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FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

FOR THE

KENNEDY LANDS – 3432 GREENBANK ROAD

MINTO COMMUNITIES INC.

CITY OF OTTAWA

PROJECT NO.: 20-1182

AUGUST 2023
3RD SUBMISSION
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FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT FOR THE KENNEDY LANDS – 3432 GREENBANK ROAD

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1.0 INTRODUCTION

This Functional Servicing and Stormwater Management Report (FSR) is submitted in support of the Kennedy Lands Plan of Subdivision and Zoning Amendment planning applications on behalf of Minto Communities Inc.

The Kennedy Lands are located at 3432 Greenbank Road within the Barrhaven South Community in the City of Ottawa. The approximately 23 ha property is situated on the south side of the Jock River, north of Mattamy's Half Moon Bay Subdivision as shown on ***Figure 1***. The property is bisected by the Future Greenbank Road alignment – with the majority of the property to the north of the Future Greenbank Road alignment, and a small area to the south/east of the future arterial road that is planned to contain the stormwater management pond expansion and a future development to be designed by others.

The Kennedy Lands will be comprised of the following, as depicted on ***Figure 2,*** and presented in **Table 1.1.** A copy of the Minto Kennedy Lands Concept Plan dated July June 28, 2023 is enclosed in ***Appendix A***.

Table 1.1: Development Statistics for the Kennedy Lands

Land Use	Total Area (ha)	Projected Residential Units		Residential Population per Unit*	Projected Population*
Residential and ROWs	15.81	Singles	105	3.4	351
		Executive Towns	266	2.7	708
		Avenue Towns	158	2.7	427
Open Space and Park	1.70				
Future Development Land by Others (SE of Future Greenbank Road)	2.26				
Stormwater Management Pond Block	0.69				
Greenbank Road	2.62				
TOTAL	**23.08**		**529**		**1503**

**Note: Population projections may differ from population estimates used in other studies. Population projection and residential population per unit values are based on City of Ottawa and MECP design criteria for servicing demand calculations.*

The subject property is within the study area of the ***Barrhaven South Master Servicing Study*** by Stantec dated June 2007 (MSS) and the ***Barrhaven South Master Servicing Study Addendum*** by Stantec dated October 12, 2017 (Stantec MSS Addendum), which

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is considered to best represent current servicing for the subject property and adjacent developments.

This FSR is provided to demonstrate conformance with the design criteria of the City of Ottawa, background studies, including the ***MSS***, ***Stantec MSS Addendum***, and general industry practice.

1.1 Existing Conditions

The subject site is currently vacant and grass covered across the majority of the site, consisting of agricultural fields. The site is relatively flat with a slight slope upward towards the center of the site. The existing elevations within the proposed development area generally range between 92.0 m to 94.0 m.

The Kennedy Lands are within the Jock River watershed and are under the jurisdiction of the Rideau Valley Conservation Authority (RVCA). Where existing grades in the subject property are below the 100-year floodplain elevation and are proposed to be raise, a permit under O. Reg 174/06 will be required. It is understood that it must be shown to the RVCA that the proposed fill is not expected to have a negative impact on the function of the Jock River and a cut / fill floodplain proposal will be required.

There are three existing minor drainage features within Kennedy Lands, oriented in the south to north direction. These drainage features have been identified as minor tributaries of the Clarke Drain but have degraded and provide negligible ecological function. Historically, the minor drainage features were fed by surface runoff and overland flows from the south; however, upstream portions of each of the three minor drainage features have been decommissioned as part of the construction of the adjacent Mattamy Half Moon Bay and Half Moon Bay West residential subdivisions. It has been concluded that the hydrological inputs to the three minor drainage features are limited to surface runoff from the adjacent agricultural fields within the subject site. Further details are included in the ***Headwaters Drainage Assessment (HDA) (Revised), Kennedy Lands Development*** by McKinley Environmental Solutions dated April 2022 (McKinley HDA).

The subsurface profile is divided by two areas, east and west. For the east portion, the subsurface profile consists of topsoil followed by compact to very dense silty sand and/or glacial till. The glacial till layer consists of dense to very dense silty sand with gravel, cobbles, and boulders. For the west portion, the subsurface profile consists of a thin layer of topsoil and/or silty sand with clay overlying a silty clay deposit. The upper portion of the silty clay consists of stiff brown silty clay, while the lower portion consists of firm grey silty clay. The west portion of the site is subject to permissible grade raise elevations between 1.0 m to 2.5 m, based on the ***Geotechnical Investigation, PG5348-1, Revision 4*** by Paterson Group, dated March 11, 2022). The grading and servicing has been designed to keep grades as low as possible, due to the grade raise restrictions in the area.

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1.2 Summary of Pre-consultation

The following provides a summary of the pre-consultation meetings:

1.2.1 City of Ottawa, August 6, 2021

City of Ottawa Staff met with Minto Developments Inc., Fotenn Consultants and David Schaeffer Engineering Limited on August 6, 2021 to discuss the application and to confirm application submission requirements. Refer to meeting notes, enclosed in ***Appendix A***.

1.3 Existing Permits / Approvals

The existing approvals related to the Kennedy Lands are presented in ***Table 1.2*** and the approvals are enclosed in ***Appendix B***.

Table 1.2 Existing Approvals

Agency	Approval Type	Approval Number	Remarks
City of Ottawa	By-Law to provide for the abandonment of drainage works	West Clarke Municipal Drain (By-Law 2007-413) East Clarke Municipal Drain (By-Law 2007-414)	Ottawa City Council met on October 24, 2007 at 10:00 am and passed the by-law
Ministry of the Environment, Conservation and Parks (MECP)	Environmental Compliance Approval	3029-ACNJPT August 12, 2016	Construction of sanitary and storm sewers in Half Moon Bay North Phase 7 Subdivision
Ministry of the Environment, Conservation and Parks (MECP)	Environmental Compliance Approval	9531-7EZK5S June 5, 2008	Approval for sanitary sewer construction on Greenbank Road.
Ministry of the Environment, Conservation and Parks (MECP)	Environmental Compliance Approval	1648-ADBLF9 September 19, 2015	Construction of stormwater management facility (Interim Greenbank SWM Pond)
Rideau Valley Conservation Authority (RVCA)	Alteration of Waterways Permit	RV5-33/16 December 2, 2016	Permit for Interim Greenbank SWM Pond and Ultimate Outlet Channel

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1.4 Required Permits / Approvals

The Kennedy Lands are subject to the following permits and approvals, presented in ***Table 1.3***:

Table 1.3: Required Permits and Approvals

Agency	Approval Type	Trigger	Remarks
City of Ottawa	Commence Work Notification (CWN)	Construction of new sanitary and storm sewers throughout the subdivision.	The City of Ottawa will issue a commence work notification for construction of the sanitary and storm sewers once an ECA is issued by the MECP.
City of Ottawa	MECP Form 1 – Record of Watermains Authorized as a Future Alteration	Construction of watermains throughout the subdivision.	The City of Ottawa will review the watermains on behalf of the MECP through the Form 1 - Record of Watermains Authorized as a Future Alteration.
Ministry of the Environment, Conservation and Parks (MECP)	Environmental Compliance Approval (ECA) for sanitary and storm sewers.	Construction of new sanitary and storm sewers throughout the subdivision.	The City of Ottawa will review the sanitary and storm sewer design on behalf of the MECP through the MECP Transfer of Review Program.
Ministry of the Environment, Conservation and Parks (MECP)	Amendment to Environmental Compliance Approval (ECA) for stormwater management pond.	Expansion of the Interim Greenbank SWM Pond to its ultimate configuration.	The City of Ottawa will review the Ultimate SWM Pond design on behalf of the MECP through the MECP Transfer of Review process.
Ministry of the Environment, Conservation and Parks (MECP)	Permit to Take Water (PTTW)	If pumping for construction of proposed land uses exceeds 400,000 L/day of ground and/or surface water.	Per Paterson Group Report PG5348-1, Revision 4 dated March 11, 2022.
Ministry of the Environment, Conservation and Parks (MECP)	Environmental Activity and Sector Registry (EASR)	If pumping for construction of proposed land uses ranges between 50,000 to 400,000 L/day of ground and/or surface water.	Per Paterson Group Report PG5348-1, Revision 4 dated March 11, 2022.
RVCA	Alteration of Waterways	Infill drainage features (HDFA)	Removal of existing minor drainage features on Kennedy Lands.
RVCA	Floodplain Cut/Fill	Grading within the subject lands and new definition of the regulatory floodplain	Required to establish the revised floodline to have regard for the developable land.

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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, October 2012
  (City Standards)
    - **Technical Bulletin ISDTB-2014-01**, Revisions to Ottawa Design Guidelines - Sewer
      City of Ottawa, February 5, 2014
      (ITSB-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-2018-04**, Revisions to Ottawa Design Guidelines – Sewer
      City of Ottawa, June 27, 2018
      (ISTB-2018-04)
    - **Technical Bulletin ISTB-2019-02,** Revisions to Ottawa Design Guidelines – Sewer
      City of Ottawa, July 8, 2019
      (ISDTB-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-2021-03**
      City of Ottawa, August 18, 2021
      (ISTB-2021-03)
- **City of Ottawa Official Plan**
  adopted by Council 2003.
  (Official Plan)

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- **Stormwater Management Planning and Design Manual**
  Ministry of Environment, March 2003
  (*SWMP Design Manual)*
- **Erosion & Sediment Control Guidelines for Urban Construction**
  Toronto and Region Conservation Authority (TRCA), 2019
  (ECS Guidelines)
- **Barrhaven South Master Servicing Study**
  Stantec, June 2007
  (MSS)
- **Barrhaven South Master Servicing Study Addendum**
  Stantec, October 12, 2017
  (Stantec MSS Addendum)
- **Design Brief for the Interim Greenbank Stormwater Management Pond**
  JFSA and DSEL, Revised July, 2016
  (Greenbank SWM PDB)
- **Geotechnical Investigation**
  Paterson Group, March 11, 2022
  (PG5348-1 Revision 4)
- **Headwaters Drainage Assessment (HDA) (Revised), Kennedy Lands Development**
  McKinley Environmental Solutions, April 2022
  (McKinley HDA)
- **Greenbank Road and South West Transitway Extension, Marketplace Avenue to Barnsdale Road, Preliminary Design, Plan and Profile, Contract CP000521**
  City of Ottawa, February 2022, Cross Sections July 2023
  (GRSWTE Preliminary Design)
- **Ultimate Greenbank Pond Expansion Modifications Memorandum**
  DSEL, March 28, 2023
  (Ultimate Pond Memo)

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3.0 WATER SUPPLY SERVICING

3.1 Existing Water Supply Services

The Kennedy Lands are located within the 3SW Pressure Zone. The development will be fed from the existing infrastructure constructed with various phases of the adjacent Mattamy Half Moon Bay development to the south at the following locations:

- Existing 300 mm diameter watermain on Perseus Avenue in Mattamy HMB West.
- Existing 300 mm diameter watermain on Riverboat Heights in Mattamy HMB North.

The existing watermain network is depicted on ***Figure 3***.

Boundary conditions will be provided by the City of Ottawa from the existing Hydraulic Grade Line (HGL) levels at Jockvale Road and Greenbank Road. The City has plans to change the Barrhaven South area to a different pressure zone, Pressure Zone 3C, sometime in the future. When this occurs, the HGL at Jockvale and Greenbank will decrease.

3.2 Proposed Water Supply

Potable water will be delivered to the proposed development area through the extension of watermains from the existing trunk watermains. The Kennedy Lands will connect to existing infrastructure at the following locations:

- 300 diameter watermain on Perseus Avenue will connect to the water supply along Street 2.
- 300 diameter watermain on Riverboat Heights will be extended north from its current termination at Greenbank Road to Street 1.
- 400 diameter watermain on Greenbank Road at Pearl Dace Crescent will connect to the water supply along Street 2.

The internal development will be serviced by a network of new 150 mm, 200 mm, and 300 mm diameter watermains designed in accordance with City of Ottawa Guidelines as summarized in ***Table 3.1***.

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Table 3.1: Water Supply Design Criteria

Design Parameter	Value
Residential - Single Family	3.4 p/unit
Residential - Townhome	2.7 p/unit
Residential – Average Daily Demand	280 L/p/day
Residential - Maximum Daily Demand	2.5 x Average Daily Demand
Residential - Maximum Hourly Demand	2.2 x Maximum Daily Demand
Park Average Daily Demand	28,000 L/ha/day
Commercial / Institutional Maximum Daily Demand	1.5 x Average Daily Demand
Commercial / Institutional Maximum Hour Demand	1.8 x Maximum Daily Demand
Fire Flow	Calculated as per the Fire Underwriter's Survey 1999 and as amended by ISTB-2014-02 & ISTB-2018-02.
Minimum Watermain Size	150 mm diameter
Minimum Service Lateral Size	25 mm dia. (up to 310 kPa), 20 mm dia. (over 310 kPa)
Minimum Depth of Cover	2.4 m from top of watermain to finished grade
Peak hourly demand operating pressure	275 kPa and 690 kPa
Fire flow operating pressure minimum	140 kPa
Extracted from Section 4: Ottawa Design Guidelines, Water Distribution (July 2010) Amended by Technical Bulletin ISD-2010-2 (December 15, 2010), ISDTB-2014-02 (May 27, 2014), ISTB-2021-03 (August 18, 2021)	

The proposed water supply network is depicted in ***Figure 3***.

Fire flow calculations will be calculated at the time of detailed design in accordance with Fire Underwriters Survey's Water Supply for Public Fire Protection Guideline (1999) and Technical Bulletins ISDTB-2014-02 and ISTB-2018-02.

Single Detached Homes and Executive Townhomes are expected to be with the City of Ottawa's cap of 10,000 L/min (167 L/s) as outlined in ISTB-2018-02. Fire walls will be determined, if required, within the Avenue Townhomes based on maximum area based on the results of the hydraulic network analysis. Fire flow demand for the Avenue Townhomes (back-to-back units) will be determined at the time of detailed design.

A complete hydraulic network analysis will be prepared for the proposed water distribution network at the time of detailed design to confirm that water supply is available within the required pressure range under the anticipated demand during average day, peak hour, and fire flow conditions.

3.3 Future Connections

As per the ***Stantec MSS Addendum***, there will be a 406 mm / 610 mm diameter watermain constructed in the future along Future Greenbank Road as depicted on ***Figure 3***, providing reliability to the overall system. Refer to Drawing A-8 Water Servicing Plan from the ***Stantec MSS Addendum*** included in ***Appendix C***.

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3.4 Stantec MSS Addendum Conformance

The connection to the 300 mm diameter watermain on Perseus Avenue and the connection to the 300 mm diameter watermain on Riverboat Heights conform to the ***Stantec MSS Addendum***. The future 406 mm / 610 mm diameter watermain along Future Greenbank Road crossing Jock River conforms to the ***Stantec MSS Addendum***.

3.5 Water Supply Conclusion

The network will be sized to ensure that water supply will be available within the required pressure range under the anticipated demand during average day, peak hour and fire flow conditions. It is expected that the 150 mm, 200 mm and 300 mm diameter sizes will satisfy these demands.

The proposed preliminary water supply design conforms to all relevant City guidelines and policies, while connections to watermain trunks conform to the ***Stantec MSS Addendum***.

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4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

The existing South Nepean Collector will provide the sanitary outlet for the entire Barrhaven South Community, which includes the Kennedy Lands. The ***MSS*** determined that the sewer is able to accommodate sanitary flows from approximately 26,000 people in the Barrhaven South Community.

The following are the location of the existing trunk connection points:

- Existing 600 mm diameter sanitary trunk along Future Greenbank Road through the Half Moon Bay (HMB) North development, ultimately connecting to the South Nepean Collector.

The design of the existing infrastructure included capacity for the Kennedy Lands.

4.2 Wastewater Design

The Kennedy Lands will be serviced by a network of new gravity sewers designed in accordance with City of Ottawa design criteria.

The sanitary sewers will outlet to the existing trunk sewers at the following location:

- The 600 mm diameter trunk sanitary sewer along Future Greenbank Road across from Riverboat Heights in Mattamy HMB North; and

- The 600 mm diameter trunk sanitary sewer along Future Greenbank Road across from Pearl Dace Crescent in Mattamy HMB North.

The proposed sanitary sewer layout is depicted in ***Figure 4***.

Table 4.1 summarizes the City Standards employed in the design of the proposed wastewater sewer system.

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Table 4.1: Wastewater Design Criteria

Design Parameter	Value
Low Density Residential	3.4 p/unit
Medium Density Residential	2.7 p/unit
High Density	2.3 p/unit
Peak Wastewater Generation per Person	280 L/p/d
Peaking Factor Applied	Harmon's Equation $$P.F. = 1 + \left(\frac{14}{4 + \left(\frac{P}{1000} \right)^{1/2}} \right) \times K$$ K = 0.8
Institutional Flows	28,000 L/ha/day
Institutional Peaking Factor	1.0 (Contribution Area <= 20%), 1.5 (>20%)
Infiltration and Inflow Allowance	0.28 L/s/ha (wet) 0.05L/s/ha (dry) 0.33L/s/ha (total I/I)
Sanitary sewers are to be sized employing the Manning's Equation	$$Q = \frac{1}{n} A R^{2/3} S^{1/2}$$
Minimum Sewer Size	200 mm diameter
Minimum Manning's 'n'	0.013
Service Lateral Size	135 mm dia PVC SDR 28 with a minimum slope of 1.0%
Minimum Depth of Cover	2.5 m from crown of sewer to grade
Minimum Full Flowing Velocity	0.6 m/s
Maximum Full Flowing Velocity	3.0 m/s
Additional Considerations	Sewers servicing less than 10 residential connections to have a minimum gradient of 0.65%
	Where expected depth of flow is less than 1/3 pipe diameter, calculate actual flowing velocity and increase slope as required to achieve 0.6 m/s.
Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012. Amended by Technical Bulletin ISTB-2018-01 (March 21, 2018)	

The supporting sanitary sewer calculation sheets are contained in ***Appendix D.***

The design of the downstream sanitary infrastructure included capacity for the Kennedy Lands. The latest information is presented on HMB West, Phases 2A & 2B, Sheet 42, External Sanitary Drainage Plan and associated sanitary design sheet, included in ***Appendix D***.

The following was assumed for the Kennedy Lands in the Half Moon Bay West, Phases 2A & 2B design:

- Area = 22.74 ha

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- Residential Population = 2434
- Peak Residential Flow = 31.55 L/s (peak factor of 3.20)
- Infiltration Flow = 6.37 L/s
- Total flow from Kennedy Lands in Future Greenbank Road Trunk = 37.92 L/s

At the time of detailed design of the downstream infrastructure, capacity calculations were based on the old Sewer Design Guidelines, which have since been updated by Technical Bulletin ISTB-2018-01 (March 21, 2018).

Based on the sanitary sewer calculation sheets for the proposed development, the peak flows based on current design standards are as follows:

- Peak flow at Future Greenbank Road across from Riverboat Heights is 17.46 L/s.
- Peak flow at Future Greenbank Road across from Pearl Dace is 4.94 L/s.
- Peak flow SE of Future Greenbank Road is 1.66 L/s.
- Total flow from the Kennedy Lands is 24.06 L/s.

This indicates that there is sufficient downstream capacity for the Kennedy Lands and the peak flows are lower than what was designed for when the downstream infrastructure was constructed.

4.3 Stantec MSS Addendum Conformance

The proposed sanitary design conforms to the Stantec MSS Addendum by connecting to a 600 mm diameter trunk sewer on Future Greenbank Road. The sanitary drainage plan and design sheets from the ***Stantec MSS Addendum*** are contained in ***Appendix D***. Drainage areas MSS-A-6 and MSS-A-5 include the Kennedy Lands and confirm that these lands were tributary to the downstream trunk infrastructure per the ***Stantec MSS Addendum***.

4.4 Wastewater Servicing Conclusion

The sanitary flows from the Kennedy Lands are conveyed to the downstream 600 mm diameter sanitary trunk through Mattamy HMB North Lands and ultimate to the South Nepean Collector.

The estimated peak flows from the subject site are lower than what the downstream infrastructure was designed for, confirming downstream capacity. The sanitary demands have been lowered based on Technical Bulletin ISTB-2018-01 (March 21, 2018).

The proposed wastewater design follows all relevant City guidelines and policies and is in general conformance with the ***Stantec MSS Addendum***.

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5.0 STORMWATER CONVEYANCE

5.1 Existing Conditions

The Kennedy Lands are located within the Jock River Watershed and under the jurisdiction of the Rideau Valley Conservation Authority (RVCA). There are (3) three minor drainage features that run in the south to north direction, tributary to the former Clarke Drain. These features no longer receive significant surface runoff and are mostly decommissioned due to residential development intercepting most of the stormwater from the south.

The existing Interim Greenbank Pond is generally located southeast of Future Greenbank Road, west of the Jock River and east of the Kennedy Lands. It was constructed in 2016 and designed for the adjacent Mattamy HMB North Phase 7 development to the south of Future Greenbank Road. The pond was designed as an interim facility to be expanded in the future for the Kennedy Lands. The existing outlet channel from the interim facility was designed with capacity for the ultimate pond configuration.

Surveys of the as built interim Greenbank Pond, completed in 2021 and 2022, confirm that the pond is in general conformance with the design. Pond capacity at the permanent pool and extended detention elevations is slightly higher than calculated in the design. A comparison can be found in ***Appendix E.***

The west portion of the site is subject to permissible grade raise elevations between 1.0 m to 2.5 m, based on the ***Geotechnical Investigation, PG5348-1, Revision 4*** by Paterson Group, dated March 11, 2022). The grading and servicing has been designed to keep grades as low as possible, due to the grade raise restrictions in the area.

5.2 Minor System

The Kennedy Lands will be serviced by a storm sewer system designed in accordance with the amendment to the storm sewer and stormwater management elements of the Ottawa Design Guidelines – Sewer (Technical Bulletin PIEDTB-2016-01, September 6, 2016).

The minor storm sewer system will be sized as follows:

- 2-year event for local streets;
- 5-year event for collector streets; and
- 10-year events for arterial roads

The storm sewers are sized using City of Ottawa IDF curves.

Based on the existing conditions and constraints, such as the permissible grade raise restrictions, the following is proposed:

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- Full site serviced by expansion of the existing Greenbank Pond to its ultimate configuration;
- Sump pumps per City technical bulletin for foundation drainage on the western portion of the development;
- Gravity foundation drainage for the eastern portion; and;
- Inlet to the expanded pond with an invert set at 1.15 m below the permanent pool elevation of 89.20 m, resulting in standing water in the storm sewer.

The storm sewers servicing the Kennedy Lands will discharge to the proposed Greenbank Pond Expansion (Ultimate Greenbank Pond) via one inlet and discharge from the pond to the Jock River via a naturalized channel. The existing naturalized channel has been designed with capacity for the Ultimate Greenbank Pond configuration and associated drainage areas.

Refer to ***Figure 5*** for the preliminary storm servicing plan, and ***Figure 7*** for the Ultimate Greenbank Pond. Storm design sheets are enclosed in ***Appendix E*** for reference.

Table 5.1 summarizes the relevant City Standards employed in the design of the proposed storm sewer system referred to as the minor system.

