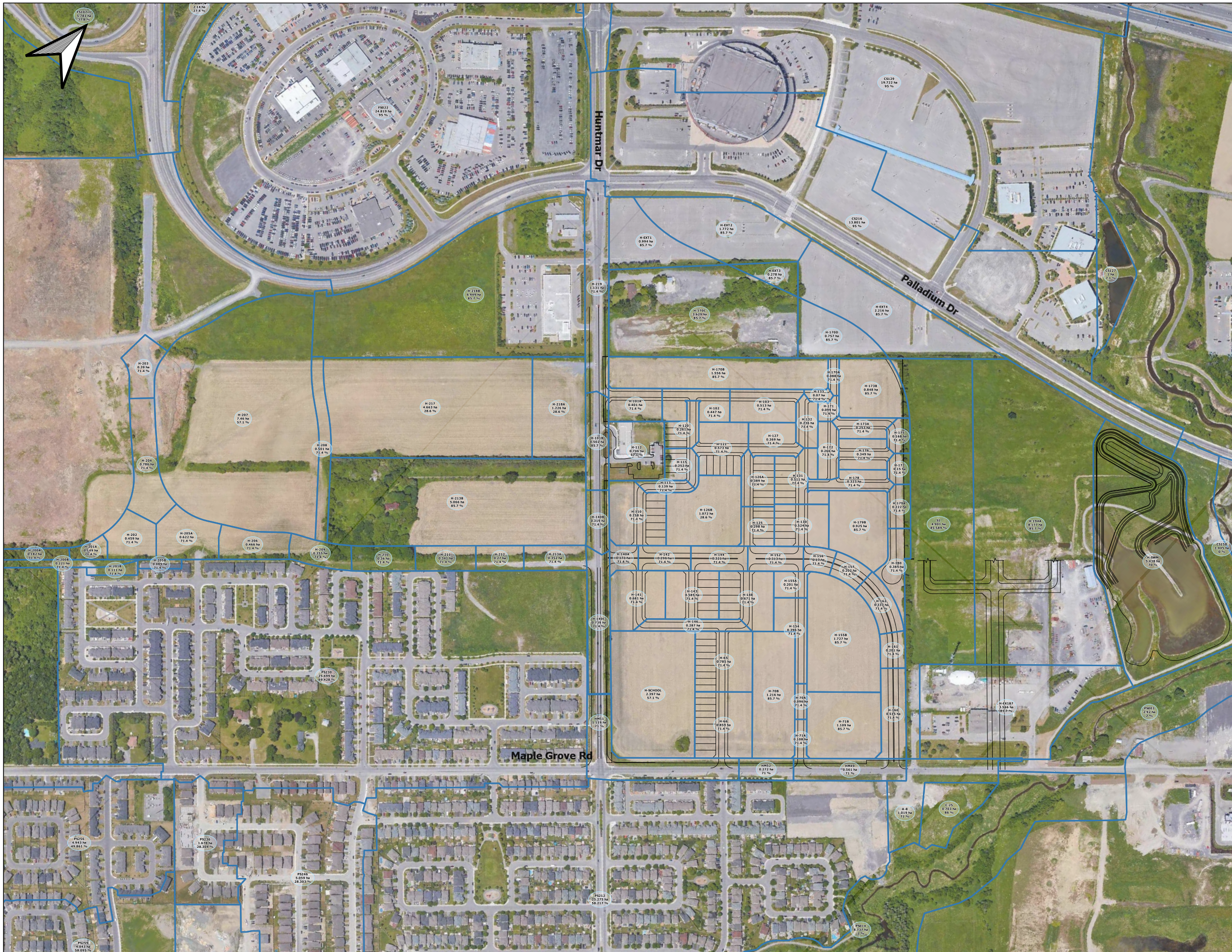
**ATREL Engineering Ltd**  
 Engineers — Ingénieurs  
 1-2864 CHAMBERLAND STREET, ROCKLAND, ONTARIO K4H 1M6  
 TEL: (613) 448-7423


SCALE : 1:5,500  
 0 50 100 150 200 250 300 m

PROJECT :  
 130 Huntmar Drive /  
 Preliminary Kanata West Pond 4 Sizing

TITLE :  
 Figure B1: Existing Subcatchments

PROJECT	1801-19
DRAWN:	MP
DATE:	September 2021



**Legend**  
 Proposed Subcatchments

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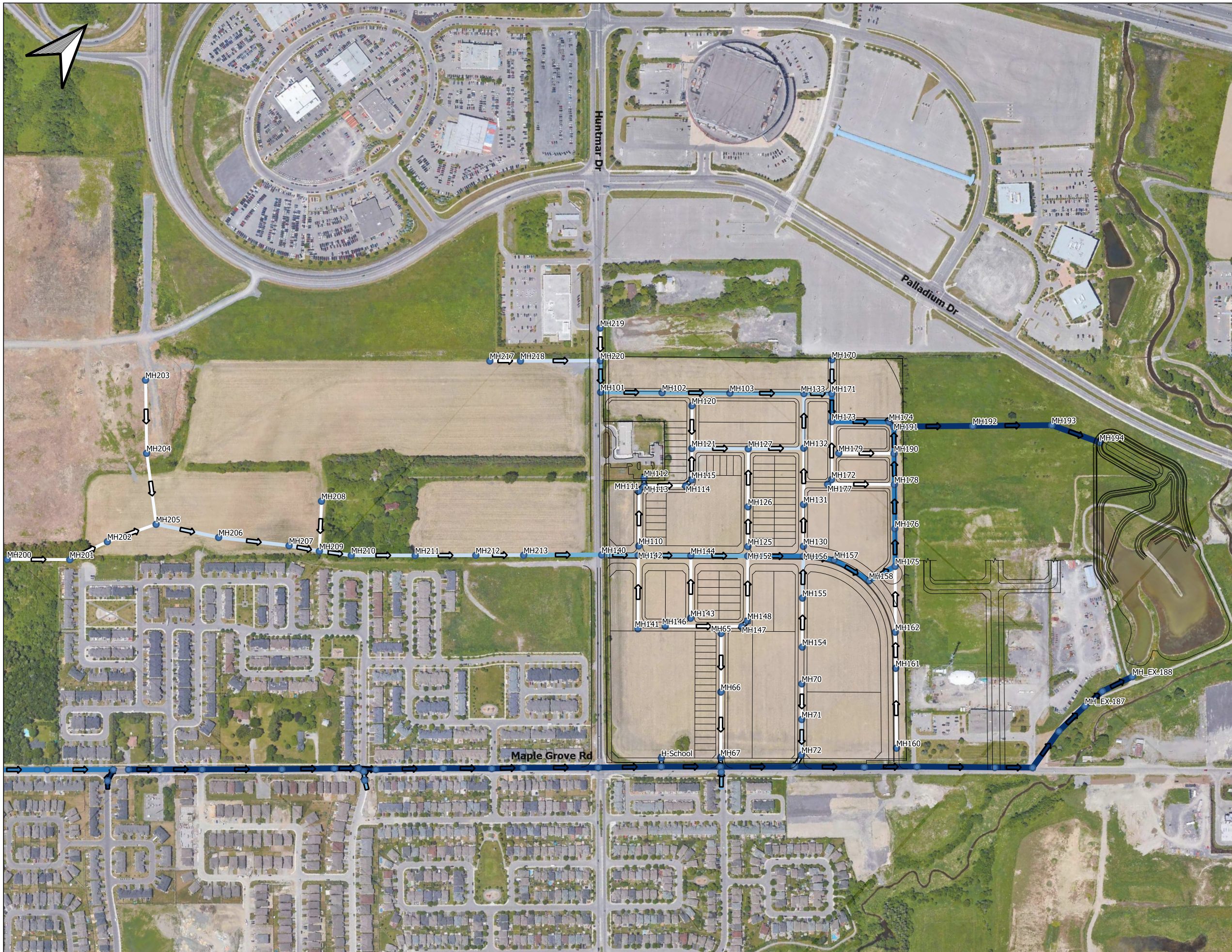
**ATREL Engineering Ltd**  
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 TEL: (613) 448-7423

SCALE : 1:5,500  
 0 50 100 150 200 250 300 m

PROJECT : 130 Huntmar Drive / Preliminary Kanata West Pond 4 Sizing

TITLE : Figure B2: Proposed Subcatchments

PROJECT	1801-19
DRAWN:	MP
DATE:	September 2021



**Legend**

- Storm Sewers
- ⇒ 300mm-750mm
  - ⇒ 750mm-1200mm
  - ⇒ 1200mm-1650mm
  - ⇒ 1650mm-2100mm
  - ⇒ 2100mm-2550mm
  - Manholes

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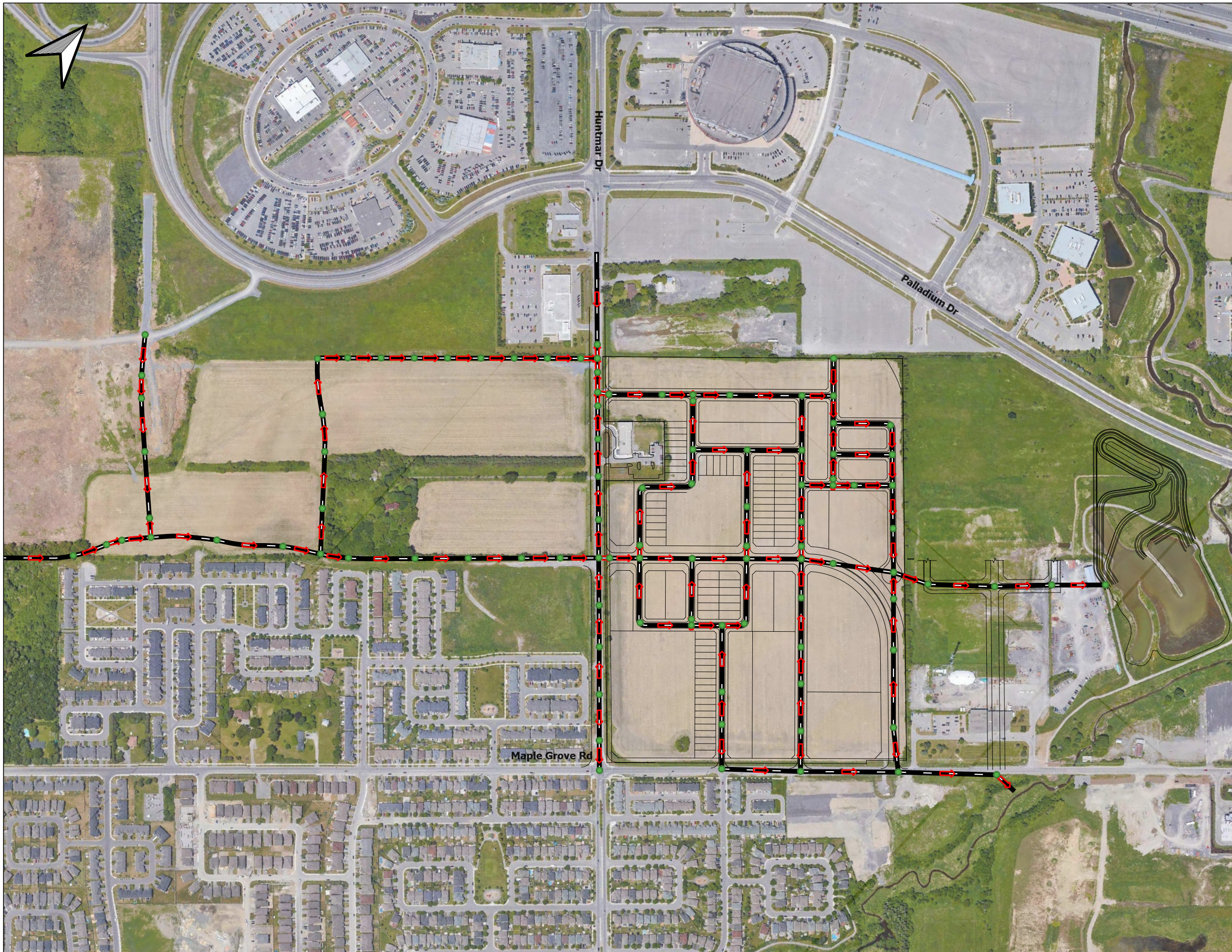
SCALE : 1:5,500  
 0 50 100 150 200 250 300 m

PROJECT : 130 Huntmar Drive / Preliminary Kanata West Pond 4 Sizing

TITLE : Figure B3: Proposed Minor System

PROJECT	1801-19
DRAWN:	MP
DATE:	September 2021





- Legend**
- Major System Junctions
  - Major System Conduits

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SCALE : 1:5,500  
 0 50 100 150 200 250 300 m

