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SERVICING OPTIONS REPORT

FOR

BLACKSHEEP DEVELOPMENTS
2159 MER-BLEUE ROAD

CITY OF OTTAWA

PROJECT NO.: 17-934

DECEMBER 2017 – REV 2

SERVICING OPTIONS REPORT
FOR
2159 MER-BLEUE ROAD
BLACKSHEEP DEVELOPMENTS

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FOR
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CITY OF OTTAWA
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1.0 INTRODUCTION

David Schaeffer Engineering Limited (DSEL) has been retained by Blacksheep Developments to prepare a Servicing Options Report in support of the application for subdivision and Zoning By-law Amendment (ZBLA) at 1251 Mer-Bleue Road.

The subject property is located within the City of Ottawa, in the Cumberland ward. As illustrated in ***Figure 1***, the subject property is located south east of the Innes Road and Mer Bleue Road intersection. Comprised of a single parcel, the subject property measures approximately 5.35 ha and is currently located within the Bilberry Creek Industrial Park. The subject site is zoned General Industrial Zone [IG7 H].

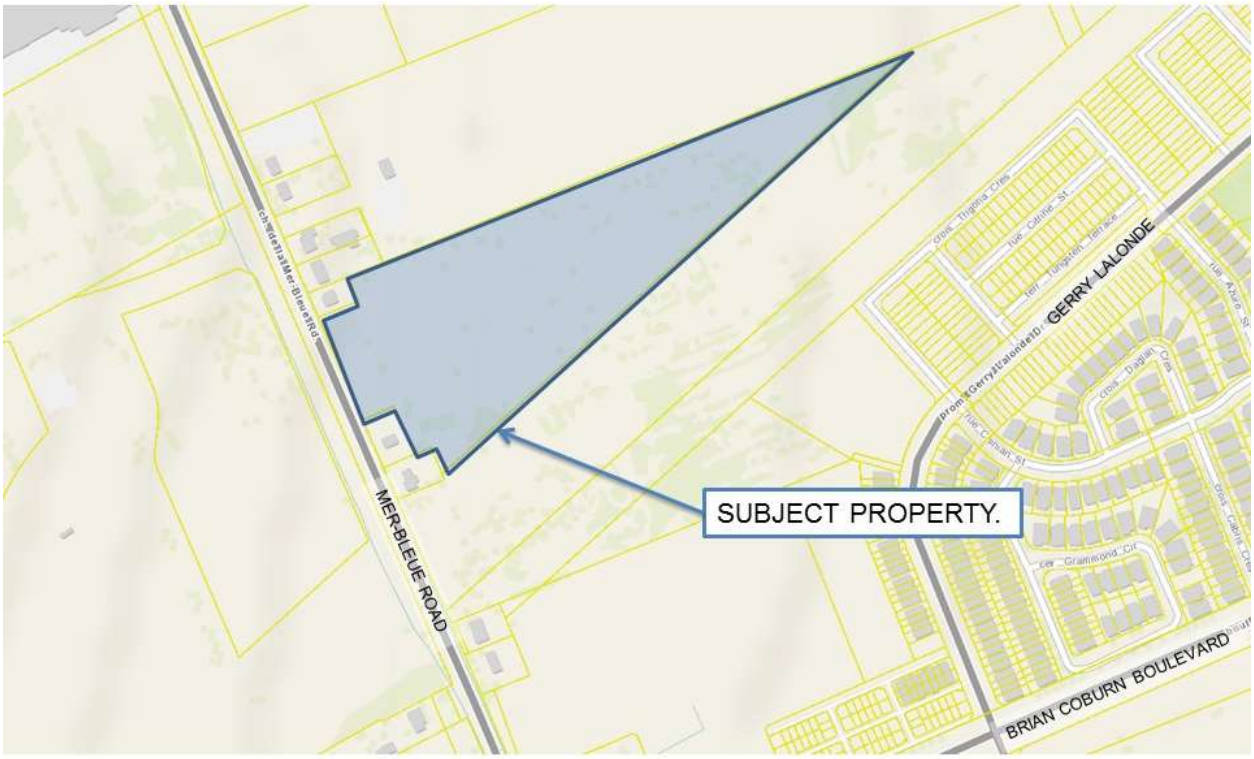

Figure 1: Site Location

The proposed subdivision and ZBLA would allow for a phased residential/commercial development. The development would include approximately ***14,864 m²*** of commercial space, a ***185 room*** retirement residence, and approximately ***929 m²*** of institutional space. The residential component is comprised of approximately ***120 units***. A copy of the conceptual site plan is included in ***Drawings/Figures***.

The objective of this report is to provide sufficient site servicing details to support the application for subdivision and re-zoning.

1.1 Existing Conditions

The existing subject site is currently an undeveloped parcel within the Bilberry Creek Industrial Park.

Site servicing of the subject lands have been contemplated in the Gloucester and Cumberland East Urban Community Expansion Area and Bilberry Creek Industrial Park Master Servicing Update (***EUC/BCMS***). However, municipal storm and sanitary services have not been extended to the subject property at the time of publication of this report.

1.2 Required Permits / Approvals

The proposed development is subject to the site plan control approval process. The City of Ottawa must approve the engineering design drawings and reports prior to the issuance of site plan control.

The contemplated development blocks would be considered single parcels of land and are not considered industrial, therefore, would qualify for an exemption based on Section 53 of the Ontario Water Resources Act under OReg 525/98. Any extension to public infrastructure would require an Environmental Compliance Application (ECA) under the City of Ottawa Transfer of Review process.

1.3 Pre-consultation

Pre-consultation correspondence, along with the servicing guidelines checklist, is located in ***Appendix A***.

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
  (City Standards)

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

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

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

- **Design Guidelines for Sewage Works,**
  Ministry of the Environment, 2008.
  (MOE* 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, 2010 Update.
  (OBC)

- **Water Supply for Public Fire Protection**
  Fire Underwriters Survey, 1999.
  (FUS)

- **Gloucester and Cumberland East Urban Community Expansion Area and Bilberry Creek Industrial Park Master Servicing Update**
  Stantec Consulting Ltd., July, 2006.
  (EUC/BCMS)

- **Site Servicing and Stormwater Management Report – Orleans II Development Rezoning**
  Stantec Consulting Ltd., December 13, 2016.
  (SmartREIT Report)

3.0 WATER SUPPLY SERVICING

3.1 Existing Water Supply Services

The subject property lies within the City of Ottawa 2E pressure zone. An existing 406mm diameter watermain is located within the Mer Bleue right-of-way and the existing Innes Road elevated tank is located North West of the site.

3.2 Preliminary Water Supply Servicing Design

It is contemplated that the development will be serviced via an internal watermain network with a connection to the existing 406mm diameter watermain within the Mer-Bleue right-of-way. A conceptual plan has been included in ***Drawings/Figures***.

Table 1 summarizes the ***Water Supply Guidelines*** employed in the preparation of the preliminary water demand estimate.

Table 1
Water Supply Design Criteria

Design Parameter	Value
Residential Average Apartment	1.8 person/unit
Residential Average Daily Demand	350 L/d/person
Residential Maximum Daily Demand	3.6 x Average Daily *
Residential Maximum Hourly	5.4 x Average Daily *
Nursing/Rest Homes	450 L/bed/day
Institutional	50,000 L/gross ha/day
Commercial Floor Space	2.5 L/m^2/day
Commercial Maximum Daily Demand	1.5 x avg. day
Commercial Maximum Hour Demand	1.8 x max. day
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	275kPa
During normal operating conditions pressure must not exceed	552kPa
During fire flow operating pressure must not drop below	140kPa

Daily average based on Appendix 4-A from **Water Supply Guidelines*
*** Residential Max. Daily and Max. Hourly peaking factors per MOE Guidelines for Drinking-Water Systems Table 3-3 for 0 to 500 persons.*
-Table updated to reflect ISD-2010-2

Based on the ***EUC/BCMS***, a peak water demand of ***351 L/min*** was contemplated for the industrial designation of the site.

Table 2 summarizes the estimated water supply demand for the development based on the development statistics provided by Blacksheep Developments. Associated calculations are included in ***Appendix B***.

Table 2
Summary of Estimated Water Demand

Design Parameter	Proposed Demand[1] (L/min)
Average Daily Demand	168.4
Max Day + Fire Flow	362.8
Peak Hour	596.4

1) Water demand calculation per ***Water Supply Guidelines***. See ***Appendix B*** for detailed calculations.

The City of Ottawa was contacted to obtain boundary conditions associated with the estimated water demand as indicated in ***Table 2***. No response was received at the time of publication. Correspondence with the City has been included in ***Appendix A***.

The Innes Elevated tank is located approximately 730m North West of the subject site and provides potable water to the development via the existing 406mm diameter watermain within the Mer-Bleue Road right-of-way. Based on the current elevation of the site and the operational level of the tank at 131m, it is estimated that the available pressure at the site will be approximately 420 kPa. Therefore, it is anticipated that water pressure to the site will be within the recommended pressure range as specified by the ***Water Supply Guidelines***.

3.3 Water Supply Conclusion

Based on the ***EUC/BCMS***, a peak water demand of ***351 L/min*** was contemplated for the industrial designation of the site. The contemplated development anticipates a peak water demand of ***596.4 L/min***.

It is estimated that the available pressure at the site will be approximately 422 kPa, falling within the required pressure range as specified by the ***Water Supply Guidelines***.

4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

Municipal wastewater services are not immediately available to the site. An existing 375mm diameter sanitary sewer is located within the Vanguard Drive right-of-way and an existing 200mm diameter sanitary sewer within the Trigoria Crescent right-of-way are located in the vicinity of the proposed development.

Based on the ***EUC/BCMS***, sanitary servicing for the subject lands is contemplated via the future Vanguard extension to the Tenth Line Pump Station as indicated by *SAN 4* included within ***Appendix C***.

4.2 Preliminary Wastewater Design

An analysis was previously conducted by DSEL to evaluate flows to the Tenth Line Pump Station. As shown by the attached overall sanitary drainage area plan, dated May 2015, and associated calculation sheet included in ***Appendix C***, the subject property was contemplated as light industrial lands at a flow of 35,000 L/ha/day. Based on an estimated site area of 5.35 ha, a peak flow of ***10.2 L/s*** was contemplated for the site.

Table 3 summarizes the ***City Standards*** required in the design of the contemplated wastewater sewer system.

Table 3
Wastewater Design Criteria

Design Parameter	Value
Residential Average Apartment	1.8 person/unit
Residential Average Daily Demand	350 L/d/person
Nursing/Rest Homes	450 L/bed/day
Institutional	50,000 L/gross ha/day
Commercial Floor Space	5 L/m^2/day
Peaking Factor	Harmon's Peaking Factor. Max 4.0, Min 2.0
Infiltration and Inflow Allowance	0.28L/s/ha
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{2/3} S^{1/2}$
Minimum Sewer Size	250mm 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.	

Table 4 demonstrates the estimated peak flow from the development based on the development statistics provided by Blacksheep Developments. See ***Appendix C*** for associated calculations.

Table 4
Summary of Estimated Peak Wastewater Flow

Design Parameter	Total Flow (L/s)
Estimated Average Dry Weather Flow	4.10
Estimated Peak Dry Weather Flow	9.68
Estimated Peak Wet Weather Flow	11.17

The peak wastewater flow generated from the development has been estimated to be **11.17** ***L/s***, therefore a ***1 L/s*** increase in peak wet weather flow is anticipated for the subject site.

4.3 Preliminary Wastewater Capacity Analysis – Option 1

Option 1 includes installing an extension from the existing 375mm diameter sanitary sewer within the Vanguard Drive right-of-way to the development, as shown by *FIG-1* included in ***Appendix C***.

A sanitary analysis was conducted for the local municipal sanitary in order to assess the available capacity. The analysis was conducted from the site to the Tenth Line Pump Station, as shown by the *Tenth Line Road Pump Station*, dated May 2015, included in ***Appendix C***.

Based on the sanitary analysis, the controlling section of the local sewer system is located at the intersection of Vanguard Drive and Tenth Line (section MH EXIST 1-MH 1) with an available residual capacity of ***53.46 L/s***; detailed calculations are included in ***Appendix C***.

The analysis above indicates that sufficient capacity is available in the local sewers to accommodate the contemplated development.

4.4 Preliminary Wastewater Capacity Analysis – Option 2

Option 2 includes installing an extension from the existing 200mm diameter sanitary sewer within the Trigoria Crescent right-of-way to the development, as shown by *FIG-1* included in ***Appendix C***.

A sanitary analysis was conducted for the local municipal sanitary sewers in order to assess the available capacity. The catchment area serviced by the Trigoria Crescent sanitary sewer was identified by the *Tenth Line Road Pump Station* figure, dated May 2015, included in ***Appendix C***. The analysis was conducted from Trigoria Crescent to the upstream extents of the drainage area located near the intersection of Tenth Line and Chinian Street, as shown by the ***Chinian Street Sanitary Analysis*** included in ***Appendix C***.

City of Ottawa Sewer Design Guidelines (2004) Figure 4.4 'Peak Flow Monitored Design Parameters' were employed to generate an estimate of the existing wastewater flow conditions within the sewer.

Based on the sanitary analysis, the controlling section of the local sewer system is located at the intersection of Tenth Line and Chinian Street (section 18-19), and is currently at capacity. To provide sufficient capacity within the existing sanitary sewer, section 7-8, section 8-9, section 17-18, and section 18-19 would need to be modified to increase capacity; detailed calculations are included in ***Appendix C***.

4.5 Wastewater Servicing Conclusions

The development results in an estimated peak wastewater flow of ***11.17 L/s***.

