FUNCTIONAL SERVICING REPORT

130 HUNTMAR DRIVE

Prepared for:

LIONESS DEVELOPMENT INC.

PROJECT No: 191002

CITY OF OTTAWA

AUGUST 2023

ATREL Engineering Ltd Ltée
Engineers - Ingénieurs

REVISION 4

FUNCTIONAL SERVICING REPORT
130 HUNTMAR DRIVE

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1.0 BACKGROUND

1.1 General

Atrel Engineering Ltd. has been retained by Lioness Development Inc. to complete a 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.

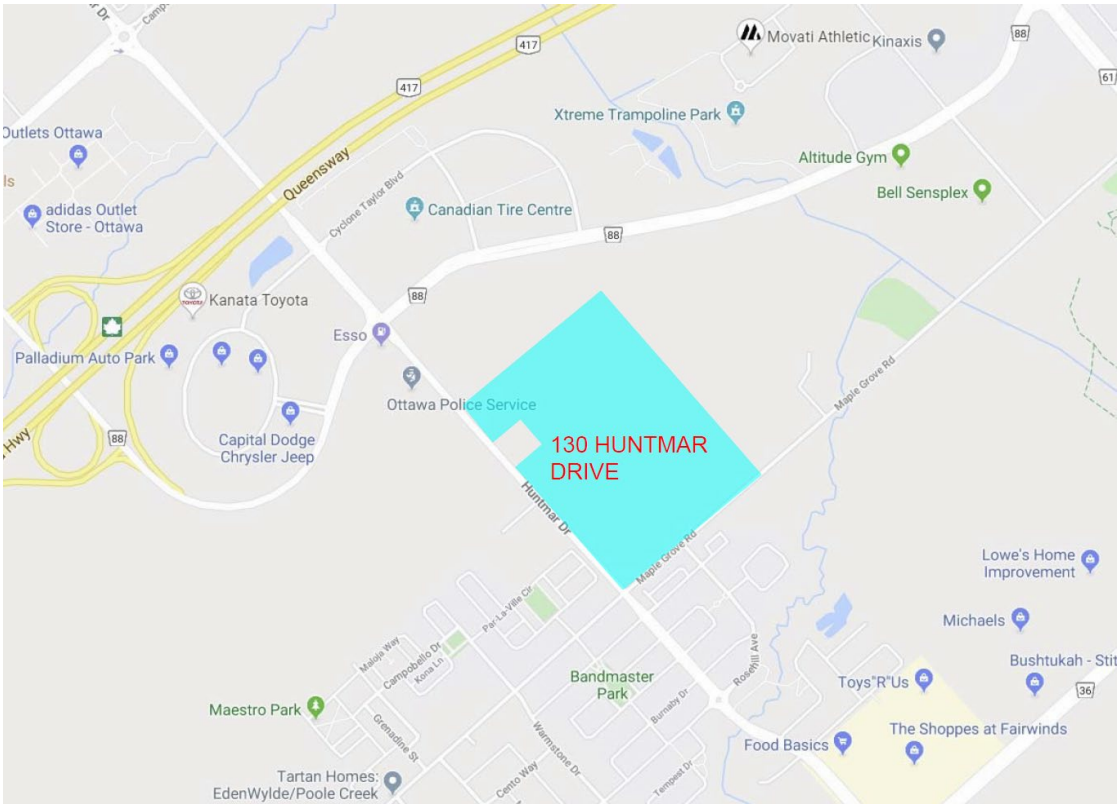

Figure 1 – Location Map

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. 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 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 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 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 diamater watermain is not yet installed on Huntmar Drive between Cyclone Taylor Boulevard and Maple Grove, 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 Huntamar 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. 15.

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. The boundary condition for connection No. 4 was assumed to be the same as connection No. 2 due to its proximity.

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 four 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

Type of development	**Average daily demand**	**Maximum daily**	**Peak hourly**
Residential	280 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
7.8699 l/s	18.2980 l/s	38.5128 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.
4
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 KWPSS 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 Hutnmar 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. 11 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. 8, 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. 8 (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:

Location	Type	Area (ha)	Population
To MH 215A	Infiltration	1.21	0
	Commercial	3.61	361
	Institutional	0	0
	Green Space	5.89	196

DSEL's sewer computation sheets (attached in Appendix "D") which correlate with drawing No.25 & 26 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. 25 to 26, located in Appendix D. A summary of the tributary areas and populations is shown below:

Location	Type	Area (ha)	Population
To MH 217A	Residential	104.81	7066
	Commercial	40.12	4012
	Institutional	7.46	746
	Green Space	0.53	17.6

DSEL's sewer computation sheets (attached in Appendix "D") which correlate with drawing No.25 & 26 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 529.33 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 55%.

2.4.4 Sanitary HGL Analysis

In the event of a catastrophic failure at the KWPS, the annual event, the sanitary HGL under this situation cannot touch the underside of footings. The City confirmed that the HGL elevation at Maple Grove adjacent to the KWPS during a catastrophic failure is 95.2m. 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 96.33m 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 the HGL is maintained under the underside of footings 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 KWMSS 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 94.738 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 ±0.65 and at ±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 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. 11 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
        vi. Future Huntmar Drive expansion = 10 year storm
    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 (Sawtoothing 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 25,598m^3 for a total storage volume of 72,100m^3, refer to JFSA's memorandum in Appendix "E" of this report.

The pond expansion was assessed at in detailed 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 then 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 (LID)

As per the KWMSS the proposed development is considered to be in an area of low groundwater recharge and will need to meet the proposed infiltration rates of 104 mm/Year. It is proposed to use the rear yard drainage system as a LID to promote infiltration. It is estimated that 1550m of rear yard trench with subdrain will be installed withing the development. Using the void in the clear stone below the subdrain, it was determined that 0.30m deep will provide the 162 m^3 of infiltration storage volume to meet the annual water budget. 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.

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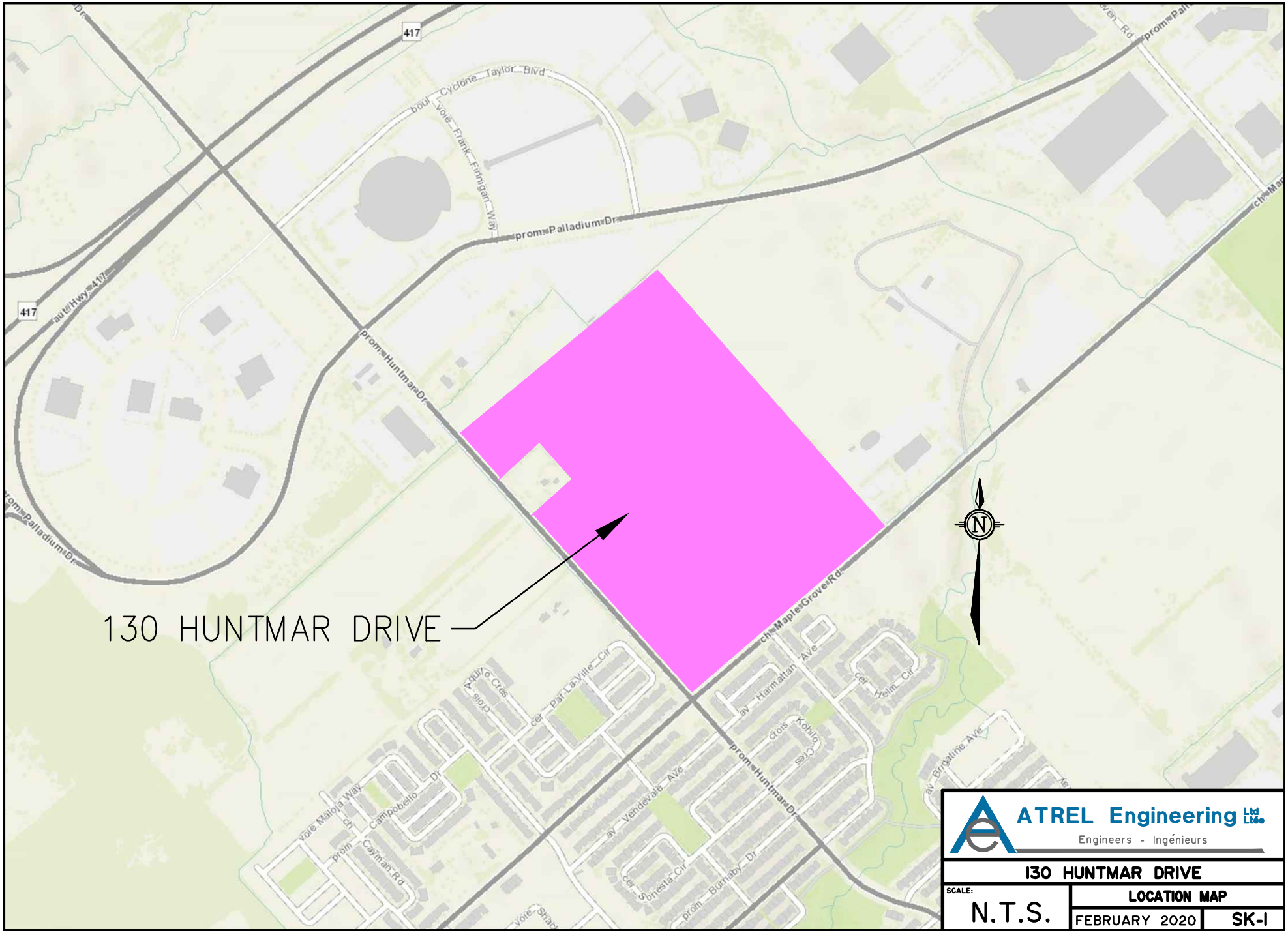
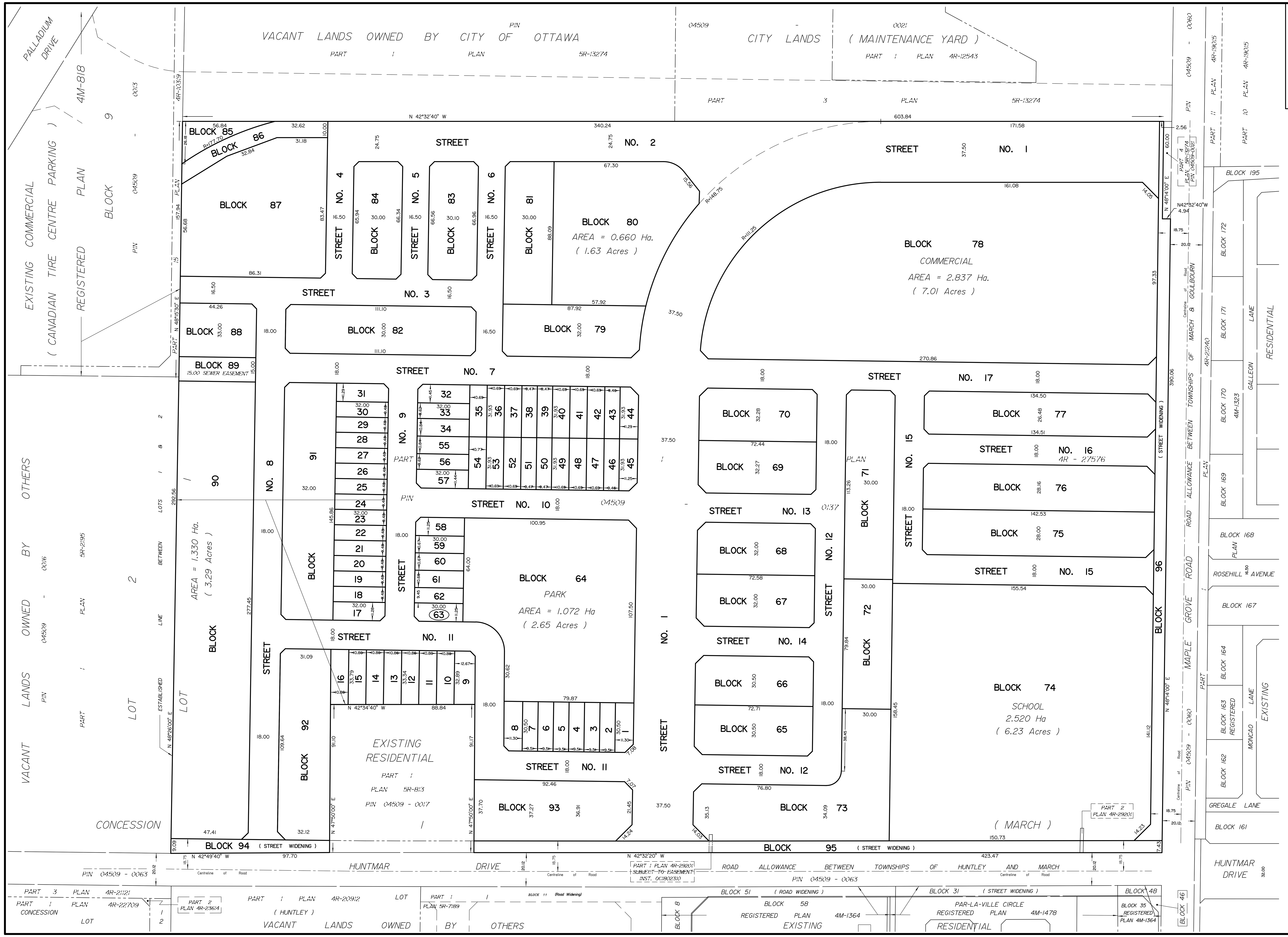
APPENDIX "A"

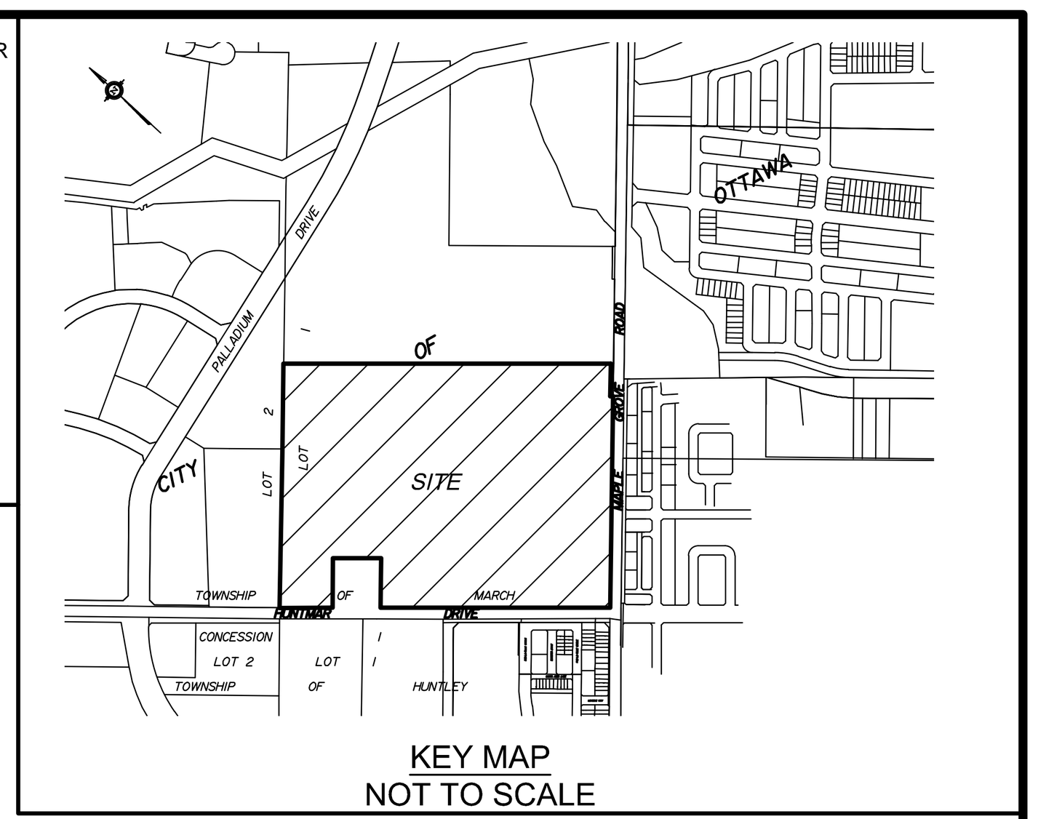
- SK-1 Location Map
- 130 Huntmar Drive – Draftplan of Subdivision
- 130 Huntmar Drive – Pre-Consultation Meeting Minutes
- LRT Extension – Plan and Profile (Parsons)



ATREL Engineering Ltd. Ltée.
Engineers - Ingénieurs

130 HUNTMAR DRIVE		
SCALE: N.T.S.	LOCATION MAP	
	FEBRUARY 2020	SK-1





SUBJECT TO THE CONDITIONS, IF ANY, SET FORTH IN OUR LETTER DATED

______________________.

THIS DRAFT PLAN IS APPROVED BY THE CITY OF OTTAWA UNDER SECTION 51 OF THE PLANNING ACT.
THIS ____ DAY OF ___________, 20__ .

____
DERRICK MOODIE, MANAGER
DEVELOPMENT REVIEW-WEST
PLANNING, REAL ESTATE AND ECONOMIC
DEVELOPMENT DEPARTMENT, CITY OF OTTAWA

DRAFT PLAN OF SUBDIVISION OF

PART OF LOT 1
CONCESSION 1

Geographic Township of March
CITY OF OTTAWA

Prepared by Annis , O'Sullivan , Vollebekk Ltd.

Scale 1 : 1000

40 30 20 10 0 20 40 Metres

Metric

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

SURVEYOR'S CERTIFICATE

I CERTIFY THAT :
The boundaries of the lands to be subdivided and their relationship to adjoining lands have been accurately and correctly shown.

___________ Date

____
T. Hartwick
ONTARIO LAND SURVEYOR

OWNER'S CERTIFICATE

This is to certify that I am the owner / agent of the lands to be subdivided and that this plan was prepared in accordance with my instructions.

_____________ Date

____
Marcel Denomme
Urbandale Corporation
I have authority to bind the corporation

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51-17 OF THE PLANNING ACT

(a) see plan
(b) see plan
(c) see plan
(d) single family, multi-family residential housing, institutional, park land and commercial
(e) see plan
(f) see plan
(g) see plan
(h) City of Ottawa
(i) see soils report
(j) see plan
(k) sanitary, storm sewers, municipal water, bell, hydro, cable and gas to be available
(l) see plan

REVISION SCHEDULE

NO.	REVISION	DATE	
16	Block Revisions between Streets 1 and 12	MAY. 4, 2023	N
15	Revised depth of Blocks bet. St. 1 & St. 12	MAR. 14, 2023	N
14	REPLACED 9 SINGLES WITH BLOCK	JAN 25, 2023	N
13	REVISIONS	JAN 17, 2023	N
12	REVISIONS	JUNE 8, 2022	N
11	Revised Street 1	MAR.19, 2021	DG
10	Revised part of Street 2 width	Sept. 23, 2020	N
9	Revised Centreline St. No 1	AUG. 28, 2020	N
8	for discussion	AUG. 12, 2020	N
7	.....	.....	..
4	revise lots	July 29, 2020	ST
3	for discussion	Feb. 6, 2020	N
2	for discussion	Oct. 9, 2019	N
1	PLAN PREPARED	, 2019	N

Ontario Land Surveyors
ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: Nepean@aovltd.com

Job No. 20131-19 Urbandale Pt Lt 1 C1 MA DPS D16 | N

130 Huntmar
Pre-Consultation Meeting Minutes

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

Attendee	Role	Organization
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: 30^0C, 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 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 treed 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

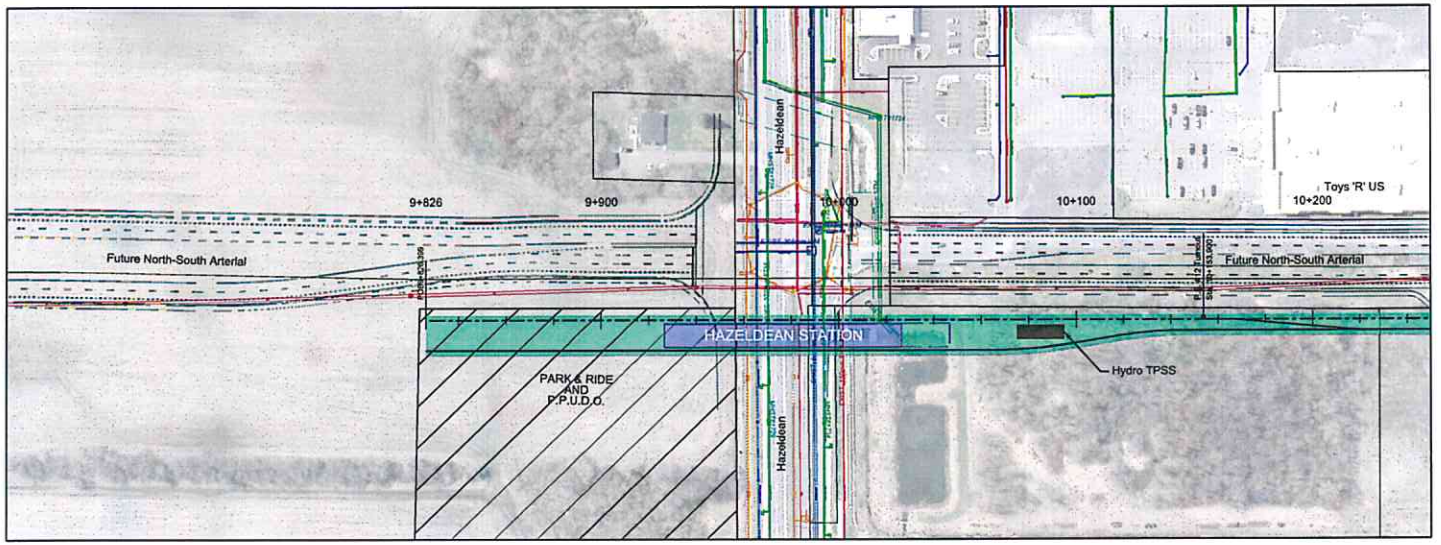
Please refer to the links to "Guide to preparing studies and plans" and fees for general information. Additional information is available related to building permits, development charges, and the Accessibility Design Standards. Be aware that other fees and permits may be required, outside of the development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

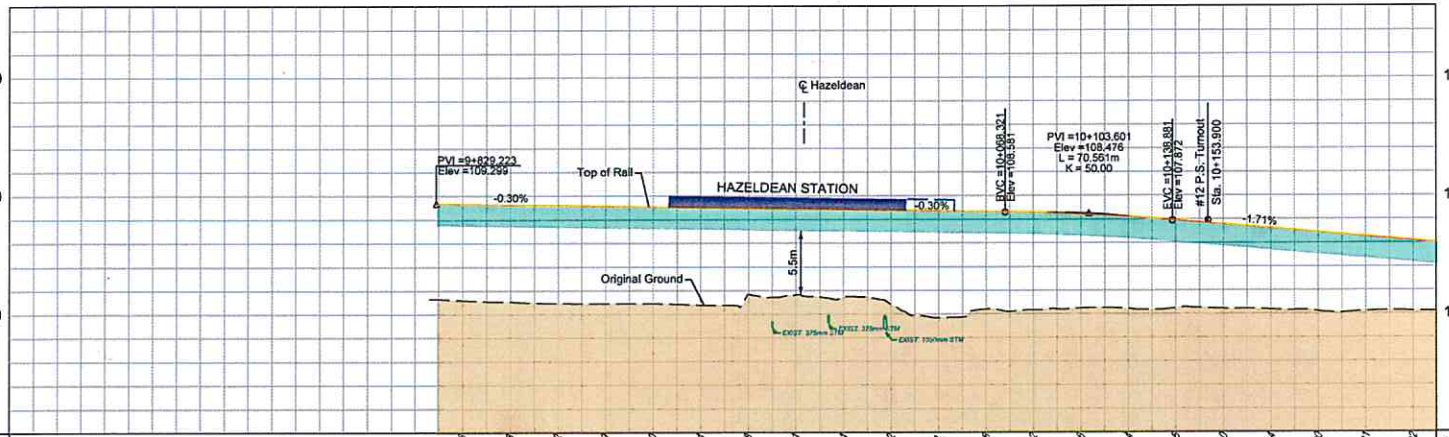
These pre-con comments are valid for one year. If you submit a development application(s) after this time, you may be required to meet for another pre-consultation meeting and/or the submission requirements may change. You are as well encouraged to contact us for a follow-up meeting if the plan/concept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

Please contact me at stream.shen@ottawa.ca or at 613-580-2424 extension 24488 if you have any questions.

Sincerely,

Stream Shen MCIP RPP
Planner II
Development Review - West





Station	9+820	9+900	10+000	10+100	10+200
Top of Rail	109.27	109.21	109.15	109.09	109.03	108.97	108.91	108.85	108.79	108.73	108.67	108.61	108.53	108.39	108.16	107.85	107.51	107.17	106.83	106.48	106.14
Original Ground																					

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

DRAFT
FOR INFORMATION ONLY
March 13, 2018

March 13, 2018

Key Plan:

Confederation Line Kanata LRT Extension

Hazeldean Road to Moodie Drive

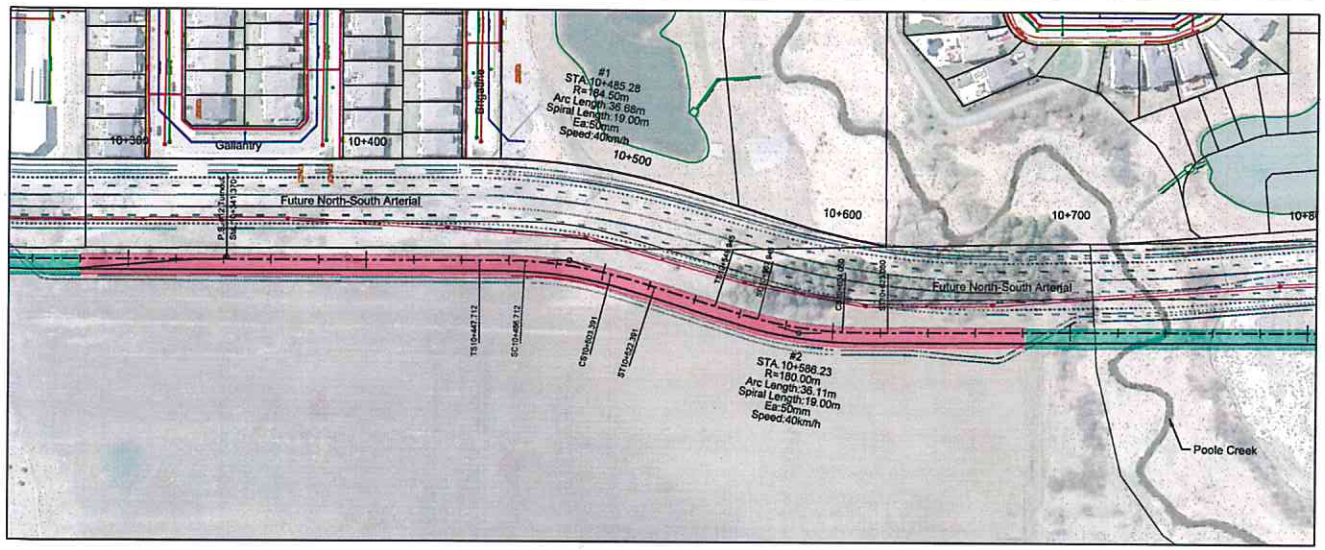
HORIZONTAL
0m 20 40 80 120 160
0m 4 8 16 24 32
VERTICAL

Ottawa PARSONS

Plan and Profile

Hazeldean Station
Limit of Kanata
LRT to 10+250

Revision:
Sheet: 1



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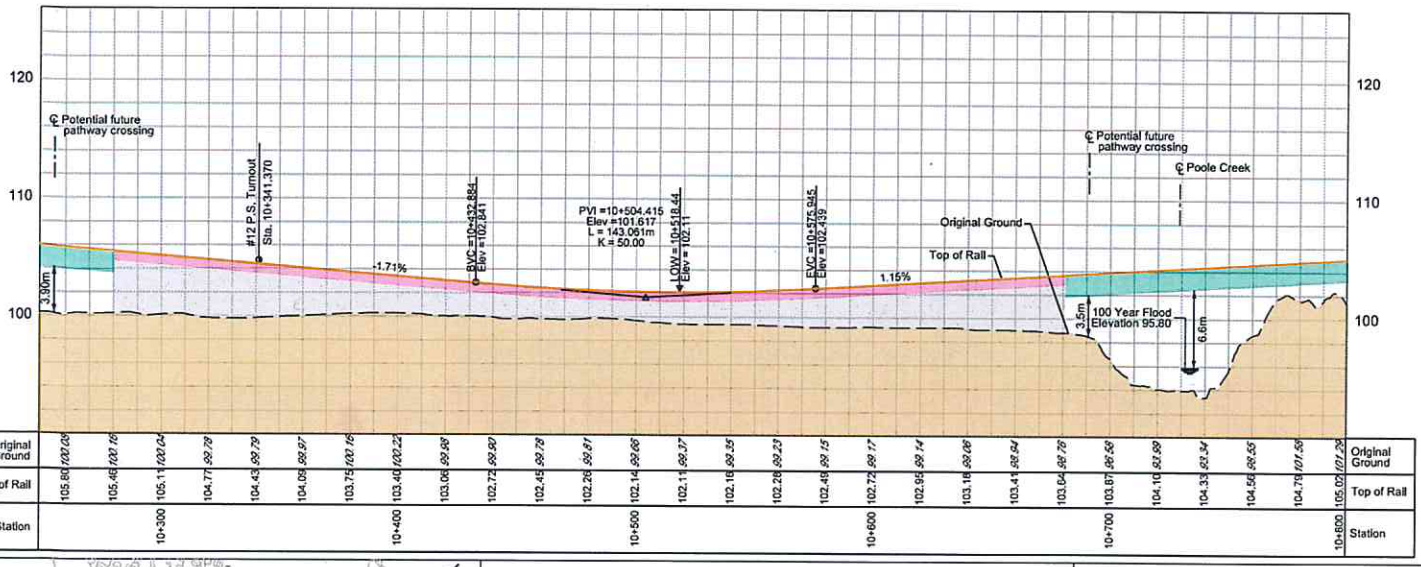

Legend:

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March 13, 2018

March 13, 2018

Confederation Line Kanata LRT Extension

Hazeldean Road to Moodie Drive

HORIZONTAL 0m 20 40 80 120 160
VERTICAL 0m 4 8 16 24 32

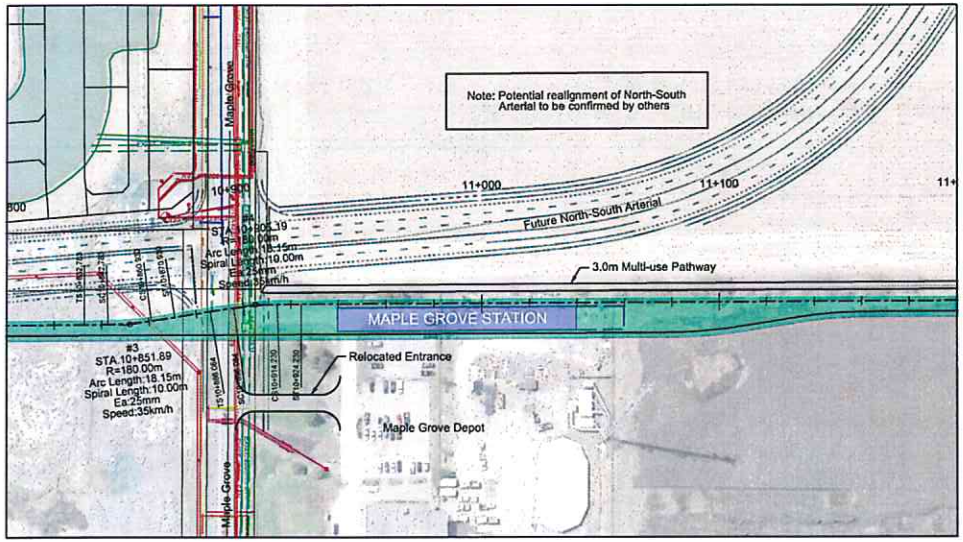
Ottawa PARSONS

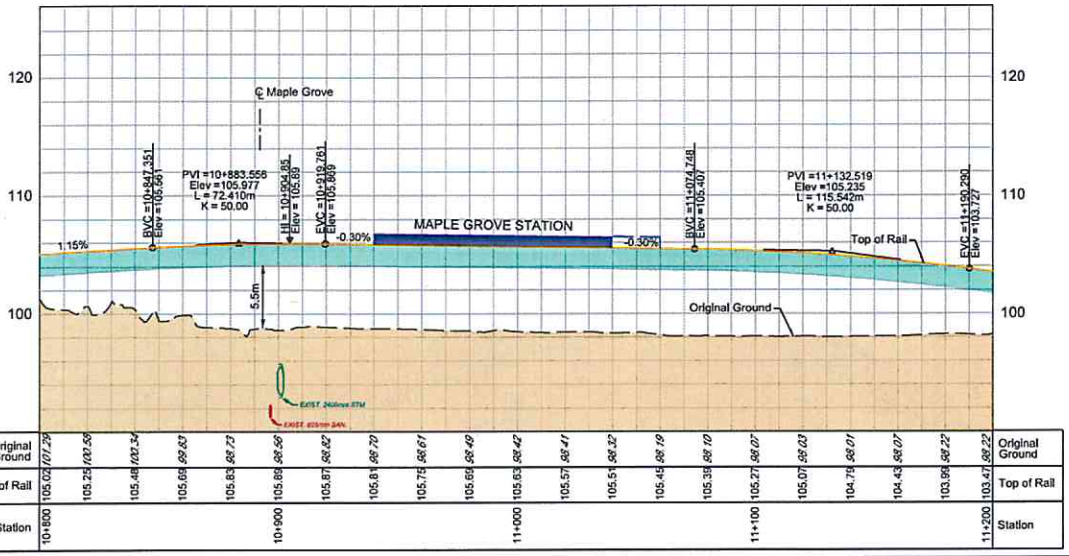
Section:
Plan and Profile

10+250 to 10+800

Revision:

Sheet: 2





Station	10+800					10+900					11+000					11+100					11+200	Station
Original Ground	105.02	105.29	105.48	105.69	105.83	105.89	105.87	105.81	105.75	105.69	105.63	105.57	105.51	105.45	105.39	105.27	105.07	104.79	104.43	103.99	103.47	Original Ground
Top of Rail	107.29	107.59	107.54	107.63	107.73	107.66	107.82	107.70	107.61	107.49	107.42	107.41	107.32	107.19	107.10	107.07	107.03	107.01	107.07	107.22	107.22	Top of Rail

Note:
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FOR INFORMATION ONLY
March 13, 2018

March 13, 2018

Confederation Line Kanata LRT Extension
Hazeldean Road to Moodie Drive

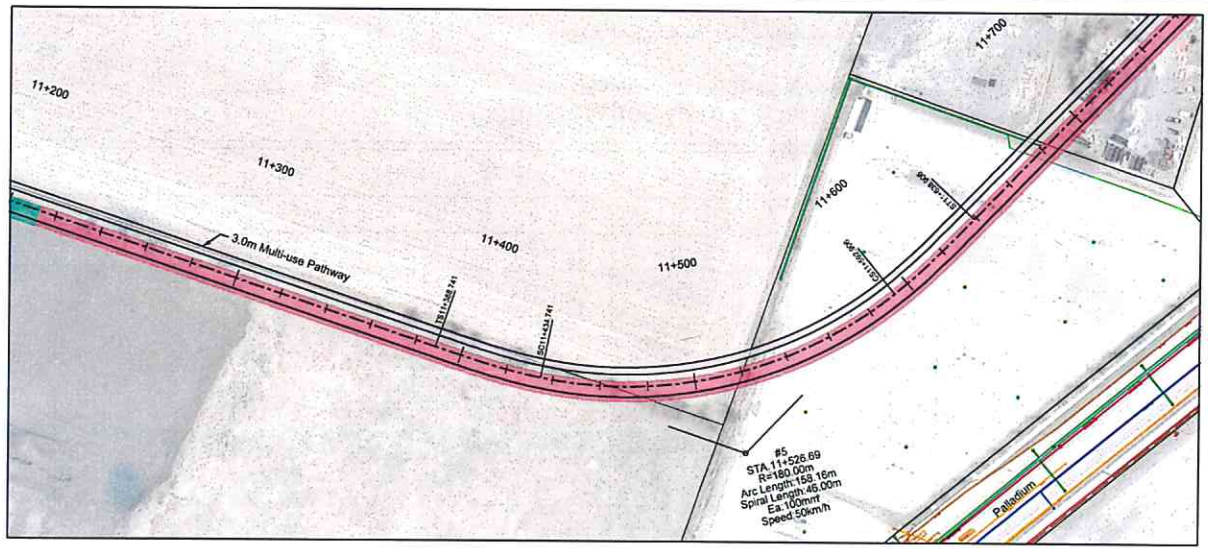
HORIZONTAL
0m 20 40 80 120 160
VERTICAL
0m 4 8 16 24 32

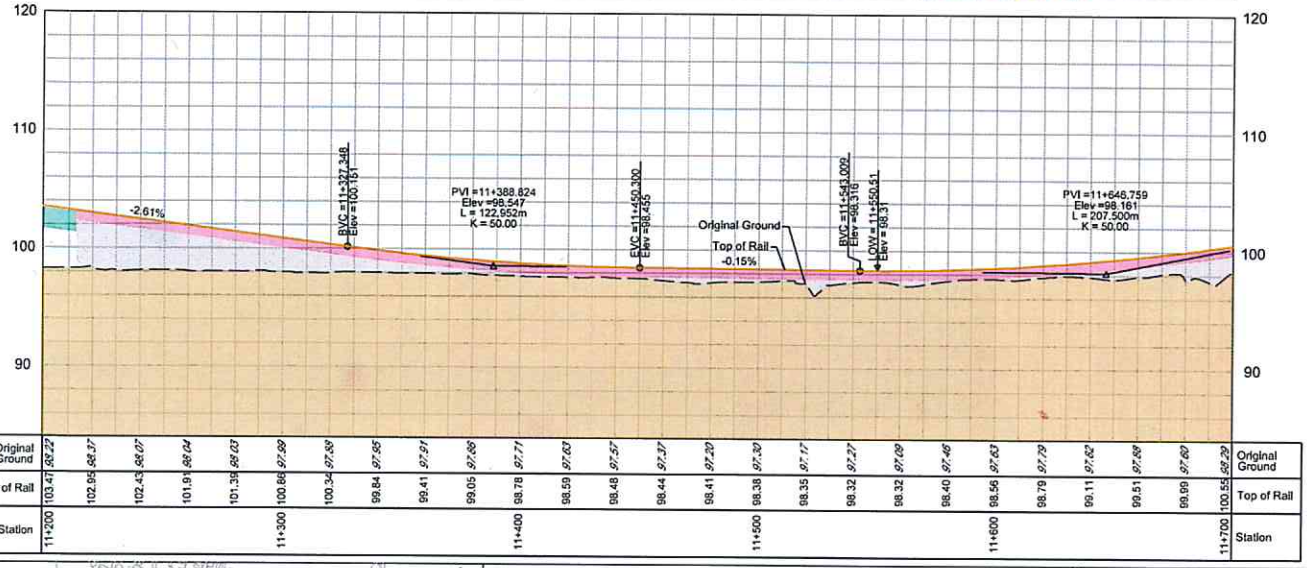
Ottawa PARSONS

Plan and Profile

Maple Grove Station
10+800 to 11+200

Revision:
Sheet: 3





Original Ground	98.22	98.37	98.07	98.04	98.03	97.99	97.89	97.85	97.91	97.86	97.71	97.63	97.57	97.37	97.20	97.30	97.17	97.27	97.09	97.46	97.53	97.79	97.62	97.58	97.60	98.29	Original Ground
Top of Rail	103.47	102.95	102.43	101.91	101.39	100.86	100.34	99.84	99.41	99.05	98.78	98.59	98.48	98.44	98.41	98.38	98.35	98.32	98.32	98.40	98.56	98.79	99.11	99.51	99.99	100.55	Top of Rail
Station	11+200					11+300					11+400					11+500					11+600					11+700	Station

Note:
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DRAFT
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March 13, 2018

March 13, 2018

Confederation Line Kanata LRT Extension
Hazeldean Road to Moodie Drive

HORIZONTAL 0m 20 40 80 120 160
VERTICAL 0m 4 8 16 24 32

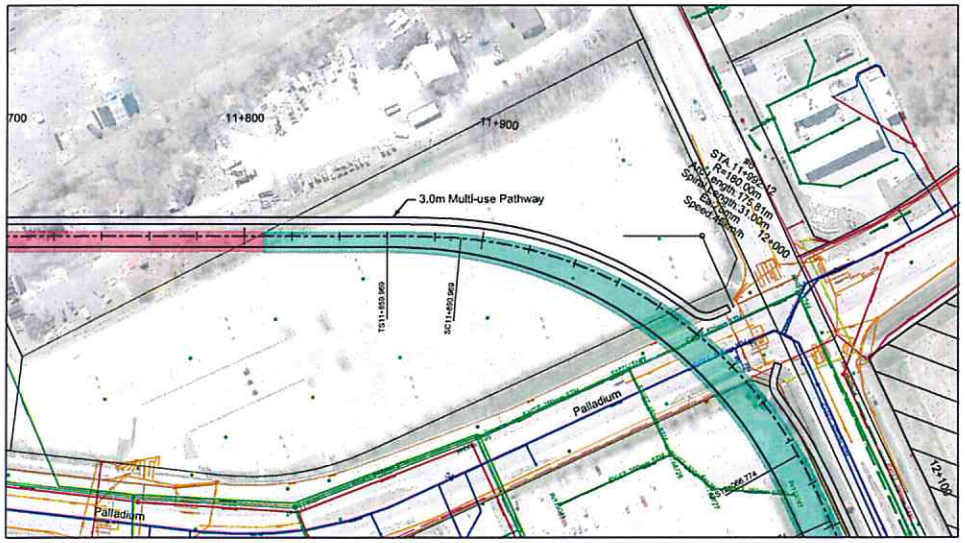
Ottawa PARSONS

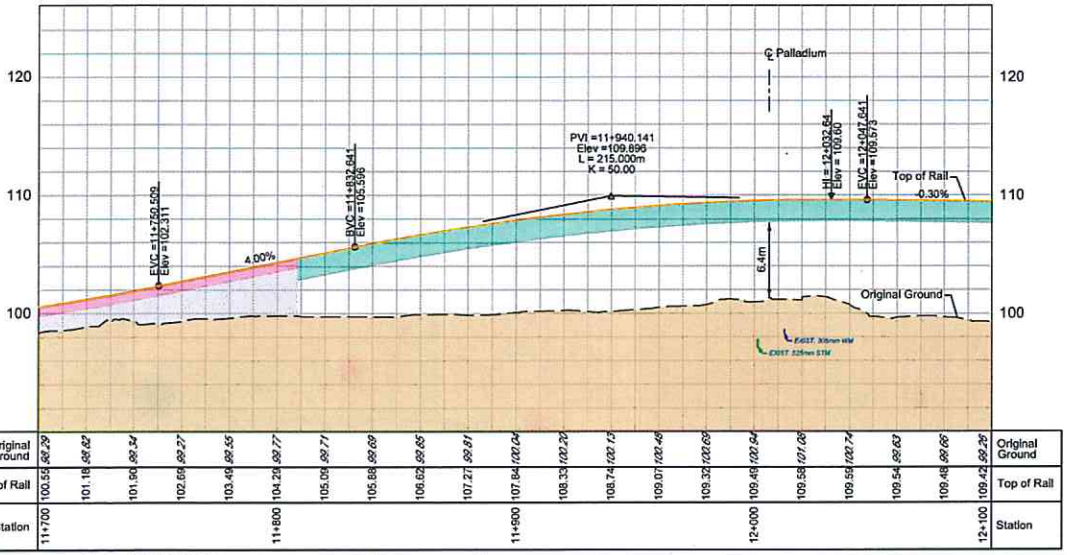
Plan and Profile

11+200 to 11+700

Revision:

Sheet: 4





Original Ground	100.55	101.18	101.90	102.68	103.49	104.29	105.06	105.88	106.62	107.27	107.84	108.33	108.74	109.07	109.32	109.49	109.58	109.59	109.54	109.48	109.42	Original Ground
Top of Rail	100.55	101.18	101.90	102.68	103.49	104.29	105.06	105.88	106.62	107.27	107.84	108.33	108.74	109.07	109.32	109.49	109.58	109.59	109.54	109.48	109.42	Top of Rail
Station	11+700					11+800					11+900					12+000					12+100	Station

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FOR INFORMATION ONLY
March 13, 2018

March 13, 2018

Confederation Line Kanata LRT Extension
Hazeldean Road to Moodie Drive

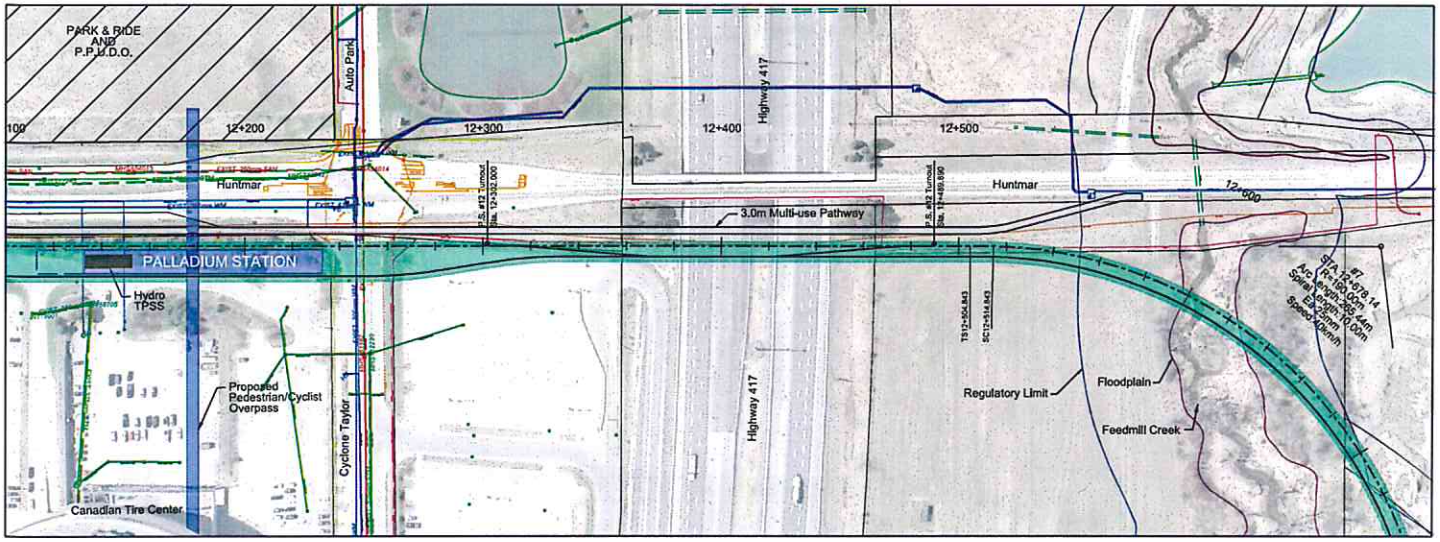
HORIZONTAL
0m 20 40 80 120 160
0m 4 8 16 24 32
VERTICAL

Ottawa PARSONS

Plan and Profile

11+700 to 12+100

Revision:
Sheet: 5



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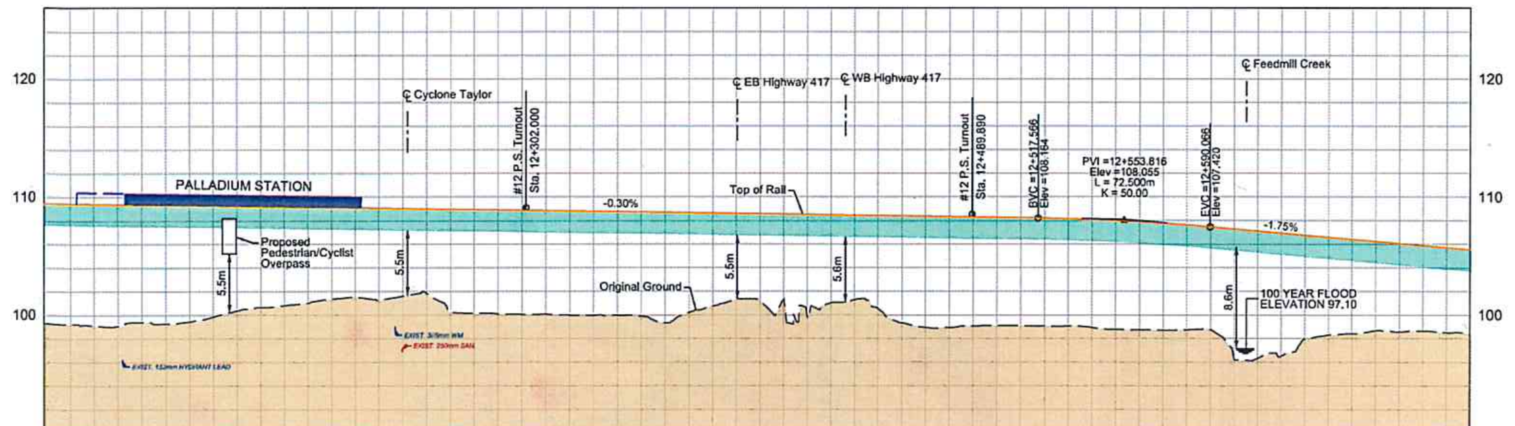

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Original Ground	99.26	99.06	99.32	99.39	100.29	100.74	101.29	101.21	101.64	100.11	100.01	99.95	99.94	99.30	100.73	101.19	100.43	101.25	99.31	98.90	99.08	99.04	98.91	98.73	98.73	96.48	96.44	98.27	98.63	98.62	98.29
Top of Rail	109.42	109.36	109.30	109.24	109.18	109.12	109.06	109.00	108.94	108.88	108.82	108.76	108.70	108.64	108.58	108.52	108.46	108.40	108.34	108.28	108.22	108.16	108.05	107.86	107.59	107.25	106.90	106.55	106.20	105.85	105.50
Station	12+100					12+200					12+300					12+400					12+500					12+600					12+700