PROJECT : 130 Huntmar Drive / Preliminary Kanata West Pond 4 Sizing

TITLE : Figure B4: Proposed Major System

PROJECT	1801-19
DRAWN:	MP
DATE:	September 2021

Table B1 - Subcatchment Parameters

NAME	AREA (ha)	IMPERV (%)	WIDTH (m)	SLOPE (%)	IMPERV (n)	PERV (n)	Dstor-IMP (mm)	Dstor-Perv (mm)	ZERO IMP (%)	ROUTING	ROUTED (%)	CURVE NO	DRYTIME
H-101A	0.40	71	51	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-101B	0.50	86	35	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-102	0.45	71	47	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-103	0.51	71	53	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-110	0.76	71	79	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-112	0.75	57	87	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-113	0.14	71	19	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-115	0.25	71	54	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-120	0.26	71	50	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-121	0.57	71	77	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-125	0.30	71	52	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-126A	0.39	71	51	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-126B	1.07	29	96	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-127	0.37	71	51	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-130	0.52	71	84	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-131	0.51	71	72	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-132	0.24	71	34	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-133	0.07	71	18	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-140A	0.17	71	41	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-140B	0.32	71	37	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-140C	0.74	71	35	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-141	0.68	71	83	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-142	0.30	71	38	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-143	0.59	71	82	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-144	0.32	71	38	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-146	0.29	71	19	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-148	0.67	71	90	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-152	0.31	71	38	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-154	0.40	71	42	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-155A	0.20	71	52	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-155B	1.73	86	171	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-156	0.17	71	43	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-157	0.20	71	43	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-160	0.52	71	39	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-161	0.20	71	41	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-162	0.34	71	42	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-170A	0.09	71	16	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-170B	1.56	86	48	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-170C	3.63	86	129	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-170D	0.76	86	113	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-171	0.10	71	34	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-172	0.27	71	31	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-173A	0.25	71	34	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-173B	0.85	86	86	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-175	0.17	71	35	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-176	0.35	71	46	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-177	0.15	71	33	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7



**Table B2 : East and West Huntmar Developments - Onsite Storage Summary**

Location	Name	Land Use	Area (ha)	C	Control Rate	Assumed Storage	Required Storage Volume (m <sup>3</sup> )	Required Storage Volume (m <sup>3</sup> /ha)
West Huntmar	H-213B	Commercial	5.07	0.80	340 L/s/ha	50m <sup>3</sup> /ha	253	50
	H-207	School	7.46	0.60	5YrCHI3hr	100Yr Onsite	300	40
	H-217	Park	4.66	0.40	5YrCHI3hr	100Yr Onsite	405	87
	H-218A	Park	1.23	0.40	5YrCHI3hr	100Yr Onsite	190	154
	H-218B	Commercial	6.95	0.80	5YrCHI3hr	100Yr Onsite	1267	182
East Huntmar	H-170C	Commercial	3.63	0.80	220 L/s/ha	50m <sup>3</sup> /ha	181	50
	H-112	School	0.75	0.60	220 L/s/ha	100Yr Onsite	83	111
	H-126B	Park	1.07	0.40	115 L/s/ha	100Yr Onsite	75	70
	H-SCHOOL	School	2.40	0.60	220 L/s/ha	100Yr Onsite	153	64
	H-71B	Commercial	1.11	0.80	250 L/s/ha	50m <sup>3</sup> /ha	55	50
	H-155B	Commercial	1.73	0.80	250 L/s/ha	50m <sup>3</sup> /ha	86	50
	H-70B	Commercial	1.22	0.80	250L/s/ha	50m <sup>3</sup> /ha	61	50
External	H-194A	Commercial	8.18	0.80	220 L/s/ha	50m <sup>3</sup> /ha	409	50
	H-194B	Commercial	4.90	0.80	220 L/s/ha	50m <sup>3</sup> /ha	245	50
	C-25	Commercial	0.70	0.80	85 L/s/ha	50m <sup>3</sup> /ha	35	50
	A-8	Residential	1.02	0.70	230 L/s/ha	40m <sup>3</sup> /ha	41	40

**Table B3 - 130 Huntmar Flows to Maple Grove Sewer**

<b>Name</b>	<b>Area (ha)</b>	<b>Assumed Rate (L/s/ha)</b>	<b>Peak Flow (L/s)</b>
ASCH	2.390	220	526
H-65	0.780	340	265
H-66	0.850	340	289
H-70B	1.210	250	303
H-71A	0.100	340	34
H-70A	0.090	340	31
H-71B	1.100	250	275
<b>Total</b>	<b>6.52</b>	<b>264</b>	<b>1722</b>



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# Attachment C

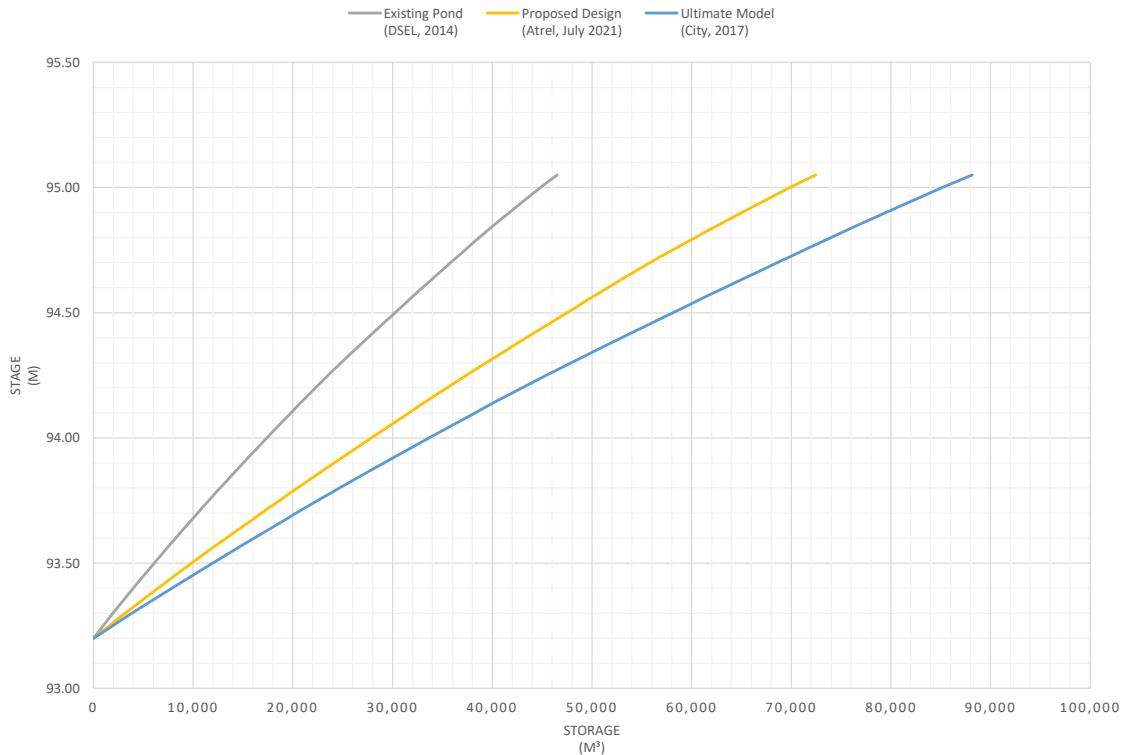
SWM Pond 4 Details

Table C1:Pond 4 Ultimate Stage/Storage Comparison

Elevation* (m)	Depth (m)	Existing Pond (DSEL, 2014)		Ultimate Model (City, 2017)		Proposed Design (Atrcl, July 2021)		Existing Difference		Ultimate Difference	
		Area (m²)	Volume (m³)	Area (m²)	Volume (m³)	Area (m²)	Volume (m³)	Area (m²)	Volume (m³)	Area (m²)	Volume (m³)
93.20	0.00	19,714	0	38,860	0	31,921	0	12,206	0	-6,939	0
93.25	0.05	19,720	986	38,872	1,943	32,227	1,604	12,507	618	-6,646	-340
93.30	0.10	20,072	1,981	39,447	3,901	32,533	3,223	12,462	1,242	-6,914	-679
93.35	0.15	20,354	2,991	39,910	5,885	32,840	4,857	12,487	1,866	-7,070	-1,028
93.40	0.20	20,640	4,016	40,376	7,892	33,148	6,507	12,508	2,491	-7,228	-1,386
93.45	0.25	20,991	5,057	40,950	9,925	33,456	8,172	12,464	3,115	-7,495	-1,754
93.50	0.30	20,997	6,107	40,957	11,973	33,765	9,852	12,768	3,746	-7,192	-2,121
93.55	0.35	21,435	7,167	41,329	14,030	35,008	11,571	13,573	4,404	-6,321	-2,459
93.60	0.40	21,870	8,250	42,077	16,115	35,278	13,329	13,409	5,079	-6,799	-2,787
93.65	0.45	22,065	9,348	42,453	18,229	35,548	15,099	13,483	5,751	-6,904	-3,129
93.70	0.50	22,383	10,459	43,013	20,365	35,819	16,883	13,436	6,424	-7,195	-3,482
93.75	0.55	22,626	11,585	43,430	22,526	36,089	18,681	13,463	7,096	-7,341	-3,845
93.80	0.60	22,868	12,722	43,877	24,709	36,358	20,492	13,490	7,770	-7,518	-4,217
93.85	0.65	23,112	13,872	44,304	26,914	36,628	22,317	13,517	8,445	-7,675	-4,597
93.90	0.70	23,356	15,033	44,748	29,140	36,898	24,155	13,542	9,122	-7,850	-4,985
93.95	0.75	23,600	16,207	45,188	31,388	37,168	26,007	13,567	9,800	-8,020	-5,381
94.00	0.80	23,846	17,393	45,628	33,659	37,437	27,872	13,591	10,479	-8,190	-5,787
94.05	0.85	24,171	18,594	46,223	35,955	37,707	29,750	13,535	11,157	-8,516	-6,204
94.10	0.90	24,378	19,807	46,600	38,275	37,976	31,643	13,598	11,835	-8,624	-6,633
94.15	0.95	24,842	21,038	47,450	40,627	38,246	33,548	13,404	12,510	-9,205	-7,079
94.20	1.00	24,843	22,280	47,761	43,007	38,515	35,467	13,672	13,187	-9,246	-7,540
94.25	1.05	25,663	23,543	49,339	45,434	39,386	37,415	13,723	13,872	-9,953	-8,020
94.30	1.10	26,368	24,843	50,046	47,919	39,919	39,397	13,551	14,554	-10,127	-8,522
94.35	1.15	26,531	26,166	50,303	50,428	40,197	41,400	13,666	15,234	-10,107	-9,028
94.40	1.20	27,023	27,505	50,992	52,960	40,469	43,417	13,445	15,912	-10,523	-9,543
94.45	1.25	27,438	28,866	51,564	55,524	40,737	45,447	13,299	16,581	-10,828	-10,077
94.50	1.30	27,607	30,242	51,863	58,110	41,001	47,490	13,393	17,248	-10,862	-10,619
94.55	1.35	27,767	31,627	52,128	60,709	41,261	49,547	13,494	17,920	-10,867	-11,162
94.60	1.40	27,984	33,020	52,536	63,326	41,519	51,616	13,534	18,596	-11,017	-11,710
94.65	1.45	28,293	34,427	52,782	65,959	41,774	53,699	13,480	19,271	-11,008	-12,260
94.70	1.50	28,315	35,843	53,212	68,609	44,516	55,820	16,200	19,978	-8,697	-12,788
94.75	1.55	28,379	37,260	53,324	71,272	45,122	58,061	16,743	20,801	-8,202	-13,211
94.80	1.60	29,146	38,698	53,674	73,947	45,941	60,338	16,795	21,640	-7,733	-13,609
94.85	1.65	29,974	40,176	54,922	76,662	46,746	62,655	16,772	22,479	-8,176	-14,007
94.90	1.70	30,921	41,698	56,239	79,441	47,562	65,013	16,641	23,314	-8,677	-14,428
94.95	1.75	31,457	43,258	56,952	82,271	48,408	67,412	16,951	24,154	-8,545	-14,859
95.00	1.80	32,733	44,862	58,804	85,164	50,479	69,884	17,746	25,022	-8,325	-15,280
95.05	1.85	33,894	46,528	60,125	88,137	52,553	72,460	18,659	25,932	-7,572	-15,678

\*Active Storage Only

FIGURE C1:  
SWM POND 4 - STAGE/STORAGE COMPARISON



**Table C2: SWM Pond Inflow, Outflow and Storage Summary**

Event	Minor Inflow (m <sup>3</sup> /s)		Major Inflow (m <sup>3</sup> /s)	Total Inflow <sup>(1)</sup> (m <sup>3</sup> /s)	Pond Outflow (m <sup>3</sup> /s)	Pond Level (m)	Volume Used <sup>(2)</sup> (m <sup>3</sup> )
	West	South					
25mm/3hr Chicago	4.24	6.72	0.000	11.290	0.262	94.072	29,890
2yr/12hr SCS	5.89	8.78	0.000	20.600	3.165	94.322	39,540
5yr/12hr SCS	8.38	11.77	0.000	14.990	7.755	94.431	43,940
10yr/12hr SCS	10.09	13.54	0.000	24.280	10.740	94.490	46,320
25yr/12hr SCS	12.35	16.20	0.000	29.010	15.580	94.574	49,780
50yr/12hr SCS	13.51	17.94	0.000	32.220	19.680	94.632	52,240
100yr/12hr SCS	14.46	19.28	0.137	34.690	24.170	94.682	54,340

Note: Maximum allowable release for the 10-Year event based on the KWMSS is 17.282 m<sup>3</sup>/s



**Table C-3 Criteria for Required Storage Volumes**

Pond	Area <sup>(1)</sup> (ha)	Imperviousness (%)	Storage Volume for Impervious Level <sup>(2)</sup> (m <sup>3</sup> /ha)
N/A	N/A	55	110
Pond 4	239.7	60	116.67
N/A	N/A	70	130

<sup>(1)</sup> Refer to Appendix C for drainage areas to SWM Facility.