Based on the sanitary analysis conducted, capacity within the Vanguard Drive sanitary system is available to service the contemplated development.

Based on the sanitary analysis conducted, modifications to the existing sanitary sewer within the Chinian Street right-of-way would be required to increase capacity to support the contemplated development.

5.0 STORMWATER MANAGEMENT

5.1 Existing Stormwater Services

The existing development is an undeveloped parcel and it is anticipated that no stormwater management controls for flow attenuation exist on site. Municipal stormwater services are not immediately available to the site.

An existing 1050mm diameter storm sewer within the Vanguard Drive right-of-way and an existing 450mm diameter storm sewer within the Trigoria Crescent right-of-way are located in the vicinity of the proposed development.

Stormwater from the Vanguard Drive sewer system is directed towards Bilberry Creek via a 1350mm diameter storm sewer running from the industrial park to the Wildflower outlet which outlets to the Bilberry Creek, as shown by STM 4 included in the ***Appendix D***.

Stormwater from the Trigoria Crescent sewer system is directed towards Neighbourhood 5 Ultimate SWM Facility via a 2700mm diameter storm sewer, as shown by the Avalon West Drainage Plan included in ***Appendix D.***

5.2 Preliminary Post-development Stormwater Management Target – Option 1

Based on the ***EUC/BCMS***, storm servicing for the subject lands is contemplated via the future Vanguard extension. **Option 1** includes installing storm sewers with a connection from the existing 1050mm diameter storm sewer within the Vanguard Drive right-of-way to the development.

Stormwater management requirements for the development were based on the established criteria from the ***EUC/BCMS***. It has been established that the following criteria apply:

- Control to an allowable release rate of ***50 L/s/ha***;
- Attenuate all storms up to and including the City of Ottawa 100-year design event on site.
- Stormwater quality controls to a normal level of treatment (80% TSS removal) are anticipated; confirmation will need to be provided by the conservation authority having jurisdiction.

Based on the above the allowable release rate for the site is ***267.5 L/s***.

5.3 Preliminary Post-development Stormwater Management Target – Option 2

Option 2 includes installing storm sewers with a connection from the existing 450mm diameter storm sewer within the Trigoria Crescent right-of-way to the development.

The following stormwater management requirements for the contemplated development were assumed:

- Meet an allowable release rate based on the existing Rational Method Coefficient of 0.20, employing the City of Ottawa IDF parameters for a 5-year storm with a time of concentration equal to 23 minutes.
- Attenuate all storms up to and including the City of Ottawa 100-year design event on site.
- Stormwater quality controls to a normal level of treatment (80% TSS removal) are anticipated; confirmation will need to be provided by the conservation authority having jurisdiction.

Based on the above the allowable release rate for the proposed development is ***191.1 L/s***.

5.4 Preliminary Proposed Stormwater Management System – Option 1

Based on the ***EUC/BCMS***, storm servicing for the subject lands is contemplated via the future Vanguard extension. As a result, the storm sewer system is capable of supporting a release rate for the contemplated development of ***267.5 L/s***.

To meet the stormwater objectives the proposed development may contain a combination of roof top flow attenuation along with surface and subsurface storage.

Table 5 summarizes contemplated post-development flow rates. The following storage requirement estimate assumes that approximately 10% of the development area will be directed to the outlet without flow attenuation. These areas will be compensated for in areas with flow attenuation controls.

Table 5
Summary of Estimated Stormwater Flow Rate – Option 1

Control Area	5-Year Release Rate	5-Year Storage	100-Year Release Rate	100-Year Storage
	(L/s)	(m^3)	(L/s)	(m^3)
Unattenuated Areas	67.9	0.0	144.8	0.0
Attenuated Areas	58.0	915.7	122.7	1938.6
Total	**125.8**	**915.7**	**267.5**	**1938.6**

It is anticipated that approximately ***1938.6 m^3*** of storage would be required on site to attenuate flow to the established release rate of ***267.5 L/s***, outlined in the ***EUC/BCMS***; storage calculations are contained within ***Appendix D***.

The analysis above indicates that sufficient capacity is available in the local sewers to accommodate the contemplated development.

Actual storage volumes will need to be confirmed at the detailed design stage of the development.

5.5 Preliminary Proposed Stormwater Management System – Option 2

To meet the stormwater objectives the proposed development may contain a combination of roof top flow attenuation along with surface and subsurface storage.

A storm analysis was conducted for the local municipal storm sewers in order to assess the available capacity. The catchment area serviced by the Trigoria Crescent storm sewer was identified by the *Avalon West (Neighbourhood 5) Stormwater Management Facility Design report,* prepared by IBI Group, dated September 2012; relevant excerpts are included in ***Appendix D***. The analysis was conducted from Trigoria Crescent to upstream extents of the drainage area located near the intersection of Aubepines Drive and Hepatica Way, as shown by the ***Avalon West Drainage Area Plan*** included in ***Appendix D***.

Based on the analysis, the controlling section of the local sewer system downstream of the site is located between MH8 and MH9 with an available residual capacity of ***56.5 L/s***; detailed calculations and the *Chinian Street Storm Analysis* figure are included in ***Appendix D***. An additional restriction was identified near the intersection of Chinian Street and Strasbourg Street. The existing inverts at this location would need to be confirmed.

Due to the restriction of the receiving sewers, it is anticipated the proposed development would need to control to a maximum release rate of ***56.5 L/s***.

Table 6 summarizes contemplated post-development flow rates. Based on the allowable capacity of the receiving storm sewer, the uncontrolled area would need to limited to 4% of the development area. These areas will be compensated for in areas with flow attenuation controls.

Table 6
Summary of Estimated Stormwater Flow Rate – Option 2

Control Area	5-Year Release Rate	5-Year Storage	100-Year Release Rate	100-Year Storage
	(L/s)	(m^3)	(L/s)	(m^3)
Unattenuated Areas	24.84	0.0	52.97	0.0
Attenuated Areas	1.67	1361.4	3.53	2877.1
Total	**26.5**	**1361.44**	**56.50**	**2877.1**

It is anticipated that approximately ***2877.1 m^3*** of storage will be required on site to attenuate flow to the established release rate of ***56.5 L/s***; storage calculations are contained within ***Appendix D***.

Actual storage volumes will need to be confirmed at the detailed design stage of the development.

5.6 Stormwater Servicing Conclusions

Storm sewers would need to be extended to service the contemplated development.

Based on the storm analysis conducted, capacity within the Vanguard Drive and Trigoria Crescent storm sewer systems are available to service the development.

6.0 UTILITIES

Utility servicing will be coordinated with the individual utility companies prior to site development.

Special considerations will need to be taken with development within the Hydro corridor. The development will be coordinated and approved by the utility company having jurisdiction.

7.0 CONCLUSION AND RECOMMENDATIONS

David Schaeffer Engineering Ltd. (DSEL) has been retained by Blacksheep Developments to prepare a Servicing Options Report in support of the application for subdivision and Zoning By-law Amendment (ZBLA) at 2159 Mer-Bleue Road. The preceding report outlines the following:

- The watermain boundary conditions have been requested from the City of Ottawa, however they were unavailable at the time of this publication;
- Based on the current elevation of the site and the operational level of the Innes Elevated tank, it is anticipated that water pressure to the site will be within the recommended pressure range as specified by the ***Water Supply Guidelines***.
- The ultimate development is proposed to have a peak wet weather flow of ***11.17 L/s***. Based on the sanitary analysis, there is sufficient capacity within the existing sanitary sewers in the vicinity of the site;
- Based on the storm analysis, there is sufficient capacity within the existing storm sewers in the vicinity of the site;
- Stormwater quality controls to a normal level of treatment (80% TSS removal) are anticipated; confirmation will need to be provided by the conservation authority having jurisdiction.

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Per: Alison J. Gosling, EIT.

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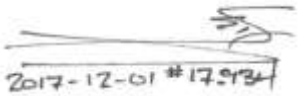
Per: Robert D. Freel, P. Eng.

Reviewed by,
David Schaeffer Engineering Ltd.



Per: Adam D. Fobert, P. Eng.

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APPENDIX A

Pre-Consultation

DEVELOPMENT SERVICING STUDY CHECKLIST

17--934 27/11/2017

4.1 General Content		
☐	Executive Summary (for larger reports only).	N/A
☒	Date and revision number of the report.	Report Cover Sheet
☒	Location map and plan showing municipal address, boundary, and layout of proposed development.	Drawings/Figures
☒	Plan showing the site and location of all existing services.	Figure 1
☒	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
☒	Summary of Pre-consultation Meetings with City and other approval agencies.	Section 1.3
☒	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.	Section 2.1
☒	Statement of objectives and servicing criteria.	Section 1.0
☒	Identification of existing and proposed infrastructure available in the immediate area.	Sections 3.1, 4.1, 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).	N/A
☒	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.	N/A
☐	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.	N/A
☐	Proposed phasing of the development, if applicable.	N/A
☒	Reference to geotechnical studies and recommendations concerning servicing.	Section 1.4
☒	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	N/A

4.2 Development Servicing Report: Water		
☐	Confirm consistency with Master Servicing Study, if available	N/A
☒	Availability of public infrastructure to service proposed development	Section 3.1
☒	Identification of system constraints	Section 3.1
☒	Identify boundary conditions	Section 3.1, 3.2
☒	Confirmation of adequate domestic supply and pressure	Section 3.3

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

☒	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.	Section 3.2
☐	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.	N/A
☐	Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design	N/A
☐	Address reliability requirements such as appropriate location of shut-off valves	N/A
☐	Check on the necessity of a pressure zone boundary modification	N/A
☒	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	Section 3.2, 3.3
☐	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.	N/A
☐	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.	N/A
☒	Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Section 3.2
☐	Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	N/A

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.	N/A
☐	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.	N/A
☒	Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 4.1
☒	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)	Section 4.2
☒	Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	Section 4.2, Appendix C
☒	Description of proposed sewer network including sewers, pumping stations, and forcemains.	Section 4.2
☐	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).	N/A

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

☐	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 5.1
☒	Analysis of available capacity in existing public infrastructure.	Section 5.1, Appendix D
☒	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Drawings/Figures
☒	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.	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.	Section 5.2
☒	Description of the stormwater management concept with facility locations and descriptions with references and supporting information	Section 5.3
☐	Set-back from private sewage disposal systems.	N/A
☐	Watercourse and hazard lands setbacks.	N/A
☒	Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	Appendix A
☐	Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	N/A
☒	Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).	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.	N/A
☒	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.	Section 5.1, 5.3
☐	Any proposed diversion of drainage catchment areas from one outlet to another.	N/A
☐	Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	N/A
☐	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	N/A
☐	Identification of municipal drains and related approval requirements.	N/A

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

☒	Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 5.3
☐	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	N/A
☐	Inclusion of hydraulic analysis including hydraulic grade line elevations.	N/A
☒	Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Section 6.0
☐	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.	N/A
☐	Identification of fill constraints related to floodplain and geotechnical investigation.	N/A

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.	N/A
☐	Changes to Municipal Drains.	N/A
☐	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	N/A

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.	
☐	All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario	

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

Alison Gosling

From: Alison Gosling
Sent: Monday, November 27, 2017 10:36 AM
To: 'White, Joshua'
Cc: Robert Freel
Subject: 2159 Mer-Bleue - Boundary condition request

Good morning Josh,

We would like to request water boundary conditions for Mer-Bleue Road using the following proposed development demands:

1. Location of Service / Street Number: 2159 Mer-Bleue Road

2. Type of development and the amount of fire flow required for the proposed development:

- The proposed phased development is mixed use residential/commercial. The full build-out proposes 120 residential units, 185 nursing/rest home units, 14,864 m^2 of commercial space, and 0.929 ha of institutional space.
- It is anticipated that the development will have a connections to be serviced from the existing 406 mm diameter watermain within Mer-Bleue Road, as shown by the attached map.
- Fire demand based on FUS will be used to calculate fire demand, sufficient information is unavailable at this time to complete a calculation we would request that the available fire flow at 140 kPa be provided for later comparison and for water data card purposes.

3.

	L/min	L/s
Avg. Daily	168.4	2.81
Max Day	362.8	6.05
Peak Hour	596.4	9.94

It you have any questions please feel free to contact me.