DRAFT
FOR INFORMATION ONLY
March 13, 2018

March 13, 2018

Confederation Line Kanata LRT Extension

Hazeldean Road to Moodie Drive

HORIZONTAL 0 20 40 80 120 160
VERTICAL 0 4 8 16 24 32

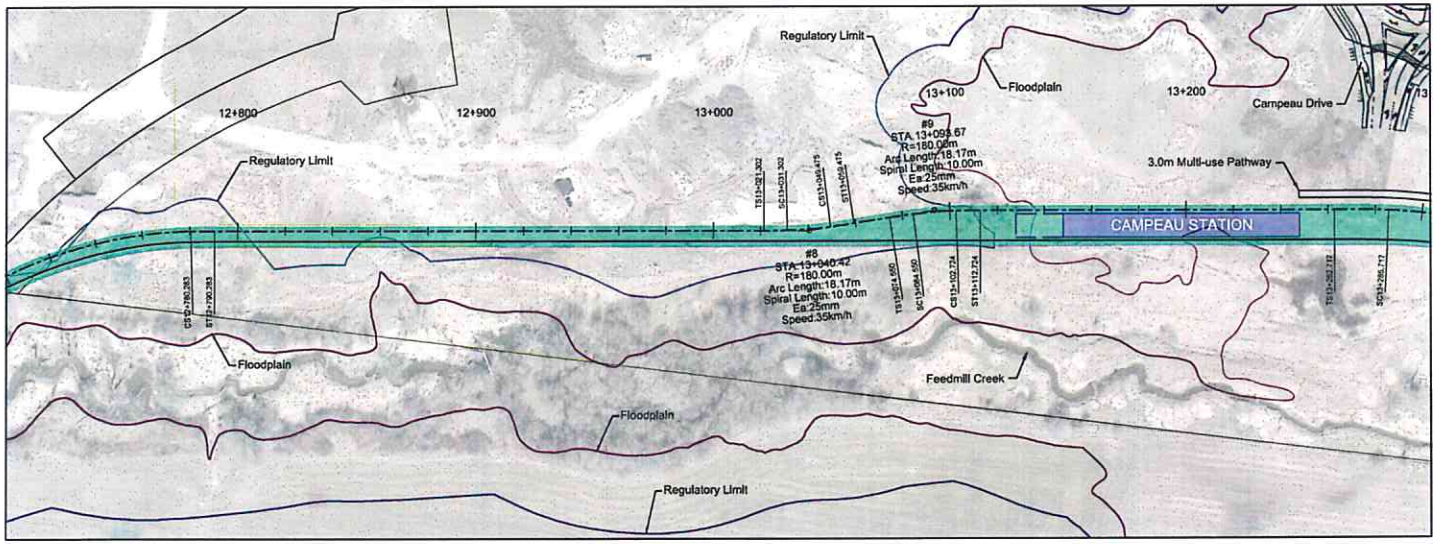
Ottawa PARSONS

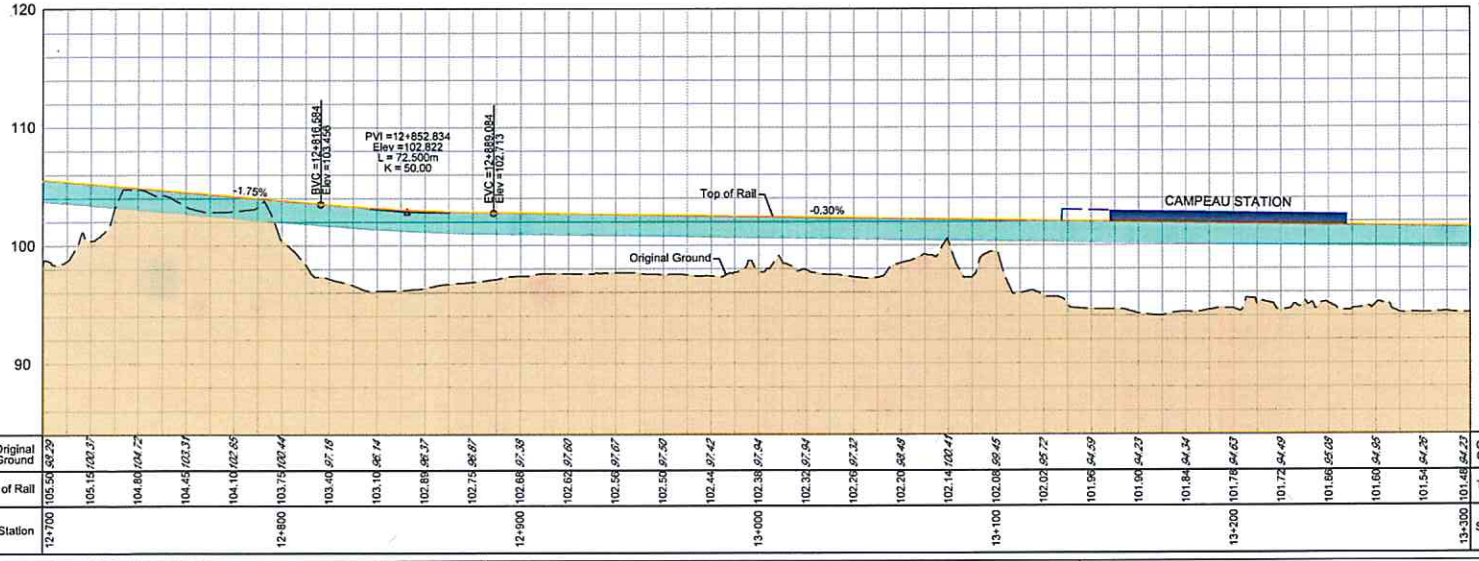
Plan and Profile

Palladium Station
12+100 to 12+700

Revision:

Sheet: 6





Station	Original Ground	Top of Rail
12+700	105.50	105.29
	105.15	105.17
	104.80	104.72
	104.45	104.31
	104.10	103.85
12+800	103.75	103.44
	103.40	103.18
	103.10	102.94
	102.89	102.87
	102.75	102.67
12+900	102.68	102.58
	102.62	102.60
	102.56	102.67
	102.50	102.50
	102.44	102.42
13+000	102.38	102.54
	102.32	102.54
	102.26	102.32
	102.20	102.48
	102.14	102.41
13+100	102.08	102.46
	102.03	102.72
	101.96	102.59
	101.90	102.23
	101.84	102.34
13+200	101.78	102.63
	101.72	102.49
	101.66	102.08
	101.60	102.05
	101.54	102.26
13+300	101.48	102.23

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

DRAFT
FOR INFORMATION ONLY
March 13, 2018

March 13, 2018

Confederation Line Kanata LRT Extension

Hazeldean Road to Moodie Drive

HORIZONTAL 1in 20 40 80 120 160
VERTICAL 1in 4 8 16 24 32

Ottawa PARSONS

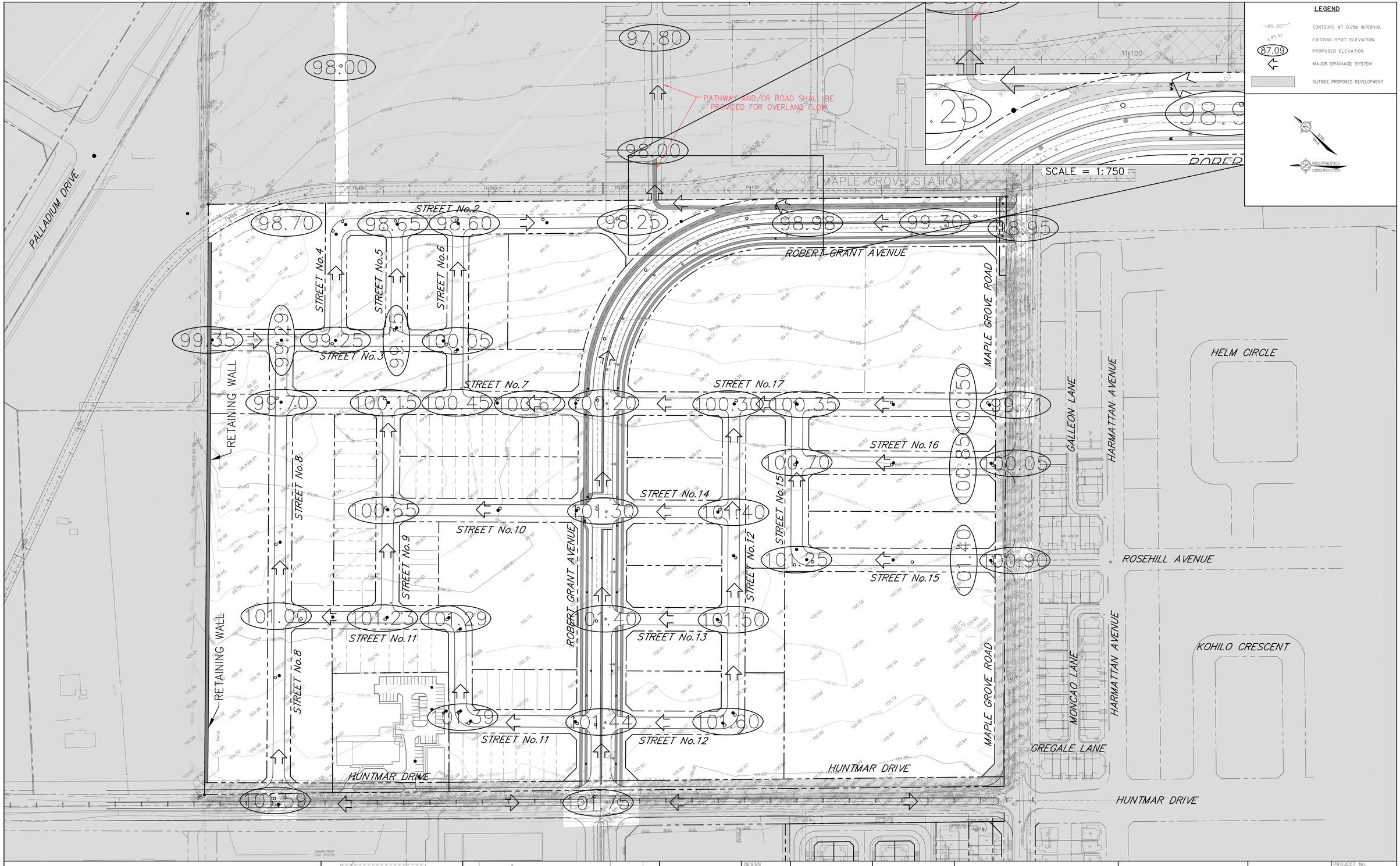
Plan and Profile

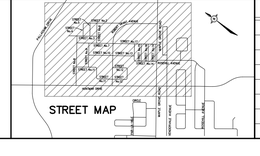
Campeau Station
12+700 to 13+300

Revision:
Sheet: 7

APPENDIX "B"

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





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1	REVISED AS PER CITY COMMENTS	APR. 18/22	AGS
1	REVISED AS PER CITY COMMENTS	AUG. 03/23	AGS

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

DESIGN AGS
CHECKED JMD
DRAWN CED
CHECKED AGS
APPROVED JMD

LICENSED PROFESSIONAL ENGINEER A. G. Y. SAUVE 100142393 May 3, 2023 PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER J.M.J.DECOEUR Aug 3, 2023 PROVINCE OF ONTARIO

ATREL Engineering Ltd.
Engineers - Ingénieurs
2484 CHAMBERLAND STREET, ROCKLAND, ONTARIO K4K 1M6
TEL.: (613) 446-7423

CITY OF OTTAWA
130 HUNTMAR DR.

LIONESS DEVELOPMENT INC.

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

PLAN
MACRO GRADING PLAN

STRAW BALE FLOW CHECK DAM

LIGHT-DUTY SILT FENCE BARRIER

LIGHT-DUTY SILT FENCE BARRIER

LIGHT-DUTY SILT FENCE BARRIER

STREET No.1

STREET No.2

STREET No.3

STREET No.4

STREET No.5

STREET No.6

STREET No.7

STREET No.8

STREET No.9

STREET No.10

STREET No.11

STREET No.11

STREET No.12

STREET No.13

STREET No.14

STREET No.15

STREET No.16

STREET No.17

ROBERT GRANT AVENUE

MAPLE GROVE ROAD

HELM CIRCLE

GALLEON LANE

HARMATTAN AVENUE

ROSEHILL AVENUE

MONCAO LANE

HARMATTAN AVENUE

KOHILO CRESCENT

GREGALE LANE

HUNTMAR DRIVE

HUNTMAR DRIVE

LEGEND

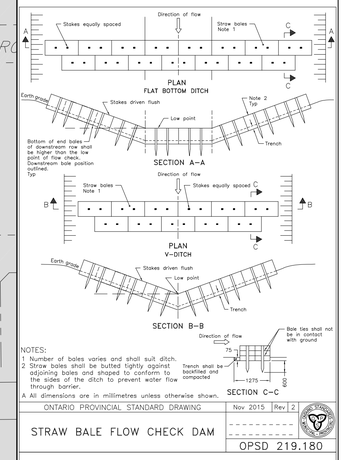
- EXISTING DECIDUOUS TREE
- EXISTING TREE LINE
- STRAW BALES AS PER OPSD 219.180
- SILT FENCE BARRIER AS PER OPSD 219.110
- EXISTING ELEVATION CONTOUR
- EXISTING SPOT ELEVATION
- OUTSIDE PROPOSED DEVELOPMENT

MAIN ROAD

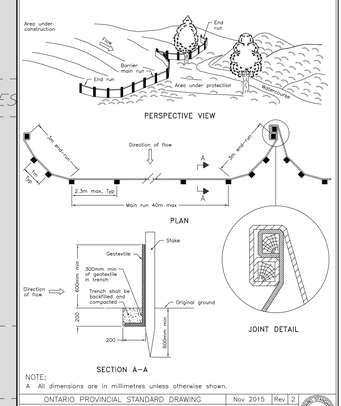
CONSTRUCTION

NOTES

1) 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
2) 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.
3) 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.
4) 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.
5) STRAW BALES SHOULD BE INSTALLED AS PER OPSD 219.100 AND OPSD 219.180 AS APPROPRIATE.
6) STRAW BALES SHALL BE INSTALLED AT EVERY MAJOR POINT OF WATER ENTRY INCLUDING DITCH INLET CATCHBASINS AND CULVERTS.
7) 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.
8) 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.
9) FILTER CLOTH IN CBs SHOULD BE INSTALLED WITH GENEROUS EXCESS OF MATERIAL AROUND PERIMETER TO FACILITATE REMOVAL. FOR CBs POTENTIALLY SUBJECTED TO HEAVING SEDIMENT LOADING, A GRANULAR "PRE-FILTERED" SHOULD BE PROVIDED AROUND PERIMETER OF CB OR AT INTERVALS ALONG THE CURB.
10) ANY MATERIAL STOCKPILES SHOULD BE LOCATED ON FLAT AREAS WELL AWAY FROM ANY DRAINAGE INLETS.
11) NO SEDIMENT CONTROL STRUCTURES SHALL BE REMOVED UNLESS FOUND UNNECESSARY OR ANOTHER SEDIMENT CONTROL POINT IS INSTALLED ELSEWHERE TO REPLACE THE LATTER.
12) 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.
13) 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		

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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
May 3, 2022
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER
J. M. J. DECOEUR
Aug 3, 2022
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2484 CHAMBERLAND STREET, ROCKLAND, ONTARIO K4K 1M6
TEL.: (613) 446-7423

CITY OF OTTAWA
130 HUNTMAR DR.

LIONESS DEVELOPMENT INC.

PROJECT No. 19100-2

DATE JANUARY 2020

PLAN MACRO EROSION AND SEDIMENT CONTROL PLAN

DRAWING No. 19100-2-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

Stantec

Memo

To:	Christopher Rogers, M.A.Sc., P.Eng. Ottawa, ON	From:	Kevin Alemany, M.A.Sc., P.Eng. Ottawa, ON
File:	163401169	Date:	December 16, 2013

Reference: Kanata West Master Serving Study Watermain Sizing - 2013 Water Master Plan Update

Chris,

The following memorandum addressing the watermain sizing requirements for the portion of Kanata West along Huntmar Drive from Palladium Drive and along an unnamed future road (east and parallel to Huntmar) down to Hazeldean Road as shown in **Figures 1** and **2**.

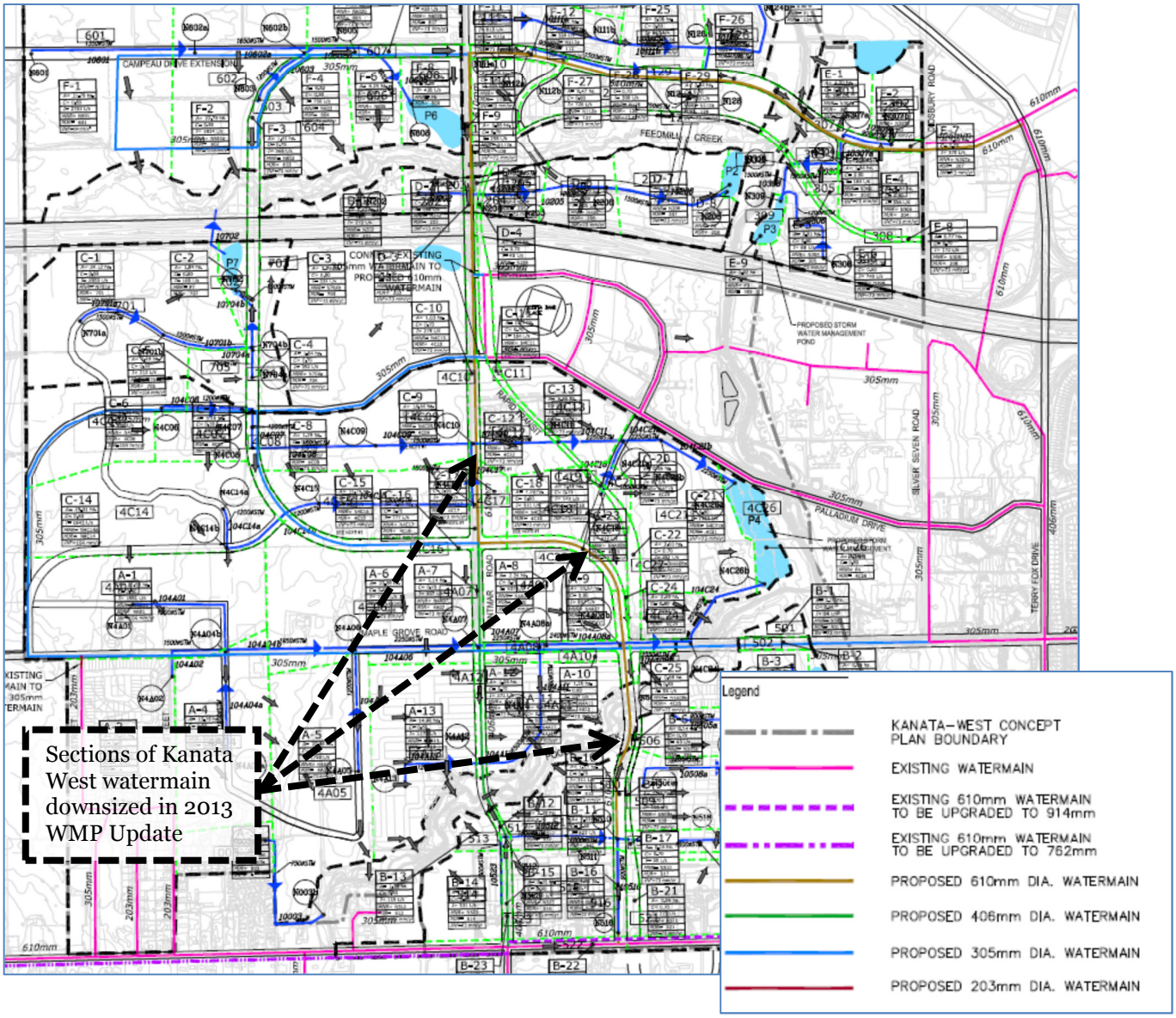
In 2006, Stantec Consulting Ltd in association with Cumming Cockburn Limited/IBI prepared the Kanata West Master Servicing Study. Through the assessment of planned future growth, proposed pumping and planned storage infrastructure in Zone 3W, Stantec identified a preferred sizing and alignment for a larger diameter watermain network within the Kanata West development lands. Due to the anticipated configuration of the zone and projection of demand use, a pipe configuration was proposed that included a large 610mm diameter watermain that passed through the Kanata West lands from Terry Fox Drive, along Campeau Drive, down Huntmar Drive, and along an future unnamed road alignment until it reached the larger diameter watermain along Hazeldean Road as shown in **Figure 1** below.

During the course of the 2013 Water Master Plan Update, Stantec under took an evaluation of the sizing requirements of the portion of unbuilt 610mm diameter watermain along Huntmar from Palladium Drive to Hazeldean Road. A smaller 406mm diameter watermain was assessed and it was determined that due to the change in projected unit demands that were updated by the City's planning department for the 2013 Infrastructure Master Plan Update and due to the rebuilt and upsized Hazeldean Road watermain, the remaining portion of the 610mm looping Kanata West watermain could be downsized to a 406mm diameter watermain and provide the same level of service as previously required (see **Figure 2**).

Per the final pipe alignments and sizing shown in the 2013 Water Master Plan Update, it is recommended that the Kanata West large 610mm diameter feedermain watermain be downsized to a 406mm diameter watermain as described above and shown in **Figure 2**.

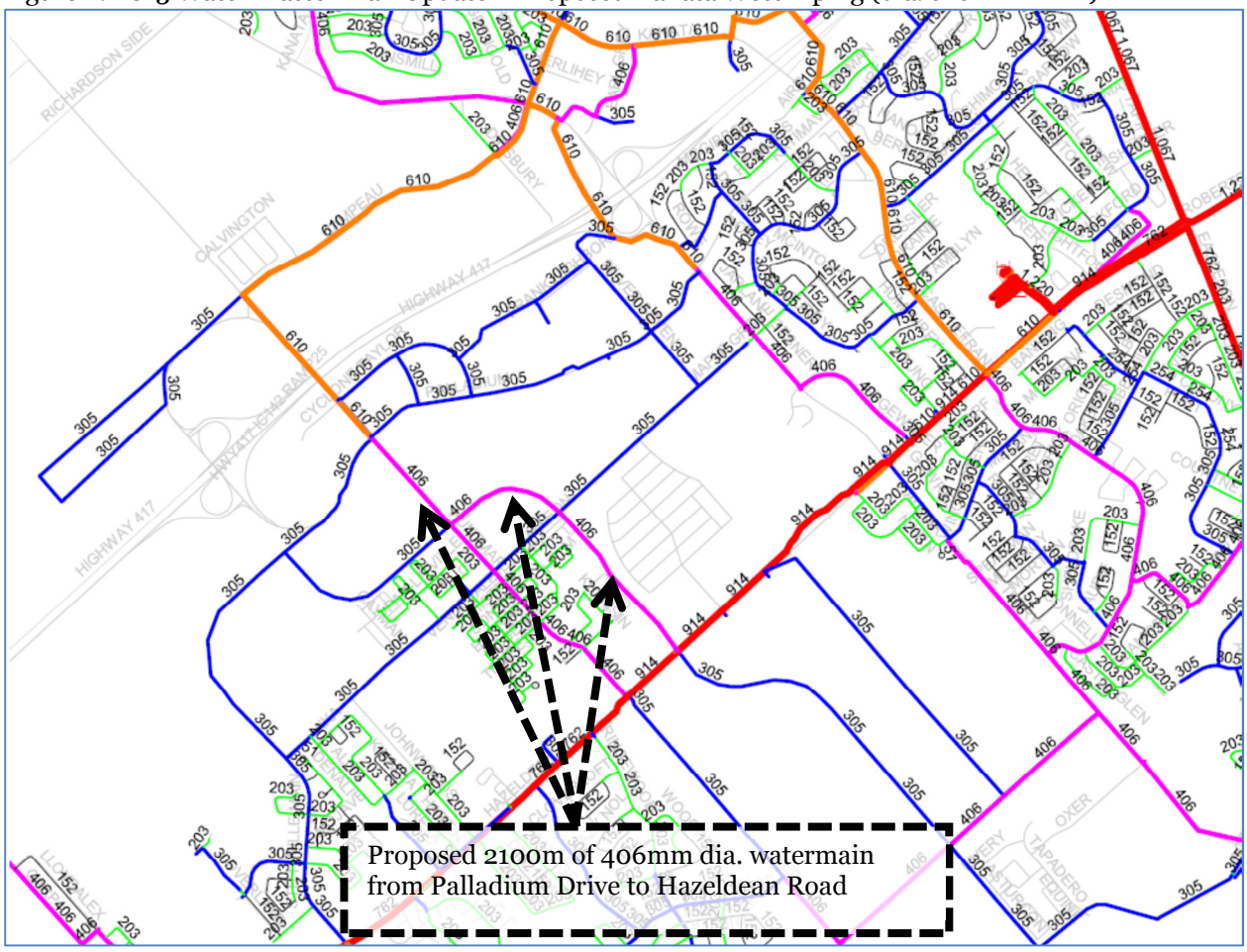
Reference: Kanata West Master Serving Study Watermain Sizing - 2013 Water Master Plan Update

Figure WM-1: Watermain Final Concept (Kanata West Master Servicing Study, Stantec, 2006)



Reference: Kanata West Master Serving Study Watermain Sizing - 2013 Water Master Plan Update

Figure 2: 2013 Water Master Plan Update – Proposed Kanata West Piping (dia. shown in mm)



Sincerely, Kevin

STANTEC CONSULTING LTD.

Kevin Alemany M.A.Sc., P.Eng.
Environmental Engineer
Phone: (613) 724-4091
Fax: (613) 722-2799
kevin.alemany@stantec.com

c. John Krug, Stantec

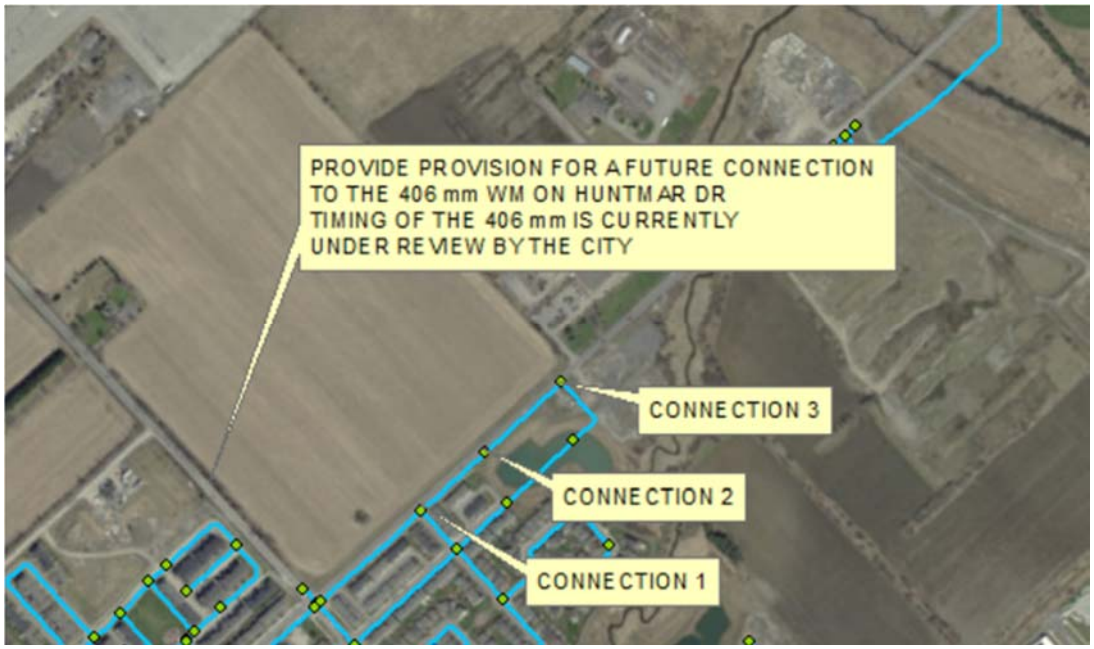
Boundary Conditions for 130 Huntmar Drive

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[1] (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

[1] Ground Elevation = 100.9m

Connection 2 - Maple Grove Road

Demand Scenario	Head (m)	Pressure[1] (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

[1] Ground Elevation = 99.9m

Connection 3 - Maple Grove Road

Demand Scenario	Head (m)	Pressure[1] (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

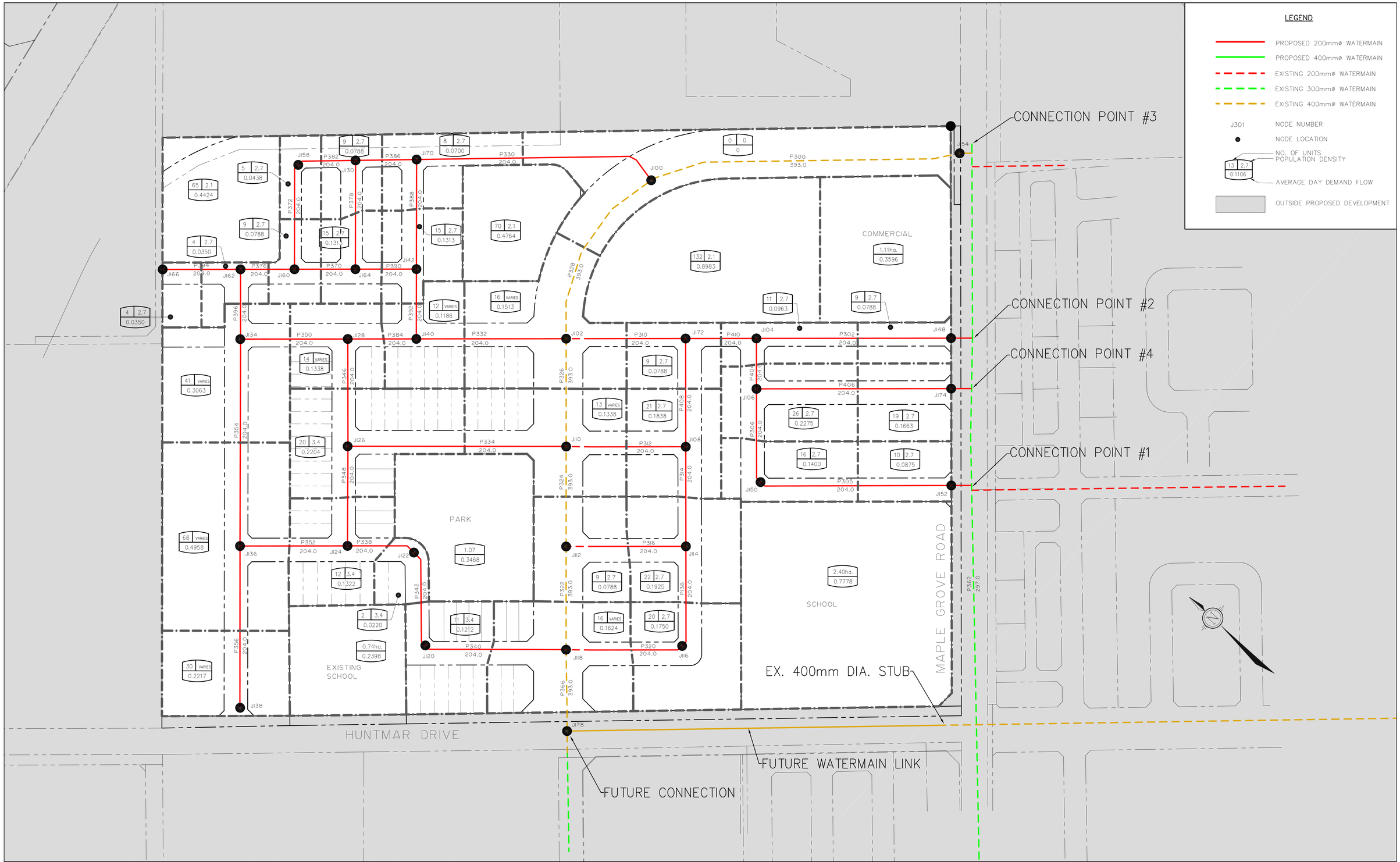
[1] Ground Elevation = 98.6m

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.



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STREET MAP

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

DESIGN	AGS
CHECKED	JMD
DRAWN	CED
CHECKED	AGS
APPROVED	JMD

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TEL.: (613) 446-7423

CITY OF OTTAWA
130 HUNTMAR DRIVE

LIONESS DEVELOPMENT INC.

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

PLAN WATERMAIN LAYOUT AND DEMAND

TABLE 1: Boundary Condition Data

DATE: **August 2023**
DESIGNED BY: AGS
CHECKED BY: AGS

PROJECT: **130 Huntmar Drive**
CLIENT: Urbandale Corporation
PROJECT #: 191002
BY: Atrel 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: **August 2023**
CLIENT: Urbandale Corporation
DESIGNED BY: AGS
PROJECT #: 191002
CHECKED BY: AGS
BY: Atrel Engineering Ltd

NODE. NO.	AVERAGE DAY DEMAND (l/s)	ELEVATION (m)	X COORDINATE (m)	Y COORDINATE (m)
J100	0.0000	98.25	350425.07	5017187.20
J102	0.1513	100.20	350285.80	5017143.79
J104	0.9946	100.35	350381.89	5017036.22
J106	0.2275	100.70	350353.19	5017010.59
J108	0.1838	101.40	350284.33	5017021.48
J110	0.1338	101.30	350224.32	5017089.05
J112	0.0788	101.40	350167.90	5017038.81
J114	0.1925	101.50	350227.68	5016970.86
J116	0.1750	101.60	350169.02	5016922.83
J118	0.1624	101.44	350108.64	5016985.99
J120	0.3610	101.39	350039.37	5017068.97
J122	0.3688	101.29	350087.85	5017122.61
J124	0.1322	101.23	350056.19	5017163.84
J126	0.2204	100.65	350113.02	5017214.35
J128	0.1338	100.15	350174.19	5017268.71
J130	0.0788	98.65	350277.79	5017358.18
J134	0.3063	99.70	350118.34	5017332.16
J136	0.4958	101.00	350001.56	5017224.99
J138	0.2217	101.59	349909.39	5017142.94
J140	0.1186	100.45	350208.24	5017230.60
J142	0.1313	100.05	350244.65	5017265.69
J148	0.4384	99.71	350494.89	5016914.94
J150	0.9178	101.25	350302.49	5016960.92
J152	0.0875	100.90	350407.52	5016838.91
J154	0.0000	98.95	350597.35	5017005.80
J158	0.0438	98.70	350249.55	5017394.03
J160	0.0788	99.25	350157.34	5017366.29
J162	0.0350	99.29	350185.18	5017335.39
J164	0.1313	99.75	350213.65	5017303.78
J166	0.4774	99.35	350121.06	5017408.01
J170	0.5464	98.60	350309.78	5017321.52
J172	0.0788	100.30	350346.34	5017076.76
J174	0.1663	100.05	350463.41	5016888.78
J178	0.0000	101.75	350063.60	5016943.71

TABLE 3: AVERAGE DAY AND PEAK HOUR DEMAND RESULTS

PROJECT: **130 Huntmar Drive**
DATE: **August 2023**
CLIENT: Urbandale Corporation
DESIGNED BY: AGS
PROJECT #: 191002
CHECKED BY: AGS
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	161.00	614.88	0.0000	156.26	568.48
J102	100.20	0.1513	161.00	595.77	0.8322	156.25	549.26
J104	100.35	0.9946	161.00	594.30	5.4703	156.26	547.92
J106	100.70	0.2275	161.00	590.88	1.2513	156.27	544.58
J108	101.40	0.1838	161.00	584.01	1.0109	156.25	537.47
J110	101.30	0.1338	161.00	584.99	0.7359	156.25	538.45
J112	101.40	0.0788	161.00	584.01	0.4334	156.25	537.46
J114	101.50	0.1925	161.00	583.03	1.0588	156.25	536.48
J116	101.60	0.1750	161.00	582.05	0.9625	156.25	535.49
J118	101.44	0.1624	161.00	583.62	0.8932	156.25	537.06
J120	101.39	0.3610	161.00	584.10	1.0982	156.22	537.33
J122	101.29	0.3688	161.00	585.07	2.0284	156.21	538.22
J124	101.23	0.1322	161.00	585.66	0.7271	156.21	538.79
J126	100.65	0.2204	161.00	591.34	1.2122	156.22	544.51
J128	100.15	0.1338	161.00	596.24	0.7359	156.21	549.39
J130	98.65	0.0788	161.00	610.94	0.4334	156.21	564.08
J134	99.70	0.3063	161.00	600.65	1.6847	156.21	553.74
J136	101.00	0.4958	161.00	587.91	2.7269	156.21	540.98
J138	101.59	0.2217	161.00	582.13	1.2194	156.20	535.18
J140	100.45	0.1186	161.00	593.31	0.6523	156.22	546.49
J142	100.05	0.1313	161.00	597.22	0.7222	156.22	550.38
J148	99.71	0.4384	161.00	600.59	1.4043	156.30	554.53
J150	101.25	0.9178	161.00	585.49	2.1700	156.28	539.22
J152	100.90	0.0875	161.00	588.93	0.4813	156.30	542.87
J154	98.95	0.0000	161.00	608.04	0.0000	156.29	561.90
J158	98.70	0.0438	161.00	610.45	0.2409	156.21	563.58
J160	99.25	0.0788	161.00	605.06	0.4334	156.21	558.15
J162	99.29	0.0350	161.00	604.67	0.1925	156.21	557.79
J164	99.75	0.1313	161.00	600.16	0.7222	156.21	553.30
J166	99.35	0.4774	161.00	604.08	2.6257	156.20	557.13
J170	98.60	0.5464	161.00	611.43	3.0052	156.22	564.59
J172	100.30	0.0788	161.00	594.79	0.4334	156.25	548.31
J174	100.05	0.1663	161.00	597.26	0.9147	156.30	551.20
J178	101.75	0.0000	161.00	580.58	0.0000	156.25	534.02
	Total =	7.8699	l/s		Total =	38.5128	l/s

TABLE 4: PIPE DATA

DATE: **August 2023**
DESIGNED BY: AGS
CHECKED BY: AGS

PROJECT: **130 Huntmar Drive**
CLIENT: Urbandale Corporation
PROJECT #: 191002
BY: Atrel 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	-4.2460	0.0350	0.0013	0.0058	-22.1095	0.1823	0.0284	0.1222
P302	J104	J148	148.73	204	110	-1.0247	0.0314	0.0018	0.0119	-5.0900	0.1557	0.0343	0.2306
P304	J152	J150	146.56	204	110	0.9575	0.0293	0.0015	0.0104	4.1434	0.1268	0.0231	0.1575
P306	J106	J150	72.25	204	110	-0.0398	0.0012	0.0000	0.0000	-1.9735	0.0604	0.0029	0.0399
P310	J102	J172	90.32	204	110	-0.2498	0.0076	0.0001	0.0008	-1.6485	0.0504	0.0026	0.0286
P312	J108	J110	90.37	204	110	0.0311	0.0010	0.0000	0.0000	0.2938	0.0090	0.0001	0.0012
P314	J114	J108	75.97	204	110	-0.2482	0.0076	0.0001	0.0010	-1.3247	0.0405	0.0015	0.0191
P316	J114	J112	90.49	204	110	-0.0976	0.0030	0.0000	0.0002	-0.5200	0.0159	0.0003	0.0035
P318	J114	J116	77.09	204	110	0.1533	0.0047	0.0000	0.0002	0.7859	0.0240	0.0006	0.0072
P320	J116	J118	88.69	204	110	-0.0217	0.0007	0.0000	0.0000	-0.1766	0.0054	0.0000	0.0004
P322	J118	J112	79.39	393	120	-1.1405	0.0094	0.0000	0.0005	-5.8369	0.0481	0.0008	0.0105
P324	J112	J110	75.54	393	120	-1.3169	0.0109	0.0001	0.0007	-6.7903	0.0560	0.0010	0.0135
P326	J110	J102	82.32	393	120	-2.2772	0.0188	0.0001	0.0018	-11.8333	0.0976	0.0032	0.0384
P328	J102	J100	152.83	393	120	-3.2341	0.0267	0.0005	0.0034	-16.7054	0.1377	0.0111	0.0728
P330	J170	J100	180.08	204	110	-1.0120	0.0310	0.0021	0.0116	-5.4041	0.1653	0.0464	0.2578
P332	J102	J140	116.41	204	110	1.0554	0.0323	0.0015	0.0125	5.6883	0.1740	0.0330	0.2833
P334	J110	J126	167.59	204	110	0.8576	0.0262	0.0014	0.0085	4.6009	0.1408	0.0321	0.1913
P338	J122	J124	53.40	204	110	0.2266	0.0069	0.0000	0.0007	1.6405	0.0502	0.0015	0.0282
P340	J118	J120	109.37	204	110	0.9564	0.0293	0.0011	0.0104	4.7671	0.1458	0.0223	0.2043
P342	J120	J122	74.95	204	110	0.5954	0.0182	0.0003	0.0045	3.6689	0.1122	0.0094	0.1258
P344	J128	J164	52.79	204	110	0.1211	0.0037	0.0000	0.0004	0.7642	0.0234	0.0004	0.0067
P346	J128	J126	81.83	204	110	-0.2261	0.0069	0.0001	0.0007	-1.3977	0.0428	0.0017	0.0211
P348	J126	J124	76.03	204	110	0.4111	0.0126	0.0002	0.0022	1.9911	0.0609	0.0031	0.0406
P350	J128	J134	84.52	204	110	0.5029	0.0154	0.0003	0.0033	2.7216	0.0833	0.0061	0.0724
P352	J124	J136	82.00	204	110	0.5055	0.0155	0.0003	0.0032	2.9045	0.0889	0.0067	0.0817
P354	J134	J136	158.51	204	110	0.2120	0.0065	0.0001	0.0006	1.0418	0.0319	0.0019	0.0122
P356	J136	J138	123.40	204	110	0.2217	0.0068	0.0001	0.0008	1.2194	0.0373	0.0020	0.0163
P366	J118	J178	61.78	393	120	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
P370	J164	J162	42.55	204	110	0.4008	0.0123	0.0001	0.0022	2.1588	0.0661	0.0020	0.0472
P372	J162	J158	87.08	204	110	-0.2058	0.0063	0.0001	0.0006	-1.0977	0.0336	0.0012	0.0135
P376	J160	J162	41.59	204	110	-0.5716	0.0175	0.0002	0.0040	-3.0640	0.0937	0.0038	0.0904
P378	J164	J130	84.11	204	110	-0.0500	0.0015	0.0000	0.0000	-0.2143	0.0066	0.0001	0.0007
P382	J158	J130	45.64	204	110	-0.2496	0.0076	0.0000	0.0008	-1.3386	0.0410	0.0009	0.0196
P384	J140	J128	51.10	204	110	0.5317	0.0163	0.0002	0.0036	2.8240	0.0864	0.0040	0.0775
P386	J170	J130	48.66	204	110	0.3784	0.0116	0.0001	0.0019	1.9863	0.0608	0.0020	0.0401
P388	J170	J142	85.79	204	110	0.0871	0.0027	0.0000	0.0000	0.4127	0.0126	0.0002	0.0022
P390	J164	J142	49.11	204	110	-0.3609	0.0110	0.0001	0.0019	-1.9025	0.0582	0.0018	0.0371
P392	J142	J140	50.56	204	110	-0.4051	0.0124	0.0001	0.0022	-2.2120	0.0677	0.0025	0.0493
P394	J166	J160	55.29	204	110	-0.4774	0.0146	0.0001	0.0027	-2.6257	0.0803	0.0037	0.0676
P396	J134	J160	51.82	204	110	-0.0154	0.0005	0.0000	0.0000	-0.0049	0.0002	0.0000	0.0000
P404	J104	J106	38.48	204	110	-0.7616	0.0233	0.0003	0.0073	-5.0915	0.1558	0.0089	0.2306
P406	J174	J106	148.51	204	110	0.9494	0.0290	0.0015	0.0103	4.3693	0.1337	0.0258	0.1739
P408	J108	J172	83.07	204	110	-0.4631	0.0142	0.0002	0.0027	-2.6294	0.0804	0.0056	0.0679
P410	J104	J172	53.92	204	110	0.7917	0.0242	0.0004	0.0072	4.7112	0.1441	0.0108	0.2001

FIRE FLOW CALCULATIONS **Table 5**

CONSULTANT: Atrel 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	X
· 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)^½	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: **August 2023**
DESIGNED BY: AGS
CHECKED BY: AGS

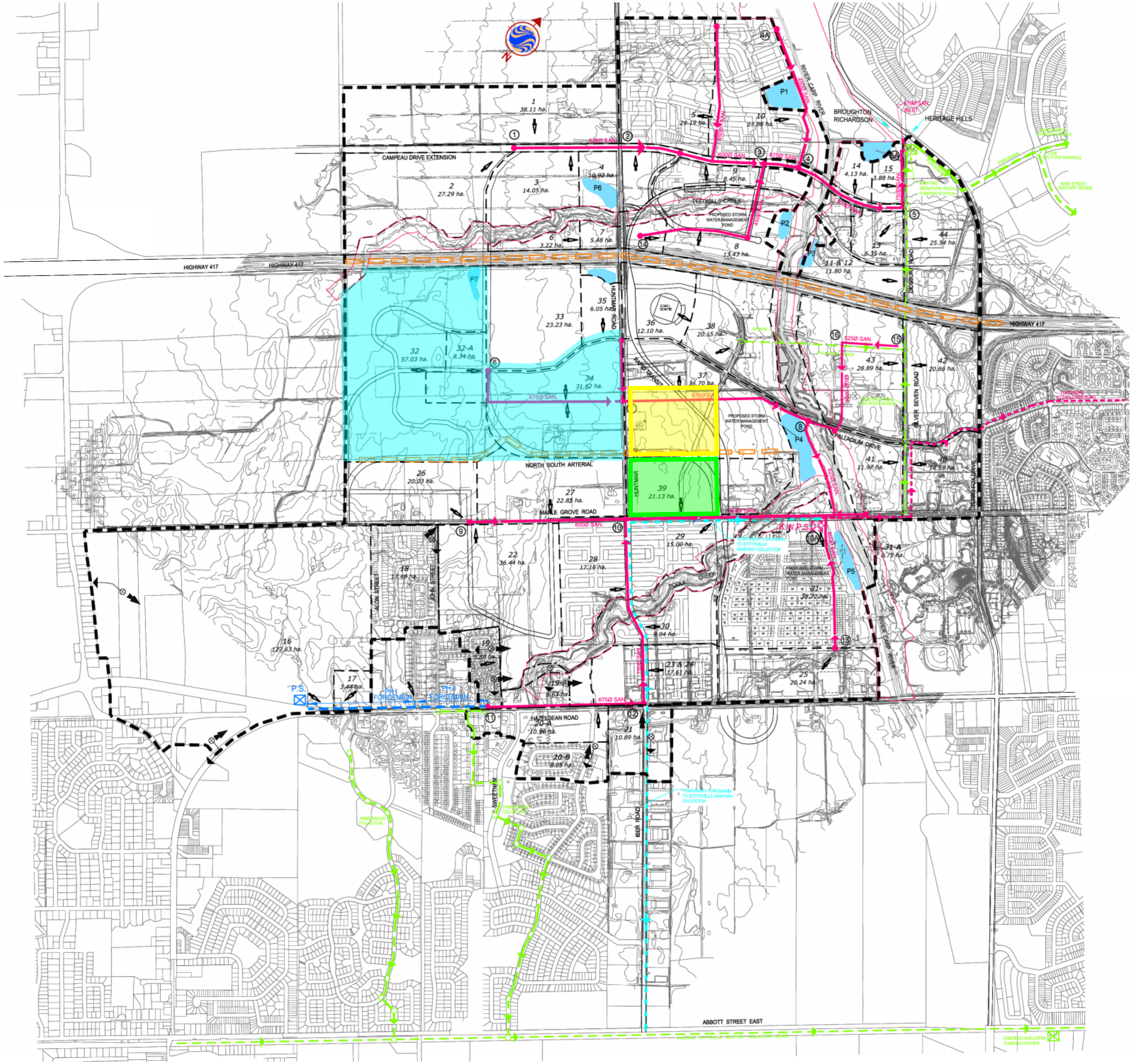
PROJECT: **130 Huntmar Drive**
CLIENT: Urbandale Corporation
PROJECT #: 191002
BY: Atrel Engineering Ltd