<sup>(2)</sup> Protection Level for Wet Pond: Normal 70% long-term S.S. removal.

SWM Planning & Design Manual, Table 3.2, p.3-10 (March 2003).

**Table C-4: Required Storage Volumes for SWM Facility**

Pond Component	Required Volume (m <sup>3</sup> )	Provided Volume <sup>(4)</sup> (m <sup>3</sup> )	Volume Ratio	Provided Area <sup>(5)</sup> (m <sup>2</sup> )	Provided Elevation (m)
Permanent Pool (PP) <sup>(1)</sup>	18379	47482	2.58	31921	93.200
Quality Control <sup>(2)</sup>	9589	9852	1.03	N/A	93.500
Extended Detention <sup>(3)</sup>	N/A	35467	N/A	N/A	94.200
Forebay (20% PP)	3676	N/A	N/A	4855	92.900
PP - Forebay	14704	N/A	N/A	27066	93.200
Area Ratio (%) <sup>(6)</sup> =				15	

<sup>(1)</sup> Required PP volume based on Table B-1 (116.7 - 40 = 76 m<sup>3</sup>/ha).

<sup>(2)</sup> Required quality control volume based on 40 m<sup>3</sup>/ha.

<sup>(3)</sup> Provided extended detention volume based on an elevation of 94.2 m as per KWMSS.

<sup>(4)</sup> Based on detailed grading plan (refer to Pond Figure).

<sup>(5)</sup> As per MOE, Maximum Forebay Area: 33% of Total Permanent Pool.

**Table C-5: Extended Detention Parameters for SWM Facility**

Permanent Pool Parameters		Flow Augmentation Orifice	Quality Control Orifice
Area (C3)	31920.58 m <sup>2</sup>	Diameter 0.200 m	Diameter 0.350 m
Volume	47482.30 m <sup>3</sup>		
PP Elev	93.200 m	Area 0.031 m <sup>2</sup>	Area 0.096 m <sup>2</sup>
QC Det.	93.500 m	Invert 93.200 m	Invert 93.400 m
h (m)	0.300 m	C <sub>o</sub> 0.62	Co 0.62

- Notes:
- C3 is the intercept from the area-depth linear regression.
  - PP Elev indicates the elevation of the permanent pool.
  - QC Elev indicates the elevation of the storage volume required by MOE for quality control.
  - h is the maximum water elevation above the orifice (m).

**Table C-6: Extended Detention Drawdown Time for SWM Facility**

Elev. (m)	Active Storage			C2 (m <sup>2</sup> /m)	Drawdown Time (h)	Drawdown Time (days)	Flow (m <sup>3</sup> /s)	Demarkation Point
	V (m <sup>3</sup> )	A (m <sup>2</sup> )	depth (m)					
<b>93.20</b>	<b>0.00</b>	<b>31920.58</b>	<b>0.00</b>				<b>0</b>	<b>PP Elev</b>
93.25	1603.68	32226.68	0.05	6122	46.04	1.92	0.01	
93.30	3222.66	32533.13	0.10	6126	65.32	2.72	0.01	
93.35	4856.99	32840.12	0.15	6130	80.25	3.34	0.02	
<b>93.40</b>	<b>6506.68</b>	<b>33147.60</b>	<b>0.20</b>	<b>6135</b>	<b>92.96</b>	<b>3.87</b>	<b>0.03</b>	<b>FA Elev</b>
93.45	8171.75	33455.58	0.25	6140	105.06	4.38	0.05	
<b>93.50</b>	<b>9852.25</b>	<b>33764.67</b>	<b>0.30</b>	<b>6147</b>	<b>112.88</b>	<b>4.70</b>	<b>0.07</b>	<b>QC Elev</b>
93.55	11571.48	35008.09	0.35	8821	118.82	4.95	0.09	
93.60	13328.63	35278.30	0.40	8394	123.68	5.15	0.11	
93.65	15099.30	35548.42	0.45	8062	127.77	5.32	0.13	
93.70	16883.46	35818.51	0.50	7796	131.32	5.47	0.15	
93.75	18681.14	36088.51	0.55	7578	134.46	5.60	0.17	
93.80	20492.30	36358.41	0.60	7396	137.30	5.72	0.19	
93.85	22316.97	36628.30	0.65	7243	139.91	5.83	0.20	
93.90	24155.12	36898.02	0.70	7111	142.34	5.93	0.22	
93.95	26006.76	37167.61	0.75	6996	144.63	6.03	0.23	
94.00	27871.88	37437.22	0.80	6896	146.81	6.12	0.24	
94.05	29750.47	37706.72	0.85	6807	148.89	6.20	0.26	
94.10	31642.54	37976.16	0.90	6728	150.89	6.29	0.27	
94.15	33548.08	38245.55	0.95	6658	152.82	6.37	0.28	
<b>94.20</b>	<b>35467.09</b>	<b>38515.09</b>	<b>1.00</b>	<b>6595</b>	<b>154.69</b>	<b>6.45</b>	<b>0.29</b>	<b>Ext. Det.</b>

- Notes:
- C2 is the slope coefficient from the area-depth linear regression.
  - PP Elev indicates the elevation of the permanent pool.
  - QC Elev indicates the elevation of the storage volume required by MOE for quality control.
  - FA Elev indicates the elevation of flow augmentation provided in accordance with the KWMSS (10% of active volume).
  - Ext. Det. indicates the elevation of extended detention provided as per the KWMSS.

**Table B-7: Stage-Storage-Outflow Curve for SWM Facility (Free Outfall Conditions)**

		Flow Augmentation		Quality Control		Quality Control 1		Quality Control 2				
		Vertical Orifice		Vertical Orifice		Broad Crested Weir		Broad Crested Weir				
		Dia (m)	0.200	Dia (m)	0.350	L (m)	37.000	L (m)	40.000			
						z (H:1V)	1.0	z (H:1V)	1.0			
		Area (m <sup>2</sup> )	0.03142	Area (m <sup>2</sup> )	0.09621	Trap H (m)	1.000	Trap H (m)	1.000			
		Invert (m)	93.20	Invert (m)	93.40	Invert (m)	94.20	Invert (m)	94.60			
		C <sub>o</sub>	0.62	C <sub>o</sub>	0.62	C <sub>w</sub>	1.800	C <sub>w</sub>	1.800			
		Q @ D	0.027	Q @ D	0.111	n contr.	0	n contr.	0			
Elevation (m)	Active Sto. (m <sup>3</sup> )	Notes	Head (m)	Outflow (m <sup>3</sup> /s)	Head (m)	Outflow (m <sup>3</sup> /s)	Head (m)	Outflow (m <sup>3</sup> /s)	Head (m)	Outflow (m <sup>3</sup> /s)	Outflow (m <sup>3</sup> /s)	Storage (ha-m)
93.20	0	PP Elev	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
93.25	1604		0.050	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.160
93.30	3223		0.100	0.014	0.000	0.000	0.000	0.000	0.000	0.000	0.014	0.322
93.35	4857		0.150	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.020	0.486
93.40	6507	FA Elev	0.200	0.027	0.000	0.000	0.000	0.000	0.000	0.000	0.027	0.651
93.45	8172		0.250	0.033	0.050	0.016	0.000	0.000	0.000	0.000	0.033	0.817
93.50	9852	QC Elev	0.300	0.039	0.100	0.032	0.000	0.000	0.000	0.000	0.039	0.985
93.55	11571		0.350	0.043	0.150	0.047	0.000	0.000	0.000	0.000	0.043	1.157
93.60	13329		0.400	0.047	0.200	0.063	0.000	0.000	0.000	0.000	0.047	1.333
93.65	15099		0.450	0.051	0.250	0.079	0.000	0.000	0.000	0.000	0.051	1.510
93.70	16883		0.500	0.055	0.300	0.095	0.000	0.000	0.000	0.000	0.055	1.688
93.75	18681		0.550	0.058	0.350	0.111	0.000	0.000	0.000	0.000	0.058	1.868
93.80	20492		0.600	0.061	0.400	0.125	0.000	0.000	0.000	0.000	0.061	2.049
93.85	22317		0.650	0.064	0.450	0.139	0.000	0.000	0.000	0.000	0.064	2.232
93.90	24155		0.700	0.067	0.500	0.151	0.000	0.000	0.000	0.000	0.067	2.416
93.95	26007		0.750	0.070	0.550	0.162	0.000	0.000	0.000	0.000	0.070	2.601
94.00	27872		0.800	0.072	0.600	0.172	0.000	0.000	0.000	0.000	0.072	2.787
94.05	29750		0.850	0.075	0.650	0.182	0.000	0.000	0.000	0.000	0.075	2.975
94.10	31643		0.900	0.077	0.700	0.191	0.000	0.000	0.000	0.000	0.077	3.164
94.15	33548		0.950	0.080	0.750	0.200	0.000	0.000	0.000	0.000	0.080	3.355
94.20	35467	Ext. Det.	1.000	0.082	0.800	0.209	0.000	0.000	0.000	0.000	0.082	3.547
94.25	37415		1.050	0.084	0.850	0.217	0.050	0.746	0.000	0.000	0.830	3.741
94.30	39397		1.100	0.086	0.900	0.225	0.100	2.112	0.000	0.000	2.198	3.940
94.35	41400		1.150	0.088	0.950	0.233	0.150	3.885	0.000	0.000	3.973	4.140
94.40	43417		1.200	0.090	1.000	0.240	0.200	5.989	0.000	0.000	6.080	4.342
94.45	45447		1.250	0.093	1.050	0.247	0.250	8.381	0.000	0.000	8.474	4.545
94.50	47490		1.300	0.095	1.100	0.254	0.300	11.032	0.000	0.000	11.127	4.749
94.55	49547		1.350	0.096	1.150	0.261	0.350	13.921	0.000	0.000	14.017	4.955
94.60	51616		1.400	0.098	1.200	0.268	0.400	17.031	0.000	0.000	17.129	5.162
94.65	53699		1.450	0.100	1.250	0.274	0.450	20.349	0.050	0.806	20.449	5.370
94.70	55820		1.500	0.102	1.300	0.280	0.500	23.865	0.100	2.283	23.967	5.582
94.75	58061		1.550	0.104	1.350	0.286	0.550	27.569	0.150	4.199	27.673	5.806
94.80	60338		1.600	0.106	1.400	0.292	0.600	31.455	0.200	6.472	31.560	6.034
94.85	62655		1.650	0.107	1.450	0.298	0.650	35.515	0.250	9.056	35.622	6.266
94.90	65013		1.700	0.109	1.500	0.304	0.700	39.743	0.300	11.920	39.852	6.501
94.95	67412		1.750	0.111	1.550	0.310	0.750	44.135	0.350	15.039	44.246	6.741
95.00	69884		1.800	0.112	1.600	0.315	0.800	48.685	0.400	18.397	48.798	6.988
95.05	72460	Top Berm	1.850	0.114	1.650	0.321	0.850	53.391	0.450	21.979	53.505	7.246

- Notes :
- PP Elev indicates the elevation of the permanent pool.
  - QC Elev indicates the elevation of the storage volume required by MOE for quality control.
  - Ext Det indicates the elevation of extended detention provided based on the 15 mm storm target for erosion control.
  - Ovf Elev indicates the elevation of the top of the drop inlet structure, set above the 100-year water level.
  - Top of Berm indicates the elevation at the top of the berm.

