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FUNCTIONAL SERVICING REPORT

FOR

RICHCRAFT HOMES
TRAILS EDGE NORTH

CITY OF OTTAWA

PROJECT NO.: 20-1195

AUGUST 2022

FUNCTIONAL SERVICING REPORT
FOR
RICHCRAFT HOMES
TRAILS EDGE NORTH

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1.0 INTRODUCTION

David Schaeffer Engineering Limited (DSEL) has been retained by Richcraft Homes to prepare a Functional Servicing Report in support of the Draft Plan of Subdivision application for Trails Edge North.

The study area is located within the City of Ottawa urban boundary in the Innes ward. As illustrated in ***Figure 1***, the study area is located east of future residential lands, west of Mer Bleue Road, south of existing commercial lands fronting Innes Road, and north of a Hydro Corridor. The study area measures approximately 82 ha and is comprised of the following parcels:

- PIN 04404-1303
- PIN 04404-0280
- PIN 04404-0503
- PIN 04404-0539
- PIN 04404-0541
- PIN 04404-0542
- PIN 04404-0543
- PIN 04404-0544

The proposed concept plan would allow for the development of employment lands, park blocks, a mix of low, medium and high density residential development, and a network of roads with a mix of 14.50m, 18m, and 24m right-of-way (ROW) widths.

The subject property is within the study area of the *Master Servicing Study for East Urban Community Phase 3 Area Community Design Plan* (MSS) (DSEL, Dec 2020). The *MSS* was completed in order to provide a conceptual servicing strategy and cohesive development approach for the EUC Phase 3 Area, in support of the Official Plan Amendment based on the *East Urban Community Phase 3 Area Community Design Plan* (CDP) (Fotenn, 2020). The MSS identifies existing infrastructure and environmental constraints, describes the neighbourhood-level trunk services that will service all properties within the study area, establishes targets for future site-specific stormwater

management plans, and identifies required infrastructure upgrades to support the proposed development of the MSS area.

The objectives of this report are to:

- Provide sufficient detail to demonstrate that development of the study area will be adequately supported by municipal services, as set out in the *Master Servicing Study for East Urban Community Phase 3 Area Community Design Plan* (DSEL, Dec 2020);
- Justify any alternative servicing strategies to those proposed in the MSS, to be evaluated for the purpose of optimizing the development potential of the study area;
- Define the course of subsequent detailed design, review, and acceptance of the proposed municipal services;
- Demonstrate how the proposed municipal services will conform with current Ministry of the Environment servicing design criteria and other applicable agency guidelines; and,
- Demonstrate good engineering practice for the protection of public safety, the environment, and sustainable operation.

1.1 Existing Conditions

Under existing conditions, the study area is primarily vacant undeveloped land.

There is a stormwater management pond in the north western portion of the study area servicing the existing commercial development to the north. The stormwater management facility directs treated stormwater along an open ditch towards the existing EUC Pond 1 SWM facility.

A snow disposal facility was constructed by the City of Ottawa at 2170 Innes Road adjacent to the southern boundary of the study area.

Per the MSS, depending on the snapshot in time being considered, the study area has had different portions draining to Mud Creek and Bilberry Creek. Based on the latest info at the time of the MSS, it is understood that the full study area is within the Mud Creek watershed.

The *Geotechnical - Existing Conditions Report – PG3130-2, Revision 2* (Paterson Group, July 7, 2019) includes the following information for the study area:

- the long-term groundwater table is estimated to be between 1.5 m – 2.5 m below the ground surface;

- the overburden varies between shallow bedrock and deep silty clay deposit. Based on available geological mapping, the overburden drift thickness is 0 to 30 m in depth;
- the bedrock within the study area consists of interbedded limestone and dolomite of the Gull River formation. Based on the borehole and test pitting program, the bedrock ranges from 1 m to 25 m below the existing surface. Proposed development within bedrock may require blasting; specific blasting requirements would apply; and,
- a grade raise restriction of 2.0 m is recommended for the majority of the study area. A grade raise restriction of 0.5 to 1.5 m applies to the southern and western portions of the study area.

To the west of the study area there is a planned residential development project by Glenview Homes, known as 3610 Innes Road. A preliminary network is shown in ***Figure 1*** and ***Drawings 1-4*** to provide context for the servicing strategies. The road network is preliminary and subject to refinements through future planning applications for these neighbouring lands. Richcraft is proceeding with development applications for the study area with the understanding that development applications for these neighbouring lands are to also proceed in the short term.

1.2 Development Concept

The proposed development concept is shown in ***Drawings 1-4***. The development concept consists of 340 detached single homes, 529 townhomes, 114 back-to-back townhomes, park blocks, employment blocks, open space and the associated road network.

The road network consists of local roads with 14.5 m and 18 m ROW widths and collector roads with a 24 m ROW width.

Table 1 summarizes the land use breakdown and predicted populations associated with the development concept.

Easements or dedicated blocks have been added where necessary to allow access to sanitary, storm and/or watermain infrastructure. A markup has been provided in ***Appendix A*** to indicate the size of easement and the future infrastructure accommodations. Minimum size provided is 6m which is plenty of room to accommodate overland flow routes where they are required.

Although similar to the development concept in the CDP and MSS, the road network, land uses, and arrangement of land uses for the study area have been refined as part of the Draft Plan of Subdivision application and take into consideration the preliminary road layout of the neighbouring properties. Within the MSS, the projected population for the study area was approximately 4,868. The minor changes in land use have resulted in a minor decrease (1.4%) in the anticipated population when compared to the MSS.

Please note that, per the MSS, there is expected to be some limited additional capacity available within the planned servicing infrastructure to accommodate select increases to anticipated populations in the future. Any changes to anticipated future populations would be addressed through future revisions to the Draft Plan or separate development applications under the *Planning Act.*

The study area is expected to be developed in distinct phases according to the landowner's preferred timing. Depending on future phases limits, temporary construction access roads and/or out-of-phase servicing corridors may be required, and may require City approval prior to construction.

Table 1: Development Statistics (Richcraft Homes, August 2022)

Land Use	Area (ha)	Projected Number of Units	Residential Population per Unit*	Projected Population*
Low Density Residential	25.87	340 Singles	3.4	1156
		529 Townhomes	2.7	1429
		114 B2B	2.7	308
Medium Density Residential	2.51	200	1.8	360
High Density Residential	7.8	859	1.8	1547
Employment	19.34			
Park	6.41			
Open Space	3.65			
Roads	15.61			
Total	**81.99**	**2042**		**4800**

** NOTE: Population projections may differ from population estimates used in background Transportation Studies, Planning Rationale, and other studies. Population projection and residential population per unit values are based on Ministry of Environment, Conservation and Parks guidelines for servicing demand calculations.*

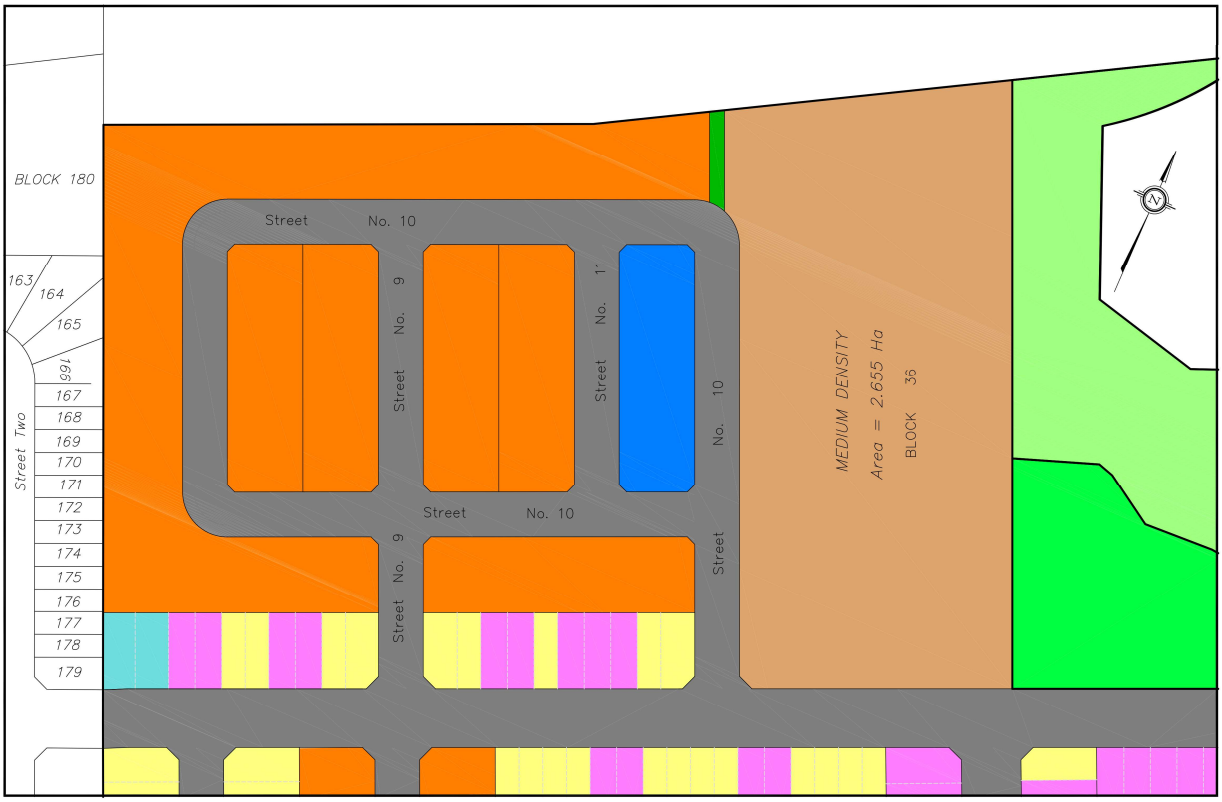
It is expected that the employment blocks and the high density/mixed use development blocks included in the development concept will be subject to future site plan application processes. While the *general* servicing concept for the blocks is described in this FSR, *detailed* servicing designs for these blocks are expected to be developed, reviewed, and approved separate from this FSR through the site plan application process.

Environmental studies related to the Draft Plan of Subdivision application for the study area characterize and provide management recommendations for vegetation, natural features, and drainage features affected by the development concept and the planned off-site servicing projects. The recommendations from other studies are not repeated within this FSR, unless directly related to the servicing concept.

Please note that an alternative development concept may be pursued in the northwest area of the Draft Plan of Subdivision. The proposed alternative concept is depicted in ***Exhibit 1***. The alternative concept re-orients lands uses around the main road network,

maintains external servicing/drainage connections (where required), and offers a like-for-like substitution from a population and imperviousness perspective. Therefore, the analysis and conclusions outlined in the following sections of the FSR are considered to apply to both the concept plan in the Draft Plan of Subdivision (***Appendix A***), and the alternative development concept in ***Exhibit 1.***

Exhibit 1: Alternative Development Concept (Richcraft Homes, December 2020)



1.3 Required Permits / Approvals

The City of Ottawa must approve detailed engineering design drawings and reports prior to construction of the municipal infrastructure identified in this report. This is expected to occur as part of the next steps in the Draft Plan of Subdivision process.

The specific additional approvals and permits listed in ***Table 2*** are expected to be required prior to construction of the municipal infrastructure detailed herein. Please note that other permits and approvals may be required, as detailed in the other studies submitted as part of the Draft Plan of Subdivision application (e.g. *Tree Conservation Report, Environmental Impact Statement, Phase 1 Environmental Site Assessment, etc.)*. Coordination and permissions from the land owner will be required for any infrastructure works outside of the study area.

Table 2: Required Permits/Approvals

Agency	Permit/Approval Required	Trigger	Remarks
RVCA	Permit under Ontario Regulation 174/06, RVCA's Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation	Ditches requiring closure due to development/grading.	Proposed land uses & municipal infrastructure require grading within the subject lands and result in the closure of existing ditches.
MECP	Environmental Compliance Approval	Construction of new sanitary & storm sewers.	The MECP is expected to review the stormwater collection system and wastewater collection system via transfer of review.
MECP	Permit to Take Water	Construction of proposed land uses (e.g. basements for residential homes) and services.	Pumping of groundwater may be required during construction, given groundwater conditions and proposed land uses and on-site/off-site municipal infrastructure.
City of Ottawa	MECP Form 1 – Record of Watermains Authorized as a Future Alteration.	Construction of watermains.	The City of Ottawa is expected to review the watermains on behalf of the MECP through the Form 1 – Record of Watermains Authorized as a Future Alteration.

Please note that there are specific requirements for the design of the extension of Frank Bender Street, involving mitigation measures associated with the adjacent snake habitat area. There are services in this same ROW corridor, and allowances for culvert connections within the ROW under the roadway. The design of the road and associated services is expected to be advanced as part of detailed design, and will be subject to additional site-specific permitting.

Please also note that there will be specific approval requirements related to the road crossing of the Hydro One Corridor, and the associated services within the ROW. Coordination with Hydro One is also expected to be required for development of services and land uses adjacent to the Hydro One Corridor.

1.4 MECP Pre-Consultation

Per the City of Ottawa Transfer of Review Agreement No. TOR-OTT-E-2019-01, Ministry of the Environment, Conservation and Parks (MECP) pre-consultation is not required, as the City of Ottawa is expected to assess that the proposed works fall under Schedule A of the agreement. As such, the City of Ottawa is expected to review the proposed infrastructure on behalf of MECP as part of issuing Environmental Compliance Approval for the appropriate works.

2.0 GUIDELINES, PREVIOUS STUDIES, AND REPORTS

2.1 Existing Studies, Guidelines, and Reports

The following studies were utilized in the preparation of this report.

- **Ottawa Sewer Design Guidelines**,
  City of Ottawa, *SDG002,* October 2012
  (Sewer Design Guidelines)

  - **Technical Bulletin ISDTB-2014-01, Revisions to Ottawa Design Guidelines - Sewer**
    City of Ottawa, February 5, 2014.
    (ISDTB-2014-01)

  - **Technical Bulletin PIEDTB-2016-01, Revisions to Ottawa Design Guidelines – Sewer**
    City of Ottawa, September 6, 2016.
    (PIEDTB-2016-01)

  - **Technical Bulletin ISTB-2018-01, Revisions to Ottawa Design Guidelines – Sewer,**
    City of Ottawa, March 21, 2018.
    (ISTB-2018-01)

  - **Technical Bulletin ISTB-2019-02, Revisions to Ottawa Design Guidelines – Sewer,**
    City of Ottawa, July 8, 2019.
    (ISTB-2019-02)

- **Ottawa Design Guidelines – Water Distribution**
  City of Ottawa, July 2010.
  (Water Supply Guidelines)

  - **Technical Bulletin ISD-2010-2**
    City of Ottawa, December 15, 2010.
    (*ISDTB-2010-2*)

  - **Technical Bulletin ISDTB-2014-02**
    City of Ottawa, May 27, 2014.
    (*ISDTB-2014-02*)

  - **Technical Bulletin ISTB-2018-02**
    City of Ottawa, March 21, 2018
    (*ISDTB-2018-02*)

- **Design Guidelines for Sewage Works,**
  Ministry of the Environment, Conservation and Parks, 2008.
  (MECP* Design Guidelines*)

- **Stormwater Planning and Design Manual,**
  Ministry of the Environment, March 2003.
  (SWMP Design Manual)

- **Ontario Building Code Compendium**
  Ministry of Municipal Affairs and Housing Building Development Branch, January 1, 2012, as updated from time to time.
  (OBC)

- **Existing Conditions Water Budget**
  Palmer, December 2014

- **First Innes Shopping Centres, Stormwater Management Report - Phase 3 Update**
  Stantec, February 2006

- **Geotechnical - Existing Conditions Report – PG3130-2, Revision 2**
  Paterson Group, July 7, 2019

- **Conceptual Site Servicing and Stormwater Management Report**
  Novatech, 2020

- **Mud Creek Cumulative Impact Study**
  Stantec, 2020

- **Environmental Impact Statement Trails Edge North**
  GHD, 2020

- **East Urban Community Phase 3 Area Community Design Plan Master Transportation Study**
  Castleglenn, 2020

- **East Urban Community Phase 3 Area Community Design Plan**
  FOTENN, 2020

- **Master Servicing Study for East Urban Community Phase 3 Area Community Design Plan**
  David Schaeffer Engineering Ltd., December 2020
  (MSS)

- **EUC Pond 1 North Main Cell and North Forebay Modifications**
  DSEL, August 31, 2020

3.0 WATER SUPPLY SERVICING

3.1 Existing Water Supply Services

The study area lies within the existing City of Ottawa 2E pressure zone. There is an existing elevated storage tank just north of the study area on Frank Bender Street. There is an existing 600 mm diameter watermain along the Hydro Corridor to the south, a 400 mm diameter watermain within Mer Bleue Road to the east and a 300 mm diameter watermain within Pagé Road to the west. There is also a 400-600 mm diameter watermain within Innes Road and a 300-600 mm watermain within Frank Bender Street (formerly Belcourt Extension) to the north of the study area. The surrounding existing watermain infrastructure is shown in ***Drawing 4***.

3.2 Water Supply Servicing Design

The proposed alignment of the trunk watermain network is depicted in ***Drawing 4.***

Adequacy of sizing and configuration of trunk watermain infrastructure is provided in the MSS. Per the MSS (as shown in excerpts in ***Appendix B***), in support of full buildout of the MSS area, the following trunk watermains will be required within the study area:

- a 300 mm diameter watermain will be required on Street 13, connecting to the 600mm diameter watermain within the Hydro Corridor;
- a 300 mm diameter watermain will be required on Street 14, connecting to the existing 300 mm diameter watermain within Frank Bender Street; and
- a 300 mm diameter watermain will be required on Street 12, connecting to the existing 400 mm diameter watermain within Mer Bleue road and the future 300 mm diameter watermain within the neighbouring development to the west.

Depending on phasing and timing of development, not all of the watermains listed above are anticipated to be required to be in place prior to development of the study area. At the time of detailed design, detailed hydraulic modelling will be undertaken to verify that the proposed on-site and off-site watermains are in conformance with the City's *Water Supply Guidelines*, according to the phasing plans for the study area. At minimum, a looped watermain network with two connections will be required to service the study area.

Potential alignments of local watermains are also depicted in Drawing 4, to illustrate that a redundant looped network can be achieved to support the development of the site, extending from the planned trunk watermain infrastructure. At this time, the proposed watermains are primarily shown in right-of-ways and proposed servicing easements, causing slight deviations in watermain alignment as compared to the MSS. Implementing the local watermain network shown in Drawing 4 allows all development blocks to be adequately serviced by local distribution mains or connected directly to one of the trunks. At the time of detailed design, detailed hydraulic modelling will be undertaken to verify that the proposed local watermains are in conformance with the City's Water Supply Guidelines. The alignment and sizing of local watermains will also be confirmed by the

detailed hydraulic modelling. Additional servicing easements may be determined to be required, which may trigger minor amendments to the proposed lot fabric in the concept plan.

Table 3: Water Supply Design Criteria

Design Parameter	Value
Residential - Single Family	3.4 p/unit
Residential – Townhome/ Semi	2.7 p/unit
Residential – Apartment	1.8 p/unit
Residential Average Daily Demand	280 L/d/p
Residential - Maximum Daily Demand	2 x Average Daily Demand
Residential - Maximum Hourly Demand	3 x Average Daily Demand
Residential – Minimum Hourly Demand	0.5 x Average Daily Demand
Commercial/Institutional Average Daily Demand	35,000 L/gross ha/day
Park Average Daily Demand	9,300 L/gross ha/day
Commercial/Institutional Maximum Daily Demand	1.5 x Average Daily Demand
Commercial/Institutional Maximum Hour Demand	1.8 x Maximum Daily Demand
Commercial/Institutional Minimum Hourly Demand	0.5 x Average Daily Demand
Minimum Watermain Size	150mm diameter
Minimum Depth of Cover	2.4m from top of watermain to finished grade
During normal operating conditions desired operating pressure is within	350kPa and 480kPa
During normal operating conditions pressure must not drop below	276kPa
During normal operating conditions pressure must not exceed	552kPa
During fire flow operating pressure must not drop below	140kPa

Notes:

- *Extracted from Section 4: Ottawa Design Guidelines, Water Distribution (July 2010), Table 4.1 - Per Unit Populations and Design Guidelines for Drinking Water Systems (MECP, 2008), Table 3-1 Peaking Factors.*
- *No Outdoor Water Demand considered for residential uses.*

The MSS contemplated the development of the study area by employing a 15,000 L/min fire flow for the design of the trunk watermain network and an average water demand allowance based on the following consumption rates: single family homes at 570 L/unit/d and 1050 L/unit/day outdoor water demand; towns at 560 L/unit/d; apartments at 400 L/unit/day; and employment at 8500 L/ha/d. As detailed designs progress, timing, alignment, and sizing of local watermains will be confirmed. The subdivision's local watermain network will be sized to meet maximum hour and maximum day plus fire flow demands. ***Table 3*** summarizes the *Water Supply Guidelines* employed in the preparation of the preliminary water demand estimate (***Appendix C*** and ***Table 4***) and that will be applied in future watermain network hydraulic modelling and detailed design.