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Table 5.1: Storm Sewer Design Criteria

Design Parameter	Value
Minor System Design Return Period	2-Year (Local Streets), 5-Year (Collector Streets), 10-Year (Arterial Streets) – PIEDTB-2016-01
Major System Design Return Period	100-Year
Intensity Duration Frequency Curve (IDF) 5-year storm event. A = 998.071 B = 6.053 C = 0.814	$i = \frac{A}{(t_c + B)^C}$
Initial Time of Concentration	10 minutes
Rational Method	$Q = CiA$
Runoff coefficient for paved and roof areas	0.9
Runoff coefficient for landscaped areas	0.2
Storm sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} A R^{2/3} S^{1/2}$
Minimum Sewer Size	250 mm diameter
Minimum Manning's 'n'	0.013
Service Lateral Size	100 mm dia PVC SDR 28 with a minimum slope of 1.0%
Minimum Depth of Cover	2.0 m from crown of sewer to grade
Minimum Full Flowing Velocity	0.8 m/s
Maximum Full Flowing Velocity	6.0 m/s (above 3.0 m/s may require protection against displacement by sudden jarring)
Clearance from 100-Year HGL	Not above ground surface in areas with sump pumps 0.30 m for USF in areas without sump pumps
Max Allowable Flow Depth on Municipal Roads	35 cm above gutter (PIEDTB-2016-01)
Extracted from Sections 5 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012	

5.3 Major System

The majority of the major system flow for the residential subdivision will be conveyed through the road network, and outlet to the Jock River. Future Greenbank Road will have 100 year capture in the sewers, the emergency overland will be through the Kennedy subdivision. A portion of the future development lands to the east will have major system flows directed to the Ultimate Greenbank Pond prior to release to the Jock River, while the remaining portion will flow directly overland to the Jock River to the east.

The major system is to be designed in accordance with the amendment to the storm sewer and stormwater management elements of the Ottawa Design Guidelines – Sewer (Technical Bulletin PIEDTB-2016-01, September 6, 2018).

The maximum depth of flow on local and collector streets will be designed to 0.35 m during the 100-year event. The depth of flow may extend 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%).

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There must be at least 15 cm of vertical clearance between the spill elevation on the street and the ground elevation at the nearest building envelope.

As cross street flow is not permitted on arterial roadways, 100-year captures are provided to prevent major system flow from crossing Future Greenbank Road.

5.4 Proposed Outlet – Stormwater Management (SWM) Pond

The Ultimate Greenbank Pond was identified in the ***Stantec MSS Addendum*** to service the Mattamy HMB North Phase 7 lands and the Kennedy Lands. The Interim Greenbank Pond has been approved and constructed. At the time of detailed design, the conceptual design of the Ultimate Greenbank Pond was completed. Details can be found in the ***Design Brief for the Interim Greenbank Stormwater Management Pond for Phase 4 and 7 of the Half Moon Bay Subdivision*** by JFSA and DSEL dated July 5, 2016 (Greenbank PDB). The preliminary design for the Ultimate Greenbank Pond is enclosed in ***Appendix E*** for reference. An updated design for the Ultimate Greenbank Pond was completed in 2023 and a memorandum was submitted to the City of Ottawa for review. Refer to ***Figure 7*** for a conceptual depiction of the 2023 Ultimate Greenbank Pond and associated pond characteristics.

The Ultimate Greenbank Pond is located within the Jock River Watershed and is subject to the following design criteria:

5.4.1 Water Quality Control

As noted in the ***Stantec MSS Addendum***, water quality control targets as per the MECP Enhanced Level of Protection (80% long term TSS removal).

The Ultimate Greenbank Pond design has been designed in accordance with the quality control objectives.

5.4.2 Water Quantity Control

As noted in the ***Stantec MSS Addendum***, no quantity control storage is required for flood control purposes, as the hydrograph from the sub-watershed will peak before the upstream peak in the Jock River.

5.4.3 Ultimate Greenbank Pond – Greenbank PDB Design

As noted above, the Ultimate Greenbank Pond was designed at the time of detailed design of the existing Interim Pond. Based on the ***Greenbank PDB***, the pond design characteristics, based on a 37.479 ha total ultimate drainage area to the pond, are summarized in ***Table 5.2***.

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Table 5.2: Ultimate Greenbank Pond Characteristics – Greenbank PDB Design (2016)

Item	Target	Comments
Drainage Area	37.479 ha	Ultimate Greenbank Pond to serve additional drainage areas to the north (Kennedy Lands)
Imperviousness	66%	Designed for total ultimate drainage area of 37.479 ha
Required Permanent Pool Volume	6,584 m^3	Based on 175.67m^3/ha(1)
Required Quality Control Volume	1,499 m^3	Based on 40 m^3/ha
Allowable Release Rate for Quality Control	39 L/s	Minimum extended detention time between 24 to 48 hours

(1) Interpolated for 66% imperviousness, enhanced protection level for wet pond, as per Table 3.2 of the SWM Planning and Design Manual.

The preliminary operating conditions of the Ultimate Greenbank Pond are provided in the ***Greenbank PDB*** for both free outfall and restrictive downstream conditions.

The provided permanent pool in the Ultimate Greenbank Pond is 7,471 m^3, at an elevation of 89.20 m, which is more than the minimum permanent pool volume required in ***Table 5.2***.

The provided extended detention volume in the Ultimate Greenbank Pond is 2,010 m^3 above the operational permanent pool elevation of 89.50 m, which is more than the minimum quality control volume required in ***Table 5.2***.

The extended detention level is set based on a 100-year flood level on the Jock River at the pond outlet of 90.75 m. There is a 150 mm quality control orifice at an invert of 89.20 m and a 40 m long quantity control weir with an invert set equal to the 100-year flood level.

The outflows from the pond will be conveyed to the Jock River by an outlet channel with a culvert under Greenbank Road. The channel and culvert have been sized to convey the maximum 100-year flow of 8.265 m^3/s, as detailed in the ***Greenbank PDB***.

The maximum preliminary pond level during the 100-year 24-hour SCS Type II design storm is 91.003 m and a 0.30 m freeboard above this pond level will be provided to the top of berm around the pond.

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5.4.4 Ultimate Greenbank Pond – Current Design

A functional update to the Ultimate Greenbank Pond design was completed in March 2023 to capture the latest design concepts for lands tributary to the ultimate pond and to address comments from the City of Ottawa. The updated pond design characteristics, based on an updated 37.564 ha total drainage area to the pond, are summarized in ***Table 5.3***.

Table 5.3: Ultimate Greenbank Pond Characteristics – Current Design (2023)

Item	Target	Comments
Drainage Area	37.564 ha	Ultimate Greenbank Pond based on Current Design
Imperviousness	69%	Designed for total ultimate drainage area of 37.564 ha
Required Permanent Pool Volume	6,862m^3	Based on 182.7m^3/ha(1)
Required Quality Control Volume	1,503 m^3	Based on 40 m^3/ha
Allowable Release Rate for Quality Control	39 L/s	Minimum extended detention time between 24 to 48 hours

(1) Interpolated for 69% imperviousness, enhanced protection level for wet pond, as per Table 3.2 of the SWM Planning and Design Manual.

The design elevations and volumes of the 2023 Ultimate Greenbank Pond are detailed in ***Figure 7***, with a provided permanent pool volume of 7,997 m^3 and an extended detention volume of 2,076 m^3. These values have been calculated using the as-built information for the existing interim pond. The provided volumes exceed the required volumes presented in ***Table 5.3***, confirming capacity.

Drainage areas and overall imperviousness of the Kennedy Lands and the existing tributary development are presented in ***Table 5.4***, along with a comparison of the ultimate drainage values considered in the 2016 PDB and the current Ultimate Pond design.

Table 5.4: Ultimate Greenbank Pond Drainage Area 2023 vs 2016 Design Comparison

	Kennedy Lands / Greenbank Road	Interim Pond Drainage Area	Total Drainage to Ultimate Pond (March 2023)	Greenbank PDB Design (July 2016)
Area	24.05 ha	13.514 ha(1)	37.564 ha	37.479
Imperviousness	76%	53%	69%	66%

1) Approved Drainage area from Table 1 – SWM Pond Characteristics from the Greenbank PDB – 15.997 ha less 2.483 ha undeveloped area.

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The 69% imperviousness was calculated by combining the assumptions made for the Interim Pond Drainage area with the current calculations and drainage areas for the Kennedy Lands and Greenbank Road.

5.5 Submerged Pipes

As indicated in the ***Stantec MSS Addendum***, due to grade raise restrictions and lack of relief in the Barrhaven South area, portions of the minor system will be partially submerged. A summary of the submerged pipes and the extents are presented in ***Appendix E***. The ***Stantec MSS Addendum*** states appropriate solutions, that are acceptable to the City, to avoid and/or manage the accumulation of sediments for sewers subject to standing water.

Section 8.3.8.3 of the City Standards states that the design must check the impact on the system, assuming the pipes are 25% filled with sediment accumulation. This detailed HGL analysis will be completed at the time of detailed design to confirm the following, considering 25% sediment accumulation during the 10-year storm:

- Minimum freeboard of 0 between the HGL and the underside of footings where foundations are drained with gravity service connections to the storm sewer; and
- Minimum freeboard of 0 between the HGL and the manhole top of grate elevations throughout the development.

It is proposed that the pond inlets be designed to allow for isolation of the submerged trunk storm sewers for the purposes of cleaning.

5.6 Stantec MSS Addendum Conformance

In general, the location of the Ultimate Greenbank Pond and drainage boundaries are in conformance with the ***Stantec MSS Addendum***. The overall storm design deviates from the Stantec MSS Addendum as it implements the amendment to the storm sewer and stormwater management elements of the Ottawa Design Guidelines – Sewer (Technical Bulletin PIEDTB-2016-01, September 6, 2018, ISTB-2018-04, June 27, 2018, and ISTB2019-02, July 8, 2019).

The ***Stantec MSS Addendum*** considered the use of sump pumps for the development of areas with grade raise restrictions but did not carry forward this alternative solution based on City policy at the time of preparation of the study; however, on June 27, 2018, the City of Ottawa published technical bulletin ISTB-2018-04 for the use of sump pumps, which was subsequently updated with ISTB-2019-02 (July 8, 2019).

Per Technical Bulletin ISTB-2018-04, an MSS Addendum will be required to detail the use of sump pumps within a portion of the Kennedy Lands.

5.7 Stormwater Conveyance Conclusion

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- The storm sewers are designed as per the City of Ottawa guidelines, including the amendment to the guidelines per Technical Bulletin PIEDTB-2016-01 (September 6, 2018), Technical Bulletin ISTB-2018-04 (June 27, 2018) and Technical Bulletin ISTB-2019-02 (July 8, 2019).
- The storm sewers will outlet to the Ultimate Greenbank Pond, per the Stantec MSS Addendum, where the flows will be treated for quality prior to discharging to the Jock River. The Ultimate Greenbank Pond will be expanded with a new outlet to service the Kennedy Lands.
- Sump pumps are to be implemented in the western portion of the Kennedy Lands development as per City of Ottawa Technical Bulletin ISTB-2018-04 (June 27, 2018) and ISTB 2019-02 (July 8, 2019),
- The preliminary Ultimate Greenbank Pond is designed to provide quality control treatment to achieve an enhanced level of protection (80% TSS removal per MECP guidelines). There are no quantity control requirements tributary to the Jock River.
- Portions of the proposed minor system to the Ultimate Greenbank Pond will be submerged throughout the year and modelling at the time of detailed design will be completed to confirm HGL freeboards for 25% sediment accumulation during the 10-year storm. The pond inlet will be designed to allow for isolation of the submerged trunk storm sewers for the purposes of cleaning.

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6.0 SITE GRADING

6.1 Grading and Drainage

The grading for the Kennedy Lands is restricted by the existing adjacent Half Moon Bay North Subdivision, the design grades for the Future Greenbank Road and the Jock River water levels. Detailed grading will be completed at the time of detailed design. A conceptual grading plan is depicted on ***Figure 6***.

To achieve the planned storm drainage and meet City of Ottawa and MECP guidelines, fill is required from existing ground for the proposed development. The proposed finished grades range between 92.25 m and 94.63 m.

It is noted in the ***Geotechnical Investigation*** by Paterson Group dated March 11, 2022, that due to difference in subsurface soil, Kennedy Lands can be split into two areas: east and west. There are no restrictions to raise the east portion. While the west portion has areas of permissible grade raise by 1.0 m, 1.5 m, and 2.5 m above existing grades.

In the east part of Kennedy Lands, the foundations will be serviced by gravity drainage. While in the west, it is understood that the underlying soil conditions and grade raise restrictions meet the requirement for implementation of sump pumps.

In June 2018, the City of Ottawa published Technical Bulletin ITSB-2018-04 (June 27, 2018), which outlines the criteria for sump pumps, the requirements for hydrogeological assessment areas with sump pumps, and revised information on HGL for storm sewers with sump pumps. The updated Technical Bulletin ISTB-2019-02 (July 8, 2019) was subsequently released.

Where existing grades in the subject property are below the 100-year floodplain elevation and are proposed to be raised, a permit under O. Reg 174/06 will be required. It is understood that it must be shown to the RVCA that the proposed fill is not expected to have a negative impact on the function of the Jock River and a cut / fill floodplain proposal will be required.

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6.2 Grading Criteria

The following grading criteria and guidelines will be applied at the time of detailed design as per City of Ottawa Guidelines:

- Maximum slope in grassed areas between 2% and 5%;
- Grades in excess of 7% require terracing to a maximum of a 3:1 slope;
- Driveway grades between 2% and 6%;
- Drainage ditches and swales should have a minimum slope of 1.5%;
- Perforated pipe is required for swales less than 1.5% in slope; and
- Swales are to be 0.15 m deep with 3:1 side slopes unless otherwise indicated on the drawings.

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 the vegetation has been removed and the top layer of soil is disturbed.

Erosion and sediment controls must be in place during construction. The following 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 entering existing ditches.
- No refueling or cleaning of equipment near existing watercourses.
- Provide sediment traps and basins during dewatering.
- Install filter cloth between catch basins and frames.
- Installation of mud mats at construction accesses.
- Construction of temporary sedimentation ponds to treat water prior to outletting to existing wetlands and watercourses.
- Plan construction at proper time to avoid flooding.

A detailed erosion and sediment control plan will be prepared for the Kennedy Lands prior to construction to ensure there are no negative impacts on the natural areas, particularly the Jock River. A preliminary erosion and sediment control plan is depicted in ***Figure 8***.

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8.0 CONCLUSIONS

A summary of the Functional Servicing and Stormwater Management Report for the Kennedy Lands is as follows:

- The City of Ottawa has been pre-consulted regarding this application. Approvals will be required from the City of Ottawa, Ministry of the Environment, Conservation and Parks and Rideau Valley Conservation Authority.
- Watermains will be designed as per the City of Ottawa guidelines and connect to existing watermains in existing Mattamy Half Moon Bay North and Half Moon Bay West. A trunk watermain will be installed along Future Greenbank Road in the future, as per the Stantec MSS Addendum.
- Sanitary sewers are designed as per the City of Ottawa guidelines and will discharge to existing sanitary trunk sewers within Mattamy Half Moon Bay North. The downstream infrastructure was designed with capacity for the Kennedy Lands.
- Storm sewers are designed as per the City of Ottawa guidelines, including the Technical Bulletin PIEDTB-2016-01 (September 6, 2018), Technical Bulletin ISTB-2018-04 (June 27, 2018) and Technical Bulletin ISTB-2019-02 (July 8, 2019).
- The storm sewers will outlet to the Ultimate Greenbank Pond, where the flows will be treated for quality prior to discharging to the Jock River. The existing Interim Greenbank Pond will be expanded to service the Kennedy Lands per the Stantec MSS Addendum.
- The preliminary Ultimate Greenbank Pond is designed to provide quality control treatment to achieve an enhanced level of protection (80% TSS removal per MECP guidelines). There are no quantity control requirements tributary to the Jock River.
- Portions of the proposed minor system to the Ultimate Greenbank Pond are expected to be submerged throughout the year and modelling at the time of detailed design will be completed to confirm HGL freeboards for 25% sediment accumulation during the 10-year storm. The pond inlet will be designed to allow for isolation of the submerged trunk storm sewers for the purposes of cleaning.
- The MSS indicates that proposed grades for the Kennedy Lands will vary between approximately 92.50 m and 94.50 m. There are grade raise restrictions for the site, based on the geotechnical review, and the site has been designed as low as possible. To achieve this, the use of sump pumps has been introduced for the western portion of the site to mitigate grade raises to be implemented.
- Erosion and sediment control measures will be implemented and maintained throughout construction. The Jock River will be protected from any negative impacts from construction.
- The preliminary design of Kennedy Lands has been completed in general conformance with the City of Ottawa Design Guidelines and criteria presented in other background study documents.

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Prepared by,
David Schaeffer Engineering Ltd.

Per: Laurence Coulson, P.Eng.

Reviewed by,
David Schaeffer Engineering Ltd.

Per: Alex Tourigny, P.Eng.

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APPENDIX A

CONCEPT PLAN
PRE-CONSULTATION
CLARK MUNICIPAL DRAIN NOTICE OF ABANDONMENT

JOCK RIVER

Ditches leading to Jock River

Floodplain Area
0.66 ha
(1.63 ac)

Floodplain Area
0.11 ha (0.28 ac)

STREET NO. 6 · STREET NO. 1 · STREET NO. 2 · STREET NO. 7 · STREET NO. 11 · STREET NO. 10 · STREET NO. 9 · STREET NO. 8 · STREET NO. 7 · STREET NO. 5 · STREET NO. 6 · STREET NO. 1 · STREET NO. 2 · STREET NO. 3 · STREET NO. 2 · STREET NO. 4 · STREET NO. 1

BLOCK 103 · BLOCK 104 · BLOCK 105 · BLOCK 106 · BLOCK 107 · BLOCK 108 · BLOCK 109 · BLOCK 110 · BLOCK 111 · BLOCK 112 · BLOCK 113 · BLOCK 114 · BLOCK 115 · BLOCK 116 · BLOCK 117 · BLOCK 118 · BLOCK 119 · BLOCK 120 · BLOCK 121 · BLOCK 122 · BLOCK 123 · BLOCK 124 · BLOCK 125

Parkland
0.85 ha

FUTURE
GREENBANK ROAD
REALIGNMENT
2.62 ha
(6.47 ac)

FUTURE
DEVELOPMENT
OWNED BY OTHERS
2.26 ha
(5.58 ac)

Block 126
Storm Water Management
0.69 ha (1.71 ac)

Owned By Others
0.09 ha
(0.22 ac)

Block A1
Mattamy to Minto
0.016 ha (0.040 ac)

Block A2
Minto to Mattamy
0.0009ha
(0.0022ac)

Block A3
Mattamy to Minto
0.011 ha (0.027ac)

Block A4
Minto to Mattamy
0.101 ha (0.25 ac)

Block A5
Minto to Mattamy
0.034 ha (0.084 ac)

Block A7
Mattamy to Minto
0.004 ha (0.010 ac)

Block A8
Mattamy to Minto
0.157 ha (0.388 ac)

Block A6
Minto to Mattamy
0.052 ha (0.128 ac)

Proxima Terrace · Celestial Grove · Perseus Avenue · RIVER RUN · BURBOT STREET · BURBOT STREET · RIVERBOAT HEIGHTS

EXISTING RESIDENTIAL

Unit Type	Count	Percent
Singles	103	19.5%
Executive Towns	262	49.5%
Avenue Towns	158	29.9%
Units from Land Swap	6	1.1%
Total	529	100.0%

Legend

- 28' Single Family Homes
- 36' Single Family Homes
- 43' Single Family Homes
- Executive Towns
- Avenue Towns
- Storm Water Management (SWM) Pond
- Parkland
- Natural Feature | Area within Floodplain
- Open Space / Pathways
- Property Boundary
- Mattamy to Minto Land Exchange
- Minto to Mattamy Land Exchange

Notes:

Parkland Required = 0.88 ha

MISSING 0.03 ha

No.	Description	Date	By
3	Change in Lotting	6/28/2023	E.H
2	Land Exchange Edits	6/20/2023	E.H
1	Executive Town Depth Adjustment	6/14/2023	E.H
0	Issued for Review	5/3/2023	D.F

Revisions

Title: **Concept Plan 44**

Project: **Kennedy Lands**

North

Scale: **NTS**

Drawn By: D.F.
Checked By: C.S.

Minto Communities Inc
180 Kent Street,
Ottawa, ON
K1P 0B6

Richard Hu

From: Moore, Sean <Sean.Moore@ottawa.ca>
Sent: August 6, 2021 3:37 PM
To: Curtiss Scarlett; Bronwyn Anderson
Cc: Shillington, Jeffrey; Krabicka, Jeannette; Rehman, Sami; Richardson, Mark; McKinney, Frank; Young, Mark; Giampa, Mike
Subject: Kennedy Lands / Minto Preconsult
Attachments: 3432 Greenbank Road_design_brief_submission requirements.pdf; 3432 Greenbank Road - UD Illustration.pdf; 210806_3432 Greenbank (Minto)_pre-consultation PFP comments.pdf

Curtiss,

As per our preconsultation this morning for Zoning and Subdivision at 3432 Greenbank Road please find our comments and requirements below.

Plans and Studies List:

Required Plans:

- Draft Plan of Subdivision
- Plan of Survey
- Grading Control and Drainage Plan
- Site Servicing Plan
- Geometric Road Design (GRD) drawings will be required with the first submission of underground infrastructure and grading drawings.
- Sediment and Erosion Control Plan

Required Reports:

- Servicing Study & Stormwater Management Report
- Transportation Impact Assessment
- Noise Feasibility Study
- Geotechnical Study – with information on soils for tree planting and discussion on the proposed ROW cross section
- Phase 1 ESA (5 copies) – to conformity with OReg 153/04 / Phase 2 ESA if needed
- Tree Conservation Report
- Environmental Impact Statement, addressing:

- SAR
- Floodplain
- setbacks from watercourses (OP 4.7.3)
- draw recommendations from Subwatershed study into design

- Planning Rationale, including parks discussion and zoning/OPA/Secondary Plan discussion with accompanying zoning by-law amendment

All required plans & reports are to be provided in digital format (.pdf) at application submission through an FTP site. Send the submission requirements to PlanningCirculations@ottawa.ca and cc me as the file lead.

Engineering

1. Full comments to be submitted separately from Jeff Shillington
2. Please limit any retaining wall requirements on City property

Rec, Culture and Facilities Services Department:

1. See attached

Urban Design

1. A design brief is required. A terms of reference is provided.
2. Please review and address any relevant policies related to Urban Design in The Barrhaven South Community Design Plan.
3. Efforts to break down the length of the blocks should be considered. An illustration is provided.
4. PRUD support's RCFS desire to co-located parkland dedication adjacent to the future District Park to the north.
5. End block conditions should have units facing both future Greenbank Road and the Jock River to enhance views and reduce the need for noise walls.
6. Please provide additional information in support of the proposed 16.5 m r.o.w. to demonstrate that tree planting and the provision of sidewalks is possible.
7. Consideration should be given to creating window street opportunities abutting the District Park across the entire north end of the site vs. the current 50/50 approach.
8. Greater mixing of unit types should be considered. The provision of additional detached dwellings is encouraged, and the provision of higher density units (Infusion Terraces) at the intersection of River Boat Heights and Greenbank Road is also encouraged in accordance with the CDP.