## **CALCULATION SHEET C-8: CONTROLS**

Flow Augmentation			Quantity Control 1			Top of Drop Inlet Structure			Top of Drop Inlet Structure		
Vertical Circular Orifice			Vertical Rectangular Orifice			Sharp Crested Weir			Sharp Crested Weir		
Diameter	(m)	0.200	Diameter	(m)	0.350	L	(m)	37.000	L	(m)	40.000
$A_o$	(m <sup>2</sup> )	0.031	$A_o$	(m <sup>2</sup> )	0.096	$C_w$		1.80	$C_w$		1.80
invert	(m)	93.20	invert	(m)	93.40	Invert	(m)	94.20	Invert	(m)	94.60
$C_o$		0.62	$C_o$		0.62	n		0	n		0
Max Water Level	(m)	94.682	Max Water Level	(m)	94.682	Max Water Level	(m)	94.682	Max Water Level	(m)	94.682
Head of Water	(m)	1.482	Head of Water	(m)	1.282	Head of Water	(m)	0.482	Head of Water	(m)	0.082
$Q_o$	(m <sup>3</sup> /s)	0.101	$Q_o$	(m <sup>3</sup> /s)	0.278	$Q_w$	(m <sup>3</sup> /s)	22.287	$Q_w$	(m <sup>3</sup> /s)	1.691
Orifice Equation: $Q_o = C_o A_o (2gh)^{0.5}$ Not including reverse pipe losses $Q_o$ is the orifice flow $C_o$ is the orifice coefficient $A_o$ is the orifice flow area $g$ is the gravitational constant $h$ is the head of water						Note: Top perimeter of 1.8 m diameter MH			Note: Top perimeter of 1.8 m diameter MH		
Orifice Equation: $Q_o = C_o A_o (2gh)^{0.5}$ $Q_o$ is the orifice flow $C_o$ is the orifice coefficient $A_o$ is the orifice flow area $g$ is the gravitational constant $h$ is the head of water						Weir Equation: $Q_w = C_w (L - 0.1nh)(h)^{1.5}$ $Q_w$ is the weir flow $C_w$ is the weir coefficient $L$ is the weir length $h$ is the weir height $n$ is the # of side contractions			Weir Equation: $Q_w = C_w (L - 0.1nh)(h)^{1.5}$ $Q_w$ is the weir flow $C_w$ is the weir coefficient $L$ is the weir length $h$ is the weir height $n$ is the # of side contractions		

## CALCULATION SHEET C-9: FOREBAY SIZING FOR SWM FACILITY

### 130 Huntmar Drive Subdivision Pond 4 City of Ottawa Calculation of South Forebay Size

#### Settling Criteria

From the SWMP Manual, the required length for settling is as follows:

$$L_{min} = \left( \frac{rQ_p}{V_s} \right)^{0.5}$$

where: r = length to width ratio, at the invert of the inlet pipe.  
Q<sub>p</sub> = peak outflow during design quality storm  
V<sub>s</sub> = settling velocity

Input: r = 4.42 (105 m / 14 m)  
Q<sub>p</sub> = 0.291 m<sup>3</sup>/s (at elevation 93.5 m)  
V<sub>s</sub> = 0.0003 m/s

$$L_{min} = 65.47 \text{ m}$$

The peak flow rate from the pond during the quality storm is taken as the flow that would occur just below the quantity controls (Refer to Table B-5 of Appendix B)

#### Dispersion Criteria

From the SWMP Manual, the required length for dispersion is as follows:

$$L_{min} = \frac{8Q}{dV_f}$$

where: Q = Inlet flow rate (10-Year, 12-Hour SCS Storm)  
d = depth of permanent pool (forebay) during peak 10-year inflow  
V<sub>f</sub> = desired final velocity

Input: Q = 13.580 m<sup>3</sup>/s  
d = 3.29 m  
V<sub>f</sub> = 0.5 m/s

$$L_{min} = 66.04 \text{ m}$$

The minimum forebay length is determined by the larger of the settling or dispersion criteria.

Minimum Length of Forebay Required 66 m  
Length of Forebay Provided 105 m (at elevation 91.20)

#### Average Forebay Velocity

From the SWMP Manual, the maximum allowable average velocity is 0.15 m/s:

$$V_{avg} = \frac{Q}{dW_{avg}}$$

where: Q = Inlet flow rate (10-Year, 12-Hour SCS Storm)  
d = depth of pond during peak 10-year inflow  
W<sub>avg</sub> = average width of forebay

Input: Q = 13.580 m<sup>3</sup>/s  
d = 3.29 m  
W<sub>avg</sub> = 20 m (14 m bottom, 26 m permanent pool)

$$V = 0.21 \text{ m/s} < 0.15 \text{ m/s}$$

## CALCULATION SHEET C-10: FOREBAY SIZING FOR SWM FACILITY

### 130 Huntmar Drive Subdivision Pond 4 City of Ottawa Calculation of North Forebay Size

#### Settling Criteria

From the SWMP Manual, the required length for settling is as follows:

$$L_{min} = \left( \frac{rQ_p}{V_s} \right)^{0.5}$$

where: r = length to width ratio, at the invert of the inlet pipe.  
Q<sub>p</sub> = peak outflow during design quality storm  
V<sub>s</sub> = settling velocity

Input: r = 3.85 (100 m / 14 m)  
Q<sub>p</sub> = 0.291 m<sup>3</sup>/s (at elevation 93.5 m)  
V<sub>s</sub> = 0.0003 m/s

$$L_{min} = 61.05 \text{ m}$$

The peak flow rate from the pond during the quality storm is taken as the flow that would occur just below the quantity controls (Refer to Table B-5 of Appendix B)

#### Dispersion Criteria

From the SWMP Manual, the required length for dispersion is as follows:

$$L_{min} = \frac{8Q}{dV_f}$$

where: Q = Inlet flow rate (10-Year, 12-Hour SCS Storm)  
d = depth of permanent pool (forebay) during peak 10-year inflow  
V<sub>f</sub> = desired final velocity

Input: Q = 10.090 m<sup>3</sup>/s  
d = 2.92 m  
V<sub>f</sub> = 0.5 m/s

$$L_{min} = 55.29 \text{ m}$$

The minimum forebay length is determined by the larger of the settling or dispersion criteria.

Minimum Length of Forebay Required 61 m  
Length of Forebay Provided 100 m (at elevation 91.20)

#### Average Forebay Velocity

From the SWMP Manual, the maximum allowable average velocity is 0.15 m/s:

$$V_{avg} = \frac{Q}{d W_{avg}}$$

where: Q = Inlet flow rate (10-Year, 12-Hour SCS Storm)  
d = depth of pond during peak 10-year inflow  
W<sub>avg</sub> = average width of forebay

Input: Q = 10.090 m<sup>3</sup>/s  
d = 2.94 m  
W<sub>avg</sub> = 20 m (14 m bottom, 26 m permanent pool)

$$V = 0.17 \text{ m/s} < 0.15 \text{ m/s}$$



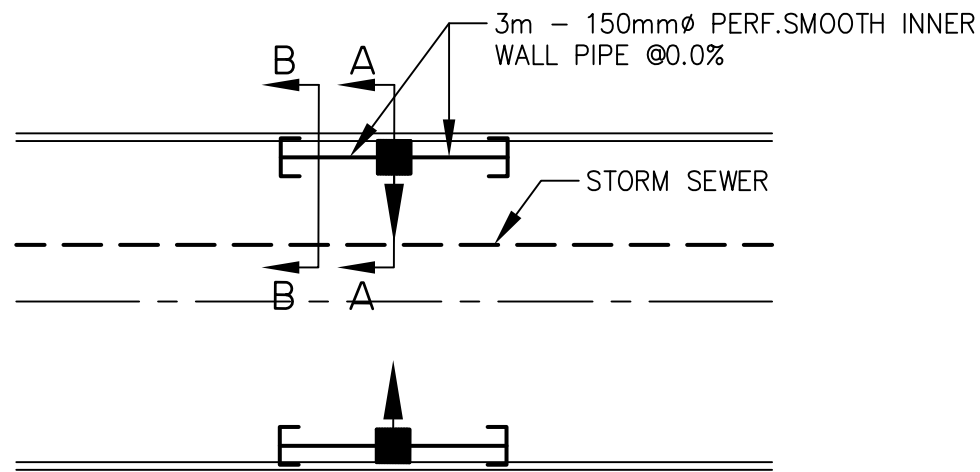
J.F. Sabourin and Associates Inc.  
52 Springbrook Drive,  
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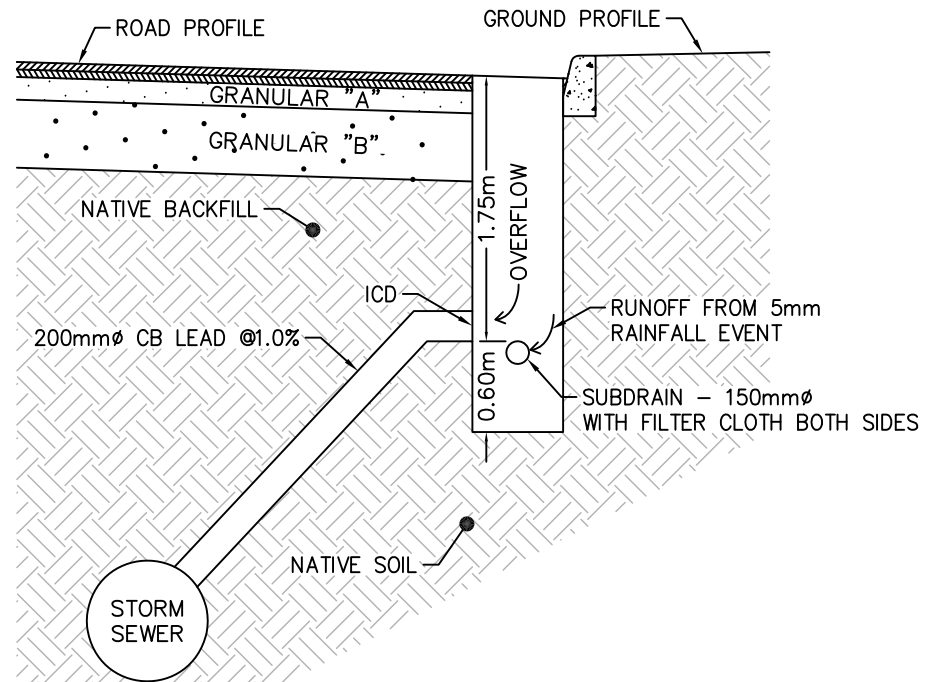
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Québec, QC