Fire flow requirements are to be confirmed in accordance with Local Guidelines (Fire Underwriters Survey), City of Ottawa *Water Supply Guidelines*, and the Ontario Building

Code, upon development of detailed concepts for the different land uses. For planning purposes, fire flow estimates are provided in the preliminary water demand estimate (***Appendix C*** and ***Table 4***) based on the information available in the preliminary concept plan and comparable recent developments in the City of Ottawa.

Table 4: Water Demand Estimate and Comparison to Equivalent MSS Demands

	Avg. Daily		Max Day		Peak Hour		Fire Flow Requirement
	m^3/d	L/min	m^3/d	L/min	m^3/d	L/min	L/min
Residential Demand	1344.0	933.3	2688.0	1866.7	4032.0	2800.0	10000 L/min* *(per ISDTB-2014-02)*
Commercial Demand	676.9	470.1	1015.4	705.1	1827.6	1269.2	15000 L/min *(considered adequate for most types of structures and occupancies, but is to be confirmed at the detailed design level)*
Park	59.61	41.4	89.4	62.1	161.0	111.8	
Total Demands	**2080.5**	**1444.8**	**3792.8**	**2633.9**	**6020.6**	**4181.0**	
Demands for Study Area under MSS Dev Stats	**2101.2**	**1459.2**	**3833.5**	**2662.2**	**6082.3**	**4223.8**	

*Residential Fire Flow demands will be confirmed at detailed design. There is a possibility certain units may not meet the requirements to apply the 10,000 L/min cap. In these instances, the Fire Flow demand will be calculated in accordance with the FUS method per the *Water Supply Guidelines.* Mitigation measures may also be proposed to lower the required Fire Flow.

As stated in ***Section 1.2***, the proposed concept plan represents a slight decrease in anticipated population when compared to what the MSS considered for the study area. When applying the design criteria from ***Table 3*** to the MSS development stats for the study area, the resultant water demand is slightly higher (approx. 1%) then the anticipated water demand for the study area per the Draft Plan of Subdivision. See ***Table 4*** and ***Appendix C*** for details. As such, the MSS adequately considered the watermain servicing of the study area, and no additional modelling or design information is required in support of the Draft Plan of Subdivision.

3.3 Water Supply Conclusion

The study area will connect to the City's 2E pressurized water supply network to meet the water demands of the proposed concept plan, via the trunk watermain infrastructure identified in the MSS and a network of local watermains. The proposed concept plan development statistics yield a water demand below what was anticipated by the MSS, therefore it follows that the trunk watermain infrastructure described in the MSS will adequately service the study area.

Detailed future modelling will confirm phasing of the extensions of trunk watermains and sizing of the local watermain network. The proposed water supply design will conform to all relevant City and MECP Guidelines and Policies.

4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

The existing 900 mm diameter Forrest Valley Trunk (FVT) sanitary sewer is located on Pagé Road to the west of the study area. Within the Orleans Village development to the west of the study area, there is an existing sanitary sewer network that includes a 675 mm diameter sanitary sewer stubbed at the western boundary of the Glenview lands on Street 3. The surrounding existing sanitary sewer infrastructure is shown in ***Drawing 3***.

4.2 Wastewater Design

The study area is expected to be serviced by an internal gravity trunk sanitary sewer system ranging in diameter from 300mm to 600 mm, which is to follow the local road network and select servicing easements. See ***Drawing 3*** for details. As detailed designs progress, alignment and sizing of local sanitary sewers will be confirmed and additional servicing easements may be required, which may trigger minor amendments to the proposed lot fabric in the concept plan.

The MSS contemplated that the study area would be serviced by the FVT sanitary sewer via a trunk sewer running from Pagé Road towards the study area via Nature Trail Crescent as well as Ponthieu Circle and Beaugency Street within the Orleans Village development. The MSS confirmed capacity within the FVT at the intersection of Pagé Road and Nature Trail Crescent for the study area along with the neighbouring upstream and downstream drainage areas. The upstream drainage area consists of a commercial development to the north of the study area while the downstream drainage areas consist of the Glenview lands and Orleans Village development to the west.

Per the MSS, the total peak flow from the study area, the Glenview lands and the external commercial developments directed towards MH1A within the Orleans Village development is 113.41 L/s. See ***Appendix D*** for details.

Table 5 summarizes the *Sewer Design Guidelines* applied in the preliminary sanitary design, see ***Appendix D*** for details. The ***Table 5*** parameters are also to be employed in the future detailed design of the proposed wastewater sewer system.

The only deviations from the MSS wastewater servicing strategy are the minor land use changes associated with the proposed concept plan. Applying the wastewater parameters in ***Table 5*** to the proposed development concept, the estimated peak sanitary flow, including external flows from the the Glenview lands and the external commercial developments, directed towards MH1A within the Orleans Village development is 113.75 L/s. See ***Appendix D*** for details.

A comparison between the anticipated peak flow and the MSS anticipated peak flow from the Draft Plan of Subdivision can be found in ***Table 6***. The anticipated peak flow of 113.75 L/s is 0.03% higher than the peak flow considered in the MSS. There is not expected to be any issues associated with the minor flow increase as the anticipated peak flow is still

below the conservative flow of 120.83 L/s that was used within the FVT capacity analysis in the MSS. As such, the MSS adequately considered the wastewater servicing of the study area, and no additional design information is required in support of the Draft Plan of Subdivision.

Table 5: Wastewater Design Criteria

Design Parameter	Value
Residential - Single Family	3.4p/unit
Residential – Townhome/ Semi	2.7p/unit
Average Daily Demand	280 L/d/per
Peaking Factor	Harmon's Peaking Factor, where K=0.8
Commercial / Institutional Flows	35,000 L/gross ha/day
Commercial / Institutional Peak Factor	1.5 if contribution >20%, otherwise 1.0
Light Industrial Flows	35,000 L/gross ha/day
Industrial Peaking Factor	Per Figure in Appendix 4-B, City of Ottawa Guidelines
Infiltration and Inflow Allowance	0.33 L/s/gross ha for all areas
Park Flows	9,300 L/ha/d (75 p/acre per Sewer Guidelines Appendix 4-A)
Park Peaking Factor	1.0
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{2/3} S^{1/2}$
Minimum Sewer Size	200mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2.5m from crown of sewer to grade
Minimum Full Flowing Velocity	0.6m/s
Maximum Full Flowing Velocity	3.0m/s
Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012, Technical Bulletins, and recent residential subdivisions in City of Ottawa.	

Richcraft Homes may seek City approval at detailed design for any opportunities to minimize the amount of infrastructure to be constructed to support the proposed development (e.g. Richcraft may propose minor infrastructure sizing changes and minor alignment changes at detailed design, ensuring the changes have no adverse environmental impacts and no adverse capacity implications on affected landowners).

Table 6: Peak Sanitary Flow Contribution to MH1A

	Total Residential Area (ha)	Population	Total Employment Area (ha)	Total Park Area (ha)	Total Flow to MH1A (L/s)
Trails Edge North FSR (DSEL, July 2022)	64.63	7118	28.60	7.71	113.75
MSS (DSEL, Dec 2020)	64.39	7181	27.78	7.63	113.41

4.3 Wastewater Servicing Conclusions

The proposed wastewater system for the subject lands is to be designed to conform to all relevant City of Ottawa *Sewer Design Guidelines* and *MECP Guidelines*.

The study area will be serviced by local and trunk sanitary sewers within the study area and an off-site trunk sanitary sewer network extending through neighbouring developments towards the FVT in Pagé Road, consistent with the MSS. There is proven to be adequate capacity in the downstream infrastructure to accommodate the anticipated flows from the subject lands in the Draft Plan of Subdivision.

5.0 STORMWATER MANAGEMENT

5.1 Existing Stormwater Drainage

The study area is tributary to Mud Creek, which outlets to Green's Creek before ultimately draining to the Ottawa River. The City of Ottawa has recently completed an Environmental Assessment related to Mud Creek, and has recommended in-stream improvements in order to mitigate existing erosion patterns and anticipated changes in erosion patterns based on planned development in the watershed (including the planned development within the Draft Plan of Subdivision).

There is a small stormwater management facility located adjacent to the northern boundary of the study area, behind an existing Canadian Tire store. Per the *First Innes Shopping Centres, Stormwater Management Report - Phase 3 Update* (Stantec, February 2006), the stormwater management facility is a permanent surcharge basin at the upstream end of the shopping center's storm sewer system. The pond is required due to a restrictive release rate for the downstream sewers on Frank Bender Street. The 0.3 ha stormwater management facility is to be left in place as-is.

A temporary stormwater management pond was previously constructed within the study area to support the commercial development at 3730 Innes Road. Per the *Trinity Development – Innes / Belcourt Stormwater Management System,* (IBI Group, 2009) the facility directs treated stormwater along an open ditch towards the existing EUC Pond 1 SWM facility.

A snow disposal facility was constructed by the City of Ottawa at 2170 Innes Road adjacent to the southern boundary of the study area. Per the MSS, this facility directs treated snow melt water from the onsite facility to the North Cell of the EUC Pond 1 via a 150 mm diameter forcemain installed within the Hydro Corridor.

The existing stormwater management infrastructure surrounding the North West quadrant can be seen in ***Drawing 2***. Brian Coburn Boulevard has been constructed complete with a piped sewer network discharging to the South Main Cell of EUC Pond 1 (first receiving treatment by an OGS), and a cut off ditch on the north side, directing flows to the North Main Cell.

The MSS outlines specific modifications required to existing EUC Pond 1 in order to support additional development in its drainage catchment, including the planned development within the Draft Plan of Subdivision. The EUC Pond 1 modifications outlined in the MSS are being completed through a review & approval process separate to this FSR.

5.2 Post-Development Stormwater Management Targets

The MSS proposes that stormwater runoff from the study area be treated for erosion, quality, and quantity control by EUC Pond 1, including proposed pond modifications.

The associated stormwater management requirements within the Draft Plan of Subdivision proper have been adopted from the MSS, current City of Ottawa *Sewer Design Guidelines*, the latest technical bulletins and the MECP *SWMP Manual*. The following City standards will be required for stormwater management within the subject property:

- Storm sewers on local roads are to be designed to provide a 2-year level of service without any ponding per the City's latest Technical Bulletin PIEDTB-2016-01.
- Storm sewers on collector roads are to be designed to provide a 5-year level of service without any ponding per the City's latest Technical Bulletin PIEDTB-2016-01.
- Storm sewers on arterial roads are to be designed to provide a 10-year level of service without any ponding per the City's latest Technical Bulletin PIEDTB-2016-01.
- For less frequent storms (i.e. larger than 1:2 or 1:5 year), the minor system sewer capture will be restricted with the use of inlet control devices to prevent excessive hydraulic surcharges.
- Under full flow conditions, the allowable velocity in storm sewers is to be no less than 0.80 m/s and no greater than 6.0 m/s.
- For the 100-year storm and for all roads, the maximum depth of water (static and/or dynamic) on streets shall not exceed 0.35 m at the gutter.
- The major system shall be designed with sufficient capacity to allow the excess runoff of a 100-year storm to be conveyed within the public ROW or adjacent to the right-of-way provided that the water level must not touch any part of the building envelope, must remain below all building openings during the stress test event (100-year + 20%), and must maintain 15 cm vertical clearance between spill elevation on the street and the ground elevation at the nearest building envelope.
- Runoff from the proposed residential areas shall not be directed into future development blocks, including the park or existing development.
- When catchbasins are installed in rear yards, safe overland flow routes are to be provided to allow the release of excess flows from such areas. A minimum of 30 cm of vertical clearance is required between the rear yard spill elevation and the ground elevation at the adjacent building envelope.
- The product of the maximum flow depths on streets and maximum flow velocity must be less than 0.60 m^2/s on all roads.

The list of standards above is not exhaustive, and additional requirements are expected to apply in accordance with typical residential subdivision design in the City of Ottawa.

5.3 Proposed Minor System

The study area is expected to be serviced by an internal gravity storm sewer system that is to follow the local road network. The stormwater runoff will be conveyed within the underground piped sewer system towards the EUC Pond 1 SWM facility. The trunk storm network consists of sewers ranging in diameter from 450 mm to 2700 mm and can be seen in ***Drawing 2***. As detailed designs progress, alignment and sizing of local storm sewers will be confirmed and servicing easements may be required, which may trigger minor amendments to the proposed lot fabric in the concept plan.

Table 7 summarizes the standards that will be employed in the future detailed design of the storm sewer network, meeting the requirements in ***Section 5.2***.

Table 7: Storm Sewer Design Criteria

Design Parameter	Value
Minor System Design Return Period	1:2 year (PIEDTB-2016-01) for local roads, without ponding 1:5 year (PIEDTB-2016-01) for collector roads, without ponding 1:10 year (PIEDTB-2016-01) for arterial roads, without ponding
Major System Design Return Period	1:100 year
Intensity Duration Frequency Curve (IDF) 2-year storm event: A=732.951 | B=6.199 | C=0.810 5-year storm event: A = 998.071 | B = 6.053 | C = 0.814	$i = \frac{A}{(t_c + B)^C}$
Minimum Time of Concentration	10 minutes
Rational Method	$Q = CiA$
Storm sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} A R^{2/3} S^{1/2}$
Runoff coefficient for paved and roof areas	0.9
Runoff coefficient for landscaped areas	0.2
Minimum Sewer Size	250 mm diameter
Minimum Manning's 'n' for pipe flow	0.013
Minimum Depth of Cover	2.0m from crown of sewer to grade
Minimum Full Flowing Velocity	0.8 m/s
Maximum Full Flowing Velocity	6.0 m/s (where velocities in excess of 3.0 m/s are proposed, provision shall be made to protect against displacement of sewers by sudden movement)
Clearance from 100-Year Hydraulic Grade Line to Building Opening	0.30 m
Max. Allowable Flow Depth on Municipal Roads	35 cm above gutter (PIEDTB-2016-01)
Extent of Major System	To be contained within the municipal right-of-way or adjacent to the right-of-way provided that the water level must not touch any part of the building envelope and must remain below the lowest building opening during the stress test event (100-year + 20%) and 15cm vertical clearance is maintained between spill elevation on the street and the ground elevation at the nearest building envelope (PIEDTB-2016-01)

Stormwater Management Model	DDSWMM (release 2.1), SWMHYMO (v. 5.02) and XPSWMM (v. 10)
Model Parameters	Fo = 76.2 mm/hr, Fc = 13.2 mm/hr, DCAY = 4.14/hr, D.Stor.Imp. = 1.57 mm, D.Stor.Per. = 4.67 mm
Imperviousness	Based on runoff coefficient (C) where Percent Imperviousness = (C - 0.2) / 0.7 x 100%.
Design Storms	Chicago 3-hour Design Storms and 24-hour SCS Type II Design Storms. Maximum intensity averaged over 10 minutes.
Historical Events	July 1st, 1979, August 4th, 1988 and August 8th, 1996
Climate Change Street Test	20% increase in the 100-year, 3-hour Chicago storm
Extracted from City of Ottawa Sewer Design Guidelines, October 2012 and subsequent Technical Bulletins, and based on recent residential subdivisions in the City of Ottawa.	

Street catchbasins will collect drainage from the streets and front yards, while rear yard catchbasins will capture drainage from backyards. Perforated catch basin leads will be provided in rear yards, except the last segment where it connects to the right-of-way which will be solid pipe, per current *Sewer Design Guidelines*. The design for the minor system captures drainage for storm events up to and including the 2-year (local streets) and 5-year (collector streets) events assuming the use of inlet control devices (ICDs) for all street catchbasins.

Rational Method storm sewer design sheets are provided in ***Appendix E***, based on average predicted runoff coefficients for various land uses and applying assumptions consistent with the MSS. As detailed designs progress, the imperviousness and runoff coefficient values will be refined to reflect the proposed building footprints under maximum zoning, driveways, etc. At this stage, the development area and expected imperviousness for the Draft Plan of Subdivision are comparable to the assumptions in the MSS.

Consistent with the MSS, 100-year flows from the Innes Park Woods to the north of the study area and 10-year capture from a portion of Mer Bleue Road have been considered within the proposed storm sewer design. The capture within the Innes Park Woods involves construction of a cutoff swale that serves to mimic existing drainage conditions, per the recommendations of the *Environmental Impact Statement* (GHD, 2020).

The existing temporary stormwater management pond within the study area is to be decommissioned and the proposed storm sewer network is to capture the flows from the commercial block to the north. Consistent with the MSS, the flows from this commercial block have been considered to be controlled to 85 L/s/ha. Level of service will need to be maintained for the area currently serviced by the stormwater management pond. If areas downstream of the facility are developed prior to the existing facility being decommissioned, the outflows from the temporary pond will need to be accommodated. Once the facility is decommissioned to allow development to occur, Contractors will need to provide detailed staging plans and flow by-pass to ensure the level of service for the development tributary to the facility are maintained. Tie-in grades at the property line and existing emergency flow routes (if applicable) will need to be respected.

The only deviation from the MSS stormwater servicing strategy are the minor land use and road alignment changes associated with the proposed concept plan.

As shown in ***Drawing 2***, the proposed sewer network is to direct flows to two separate northern forebays of the Pond 1 SWM facility, as considered in the latest design of the facility in the *EUC Pond 1 North Main Cell and North Forebay Modifications* (DSEL, August 31, 2020). The majority of the study area is to be serviced by storm sewer Trunks 1 and 2, which are to inlet into the southernmost forebay. As shown in ***Appendix E***, the peak rational method design flow (2 to 100-year flow, depending on land use) to Pond 1 is 9931 L/s. The remaining portion of the study area and the Glenview lands are to be serviced by storm sewer Trunk 3, directed to the northeastern forebay with a peak rational method design flow (2 to 5-year flow, depending on land use) to Pond 1 of 2456 L/s.

A comparison to the peak flows considered in the MSS is provided in ***Table 8***. As shown, the proposed design anticipates a 16% decrease in the peak rational method flow within storm sewer Trunks 1 and 2. A 9% increase is expected in the peak rational method flow within storm sewer Trunk 3, which is largely attributed to the Trunk 3 minor change in alignment based on the minor land use and road alignment changes associated with the proposed concept plan. Trunk 3 demonstrates 38% residual capacity despite the minor increase in peak rational method flow, therefore the minor modification from the MSS is not expected to have an adverse impact on the operation or characteristics of the storm sewer network or the downstream EUC Pond 1. Because the development area and expected imperviousness for the Draft Plan of Subdivision are comparable to the assumptions in the MSS, the MSS is considered to have adequately addressed stormwater servicing of the study area. Therefore, no additional design information is required in support of the Draft Plan of Subdivision.

Table 8: Peak Rational Method Storm Flow Contribution to EUC Pond 1

	Trails Edge North FSR (DSEL, July 2022)	**MSS (DSEL, Dec 2020)**
Rational Method Peak Flow from Trunk 1/2	9,931 L/s	11,844 L/s
Rational Method Peak Flow from Trunk 3	2,456 L/s	2,260 L/s

The stormwater flows from the study area were considered in the design and sizing of the proposed EUC Pond 1 modifications, as described in the MSS and in the subsequent *EUC Pond 1 North Main Cell and North Forebay Modifications* (DSEL, August 31, 2020). As such, capacity in the EUC Pond 1 SWM facility for the anticipated flows has been demonstrated and will be further confirmed at the time of detailed design. As previously noted, it is understood that the modifications to the EUC Pond 1 SWM facility are to be undertaken at the time of development of the Draft Plan of Subdivision or any other development within the catchment that is to occur beforehand. It is understood that there will be agreements in place facilitating cost sharing and site access where necessary.

Please note that Richcraft Homes may seek City approval at detailed design for any opportunities to minimize the amount of infrastructure to be constructed to support the proposed development (e.g. Richcraft may propose minor infrastructure sizing changes and minor alignment changes at detailed design, ensuring the changes have no adverse environmental impacts and no adverse capacity implications on affected landowners).

5.4 Hydraulic Grade Line

A detailed hydraulic gradeline (HGL) analysis will be completed for the proposed system at the detailed design level, based on the 100-year 3-hour Chicago, 12-hour SCS, and 24-hour SCS design storms. Other design storms and/or historical events may be considered at detailed design, as required. Detailed grading design and storm sewer design will be modified as required to achieve the freeboard requirements set out in *the Sewer Design Guidelines and* PIEDTB-2016-0. A preliminary HGL analysis was conducted as part of the MSS and no issues were found.

5.5 Major System

Major system conveyance, or overland flow (OLF), will be provided to accommodate flows in excess of the minor system capacity. OLF is accommodated by generally routing any surface flow exceeding surface ponding along the road network, service easements and the Hydro Corridor towards the EUC Pond 1 SWM facility, as shown in ***Drawing 1***.

Consistent with the MSS, the proposed major system design is to have employment, commercial, park, medium density residential, and medium-high density residential blocks within the study area provide onsite storage up to the 100-year storm event.