Thank you,

Alison Gosling, E.I.T.
Project Coordinator / Junior Designer

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.542
fax: (613) 836-7183
email: agosling@dsel.ca

APPENDIX B

Water Supply

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		0
Semi-detached	2.7		0
Townhouse	2.7		0
Apartment			0
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8	120	216

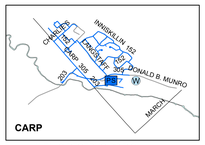
	Pop	Avg. Daily		Max Day		Peak Hour	
		m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Total Domestic Demand	216	75.6	52.5	272.2	189.0	408.2	283.5

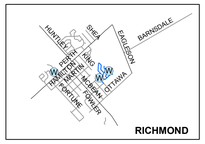
Institutional / Commercial / Industrial Demand

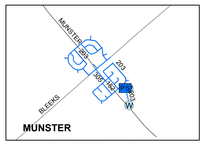
			Avg. Daily		Max Day		Peak Hour	
Property Type	**Unit Rate**	**Units**	m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Commercial floor space	2.5 $L/m^2/d$	14,864	37.16	25.8	55.7	38.7	100.3	69.7
Nursing / Rest homes †	450 L/bed/d	185	83.25	57.8	124.9	86.7	224.8	156.1
Industrial - Light	35,000 L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Institutional	50,000 L/gross ha/d	0.929	46.45	32.3	69.7	48.4	125.4	87.1
Total I/CI Demand			166.9	115.9	250.3	173.8	450.5	312.9
Total Demand			**242.5**	**168.4**	**522.5**	**362.8**	**858.8**	**596.4**

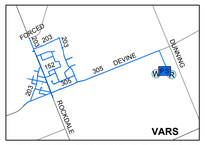
† Flow rates per City of Ottawa Sewer Design Guidelins Appendix 4A

City of Ottawa - Water Distribution System
Facilities & Feedermains



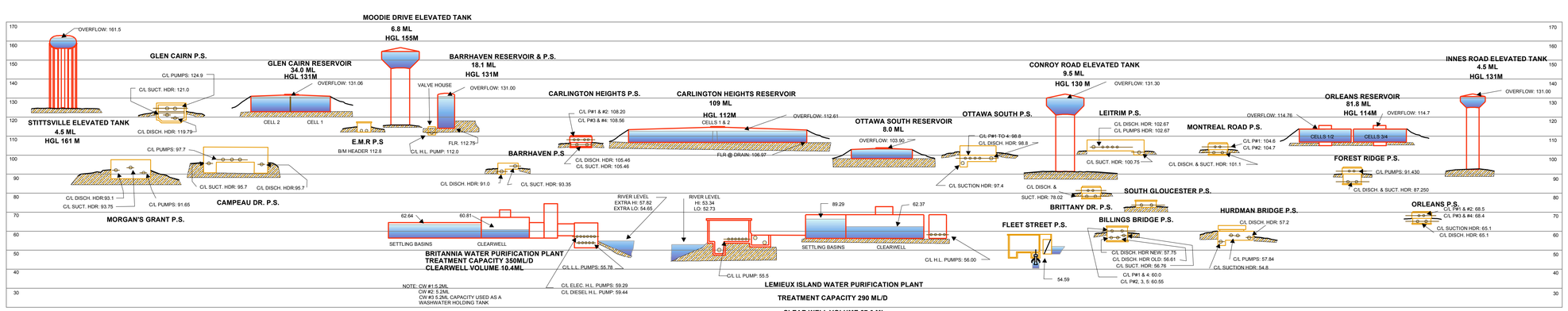






ORLEANS P.S.
FOREST RIDGE P.S
Ogilvie Rd. Backup P.S.
ORLEANS RES.
MONTREAL ROAD P.S.
BRITTANY DRIVE P.S.
FLEET STREET P.S.
LEMIEUX ISLAND PURIFICATION PLANT & P.S. & RES.
INNES RD ELEVATED TANK
Innes Rd/BearBrook Rd Backup P.S.
HURDMAN P.S.
Innes Rd Backup P.S.
BRITANNIA PURIFICATION PLANT & P.S. & RES.
BILLINGS BRIDGE P.S.
MORGAN'S GRANT P.S.
CAMPEAU DR. P.S.
ENERGY MINES & RESOURCES P.S.
CARLINGTON HEIGHTS P.S. & RES.
CONROY RD ELEVATED TANK
SOUTH GLOUCESTER P.S. (INACTIVE)
LEITRIM P.S.
GLEN CAIRN P.S. & RES
BARRHAVEN P.S.
Merivale Rd. Backup P.S.
OTTAWA SOUTH P.S & RES.
STITTSVILLE ELEVATED TANK
BARRHAVEN RES. & P.S.
Abbott/Iber St. Backup P.S.
MOODIE ELEVATED TANK
Shadow Ridge
SHADOW RIDGE P.S. & WELLS
SHADOW RIDGE WELL

1E 1W 2C 2E 2W 3C 3W 4C MONT ME MG EMR BARR SHAD



Legend

Water System Structure

- Pump Station
- Backup Pump Station
- Water Treatment Plant
- Well
- Elevated Tank
- Reservoir

WATERMAINS

Priority, Internal Diameter

- Backbone 1524mm - 1981mm
- Backbone 1067mm - 1372mm
- Backbone 610mm - 914mm
- Backbone 406mm - 508mm
- Backbone 152mm - 305mm
- Distribution 1676mm - 1981mm
- Distribution 1067mm - 1372mm
- Distribution 610mm - 914mm
- Distribution 406mm - 508mm
- Distribution 305mm - 381mm

PRESSURE ZONES

- 1E
- 1W
- 2C
- 2E
- 2W
- 3C
- 3W
- 4C
- BARR
- EMR
- ME
- MG
- MONT
- SHAD

N W E S

Ottawa

Infrastructure Services & Community Sustainability
Infrastructure Services

0 1,000 2,000 4,000 6,000

Meters

FIGURE 1-1

DRAWN BY: D. HESS

DATE: 03 Feb 2015

INNES ROAD ELEVATED STORAGE TOWER

ELEVATED STORAGE TANK
BILBERRY CREEK INDUSTRIAL PARK

Ex. 400 mm ϕ

SUBJECT PROPERTY

N5

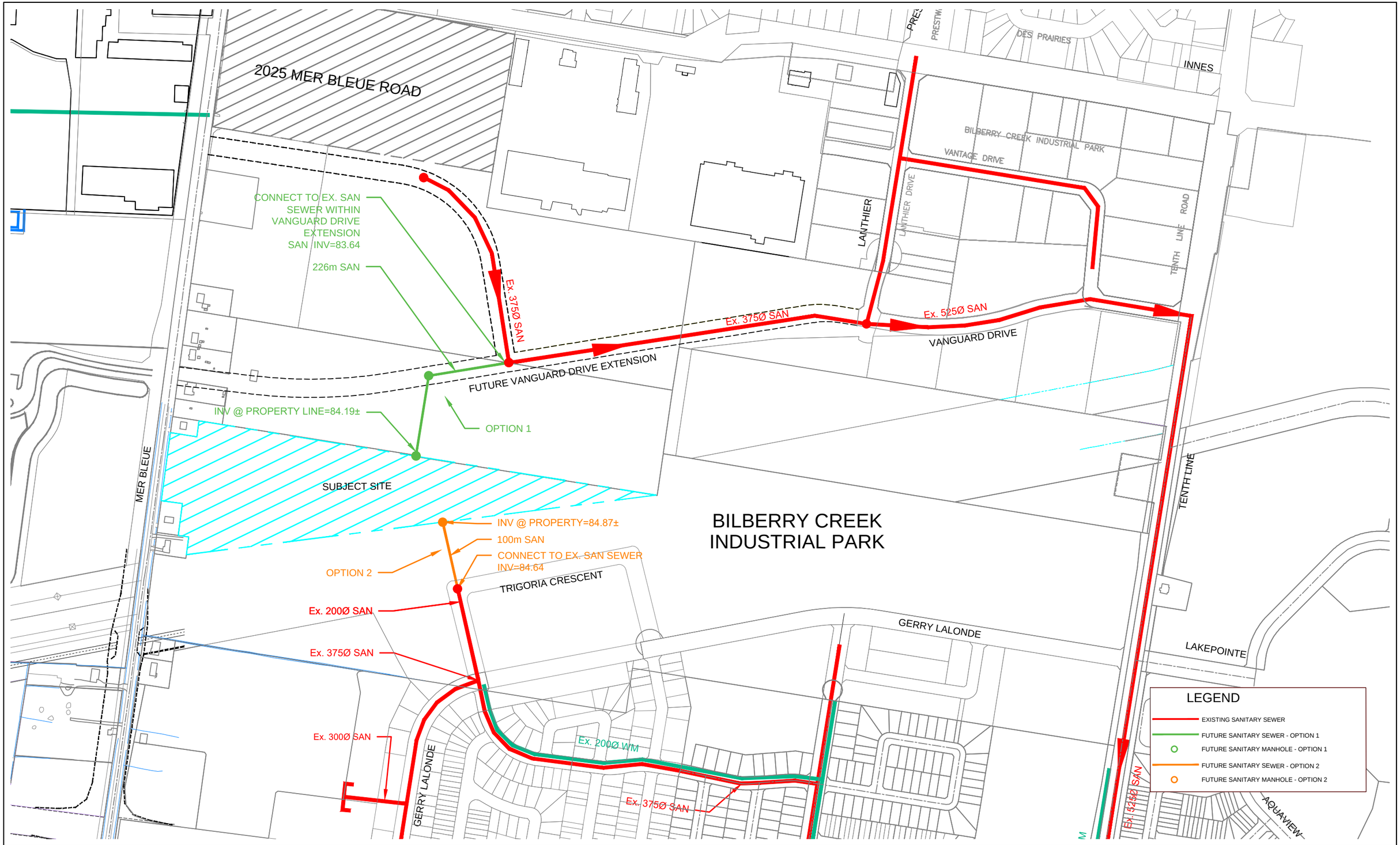
- NEIGHBOURHOOD BOUNDARY
- EUC AREA BOUNDARY
- EXISTING WATERMAIN
- FUTURE WATERMAIN
- EXISTING ELEVATED STORAGE TANK
- FUTURE ELEVATED STORAGE TANK

WATERMAINS

FIRST SUBMISSION:	FEB., 2004	WM 4
REVISION No.: 5	JUNE, 2006	

APPENDIX C

Wastewater Collection



DSEL
david schaeffer engineering ltd
SMART SUBDIVISIONS™

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

CONCEPTUAL SANITARY SERVICING
BLACKSHEEP DEVELOPMENTS - MER BLEUE

PROJ NO.:	17–934
DRAWN BY:	AJG
DATE:	2017–11–28
SCALE:	NTS
FIGURE NO.:	FIG-1

z:\projects\17-934_blacksheep_mer-bleue\b_design\b2_drawings\b2-5_sketches and figures\2017-11-28_servicing-options-fig\2017-11-28_934_ex_servicing_dsel.dwg

Blacksheep Developments
Mer Bleue Lands
Proposed Site Conditions

Existing Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2004

Site Area	5.350	**ha**

Extraneous Flow Allowances

Infiltration / Inflow	**1.50**	**L/s**

Domestic Contributions

Unit Type	Unit Rate	Units	Pop
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Duplex	2.3		0
Townhouse	2.7		0
Apartment			
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8	120	216

Total Pop	**216**	
Average Domestic Flow	**0.88**	**L/s**
Peaking Factor	**4**	
Peak Domestic Flow	**3.50**	**L/s**

Institutional / Commercial / Industrial Contributions

Property Type	Unit Rate		No. of Units	Avg Wastewater (L/s)
Commercial floor space*	5	$L/m^2/d$	14,864	1.72
Nursing / Rest homes †	450	L/bed/d	185	0.96
School	70	L/student/d		0.00
Industrial - Light**	35,000	L/gross ha/d		0.00
Insitutional	50,000	L/gross ha/d	0.929	0.54

Average I/C/I Flow	**3.22**
Peak Institutional / Commercial Flow	4.03
Peak Industrial Flow**	2.15
Peak I/C/I Flow	**6.18**

** assuming a 12 hour commercial operation*

*** peak industrial flow per City of Ottawa Sewer Design Guidelines Appendix 4B*

Total Estimated Average Dry Weather Flow Rate	**4.10 L/s**
Total Estimated Peak Dry Weather Flow Rate	**9.68 L/s**
Total Estimated Peak Wet Weather Flow Rate	**11.17 L/s**

SANITARY SEWER CALCULATION SHEET

CLIENT: **BLACKSHEEP DEVELOPMENTS**
LOCATION: **2159 MER-BLEUE ROAD - OPTION 1**
FILE REF: **17-934**
DATE: **28-Nov-17**

MONITORED DESIGN PARAMETERS

Avg. Daily Flow Res.	300	L/p/d	Peak Fact Res. Per Harmons: Min = 2.0, Max =4.0		Infiltration / Inflow	0.28	L/s/ha
Avg. Daily Flow Comm.	17,000	L/ha/d	Peak Fact. Comm.	1	Min. Pipe Velocity	0.60	m/s full flowing
Avg. Daily Flow Instit.	10,000	L/ha/d	Peak Fact. Instit.	1	Max. Pipe Velocity	3.00	m/s full flowing
Avg. Daily Flow Indust.	10,000	L/ha/d	Peak Fact. Indust. per MOE graph		Mannings N	0.013	