# Attachment D

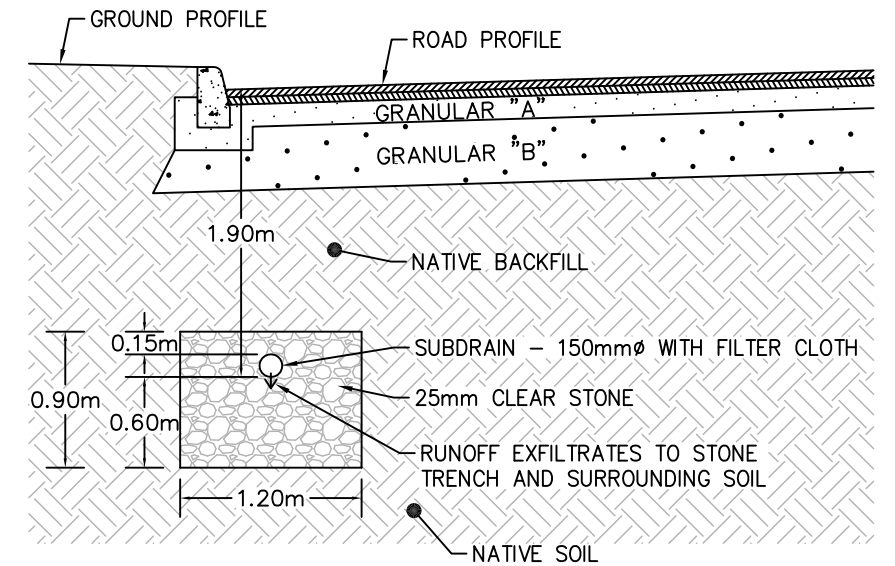
Water Budget



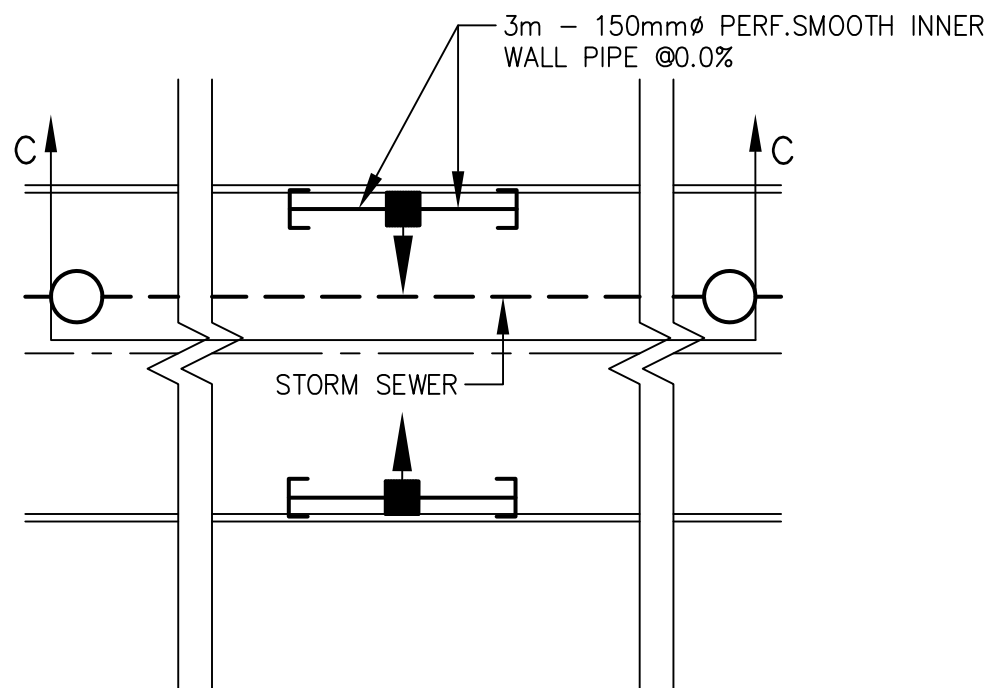
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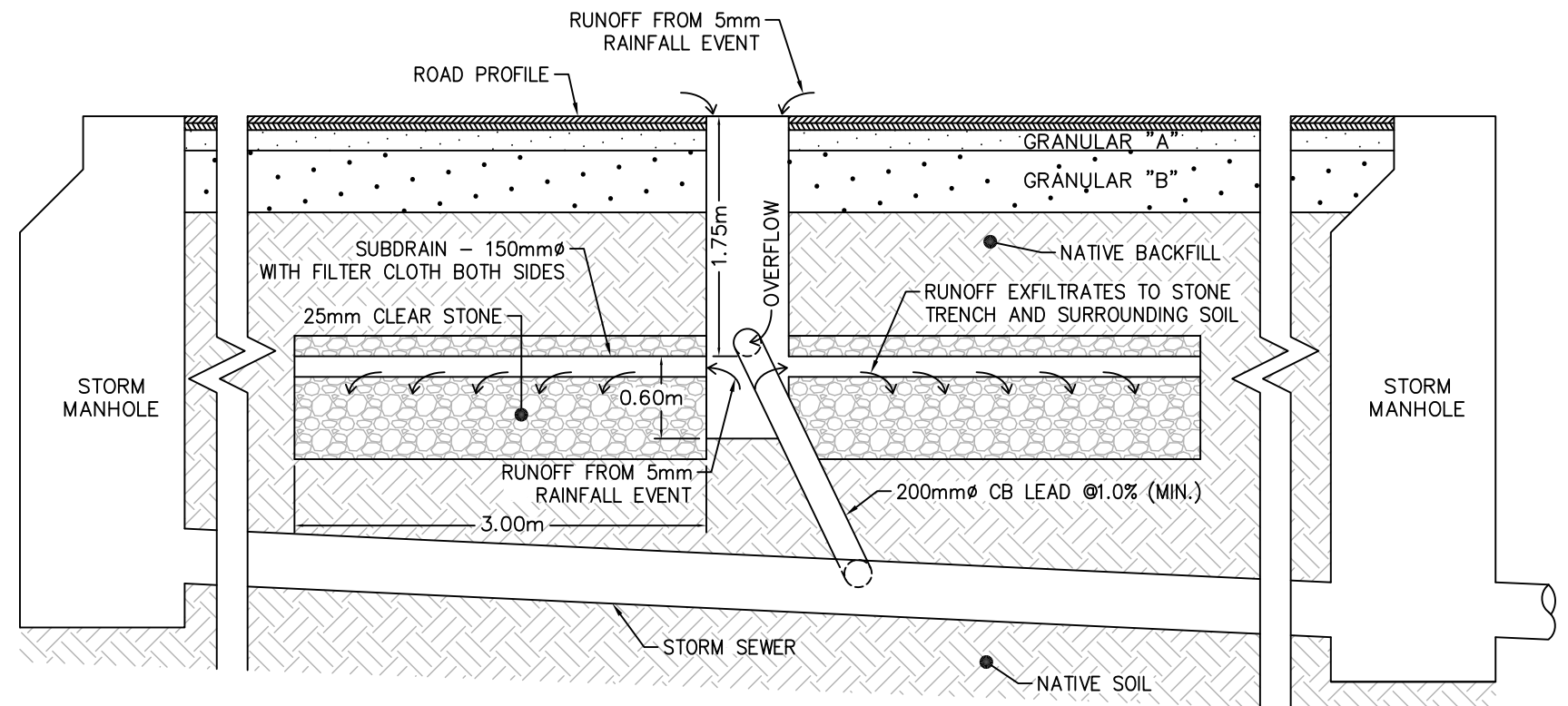
DETAIL A-A (SCALE-1:50)



DETAIL B-B (SCALE-1:50)



ROAD CATCHBASIN (SCALE-1:200)



DETAIL C-C (SCALE-1:50)



130 Huntmar - Pre Development Water Balance

Table D1-1: Pre Development Conditions - Pervious Areas

Condition	Land Use	Total Area (ha)	Total Imp (%)	Pervious Area (ha)	Impervious Area (ha)	Soil Type	Hydrologic Soil Group	Precipitation (mm/Year)	Evapo-transpiration (mm/Year)	Surplus (mm/Year)	Infiltration Factor*			Total	Infiltration (mm/yr.)	Runoff (mm/yr.)	Infiltration Volume (m <sup>3</sup> /yr.)	Runoff Volume (m <sup>3</sup> /yr.)
											Topography Factor	Soils Factor	Cover Factor					
Pre-Development	Natural	26.83	0%	26.83	0.00	Clay	D	940	525	415	0.1	0.05	0.1	0.25	104	311	27,836	83,508
<b>Total</b>		<b>26.83</b>		<b>26.83</b>	<b>0.00</b>												<b>27,836</b>	<b>83,508</b>

\*Infiltration factor adjusted to match infiltration rate of 104 mm/yr provided in Kanata West Master Servicing Study (Stantec, June 2006).

Table D1-2: Pre Development Conditions - Impervious Areas

Condition	Land Use	Total Area (ha)	Total Imp (%)	Pervious Area (ha)	Impervious Area (ha)	Precipitation (mm/Year)	Evaporation (mm/Year)	Surplus (mm/Year)	Infiltration (mm/yr.)	Runoff (mm/yr.)	Infiltration Volume (m <sup>3</sup> /yr.)	Runoff Volume (m <sup>3</sup> /yr.)
Pre-Development	Natural	26.83	0%	26.83	0.00	940	244	696	0	696	0	0
<b>Total</b>		<b>26.83</b>		<b>26.83</b>	<b>0.00</b>				<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Table D1-3: Pre Development Conditions - Water Budget Summary

Condition	Land Use	Total Area (ha)	Total Imp (%)	Pervious Area (ha)	Impervious Area (ha)	Pervious Runoff Volume (m <sup>3</sup> /yr.)	Impervious Runoff Volume (m <sup>3</sup> /yr.)	Runoff Volume (m <sup>3</sup> /yr.)	Infiltration Volume (m <sup>3</sup> /yr.)
Pre-Development	Natural	26.83	0%	26.83	0.00	83,508	0	83,508	27,836
<b>Total</b>		<b>26.83</b>		<b>26.83</b>	<b>0.00</b>		<b>Total</b>	<b>83,508</b>	<b>27,836</b>

**130 Huntmar - Post Development Water Balance**

**Table D2-1: Post Development Conditions - Pervious Areas**

Condition	Land Use	Total Area (ha)	Total Imp (%)	Pervious Area (ha)	Impervious Area (ha)	Soil Type	Hydrologic Soil Group	Precipitation (mm/Year)	Evapo-transpiration (mm/Year)	Surplus (mm/Year)	Infiltration Factor*				Infiltration (mm/yr.)	Runoff (mm/yr.)	Infiltration Volume (m <sup>3</sup> /yr.)	Runoff Volume (m <sup>3</sup> /yr.)
											Topography Factor	Soils Factor	Cover Factor	Total				
Post Development	Parkland	1.07	29%	0.76	0.31	Clay	D	940	525	415	0.1	0.2	0.1	0.4	166	249	1,261	1,892
	School	3.14	57%	1.35	1.79	Clay	D	940	525	415	0.1	0.2	0.1	0.4	166	249	2,241	3,362
	Residential	15.24	71%	4.42	10.82	Clay	D	940	525	415	0.1	0.2	0.1	0.4	166	249	7,337	11,005
	Commercial	7.38	86%	1.03	6.35	Clay	D	940	525	415	0.1	0.2	0.1	0.4	166	249	1,715	2,573
<b>Total</b>		<b>26.83</b>	<b>72%</b>	<b>7.56</b>	<b>19.27</b>												<b>12,554</b>	<b>18,831</b>

\*Infiltration factor adjusted to match infiltration rate of 104 mm/yr provided in Kanata West Master Servicing Study (Stantec, June 2006).

**Table D2-2: Post Development Conditions - Impervious Areas**

Condition	Land Use	Total Area (ha)	Total Imp (%)	Pervious Area (ha)	Impervious Area (ha)	Precipitation (mm/Year)	Evaporation (mm/Year)	Surplus (mm/Year)	Infiltration (mm/yr.)	Runoff (mm/yr.)	Infiltration Volume (m <sup>3</sup> /yr.)	Runoff Volume (m <sup>3</sup> /yr.)
Post Development	Parkland	1.07	29%	0.76	0.31	940	244	696	0	696	0	2,158
	School	3.14	57%	1.35	1.79	940	244	696	0	696	0	12,450
	Residential	15.24	71%	4.42	10.82	940	244	696	0	696	0	75,267
	Commercial	7.38	86%	1.03	6.35	940	244	696	0	696	0	44,148
<b>Total</b>		<b>26.83</b>	<b>72%</b>	<b>7.56</b>	<b>19.27</b>				<b>0</b>		<b>0</b>	<b>134,023</b>

**Table D2-3: Post Development Conditions - Water Budget Summary**

Condition	Land Use	Total Area (ha)	Total Imp (%)	Pervious Area (ha)	Impervious Area (ha)	Pervious Runoff Volume (m <sup>3</sup> /yr.)	Impervious Runoff Volume (m <sup>3</sup> /yr.)	Runoff Volume (m <sup>3</sup> /yr.)	Infiltration Volume (m <sup>3</sup> /yr.)
Post Development	Parkland	1.07	29%	0.76	0.31	1892	2158	4050	1261
	School	3.14	57%	1.35	1.79	3362	12450	15812	2241
	Residential	15.24	71%	4.42	10.82	11005	75267	86272	7337
	Commercial	7.38	86%	1.03	6.35	2573	44148	46721	1715
<b>Total</b>		<b>26.83</b>	<b>72%</b>	<b>7.56</b>	<b>19.27</b>		<b>152,854</b>	<b>12,554</b>	

**Table D2-4: Post Development Conditions - LID Infiltration Requirements**

Description	Total Runoff Area (ha)	Area treated by LID (%)	Total Treated Area (ha)	Average Site Runoff (mm/yr.)	LID Storm Design Capacity (mm)	LID Runoff Capture Capacity <sup>1</sup> (mm)	Annual Rainfall Percentile Capture <sup>2</sup>	Captured Runoff (mm/yr.)	LID Infiltrated Volume (m <sup>3</sup> /yr.)	Site Infiltration Surplus (m <sup>3</sup> /yr.)
Post Development LID System	26.83	50%	13.42	570	5.0	1.92	64%	141	18,913	3,631

<sup>1</sup> Refer to "TMP vs Runoff Volume Summary Tables" in Attachment C

<sup>2</sup> Refer table B2-5 Ottawa Airport Annual Rainfall Percentiles J.L. Richard - Barrhaven South MSS (2021)