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	453.10	144.49	283.00	430.76	1117.80	140.0	282.9980	1117.8010	J138	117.42	113.57	1072.43	1072.43
J102	0.3783	434.85	144.58	283.00	404.62	931.00	140.0	283.3763	930.9979	J178	128.72	114.89	911.56	911.56
J104	2.4865	455.87	146.87	300.00	385.86	695.38	140.0	302.4844	695.3771	J104	139.96	114.63	695.38	695.38
J106	0.5688	458.28	147.47	300.00	376.03	636.48	140.0	300.5667	636.4759	J106	139.96	114.98	636.48	636.48
J108	0.4595	424.99	144.77	300.00	337.05	562.53	140.0	300.4574	562.5312	J108	139.96	115.68	562.53	562.52
J110	0.3345	483.90	150.68	167.00	469.91	922.11	140.0	167.3333	922.1080	J178	137.86	115.82	919.03	919.03
J112	0.1970	482.93	150.68	167.00	466.54	848.64	140.0	167.1958	848.6402	J178	138.20	115.85	846.27	846.27
J114	0.4813	482.13	150.70	167.00	447.01	567.15	140.0	167.4801	567.1480	J114	139.96	115.78	567.15	567.15
J116	0.4375	481.05	150.69	167.00	427.32	451.61	140.0	167.4363	451.6063	J116	139.96	115.88	451.61	451.61
J118	0.4060	482.54	150.68	167.00	463.68	789.01	140.0	167.4048	789.0121	J178	136.93	115.72	785.22	785.22
J120	0.6627	482.91	150.67	167.00	411.61	391.37	140.0	167.6615	391.3663	J120	139.96	115.67	391.37	391.37
J122	0.9220	483.84	150.67	167.00	412.51	393.03	140.0	167.9208	393.0309	J122	139.96	115.57	393.03	392.96
J124	0.3305	484.41	150.66	167.00	428.37	448.73	140.0	167.3293	448.7259	J124	139.96	115.51	448.73	448.72
J126	0.5510	490.10	150.66	167.00	444.26	504.01	140.0	167.5498	504.0071	J126	139.96	114.93	504.01	504.00
J128	0.3345	435.02	144.54	300.00	317.34	492.55	140.0	300.3324	492.5462	J128	139.96	114.43	492.55	492.55
J130	0.1970	449.64	144.54	300.00	290.95	430.38	140.0	300.1949	430.3751	J130	139.96	112.93	430.38	430.38
J134	0.7658	439.41	144.54	300.00	270.92	410.02	140.0	300.7637	410.0184	J134	139.96	113.98	410.02	410.02
J136	1.2395	426.70	144.54	283.00	200.13	322.68	140.0	284.2375	322.6777	J138	134.18	115.28	319.15	319.15
J138	0.5543	420.91	144.54	283.00	-283.13	172.64	140.0	283.5523	172.6420	J138	139.96	115.87	172.64	172.58
J140	0.2965	432.09	144.54	300.00	311.87	483.90	140.0	300.2944	483.8993	J140	139.96	114.73	483.90	483.90
J142	0.3283	435.95	144.54	300.00	298.83	454.44	140.0	300.3262	454.4439	J142	139.96	114.33	454.44	454.44
J148	0.7364	467.48	147.42	300.00	400.62	737.14	140.0	300.7343	737.1393	J148	139.96	113.99	737.14	737.14
J150	1.5167	462.33	148.43	300.00	302.70	444.71	140.0	301.5146	444.7071	J150	139.96	115.53	444.71	444.71
J152	0.2188	512.21	153.17	167.00	503.88	1588.48	140.0	167.2176	1588.4760	J152	139.97	115.18	1588.50	1588.50
J154	0.0000	444.58	144.32	283.00	442.02	3300.92	140.0	282.9980	3300.9244	J154	140.00	113.24	3301.16	3300.24
J158	0.1095	449.16	144.54	300.00	242.71	373.12	140.0	300.1074	373.1165	J158	139.96	112.98	373.12	373.12
J160	0.1970	443.79	144.54	300.00	254.87	387.98	140.0	300.1949	387.9774	J166	138.97	113.53	387.30	387.30
J162	0.0875	443.40	144.54	300.00	285.75	427.20	140.0	300.0854	427.2014	J162	139.96	113.57	427.20	427.20
J164	0.3283	438.89	144.54	300.00	309.96	472.36	140.0	300.3262	472.3589	J164	139.96	114.03	472.36	472.36
J166	1.1935	502.77	150.66	167.00	356.16	274.55	140.0	168.1923	274.5465	J166	139.96	113.63	274.55	274.48
J170	1.3660	450.08	144.53	300.00	306.45	455.57	140.0	301.3639	455.5747	J170	139.96	112.88	455.58	455.58
J172	0.1970	441.46	145.35	300.00	372.68	659.31	140.0	300.1949	659.3074	J172	139.96	114.58	659.31	659.30
J174	0.4158	464.93	147.50	300.00	404.04	764.81	140.0	300.4137	764.8077	J174	139.96	114.33	764.81	764.81
J178	0.0000	479.50	150.68	167.00	457.51	723.54	140.0	166.9988	723.5366	J178	139.96	116.03	723.54	723.54

Total = 18.2980 l/s

APPENDIX "D"

- KWMSS – Preferred Waste-Water Option – Drawing S-1
- Infrastructure Master Plan – Kanata West Sewers Page 200 (2013)
- 195 Huntmar - Sanitary Drainage Plan – Sheet No. 25 & 26 (DSEL) (DRAFT)
- 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
- Table 7B – Sanitary Sewer Computation Form – Annual Event



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1770 WOODWARD DR., OTTAWA (613)225-1311

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
- NODES
- EXISTING PUMPING STATION AND FORCEMAIN (TO BE DECOMMISSIONED)
- 44 25.54 ha. INPUT POINT AND AREA IN HECTARES
- EXISTING PUMPING STATION GRAVITY OUTLET

		By	Appd.	Date
5	REVISED FOR DEC.21/05 SUBMISSION	G.B.U.	S.J.P.	05:12:21
4	REVISED TRUNK SEWER FROM 16 TO KWPS	R.W.W.	R.W.W.	05:10:05
3	ARROWS FOR EXIST. PUMP STATIONS ADDED	R.W.W.	R.W.W.	05:08:09
2	REPORT JUNE 2005	R.W.W.	R.W.W.	05:06:07
1	REPORT APR. 2005	R.W.W.	R.W.W.	05:04:20

Revision

File Name:

Dwn. Chkd. Dsgn. Date

Seals

Client/Project

Kanata West Concept Plan
Master Servicing Study

Ottawa, Ontario

Title

Preferred Waste-Water Option

Project No. 60400406

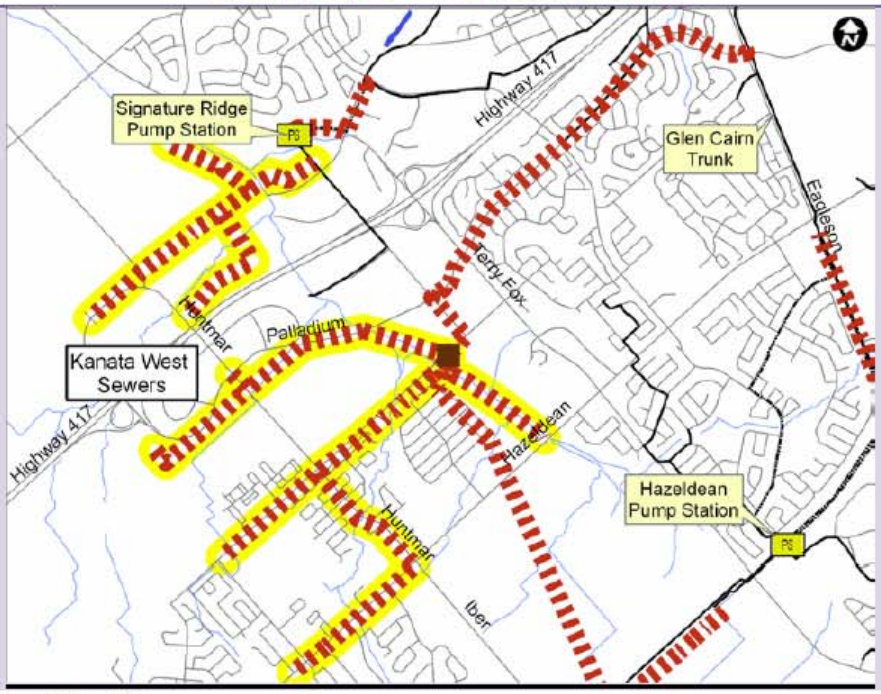
Scale 1:7500 (0, 75, 225, 375m)

Drawing No. S-I

Sheet 7 of 7

Revision 5

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

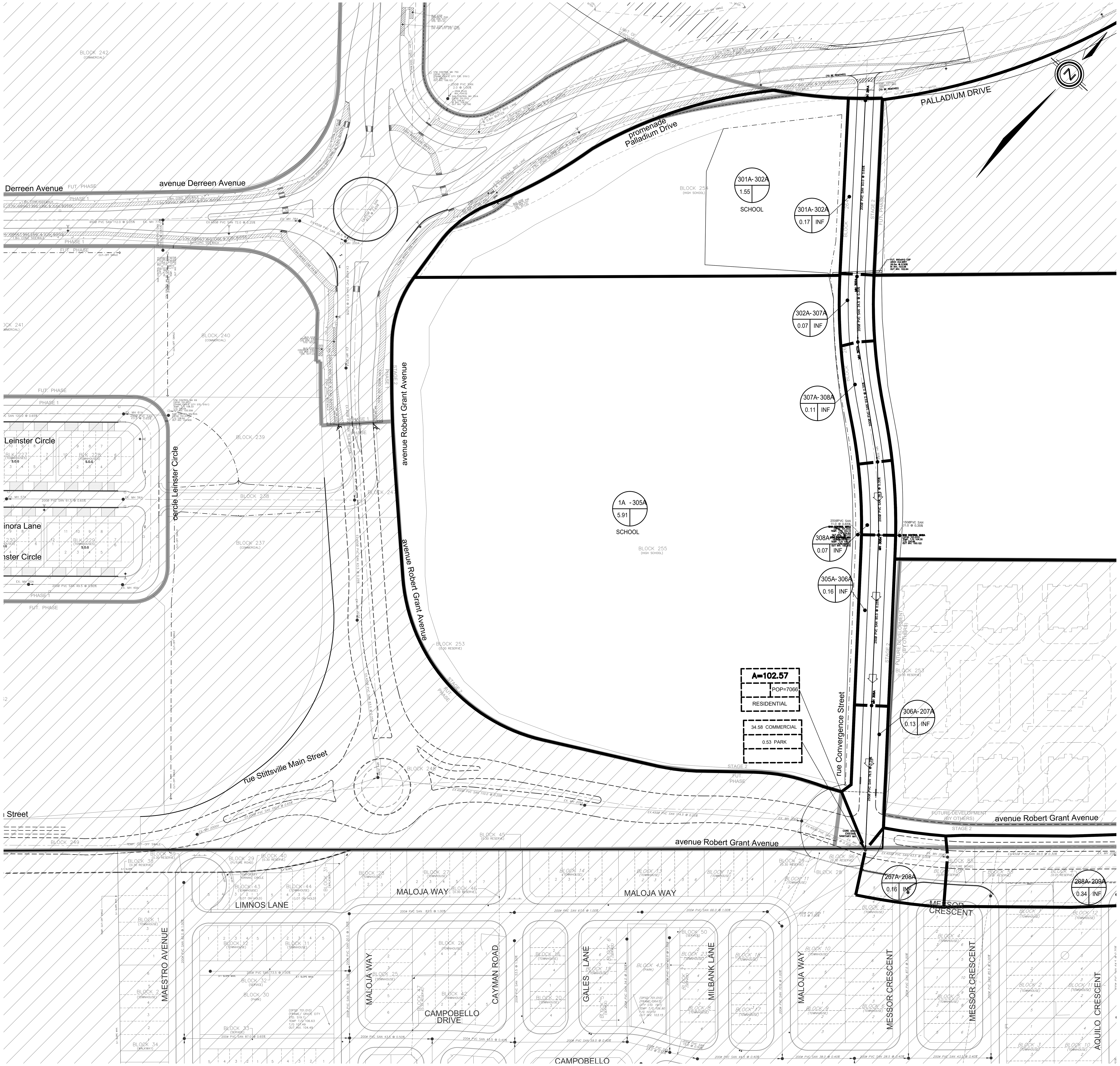
Construction Cost Estimate = $7.1 M
Capital Cost Estimate* = $11.3 M (100% Development Charges, 0% Rate)
**Including construction cost, engineering, city internal costs and contingency allowance.*

EA Requirements and Consultation

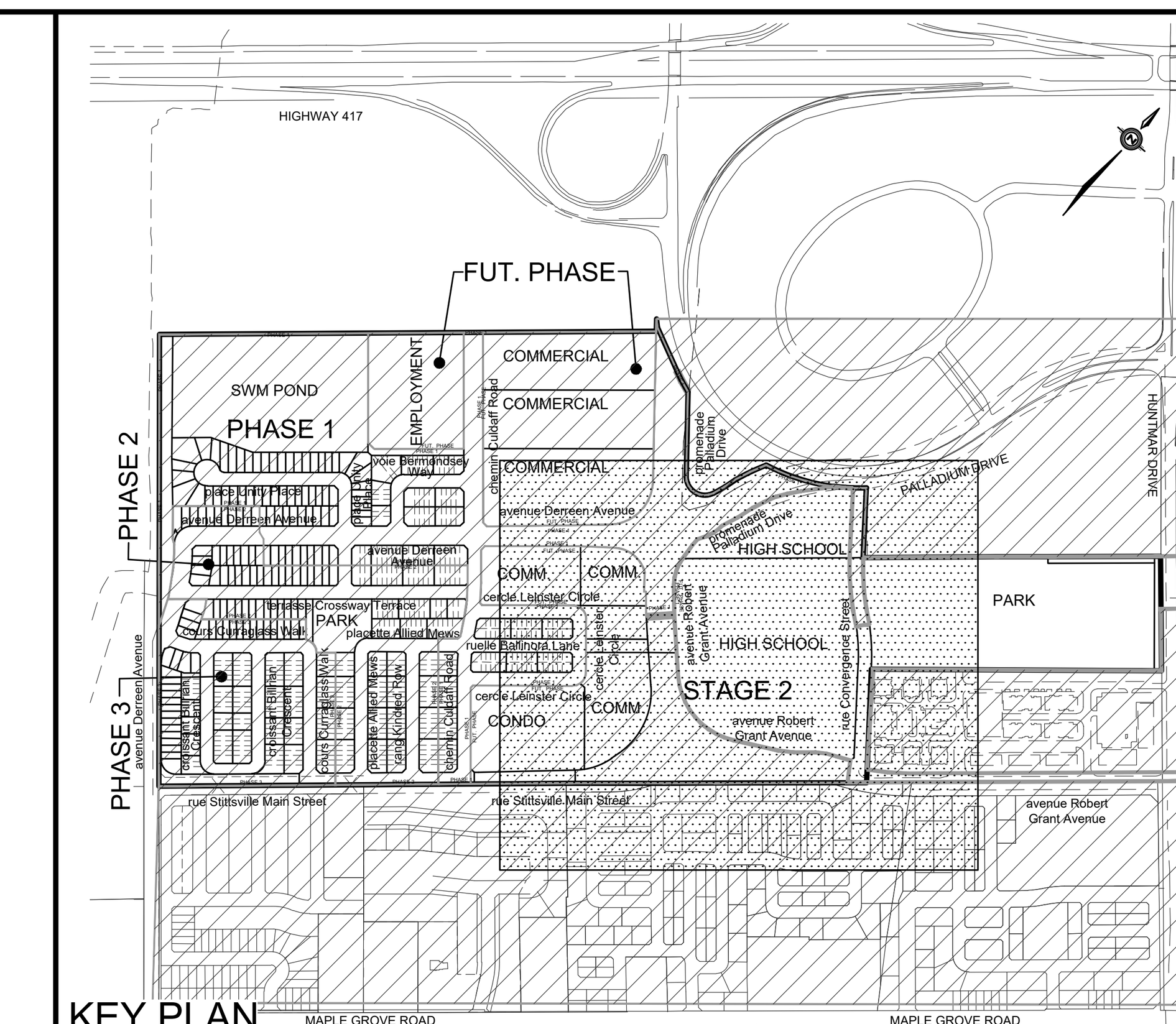
Schedule B Class EA has been completed and the project is approved.

Follow Up Actions

Coordinate design and construction with local subdivision development.



REFER TO
DWG No. 26



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
TRIBUTARY TYPE — PARK
POPULATION — 61
UPSTREAM MH TO DOWNSTREAM MH — 43A–44A
AREA IN OTHER PHASES IN HECTARES — 0.78
POPULATION — 61
EXTERNAL AREA IN HECTARES — A=53.63
EXTERNAL POPULATION — POP=5739
DENSITY (PERSONS/HECTARE) — 107
EXTERNAL LAND USE — RESIDENTIAL
200mmø SAN
MAINTENANCE HOLE — MH202A
CAP
EXISTING / OTHER PHASES NOT PART OF THIS APPLICATION

TOPOGRAPHIC INFORMATION

CITY OF OTTAWA 1K 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

DRAFT PLAN PROVIDED BY STANTEC GEOMATICS LTD., PROJECT No. 16–16–135–45, RECEIVED ON DECEMBER 19, 2019.

NOT FOR CONSTRUCTION

ELEVATION NOTE

ELEVATIONS SHOWN HEREON ARE GEODETIC (CGVD–1928:1978) AND ARE DERIVED FROM THE CAN–NET VRS NETWORK MONUMENT: OTTAWA
ELEVATION = 95.205m

DRAFT

No.	BY	DATE	DESCRIPTION
1	X.X.	YY–MM–DD	1st SUBMISSION

Ottawa CITY OF OTTAWA

PROJECT No. 12–624

SANITARY DRAINAGE PLAN

2325483 ONTARIO LTD.

195 HUNTMAR DRIVE - STAGE 2

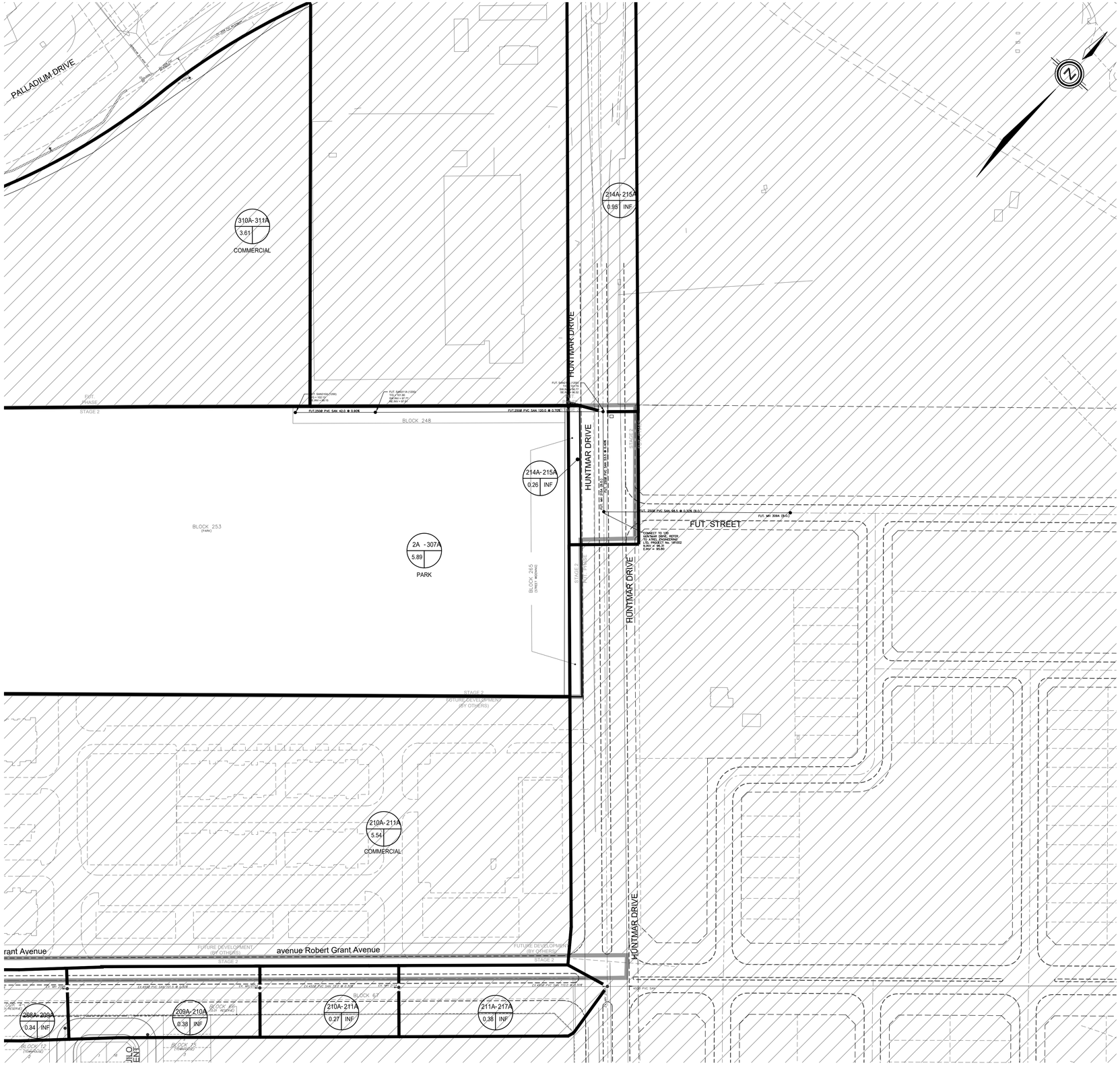
DSEL

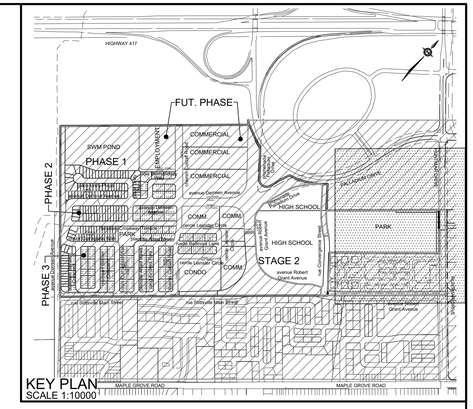
120 Iber Road, Unit 103
Stittsville, ON K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

DRAWN BY: G.G.G.	CHECKED BY: S.L.M.	SHEET NO.
DESIGNED BY: G.G.G.	CHECKED BY: S.L.M.	25
SCALE: 1:1000	DATE: JULY 2023	

CITY PLAN No. 18059

CITY FILE No. D07-16-16-0011





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
- TRIBUTARY TYPE — PARK
- 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
- EXISTING / OTHER PHASES NOT PART OF THIS APPLICATION

TOPOGRAPHIC INFORMATION

CITY OF OTTAWA 1K 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

DRAFT PLAN PROVIDED BY STANTEC GEOMATICS LTD., PROJECT No. 16–16–135–45, RECEIVED ON DECEMBER 19, 2019.

NOT FOR CONSTRUCTION

ELEVATION NOTE

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

ELEVATION = 95.205m

DRAFT

No.	BY	DATE	DESCRIPTION
1	X.X.	YY–MM–DD	1st SUBMISSION

Ottawa CITY OF OTTAWA

PROJECT No. 12–624

SANITARY DRAINAGE PLAN

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195 HUNTMAR DRIVE - STAGE 2

DSEL
120 Iber Road, Unit 103
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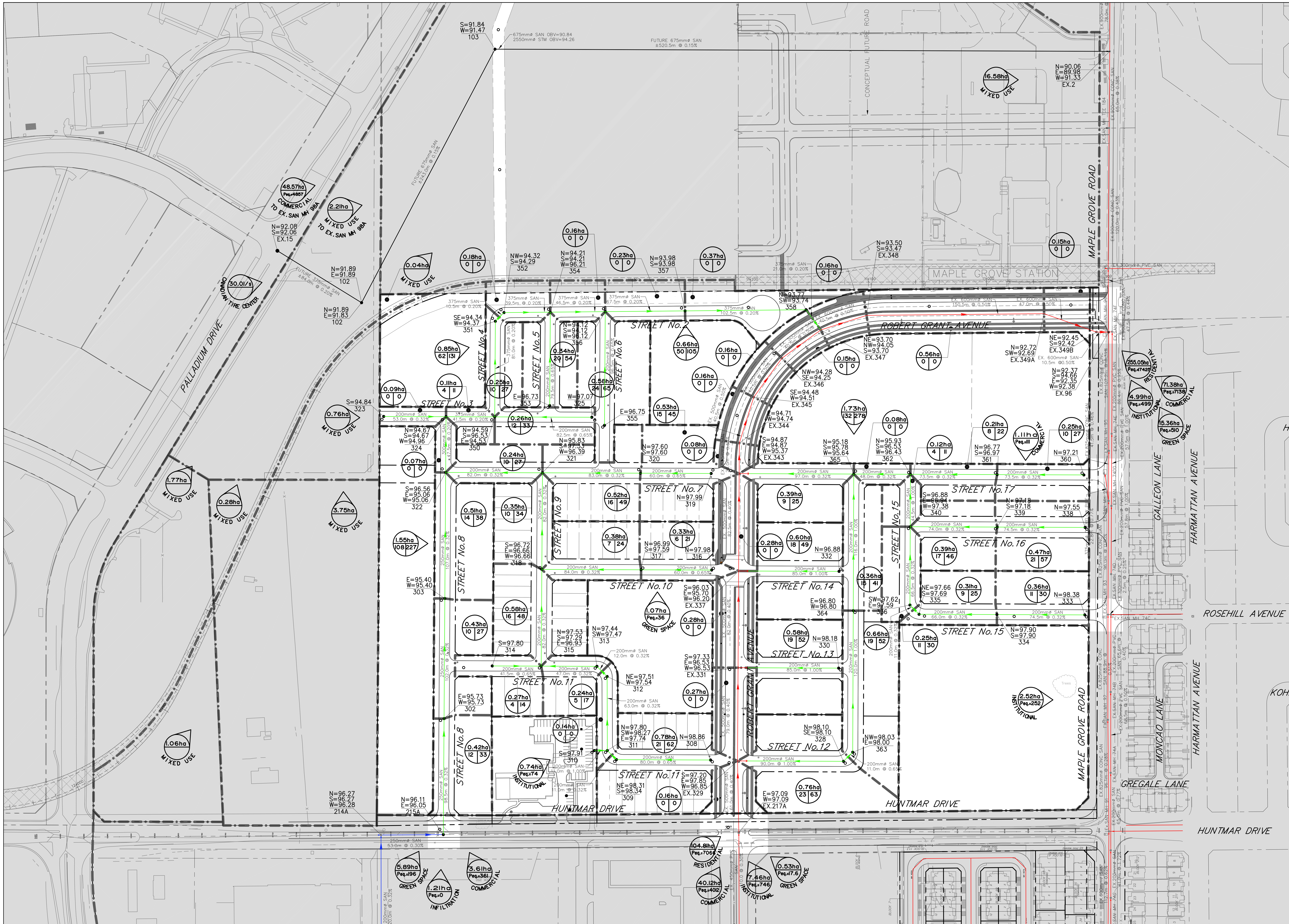
DRAWN BY: G.G.G.	CHECKED BY: S.L.M.	SHEET NO.	
DESIGNED BY: G.G.G.	CHECKED BY: S.L.M.	26	
SCALE: 1:1000	DATE: JULY 2023		

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



LEGEND

0.63ha / 10 / 40	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	PROPOSED OBVERT ELEVATION
348	PROPOSED MANHOLE NUMBER

THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, 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.

STREET MAP

No.	REVISION △-APPLIES WHEN DRAWING MODIFIED	DATE	BY
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
8	REVISED AS PER CITY COMMENTS	APR. 18/22	AGS
9	REVISED AS PER CITY COMMENTS	AUG. 03/23	AGS

SCALE 1:1500 (15m 0 45m)

DESIGN	AGS
CHECKED	JMD
DRAWN	CED
CHECKED	AGS
APPROVED	JMD

LICENSED PROFESSIONAL ENGINEER A. G. Y. SAUVE 100142393 Aug. 3, 2023 PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER J.M.J.DECOEUR Aug 3, 2023 PROVINCE OF ONTARIO

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

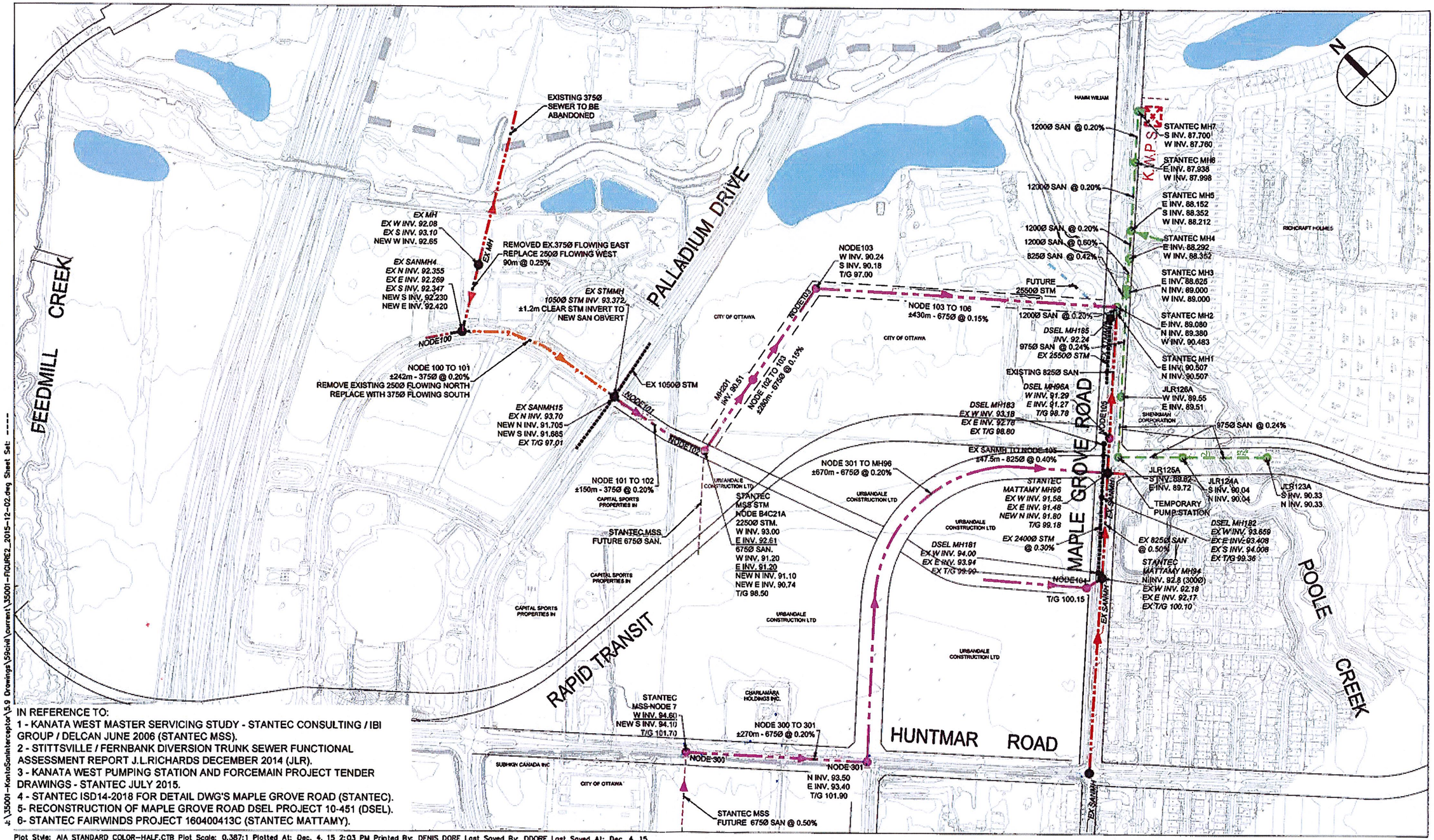
CITY OF OTTAWA
130 HUNTMAR DR.

LIONESS DEVELOPMENT INC.

PROJECT No. 191002
DATE JANUARY 2020

PLAN
MACRO SANITARY DRAINAGE AREA PLAN

DRAWING No. 191002-SANM



IN REFERENCE TO:
1 - KANATA WEST MASTER SERVICING STUDY - STANTEC CONSULTING / IBI GROUP / DELCAN JUNE 2006 (STANTEC MSS).
2 - STITTSVILLE / 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).

J:\35001-KantoSanInterceptor\5.9 Drawings\59civil\current\35001-FIGURE2_2015-12-02.dwg Sheet Set: ----
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

IBI GROUP

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.

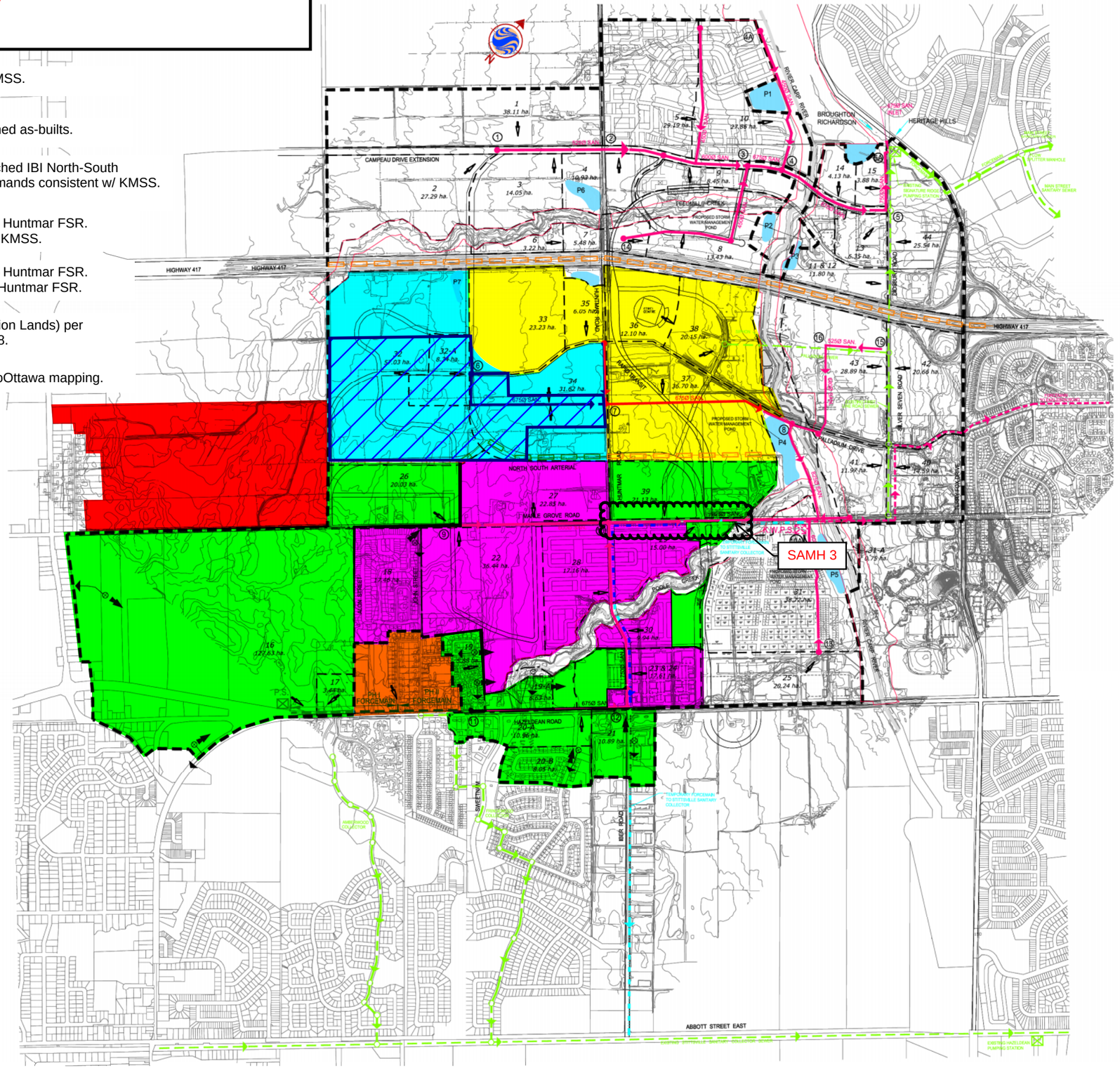
Area redirected per 195 Huntmar FSR. Demands consistent w/ KMSS.

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

CCL/IBI Consulting Limited

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
- NODES
- EXISTING PUMPING STATION AND FORCEMAIN (TO BE DECOMMISSIONED)
- 44 / 25.54 ha. — INPUT POINT AND AREA IN HECTARES
- EXISTING PUMPING STATION GRAVITY OUTLET

No.	Revision	By	Appd.	Date
5	REVISED FOR DEC.21/05 SUBMISSION	G.B.U.	S.v.P.	05/12/21
4	REVISED TRUNK SEWER FROM 16 TO KMPS	R.M.W.	R.M.W.	05/10/05
3	ARROWS FOR EXIST. PUMP STATIONS ADDED	R.M.W.	R.M.W.	05/08/09
2	REPORT JUNE 2005	R.M.W.	R.M.W.	05/06/07
1	REPORT APR. 2005	R.M.W.	R.M.W.	05/04/20

File Name: Dwn. Chkd. Dsgn. Date

Seals

Client/Project
Kanata West Concept Plan
Master Servicing Study
Ottawa, Ontario

Title
Preferred Waste-Water Option

Project No. 60400406
Scale 1:7500 (0, 75, 225, 375m)
Drawing No. S-I
Sheet 7 of 7
Revision 5

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 AREA (ha)	CUMULATIVE POP.	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. (FULL) (m/s)	VEL. (ACT.) (m/s)
195 Huntmar FSR	Areas 32, 32A, 34 & Portion of 33		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		0.00	1.22	20.03	66.72	22.02	70.93							
	Area 22	9	10	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	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	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	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	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	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	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	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	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	36.98	3.87	213.70	70.52	173.50							
	Area 28 & Portions of 29 & 30	12	10	30.33		2325	158.52	10010	2.56	83.05		71.38		0.00		14.13	36.98	30.33	244.03	80.53	200.56							
Maple Grove Road Trunk Sewer	Area 39 Mixed Use		10	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				384.45	28093	2.20	200.29		201.62		12.47		21.71	107.58	0.00	620.25	204.68	542.55	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

Park Flow =	9300	L/ha/da	0.108		Harmon Correction Factor =	0.800		
Average Daily Flow =	280	l/p/day			Industrial Peak Factor = as per MOE Graph			
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	l/s/Ha						

Designed: B.K.	PROJECT: **195 Huntmar Drive**		
Checked:	LOCATION: **City of Ottawa**		
Dwg. Reference:	File Ref: 14-624	Date: May-19	Sheet No. 1 of 1

*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

SANITARY SEWER COMPUTATION FORM

Table 7A

DATE: **August 3, 2023**
DESIGNED BY: AGS
CHECKED BY: AGS

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

q= 280 l/cap.day
I= 0.33 l/ha.s
PVC/CONC N= 0.013
OTHER N= 0.024

LOCATION				RESIDENTIAL						COMMERCIAL INSTITUTIONAL						GREEN SPACE						Canadian Tire Centre FLOW		PEAK EXT.FLOW	PEAK DES.	SEWER DATA						UpStream		DwnStream	
				INDIVIDUAL		CUMULATIVE		PEAKING	FLOW	INDIVIDUAL		CUMULATIVE		PEAKING	FLOW	INDIVIDUAL		CUMULATIVE		PEAKING	FLOW														
FROM (Up)		TO (Down)		AREA (ha.)	POP.	AREA (ha.)	POP.	FACTOR M	Q(p) (L/S)	AREA (ha.)	POP.	AREA (ha.)	POP.	FACTOR M	Q(p) (L/S)	AREA (ha.)	POP.	AREA (ha.)	POP.	FACTOR M	Q(p) (L/S)	Ind. (L/S)	Cum. (L/S)	Q(i) (L/S)	Q(d) (L/S)	TYPE PIPE	DIA. (NOM) (mm)	SLOPE (%)	LENGTH (M)	CAP. (L/S)	Remaining Capacity (%)	VEL. (M/S)	Obv. (M)	Inv. (M)	Obv. (M)	Inv. (M)
MH	212A	MH	213A	1.21		1.21				3.61	361.0	3.61	361	1.50	1.75	5.89	196.0	5.89	196	1.50	0.95			3.53	6.24	PVC	200	0.32	42.0	18.96	67%	0.60	96.81	96.61	96.67	96.47
MH	213A	MH	214A			1.21						3.61	361	1.50	1.75			5.89	196	1.50	0.95			3.53	6.24	PVC	200	0.32	120.0	18.96	67%	0.60	96.67	96.47	96.28	96.08
MH	214B	MH	214A																							PVC	200	0.32	120.0	18.96	100%	0.60	96.66	96.46	96.27	96.07
MH	214A	MH	215A			1.21						3.61	361	1.50	1.75			5.89	196	1.50	0.95			3.53	6.24	PVC	250	0.30	53.0	33.08	81%	0.67	96.27	96.02	96.11	95.86
MH	215A	MH	302	0.42	33.0	1.63	33	3.68	0.39			3.61	361	1.50	1.75			5.89	196	1.50	0.95			3.67	6.77	PVC	250	0.32	98.5	34.17	80%	0.69	96.05	95.80	95.73	95.48
MH	302	MH	303	0.43	27.0	2.06	60	3.64	0.71			3.61	361	1.50	1.75			5.89	196	1.50	0.95			3.81	7.23	PVC	250	0.32	102.0	34.38	79%	0.69	95.73	95.48	95.40	95.15
MH	303	MH	322	2.07	265.0	4.13	325	3.45	3.63			3.61	361	1.50	1.75			5.89	196	1.50	0.95			4.50	10.84	PVC	250	0.32	107.0	34.17	68%	0.69	95.40	95.15	95.06	94.81
MH	308	MH	309	0.79	62.0	0.79	62	3.64	0.73															0.26	0.99	PVC	200	0.65	80.0	26.86	96%	0.84	98.86	98.66	98.34	98.14
MH	309	MH	311			0.79	62	3.64	0.73															0.26	0.99	PVC	200	0.32	11.0	18.96	95%	0.60	98.31	98.11	98.27	98.07
MH	310	MH	311							0.74	74.0	0.74	74	1.50	0.36									0.24	0.60	PVC	200	1.00	11.0	33.31	98%	1.05	97.91	97.71	97.80	97.60
MH	311	MH	312	0.14		0.93	62	3.64	0.73			0.74	74	1.50	0.36									0.55	1.64	PVC	200	0.32	63.0	18.96	91%	0.60	97.74	97.54	97.54	97.34
MH	312	MH	313			0.93	62	3.64	0.73			0.74	74	1.50	0.36									0.55	1.64	PVC	200	0.32	12.0	18.96	91%	0.60	97.51	97.31	97.47	97.27
MH	313	MH	315	0.27	17.0	1.20	79	3.62	0.93			0.74	74	1.50	0.36									0.64	1.93	PVC	200	0.32	47.0	18.96	90%	0.60	97.44	97.24	97.29	97.09
MH	314	MH	315	0.26	14.0	0.26	14	3.72	0.17															0.09	0.25	PVC	200	0.65	41.5	26.86	99%	0.84	97.80	97.60	97.53	97.33
MH	315	MH	318	0.56	48.0	2.02	141	3.56	1.63			0.74	74	1.50	0.36									0.91	2.90	PVC	200	0.32	82.0	18.96	85%	0.60	96.93	96.73	96.66	96.46
MH	316	MH	317	0.34	21.0	0.34	21	3.70	0.25							1.07	36.0	1.07	36	1.50	0.18			0.47	0.89	PVC	200	0.65	60.0	26.86	97%	0.84	97.98	97.78	97.59	97.39
MH	317	MH	318	0.37	24.0	0.71	45	3.66	0.53									1.07	36	1.50	0.18			0.59	1.30	PVC	200	0.32	84.0	18.96	93%	0.60	96.99	96.79	96.72	96.52
MH	318	MH	321	0.37	34.0	3.10	220	3.51	2.50			0.74	74	1.50	0.36			1.07	36	1.50	0.18			1.62	4.65	PVC	200	0.32	82.0	18.96	75%	0.60	96.66	96.46	96.39	96.19
MH	319	MH	320	0.56	45.0	0.56	45	3.66	0.53															0.18	0.72	PVC	200	0.65	60.0	26.86	97%	0.84	97.99	97.79	97.60	97.40
MH	320	MH	321	0.50	49.0	1.06	94	3.60	1.10															0.35	1.45	PVC	200	0.32	83.0	18.96	92%	0.60	97.60	97.40	97.33	97.13
MH	321	MH	322	0.24	27.0	4.40	341	3.44	3.81			0.74	74	1.50	0.36			1.07	36	1.50	0.18			2.05	6.39	PVC	200	0.32	82.0	18.96	66%	0.60	95.83	95.63	95.56	95.36
MH	322	MH	324	0.07		8.60	666	3.33	7.18			4.35	435	1.50	2.11			6.96	232	1.50	1.13			6.57	16.99	PVC	300	0.20	47.5	42.94	60%	0.61	95.06	94.76	94.96	94.66
MH	323	MH	324	2.46	355.0	2.46	355	3.44	3.95	3.20	320.0	3.20	320	1.50	1.56									1.87	7.38	PVC	200	0.32	53.0	18.96	61%	0.60	94.84	94.64	94.67	94.47
MH	324	MH	350	0.11	11.0	11.17	1032	3.23	10.81			7.55	755	1.50	3.67			6.96	232	1.50	1.13			8.47	24.08	PVC	375	0.20	41.5	73.72	67%	0.70	94.67	94.30	94.59	94.22
MH	325	MH	350	0.26	33.0	0.26	33	3.68	0.39															0.09	0.48	PVC	200	0.65	82.5	26.86	98%	0.84	97.07	96.87	96.53	96.33
MH	350	MH	351	1.09	158.0	12.52	1223	3.19	12.66			7.55	755	1.50	3.67			6.96	232	1.50	1.13			8.92	26.38	PVC	375	0.20	81.0	73.72	64%	0.70	94.53	94.16	94.37	94.00
MH	351	MH	352			12.52	1223	3.19	12.66			7.55	755	1.50	3.67			6.96	232	1.50	1.13			8.92	26.38	PVC	375	0.20	10.5	73.72	64%	0.70	94.34	93.97	94.32	93.95
MH	352	MH	354	0.17		12.69	1223	3.19	12.66			7.55	755	1.50	3.67			6.96	232	1.50	1.13			8.98	26.43	PVC	375	0.20	39.5	73.72	64%	0.70	94.29	93.92	94.21	93.84
MH	353	MH	354	0.34	54.0	0.34	54	3.65	0.64															0.11	0.75	PVC	200	0.65	79.5	26.86	97%	0.84	96.73	96.53	96.21	96.01
MH	354	MH	356	0.16		13.19	1277	3.18	13.17			7.55	755	1.50	3.67			6.96	232	1.50	1.13			9.14	27.11	PVC	375	0.20	46.5	73.72	63%	0.70	94.21	93.84	94.12	93.75
MH	355	MH	356	1.24	172.0	1.24	172	3.54	1.97															0.41	2.38	PVC	200	0.65	96.5	26.86	91%	0.84	96.75	96.55	96.12	95.92
MH	356	MH	357	0.23		14.66	1449	3.15	14.80			7.55	755	1.50	3.67			6.96	232	1.50	1.13			9.63	29.23	PVC	375	0.20	67.5	73.72	60%	0.70	94.12	93.75	93.98	93.61
MH	357	MH	358	0.37		15.03	1449	3.15	14.80			7.55	755	1.50	3.67			6.96	232	1.50	1.13			9.75	29.35	PVC	375	0.20	102.5	73.72	60%	0.70	93.98	93.61	93.77	93.40
MH	358	MH	347			15.03	1449	3.15	14.80			7.55	755	1.50	3.67			6.96	232	1.50	1.13			9.75	29.35	PVC	375	0.20	21.0	73.72	60%	0.70	93.74	93.37	93.70	93.33
MH	217A	MH	329	104.81	7066.0	104.81	7066	2.68	61.42	47.58	4758.0	47.58	4758	1.50	23.13	0.53	17.6	0.53	18	1.50	0.09			50.46	135.10	PVC	500	0.40	61.0	198.43	32%	1.16	97.09	96.62	96.85	96.38
MH	328	MH	329	0.76	63.0	0.76	63	3.63	0.74															0.25	0.99	PVC	200	1.00	90.0	33.31	97%	1.05	98.10	97.90	97.20	97.00
MH	329	MH	331	0.27		105.84	7129	2.68	61.90			47.58	4758	1.50	23.13			0.53	18	1.50	0.09			50.80	135.92	PVC	500	0.40	79.0	198.43	32%	1.16	96.85	96.38	96.53	96.06
MH	330	MH	331	0.58	52.0	0.58	52	3.65	0.61															0.19	0.81	PVC	200	1.00	85.0	33.31	98%	1.05	98.18	97.98	97.33	97.13
MH	331	MH	337	0.28		106.70	7181	2.68	62.29			47.58	4758	1.50	23.13			0.53	18	1.50	0.09			51.09	136.59	PVC	500	0.40	82.0	198.43	31%	1.16	96.53	96.06	96.20	95.73
MH	332	MH	337	0.60	49.0	0.60	49	3.65	0.58															0.20	0.78	PVC	200	0.60	85.0	25.80	97%	0.81	96.21	96.01	95.70	95.50
MH	337	MH	343	0.28		107.58	7230	2.67	62.66			47.58	4758	1.50	23.13			0.53	18	1.50	0.09			51.38	137.26	PVC	500	0.40	82.5	198.43	31%	1.16	95.70	95.23	95.37	94.90
MH	333	MH	334	0.36	30.0	0.36	30	3.68	0.36															0.12	0.48	PVC	200	0.65	74.5	26.86	98%	0.84	98.39	98.19	97.91	97.71
MH	334	MH	335	0.31	25.0	0.67	55	3.64	0.65															0.22	0.87	PVC	200	0.32	66.0	18.93	95%	0.60	97.91	97.71	97.70	97.50
MH	335	MH	336			0.67	55	3.64	0.65															0.22	0.87	PVC	200	0.32	11.0	18.93	95%	0.60	97.67	97.47	97.63	97.43
MH	336	MH	340	0.25	30.0	0.92	85	3.61	0.99															0.30	1.30	PVC	200	0.32	66.5	18.93	93%	0.60	97.60	97.40	97.39	97.19
MH	338	MH	339	0.47	57.0	0.47	57	3.64	0.67															0.16	0.83	PVC	200	0.50	74.5	23.55	96%	0.74	97.56	97.36	97.19	96.99
MH	339	MH	340	0.39	46.0	0.86	103	3.59	1.20															0.28	1.48	PVC	200	0.32	74.0	18.93	92%	0.60	97.19	96.99	96.95	96.75
MH	340	MH	362	0.12	11.0	1.90	199	3.52	2.27															0.63	2.90	PVC	200	1.00	44.5	33.31	91%	1.05	96.89	96.69	96.44	96.24
MH	360	MH	361	0.25	27.0	0.25	27	3.69	0.32	1.11	111.0	1.11	111	1.50	0.54									0.45	1.31	PVC	200	0.32	76.5	18.93	93%	0.60	97.23	97.03	96.98	96.78
MH	361	MH	362	0.21	22.0	0.46	49	3.65	0.58			1.11	111	1.50	0.54									0.52	1.64	PVC	200	0.32	73.5	18.93	91%	0.60	96.78	96.58	96.54	96.34
MH	362	MH	365	0.08		2.44	248	3.49	2.80			1.11	111	1.50	0.54									1.17	4.52	PVC	200	0.32	48.0	18.93	76%	0.60	95.94	95.74	95.78	95.58
MH	328	MH	363																							PVC	200	0.65	11.0	26.86	100%	0.84	98.10	97.90	98.03	97.83
MH	363	MH	364	0.66	52.0	0.66	52	3.65	0.61															0.22	0.83	PVC	200	1.00	120.0	33.31	98%	1.05	98.00	97.80	96.80	96.60
MH	364	MH	365	0.36	41.0	1.02	93	3.60	1.09															0.34	1.42	PVC	200	1.00	116.0	33.31	96%	1.05	96.80	96.60	95.64	95.44
MH	365	MH	343	2.12	303.0	5.58	644	3.33	6.95			1.11	111	1.50	0.54									2.21	9.70	PVC	200	0.32	97.0	18.93	49%	0.60	95.18	94.98	94.87	94.67
MH	343	MH	344	0.07		113.23	7874	2.65	67.51			48.69	4869	1.50	23.67			0.53	18	1.50	0.09			53.61	144.87	PVC	500	0.50	26.0	221.86	35%	1.30	94.87	94.40	94.74	94.27
MH	344	MH	345	0.16		113.39	7874	2.65	67.51			48.69	4869	1.50	23.67			0.53	18	1.50	0.09			53.66	144.92	PVC	500	0.50	40.5	221.86	35%	1.30	94.71	94.24	94.51	94.04
MH	345	MH	346	0.16		113.55	7874	2.65	67.51			48.69	4869	1.50	23.67			0.53	18	1.50	0.09			53.71	144.98	PVC	500	0.50	40.5	221.86	35%	1.30	94.48	94.01	94.28	93.81
MH	346	MH	347	0.15		113.70	7874	2.65	67.51			48.69	4869	1.50	23.67			0.53	18	1.50	0.09			53.76	145.03	PVC	500	0.50	40.5	221.86	35%	1.30	94.25	93.78	94.05	93.58
MH	347	MH	348	0.16		128.89	9323	2.59	78.19			56.24	5624	1.50	27.34			7.49	250	1.50	1.21			63.56	170.31	PVC	600	0.50	40.5	360.83	53%	1.47	93.70	93.14	93.50	92.94
MH	348	MH	349A	0.56		129.45	9323	2.59	78.19			56.24	5624	1.50	27.34			7.49	250	1.50	1.21			63.75	170.49	PVC	600	0.50	150.5	360.83	53%	1.47	93.47	92.91	92.72	92.16
MH	349A	MH	349B	0.15		129.60	9323	2.59	78.19			56.24	5624	1.50	27.34			7.49	250	1.50	1.21			63.80	170.54	PVC	600	0.50	47.0	360.83	53%	1.47	92.69	92.13	92.45	91.89
MH	349B	EX. MH	96			129.60	9323	2.59	78.19			56.24	5624	1.50	27.34			7.49	250	1.50	1.21			63.80	170.54	PVC	600	0.50	10.5	360.83	53%	1.47	92.42	91.86	92.37	91.81
EX.MH	96	EX.MH	97	263.90	18753.0	393.50	28076	2.20	200.58	136.95	13694.6	193.19	19319	1.50	93.91	15.36	510.0	22.85	760	1.50	3.69	30.00	30.00	201.15	529.33	CONC	900	0.38	47.5	1164.20	55%	1.77	92.35	91.44		