Location			Residential Area and Population									Commercial		Institutional		Industrial			Infiltration				Pipe Data								
Area ID	Up	Down	Area	Number of Units by type				Pop.	Cumulative Area	Cumulative Pop.	Peak. Fact.	Q_{res}	Area	Accu. Area	Area	Accu. Area	Area	Accu. Area	Q_{C+I+I}	Total Area	Accu. Area	Infiltration Flow	Total Flow	DIA	Slope	Length	$A_{hydraulic}$	R	Velocity	Q_{cap}	Q / Q full	Q / Q full
			(ha)	Singles	Semi's	Town's	Apt's		(ha)		(-)	(L/s)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	(L/s)	(L/s)	(mm)	(%)	(m)	(m^2)	(m)	(m/s)	(L/s)	(-)	(L/s)
TRIGORIA CRESCENT	1	2	0.000					0.0	0.000	0.0	4.00	0.00		0.00		0.00		0.00	0.0	0.000	0.000	0.000	0.00	200	0.65	60.0	0.031	0.050	0.84	26.4	0.00	26.4
	2	3	0.000					0.0	0.000	0.0	4.00	0.00		0.00		0.00		0.00	0.0	0.000	0.000	0.000	0.00	200	0.65	45.0	0.031	0.050	0.84	26.4	0.00	26.4
CHINIAN STREET	3	4	24.930					1969.0	24.930	1969.0	3.59	24.55	10.24	10.24		0.00		0.00	8.9	35.170	35.170	9.848	43.29	375	0.15	53.5	0.110	0.094	0.61	67.9	0.64	24.6
	4	5	0.000					0.0	24.930	1969.0	3.59	24.55		10.24		0.00		0.00	8.9	0.000	35.170	9.848	43.29	375	0.11	35.8	0.110	0.094	0.53	58.6	0.74	15.3
	5	6	0.000					0.0	24.930	1969.0	3.59	24.55		10.24		0.00		0.00	8.9	0.000	35.170	9.848	43.29	375	0.10	50.0	0.110	0.094	0.50	55.5	0.78	12.2
	6	7	0.000					0.0	24.930	1969.0	3.59	24.55		10.24		0.00		0.00	8.9	0.000	35.170	9.848	43.29	375	0.10	39.4	0.110	0.094	0.51	55.8	0.78	12.5
	7	8	0.000					0.0	24.930	1969.0	3.59	24.55		10.24		0.00		0.00	8.9	0.000	35.170	9.848	43.29	375	0.08	39.4	0.110	0.094	0.44	48.4	0.90	5.1
	8	9	0.000					0.0	24.930	1969.0	3.59	24.55		10.24		0.00		0.00	8.9	0.000	35.170	9.848	43.29	375	0.09	56.4	0.110	0.094	0.47	52.2	0.83	8.9
	9	10	0.000					0.0	24.930	1969.0	3.59	24.55		10.24		0.00		0.00	8.9	0.000	35.170	9.848	43.29	375	0.17	53.3	0.110	0.094	0.65	72.1	0.60	28.8
	10	11	0.000					0.0	24.930	1969.0	3.59	24.55		10.24		0.00		0.00	8.9	0.000	35.170	9.848	43.29	375	0.16	38.5	0.110	0.094	0.63	69.2	0.63	25.9
	11	12	0.000					0.0	24.930	1969.0	3.59	24.55		10.24		0.00		0.00	8.9	0.000	35.170	9.848	43.29	375	0.17	41.6	0.110	0.094	0.65	71.9	0.60	28.6
	12	13	0.000					0.0	24.930	1969.0	3.59	24.55		10.24		0.00		0.00	8.9	0.000	35.170	9.848	43.29	375	0.10	30.8	0.110	0.094	0.50	54.7	0.79	11.4
	13	14	0.000					0.0	24.930	1969.0	3.59	24.55		10.24		0.00		0.00	8.9	0.000	35.170	9.848	43.29	375	0.14	55.8	0.110	0.094	0.60	66.4	0.65	23.1
	14	15	0.000					0.0	24.930	1969.0	3.59	24.55		10.24		0.00		0.00	8.9	0.000	35.170	9.848	43.29	375	0.19	53.9	0.110	0.094	0.68	75.5	0.57	32.2
	15	16	0.000					0.0	24.930	1969.0	3.59	24.55		10.24		0.00		0.00	8.9	0.000	35.170	9.848	43.29	375	0.18	78.2	0.110	0.094	0.67	74.2	0.58	30.9
	16	17	0.000					0.0	24.930	1969.0	3.59	24.55		10.24		0.00		0.00	8.9	0.000	35.170	9.848	43.29	375	0.16	31.9	0.110	0.094	0.63	69.5	0.62	26.2
	17	18	0.000					0.0	24.930	1969.0	3.59	24.55		10.24		0.00		0.00	8.9	0.000	35.170	9.848	43.29	375	0.06	72.5	0.110	0.094	0.37	41.2	1.05	-2.1
	18	19	0.000					0.0	24.930	1969.0	3.59	24.55		10.24		0.00		0.00	8.9	0.000	35.170	9.848	43.29	375	0.04	47.0	0.110	0.094	0.33	36.2	1.20	-7.1
	19	20	7.240					398.0	32.170	2367.0	3.53	28.99		10.24		0.00		0.00	8.9	7.240	42.410	11.875	49.76	375	0.26	80.3	0.110	0.094	0.81	89.4	0.56	39.6

*Slopes calculated based on maintenance hole inverts provided via GeoOttawa

Chinian Street Sanitary Analysis

November 28, 2017

1:2,866

Sewer Fittings / Raccords

- Cap / bouchon
- Tee / raccord en T
- Sanitary Manholes / Regards d'égout domestique

Sanitary Pipes / Conduites d'égout domestique

- Private / Branchement privé
- Public / Branchement public

Sanitary Pump Stations and Treatment Plants / Installations d'infrastructure

- Sanitary Pump Station / Station de pompage des eaux usées
- Wastewater Treatment Plant / Usine d'épuration des eaux usées
- Combined Manholes / Regards d'égout unitaire

Combined Pipes / Conduites d'égout unitaire

- Private / Branchement privé
- Public / Branchement public

0 0.035 0.07 0.14 mi

0 0.05 0.1 0.2 km

City of Ottawa

SANITARY DRAINAGE AREA

TO TENTH LINE P.S.

SUBJECT PROPERTY

CUMBERLAND PS#4 TO BE UPGRADED (2005) REPORT No.634-00457 DATED DEC., 2003

CUMBERLAND PS#5 (TO BE DECOMMISSIONED ONCE TENTH LINE PUMP STATION AND SEWERS ARE CONSTRUCTED)

300ø SANITARY FORCEMAIN

BLACKBURN HAMLET BY-PASS

N5

0 50 150 250m

- NEIGHBOURHOOD BOUNDARY
- EUC AREA BOUNDARY
- FUTURE SANITARY FORCEMAIN
- EXISTING SANITARY FORCEMAIN
- EXISTING SANITARY SEWER
- FUTURE SANITARY SEWER
- SANITARY DRAINAGE AREA
- 375 SANITARY SEWER SIZE
- 101 MANHOLE AND NUMBER
- COLLECTOR SEWER FLOW DIRECTION
- LOCAL SEWER FLOW DIRECTION
- EXISTING SANITARY PUMP STATION
- FUTURE SANITARY PUMP STATION

SANITARY COLLECTOR SEWERS AND DRAINAGE AREAS

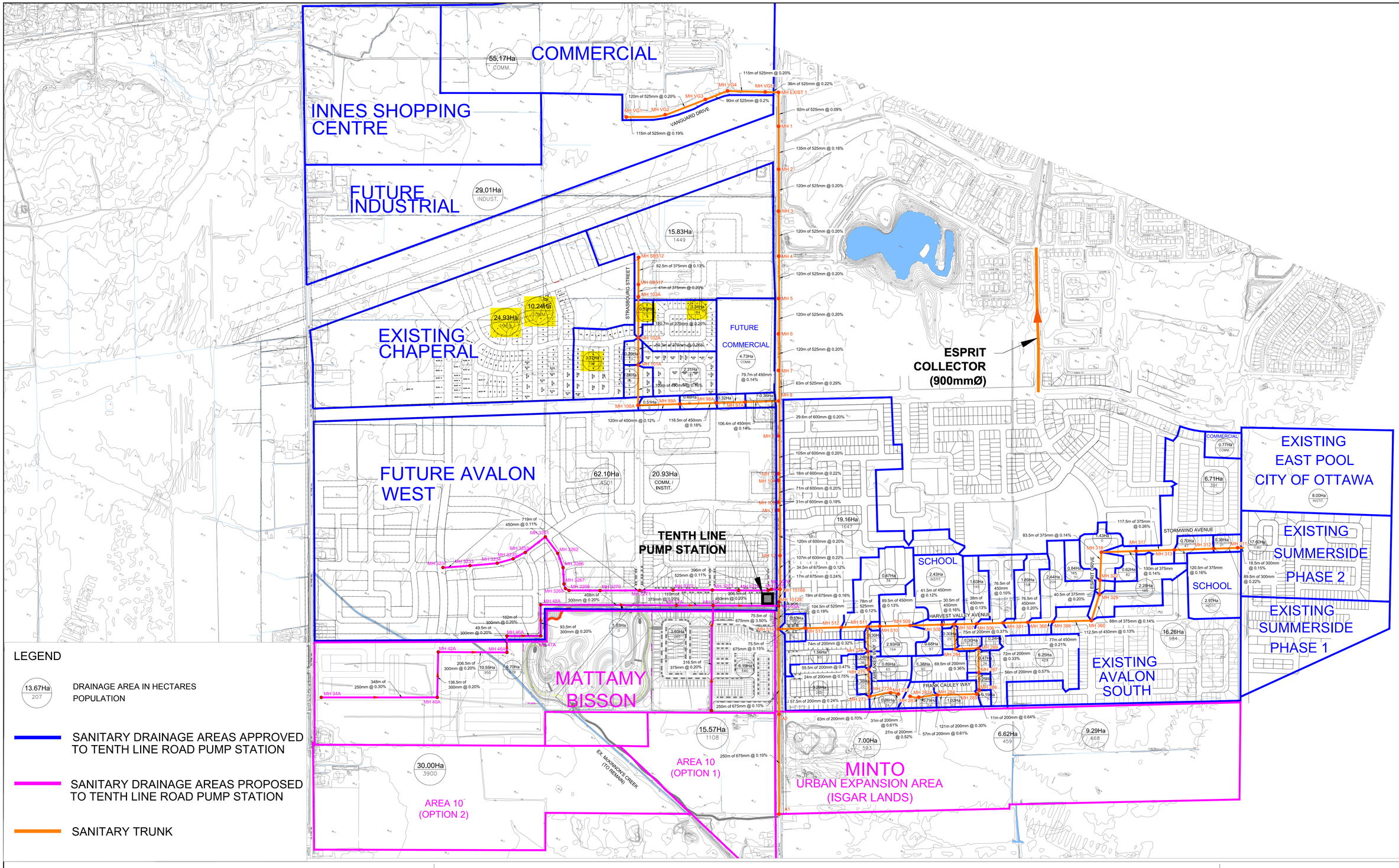
FIRST SUBMISSION:	FEB., 2004	SAN 4
REVISION No.: 3	AUG., 2005	

SANITARY SEWER CALCULATION SHEET
Option 1

LOCATION			RESIDENTIAL AREA AND POP								COMM / INDUST		INSTIT		C+I+I	INFILTRATION				PIPE					
STREET	FROM M.H.	TO M.H.	AREA (ha)	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	FLOW CALCULATION PARAMETERS	FLOW	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
Strasbourg	512	517			0.00	0		Operational Parameters	300				0.00	0.00	0.00	0.00	0.00	0.000	26.09	82.5	375	0.13	63.22	0.57	0.54
Strasbourg	517	103A			0.00	0		Operational Parameters	300				0.00	0.00	0.00	0.00	0.00	0.000	26.09	41.0	375	0.17	72.29	0.65	0.59
Strasbourg	103A	102A	0.53	17	0.53	17	3.03	Operational Parameters	300	0.18			0.00	0.00	0.00	0.53	0.53	0.148	26.42	120.7	375	0.20	78.41	0.71	0.63
Contribution From MH 104A - 102A			3.34	184												3.34									
Contribution from MH 111C to 102A			28.30	2166				Use Tamarack Ph4 parameters for Montfort Lands			10.24	10.24			8.89	38.54									
Strasbourg	102A	101A	0.39	17	32.56	2367	2.52	Operational Parameters	300	20.71	0.00	10.24	0.00	0.00	8.89	0.39	42.80	11.984	67.67	80.3	375	0.26	89.40	0.81	0.90
Contribution from 117A to 101A			2.31	181																					
Strasbourg	101A	100A	0.81	56	35.68	2604	2.50	Operational Parameters	300	22.60		10.24	0.00	0.00	8.89	0.81	43.61	12.211	69.79	109.0	450	0.16	114.04	0.72	0.76
Brian Coburn	100A	99A	0.51	0	36.19	2604	2.50	Operational Parameters	300	22.60		10.24	0.00	0.00	8.89	0.51	44.12	12.354	69.93	120.1	450	0.12	98.76	0.62	0.68
Brian Coburn	99A	98A	0.48	0	36.67	2604	2.50	Operational Parameters	300	22.60		10.24	0.00	0.00	8.89	0.48	44.60	12.488	70.07	118.5	450	0.18	120.96	0.76	0.78
Brian Coburn	98A	97A	0.32	0	36.99	2604	2.50	Operational Parameters	300	22.60	4.74	14.98	0.00	0.00	13.00	5.06	49.66	13.905	75.60	79.7	450	0.14	106.68	0.67	0.73
Brian Coburn	97A	96A	0.36	0	37.35	2604	2.50	Operational Parameters	300	22.60		14.98	0.00	0.00	13.00	0.36	50.02	14.006	75.70	106.4	450	0.14	106.68	0.67	0.73
To Tenth Line Road MH 8																									
Existing Commercial (17,000L/cap/da, PF = 1)											55.17	55.17			10.86	55.17	55.17	15.448	26.31						
Future Light Industrial (35,000L/cap/day, PF = 3.5 from Figure 4-B)											29.01	29.01			41.13	29.01	29.01	8.123	49.25						
Vanguard					0.00								0.00	0.00	0.00	0.00	0.00	0.000	75.56	115.0	525	0.19	187.46	0.87	0.82
Vanguard																			75.56	120.0	525	0.20	192.33	0.89	0.82
Vanguard																			75.56	90.0	525	0.20	192.33	0.89	0.82
Vanguard																			75.56	115.0	525	0.20	192.33	0.89	0.82
Vanguard																			75.56	36.0	525	0.22	201.72	0.93	0.85
To Tenth Line Road MH EX1																			75.56						
Contribution from Vanguard																			75.56						
Tenth Line	Exist 1	1																	75.56	92.0	525	0.09	129.02	0.60	0.62
Tenth Line	1	2																	75.56	135.0	525	0.18	182.46	0.84	0.79
Tenth Line	2	3																	75.56	120.0	525	0.20	192.33	0.89	0.82
Tenth Line	3	4																	75.56	120.0	525	0.20	192.33	0.89	0.82
Tenth Line	4	5																	75.56	120.0	525	0.20	192.33	0.89	0.82
Tenth Line	5	6																	75.56	120.0	525	0.20	192.33	0.89	0.82
Tenth Line	6	7																	75.56	120.0	525	0.20	192.33	0.89	0.82
Tenth Line	7	8																	75.56	63.0	525	0.29	231.60	1.07	0.95
Contribution from Brian Coburn																			75.70						
Tenth Line	8	9																	151.26	105.0	600	0.20	274.59	0.97	0.99
Tenth Line	9	10																	151.26	120.0	600	0.20	274.59	0.97	0.99
Tenth Line	10	10A																	151.26	18.0	600	0.22	288.00	1.02	1.03
Tenth Line	10A	10B																	151.26	71.0	600	0.20	274.59	0.97	0.99
Tenth Line	10B	11																	151.26	31.0	600	0.19	267.64	0.95	0.98
Tenth Line	11	12																	151.26	120.0	600	0.20	274.59	0.97	0.99
Tenth Line	12	13																	151.26	107.0	600	0.22	288.00	1.02	1.03
Contribution from N5		13			62.10	4501	3.29				59.99	20.93	20.93		0.00	18.17	83.03	83.03	23.248	101.41	0.0				
Tenth Line	13	CAP																	252.67	17.0	675	0.24	411.80	1.15	1.21
Tenth Line	CAP	EXIST																	252.67	19.0	675	0.16	336.24	0.94	1.04
To Tenth Line Road Pump Station																			252.67						
To Tenth Line Road Pump Station																			426.55	50.0	675	0.20	375.92	1.05	1.20