Forestry

TCR requirements:

1. a Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City
    a. an approved TCR is a requirement of Site Plan approval.
    b. The TCR may be combined with eh LP provided all information is supplied
2. As of January 1 2021, any removal of privately-owned trees 10cm or larger in diameter, or publicly (City) owned trees of any diameter requires a tree permit issued under the Tree Protection Bylaw (Bylaw 2020 – 340); the permit will be based on an approved TCR and made available at or near plan approval.
3. The Planning Forester from Planning and Growth Management as well as foresters from Forestry Services will review the submitted TCR
    a. If tree removal is required, both municipal and privately-owned trees will be addressed in a single permit issued through the Planning Forester
    b. Compensation may be required for city owned trees – if so, it will need to be paid prior to the release of the tree permit
4. the TCR must list all trees on site, as well as off-site trees if the CRZ extends into the developed area, by species, diameter and health condition
5. please identify trees by ownership – private onsite, private on adjoining site, city owned, co-owned (trees on a property line)
6. the TCR must list all trees on adjacent sites if they have a critical root zone that extends onto the development site

7. If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained
8. All retained trees must be shown and all retained trees within the area impacted by the development process must be protected as per City guidelines available at Tree Protection Specification or by searching Ottawa.ca
    a. the location of tree protection fencing must be shown on a plan
    b. show the critical root zone of the retained trees
    c. if excavation will occur within the critical root zone, please show the limits of excavation
9. the City encourages the retention of healthy trees; if possible, please seek opportunities for retention of trees that will contribute to the design/function of the site.
10. For more information on the process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca or on City of Ottawa

LP tree planting requirements:

For additional information on the following please contact adam.palmer@Ottawa.ca

Minimum Setbacks

- Maintain 1.5m from sidewalk or MUP/cycle track.
- Maintain 2.5m from curb
- Coniferous species require a minimum 4.5m setback from curb, sidewalk or MUP/cycle track/pathway.
- Maintain 7.5m between large growing trees, and 4m between small growing trees. Park or open space planting should consider 10m spacing.
- Adhere to Ottawa Hydro's planting guidelines (species and setbacks) when planting around overhead primary conductors.

Tree specifications

- Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.
- Maximize the use of large deciduous species wherever possible to maximize future canopy coverage
- Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification; and include watering and warranty as described in the specification (can be provided by Forestry Services).
- Plant native trees whenever possible
- No root barriers, dead-man anchor systems, or planters are permitted.
- No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree)

Hard surface planting

- Curb style planter is highly recommended
- No grates are to be used and if guards are required, City of Ottawa standard (which can be provided) shall be used.
- Trees are to be planted at grade

Soil Volume

- Please ensure adequate soil volumes are met:

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

Conifer	25	15

Sensitive Marine Clay

- Please follow the City's 2017 Tree Planting in Sensitive Marine Clay guidelines

Environmental

An EIS will be required, which should address:
-SAR
-Floodplain
-setbacks from watercourses (OP 4.7.3)
-draw recommendations from Subwatershed study into design

A TCR will be required for plan of subdivision and/or site plan; can be combined with EIS to avoid duplications. I will default to Forestry Planner, who will be reviewing the TCR for tree cutting permit process.

The applicant should contact the RVCA to determine if any permits or approvals are required under their regulations.

Transportation

Any Development Charge road work (road widening, signal, auxiliary lane) may be front ended by the applicant, so long as the work is listed in the affordable network. Repayment will be based on warrants, as determined solely by the Transportation Services Department. A Front Ending application is required prior to any review.

A TIA is warranted, please proceed to scoping.
The application will not be deemed complete until the submission of the draft step 1-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable). Although a full review of the TIA Strategy report (Step 4) is not required prior to an application, it is strongly recommended.
Synchro files are required with Step 4.

Geometric Road Design (GRD) drawings will be required with the first submission of underground infrastructure and grading drawings.
These drawings should include such items as, but is not limited to:

Road Signage and Pavement Marking for the subdivision
Intersection control measure at new internal intersections
Location of depressed curbs and TWSIs;

Include traffic calming measures on roads within the limits of their subdivision to limit vehicular speed to 30 kph and improve pedestrian safety. These measures may include either vertical or horizontal features.

Site triangles at the following locations on the final plan will be required:

Local Road to Local Road: 3 metre x 3 metres
Local Road to Collector Road: 5 metre x 5 metres
Collector Road to Collector Road: 5 metre x 5 metres
Collector Road to Arterial Road: 5 metre x 5 metres

ROW protection on Greenbank is per the EA and addendums.
A Road Noise Impact Study is required

Please note that all new applications (pre-consultation meetings dated after March 3, 2021) must use the NEW TRANS Trip Generation Manual when forecasting site generated trips using this manual. The TRANS committee (a joint transportation planning committee serving the National Capital region) finalized a new manual early in March 2021. The document will be available in French and English on the TRANS website http://www.ncr-trans-rcn.ca/surveys/2009-trip-generation. The new manual has simplified the conversion from vehicle trips to person trips and then trips by modal share.

Regards,

Sean Moore, RPP/MCIP
Senior Planner
Development Review South Unit
Planning, Infrastructure and Economic Development Dept.
City of Ottawa

Cell: 613-805-9804
- Please note I am working from home during this crisis until further notice

'

This e-mail originates from the City of Ottawa e-mail system. Any distribution, use or copying of this e-mail or the information it contains by other than the intended recipient(s) is unauthorized. Thank you.

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'

Richard Hu

From: Shillington, Jeffrey <jeff.shillington@ottawa.ca>
Sent: August 10, 2021 3:15 PM
To: Steve Pichette
Cc: Moore, Sean; Curtiss Scarlett; Bronwyn Anderson
Subject: RE: Kennedy Lands / Minto Preconsult

Steve,

As discussed at the meeting the please find the following engineering comments:

- All servicing is to follow the 2007 Barrhaven South Master Servicing Study and the 2017 Barrhaven South Master Servicing Addendum;
- Stormwater Facilities Operations have indicated they intend on accepting the interim Greenbank Pond from Mattamy once all deficiencies are corrected and closing the file with Mattamy. Minto will require a consent to enter from the City in order to complete the expansion.
- Sump Pumps will be required on a portion of the development and require the following as per the City of Ottawa's sump pump conditions:
    - a hydrogeological assessment prior to registration that includes;
        - assessment of the seasonal high water table;
        - monitoring well program;
        - identification of the pre-development high water table;
        - anticipated post-development changes to the long-term water table;
        - potential for short term groundwater concerns during transient events;
        - estimated rate of groundwater ingress for both long-term and transient conditions;
        - assessment to be used to support the setting of the underside of footing elevations of affected areas;
    - as per the MSS addendum, an alternative house design is required (i.e. sump pumps);

Should you have any questions or concerns, please do not hesitate to contact me.

Regards,

Jeff Shillington, P.Eng.
Senior Project Manager, Development Review, South Branch
Planning, Infrastructure and Economic Development
City of Ottawa
tel: 580-2424 x 16960
email: jeff.shillington@ottawa.ca

From: Moore, Sean
Sent: August 06, 2021 3:37 PM
To: Curtiss Scarlett ; Bronwyn Anderson
Cc: Shillington, Jeffrey ; Krabicka, Jeannette ; Rehman, Sami ; Richardson, Mark ; McKinney, Frank ; Young, Mark ; Giampa, Mike
Subject: Kennedy Lands / Minto Preconsult

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- Floodplain
- setbacks from watercourses (OP 4.7.3)
- draw recommendations from Subwatershed study into design

- Planning Rationale, including parks discussion and zoning/OPA/Secondary Plan discussion with accompanying zoning by-law amendment

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Engineering

1. Full comments to be submitted separately from Jeff Shillington
2. Please limit any retaining wall requirements on City property

Rec, Culture and Facilities Services Department:

1. See attached

Urban Design

1. A design brief is required. A terms of reference is provided.
2. Please review and address any relevant policies related to Urban Design in The Barrhaven South Community Design Plan.
3. Efforts to break down the length of the blocks should be considered. An illustration is provided.

4. PRUD support's RCFS desire to co-located parkland dedication adjacent to the future District Park to the north.
5. End block conditions should have units facing both future Greenbank Road and the Jock River to enhance views and reduce the need for noise walls.
6. Please provide additional information in support of the proposed 16.5 m r.o.w. to demonstrate that tree planting and the provision of sidewalks is possible.
7. Consideration should be given to creating window street opportunities abutting the District Park across the entire north end of the site vs. the current 50/50 approach.
8. Greater mixing of unit types should be considered. The provision of additional detached dwellings is encouraged, and the provision of higher density units (Infusion Terraces) at the intersection of River Boat Heights and Greenbank Road is also encouraged in accordance with the CDP.

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    a. an approved TCR is a requirement of Site Plan approval.
    b. The TCR may be combined with eh LP provided all information is supplied
2. As of January 1 2021, any removal of privately-owned trees 10cm or larger in diameter, or publicly (City) owned trees of any diameter requires a tree permit issued under the Tree Protection Bylaw (Bylaw 2020 – 340); the permit will be based on an approved TCR and made available at or near plan approval.
3. The Planning Forester from Planning and Growth Management as well as foresters from Forestry Services will review the submitted TCR
    a. If tree removal is required, both municipal and privately-owned trees will be addressed in a single permit issued through the Planning Forester
    b. Compensation may be required for city owned trees – if so, it will need to be paid prior to the release of the tree permit
4. the TCR must list all trees on site, as well as off-site trees if the CRZ extends into the developed area, by species, diameter and health condition
5. please identify trees by ownership – private onsite, private on adjoining site, city owned, co-owned (trees on a property line)
6. the TCR must list all trees on adjacent sites if they have a critical root zone that extends onto the development site
7. If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained
8. All retained trees must be shown and all retained trees within the area impacted by the development process must be protected as per City guidelines available at Tree Protection Specification or by searching Ottawa.ca
    a. the location of tree protection fencing must be shown on a plan
    b. show the critical root zone of the retained trees
    c. if excavation will occur within the critical root zone, please show the limits of excavation
9. the City encourages the retention of healthy trees; if possible, please seek opportunities for retention of trees that will contribute to the design/function of the site.
10. For more information on the process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca or on City of Ottawa

LP tree planting requirements:

For additional information on the following please contact adam.palmer@Ottawa.ca

Minimum Setbacks

- Maintain 1.5m from sidewalk or MUP/cycle track.
- Maintain 2.5m from curb
- Coniferous species require a minimum 4.5m setback from curb, sidewalk or MUP/cycle track/pathway.
- Maintain 7.5m between large growing trees, and 4m between small growing trees. Park or open space planting should consider 10m spacing.
- Adhere to Ottawa Hydro's planting guidelines (species and setbacks) when planting around overhead primary conductors.

Tree specifications

- Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.
- Maximize the use of large deciduous species wherever possible to maximize future canopy coverage
- Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification; and include watering and warranty as described in the specification (can be provided by Forestry Services).
- Plant native trees whenever possible
- No root barriers, dead-man anchor systems, or planters are permitted.
- No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree)

Hard surface planting

- Curb style planter is highly recommended
- No grates are to be used and if guards are required, City of Ottawa standard (which can be provided) shall be used.
- Trees are to be planted at grade

Soil Volume

- Please ensure adequate soil volumes are met:

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

Sensitive Marine Clay

- Please follow the City's 2017 Tree Planting in Sensitive Marine Clay guidelines

Environmental

An EIS will be required, which should address:
-SAR
-Floodplain
-setbacks from watercourses (OP 4.7.3)
-draw recommendations from Subwatershed study into design

A TCR will be required for plan of subdivision and/or site plan; can be combined with EIS to avoid duplications. I will default to Forestry Planner, who will be reviewing the TCR for tree cutting permit process.

The applicant should contact the RVCA to determine if any permits or approvals are required under their regulations.

Transportation

Any Development Charge road work (road widening, signal, auxiliary lane) may be front ended by the applicant, so long as the work is listed in the affordable network. Repayment will be based on warrants, as determined solely by the Transportation Services Department. A Front Ending application is required prior to any review.

A TIA is warranted, please proceed to scoping.
The application will not be deemed complete until the submission of the draft step 1-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable). Although a full review of the TIA Strategy report (Step 4) is not required prior to an application, it is strongly recommended.
Synchro files are required with Step 4.

Geometric Road Design (GRD) drawings will be required with the first submission of underground infrastructure and grading drawings.
These drawings should include such items as, but is not limited to:

- Road Signage and Pavement Marking for the subdivision
- Intersection control measure at new internal intersections
- Location of depressed curbs and TWSIs;

Include traffic calming measures on roads within the limits of their subdivision to limit vehicular speed to 30 kph and improve pedestrian safety. These measures may include either vertical or horizontal features.

Site triangles at the following locations on the final plan will be required:

- Local Road to Local Road: 3 metre x 3 metres
- Local Road to Collector Road: 5 metre x 5 metres
- Collector Road to Collector Road: 5 metre x 5 metres
- Collector Road to Arterial Road: 5 metre x 5 metres

ROW protection on Greenbank is per the EA and addendums.
A Road Noise Impact Study is required

Please note that all new applications (pre-consultation meetings dated after March 3, 2021) must use the NEW TRANS Trip Generation Manual when forecasting site generated trips using this manual. The TRANS committee (a joint transportation planning committee serving the National Capital region) finalized a new manual early in March 2021. The document will be available in French and English on the TRANS website http://www.ncr-trans-rcn.ca/surveys/2009-trip-generation. The new manual has simplified the conversion from vehicle trips to person trips and then trips by modal share.

Regards,

Sean Moore, RPP/MCIP
Senior Planner
Development Review South Unit
Planning, Infrastructure and Economic Development Dept.
City of Ottawa

Cell: 613-805-9804
- Please note I am working from home during this crisis until further notice

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This e-mail originates from the City of Ottawa e-mail system. Any distribution, use or copying of this e-mail or the information it contains by other than the intended recipient(s) is unauthorized. Thank you.

Le présent courriel a été expédié par le système de courriels de la Ville d'Ottawa. Toute distribution, utilisation ou reproduction du courriel ou des renseignements qui s'y trouvent par une personne autre que son destinataire prévu est interdite. Je vous remercie de votre collaboration.

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NOTICE OF ABANDONMENT
OF DRAINAGE WORKS
***Drainage Act*, R.S.O. 1990, c.D.17 ss. 84(1), as amended**

RE: CLARKE MUNICIPAL DRAIN – BARRHAVEN WARD

Dear owner of land assessed for benefit in relation to the Clarke Municipal Drain:

YOU ARE HEREBY NOTIFIED that the City of Ottawa has received a written request pursuant to Section 84(1) of the *Drainage Act*, R.S.O. 1990, c. D.17, as amended (hereinafter referred to as the "Drainage Act") to abandon the Clarke Municipal Drain, East Main Drain, from sta. 0+00 to sta. 14+31 and West Main Drain, from sta. 0+00 to sta. 8+58 located in Lots 12 and 13, Concession 3, former Township of Nepean, Barrhaven West Ward (hereinafter referred to as the "Clarke Municipal Drain, East and West Main Drains").

TAKE NOTICE THAT the City of Ottawa has received the written request of three-quarters of the owners of land assessed for benefit in respect of the above-described drainage works, who, according to the last revised assessment roll, own not less than three-quarters of the area assessed for benefit, asking for the abandonment of the Clarke Municipal Drain, East and West Main Drains.

AND FURTHER TAKE NOTICE that the City of Ottawa intends to act on the request for abandonment of the Clarke Municipal Drain, East and West Main Drains, unless you send a notice to the City Clerk of the City of Ottawa, in accordance with Subsection 84(1) of the Drainage Act requesting that the report of an engineer be made on the proposed abandonment. A copy of Section 84 of the Drainage Act is enclosed with this notice. Your notice must be received by the City Clerk on or before December 12, 2022.

If you do not require the report of an engineer to be made on the proposed abandonment, no action is required on your part.

If you require a report of an engineer to made on the proposed abandonment of the Clarke Municipal Drain, East and West Main Drains, please send a notice to the City Clerk at the address set out below.

Please ensure that the notice includes your full legal name, mailing address, telephone number and email address.

M. Rick O'Connor, City Clerk and Solicitor
c/o Ms. Nazgol Namazi, Legal Counsel, phone 613-580-2424 ext 28613
City of Ottawa 01-83
110 Laurier Avenue, 3rd Floor West, Ottawa, ON K1P 1J1

If you prefer, your notice may be delivered to the Drainage Superintendent at the address below.

_____

Signed: Dave Ryan
Title: Drainage Superintendent
Address: 2155 Roger Stevens Drive, North Gower, ON K0A 2T0

Dated this 2nd day of December 2022

This form contains information collected and maintained specifically for the purpose of creating a record available to the general public and is open to inspection by any person upon request to the office of the City Clerk and Solicitor, City of Ottawa, Monday to Friday from 8:30 am to 4:30 pm.

Any notice received by the City Clerk and Solicitor, City of Ottawa, in accordance Subsection 84(1) of the Drainage Act requesting that the report of an engineer be made on the proposed abandonment, is subject to disclosure to the public in accordance with the provisions of the *Municipal Freedom and Protection of Privacy Act*, R.S.O 1990, c.M.56, as amended.

APPENDIX B

EXISTING APPROVALS

Ontario

Ministry of the Environment and Climate Change
Ministère de l'Environnement et de l'Action en matière de changement climatique

ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER 1648-ADBLF9
Issue Date: September 19, 2016

Mattamy (Half Moon Bay) Limited
50 Hines Road, Suite 100
Kanata, Ontario
K2K 2M5

Site Location: Part of Lot 10, 11 and 12, Concession 3 (Rideau Front)
City of Ottawa, Ontario

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

establishment of stormwater management Works serving Phase 4 and Phase 7 of Half Moon Bay residential subdivision development and external lands, located south of the future Greenbank Road, west of the existing Greenbank Road and Jock River, north of River Run Avenue, east of the future Greenbank Road and future development, for the collection, treatment and disposal of stormwater run-off from a total catchment area of approximately 16 hectares, within Jock River watershed, in the City of Ottawa, providing Enhanced Level water quality control and erosion protection and conveyance post-development flows for all storm events up to and including the 100-year storm event, consisting of the following

stormwater management facility (catchment area 16 hectares): - one (1) wet pond (Interim Greenbank SWM Pond) with a sediment forebay, located at north-east corner of the subdivision, within Block 205, having a permanent pool volume of 2,444 m^3, an extended detention volume of 846 m^3, and a total storage volume of approximately 6,537 m^3 during the 100-year storm event, including the permanent pool volume, at a total depth of approximately 4 m, complete with:

- an inlet structure consisting of a 1500 mm diameter inlet pipe, headwall and plunge pool with rip-rap over Terrafix filter fabric or equivalent, receiving inflow from on-site storm sewers located on the south side of the pond to the sediment forebay;

- an overland flow route with erosion control mat, having bottom width of 3 m, receiving stormwater run-off overland flow from Pearl Dace Crescent located on west side of the pond to the sediment forebay;

- a 450 mm diameter inlet pipe with headwall and rip-rap protection, located north side of the pond, receiving inflow from external undeveloped catchment area, discharging to the main cell;

- a 300 mm diameter conveyance pipe through the sediment forebay berm including all maintenance structures, connecting the sediment forebay to the main cell;

- a 100 mm diameter orifice plate on a 400 mm by 400 mm opening located at the 2.4 m by 2.4 m outlet control manhole, allowing a maximum release rate of 17 L/s at the extended detention level, discharging via a 750 mm diameter outlet pipe to an outlet channel;

- a 0.7 m wide weir with grate located at the 2.4 m by 2.4 m outlet control manhole identified above, combined with a 100 mm diameter orifice plate identified above and a 20 m wide broad-crested weir, allowing a maximum release rate of 2218 L/s during the 100-year storm event, discharging to an outlet channel;

- a 20 m wide broad-crested weir identified above from the main cell to the outlet channel for emergency overflow;

an outlet channel: an approximately 38 m long outlet channel with a plunge pool, having bottom width of 8 m, located at east side of the pond, within Block 207, complete with rip-rap wrapped all sides with Terrafix filter fabric or equivalent, receiving inflow from a 750 mm diameter inlet pipe and a 20 m wide broad-crested weir identified above, and from Half Moon Bay Road via an overland flow route, having bottom width of 3 m, discharging via a 3000 mm by 2400 mm box culvert with rip-rap protection under existing Greenbank Road to Jock River;

including erosion/sedimentation control measures during construction and all other controls and appurtenances essential for the proper operation of the aforementioned Works;

all in accordance with the submitted application and supporting documents listed in Schedule "A" forming part of this Approval.

For the purpose of this environmental compliance approval, the following definitions apply:

1. "Approval" means this Environmental Compliance Approval and any Schedules to it, including the application and supporting documentation;

2. "Director" means any Ministry employee appointed by the Minister pursuant to section 5 of the Part II.1 of the Environmental Protection Act;

3. "District Manager" means the District Manager of the Ottawa office of the Ministry;

4. "Ministry" means the Ontario Ministry of the Environment and Climate Change;

5. "Owner" means Mattamy (Half Moon Bay) Limited, and includes its successors and assignees;

6. "Water Supervisor" means the Water Supervisor of the Ottawa office of the Ministry;

7. "Works" means the sewage works described in the Owner's application, this Approval and in the supporting documentation referred to herein, to the extent approved by this Approval.

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL PROVISIONS

1.1 The Owner shall ensure that any person authorized to carry out work on or operate any aspect of the Works is notified of this Approval and the Conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

1.2 Except as otherwise provided by these Conditions, the Owner shall design, build, install, operate and maintain the Works in accordance with the description given in this Approval, and the application for approval of the Works.

1.3 Where there is a conflict between a provision of any submitted document referred to in this Approval and the Conditions of this Approval, the Conditions in this Approval shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

1.4 Where there is a conflict between the listed submitted documents, and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.

1.5 The Conditions of this Approval are severable. If any Condition of this Approval, or the application of any requirement of this Approval to any circumstance, is held invalid or unenforceable, the application of such Condition to other circumstances and the remainder of this Approval shall not be affected thereby.

1.6 The issuance of, and compliance with the Conditions of this Approval does not:

(a) relieve any person of any obligation to comply with any provision of any applicable statute, regulation or other legal requirement, including, but not limited to, the obligation to obtain approval from the local conservation authority necessary to construct or operate the sewage Works; or

(b) limit in any way the authority of the Ministry to require certain steps be taken to require the Owner to furnish any further information related to compliance with this Approval.

1.7 This Approval includes the treatment and disposal of stormwater run-off from approximately 16 hectares of catchment area draining to the stormwater management facility (Interim Greenbank SWM Pond) in the City of Ottawa, based on an average imperviousness of approximately 46%. Any changes within the drainage areas that might increase the required storage volumes or increase the flows to or from the

stormwater management facility or any structural/physical changes to the stormwater management facility including the inlets or outlets will require an amendment to this Approval.

2. EXPIRY OF APPROVAL

This Approval will cease to apply to those parts of the proposed Works which have not been constructed within **five (5) years** of the date of this Approval.

3. CHANGE OF OWNER

3.1 The Owner shall notify the District Manager and the Director, in writing, of any of the following changes within thirty (30) days of the change occurring:

(a) change of Owner;

(b) change of address of the Owner;

(c) change of partners where the Owner is or at any time becomes a partnership, and a copy of the most recent declaration filed under the Business Names Act, R.S.O. 1990, c.B17 shall be included in the notification to the District Manager; and

(d) change of name of the corporation where the Owner is or at any time becomes a corporation, and a copy of the most current information filed under the Corporations Information Act, R.S.O. 1990, c. C39 shall be included in the notification to the District Manager.

3.2 In the event of any change in ownership of the Works, other than a change in ownership to the municipal, i.e. assumption of the Works, the Owner shall notify the succeeding owner in writing of the existence of this Approval, and a copy of such notice shall be forwarded to the District Manager and the Director.