Mixed Uses Assumes: 15% Community Retail, 42.5% Business Park and 42.5% Residential (150 cap/ha.) as per KWMSS
Existing Sanitary Trunk Sewers
Proposed Sanitary Sewers
Future External Sanitary Sewers

LICENSED PROFESSIONAL ENGINEER
A. G. Y. SAUVE
100142393
Aug. 3, 2023
PROVINCE OF ONTARIO

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

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

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.
Atrel Engineering Ltd
1-2884 Chamberland Street | Rockland, ON K4K 1M6
Tel: (613) 446-7423 ext. 30 | Cell: (613) 857-8426
Email andresauve@atrel.com

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SANITARY SEWER COMPUTATION FORM - ANNUAL

Table 7B

DATE: **August 3, 2023**
DESIGNED BY: AGS
CHECKED BY: AGS

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

q= 200 l/cap.day
I= 0.30 l/ha.s
PVC/CONC N= 0.013
OTHER N= 0.024

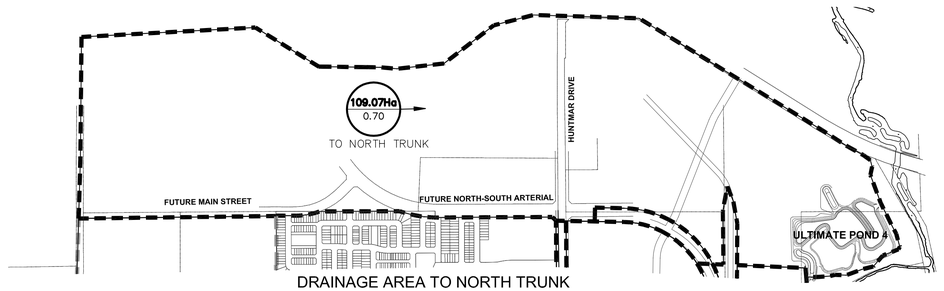
LOCATION				RESIDENTIAL						COMMERCIAL , INSTITUTIONAL						GREEN SPACE						Canadian Tire Centre FLOW		PEAK EXT.FLOW	PEAK DES.	SEWER DATA										UpStream		DwnStream		HGL	FRICT.	MINOR	HGL	UpStream		Down	USF	Freeboard
				INDIVIDUAL		CUMULATIVE		PEAKING	FLOW	INDIVIDUAL		CUMULATIVE		PEAKING	FLOW	INDIVIDUAL		CUMULATIVE		PEAKING	FLOW																			SLOPE	LOSS	LOSS	(Ext)	Hgl at	Hgl Out	MH		
FROM (Up)		TO (Down)		AREA (ha.)	POP.	AREA (ha.)	POP.	FACTOR M	Q(p) (L/S)	AREA (ha.)	POP.	AREA (ha.)	POP.	FACTOR M	Q(p) (L/S)	AREA (ha.)	POP.	AREA (ha.)	POP.	FACTOR M	Q(p) (L/S)	Ind. (L/S)	Cum. (L/S)	Q(i) (L/S)	Q(d) (L/S)	TYPE PIPE	DIA. (mm)	SLOPE (%)	LENGTH (M)	CAP. (L/S)	Remaining Capacity (%)	VEL. (M/S)	Obv. (M)	Inv. (M)	Obv. (M)	Inv. (M)	(%)	(M)	(M)	(M)	UP-MH (M)	UP-MH (M)	Hgl (M)	(m)	(m)
MH	212A	MH	213A	1.21		1.21				3.61	361.0	3.61	361	1.50	1.25	5.89	196.0	5.89	196	1.50	0.68			3.21	5.15	PVC	200	0.32	42.0	18.96	73%	0.60	96.81	96.61	96.67	96.47	0.02	0.01			96.68	96.68	96.67	99.79	2.98
MH	213A	MH	214A			1.21						3.61	361	1.50	1.25			5.89	196	1.50	0.68			3.21	5.15	PVC	200	0.32	120.0	18.96	73%	0.60	96.67	96.47	96.28	96.08	0.02	0.03			96.62	96.62	96.59	99.45	2.78
MH	214B	MH	214A																							PVC	200	0.32	120.0	18.96	100%	0.60	96.66	96.46	96.27	96.07					96.59	96.59	96.59	99.45	2.79
MH	214A	MH	215A			1.21						3.61	361	1.50	1.25			5.89	196	1.50	0.68			3.21	5.15	PVC	250	0.30	53.0	33.08	84%	0.67	96.27	96.02	96.11	95.86	0.01				96.59	96.59	96.59	99.50	2.91
MH	215A	MH	302	0.42	33.0	1.63	33	3.01	0.23			3.61	361	1.50	1.25			5.89	196	1.50	0.68			3.34	5.50	PVC	250	0.32	98.5	34.17	84%	0.69	96.05	95.80	95.73	95.48	0.01	0.01			96.59	96.59	96.58	99.59	3.00
MH	302	MH	303	0.43	27.0	2.06	60	2.98	0.41			3.61	361	1.50	1.25			5.89	196	1.50	0.68			3.47	5.82	PVC	250	0.32	102.0	34.38	83%	0.69	95.73	95.48	95.40	95.15	0.01	0.01			96.58	96.58	96.57	99.06	2.48
MH	303	MH	322	2.07	265.0	4.13	325	2.84	2.14			3.61	361	1.50	1.25			5.89	196	1.50	0.68			4.09	8.16	PVC	250	0.32	107.0	34.17	76%	0.69	95.40	95.15	95.06	94.81	0.02	0.02			96.57	96.57	96.55	98.15	1.58
MH	308	MH	309	0.79	62.0	0.79	62	2.98	0.43															0.24	0.66	PVC	200	0.65	80.0	26.86	98%	0.84	98.86	98.66	98.34	98.14					98.34	98.34	98.34	99.49	0.63
MH	309	MH	311			0.79	62	2.98	0.43															0.24	0.66	PVC	200	0.32	11.0	18.96	96%	0.60	98.31	98.11	98.27	98.07					98.27	98.27	98.27	99.39	1.08
MH	310	MH	311							0.74	74.0	0.74	74	1.50	0.26									0.22	0.48	PVC	200	1.00	11.0	33.31	99%	1.05	97.91	97.71	97.80	97.60					97.80	97.80	97.80	99.83	1.92
MH	311	MH	312	0.14		0.93	62	2.98	0.43			0.74	74	1.50	0.26									0.50	1.19	PVC	200	0.32	63.0	18.96	94%	0.60	97.74	97.54	97.54	97.34	0.00				97.54	97.54	97.54	99.39	1.65
MH	312	MH	313			0.93	62	2.98	0.43			0.74	74	1.50	0.26									0.50	1.19	PVC	200	0.32	12.0	18.96	94%	0.60	97.51	97.31	97.47	97.27	0.00				97.47	97.47	97.47	99.29	1.78
MH	313	MH	315	0.27	17.0	1.20	79	2.96	0.54			0.74	74	1.50	0.26									0.58	1.38	PVC	200	0.32	47.0	18.96	93%	0.60	97.44	97.24	97.29	97.09	0.00				97.29	97.29	97.29	99.29	1.85
MH	314	MH	315	0.26	14.0	0.26	14	3.04	0.10															0.08	0.18	PVC	200	0.65	41.5	26.86	99%	0.84	97.80	97.60	97.53	97.33					97.53	97.53	97.53	98.70	0.90
MH	315	MH	318	0.56	48.0	2.02	141	2.92	0.95			0.74	74	1.50	0.26									0.83	2.04	PVC	200	0.32	82.0	18.96	89%	0.60	96.93	96.73	96.66	96.46	0.00				96.66	96.66	96.66	99.23	2.30
MH	316	MH	317	0.34	21.0	0.34	21	3.03	0.15							1.07	36.0	1.07	36	1.50	0.13			0.42	0.70	PVC	200	0.65	60.0	26.86	97%	0.84	97.98	97.78	97.59	97.39					97.59	97.59	97.59	99.30	1.32
MH	317	MH	318	0.37	24.0	0.71	45	2.99	0.31									1.07	36	1.50	0.13			0.53	0.97	PVC	200	0.32	84.0	18.96	95%	0.60	96.99	96.79	96.72	96.52	0.00				96.72	96.72	96.72	98.74	1.75
MH	318	MH	321	0.37	34.0	3.10	220	2.88	1.47			0.74	74	1.50	0.26			1.07	36	1.50	0.13			1.47	3.32	PVC	200	0.32	82.0	18.96	82%	0.60	96.66	96.46	96.39	96.19	0.01	0.01			96.57	96.57	96.56	98.65	1.99
MH	319	MH	320	0.56	45.0	0.56	45	2.99	0.31															0.17	0.48	PVC	200	0.65	60.0	26.86	98%	0.84	97.99	97.79	97.60	97.40					97.60	97.60	97.60	98.62	0.63
MH	320	MH	321	0.50	49.0	1.06	94	2.95	0.64															0.32	0.96	PVC	200	0.32	83.0	18.96	95%	0.60	97.60	97.40	97.33	97.13	0.00				97.33	97.33	97.33	98.25	0.65
MH	321	MH	322	0.24	27.0	4.40	341	2.83	2.24			0.74	74	1.50	0.26			1.07	36	1.50	0.13			1.86	4.48	PVC	200	0.32	82.0	18.96	76%	0.60	95.83	95.63	95.56	95.36	0.02	0.01			96.56	96.56	96.55	98.15	1.59
MH	322	MH	324	0.07		8.60	666	2.74	4.23			4.35	435	1.50	1.51			6.96	232	1.50	0.81			5.97	12.52	PVC	300	0.20	47.5	42.94	71%	0.61	95.06	94.76	94.96	94.66	0.02	0.01			96.55	96.55	96.54	97.70	1.15
MH	323	MH	324	2.46	355.0	2.46	355	2.83	2.32	3.20	320.0	3.20	320	1.50	1.11									1.70	5.13	PVC	200	0.32	53.0	18.96	73%	0.60	94.84	94.64	94.67	94.47	0.02	0.01			96.55	96.55	96.54	97.35	0.80
MH	324	MH	350	0.11	11.0	11.17	1032	2.67	6.39			7.55	755	1.50	2.62			6.96	232	1.50	0.81			7.70	17.52	PVC	375	0.20	41.5	73.72	76%	0.70	94.67	94.30	94.59	94.22	0.01				96.54	96.54	96.54	97.29	0.75
MH	325	MH	350	0.26	33.0	0.26	33	3.01	0.23															0.08	0.31	PVC	200	0.65	82.5	26.86	99%	0.84	97.07	96.87	96.53	96.33					96.54	96.54	96.54	97.90	0.83
MH	350	MH	351	1.09	158.0	12.52	1223	2.65	7.49			7.55	755	1.50	2.62			6.96	232	1.50	0.81			8.11	19.02	PVC	375	0.20	81.0	73.72	74%	0.70	94.53	94.16	94.37	94.00	0.01	0.01			96.54	96.54	96.53	97.25	0.71
MH	351	MH	352			12.52	1223	2.65	7.49			7.55	755	1.50	2.62			6.96	232	1.50	0.81			8.11	19.02	PVC	375	0.20	10.5	73.72	74%	0.70	94.34	93.97	94.32	93.95	0.01				96.53	96.53	96.53	97.10	0.57
MH	352	MH	354	0.17		12.69	1223	2.65	7.49			7.55	755	1.50	2.62			6.96	232	1.50	0.81			8.16	19.08	PVC	375	0.20	39.5	73.72	74%	0.70	94.29	93.92	94.21	93.84	0.01	0.01			96.53	96.53	96.52	97.10	0.57
MH	353	MH	354	0.34	54.0	0.34	54	2.98	0.37															0.10	0.48	PVC	200	0.65	79.5	26.86	98%	0.84	96.73	96.53	96.21	96.01					96.52	96.52	96.52	97.62	0.89
MH	354	MH	356	0.16		13.19	1277	2.64	7.80			7.55	755	1.50	2.62			6.96	232	1.50	0.81			8.31	19.53	PVC	375	0.20	46.5	73.72	74%	0.70	94.21	93.84	94.12	93.75	0.01	0.01			96.52	96.52	96.51	97.45	0.93
MH	355	MH	356	1.24	172.0	1.24	172	2.90	1.16															0.37	1.53	PVC	200	0.65	96.5	26.86	94%	0.84	96.75	96.55	96.12	95.92	0.00				96.51	96.51	96.51	97.90	1.15
MH	356	MH	357	0.23		14.66	1449	2.61	8.77			7.55	755	1.50	2.62			6.96	232	1.50	0.81			8.75	20.95	PVC	375	0.20	67.5	73.72	72%	0.70	94.12	93.75	93.98	93.61	0.02	0.01			96.51	96.51	96.50	97.40	0.89
MH	357	MH	358	0.37		15.03	1449	2.61	8.77			7.55	755	1.50	2.62			6.96	232	1.50	0.81			8.86	21.06	PVC	375	0.20	102.5	73.72	71%	0.70	93.98	93.61	93.77	93.40	0.02	0.02			96.50	96.50	96.48	97.24	0.74
MH	358	MH	347			15.03	1449	2.61	8.77			7.55	755	1.50	2.62			6.96	232	1.50	0.81			8.86	21.06	PVC	375	0.20	21.0	73.72	71%	0.70	93.74	93.37	93.70	93.33	0.02				96.48	96.48	96.48	97.20	0.72
MH	217A	MH	329	104.81	7066.0	104.81	7066	2.26	36.99	47.58	4758.0	47.58	4758	1.50	16.52	0.53	17.6	0.53	18	1.50	0.06			45.88	99.45	PVC	500	0.40	61.0	198.43	50%	1.16	97.09	96.62	96.85	96.38	0.10	0.06			96.97	96.97	96.91	99.75	2.66
MH	328	MH	329	0.76	63.0	0.76	63	2.98	0.43															0.23	0.66	PVC	200	1.00	90.0	33.31	98%	1.05	98.10	97.90	97.20	97.00					97.20	97.20	97.20	99.60	1.50
MH	329	MH	331	0.27		105.84	7129	2.26	37.28			47.58	4758	1.50	16.52			0.53	18	1.50	0.06			46.19	100.05	PVC	500	0.40	79.0	198.43	50%	1.16	96.85	96.38	96.53	96.06	0.10	0.08			96.91	96.91	96.83	99.44	2.53
MH	330	MH	331	0.58	52.0	0.58	52	2.99	0.36															0.17	0.53	PVC	200	1.00	85.0	33.31	98%	1.05	98.18	97.98	97.33	97.13					97.33	97.33	97.33	99.50	1.32
MH	331	MH	337	0.28		106.70	7181	2.26	37.53			47.58	4758	1.50	16.52			0.53	18	1.50	0.06			46.44	100.55	PVC	500	0.40	82.0	198.43	49%	1.16	96.53	96.06	96.20	95.73	0.10	0.08			96.83	96.83	96.75	99.40	2.57
MH	332	MH	337	0.60	49.0	0.60	49	2.99	0.34															0.18	0.52	PVC	200	0.60	85.0	25.80	98%	0.81	96.21	96.01	95.70	95.50					96.75	96.75	96.75	99.40	2.65
MH	337	MH	343	0.28		107.58	7230	2.26	37.75			47.58	4758	1.50	16.52			0.53	18	1.50	0.06			46.71	101.04	PVC	500	0.40	82.5	198.43	49%	1.16	95.70	95.23	95.37	94.90	0.10	0.09			96.75	96.75	96.66	99.30	2.55
MH	333	MH	334	0.36	30.0	0.36	30	3.01	0.21															0.11	0.32	PVC	200	0.65	74.5	26.86	99%	0.84	98.39	98.19	97.91	97.71					97.91	97.91	97.91	99.40	1.01
MH	334	MH	335	0.31	25.0	0.67	55	2.98	0.38															0.20	0.58	PVC	200	0.32	66.0	18.93	97%	0.60	97.91	97.71	97.70	97.50					97.70	97.70	97.70	99.30	1.39
MH	335	MH	336			0.67	55	2.98	0.38															0.20	0.58	PVC	200	0.32	11.0	18.93	97%	0.60	97.67	97.47	97.63	97.43					97.63	97.63	97.63	99.25	1.58
MH	336	MH	340	0.25	30.0	0.92	85	2.96	0.58															0.28	0.86	PVC	200	0.32	66.5	18.93	95%	0.60	97.60	97.40	97.39	97.19	0.00				97.39	97.39	97.39	99.25	1.65
MH	338	MH	339	0.47	57.0	0.47	57	2.98	0.39															0.14	0.53	PVC	200	0.50	74.5	23.55	98%	0.74	97.56	97.36	97.19	96.99					97.19	97.19	97.19	98.25	0.69
MH	339	MH	340	0.39	46.0	0.86	103	2.94	0.70															0.26	0.96	PVC	200	0.32	74.0	18.93	95%	0.60	97.19	96.99	96.95	96.75	0.00				96.95	96.95	96.95	98.80	1.61
MH	340	MH	362	0.12	11.0	1.90	199	2.89	1.33															0.57	1.90	PVC	200	1.00	44.5	33.31	94%	1.05	96.89	96.69	96.44	96.24	0.00				96.70	96.70	96.70	98.70	1.81
MH	360	MH	361	0.25	27.0	0.25	27	3.02	0.19	1.11	111.0	1.11	111	1.50	0.39									0.41	0.98	PVC	200	0.32	76.5	18.93	95%	0.60	97.23	97.03	96.98	96.78	0.00				96.98	96.98	96.98	97.85	0.62
MH	361	MH	362	0.21	22.0	0.46	49	2.99	0.34			1.11	111	1.50	0.39									0.47	1.20	PVC	200	0.32	73.5	18.93	94%	0.60	96.78	96.58	96.54	96.34	0.00				96.70	96.70	96.70	98.40	1.62
MH	362	MH	365	0.08		2.44	248	2.87	1.65			1.11	111	1.50	0.39									1.07	3.10	PVC	200	0.32	48.0	18.93	84%	0.60	95.94	95.74	95.78	95.58	0.01				96.70	96.70	96.70	98.35	1.65
MH	328	MH	363																							PVC	200	0.65	11.0	26.86	100%	0.84	98.10	97.90	98.03	97.83					98.03	98.03	98.03	99.60	1.50
MH	363	MH	364	0.66	52.0	0.66	52	2.99	0.36															0.20	0.56	PVC	200	1.00	120.0	33.31	98%	1.05	98.00	97.80	96.80	96.60					96.80	96.80	96.80	99.60	1.60
MH	364	MH	365	0.36	41.0	1.02	93	2.95	0.64															0.31	0.94	PVC	200	1.00	116.0	33.31	97%	1.05	96.80	96.60	95.64	95.44	0.00				96.70	96.70	96.70	99.45	2.65
MH	365	MH	343	2.12	303.0	5.58	644	2.75	4.10			1.11	111	1.50	0.39									2.01	6.49	PVC	200	0.32	97.0	18.93	66%	0.60	95.18	94.98	94.87	94.67	0.04	0.04			96.70	96.70	96.66	98.30	1.60
MH	343	MH	344	0.07		113.23	7874	2.23	40.72			48.69	4869	1.50	16.91			0.53	18	1.50	0.06			48.74	106.42	PVC	500	0.50	26.0	221.86	52%	1.30	94.87	94.40	94.74	94.27	0.12	0.03			96.66	96.66	96.63	98.20	1.54
MH	344	MH	345	0.16		113.39	7874	2.23	40.72			48.69	4869	1.50	16.91			0.53	18	1.50	0.06			48.78	106.47	PVC	500	0.50	40.5	221.86	52%	1.30	94.71	94.24	94.51	94.04	0.12	0.05			96.63	96.63	96.58	98.08	1.45
MH	345	MH	346	0.16		113.55	7874	2.23	40.72			48.69	4869	1.50	16.91			0.53	18	1.50	0.06			48.83	106.52	PVC	500	0.50	40.5	221.86	52%	1.30	94.48	94.01	94.28	93.81	0.12	0.05			96.58	96.58	96.53	97.88	1.30
MH	346	MH	347	0.15		113.70	7874	2.23	40.72			48.69	4869	1.50	16.91			0.53	18	1.50	0.06			48.88	106.57	PVC	500	0.50	40.5	221.86	52%	1.30	94.25	93.78	94.05	93.58	0.12	0.05			96.53	96.53	96.48	97.63	1.10
MH	347	MH	348	0.16		128.89	9323	2.19	47.28			56.24	5624	1.50	19.53			7.49	250	1.50	0.87			57.79	125.46	PVC	600	0.50	40.5	360.83	65%	1.47	93.70	93.14	93.50	92.94	0.06	0.02			96.48	96.48	96.46	97.40	0.92
MH	348	MH	349A	0.56		129.45	9323	2.19	47.28			56.24	5624	1.50	19.53			7.49	250	1.50	0.87			57.95	125.63	PVC	600	0.50	150.5	360.83	65%	1.47	93.47	92.91	92.72	92.16	0.06	0.09			96.46	96.46	96.37	97.25	0.79
MH	349A	MH	349B	0.15		129.60	9323	2.19	47.28			56.24	5624	1.50	19.53			7.49	250	1.50	0.87			58.00	125.68	PVC	600	0.50	47.0	360.83	65%	1.47	92.69	92.13	92.45	91.89	0.06	0.03			96.37	96.37	96.34	97.12	0.75
MH	349B	EX. MH	96			129.60	9323	2.19	47.28			56.24	5624	1.50	19.53			7.49	250	1.50	0.87			58.00	125.68	PVC	600	0.50	10.5	360.83	65%	1.47	92.42	91.86	92.37	91.81	0.06	0.01			96.34	96.34	96.33	97.00	0.66
EX.MH	96	EX.MH	97	263.90	18753.0	393.50	28076	1.90	123.70	136.95	13694.6	193.19	19319	1.50	67.08	15.36	510.0	22.85	760	1.50	2.64	30.00	30.00	182.86	406.28	CONC	900	0.38	47.5	1164.20	65%	1.77	92.35	91.44			0.05	0.02			96.33	96.33	96.31	N/A	N/A
EX.MH	97	EX.MH	100			393.50	28076	1.90	123.70			193.19	19319	1.50	67.08			22.85	760	1.50	2.64		30.00	182.86	406.28	CONC	900	0.38	212.5	1164.20	65%	1.77					0.05	0.10			96.31	96.21	N/A	N/A	N/A
EX.MH	100	EX.MH	PS									193.19	19319	1.50	67.08											CONC	1200	0.32	316.0	2300.81							0.32	1.01			96.21	96.21	95.20	N/A	N/A

Mixed Uses Assumes: 15% Community Retail, 42.5% Business Park and 42.5% Residential (150 cap/ha.) as per KWMSS
Existing Sanitary Sewers
Proposed Sanitary Sewers
Future External Sanitary Sewers
Area and population unknown, assummed HGL at 0.32% from MH 100 to KWPS
The HGL at KWPS during the annual event and at catastrphic failure is 95.20m

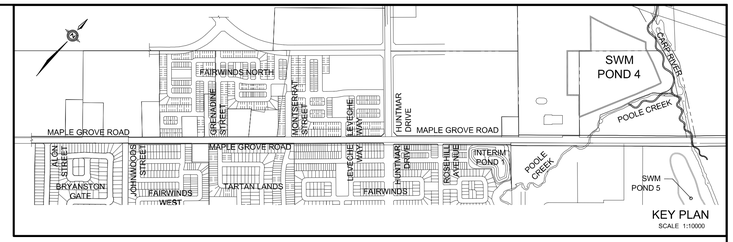
LICENSED PROFESSIONAL ENGINEER
A.G.Y SAUVE
100142393
Aug 3, 2023
PROVINCE OF ONTARIO

APPENDIX "E"

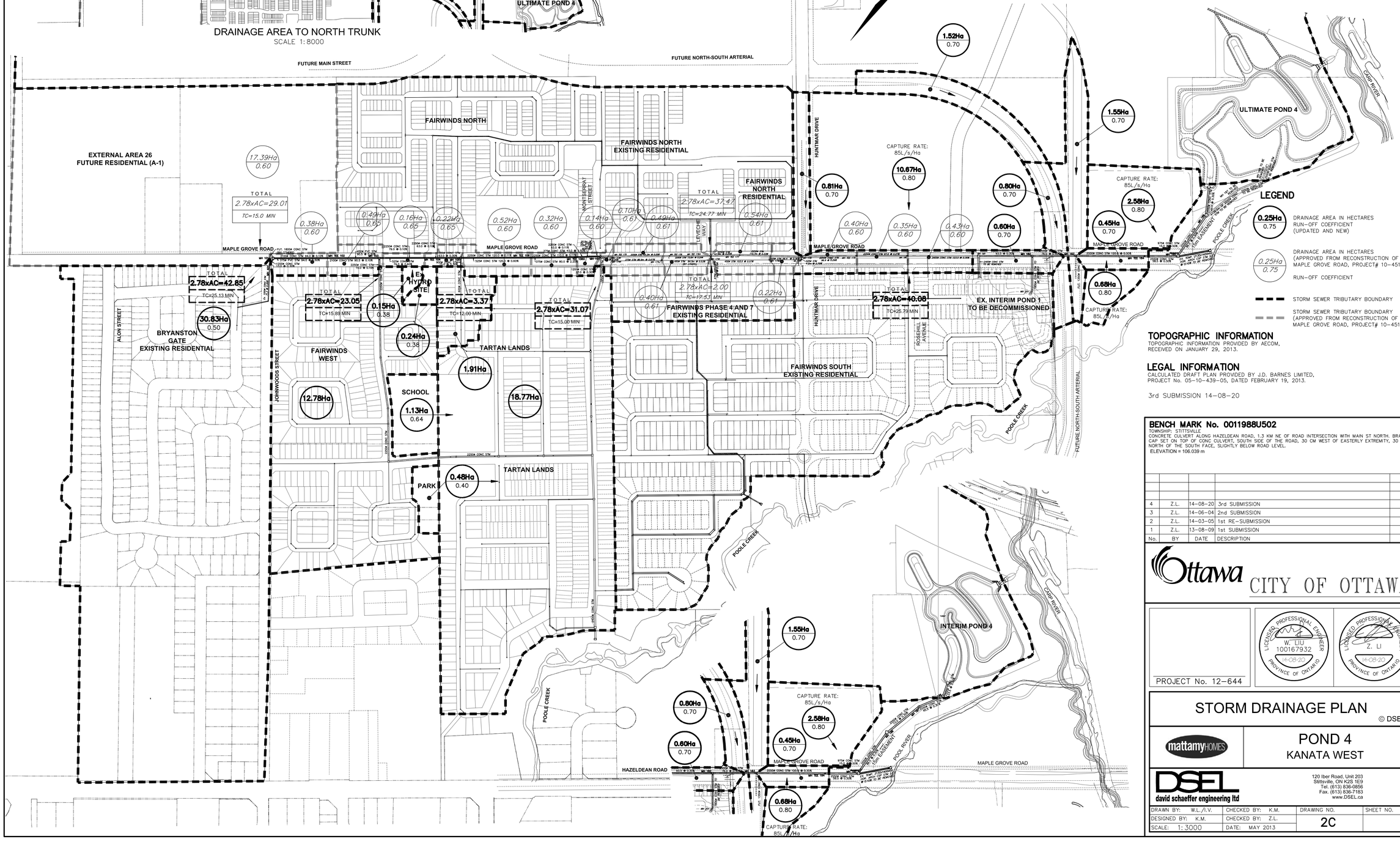
- Storm Drainage Plan – Pond 4 Kanata West (DSEL)
- 191002-STMM - Macro Storm Drainage Area Plan
- 191002-RC1 – Runoff Coefficient Detail Calculations
- Storm Sewer Calculation Sheet (DSEL)
- 195 Huntmar Drive Storm Drainage Area – Sheet No. 22 & 23 (DSEL) (DRAFT)
- Table 8 - Storm Sewer Design Sheet (Rational Method)
- Table 9 - Storm Sewer Design Sheet (Restricted)
- 130 Huntmar Drive / Preliminary Kanata West Pond 4 Sizing (JFSA)
- 191002-SWMP - Stormwater Management Pond
- KWMSS - Storm Drainage Area Plan South Ponds – Drawing ST-PS
- LID Detail – Modified Standard Detail Drawing S29



DRAINAGE AREA TO NORTH TRUNK
SCALE 1:8000



KEY PLAN
SCALE 1:10000



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	

CITY OF OTTAWA

PROJECT No. 12-644

LICENSED PROFESSIONAL ENGINEER
W. LIU
100167932
14-08-20
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER
Z. LI
14-08-20
PROVINCE OF ONTARIO

STORM DRAINAGE PLAN

© DSEL

mattamyHOMES

POND 4
KANATA WEST

DSEL
david schaeffer engineering ltd
120 Iber Road, Unit 203
Stittsville, ON K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

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

M:\12644\Subm_3\Drawings\02C_644_Stm_Drainage.dwg, vyao

LEGEND

- 5 YEAR, 0.70ha, R=0.20 — MINOR SYSTEM CAPTURE RATE
- FUTURE STORM DRAINAGE AREA
- RUNOFF COEFFICIENT
- PROPOSED STORM SEWER
- PROPOSED STORM SEWER BY OTHERS
- DRAINAGE AREA BOUNDARY
- PERFORATED PIPE FOR REAR YARD AS PER CITY STANDARD S29
- DRAINAGE AREA TO MAPLE GROVE ROAD
- MAJOR DRAINAGE SYSTEM
- EXISTING STORM SEWER
- OUTSIDE PROPOSED DEVELOPMENT
- NW=98.00 SE=97.40 SW=97.66 — PROPOSED OBVERT ELEVATION
- 146 — PROPOSED MANHOLE NUMBER

FOR CONSTRUCTION

TRUE NORTH

PROPOSED POND EXPANSION

EXISTING POND 4

CONCEPTUAL FUTURE ROAD

EXISTING DITCH

CARP RIVER

PALLADIUM DRIVE

HUNTMAR DRIVE

MAPLE GROVE ROAD

STREET No.4

STREET No.5

STREET No.6

MONCAO LANE

GALLEON LANE

HARMATTAN AVENUE

ROSKILL AVENUE

KOHLO CRESCENT

HELM CIRCLE

THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, 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.

STREET MAP

No.	REVISION △-APPLIES WHEN DRAWING MODIFIED	DATE	BY
2	ISSUED FOR SANITARY TRUNK MOECC APPROVAL	AUG. 4/20	AGS
1	REVISED AS PER CITY COMMENTS	OCT. 7/20	AGS
1	REVISED AS PER NEW ROAD ALIGNMENT	MAR. 4/21	AGS
1	REVISED AS PER CITY COMMENTS	MAR. 30/21	AGS
A	RECORD DRAWING	AUG. 25/21	AGS
1	REVISED AS PER CITY COMMENTS	SEP. 20/21	AGS
2	REVISED AS PER CITY COMMENTS	APR. 18/22	AGS
3	REVISED AS PER CITY COMMENTS	AUG. 03/23	AGS

SCALE
1 : 2 500
40m 0 60m
HORIZONTAL

DESIGN	AGS
CHECKED	JMD
DRAWN	CED
CHECKED	AGS
APPROVED	JMD

LICENSED PROFESSIONAL ENGINEER — A. G. Y. SAUVE — 100142393 — Nov 3, 2023 — PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER — J.M.J.DECOEUR — Aug 3, 2023 — PROVINCE OF ONTARIO

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

CITY OF OTTAWA
130 HUNTMAR DR.

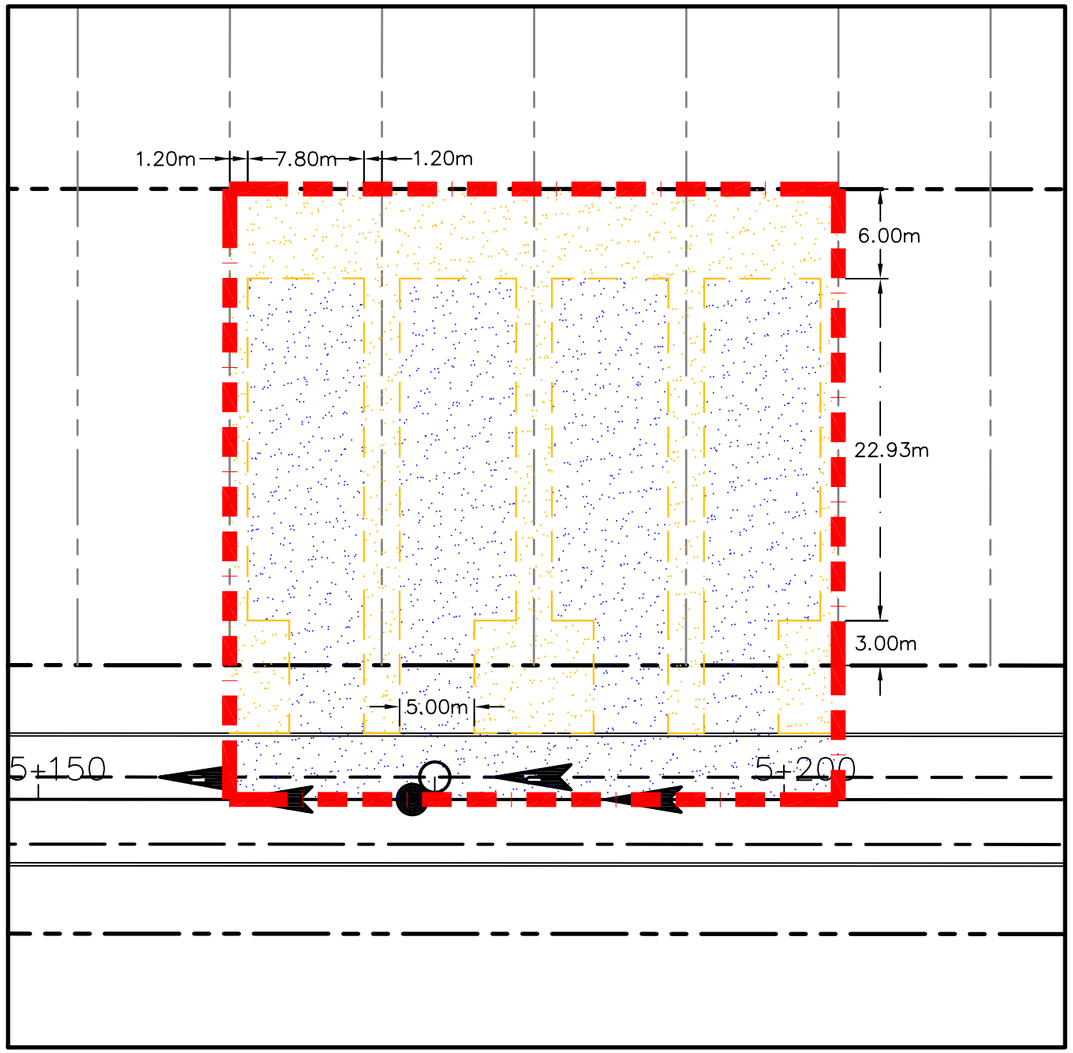
LIONESS DEVELOPMENT INC.

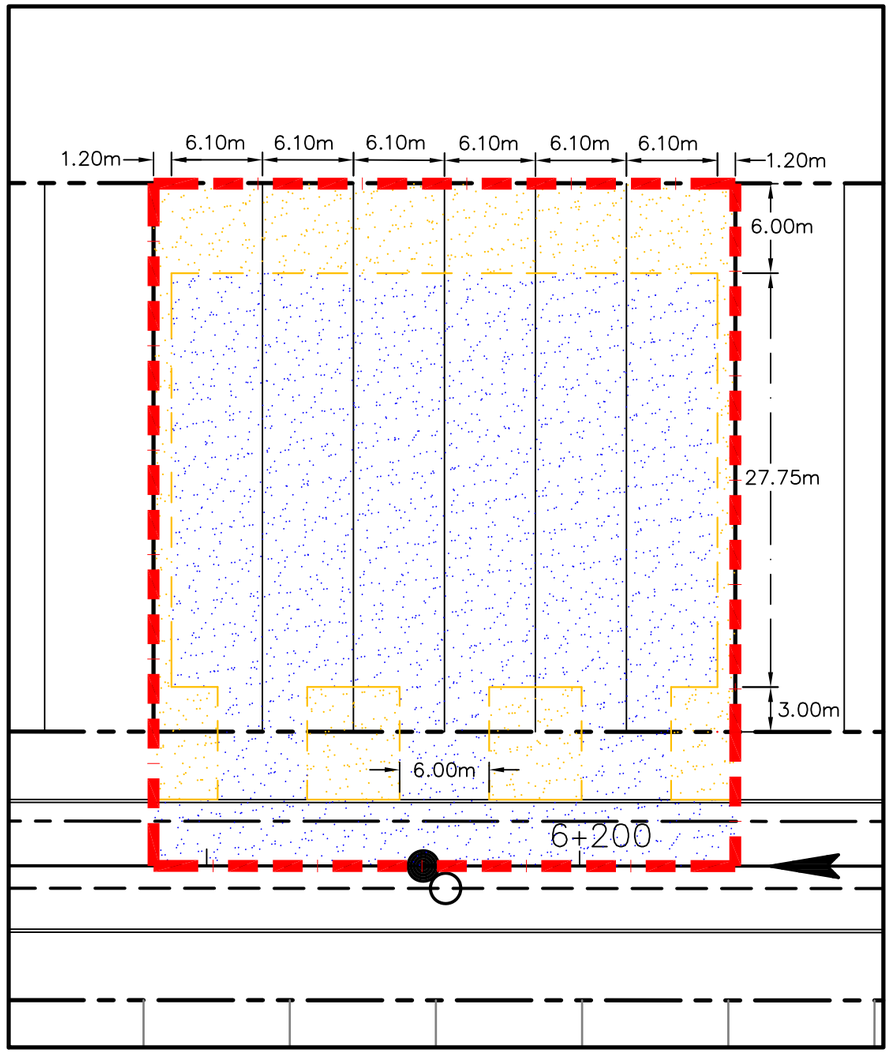
PROJECT No. 191002

DATE JANUARY 2020

PLAN
MACRO STORM DRAINAGE AREA PLAN

DRAWING No. 191002-STMM





LEGEND

AREA @ 0.20 RUNOFF COEFFICIENT

AREA @ 0.90 RUNOFF COEFFICIENT

R_{AVG} AVERAGE RUNOFF COEFFICIENT

TYPICAL SINGLE DWELLING

AREA	RUNOFF COEFFICIENT
0.1047 ha.	0.90
0.0621 ha.	0.20

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

R_{AVG} = 0.639 ---> 0.65

TYPICAL TOWNHOUSE

AREA	RUNOFF COEFFICIENT
0.1324 ha.	0.90
0.0459 ha.	0.20

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

R_{AVG} = 0.720 ---> 0.70

ATREL Engineering Ltd Ltée
Engineers - Ingénieurs

RUNOFF COEFFICIENT DETAIL CALCULATIONS

SCALE: 1:400

130 HUNTMAR

OCT. / 2020 | 191002-RCI

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

Local Roads Return Frequency = 2 years
Collector Roads Return Frequency = 5 years
Manning 0.013 Arterial Roads Return Frequency = 10 years

	LOCATION		AREA (Ha)																FLOW						SEWER DATA							
			2 YEAR				5 YEAR				10 YEAR				100 YEAR				Time of	Intensity	Intensity	Intensity	Intensity	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO
			AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	Conc.	2 Year	5 Year	10 Year	100 Year										
Location	From Node	To Node	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(min)	(mm/h)	(mm/h)	(mm/h)	(mm/h)	Q (l/s)	(actual)	(nominal)		(%)	(m)	(l/s)	(m/s)	LOW (min	Q/Q full
rue Convergence Street																																	
					0.00	0.00	0.08	0.70	0.16	0.16			0.00	0.00			0.00	0.00															
	301	302			0.00	0.00	0.26	0.70	0.51	0.66			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	69	600	600	CONC	0.15	94.0	238	0.8411	1.8627	0.290
	302	307			0.00	0.00			0.00	0.66			0.00	0.00			0.00	0.00	11.86	70.32	95.29	111.65	163.15	63	600	600	CONC	0.15	36.0	238	0.8411	0.7134	0.265
	307	308			0.00	0.00			0.00	0.66			0.00	0.00			0.00	0.00	12.58	68.15	92.31	108.14	158.00	61	825	825	CONC	0.10	64.0	454	0.8492	1.2562	0.135
					0.00	0.00	7.46	0.60	12.44	13.10			0.00	0.00			0.00	0.00	15.00														
	308	305			0.00	0.00	0.08	0.70	0.16	13.26			0.00	0.00			0.00	0.00	15.00	61.77	83.56	97.85	142.89	1108	1050	1050	CONC	0.35	38.5	1616	1.8657	0.3439	0.686
	305	306			0.00	0.00	0.28	0.70	0.54	13.81			0.00	0.00			0.00	0.00	15.34	60.97	82.46	96.56	141.00	1138	1050	1050	CONC	0.30	87.0	1496	1.7273	0.8395	0.761
	306	209			0.00	0.00			0.00	13.81			0.00	0.00			0.00	0.00	16.18	59.11	79.92	93.57	136.62	1103	1050	1050	CONC	0.30	65.0	1496	1.7273	0.6272	0.738
To avenue Robert Grant Avenue, Pipe 209 - 210						0.00				13.81				0.00				0.00	16.81														
avenue Robert Grant Avenue																																	
					0.00	0.00			0.00	0.00	0.39	0.70	0.76	0.76			0.00	0.00															
	FUT. 203	FUT. 204			0.00	0.00			0.00	0.00	0.79	0.70	1.54	2.30			0.00	0.00	10.00	76.81	104.19	122.14	178.56	280	525	525	CONC	1.10	110.0	451	2.0836	0.8799	0.622
	FUT. 204	FUT. 205			0.00	0.00			0.00	0.00			0.00	2.30			0.00	0.00	10.88	73.58	99.76	116.93	170.90	268	525	525	CONC	0.85	107.5	396	1.8316	0.9782	0.677
To avenue Robert Grant Avenue, Pipe FUT. 205 - FUT. 206						0.00				0.00				2.30				0.00	11.86														
avenue Robert Grant Avenue																																	
					0.00	0.00			0.00	0.00	0.11	0.70	0.21	0.21			0.00	0.00															
					0.00	0.00	0.18	0.70	0.35	0.35			0.00	0.21			0.00	0.00															
	FUT. 200	FUT. 201			0.00	0.00			0.00	0.35	0.26	0.70	0.51	0.72			0.00	0.00	10.00	76.81	104.19	122.14	178.56	124	375	375	PVC	1.50	94.0	215	1.9442	0.8058	0.580
					0.00	0.00			0.00	0.35	0.09	0.70	0.18	0.90			0.00	0.00															
	FUT. 201	FUT. 202			0.00	0.00			0.00	0.35	0.15	0.70	0.29	1.19			0.00	0.00	10.81	73.84	100.12	117.35	171.51	174	525	525	CONC	1.40	62.5	509	2.3506	0.4431	0.343
	FUT. 202	FUT. 205			0.00	0.00			0.00	0.35	0.46	0.70	0.90	2.08			0.00	0.00	11.25	72.32	98.03	114.88	167.89	274	600	600	CONC	0.55	77.5	455	1.6105	0.8020	0.601
Contribution From avenue Robert Grant Avenue, Pipe FUT. 204 - FUT. 205						0.00				0.00				2.30				0.00	11.86														
	FUT. 205	FUT. 206			0.00	0.00			0.00	0.35	0.62	0.70	1.21	5.59			0.00	0.00	12.05	69.74	94.48	110.70	161.76	651	825	825	CONC	0.35	96.0	849	1.5886	1.0072	0.767
	FUT. 206	FUT. 207			0.00	0.00			0.00	0.35	0.47	0.70	0.91	6.50			0.00	0.00	13.06	66.77	90.41	105.91	154.72	720	825	825	CONC	0.55	106.5	1065	1.9914	0.8913	0.676
	FUT. 207	209			0.00	0.00			0.00	0.35	0.13	0.70	0.25	6.75			0.00	0.00	13.95	64.36	87.11	102.03	149.03	720	900	900	CONC	0.30	46.5	992	1.5586	0.4972	0.726
Contribution From rue Convergence Street, Pipe 306 - 209						0.00				13.81				0.00				0.00	16.81														
	209	210			0.00	0.00			0.00	14.16			0.00	6.75			0.00	0.00	16.81	57.80	78.13	91.47	133.53	1724	1050	1050	CONC	0.90	48.5	2591	2.9918	0.2702	0.665
	210	211			0.00	0.00			0.00	14.16	0.24	0.70	0.47	7.22			0.00	0.00	17.08	57.26	77.39	90.60	132.25	1750	1350	1350	CONC	0.20	96.0	2387	1.6676	0.9595	0.733
					0.00	0.00			0.00	14.16	0.30	0.70	0.58	7.80			0.00	0.00															
	211	212			0.00	0.00			0.00	14.16	0.33	0.70	0.64	8.45			0.00	0.00	18.04	55.41	74.87	87.64	127.91	1800	1350	1350	CONC	0.30	91.0	2923	2.0424	0.7426	0.616
	212	213			0.00	0.00			0.00	14.16			0.00	8.45			0.00	0.00	18.78	54.08	73.04	85.49	124.76	1756	1350	1350	CONC	0.50	72.0	3774	2.6367	0.4551	0.465
					0.00	0.00	5.07	0.80	11.28	25.43			0.00	8.45			0.00	0.00	15.00														
					0.00	0.00			0.00	25.43	0.34	0.70	0.66	9.11			0.00	0.00															
	213	FUT. 214			0.00	0.00			0.00	25.43	0.37	0.70	0.72	9.83			0.00	0.00	19.24	53.29	71.97	84.23	122.91	2658	1350	1350	CONC	0.45	117.0	3580	2.5014	0.7796	0.742
	FUT. 214	FUT. 4002			0.00	0.00			0.00	25.43	0.76	0.70	1.48	11.31			0.00	0.00	20.02	52.00	70.21	82.17	119.88	2715	1650	1650	CONC	0.45	55.5	6114	2.8594	0.3235	0.444
BLOCK 248																																	
					0.00	0.00	3.61	0.80	8.03	8.03			0.00	0.00			0.00	0.00	15.00														
					0.00	0.00	4.66	0.40	5.18	13.21			0.00	0.00			0.00	0.00	15.00														
	217	218			0.00	0.00			0.00	13.21			0.00	0.00			0.00	0.00	15.00	61.77	83.56	97.85	142.89	1104	825	825	CONC	0.90	46.0	1362	2.5475	0.3010	0.811
					0.00	0.00	1.23	0.40	1.37	14.58			0.00	0.00			0.00	0.00	12.00														
	218	220			0.00	0.00			0.00	14.58			0.00	0.00			0.00	0.00	15.30	61.07	82.60	96.72	141.24	1204	975	975	CONC	0.70	120.0	1875	2.5113	0.7964	0.642
To HUNTMAR DRIVE, Pipe 220 - FUT. 216						0.00				14.58				0.00				0.00	16.10														
HUNTMAR DRIVE																																	
					0.00	0.00	3.15	0.80	7.01	7.01			0.00	0.00			0.00	0.00	15.00														
					0.00	0.00			0.00	7.01	1.18	0.70	2.30	2.30			0.00	0.00	12.00														
	219	220			0.00	0.00			0.00	7.01			0.00	2.30			0.00	0.00	15.00	61.77	83.56	97.85	142.89	810	1200	1200	CONC	0.10	49.0	1233	1.0901	0.7492	0.657
Contribution From BLOCK 248, Pipe 218 - 220						0.00				14.58				0.00				0.00	16.10														
	220	FUT. 216			0.00	0.00			0.00	21.58			0.00	2.30			0.00	0.00	16.10	59.29	80.17	93.87	137.05	1946	1200	1200	CONC	0.40	47.5	2466	2.1802	0.3631	0.789
To FUT. STREET, Pipe FUT. 216 - FUT. 4003						0.00				21.58				2.30				0.00	16.46														