If the detailed design results in total (e.g. static + dynamic) depths greater than 35 cm or violations of the flow spread parameters in ***Section 5.2***, excess flows may be redirected to a different overland flow route, attenuated in surface storage, or captured within the minor system in order to reduce flow depths/spread, if necessary.

Therefore, the proposed drainage systems are expected to safely capture and convey all storms up to and including the 100-year event in accordance with the requirements of the MSS and *Sewer Design Guidelines.*

5.6 Grading and Foundation Drainage

A site grading plan has been developed to optimize earthworks, provide sewer cover, provide major system conveyance, and tie into existing roads adjacent to the site. The proposed grading plan is illustrated in ***Drawing 1***. The preliminary grading plan illustrates that there is an anticipated area of fill at the southern and eastern ends of the study area, with cut areas at the northwestern end.

Consistent with the MSS, in certain areas the proposed road grades are to be higher than the maximum permissible grade raises in the study area per the *Geotechnical – Existing Conditions Report East Urban Community Mixed Use CDP* (Paterson Group, July 7,

2019). The grading plan has been designed as low as possible to best respect the grade raise restrictions, and was determined by providing minimum cover to the infrastructure (assuming full basements for all land uses), facilitating major system flow to the EUC Pond 1, and respecting existing road grades in the surrounding developments.

Since the proposed grading plan indicates portions of the study area are to be above proposed grade raise restrictions, a surcharge program and potentially a lot-level lightweight fill program may be required to the satisfaction of a licensed Geotechnical Engineer in Ontario. As the design process advances for the Draft Plan of Subdivision, grading plans, grade raise restrictions, surcharge programs and fill specifications will be required from a Geotechnical Engineer. Please note that Richcraft Homes may also look to modify the infrastructure design and associated earthworks program according to future more refined information related to the land uses (e.g. architectural relationships, presence of basements, etc.).

The following additional grading criteria and guidelines will be applied to detailed design, per City of Ottawa *Sewer Design Guidelines*:

- Driveway slopes will have a maximum slope of 6%;
- Slope in grassed areas will be between 2% and 5%;
- Grades in excess of 7% will require terracing to a maximum of a 3:1 slope;
- Swales are to be 0.15m deep with 3:1 side slopes unless otherwise indicated on the drawings; and,
- Perforated pipe will be required for drainage swales if they are less than 1.5% in slope (preferred to promote infiltration) and will be used to interconnect rear yard catchbasins where possible.

5.7 Infiltration

Per the MSS and the *Existing Conditions Water Budget* (Palmer, December 2014), pre-development infiltration rates are to be preserved for the limited exposed bedrock areas within the EUC Phase 3 CDP area. As discussed in the MSS, the protection of the Innes Park Woods to the north of the study area and the associated buffer will ensure that the infiltration rates in this area will remain unchanged.

The *Mud Creek Cumulative Impact Study* (Stantec, May 2020) found that the implementation of LIDs would have little impact on the erosion protection requirements for Mud Creek, and as such has recommended that the requirement for LIDs in the EUC MUC CDP study area west of Mer Bleue include:

- A tree planting program in parkland, which is addressed in the CDP (Fotenn, 2020);
- Using infiltration trenches in backyards of singles and townhomes where feasible, which is addressed in the proposed development; and,

- Setting right-of-way widths for the majority of local roadways at 18 m (not 16.5 m) to ensure healthy street trees that will be effective in providing evapotranspiration in post-development conditions, which is addressed in the proposed development.

As noted in ***Section 5.3***, as part of the development residential uses, shallow rear yard swales with perforated pipes in rear yards are to be provided, in accordance with City *Sewer Design Guidelines*.

5.8 Stormwater Servicing Conclusions

Consistent with the MSS, the study area is to be serviced by directing post development runoff to the EUC Pond 1 SWM facility, which is to be modified to support development in the catchment area. Capacity in the EUC Pond 1 SWM facility is demonstrated in the MSS and will be confirmed at the time of detailed design.

Major system conveyance will generally be accounted for by routing surface flow along the road network, service easements, and the Hydro Corridor towards the EUC Pond 1 SWM facility. Consistent with the MSS, the proposed major system design is to have employment, commercial, park, medium density residential, and medium-high density residential blocks within the study area provide onsite storage up to the 100-year storm event. The proposed minor and major storm conveyance systems will be designed in accordance with City of Ottawa, RVCA, and MECP requirements as set out in background studies and current standards.

A preliminary site grading plan has been developed to optimize earthworks, tie into the surrounding transportation network and provide major system conveyance. The site is subject to permissible grade raises and at the time of detailed design, the grading plans will be subject to review by a Geotechnical Engineer.

Consistent with the MSS, using infiltration trenches in backyards of singles and townhomes where feasible will be considered to appropriately promote infiltration of stormwater.

In general, the proposed Draft Plan of Subdivision has a comparable development pattern and impervious to the MSS, and therefore it follows that the trunk storm sewer network and EUC Pond 1 modifications described in the MSS will adequately service the study area.

6.0 UTILITIES

Utility services extending to the site may require connections to multiple existing infrastructure points. Consultation with Enbridge gas, Hydro Ottawa, Rogers, and Bell is required as part of the development process to confirm the servicing plan for the subject lands. It is understood through preliminary discussions that there is existing infrastructure surrounding the study area on Innes Road, Mer Bleue Road and Pagé Road. The servicing strategy is to be confirmed as the design process advances.

7.0 EROSION AND SEDIMENT CONTROL

Soil erosion occurs naturally and is a function of soil type, climate, and topography. The extent of erosion losses is exaggerated during construction where vegetation has been removed and the top layer of soil becomes agitated.

Prior to topsoil stripping, earthworks or underground construction, erosion and sediment controls will be implemented and will be maintained throughout construction.

The following specific recommendations to the Contractor will be included in contract documents.

- Limit extent of exposed soils at any given time.
- Re-vegetate exposed areas as soon as possible.
- Minimize the area to be cleared and grubbed.
- Protect exposed slopes with plastic or synthetic mulches.
- Install silt fence to prevent sediment from leaving the site and entering existing watercourses, and clean and maintain throughout construction.
- Install catchbasin inserts during construction to protect from silt entering the storm sewer system.
- Install mud mats in order to prevent mud tracking onto adjacent roads.
- No refueling or cleaning of equipment near existing watercourses.
- No material stockpiles within 30m of existing watercourses, unless otherwise permitted by RVCA and City of Ottawa.
- Provide sediment traps and basins during dewatering.
- Plan construction at proper time to avoid flooding.

The Contractor will, at every rainfall, complete inspections and guarantee proper performance.

Erosion and sediment control will remain in place until the working areas have been stabilized and re-vegetated.

8.0 CONCLUSION AND RECOMMENDATIONS

The overall municipal servicing strategy for the subject property was contemplated as part of the *Master Servicing Study for East Urban Community Phase 3 Area Community Design Plan* (MSS) (DSEL, Dec 2020).

This *Functional Servicing Report* provides details on the planned on-site and off-site municipal services for the subject property, highlights proposed deviations from the MSS, and demonstrates that adequate municipal infrastructure capacity is expected to be available for the planned development of the subject property.

- Water service is to be provided to the study area via extensions of the existing 2E pressure zone watermains, including through neighbouring properties, per the MSS.
- Sanitary service is to be provided to the study area via extensions of the existing sanitary sewer network through neighbouring properties, directing wastewater to the west, to the existing Forrest Valley Trunk sanitary sewer within Pagé Road. Downstream capacity has been confirmed within the MSS.
- Consistent with the MSS, the study area is to be serviced by directing post development runoff to the EUC Pond 1 SWM facility. Capacity in the EUC Pond 1 SWM facility is demonstrated in the MSS, and will be confirmed at the time of detailed design.
- Major system conveyance will generally be accounted for by routing surface flow along the road network, service easements and the Hydro Corridor towards the EUC Pond 1 SWM facility. Consistent with the MSS, the proposed major system design is to have employment, commercial, park, medium density residential, and medium-high density residential blocks within the study area provide onsite storage up to the 100-year storm event.
- The site will be graded in accordance with City of Ottawa design guidelines and standards. Consistent with the MSS, in certain areas the proposed road grades are to be higher than the maximum permissible grade raises of 0.5-1.5 m and 2 m per the *Geotechnical – Existing Conditions Report East Urban Community Mixed Use CDP* (Paterson Group, July 7, 2019). The detailed grading design will be reviewed and certified by a Geotechnical Engineer prior to construction.
- Consistent with the MSS, select Low Impact Development techniques detailed in ***Section 5.7*** will be implemented to promote infiltration of stormwater.

The proposed servicing and grading plans are expected to meet all City, RVCA, and MECP requirements as set out in background studies and current standards.

Prior to detailed design of the infrastructure presented in this report, this FSR will require approval under the *Planning Act* as supporting information for the Draft Plan of Subdivision application. Project-specific approvals are also expected to be required for the infrastructure presented in this report from the City of Ottawa, Ministry of Environment,

Conservation and Parks, and Rideau Valley Conservation Authority, among other agencies.

Prepared By:
David Schaeffer Engineering Ltd.

Per: Alexandre Tourigny, P.Eng.

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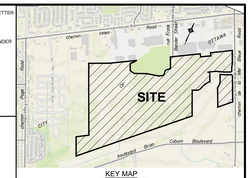
Appendix A

Servicing Guidelines Checklist & Concept Plan

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__.

JEFF MOSHER, P. ENG, MANAGER
DEVELOPMENT REVIEW-EAST
PLANNING, REAL ESTATE AND ECONOMIC
DEVELOPMENT DEPARTMENT, CITY OF OTTAWA



KEY MAP
NOT TO SCALE

DRAFT PLAN OF SUBDIVISION OF
PART OF LOTS 1, 2, 3 and 4
CONCESSION 3 (OTTAWA FRONT)
Geographic Township of Gloucester
and
PART OF BLOCK 115
REGISTERED PLAN 4M-1545
CITY OF OTTAWA
Prepared by Annis , O'Sullivan , Vollebekk Ltd.

Scale 1 : 1250

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 our instructions.

Date — Steve Grandmont, RICHCRAFT HOMES LTD., 2322/2328 ONTARIO INC.
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, park land and open space
(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

PROPOSED LAND USE TABLE

PROPOSED USE	LOTS / BLOCKS	NO. OF UNITS	AREA (Ha/Ac)
SINGLE FAMILY	1 - 340	340	12.369 / 30.57
TOWNHOMES	343, 345, 347, 348-353, 357-360, 362-365, 367, 368-372, 375-378, 380, 381, 383-385	529	11.996 / 29.64
BACK TO BACK	354, 373, 382	114	1.452 / 3.59
MEDIUM DENSITY	356	...	2.506 / 6.19
HIGH DENSITY	366, 379	...	7.797 / 19.24
WALKWAYS	344, 346, 355, 361		0.115 / 0.28
PARKS	342, 374, 386		0.411 / 15.64
OPEN SPACE	341		3.653 / 9.03
EMPLOYMENT LANDS	387, 388, 389		19.339 / 47.79
STREETS			15.400 / 38.28
OTHER	390, 391	...	0.867 / 2.14
SITE TOTAL		...	91.989 / 202.59

REVISION SCHEDULE

NO.	REVISION	DATE	BY
8	REVISIONS	JULY 5, 2022	N
7	REVISIONS	JUNE 21, 2022	N
6	REVISIONS	APR. 19, 2022	N
5	BLK. 36 CHANGED TO MED. DENSITY	OCT. 16, 2020	N
4	REVISIONS	AUG. 13, 2020	N
3	REVISIONS	AUG. 7, 2020	AR/N
2	REVISIONS	JULY 16, 2020	N
1	CONCEPT PLAN PREPARED	JAN. 6, 2020	N

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Ontario Land Surveyors

Job No. 18858-9 Richcraft Pt Lts 1-4 Cl OF GL DPS 08 — N

DEVELOPMENT SERVICING STUDY CHECKLIST

4.1 General Content		
☐	Executive Summary (for larger reports only).	N/A
☐	Date and revision number of the report.	Title Page
☐	Location map and plan showing municipal address, boundary, and layout of proposed development.	Figure 1
☐	Plan showing the site and location of all existing services.	Figures 2/3/4
☐	Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	Section 1.0 & Section 2.0
☐	Summary of Pre-consultation Meetings with City and other approval agencies.	Section 1.4
☐	Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	All sections
☐	Statement of objectives and servicing criteria.	Section 1.0 & Section 3.2, Section 4.2, and Section 5.2
☐	Identification of existing and proposed infrastructure available in the immediate area.	Sections 3.1, Section 4.1, and Section 5.1
☐	Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	Sections 1.1 & 1.2
☐	Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	Drawing 1
☐	Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	*MSS*
☐	Proposed phasing of the development, if applicable.	N/A. Depends on landowner preferred timing
☐	Reference to geotechnical studies and recommendations concerning servicing.	Section 1.1 & Section 2.1
☐	All preliminary and formal site plan submissions should have the following information: -Metric scale -North arrow (including construction North) -Key plan -Name and contact information of applicant and property owner -Property limits including bearings and dimensions -Existing and proposed structures and parking areas -Easements, road widening and rights-of-way -Adjacent street names	All Figures

4.2 Development Servicing Report: Water		
☐	Confirm consistency with Master Servicing Study, if available	Section 3.2
☐	Availability of public infrastructure to service proposed development	MSS & Section 3.2
☐	Identification of system constraints	MSS & Section 3.2
☐	Identify boundary conditions	Detailed hydraulic assessment N/A for FSR

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☐	Confirmation of adequate domestic supply and pressure	MSS. Detailed hydraulic assessment N/A for FSR.
☐	Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	MSS. Detailed hydraulic assessment N/A for FSR.
☐	Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	Detailed hydraulic assessment N/A for FSR.
☐	Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design	Detailed hydraulic assessment N/A for FSR.
☐	Address reliability requirements such as appropriate location of shut-off valves	Detailed hydraulic assessment N/A for FSR.
☐	Check on the necessity of a pressure zone boundary modification	MSS.
☐	Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range	MSS. Detailed hydraulic assessment N/A for FSR.
☐	Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	MSS, Section 3.2 & Figure 5. Detailed hydraulic assessment N/A for FSR.
☐	Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	MSS.
☐	Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Section 3.2, Appendix C
☐	Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	Detailed hydraulic assessment N/A for FSR.

4.3 Development Servicing Report: Wastewater		
☐	Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	Section 4.2
☐	Confirm consistency with Master Servicing Study and/or justifications for deviations.	Section 4.2
☐	Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	MSS
☐	Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 4.1 & 4.2
☐	Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	MSS, Section 4.2, Appendix D
☐	Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	Appendix D
☐	Description of proposed sewer network including sewers, pumping stations, and forcemains.	MSS, Section 4.2, Appendix C & Figure 3

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☐	Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	MSS
☐	Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	N/A
☐	Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
☐	Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	N/A
☐	Special considerations such as contamination, corrosive environment etc.	N/A

4.4 Development Servicing Report: Stormwater Checklist

☐	Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)	Section 1.1 & Section 5.1
☐	Analysis of available capacity in existing public infrastructure.	MSS & Section 5.3
☐	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Figure 5, Appendix B
☐	Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	MSS, Section 5.2
☐	Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	MSS & Section 5.2
☐	Description of the stormwater management concept with facility locations and descriptions with references and supporting information	MSS, Section 5.3, & Figure 5
☐	Set-back from private sewage disposal systems.	N/A
☐	Watercourse and hazard lands setbacks.	MSS, Section 5.3
☐	Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	N/A
☐	Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	MSS, Section 5.2, Section 5.3 & Section 5.4
☐	Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).	*MSS,* Section 5.3
☐	Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	MSS, Section 5.3
☐	Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	*MSS*
☐	Any proposed diversion of drainage catchment areas from one outlet to another.	Section 5.3
☐	Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	Section 5.3, Appendix E & Figure 2

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☐	If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	N/A
☐	Identification of potential impacts to receiving watercourses	MSS
☐	Identification of municipal drains and related approval requirements.	N/A
☐	Descriptions of how the conveyance and storage capacity will be achieved for the development.	*MSS,* Section 5.5
☐	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	MSS, Section 5.3 & Drawing 1
☐	Inclusion of hydraulic analysis including hydraulic grade line elevations.	*MSS & EUC Pond 1 North Main Cell and North Forebay Modifications (DSEL, August 31, 2020)*
☐	Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Section 7.0
☐	Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	MSS
☐	Identification of fill constraints related to floodplain and geotechnical investigation.	Section 1.1 & 5.6

4.5 Approval and Permit Requirements: Checklist		
☐	Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement ct. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.	Section 1.2
☐	Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	Section 1.2
☐	Changes to Municipal Drains.	N/A
☐	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	Section 1.2

4.6 Conclusion Checklist		
☐	Clearly stated conclusions and recommendations	Section 8.0
☐	Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	N/A first submission
☐	All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario	Section 8.0

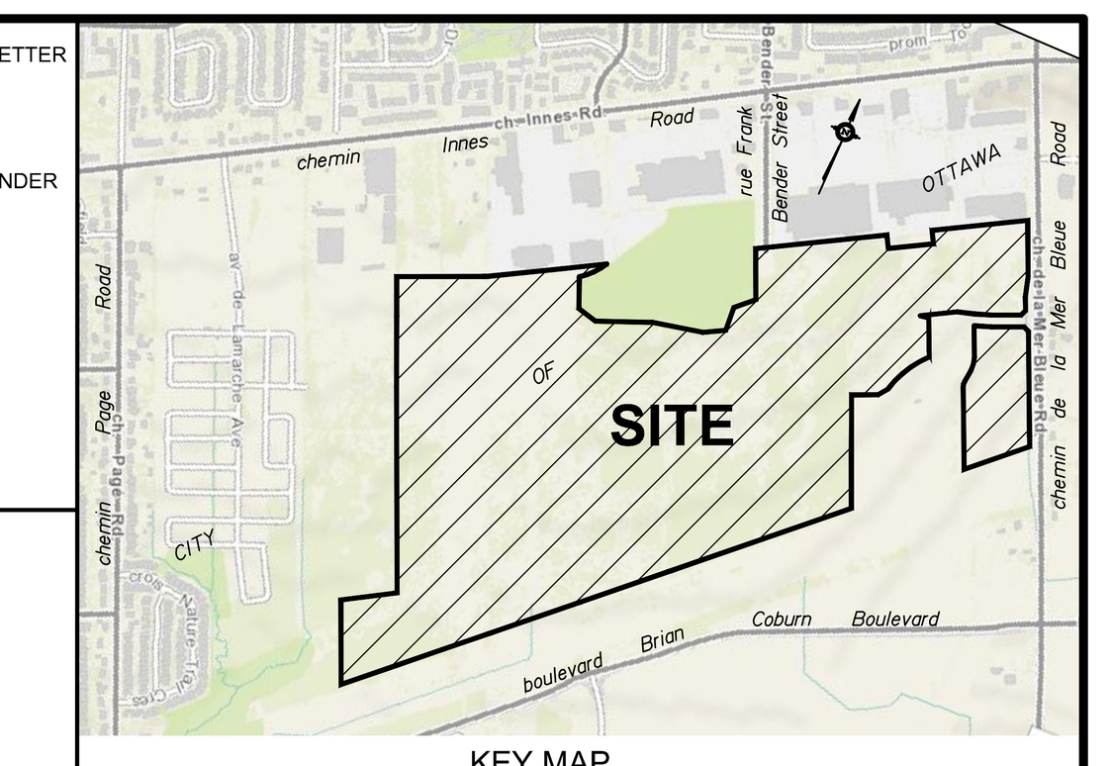
*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

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__ .

____
JEFF MCEWEN, P. ENG. MANAGER,
DEVELOPMENT REVIEW-EAST
PLANNING, REAL ESTATE AND ECONOMIC DEVELOPMENT DEPARTMENT, CITY OF OTTAWA



KEY MAP
NOT TO SCALE

DRAFT PLAN OF SUBDIVISION OF
PART OF LOTS 1, 2, 3 and **4**
CONCESSION 3 (OTTAWA FRONT)
Geographic Township of Gloucester
and
PART OF BLOCK 115
REGISTERED PLAN 4M-1545
CITY OF OTTAWA
Prepared by Annis , O'Sullivan , Vollebekk Ltd.

Scale 1 : 1250
50 37.5 25 12.5 0 25 50 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 our instructions.