3.3 Notwithstanding any other requirements in this Approval, upon transfer of the ownership of the Works to a municipality, if applicable, any reference to the "District Manager" within the Terms and Conditions of this Approval shall be replaced with "Water Supervisor".

4. OPERATION AND MAINTENANCE

4.1 The Owner shall inspect the Works at least **once a year** and, if necessary, clean and maintain the Works to prevent the excessive build-up of sediments and/or vegetation.

4.2 The Owner shall maintain a record the results of these inspections and any cleaning and maintenance operations undertaken. The record shall include the following:

(a) the name of the Works; and

(b) the date and results of each inspection, maintenance and cleaning, including an estimate of the quantity of any materials removed.

5. MONITORING AND REPORTING

5.1 The Owner shall carry out a monitoring program and evaluate the performance of the stormwater management Works commencing at the initial completion of construction of the Works and continuing for a minimum of **two (2) years** after 90% of the homes in the Half Moon Bay Subdivision Phase 4 and Phase 7 have been occupied.

5.2 The monitoring program shall include obtaining grab samples at the outfall of the Interim Greenbank SWM Pond for at least three (3) rainfall wet events per year (a wet event is defined as a minimum of 15 mm of rain in the previous 24 hours). Two (2) of the events must occur within the May to September time period.

5.3 Samples should be tested for Total Suspended Solids (mg/L) and results recorded.

5.4 The methods and protocols for sampling, analysis and recording shall conform, in order of precedence, to the methods and protocols specified in the following:

(a) the Ministry's Procedure F-10-1, "Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only)", as amended from time to time by more recently published editions;

(b) the Ministry's publication "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" (January 1999), ISBN 0-7778-1880-9, as amended from time to time by more recently published editions;

(c) the publication "Standard Methods for the Examination of Water and Wastewater" (21st edition), as amended from time to time by more recently published editions.

5.5 The Owner shall prepare a Performance Report, **every five (5) years**, a Performance Assessment Report, addressing the following:

(a) a description of any operating problems encountered and corrective actions taken during the reporting period and the need for further investigations in the following reporting period for system refinements or ways of improving the performance of the Works;

(b) measurement of the mass of accumulated sediment removed when undertaking maintenance of the Works as per the Operations and Maintenance Conditions, above;

5.6 The Owner shall maintain a record of all test results and all reports related to the sampling, monitoring and maintenance program for the Works, and shall make the information available to the Ministry, upon request.

5.7 The measurement frequency specified in this Condition 5, Subsections (1) and (2), above, and reporting frequency specified in Subsection (5), above, may, **after five (5) years** of monitoring in accordance with this Condition, be modified by the District Manager/Water Supervisor of the Ottawa office in writing from time to time.

6. TEMPORARY EROSION AND SEDIMENT CONTROL

6.1 The Owner shall install and maintain temporary sediment and erosion control measures during construction and conduct inspections once every **two (2) weeks** and after each significant storm event (a significant storm event is defined as a minimum of 25 mm of rain in any 24 hours period). The inspections and maintenance of the temporary sediment and erosion control measures shall continue until they are no longer required and at which time they shall be removed and all disturbed areas reinstated properly.

6.2 The Owner shall maintain records of inspections and maintenance which shall be made available for inspection by the Ministry, upon request. The record shall include the name of the inspector, date of inspection, and the remedial measures, if any, undertaken to maintain the temporary sediment and erosion control measures.

7. RECORD KEEPING

The Owner shall retain for a minimum of **five (5) years** from the date of their creation, all records and information related to or resulting from the operation and maintenance activities required by this Approval.

Schedule "A"

1. Application for Environmental Compliance Approval, dated July 28, 2016, and received on August 5, 2016, including final plans and specifications prepared by David Schaeffer Engineering Ltd.

2. Design Brief for the Interim Greenbank Stormwater Management Pond for Phases 4 and 7 of the Half Moon Bay Subdivision, City of Ottawa, December 2015, Revised July 2016, prepared by David Schaeffer Engineering Ltd. and J.F. Sabourin and Associates Inc.

3. Engineering Drawings, stamped and dated July 22, 2016 and August 26, 2016, prepared by David Schaeffer Engineering Ltd.

4. Emails dated August 31 and September 1, 2016, from Jennifer Ailey, P.Eng., David Schaeffer Engineering Ltd., including all supporting documents.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is imposed to ensure that the Works are built and operated in the manner in which they were described for review and upon which approval was granted. This Condition is also included to emphasize the precedence of Conditions in the Approval and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review.

2. Condition 2 is included to ensure that, when the Works are constructed, the Works will meet the standards that apply at the time of construction to ensure the ongoing protection of the environment.

3. Condition 3 is included to ensure that the Ministry records are kept accurate and current with respect to approved Works and to ensure that any subsequent Owner of the Works is made aware of the Approval and continue to operate the Works in compliance with it.

4. Condition 4 is included to require that the Works be properly operated and maintained such that the environment is protected.

5. Condition 5 is included to enable the Owner to evaluate and demonstrate the performance of the Works on a continual basis, so that the Works are properly operated and maintained at a level which is consistent with the design objectives specified in the Approval and that the Works do not cause any impairment of the receiving watercourse.

6. Condition 6 is included as installation, regular inspection and maintenance of the temporary sediment and erosion control measures is required to mitigate the impact on the downstream receiving watercourse during construction, until they are no longer required.

7. Condition 7 is included to require that all records are retained for a sufficient time period to adequately evaluate the long-term operation and maintenance of the Works.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;

8. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of
Part II.1 of the Environmental Protection Act
Ministry of the Environment and
Climate Change
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 19th day of September, 2016

Gregory Zimmer, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

LW/
c: DWMD Supervisor, MOECC Ottawa
District Manager, MOECC Ottawa Office
Jennifer Ailey, P.Eng., David Schaeffer Engineering Ltd. (DSEL)

RIDEAU VALLEY
CONSERVATION AUTHORITY

3889 Rideau Valley Drive, P.O. Box 599, Manotick, ON K4M 1A5
tel 613-692-3571 | 1-800-267-3504 | fax 613-692-0831 | www.rvca.ca

A member of Conservation Ontario

LETTER OF PERMISSION – ONT. REG. 174/06, SECTION 28 CONSERVATION AUTHORITIES ACT 1990, AS AMENDED.

Date: December 2, 2016.
File: RV5-33/16
Contact: Hal Stimson
(613) 692-3571 Ext 1127
hal.stimson@rvca.ca

Mr. Rob Pierce
Mattamy (Half Moon Bay) Limited
50 Hines Road Suite 100
Kanata, Ontario
K2K 2M5

Permit to alter a waterway under Section 28 of the Conservation Authorities Act for Storm water management pond and outlet at Lot 12, Concession 3, Nepean now in the City of Ottawa

Dear Mr. Pierce

The Rideau Valley Conservation Authority has reviewed your application on behalf of Mattamy Limited and understands the proposal to be for: the installation of a new storm water management facility spillway and a storm outlet with concrete headwall and rip rap outlet protection. The work involves the installation of a new 3.0 m by 2.4 m by 19.0 m long concrete box culvert crossing Greenbank Road which will require appropriate City of Ottawa authorization for the work on City Road Right of Way. The work must also ensure that flow from property to the north is accepted per current drainage conditons.

This proposal was reviewed under Ontario Regulation 174/06, the "*Development, Interference with Wetlands and Alterations to Shorelines and Watercourses*" regulation.

PERMISSION AND CONDITIONS

By this letter the Rideau Valley Conservation Authority hereby grants you approval to undertake this project as outlined in your permit application but subject to the following conditions:

1. Approval is subject to the understanding of the project as described above and outlined in the application and submitted plans including:
   - Drawing Sheet No. 28 titled Plan and Profiles of Pond Inlet/Outlet – Half Moon Bay Subdivision Phases 4, 7 & 8, Revision No. 4 dated 16-10-17 stamped by Z. Li, P. Eng.as prepared by DSEL.
   - Drawing Sheet No. 34 titled Greenbank SWM Pond (Interim) – Half Moon Bay Subdivision Phases 4, 7 & 8, Revision No. 5 dated 16-10-17 stamped by Z. Li, P. Eng.as prepared by DSEL.
   - Drawing Sheet No. 34A titled Greenbank SWM POND (Ultimate) – Half Moon Bay Subdivision Phases 4, 7 & 8, Revision No. 5 dated 16-10-17 stamped by Z. Li, P. Eng.as prepared by DSEL.
   - Drawing Sheet No. 35 titled Greenbank SWM Pond Sections (Interim) – Half Moon Bay Subdivision Phases 4, 7 & 8, Revision No. 5 dated 16-10-17 stamped by Z. Li, P. Eng.as prepared by DSEL.
   - Drawing Sheet No. 35A titled Greenbank SWM Pond Sections and Details (Ultimate) – Half Moon Bay Subdivision Phases 4, 7 & 8, Revision No. 5 dated 16-10-17 stamped by Z. Li, P. Eng.as prepared by DSEL.
   - Drawing Sheet No. 48 titled Erosion and Sediment Control Plan – Half Moon Bay Subdivision Phases 4, 7 & 8, Revision No. 7 dated 16-10-17 stamped by Z. Li, P. Eng.as prepared by DSEL.
   - Drawing Sheet No. 50 titled Erosi9on and Sediment Control Details – Half Moon Bay Subdivision Phases 4, 7 & 8, Revision No. 6 dated 16-10-17 stamped by Z. Li, P. Eng.as prepared by DSEL.
   - Report titled Design Brief for the Interim Stormwater Management Pond for Phases 4 and 7 of the Half Moon Bay Subdivision Project No. 13-703 July 2016 by DSEL.
   - Report titled Technical Design Brief: Greenbank SWM Pond Outlet Channel Half Moon Bay Subdivision dated September 22, 2016 by GeoMorphix
   - Report titled Headwater Drainage Assessment Mattamy Half Moon Bay dated May 6, 2016 by Kilgour & Associates Ltd.

   No conditions are subject to change/revision by the on-site contractor(s).

2. **A De-watering Plan and Sediment and Erosion Control Plan for the installation of the box culvert and the channel outlet must be submitted by the contractor to this office for review prior to construction activities commencing.**

3. Any excess excavated material, as a result of the work, must be disposed of in a suitable location outside any regulatory floodplain and fill regulated area.

4. Rip rap erosion protection to be used at the storm outlet is not to encroach onto the bed of the Jock River.

5. It is recommended that you retain the services of an engineer to conduct on-site inspections to ensure adequacy of the work, verify stability and re-instatement of the final grades and confirm all imported fill is of a suitable type and has been adequately placed and compacted.

6. Only clean non-contaminated fill material will be used and all work is to occur on your property, or if on other property (i.e. road allowance) only with full authorization of the owner(s).

7. **There will be no in-water works between March 15 and July 15, of any given year to protect local aquatic species populations during their spawning and nursery time periods.**

8. All in-stream work should be completed in the dry by de-watering the work area and diverting and/or pumping any flows around cofferdams placed at the limits of the work area. Silt or debris that has accumulated around the temporary cofferdams should be cautiously removed prior to their withdrawal. No channel modifications or dredging is permitted or implied by this letter.

9. Work in-water shall not be conducted at times when flows are elevated due to local rain events, storms or seasonal floods. Existing stream flows must be maintained downstream of the de-watered work area without interruption, during all stages of the work. There must be no increase in water levels upstream of the de-watered work area.

10. It is recommended that you ensure your contractor(s) are provided with a copy of this letter so as to ensure compliance with the conditions listed herein.

11. Any aquatic species (fish, turtles) trapped within an enclosed work area are to be safely relocated outside of the enclosed area to the main watercourse downstream of the work zone.

12. Sediment barriers should be used on site in an appropriate method according to the Ontario Provincial Standard Specifications (OPSS) for silt barriers as a minimum and should include the use of an in-water sediment at the confluence with the Jock River. If the sediment and erosion control methods include silt fence it should be placed along the shoreline to prevent overland flow on disturbed areas from entering the watercourse. Soil type, slope of land, drainage area, weather, predicted sediment load and deposition should be considered when selecting the type of sediment/erosion control.

13. Sediment and erosion control measures shall be in place before any excavation or construction works commence. All sediment/erosion control measures are to be monitored regularly by experienced personnel and maintained as necessary to ensure good working order. In the event that the erosion and sedimentation control measures are deemed not to be performing adequately, the contractor shall undertake immediate additional measures as appropriate to the situation to the satisfaction of the Conservation Authority.

14. The waters of the creek are NOT to be considered as machine staging areas. Activities such as equipment refuelling and maintenance must be conducted away from the water to prevent entry of

petroleum products, debris, or other deleterious substances into the water. Operate machinery from outside the water, or on the water in a manner that minimizes disturbance to the banks or bed of the watercourse. Equipment shall not be cleaned in the watercourse or where wash-water can enter any watercourse. Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks

15. All disturbed soil areas must be appropriately stabilized to prevent erosion.

16. Develop a response plan that is to be implemented immediately in the event of flooding, a sediment release or spill of a deleterious substance. This plan is to include measures to: a) stop work, contain sediment-laden water and other deleterious substances and prevent their further migration into the watercourse and downstream receiving watercourses; b) notify the RVCA and all applicable authorities in the area c) promptly clean-up and appropriately dispose of the sediment-laden water and deleterious substances; and d) ensure clean-up measures are suitably applied so as not to result in further alteration of the bed and/or banks of the watercourse; and e) ensure construction equipment and/or materials are located outside the 100-year floodplain in the vent of flooding.

17. Nothing in this letter of permission relieves the applicant from requirements of any other federal, provincial or municipal permits or permission including, for example, Ontario Ministry of Environment Certificate of Approvals, or stormwater or site plan approvals.

18. Any stockpiled materials shall be stored and stabilized away from the water.

19. The owner is ultimately responsible for failure to comply with any and/or all of these conditions and must take all precautions to ensure no sediment runoff from the work site into any watercourse during and after the construction period. Failure to comply with the approval and/or conditions of this letter will result in the permit being revoked and may also result in legal action being initiated to resolve the matter to the Conservation Authority's satisfaction.

20. The applicant agrees that Authority staff may visit the subject property, before, during and after project completion, to ensure compliance with the conditions as set out in this letter of permission.

21. A new application must be submitted should any work as specified in this letter be ongoing or planned for or after December 2, 2018.

22. That the Authority be given twenty-four hours notice prior to the start of construction and within twenty-four hours of project completion.

23. All other approvals as might be required from the Municipality, and/or other Provincial or Federal Agencies must be obtained prior to initiation of work. This includes but is not limited to the Endangered Species Act., the Ontario Water Resources Act., Environmental Protection Act., Public Lands Act, and the Fisheries Act.

By this letter the Rideau Valley Conservation Authority assumes no responsibility or liability for any flood, erosion, or slope failure damage which may occur either to your property or the structures on it or if any activity undertaken by you adversely affects the property or interests of adjacent landowners. This letter does not relieve you of the necessity or responsibility for obtaining any other federal, provincial or municipal permits. This permit is not transferable to subsequent property owners.

Should you have any questions regarding this letter please contact Hal Stimson at our Manotick office.

T. K. Davidson — Dec 2/16

Terry K. Davidson, P. Eng.
Conservation Authority S. 28 Signing delegate
O. Reg. 174/06

Date

Cc: J. Ailey, P. Eng. DSEL

- Pursuant to the provisions of S. 28(12) of the Conservation Authorities Act (R.S.O.1990, as amended.) any or all of the conditions set out above may be appealed to the Executive Committee of the Conservation Authority in the event that they are not satisfactory or cannot be complied with.
- Failure to comply with the conditions of approval or the scope of the project may result in the cancelling of the permission and/or initiation of legal action under S. 28(16) of the Act.
- This letter of permission does not come into full force and effect until the attached copy of this letter is returned to the Authority offices in Manotick signed and dated which return shall be taken as indicating acceptance of the conditions of the Authority's approval and acknowledgement that the details of the proposal as described in this letter are a fair and accurate representation of the proposed undertaking.

Name: ROB PIERCE (print)

Signed: RP Date: 2 Dec 2016

Ontario

Ministry of the Environment and Climate Change
Ministère de l'Environnement et de l'Action en matière de changement climatique

ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER 3029-ACNJPT
Issue Date: August 12, 2016

Mattamy (Half Moon Bay) Limited
50 Hines Road, Unit 100
Kanata, Ontario
K2K 2M5

Site Location: Half Moon Bay North Phases 4 and 7
Part of Lots 10, 11 and 12, Concession 3 (Rideau Front)
City of Ottawa

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

storm and sanitary sewers to be constructed in the City of Ottawa, on River Run Avenue (from 0+031.6 to 0+167.9), Burbot Street (from 0-001.6 to 0+351.5), Brassy Minnow Crescent (from 0+004.2 to 0+292.7), Pumpkinseed Crescent (from 0+002.1 to 0+175.4), Riverboat Heights (from 0+023.8 to 0+138.7), Logperch Circle (from 0+001.2 to 0+421.9), Pearl Dave Crescent (from 0-002.0 to 0+370.9), Finescale Way (from 0+000.0 to 132.1), Millars Sound Way (from 0-000.6 to 0+287.3), River Landing Avenue (from 0+011.7 to 0+160.0), Block 203 (from 0-002.3 to 0+070.9), Block 204 (from 0+015.5 to 0+090.5), Block 205 (from 0+000.0 to 0+156.3), Half Moon Bay Road (from 0+014.7 to 0+234.4), Greenbank Storm Pond Inlet (0-000.4 to 0+013.4), Greenbank Storm Pond Outlet (from 0+000.0 to 0+030.0);

all in accordance with the application from Mattamy (Half Moon Bay) Limited, dated July 28, 2016, including final plans and specifications prepared by David Schaeffer Engineering Ltd..

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of
Part II.1 of the Environmental Protection Act
Ministry of the Environment and
Climate Change
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 12th day of August, 2016

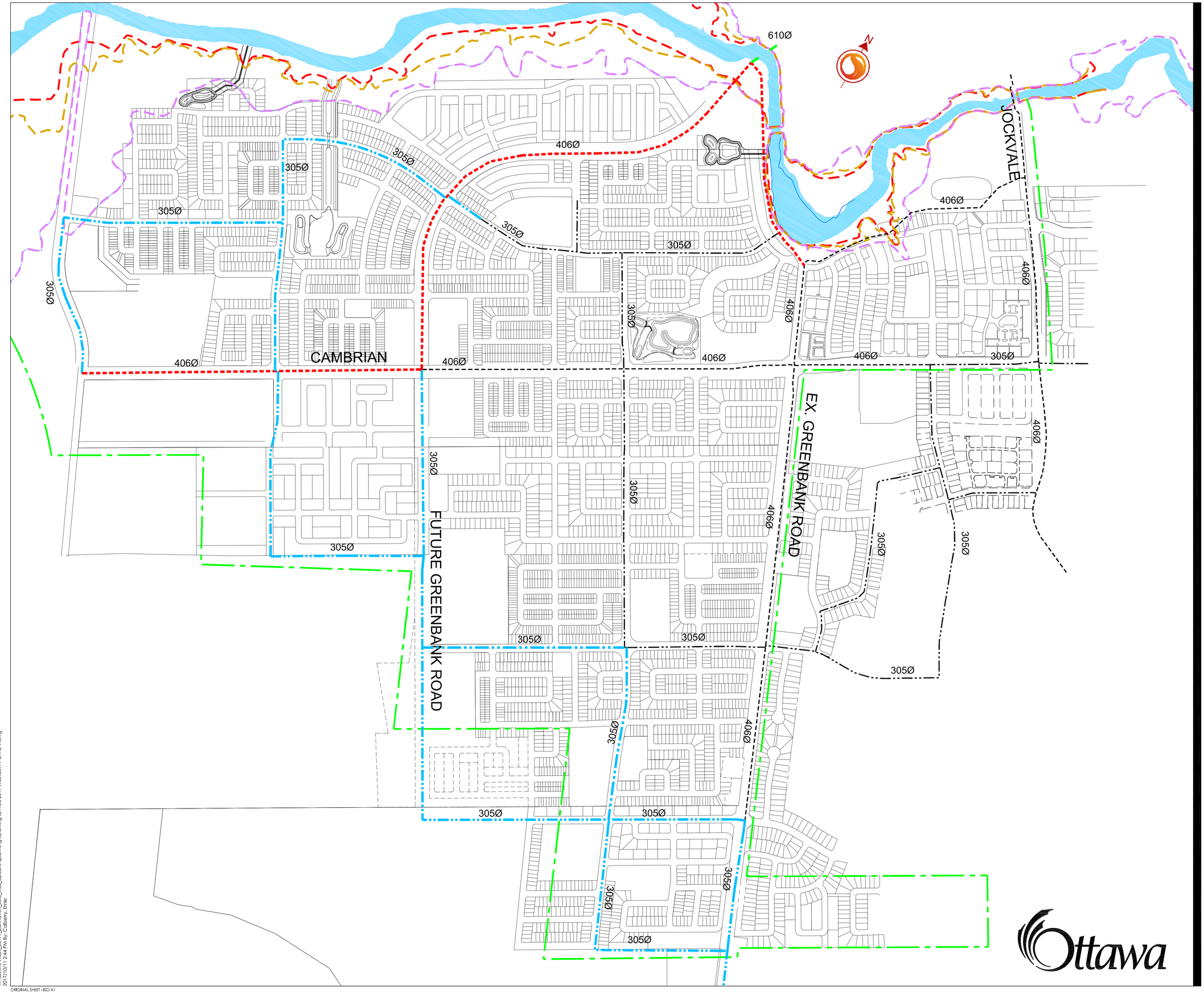
Gregory Zimmer, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

AF/

c: District Manager, MOECC Ottawa
M. Rick O'Connor, City Clerk, City of Ottawa
Jeff Shillington, Project Manger, Development Review City of Ottawa (File No. D07-16-13-0019)
Linda Carkner, Program Manager, Infrastructure Services, City of Ottawa
Jennifer Ailey, P. Eng., David Schaeffer Engineering Limited (DSEL)

APPENDIX C

BARRHAVEN SOUTH MASTER SERVICING STUDY ADDENDUM, DRAWING A-8, WATER SERVICING PLAN



Stantec

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

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Legend

- EXISTING 305Ø WATERMAIN
- EXISTING 406Ø WATERMAIN
- FUTURE 305Ø WATERMAIN
- FUTURE 406Ø WATERMAIN
- FUTURE 610Ø WATERMAIN
- 10 YEAR FLOOD LINE
- 25 YEAR FLOOD LINE
- 100 YEAR FLOOD LINE
- LIMIT OF CDP BOUNDARY
- 106.20 / 106.00 PROPOSED / EXISTING ELEVATION

Notes

1. THE LOCATION OF UTILITIES IS APPROXIMATE ONLY, THE EXACT LOCATION SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED. THE CONTRACTOR SHALL PROVE THE LOCATION OF UTILITIES AND SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION FROM DAMAGE.
2. CONCEPTUAL GRADING BASED ON AVAILABLE GRADE RAISE RESTRICTIONS, CONTOUR MAPPING, AND PRELIMINARY PROFILES FOR THE GREENBANK ROAD REALIGNMENT.