DESIGN PARAMETERS					
Average Daily Flow =	350	l/p/day	Industrial Peak Factor =	as per MOE Graph	
Commercial/Institution Flow =	50000	L/ha/da	Extraneous Flow =	0.280	L/s/ha
Industrial Flow =	35000	L/ha/da	Minimum Velocity =	0.760	m/s
Max Res. Peak Factor =	4.00		Manning's n =	0.013	
Commercial/Institutional PF =	1.50		Townhouse coeff=	2.7	
Park Average Flow =	9300	L/ha/da	Single house coeff=	3.4	

DESIGNED BY:		PROJECT: BISSON SUBDIVISION / TENTH LINE ROAD PUMP STATION TRUNKS		
	J. AILEY	LOCATION: City of Ottawa		
DRAWING REFERENCE:	OVERALL SANITARY DRAINAGE PLAN	File Ref: 12-609	Date: 26/05/2015	Sheet No. 3 of 3



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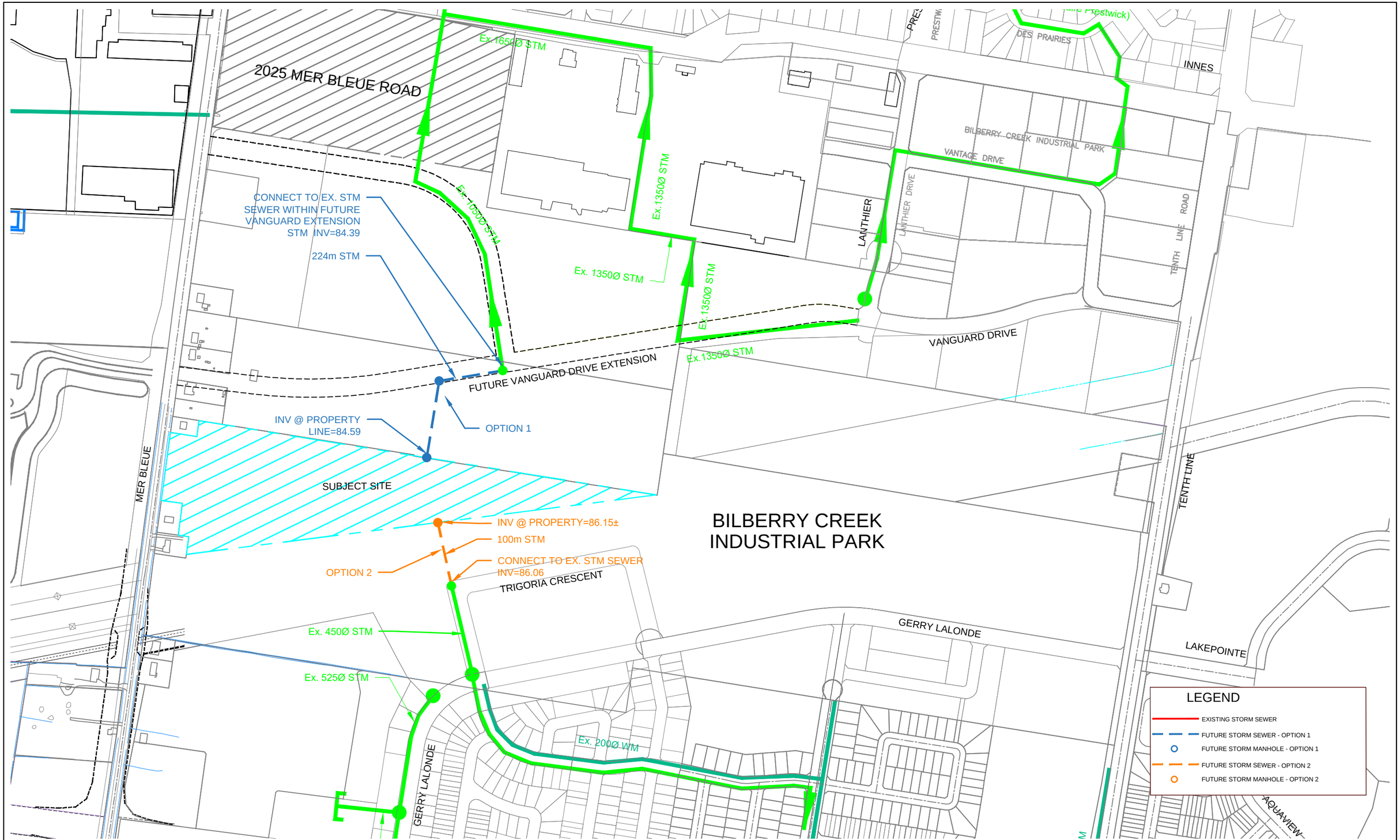
TENTH LINE ROAD PUMP STATION

OVERALL SANITARY DRAINAGE AREA PLAN

PROJECT No. :	12-609
SCALE:	1:5000
DATE:	MAY 2015
Fig No.	1

APPENDIX D

Stormwater Management



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CONCEPTUAL STORM SERVICING
BLACKSHEEP DEVELOPMENTS - MER BLEUE

PROJ NO.:	17-934
DRAWN BY:	AJG
DATE:	2017-11-28
SCALE:	NTS
FIGURE NO.:	FIG-2

z:\projects\17-934_blacksheep_mer-bleue\b_design\b2_drawings\b2-5_sketches and figures\2017-11-28_servicing-options-fig\2017-11-28_934_ex_servicing_dsel.dwg

Estimated Peak Stormwater Flow Rate
City of Ottawa Sewer Design Guidelines, 2012

Existing Drainage Charateristics From Internal Site

Area	5.3500	ha
C	0.20	Rational Method runoff coefficient
L	52.663	m
Up Elev	88.65	m
Dn Elev	88.23	m
Slope	0.8	%
Tc	23.0	min

1) Time of Concentration per Federal Aviation Administration

$$t_c = \frac{1.8(1.1-C)L^{0.5}}{S^{0.333}}$$

tc, in minutes
C, rational method coefficient, (-)
L, length in ft
S, average watershed slope in %

Stormwater - Proposed Development
City of Ottawa Sewer Design Guidelines, 2004

Target Flow Rate

Area 5.35 ha
Q 50.0 L/s/ha
Q 267.5 L/s

Estimated Post Development Peak Flow from Unattenuated Areas

Total Area 0.54 ha
C 0.65 Rational Method runoff coefficient

	5-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual}* (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
20.0	70.3	67.9	67.9	0.0	0.0	120.0	144.8	144.8	0.0	0.0

Note:
C value for the 100-year storm is increased by 25%, to a maximum of 1.0 per Ottawa Sewer Design Guidelines (5.4.5.2.1)

Estimated Post Development Peak Flow from Attenuated Areas

Total Area 4.82 ha
C 0.70 Rational Method runoff coefficient

	5-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
20	70.3	657.7	57.5	600.3	720.3	120.0	1403.8	122.7	1281.1	1537.4
25	60.9	570.1	57.5	512.6	768.9	103.8	1215.3	122.7	1092.7	1639.0
30	53.9	504.9	57.6	447.3	805.1	91.9	1075.1	122.7	952.5	1714.5
35	48.5	454.2	57.7	396.6	832.8	82.6	966.4	122.7	843.8	1771.9
40	44.2	413.7	57.7	356.0	854.3	75.1	879.4	122.7	756.8	1816.3
45	40.6	380.4	57.7	322.6	871.1	69.1	808.1	122.7	685.4	1850.7
50	37.7	352.5	57.8	294.8	884.3	64.0	748.5	122.7	625.8	1877.4
55	35.1	328.8	57.8	271.0	894.4	59.6	697.8	122.7	575.1	1897.9
60	32.9	308.4	57.8	250.6	902.1	55.9	654.1	122.7	531.5	1913.3
65	31.0	290.6	57.9	232.8	907.9	52.6	616.1	122.7	493.5	1924.5
70	29.4	275.0	57.9	217.1	911.8	49.8	582.7	122.7	460.0	1932.1
75	27.9	261.1	57.9	203.2	914.4	47.3	553.0	122.7	430.4	1936.7
80	26.6	248.7	57.9	190.8	915.6	45.0	526.5	122.7	403.9	1938.6
85	25.4	237.5	58.0	179.6	915.7	43.0	502.7	122.7	380.0	1938.2
90	24.3	227.4	58.0	169.4	914.9	41.1	481.1	122.7	358.5	1935.7
95	23.3	218.2	58.0	160.2	913.2	39.4	461.5	122.7	338.8	1931.4
100	22.4	209.8	58.0	151.8	910.6	37.9	443.6	122.7	320.9	1925.5
105	21.6	202.1	58.0	144.0	907.4	36.5	427.1	122.7	304.5	1918.2
110	20.8	194.9	58.0	136.9	903.6	35.2	412.0	122.7	289.3	1909.5
115	20.1	188.4	58.1	130.3	899.1	34.0	398.0	122.7	275.3	1899.6
120	19.5	182.3	58.1	124.2	894.2	32.9	385.0	122.7	262.3	1888.6

Note:
C value for the 100-year storm is increased by 25%, to a maximum of 1.0 per Ottawa Sewer Design Guidelines (5.4.5.2.1)

5-year $Q_{attenuated}$ **57.96 L/s** **100-year $Q_{attenuated}$** **122.66 L/s**
5-year Max. Storage Required **915.7 m^3** **100-year Max. Storage Required** **1938.6 m^3**

Summary of Release Rates and Storage Volumes

Control Area	5-Year Release Rate (L/s)	5-Year Storage (m^3)	100-Year Release Rate (L/s)	100-Year Storage (m^3)
Unattenuated Areas	67.9	0.0	144.8	0.0
Attenutated Areas	58.0	915.7	122.7	1938.6
Total	**125.8**	**915.7**	**267.5**	**1938.6**

Stormwater - Proposed Development
City of Ottawa Sewer Design Guidelines, 2012

Target Flow Rate

Area 5.35 ha
C 0.20 Rational Method runoff coefficient
t_c 23.0 min

5-year
Q 56.5 L/s

Estimated Post Development Peak Flow from Unattenuated Areas

Total Area 0.21 ha
C 0.65 Rational Method runoff coefficient

	5-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
23.0	64.3	24.8	24.8	0.0	0.0	109.7	53.0	53.0	0.0	0.0

Note:
C value for the 100-year storm is increased by 25%, to a maximum of 1.0 per Ottawa Sewer Design Guidelines (5.4.5.2.1)

Estimated Post Development Peak Flow from Attenuated Areas

Total Area 5.14 ha
C 0.70 Rational Method runoff coefficient

	5-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
10	104.2	1040.5	1.6	1038.9	623.3	178.6	2229.0	3.5	2225.5	1335.3
15	83.6	834.5	1.6	832.8	749.5	142.9	1783.8	3.5	1780.3	1602.2
20	70.3	701.6	1.7	699.9	839.9	120.0	1497.4	3.5	1493.9	1792.6
25	60.9	608.1	1.7	606.5	909.7	103.8	1296.4	3.5	1292.8	1939.2
30	53.9	538.6	1.7	536.9	966.4	91.9	1146.8	3.5	1143.3	2057.9
35	48.5	484.5	1.7	482.9	1014.0	82.6	1030.9	3.5	1027.3	2157.4
40	44.2	441.3	1.7	439.6	1055.0	75.1	938.1	3.5	934.5	2242.9
45	40.6	405.7	1.7	404.1	1091.0	69.1	862.0	3.5	858.5	2317.8
50	37.7	376.0	1.7	374.4	1123.1	64.0	798.4	3.5	794.8	2384.5
55	35.1	350.8	1.7	349.1	1152.0	59.6	744.3	3.5	740.8	2444.6
60	32.9	329.0	1.7	327.3	1178.4	55.9	697.8	3.5	694.2	2499.2
65	31.0	310.0	1.7	308.4	1202.6	52.6	657.2	3.5	653.7	2549.3
70	29.4	293.3	1.7	291.7	1225.0	49.8	621.5	3.5	618.0	2595.7
75	27.9	278.5	1.7	276.8	1245.8	47.3	589.9	3.5	586.4	2638.7
80	26.6	265.3	1.7	263.6	1265.3	45.0	561.6	3.5	558.1	2678.9
85	25.4	253.3	1.7	251.7	1283.6	43.0	536.2	3.5	532.7	2716.7
90	24.3	242.6	1.7	240.9	1300.8	41.1	513.2	3.5	509.7	2752.3
95	23.3	232.7	1.7	231.1	1317.1	39.4	492.3	3.5	488.8	2785.9
100	22.4	223.8	1.7	222.1	1332.6	37.9	473.2	3.5	469.6	2817.8
105	21.6	215.5	1.7	213.9	1347.4	36.5	455.6	3.5	452.1	2848.1
110	20.8	207.9	1.7	206.3	1361.4	35.2	439.4	3.5	435.9	2877.1