____________ Date
____________________ Steve Grandmont
RICHCRAFT HOMES LTD.
2322028 ONTARIO INC.
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, park land and open space
(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

PROPOSED LAND USE TABLE

PROPOSED USE	LOTS / BLOCKS	NO. OF UNITS	AREA (Ha/Ac)
SINGLE FAMILY	1 - 340	340	12.369 / 30.57
TOWNHOMES	343, 345, 347, 348-353, 357-360, 362-365, 367, 368-372, 375-378, 380, 381, 383-385	529	11.996 / 29.64
BACK TO BACK	354, 373, 382	114	1.452 / 3.59
MEDIUM DENSITY	356	...	2.506 / 6.19
HIGH DENSITY	366, 379	...	7.787 / 19.24
WALKWAYS	344, 346, 355, 361		0.115 / 0.28
PARKS	342, 374, 386		6.411 / 15.84
OPEN SPACE	341		3.653 / 9.03
EMPLOYMENT LANDS	387, 388, 389		19.339 / 47.79
STREETS			15.490 / 38.28
OTHER	390, 391	...	0.867 / 2.14
SITE TOTAL		...	81.985 / 202.59

REVISION SCHEDULE

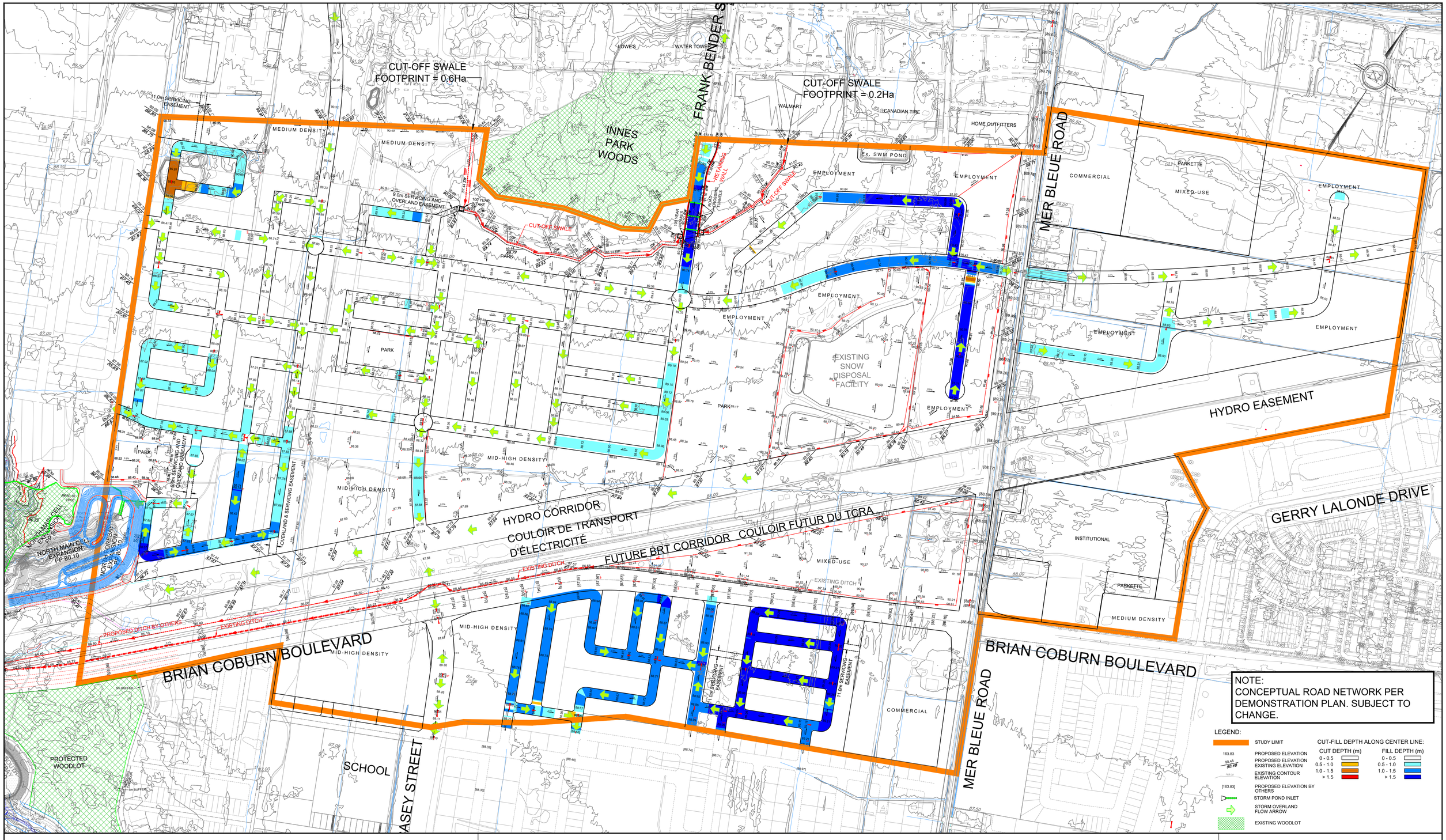
NO.	REVISION	DATE	BY
8	REVISIONS	JULY 5, 2022	N
7	REVISIONS	JUNE 21, 2022	N
6	REVISIONS	APR. 19, 2022	N
5	BLK. 36 CHANGED TO MED. DENSITY	OCT. 16, 2020	N
4	REVISIONS	AUG. 13, 2020	N
3	REVISIONS	AUG. 7, 2020	AR/N
2	REVISIONS	JULY 16, 2020	N
1	CONCEPT PLAN PREPARED	JAN. 6, 2020	N

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
Ontario Land Surveyors

Job No. 18818-19 Richcraft Pt Lts 1-4 C3 OF GL DPS D8 | N

Appendix B

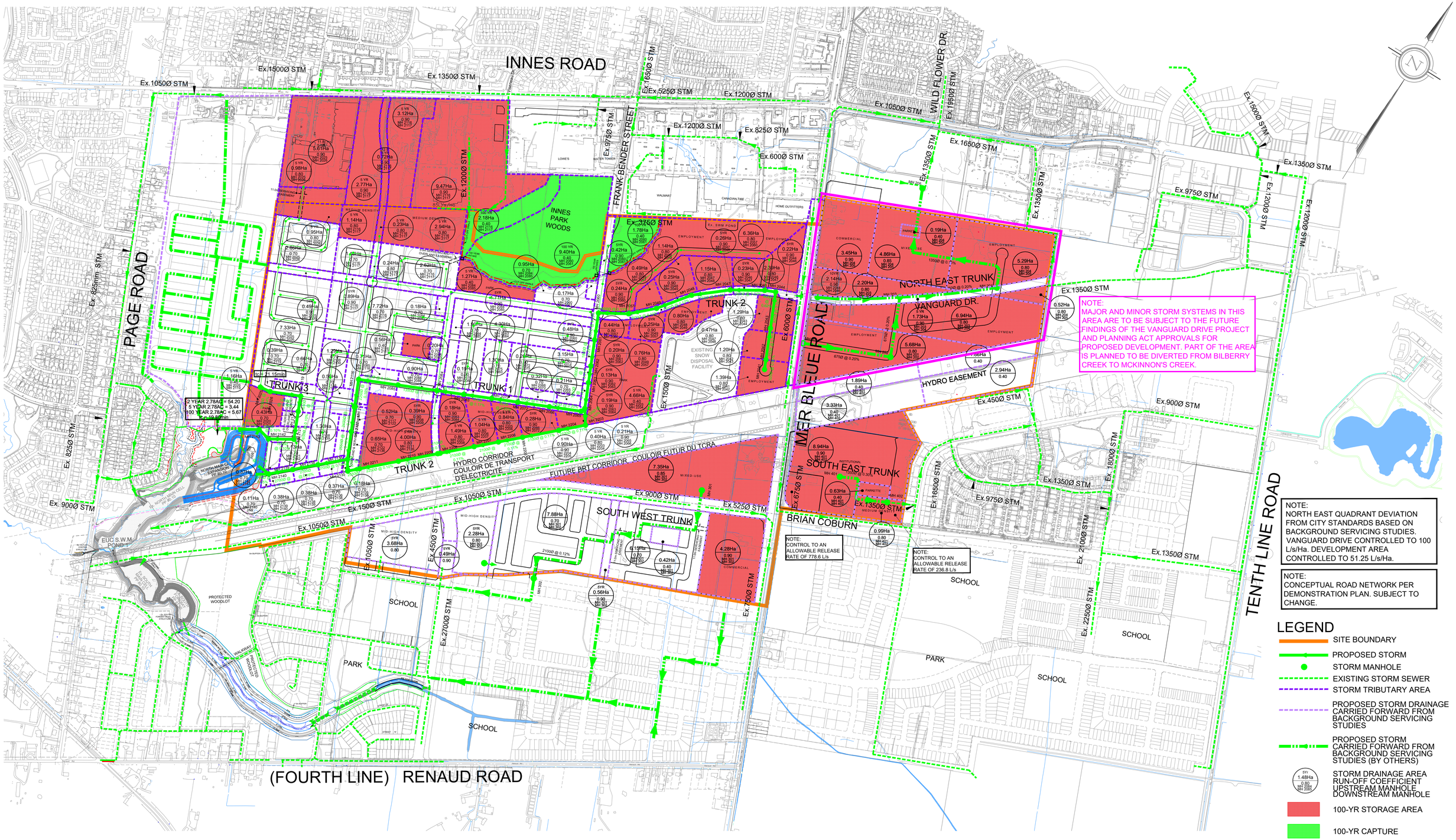
Excerpts from Supporting EUC Phase 3 Area CDP MSS (DSEL, Dec 2020)



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

EAST URBAN COMMUNITY PHASE 3 AREA COMMUNITY DESIGN PLAN
GRADING PLAN

PROJECT No. :	14-733
SCALE	1:4000
DATE:	OCTOBER 2019
DRAWING No.	2



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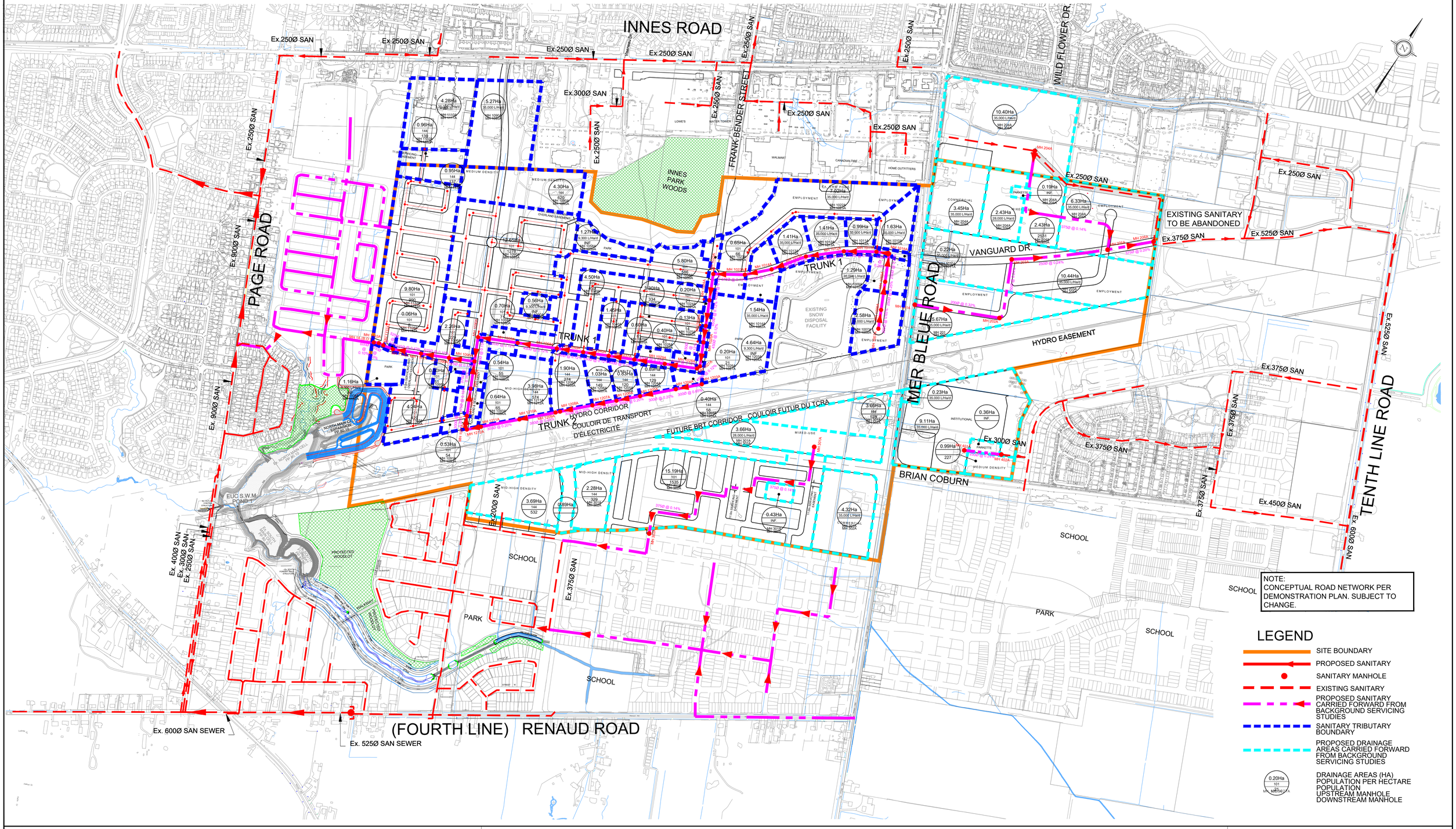
EAST URBAN COMMUNITY PHASE 3 AREA COMMUNITY DESIGN PLAN
CONCEPTUAL STORM SERVICING

PROJECT No. :	14-733
SCALE	1:5000
DATE:	OCTOBER 2019
DRAWING No.	4



NOTE:
CONCEPTUAL ROAD NETWORK PER DEMONSTRATION PLAN. SUBJECT TO CHANGE.

LEGEND

- SITE BOUNDARY
- PROPOSED SANITARY
- SANITARY MANHOLE
- EXISTING SANITARY
- PROPOSED SANITARY CARRIED FORWARD FROM BACKGROUND SERVICING STUDIES
- SANITARY TRIBUTARY BOUNDARY
- PROPOSED DRAINAGE AREAS CARRIED FORWARD FROM BACKGROUND SERVICING STUDIES
- DRAINAGE AREAS (HA) POPULATION PER HECTARE POPULATION UPSTREAM MANHOLE DOWNSTREAM MANHOLE

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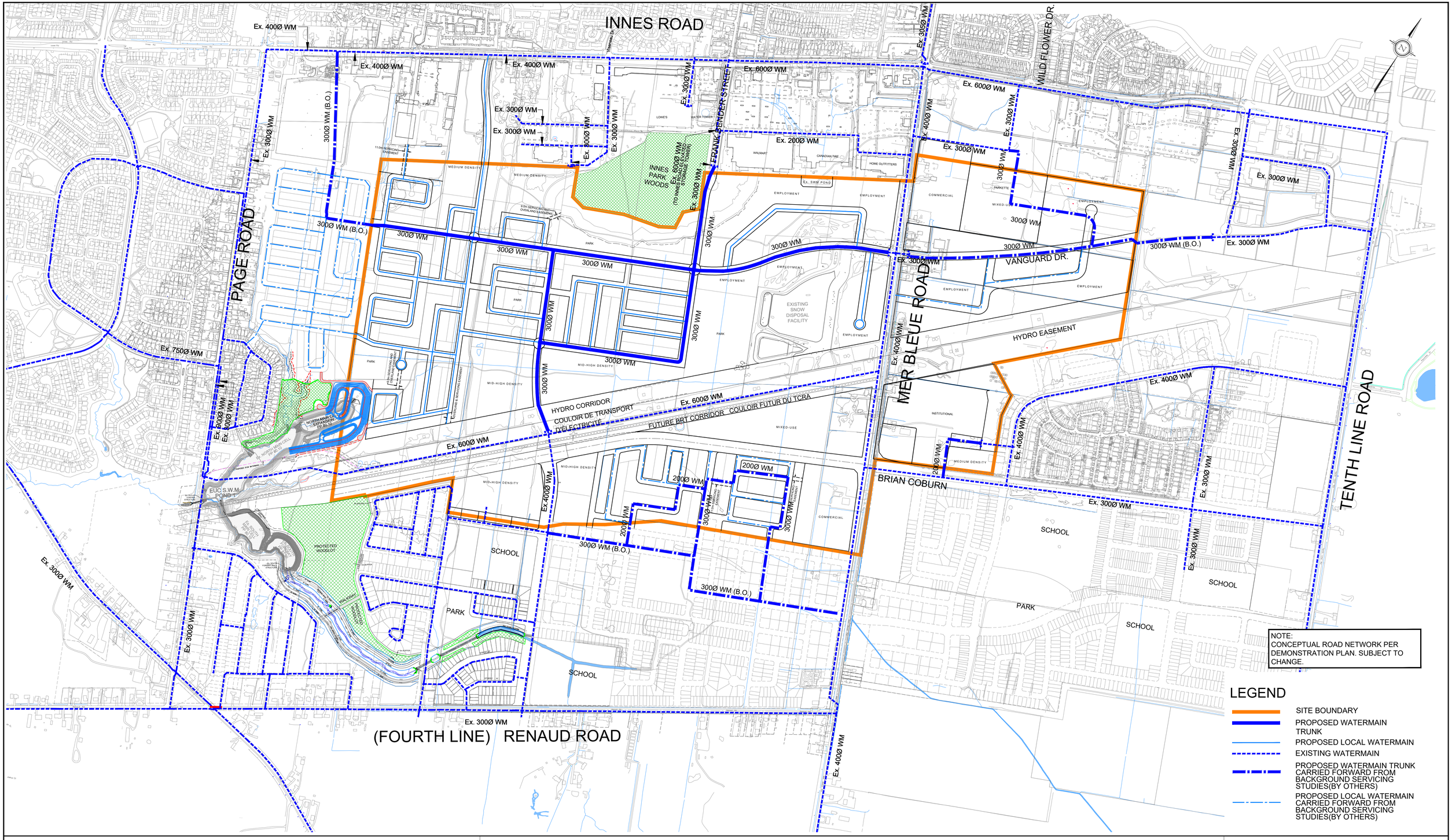
www.DSEL.ca

EAST URBAN COMMUNITY PHASE 3 AREA COMMUNITY DESIGN PLAN
CONCEPTUAL SANITARY SERVICING

PROJECT No. :	14-733
SCALE	1:5000
DATE:	OCTOBER 2019
DRAWING No.	5



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EAST URBAN COMMUNITY PHASE 3 AREA COMMUNITY DESIGN PLAN
WATERMAIN SERVICING

PROJECT No. :	14-733
SCALE	1:5000
DATE:	OCTOBER 2019
DRAWING No.	6

Appendix C

Water Demand Calculations

Richcraft Homes
Trails Edge North
Proposed Site Conditions

Water Demand Design Flows per Unit Count
City of Ottawa - Water Distribution Guidelines, July 2010

Domestic Demand

Type of Housing	Per / Unit	Units	Pop
Single Family	3.4	340	1156
Townhouse	2.7	529	1429
B2B	2.7	114	308
Apartment			0
Bachelor	1.4	-	0
1 Bedroom	1.4	-	0
2 Bedroom	2.1	-	0
3 Bedroom	3.1	-	0
Average	1.8	1,059	1907

	Pop	Avg. Daily		Max Day		Peak Hour	
		m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Total Domestic Demand	4800	1344.0	933.3	2688.0	1866.7	4032.0	2800.0

Institutional / Commercial / Industrial Demand

			Avg. Daily		Max Day		Peak Hour	
Property Type	**Unit Rate**	**Units**	m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Empoyment	35,000.0 L/ha/d	19.34	676.90	470.1	1015.4	705.1	1827.6	1269.2
Parks	9,300 L/ha/d	6.41	59.61	41.4	89.4	62.1	161.0	111.8
Total I/CI Demand			736.5	511.5	1104.8	767.2	1988.6	1381.0
Total Demand			**2080.5**	**1444.8**	**3792.8**	**2633.9**	**6020.6**	**4181.0**

Water Demand Design Flows per Unit Count
City of Ottawa - Water Distribution Guidelines, July 2010

Domestic Demand

Type of Housing	Per / Unit	Units	Pop
Single Family	3.4	319	1085
Townhouse	2.7	746	2015
B2B	2.7	-	0
Apartment			0
Bachelor	1.4	-	0
1 Bedroom	1.4	-	0
2 Bedroom	2.1	252	530
3 Bedroom	3.1	-	0
Average	1.8	688	1239

	Pop	Avg. Daily		Max Day		Peak Hour	
		m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Total Domestic Demand	4869	1363.3	946.8	2726.6	1893.5	4090.0	2840.3

Institutional / Commercial / Industrial Demand

			Avg. Daily		Max Day		Peak Hour	
Property Type	**Unit Rate**	**Units**	m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Empoyment	35,000.0 L/ha/d	19.42	679.70	472.0	1019.6	708.0	1835.2	1274.4
Parks	9,300 L/ha/d	6.26	58.22	40.4	87.3	60.6	157.2	109.2
Total I/CI Demand			737.9	512.4	1106.9	768.7	1992.4	1383.6
Total Demand			**2101.2**	**1459.2**	**3833.5**	**2662.2**	**6082.3**	**4223.8**