2	REVISED AS PER CITY COMMENTS	ST	KA	17.10.11
1	ISSUED FOR MSS ADDENDUM	ST	KA	14.11.28
Revision		By	Appd.	YY.MM.DD
File Name: 163400999-DWG 9.DWG		ST	AP	KA	14.11.21
		Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
CITY OF OTTAWA

BARRHAVEN SOUTH MASTER SERVICING STUDY ADDENDUM
Ottawa, ON

Title
WATER SERVICING PLAN

Project No.	Scale	Drawing No.	Sheet	Revision
163400999	1:5000 (0 50 150 250m)	A-8	9 of 9	2

Ottawa

W:\northern\163400999_Barrhaven_SUC_MSS_Update\planning\drawing\DWGS 2017\163400999-DWG 9.dwg
2017/10/11 2:44 PM By: C.dalberny, Ernie
ORIGINAL SHEET - ISO A1

APPENDIX D

KENNEDY LANDS – SANITARY DESIGN SHEETS

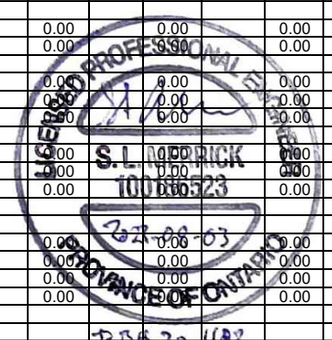
MATTAMY HMB WEST PHASES 2A&2B –
SANITARY DRAINAGE AREA PLAN AND DESIGN SHEET

STANTEC MSS ADDENDUM –
DRAWING A-4, SANITARY SERVICING PLAN AND DESIGN SHEET

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION							COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
STREET 5/ STREET 6																											
	27A	28A	0.51		46	0.51	46	3.7	0.55		0.00		0.00		0.00	0.00	0.51	0.51	0.17	0.71	73.5	200	0.65	26.44	0.03	0.84	0.36
	28A	29A	0.29		26	0.80	72	3.6	0.85		0.00		0.00		0.00	0.00	0.29	0.80	0.26	1.11	68.0	200	0.35	19.40	0.06	0.62	0.33
To STREET 1, Pipe 29A - 30A						0.80	72				0.00		0.00		0.00			0.80									
	31A	32A	0.52		47	0.52	47	3.7	0.56		0.00		0.00		0.00	0.00	0.52	0.52	0.17	0.73	73.5	200	0.65	26.44	0.03	0.84	0.36
	32A	33A	0.39		35	0.91	82	3.6	0.96		0.00		0.00		0.00	0.00	0.39	0.91	0.30	1.26	73.5	200	0.35	19.40	0.06	0.62	0.34
To STREET 1, Pipe 33A - 34A						0.91	82				0.00		0.00		0.00			0.91									
STREET 7/ STREET 8																											
	20A	21A	0.48		43	0.48	43	3.7	0.51		0.00		0.00		0.00	0.00	0.48	0.48	0.16	0.67	85.0	200	0.65	26.44	0.03	0.84	0.35
	21A	22A	0.56		50	1.04	93	3.6	1.09		0.00		0.00		0.00	0.00	0.56	1.04	0.34	1.43	84.5	200	0.35	19.40	0.07	0.62	0.36
To STREET 1, Pipe 22A - 26A						1.04	93				0.00		0.00		0.00			1.04									
	23A	24A	0.36		32	0.36	32	3.7	0.38		0.00		0.00		0.00	0.00	0.36	0.36	0.12	0.50	62.0	200	0.65	26.44	0.02	0.84	0.33
	24A	25A	0.53		48	0.89	80	3.6	0.94		0.00		0.00		0.00	0.00	0.53	0.89	0.29	1.23	81.5	200	0.35	19.40	0.06	0.62	0.34
	25A	26A	0.39		35	1.28	115	3.6	1.33		0.00		0.00		0.00	0.00	0.39	1.28	0.42	1.76	76.0	200	0.35	19.40	0.09	0.62	0.38
To STREET 1, Pipe 26A - 29A						1.28	115				0.00		0.00		0.00			1.28									
STREET 10																											
Contribution From STREET 9, Pipe 14A - 15A						0.29	26				0.00		0.00		0.00		0.29	0.29									
Contribution From STREET 9, Pipe 16A - 15A						0.70	63				0.00		0.00		0.00		0.70	0.99									
	15A	12A	0.42		38	1.41	127	3.6	1.47		0.00		0.00		0.00	0.00	0.42	1.41	0.47	1.94	77.0	200	0.35	19.40	0.10	0.62	0.39
	12A	13A	0.72		65	2.13	192	3.5	2.19		0.00		0.00		0.00	0.00	0.72	2.13	0.70	2.90	105.0	200	0.35	19.40	0.15	0.62	0.44
To STREET 1, Pipe 13A - 19A						2.13	192				0.00		0.00		0.00			2.13									
STREET 9																											
	14A	15A	0.29		26	0.29	26	3.7	0.31		0.00		0.00		0.00	0.00	0.29	0.29	0.10	0.41	71.0	200	0.65	26.44	0.02	0.84	0.30
To STREET 10, Pipe 15A - 12A						0.29	26				0.00		0.00		0.00			0.29									
	16A	15A	0.70		63	0.70	63	3.6	0.74		0.00		0.00		0.00	0.00	0.70	0.70	0.23	0.97	88.0	200	0.65	26.44	0.04	0.84	0.40
To STREET 10, Pipe 15A - 12A						0.70	63				0.00		0.00		0.00			0.70									
	17A	18A	0.67		60	0.67	60	3.6	0.71		0.00		0.00		0.00	0.00	0.67	0.67	0.22	0.93	114.0	200	0.65	26.44	0.04	0.84	0.39
	18A	19A	0.74		67	1.41	127	3.6	1.47		0.00		0.00		0.00	0.00	0.74	1.41	0.47	1.94	113.0	200	0.35	19.40	0.10	0.62	0.39
To STREET 1, Pipe 19A - 22A						1.41	127				0.00		0.00		0.00			1.41									
	2A	3A	0.23		13	0.23	13	3.7	0.16		0.00		0.00		0.00	0.00	0.23	0.23	0.08	0.23	30.5	200	0.65	26.44	0.01	0.84	0.26
	3A	6A	0.39		35	0.62	48	3.7	0.57		0.00		0.00		0.00	0.00	0.39	0.62	0.20	0.77	61.0	200	0.35	19.40	0.04	0.62	0.30
To STREET 1, Pipe 6A - 7A						0.62	48				0.00		0.00		0.00			0.62									
STREET 1																											
Contribution From STREET 1, Pipe 34A - 38A						11.34	1012				0.00		0.00		0.00		11.34	11.34									
Contribution From STREET 1, Pipe 37A - 38A						1.27	115				0.00		0.00		0.00		1.27	12.61									
	38A	39A	0.66		59	13.27	1186	3.2	12.30		0.00		0.00		0.00	0.00	0.66	13.27	4.38	16.68	108.5	300	0.20	43.25	0.39	0.61	0.57
	39A	EX. 233A	0.66		59	13.93	1245	3.2	12.87		0.00		0.00		0.00	0.00	0.66	13.93	4.60	17.46	113.0	300	0.20	43.25	0.40	0.61	0.58



DESIGN PARAMETERS

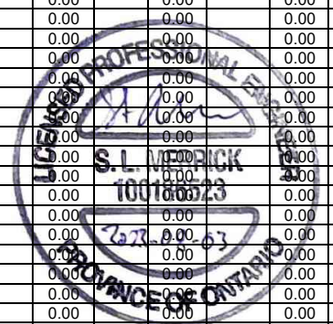
Park Flow =	9300	L/ha/da	0.10764	l/s/Ha			
Average Daily Flow =	280	l/p/day			Industrial Peak Factor = as per MOE Graph		
Comm/Inst Flow =	28000	L/ha/da	0.3241	l/s/Ha	Extraneous Flow =	0.330	L/s/ha
Industrial Flow =	35000	L/ha/da	0.40509	l/s/Ha	Minimum Velocity =	0.600	m/s
Max Res. Peak Factor =	4.00				Manning's n = (Conc)	0.013	(Pvc) 0.013
Commercial/Inst./Park Peak Factor =	1.00				Townhouse coeff=	2.7	
Institutional =	0.32	l/s/Ha			Single house coeff=	3.4	

Designed:	BNC	PROJECT:	**Minto-Kennedy Lands**
Checked:	SLM	LOCATION:	**City of Ottawa**
Dwg. Reference: Sanitary Drainage Plan, Dwgs. No. 4		File Ref: 20-1182	Date: **02 Aug 2023**
			Sheet No 1 of 3

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION							COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
STREET 2																											
	35A	36A	0.62		56	0.62	56	3.6	0.66		0.00		0.00		0.00	0.00	0.62	0.62	0.20	0.87	81.0	200	0.70	27.44	0.03	0.87	0.39
	36A	37A	0.40		36	1.02	92	3.6	1.07		0.00		0.00		0.00	0.00	0.40	1.02	0.34	1.41	86.5	200	0.35	19.40	0.07	0.62	0.36
To STREET 1, Pipe 37A - 38A						1.02	92				0.00		0.00		0.00			1.02									
	41A	102A	0.25		23	0.25	23	3.7	0.28		0.00		0.00		0.00	0.00	0.25	0.25	0.08	0.36	57.0	200	0.65	26.44	0.01	0.84	0.29
	102A	46A	0.44		40	0.69	63	3.6	0.74		0.00		0.00		0.00	0.00	0.44	0.69	0.23	0.97	90.0	200	0.35	19.40	0.05	0.62	0.32
	46A	47A	0.36		32	1.05	95	3.6	1.11		0.00		0.00		0.00	0.00	0.36	1.05	0.35	1.45	81.5	200	0.35	19.40	0.07	0.62	0.36
To STREET 1, Pipe 47A - 52A						1.05	95				0.00		0.00		0.00			1.05									
STREET 4																											
	42A	43A	0.42		38	0.42	38	3.7	0.45		0.00		0.00		0.00	0.00	0.42	0.42	0.14	0.59	90.5	200	0.65	26.44	0.02	0.84	0.34
	43A	44A	0.40		36	0.82	74	3.6	0.87		0.00		0.00		0.00	0.00	0.40	0.82	0.27	1.14	90.5	200	0.35	19.40	0.06	0.62	0.33
To STREET 1, Pipe 44A - 47A						0.82	74				0.00		0.00		0.00			0.82									
STREET 1																											
Contribution From STREET 2, Pipe 36A - 37A						1.02	92				0.00		0.00		0.00		1.02	1.02									
	37A	38A	0.25		23	1.27	115	3.6	1.33		0.00		0.00		0.00	0.00	0.25	1.27	0.42	1.75	74.0	200	0.35	19.40	0.09	0.62	0.38
To STREET 1, Pipe 38A - 39A						1.27	115				0.00		0.00		0.00			1.27									
Contribution From STREET 4, Pipe 43A - 44A						0.82	74				0.00		0.00		0.00		0.82	0.82									
	44A	47A				0.82	74	3.6	0.87		0.00		0.00		0.00	0.00	0.00	0.82	0.27	1.14	70.0	200	0.35	19.40	0.06	0.62	0.33
Contribution From STREET 2, Pipe 46A - 47A						1.05	95				0.00		0.00		0.00		1.05	1.87									
	47A	52A	0.36		32	2.23	201	3.5	2.29		0.00		0.00		0.00	0.00	0.36	2.23	0.74	3.03	46.0	200	0.35	19.40	0.16	0.62	0.45
To STREET 1/3, Pipe 52A - 53A						2.23	201				0.00		0.00		0.00			2.23									
Contribution From STREET 1/ STREET 3, Pipe 50A - 51A						0.42	37				0.00		0.00		0.85		1.27	1.27									
	51A	52A	0.04		3	0.46	40	3.7	0.48		0.00		0.00		0.85	0.09	0.04	1.31	0.43	1.00	31.5	200	0.35	19.40	0.05	0.62	0.32
To STREET 1/3, Pipe 52A - 53A						0.46	40				0.00		0.00		0.85			1.31									
Contribution From STREET 9, Pipe 3A - 6A						0.62	48				0.00		0.00		0.00		0.62	0.62									
			0.04		3	0.66	51				0.00		0.00		0.00		0.04	0.66									
	6A	7A	0.06		5	0.72	56	3.6	0.66		0.00		0.00		0.00	0.00	0.06	0.72	0.24	0.90	14.0	200	0.35	19.40	0.05	0.62	0.31
	7A	8A	0.25		23	0.97	79	3.6	0.93		0.00		0.00		0.00	0.00	0.25	0.97	0.32	1.25	42.0	200	0.35	19.40	0.06	0.62	0.34
	8A	9A	0.54		49	1.51	128	3.6	1.48		0.00		0.00		0.00	0.00	0.54	1.51	0.50	1.98	74.5	200	0.35	19.40	0.10	0.62	0.40
	9A	10A				1.51	128	3.6	1.48		0.00		0.00		0.00	0.00	0.00	1.51	0.50	1.98	11.0	200	0.35	19.40	0.10	0.62	0.40
	10A	13A	0.47		42	1.98	170	3.5	1.95		0.00		0.00		0.00	0.00	0.47	1.98	0.65	2.60	65.0	200	0.35	19.40	0.13	0.62	0.43
Contribution From STREET 10, Pipe 12A - 13A						2.13	192				0.00		0.00				2.13	4.11									
	13A	19A	0.34		31	4.45	393	3.4	4.36		0.00		0.00		0.00	0.00	0.34	4.45	1.47	5.83	72.5	250	0.25	29.73	0.20	0.61	0.47
Contribution From STREET 9, Pipe 18A - 19A						1.41	127				0.00		0.00		0.00		1.41	5.86									
	19A	22A	0.30		27	6.16	547	3.4	5.96		0.00		0.00		0.00	0.00	0.30	6.16	2.03	7.99	71.0	250	0.25	29.73	0.27	0.61	0.51
Contribution From STREET 7/ STREET 8, Pipe 21A - 22A						1.04	93				0.00		0.00		0.00		1.04	7.20									
	22A	26A	0.31		28	7.51	668	3.3	7.20		0.00		0.00		0.00	0.00	0.31	7.51	2.48	9.68	70.0	250	0.25	29.73	0.33	0.61	0.54
Contribution From STREET 7/ STREET 8, Pipe 25A - 26A						1.28	115				0.00		0.00		0.00		1.28	8.79									
	26A	29A	0.48		43	9.27	826	3.3	8.78		0.00		0.00		0.00	0.00	0.48	9.27	3.06	11.84	70.0	250	0.25	29.73	0.40	0.61	0.57
Contribution From STREET 5/ STREET 6, Pipe 28A - 29A						0.80	72				0.00		0.00		0.00		0.80	10.07									
	29A	30A				10.07	898	3.3	9.50		0.00		0.00		0.00	0.00	0.00	10.07	3.32	12.82	35.0	250	0.25	29.73	0.43	0.61	0.58
	30A	33A	0.16		14	10.23	912	3.3	9.64		0.00		0.00		0.00	0.00	0.16	10.23	3.38	13.01	12.0	250	0.25	29.73	0.44	0.61	0.58
Contribution From STREET 5/ STREET 6, Pipe 32A - 33A						0.91	82				0.00		0.00		0.00		0.91	11.14									
	33A	34A				11.14	994	3.2	10.44		0.00		0.00		0.00	0.00	0.00	11.14	3.68	14.12	33.5	250	0.25	29.73	0.47	0.61	0.60



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 =	28000	L/ha/da	0.3241	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 =	1.00				Townhouse coeff=	2.7	
Institutional =	0.32	l/s/Ha			Single house coeff=	3.4	

Designed:	BNC	PROJECT:	**Minto-Kennedy Lands**
Checked:	SLM	LOCATION:	**City of Ottawa**
Dwg. Reference: Sanitary Drainage Plan, Dwgs. No. 4		File Ref: 20-1182	Date: **02 Aug 2023**
			Sheet No. 2 of 3

1182_SAN.xlsx

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

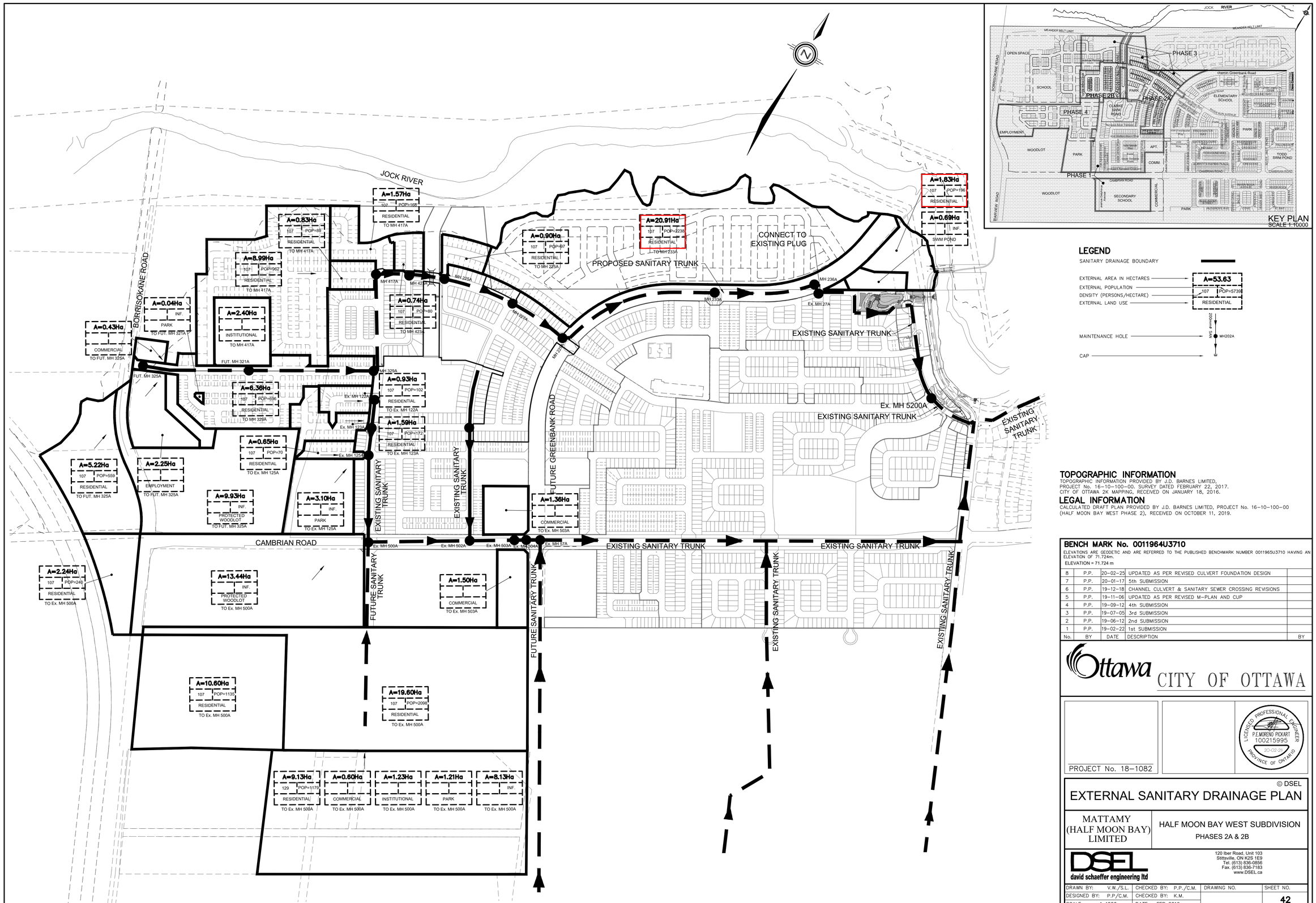
LOCATION				RESIDENTIAL AREA AND POPULATION							COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET		FROM M.H.	TO M.H.	AREA (ha)	UNITS	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
		34A	38A	0.20		18	11.34	1012	3.2	10.62		0.00		0.00		0.00	0.00	0.20	11.34	3.74	14.36	44.5	250	0.25	29.73	0.48	0.61	0.60
To STREET 1, Pipe 38A - 39A							11.34	1012				0.00		0.00		0.00			11.34									
STREET 1/ STREET 3																												
		48A	49A	0.39		35	0.39	35	3.7	0.42		0.00		0.00	0.85	0.85	0.09	1.24	1.24	0.41	0.92	112.5	200	0.65	26.44	0.03	0.84	0.39
		49A	50A	0.03		2	0.42	37	3.7	0.44		0.00		0.00		0.85	0.09	0.03	1.27	0.42	0.95	9.5	200	0.35	19.40	0.05	0.62	0.32
		50A	51A				0.42	37	3.7	0.44		0.00		0.00		0.85	0.09	0.00	1.27	0.42	0.95	10.0	200	0.35	19.40	0.05	0.62	0.32
To STREET 1, Pipe 51A - 52A							0.42	37				0.00		0.00		0.85			1.27									
Contribution From STREET 1, Pipe 47A - 52A							2.23	201				0.00		0.00		0.00		2.23	2.23									
Contribution From STREET 1, Pipe 51A - 52A							0.46	40				0.00		0.00		0.85		1.31	3.54									
		52A	53A	0.28		25	2.97	266	3.5	3.00		0.00		0.00		0.85	0.09	0.28	3.82	1.26	4.35	138.5	200	0.35	19.40	0.22	0.62	0.50
		53A	54A	0.45		41	3.42	307	3.5	3.44		0.00		0.00		0.85	0.09	0.45	4.27	1.41	4.94	10.0	200	0.35	19.40	0.25	0.62	0.51
To GREENBANK ROAD CONNECTION - 1002, Pipe 54A - 55A							3.42	307				0.00		0.00		0.85			4.27									
GREENBANK ROAD CONNECTION																												
Contribution From STREET 1/ STREET 3, Pipe 53A - 54A							3.42	307				0.00		0.00		0.85		4.27	4.27									
		54A	EX. 235A				3.42	307	3.5	3.44		0.00		0.00		0.85	0.09	0.00	4.27	1.41	4.94	55.0	200	0.35	19.40	0.25	0.62	0.51
PRIVATE BLOCK SERVICING																												
		100A	EX. 45A	1.54		139	1.54	139	3.6	1.60		0.00		0.00	0.50	0.50	0.05	2.04	2.04	0.67	2.33	85.5	200	0.35	19.40	0.12	0.62	0.41

LICENSED PROFESSIONAL ENGINEER
S. L. MERRICK
100186523
2023-08-03
PROVINCE OF ONTARIO

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 =	28000	L/ha/da	0.3241	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 =	1.00				Townhouse coeff=	2.7		
Institutional =	0.32	l/s/Ha			Single house coeff=	3.4		

Designed:	BNC	PROJECT:	**Minto-Kennedy Lands**
Checked:	SLM	LOCATION:	**City of Ottawa**
Dwg. Reference: Sanitary Drainage Plan, Dwgs. No. 4		File Ref: 20-1182	Date: **02 Aug 2023**
			Sheet No. 3 of 3



LEGEND

SANITARY DRAINAGE BOUNDARY

EXTERNAL AREA IN HECTARES — A=53.63

EXTERNAL POPULATION — 107 POP=5739

DENSITY (PERSONS/HECTARE)

EXTERNAL LAND USE — RESIDENTIAL

MAINTENANCE HOLE — 200mmø SAN MH202A

CAP

TOPOGRAPHIC INFORMATION

TOPOGRAPHIC INFORMATION PROVIDED BY J.D. BARNES LIMITED, PROJECT No. 16-10-100-00. SURVEY DATED FEBRUARY 22, 2017. CITY OF OTTAWA 2K MAPPING, RECEIVED ON JANUARY 18, 2016.

LEGAL INFORMATION

CALCULATED DRAFT PLAN PROVIDED BY J.D. BARNES LIMITED, PROJECT No. 16-10-100-00 (HALF MOON BAY WEST PHASE 2), RECEIVED ON OCTOBER 11, 2019.