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

LICENSED PROFESSIONAL ENGINEER
S. L. MERRICK
100186523
2023-07-28
PROVINCE OF ONTARIO
DOB # 12-624

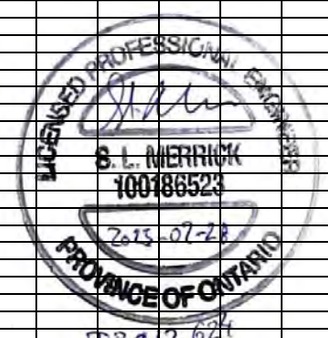
Designed: GGG	PROJECT:	195 HUNTMAR DRIVE - STAGE 2	
Checked: SLM	LOCATION:	City of Ottawa	
Dwg. Reference: STORM DRAINAGE PLAN	File Ref: 12-624	Date: July 28, 2023	Sheet No. SHEET 1 OF 2

624_stm.xlsx

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

Local Roads Return Frequency = 2 years
Collector Roads Return Frequency = 5 years
Manning 0.013 Arterial Roads Return Frequency = 10 years

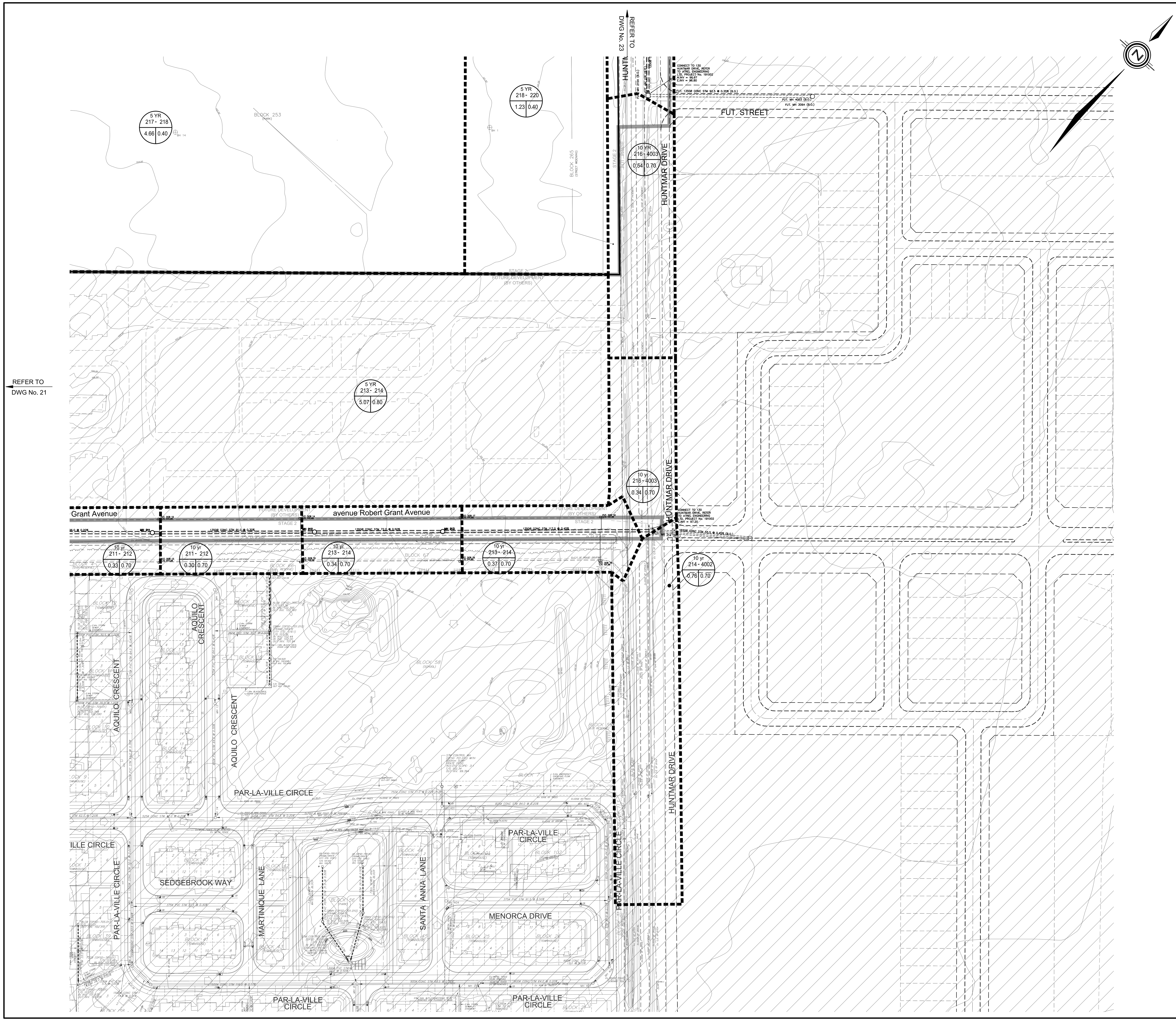
	LOCATION		AREA (Ha)														FLOW						SEWER DATA								
			2 YEAR				5 YEAR				10 YEAR				100 YEAR				Time of	Intensity	Intensity	Intensity	Intensity	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO
			AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	Conc.	2 Year	5 Year	10 Year	100 Year										
Location	From Node	To Node	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(min)	(mm/h)	(mm/h)	(mm/h)	(mm/h)	Q (l/s)	(actual)	(nominal)		(%)	(m)	(l/s)	(m/s)	LOW (min	Q/Q full
FUT. STREET																																
Contribution From HUNTMAR DRIVE, Pipe 220 - FUT. 216						0.00				21.58				2.30				0.00	16.46													
					0.00	0.00			0.00	21.58	0.34	0.70	0.66	2.96			0.00	0.00														
	FUT. 216	FUT. 4003			0.00	0.00			0.00	21.58	0.54	0.80	1.20	4.16			0.00	0.00	16.46	58.52	79.12	92.63	135.23	2093	1350	1350	CONC	0.35	92.5	3158	2.2060	0.6988	0.663

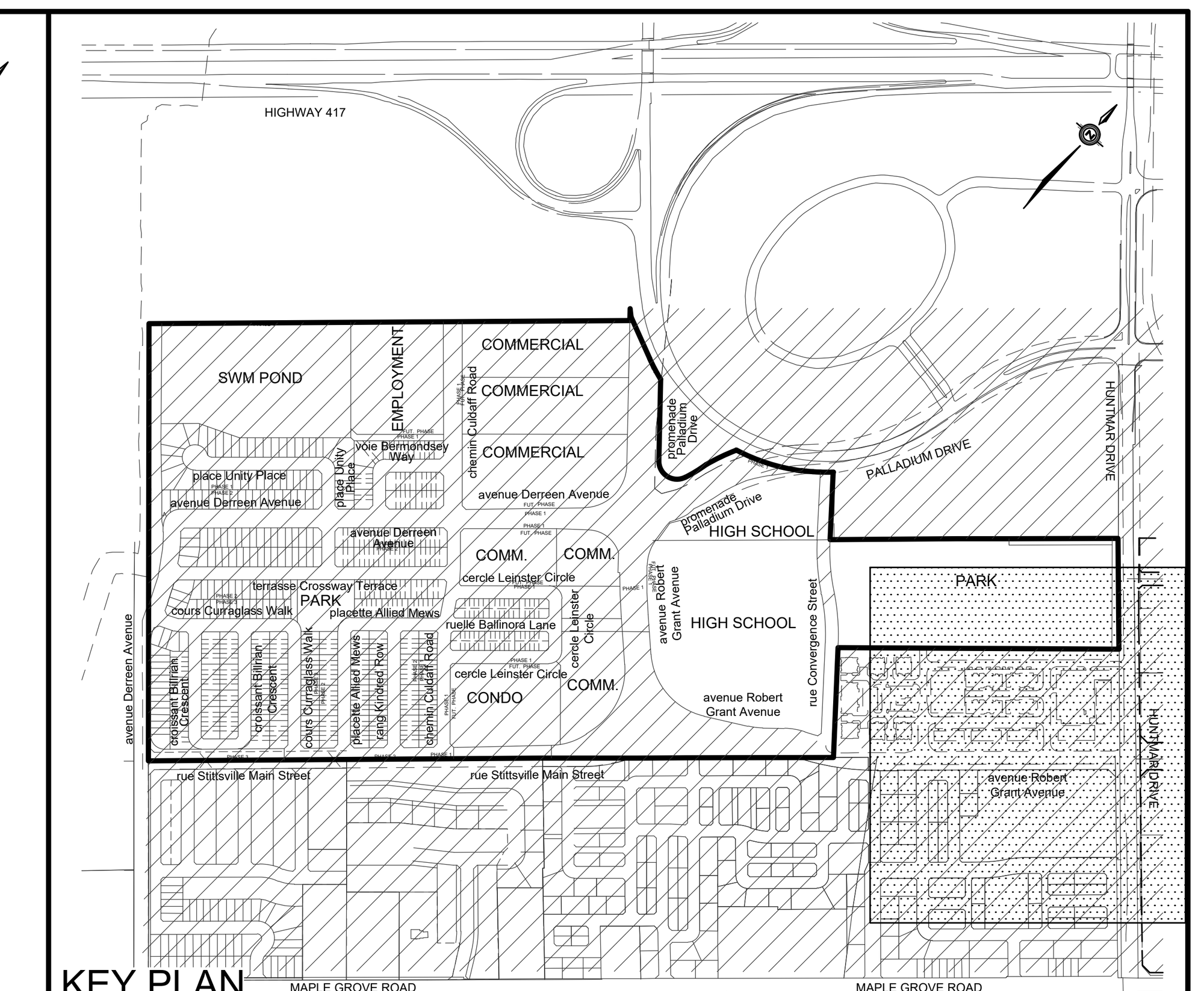


Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficient

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

Designed: GGG	PROJECT:		195 HUNTMAR DRIVE
Checked: SLM	LOCATION:	City of Ottawa	
Dwg. Reference: STORM DRAINAGE PLAN	File Ref: 12-624	Date: 28 Jul 2023	Sheet No. SHEET 2 OF 2





KEY PLAN
SCALE 1:10000

LEGEND

- STORM DRAINAGE BOUNDARY
- SUB-DRAINAGE BOUNDARY
- STORM DRAINAGE BOUNDARY (OTHER PHASES)
- STORM FREQUENCY — 2Yr
- UPSTREAM MH TO DOWNSTREAM MH — 43 - 44
- AREA IN HECTARES — 0.37
- RUNOFF COEFFICIENT — 0.51
- EXTERNAL 2.78AC = — 2.78AC=14.40
- EXTERNAL TIME OF CONCENTRATION — TC=14.5 MIN
- EXTERNAL BLENDED RUNOFF COEFFICIENT — C= 0.70
- EXTERNAL STORM FREQUENCY — 2YR
- UPSTREAM MH TO DOWNSTREAM MH — 21–23
- AREA IN OTHER PHASES IN HECTARES — 0.28
- RUNOFF COEFFICIENT — 0.78
- STREET CATCHBASIN & LEAD
- STREET CATCHBASIN WITH CLOSED LID & LEAD
- MAINTENANCE HOLE — MH202 (375mmø ST)
- CURB INLET CATCHBASIN & LEAD
- CATCHBASIN/ MAINTENANCE HOLE — CBMH201
- INTERCONNECTED CATCH BASIN & LEADS
- CAP
- OVERLAND FLOW DIRECTION
- EXTERNAL OVERLAND FLOW DIRECTION
- EXISTING / OTHER PHASES NOT PART OF THIS APPLICATION

TOPOGRAPHIC INFORMATION

CITY OF OTTAWA 1K 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

DRAFT PLAN PROVIDED BY STANTEC GEOMATICS LTD., PROJECT No. 16–16–135–45, RECEIVED ON DECEMBER 19, 2019.

NOT FOR CONSTRUCTION

ELEVATION NOTE

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

ELEVATION = 95.205m

DRAFT

No.	BY	DATE	DESCRIPTION
1	X.X.	YY–MM–DD	1st SUBMISSION

CITY OF OTTAWA

PROJECT No. 12–624

STORM DRAINAGE PLAN

2325483 ONTARIO LTD.

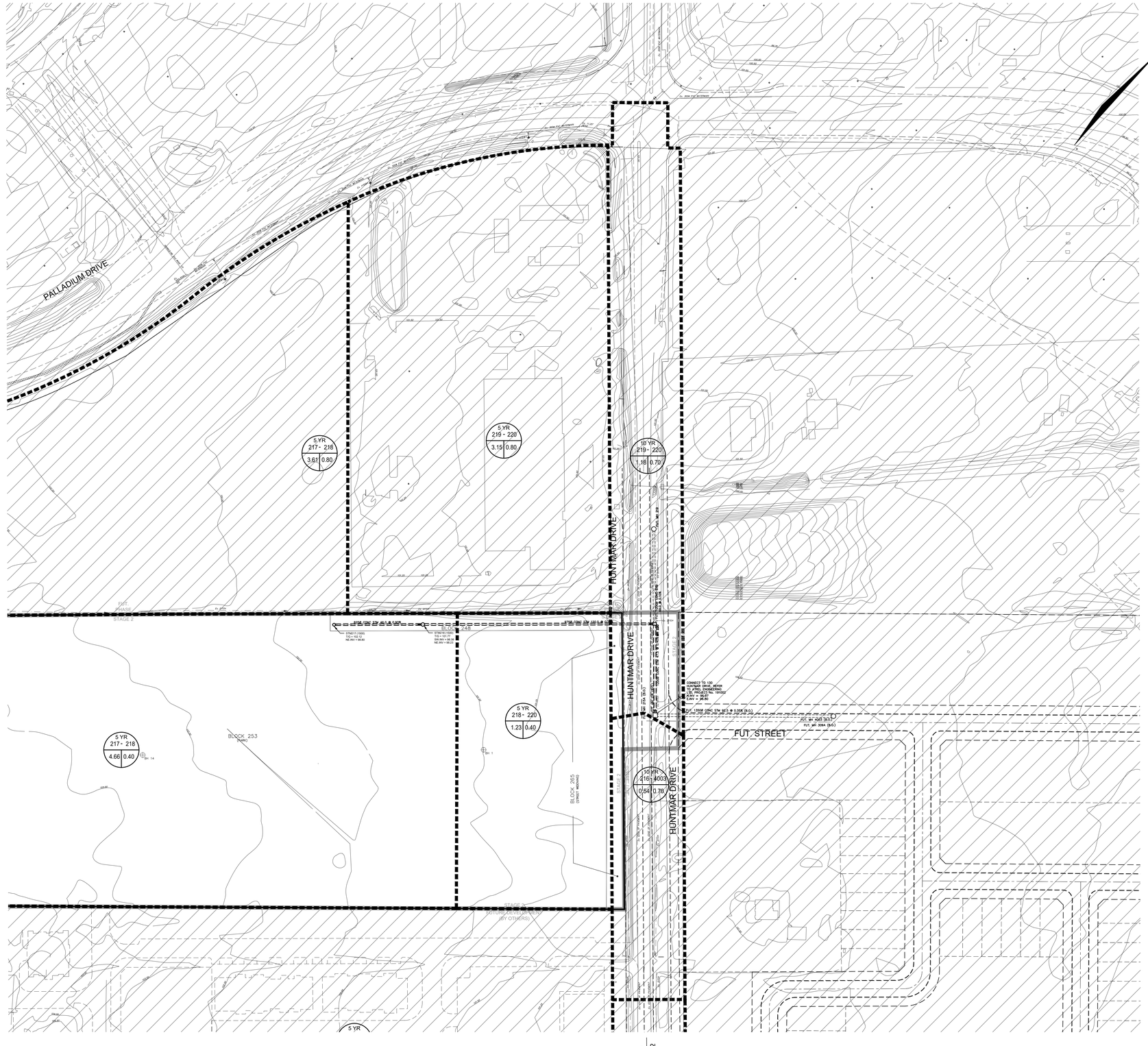
195 HUNTMAR DRIVE - STAGE 2

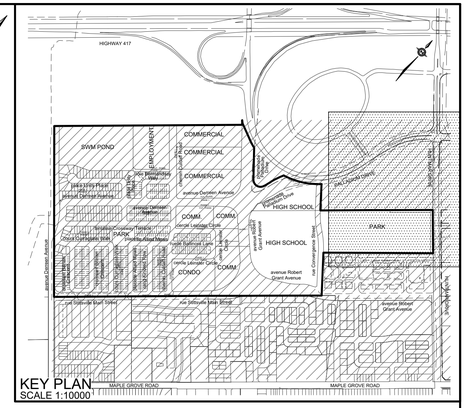
DSEL
120 Iber Road, Unit 103
Stittsville, ON K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

DRAWN BY:	G.G.G.	CHECKED BY:	S.L.M.	SHEET No.
DESIGNED BY:	G.G.G.	CHECKED BY:	S.L.M.	22
SCALE:	1:1000	DATE:	JULY 2023	

CITY PLAN No. 18059

CITY FILE No. D07-16-16-0011





LEGEND

STORM DRAINAGE BOUNDARY
SUB-DRAINAGE BOUNDARY
STORM DRAINAGE BOUNDARY (OTHER PHASES)
STORM FREQUENCY
UPSTREAM MH TO DOWNSTREAM MH
AREA IN HECTARES
RUNOFF COEFFICIENT
EXTERNAL 2.78AC =
EXTERNAL TIME OF CONCENTRATION
EXTERNAL BLENDED RUNOFF COEFFICIENT
EXTERNAL STORM FREQUENCY
UPSTREAM MH TO DOWNSTREAM MH
AREA IN OTHER PHASES IN HECTARES
RUNOFF COEFFICIENT
STREET CATCHBASIN & LEAD
STREET CATCHBASIN WITH CLOSED LID & LEAD
MAINTENANCE HOLE
CURB INLET CATCHBASIN & LEAD
CATCHBASIN/ MAINTENANCE HOLE
INTERCONNECTED CATCH BASIN & LEADS
CAP
OVERLAND FLOW DIRECTION
EXTERNAL OVERLAND FLOW DIRECTION
EXISTING / OTHER PHASES NOT PART OF THIS APPLICATION

2Yr 43 - 44 0.37 0.51
2.78AC=14.40
TC=14.5 MIN
C= 0.70 2YR
21-23 0.28 0.78
STMMH 91
MH202
CBMH201

TOPOGRAPHIC INFORMATION

CITY OF OTTAWA 1K 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

DRAFT PLAN PROVIDED BY STANTEC GEOMATICS LTD., PROJECT No. 16-16-135-45, RECEIVED ON DECEMBER 19, 2019.

NOT FOR CONSTRUCTION

ELEVATION NOTE

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

ELEVATION = 95.205m

DRAFT

No.	BY	DATE	DESCRIPTION
1	X.X.	YY-MM-DD	1st SUBMISSION

Ottawa CITY OF OTTAWA

PROJECT No. 12-624

CITY PLAN No. 18059

CITY FILE No. D07-16-16-0011

STORM DRAINAGE PLAN

2325483 ONTARIO LTD.

195 HUNTMAR DRIVE - STAGE 2

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

DRAWN BY: G.G.G.	CHECKED BY: S.L.M.	SHEET NO.
DESIGNED BY: G.G.G.	CHECKED BY: S.L.M.	23
SCALE: 1:1000	DATE: JULY 2023	

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
May, 2023

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 2 Year INDIV. 2.78AR	2 Year ACCUM. 2.78AR	5 Year INDIV. 2.78AR	5 Year ACCUM. 2.78AR	10 Year INDIV. 2.78AR	10 Year ACCUM. 2.78AR	TIME CONC.	RAINF. INTENS. 2 Year	RAINF. INTENS. 5 Year	RAINF. INTENS. 10 Year	2 Year Flow	5 Year Flow	10 Year Flow	ACTUAL PIPE FLOW	PIPE SEWER DATA								UpStream		DwStream	
FROM (Up)		TO (Down)		2 Year 0.40	2 Year 0.60	2 Year 0.70	2 Year 0.80	5 Year 0.40	5 Year 0.60	5 Year 0.70	5 Year 0.80	10 Year 0.70	10 Year 0.80														TYPE	DIA. (N0M) (mm)	(ACT)	SLOPE (%)	LENGTH (M)	CAP. (L/S)	Remaining Capacity (%)	VEL. (M/S)	TIME OF FLOW (MIN)	Obv. (M)	Inv. (M)	Obv. (M)	Inv. (M)
MH	217	MH	218					4.66			3.61					13.21	13.21			15.00	61.77	83.56	97.85		1103.87		1103.87	CONC	825	838.2	0.90	46.0	1420.65	22%	2.57	0.30	99.61	98.79	99.20	98.38
MH	218	MH	220					1.23								1.37	14.58			15.30	61.07	82.61	96.73		1204.32		1204.32	CONC	975	990.6	0.70	120.0	1956.07	38%	2.54	0.79	99.20	98.23	98.36	97.39
																				16.09																			
MH	219	MH	220								3.15	1.18				7.01	7.01	2.30	2.30	15.00	61.77	83.56	97.85		585.39	224.69	810.08	CONC	1200	1219.2	0.10	49.0	1286.19	37%	1.10	0.74	98.43	97.23	98.38	97.18
																				15.74																			
MH	220	MH	101														21.58		2.30	16.09	59.32	80.21	93.91		1731.25	215.64	1946.89	CONC	1200	1219.2	0.40	47.5	2572.39	24%	2.20	0.36	98.36	97.16	98.17	96.97
																				16.45																			
MH	101	MH	102			0.40						0.50		0.78	0.78		21.58	0.97	3.27	16.45	58.55	79.16	92.68	45.58	1708.58	303.00	2057.16	CONC	1350	1371.6	0.35	92.5	3294.18	38%	2.23	0.69	98.15	96.80	97.83	96.48
MH	102	MH	103			0.45								0.88	1.65		21.58		3.27	17.14	57.15	77.23	90.42	94.53	1666.93	295.61	2057.07	CONC	1350	1371.6	0.35	102.0	3294.18	38%	2.23	0.76	97.83	96.48	97.47	96.12
MH	103	MH	133			0.51								0.99	2.65		21.58		3.27	17.90	55.68	75.23	88.06	147.36	1623.76	287.89	2059.01	CONC	1350	1371.6	0.35	111.5	3294.18	37%	2.23	0.83	97.47	96.12	97.08	95.73
																				18.73																			
MH	110	MH	111			0.76								1.48	1.48					10.00	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												1.48					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
																				11.22																			
MH	112	MH	113		0.75									1.25	1.25					10.00	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
																				10.17																			
MH	113	MH	114			0.14								0.27	3.00					11.22	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												3.00					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								0.49	3.49					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
																				12.73																			
MH	120	MH	121			0.26								0.51	0.51					10.00	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
																				11.15																			
MH	121	MH	127			0.57								1.11	5.10					12.73	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
																				13.69																			
MH	125	MH	126			0.30								0.58	0.58					10.00	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								1.95	2.53					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
																				12.37																			
MH	127	MH	132			0.36								0.70	8.34					13.69	65.05	88.06	103.15	542.34			542.34	CONC	975	990.6	0.30	83.5	1280.55	58%	1.66	0.84	97.72	96.75	97.47	96.50
																				14.52																			
MH	130	MH	131			0.52								1.01	1.01					10.00	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	131	MH	132			0.51								0.99	2.00					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
																				12.34																			
MH	132	MH	133			0.24								0.47	10.81					14.52	62.92	85.13	99.70	680.08			680.08	CONC	1050	1066.8	0.30	82.0	1560.35	56%	1.75	0.78	97.47	96.42	97.22	96.17
																				15.31																			
MH	133	MH	171			0.07								0.14	13.59		21.58		3.27	18.73	54.16	73.16	85.63	736.11	1579.08	279.95	2595.14	CONC	1650	1676.4	0.30	42.0	5208.04	50%	2.36	0.30	97.08	95.43	96.95	95.30
																				19.03																			
MH	170	MH	171			0.09	5.95							13.41	13.41					10.00	76.81	104.19	122.14	1029.86			1029.86	CONC	1050	1066.8	0.30	51.0	1560.35	34%	1.75	0.49	97.04	95.99	96.89	95.84
																				10.49																			
MH	171	MH	173			0.10								0.19	27.19		21.58		3.27	19.03	53.65	72.46	84.80	1458.96	1563.97	277.23	3300.16	CONC	1800	1828.8	0.30	42.0	6568.16	50%	2.50	0.28	96.74	94.94	96.61	94.81
																				19.31																			
MH	172	MH	173			0.27								0.53	0.53					10.00	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
																				11.51																			
MH	173	MH	174			0.25	0.85							2.38	30.10		21.58		3.27	19.31	53.17	71.80	84.04	1600.22	1549.73	274.75	3424.69	CONC	1800	1828.8	0.30	86.0	6568.16	48%	2.50	0.57	96.55	94.75	96.29	94.49
MH	174	MH	191												30.10		21.58		3.27	19.88	52.22	70.51	82.51	1571.63	1521.88	269.75	3363.26	CONC	1800	1828.8	0.30	10.5	6568.16	49%	2.50	0.07	96.26	94.46	96.23	94.43
																				19.95																			
MH	200	MH	201							0.18		0.37						0.35	0.35	0.72	0.72	10.00	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	106.37	106.00	104.96	104.59
MH	201	MH	202									0.24							0.35	0.47	1.19	10.82	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	104.96	104.44	104.08	103.56
MH	202	MH	205									0.46							0.35	0.90	2.08	11.26	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	104.08	103.48	103.65	103.05
																				12.05																			
MH	203	MH	204									0.39							0.76	0.76		10.00	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	106.42	105.97	105.21	104.76
MH	204	MH	205									0.79							1.54	2.30		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	104.56	104.04	103.65	103.13
																				11.93																			
MH	205	MH	206									0.62							0.35	1.21	5.59	12.05	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	103.65	102.83	103.31	102.49
MH	206	MH	207									0.47							0.35	0.91	6.50	13.05	66.80	90.45	105.96		31.68	688.70	720.38	CONC	825	838.2	0.55	106.5	1110.58	35%	2.01	0.88	103.29	102.47	102.70	101.88
MH	207	MH	209																0.35		6.50	13.93	64.42	87.19	102.12		30.54	663.74	694.28	CONC	900	914.4	0.30	46.5	1034.42	33%	1.58	0.49	102.70	101.80	102.56	101.66
																				14.42																			
MH	306	MH	209						7.46	0.70						13.81	13.81			10.00	76.81	104.19	122.14		1438.39		1438.39	CONC	1050	1066.8	0.30	65.0	1560.35	8%	1.75	0.62	101.60	100.55	101.40	100.35
																				10.62																			
MH	209	MH	210									0.24							14.16	0.47	6.97	14.42	63.17	85.48	100.11		1210.03	697.43	1907.47	CONC	1050	1066.8	0.90	48.5	2702.60	29%	3.02	0.27	101.34	100.29	100.90	99.85
MH	210	MH	211									0.33							14.16	0.64	7.61	14.69	62.51	84.58	99.05		1197.29	753.66	1950.95	CONC	1350	1371.6	0.20	96.0	2490.17	22%	1.69	0.95	100.78	99.43	100.59	99.24
MH	211	MH	212									0.30							14.16	0.58	8.19	15.64	60.30	81.55	95.49		1154.40	782.32	1936.72	CONC	1350	1371.6	0.30	91.0	3049.82	36%	2.06	0.73	100.56	99.21	100.29	98.94
MH	212	MH	213									0.34							14.16	0.66	8.85	16.37	58.71	79.37	92.93		1123.54	822.83	1946.37	CONC	1350	1371.6	0.50	72.0	3937.30	51%	2.66	0.45	100.23	98.88	99.87	98.52
MH	213	MH	140								5.07	0.37				11.28	25.43	0.72	9.57	16.82	57.78	78.10	91.43		1986.20	875.38	2861.58	CONC	1350	1371.6	0.45	117.0	3735.25	23%	2.53	0.77	99.83	98.48	99.30	97.95

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
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Rational Method
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PVC/CONC N= 0.013
CSP N= 0.024
CORR N= 0.021

Table 8

LOCATION				AREA (ha.) RUNOFF COEFFICIENT										Rational Method						TIME	RAINF.	RAINF.	RAINF.				ACTUAL	PIPE SEWER DATA									UpStream		DwStream	
														2 Year		5 Year		10 Year																					
FROM		TO		2 Year				5 Year				10 Year		INDIV.	ACCUM.	INDIV.	ACCUM.	INDIV.	ACCUM.	CONC.	INTENS.	INTENS.	INTENS.	2 Year	5 Year	10 Year	PIPE	TYPE	DIA.		SLOPE	LENGTH	CAP.	Remaining	VEL.	TIME OF	Obv.	Inv.	Obv.	Inv.
(Up)		(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	(MIN)	2 Year (MM/HR)	5 Year (MM/HR)	10 Year (MM/HR)	Flow (L/S)	Flow (L/S)	Flow (L/S)	FLOW (L/S)		(N0M) (mm)	(ACT)	(%)	(M)	(L/S)	Capacity (%)	(M/S)	FLOW (MIN)	(M)	(M)	(M)	(M)
																				17.59																			
MH	140	MH	142			0.17						1.06		0.33	0.33		25.43	2.06	11.64	17.59	56.25	76.02	88.99	18.61	1933.30	1035.58	2987.49	CONC	1650	1676.4	0.45	55.0	6378.52	53%	2.89	0.32	98.85	97.20	98.60	96.95
																				17.91																			
MH	141	MH	142			0.73								1.42	1.42					10.00	76.81	104.19	122.14	109.11			109.11	CONC	525	533.4	0.50	110.5	317.25	66%	1.42	1.30	98.55	98.03	98.00	97.48
																				11.30																			
MH	142	MH	144			0.30								0.58	2.34		25.43		11.64	17.91	55.65	75.20	88.02	129.95	1912.44	1024.30	3066.69	CONC	1650	1676.4	0.45	79.0	6378.52	52%	2.89	0.46	98.00	96.35	97.64	95.99
																				18.37																			
MH	143	MH	144			0.58								1.13	1.13					10.00	76.81	104.19	122.14	86.69			86.69	CONC	525	533.4	0.30	94.0	245.74	65%	1.10	1.42	98.22	97.70	97.94	97.42
																				11.42																			
MH	144	MH	152			0.32								0.62	4.09		25.43		11.64	18.37	54.82	74.05	86.68	224.03	1883.20	1008.70	3115.93	CONC	1650	1676.4	0.45	85.5	6378.52	51%	2.89	0.49	97.64	95.99	97.26	95.61
																				18.86																			
MH	151	MH	152			0.60								1.17	1.17					10.00	76.81	104.19	122.14	89.68			89.68	CONC	525	533.4	0.30	94.0	245.74	64%	1.10	1.42	97.94	97.42	97.66	97.14
																				11.42																			
MH	152	MH	156			0.31								0.60	5.86		25.43		11.64	18.86	53.94	72.86	85.27	315.95	1852.93	992.29	3161.18	CONC	1800	1828.8	0.40	83.5	7584.26	58%	2.89	0.48	97.26	95.46	96.93	95.13
																				19.34																			
MH	141	MH	146																	10.00	76.81	104.19	122.14					PVC	300	299.2	0.35	11.0	56.81	100%	0.81	0.23	99.18	98.88	99.14	98.84
MH	146	MH	147			0.67								1.30	1.30					10.23	75.94	103.01	120.75	99.01			99.01	CONC	525	533.4	0.35	120.0	265.43	63%	1.19	1.68	99.14	98.62	98.72	98.20
MH	147	MH	148			0.40								0.78	2.08					11.91	70.17	95.08	111.41	146.11			146.11	CONC	600	609.6	0.60	120.0	496.18	71%	1.70	1.18	98.42	97.82	97.70	97.10
MH	148	MH	156			0.38	1.73							4.59	6.67					13.09	66.68	90.29	105.78	444.70			444.70	CONC	825	838.2	0.50	106.0	1058.89	58%	1.92	0.92	97.31	96.49	96.78	95.96
																				14.01																			
MH	156	MH	157			0.17								0.33	12.86		25.43		11.64	19.34	53.11	71.73	83.95	682.86	1824.20	976.93	3483.99	CONC	1950	1981.2	0.30	46.5	8130.98	57%	2.64	0.29	96.78	94.83	96.64	94.69
MH	157	MH	158			0.20								0.39	13.25		25.43		11.64	19.64	52.62	71.06	83.16	697.04	1807.16	967.74	3471.94	CONC	1950	1981.2	0.30	61.0	8130.98	57%	2.64	0.39	96.61	94.66	96.43	94.48
MH	158	MH	175												13.25		25.43		11.64	20.02	52.00	70.20	82.16	688.83	1785.29	956.10	3430.22	CONC	1950	1981.2	0.30	45.0	8130.98	58%	2.64	0.28	96.18	94.23	96.04	94.09
																				20.31																			
MH	160	MH	161			0.51								0.99	0.99					10.00	76.81	104.19	122.14	76.23			76.23	CONC	525	533.4	0.30	120.0	245.74	69%	1.10	1.82	96.87	96.35	96.51	95.99
MH	161	MH	162			0.20								0.39	1.38					11.82	70.46	95.48	111.88	97.35			97.35	CONC	600	609.6	0.30	54.5	350.85	72%	1.20	0.76	96.51	95.91	96.35	95.75
MH	162	MH	175			0.34								0.66	2.04					12.57	68.16	92.31	108.15	139.27			139.27	CONC	675	685.8	0.30	99.0	480.32	71%	1.30	1.27	96.35	95.68	96.05	95.38
																				13.84																			
MH	175	MH	176			0.38								0.74	16.03		25.43		11.64	20.31	51.54	69.59	81.43	826.16	1769.77	947.61	3543.54	CONC	1950	1981.2	0.30	56.5	8130.98	56%	2.64	0.36	96.00	94.05	95.83	93.88
MH	176	MH	178			0.22	0.66							1.90	17.93		25.43		11.64	20.66	50.99	68.83	80.54	914.02	1750.45	937.25	3601.71	CONC	1950	1981.2	0.30	66.0	8130.98	56%	2.64	0.42	95.83	93.88	95.63	93.68
																				21.08																			
MH	177	MH	178			0.58								1.13	1.13					10.00	76.81	104.19	122.14	86.69			86.69	CONC	450	457.2	0.30	100.5	162.91	47%	0.99	1.69	96.24	95.79	95.94	95.49
																				11.69																			
MH	178	MH	190			0.15								0.29	19.35		25.43		11.64	21.08	50.36	67.97	79.53	974.27	1728.57	925.50	3628.34	CONC	1950	1981.2	0.30	46.5	8130.98	55%	2.64	0.29	95.63	93.68	95.49	93.54
																				21.37																			
MH	179	MH	190			0.35								0.68	0.68					10.00	76.81	104.19	122.14	52.32			52.32	PVC	375	366.4	0.30	83.0	90.28	42%	0.86	1.62	96.33	95.96	96.08	95.71
																				11.62																			
MH	190	MH	191			0.17								0.33	20.36		25.43		11.64	21.37	49.92	67.37	78.83	1016.27	1713.32	917.35	3646.94	CONC	2100	2133.6	0.30	40.5	9907.60	63%	2.77	0.24	95.49	93.39	95.37	93.27
																				21.62																			
MH	191	MH	192			0.04	4.86							10.89	61.34		47.02		14.91	21.62	49.57	66.89	78.26	3040.66	3144.86	1166.57	7352.09	CONC	2550	2590.8	0.30	118.5	16627.39	56%	3.15	0.63	95.31	92.76	94.95	92.40
MH	192	MH	193				8.17							18.17	79.51		47.02		14.91	22.24	48.68	65.68	76.84	3870.58	3087.97	1145.40	8103.96	CONC	2550	2590.8	0.30	118.5	16627.39	51%	3.15	0.63	94.62	92.07	94.26	91.71
MH	193	MH	194												79.51		47.02		14.91	22.87	47.83	64.52	75.48	3803.00	3033.43	1125.13	7961.56	CONC	2550	2590.8	0.30	78.0	16627.39	52%	3.15	0.41	94.23	91.68	94.00	91.45
																				23.28																			
MH	School	MH	ex 179	2.52										4.20	4.20					10.00	76.81	104.19	122.14	322.86			322.86	CONC	750	762.0	0.30	14.0	636.13	49%	1.39	0.17	97.64	96.89	97.60	96.85
																				10.17																			
MH	65	MH	66			0.36								0.70	0.70					10.00	76.81	104.19	122.14	53.81			53.81	CONC	450	457.2	0.30	76.0	162.91	67%	0.99	1.28	98.55	98.10	98.32	97.87
MH	66	MH	67			0.29								0.56	1.26					11.28	72.23	97.90	114.73	91.36			91.36	CONC	525	533.4	0.30	61.5	245.74	63%	1.10	0.93	98.32	97.80	98.14	97.62
MH	67	MH	ex 180												1.26					12.21	69.25	93.81	109.92	87.59			87.59	CONC	525	533.4	0.30	14.5	245.74	64%	1.10	0.22	97.34	96.82	97.30	96.78
																				12.43																			
MH	70	MH	73			0.26								0.51	0.51					10.00	76.81	104.19	122.14	38.86			38.86	PVC	300	299.2	0.60	76.5	74.38	48%	1.06	1.21	98.75	98.45	98.29	97.99
																				11.21									525										
MH	71	MH	72			0.47								0.91	0.91					10.00	76.81	104.19	122.14	70.25			70.25	CONC	450	457.2	0.30	77.5	162.91	57%	0.99	1.30	98.44	97.99	98.21	97.76
MH	72	MH	73			0.39								0.76	1.67					11.30	72.14	97.79	114.60	120.73			120.73	CONC	525	533.4	0.30	73.5	245.74	51%	1.10	1.11	98.21	97.69	97.99	97.47
																				12.42									525										
MH	73	MH	74			0.16								0.31	2.49					12.42	68.63	92.96	108.91	170.95			170.95	CONC	525	533.4	0.60	47.5	347.53	51%	1.56	0.51	97.99	97.47	97.70	97.18
MH	74	MH	75			0.21	1.11							2.88	5.37					12.92	67.14	90.92	106.52	360.42			360.42	CONC	825	838.2	0.30	73.5	820.21	56%	1.49	0.82	97.70	96.88	97.48	96.66
MH	75	MH	76			0.25								0.49	5.85					13.75	64.89	87.83	102.88	379.91			379.91	CONC	825	838.2	0.30	73.5	820.21	54%	1.49	0.82	97.48	96.66	97.26	96.44
MH	76	MH	ex 181												5.85					14.57	62.79	84.96	99.51	367.62			367.62	CONC	825	838.2	0.30	19.0	820.21	55%	1.49	0.21	97.26	96.44	97.20	96.38
																				14.79																			

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

LICENSED PROFESSIONAL ENGINEER
A. G. Y. SAUVE
100142393
Aug 3, 2023
PROVINCE OF ONTARIO

STORM SEWER COMPUTATION FORM

DESIGNED BY: AGS
CHECKED BY: AGS

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

Restricted Flow
RATIONAL METHOD Q= 2.78 AIR
PVC/CONC N= 0.013
CSP N= 0.024
CORR N= 0.021

Table 9

LOCATION FROM (Up)		TO (Down)		AREA (ha.) RUNOFF COEFFICIENT 2 Year 0.40	2 Year 0.60	2 Year 0.70	2 Year 0.80	5 Year 0.40	5 Year 0.60	5 Year 0.70	5 Year 0.80	10 Year 0.70	10 Year 0.80	Restricted Flow (L/S)	**ACTUAL PIPE FLOW (L/S)**	PIPE SEWER DATA TYPE	DIA. (N0M) (mm)	(ACT)	SLOPE (%)	LENGTH (M)	CAP. (L/S)	Remaining Capacity (%)	VEL. (M/S)	UpStream Obv. (M)	UpStream Inv. (M)	DwStream Obv. (M)	DwStream Inv. (M)	**UpStream Hgl at UP-MH (M)**	UpStream Hgl Out UP-MH (M)	MH Hgl (M)	Down Up USF ELEV (M)	Down HGL FREEBOARD (M)
MH	217	MH	218					4.66			3.61			1103.87	1103.87	CONC	825	838.2	0.90	46.0	1420.65	22%	2.57	99.61	98.79	99.20	98.38	99.61	99.61	99.20	N/A	n/a
MH	218	MH	220					1.23						142.51	1246.38	CONC	975	990.6	0.70	120.0	1956.07	36%	2.54	99.20	98.23	98.36	97.39	99.20	99.20	98.64	N/A	n/a
MH	219	MH	220								3.15	1.18		810.08	810.08	CONC	1200	1219.2	0.10	49.0	1286.19	37%	1.10	98.43	97.23	98.38	97.18	98.66	98.66	98.64	N/A	n/a
MH	220	MH	101												2056.46	CONC	1200	1219.2	0.40	47.5	2572.39	20%	2.20	98.36	97.16	98.17	96.97	98.64	98.45	98.33	N/A	n/a
MH	101	MH	102			0.40						0.50		206.84	2263.30	CONC	1350	1371.6	0.35	92.5	3294.18	31%	2.23	98.15	96.80	97.83	96.48	98.33	98.15	97.83	99.59	1.44
MH	102	MH	103			0.45								99.00	2362.30	CONC	1350	1371.6	0.35	102.0	3294.18	28%	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	2474.50	CONC	1350	1371.6	0.35	111.5	3294.18	25%	2.23	97.47	96.12	97.08	95.73	97.47	97.47	97.08	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	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	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			0.36								79.20	954.65	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	1234.05	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	3723.95	CONC	1650	1676.4	0.30	42.0	5208.04	28%	2.36	97.08	95.43	96.95	95.30	97.08	97.08	96.96	97.70	0.62
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	97.07	97.07	96.96	97.65	0.58
MH	171	MH	173			0.10								22.00	5074.75	CONC	1800	1828.8	0.30	42.0	6568.16	23%	2.50	96.74	94.94	96.61	94.81	96.96	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	96.55	98.05	1.06
MH	173	MH	174			0.25	0.85							242.00	5376.15	CONC	1800	1828.8	0.30	86.0	6568.16	18%	2.50	96.55	94.75	96.29	94.49	96.55	96.55	96.34	97.25	0.70
MH	174	MH	191												5376.15	CONC	1800	1828.8	0.30	10.5	6568.16	18%	2.50	96.26	94.46	96.23	94.43	96.34	96.26	96.23	96.70	0.44
MH	200	MH	201							0.18		0.37		124.44	124.44	PVC	375	366.4	1.50	94.0	201.88	38%	1.91	106.37	106.00	104.96	104.59	106.37	106.37	104.98	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	104.96	104.44	104.08	103.56	104.98	104.96	104.08	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	104.08	103.48	103.65	103.05	104.08	104.08	103.74	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	106.42	105.97	105.21	104.76	106.42	106.42	105.21	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	104.56	104.04	103.65	103.13	104.56	104.56	103.74	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	103.65	102.83	103.31	102.49	103.74	103.65	103.31	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	103.29	102.47	102.70	101.88	103.29	103.29	102.70	N/A	n/a
MH	207	MH	209												830.36	CONC	900	914.4	0.30	46.5	1034.42	20%	1.58	102.70	101.80	102.56	101.66	102.70	102.70	102.56	N/A	n/a
MH	306	MH	209						7.46	0.70				1438.39	1438.39	CONC	1050	1066.8	0.30	65.0	1560.35	8%	1.75	101.60	100.55	101.40	100.35	101.60	101.60	101.40	N/A	n/a
MH	209	MH	210									0.24		57.04	2325.80	CONC	1050	1066.8	0.90	48.5	2702.60	14%	3.02	101.34	100.29	100.90	99.85	101.35	101.34	100.90	N/A	n/a
MH	210	MH	211									0.33		78.44	2404.23	CONC	1350	1371.6	0.20	96.0	2490.17	3%	1.69	100.78	99.43	100.59	99.24	100.79	100.78	100.59	N/A	n/a
MH	211	MH	212									0.30		71.31	2475.54	CONC	1350	1371.6	0.30	91.0	3049.82	19%	2.06	100.56	99.21	100.29	98.94	100.56	100.56	100.29	N/A	n/a
MH	212	MH	213									0.34		80.81	2556.35	CONC	1350	1371.6	0.50	72.0	3937.30	35%	2.66	100.23	98.88	99.87	98.52	100.23	100.23	100.03	N/A	n/a
MH	213	MH	140								5.07	0.37		1811.74	4368.10	CONC	1350	1371.6	0.45	117.0	3735.25	-17%	2.53	99.83	98.48	99.30	97.95	100.03	100.02	99.30	N/A	n/a

STORM SEWER COMPUTATION FORM

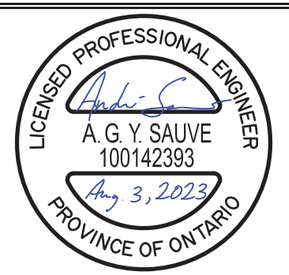
DESIGNED BY: AGS
CHECKED BY: AGS

130 Huntmar Drive Restricted Flow
Lioness Development Inc RATIONAL METHOD Q= 2.78 AIR
191002 PVC/CONC N= 0.013
Atrel Engineering Ltd CSP N= 0.024
September, 2021 CORR N= 0.021

Table 9

LOCATION FROM (Up)		TO (Down)		AREA (ha.) RUNOFF COEFFICIENT 2 Year 0.40	0.60	0.70	0.80	5 Year 0.40	0.60	0.70	0.80	10 Year 0.70	0.80	Restricted Flow (L/S)	**ACTUAL PIPE FLOW (L/S)**	PIPE SEWER DATA TYPE	DIA. (N0M) (mm)	(ACT)	SLOPE (%)	LENGTH (M)	CAP. (L/S)	Remaining Capacity (%)	VEL. (M/S)	UpStream Obv. (M)	Inv. (M)	DwStream Obv. (M)	Inv. (M)	**UpStream Hgl at UP-MH (M)**	Hgl Out UP-MH (M)	Down MH Hgl (M)	Up USF ELEV (M)	HGL FREEBOARD (M)
MH	140	MH	142			0.17						1.06		290.52	4658.62	CONC	1650	1676.4	0.45	55.0	6378.52	27%	2.89	98.85	97.20	98.60	96.95	98.86	98.85	98.60	99.75	0.90
MH	141	MH	142			0.73								248.20	248.20	CONC	525	533.4	0.50	110.5	317.25	22%	1.42	98.55	98.03	98.00	97.48	98.55	98.55	98.00	99.60	1.05
MH	142	MH	144			0.30								102.00	5008.82	CONC	1650	1676.4	0.45	79.0	6378.52	21%	2.89	98.00	96.35	97.64	95.99	98.00	98.00	97.64	99.44	1.44
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	99.50	1.28
MH	144	MH	152			0.32								108.80	5314.82	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	99.40	1.76
MH	151	MH	152			0.60								204.00	204.00	CONC	525	533.4	0.30	94.0	245.74	17%	1.10	97.94	97.42	97.66	97.14	97.94	97.94	97.66	99.40	1.46
MH	152	MH	156			0.31								105.40	5624.22	CONC	1800	1828.8	0.40	83.5	7584.26	26%	2.89	97.26	95.46	96.93	95.13	97.26	97.26	96.99	99.30	2.04
MH	141	MH	146													PVC	300	299.2	0.35	11.0	56.81	100%	0.81	99.18	98.88	99.14	98.84	99.18	99.18	99.14	99.60	0.42
MH	146	MH	147			0.67								227.80	227.80	CONC	525	533.4	0.35	120.0	265.43	14%	1.19	99.14	98.62	98.72	98.20	99.14	99.14	98.72	99.60	0.46
MH	147	MH	148			0.40								136.00	363.80	CONC	600	609.6	0.60	120.0	496.18	27%	1.70	98.42	97.82	97.70	97.10	98.45	98.42	97.70	99.45	1.03
MH	148	MH	156			0.38	1.73							561.70	925.50	CONC	825	838.2	0.50	106.0	1058.89	13%	1.92	97.31	96.49	96.78	95.96	97.43	97.39	96.99	98.30	0.91
MH	156	MH	157			0.17								57.80	6607.52	CONC	1950	1981.2	0.30	46.5	8130.98	19%	2.64	96.78	94.83	96.64	94.69	96.99	96.99	96.90	98.27	1.28
MH	157	MH	158			0.20								68.00	6675.52	CONC	1950	1981.2	0.30	61.0	8130.98	18%	2.64	96.61	94.66	96.43	94.48	96.90	96.90	96.78	98.17	1.27
MH	158	MH	175												6675.52	CONC	1950	1981.2	0.30	45.0	8130.98	18%	2.64	96.18	94.23	96.04	94.09	96.78	96.69	96.60	97.63	0.94
MH	160	MH	161			0.51								173.40	173.40	CONC	525	533.4	0.30	120.0	245.74	29%	1.10	96.87	96.35	96.51	95.99	97.02	97.02	96.84	N/A	n/a
MH	161	MH	162			0.20								68.00	241.40	CONC	600	609.6	0.30	54.5	350.85	31%	1.20	96.51	95.91	96.35	95.75	96.84	96.84	96.76	N/A	n/a
MH	162	MH	175			0.34								115.60	357.00	CONC	675	685.8	0.30	99.0	480.32	26%	1.30	96.35	95.68	96.05	95.38	96.76	96.76	96.60	N/A	n/a
MH	175	MH	176			0.38								83.60	7116.12	CONC	1950	1981.2	0.30	56.5	8130.98	12%	2.64	96.00	94.05	95.83	93.88	96.60	96.50	96.37	N/A	n/a
MH	176	MH	178			0.22	0.66							48.40	7164.52	CONC	1950	1981.2	0.30	66.0	8130.98	12%	2.64	95.83	93.88	95.63	93.68	96.37	96.37	96.22	97.00	0.63
MH	177	MH	178			0.58								127.60	127.60	CONC	450	457.2	0.30	100.5	162.91	22%	0.99	96.24	95.79	95.94	95.49	96.40	96.40	96.22	98.05	1.65
MH	178	MH	190			0.15								33.00	7325.12	CONC	1950	1981.2	0.30	46.5	8130.98	10%	2.64	95.63	93.68	95.49	93.54	96.22	96.22	96.11	96.80	0.58
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	96.33	96.33	96.11	97.75	1.42
MH	190	MH	191			0.17								37.40	7439.52	CONC	2100	2133.6	0.30	40.5	9907.60	25%	2.77	95.49	93.39	95.37	93.27	96.11	96.11	96.04	96.65	0.54
MH	191	MH	192			0.04	4.86							1078.00	13893.67	CONC	2550	2590.8	0.30	118.5	16627.39	16%	3.15	95.31	92.76	94.95	92.40	96.04	95.66	95.41	96.70	1.04
MH	192	MH	193				8.17							1797.40	15691.07	CONC	2550	2590.8	0.30	118.5	16627.39	6%	3.15	94.62	92.07	94.26	91.71	95.41	95.41	95.09	96.00	0.59
MH	193	MH	194												15691.07	CONC	2550	2590.8	0.30	78.0	16627.39	6%	3.15	94.23	91.68	94.00	91.45	95.09	94.91	94.70	95.20	0.29
MH	School	MH	ex 179		2.52									554.40	554.40	CONC	750	762.0	0.30	14.0	636.13	13%	1.39	97.64	96.89	97.60	96.85	97.64	97.64	97.60	99.20	1.56
MH	65	MH	66			0.36								122.40	122.40	CONC	450	457.2	0.30	76.0	162.91	25%	0.99	98.55	98.10	98.32	97.87	98.55	98.55	98.32	99.25	0.70
MH	66	MH	67			0.29								98.60	221.00	CONC	525	533.4	0.30	61.5	245.74	10%	1.10	98.32	97.80	98.14	97.62	98.32	98.32	98.14	99.35	1.03
MH	67	MH	ex 180												221.00	CONC	525	533.4	0.30	14.5	245.74	10%	1.10	97.34	96.82	97.30	96.78	97.34	97.34	97.30	99.40	2.06
MH	70	MH	73			0.26								57.20	57.20	PVC	300 525	299.2	0.60	76.5	74.38	23%	1.06	98.75	98.45	98.29	97.99	98.75	98.75	98.29	99.25	0.50
MH	71	MH	72			0.47								103.40	103.40	CONC	450	457.2	0.30	77.5	162.91	37%	0.99	98.44	97.99	98.21	97.76	98.44	98.44	98.21	N/A	n/a
MH	72	MH	73			0.39								85.80	189.20	CONC	525 525	533.4	0.30	73.5	245.74	23%	1.10	98.21	97.69	97.99	97.47	98.21	98.21	98.05	99.20	0.99
MH	73	MH	74			0.16								54.40	300.80	CONC	525	533.4	0.60	47.5	347.53	13%	1.56	97.99	97.47	97.70	97.18	98.05	98.02	97.81	98.70	0.68
MH	74	MH	75			0.21	1.11							348.90	649.70	CONC	825	838.2	0.30	73.5	820.21	21%	1.49	97.70	96.88	97.48	96.66	97.81	97.70	97.48	98.35	0.65
MH	75	MH	76			0.25								85.00	734.70	CONC	825	838.2	0.30	73.5	820.21	10%	1.49	97.48	96.66	97.26	96.44	97.48	97.48	97.26	98.45	0.97
MH	76	MH	ex 181												734.70	CONC	825	838.2	0.30	19.0	820.21	10%	1.49	97.26	96.44	97.20	96.38	97.26	97.26	97.20	98.50	1.24

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



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July 28, 2023 Project Number: P1801

Atrel Engineering Ltd
1-2884 Chamberland Street
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Attention: **Jean Décoeur, P.Eng**

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

Introduction

JFSA Canada Inc. (JFSA) was retained by Atrel Engineering Ltd. (Atrel) to complete a preliminary stormwater analysis for the proposed **26.51 ha** residential/commercial development, located at 130 Huntmar Drive in Stittsville, Ontario and the associated Pond 4 upgrades that are required as a part of this development application. The following memo is an update of the original memo of the same name dated September 2021, which has been revised to address review comments provided by the City.