**Table B2-5: Ottawa Airport Annual Rainfall Percentiles  
J.L. Richard - Barrhaven South MSS (2021)**

Event Percentile	Rainfall Depth (mm)
0	0
50	2.9
55	3.4
60	4.2
65	5.1
70	6.2
75	7.5
80	9.1
85	11.4
90	15.1
95	21.6
99	37.1

MOE SWM Manual

Table 3.1: Hydrologic Cycle Component Values

	Water Holding Capacity mm	Hydrologic Soil Group	Precipitation mm	Evapo- transpiration mm	Runoff mm	Infiltration* mm
<b>Urban Lawns/Shallow Rooted Crops (spinach, beans, beets, carrots)</b>						
Fine Sand	50	A	940	515	149	276
Fine Sandy Loam	75	B	940	525	187	228
Silt Loam	125	C	940	536	222	182
Clay Loam	100	CD	940	531	245	164
Clay	75	D	940	525	270	145
<b>Moderately Rooted Crops (corn and cereal grains)</b>						
Fine Sand	75	A	940	525	125	291
Fine Sandy Loam	150	B	940	539	160	241
Silt Loam	200	C	940	543	199	199
Clay Loam	200	CD	940	543	218	179
Clay	150	D	940	539	241	160
<b>Pasture and Shrubs</b>						
Fine Sand	100	A	940	531	102	307
Fine Sandy Loam	150	B	940	539	140	261
Silt Loam	250	C	940	546	177	217
Clay Loam	250	CD	940	546	197	197
Clay	200	D	940	543	218	179
<b>Mature Forests</b>						
Fine Sand	250	A	940	546	79	315
Fine Sandy Loam	300	B	940	548	118	274
Silt Loam	400	C	940	550	156	234
Clay Loam	400	CD	940	550	176	215
Clay	350	D	940	549	196	196

**Notes:** Hydrologic Soil Group A represents soils with low runoff potential and Soil Group D represents soils with high runoff potential. The evapotranspiration values are for mature vegetation. Streamflow is composed of baseflow and runoff.

\* This is the total infiltration of which some discharges back to the stream as base flow. The infiltration factor is determined by summing a factor for topography, soils and cover.

Infiltration Factor*		Value
Topography	Flat Land, average slope < 0.6 m/km	0.3
	Rolling Land, average slope 2.8 m to 3.8 m/km	0.2
	Hilly Land, average slope 28 m to 47 m/km	0.1
Soils	Tight impervious clay	0.1
	Medium combinations of clay and loam	0.2
	Open Sandy loam	0.4
Cover	Cultivated Land	0.1
	Woodland	0.2

**TIMP vs Runoff Volume Summary Tables**

**Runoff Volume (mm) Generated for 5 mm event**

TIMP	XIMP = % of TIMP										
	1.00	0.90	0.80	0.70	0.60	0.50	0.40	0.30	0.20	0.10	0.01
95.0%	3.26	2.93	2.63	2.50	2.42	2.39	2.39	2.43	2.48	2.54	2.62
90.0%	3.09	2.78	2.47	2.16	1.86	1.69	1.60	1.51	1.43	1.38	1.36
85.0%	2.91	2.62	2.33	2.04	1.75	1.46	1.17	0.97	0.82	0.73	0.66
80.0%	2.74	2.47	2.19	1.92	1.65	1.37	1.10	0.82	0.55	0.30	0.15
75.0%	2.57	2.31	2.06	1.80	1.54	1.29	1.03	0.77	0.51	0.26	0.03
70.0%	2.40	2.16	1.92	1.68	1.44	1.20	0.96	0.72	0.48	0.24	0.02
65.0%	2.23	2.01	1.78	1.56	1.34	1.11	0.89	0.67	0.45	0.22	0.02
60.0%	2.06	1.85	1.65	1.44	1.23	1.03	0.82	0.62	0.41	0.21	0.02
55.0%	1.89	1.70	1.51	1.32	1.13	0.94	0.75	0.57	0.38	0.19	0.02
50.0%	1.71	1.54	1.37	1.20	1.03	0.86	0.69	0.51	0.34	0.17	0.02
45.0%	1.54	1.39	1.23	1.08	0.93	0.77	0.62	0.46	0.31	0.15	0.02
40.0%	1.37	1.23	1.10	0.96	0.82	0.69	0.55	0.41	0.27	0.14	0.01

**Runoff Volume (mm) Generated for 22 mm event**

TIMP	XIMP = % of TIMP										
	1.00	0.90	0.80	0.70	0.60	0.50	0.40	0.30	0.20	0.10	0.01
95.0%	19.41	18.62	18.40	18.36	18.41	18.52	18.63	18.75	18.87	19.00	19.12
90.0%	18.39	17.40	16.86	16.55	16.39	16.32	16.29	16.30	16.34	16.43	16.53
85.0%	17.37	16.35	15.63	15.15	14.81	14.56	14.41	14.32	14.26	14.23	14.22
80.0%	16.34	15.33	14.53	13.94	13.47	13.12	12.84	12.62	12.47	12.35	12.29
75.0%	15.32	14.30	13.55	12.86	12.32	11.87	11.51	11.21	10.95	10.73	10.58
70.0%	14.30	13.27	12.58	11.89	11.26	10.76	10.32	9.95	9.64	9.37	9.14
65.0%	13.28	12.30	11.60	10.95	10.31	9.75	9.27	8.85	8.48	8.14	7.88
60.0%	12.26	11.34	10.62	10.03	9.43	8.84	8.31	7.84	7.46	7.08	6.78
55.0%	11.24	10.38	9.64	9.10	8.55	8.01	7.46	6.96	6.53	6.13	5.81
50.0%	10.21	9.42	8.72	8.17	7.68	7.18	6.68	6.19	5.69	5.29	4.93
45.0%	9.19	8.46	7.83	7.24	6.79	6.34	5.90	5.45	5.02	4.56	4.16
40.0%	8.17	7.50	6.93	6.38	5.91	5.52	5.13	4.73	4.33	3.93	3.58

**Runoff Volume (mm) Generated for 10 mm event**

TIMP	XIMP = % of TIMP										
	1.00	0.90	0.80	0.70	0.60	0.50	0.40	0.30	0.20	0.10	0.01
95.0%	8.01	7.32	7.02	6.88	6.83	6.85	6.90	6.97	7.06	7.16	7.28
90.0%	7.59	6.83	6.24	5.92	5.65	5.48	5.36	5.29	5.24	5.24	5.25
85.0%	7.17	6.45	5.73	5.20	4.90	4.58	4.34	4.15	3.99	3.88	3.80
80.0%	6.74	6.07	5.39	4.72	4.24	3.91	3.62	3.33	3.08	2.87	2.72
75.0%	6.32	5.69	5.06	4.43	3.79	3.33	2.96	2.69	2.42	2.15	1.90
70.0%	5.90	5.31	4.72	4.13	3.54	2.95	2.48	2.09	1.80	1.54	1.32
65.0%	5.48	4.93	4.38	3.84	3.29	2.74	2.19	1.68	1.32	0.96	0.73
60.0%	5.06	4.55	4.05	3.54	3.03	2.53	2.02	1.52	1.01	0.61	0.31
55.0%	4.64	4.17	3.71	3.25	2.78	2.32	1.85	1.39	0.93	0.46	0.05
50.0%	4.21	3.79	3.37	2.95	2.53	2.11	1.69	1.26	0.84	0.42	0.04
45.0%	3.79	3.41	3.03	2.66	2.28	1.90	1.52	1.14	0.76	0.38	0.04
40.0%	3.37	3.03	2.70	2.36	2.02	1.69	1.35	1.01	0.67	0.34	0.03

**Runoff Volume (mm) Generated for 25 mm event**

TIMP	XIMP = % of TIMP										
	1.00	0.90	0.80	0.70	0.60	0.50	0.40	0.30	0.20	0.10	0.01
95.0%	22.29	21.52	21.32	21.30	21.38	21.49	21.60	21.72	21.85	21.98	22.10
90.0%	21.16	20.17	19.65	19.37	19.23	19.18	19.16	19.19	19.28	19.39	19.48
85.0%	20.02	18.99	18.29	17.83	17.50	17.29	17.17	17.09	17.05	17.03	17.04
80.0%	18.88	17.89	17.07	16.49	16.05	15.72	15.45	15.26	15.14	15.04	14.98
75.0%	17.75	16.79	15.94	15.29	14.75	14.33	13.99	13.69	13.45	13.27	13.14
70.0%	16.61	15.69	14.89	14.16	13.58	13.08	12.67	12.31	12.01	11.75	11.53
65.0%	15.47	14.59	13.84	13.10	12.48	11.95	11.47	11.07	10.70	10.41	10.16
60.0%	14.33	13.49	12.81	12.12	11.44	10.89	10.40	9.95	9.55	9.19	8.89
55.0%	13.20	12.40	11.77	11.14	10.50	9.89	9.40	8.91	8.51	8.11	7.79
50.0%	12.06	11.29	10.72	10.16	9.58	9.00	8.45	7.98	7.52	7.14	6.79
45.0%	10.92	10.20	9.68	9.17	8.65	8.13	7.62	7.10	6.67	6.26	5.88
40.0%	9.79	9.13	8.64	8.18	7.72	7.27	6.81	6.34	5.88	5.45	5.11

**Runoff Volume (mm) Generated for 15 mm event**

TIMP	XIMP = % of TIMP										
	1.00	0.90	0.80	0.70	0.60	0.50	0.40	0.30	0.20	0.10	0.01
95.0%	12.76	11.96	11.67	11.58	11.58	11.62	11.71	11.83	11.95	12.08	12.19
90.0%	12.09	11.08	10.54	10.18	9.96	9.81	9.74	9.72	9.72	9.75	9.78
85.0%	11.42	10.31	9.68	9.16	8.78	8.49	8.28	8.12	8.00	7.93	7.88
80.0%	10.74	9.67	8.85	8.35	7.85	7.44	7.14	6.87	6.66	6.49	6.36
75.0%	10.07	9.06	8.16	7.54	7.08	6.61	6.20	5.85	5.56	5.30	5.11
70.0%	9.40	8.46	7.52	6.83	6.31	5.87	5.43	5.00	4.65	4.33	4.08
65.0%	8.73	7.86	6.98	6.18	5.59	5.13	4.72	4.32	3.91	3.52	3.22
60.0%	8.06	7.25	6.45	5.64	4.99	4.44	4.01	3.64	3.27	2.89	2.55
55.0%	7.39	6.65	5.91	5.17	4.43	3.89	3.39	2.97	2.62	2.28	1.97
50.0%	6.71	6.04	5.37	4.70	4.03	3.36	2.88	2.43	1.97	1.66	1.38
45.0%	6.04	5.44	4.83	4.23	3.63	3.02	2.42	1.97	1.55	1.15	0.79
40.0%	5.37	4.83	4.30	3.76	3.22	2.69	2.15	1.61	1.14	0.78	0.45

**Runoff Volume (mm) Generated for 30 mm event**

TIMP	XIMP = % of TIMP										
	1.00	0.90	0.80	0.70	0.60	0.50	0.40	0.30	0.20	0.10	0.01
95.0%	27.14	26.38	26.22	26.24	26.34	26.45	26.57	26.69	26.82	26.95	27.08
90.0%	25.86	24.85	24.36	24.14	24.03	23.99	24.03	24.12	24.21	24.31	24.39
85.0%	24.57	23.49	22.82	22.39	22.12	21.96	21.86	21.80	21.77	21.79	21.85
80.0%	23.28	22.20	21.43	20.87	20.47	20.16	19.95	19.81	19.70	19.63	19.58
75.0%	22.00	20.94	20.12	19.48	18.98	18.59	18.26	18.02	17.83	17.70	17.59
70.0%	20.71	19.73	18.86	18.19	17.62	17.16	16.77	16.43	16.14	15.93	15.77
65.0%	19.42	18.51	17.64	16.94	16.34	15.82	15.39	15.02	14.67	14.38	14.14
60.0%	18.14	17.29	16.45	15.74	15.14	14.59	14.11	13.70	13.31	13.01	12.71
55.0%	16.85	16.08	15.30	14.58	13.96	13.43	12.92	12.48	12.06	11.72	11.41
50.0%	15.56	14.86	14.16	13.45	12.86	12.29	11.81	11.36	10.94	10.53	10.21
45.0%	14.28	13.64	13.01	12.39	11.74	11.24	10.73	10.29	9.87	9.45	9.12
40.0%	12.99	12.44	11.88	11.31	10.74	10.20	9.75	9.29	8.87	8.49	8.14