BENCH MARK No. 001196 4U3710

ELEVATIONS ARE GEODETIC AND ARE REFERRED TO THE PUBLISHED BENCHMARK NUMBER 001196 5U3710 HAVING AN ELEVATION OF 71.724m.

ELEVATION = 71.724 m

No.	BY	DATE	DESCRIPTION	BY
8	P.P.	20-02-25	UPDATED AS PER REVISED CULVERT FOUNDATION DESIGN	
7	P.P.	20-01-17	5th SUBMISSION	
6	P.P.	19-12-18	CHANNEL CULVERT & SANITARY SEWER CROSSING REVISIONS	
5	P.P.	19-11-06	UPDATED AS PER REVISED M-PLAN AND CUP	
4	P.P.	19-09-12	4th SUBMISSION	
3	P.P.	19-07-05	3rd SUBMISSION	
2	P.P.	19-06-12	2nd SUBMISSION	
1	P.P.	19-02-22	1st SUBMISSION	

Ottawa CITY OF OTTAWA

PROJECT No. 18-1082

LICENSED PROFESSIONAL ENGINEER P.E. MORENO PICKART 100215995 20-02-25 PROVINCE OF ONTARIO

© DSEL

EXTERNAL SANITARY DRAINAGE PLAN

MATTAMY (HALF MOON BAY) LIMITED

HALF MOON BAY WEST SUBDIVISION
PHASES 2A & 2B

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

DRAWN BY:	V.W./S.L.	CHECKED BY:	P.P./C.M.	DRAWING NO.	SHEET NO.
DESIGNED BY:	P.P./C.M.	CHECKED BY:	K.M.		42
SCALE:	1:4000	DATE:	FEB 2019		

CITY FILE No. D07-16-16-0023 P1 CITY PLAN No. 17586

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION							COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (Nominal) (mm)	DIA (Actual) (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
voie Megrez Way																												
	200A	201A	0.24	7	19	0.24	19	4.00	0.31								0.24	0.24	0.07	0.38	48.0	200	200	0.65	26.44	0.01	0.84	0.29
	201A	202A	0.22	7	19	0.46	38	4.00	0.62								0.22	0.46	0.13	0.75	52.0	200	200	0.35	19.40	0.04	0.62	0.29
To terrasse Alcor Terrace, Pipe 202A - 203A						0.46	38											0.46										
	208A	209A	0.22	6	17	0.22	17	4.00	0.28								0.22	0.22	0.06	0.34	48.5	200	200	0.65	26.44	0.01	0.84	0.28
	209A	210A	0.06	1	4	0.28	21	4.00	0.34								0.06	0.28	0.08	0.42	8.0	200	200	0.35	19.40	0.02	0.62	0.25
To terrasse Proxima Terrace, Pipe 210A - 213A						0.28	21											0.28										
cote Regulus Ridge																												
			0.12	3	11	0.12	11										0.12	0.12										
	211A	212A	0.12	4	11	0.24	22	4.00	0.36								0.12	0.24	0.07	0.43	30.0	200	200	0.65	26.44	0.02	0.84	0.30
			0.11	3	9	0.35	31										0.11	0.35										
	212A	213A	0.17	4	14	0.52	45	4.00	0.73								0.17	0.52	0.15	0.88	47.0	200	200	0.40	20.74	0.04	0.66	0.33
To terrasse Proxima Terrace, Pipe 213A - 216A						0.52	45											0.52										
			0.20	7	19	0.20	19										0.20	0.20										
	204A	205A	0.22	5	17	0.42	36	4.00	0.58								0.22	0.42	0.12	0.70	53.0	200	200	0.65	26.44	0.03	0.84	0.36
			0.21	7	19	0.63	55										0.21	0.63										
	205A	206A	0.24	6	21	0.87	76	4.00	1.23								0.24	0.87	0.25	1.48	58.0	200	200	0.35	19.40	0.08	0.62	0.36
	206A	207A	0.01			0.88	76	4.00	1.23								0.01	0.88	0.25	1.48	15.5	200	200	0.35	19.40	0.08	0.62	0.36
To terrasse Alcor Terrace, Pipe 207A - 105A						0.88	76											0.88										
terrasse Alcor Terrace																												
Contribution From voie Megrez Way, Pipe 201A - 202A						0.46	38										0.46	0.46										
	202A	203A	0.08	2	7	0.54	45	4.00	0.73								0.08	0.54	0.15	0.88	11.0	200	200	0.35	19.40	0.05	0.62	0.31
	203A	207A	0.26	6	21	0.80	66	4.00	1.07								0.26	0.80	0.23	1.30	58.5	200	200	0.35	19.40	0.07	0.62	0.35
Contribution From cote Regulus Ridge, Pipe 206A - 207A						0.88	76										0.88	1.68										
	207A	*Ex. PLUG*	0.28	6	21	1.96	163	4.00	2.64								0.28	1.96	0.56	3.20	62.5	200	200	0.35	19.40	0.17	0.62	0.45
To Celestial Grove, *Ex. PLUG - 105A (Phase 1)*						1.96	163											1.96										
terrasse Proxima Terrace																												
	217A	218A	0.40	6	21	0.40	21	4.00	0.34								0.40	0.40	0.11	0.45	40.0	200	200	0.65	26.44	0.02	0.84	0.32
	218A	219A	0.29	7	24	0.69	45	4.00	0.73								0.29	0.69	0.20	0.93	45.0	200	200	0.35	19.40	0.05	0.62	0.31
	219A	220A	0.20	4	14	0.89	59	4.00	0.96					0.90	0.90	0.15	1.10	1.79	0.51	1.61	50.0	200	200	1.65	42.13	0.04	1.34	0.63
To bois Celestial Grove, Pipe 220A - 227A						0.89	59								0.90			1.79										
Contribution From voie Megrez Way, Pipe 209A - 210A						0.28	21										0.28	0.28										
	210A	213A	0.26	5	17	0.54	38	4.00	0.62								0.26	0.54	0.15	0.77	62.5	200	200	0.35	19.40	0.04	0.62	0.30
Contribution From cote Regulus Ridge, Pipe 212A - 213A						0.52	45										0.52	1.06										
	213A	216A	0.16	3	11	1.22	94	4.00	1.52								0.16	1.22	0.35	1.87	35.5	200	200	0.35	19.40	0.10	0.62	0.39
	216A	220A	0.15	3	11	1.37	105	4.00	1.70								0.15	1.37	0.39	2.09	37.0	200	200	0.35	19.40	0.11	0.62	0.40
To bois Celestial Grove, Pipe 220A - 227A						1.37	105											1.37										
Future Street																												
Contribution From External						0.74	80										0.74	0.74										
	PLUG	423A				0.74	80	4.00	1.30								0.00	0.74	0.21	1.51	14.5	200	200	0.65	26.44	0.06	0.84	0.45
To avenue Perseus Avenue, Pipe 423A - 424A						0.74	80											0.74										
Future Street																												
Contribution From External						0.90	97										0.90	0.90										
	PLUG	225A				0.90	97	4.00	1.57								0.00	0.90	0.26	1.83	14.0	200	200	1.35	38.11	0.05	1.21	0.61
To avenue Perseus Avenue, Pipe 225A - 226A						0.90	97											0.90										

LICENSED PROFESSIONAL ENGINEER
P.E MORENO PICKART
100215995
JAN 14, 20
PROVINCE OF ONTARIO

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da
Average Daily Flow =	350	l/p/day
Comm/Inst Flow =	50000	L/ha/da
Industrial Flow =	35000	L/ha/da
Max Res. Peak Factor =	4.00	
Commercial/Inst./Park Peak Factor =	1.50	

Industrial Peak Factor = as per MOE Graph
Extraneous Flow = 0.286 L/s/ha
Minimum Velocity = 0.600 m/s
Manning's n = (Conc) 0.013 (Pvc) 0.013
Townhouse coeff= 2.7
Single house coeff= 3.4

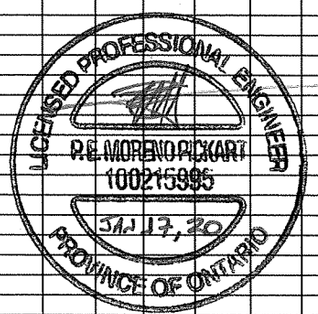
Designed: P.P.
Checked: K.M.
Dwg. Reference: Sanitary Drainage Plan, Dwgs. No. 39, 40 & 41

PROJECT: **Half Moon Bay West - Phases 2A & 2B**
LOCATION: **City of Ottawa**
File Ref: 18-1082
Date: Date: Jan 2020
Sheet No. 1 of 3

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION						COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE							
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (Norminal) (mm)	DIA (Actual) (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
bois Celestial Grove																												
Contribution From avenue Perseus Avenue, Pipe 2280A - 2270A						1.18	89										1.18	1.18										
Contribution From avenue Perseus Avenue, Pipe 22610A - 2270A						0.81	62										0.81	0.81										
	2270A	227A				1.99	151	4.00	2.45								0.00	1.99	0.57	3.02	4.0	200	200	1.00	32.80	0.09	1.04	0.64
To avenue Perseus Avenue, Pipe 227A - 228A						1.99	151											1.99										
	214A	215A	0.15	3	11	0.15	11	4.00	0.18								0.15	0.15	0.04	0.22	33.0	200	200	1.45	39.49	0.01	1.26	0.32
	215A	220A	0.24	4	14	0.39	25	4.00	0.41								0.24	0.39	0.11	0.52	62.5	200	200	1.50	40.17	0.01	1.28	0.43
Contribution From terrasse Proxima Terrace, Pipe 216A - 220A						1.37	105										1.37	1.76										
Contribution From terrasse Proxima Terrace, Pipe 219A - 220A						0.89	59								0.90		1.79	3.55										
	220A	227A	0.11			2.76	189	4.00	3.06						0.90	0.15	0.11	3.66	1.05	4.25	72.0	200	200	0.35	19.40	0.22	0.62	0.49
To avenue Perseus Avenue, Pipe 227A - 228A						2.76	189								0.90			3.66										
Place Nokomis Place																												
	418A	419A	0.28	5	17	0.28	17	4.00	0.28								0.28	0.28	0.08	0.36	52.0	200	200	0.65	26.44	0.01	0.84	0.29
	419A	420A	0.15	2	7	0.43	24	4.00	0.39								0.15	0.43	0.12	0.51	11.0	200	200	0.35	19.40	0.03	0.62	0.26
	420A	421A	0.65	14	48	1.08	72	4.00	1.17								0.65	1.08	0.31	1.48	84.5	200	200	0.35	19.40	0.08	0.62	0.36
	421A	423A	0.43	11	38	1.51	110	4.00	1.78								0.43	1.51	0.43	2.21	71.5	200	200	0.35	19.40	0.11	0.62	0.41
To avenue Perseus Avenue, Pipe 423A - 424A						1.51	110											1.51										
Placette Ursid Mews																												
	415A	412A	0.37	22	60	0.37	60	4.00	0.97								0.37	0.37	0.11	1.08	86.0	200	200	0.65	26.44	0.04	0.84	0.41
To Cercle Atima Circle, Pipe 412A - 413A						0.37	60											0.37										
Cercle Atima Circle																												
	414A	416A	0.36	11	30	0.36	30	4.00	0.49								0.36	0.36	0.10	0.59	85.0	200	200	0.65	26.44	0.02	0.84	0.34
To Rue Apolune Street, Pipe 416A - 417A						0.36	30											0.36										
	414A	409A	0.11	2	6	0.11	6	4.00	0.10								0.11	0.11	0.03	0.13	11.0	200	200	2.00	46.38	0.00	1.48	0.30
	409A	410A	0.55	23	63	0.66	69	4.00	1.12								0.55	0.66	0.19	1.31	84.0	200	200	0.65	26.44	0.05	0.84	0.43
	410A	411A	0.15	3	9	0.81	78	4.00	1.26								0.15	0.81	0.23	1.50	11.0	200	200	0.85	30.24	0.05	0.96	0.50
	411A	412A	0.16	5	14	0.97	92	4.00	1.49								0.16	0.97	0.28	1.77	37.0	200	200	0.50	23.19	0.08	0.74	0.43
Contribution From Placette Ursid Mews, Pipe 415A - 412A						0.37	60										0.37	1.34										
	412A	413A	0.17	5	14	1.51	166	4.00	2.69								0.17	1.51	0.43	3.12	48.0	200	200	0.35	19.40	0.16	0.62	0.45
To Rue Apolune Street, Pipe 413A - 416A						1.51	166											1.51										
Rue Apolune Street																												
Contribution From Future Phase						9.93					2.25						12.18	12.18										
Contribution From Future Phase						11.58	1255				0.43				0.04		12.05	24.23										
	329A	134A	0.20			21.71	1255	3.73	18.98		2.68				0.04	2.33	0.20	24.43	6.99	28.30	18.0	375	375	0.15	67.91	0.42	0.61	0.59
	134A	413A	0.13			21.84	1255	3.73	18.98		2.68				0.04	2.33	0.13	24.56	7.02	28.34	61.0	375	375	0.15	67.91	0.42	0.61	0.59
Contribution From Cercle Atima Circle, Pipe 412A - 413A						1.51	166								0.04		1.51	26.07										
			0.22	11	30	23.57	1451				2.68				0.04		0.22	26.29										
	413A	416A	0.38	9	31	23.95	1482	3.68	22.11		2.68				0.04	2.33	0.38	26.67	7.63	32.07	99.0	375	375	0.15	67.91	0.47	0.61	0.60
Contribution From Cercle Atima Circle, Pipe 414A - 416A						0.36	30								0.04		0.36	27.03										
	416A	417A	0.28	5	17	24.59	1529	3.67	22.75		2.68				0.04	2.33	0.28	27.31	7.81	32.90	67.5	375	375	0.15	67.91	0.48	0.61	0.61
To avenue Perseus Avenue, Pipe 417A - 423A						24.59	1529				2.68				0.04			27.31										
Contribution From Future Phase						1.57	168										1.57	1.57										
	PLUG	417A				1.57	168	4.00	2.72									1.57	0.45	3.17	17.5	200	200	0.35	19.40	0.16	0.62	0.45
To avenue Perseus Avenue, Pipe 417A - 423A						1.57	168											1.57										



DESIGN PARAMETERS

Park Flow =	9300	L/ha/da
Average Daily Flow =	350	l/p/day
Comm/Inst Flow =	50000	L/ha/da
Industrial Flow =	35000	L/ha/da
Max Res. Peak Factor =	4.00	
Commercial/Inst./Park Peak Factor =	1.50	

Industrial Peak Factor = as per MOE Graph
Extraneous Flow = 0.286 L/s/ha
Minimum Velocity = 0.600 m/s
Manning's n = (Conc) 0.013 (Pvc) 0.013
Townhouse coeff= 2.7
Single house coeff= 3.4

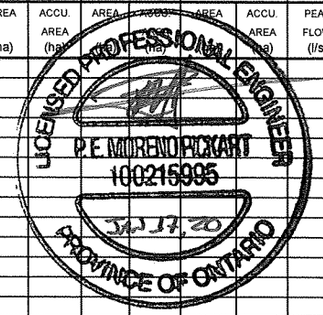
Designed: P.P.
Checked: K.M.
Dwg. Reference: Sanitary Drainage Plan, Dwgs. No. 39, 40 & 41

PROJECT: **Half Moon Bay West - Phases 2A & 2B**
LOCATION: **City of Ottawa**
File Ref: 18-1082
Date: Date: Jan 2020
Sheet No. 2 of 3

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

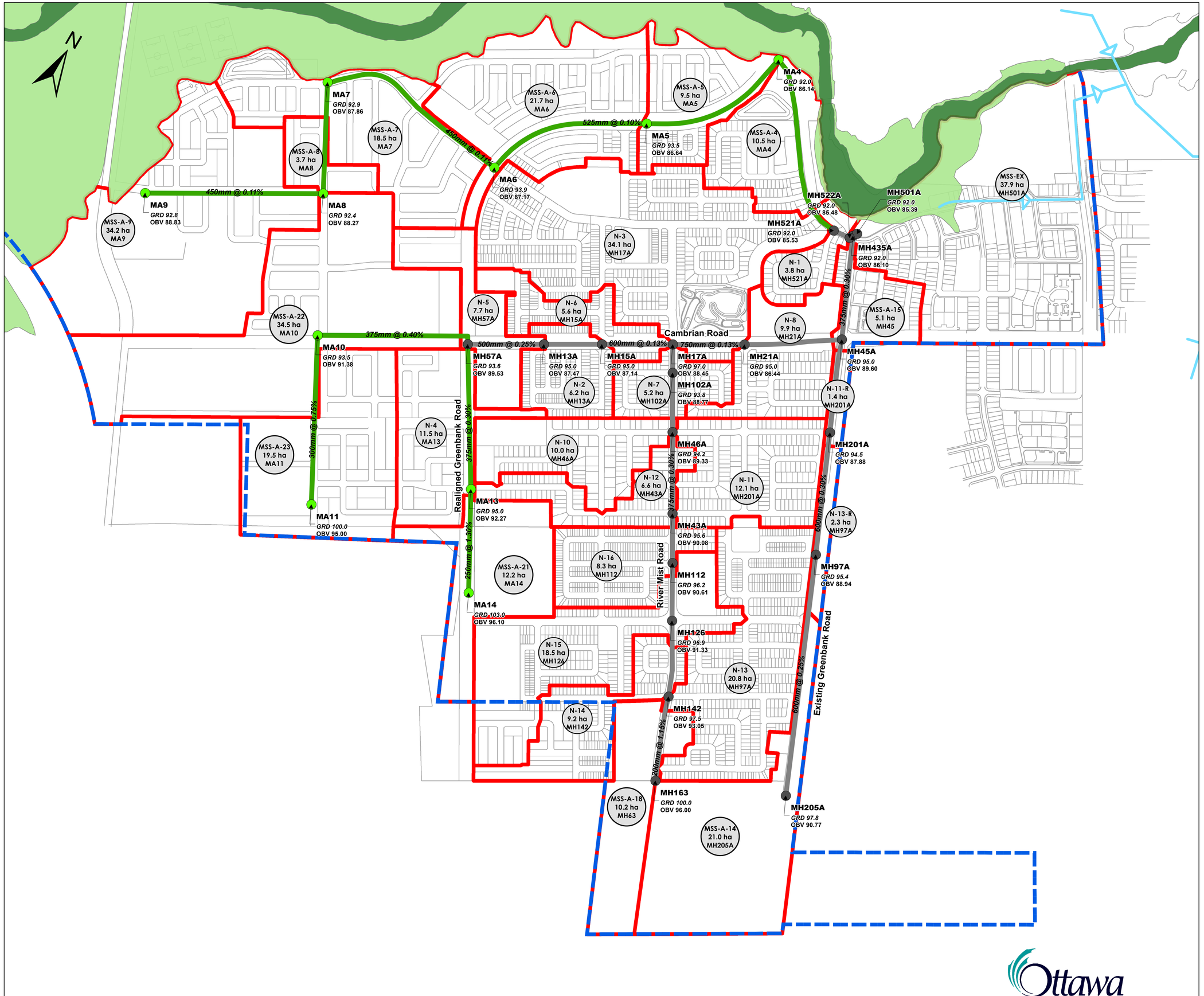
LOCATION			RESIDENTIAL AREA AND POPULATION							COMM	INSTIT	PARK		C+I+I	INFILTRATION				PIPE							
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (Nominal) (mm)	DIA (Actual) (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
avenue Perseus Avenue																										
	2290A	2280A	0.92	21	72	0.92	72	4.00	1.17							0.92	0.92	0.26	1.43	106.5	200	200	2.20	48.65	0.03	1.55	0.68
	2280A	2270A	0.26	5	17	1.18	89	4.00	1.44							0.26	1.18	0.34	1.78	38.0	200	200	0.90	31.12	0.06	0.99	0.53
To bois Celestial Grove, Pipe 2270A - 227A						1.18	89										1.18									
	2250A	2260A	0.47	10	34	0.47	34	4.00	0.55							0.47	0.47	0.13	0.69	57.0	200	200	0.65	26.44	0.03	0.84	0.36
	2260A	226A				0.47	34	4.00	0.55							0.00	0.47	0.13	0.69	4.0	200	200	0.65	26.44	0.03	0.84	0.36
To avenue Perseus Avenue, Pipe 226A - 2261A						0.47	34										0.47									
	2260A	22610A	0.52	12	41	0.52	41	4.00	0.66							0.52	0.52	0.15	0.81	64.5	200	200	0.65	26.44	0.03	0.84	0.38
	22610A	2270A	0.29	6	21	0.81	62	4.00	1.00							0.29	0.81	0.23	1.24	40.0	200	200	0.35	19.40	0.06	0.62	0.34
To bois Celestial Grove, Pipe 2270A - 227A						0.81	62										0.81									
Contribution From External						8.99	962						2.40			11.39	11.39									
Contribution From Future Phase						0.83	89									0.83	12.22									
	PLUG	417A				9.82	1051	3.79	16.12				2.40		2.08	0.00	12.22	3.49	21.70	10.5	300	300	0.20	43.25	0.50	0.61	0.61
Contribution From Rue Apolune Street, Pipe PLUG - 417A						1.57	168									1.57	13.79									
Contribution From Rue Apolune Street, Pipe 416A - 417A						24.59	1529				2.68			0.04		27.31	41.10									
	417A	423A	0.14			36.12	2748	3.47	38.68		2.68		2.40	0.04	4.42	0.14	41.24	11.79	54.89	75.0	450	450	0.12	98.76	0.56	0.62	0.64
Contribution From Place Nokomis Place, Pipe 421A - 423A						1.51	110									1.51	42.75									
Contribution From Future Street, Pipe PLUG - 423A						0.74	80									0.74	43.49									
	423A	424A	0.09			38.46	2938	3.45	41.06		2.68		2.40	0.04	4.42	0.09	43.58	12.46	57.94	45.0	450	450	0.12	98.76	0.59	0.62	0.65
	424A	425A	0.05			38.51	2938	3.45	41.06		2.68		2.40	0.04	4.42	0.05	43.63	12.48	57.96	22.0	450	450	0.12	98.76	0.59	0.62	0.65
	425A	225A	0.04			38.55	2938	3.45	41.06		2.68		2.40	0.04	4.42	0.04	43.67	12.49	57.97	22.5	450	450	0.12	98.76	0.59	0.62	0.65
Contribution From Future Street, Pipe PLUG - 225A						0.90	97									0.90	44.57									
	225A	226A				39.45	3035	3.44	42.27		2.68		2.40	0.04	4.42	0.00	44.57	12.75	59.43	70.0	500	466	0.10	98.96	0.60	0.58	0.61
Contribution From avenue Perseus Avenue, Pipe 2260A - 226A						0.47	34										0.47									
	226A	2261A				39.92	3069	3.43	42.69		2.68		2.40	0.04	4.42	0.00	45.04	12.88	59.99	62.0	500	466	0.10	98.96	0.61	0.58	0.61
	2261A	227A				39.92	3069	3.43	42.69		2.68		2.40	0.04	4.42	0.00	45.04	12.88	59.99	42.0	500	466	0.10	98.96	0.61	0.58	0.61
Contribution From bois Celestial Grove, Pipe 220A - 227A						2.76	189							0.90		3.66	48.70									
Contribution From bois Celestial Grove, Pipe 2270A - 227A						1.99	151									1.99	50.69									
	227A	228A				44.67	3409	3.39	46.88		2.68		2.40	0.94	4.56	0.00	50.69	14.50	65.94	36.0	500	466	0.10	98.96	0.67	0.58	0.62
	228A	229A				44.67	3409	3.39	46.88		2.68		2.40	0.94	4.56	0.00	50.69	14.50	65.94	112.0	500	466	0.10	98.96	0.67	0.58	0.62
To chemin Greenbank Road, Pipe 229A - 230A						44.67	3409				2.68		2.40	0.94			50.69									
chemin Greenbank Road																										
Contribution From avenue Perseus Avenue, Pipe 228A - 229A						44.67	3409				2.68		2.40	0.94		50.69	50.69									
	229A	230A	0.89			45.56	3409	3.39	46.88		2.68		2.40	0.94	4.56	0.89	51.58	14.75	66.19	33.0	500	466	0.10	98.96	0.67	0.58	0.62
	230A	231A	0.63			46.19	3409	3.39	46.88		2.68		2.40	0.94	4.56	0.63	52.21	14.93	66.37	150.0	500	466	0.10	98.96	0.67	0.58	0.62
	231A	232A	0.38			46.57	3409	3.39	46.88		2.68		2.40	0.94	4.56	0.38	52.59	15.04	66.48	88.0	500	466	0.10	98.96	0.67	0.58	0.62
	232A	233A	0.62			47.19	3409	3.39	46.88		2.68		2.40	0.94	4.56	0.62	53.21	15.22	66.66	144.5	500	466	0.10	98.96	0.67	0.58	0.62
Contribution From External						20.91	2238									20.91	74.12									
	233A	234A	0.58			68.68	5647	3.20	73.10		2.68		2.4	0.94	4.56	0.58	74.70	21.36	99.03	144.5	600	559	0.10	160.77	0.62	0.66	0.69
	234A	235A	0.48			69.16	5647	3.20	73.10		2.68		2.40	0.94	4.56	0.48	75.18	21.50	99.16	111.5	600	559	0.10	160.77	0.62	0.66	0.69
To HMB North Phase 7, *Ex. PLUG - 27A*, Pipe 235A - 236A						69.16	5647				2.68		2.40	0.94			75.18									
Contribution From chemin Greenbank Road, Pipe 234A - 235A						69.16	5647				2.68		2.40	0.94		75.18	75.18									
	235A	236A	0.07			69.23	5647	3.20	73.10		2.68		2.40	0.94	4.56	0.07	75.25	21.52	99.18	16.5	600	559	0.10	160.77	0.62	0.66	0.69
Contribution From External						1.83	196									1.83	77.08									
Contribution From External						0.69										0.69	77.77									
	236A	*Ex. 27A*	1.26			73.01	5843	3.18	75.31		2.68		2.40	0.94	4.56	1.26	79.03	22.60	102.47	7.0	600	600	0.15	237.81	0.43	0.84	0.81
To HMB North Phase 7, *Ex. 27A - 29A*						73.01	5843				2.68		2.40	0.94			79.03									