The proposed development will discharge to an existing Stormwater Management (SWM) pond, commonly referred to as Pond 4, located on the west banks of the Carp River just south of Palladium Drive. Runoff from the proposed development will be conveyed to Pond 4 through a proposed stormwater trunk sewer, with best efforts to retain all major systems flows on site, and only during extreme events (>100-Year) will major system flow to the east from the development to the SWM pond. The proposed trunk sewer will also convey minor system flow from the approximately **31.05 ha** of the 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 current pond outlet configuration slightly adjusted to ensure no adverse impacts to the surrounding area. As such the following memo also details the proposed upgrading of the existing Pond 4 SWM facility.

Base Model

The proposed development sites are within the Carp River watershed and are captured in the City of Ottawa's PCSWMM models of the Carp River. The City last updated the Ultimate conditions model in September 2021. This City updated model has been used as the starting point for the proposed development as it considers recently approved developments within the Carp River watershed such as Pond 7.

Subcatchments

The proposed development is contained within existing model subcatchments areas PS201, PS202 and PS207. These subcatchments were clipped and replaced with the smaller more refined subcatchments as specified by Atrel in their 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 preliminarily size the storm sewer network both east and west of Huntmar Drive. The Huntmar west lands (designed by DSEL) have also been included in the updated model. Detailed rational method calculations are also provided in **Attachment A.** A visual overview of the proposed subcatchments has been provided in **Figure 1.**

Small refinements had to be made to neighbouring subcatchments within the PCSWMM model to ensure that the existing and proposed drainage boundaries conformed. Refinements to the City’s model consist of either clipping or extending drainage boundaries surrounding the Huntmar West lands, in particular along the northern edge along Palladium Drive, the western edge that drains to Pond 7 and minor tweaks along the southern edge of the existing Fairwinds North development. **Figure B1** in **Attachment B** outlines the subcatchments per the City’s Carp River model and **Figure B2** in **Attachment B** outlines the drainage areas based on the JFSA updates. No other changes were made to the model outside of this area, and issues previously identified have been resolved in the City’s updated model.

Within the proposed development area, the runoff coefficients as indicated in the drawing by Atrel were converted to percent impervious values and applied to the latest model. For lumped subcatchments, the width was obtained by determining the average maximum length of overland flow and dividing the area by this length (as per page 72 of the EPASWMM Storm Water Management Model Reference Manual Volume I – Hydrology). For smaller subcatchments, the Width parameter has been calculated per City standards. The depression storage, pervious and impervious manning 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 **Table B1** in **Attachment B**.

Minor System

The proposed storm trunk sewer that will pass through the 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 provided by Atrel and DSEL in the rational method calculation sheets provided in **Attachment A**. A visual overview of the proposed storm sewer system has been provided in **Figure 2.** A simplistic HGL analysis (comparing 100-year HGL to the top of MH) has been completed for the storm sewers within the proposed development, see **Table B5** in **Attachment B** for full details. From this analysis, it is seen that the minimum 100-year freeboard of the proposed subdivisions is **1.8m** with an average freeboard of **3.01m**, providing sufficient freeboard for future USFs to be established throughout the site.

Locations where the proposed 130 Huntmar development will connect to the existing trunk sewer along Maple Grove Road, have also been included in the model. Additional details and analysis regarding the latest assumed drainage areas from the 130 Huntmar Site that drains to the Maple Grove storm sewer have been provided in the “Maple Grove Storm Sewer” Section below.

Major System

Major system conveyance routes have 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 road sag storage east of Huntmar Drive ensures that the proposed design is conservative. Note that as per City guidelines, the modelling assumes 100% capture of major system 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. As such both sites east and west of Huntmar have 100-year capture locations to ensure major system flows from the site are retained onsite during such events. Based on the latest modelling results, ponding depths on the roadway within both of the proposed developments for the 100-Year event are less than **30 cm**. A visual overview of the proposed major system has been provided in **Figure 3.**

Major/Minor Linking

Runoff from the subcatchments was applied directly to the closest applicable major system node within the model. Road catchbasins have been included in the design and model for a portion of the lands west of Huntmar Road from Convergence Street to the Intersection of Robert Grant Ave and Huntmar Road as indicated in DSEL drawings; with required ICDs sized based on the specified level of service. For the remaining portion of the lands, both east and west of Huntmar Road CBs locations will be determined at the detailed design stage, in accordance with City standards.

For these less detailed lands minor system capture has been represented using a depth/flow rating curve applied (using an outlet link) connecting the flow from the streets to the minor system. The values applied in these rating curves are set based on the level of service provided at each respective location, as per Atrel's and DSEL's design.

For the East Huntmar Lands residential lands will have a capture rate of **340 L/s/ha** or **220 L/s/ha** (based on their location relative to the arterial road), commercial lands at either **220 L/s/ha** or **250 L/s/ha** (based on their location relative to the arterial road) with some on-site storage (assumed **50 m³/ha**) and the proposed school blocks and parklands 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 less detailed lands west of Huntmar Drive roadway capture is based on rational method calculation based on the level of service required. For the lumped commercial, park and school blocks all locations will have a 5-year level of service with onsite storage provided up to the 100-year event.

On-Site Storage

On-site storage has been assumed for the 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 assumed release rates for the various lumped areas and the required or assumed on-site storage volume for each location.

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.

SWM Pond

Based on this analysis it was found that the existing SWM "Pond 4" will need to be upsized by approximately **60%** to accommodate the proposed Huntmar developments, which will equate to approximately **25,598 m³** 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.

Atrel has developed a detailed Pond 4 stage/storage curve that has been increased in volume to accommodate the proposed Huntmar developments and included in the latest modelling. Detailed drawings of the proposed pond have been provided in **Attachment A**, 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 (both 2017 and 2021 update) and the current proposed pond expansion have also been provided in **Attachment C**. It is seen that the latest Pond design closely aligns with the latest pond curve adopted in the City's 2021 Carp River model update. Note that the City's 2017 ultimate model considered additional drainage areas that have now been directed to Pond 7.

As outlined in **Attachment C Table C3** and **C4**, the Pond will have a total drainage area of **239.7 ha** with an average imperviousness of **60%**. Based on the Ministry of the Environment, Conservation and Parks (MECP) design guidelines to achieve the specified **70% TSS** removal the pond will require a permanent pool volume of **18,387m³** and a quality control volume of **9,588m³.** Based on the latest pond design by Atrel, the pond will provide a permeate pool volume of **49,942m³** and provide a quality control volume of **9,852m³** at an elevation of **93.50m** (**30cm** above the permanent pool), both of which are above the required volume specified by MECP.

As identified in the latest round of City comments and indicated in the JFSA 2014 PDB under ultimate conditions, the current south forebay has an average 10 Year event velocity of **0.26 m/s**, exceeding the maximum allowable average forebay velocity to avoid sediment resuspensions (**0.15 m/s**). As such the south forebay has been expanded from a **10 m** bottom - **29 m** top to have a **21 m** bottom and **33 m** top. As per **Calculation sheet C6** in **Attachment C** the average velocity for this event is now **0.15 m/s** and meets MECP requirements. The proposed north forebay that will be constructed as a part of the pond expansion will have an **18 m** bottom width and a **30 m** top width to meet the MECP average velocity target of **0.15 m/s. Calculation sheet C7** in **Attachment C** for full details.

Note that the City PCSWMM models for the pond outlet previously 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 Table C6**, for the various pond outlet components. It is important to note that it is proposed that no modification be made to the pond outlet structures (flow augmentation orifice, quality control orifice and **9.0m** x **3.0m** drop structure), with the only modification being an increase in the earth berm overflow weir, designed to convey events greater than the 10-year event. The weir is currently **30 m** and it is proposed that it be extended to **45 m** to accommodate the changes and additional drainage area under ultimate conditions.

Based on the location of Pond 4 relative to the greater Carp River it was established that quantity control is only required 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. As such, attenuating flows from this area in Pond 4 for the larger return periods (e.g. 100-Year event) would exacerbate the peak flows and flood levels along the Carp River, due to the coinciding of peaks. As such there are only 3 targets specified for Pond 4 and are as follows:

- The 10-year peak flow out of the pond does not exceed **17.282 m^3/s,** as per the KWMSS study
- The 100-year water level in the pond does not exceed an elevation of **94.74m** as per the JFSA 2014 PDB ultimate conditions modelling (which showed no USF issues under this scenario for the existing developments on the Maple Grove storm sewer).
- The proposed development does not increase flood elevations for the 100-year event

Based on the latest analysis the 10-year flow from pond 4 is **9.15 m^3/s**, well less than the **17.282 m^3/s** allowed. The 100-year water level in the pond is **94.738 m**, less than that specified in the JFSA 2014 PDB**.** As such the proposed pond design meets all specified requirements. **Table 1** below outlines the full details of the simulated water levels and flows in and out of the pond for the various return periods.

Table 1:Pond 4 - Operation Summary

Design	Minor Inflow (m^3/s)		Major Inflow (m^3/s)	Total Inflow [1] (m^3/s)	Pond Outflow (m^3/s)	Pond Level (m)	Volume Used [2] (m^3)
	West	South					
25mm/3hr Chicago	4.04	6.70	0.000	11.080	0.257	94.051	30,120
2yr/12hr SCS	5.66	8.73	0.000	14.730	2.484	94.336	41,490
5yr/12hr SCS	8.12	11.74	0.000	20.320	6.544	94.474	47,200
10yr/12hr SCS	9.83	13.61	0.000	24.070	9.150	94.546	50,180
25yr/12hr SCS	11.87	16.20	0.000	28.630	12.830	94.629	53,680
50yr/12hr SCS	13.13	17.98	0.000	31.630	16.600	94.683	56,080
100yr/12hr SCS	14.26	19.56	0.134	34.330	21.020	94.738	58,500

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

Based on this analysis it is seen that the peak flow out of the pond for the 10-Year event is **9.15 m^3/s**, significantly less than the allowable **17.282 m^3/s** per the KWMSS**.** The 100-Year Pond elevation is **94.738m** which is less than **94.74m** as set out in the ultimate conditions PDB by JFSA in 2014. Major system flow to the pond only occurs during the 100-year event, with these flows coming from the neighbouring city lands (assumed to have a storage volume of 50 m/ha). The total storage volume in the pond for the 100-year event will be **58,500m^3**.

Storm Stacking

As requested by the City, a storm stacking stress test scenario has been assessed as a part of this study, to assess the proposed SWM pond operations under sequential extreme events. For this analysis, a 100-year Chicago 3Hr storm was followed by a 48-hour dry period then followed by a 100-year SCS 24-hour storm. This storm stacking event is in line with the storm stacking analysis requested by the City of Ottawa for the Brookline/Kanata North development recently assessed by JFSA and is reflective of two 100-year events occurring within a 3-day window. Based on this scenario the maximum water level in Pond 4 was found to be **94.805 m**, only 7 **cm** higher than the 100-year SCS 12 Hour storm event assessed in this study. Note that the pond water levels are only slightly higher than the stand-alone 100-year event as the pond will be equipped with a **45m** wide overflow weir, to safely convey flows downstream during such an event.

Maple Grove Storm Sewer

Provided in **Attachment B** is Figure 3 extracted from the original JFSA 2014 PDB. This figure outlines the assumed capture rates and onsite storage requirements assumed for all lands draining to Pond 4 under ultimate conditions based on the 2014 study. **Figure B3** in **Attachment B** is a simplified copy of this figure with only the lands surrounding the 130 Huntmar development that drain to the Maple Grove storm sewer included. Based on a more detailed design of the 130 Huntmar site, the total area from the 130 Huntmar site that will drain to Pond 4 via the Maple Grove storm sewer has been refined. **Figure B4** in **Attachment B** outlines these latest drainage areas and assumed release rates, along with the original areas from the 2014 study indicated in grey hatching. **Tables B3 and B4** in **Attachment B,** outline the drainage area and assumed unitary release rates for this area based on the 2014 study and this 2023 study, along with the total peak flows. Based on the original 2014 analysis this area had a total drainage area of **15.59 ha** and a peak capture rate of **2,093 L/s**. Based on the latest analysis the total drainage area to the Maple Grove storm sewer from the 130 Huntmar development will be **7.60 ha** with a peak capture rate of **1,977 L/s**, **116 L/s** lower than that assumed in the original 2014 PDB study.

As the 100-Year total peak flows assumed to discharge to the Maple Grove storm sewer from the 130 Huntmar site will be less than that assumed in the original 2014 study, and as established above the pond water levels will be lower than that assumed in the 2014 PDB, it can be concluded that the proposed developments and drainage area refinements proposed at 130 Huntmar will not negatively affect the existing HGL through the Maple Grove storm sewer.

Carp River

Tables 1 to **4** outline the peak flows and peak water levels on the Carp River presented in the City's 2021 Ultimate Conditions model and the latest proposed conditions models, at 4 key locations on the Carp River downstream of the Pond 4.

Table 2: Pond 4 Outlet to Carp River
(Node: PJ200 - 239.9 ha)

Event	City Ultimate (2021) Peak Inflow (m^3/s)	JFSA Pond 4 (2023) Peak Inflow (m^3/s)	Difference Peak Inflow (m^3/s)
25mm CHI 3Hr	0.26	0.26	0.00
2 Year SCS 12hr	3.48	2.48	-0.99
5 Year SCS 12hr	8.09	6.54	-1.55
10 Year SCS 12hr	11.07	9.15	-1.92
25 Year SCS 12hr	14.36	12.83	-1.54
50 Year SCS 12hr	16.36	16.60	0.25
100 Year SCS 12hr	18.87	21.02	2.15

Table 3: Carp River at Highway 417
(Node: CJ120 - 3079.8 ha)

Event	City Ultimate (2021) [2]		JFSA Pond 4 (2023) [3]		Difference [3] - [2]	
	Peak Inflow (m^3/s)	Peak WSE (m)	Peak Inflow (m^3/s)	Peak WSE (m)	Peak Inflow (m^3/s)	Peak WSE (m)
25mm Ch 3Hr	4.2	92.57	5.3	92.68	1.1	0.11
2 Year SCS 12hr	10.7	93.07	11.4	93.11	0.7	0.04
5 Year SCS 12hr	16.4	93.37	17.2	93.40	0.8	0.03
10 Year SCS 12hr	20.4	93.52	21.1	93.55	0.7	0.03
25 Year SCS 12hr	25.2	93.71	25.9	93.73	0.7	0.02
50 Year SCS 12hr	28.5	93.82	29.1	93.84	0.6	0.02
100 Year SCS 12hr	32.5	93.97	32.3	93.97	-0.2	-0.01

Table 4: Carp River at Confluence with Feed Mill Creek
(Node: CJ108 - 4258.0 ha)

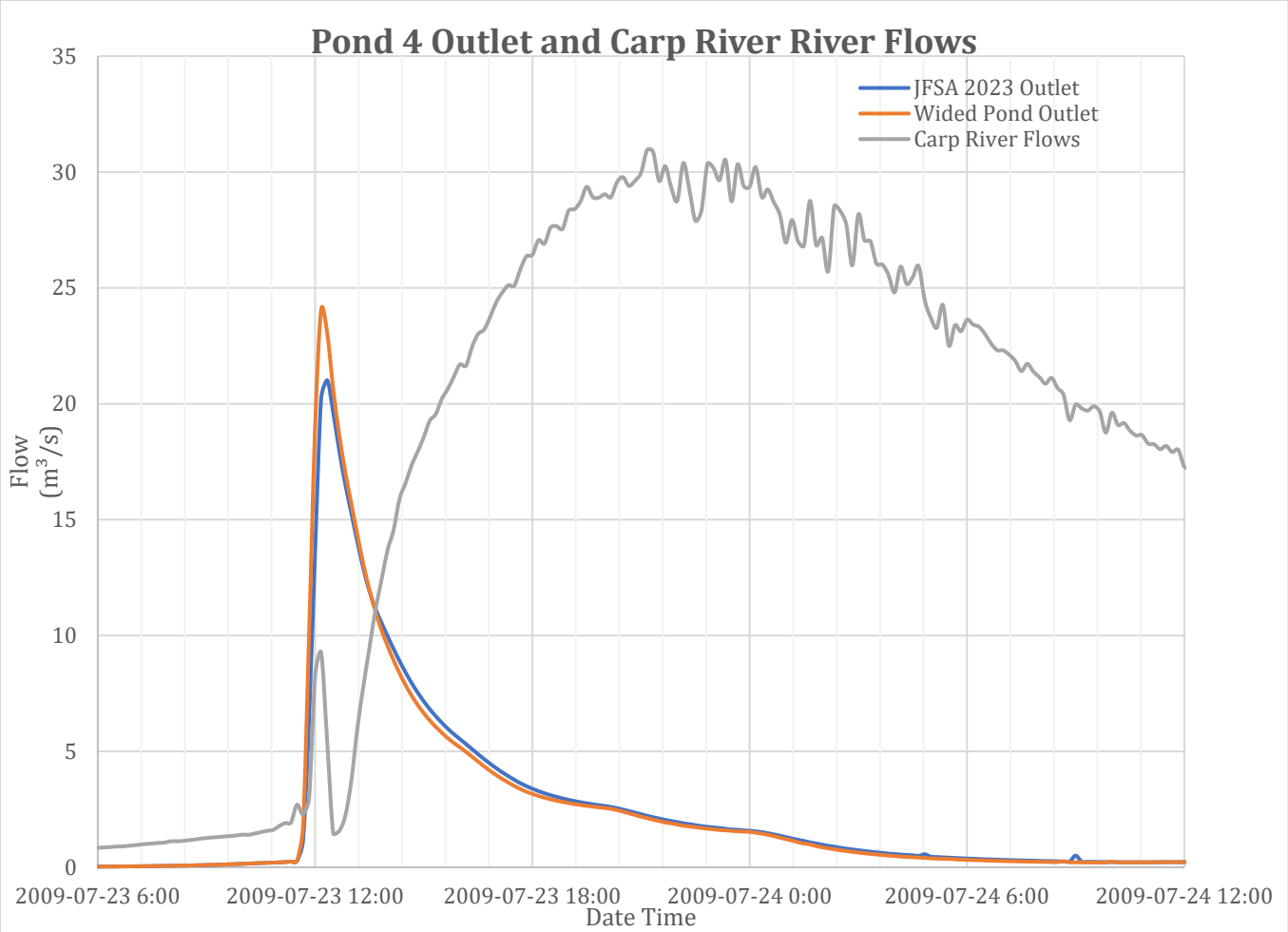
Event	City Ultimate (2021) [2]		JFSA Pond 4 (2023) [3]		Difference [3] - [2]	
	Peak Inflow (m^3/s)	Peak WSE (m)	Peak Inflow (m^3/s)	Peak WSE (m)	Peak Inflow (m^3/s)	Peak WSE (m)
25mm Ch 3Hr	4.9	92.37	6.3	92.48	1.4	0.11
2 Year SCS 12hr	13.7	92.90	14.7	92.94	1.0	0.04
5 Year SCS 12hr	21.6	93.19	22.5	93.22	0.8	0.03
10 Year SCS 12hr	27.1	93.34	28.0	93.36	0.9	0.02
25 Year SCS 12hr	33.8	93.52	34.6	93.54	0.8	0.02
50 Year SCS 12hr	38.4	93.63	39.1	93.64	0.7	0.01
100 Year SCS 12hr	44.2	93.78	44.0	93.77	-0.3	-0.01

Table 5: Carp River at Richardson Side Road
(Node: CJ050 - 4711.6 ha)

Event	City Ultimate (2021) [2]		JFSA Pond 4 (2023) [3]		Difference [3] - [2]	
	Peak Inflow (m^3/s)	Peak WSE (m)	Peak Inflow (m^3/s)	Peak WSE (m)	Peak Inflow (m^3/s)	Peak WSE (m)
25mm Ch 3Hr	4.8	92.02	5.8	92.13	1.0	0.11
2 Year SCS 12hr	12.3	92.55	13.1	92.58	0.8	0.03
5 Year SCS 12hr	19.8	92.82	20.4	92.86	0.6	0.03
10 Year SCS 12hr	23.9	93.01	25.0	93.03	1.0	0.02
25 Year SCS 12hr	31.7	93.16	32.6	93.18	0.9	0.02
50 Year SCS 12hr	36.5	93.26	37.0	93.28	0.5	0.02
100 Year SCS 12hr	42.8	93.45	42.6	93.44	-0.3	-0.01

As shown in **Table 2** (pond Outlet) above the peak flows out of the pond under the latest proposed Pond 4 configuration are less than that assumed in the City's 2021 Carp River model for all events except for the 100-year event. Note that the 10 Year flow out of the pond is significantly less than the allowable **17.282 m^3/s** specified in the KWMSS. For locations on the Carp River downstream of the Pond (**Tables 3-5**) it is seen that the 100-year peak flows and water levels are less under the proposed conditions than that specified in the City 2021 Carp River model, as the proposed pond will not adversely affect the existing floodplain extents on the Carp River. For the lower return periods, the peak flows and water levels have increased from that assumed in the City's model.

It is important to note that the increases for these lower return periods are not due to an undersized SWM pond, but because the proposed SWM pond is attenuating peak flows more than what was assumed in the City's model (see **Table 2** above). Given the Ponds location on the Carp River, holding back flows in the pond results in the tail of the pond outflows overlapping more with the peak flows on the Carp River. To illustrate this more clearly, the following figure outlines the 100-year peak flow on the Carp River at the Pond 4 outlet (Grey) the currently proposed pond outflow to the Carp River (Blue) and an alternative Pond outlet configuration where the existing **9 m** x **3 m** drop structure is doubled to be an **18 m** x **3 m** drop structure (Orange).



Comparing the two pond outlet configurations, it is seen that with the larger drop structure (orange) the peak flow out of the pond increases significantly while the tail of the pond outflow is slightly lower than the current configuration when the peak flow on the Carp occurs. As such it can be concluded that either an additional or wider pond outlet structure can be added if the city desire to have no increases in peak flows on the Carp River during the smaller return periods, but this will result in increases in total peak flows out of the pond. The analysis presented in this memo, which assumes leaving the pond outlet structures as they currently are (except for widening the existing overflow berm by 15 m) is a conservative approach for both peak flows on the Carp River and HGLs within the subdivision. Additional analysis can be completed which assumes the addition or modification of the (existing) drop structure if the city desires to adopt this approach.

Water Balance

To ensure the site offsets any deficits in groundwater recharge due to the increases in impervious areas, rear yard trenches with sub-drains will be implemented throughout the site to promote infiltration. Based on the latest draft plan for the site, there will be approximately **1550 m** of rear yard trenches with subdrain. Assuming a rear yard trench width of **0.9 m** over the **1550 m**, results in **1,395m²** of surface area. Assuming the trench will be **0.30 m** deep and filled with clear stone below the subdrain (void ratio of **0.4**), that results in a total onsite storage volume of **167m³**. Based on previous studies the site would need to provide approximately **162m³** of infiltration storage volume to meet the annual water budget. Details outlining the location of the trenches and the trench specifications have been included in **Attachment D.**

Summary

In conclusion, the analysis conducted by JFSA Canada Inc. for the proposed residential/commercial developments along Huntmar Drive in Stittsville, Ontario, along with the associated Pond 4 upgrades, demonstrates that the proposed developments are sufficiently designed to ensure no adverse impacts on the operations of Pond 4 and the greater Carp River watershed. The study evaluated various aspects of the site, including subcatchments, minor and major system flows, on-site storage, SWM pond sizing, storm stacking, and water balance.

Based on the findings, it has been determined that the current SWM facility, Pond 4, will need to be upsized by approximately **60%** to accommodate the proposed Huntmar developments, requiring approximately **25,598 m³** of additional active storage volume. The proposed design aligns with Ministry of the Environment, Conservation and Parks (MECP) guidelines for 70% Total Suspended Solids (TSS) removal, and the proposed pond will meet all specified requirements, including 10-year peak flow and 100-year water level criteria. The overflow berm in the pond will need to be extended from **30m** to **45m**, but no other changes to the pond outlet are currently proposed. The existing south forebay will need to be extended to meet MECP resuspension velocity, while the proposed west has been designed to meet these requirements. The peak flows out of the pond for all return periods except the 100-year event are less than those assumed in the City's 2021 Carp River model, and the 100-year water levels and peak flows on the Carp River are less than that specified in the City’s 2021 Carp River model.

Furthermore, the study indicates that the proposed developments and drainage area refinements at 130 Huntmar will not negatively affect the existing Hydraulic Grade Line (HGL) through the Maple Grove storm sewer. Additionally, the HGL within the proposed development provides sufficient freeboard for future USFs to be established throughout the site.

To mitigate any deficits in groundwater recharge due to increased impervious areas, rear yard trenches with sub-drains will be implemented throughout the site to promote infiltration, providing necessary on-site storage volume.

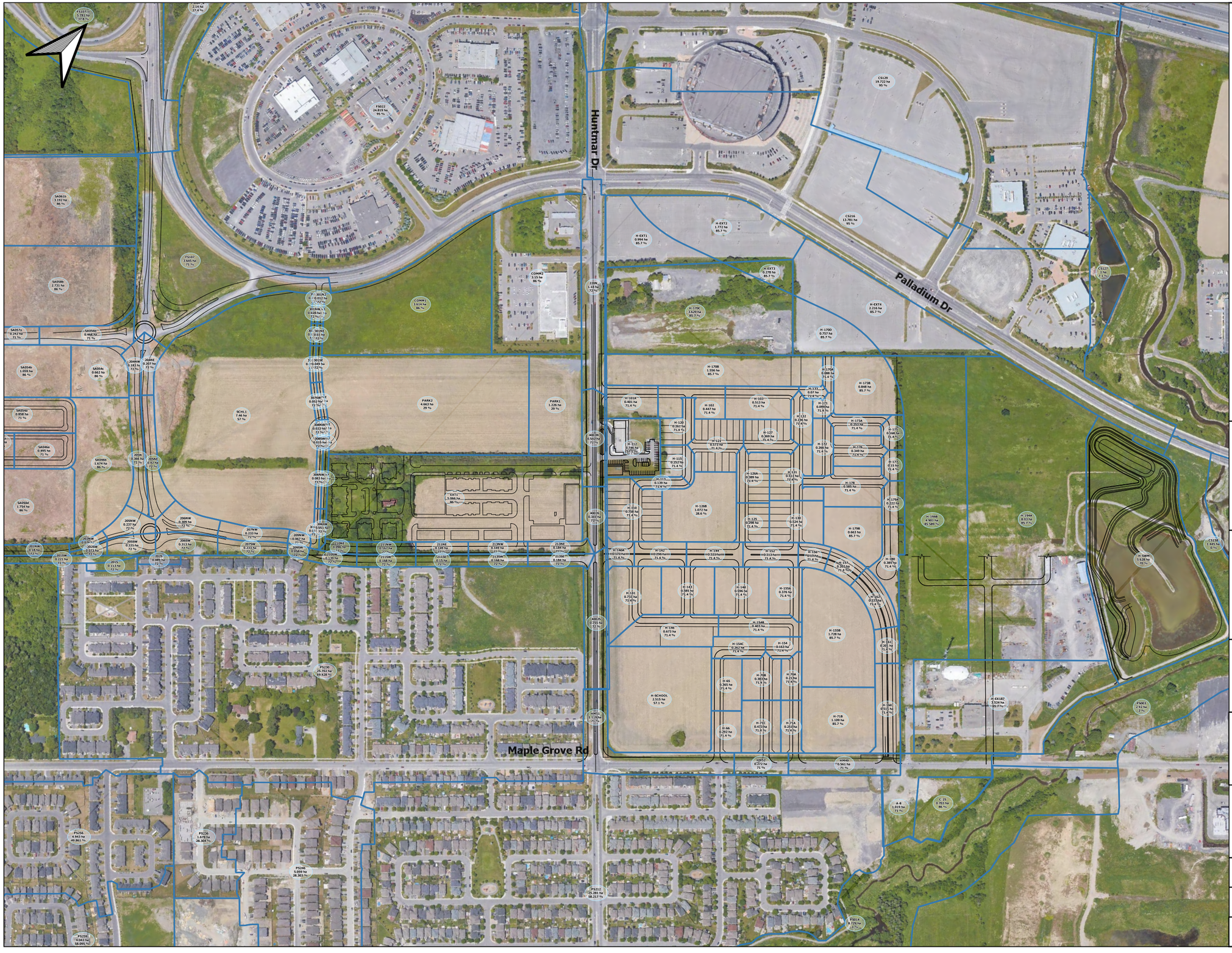
In summary, the comprehensive analysis presented in this report supports the viability of the proposed residential/commercial developments along Huntmar Drive and the associated Pond 4 upgrades. The design takes into account environmental considerations and ensures the preservation of water resources and the surrounding area. The proposed stormwater management measures and pond upgrades are expected to effectively handle stormwater runoff while minimizing adverse impacts on the greater Carp River watershed.

Respectfully submitted,
JFSA Canada 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: LID Measures Overview



Legend

Proposed Subcatchments

JFSA CANADA INC.
WATER RESOURCE ENGINEERING, ENVIRONMENTAL MANAGEMENT AND LAND PLANNING CONSULTANTS

ATREL Engineering Ltd Ltée
Engineers — Ingénieurs
1-2584 CHAMBERLAND STREET, ROCKLAND, ONTARIO K4K 1M6
TEL.: (613) 446-7423

SCALE : 1:5,500

0 50 100 150 200 250 300 m

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

TITLE :
Figure 1: Proposed Subcatchments

PROJECT	1801-19
DRAWN:	ON
DATE:	July 2023

Legend

Storm Sewers

- 0.3000 - 0.7500
- 0.7500 - 1.2000
- 1.2000 - 1.6500
- 1.6500 - 2.1000
- 2.1000 - 2.5500

Manholes

JFSA CANADA INC.
WATER RESOURCE ENGINEERING, ENVIRONMENTAL MANAGEMENT AND LAND PLANNING CONSULTANTS

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1-2584 CHAMBERLAND STREET, ROCKLAND, ONTARIO K4K 1M6
TEL.: (613) 446-7423

SCALE : 1:5,500

0 50 100 150 200 250 300 m

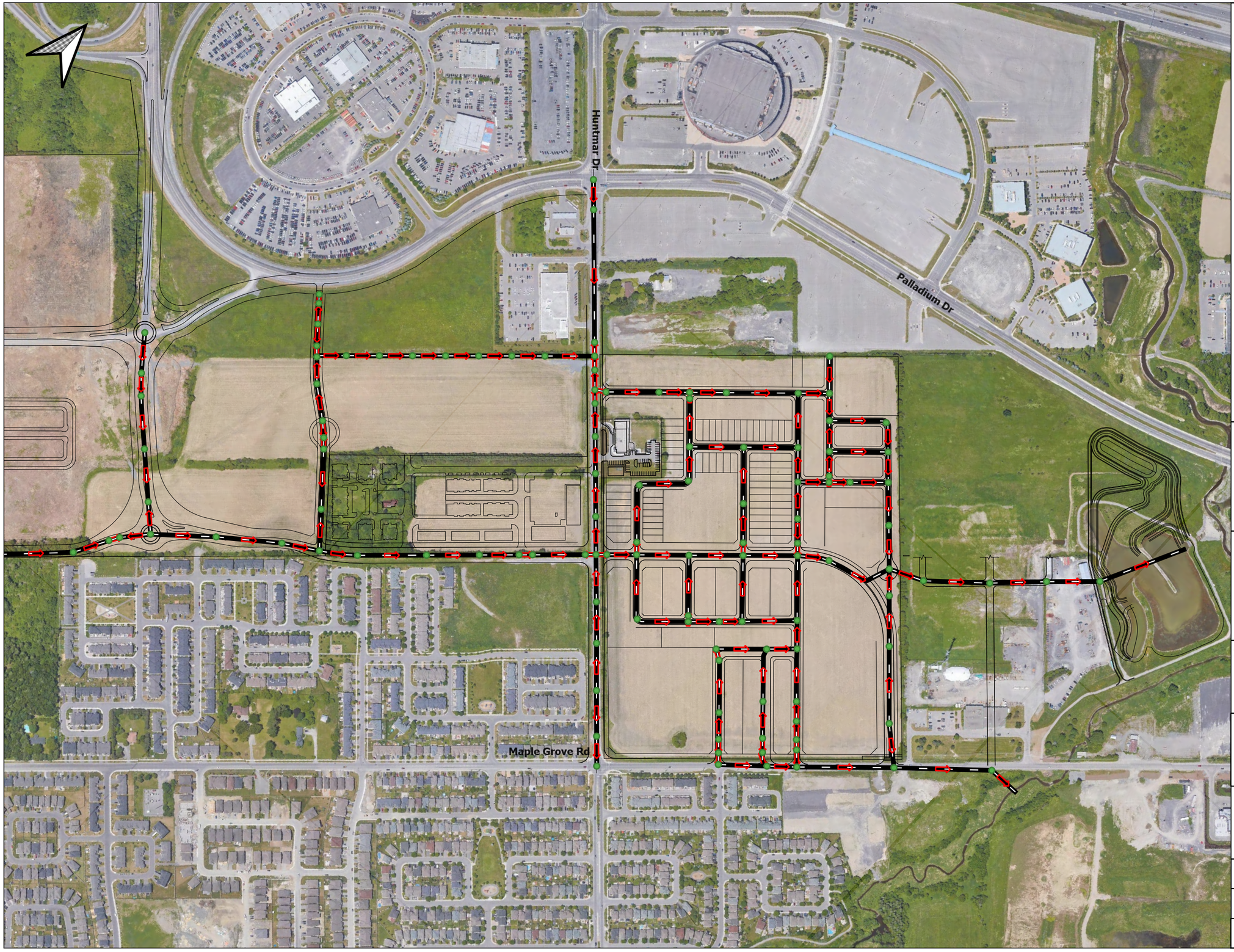
PROJECT :

130 Huntmar Drive /
Preliminary Kanata West Pond 4 Sizing

TITLE :

Figure 2: Proposed Minor System

PROJECT	1801-19
DRAWN:	ON
DATE:	July 2023



Legend

- Major System Junctions
- Major System Conduits

JFSA CANADA INC.
WATER RESOURCE ENGINEERING, ENVIRONMENTAL MANAGEMENT AND LAND PLANNING CONSULTANTS

ATREL Engineering Ltd Ltée
Engineers — Ingénieurs
1-2584 CHAMBERLAND STREET, ROCKLAND, ONTARIO K4K 1M6
TEL.: (613) 446-7423

SCALE : 1:5,500

0 50 100 150 200 250 300 m

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

TITLE :
Figure 3: Proposed Major System

PROJECT	1801-19
DRAWN:	ON
DATE:	July 2023

J.F. Sabourin and Associates Inc.
52 Springbrook Drive,
Ottawa, ON K2S 1B9
T 613-836-3884 F 613-836-0332

jfsa.com

Ottawa. ON
Paris. ON
Gatineau. QC
Montréal. QC
Québec. QC

Attachment A

Proposed Development Plan (Atrel & DSEL)

LEGEND

- 5 YEAR, 0.70ha, R=0.20 — MINOR SYSTEM CAPTURE RATE
- FUTURE STORM DRAINAGE AREA
- RUNOFF COEFFICIENT
- PROPOSED STORM SEWER
- PROPOSED STORM SEWER BY OTHERS
- DRAINAGE AREA BOUNDARY
- PERFORATED PIPE FOR REAR YARD AS PER CITY STANDARD S29
- DRAINAGE AREA TO MAPLE GROVE ROAD
- MAJOR DRAINAGE SYSTEM
- EXISTING STORM SEWER
- OUTSIDE PROPOSED DEVELOPMENT
- NW=98.00 SE=97.40 SW=97.66 — PROPOSED OBVERT ELEVATION
- 146 — PROPOSED MANHOLE NUMBER

FOR CONSTRUCTION

TRUE NORTH

PROPOSED POND EXPANSION

EXISTING POND 4

CONCEPTUAL FUTURE ROAD

EXISTING DITCH

CARP RIVER

PALLADIUM DRIVE

HUNTMAR DRIVE

MAPLE GROVE ROAD

STREET No.4

STREET No.5

STREET No.6

MONCAO LANE

GALLEON LANE

HARMATTAN AVENUE

ROSKILL AVENUE

KOHLO CRESCENT

HELM CIRCLE

THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, 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.

STREET MAP

No.	REVISION △-APPLIES WHEN DRAWING MODIFIED	DATE	BY
2	ISSUED FOR SANITARY TRUNK MOECC APPROVAL	AUG. 4/20	AGS
1	REVISED AS PER CITY COMMENTS	OCT. 7/20	AGS
1	REVISED AS PER NEW ROAD ALIGNMENT	MAR. 4/21	AGS
1	REVISED AS PER CITY COMMENTS	MAR. 30/21	AGS
A	RECORD DRAWING	AUG. 25/21	AGS
1	REVISED AS PER CITY COMMENTS	SEP. 20/21	AGS
2	REVISED AS PER CITY COMMENTS	APR. 18/22	AGS
3	REVISED AS PER CITY COMMENTS	AUG. 03/23	AGS

SCALE
1 : 2 500
40m 0 60m
HORIZONTAL

DESIGN	AGS
CHECKED	JMD
DRAWN	CED
CHECKED	AGS
APPROVED	JMD

LICENSED PROFESSIONAL ENGINEER — A. G. Y. SAUVE — 100142393 — Nov 3, 2023 — PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER — J.M.J.DECOEUR — Aug 3, 2023 — PROVINCE OF ONTARIO

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

CITY OF OTTAWA
130 HUNTMAR DR.

LIONESS DEVELOPMENT INC.

PROJECT No. 191002

DATE JANUARY 2020

PLAN
MACRO STORM DRAINAGE AREA PLAN

DRAWING No. 191002-STMM

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
May, 2023

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 2 Year INDIV. 2.78AR	2 Year ACCUM. 2.78AR	5 Year INDIV. 2.78AR	5 Year ACCUM. 2.78AR	10 Year INDIV. 2.78AR	10 Year ACCUM. 2.78AR	TIME CONC.	RAINF. INTENS. 2 Year	RAINF. INTENS. 5 Year	RAINF. INTENS. 10 Year	2 Year Flow	5 Year Flow	10 Year Flow	ACTUAL PIPE FLOW	PIPE SEWER DATA								UpStream		DwStream	
FROM (Up)		TO (Down)		2 Year 0.40	2 Year 0.60	2 Year 0.70	2 Year 0.80	5 Year 0.40	5 Year 0.60	5 Year 0.70	5 Year 0.80	10 Year 0.70	10 Year 0.80														TYPE	DIA. (N0M) (mm)	(ACT)	SLOPE (%)	LENGTH (M)	CAP. (L/S)	Remaining Capacity (%)	VEL. (M/S)	TIME OF FLOW (MIN)	Obv. (M)	Inv. (M)	Obv. (M)	Inv. (M)
MH	217	MH	218					4.66			3.61					13.21	13.21			15.00	61.77	83.56	97.85		1103.87		1103.87	CONC	825	838.2	0.90	46.0	1420.65	22%	2.57	0.30	99.61	98.79	99.20	98.38
MH	218	MH	220					1.23								1.37	14.58			15.30	61.07	82.61	96.73		1204.32		1204.32	CONC	975	990.6	0.70	120.0	1956.07	38%	2.54	0.79	99.20	98.23	98.36	97.39
																				16.09																			
MH	219	MH	220								3.15	1.18				7.01	7.01	2.30	2.30	15.00	61.77	83.56	97.85		585.39	224.69	810.08	CONC	1200	1219.2	0.10	49.0	1286.19	37%	1.10	0.74	98.43	97.23	98.38	97.18
																				15.74																			
MH	220	MH	101														21.58		2.30	16.09	59.32	80.21	93.91		1731.25	215.64	1946.89	CONC	1200	1219.2	0.40	47.5	2572.39	24%	2.20	0.36	98.36	97.16	98.17	96.97
																				16.45																			
MH	101	MH	102			0.40						0.50		0.78	0.78		21.58	0.97	3.27	16.45	58.55	79.16	92.68	45.58	1708.58	303.00	2057.16	CONC	1350	1371.6	0.35	92.5	3294.18	38%	2.23	0.69	98.15	96.80	97.83	96.48
MH	102	MH	103			0.45								0.88	1.65		21.58		3.27	17.14	57.15	77.23	90.42	94.53	1666.93	295.61	2057.07	CONC	1350	1371.6	0.35	102.0	3294.18	38%	2.23	0.76	97.83	96.48	97.47	96.12
MH	103	MH	133			0.51								0.99	2.65		21.58		3.27	17.90	55.68	75.23	88.06	147.36	1623.76	287.89	2059.01	CONC	1350	1371.6	0.35	111.5	3294.18	37%	2.23	0.83	97.47	96.12	97.08	95.73
																				18.73																			
MH	110	MH	111			0.76								1.48	1.48					10.00	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												1.48					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
																				11.22																			
MH	112	MH	113		0.75									1.25	1.25					10.00	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
																				10.17																			
MH	113	MH	114			0.14								0.27	3.00					11.22	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												3.00					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								0.49	3.49					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
																				12.73																			
MH	120	MH	121			0.26								0.51	0.51					10.00	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
																				11.15																			
MH	121	MH	127			0.57								1.11	5.10					12.73	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
																				13.69																			
MH	125	MH	126			0.30								0.58	0.58					10.00	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								1.95	2.53					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
																				12.37																			
MH	127	MH	132			0.36								0.70	8.34					13.69	65.05	88.06	103.15	542.34			542.34	CONC	975	990.6	0.30	83.5	1280.55	58%	1.66	0.84	97.72	96.75	97.47	96.50
																				14.52																			
MH	130	MH	131			0.52								1.01	1.01					10.00	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	131	MH	132			0.51								0.99	2.00					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
																				12.34																			
MH	132	MH	133			0.24								0.47	10.81					14.52	62.92	85.13	99.70	680.08			680.08	CONC	1050	1066.8	0.30	82.0	1560.35	56%	1.75	0.78	97.47	96.42	97.22	96.17
																				15.31																			
MH	133	MH	171			0.07								0.14	13.59		21.58		3.27	18.73	54.16	73.16	85.63	736.11	1579.08	279.95	2595.14	CONC	1650	1676.4	0.30	42.0	5208.04	50%	2.36	0.30	97.08	95.43	96.95	95.30
																				19.03																			
MH	170	MH	171			0.09	5.95							13.41	13.41					10.00	76.81	104.19	122.14	1029.86			1029.86	CONC	1050	1066.8	0.30	51.0	1560.35	34%	1.75	0.49	97.04	95.99	96.89	95.84
																				10.49																			
MH	171	MH	173			0.10								0.19	27.19		21.58		3.27	19.03	53.65	72.46	84.80	1458.96	1563.97	277.23	3300.16	CONC	1800	1828.8	0.30	42.0	6568.16	50%	2.50	0.28	96.74	94.94	96.61	94.81
																				19.31																			
MH	172	MH	173			0.27								0.53	0.53					10.00	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
																				11.51																			
MH	173	MH	174			0.25	0.85							2.38	30.10		21.58		3.27	19.31	53.17	71.80	84.04	1600.22	1549.73	274.75	3424.69	CONC	1800	1828.8	0.30	86.0	6568.16	48%	2.50	0.57	96.55	94.75	96.29	94.49
MH	174	MH	191												30.10		21.58		3.27	19.88	52.22	70.51	82.51	1571.63	1521.88	269.75	3363.26	CONC	1800	1828.8	0.30	10.5	6568.16	49%	2.50	0.07	96.26	94.46	96.23	94.43
																				19.95																			
MH	200	MH	201							0.18		0.37						0.35	0.35	0.72	0.72	10.00	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	106.37	106.00	104.96	104.59
MH	201	MH	202									0.24							0.35	0.47	1.19	10.82	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	104.96	104.44	104.08	103.56
MH	202	MH	205									0.46							0.35	0.90	2.08	11.26	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	104.08	103.48	103.65	103.05
																				12.05																			
MH	203	MH	204									0.39							0.76	0.76		10.00	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	106.42	105.97	105.21	104.76
MH	204	MH	205									0.79							1.54	2.30		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	104.56	104.04	103.65	103.13
																				11.93																			
MH	205	MH	206									0.62							0.35	1.21	5.59	12.05	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	103.65	102.83	103.31	102.49
MH	206	MH	207									0.47							0.35	0.91	6.50	13.05	66.80	90.45	105.96		31.68	688.70	720.38	CONC	825	838.2	0.55	106.5	1110.58	35%	2.01	0.88	103.29	102.47	102.70	101.88
MH	207	MH	209																0.35		6.50	13.93	64.42	87.19	102.12		30.54	663.74	694.28	CONC	900	914.4	0.30	46.5	1034.42	33%	1.58	0.49	102.70	101.80	102.56	101.66
																				14.42																			
MH	306	MH	209						7.46	0.70						13.81	13.81			10.00	76.81	104.19	122.14		1438.39		1438.39	CONC	1050	1066.8	0.30	65.0	1560.35	8%	1.75	0.62	101.60	100.55	101.40	100.35
																				10.62																			
MH	209	MH	210									0.24							14.16	0.47	6.97	14.42	63.17	85.48	100.11		1210.03	697.43	1907.47	CONC	1050	1066.8	0.90	48.5	2702.60	29%	3.02	0.27	101.34	100.29	100.90	99.85
MH	210	MH	211									0.33							14.16	0.64	7.61	14.69	62.51	84.58	99.05		1197.29	753.66	1950.95	CONC	1350	1371.6	0.20	96.0	2490.17	22%	1.69	0.95	100.78	99.43	100.59	99.24
MH	211	MH	212									0.30							14.16	0.58	8.19	15.64	60.30	81.55	95.49		1154.40	782.32	1936.72	CONC	1350	1371.6	0.30	91.0	3049.82	36%	2.06	0.73	100.56	99.21	100.29	98.94
MH	212	MH	213									0.34							14.16	0.66	8.85	16.37	58.71	79.37	92.93		1123.54	822.83	1946.37	CONC	1350	1371.6	0.50	72.0	3937.30	51%	2.66	0.45	100.23	98.88	99.87	98.52
MH	213	MH	140								5.07	0.37				11.28	25.43	0.72	9.57	16.82	57.78	78.10	91.43		1986.20	875.38	2861.58	CONC	1350	1371.6	0.45	117.0	3735.25	23%	2.53	0.77	99.83	98.48	99.30	97.95