**Runoff Volume (mm) Generated for 20 mm event**

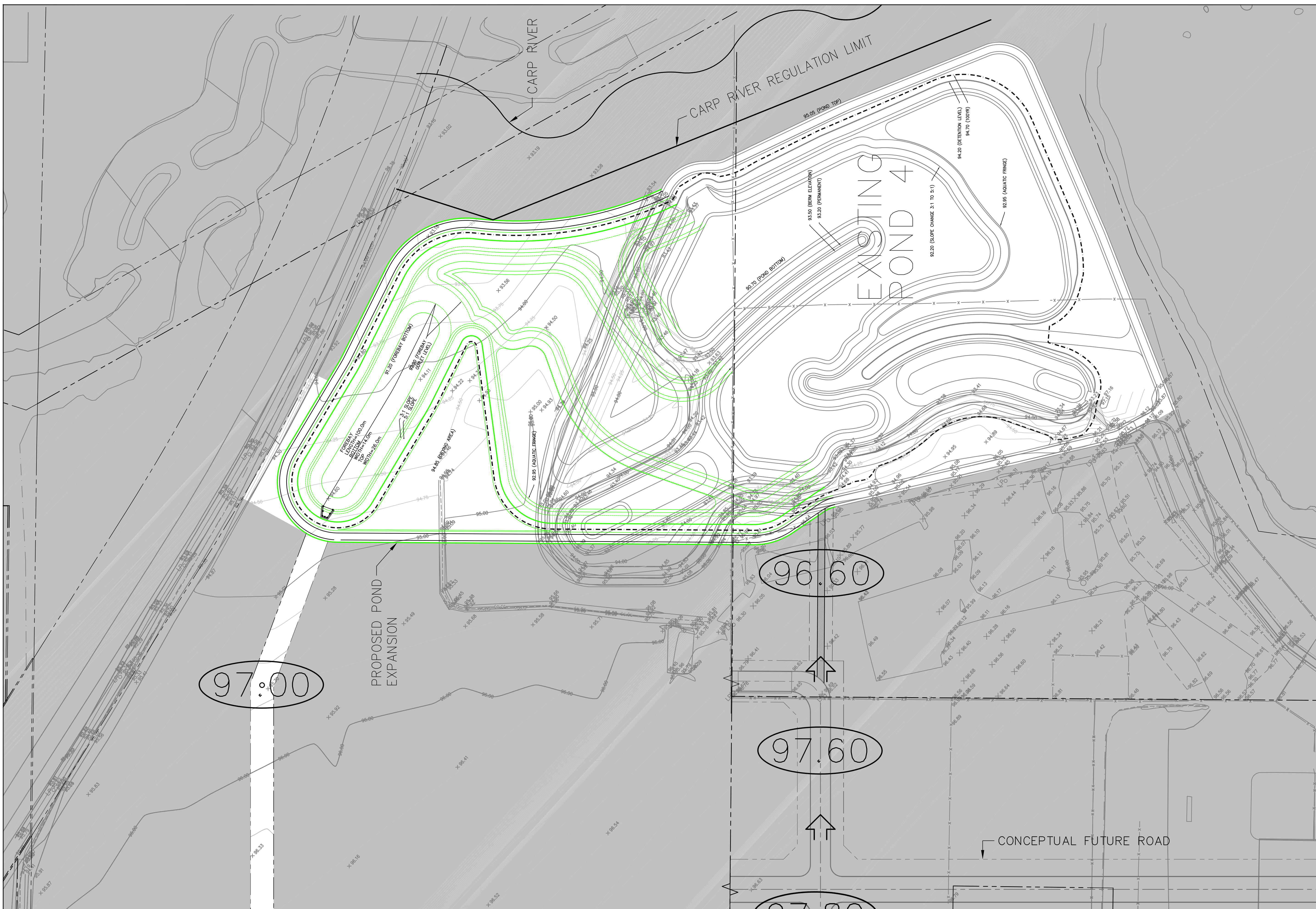
TIMP	XIMP = % of TIMP										
	1.00	0.90	0.80	0.70	0.60	0.50	0.40	0.30	0.20	0.10	0.01
95.0%	17.51	16.70	16.46	16.41	16.44	16.53	16.65	16.76	16.89	17.02	17.14
90.0%	16.59	15.58	15.02	14.70	14.51	14.43	14.39	14.40	14.42	14.48	14.57
85.0%	15.67	14.60	13.89	13.39	13.04	12.79	12.60	12.49	12.43	12.39	12.37
80.0%	14.74	13.62	12.91	12.28	11.81	11.44	11.16	10.92	10.73	10.60	10.51
75.0%	13.82	12.68	11.98	11.31	10.74	10.30	9.91	9.59	9.35	9.11	8.93
70.0%	12.90	11.79	11.04	10.42	9.80	9.28	8.84	8.44	8.11	7.83	7.61
65.0%	11.98	10.89	10.10	9.52	8.95	8.37	7.87	7.44	7.06	6.72	6.44
60.0%	11.06	9.99	9.24	8.63	8.10	7.57	7.03	6.55	6.13	5.75	5.44
55.0%	10.14	9.12	8.40	7.74	7.25	6.76	6.28	5.79	5.30	4.91	4.56
50.0%	9.21	8.29	7.57	6.94	6.40	5.96	5.52	5.08	4.63	4.19	3.79
45.0%	8.29	7.46	6.73	6.17	5.60	5.15	4.76	4.36	3.97	3.57	3.21
40.0%	7.37	6.63	5.90	5.40	4.89	4.38	3.99	3.65	3.29	2.94	2.62

**LEGEND**

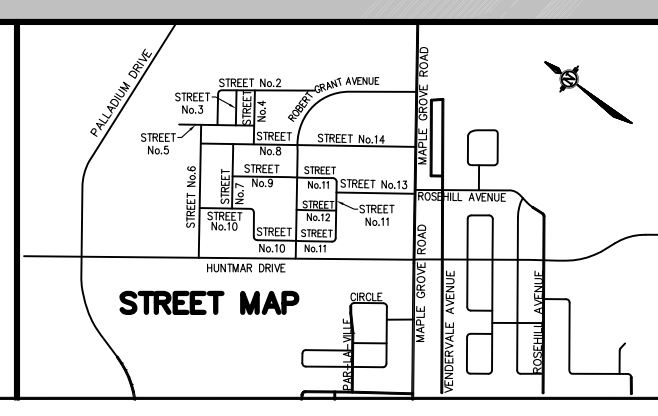
- 99.00
- X 89.81
- (87.09)
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CONTOURS AT 0.25m INTERVAL  
EXISTING SPOT ELEVATION  
PROPOSED ELEVATION  
MAJOR DRAINAGE SYSTEM  
OUTSIDE PROPOSED DEVELOPMENT

TRUE  
N  
CONSTRUCTION  
CONSTRUCTION



THE POSITION OF ALL POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.



No.	REVISION	APPLIES WHEN DRAWING MODIFIED	DATE	BY
1	ISSUED FOR SANITARY TRUNK MOECC APPROVAL		JULY 6/20	AGS
2	ISSUED FOR SANITARY TRUNK MOECC APPROVAL		AUG. 4/20	AGS
3	REVISED AS PER CITY COMMENTS		OCT. 7/20	AGS
4	REVISED AS PER NEW ROAD ALIGNMENT		MAR. 4/21	AGS
5	REVISED AS PER CITY COMMENTS		MAR. 30/21	AGS
6	RECORD DRAWING		AUG. 15/21	AGS
7	REVISED AS PER CITY COMMENTS		SEP. 20/21	AGS

SCALE 1:750  
8m 0 24m

DESIGN AGS  
CHECKED JMD  
DRAWN CED  
CHECKED AGS  
APPROVED JMD

LICENCED PROFESSIONAL ENGINEER  
A. G. Y. SAUVE  
100142393  
Sept 25, 2021  
PROVINCE OF ONTARIO

LICENCED PROFESSIONAL ENGINEER  
J. M. JOSEPH  
100142393  
Sept 25, 2021  
PROVINCE OF ONTARIO

**ATREL Engineering Inc.**  
Engineers - Ingénieurs  
1-2884 CHAMBERLAND STREET, ROCKLAND, ONTARIO K4K 1M6  
TEL.: (613) 446-7423

CITY OF OTTAWA  
130 HUNTMAR DR.  
PLAN  
STORMWATER  
MANAGEMENT POND

LIONESS DEVELOPMENT INC.  
PROJECT No. 191002  
DATE JANUARY 2020  
DRAWING No. 191002-SWMP

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Legend

- KANATA-WEST CONCEPT PLAN BOUNDARY
- POND DRAINAGE BOUNDARY
- STORM SEWER DRAINAGE LIMIT

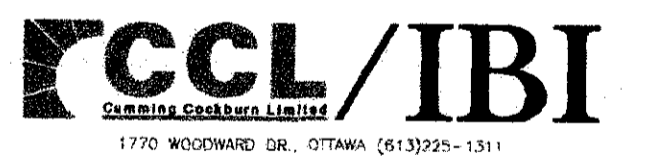
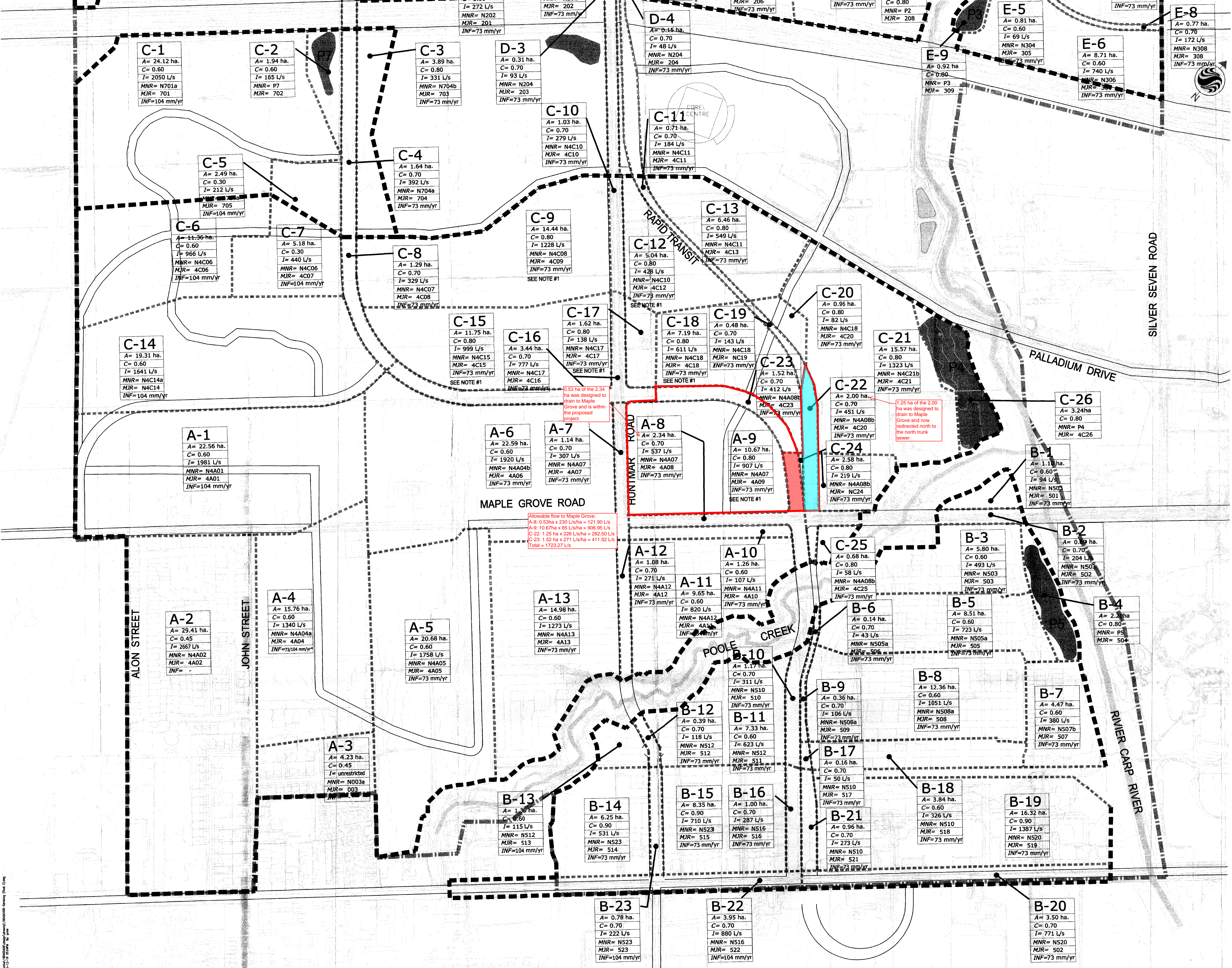
A-1