DESIGN PARAMETERS						
Park Flow =	9300	L/ha/da	Industrial Peak Factor = as per MOE Graph			
Average Daily Flow =	350	l/p/day	Extraneous Flow =	0.286	L/s/ha	
Comm/Inst Flow =	50000	L/ha/da	Minimum Velocity =	0.600	m/s	
Industrial Flow =	35000	L/ha/da	Manning's n =	(Conc) 0.013	(Pvc)	0.013
Max Res. Peak Factor =	4.00		Townhouse coeff=	2.7		
Commercial/Inst./Park Peak Factor =	1.50		Single house coeff=	3.4		

Designed:	P.P.
Checked:	K.M.
Dwg. Reference:	Sanitary Drainage Plan, Dwgs. No. 39, 40 & 41

PROJECT:	Half Moon Bay West - Phases 2A & 2B
LOCATION:	City of Ottawa
File Ref: 18-1082	Date: Jan 2020
Sheet No.	3 of 3



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Stantec

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

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Legend

- BARRHAVEN SOUTH COMMUNITY BOUNDARY
- EXISTING NODES
- FUTURE NODES
- EXISTING SEWER
- FUTURE SEWER
- EXISTING SEWER (FROM 2007 MSS)
- RIVER
- 100 YEAR FLOOD PLAIN
- SANITARY DRAINAGE CATCHMENTS
- Area Name / Area (ha) / Manhole — SANITARY CATCHMENT INFORMATION

Node Name
Ground Elevation
Top Obvert Elevation

Notes

1	ISSUED FOR MSS ADDENDUM	LP	AP	14.11.28
Revision		By	Appd.	YY.MM.DD

File Name: 163400999-SAN-DRAWING4.MXD	LP	AP	LP	14.11.28
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project

CITY OF OTTAWA

BARRHAVEN SOUTH MASTER SERVICING STUDY ADDENDUM

Ottawa, ON

Title

SANITARY SERVICING PLAN

Project No. 163400999

Scale 1:5,000 (0 75 150 300 Meters)

Drawing No. A-4

Sheet 4 of 9

Revision 1

Area:

BARRHAVEN SOUTH
MASTER SERVICING STUDY

DATE: 2017/09/29
REVISION: 2
DESIGNED BY: LP
CHECKED BY: /

SANITARY SEWER DESIGN SHEET
(City of Ottawa)

FILE NUMBER: 163400999

Colour code: HMB values
Hard coded values — Most US MH
Caculated value — Estimated value
updated value — Value from subdivision design — MH receiving flow from 2 or more sewers

DESIGN PARAMETERS

MAX PEAK FACTOR (RES.)=	4.0	AVG. DAILY FLOW / PERSON	350 L/p/day	MINIMUM VELOCITY	0.60 m/s	As per CDP (units/ha)	
MIN PEAK FACTOR (RES.)=	2.0	COMMERCIAL	50,000 L/ha/day	MAXIMUM VELOCITY	3.00 m/s	LOW DENSITY RESIDENTIAL	26
PEAKING FACTOR (INDUSTRIAL):	2.4	INDUSTRIAL (HEAVY)	55,000 L/ha/day	MANNINGS n	0.013	SEMI-DETACHED	52
PEAKING FACTOR (COMM., INST.):	1.5	INDUSTRIAL (LIGHT)	35,000 L/ha/day	BEDDING CLASS	B	TOWN HOUSES	82
PERSONS / SINGLE UNIT	3.4	INSTITUTIONAL	50,000 L/ha/day	MINIMUM COVER	2.50 m	APARTMENTS	120
PERSONS / TOWNHOME	2.7	INFILTRATION	0.28 L/s/ha			COMMUNITY CORE	60
PERSONS / APARTMENT	1.8					AVERAGE PERSONS/ha	107

LOCATION				RESIDENTIAL AREA AND POPULATION										COMMERCIAL		INDUSTRIAL (L)		INDUSTRIAL (H)		INSTITUTIONAL		GREEN / UNUSED		C+I+I	INFILTRATION			TOTAL	PIPE						
AREA ID NUMBER	Source	FROM M.H.	TO M.H.	DEV AREA	DEV POP	ADD'N RES AREA	ADD'N POP	TOTAL AREA	TOTAL POP	CUMULATIVE AREA	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW	AREA	ACCU. AREA	AREA	ACCU. AREA	AREA	ACCU. AREA	AREA	ACCU. AREA	AREA	ACCU. AREA	PEAK FLOW	TOTAL AREA	ACCU. AREA	INFILT. FLOW	FLOW	LENGTH	DIA	MATERIAL	SLOPE	CAP. (FULL)	CAP. V PEAK FLOW	VEL. (FULL)	VEL. (ACT.)
				(ha)		(ha)		(ha)		(ha)			(L/s)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	(L/s)	(L/s)	(m)	(mm)		(%)	(L/s)	(%)	(m/s)	(m/s)
MSS-A-23		MA11	MA10	0.00	0	14.2	1,523	14.2	1,523	14.20	1,523	3.67	22.6	0.0	0.0	0.0	0.0	0.0	0.0	2.8	2.8	2.5	2.5	2	19.5	19.5	5.5	30.1	482.1	300	PVC	0.75	87.6	34%	1.20	1.08
MSS-A-22		**MA10**	MH57A	0.00	0	12.8	1,371	12.8	1,371	27.00	2,894	3.46	40.6	0.0	0.0	0.0	0.0	0.0	0.0	7.2	10.0	14.5	17.0	8.7	34.5	54.0	15.1	64.4	449.7	375	PVC	0.40	115.1	56%	1.01	1.04
Realigned Greenbank Road																																			
MSS-A-21		MA14	MA13	0.0	0	4.8	513	4.8	513	4.8	513	3.97	8.3	0.0	0.0	0.0	0.0	0.0	0.0	7.5	7.5	0.0	0.0	6.5	12.3	12.3	3.4	18.2	295.0	250	PVC	1.30	71.4	25%	1.40	1.12
N-4		**MA13**	MH57A	0.0	0	11.0	1,176	11.0	1,176	15.8	1,689	3.64	24.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.5	0.5	0.5	6.5	11.5	23.8	6.7	38.1	413.1	375	PVC	0.30	100.3	38%	0.88	0.81
Cambrian Road																																			
N-5		MH57A	MH13A	0.0	0	4.3	458	4.3	458	47.1	5,041	3.24	66.2	3.4	3.4	0.0	0.0	0.0	0.0	0.0	17.5	0.0	17.5	18.1	7.7	85.5	23.9	108.2	216.5	500	CPP	0.25	188.2	57%	0.96	0.99
N-2		**MH13A**	MH15A	6.2	631	0.0	3	6.2	634	53.3	5,675	3.19	73.3	0.0	3.4	0.0	0.0	0.0	0.0	0.0	17.5	0.0	17.5	18.1	6.2	91.7	25.7	117.1	165.2	500	CPP	0.20	168.6	69%	0.86	0.93
N-6		**MH15A**	MH17A	5.6	868	0.0	2	5.6	870	58.9	6,545	3.13	83.0	0.0	3.4	0.0	0.0	0.0	0.0	0.0	17.5	0.0	17.5	18.1	5.6	97.3	27.2	128.3	202.0	600	CPP	0.13	230.7	56%	0.79	0.81
River Mist Road																																			
MSS-A-18	Stantec	MH163	162	6.5	543	0.0	0	6.5	543	6.5	543	3.96	8.7	0.0	0.0	0.0	0.0	0.0	0.0	2.8	2.8	0.9	0.9	2.4	10.2	10.2	2.9	14.0	36.3	200	PVC	1.15	35.8	39%	1.12	1.04
	Stantec	162	161	0.0	0	0.0	0	0.0	0	6.5	543	3.96	8.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.0	0.9	2.4	0.0	10.2	2.9	14.0	87.2	250	PVC	1.15	67.3	21%	1.32	1.00
	Stantec	161	EX151	0.0	0	0.0	0	0.0	0	6.5	543	3.96	8.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.0	0.9	2.4	0.0	10.2	2.9	14.0	75.6	250	PVC	1.15	67.3	21%	1.32	1.00
	Stantec	EX151	MH142	0.0	0	0.0	0	0.0	0	6.5	543	3.96	8.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.0	0.9	2.4	0.0	10.2	2.9	14.0	44.4	300	PVC	1.40	119.0	12%	1.63	1.08
N-14	Stantec	**MH142**	EX139	8.2	825	1.0	102	9.2	927	15.7	1,470	3.69	22.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.0	0.9	2.4	9.2	19.4	5.4	29.8	74.8	300	PVC	0.40	63.5	47%	0.87	0.85
	Stantec	EX139	EX136	0.0	0	0.0	0	0.0	0	15.7	1,470	3.69	22.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.0	0.9	2.4	0.0	19.4	5.4	29.8	64.7	300	PVC	0.40	63.5	47%	0.87	0.85
	Stantec	EX136	MH126	0.0	0	0.0	0	0.0	0	15.7	1,470	3.69	22.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.0	0.9	2.4	0.0	19.4	5.4	29.8	78.9	300	PVC	0.41	64.2	46%	0.88	0.86
N-15	Stantec	**MH126**	EX123	16.5	954	0.0	0	16.5	954	32.2	2,424	3.52	34.6	0.0	0.0	0.0	0.0	0.0	0.0	2.1	4.9	0.0	0.9	4.3	18.6	38.0	10.6	49.5	71.3	375	PVC	0.45	122.0	41%	1.07	1.01
	Stantec	EX123	MH112	0.0	0	0.0	0	0.0	0	32.2	2,424	3.52	34.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	0.0	0.9	4.3	0.0	38.0	10.6	49.5	90.3	375	PVC	0.42	118.6	42%	1.04	0.99
N-16	Stantec	**MH112**	EX102	8.3	689	0.0	0	8.3	689	40.5	3,113	3.43	43.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	0.0	0.9	4.3	8.3	46.3	13.0	60.6	68.0	375	PVC	0.31	101.5	60%	0.89	0.93
	Stantec	EX102	EX101	0.0	0	0.0	0	0.0	0	40.5	3,113	3.43	43.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	0.0	0.9	4.3	0.0	46.3	13.0	60.6	34.0	375	PVC	0.29	98.0	62%	0.86	0.91
	IBI	EX101	MH43A	0.0	0	0.0	0	0.0	0	40.5	3,113	3.43	43.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	0.0	0.9	4.3	0.0	46.3	13.0	60.6	38.0	375	PVC	0.30	100.3	60%	0.88	0.92
N-12	IBI	**MH43A**	MH44A	6.6	352	0.0	0	6.6	352	47.1	3,465	3.39	47.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	0.0	0.9	4.3	6.6	52.9	14.8	66.7	81.0	375	PVC	0.30	100.3	67%	0.88	0.95
	IBI	MH44A	MH45A	0.0	0	0.0	0	0.0	0	47.1	3,465	3.39	47.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	0.0	0.9	4.3	0.0	52.9	14.8	66.7	64.0	375	PVC	0.30	100.3	67%	0.88	0.95
	IBI	MH45A	MH46A	0.0	0	0.0	0	0.0	0	47.1	3,465	3.39	47.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	0.0	0.9	4.3	0.0	52.9	14.8	66.7	85.0	375	PVC	0.30	100.3	67%	0.88	0.95
N-10	IBI	**MH46A**	MH47A	8.4	562	0.0	0	8.4	562	55.5	4,027	3.33	54.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	1.6	2.5	4.3	10.0	62.9	17.6	76.2	41.0	375	PVC	0.30	100.3	76%	0.88	0.98
	DSEL	MH47A	MH101A	0.0	0	0.0	0	0.0	0	55.5	4,027	3.33	54.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	0.0	2.5	4.3	0.0	62.9	17.6	76.2	64.0	375	PVC	0.30	100.3	76%	0.88	0.98
	DSEL	MH101A	MH102A	0.0	0	0.0	0	0.0	0	55.5	4,027	3.33	54.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	0.0	2.5	4.3	0.0	62.9	17.6	76.2	64.0	375	PVC	0.30	100.3	76%	0.88	0.98
N-7	DSEL	**MH102A**	MH17A	4.0	291	1.2	129	5.2	420	60.7	4,447	3.29	59.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	0.0	2.5	4.3	5.2	68.1	19.1	82.7	81.0	375	PVC	0.30	100.3	82%	0.88	0.99
Cambrian Road																																			
N-3		MH17A	MH21A	26.0	1,956	0.0	0	26.0	1,956	145.6	12,948	2.84	149.0	0.0	3.4	0.0	0.0	0.0	0.0	3.0	25.4	5.1	25.1	25.0	34.1	199.5	55.9	229.9	204.3	750	CPP	0.13	419.5	55%	0.92	0.94
N-8		**MH21A**	MH45	7.0	408	0.0	0	7.0	408	152.6	13,356	2.83	153.1	0.0	3.4	0.0	0.0	0.0	0.0	0.0	25.4	2.9	28.0	25.0	9.9	209.4	58.6	236.7	277.8	750	CPP	0.13	419.5	56%	0.92	0.95
Greenbank Road																																			
MSS-A-14	IBI	MH205A	MH98A	0.0	0	21.0	2,246	21.0	2,246	21.0	2,246	3.55	32.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.0	21.0	5.9	38.2	126.0	600	CPP	0.25	321.2	12%	1.10	0.73
	IBI	MH98A	MH99A	0.0	0	0.0	0	0.0	0	21.0	2,246	3.55	32.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.0	5.9	38.2	125.0	600	CPP	0.25	321.2	12%	1.10	0.73
	IBI	MH99A	MH100A	0.0	0	0.0	0	0.0	0	21.0	2,246	3.55	32.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.0	5.9	38.2	108.0	600	CPP	0.25	321.2	12%	1.10	0.73
	IBI	MH100A	MH204A	0.0	0	0.0	0	0.0	0	21.0	2,246	3.55	32.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.0	5.9	38.2	105.0	600	CPP	0.25	321.2	12%	1.10	0.73
	IBI	MH204A	MH206A	0.0	0	0.0	0	0.0	0	21.0	2,246	3.55	32.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.0	5.9	38.2	103.0	600	CPP	0.25	321.2	12%	1.10	0.73
	IBI	MH206A	MH97A	0.0	0	0.0	0	0.0	0	21.0	2,246	3.55	32.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.0	5.9	38.2	125.0	600	CPP	0.25	321.2	12%	1.10	0.73
N-13, N-13-R	IBI	**MH97A**	MH96A	19.9	1,625	0.1	6	20.0	1,631	41.0	3,877	3.35	52.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.8	0.0	20.8	41.8	11.7	64.3	98.0	600	CPP	0.30	350.4	18%	1.20	0.89
	IBI	MH96A	MH95A	0.0	0	0.0	0	0.0	0	41.0	3,877	3.35	52.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	41.8	11.7	64.3	129.0	600	CPP	0.30	350.4	18%	1.20	0.89
	IBI	MH95A	MH201A	0.0	0	0.0	0	0.0	0	41.0	3,877	3.35	52.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	41.8	11.7	64.3	123.0	600	CPP	0.30	350.4	18%	1.20	0.89
N-11, N-11-R	IBI	**MH201A**	MH201B	12.1	787	0.0	0	12.1	787	53.1	4,664	3.27	61.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	12.1	53.9	15.1	76.9	124.0	600	CPP	0.30	350.4	22%	1.20	0.94
	IBI	MH201B	MH200A	0.0	0	0.0	0	0.0	0	53.1	4,664	3.27	61.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	53.9	15.1	76.9	68.0	600	CPP	0.30	350.4	22%	1.20	0.94
	IBI	MH200A	MH200C	0.0	0	0.0	0	0.0	0	53.1	4,664	3.27	61.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	53.9	15.1	76.9	48.0	600	CPP	0.50	452.6	17%	1.55	1.12
	IBI	MH200C	MH45	0.0	0	0.0	0	0.0	0	53.1	4,664	3.27	61.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	53.9	15.1	76.9	26.0	600	CPP	0.12	221.9	35%	0.76	0.68
MSS-A-15		MH45	MH435A	0.0	0	5.1	548	5.1	548	210.8	18,568	2.68	201.6	0.0	3.4	0.0	0.0	0.0	0.0	0.0	25.4	0.0	28.8	25.0	5.1	268.4	75.2	301.8	296.6	900	CPP	0.10	597.0	51%	0.91	0.91
North																																			
MSS-A-9		MA9	MA8	0.0	0	22.2	2,378	22.2	2,378	22.2	2,378	3.53	34.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.5	9.5	9.5	2.2	34.2	34.2	9.6	45.8	507.5	450	CPP	0.11	98.4	47%	0.60	0.59
MSS-A-8		**MA8**	MA7	0.0	0	2.9	308	2.9	308	25.1	2,686	3.48	37.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.8	10.3	2.2	3.7	37.9	10.6	50.7	317.1	450	CPP	0.11	98.4	52%	0.60	0.61
MSS-A-7		**MA7**	MA6	0.0	0	18.5	1,979	18.5	1,979	43.6	4,665	3.27	61.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	10.3	2.2	18.5	56.4	15.8	79.8	573.1	450	CPP	0.11	98.4	81%	0.60	0.67
MSS-A-6		**MA6**	MA5	0.0	0	21.7	2,320	21.7	2,320	65.3	6,985	3.11	88.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	10.3	2.2	21.7	78.1	21.9	112.1	473.9	600	CPP	0.10	201.5	56%	0.69	0.71
MSS-A-5		**MA5**	M27A	0.0	0	9.5	1,020	9.5	1,020	74.8	8,005	3.05	98.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	10.3	2.2	9.5	87.6	24.5	125.6	220.0	600	CPP	0.10	201.5	62%	0.69	0.73
MSS-A-4		**M27A**	MH5200A	0.0	0	8.1	863	8.1	863	82.9	8,868	3.01	108.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	10.3	2.2	8.1	95.7	26.8	137.1	501.5	600	CPP	0.15	248.2	55%	0.85	0.87
		MH5200A	MH520A	0.0	0	0.0	0	0.0	0	82.9	8,868	3.01	108.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	10.3	2.2	0.0	95.7	26.8	137.1	46.0	600	CPP	0.08	181.0	76%	0.62	0.69
		MH520A	MH521A	0.0	0	0.0	0	0.0	0	82.9	8,868	3.01	108.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	10.3	2.2	0.0	95.7	26.8	137.1	44.4	600	CPP	0.10	201.5	68%	0.69	0.75
N-1		**MH521A**	MH522A	3.3	177	0.5	54	3.8	231	86.7	9,099	3.00	110.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	10.3	2.2	3.8	99.5	27.9	140.7	50.1	600	CPP	0.09	192.7	73%	0.66	0.73
		MH522A	MH435A	0.0	0	0.0	0	0.0	0	86.7	9,099	3.00	110.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	10.3	2.2	0.0	99.5	27.9	140.7	10.8	600	CPP	0.21	292.0	48%	1.00	0.99
		MH435A	MH501A	0.0	0	0.0	0	0.0	0	297.5	27,667	2.51	281.3	0.0	3.4	0.0	0.0	0.0	0.0	0.0	27.9	0.0	39.1	27.2	0.0	367.9	103.0	411.5	13.3	900	CPP	0.11	623.2	66%	0.95	1.02

Area: B MAS

BARRHAVEN SOUTH MASTER SERVICING STUDY

DATE: 2017/09/29
REVISION: 1
DESIGNED: LP
CHECKED: /

SANITARY SEWER DESIGN SHEET

PIPE DESIGN

FILE NUMBER: 163400999

Colour code:
Hard coded values
Caculated value
Value from subdivision design
Most US MH
Estimated value
MH receiving flow from 2 or more sewers