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
May, 2023

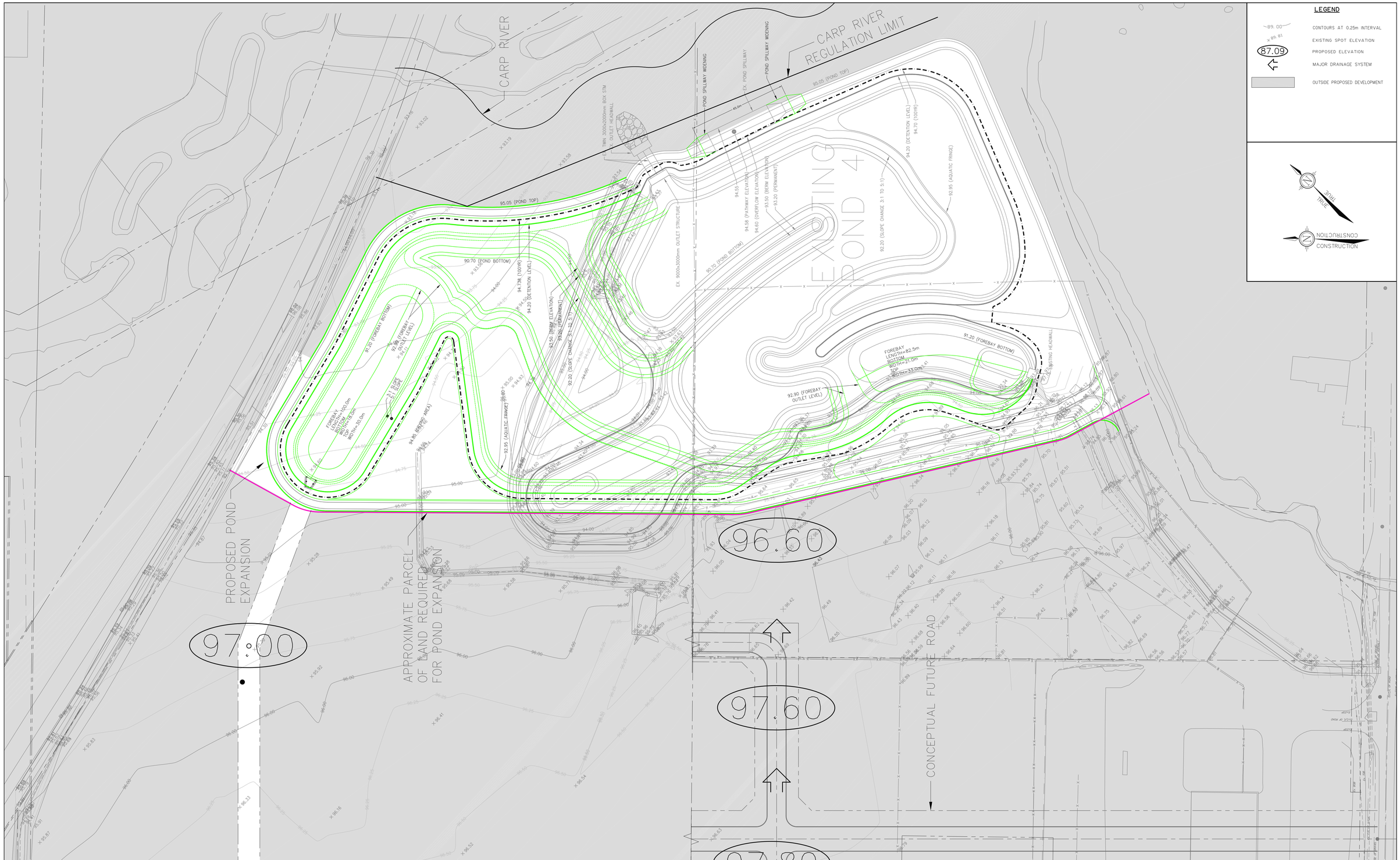
Rational Method
RATIONAL METHOD Q= 2.78 AIR
PVC/CONC N= 0.013
CSP N= 0.024
CORR N= 0.021

Table 8

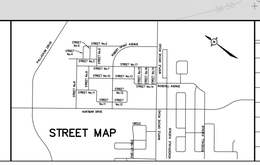
LOCATION				AREA (ha.) RUNOFF COEFFICIENT										Rational Method						TIME	RAINF.	RAINF.	RAINF.				ACTUAL	PIPE SEWER DATA									UpStream		DwStream	
														2 Year		5 Year		10 Year																					
FROM		TO		2 Year				5 Year				10 Year		INDIV.	ACCUM.	INDIV.	ACCUM.	INDIV.	ACCUM.	CONC.	INTENS.	INTENS.	INTENS.	2 Year	5 Year	10 Year	PIPE	TYPE	DIA.		SLOPE	LENGTH	CAP.	Remaining	VEL.	TIME OF	Obv.	Inv.	Obv.	Inv.
(Up)		(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	(MIN)	2 Year (MM/HR)	5 Year (MM/HR)	10 Year (MM/HR)	Flow (L/S)	Flow (L/S)	Flow (L/S)	FLOW (L/S)		(N0M) (mm)	(ACT)	(%)	(M)	(L/S)	Capacity (%)	(M/S)	FLOW (MIN)	(M)	(M)	(M)	(M)
																				17.59																			
MH	140	MH	142			0.17						1.06		0.33	0.33		25.43	2.06	11.64	17.59	56.25	76.02	88.99	18.61	1933.30	1035.58	2987.49	CONC	1650	1676.4	0.45	55.0	6378.52	53%	2.89	0.32	98.85	97.20	98.60	96.95
																				17.91																			
MH	141	MH	142			0.73								1.42	1.42					10.00	76.81	104.19	122.14	109.11			109.11	CONC	525	533.4	0.50	110.5	317.25	66%	1.42	1.30	98.55	98.03	98.00	97.48
																				11.30																			
MH	142	MH	144			0.30								0.58	2.34		25.43		11.64	17.91	55.65	75.20	88.02	129.95	1912.44	1024.30	3066.69	CONC	1650	1676.4	0.45	79.0	6378.52	52%	2.89	0.46	98.00	96.35	97.64	95.99
																				18.37																			
MH	143	MH	144			0.58								1.13	1.13					10.00	76.81	104.19	122.14	86.69			86.69	CONC	525	533.4	0.30	94.0	245.74	65%	1.10	1.42	98.22	97.70	97.94	97.42
																				11.42																			
MH	144	MH	152			0.32								0.62	4.09		25.43		11.64	18.37	54.82	74.05	86.68	224.03	1883.20	1008.70	3115.93	CONC	1650	1676.4	0.45	85.5	6378.52	51%	2.89	0.49	97.64	95.99	97.26	95.61
																				18.86																			
MH	151	MH	152			0.60								1.17	1.17					10.00	76.81	104.19	122.14	89.68			89.68	CONC	525	533.4	0.30	94.0	245.74	64%	1.10	1.42	97.94	97.42	97.66	97.14
																				11.42																			
MH	152	MH	156			0.31								0.60	5.86		25.43		11.64	18.86	53.94	72.86	85.27	315.95	1852.93	992.29	3161.18	CONC	1800	1828.8	0.40	83.5	7584.26	58%	2.89	0.48	97.26	95.46	96.93	95.13
																				19.34																			
MH	141	MH	146																	10.00	76.81	104.19	122.14					PVC	300	299.2	0.35	11.0	56.81	100%	0.81	0.23	99.18	98.88	99.14	98.84
MH	146	MH	147			0.67								1.30	1.30					10.23	75.94	103.01	120.75	99.01			99.01	CONC	525	533.4	0.35	120.0	265.43	63%	1.19	1.68	99.14	98.62	98.72	98.20
MH	147	MH	148			0.40								0.78	2.08					11.91	70.17	95.08	111.41	146.11			146.11	CONC	600	609.6	0.60	120.0	496.18	71%	1.70	1.18	98.42	97.82	97.70	97.10
MH	148	MH	156			0.38	1.73							4.59	6.67					13.09	66.68	90.29	105.78	444.70			444.70	CONC	825	838.2	0.50	106.0	1058.89	58%	1.92	0.92	97.31	96.49	96.78	95.96
																				14.01																			
MH	156	MH	157			0.17								0.33	12.86		25.43		11.64	19.34	53.11	71.73	83.95	682.86	1824.20	976.93	3483.99	CONC	1950	1981.2	0.30	46.5	8130.98	57%	2.64	0.29	96.78	94.83	96.64	94.69
MH	157	MH	158			0.20								0.39	13.25		25.43		11.64	19.64	52.62	71.06	83.16	697.04	1807.16	967.74	3471.94	CONC	1950	1981.2	0.30	61.0	8130.98	57%	2.64	0.39	96.61	94.66	96.43	94.48
MH	158	MH	175												13.25		25.43		11.64	20.02	52.00	70.20	82.16	688.83	1785.29	956.10	3430.22	CONC	1950	1981.2	0.30	45.0	8130.98	58%	2.64	0.28	96.18	94.23	96.04	94.09
																				20.31																			
MH	160	MH	161			0.51								0.99	0.99					10.00	76.81	104.19	122.14	76.23			76.23	CONC	525	533.4	0.30	120.0	245.74	69%	1.10	1.82	96.87	96.35	96.51	95.99
MH	161	MH	162			0.20								0.39	1.38					11.82	70.46	95.48	111.88	97.35			97.35	CONC	600	609.6	0.30	54.5	350.85	72%	1.20	0.76	96.51	95.91	96.35	95.75
MH	162	MH	175			0.34								0.66	2.04					12.57	68.16	92.31	108.15	139.27			139.27	CONC	675	685.8	0.30	99.0	480.32	71%	1.30	1.27	96.35	95.68	96.05	95.38
																				13.84																			
MH	175	MH	176			0.38								0.74	16.03		25.43		11.64	20.31	51.54	69.59	81.43	826.16	1769.77	947.61	3543.54	CONC	1950	1981.2	0.30	56.5	8130.98	56%	2.64	0.36	96.00	94.05	95.83	93.88
MH	176	MH	178			0.22	0.66							1.90	17.93		25.43		11.64	20.66	50.99	68.83	80.54	914.02	1750.45	937.25	3601.71	CONC	1950	1981.2	0.30	66.0	8130.98	56%	2.64	0.42	95.83	93.88	95.63	93.68
																				21.08																			
MH	177	MH	178			0.58								1.13	1.13					10.00	76.81	104.19	122.14	86.69			86.69	CONC	450	457.2	0.30	100.5	162.91	47%	0.99	1.69	96.24	95.79	95.94	95.49
																				11.69																			
MH	178	MH	190			0.15								0.29	19.35		25.43		11.64	21.08	50.36	67.97	79.53	974.27	1728.57	925.50	3628.34	CONC	1950	1981.2	0.30	46.5	8130.98	55%	2.64	0.29	95.63	93.68	95.49	93.54
																				21.37																			
MH	179	MH	190			0.35								0.68	0.68					10.00	76.81	104.19	122.14	52.32			52.32	PVC	375	366.4	0.30	83.0	90.28	42%	0.86	1.62	96.33	95.96	96.08	95.71
																				11.62																			
MH	190	MH	191			0.17								0.33	20.36		25.43		11.64	21.37	49.92	67.37	78.83	1016.27	1713.32	917.35	3646.94	CONC	2100	2133.6	0.30	40.5	9907.60	63%	2.77	0.24	95.49	93.39	95.37	93.27
																				21.62																			
MH	191	MH	192			0.04	4.86							10.89	61.34		47.02		14.91	21.62	49.57	66.89	78.26	3040.66	3144.86	1166.57	7352.09	CONC	2550	2590.8	0.30	118.5	16627.39	56%	3.15	0.63	95.31	92.76	94.95	92.40
MH	192	MH	193				8.17							18.17	79.51		47.02		14.91	22.24	48.68	65.68	76.84	3870.58	3087.97	1145.40	8103.96	CONC	2550	2590.8	0.30	118.5	16627.39	51%	3.15	0.63	94.62	92.07	94.26	91.71
MH	193	MH	194												79.51		47.02		14.91	22.87	47.83	64.52	75.48	3803.00	3033.43	1125.13	7961.56	CONC	2550	2590.8	0.30	78.0	16627.39	52%	3.15	0.41	94.23	91.68	94.00	91.45
																				23.28																			
MH	School	MH	ex 179	2.52										4.20	4.20					10.00	76.81	104.19	122.14	322.86			322.86	CONC	750	762.0	0.30	14.0	636.13	49%	1.39	0.17	97.64	96.89	97.60	96.85
																				10.17																			
MH	65	MH	66			0.36								0.70	0.70					10.00	76.81	104.19	122.14	53.81			53.81	CONC	450	457.2	0.30	76.0	162.91	67%	0.99	1.28	98.55	98.10	98.32	97.87
MH	66	MH	67			0.29								0.56	1.26					11.28	72.23	97.90	114.73	91.36			91.36	CONC	525	533.4	0.30	61.5	245.74	63%	1.10	0.93	98.32	97.80	98.14	97.62
MH	67	MH	ex 180												1.26					12.21	69.25	93.81	109.92	87.59			87.59	CONC	525	533.4	0.30	14.5	245.74	64%	1.10	0.22	97.34	96.82	97.30	96.78
																				12.43																			
MH	70	MH	73			0.26								0.51	0.51					10.00	76.81	104.19	122.14	38.86			38.86	PVC	300	299.2	0.60	76.5	74.38	48%	1.06	1.21	98.75	98.45	98.29	97.99
																				11.21									525										
MH	71	MH	72			0.47								0.91	0.91					10.00	76.81	104.19	122.14	70.25			70.25	CONC	450	457.2	0.30	77.5	162.91	57%	0.99	1.30	98.44	97.99	98.21	97.76
MH	72	MH	73			0.39								0.76	1.67					11.30	72.14	97.79	114.60	120.73			120.73	CONC	525	533.4	0.30	73.5	245.74	51%	1.10	1.11	98.21	97.69	97.99	97.47
																				12.42									525										
MH	73	MH	74			0.16								0.31	2.49					12.42	68.63	92.96	108.91	170.95			170.95	CONC	525	533.4	0.60	47.5	347.53	51%	1.56	0.51	97.99	97.47	97.70	97.18
MH	74	MH	75			0.21	1.11							2.88	5.37					12.92	67.14	90.92	106.52	360.42			360.42	CONC	825	838.2	0.30	73.5	820.21	56%	1.49	0.82	97.70	96.88	97.48	96.66
MH	75	MH	76			0.25								0.49	5.85					13.75	64.89	87.83	102.88	379.91			379.91	CONC	825	838.2	0.30	73.5	820.21	54%	1.49	0.82	97.48	96.66	97.26	96.44
MH	76	MH	ex 181												5.85					14.57	62.79	84.96	99.51	367.62			367.62	CONC	825	838.2	0.30	19.0	820.21	55%	1.49	0.21	97.26	96.44	97.20	96.38
																				14.79																			

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

LICENSED PROFESSIONAL ENGINEER
A. G. Y. SAUVE
100142393
Aug 3, 2023
PROVINCE OF ONTARIO



THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, 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
2	ISSUED FOR SANITARY TRUNK MOECC APPROVAL	AUG. 4/20	AGS
1	REVISED AS PER CITY COMMENTS	OCT. 7/20	AGS
1	REVISED AS PER NEW ROAD ALIGNMENT	MAR. 4/21	AGS
2	REVISED AS PER CITY COMMENTS	MAR. 30/21	AGS
2	*RECORD DRAWING*	*AUG 25/21*	*AGS*
1	REVISED AS PER CITY COMMENTS	SEP. 20/21	AGS
2	REVISED AS PER CITY COMMENTS	APR. 18/22	AGS
3	REVISED AS PER CITY COMMENTS	AUG. 03/23	AGS

SCALE 1:750 (8m 0 24m)

DESIGN AGS
CHECKED JMD
DRAWN CED
CHECKED AGS
APPROVED JMD

LICENSED PROFESSIONAL ENGINEER A. G. Y. SAUVE 100142393 Aug 3, 2023 PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER J.M.J.DECOEUR Aug 3, 2023 PROVINCE OF ONTARIO

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

CITY OF OTTAWA
130 HUNTMAR DR.

LIONESS DEVELOPMENT INC.

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

PLAN
STORMWATER MANAGEMENT POND

CONTRACTOR TO VERIFY THE PRECISE LOCATIONS AND INVERT ELEVATIONS OF Ex. UNDERGROUND SERVICES AND Ex. UTILITIES PRIOR TO STARTING CONSTRUCTION

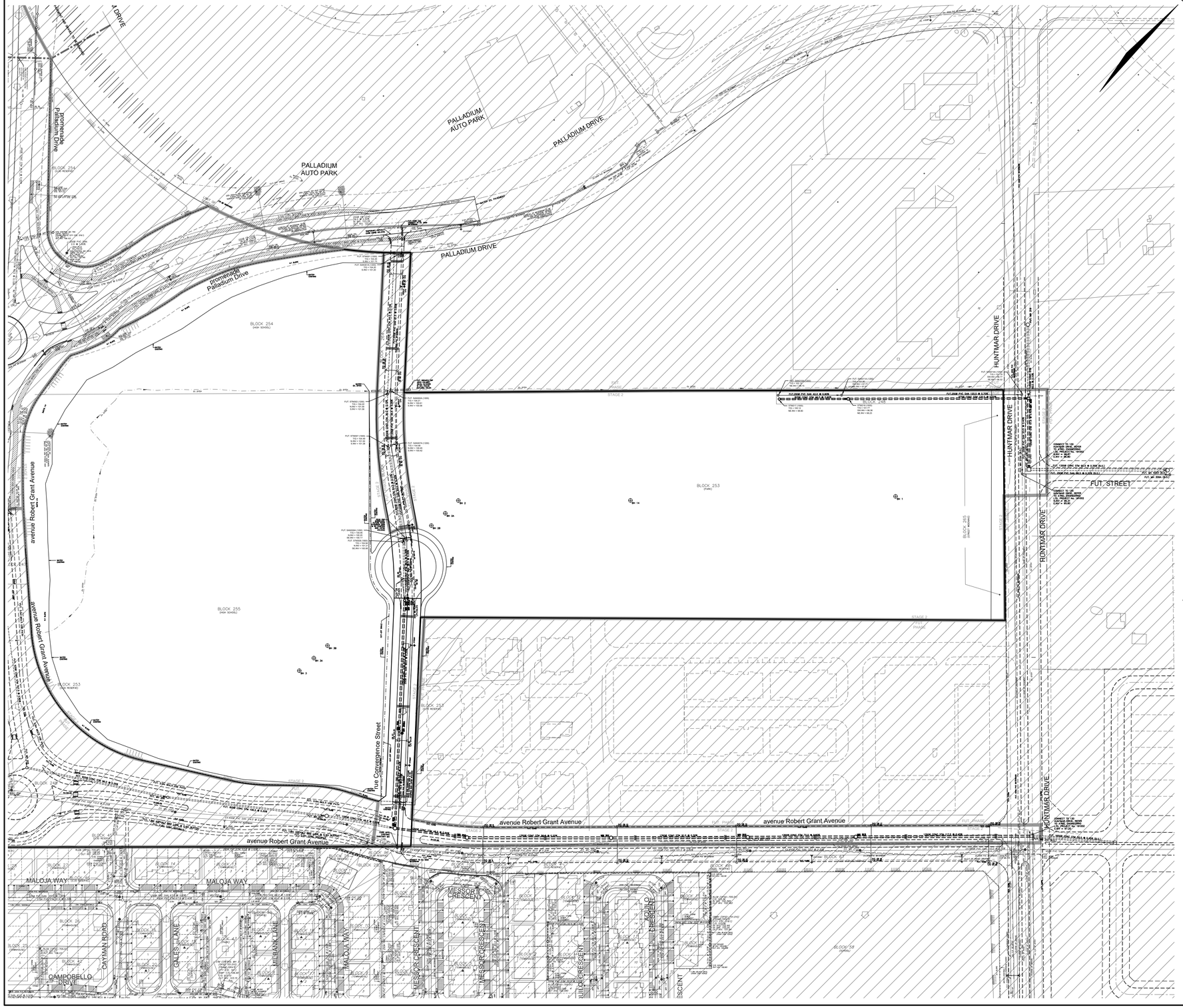
ANY DISTURBED AREA DURING CONSTRUCTION TO BE RESTORED TO THE ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE AUTHORITIES HAVING JURISDICTION

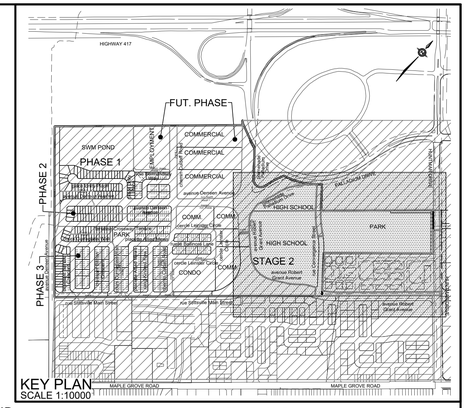
NOTE:
THE COVER OF EX. MH, CB, CHAMBER AND OTHER ABOVEGROUND FEATURES TO BE ADJUSTED TO SUIT THE NEW FINISHED GRADE, WHERE APPLICABLE

NOTE:
ALL EXISTING TREES, SHRUBS ETC. WITHIN LOTS, BLOCKS AND ROADS TO BE REMOVED, UNLESS OTHERWISE NOTED

NOTE:
FOR WATERMAIN STUBS, 2.4m MIN. COVER TO BE PROVIDED

PERMISSION REQUIRED FOR WORK ON ADJACENT LANDS





LEGEND

- CROSS
- 45° BEND
- LATERAL
- HYDRANT, VALVE & VB
- TEE
- VALVE & VC
- VALVE & VB
- 22.5° BEND
- 11.25° BEND
- REDUCER
- CAP
- FUTURE SANITARY MAINTENANCE HOLE
- SANITARY MAINTENANCE HOLE
- CAP
- FUTURE STORM MAINTENANCE HOLE
- STREET CATCHBASIN & LEAD
- STREET CATCHBASIN WITH CLOSED LID & LEAD
- STORM MAINTENANCE HOLE
- CURB INLET CATCH-BASIN & LEAD
- CATCHBASIN / MAINTENANCE HOLE INTERCONNECTED
- CATCH BASIN & LEADS
- CAP
- TEE CATCHBASIN
- PERFORATED PIPE
- ELBOW CATCHBASIN
- PREVIOUS/FUTURE PHASES

- SINGLE SERVICE LOCATION (ST, SAN & WM)
- SINGLE SERVICE LOCATION (SAN & WM)
- SINGLE SERVICE LOCATION (ST, SAN & WM)
- HYDRO SWITCHGEAR
- HYDRO TRANSFORMER
- STREET LIGHT STANDARD
- DITCH AND CULVERT
- CONCRETE SIDEWALK
- CURB & DEPRESSED CURB
- ASPHALT SIDEWALK
- CHAINLINK FENCE (1.8m UNLESS OTHERWISE NOTED)
- NOISE BARRIER (2.2m UNLESS OTHERWISE NOTED)
- DECORATIVE FENCE (SEE LANDSCAPE DWGS FOR DETAIL)
- CONSTRUCTION FENCE
- POST AND RAIL FENCE
- PHASING LIMITS
- PROPERTY BOUNDARY
- OVERLAND FLOW DIRECTION
- EXTERNAL OVERLAND FLOW DIRECTION
- EMERGENCY OVERLAND FLOW DIRECTION
- TACTILE WALKING SURFACE INDICATOR (AS PER CITY OF OTTAWA STD. SC6, SC7, SC7.1, SC7.2, SC7.3)
- EROSION SETBACK
- MEANDER BELT LIMIT
- CLAY SEAL (REFER TO GENERAL NOTES, No. 18, ON DWG No. 1 AND GEOTECHNICAL CONSULTANT'S SPECIFICATIONS)
- UNITS REQUIRING WATER PRESSURE REDUCING VALVES

TOPOGRAPHIC INFORMATION

CITY OF OTTAWA 1K 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

DRAFT PLAN PROVIDED BY STANTEC GEOMATICS LTD., PROJECT No. 16-16-135-45, RECEIVED ON DECEMBER 19, 2019.

NOT FOR CONSTRUCTION

ELEVATION NOTE

ELEVATIONS SHOWN HEREON ARE GEODETIC (CGVD-1928:1978) AND ARE DERIVED FROM THE CAN-NET VRS NETWORK MONUMENT: OTTAWA ELEVATION = 95.205m

DRAFT

No.	BY	DATE	DESCRIPTION
1	X.X.	YY-MM-DD	1st SUBMISSION

Ottawa CITY OF OTTAWA

PROJECT No. 12-624

OVERALL GENERAL PLAN

2325483 ONTARIO LTD.

195 HUNTMAR DRIVE - STAGE 2

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

DRAWN BY: G.G.G.	CHECKED BY: S.L.M.	SHEET NO.	
DESIGNED BY: G.G.G.	CHECKED BY: S.L.M.	4	
SCALE: 1:500 1:1250	DATE: JULY 2023		

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

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

Local Roads Return Frequency = 2 years
Collector Roads Return Frequency = 5 years
Manning 0.013 Arterial Roads Return Frequency = 10 years

	LOCATION		AREA (Ha)																FLOW						SEWER DATA							
			2 YEAR				5 YEAR				10 YEAR				100 YEAR				Time of	Intensity	Intensity	Intensity	Intensity	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO
			AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	Conc.	2 Year	5 Year	10 Year	100 Year										
Location	From Node	To Node	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(min)	(mm/h)	(mm/h)	(mm/h)	(mm/h)	Q (l/s)	(actual)	(nominal)		(%)	(m)	(l/s)	(m/s)	LOW (min	Q/Q full
rue Convergence Street																																	
					0.00	0.00	0.08	0.70	0.16	0.16			0.00	0.00			0.00	0.00															
	301	302			0.00	0.00	0.26	0.70	0.51	0.66			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	69	600	600	CONC	0.15	94.0	238	0.8411	1.8627	0.290
	302	307			0.00	0.00			0.00	0.66			0.00	0.00			0.00	0.00	11.86	70.32	95.29	111.65	163.15	63	600	600	CONC	0.15	36.0	238	0.8411	0.7134	0.265
	307	308			0.00	0.00			0.00	0.66			0.00	0.00			0.00	0.00	12.58	68.15	92.31	108.14	158.00	61	825	825	CONC	0.10	64.0	454	0.8492	1.2562	0.135
					0.00	0.00	7.46	0.60	12.44	13.10			0.00	0.00			0.00	0.00	15.00														
	308	305			0.00	0.00	0.08	0.70	0.16	13.26			0.00	0.00			0.00	0.00	15.00	61.77	83.56	97.85	142.89	1108	1050	1050	CONC	0.35	38.5	1616	1.8657	0.3439	0.686
	305	306			0.00	0.00	0.28	0.70	0.54	13.81			0.00	0.00			0.00	0.00	15.34	60.97	82.46	96.56	141.00	1138	1050	1050	CONC	0.30	87.0	1496	1.7273	0.8395	0.761
	306	209			0.00	0.00			0.00	13.81			0.00	0.00			0.00	0.00	16.18	59.11	79.92	93.57	136.62	1103	1050	1050	CONC	0.30	65.0	1496	1.7273	0.6272	0.738
To avenue Robert Grant Avenue, Pipe 209 - 210						0.00				13.81				0.00				0.00	16.81														
avenue Robert Grant Avenue																																	
					0.00	0.00			0.00	0.00	0.39	0.70	0.76	0.76			0.00	0.00															
	FUT. 203	FUT. 204			0.00	0.00			0.00	0.00	0.79	0.70	1.54	2.30			0.00	0.00	10.00	76.81	104.19	122.14	178.56	280	525	525	CONC	1.10	110.0	451	2.0836	0.8799	0.622
	FUT. 204	FUT. 205			0.00	0.00			0.00	0.00			0.00	2.30			0.00	0.00	10.88	73.58	99.76	116.93	170.90	268	525	525	CONC	0.85	107.5	396	1.8316	0.9782	0.677
To avenue Robert Grant Avenue, Pipe FUT. 205 - FUT. 206						0.00				0.00				2.30				0.00	11.86														
avenue Robert Grant Avenue																																	
					0.00	0.00			0.00	0.00	0.11	0.70	0.21	0.21			0.00	0.00															
					0.00	0.00	0.18	0.70	0.35	0.35			0.00	0.21			0.00	0.00															
	FUT. 200	FUT. 201			0.00	0.00			0.00	0.35	0.26	0.70	0.51	0.72			0.00	0.00	10.00	76.81	104.19	122.14	178.56	124	375	375	PVC	1.50	94.0	215	1.9442	0.8058	0.580
					0.00	0.00			0.00	0.35	0.09	0.70	0.18	0.90			0.00	0.00															
	FUT. 201	FUT. 202			0.00	0.00			0.00	0.35	0.15	0.70	0.29	1.19			0.00	0.00	10.81	73.84	100.12	117.35	171.51	174	525	525	CONC	1.40	62.5	509	2.3506	0.4431	0.343
	FUT. 202	FUT. 205			0.00	0.00			0.00	0.35	0.46	0.70	0.90	2.08			0.00	0.00	11.25	72.32	98.03	114.88	167.89	274	600	600	CONC	0.55	77.5	455	1.6105	0.8020	0.601
Contribution From avenue Robert Grant Avenue, Pipe FUT. 204 - FUT. 205						0.00				0.00				2.30				0.00	11.86														
	FUT. 205	FUT. 206			0.00	0.00			0.00	0.35	0.62	0.70	1.21	5.59			0.00	0.00	12.05	69.74	94.48	110.70	161.76	651	825	825	CONC	0.35	96.0	849	1.5886	1.0072	0.767
	FUT. 206	FUT. 207			0.00	0.00			0.00	0.35	0.47	0.70	0.91	6.50			0.00	0.00	13.06	66.77	90.41	105.91	154.72	720	825	825	CONC	0.55	106.5	1065	1.9914	0.8913	0.676
	FUT. 207	209			0.00	0.00			0.00	0.35	0.13	0.70	0.25	6.75			0.00	0.00	13.95	64.36	87.11	102.03	149.03	720	900	900	CONC	0.30	46.5	992	1.5586	0.4972	0.726
Contribution From rue Convergence Street, Pipe 306 - 209						0.00				13.81				0.00				0.00	16.81														
	209	210			0.00	0.00			0.00	14.16			0.00	6.75			0.00	0.00	16.81	57.80	78.13	91.47	133.53	1724	1050	1050	CONC	0.90	48.5	2591	2.9918	0.2702	0.665
	210	211			0.00	0.00			0.00	14.16	0.24	0.70	0.47	7.22			0.00	0.00	17.08	57.26	77.39	90.60	132.25	1750	1350	1350	CONC	0.20	96.0	2387	1.6676	0.9595	0.733
					0.00	0.00			0.00	14.16	0.30	0.70	0.58	7.80			0.00	0.00															
	211	212			0.00	0.00			0.00	14.16	0.33	0.70	0.64	8.45			0.00	0.00	18.04	55.41	74.87	87.64	127.91	1800	1350	1350	CONC	0.30	91.0	2923	2.0424	0.7426	0.616
	212	213			0.00	0.00			0.00	14.16			0.00	8.45			0.00	0.00	18.78	54.08	73.04	85.49	124.76	1756	1350	1350	CONC	0.50	72.0	3774	2.6367	0.4551	0.465
					0.00	0.00	5.07	0.80	11.28	25.43			0.00	8.45			0.00	0.00	15.00														
					0.00	0.00			0.00	25.43	0.34	0.70	0.66	9.11			0.00	0.00															
	213	FUT. 214			0.00	0.00			0.00	25.43	0.37	0.70	0.72	9.83			0.00	0.00	19.24	53.29	71.97	84.23	122.91	2658	1350	1350	CONC	0.45	117.0	3580	2.5014	0.7796	0.742
	FUT. 214	FUT. 4002			0.00	0.00			0.00	25.43	0.76	0.70	1.48	11.31			0.00	0.00	20.02	52.00	70.21	82.17	119.88	2715	1650	1650	CONC	0.45	55.5	6114	2.8594	0.3235	0.444
BLOCK 248																																	
					0.00	0.00	3.61	0.80	8.03	8.03			0.00	0.00			0.00	0.00	15.00														
					0.00	0.00	4.66	0.40	5.18	13.21			0.00	0.00			0.00	0.00	15.00														
	217	218			0.00	0.00			0.00	13.21			0.00	0.00			0.00	0.00	15.00	61.77	83.56	97.85	142.89	1104	825	825	CONC	0.90	46.0	1362	2.5475	0.3010	0.811
					0.00	0.00	1.23	0.40	1.37	14.58			0.00	0.00			0.00	0.00	12.00														
	218	220			0.00	0.00			0.00	14.58			0.00	0.00			0.00	0.00	15.30	61.07	82.60	96.72	141.24	1204	975	975	CONC	0.70	120.0	1875	2.5113	0.7964	0.642
To HUNTMAR DRIVE, Pipe 220 - FUT. 216						0.00				14.58				0.00				0.00	16.10														
HUNTMAR DRIVE																																	
					0.00	0.00	3.15	0.80	7.01	7.01			0.00	0.00			0.00	0.00	15.00														
					0.00	0.00			0.00	7.01	1.18	0.70	2.30	2.30			0.00	0.00	12.00														
	219	220			0.00	0.00			0.00	7.01			0.00	2.30			0.00	0.00	15.00	61.77	83.56	97.85	142.89	810	1200	1200	CONC	0.10	49.0	1233	1.0901	0.7492	0.657
Contribution From BLOCK 248, Pipe 218 - 220						0.00				14.58				0.00				0.00	16.10														
	220	FUT. 216			0.00	0.00			0.00	21.58			0.00	2.30			0.00	0.00	16.10	59.29	80.17	93.87	137.05	1946	1200	1200	CONC	0.40	47.5	2466	2.1802	0.3631	0.789
To FUT. STREET, Pipe FUT. 216 - FUT. 4003						0.00				21.58				2.30				0.00	16.46														

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

LICENSED PROFESSIONAL ENGINEER
S. L. MERRICK
100186523
2023-07-28
PROVINCE OF ONTARIO
DOB # 12-624

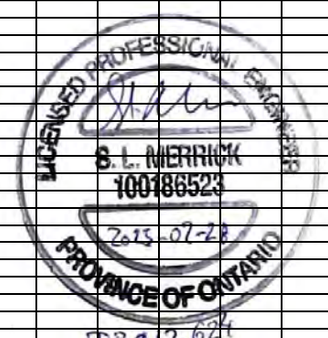
Designed: GGG	PROJECT:	195 HUNTMAR DRIVE - STAGE 2	
Checked: SLM	LOCATION:	City of Ottawa	
Dwg. Reference: STORM DRAINAGE PLAN	File Ref: 12-624	Date: July 28, 2023	Sheet No. SHEET 1 OF 2

624_stm.xlsx

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

Local Roads Return Frequency = 2 years
Collector Roads Return Frequency = 5 years
Manning 0.013 Arterial Roads Return Frequency = 10 years

	LOCATION		AREA (Ha)														FLOW						SEWER DATA								
			2 YEAR				5 YEAR				10 YEAR				100 YEAR				Time of	Intensity	Intensity	Intensity	Intensity	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO
			AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	Conc.	2 Year	5 Year	10 Year	100 Year										
Location	From Node	To Node	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(min)	(mm/h)	(mm/h)	(mm/h)	(mm/h)	Q (l/s)	(actual)	(nominal)		(%)	(m)	(l/s)	(m/s)	LOW (min	Q/Q full
FUT. STREET																																
Contribution From HUNTMAR DRIVE, Pipe 220 - FUT. 216						0.00				21.58				2.30				0.00	16.46													
					0.00	0.00			0.00	21.58	0.34	0.70	0.66	2.96			0.00	0.00														
	FUT. 216	FUT. 4003			0.00	0.00			0.00	21.58	0.54	0.80	1.20	4.16			0.00	0.00	16.46	58.52	79.12	92.63	135.23	2093	1350	1350	CONC	0.35	92.5	3158	2.2060	0.6988	0.663



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: GGG	PROJECT:		195 HUNTMAR DRIVE
Checked: SLM	LOCATION:	City of Ottawa	
Dwg. Reference: STORM DRAINAGE PLAN	File Ref: 12-624	Date: 28 Jul 2023	Sheet No. SHEET 2 OF 2

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52 Springbrook Drive,
Ottawa, ON K2S 1B9
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jfsa.com

Ottawa. ON
Paris. ON
Gatineau. QC
Montréal. QC
Québec. QC

Attachment B

PCSWMM Model Overview

Legend

Existing Subcatchments

JFSA CANADA INC.
WATER RESOURCE ENGINEERING, ENVIRONMENTAL MANAGEMENT AND LAND PLANNING CONSULTANTS

ATREL Engineering Ltd Ltée
Engineers — Ingénieurs
1-2584 CHAMBERLAND STREET, ROCKLAND, ONTARIO K4K 1M6
TEL.: (613) 446-7423

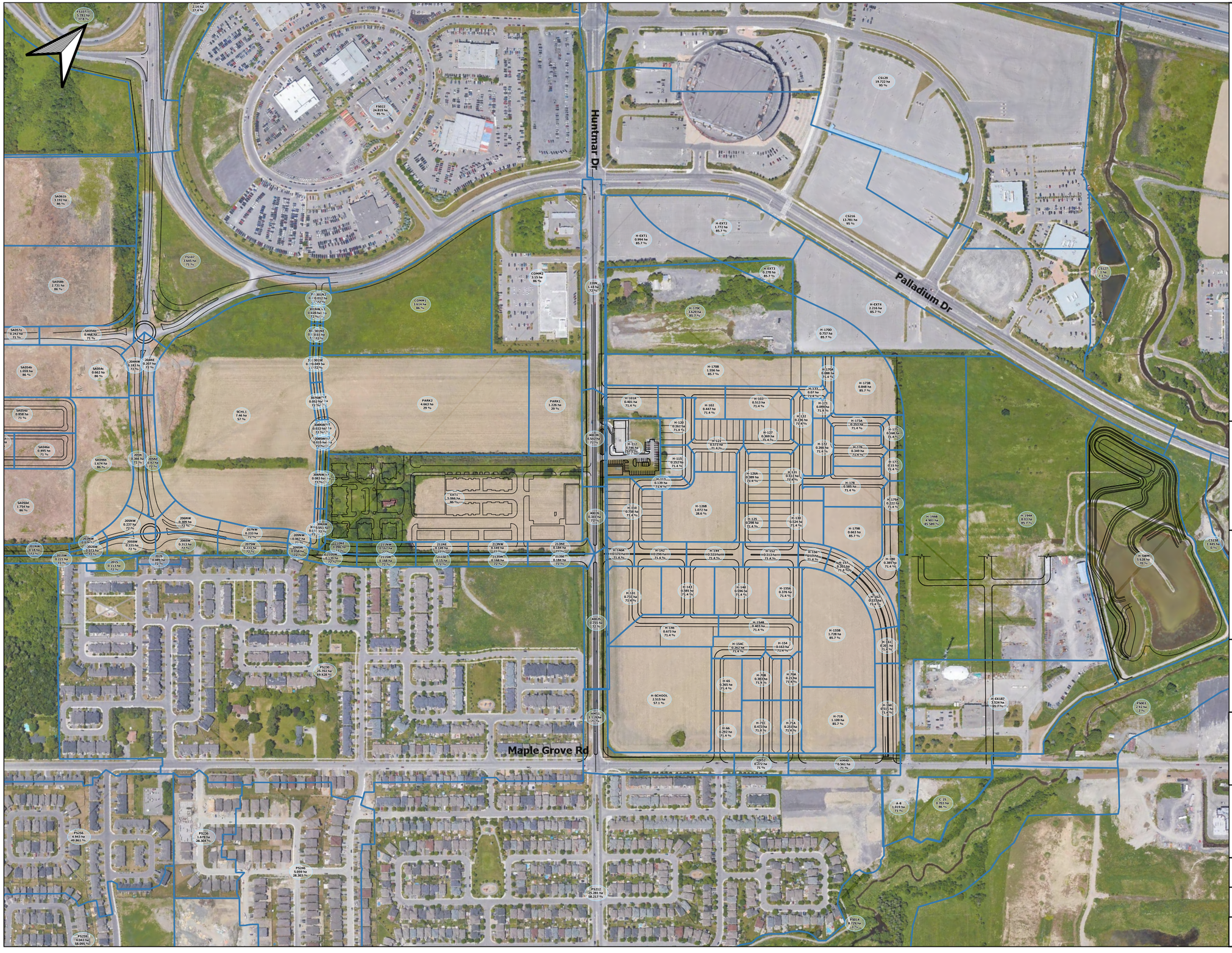
SCALE : 1:5,500

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

JFSA CANADA INC.
WATER RESOURCE ENGINEERING, ENVIRONMENTAL MANAGEMENT AND LAND PLANNING CONSULTANTS

ATREL Engineering Ltd Ltée
Engineers — Ingénieurs
1-2584 CHAMBERLAND STREET, ROCKLAND, ONTARIO K4K 1M6
TEL.: (613) 446-7423

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:	ON
DATE:	July 2023

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
201NW	0.18	72	105	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
201S	0.11	72	76	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
201SW	0.22	72	179	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
202NW	0.08	72	60	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
202S	0.09	72	64	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
202SW	0.07	72	56	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
204NE	0.21	72	86	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
204NW	0.18	72	77	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
205N	0.37	72	174	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
205NE	0.42	72	168	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
205NW	0.24	72	68	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
205SW	0.22	72	70	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
206NW	0.31	72	94	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
206SW	0.31	72	92	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
207NW	0.23	72	108	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
207SW	0.23	72	109	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
209NW	0.07	72	35	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
209SW	0.06	72	31	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
210NE	0.10	72	52	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
210SW	0.14	72	74	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
211NE	0.15	72	80	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
211NW	0.17	72	90	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
211SE	0.15	72	80	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
211SW	0.17	72	90	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
213NE	0.18	72	97	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
213NW	0.17	72	88	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
213SE	0.18	72	97	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
213SW	0.17	72	88	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
220N	1.18	72	37	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
301N1	0.01	72	14	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
301N2	0.01	72	14	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
301N3	0.03	72	33	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
301NE	0.03	72	34	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
301NW	0.03	72	32	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
301S1	0.05	72	58	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
301SE	0.05	72	56	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
301SW	0.03	72	34	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
306NE	0.08	72	92	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
306NE1	0.07	72	65	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
306NW	0.08	72	92	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7

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
306SW	0.05	72	57	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
307NE	0.05	72	57	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
307SW	0.05	72	57	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
308NE	0.02	72	26	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
308NW	0.02	72	25	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
308SE	0.02	72	18	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
308SW	0.02	72	17	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
4002S	0.76	72	37	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
4003N	0.54	72	38	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
4003S	0.34	72	37	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
COMM1	3.61	86	139	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
COMM2	3.15	86	232	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
EXT1	5.07	86	132	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-101A	0.40	71	158	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-102	0.45	71	188	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-103	0.51	71	195	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-110	0.76	71	191	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	148	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-115	0.25	71	93	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-120	0.26	71	104	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-121	0.57	71	148	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-125	0.30	71	115	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-126A	0.39	71	154	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	144	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-130	0.52	71	125	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-131	0.51	71	142	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-132	0.24	71	141	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-133	0.07	71	77	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-140A	0.17	71	38	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-141	0.73	71	176	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-142	0.30	71	155	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-143	0.59	71	142	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-144	0.32	71	167	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-146	0.67	71	704	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-148	0.60	71	132	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-152	0.31	71	163	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-154	0.16	71	77	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-154B	0.40	71	237	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7

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-154C	0.26	71	164	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-155A	0.38	71	144	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	79	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-157	0.20	71	95	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-160	0.52	71	265	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-161	0.20	71	98	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-162	0.34	71	160	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-170A	0.09	71	111	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	59	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-172	0.27	71	171	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-173A	0.25	71	150	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	97	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-176	0.35	71	151	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-177	0.15	71	91	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-178	0.58	71	360	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-179A	0.22	71	131	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-179B	0.66	86	124	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-180	0.39	71	225	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-194A	8.03	86	192	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-194B	4.90	86	108	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-65	0.37	71	83	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-66	0.29	71	65	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-70A	0.21	71	225	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-70B	0.38	71	132	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-71A	0.25	71	270	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-71B	1.11	86	104	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-71C	0.47	71	159	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-EX187	3.52	86	111	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-SCHOOL	2.51	57	160	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
H-SWM	5.63	70	302	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
PARK1	1.23	29	159	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
PARK2	4.66	29	155	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
SCHL1	7.46	57	237	0.5	0.013	0.25	1.57	4.67	25	OUTLET	100	87	7
Total	**87.18**	**73**											

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

Location	Name	Land Use	Area	Imp (%)	C	Control Rate (LOS)	Control Rate (L/s/ha)	Control Rate (L/S)	Assumed Storage	Required Storage Volume (m^3)	Required Storage Volume (m^3/ha)
West Huntmar	COMM2	Commercial	3.15	86	0.80	5-Year	186	585	100Yr Onsite	700	222
	COMM1	Commercial	3.61	86	0.80	5-Year	186	671	100Yr Onsite	674	186
	Park1	Park	1.23	29	0.40	5-Year	92	113	100Yr Onsite	189	154
	Park2	Park	4.66	29	0.40	5-Year	93	433	100Yr Onsite	316	68
	SCHL1	School	7.46	57	0.60	5-Year	139	1040	100Yr Onsite	938	126
	EXT1	Commercial	5.07	86	0.80	5-Year	160	812	100Yr Onsite	908	179
East Huntmar	H-170C	Commercial	3.63	86	0.80	-	220	798	50m^3/ha	181	50
	H-112	School	0.75	57	0.60	-	220	164	100Yr Onsite	83	111
	H-126B	Park	1.07	29	0.40	-	115	123	100Yr Onsite	96	90
	H-SCHOOL	School	2.51	57	0.60	-	220	553	100Yr Onsite	176	70
	H-71B	Commercial	1.11	86	0.80	-	250	277	50m^3/ha	55	50
	H-155B	Commercial	1.73	86	0.80	-	250	432	50m^3/ha	86	50
External	H-194A	Commercial	8.07	86	0.80	-	220	1774	50m^3/ha	403	50
	H-194B	Commercial	4.90	86	0.80	-	220	1078	50m^3/ha	245	50
	C-25	Commercial	0.70	86	0.80	-	85	60	50m^3/ha	35	50
	A-8	Residential	1.02	71	0.70	-	230	234	40m^3/ha	41	40

Legend

KWMSS Subcatchments

JFSA CANADA INC.
WATER RESOURCE ENGINEERING, ENVIRONMENTAL MANAGEMENT AND LAND PLANNING CONSULTANTS

ATREL Engineering Ltd. Ltée
Engineers — Ingénieurs
1-2584 CHAMBERLAND STREET, ROCKLAND, ONTARIO K4K 1M6
TEL.: (613) 446-7423

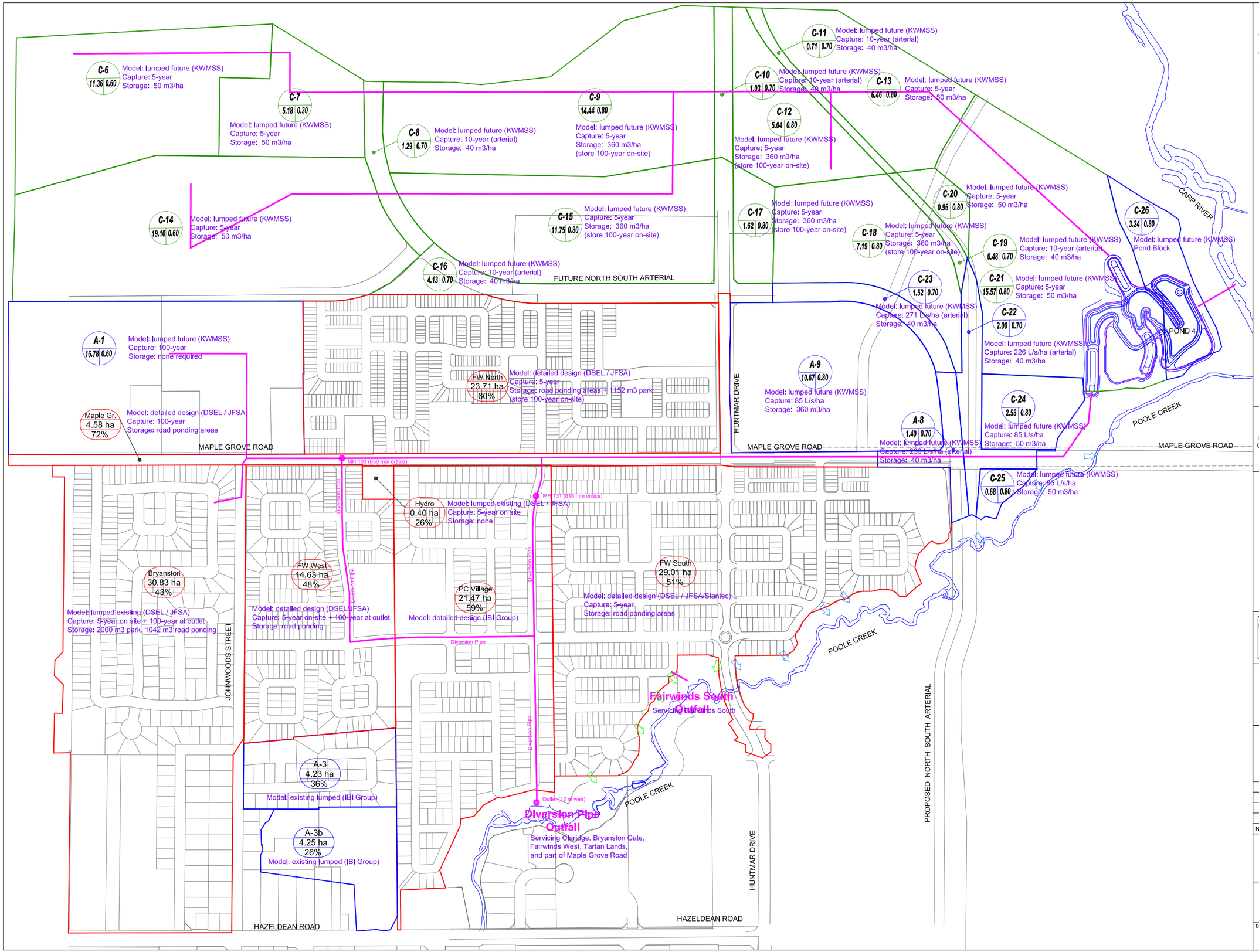
SCALE : 1:5,500

0 50 100 150 200 250 300 m

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

TITLE :
Figure B3: KWMSS release rates to Maple Grove Storm Sewer

PROJECT	1801-19
DRAWN:	ON
DATE:	July 2023



LEGEND :