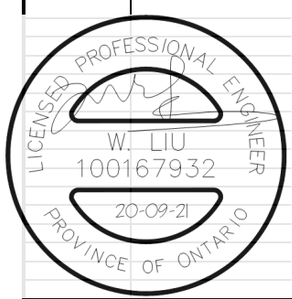
Appendix D

Sanitary Servicing Design

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION							COMM		INSTIT		PARK		C+I+I	INFILTRATION			TOTAL	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)	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)
TRUNK 2																											
	1203A	1204A	0.36		52	0.36	52	3.6	0.61		0.00		0.00	4.59	4.59	0.74	4.95	4.95	1.63	2.99	81.0	300	0.65	77.96	0.04	1.10	0.52
	1204A	1205A	0.75		108	1.11	160	3.5	1.84		0.00		0.00		4.59	0.74	0.75	5.70	1.88	4.46	111.0	300	0.20	43.25	0.10	0.61	0.39
	1205A	1206A	0.77		111	1.88	271	3.5	3.05		0.00		0.00		4.59	0.74	0.77	6.47	2.14	5.93	74.0	300	0.20	43.25	0.14	0.61	0.43
	1206A	1207A	0.97		140	2.85	411	3.4	4.55		0.00		0.00		4.59	0.74	0.97	7.44	2.46	7.74	75.0	300	0.20	43.25	0.18	0.61	0.46
	1207A	1208A				2.85	411	3.4	4.55		0.00		0.00		4.59	0.74	0.00	7.44	2.46	7.74	100.5	300	0.20	43.25	0.18	0.61	0.46
	1208A	1209A	1.77		255	4.62	666	3.3	7.18		0.00		0.00		4.59	0.74	1.77	9.21	3.04	10.96	14.5	300	0.20	43.25	0.25	0.61	0.51
	1209A	1210A	1.64		237	6.26	903	3.3	9.55		0.00		0.00		4.59	0.74	1.64	10.85	3.58	13.87	112.5	300	0.20	43.25	0.32	0.61	0.54
	1210A	1211A	2.83		408	9.09	1311	3.2	13.50		0.00		0.00		4.59	0.74	2.83	13.68	4.51	18.75	120.0	300	0.20	43.25	0.43	0.61	0.59
	1211A	1212A				9.09	1311	3.2	13.50		0.00		0.00		4.59	0.74	0.00	13.68	4.51	18.75	43.5	300	0.20	43.25	0.43	0.61	0.59
	1212A	1091A				9.09	1311	3.2	13.50		0.00		0.00		4.59	0.74	0.00	13.68	4.51	18.75	10.0	300	0.20	43.25	0.43	0.61	0.59
	1091A	1093A				9.09	1311	3.2	13.50		0.00		0.00		4.59	0.74	0.00	13.68	4.51	18.75	33.5	300	0.20	43.25	0.43	0.61	0.59
	1093A	1094A	1.16		118	10.25	1429	3.2	14.61		0.00		0.00		4.59	0.74	1.16	14.84	4.90	20.25	84.0	450	0.12	98.76	0.21	0.62	0.49
	1094A	1095A	0.52		53	10.77	1482	3.1	15.11		0.00		0.00		4.59	0.74	0.52	15.36	5.07	20.92	81.0	450	0.12	98.76	0.21	0.62	0.49
To TRUNK 1, Pipe 1095A - 1096A						10.77	1482				0.00		0.00		4.59			15.36									
TRUNK 1																											
	1007A	1008A				0.00				1.87	1.87		0.00		0.00	1.14	1.87	1.87	0.62	1.75	58.0	300	0.65	77.96	0.02	1.10	0.44
	1008A	1009A				0.00	0			1.19	3.06		0.00		0.00	1.86	1.19	3.06	1.01	2.87	86.5	300	0.25	48.35	0.06	0.68	0.37
	1009A	1010A				0.00	0			0.90	3.96		0.00		0.00	2.41	0.90	3.96	1.31	3.71	86.5	300	0.25	48.35	0.08	0.68	0.40
	1010A	1011A				0.00	0			2.04	6.00		0.00		0.00	3.65	2.04	6.00	1.98	5.63	46.0	300	0.25	48.35	0.12	0.68	0.46
	1011A	1012A				0.00	0			1.02	7.02		0.00		0.00	4.27	1.02	7.02	2.32	6.58	97.5	375	0.15	67.91	0.10	0.61	0.39
	1012A	1013A				0.00	0			2.12	9.14		0.00		0.00	5.55	2.12	9.14	3.02	8.57	125.5	375	0.15	67.91	0.13	0.61	0.42
	1013A	1014A				0.00	0			2.12	11.26		0.00		0.00	6.84	2.12	11.26	3.72	10.56	88.0	375	0.15	67.91	0.16	0.61	0.45
	1014A	1022A				0.00	0			1.18	12.44		0.00		0.00	7.56	1.18	12.44	4.11	11.66	93.0	375	0.15	67.91	0.17	0.61	0.46
	1022A	1023A				0.00	0			6.81	19.25		0.00		0.00	11.70	6.81	19.25	6.35	18.05	100.5	375	0.15	67.91	0.27	0.61	0.52
	1023A	1024A	0.72		73	0.72	73	3.6	0.86		19.25		0.00		0.00	11.70	0.72	19.97	6.59	19.14	82.0	450	0.12	98.76	0.19	0.62	0.48
	1024A	1025A	0.19		20	0.91	93	3.6	1.09		19.25		0.00		0.00	11.70	0.19	20.16	6.65	19.44	79.0	450	0.12	98.76	0.20	0.62	0.48
	1025A	1026A	0.14		15	1.05	108	3.6	1.26		19.25		0.00		0.00	11.70	0.14	20.30	6.70	19.65	58.0	450	0.12	98.76	0.20	0.62	0.48
	1026A	1027A	0.24		25	1.29	133	3.6	1.54		19.25		0.00		0.00	11.70	0.24	20.54	6.78	20.01	63.5	450	0.12	98.76	0.20	0.62	0.49
	1027A	1028A				1.29	133	3.6	1.54		19.25		0.00		0.00	11.70	0.00	20.54	6.78	20.01	25.0	450	0.12	98.76	0.20	0.62	0.49
	1028A	1029A	0.52		53	1.81	186	3.5	2.13		19.25		0.00		0.00	11.70	0.52	21.06	6.95	20.77	93.0	450	0.12	98.76	0.21	0.62	0.49
	1029A	1037A	0.48		49	2.29	235	3.5	2.66		19.25		0.00		0.00	11.70	0.48	21.54	7.11	21.47	93.0	450	0.12	98.76	0.22	0.62	0.49
	1037A	1040A	3.56		360	5.85	595	3.3	6.45		19.25		0.00		0.00	11.70	3.56	25.10	8.28	26.43	79.0	450	0.12	98.76	0.27	0.62	0.52
	1040A	1049A	1.54		156	7.39	751	3.3	8.03		19.25		0.00		0.00	11.70	1.54	26.64	8.79	28.52	79.0	450	0.12	98.76	0.29	0.62	0.53
	1049A	1058A	4.52		457	11.91	1208	3.2	12.51		19.25		0.00		0.00	11.70	4.52	31.16	10.28	34.49	81.0	450	0.12	98.76	0.35	0.62	0.56
	1058A	1059A	5.68		574	17.59	1782	3.1	17.90		19.25		0.00	1.37	1.37	11.92	7.05	38.21	12.61	42.43	121.5	450	0.12	98.76	0.43	0.62	0.60
	1059A	1090A	0.46		47	18.05	1829	3.1	18.33		19.25		0.00		1.37	11.92	0.46	38.67	12.76	43.01	121.5	450	0.12	98.76	0.44	0.62	0.60
			2.41		348	20.46	2177			5.07	24.32		0.00	0.59	1.96		8.07	46.74									
	1090A	1095A	14.50		1465	34.96	3642	2.9	34.18		24.32		0.00		1.96	15.09	14.50	61.24	20.21	69.48	68.5	450	0.15	110.42	0.63	0.69	0.73
Contribution From TRUNK 1, Pipe 1094A - 1095A						10.77	1482				0.00		0.00		4.59		15.36	76.60									
	1095A	1096A	0.50		51	46.23	5175	2.8	46.71		24.32		0.00		6.55	15.84	0.50	77.10	25.44	87.98	79.5	525	0.12	148.98	0.59	0.69	0.72
	1096A	1107A	1.98		200	48.21	5375	2.8	48.30		24.32		0.00		6.55	15.84	1.98	79.08	26.10	90.23	76.0	525	0.10	136.00	0.66	0.63	0.67
			1.91		276	50.12	5651				24.32		0.00		6.55		1.91	80.99									
			4.43		448	54.55	6099				24.32		0.00		6.55		4.43	85.42									
	1107A	1108A	9.77		987	64.32	7086	2.7	61.57	4.28	28.60		0.00		6.55	18.44	14.05	99.47	32.83	112.83	97.5	525	0.22	201.72	0.56	0.93	0.95
	1108A	1133A	0.31		32	64.63	7118	2.7	61.81		28.60		0.00	1.16	7.71	18.62	1.47	100.94	33.31	113.75	47.5	600	0.22	288.00	0.39	1.02	0.96
	1133A	1A (B.O.)				64.63	7118	2.7	61.81		28.60		0.00		7.71	18.62	0.00	100.94	33.31	113.75	15.5	600	0.10	194.17	0.59	0.69	0.71



DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.10764	l/s/Ha			
Average Daily Flow =	280	l/p/day			Industrial Peak Factor = as per MOE Graph		
Comm/Inst Flow =	35000	L/ha/da	0.4051	l/s/Ha	Extraneous Flow =	0.330	L/s/ha
Industrial Flow =	35000	L/ha/da	0.40509	l/s/Ha	Minimum Velocity =	0.600	m/s
Max Res. Peak Factor =	4.00				Manning's n = (Conc)	0.013 (Pvc)	0.013
Commercial/Inst./Park Peak Factor =	1.50				Townhouse coeff=	2.7	
Institutional =	0.41	l/s/Ha			Single house coeff=	3.4	

Designed:	V.W.	PROJECT:	**Trailsedge North**
Checked:	W.L.	LOCATION:	**City of Ottawa**
Dwg. Reference: Sanitary Drainage Plan, Dwgs. No.		File Ref: 20-1195	Date: **21 Sep 2020**
			Sheet No. 1 of 1

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)	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)
North West Sanitary Trunk																									
Trunk 1	1007A	1008A			0.00	0			2.58	2.58					1.57	2.58	2.58	0.85	2.42	58.00	200.00	0.65	26.44	0.09	0.84	0.52
COMMERCIAL	1008A	1009A			0.00	0				2.58					1.57	0.00	2.58	0.85	2.42	86.50	250.00	0.25	29.73	0.08	0.61	0.37
COMMERCIAL	1009A	1010A			0.00	0			1.29	3.87					2.35	1.29	3.87	1.28	3.63	86.50	250.00	0.25	29.73	0.12	0.61	0.41
COMMERCIAL					0.00	0			0.22	4.09						0.22	4.09								
COMMERCIAL	1010A	1011A			0.00	0			1.63	5.72					3.48	1.63	5.72	1.89	5.37	39.50	300.00	0.20	43.25	0.12	0.61	0.00
COMMERCIAL	1011A	1012A			0.00	0			0.99	6.71					4.08	0.99	6.71	2.21	6.29	99.50	375.00	0.15	67.91	0.09	0.61	0.38
COMMERCIAL	1012A	1013A			0.00	0			1.41	8.12					4.93	1.41	8.12	2.68	7.61	117.00	375.00	0.15	67.91	0.11	0.61	0.40
COMMERCIAL	1013A	1014A			0.00	0			1.41	9.53					5.79	1.41	9.53	3.14	8.93	112.00	375.00	0.15	67.91	0.13	0.61	0.41
COMMERCIAL	1014A	1022A			0.00	0			1.54	11.07					6.73	1.54	11.07	3.65	10.38	83.50	375.00	0.15	67.91	0.15	0.61	0.44
COMMERCIAL	1022A	1023A			0.00	0			7.02	18.09					10.99	7.02	18.09	5.97	16.96	96.50	375.00	0.15	67.91	0.25	0.61	0.51
	1023A	1024A	0.65	66	0.65	66	3.63	0.78		18.09					10.99	0.65	18.74	6.18	17.95	81.00	450.00	0.12	98.76	0.18	0.62	0.47
	1024A	1025A	0.20	21	0.85	87	3.61	1.02		18.09					10.99	0.20	18.94	6.25	18.26	79.00	450.00	0.12	98.76	0.18	0.62	0.47
	1025A	1026A	0.13	14	0.98	101	3.59	1.18		18.09					10.99	0.13	19.07	6.29	18.46	51.00	450.00	0.12	98.76	0.19	0.62	0.48
	1026A	1027A	0.20	21	1.18	122	3.58	1.42		18.09					10.99	0.20	19.27	6.36	18.77	74.00	450.00	0.12	98.76	0.19	0.62	0.48
	1027A	1028A			1.18	122				18.09					10.99	0.00	19.27	6.36	17.35	11.00	450.00	0.12	98.76	0.18	0.62	0.47
	1028A	1029A	0.40	41	1.58	163	3.54	1.87		18.09					10.99	0.40	19.67	6.49	19.35	100.00	450.00	0.12	98.76	0.20	0.62	0.48
	1029A	1037A	0.60	61	2.18	224	3.50	2.54		18.09					10.99	0.60	20.27	6.69	20.22	94.00	450.00	0.12	98.76	0.20	0.62	0.48
	1037A	1040A	3.30	334	5.48	558	3.36	6.08		18.09					10.99	3.30	23.57	7.78	24.85	79.00	450.00	0.12	98.76	0.25	0.62	0.51
	1040A	1049A	1.45	147	6.93	705	3.31	7.56		18.09					10.99	1.45	25.02	8.26	26.81	79.00	450.00	0.12	98.76	0.27	0.62	0.52
	1049A	1058A	4.50	455	11.43	1160	3.21	12.07		18.09					10.99	4.50	29.52	9.74	32.80	81.50	450.00	0.12	98.76	0.33	0.62	0.56
PARK	1058A	1059A	5.80	586	17.23	1746	3.10	17.54		18.09			1.27	1.27	11.20	7.07	36.59	12.07	40.81	120.50	450.00	0.12	98.76	0.41	0.62	0.59
	1059A	1090A	0.70	71	17.93	1817	3.09	18.20		18.09				1.27	11.20	0.70	37.29	12.31	41.71	123.00	450.00	0.12	98.76	0.42	0.62	0.59
PARK, EXT FUT			4.30	620	22.23	2437			5.27	23.36			0.56	1.83		10.13	47.42									
	1090A	1095A	12.65	1278	34.88	3715	2.89	34.79		23.36				1.83	14.49	12.65	60.07	19.82	69.10	75.00	450.00	0.15	110.42	0.63	0.69	0.73
Contribution from Trunk 2, MH 1094A-1095A					10.74	1478				0.00				4.64			15.38									
	1095A	1096A	0.50	51	46.12	5244	2.78	47.24		23.36				6.47	15.24	0.50	75.95	25.06	87.54	79.00	525.00	0.12	148.98	0.59	0.69	0.72
	1096A	1107A	2.26	229	48.38	5473	2.77	49.13		23.36				6.47	15.24	2.26	78.21	25.81	90.18	86.50	525.00	0.10	136.00	0.66	0.63	0.67
	1107A	1108A	4.24	429	52.62	5902	2.74	52.41		23.36				6.47	15.24	4.24	82.45	27.21	94.86	87.00	525.00	0.42	278.71	0.34	1.29	1.16
PARK	1108A	1132A	0.06	8	52.68	5910	2.74	52.48		23.36			1.16	7.63	15.43	1.22	83.67	27.61	95.52	31.50	525.00	0.10	136.00	0.70	0.63	0.68
CONTRIBUTION FROM EXTERNAL			0.96	144	53.64	6054	2.73	53.56	4.42	27.78				7.63		5.38	89.05									
			0.95	137	54.59	6191				27.78				7.63		0.95	90.00									
	1132A	1133A	9.80	990	64.39	7181	2.68	62.37		27.78				7.63	18.11	9.80	99.80	32.93	113.41	15.50	600.00	0.10	194.17	0.58	0.69	0.72
	1133A	1A (B.O.)			64.39	7181	2.68	62.37		27.78				7.63	18.11	0.00	99.80	32.93	113.41	15.50	600.00	0.10	194.17	0.58	0.69	0.72
To MH 1A By Others																										
Trunk 2																										
PARK	1203A	1204A	0.40	58	0.40	58				0.00			4.64	4.64	0.75	5.04	5.04	1.66	2.41	81.00	300.00	0.65	77.96	0.03	1.10	0.48
	1204A	1205A	0.89	129	1.29	187	3.53	2.14		0.00				4.64	0.75	0.89	5.93	1.96	4.85	111.00	300.00	0.20	43.25	0.11	0.61	0.40
	1205A	1206A	0.83	120	2.12	307	3.46	3.44		0.00				4.64	0.75	0.83	6.76	2.23	6.42	74.00	300.00	0.20	43.25	0.15	0.61	0.44
	1206A	1207A	1.03	149	3.15	456	3.40	5.02		0.00				4.64	0.75	1.03	7.79	2.57	8.34	75.00	300.00	0.20	43.25	0.19	0.61	0.47
	1207A	1208A			3.15	456				0.00				4.64	0.75	0.00	7.79	2.57	3.32	100.50	300.00	0.20	43.25	0.08	0.61	0.37

LICENSED PROFESSIONAL ENGINEER
K. MITIC
100122349
OCT. 18, 2019
PROVINCE OF ONTARIO

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 =	35000	L/ha/da	0.405	Extraneous Flow =	0.330	L/s/ha	
Industrial Flow =	35000	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	35000.00	L/ha/da					
Institutional =	0.405	l/s/Ha					

Designed: R.B	PROJECT: Orleans EUC MUC		
Checked: K.M	LOCATION: City of Ottawa		
Dwg. Reference:	File Ref: 14-733	Date: October, 2019	Sheet No. 1 of 2

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D1

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)	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)
	1208A	1209A	1.90	274	5.05	730	3.31	7.83		0.00				4.64	0.75	1.90	9.69	3.20	11.78	14.50	300.00	0.20	43.25	0.27	0.61	0.51
	1209A	1210A			5.05	730				0.00				4.64	0.75	0.00	9.69	3.20	3.95	112.50	300.00	0.20	43.25	0.09	0.61	0.38
	1210A	1211A			5.05	730				0.00				4.64	0.75	0.00	9.69	3.20	3.95	120.00	300.00	0.20	43.25	0.09	0.61	0.38
	1211A	1212A	3.98	574	9.03	1304	3.18	13.44		0.00				4.64	0.75	3.98	13.67	4.51	18.70	43.50	300.00	0.20	43.25	0.43	0.61	0.59
	1212A	1091A			9.03	1304				0.00				4.64	0.75	0.00	13.67	4.51	5.26	10.00	300.00	0.20	43.25	0.12	0.61	0.41
	1091A	1093A	0.53	54	9.56	1358	3.17	13.95		0.00				4.64	0.75	0.53	14.20	4.69	19.39	33.00	300.00	0.20	43.25	0.45	0.61	0.59
	1093A	1094A	0.64	65	10.20	1423	3.16	14.57		0.00				4.64	0.75	0.64	14.84	4.90	20.22	84.00	375.00	0.15	67.91	0.30	0.61	0.53
	1094A	1095A	0.54	55	10.74	1478	3.15	15.09		0.00				4.64	0.75	0.54	15.38	5.08	20.92	84.50	375.00	0.15	67.91	0.31	0.61	0.54
To Trunk 1, Pipe 1095A-1096A					10.74	1478				0.00				4.64			15.38									
North East Sanitary Trunk																										
External Commercial					0.00	0			10.40	10.40						10.40	10.40									
Mixed Use Block*			2.43	2531	2.43	2531	3.00	24.61	2.43	12.83						4.86	15.26									
					2.43	2531			3.45	16.28						3.45	18.71									
	204A	205A			2.43	2531			6.33	22.61			0.19	0.19	13.77	6.52	25.23	8.33	22.10	525.00	375.00	0.14	65.60	0.34	0.59	0.53
To Pipe 205A - 206A					2.43	2531				22.61				0.19			25.23		22.10							
	201A	202A			0.00	0			5.67	5.67					3.45	5.67	5.67	1.87	5.32	266.00	200.00	0.32	18.55	0.29	0.59	0.51
	202A	203A			0.00	0			0.00	5.67					3.45	0.00	5.67	1.87	5.32	176.00	250.00	0.24	29.13	0.18	0.59	0.44
	203A	205A			0.00	0			10.44	16.11					9.79	10.44	16.11	5.32	15.11	292.50	250.00	0.24	29.13	0.52	0.59	0.60
Contribution from Pipe 204A - 205A					2.43	2531				22.61				0.19			25.23									
	205A	206A			2.43	2531				38.72				0.19	23.56	0.00	41.34	13.64	37.20	150.50	375.00	0.20	78.41	0.47	0.71	0.70
To Existing Vanguard Drive Sanitary					2.43	2531				38.72				0.19			41.34		37.20							
South West Sanitary Trunk																										
Mixed Use Block			3.66	528	3.66	528			3.66	3.66					2.22	7.32	7.32									
Mid-High Density Residential			15.19	1535	18.85	2063	3.06	20.46	4.32	7.98					4.85	19.51	26.83									
	301A	302A	2.28	329	21.13	2392	3.02	23.41		7.98			0.43	0.43	4.92	2.71	29.54	9.75	38.08	791.00	375.00	0.14	65.60	0.58	0.59	0.61
To Sanitary By Others					21.13	2392				7.98				0.43			29.54		38.08							
Road			0.89	0	0.89	0									0.00	0.89	0.89	0.29	0.29	49.00	200.00	0.32	18.55	0.02	0.59	0.23
To Existing Sanitary, Fern Casey Street					0.89	0				0.00				0.00			0.89		0.29							
Mid-High Density Residential			3.69	532	3.69	532	3.37	5.81		0.00				0.00	0.00	3.69	3.69	1.22	7.03	49.00	200.00	0.32	18.55	0.38	0.59	0.55
To Existing Sanitary, Axis Way					3.69	532				0.00				0.00			3.69		7.03							
South East Sanitary Trunk											9.11	9.11	0.36	0.36		9.47	9.47									
Existing Medium Density**	401A	402A	0.99	227	0.99	227	3.50	2.57		0.00	0.23	9.34		0.36	5.73	1.22	10.69	3.53	11.83	114.00	250.00	0.24	29.13	0.41	0.59	0.56
To Existing Sanitary to Gerry Lalonde Drive					0.99	227				0.00		9.34		0.36			10.69		11.83							