Note:
C value for the 100-year storm is increased by 25%, to a maximum of 1.0 per Ottawa Sewer Design Guidelines (5.4.5.2.1)

5-year $Q_{attenuated}$ 1.67 L/s **100-year $Q_{attenuated}$ 3.53 L/s**
5-year Max. Storage Required 1361.4 m^3 **100-year Max. Storage Required 2877.1 m^3**

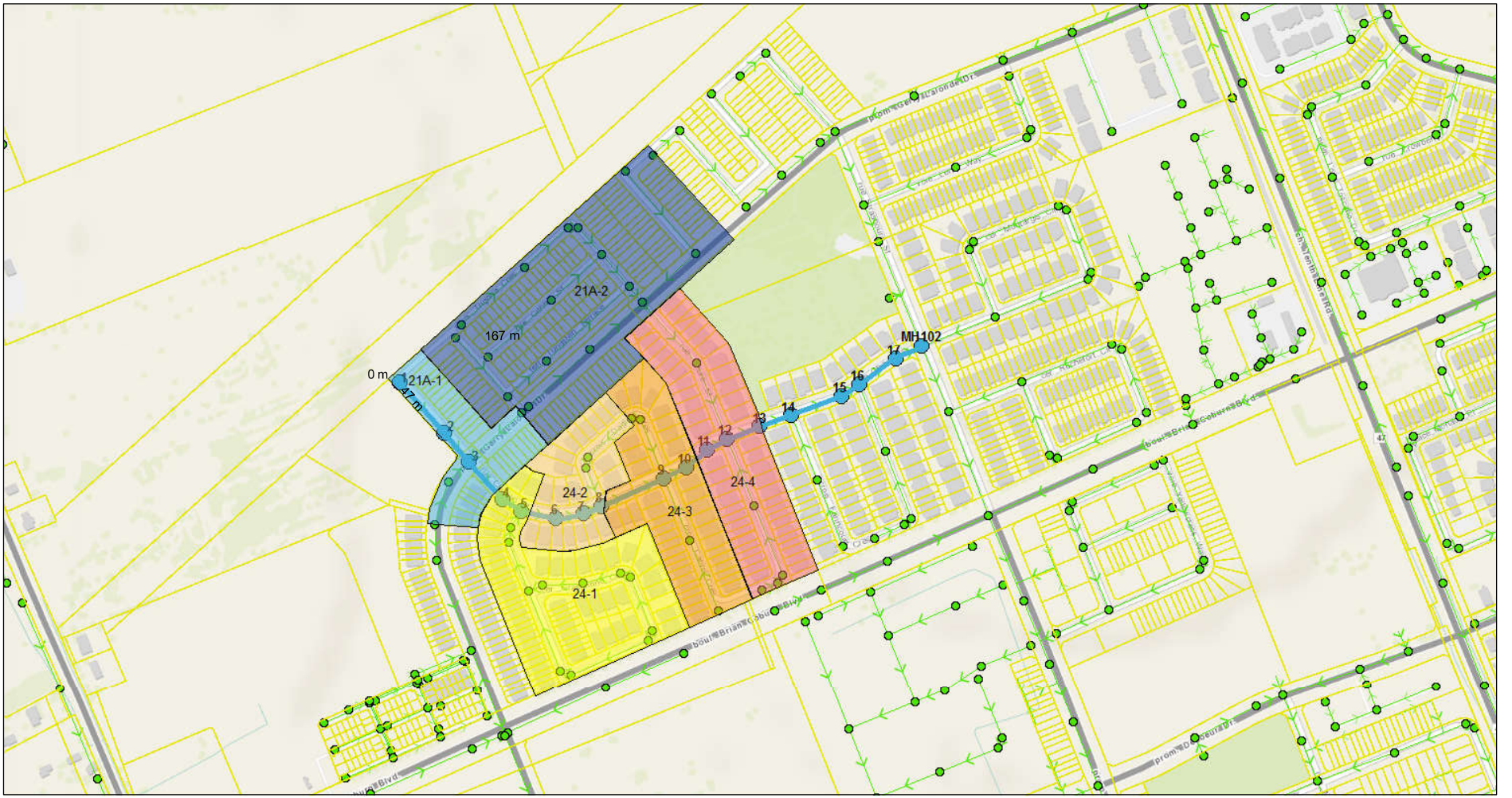
Summary of Release Rates and Storage Volumes

Control Area	5-Year Release Rate (L/s)	5-Year Storage (m^3)	100-Year Release Rate (L/s)	100-Year Storage (m^3)
Unattenuated Areas	24.84	0.0	52.97	0.0
Attenutated Areas	1.67	1361.4	3.53	2877.1
Total	**26.5**	**1361.44**	**56.50**	**2877.1**

											Sewer Data											
Street	**Area ID**	**Up**	**Down**	**Area**	**C**	**Indiv AxC**	**Acc AxC**	**T_C**	**I**	**Q†**	**DIA**	**Slope**	**Length**	**$A_{hydraulic}$**	**R**	**Velocity**	**Qcap**	**Time Flow**	**Q / Q full**	**Qresidual**	**US Inv**	**DS Inv**
				(ha)	**(-)**			**(min)**	**(mm/hr)**	**(L/s)**	**(mm)**	**(%)**	**(m)**	**(m^2)**	**(m)**	**(m/s)**	**(L/s)**	**(min)**	**(-)**	**(L/s)**		
Trigoria		MH1	MH2			0.00	0.00	10.0	104.2	0.0	450	0.33	101.74	0.159	0.113	1.04	164.8	1.6	0.00	164.8	85.98	85.64
Chinian		MH2	MH3			0.00	0.00	11.6	96.3	0.0	600	0.44	56.89	0.283	0.150	1.44	407.0	0.7	0.00	407.0	85.64	85.39
	21A-1	MH3	MH4	1.31	0.59	0.77	0.77	12.3	93.5	200.6	900	0.10	78.43	0.636	0.225	0.91	578.2	1.4	0.35	377.5	85.39	85.31
		MH4	MH5			0.00	0.77	13.7	87.9	188.7	825	0.62	34.08	0.535	0.206	2.11	1126.8	0.3	0.17	938.1	85.31	85.1
	24-1	MH5	MH6	2.87	0.57	1.64	2.41	14.0	86.9	581.6	975	0.11	53.82	0.747	0.244	1.00	748.3	0.9	0.78	166.6	85.1	85.04
		MH6	MH7			0.00	2.41	14.9	83.9	561.3	975	0.14	43.08	0.747	0.244	1.12	836.4	0.6	0.67	275.0	85.04	84.98
		MH7	MH8			0.00	2.41	15.5	81.9	547.7	975	0.17	29.4	0.747	0.244	1.24	924.2	0.4	0.59	376.5	84.98	84.93
	24-2	MH8	MH9	1.25	0.57	0.71	3.12	15.9	80.7	699.3	975	0.11	105.5	0.747	0.244	1.01	755.8	1.7	0.93	56.5	84.93	84.81
	24-3	MH9	MH10	2.15	0.57	1.23	4.35	17.7	75.8	915.4	975	0.32	37.52	0.747	0.244	1.70	1267.4	0.4	0.72	352.0	84.81	84.69
		MH10	MH11			0.00	4.35	18.0	74.9	904.0	1050	0.14	42.39	0.866	0.263	1.19	1027.4	0.6	0.88	123.4	84.69	84.63
		MH11	MH12			0.00	4.35	18.6	73.4	886.2	1050	0.17	35.14	0.866	0.263	1.30	1128.4	0.4	0.79	242.2	84.63	84.57
	21A-2	MH12		4.86	0.59	2.87	7.21															
	24-4		MH13	2.56	0.57	1.46	8.67	19.1	72.3	1742.5	1350	0.46	53.77	1.431	0.338	2.54	3639.4	0.4	0.48	1896.9	84.57	84.32
		MH13	MH14			0.00	8.67	19.4	71.5	1722.9	1350	0.18	51.36	1.431	0.338	1.56	2234.3	0.5	0.77	511.4	84.32	84.23
		MH14	MH15			0.00	8.67	20.0	70.3	1693.3	1350	0.12	81.81	1.431	0.338	1.30	1866.1	1.0	0.91	172.8	84.23	84.13
		MH15	MH16			0.00	8.67	21.0	68.1	1639.9	1350	0.12	32.41	1.431	0.338	1.31	1875.1	0.4	0.87	235.2	84.13	84.09
		MH16	MH17			0.00	8.67	21.4	67.2	1619.8	1350	0.10	69.34	1.431	0.338	1.18	1695.8	1.0	0.96	76.0	84.09	84.02
	**	MH17	MH102	3.32	0.57	1.89	10.57	22.4	65.4	1918.1	1350	1.90	43.78	1.431	0.338	5.13	7349.0	0.1	0.26	5431.0	84.02	83.19
								22.6														
Gerry Lalonde	22A	MH602	MH605	2.030	0.76	1.54	1.54	10.0	104.2	173.0	600	0.23	117.44	0.283	0.150	1.04	294.4	1.9	0.59	121.4	84.9	84.63
	40	MH605		4.350	0.76	3.31	4.85															
	TW3			1.450	0.20	0.29	5.14															
	HE3		MH607	3.610	0.20	0.72	5.86	11.9	95.2	1017.0	1350	0.07	114.07	1.431	0.338	0.99	1413.5	1.9	0.72	396.5	84.63	84.55
	41	MH607	MH608	2.830	0.76	2.15	8.01	13.8	87.6	419.0	1350	0.09	146.6	1.431	0.338	1.11	1589.4	2.2	0.26	1170.4	84.55	84.42
		MH608	MH612B			0.00	8.01	16.0	80.4	419.0	1350	0.08	133.94	1.431	0.338	1.07	1529.6	2.1	0.27	1110.6	84.42	84.31
	42	MH612B		1.080	0.62	0.67	8.68															
	43			1.490	0.62	0.92	9.61															
	TW2			2.800	0.20	0.56	10.17															
Strasbourg	HE2		MH617	6.400	0.20	1.28	11.45	18.1	74.7	1002.0	1800	0.50	120.42	2.545	0.450	3.19	8113.8	0.6	0.12	7111.8	84.31	83.71
	22B	MH617	MH103	3.620	0.59	2.14	13.58	18.7	73.2	308.0	1800	0.07	60.6	2.545	0.450	1.16	2953.2	0.9	0.10	2645.2	83.71	83.67
	23	MH103	MH102	3.160	0.20	0.63	14.21	19.6	71.2	267.0	1800	0.20	174.02	2.545	0.450	2.04	5199.2	1.4	0.05	4932.2	83.67	0
								21.0														
	25	MH102		4.850	0.80	3.88	18.09															
	11			11.120	0.57	6.34	24.43															
	21D		MH101	3.280	0.59	1.94	36.93	22.6	65.1	2782.0	2100	0.20	108.92	3.464	0.525	2.26	7842.6	0.8	0.35	5060.6	83.19	83.12
		MH101	MH100			0.00	36.93	23.4	63.6	2782.0	2100	0.17	170.59	3.464	0.525	2.06	7149.0	1.4	0.39	4367.0	83.12	82.83
	BCB-E	MH100		3.020	0.70	2.11	39.05															
Aubepines	S1		MH200	0.680	0.76	0.52	39.56	24.7	61.3	867.0	2250	0.06	140.71	3.976	0.563	1.25	4969.5	1.9	0.17	4102.5	82.83	82.75
		MH200	MH201			0.00	39.56	26.6	58.4	867.0	2250	0.10	104.84	3.976	0.563	1.70	6750.9	1.0	0.13	5883.9	82.75	82.64
	52	MH201		3.260	0.63	2.05	41.62															
	51			1.530	0.76	1.16	42.78															
	S2		MH202	0.360	0.66	0.24	43.02	27.6	57.0	1131.0	2250	0.02	96.5	3.976	0.563	0.75	3000.4	2.1	0.38	1869.4	82.64	82.62
		MH202	MH203			0.00	43.02	29.8	54.2	1131.0	2250	0.40	104.85	3.976	0.563	3.32	13190.7	0.5	0.09	12059.7	82.62	82.2
	56	MH203		2.210	0.66	1.46	44.48															
	58			2.660	0.71	1.89	46.36															
	S3		MH204	0.240	0.66	0.16	46.52	30.3	53.6	1123.0	2250	0.08	124.98	3.976	0.563	1.48	5895.3	1.4	0.19	4772.3	82.2	82.1
	57	MH204		2.010	0.41	0.82	47.35															
	S4		MH205	0.440	0.66	0.29	47.64	31.7	51.9	538.0	2250	0.07	120.29	3.976	0.563	1.43	5700.8	1.4	0.09	5162.8	82.1	82.01
	59	MH205		3.860	0.61	2.35	49.70															
	S5		MH206	0.620	0.62	0.38	50.09	33.1	50.4	985.0	2250	0.20	107.51	3.976	0.563	2.32	9211.1	0.8	0.11	8226.1	82.01	81.8
	61	MH206		2.270	0.63	1.43	51.52															
	62			11.320	0.68	7.70	59.21															
	53			4.780	0.66	3.15	62.37															
	S6		POND	0.290	0.62	0.18	62.55	33.9	49.6	4094.0	2700	0.54	67.13	5.726	0.675	4.33	24818.2	0.3	0.16	20724.2	81.8	81.44
								34.1														