- INTERIM DRAINAGE AREA (S TRUNK, DETAILED)
- INTERIM DRAINAGE AREA (S TRUNK, LUMPED)
- ULTIMATE DRAINAGE AREA (N TRUNK, LUMPED)

Hydro 0.40 ha 26%
- DRAINAGE AREA ID
- DRAINAGE AREA (HA)
- TOTAL IMPERVIOUSNESS

C-23 1.52 0.70
- KWMSS DRAINAGE AREA ID
- RUNOFF COEFFICIENT
- DRAINAGE AREA (HA)

SCALE :

0 100 200 300 400 m

J.F. Sabourin & Associates Inc.
WATER RESOURCES AND ENVIRONMENTAL CONSULTANTS
OTTAWA (613) 836-3884
GATINEAU (819) 243-6858

CLIENT :

DSEL
david schaeffer engineering ltd
120 IBER ROAD, SUITE 203
OTTAWA, ONTARIO K2S 1E9
(613) 836-0856

PROJECT :

Kanata West Community
Pond 4

No.	BY	DATE	DESCRIPTION	BY

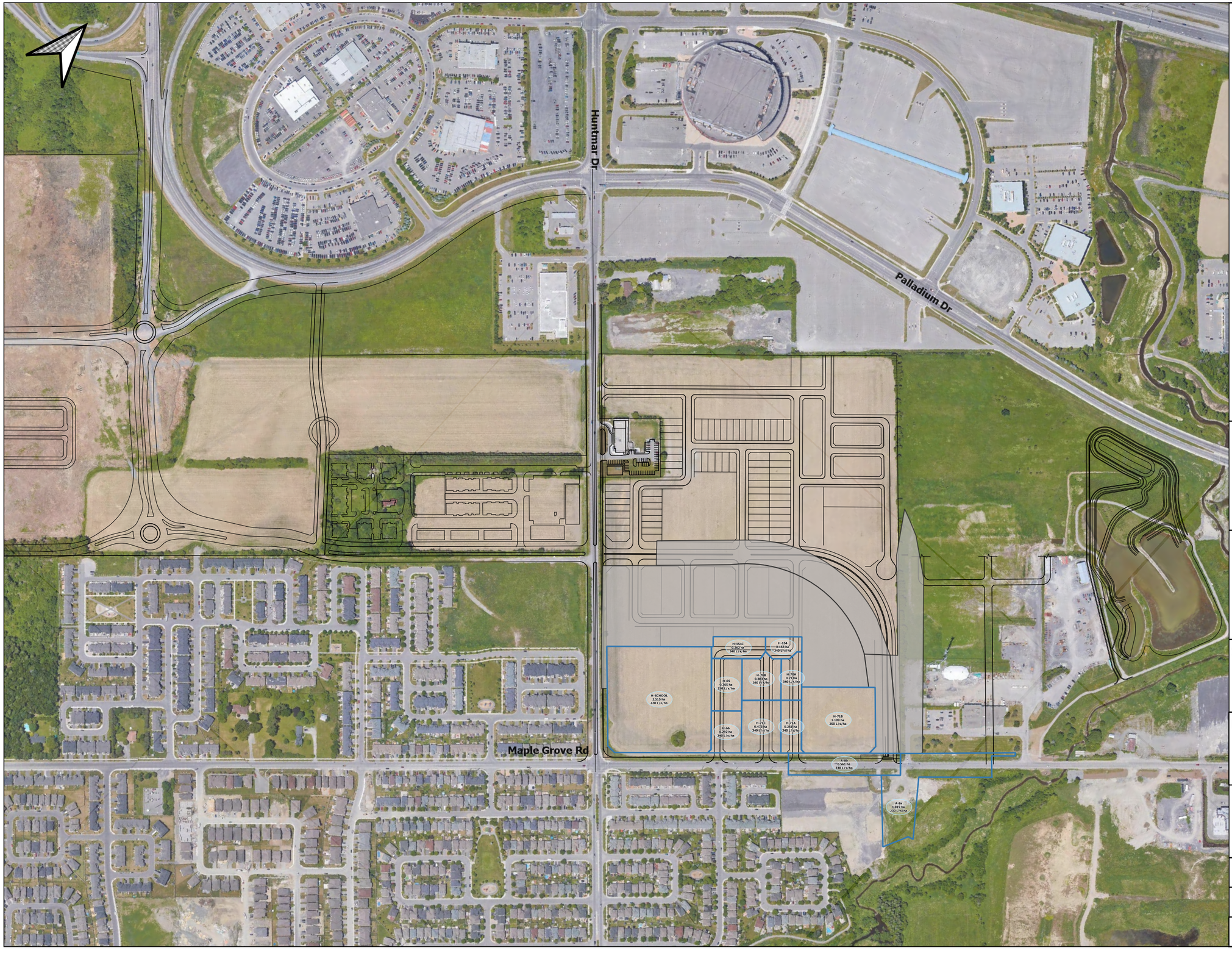
Proposed Ultimate Conditions Drainage Area to SWM Facility

FIGURE 3

DESIGNED:	
DRAWN:	LP
VERIFIED:	JFS
APPROVED:	JFS

DRAWING REF.
631-07\Design\Pond Exp\201412\CAD\JFSA Fairwinds Global.dwg

DATE	PROJECT No.
Dec/14	631-07



Legend

- KWMSS Subcatchments Removed
- JFSA Proposed Subcatchments

JFSA CANADA INC.
WATER RESOURCE ENGINEERING, ENVIRONMENTAL MANAGEMENT AND LAND PLANNING CONSULTANTS

ATREL Engineering Ltd Ltée
Engineers — Ingénieurs
1-2584 CHAMBERLAND STREET, ROCKLAND, ONTARIO K4K 1M6
TEL.: (613) 446-7423

SCALE : 1:5,500

0 50 100 150 200 250 300 m

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

TITLE :
Figure B4: JFSA 2023 release rates to Maple Grove Storm Sewer

PROJECT	1801-19
DRAWN:	ON
DATE:	July 2023

Table B3 - Maple Grove Minor Capture Rates Per JFSA 2014 PDB

Name	Area (ha)	Minor Capture Rate (L/s/ha)	Minor Capture Rate (L/s)
C-22	2.00	226	452
A-9	10.67	85	907
C-23	1.52	271	412
A-8	1.40	230	322
Total	**15.59**	**134**	**2093**

Table B4 - Maple Grove Minor Capture Rates Per JFSA 2023 Study

Name	Area (ha)	Minor Capture Rate (L/s/ha)	Minor Capture Rate (L/s)
A-8	1.02	230	234
H-154	0.16	340	56
H-154C	0.26	340	89
H-65	0.37	250	91
H-66	0.29	340	99
H-70A	0.21	340	71
H-70B	0.38	340	130
H-71A	0.25	340	85
H-71B	1.11	250	277
H-71C	0.47	340	161
A-8b	0.56	230	129
H-SCHOOL	2.51	220	553
Total	**7.60**	**260**	**1977**

Table B5 -Future Huntmar Development HGL Summary

Name	Invert	Top Of MH	100YrSCS12Hr	
			HGL	Freeboard
MH102	96.48	101.20	97.33	3.87
MH103	96.12	100.15	97.09	3.06
MH110	98.43	101.50	98.77	2.73
MH111	97.99	101.39	98.33	3.06
MH112	97.89	101.83	98.31	3.52
MH113	97.71	101.39	98.20	3.19
MH114	97.49	101.29	98.02	3.27
MH115	97.37	101.29	97.96	3.33
MH120	98.18	101.00	98.41	2.59
MH121	97.16	101.23	97.75	3.48
MH125	98.14	101.30	98.37	2.93
MH126	97.73	100.90	98.23	2.67
MH127	96.75	100.65	97.62	3.03
MH130	97.46	100.62	97.75	2.87
MH131	97.20	100.50	97.62	2.88
MH132	96.42	100.15	97.35	2.80
MH133	95.43	99.70	96.95	2.75
MH141	98.03	101.60	98.41	3.19
MH142	96.35	101.44	97.33	4.11
MH143	97.70	101.50	98.15	3.35
MH144	95.99	101.40	97.00	4.40
MH146	98.62	101.60	98.85	2.75
MH147	97.82	101.45	98.02	3.43
MH148	96.49	100.30	97.07	3.23
MH151	97.42	101.40	97.88	3.53
MH152	95.46	101.30	96.55	4.75
MH156	94.83	100.27	96.33	3.94
MH157	94.66	100.17	96.26	3.91
MH158	94.23	99.63	96.04	3.59
MH160	96.35	98.93	96.69	2.24
MH161	95.91	98.93	96.30	2.63
MH162	95.68	99.41	96.20	3.22
MH170	95.99	99.35	96.78	2.57
MH171	94.94	99.29	96.64	2.65
MH172	96.69	100.05	96.94	3.11
MH173	94.75	99.25	96.14	3.11
MH174	94.46	98.70	95.78	2.92
MH175	94.05	98.25	95.87	2.38
MH176	93.88	98.60	95.79	2.81
MH177	95.79	100.05	96.93	3.12
MH178	93.68	98.60	95.68	2.92
MH179	95.96	99.75	96.15	3.61
MH190	93.39	98.65	95.58	3.07
MH191	92.76	98.70	95.45	3.25

Table B5 -Future Huntmar Development HGL Summary

Name	Invert	Top Of MH	100YrSCS12Hr HGL	100YrSCS12Hr Freeboard
MH192	92.07	98.00	95.26	2.74
MH193	91.68	97.00	95.01	1.99
MH194	91.45	96.99	94.77	2.22
M209	100.29	104.96	101.02	3.94
M210	99.43	104.53	100.36	4.17
M211	99.21	103.56	100.06	3.51
M212	98.88	102.65	99.70	2.95
M213	98.47	102.24	99.48	2.76
M217	98.80	102.12	99.39	2.73
M218	98.30	101.77	99.06	2.71
M220	97.16	101.79	98.41	3.38
M305	100.82	104.87	101.60	3.27
M306	100.54	104.46	101.48	2.98
MH65	98.10	101.25	98.35	2.90
MH66	97.80	101.35	98.15	3.20
MH67	96.82	101.40	97.96	3.44
MH70	98.45	101.25	99.05	2.20
MH71	97.99	100.85	99.05	1.80
MH72	97.69	100.80	98.82	1.99
MH73	97.47	100.70	98.39	2.32
MH74	96.88	100.35	97.43	2.93
MH75	96.66	100.45	97.37	3.09
MH76	96.44	100.50	97.20	3.30
MFUT_200	105.99	109.07	106.16	2.91
MFUT_201	104.43	107.63	104.63	3.00
MFUT_202	103.48	106.41	103.83	2.58
MFUT_203	105.97	108.49	106.14	2.35
MFUT_204	104.04	107.53	104.39	3.14
MFUT_205	102.83	106.88	103.41	3.47
MFUT_206	102.46	105.88	103.01	2.87
MFUT_207	101.80	105.23	102.39	2.84
MFUT_214	97.20	101.79	98.11	3.68
MFUT_216	96.80	101.21	97.61	3.60
MFUT_219	98.76	101.79	99.70	2.10
MFUT_301	101.73	104.20	101.94	2.26
MFUT_302	101.56	104.22	101.75	2.47
MFUT_307	101.28	104.49	101.70	2.79
MFUT_308	100.99	104.94	101.70	3.24
Pond 4	90.70	95.05	94.74	0.31
			Min	1.80
			Max	4.75
			Average	3.01

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Gatineau. QC
Montréal. QC
Québec. QC

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)		Ultimate Model (City, 2021)		Proposed Design (Atrel, July 2023)		Existing Difference		Ultimate Difference	
		Area (m^2)	Volume (m^3)	Area (m^2)	Volume (m^3)	Area (m^2)	Volume (m^3)	Area (m^2)	Volume (m^3)	Area (m^2)	Volume (m^3)	Area (m^2)	Volume (m^3)
93.20	0.00	19,714	0	38,860	0	31,543	0	33,281	0	13,567	0	-5,579	0
93.25	0.05	19,720	986	38,872	1,943	31,552	1,577	33,592	1,672	13,872	686	-5,280	-271
93.30	0.10	20,072	1,981	39,447	3,901	32,115	3,169	33,903	3,359	13,831	1,379	-5,544	-542
93.35	0.15	20,354	2,991	39,910	5,885	32,566	4,786	34,214	5,062	13,861	2,071	-5,696	-823
93.40	0.20	20,640	4,016	40,376	7,892	33,024	6,426	34,526	6,781	13,886	2,765	-5,850	-1,112
93.45	0.25	20,991	5,057	40,950	9,925	33,586	8,091	34,838	8,515	13,846	3,458	-6,113	-1,411
93.50	0.30	20,997	6,107	40,957	11,973	33,595	9,771	35,151	10,264	14,154	4,158	-5,807	-1,709
93.55	0.35	21,435	7,167	41,329	14,030	34,297	11,468	36,393	12,053	14,958	4,886	-4,936	-1,977
93.60	0.40	21,870	8,250	42,077	16,115	34,991	13,200	36,659	13,879	14,790	5,629	-5,418	-2,236
93.65	0.45	22,065	9,348	42,453	18,229	35,304	14,957	36,925	15,719	14,860	6,371	-5,528	-2,510
93.70	0.50	22,383	10,459	43,013	20,365	35,812	16,735	37,191	17,572	14,808	7,112	-5,822	-2,794
93.75	0.55	22,626	11,585	43,430	22,526	36,201	18,536	37,457	19,438	14,831	7,853	-5,973	-3,088
93.80	0.60	22,868	12,722	43,877	24,709	36,589	20,355	37,723	21,317	14,854	8,595	-6,154	-3,392
93.85	0.65	23,112	13,872	44,304	26,914	36,979	22,194	37,988	23,210	14,876	9,339	-6,316	-3,703
93.90	0.70	23,356	15,033	44,748	29,140	37,370	24,053	38,254	25,116	14,898	10,083	-6,494	-4,024
93.95	0.75	23,600	16,207	45,188	31,388	37,761	25,931	38,519	27,036	14,919	10,828	-6,668	-4,353
94.00	0.80	23,846	17,393	45,628	33,659	38,154	27,829	38,785	28,968	14,938	11,575	-6,843	-4,690
94.05	0.85	24,171	18,594	46,223	35,955	38,674	29,750	39,050	30,914	14,879	12,320	-7,173	-5,041
94.10	0.90	24,378	19,807	46,600	38,275	39,005	31,692	39,315	32,873	14,937	13,066	-7,285	-5,402
94.15	0.95	24,842	21,038	47,450	40,627	39,747	33,661	39,581	34,845	14,739	13,808	-7,869	-5,781
94.20	1.00	24,843	22,280	47,761	43,007	39,749	35,648	39,846	36,831	15,003	14,551	-7,915	-6,176
94.25	1.05	25,663	23,543	49,339	45,434	41,061	37,668	40,469	38,839	14,806	15,296	-8,870	-6,595
94.30	1.10	26,368	24,843	50,046	47,919	42,189	39,749	40,762	40,870	14,394	16,026	-9,284	-7,049
94.35	1.15	26,531	26,166	50,303	50,428	42,450	41,865	41,050	42,915	14,519	16,749	-9,253	-7,512
94.40	1.20	27,023	27,505	50,992	52,960	43,237	44,007	41,336	44,975	14,312	17,470	-9,656	-7,985
94.45	1.25	27,438	28,866	51,564	55,524	43,900	46,186	41,619	47,049	14,181	18,182	-9,946	-8,475
94.50	1.30	27,607	30,242	51,863	58,110	44,172	48,388	41,900	49,137	14,293	18,894	-9,963	-8,973
94.55	1.35	27,767	31,627	52,128	60,709	44,428	50,603	42,179	51,239	14,412	19,612	-9,949	-9,471
94.60	1.40	27,984	33,020	52,536	63,326	44,775	52,833	42,457	53,354	14,473	20,334	-10,079	-9,971
94.65	1.45	28,293	34,427	52,782	65,959	45,269	55,084	42,734	55,484	14,440	21,057	-10,048	-10,475
94.70	1.50	28,315	35,843	53,212	68,609	45,305	57,348	43,015	57,628	14,700	21,785	-10,197	-10,981
94.75	1.55	28,379	37,260	53,324	71,272	45,407	59,616	46,204	59,858	17,825	22,598	-7,120	-11,414
94.80	1.60	29,146	38,698	53,674	73,947	46,634	61,917	47,157	62,192	18,011	23,494	-6,518	-11,755
94.85	1.65	29,974	40,176	54,922	76,662	47,959	64,282	48,101	64,573	18,126	24,397	-6,822	-12,089
94.90	1.70	30,921	41,698	56,239	79,441	49,474	66,717	49,061	67,002	18,140	25,304	-7,178	-12,438
94.95	1.75	31,457	43,258	56,952	82,271	50,331	69,212	50,069	69,481	18,612	26,223	-6,883	-12,790
95.00	1.80	32,733	44,862	58,804	85,164	52,372	71,780	52,144	72,036	19,411	27,173	-6,660	-13,129
95.05	1.85	33,894	46,528	60,125	88,137	54,230	74,445	53,478	74,676	19,585	28,148	-6,647	-13,461

*Active Storage Only

Table C-2 Criteria for Required Storage Volumes

SWM Facility	Area [1] (ha)	Imperviousness (%)	Storage Volume for Impervious Level [2] (m^3/ha)
N/A	N/A	55	110
Pond 4	239.7	60	117
N/A	N/A	70	130

[1] Refer to Appendix C for drainage areas to SWM Facility.

[2] 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-3: Required Storage Volumes for SWM Facility

Pond Component	Required Volume (m^3)	Provided Volume [4] (m^3)	Volume Ratio	Provided Area [5] (m^2)	Provided Elevation (m)
Permanent Pool (PP) [1]	18387	49942	2.72	33281	93.200
Quality Control [2]	9588	9852	1.03	N/A	93.500
Extended Detention [3]	N/A	35467	N/A	N/A	94.200
Forebay (20% PP)	3677	N/A	N/A	4855	92.900
PP - Forebay	14709	N/A	N/A	28426	93.200
			Area Ratio (%) [6] =	15	

[1] Required PP volume based on Table B-1 (116.7 - 40 = 76 m^3/ha).

[2] Required quality control volume based on 40 m^3/ha.

[3] Provided extended detention volume based on an elevation of 94.2 m as per KWMSS.

[4] Based on deatailed grading plan (refer to Pond Figure).

[5] As per MOE, Maximum Forebay Area: 33% of Total Permanent Pool.

Permanent Pool		Flow Augmentation Orifice		Quality Control Orifice	
Area (C3)	33281.10 m^2	Diameter 0.200	m	Diameter 0.350	m
Volume	49941.55 m^3				
PP Elev	93.200 m	Area 0.031	m^2	Area 0.096	m2
QC Det.	93.500 m	Invert 93.200	m	Invert 93.400	m
h (m)	0.300 m	C_o 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-5: Extended Detention Drawdown Time for SWM Facility

Elev.	Active Storage			C2	Drawdown Time	Drawdown Time	Flow	Demarkation
(m)	V (m^3)	A (m^2)	depth (m)	(m^2/m)	(h)	(days)	(m^3/s)	Point
93.20	**0.00**	**31920.58**	**0.00**				**0**	**PP Elev**
93.25	1603.68	32226.68	0.05	-21088	47.35	1.97	0.01	
93.30	3222.66	32533.13	0.10	-7480	67.18	2.80	0.01	
93.35	4856.99	32840.12	0.15	-2940	82.52	3.44	0.02	
93.40	**6506.68**	**33147.60**	**0.20**	**-668**	**95.58**	**3.98**	**0.03**	**FA Elev**
93.45	8171.75	33455.58	0.25	698	107.68	4.49	0.05	
93.50	**9852.25**	**33764.67**	**0.30**	**1612**	115.50	**4.81**	**0.07**	**QC Elev**
93.55	11571.48	35008.09	0.35	4934	121.44	5.06	0.09	
93.60	13328.63	35278.30	0.40	4993	126.30	5.26	0.11	
93.65	15099.30	35548.42	0.45	5038	130.39	5.43	0.13	
93.70	16883.46	35818.51	0.50	5075	133.94	5.58	0.15	
93.75	18681.14	36088.51	0.55	5104	137.09	5.71	0.17	
93.80	20492.30	36358.41	0.60	5129	139.92	5.83	0.19	
93.85	22316.97	36628.30	0.65	5150	142.53	5.94	0.20	
93.90	24155.12	36898.02	0.70	5167	144.96	6.04	0.22	
93.95	26006.76	37167.61	0.75	5182	147.25	6.14	0.23	
94.00	27871.88	37437.22	0.80	5195	149.43	6.23	0.24	
94.05	29750.47	37706.72	0.85	5207	151.51	6.31	0.26	
94.10	31642.54	37976.16	0.90	5217	153.51	6.40	0.27	
94.15	33548.08	38245.55	0.95	5226	155.44	6.48	0.28	
94.20	**35467.09**	**38515.09**	**1.00**	**5234**	157.31	**6.55**	**0.29**	**Ext. Det.**

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 C-6: 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)	45.759	L (m)	45.000		
							z (H:1V)	1.0	z (H:1V)	1.0		
			Area (m^2)	0.03142	Area (m^2)	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_o	0.62	C_o	0.62	C_w	1.800	C_w	1.580		
			Q @ D	0.027	Q @ D	0.111	n contr.	0	n contr.	2		
Elevation (m)	Active Sto. (m^3)	Notes	Head (m)	Outflow (m^3/s)	Head (m)	Outflow (m^3/s)	Head (m)	Outflow (m^3/s)	Head (m)	Outflow (m^3/s)	Outflow (m^3/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	0.922	0.000	0.000	1.006	3.741
94.30	39397		1.100	0.086	0.900	0.225	0.100	2.610	0.000	0.000	2.697	3.940
94.35	41400		1.150	0.088	0.950	0.233	0.150	4.801	0.000	0.000	4.889	4.140
94.40	43417		1.200	0.090	1.000	0.240	0.200	7.399	0.000	0.000	7.490	4.342
94.45	45447		1.250	0.093	1.050	0.247	0.250	10.352	0.000	0.000	10.445	4.545
94.50	47490		1.300	0.095	1.100	0.254	0.300	13.623	0.000	0.000	13.717	4.749
94.55	**49547**		**1.350**	**0.096**	**1.150**	**0.261**	**0.350**	**17.186**	**0.000**	**0.000**	**17.282**	**4.955**
94.60	51616		1.400	0.098	1.200	0.268	0.400	21.019	0.000	0.000	21.118	5.162
94.65	53699		1.450	0.100	1.250	0.274	0.450	25.108	0.050	0.796	25.209	5.370
94.70	55820		1.500	0.102	1.300	0.280	0.500	29.439	0.100	2.252	29.541	5.582
94.75	58061		1.550	0.104	1.350	0.286	0.550	34.000	0.150	4.142	34.104	5.806
94.80	60338		1.600	0.106	1.400	0.292	0.600	38.783	0.200	6.382	38.888	6.034
94.85	62655		1.650	0.107	1.450	0.298	0.650	43.777	0.250	8.927	43.885	6.266
94.90	65013		1.700	0.109	1.500	0.304	0.700	48.977	0.300	11.745	49.086	6.501
94.95	67412		1.750	0.111	1.550	0.310	0.750	54.376	0.350	14.814	54.486	6.741
95.00	69884		1.800	0.112	1.600	0.315	0.800	59.967	0.400	18.115	60.080	6.988
95.05	**72460**	**Top Berm**	**1.850**	**0.114**	**1.650**	**0.321**	**0.850**	**65.747**	**0.450**	**21.635**	**65.861**	**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-6: 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_p = peak outflow during design quality storm
- V_s = settling velocity

Input:
- r = 3.93 (82.5 m / 21 m)
- Q_p = 0.070 m^3/s (at elevation 93.5 m)
- V_s = 0.0003 m/s

L_{min} = 30.31 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 C-6 of Appendix B)

Dispersion Criteria

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

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

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

Input:
- Q = 13.610 m^3/s
- d = 3.34 m
- Vf = 0.5 m/s

L_{min} = 65.20 m

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

Minimum Length of Forebay Required	65 m	
Length of Forebay Provided	**82.5 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_{avg} = average width of forebay

Input:
- Q = 13.610 m^3/s
- d = 3.34 m
- W_{avg} = 27 m (21 m bottom, 33 m top)

V = 0.15 m/s < 0.15 m/s

CALCULATION SHEET C-7: 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_p = peak outflow during design quality storm
- V_s = settling velocity

Input:

r =	5.56		(100 m / 18 m)
Q_p =	0.070	m^3/s	(at elevation 93.5 m)
V_s =	0.0003	m/s	

L_{min} = 36.05 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:

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

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

Input:

Q =	9.830	m^3/s
d =	3.35	m
Vf =	0.5	m/s

L_{min} = 47.01 m

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

Minimum Length of Forebay Required	47 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_{avg} = average width of forebay

Input:

Q =	9.830	m^3/s	
d =	3.35	m	
W_{avg} =	24	m	(18 m bottom, 30 m top)

V = 0.12 m/s < 0.15 m/s

J.F. Sabourin and Associates Inc.
52 Springbrook Drive,
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T 613-836-3884 F 613-836-0332

jfsa.com

Ottawa. ON
Paris. ON
Gatineau. QC
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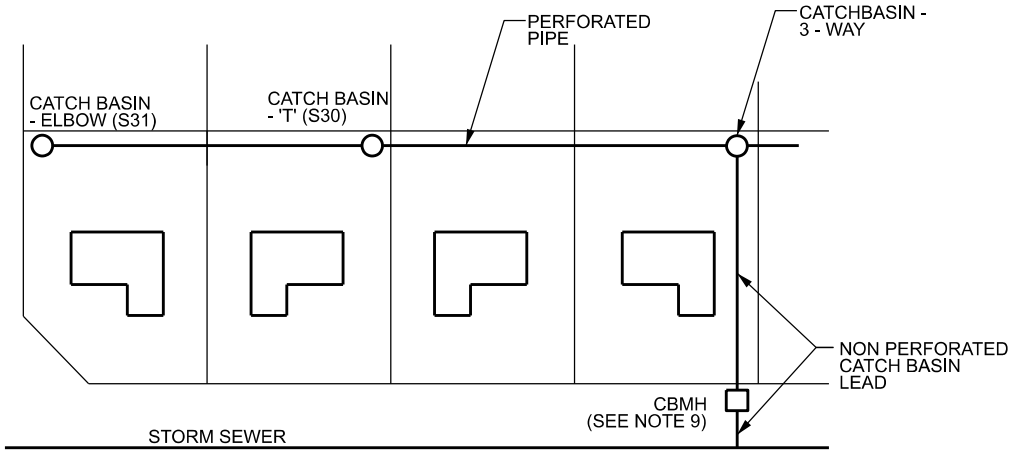
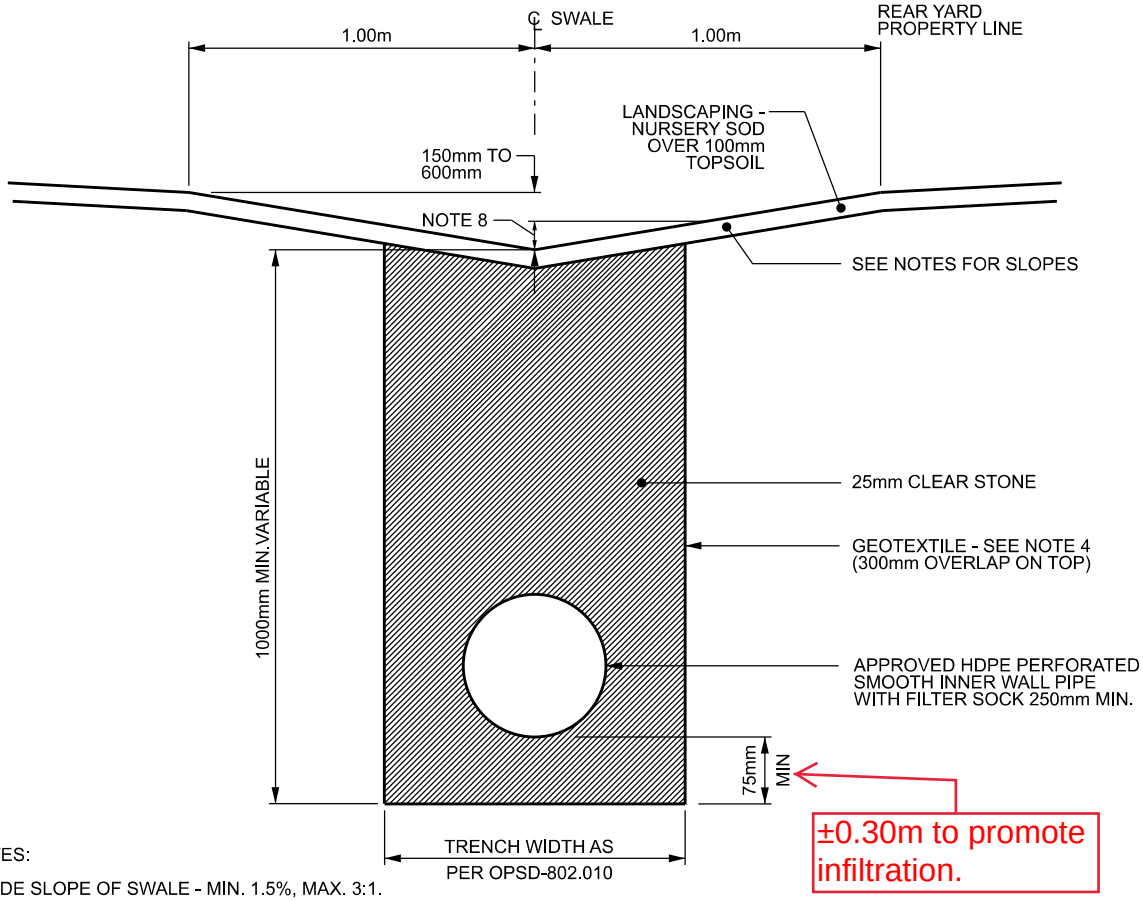
Québec. QC

Attachment D

Water Budget





NOTES:

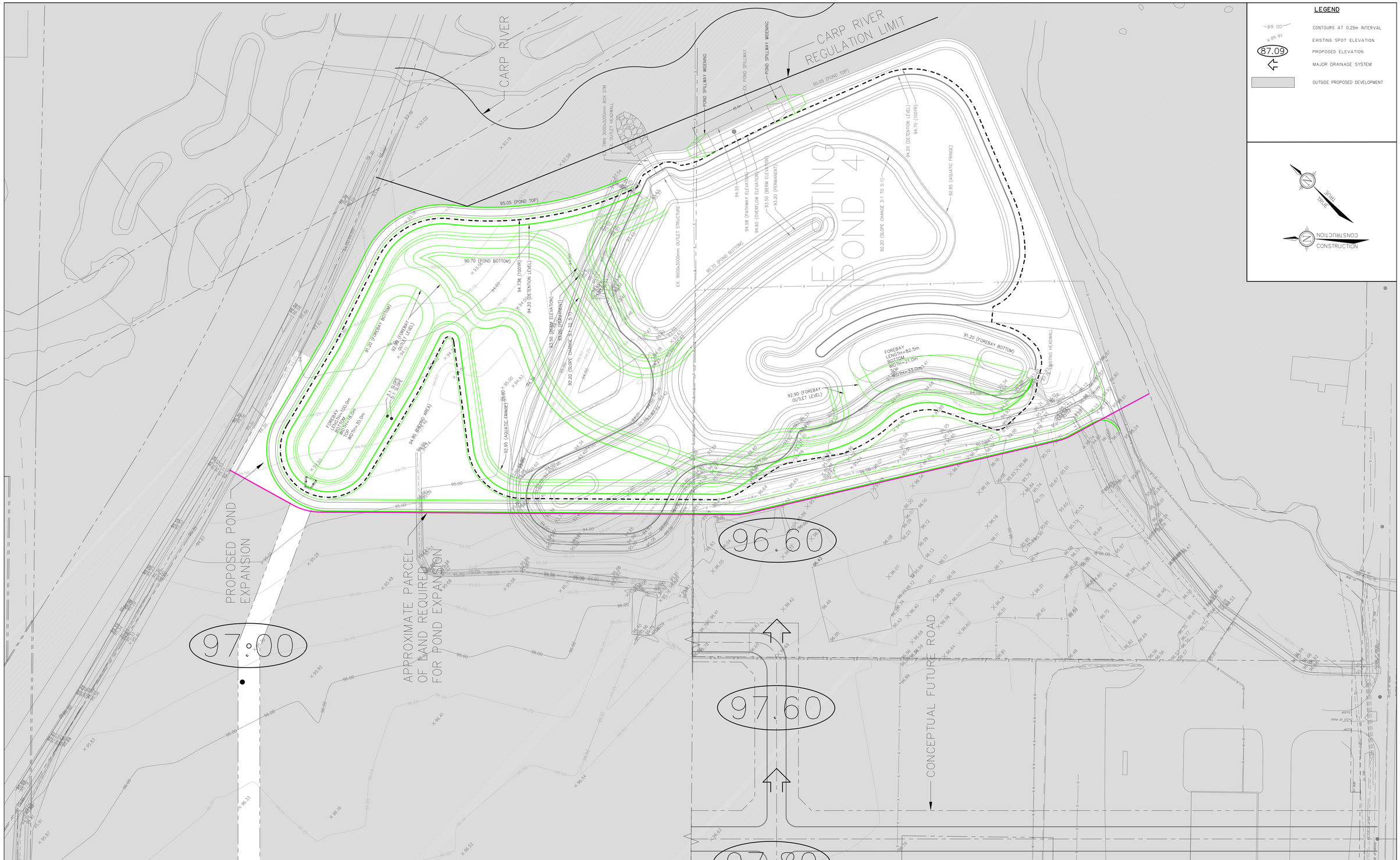
1. SIDE SLOPE OF SWALE - MIN. 1.5%, MAX. 3:1.
2. LONGITUDINAL SLOPE OF SWALE WITHOUT PERFORATED PIPE 1.5% MIN.
3. LONGITUDINAL SLOPE OF SWALE WITH PERFORATED PIPE 0.5% MIN. WITH 1% OR GREATER PREFERRED.
4. UNDER DRIVEWAYS NON PERFORATED PIPE TO BE USED WITH 75mm BEDDING AND BACKFILLED WITH APPROVED NATIVE MATERIAL.
5. CB "T" TO BE SPACED ABOUT EVERY 20 TO 25m AND LOCATED 1m OFF REAR YARD AND SIDE YARD PROPERTY LINES.
6. CB ELBOW TO BE AT UPPER ENDS OF PERFORATED PIPE AND LOCATED 1m OFF REAR YARD AND SIDE YARD PROPERTY LINES.
7. GEOTEXTILE SHALL BE APPROVED NON-WOVEN CLASS 1 OR AS SPECIFIED.
8. MAXIMUM REAR YARD WATER DEPTH IS 300mm.
9. A STANDARD CATCHBASIN NO DEEPER THAN 2.4m OR A CATCHBASIN MAINTENANCE HOLE. STANDARD FRAMES C/W PERFORATED OR SOLID COVER AS SPECIFIED. STANDARD ICD'S AS SPECIFIED

N.T.S.

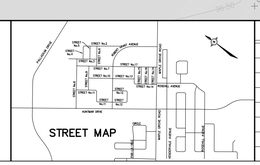
Ottawa

PERFORATED PIPE INSTALLATION FOR REAR YARD AND LANDSCAPING APPLICATIONS

DATE:	MARCH 2007
REV. DATE:	MARCH 2019
DWG. No.:	S29



THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, 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
2	ISSUED FOR SANITARY TRUNK MOECC APPROVAL	AUG. 4/20	AGS
1	REVISED AS PER CITY COMMENTS	OCT. 7/20	AGS
1	REVISED AS PER NEW ROAD ALIGNMENT	MAR. 4/21	AGS
2	REVISED AS PER CITY COMMENTS	MAR. 30/21	AGS
2	*RECORD DRAWING*	*AUG 25/21*	*AGS*
1	REVISED AS PER CITY COMMENTS	SEP. 20/21	AGS
2	REVISED AS PER CITY COMMENTS	APR. 18/22	AGS
3	REVISED AS PER CITY COMMENTS	AUG. 03/23	AGS

SCALE 1:750 (8m 0 24m)

DESIGN AGS
CHECKED JMD
DRAWN CED
CHECKED AGS
APPROVED JMD

LICENSED PROFESSIONAL ENGINEER A. G. Y. SAUVE 100142393 Aug 3, 2023 PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER J.M.J.DECOEUR Aug 3, 2023 PROVINCE OF ONTARIO

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Engineers - Ingénieurs
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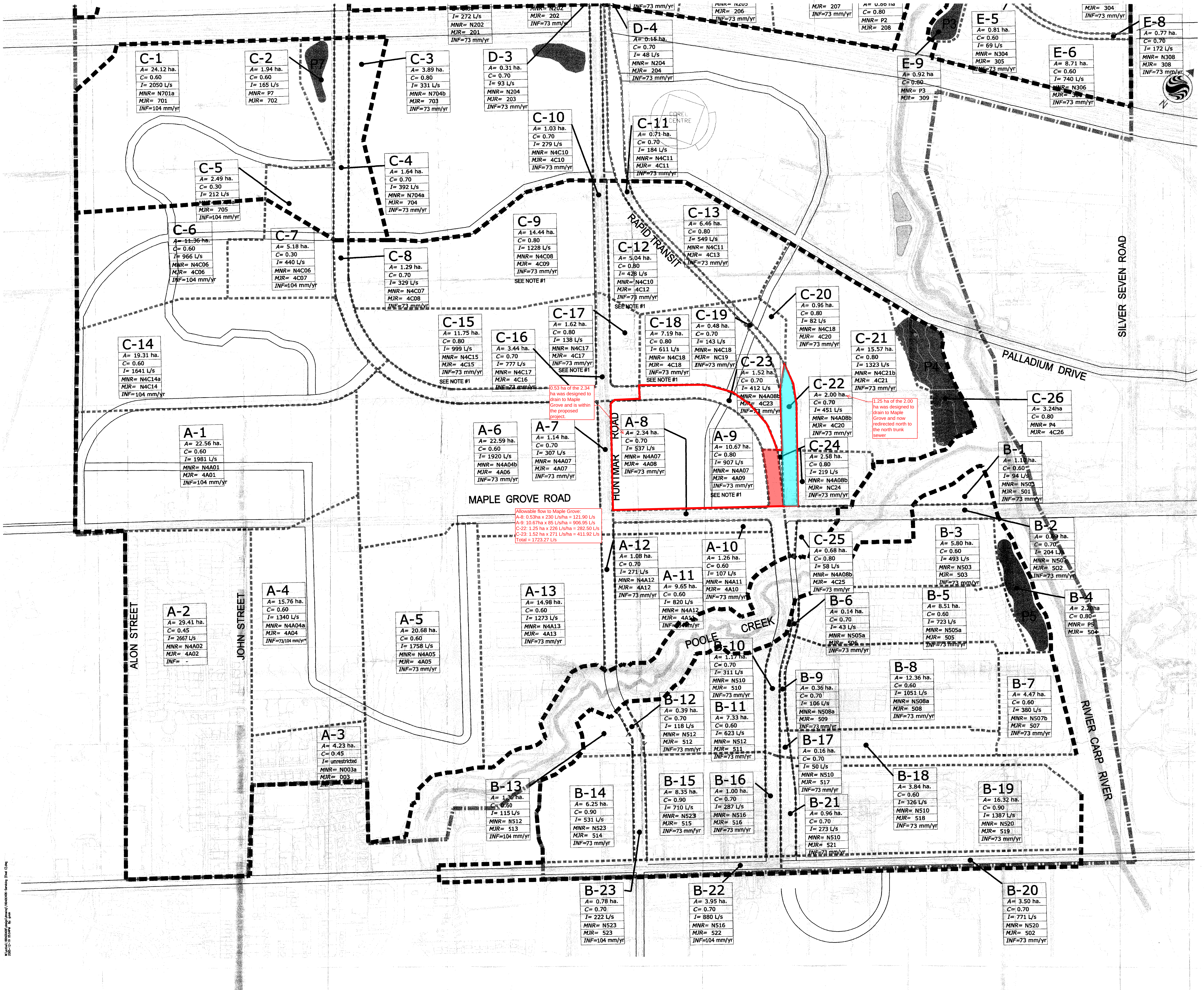
CITY OF OTTAWA
130 HUNTMAR DR.

LIONESS DEVELOPMENT INC.

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

PLAN
STORMWATER MANAGEMENT POND



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Legend

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

A-1	DRAINAGE AREA IDENTIFICATION
A= 72.31 ha.	AREA IN HECTARES
C= 0.60	RUNOFF COEFFICIENT
I= 246 L/s	100yr. INLET CAPACITY (L/s)
MNR= N4A01	MINOR SYSTEM NODE NUMBER
MJR= 4A01	MAJOR SYSTEM SEGMENT NUMBER
INF=73 mm/yr	INFILTRATION

Notes

* REFER TO FIGURE 3.2 IN KANATA WEST MASTER SERVICING 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 $360 m^3/ha$, OR IN SUFFICIENT QUANTITY TO DEMONSTRATE COMPLETE CONTAINMENT OF THE 100yr EVENT. (i.e. NO MAJOR SYSTEM FLOW IN THE 1:100yr EVENT)

CCL/IBI

1770 WOODWARD DR., OTTAWA (613)225-1311

Revision		By	Appd.	Date
2	REVISED FOR DEC.21/05 SUBMISSION	GBU	SJP	DEC.21/05
1	REVISED AS PER CITY COMMENTS (Sept.16/05)	GBU	MAF	OCT.28/05

File Name: 160400406	Dwn.	Chkd.	Dsgn.	Date
	LTM	MAF	MAF	AUG./05

Seals

Client/Project

Kanata West Concept Plan
Master Servicing Study

Ottawa, Ontario

Title

STORM DRAINAGE AREA PLAN
SOUTH PONDS

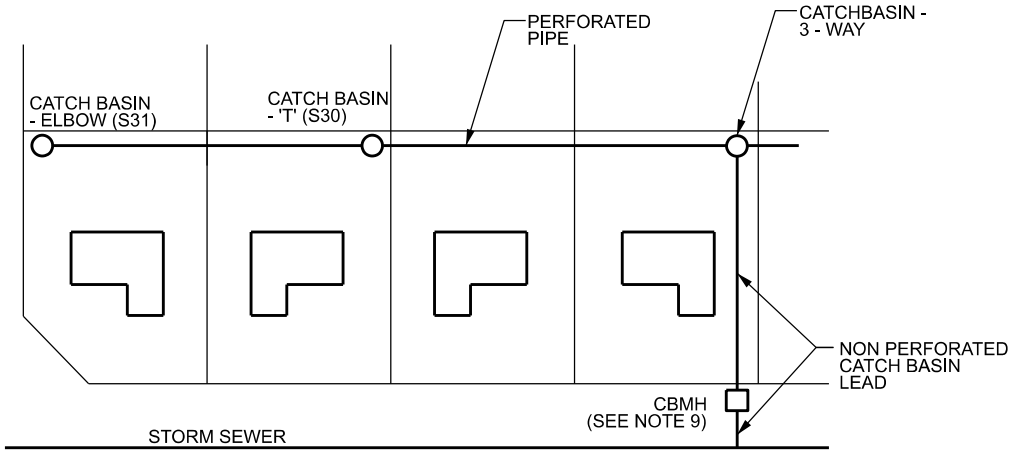
Project No. 60400406

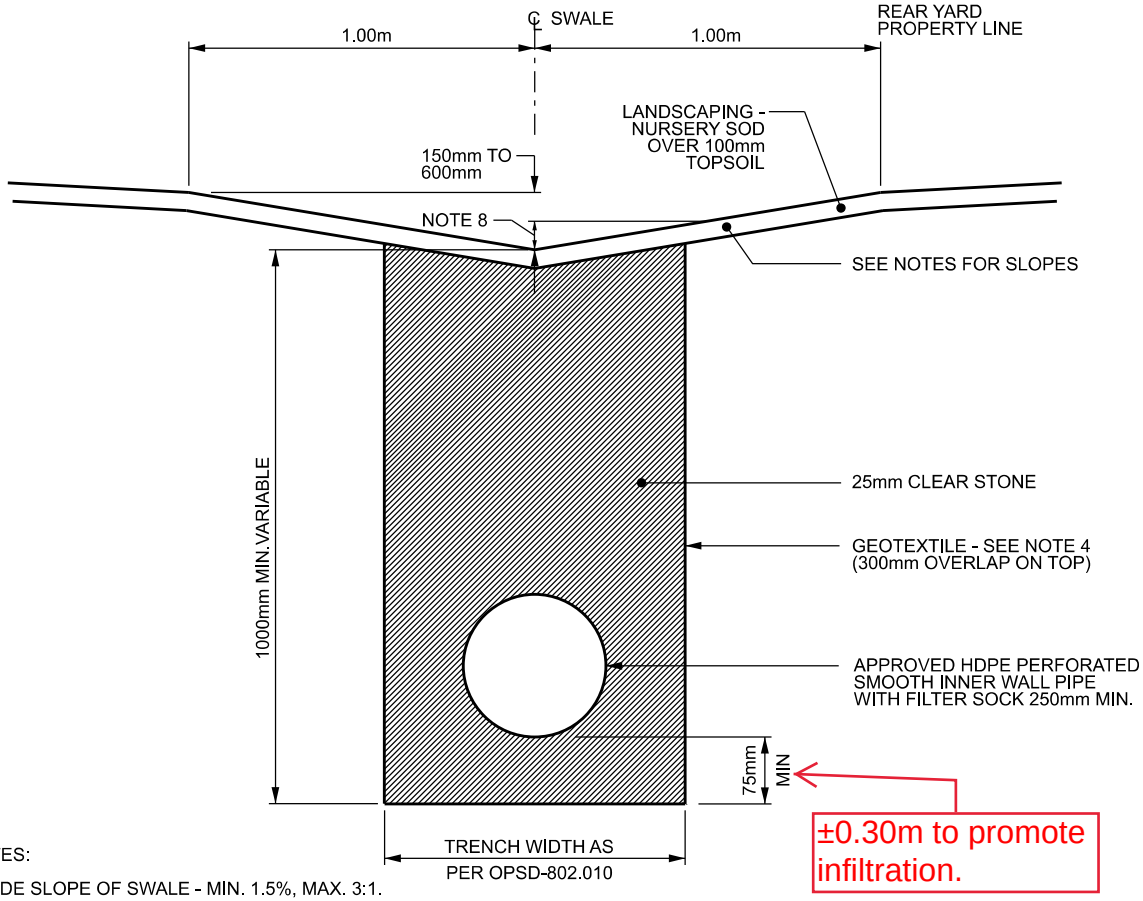
Scale 1:3000 (0 30 90 150m)

Drawing No. ST-PS

Sheet 3 of 7

Revision 2





NOTES:

1. SIDE SLOPE OF SWALE - MIN. 1.5%, MAX. 3:1.
2. LONGITUDINAL SLOPE OF SWALE WITHOUT PERFORATED PIPE 1.5% MIN.
3. LONGITUDINAL SLOPE OF SWALE WITH PERFORATED PIPE 0.5% MIN. WITH 1% OR GREATER PREFERRED.
4. UNDER DRIVEWAYS NON PERFORATED PIPE TO BE USED WITH 75mm BEDDING AND BACKFILLED WITH APPROVED NATIVE MATERIAL.
5. CB "T" TO BE SPACED ABOUT EVERY 20 TO 25m AND LOCATED 1m OFF REAR YARD AND SIDE YARD PROPERTY LINES.
6. CB ELBOW TO BE AT UPPER ENDS OF PERFORATED PIPE AND LOCATED 1m OFF REAR YARD AND SIDE YARD PROPERTY LINES.
7. GEOTEXTILE SHALL BE APPROVED NON-WOVEN CLASS 1 OR AS SPECIFIED.
8. MAXIMUM REAR YARD WATER DEPTH IS 300mm.
9. A STANDARD CATCHBASIN NO DEEPER THAN 2.4m OR A CATCHBASIN MAINTENANCE HOLE. STANDARD FRAMES C/W PERFORATED OR SOLID COVER AS SPECIFIED. STANDARD ICD'S AS SPECIFIED

N.T.S.

Ottawa

PERFORATED PIPE INSTALLATION FOR REAR YARD AND LANDSCAPING APPLICATIONS

DATE:	MARCH 2007
REV. DATE:	MARCH 2019
DWG. No.:	S29