Drainage Area Identification Area in Hectares  
Runoff Coefficient  
100yr. Inlet Capacity (L/s)  
Minor System Node Number  
Major System Segment Number  
Infiltration

Notes

\* REFER TO FIGURE 3.2 IN KANATA WEST MASTER SERVING STUDY FOR FURTHER INFILTRATION DETAILS

1 THOSE AREAS WHICH ARE COMPLETELY SURROUNDED BY ARTERIAL ROADWAYS (SPECIFICALLY AREAS A-9, C-9, C-12, C-15, C-17, C-18) MUST PROVIDE SURFACE STORAGE IN THE AMOUNT OF 30mm/hr, OR IN SUFFICIENT QUANTITY TO DEMONSTRATE COMPLETE CONTAINMENT OF THE 100yr. EVENT. (A NO MAJOR SYSTEM FLOW IN THE 1:100yr EVENT)



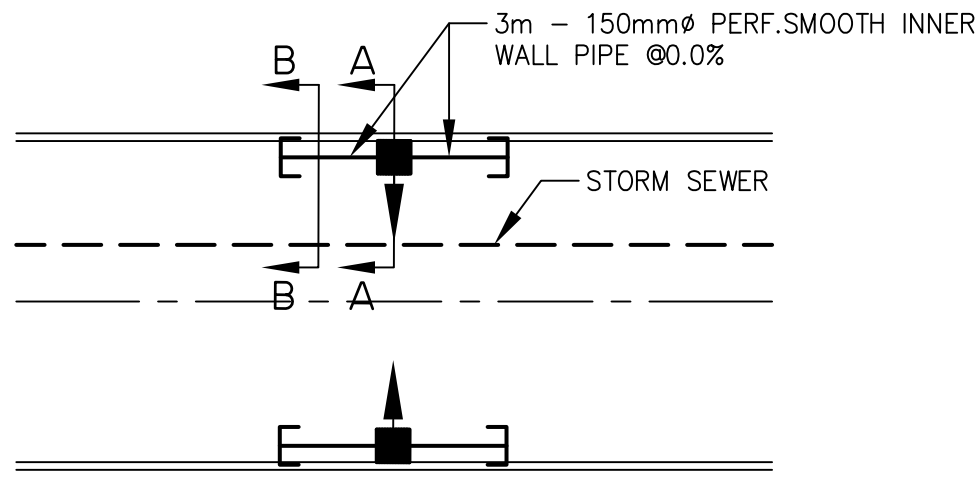
Revision	By	App'd.	Date
2	REVISED FOR DEC. 21/05 SUBMISSION	GSJ	DEC. 21/05
1	REVISED AS PER CITY COMMENTS (Sept. 16/05)	GSJ	OCT. 28/05

Client/Project  
Kanata West Concept Plan  
Master Servicing Study

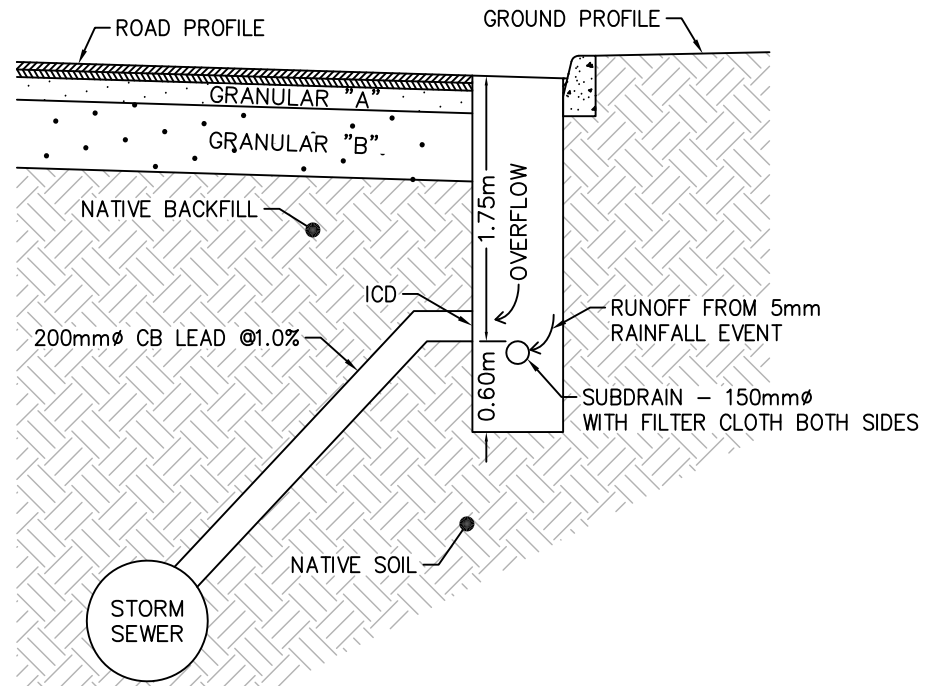
Ottawa, Ontario

Title  
STORM DRAINAGE AREA PLAN  
SOUTH PONDS

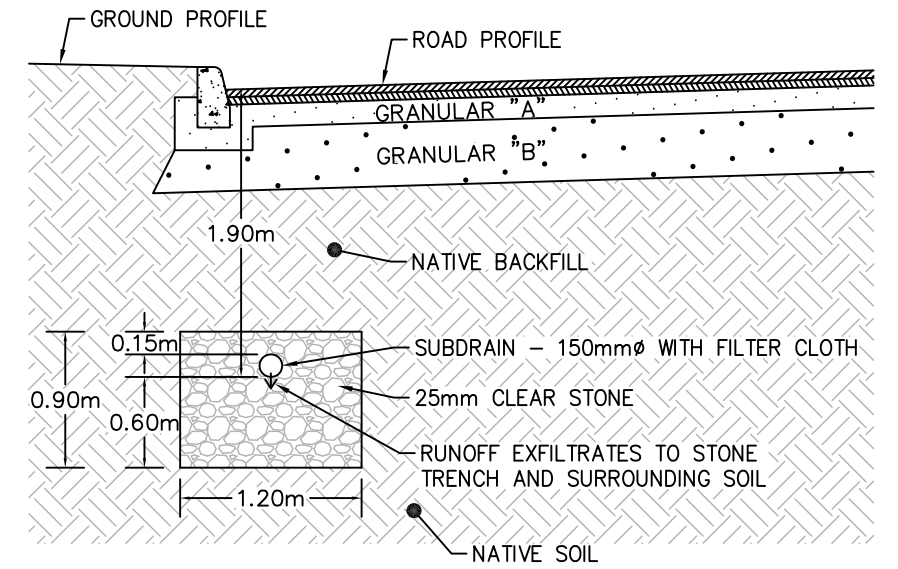
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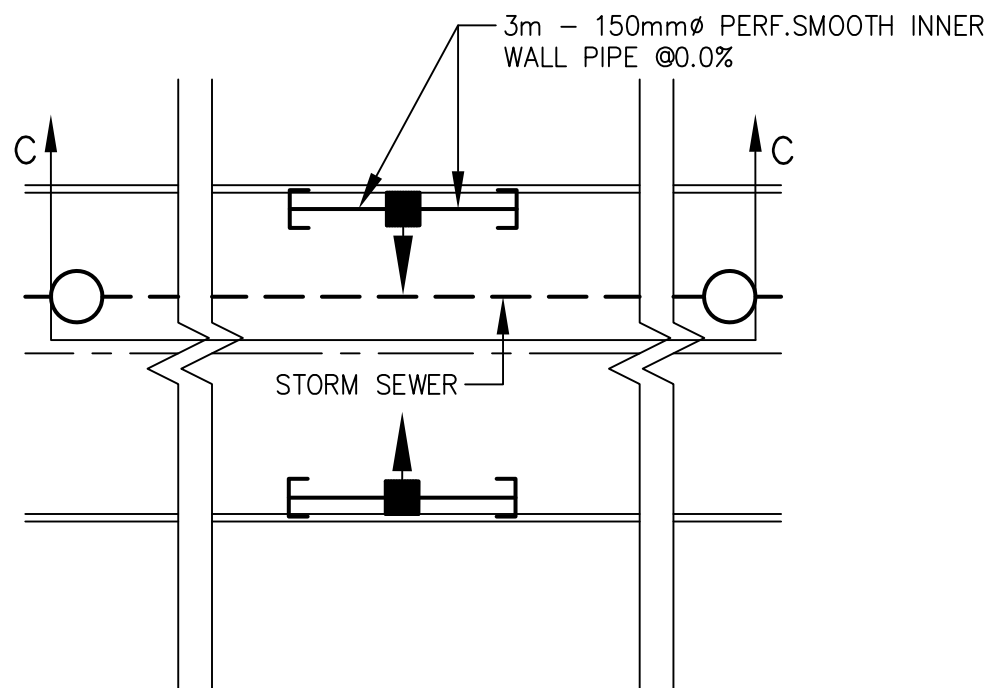
ROAD CATCHBASIN (SCALE-1:200)



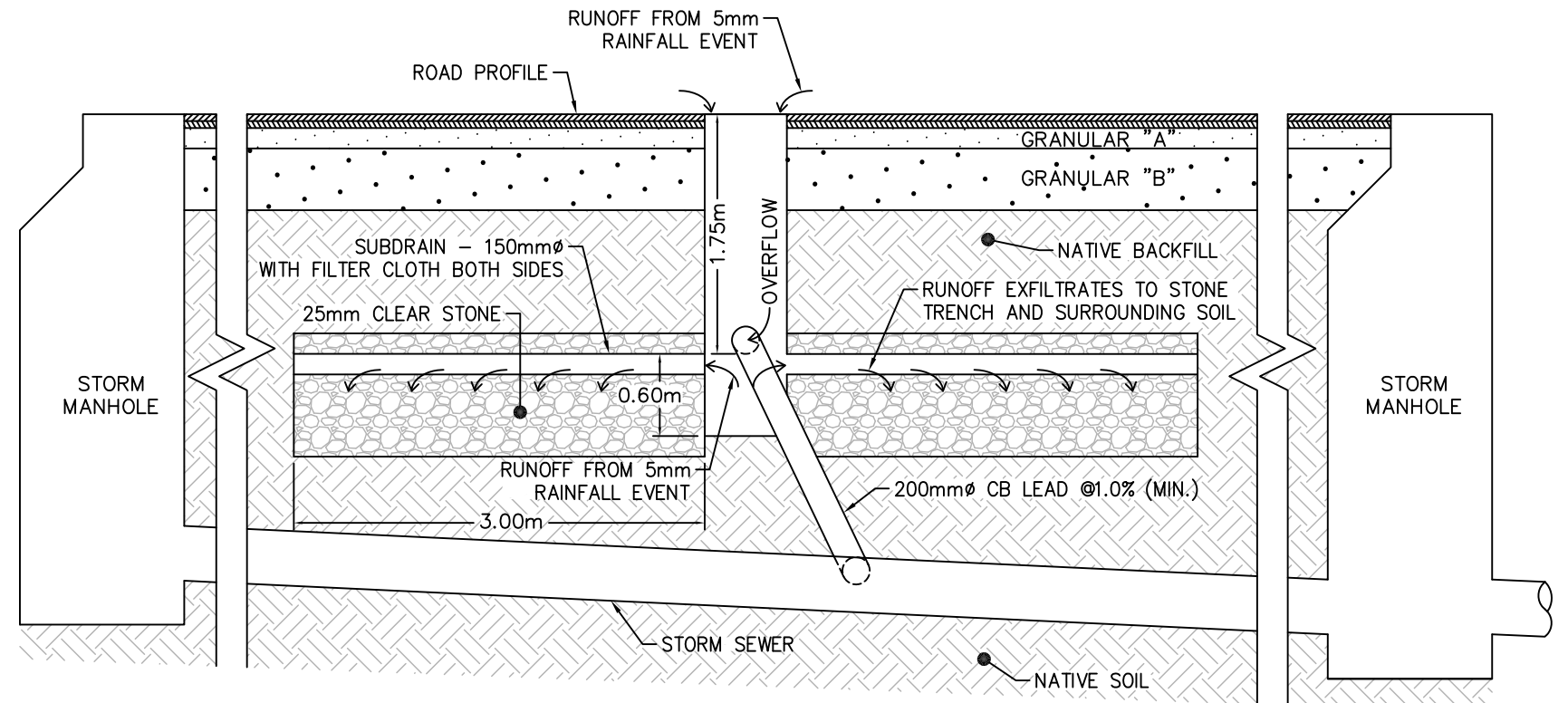
DETAIL A-A (SCALE-1:50)



DETAIL B-B (SCALE-1:50)



ROAD CATCHBASIN (SCALE-1:200)



DETAIL C-C (SCALE-1:50)