† Peak Flow rates provided by Table 4.4 of the Avalon West (Neighbourhood 5) Stormwater Management Facility Design report
*Please note that contemplated flows from the site would outlet to MH1
**Please note that a section of Area 25 has been applied to MH17

Chinian Street Storm Analysis



November 30, 2017

1:5,733

- Property Parcels
- Storm Manholes / Regards de conduites d'eaux pluviales

Storm Pipes / Conduites d'eaux pluviales

- Private / Branchement privé
- Public / Branchement public
- Combined Manholes / Regards d'égout unitaire

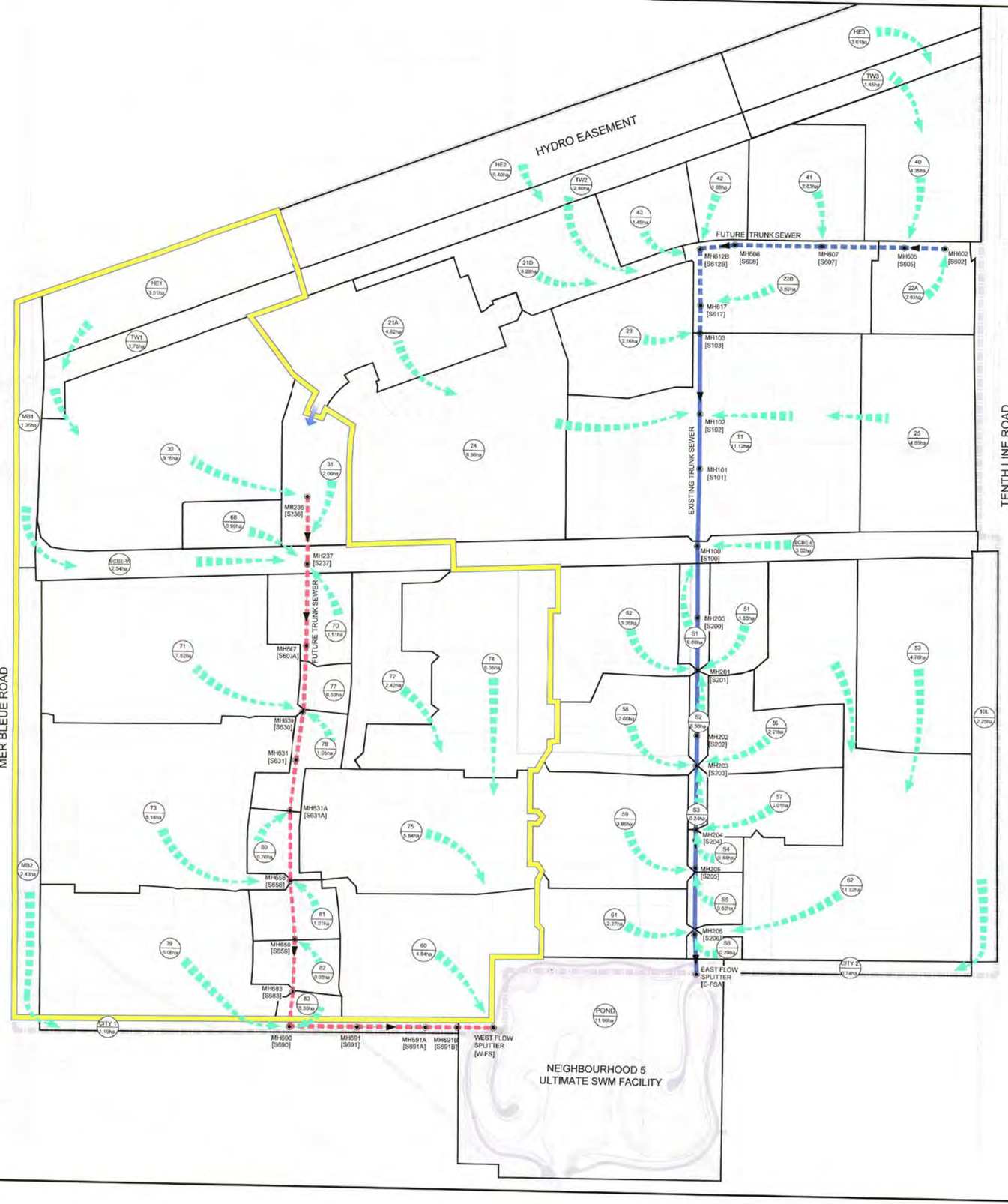
Combined Pipes / Conduites d'égout unitaire

- Private / Branchement privé
- Public / Branchement public

0 0.05 0.1 0.2 mi

0 0.1 0.2 0.4 km

City of Ottawa



LEGEND:

- NEIGHBOURHOOD 5 BOUNDARY
- EXISTING EASTERN TRUNK SEWER
- FUTURE EASTERN TRUNK SEWER
- FUTURE WESTERN TRUNK SEWER
- DRAINAGE BOUNDARIES
- WESTERN TRUNK DRAINAGE BOUNDARY
- AREA CONTRIBUTED MAJOR FLOW TO WESTERN TRUNK (MINOR TO EASTERN TRUNK)
- MAJOR FLOW
- 70 / 1.51ha — AREA ID / AREA (ha)
- MH630 — TRUNK STORM SEWER MANHOLE
- [S607] — XPSWMM MANHOLE ID
- CONNECTIVITY OF SUBCATCHMENT MANHOLE

NOTE:

FOR ADDITIONAL DETAILS REFER TO THE SWMHYMO SCHEMATIC IN FIGURE 5

No.	REVISIONS	By	Date
2.	REVISED AS PER CITY COMMENTS	P.S.	12/08/14
1.	ISSUED TO CITY	P.S.	12/05/30

IBI GROUP
333 Preston Street
Tower 1, Suite 400
Ottawa, Ontario
Canada K1S 5N4
Tel (613)225-1311
FAX (613)225-9868

Project Title
AVALON WEST (N5)
STORMWATER MANAGEMENT
FACILITY DESIGN

Drawing Title
AVALON WEST
DRAINAGE AREA PLAN

Scale
1:3000

Design	Date
R.B.	FEB. 2012
Drawn	Checked
S.V.	P.S.
Project No.	Drawing No.
30113	FIGURE 4

Table 4.4 Summary of Minor System Capture
(SWMHYMO Output 30113-D5.dat/out)

Drainage Area		Weighted Runoff Coefficient	Flow (l/s)			Manhole (XPSWMM ID)	Peak Flow from Saved Hydrograph (SWMHYMO) – 3 hour Chicago (l/s)	
ID	Area (ha)		220 l/s/ha	Rational Method 10 Year 10 Min	Other Restriction (refer to Table 4.2)*		5 Year†	100 year†
Eastern Trunk Storm Sewer								
HE3	3.61	n/a	0	0	30	MH 605 (S605)	1015	1017
TW3	1.45	0.70	0	344.7	0			
40	4.35	0.76	0	0	645.7			
41	2.83	0.76	0	0	420.1	MH 607 (S607)	419	419
HE2	6.40	n/a	0	0	30	MH 612B (S612B)	965	1002
TW2	2.80	0.70	0	665.5	0			
43	1.49	0.62	0	0	180.4			
42	1.08	0.62	0	0	130.8			
22A	2.03	0.76	0	0	172.6	MH 602 (S602)	172	173
22B	3.62	0.59	0	0	307.7	MH 617 (S617)	306	308
23	3.16	n/a	0	0	268	MH 103 (S103)	106	267
21A	4.62	0.59	0	0	392.7	MH 102 (S102)	2778	2782
21D	3.28	0.59	0	0	278.8			
24	8.86	0.57	0	0	753.1			
25	4.85	0.80	0	0	412.3			
11	11.12	0.57	0	0	945.2			
BCB-E	3.02	0.70	0	717.8	0	MH 100 (S100)	595	867
S1	0.68	0.76	149.6	0	0			
51	1.53	0.76	335.5	0	0	MH 201 (S201)	807	1131
52	3.26	0.63	717.2	0	0			
S2	0.36	0.66	79.2	0	0			
56	2.21	0.66	486.2	0	0	MH 203 (S203)	797	1123
58	2.66	0.71	585.2	0	0			
S3	0.24	0.66	52.8	0	0			
57	2.01	0.41	442.2	0	0	MH 204 (S204)	222	538
S4	0.44	0.66	96.8	0	0			
59	3.86	0.61	849.2	0	0	MH 205 (S205)	577	985
S5	0.62	0.62	136.4	0	0			
61	2.27	0.63	499.4	0	0	MH 206 (S206)	2391	4094
62	11.32	0.68	2489.3	0	0			
53	4.78	0.66	1051.6	0	0			
S6	0.29	0.62	63.8	0	0			
10L	2.25	0.70	0	534.8	0	E-FS	369	535
Western Trunk Storm Sewer								
31	2.06	0.59	0	0	353.2	236 (S236)	1442	1767
HE1	3.51	0.27	0	0	220.1			
TW1	1.75	0.70	0	416.0	0			
30	9.16	0.66	0	0	778.6			
68	0.99	0.76	0	0	217.9	237	1033	1474

Drainage Area		Weighted Runoff Coefficient	Flow (l/s)			Manhole (XPSWMM ID)	Peak Flow from Saved Hydrograph (SWMHYMO) – 3 hour Chicago (l/s)	
ID	Area (ha)		220 l/s/ha	Rational Method 10 Year 10 Min	Other Restriction (refer to Table 4.2)*		5 Year†	100 year†
MB1	1.35	0.70	0	320.9	0	(S237)		
BCB-W	2.54	0.70	0	603.7	0			
70	1.51	0.66	332.2	0	0			
71	7.08	0.69	1654.4	0	0	630 (S630)	1191	1874
78	1.05	0.66	231.0	0	0			
77	0.53	0.65	116.6	0	0	607 (S607A)	92	167
80	0.76	0.66	167.2	0	0	631A (S631A)	128	167
73	8.14	0.63	1790.8	0	0	658 (S658)	1119	2005
81	1.01	0.63	222.2	0	0			
82	0.93	0.62	204.6	0	0	659 (S659)	146	204
MB2	2.45	0.70	0	582.3	0	690 (S690)	1068	1990
79	6.08	0.59	1337.6	0	0			
83	0.35	0.62	77.0	0	0			
72	2.42	0.68	531.9	0	0	770 (S770)	2388	4272
74	6.35	0.66	1397.0	0	0			
75	5.84	0.44	1284.8	0	0			
60	4.84	0.62	1064.8	0	0			

Note: * Refer to **Table 4.2** for reference to other restriction rates.

† Results from the 5 and 100 year 3 hour Chicago evaluation from 30113-D5.dat/out as presented in **Appendix B**.

The inlet control restriction was set to match flow as indicated in **Table 4.4.** The results of the SWMHYMO evaluation indicate that when applying the inlet control restriction and storage requirements as indicated in **Table 4.4**, there is cascading flow from existing areas and some future areas north of BCB. The future development areas south of BCB are self-contained with some instances where major flow is conveyed via some drainage areas to the stormwater facility. It is anticipated that detail evaluation of the major system for the future development will be completed as part of detailed subdivision design submission. The evaluation should account for the conveyance of major flow from the existing upstream areas. As part of the detailed evaluation of the major system, the total ponding in low points is not to exceed a depth of 0.3 m under static or dynamic conditions. The surface ponding design has to ensure that emergency overflow paths are maintained and flows are conveyed safely to the end-of-pipe stormwater management facility. A safety board of 0.3 m above the emergency overflow high point and lowest house opening should be provided.