*Note: Proposed population 2531 per background servicing study

**Note: Existing population 227 per background servicing study

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 =	35000	L/ha/da	0.405	Extraneous Flow =	0.330	L/s/ha	
Industrial Flow =	35000	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	35000.00	L/ha/da					
Institutional =	0.405	l/s/Ha					

LICENSED PROFESSIONAL ENGINEER
K. MITIC
100122349
OCT. 18/2019
PROVINCE OF ONTARIO

Designed: R.B	PROJECT: Orleans EUC MUC		
Checked: K.M	LOCATION: City of Ottawa		
Dwg. Reference:	File Ref: 14-733	Date: October, 2019	Sheet No. 2 of 2

Copy of 733_SAN_Oct1819_Opt1_final.xlsx

D2

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)	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)
NW Quadrant to Nature Trail Crescent	1133A	1A (B.O.)			64.33	7168	2.68	62.26		35.83				7.63	23.00	0.00	107.79	35.57	120.83							
Per Sanitary Sewer Calculation Sheet - prepared by DSEL, October 2018					64.33	7168	2.68			35.83				7.63					120.83							
3490 Innes Rd. Future Dev. Blocks					4.33	1402	3.16	14.36	5.40	5.40				0.00	3.28	9.73	9.73	3.21	20.85							
Future Dev. Blocks taken at EUC Phase 3 CDP Mid-High Residential Density (144 pop/ha)																										
3490 Innes Road					19.75	1516	3.14	15.43	0.00	0.00			1.42	1.42	0.23	21.17	21.17	6.99	22.65							
Per Sanitary Sewer Calculation Sheet - Caivan Communities Orleans Village - prepared by DSEL, May 2018																										
Total to Existing Nature Trail Crescent sewer					88.41	10086	2.56	83.68	41.23	41.23			9.05	9.05	26.51	138.69	138.69	45.77	155.96							

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 =	35000	L/ha/da	0.405	Extraneous Flow =	0.330	L/s/ha		
Industrial Flow =	35000	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 =	0.405	l/s/Ha						

Designed: BK

Checked:

Dwg. Reference:

PROJECT: **Orleans EUC MUC**

LOCATION: **City of Ottawa**

File Ref: 14-733

Date: October, 2018

Sheet No. 1 of 1

LICENSED PROFESSIONAL ENGINEER
A. J. TEMELINI
100213887
2020-07-15
PROVINCE OF ONTARIO

Appendix E

Stormwater Servicing Design

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
Trunk 1																																
					0.00	0.00	0.27	0.90	0.68	0.68			0.00	0.00			0.00	0.00														
	2065	2066	0.28	0.70	0.54	0.54			0.00	0.68			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	112	450	450	PVC	0.25	80.0	142.5531	0.8963	1.4876	0.787
					0.00	0.54	0.23	0.90	0.58	1.25			0.00	0.00			0.00	0.00														
	2066	2072	0.28	0.70	0.54	1.09			0.00	1.25			0.00	0.00			0.00	0.00	11.49	71.53	96.94	113.60	166.02	199	600	600	PVC	0.17	95.5	253.1634	0.8954	1.7776	0.787
					0.00	1.09	0.17	0.90	0.43	1.68			0.00	0.00			0.00	0.00														
	2072	2075	3.35	0.70	6.52	7.61			0.00	1.68			0.00	0.00			0.00	0.00	13.27	66.19	89.62	104.98	153.36	654	825	825	CONC	0.33	79.0	824.5950	1.5426	0.8536	0.793
					0.00	7.61	0.18	0.90	0.45	2.13			0.00	0.00			0.00	0.00														
	2075	2083	1.34	0.70	2.61	10.22			0.00	2.13			0.00	0.00			0.00	0.00	14.12	63.93	86.52	101.33	148.00	837	975	975	CONC	0.22	88.5	1051.1471	1.4079	1.0477	0.796
					0.00	10.22	0.17	0.90	0.43	2.55			0.00	0.00			0.00	0.00														
	2083	2084	4.46	0.70	8.68	18.90			0.00	2.55			0.00	0.00			0.00	0.00	15.17	61.38	83.02	97.22	141.97	1372	1050	1050	CONC	0.40	81.5	1727.0623	1.9945	0.6810	0.794
			0.18	0.70	0.35	19.25			0.00	2.55			0.00	0.00			0.00	0.00														
			0.22	0.70	0.43	19.67			0.00	2.55			0.00	0.00			0.00	0.00														
			0.79	0.70	1.54	21.21			0.00	2.55			0.00	0.00			0.00	0.00														
			0.91	0.70	1.77	22.98			0.00	2.55			0.00	0.00			0.00	0.00														
					0.00	22.98	1.37	0.40	1.52	4.08			0.00	0.00			0.00	0.00														
					0.00	22.98	1.75	0.90	4.38	8.45			0.00	0.00			0.00	0.00														
	2084	2085	2.04	0.70	3.97	26.95			0.00	8.45			0.00	0.00			0.00	0.00	15.85	59.84	80.92	94.75	138.34	2297	1350	1350	CONC	0.29	122.0	2874.2790	2.0080	1.0126	0.799
	2085	2116	0.58	0.70	1.13	28.08			0.00	8.45			0.00	0.00			0.00	0.00	16.86	57.70	77.99	91.31	133.29	2280	1650	1650	CONC	0.10	112.5	2882.2416	1.3479	1.3910	0.791
			9.46	0.90	0.00	28.08			0.00	8.45			0.00	0.00			0.00	0.00					85L/s/Ha	805								
			0.35	0.90	0.88	28.96			0.00	8.45			0.00	0.00			0.00	0.00														
					0.00	28.96	0.59	0.40	0.66	9.11			0.00	0.00			0.00	0.00														
					0.00	28.96	0.85	0.90	2.13	11.24			0.00	0.00			0.00	0.00														
					0.00	28.96			0.00	11.24			0.00	0.00	2.25	0.40	2.50	2.50														
					0.00	28.96	2.51	0.80	5.58	16.82			0.00	0.00			0.00	2.50														
			5.61	0.70	10.92	39.87			0.00	16.82			0.00	0.00			0.00	2.50														
					0.00	39.87	6.43	0.90	16.09	32.91			0.00	0.00			0.00	2.50														
	2116	2117	7.77	0.70	15.12	54.99			0.00	32.91			0.00	0.00			0.00	2.50	18.25	55.03	74.34	87.01	127.00	6595	2250	2250	CONC	0.19	68.5	9084.5492	2.2848	0.4997	0.726
	2117	2122	0.52	0.70	1.01	56.01			0.00	32.91			0.00	0.00			0.00	2.50	18.75	54.13	73.12	85.58	124.89	6555	2400	2400	CONC	0.13	80.5	8925.6843	1.9730	0.6800	0.734
	2122	2136	0.75	0.70	1.46	57.47			0.00	32.91			0.00	0.00			0.00	2.50	19.43	52.97	71.53	83.71	122.15	6508	2550	2550	CONC	0.10	84.0	9201.9602	1.8018	0.7770	0.707
To Trunk 2, Pipe 2136 - 2138						57.47				32.91				0.00				2.50	20.21					805									
Trunk 2																																
	2041	2042	1.38	0.80	3.07	3.07			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	236	525	525	PVC	0.65	29.5	346.7273	1.6017	0.3070	0.680
	2042	2043	1.34	0.80	2.98	6.05			0.00	0.00			0.00	0.00			0.00	0.00	10.31	75.65	102.60	120.26	175.80	458	750	750	CONC	0.27	95.5	578.4757	1.3094	1.2156	0.791
	2043	2044	1.14	0.80	2.54	8.58			0.00	0.00			0.00	0.00			0.00	0.00	11.52	71.41	96.78	113.42	165.74	613	825	825	CONC	0.29	110.0	773.0058	1.4461	1.2678	0.793
					0.00	8.58	0.22	0.90	0.55	0.55			0.00	0.00			0.00	0.00														
					0.00	8.58			0.00	0.55	2.14	0.90	5.35	5.35			0.00	0.00														
	2044	2046	1.76	0.80	3.91	12.50			0.00	0.55			0.00	5.35			0.00	0.00	12.79	67.53	91.45	107.14	156.52	1468	900	900	CONC	0.91	36.5	1726.9268	2.7146	0.2241	0.850
					0.00	12.50	0.23	0.90	0.58	1.13			0.00	5.35			0.00	0.00														
	2046	2047	0.84	0.80	1.87	14.37			0.00	1.13			0.00	5.35			0.00	0.00	13.01	66.89	90.57	106.11	155.01	1631	1200	1200	CONC	0.25	100.5	1949.3651	1.7236	0.9718	0.837
					0.00	14.37	0.30	0.90	0.75	1.88			0.00	5.35			0.00	0.00														
			0.42	0.80	0.93	15.30			0.00	1.88			0.00	5.35			0.00	0.00														
	2047	2048	1.52	0.80	3.38	18.68			0.00	1.88			0.00	5.35			0.00	0.00	13.99	64.27	86.98	101.88	148.81	1909	1500	1500	CONC	0.11	123.5	2344.4784	1.3267	1.5515	0.814
					0.00	18.68	0.21	0.90	0.53	2.40			0.00	5.35			0.00	0.00														
			0.59	0.80	1.31	19.99			0.00	2.40			0.00	5.35			0.00	0.00														
	2048	2049	0.89	0.80	1.98	21.97			0.00	2.40			0.00	5.35			0.00	0.00	15.54	60.53	81.86	95.86	139.96	2040	1500	1500	CONC	0.12	88.0	2448.7278	1.3857	1.0584	0.833
					0.00	21.97	0.25	0.90	0.63	3.03			0.00	5.35			0.00	0.00														
			0.59	0.80	1.31	23.29			0.00	3.03			0.00	5.35			0.00	0.00														
	2049	2057	0.63	0.80	1.40	24.69			0.00	3.03			0.00	5.35			0.00	0.00	16.60	58.24	78.73	92.18	134.57	2170	1500	1500	CONC	0.13	104.0	2548.7167	1.4423	1.2018	0.851
					0.00	24.69	0.20	0.90	0.50	3.53			0.00	5.35			0.00	0.00														
			0.39	0.80	0.87	25.55			0.00	3.53			0.00	5.35			0.00	0.00														
	2057	2060	6.44	0.80	14.32	39.88			0.00	3.53			0.00	5.35			0.00	0.00	17.80	55.87	75.49	88.36	128.97	2967	1800	1800	CONC	0.10	92.0	3634.9621	1.4284	1.0734	0.816

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

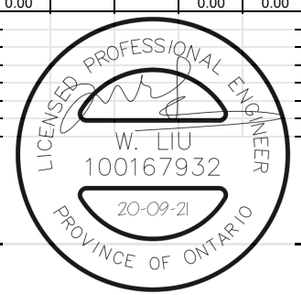
LICENSED PROFESSIONAL ENGINEER
W. LIU
100167932
20-09-21
PROVINCE OF ONTARIO

Designed: A.K.	PROJECT: Trailsedge North Community	
Checked: W.L.	LOCATION: City of Ottawa	
Dwg. Reference: DWG No. 2	File Ref: 20-1195	Date: 16 Sep 2020
		Sheet No. SHEET 1 OF 2

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
			0.25	0.70	0.49	40.36			0.00	3.53			0.00	5.35			0.00	0.00														
					0.00	40.36	0.42	0.90	1.05	4.58			0.00	5.35			0.00	0.00														
					0.00	40.36	0.46	0.90	1.15	5.73			0.00	5.35			0.00	0.00														
					0.00	40.36			0.00	5.73			0.00	5.35	1.78	0.40	1.98	1.98														
	2060	2061			0.00	40.36			0.00	5.73			0.00	5.35	9.40	0.40	10.45	12.43	18.87	53.92	72.83	85.24	124.39	4597	1800	1800	CONC	0.23	81.5	5512.6929	2.1664	0.6270	0.834
	2061	2062			0.00	40.36	0.17	0.90	0.43	6.15			0.00	5.35			0.00	12.43	19.50	52.85	71.37	83.53	121.88	4535	1800	1800	CONC	0.22	79.0	5391.5200	2.1187	0.6214	0.841
	2062	2063			0.00	40.36	0.11	0.90	0.28	6.43			0.00	5.35			0.00	12.43	20.12	51.84	69.99	81.90	119.50	4467	1800	1800	CONC	0.21	51.0	5267.5605	2.0700	0.4106	0.848
	2063	2064			0.00	40.36	0.20	0.90	0.50	6.93			0.00	5.35			0.00	12.43	20.53	51.19	69.11	80.87	117.98	4445	1950	1950	CONC	0.14	79.0	5324.3041	1.7828	0.7385	0.835
	2064	2203			0.00	40.36			0.00	6.93			0.00	5.35			0.00	12.43	21.27	50.08	67.58	79.08	115.36	4347	2100	2100	CONC	0.10	49.5	5483.0809	1.5831	0.5211	0.793
					0.00	40.36	0.33	0.80	0.73	7.66			0.00	5.35			0.00	12.43														
	2203	2204			0.00	40.36	4.55	0.40	5.06	12.72			0.00	5.35			0.00	12.43	21.79	49.32	66.55	77.87	113.58	4666	2100	2100	CONC	0.11	81.5	5750.7038	1.6603	0.8181	0.811
	2204	2205			0.00	40.36	0.71	0.90	1.78	14.50			0.00	5.35			0.00	12.43	22.61	48.18	65.00	76.04	110.91	4673	2100	2100	CONC	0.11	111.0	5750.7038	1.6603	1.1142	0.813
	2205	2206			0.00	40.36	0.74	0.80	1.65	16.15			0.00	5.35			0.00	12.43	23.72	46.72	63.01	73.71	107.49	4634	2100	2100	CONC	0.11	73.5	5750.7038	1.6603	0.7378	0.806
	2206	2207			0.00	40.36	1.00	0.80	2.22	18.37			0.00	5.35			0.00	12.43	24.46	45.81	61.77	72.25	105.35	4680	2100	2100	CONC	0.11	75.0	5750.7038	1.6603	0.7529	0.814
	2207	2208			0.00	40.36	1.26	0.80	2.80	21.17			0.00	5.35			0.00	12.43	25.21	44.92	60.56	70.83	103.27	4758	2100	2100	CONC	0.11	103.5	5750.7038	1.6603	1.0390	0.827
	2208	2209			0.00	40.36	0.41	0.90	1.03	22.20			0.00	5.35			0.00	12.43	26.25	43.75	58.97	68.96	100.53	4694	2100	2100	CONC	0.11	7.5	5750.7038	1.6603	0.0753	0.816
	2209	2210			0.00	40.36			0.00	22.20			0.00	5.35			0.00	12.43	26.33	43.67	58.86	68.83	100.34	4685	2100	2100	CONC	0.11	120.5	5750.7038	1.6603	1.2096	0.815
	2210	2211			0.00	40.36			0.00	22.20			0.00	5.35			0.00	12.43	27.54	42.40	57.13	66.80	97.36	4547	2250	2250	CONC	0.10	119.0	6590.6247	1.6576	1.1965	0.690
	2211	2135			0.00	40.36	4.03	0.80	8.96	31.16			0.00	5.35			0.00	12.43	28.73	41.22	55.52	64.91	94.60	4917	2550	2550	CONC	0.10	35.5	9201.9602	1.8018	0.3284	0.534
	2135	2136	0.40	0.70	0.78	41.14			0.00	31.16			0.00	5.35			0.00	12.43	29.06	40.90	55.10	64.42	93.88	4912	2700	2700	CONC	0.10	35.0	10717.0825	1.8718	0.3116	0.458
Contribution From Trunk 1, Pipe 2122 - 2136						57.47				32.91				0.00				2.50	20.21					805									
	2136	2138			0.00	98.61			0.00	64.07			0.00	5.35			0.00	14.93	29.37	40.61	54.70	63.95	93.20	10049	2700	2700	CONC	0.15	90.5	13125.6918	2.2925	0.6579	0.766
			0.06	0.70	0.12	98.72			0.00	64.07			0.00	5.35			0.00	14.93														
			0.36	0.70	0.70	99.42			0.00	64.07			0.00	5.35			0.00	14.93														
			0.51	0.70	0.99	100.42			0.00	64.07			0.00	5.35			0.00	14.93														
			0.63	0.70	1.23	101.64			0.00	64.07			0.00	5.35			0.00	14.93														
			0.68	0.70	1.32	102.97			0.00	64.07			0.00	5.35			0.00	14.93														
	2138	2139	1.26	0.70	2.45	105.42			0.00	64.07			0.00	5.35			0.00	14.93	30.03	40.02	53.89	63.00	91.80	10184	2700	2700	CONC	0.16	77.0	13556.1562	2.3677	0.5420	0.751
	2139	2140	0.32	0.70	0.62	106.04			0.00	64.07			0.00	5.35			0.00	14.93	30.57	39.54	53.24	62.24	90.69	10096	2700	2700	CONC	0.14	67.0	12680.6230	2.2147	0.5042	0.796
	2140	2150	0.14	0.70	0.27	106.31			0.00	64.07			0.00	5.35			0.00	14.93	31.08	39.10	52.65	61.55	89.67	10004	2700	2700	CONC	0.15	50.5	13125.6918	2.2925	0.3671	0.762
	2150	HW			0.00	106.31			0.00	64.07			0.00	5.35			0.00	14.93	31.44	38.79	52.23	61.05	88.95	9931	2700	2700	CONC	0.15	19.5	13125.6918	2.2925	0.1418	0.757
Trunk 3																																
			0.31	0.70	0.60	0.60			0.00	0.00			0.00	0.00			0.00	0.00														
	2025	2026			0.00	0.60	1.01	0.40	1.12	1.12			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	163	675	675	CONC	0.15	35.5	325.5584	0.9098	0.6503	0.502
	2026	2119	0.41	0.70	0.80	1.40			0.00	1.12			0.00	0.00			0.00	0.00	10.65	74.39	100.88	118.24	172.82	218	750	750	CONC	0.10	96.5	352.0491	0.7969	2.0183	0.618
			0.06	0.70	0.12	1.52			0.00	1.12			0.00	0.00			0.00	0.00	21.15													
					0.00	1.52	0.47	0.90	1.18	2.30			0.00	0.00			0.00	0.00														
					0.00	1.52	0.95	0.80	2.11	4.41			0.00	0.00			0.00	0.00														
					0.00	1.52	0.96	0.80	2.14	6.55			0.00	0.00			0.00	0.00														
			2.89	0.70	5.62	7.14			0.00	6.55			0.00	0.00			0.00	0.00														
					0.00	7.14	5.63	0.90	14.09	20.63			0.00	0.00			0.00	0.00														
	2119	21200	6.40	0.70	12.45	19.60			0.00	20.63			0.00	0.00			0.00	0.00	21.15	50.25	67.82	79.36	115.77	2384	1650	1650	CONC	0.18	32.5	3866.9329	1.8085	0.2995	0.617
	21200	2120	0.50	0.70	0.97	20.57			0.00	20.63			0.00	0.00			0.00	0.00	21.45	49.81	67.22	78.65	114.73	2412	1650	1650	CONC	0.18	21.5	3866.9329	1.8085	0.1981	0.624
	2120	21210	0.42	0.70	0.82	21.39			0.00	20.63			0.00	0.00			0.00	0.00	21.65	49.52	66.83	78.19	114.06	2438	1650	1650	CONC	0.18	40.5	3866.9329	1.8085	0.3732	0.630
	21210	2121			0.00	21.39			0.00	20.63			0.00	0.00			0.00	0.00	22.02	48.99	66.11	77.34	112.81	2412	1650	1650	CONC	0.18	37.0	3866.9329	1.8085	0.3410	0.624
			0.37	0.70	0.72	22.11			0.00	20.63			0.00	0.00			0.00	0.00														
	2121	2142	1.15	0.70	2.24	24.34			0.00	20.63			0.00	0.00			0.00	0.00	22.36	48.52	65.46	76.58	111.70	2532	1650	1650	CONC	0.19	76.0	3972.8959	1.8580	0.6817	0.637
	2142	2143			0.00	24.34			0.00	20.63			0.00	0.00			0.00	0.00	23.04	47.60	64.21	75.11	109.55	2484	1650	1650	CONC	0.18	23.5	3866.9329	1.8085	0.2166	0.642
	2143	2144			0.00	24.34			0.00	20.63			0.00	0.00			0.00	0.00	23.26	47.32	63.82	74.66	108.88	2469	1650	1650	CONC	0.18	20.0	3866.9329	1.8085	0.1843	0.638
	2144	HW			0.00	24.34			0.00	20.63			0.00	0.00			0.00	0.00	23.44	47.08	63.50	74.28	108.32	2456	1650	1650	CONC	0.18	17.5	3866.9329	1.8085	0.1613	0.635