Major System

Based on the hydrological modeling undertaken for the entire site on a semi-lumped basis, there are some instances of cascading major flow from already constructed areas north of BCB and from arterial roadways within the subdivision area. The following table summarizes the estimated major flow within the site based on semi-lumped areas. It should be noted that as part of detailed evaluation of the subdivision areas, the total ponding in low points is not to exceed a depth of 0.3 m under static or dynamic conditions. The surface ponding design has to ensure that emergency overflow paths are maintained and flows are conveyed safely to the

BILBERRY CREEK

WILDFLOWER OUTLET

SUBJECT PROPERTY

FUTURE INNES SNOW DISPOSAL FACILITY

N5

0 50 150 250m

- NEIGHBOURHOOD BOUNDARY
- EUC AREA BOUNDARY
- EXISTING STORM SEWER
- FUTURE STORM SEWER
- FUTURE MELTWATER FORCEMAIN
- STORM DRAINAGE AREA
- 900 STORM SEWER SIZE
- EXISTING SWM POND
- FUTURE SWM POND
- 101 MANHOLE AND NUMBER
- COLLECTOR SEWER FLOW DIRECTION
- LOCAL SEWER FLOW DIRECTION
- FUTURE MELTWATER PUMP STATION
- FUTURE DITCH REGRADING

STORM COLLECTOR SEWERS AND DRAINAGE AREAS

FIRST SUBMISSION:	FEB., 2004	STM 4
REVISION No.: 4	OCT., 2005	

DRAWINGS / FIGURES

VANGUARD ROAD EXTENSION

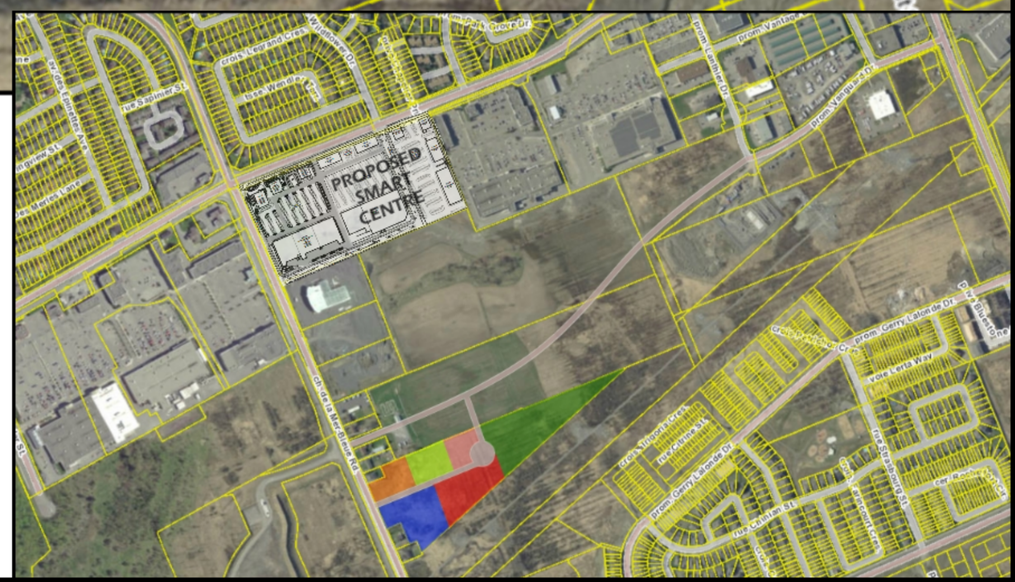
MER BLEUE ROAD

rue Nacarat

hci. Holzman Consultants Inc.
Land Development Consultants

"Fortitude" by Blacksheep Development
CDP Concept 02
July 26, 2017

- Retail Parcel A
- Retail Parcel B
- Retired Living Residence
- "Tumblers" Building
- Sports Complex
- Residential Parcel

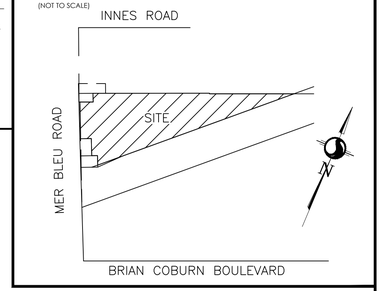


28 November 2017 10:44 AM

SUBJECT TO THE CONDITIONS, IF ANY, SET FORTH IN OUR LETTER DATED _____ 20____
THIS DRAFT PLAN IS APPROVED BY THE CITY OF OTTAWA UNDER SECTION 51 OF THE PLANNING ACT.
THIS____DAY OF_____,2017.

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

KEY PLAN
(NOT TO SCALE)



DRAFT PLAN OF SUBDIVISION

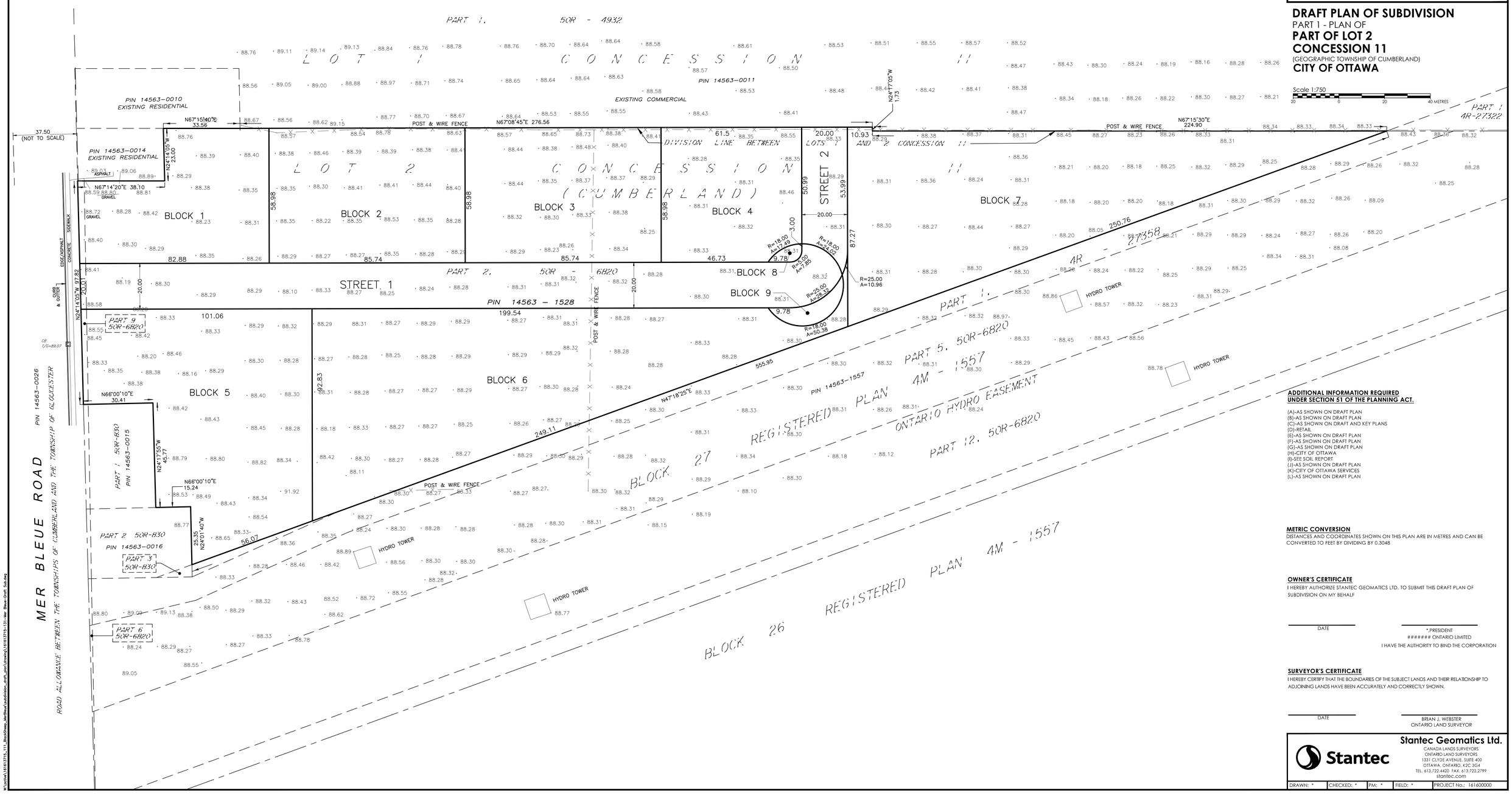
PART 1 - PLAN OF

PART OF LOT 2
CONCESSION 11

(GEOGRAPHIC TOWNSHIP OF CUMBERLAND)

CITY OF OTTAWA

Scale 1:750
20 0 20 40 METRES



ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51 OF THE PLANNING ACT.

(A)-AS SHOWN ON DRAFT PLAN
(B)-AS SHOWN ON DRAFT PLAN
(C)-AS SHOWN ON DRAFT AND KEY PLANS
(D)-RETAIL
(E)-AS SHOWN ON DRAFT PLAN
(F)-AS SHOWN ON DRAFT PLAN
(G)-AS SHOWN ON DRAFT PLAN
(H)-CITY OF OTTAWA
(I)-SEE SOIL REPORT
(J)-AS SHOWN ON DRAFT PLAN
(K)-CITY OF OTTAWA SERVICES
(L)-AS SHOWN ON DRAFT PLAN

METRIC CONVERSION

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

OWNER'S CERTIFICATE

I HEREBY AUTHORIZE STANTEC GEOMATICS LTD. TO SUBMIT THIS DRAFT PLAN OF SUBDIVISION ON MY BEHALF

DATE

*.PRESIDENT
####### ONTARIO LIMITED
I HAVE THE AUTHORITY TO BIND THE CORPORATION

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE SUBJECT LANDS AND THEIR RELATIONSHIP TO ADJOINING LANDS HAVE BEEN ACCURATELY AND CORRECTLY SHOWN.

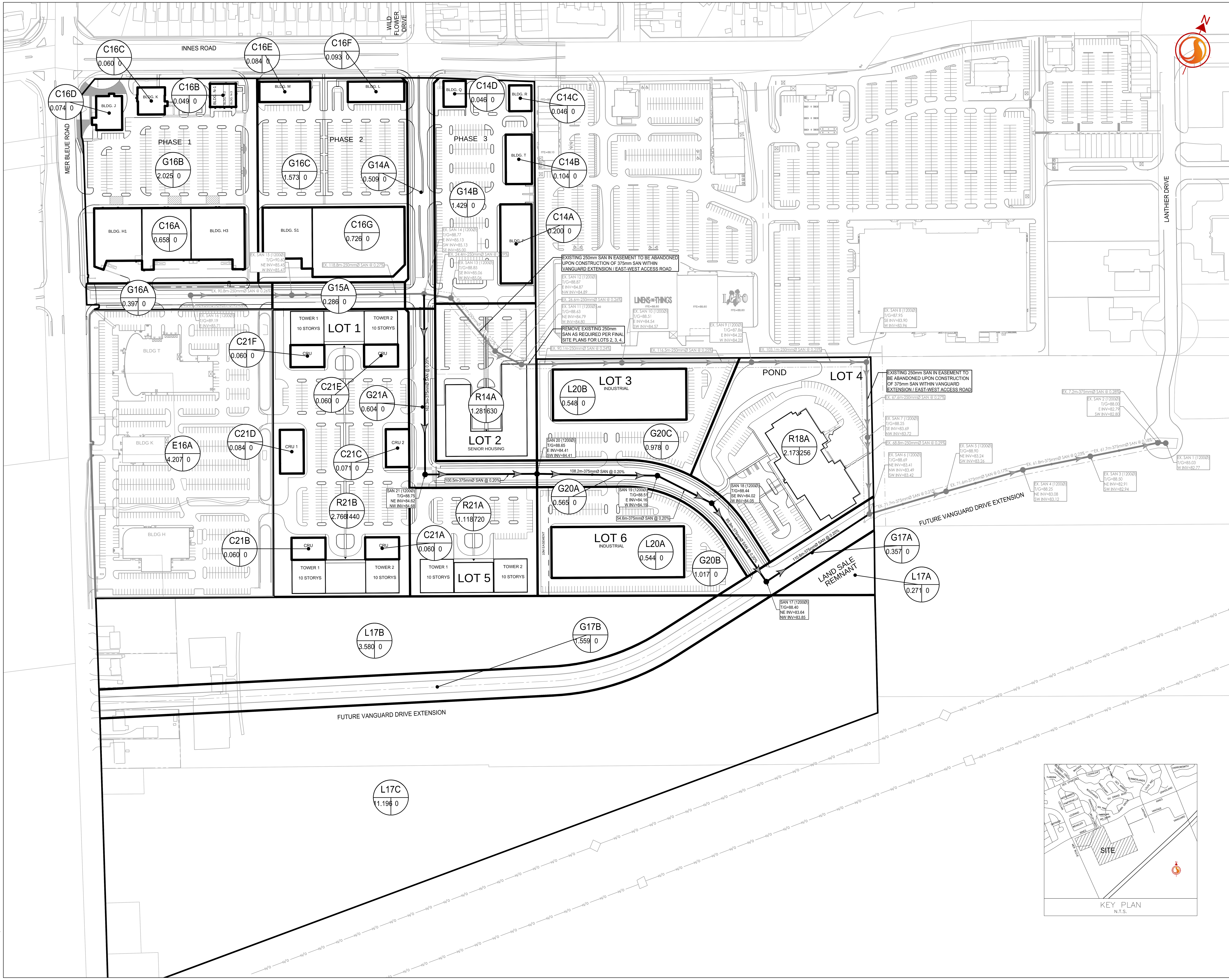
DATE

BRIAN J. WEBSTER
ONTARIO LAND SURVEYOR

Stantec Geomatics Ltd.
CANADA LANDS SURVEYORS
ONTARIO LAND SURVEYORS
1331 CLYDE AVENUE, SUITE 400
OTTAWA, ONTARIO, K2C 3G4
TEL. 613.722.4420 FAX. 613.722.2799
stantec.com

DRAWN: *	CHECKED: *	PM: *	FIELD: *	PROJECT No.: 161600000

W:\active\161613715_111_BlockDivns_MerBleu\subdivision_draft_plan\dynamo\161613715-131-Mer_Bleue-Draft_Sub.dwg



Stantec

Stantec Consulting Ltd.
400 - 1331 Clyde Avenue
Ottawa ON
Tel. 613.722.4420
www.stantec.com

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Legend

- PROPOSED TRUNK SANITARY SEWER
- EXISTING TRUNK SANITARY SEWER
- SANITARY DRAINAGE BOUNDARY
- EXISTING SANITARY DRAINAGE BOUNDARY

G17A 0.50 50

- SANITARY DRAINAGE AREA ID
  - G = GREEN SPACE OR INFILTRATION
  - C = COMMERCIAL AREA
  - L = LIGHT INDUSTRIAL AREA
  - R = RESIDENTIAL AREA
- POPULATION
- SANITARY DRAINAGE AREA (ha)

Notes

1	ISSUED FOR REZONING APPLICATION	DT	DT	16.12.16
Revision		By	Appd.	YY.MM.DD

File Name: 160401242-D8.DWG	DT	PM	DT	16.12.07
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project

SMARTREIT (ORLEANS II) INC. AND MER BLEUE SHOPPING CENTRES LTD.

ORLEANS II DEVELOPMENT REZONING

Ottawa, ON

Title

OVERALL SANITARY SEWER LAYOUT

Project No. 160401242

Scale 1:1500 (0, 15, 45, 75m)

Drawing No.	Sheet	Revision
SA-1	1 of 4	1

ORIGINAL SHEET - ARCH D