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

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

Designed: A.K.	PROJECT: Trailsedge North Community	
Checked: W.L.	LOCATION: City of Ottawa	
Dwg. Reference: DWG No. 2	File Ref: 20-1195	Date: 16 Sep 2020
		Sheet No. SHEET 2 OF 2

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

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

Manning 0.013

	LOCATION		AREA (Ha) 2 YEAR				AREA (Ha) 5 YEAR				AREA (Ha) 10 YEAR				AREA (Ha) 100 YEAR				FLOW						SEWER DATA							
			AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	Time of	Intensity	Intensity	Intensity	Intensity	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO
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	Conc. (min)	2 Year (mm/h)	5 Year (mm/h)	10 Year (mm/h)	100 Year (mm/h)	Q (l/s)	(actual)	(nominal)		(%)	(m)	(l/s)	(m/s)	LOW (min	Q/Q full
North West																																	
TRUNK 1																																	
	2065	2066	0.21	0.70	0.41	0.41	0.21	0.90	0.53	0.53			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	86	450	450	PVC	0.20	96.5	128	0.80	2.01	0.68
	2066	2072	0.32	0.70	0.62	1.03	0.28	0.90	0.70	1.23			0.00	0.00			0.00	0.00	12.01	69.87	94.67	110.93	162.09	188	600	600	PVC	0.14	96.0	230	0.81	1.97	0.82
	2072	2075	3.15	0.70	6.13	7.16	0.20	0.90	0.50	1.73			0.00	0.00			0.00	0.00	13.98	64.30	87.02	101.93	148.87	611	825	825	CONC	0.25	79.0	718	1.34	0.98	0.85
	2075	2083	1.30	0.70	2.53	9.69	0.19	0.90	0.48	2.20			0.00	0.00			0.00	0.00	14.96	61.87	83.70	98.02	143.14	784	975	975	CONC	0.17	85.0	924	1.24	1.14	0.85
	2083	2084	4.30	0.70	8.37	18.06	0.18	0.90	0.45	2.65			0.00	0.00			0.00	0.00	16.10	59.29	80.16	93.86	137.04	1283	1050	1050	CONC	0.28	81.5	1445	1.67	0.81	0.89
			0.18	0.70	0.35	18.41			0.00	2.65			0.00	0.00			0.00	0.00															
			0.20	0.70	0.39	18.80			0.00	2.65			0.00	0.00			0.00	0.00															
			0.90	0.70	1.75	20.55			0.00	2.65			0.00	0.00			0.00	0.00															
			0.95	0.70	1.85	22.40			0.00	2.65			0.00	0.00			0.00	0.00															
					0.00	22.40	1.27	0.40	1.41	4.06			0.00	0.00			0.00	0.00															
	2084	2085	1.90	0.70	3.70	26.10	1.71	0.90	4.28	8.34			0.00	0.00			0.00	0.00	16.91	57.59	77.84	91.13	133.03	2152	1350	1350	CONC	0.18	118.0	2264	1.58	1.24	0.95
	2085	2116	0.71	0.70	1.38	27.48			0.00	8.34			0.00	0.00			0.00	0.00	18.16	55.20	74.57	87.29	127.40	2139	1650	1650	CONC	0.10	119.5	2882	1.35	1.48	0.74
					0.00	27.48	0.56	0.40	0.62	8.97			0.00	0.00			0.00	0.00															
FUTURE EXT. COMM.					0.00	27.48	3.12	0.90	7.81	16.77			0.00	0.00			0.00	0.00															
FUTURE EXT. COMM.					0.00	27.48	0.72	0.90	1.80	18.57			0.00	0.00	2.18	0.40	2.42	2.42															
FUTURE EXT. COMM.			9.47	0.90	0.00	27.48	1.14	0.80	2.54	21.11			0.00	0.00			0.00	2.42					85L/s/Ha	805									
					0.00	27.48	0.89	0.90	2.23	23.34			0.00	0.00			0.00	2.42															
			1.16	0.70	2.26	29.73	2.94	0.80	6.54	29.87			0.00	0.00			0.00	2.42															
			0.24	0.80	0.53	30.27	2.77	0.90	6.93	36.80			0.00	0.00			0.00	2.42															
			2.62	0.70	5.10	35.37	0.23	0.80	0.51	37.32			0.00	0.00			0.00	2.42															
	2116	2117	7.72	0.70	15.02	50.39			0.00	37.32			0.00	0.00			0.00	2.42	19.64	52.63	71.06	83.16	121.35	5598	2250	2250	CONC	0.15	75.0	8072	2.03	0.62	0.69
	2117	2122	0.52	0.70	1.01	51.40			0.00	37.32			0.00	0.00			0.00	2.42	20.25	51.63	69.70	81.57	119.01	5544	2400	2400	CONC	0.11	84.0	8210	1.81	0.77	0.68
	2122	2136	0.65	0.70	1.26	52.67			0.00	37.32			0.00	0.00			0.00	2.42	20.25	51.63	69.70	81.57	119.01	5609	2550	2550	CONC	0.10	84.0	9202	1.80	0.78	0.61
TO TRUNK 2						52.67				37.32				0.00				2.42	21.02														
TRUNK 2																																	
	2041	2042	1.39	0.80	3.09	3.09			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	237	525	525	PVC	0.65	29.5	347	1.60	0.31	0.68
	2042	2043	1.20	0.80	2.67	5.76			0.00	0.00			0.00	0.00			0.00	0.00	10.31	75.65	102.60	120.26	175.80	436	750	750	CONC	0.25	95.5	557	1.26	1.26	0.78
	2043	2044	1.29	0.80	2.87	8.63			0.00	0.00			0.00	0.00			0.00	0.00	11.57	71.26	96.57	113.17	165.38	615	825	825	CONC	0.32	110.0	812	1.52	1.21	0.76
	2044	2046			0.00	8.63	0.22	0.90	0.55	0.55	2.14	0.90	5.35	5.35			0.00	0.00	12.78	67.57	91.50	107.20	156.61	1207	900	900	CONC	0.62	33.5	1425	2.24	0.25	0.85
	2046	2047	2.39	0.80	5.32	13.94	0.23	0.90	0.58	1.13			0.00	5.35			0.00	0.00	13.03	66.86	90.53	106.05	154.93	1602	1200	1200	CONC	0.24	103.5	1910	1.69	1.02	0.84
			0.47	0.80	1.05	14.99	0.26	0.90	0.65	1.78			0.00	5.35			0.00	0.00															
	2047	2048	1.15	0.80	2.56	17.55			0.00	1.78			0.00	5.35			0.00	0.00	14.05	64.11	86.77	101.63	148.43	1823	1500	1500	CONC	0.10	117.0	2235	1.26	1.54	0.82
			0.80	0.80	1.78	19.33	0.25	0.90	0.63	2.40			0.00	5.35			0.00	0.00															
	2048	2049	1.14	0.80	2.54	21.86			0.00	2.40			0.00	5.35			0.00	0.00	15.59	60.41	81.70	95.67	139.69	2029	1500	1500	CONC	0.12	112.5	2449	1.39	1.35	0.83
			0.49	0.80	1.09	22.95			0.00	2.40			0.00	5.35			0.00	0.00															
	2049	2057	0.76	0.80	1.69	24.64	0.25	0.90	0.63	3.03			0.00	5.35			0.00	0.00	16.94	57.53	77.77	91.04	132.90	2141	1500	1500	CONC	0.13	85.5	2549	1.44	0.99	0.84
			0.44	0.80	0.98	25.62			0.00	3.03			0.00	5.35			0.00	0.00															
	2057	2060	6.36	0.80	14.14	39.77	0.24	0.90	0.60	3.63			0.00	5.35			0.00	0.00	17.93	55.62	75.15	87.96	128.39	2955	1800	1800	CONC	0.13	90.5	4144	1.63	0.93	0.71
					0.00	39.77	0.42	0.90	1.05	4.68			0.00	5.35	1.78	0.40	1.98	1.98															
	2060	2061	0.17	0.70	0.33	40.10	0.48	0.90	1.20	5.88			0.00	5.35	9.40	0.40	10.45	12.43	18.86	53.95	72.87	85.28	124.45	4595	1800	1800	CONC	0.23	81.5	5513	2.17	0.63	0.83
	2061	2062			0.00	40.10	0.20	0.90	0.50	6.38			0.00	5.35			0.00	12.43	19.48	52.88	71.41	83.57	121.94	4539	1800	1800	CONC	0.22	79.0	5392	2.12	0.62	0.84
	2062	2063			0.00	40.10	0.13	0.90	0.33	6.71			0.00	5.35			0.00	12.43	20.11	51.86	70.02	81.94	119.55	4474	1800	1800	CONC	0.21	51.0	5268	2.07	0.41	0.85
	2063	2064			0.00	40.10	0.19	0.90	0.48	7.18			0.00	5.35			0.00	12.43	20.52	51.22	69.14	80.90	118.04	4451	1950	1950	CONC	0.14	78.5	5324	1.78	0.73	0.84
	2064	2203			0.00	40.10			0.00	7.18			0.00	5.35			0.00	12.43	21.25	50.10	67.62	79.12	115.42	4353	2100	1950	CONC	0.10	50.0	5483	1.58	0.53	0.79
					0.00	40.10	0.40	0.80	0.89	8.07			0.00	5.35			0.00	12.43															
	2203	2204			0.00	40.10	4.66	0.40	5.18	13.25			0.00	5.35			0.00	12.43	21.78	49.34	66.58	77.90	113.63	4690	2100	2100	CONC	0.11	81.5	5751	1.66	0.82	0.82
	2204	2205			0.00	40.10	0.90	0.80	2.00	15.25			0.00	5.35			0.00	12.43	22.59	48.20	65.03	76.08	110.96	4711	2100	2100	CONC	0.11	111.0	5751	1.66	1.11	0.82
	2205	2206			0.00	40.10	0.84	0.80	1.87	17.12			0.00	5.35			0.00	12.43	23.71	46.74	63.04	73.74	107.53	4685	2100	2100	CONC	0.11	74.0	5751	1.66	0.74	0.81
	2206	2207			0.00	40.10	1.04	0.80	2.31	19.43			0.00	5.35			0.00	12.43	24.45	45.82	61.79	72.27	105.38	4735	2100	2100	CONC	0.11	74.5	5751	1.66	0.75	0.82
	2207	2208			0.00	40.10	1.49	0.80	3.31	22.75			0.00	5.35			0.00	12.43	25.20	44.94	60.58	70.85	103.30	4843	2100	2100	CONC	0.11	103.5	5751	1.66	1.04	0.84
	2208	2209			0.00	40.10	0.39	0.90	0.98	23.72			0.00	5.35			0.00	12.43	26.24	43.77	58.99	68.99	100.57	4774	2100	2100	CONC	0.11	8.0	5751	1.66	0.08	0.83
	2209	2210			0.00	40.10			0.00	23.72			0.00	5.35			0.00	12.43	26.32	43.68	58.87	68.85	100.36	4764	2100	2100	CONC	0.11	120.0	5751	1.66	1.20	0.83
	2210	2211			0.00	40.10			0.00	23.72			0.00	5.35			0.00	12.43	27.52	42.41	57.14	66.82	97.40	4625	2250	2250	CONC	0.10	119.0	6591	1.66	1.20	0.70
	2211	2135			0.00	40.10	4.00	0.80	8.90	32.62			0.00	5.35			0.00	12.43	28.72	41.23	55.54	64.94	94.64	4989	2550	2550	CONC	0.10	36.5	9202	1.80	0.34	0.54
	2135	2136	0.18	0.70	0.35	40.45			0.00	32.62			0.00	5.35			0.00	12.43	29.06	40.91	55.10	64.43	93.89	4964	2700	2700	CONC	0.10	35.0	10717	1.87	0.31	0.46
Contribution From TRUNK 1, PipE 2122 - 2136						52.67				37.32				0.00				2.42	21.02														

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
K. MITIC
100122349
Oct 18, 2019
PROVINCE OF ONTARIO

Designed: R.B.
Checked: K.M.
Dwg. Reference:

PROJECT: Orleans EUC MUC
LOCATION: City of Ottawa
File Ref: 14-733
Date: October 2019
Sheet No: 1

733_STM_Oct1819_Opt1.xlsx

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

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

Manning 0.013

	LOCATION		AREA (Ha) 2 YEAR				AREA (Ha) 5 YEAR				AREA (Ha) 10 YEAR				AREA (Ha) 100 YEAR				FLOW						SEWER DATA							
			AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	Time of	Intensity	Intensity	Intensity	Intensity	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO
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	Conc. (min)	2 Year (mm/h)	5 Year (mm/h)	10 Year (mm/h)	100 Year (mm/h)	Q (l/s)	(actual)	(nominal)		(%)	(m)	(l/s)	(m/s)	LOW (min	Q/Q full
	2136	2138	0.37	0.70	0.72	93.83			0.00	69.94			0.00	5.35			0.00	14.86	27.52	42.41	57.14	66.82	97.40	9781	2700	2700	CONC	0.15	90.5	13126	2.29	0.66	0.75
			1.29	0.70	2.51	96.34			0.00	69.94			0.00	5.35			0.00	14.86															
			1.30	0.70	2.53	98.87			0.00	69.94			0.00	5.35			0.00	14.86															
			0.50	0.70	0.97	99.85			0.00	69.94			0.00	5.35			0.00	14.86															
	2138	2139	0.38	0.70	0.74	100.59			0.00	69.94			0.00	5.35			0.00	14.86	21.02	50.44	68.08	79.66	116.22	11988	2700	2700	CONC	0.16	77.0	13556	2.37	0.54	0.88
	2139	2140	0.38	0.70	0.74	101.33			0.00	69.94			0.00	5.35			0.00	14.86	21.56	49.64	66.99	78.38	114.34	11834	2700	2700	CONC	0.15	73.5	13126	2.29	0.53	0.90
	2140	HW	0.11	0.70	0.21	101.54			0.00	69.94			0.00	5.35			0.00	14.86	21.56	49.64	66.99	78.38	114.34	11844	2700	2700	CONC	0.15	47.0	13126	2.29	0.34	0.90
TO POND 1																																	
TRUNK 3																																	
					0.00	0.00	0.98	0.80	2.18	2.18			0.00	0.00			0.00	0.00	21.15														
			2.86	0.70	5.57	5.57	5.61	0.90	14.04	16.22			0.00	0.00			0.00	0.00															
					0.00	5.57	0.95	0.80	2.11	18.33			0.00	0.00			0.00	0.00															
	2025	2026	7.33	0.70	14.26	19.83	0.49	0.90	1.23	19.55			0.00	0.00			0.00	0.00	21.15	50.25	67.82	79.36	115.77	148	1650	1650	CONC	0.14	32.0	3410	1.59	0.33	0.04
	2026	2119	0.39	0.70	0.76	20.59	1.16	0.40	1.29	20.84			0.00	0.00			0.00	0.00	21.48	49.76	67.15	78.57	114.61	1366	1650	1650	CONC	0.16	92.5	3646	1.71	0.90	0.37
	2119	2120	0.66	0.70	1.28	21.87			0.00	20.84			0.00	0.00			0.00	0.00	22.39	48.48	65.41	76.52	111.61	1469	1650	1650	CONC	0.10	47.0	2882	1.35	0.58	0.51
	2120	2121	0.43	0.70	0.84	22.71			0.00	20.84			0.00	0.00			0.00	0.00	22.97	47.70	64.34	75.27	109.78	2204	1650	1650	CONC	0.10	84.5	2882	1.35	1.04	0.76
	2121	2142	1.13	0.70	2.20	24.91			0.00	20.84			0.00	0.00			0.00	0.00	24.01	46.36	62.52	73.13	106.63	2258	1650	1650	CONC	0.10	76.0	2882	1.35	0.94	0.78
	2142	2143	0.37	0.70	0.72	25.63			0.00	20.84			0.00	0.00			0.00	0.00	22.97	47.70	64.34	75.27	109.78	2204	1650	1650	CONC	0.10	43.0	2882	1.35	0.53	0.76
	2143	2144			0.00	25.63			0.00	20.84			0.00	0.00			0.00	0.00	24.01	46.36	62.52	73.13	106.63	2258	1800	1800	CONC	0.10	51.1	3635	1.43	0.60	0.62
	2144	HW			0.00	25.63			0.00	20.84			0.00	0.00			0.00	0.00	24.95	45.22	60.97	71.31	103.97	2260	1800	1800	CONC	0.10	22.5	3635	1.43	0.26	0.62
TO POND 1																																	

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
K. MITIC
100122349
OCT 18, 2019
PROVINCE OF ONTARIO

Designed: R.B.	PROJECT: Orleans EUC MUC		
Checked: K.M.	LOCATION: City of Ottawa		
Dwg. Reference:	File Ref: 14-733	Date: October 2019	Sheet No. 2

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

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

Manning 0.013

Location	From Node	To Node	AREA (Ha) 2 YEAR AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	5 YEAR AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	10 YEAR AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	100 YEAR AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	FLOW Time of Conc. (min)	Intensity 2 Year (mm/h)	Intensity 5 Year (mm/h)	Intensity 10 Year (mm/h)	Intensity 100 Year (mm/h)	Peak Flow Q (l/s)	SEWER DATA DIA. (mm) (actual)	DIA (mm) (nominal)	TYPE	SLOPE (%)	LENGTH (m)	CAPACITY (l/s)	VELOCITY (m/s)	TIME OF LOW (min	RATIO Q/Q full
NORTH EAST TRUNK*																																	
	201	202	5.68	0.80	12.63	12.63			0.00	0.00			0.00	0.00			0.00	0.00						291	675	675	CONC	0.20	262.0	376	1.05	4.16	0.77
	202	203	0.00	0.90	0.00	12.63			0.00	0.00			0.00	0.00			0.00	0.00						291	675	675	CONC	0.20	193.0	376	1.05	3.06	0.77
			2.20	0.80	4.89	17.53			0.00	0.00			0.00	0.00			0.00	0.00															
	203	204	6.94	0.80	15.43	32.96	1.73	0.90	4.33	4.33			0.00	0.00			0.00	0.00						933	1050	1050	CONC	0.20	294.0	1221	1.41	3.47	0.76
			0.52	0.80	1.16	34.12			0.00	4.33			0.00	0.00			0.00	0.00															
			5.29	0.80	11.76	45.88			0.00	4.33			0.00	0.00			0.00	0.00															
			4.86	0.85	11.48	57.37			0.00	4.33			0.00	0.00			0.00	0.00															
			0.19	0.40	0.21	57.58			0.00	4.33			0.00	0.00			0.00	0.00															
	204	205	3.45	0.90	8.63	66.21			0.00	4.33			0.00	0.00			0.00	0.00						1666	1350	1350	CONC	0.15	513.5	2067	1.44	5.93	0.81
To Existing Storm to Wildflower Drive						66.21				4.33				0.00				0.00	0.00														
SOUTH WEST TRUNK																																	
			7.35	0.85	17.37	17.37			0.00	0.00			0.00	0.00			0.00	0.00															
Commercial			4.28	0.90	10.71	28.08			0.00	0.00			0.00	0.00			0.00	0.00															
Mid-High Density					0.00	28.08	2.28	0.80	5.07	5.07			0.00	0.00			0.00	0.00															
			6.15	0.70	11.97	40.04			0.00	5.07			0.00	0.00			0.00	0.00															
			7.88	0.70	15.33	55.38			0.00	5.07			0.00	0.00			0.00	0.00															
Park	301	302	0.42	0.40	0.47	55.85	0.56	0.90	1.40	6.47			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	4964	2100	2100	CONC	0.12	790.5	6006	1.73	7.60	0.83
To Storm By Others						55.85				6.47				0.00				0.00	10.00														
Mid-High Density Residential			0.00	0.80	0.00	0.00	0.49	0.90	1.23	1.23			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	128	525	525	CONC	0.20	57.0	192	0.89	1.07	0.66
To Existing Fern Casey Street						0.00				1.23				0.00				0.00	10.00														
Mid-High Density Residential					0.00	0.00	3.68	0.80	8.18	8.18			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	853	1050	1050	CONC	0.15	61.5	1058	1.22	0.84	0.81
To Existing Storm, to Axis Way						0.00				8.18				0.00				0.00	10.00														
SOUTH EAST TRUNK																																	
Hydro Easement			1.89	0.40	2.10	2.10			0.00	0.00			0.00	0.00			0.00	0.00															
Hydro Easement			3.33	0.40	3.70	5.80			0.00	0.00			0.00	0.00			0.00	0.00															
			8.94	0.90	22.37	28.17			0.00	0.00			0.00	0.00			0.00	0.00															
Parkette			0.63	0.40	0.70	28.87			0.00	0.00			0.00	0.00			0.00	0.00															
	401	402	0.99	0.80	2.20	31.07			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	2387	1350	1350	CONC	0.30	211.0	2923	2.04	1.72	0.82
To Existing Storm to Gerry Lalonde Drive						31.07				0.00				0.00				0.00	10.00														
Hydro Easement			1.86	0.40	2.07	2.07			0.00	0.00			0.00	0.00			0.00	0.00															
Hydro Easement			2.94	0.40	3.27	5.34			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	410	450	450	CONC	3.00	269.5	494	3.10	1.45	0.83
To Existing Storm, Trigoria Crescent						5.34				0.00				0.00				0.00	10.00														

***NOTE: NORTH EAST TRUNK DEVIATION FROM CITY STANDARDS BASED ON BACKGROUND SERVICING STUDIES. VANGUARD DRIVE CONTROLLED TO 100L/s/Ha. DEVELOPMENT AREA CONTROLLED TO 51.25 L/s/Ha.**

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
K. MITIC
100122349
OCT 18, 2019
PROVINCE OF ONTARIO

Designed: R.B.	PROJECT: Orleans EUC MUC		
Checked: K.M.	LOCATION: City of Ottawa		
Dwg. Reference:	File Ref: 14-733	Date: October 2019	Sheet No. 3

TRINITY

Trinity Development Group

TRINITY DEVELOPMENT - INNES / BELCOURT STORMWATER MANAGEMENT SYSTEM OTTAWA, ONTARIO

MUNICIPAL SERVICING
REVIEWED
CITY OF OTTAWA
DEPT OF PLANNING, TRANSIT AND THE ENVIRONMENT
INFRASTRUCTURE APPROVALS DIVISION
FOR MOE SUBMISSION
SIGNED: Lisi Jurgensen
DATE: 05/02/2009
D07-12-08-0001

14252
REVISED

JANUARY 2009

IBI GROUP

Table 1. Post-Development Flow into the Existing Sewer at Innes Road

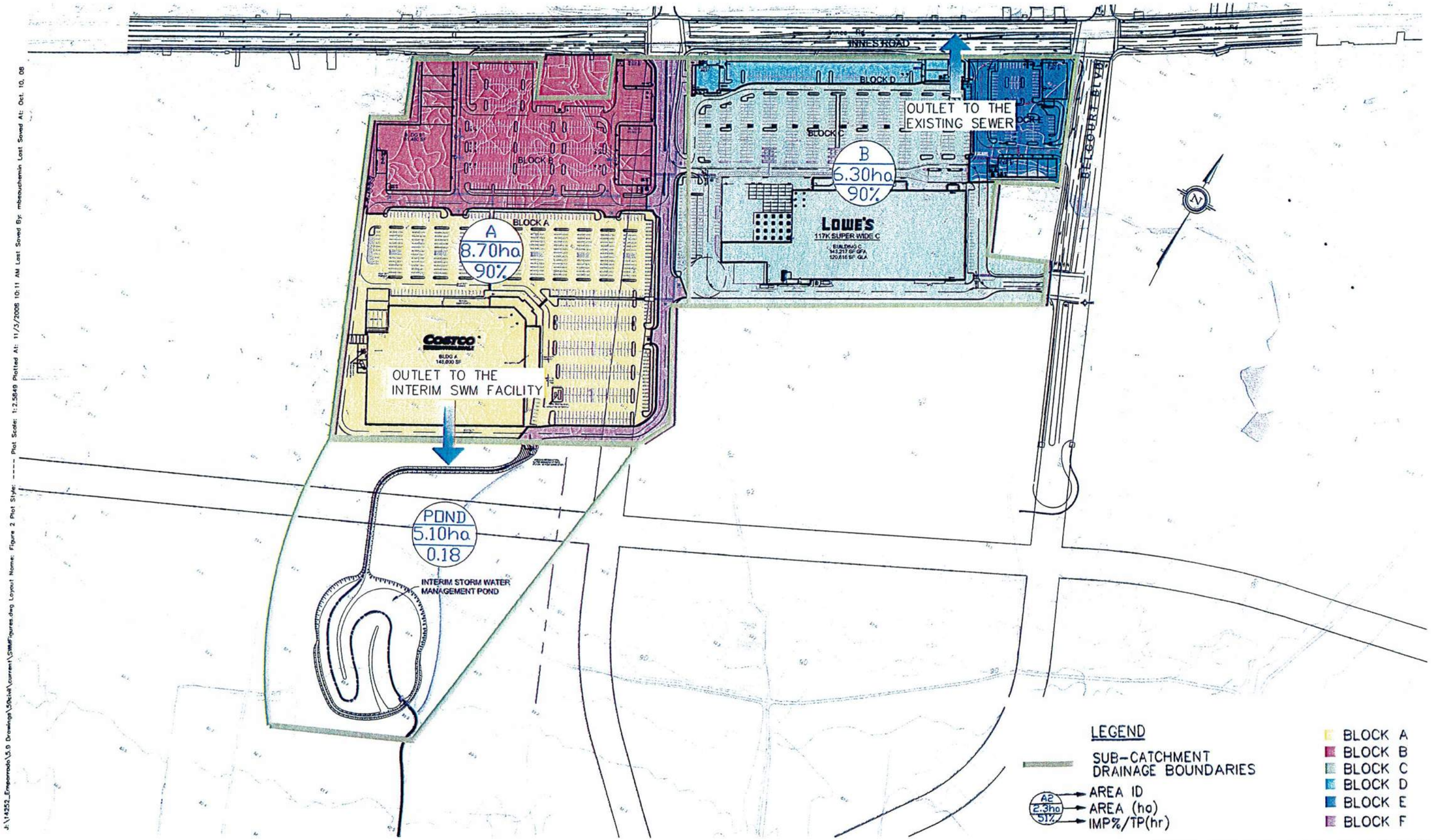
Storm Event	Post-Development Peak Flow (cms)
25 mm 4hr Chicago	0.467
2 Yr 3 hrChicago	0.471
5 Yr 3 hr Chicago	0.476
100 Yr 3hr Chicago	0.493

The above table indicates that the post-development peak flows from Area B outlet to the existing sewer at Innes Road does not exceeded the maximum allowable flow rate of 493 l/s.

From a development perspective, Area B is divided into 3 Blocks (Blocks C, D and E). The minimum required on-site storage is 1830 m^3. Blocks D and E will provide on-site-storage of approximately 400 m^3. Block C will be designed by others and the required on site-storage is approximately 1430 m^3 to ensure zero overflow. For the detail regarding the on-site storage volume and site grading for Blocks D and E, refer to the "Site Servicing Brief", (IBI Group, October 2008).

Drainage Area A

The total drainage area into the interim SWM Facility includes 8.7 ha of Area A and 5.1 ha of rural area located in the vicinity of the facility. The required level of service (85 l/s/ha) and the total inflow into the minor system will be maintained by the capacity restriction and density of the inlets directly connected into the minor system. The required on-site storage volume for Area A corresponds to a level of service of 85 l/s/ha and was determined using the route reservoir routine in SWMHYMO under the 100 year 3 hour Chicago storm. The on-site storage requirements for Area A is approximately 2700 m^3 in order to completely attenuate the runoff from the 100 year 3 hour Chicago storm event. As with the existing conditions, the 25 mm 4 hour Chicago and 2, 5 and 100 year 3 hour Chicago storms were used to evaluate peak flows. The results from the existing conditions model are presented in **Table 2** along with the post-development flows. The SWMHYMO model output and related calculations for the post-development conditions can be found in **Appendices A and C.**



J:\14252_Emparrado\5.0 Drawings\5.0civil\current\SWMfigures.dwg Layout Name: Figure 2 Plot Style: ---- Plot Scale: 1:2.5849 Plotted At: 11/3/2008 10:11 AM Last Saved By: mbeauchemin Last Saved At: Oct. 10, 08

IBI GROUP

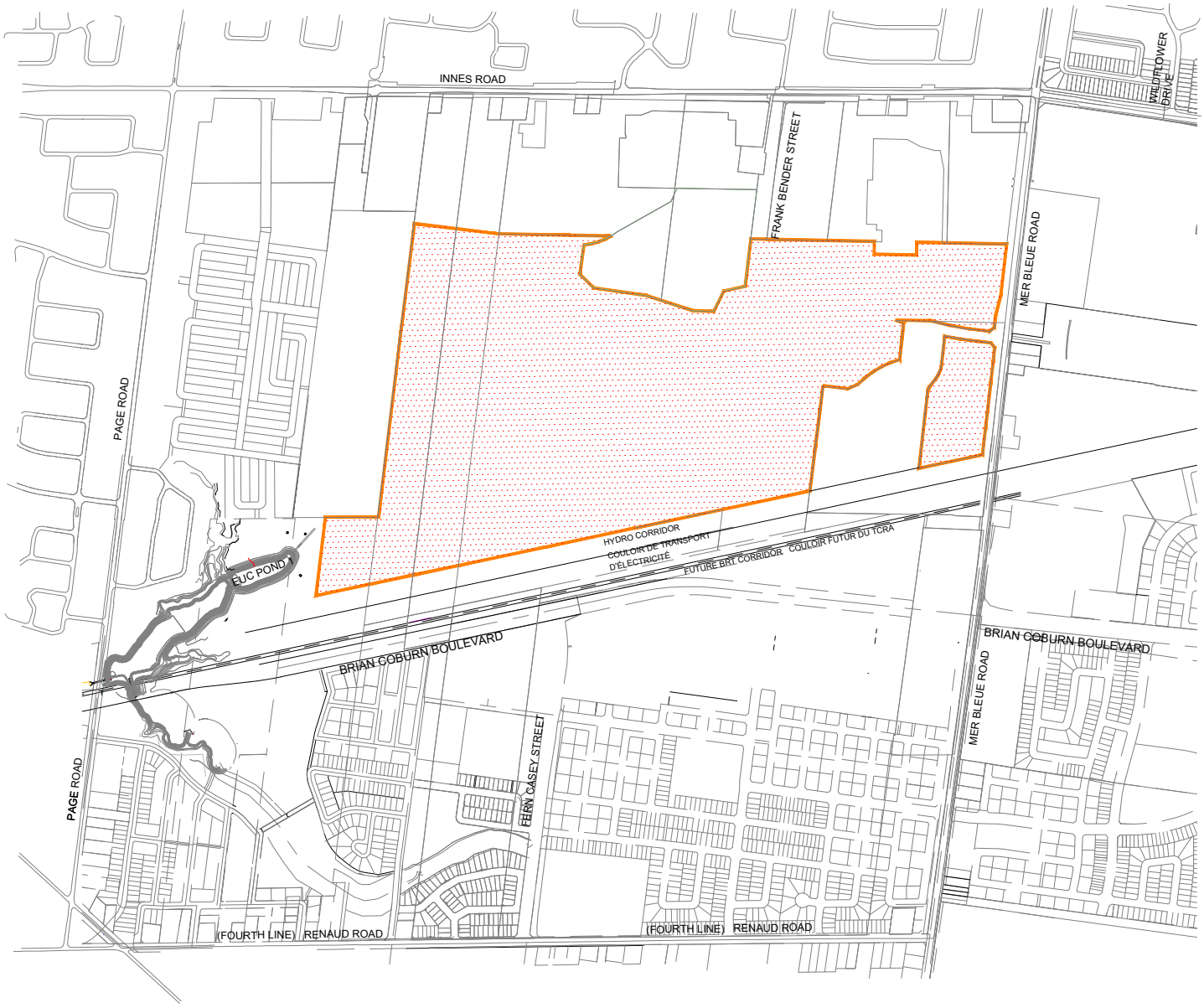
Scale: 1:3000

Project Title: EMPARRADO LANDS

Drawing Title: POST - DEVELOPMENT DRAINAGE BOUNDARIES

Sheet No.: FIGURE 2

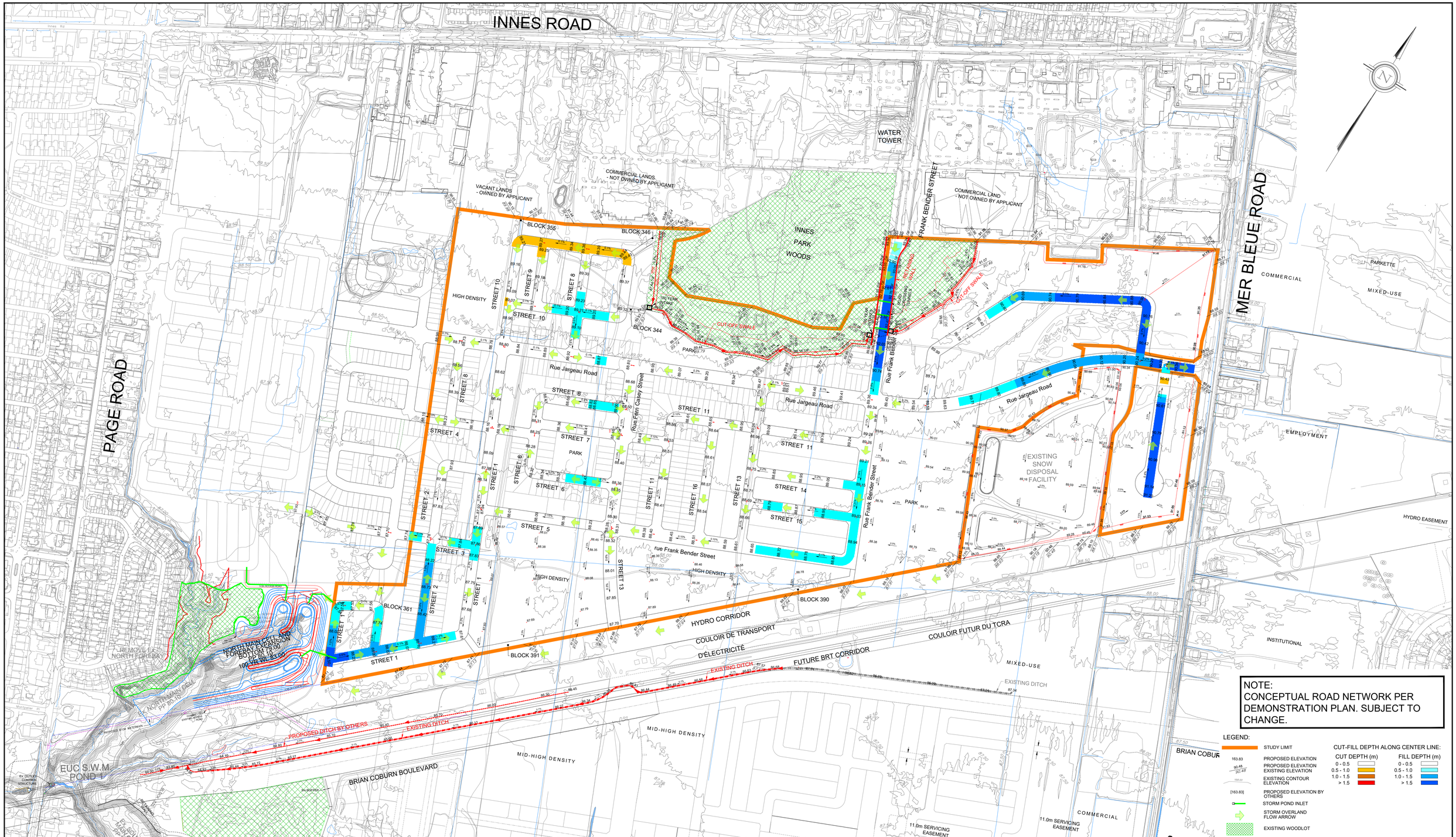
DRAWINGS & FIGURES



LEGEND

SITE BOUNDARY

TRAILSEDGE NORTH	SITE LOCATION	DATE: September 2020
		SCALE: 1:15,000
david schaeffer engineering ltd	120 Iber Road, Unit 203 Stittsville, ON K2S 1E9 TEL: (613) 836-0856 FAX: (613) 836-7183 www.DSEL.ca	PROJECT No.: 20-1195
		FIGURE: 1



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

TRAILSEDGE NORTH
GRADING PLAN

PROJECT No. :	20-1195
SCALE	1:3000
DATE:	AUGUST 2022
DRAWING No.	1

DSEL
david schaeffer engineering ltd

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

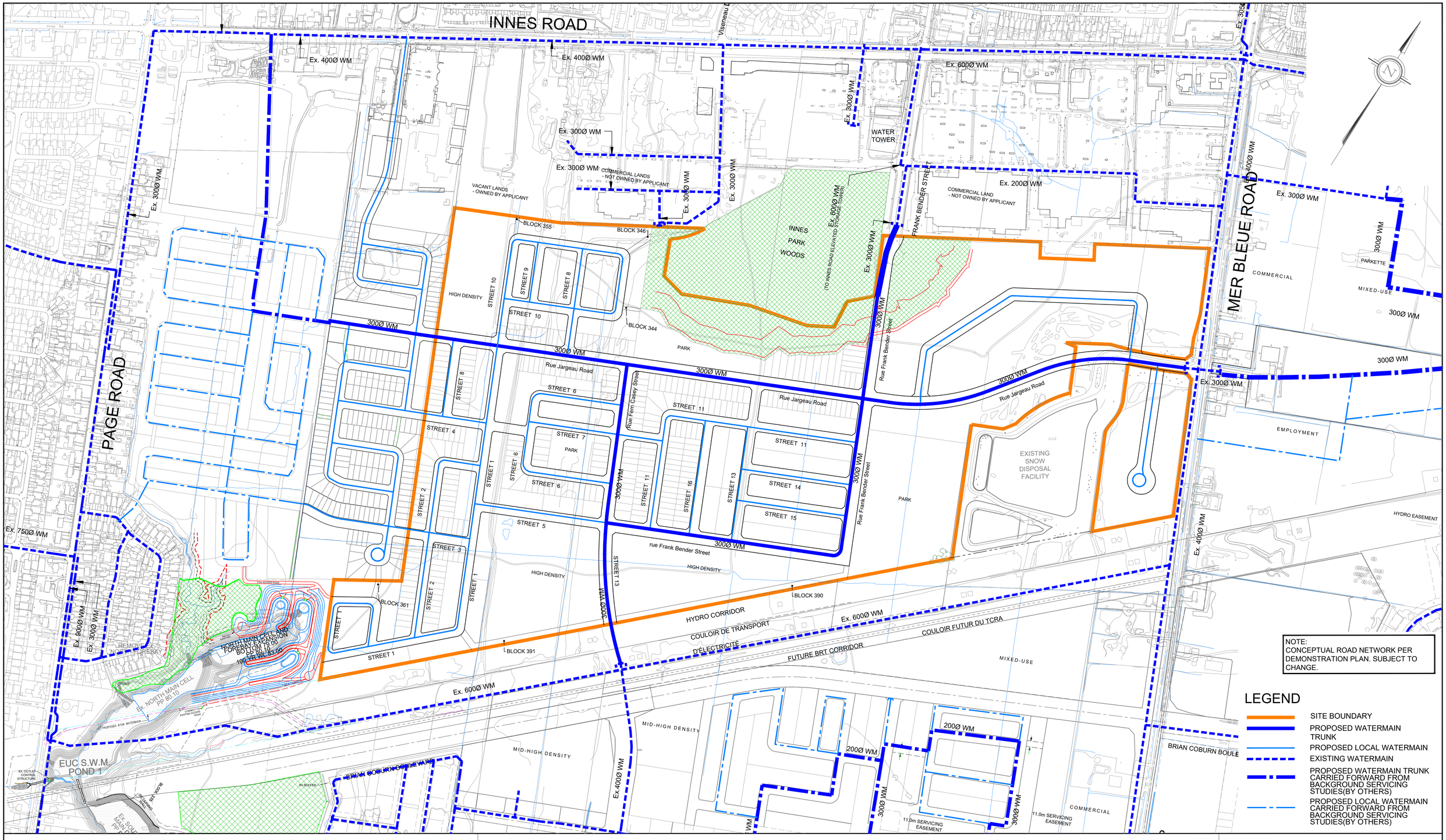
TRAILSEDGE NORTH
CONCEPTUAL STORM SERVICING

PROJECT No. :	20-1195
SCALE	1:3000
DATE:	AUGUST 2022
DRAWING No.	2

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

TRAILSEDGE NORTH
CONCEPTUAL SANITARY SERVICING

PROJECT No. :	20-1195
SCALE	1:3000
DATE:	AUGUST 2022
DRAWING No.	3



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Fax. (613) 836-7183
www.DSEL.ca

TRAILSEDGE NORTH
WATERMAIN SERVICING

PROJECT No. :	20-1195
SCALE	1:3000
DATE:	AUGUST 2022
DRAWING No.	4