LOCATION				CALCULATED VALUES					UPSTREAM				DOWNSTREAM			
AREA ID NUMBER	Source	FROM M.H.	TO M.H.	ACTUAL PIPE SIZE (mm)	AREA (m^2)	HYDR. RADIUS	SURCHARGE VELOCITY (m/s)	DEPTH OF FLOW (m)	GROUND ELEVATION (m)	OBVERT ELEVATION (m)	INVERT ELEVATION (m)	U/S COVER (m)	GROUND ELEVATION (m)	OBVERT ELEVATION (m)	INVERT ELEVATION (m)	D/S COVER (m)
MSS-A-23		MA11	MA10	305	0.073	0.076			100.00	95.000	94.695	5.00	93.50	91.384	91.079	2.12
MSS-A-22		**MA10**	MH57A	381	0.114	0.095			93.50	91.324	90.943	2.18	93.60	89.525	89.144	4.07
														^ must be above 88.01		
Realigned Greenbank Road																
MSS-A-21		MA14	MA13	254	0.051	0.064			103.00	96.100	95.846	6.90	95.00	92.265	92.011	2.74
N-4		**MA13**	MH57A	381	0.114	0.095			95.00	89.800	89.419	5.20	93.60	88.561	88.180	5.04
															^ must be above plug @ 88.151	
Cambrian Road																
N-5		MH57A	MH13A	500	0.196	0.125			93.60	88.010	87.510	5.59	95.00	87.469	86.969	7.53
N-2		**MH13A**	MH15A	500	0.196	0.125			95.00	87.469	86.969	7.53	95.00	87.139	86.639	7.86
N-6		**MH15A**	MH17A	610	0.292	0.152			95.00	87.139	86.529	7.86	97.00	86.876	86.266	10.12
River Mist Road																
MSS-A-18	Stantec	MH163	162	203	0.032	0.050	0.333	0.058	100.00	96.000	95.797	4.00	99.55	95.580	95.380	3.97
	Stantec	162	161	254	0.051	0.064	0.284	0.053	99.55	95.580	95.330	3.97	98.55	94.580	94.327	3.97
	Stantec	161	EX151	254	0.051	0.064	0.285	0.053	98.55	94.540	94.292	4.00	97.88	93.670	93.423	4.21
	Stantec	EX151	MH142	305	0.073	0.076	0.201	0.036	97.88	93.670	93.373	4.21	97.48	93.050	92.752	4.42
N-14	Stantec	**MH142**	EX139	305	0.073	0.076	0.351	0.120	97.48	93.030	92.732	4.44	96.84	92.730	92.433	4.11
	Stantec	EX139	EX136	305	0.073	0.076	0.366	0.126	96.84	92.710	92.411	4.13	96.66	92.450	92.152	4.21
	Stantec	EX136	MH126	305	0.073	0.076	0.383	0.129	96.66	91.650	91.350	5.01	96.85	91.320	91.024	5.53
N-15	Stantec	**MH126**	EX123	381	0.114	0.095	0.415	0.147	96.85	91.330	90.959	5.52	96.41	91.010	90.639	5.39
	Stantec	EX123	MH112	381	0.114	0.095	0.441	0.161	96.41	90.990	90.616	5.42	96.22	90.610	90.236	5.61
N-16	Stantec	**MH112**	EX102	381	0.114	0.095	0.497	0.213	96.22	90.590	90.213	5.63	95.71	90.380	90.003	5.33
	Stantec	EX102	EX101	381	0.114	0.095	0.562	0.246	95.71	90.360	89.984	5.35	95.69	90.260	89.884	5.43
	IBI	EX101	MH43A	381	0.114	0.095			95.69	90.265	89.884	5.43	95.60	90.090	89.709	5.51
N-12	IBI	**MH43A**	MH44A	381	0.114	0.095			95.60	90.070	89.689	5.53	95.50	89.826	89.445	5.67
	IBI	MH44A	MH45A	381	0.114	0.095			95.50	89.806	89.425	5.69	95.00	89.604	89.223	5.40
	IBI	MH45A	MH46A	381	0.114	0.095			95.00	89.594	89.213	5.41	94.20	89.339	88.958	4.86
N-10	IBI	**MH46A**	MH47A	381	0.114	0.095			94.20	89.319	88.938	4.88	94.20	89.181	88.800	5.02
	DSEL	MH47A	MH101A	381	0.114	0.095			94.20	89.181	88.800	5.02	94.20	88.989	88.608	5.21
	DSEL	MH101A	MH102A	381	0.114	0.095			94.20	88.969	88.588	5.23	93.80	88.777	88.396	5.02
N-7	DSEL	**MH102A**	MH17A	381	0.114	0.095			93.80	88.693	88.312	5.11	93.40	88.451	88.070	4.95
Cambrian Road																
N-3		MH17A	MH21A	762	0.456	0.190			97.00	86.876	86.114	10.12	95.00	86.773	86.011	8.23
N-8		**MH21A**	MH45	762	0.456	0.190			95.00	86.773	86.011	8.23	94.50	86.412	85.650	8.09
Greenbank Road																
MSS-A-14	IBI	MH205A	MH98A	610	0.292	0.152			97.80	90.780	90.170	7.02	97.40	90.465	89.855	6.94
	IBI	MH98A	MH99A	610	0.292	0.152			97.40	90.443	89.833	6.96	96.90	90.130	89.520	6.77
	IBI	MH99A	MH100A	610	0.292	0.152			96.90	90.105	89.495	6.80	96.60	89.835	89.225	6.77
	IBI	MH100A	MH204A	610	0.292	0.152			96.60	89.803	89.193	6.80	96.20	89.540	88.930	6.66
	IBI	MH204A	MH206A	610	0.292	0.152			96.20	89.517	88.907	6.68	95.80	89.260	88.650	6.54
	IBI	MH206A	MH97A	610	0.292	0.152			95.80	89.260	88.650	6.54	95.40	88.948	88.338	6.45
N-13, N-13-R	IBI	**MH97A**	MH96A	610	0.292	0.152			95.40	88.938	88.328	6.46	95.20	88.643	88.033	6.56
	IBI	MH96A	MH95A	610	0.292	0.152			95.20	88.643	88.033	6.56	95.00	88.256	87.646	6.74
	IBI	MH95A	MH201A	610	0.292	0.152			95.00	88.256	87.646	6.74	94.50	87.887	87.277	6.61
N-11, N-11-R	IBI	**MH201A**	MH201B	610	0.292	0.152			94.50	87.887	87.277	6.61	94.70	87.514	86.904	7.19
	IBI	MH201B	MH200A	610	0.292	0.152			94.70	87.510	86.900	7.19	94.40	87.307	86.697	7.09
	IBI	MH200A	MH200C	610	0.292	0.152			94.40	87.241	86.631	7.16	94.80	87.001	86.391	7.80
	IBI	MH200C	MH45	610	0.292	0.152			94.80	87.001	86.391	7.80	94.50	86.405	85.795	8.10
MSS-A-15		MH45	MH435A	914	0.656	0.228			94.50	86.405	85.491	8.10	92.60	86.108	85.194	6.49
North																
MSS-A-9		MA9	MA8	457	0.164	0.114			92.75	89.550	89.093	3.20	92.35	88.992	88.535	3.36
MSS-A-8		**MA8**	MA7	457	0.164	0.114			92.35	88.932	88.475	3.42	92.90	88.583	88.126	4.32
MSS-A-7		**MA7**	MA6	457	0.164	0.114			92.90	88.523	88.066	4.38	93.90	87.893	87.436	6.01
MSS-A-6		**MA6**	MA5	610	0.292	0.152			93.90	87.833	87.223	6.07	93.50	87.359	86.749	6.14
MSS-A-5		**MA5**	M27A	610	0.292	0.152			93.50	87.299	86.689	6.20	93.00	87.079	86.469	5.92
MSS-A-4		**M27A**	MH5200A	610	0.292	0.152			93.00	87.019	86.409	5.98	93.00	86.267	85.657	6.73
		MH5200A	MH520A	610	0.292	0.152			93.00	86.231	85.621	6.77	93.80	86.194	85.584	7.61
		MH520A	MH521A	610	0.292	0.152			93.70	86.155	85.545	7.55	93.80	86.111	85.501	7.69
N-1		**MH521A**	MH522A	610	0.292	0.152			93.80	86.078	85.468	7.72	92.60	86.033	85.423	6.57
		MH522A	MH435A	610	0.292	0.152			92.60	86.005	85.395	6.60	92.60	85.982	85.372	6.62
		MH435A	MH501A	914	0.656	0.228			92.60	85.982	85.068	6.62	92.60	85.967	85.053	6.63

APPENDIX E

KENNEDY LANDS – STORM DESIGN SHEETS

ULTIMATE GREENBANK POND – PRELIMINARY DESIGN

EXCERPT FROM GREENBANK PDB – TABLE 1

EXTENTS OF SUBMERGED STORM SEWERS

INTERIM GREENBANK POND – AS BUILT STAGE STORAGE

ULTIMATE GREENBANK POND – UPDATED DESIGN 2023

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) 2 YEAR				AREA (Ha) 5 YEAR				AREA (Ha) 10 YEAR				AREA (Ha) 100 YEAR				FLOW Time of	Intensity	Intensity	Intensity	Intensity	Peak Flow	SEWER DATA 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
PRIVATE BLOCK SERVICING																																
					0.00	0.00	1.04	0.80	2.31	2.31			0.00	0.00			0.00	0.00	12.00														
	57	58			0.00	0.00	0.50	0.80	1.11	3.42			0.00	0.00			0.00	0.00	12.00	69.89	94.70	110.96	162.13	324	750	750	CONC	0.30	25.0	609.7669	1.3802	0.3019	0.532
	58	56			0.00	0.00			0.00	3.42			0.00	0.00			0.00	0.00	12.30	68.97	93.43	109.46	159.94	320	750	750	CONC	0.30	12.0	609.7669	1.3802	0.1449	0.525
To POND INLET, Pipe 56 - 61						0.00				3.42				0.00				0.00	12.45														
STREET 4																																
	46	47	0.42	0.75	0.88	0.88			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	67	375	375	PVC	0.30	78.5	96.0323	0.8695	1.5047	0.700
	47	19	0.40	0.75	0.83	1.71			0.00	0.00			0.00	0.00			0.00	0.00	11.50	71.47	96.86	113.51	165.88	122	525	525	CONC	0.20	90.5	192.3297	0.8885	1.6977	0.635
To STREET 1, Pipe 19 - 20						1.71				0.00				0.00				0.00	13.20														
STREET 2																																
	44	45	0.64	0.75	1.33	1.33			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	102	375	375	PVC	0.50	83.0	123.9771	1.1225	1.2324	0.827
	45	18	0.39	0.75	0.81	2.15			0.00	0.00			0.00	0.00			0.00	0.00	11.23	72.38	98.11	114.97	168.03	155	525	525	CONC	0.20	86.5	192.3297	0.8885	1.6227	0.808
To STREET 1, Pipe 18 - 19						2.15				0.00				0.00				0.00	12.86														
	48	49	0.25	0.75	0.52	0.52			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	40	300	300	PVC	0.35	55.5	57.2089	0.8093	1.1429	0.700
	49	50	0.44	0.75	0.92	1.44			0.00	0.00			0.00	0.00			0.00	0.00	11.14	72.68	98.52	115.46	168.75	105	450	450	CONC	0.20	88.5	127.5033	0.8017	1.8399	0.820
	50	20	0.36	0.75	0.75	2.19			0.00	0.00			0.00	0.00			0.00	0.00	12.98	66.98	90.70	106.25	155.22	147	525	525	CONC	0.20	83.0	192.3297	0.8885	1.5570	0.762
To STREET 1, Pipe 20 - 21						2.19				0.00				0.00				0.00	14.54														
STREET 1																																
	42	43			0.00	0.00	0.66	0.75	1.38	1.38			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	143	525	525	CONC	0.20	76.0	192.3297	0.8885	1.4257	0.745
	43	17			0.00	0.00	0.66	0.75	1.38	2.75			0.00	0.00			0.00	0.00	11.43	71.73	97.22	113.93	166.50	268	675	675	CONC	0.15	110.5	325.5584	0.9098	2.0243	0.822
To STREET 1, Pipe 17 - 18						0.00				2.75				0.00				0.00	13.45														
STREET 5/ STREET 6																																
	38	39	0.52	0.75	1.08	1.08			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	83	450	450	CONC	0.20	76.5	127.5033	0.8017	1.5904	0.653
	39	13	0.29	0.75	0.60	1.69			0.00	0.00			0.00	0.00			0.00	0.00	11.59	71.19	96.48	113.06	165.22	120	600	600	CONC	0.15	69.5	237.8056	0.8411	1.3772	0.506
To STREET 1, Pipe 13 - 14						1.69				0.00				0.00				0.00	12.97														
	40	41	0.53	0.75	1.11	1.11			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	85	450	450	CONC	0.20	77.0	127.5033	0.8017	1.6008	0.666
	41	15	0.39	0.75	0.81	1.92			0.00	0.00			0.00	0.00			0.00	0.00	11.60	71.16	96.44	113.01	165.14	137	600	600	CONC	0.15	76.5	237.8056	0.8411	1.5159	0.574
To STREET 1, Pipe 15 - 16						1.92				0.00				0.00				0.00	13.12														
STREET 7/ STREET 8																																
	33	34	0.49	0.75	1.02	1.02			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	78	450	450	CONC	0.20	83.5	127.5033	0.8017	1.7359	0.615
	34	11	0.56	0.75	1.17	2.19			0.00	0.00			0.00	0.00			0.00	0.00	11.74	70.73	95.84	112.30	164.11	155	600	600	CONC	0.15	83.5	237.8056	0.8411	1.6546	0.651
To STREET 1, Pipe 11 - 12						2.19				0.00				0.00				0.00	13.39														
	35	36	0.36	0.75	0.75	0.75			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	58	450	450	CONC	0.20	65.5	127.5033	0.8017	1.3617	0.452
	36	37	0.53	0.75	1.11	1.86			0.00	0.00			0.00	0.00			0.00	0.00	11.36	71.94	97.51	114.27	167.00	134	600	600	CONC	0.15	84.5	237.8056	0.8411	1.6745	0.561
	37	12	0.39	0.75	0.81	2.67			0.00	0.00			0.00	0.00			0.00	0.00	13.04	66.83	90.49	106.01	154.87	178	600	600	CONC	0.15	78.0	237.8056	0.8411	1.5457	0.750
To STREET 1, Pipe 12 - 13						2.67				0.00				0.00				0.00	14.58														
STREET 10																																
Contribution From STREET 9, Pipe 26 - 27						0.58				0.00				0.00				0.00	11.31														
Contribution From STREET 9, Pipe 28 - 27						1.34				0.00				0.00				0.00	11.89														
	27	32	0.42	0.70	0.82	2.74			0.00	0.00			0.00	0.00			0.00	0.00	11.89	70.23	95.16	111.50	162.94	193	600	600	CONC	0.15	71.5	237.8056	0.8411	1.4169	0.810
	32	9	0.72	0.70	1.40	4.14			0.00	0.00			0.00	0.00			0.00	0.00	13.31	66.07	89.45	104.79	153.07	274	675	675	CONC	0.15	108.0	325.5584	0.9098	1.9785	0.841
To STREET 1, Pipe 9 - 10						4.14				0.00				0.00				0.00	15.29														
STREET 9																																
	26	27	0.30	0.70	0.58	0.58			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	45	375	375	PVC	0.30	68.5	96.0323	0.8695	1.3130	0.467
To STREET 10, Pipe 27 - 32						0.58				0.00				0.00				0.00	11.31														

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

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

LICENSED PROFESSIONAL ENGINEER
S. L. MERRICK
100186523
2023-08-03
PROVINCE OF ONTARIO
TBB 20-1182

Designed: BNC	PROJECT: Minto - Kennedy Lands		
Checked: SLM	LOCATION: City of Ottawa		
Dwg. Reference: 5	File Ref: 20-1182	Date: 02 Aug 2023	Sheet No. SHEET 1 OF 3

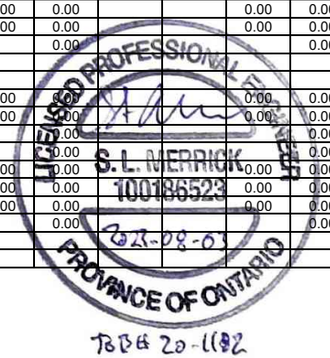
STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

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

LOCATION			AREA (Ha) 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
	28	27	0.69	0.70	1.34	1.34			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	103	450	450	CONC	0.20	91.0	127.5033	0.8017	1.8918	0.809
To STREET 10, Pipe 27 - 32						1.34				0.00				0.00				0.00	11.89														
	2	3	0.17	0.70	0.33	0.33			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	25	300	300	PVC	0.35	32.0	57.2089	0.8093	0.6590	0.444
	3	4	0.34	0.70	0.66	0.99			0.00	0.00			0.00	0.00			0.00	0.00	10.66	74.36	100.84	118.19	172.75	74	450	450	CONC	0.20	57.5	127.5033	0.8017	1.1954	0.579
To STREET 1, Pipe 4 - 5						0.99				0.00				0.00				0.00	11.85														
	29	30	0.68	0.70	1.32	1.32			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	102	600	600	CONC	0.15	114.5	237.8056	0.8411	2.2689	0.427
	30	10	0.75	0.70	1.46	2.78			0.00	0.00			0.00	0.00			0.00	0.00	12.27	69.07	93.56	109.62	160.17	192	600	600	CONC	0.15	113.5	237.8056	0.8411	2.2491	0.808
To STREET 1, Pipe 10 - 11						2.78				0.00				0.00				0.00	14.52														
STREET 1																																	
	60	4	0.05	0.70	0.10	0.10			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	7	375	375	PVC	0.30	30.0	96.0323	0.8695	0.5750	0.078
Contribution From STREET 9, Pipe 3 - 4						0.99				0.00				0.00				0.00	11.85														
	4	5	0.06	0.70	0.12	1.21			0.00	0.00			0.00	0.00			0.00	0.00	11.85	70.35	95.32	111.70	163.22	85	450	450	CONC	0.20	10.0	127.5033	0.8017	0.2079	0.666
	5	6	0.23	0.70	0.45	1.65			0.00	0.00			0.00	0.00			0.00	0.00	12.06	69.70	94.43	110.65	161.67	115	525	525	CONC	0.20	41.5	192.3297	0.8885	0.7785	0.599
	6	7	0.43	0.70	0.84	2.49			0.00	0.00			0.00	0.00			0.00	0.00	12.84	67.38	91.25	106.90	156.18	168	600	600	CONC	0.15	75.5	237.8056	0.8411	1.4961	0.706
	7	8			0.00	2.49			0.00	0.00			0.00	0.00			0.00	0.00	14.34	63.38	85.76	100.45	146.70	158	600	600	CONC	0.15	13.5	237.8056	0.8411	0.2675	0.664
	8	9	0.26	0.70	0.51	3.00			0.00	0.00			0.00	0.00			0.00	0.00	14.60	62.72	84.86	99.38	145.14	188	675	675	CONC	0.15	63.5	325.5584	0.9098	1.1633	0.577
Contribution From STREET 10, Pipe 32 - 9						4.14				0.00				0.00				0.00	15.29														
	9	10	0.22	0.70	0.43	7.57			0.00	0.00			0.00	0.00			0.00	0.00	15.77	60.01	81.16	95.03	138.75	454	900	900	CONC	0.15	72.5	701.1305	1.1021	1.0964	0.648
Contribution From STREET 9, Pipe 30 - 10						2.78				0.00				0.00				0.00	14.52														
	10	11	0.20	0.70	0.39	10.74			0.00	0.00			0.00	0.00			0.00	0.00	16.86	57.69	77.98	91.30	133.27	620	975	975	CONC	0.15	71.0	867.9562	1.1625	1.0179	0.714
Contribution From STREET 7/ STREET 8, Pipe 34 - 11						2.19				0.00				0.00				0.00	13.39														
	11	12	0.26	0.75	0.54	13.47			0.00	0.00			0.00	0.00			0.00	0.00	17.88	55.71	75.27	88.11	128.60	751	1050	1050	CONC	0.15	76.0	1057.6053	1.2214	1.0371	0.710
Contribution From STREET 7/ STREET 8, Pipe 37 - 12						2.67				0.00				0.00				0.00	14.58														
	12	13	0.34	0.75	0.71	16.85			0.00	0.00			0.00	0.00			0.00	0.00	18.92	53.84	72.72	85.11	124.20	907	1200	1200	CONC	0.15	64.0	1509.9717	1.3351	0.7989	0.601
Contribution From STREET 5/ STREET 6, Pipe 39 - 13						1.69				0.00				0.00				0.00	12.97														
	13	14			0.00	18.54			0.00	0.00			0.00	0.00			0.00	0.00	19.72	52.49	70.88	82.94	121.03	973	1200	1200	CONC	0.15	37.5	1509.9717	1.3351	0.4681	0.644
	14	15	0.12	0.75	0.25	18.79			0.00	0.00			0.00	0.00			0.00	0.00	20.19	51.73	69.85	81.73	119.25	972	1200	1200	CONC	0.15	16.0	1509.9717	1.3351	0.1997	0.644
Contribution From STREET 5/ STREET 6, Pipe 41 - 15						1.92				0.00				0.00				0.00	13.12														
	15	16	0.19	0.75	0.40	21.10			0.00	0.00			0.00	0.00			0.00	0.00	20.39	51.42	69.42	81.23	118.51	1085	1200	1200	CONC	0.15	29.0	1509.9717	1.3351	0.3620	0.719
	16	17			0.00	21.10			0.00	0.00			0.00	0.00			0.00	0.00	20.75	50.86	68.65	80.33	117.19	1073	1200	1200	CONC	0.15	42.5	1509.9717	1.3351	0.5305	0.711
Contribution From STREET 1, Pipe 43 - 17						0.00				2.75				0.00				0.00	13.45														
	17	18	0.25	0.75	0.52	21.63			0.00	2.75			0.00	0.00			0.00	0.00	21.28	50.06	67.56	79.05	115.32	1269	1350	1350	CONC	0.15	80.0	2067.1669	1.4442	0.9233	0.614
Contribution From STREET 2, Pipe 45 - 18						2.15				0.00				0.00				0.00	12.86														
	18	19			0.00	23.77			0.00	2.75			0.00	0.00			0.00	0.00	22.20	48.74	65.76	76.94	112.22	1340	1350	1350	CONC	0.15	40.0	2067.1669	1.4442	0.4616	0.648
Contribution From STREET 4, Pipe 47 - 19						1.71				0.00				0.00				0.00	13.20														
	19	20	0.35	0.75	0.73	26.21			0.00	2.75			0.00	0.00			0.00	0.00	22.66	48.11	64.90	75.93	110.74	1440	1350	1350	CONC	0.15	70.0	2067.1669	1.4442	0.8078	0.696
Contribution From STREET 2, Pipe 50 - 20						2.19				0.00				0.00				0.00	14.54														
	20	21			0.00	28.40			0.00	2.75			0.00	0.00			0.00	0.00	23.47	47.04	63.45	74.22	108.24	1511	1350	1350	CONC	0.15	52.0	2067.1669	1.4442	0.6001	0.731
Contribution From STREET 1/ STREET 3, Pipe 52 - 21						1.54				0.00				0.00				0.00	12.66														
	21	22	0.04	0.75	0.08	30.03			0.00	2.75			0.00	0.00			0.00	0.00	24.07	46.29	62.42	73.01	106.47	1562	1350	1350	CONC	0.15	28.5	2067.1669	1.4442	0.3289	0.755
	22	23	0.03	0.75	0.06	30.09			0.00	2.75			0.00	0.00			0.00	0.00	24.40	45.88	61.87	72.37	105.52	1551	1350	1350	CONC	0.15	12.0	2067.1669	1.4442	0.1385	0.750
To STREET 1/ STREET 3, Pipe 23 - 24						30.09				2.75				0.00				0.00	24.54														
STREET 1/ STREET 3																																	
	51	52	0.45	0.75	0.94	0.94			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	72	375	375	PVC	0.30	70.5	96.0323	0.8695	1.3514	0.750
	52	21	0.29	0.75	0.60	1.54			0.00	0.00			0.00	0.00			0.00	0.00	11.35	71.98	97.56	114.33	167.08	111	450	450	CONC	0.25	70.5	142.5531	0.8963	1.3109	0.779
To STREET 1, Pipe 21 - 22						1.54				0.00				0.00				0.00	12.66														
Contribution From STREET 1, Pipe 22 - 23						30.09				2.75				0.00				0.00	24.54														
	23	24			0.00	30.09			0.00	2.75			0.00	0.00			0.00	0.00	24.54	45.72	61.64	72.10	105.13	1545	1350	1350	CONC	0.15	12.0	2067.1669	1.4442	0.1385	0.748
			0.39	0.75	0.81	30.90			0.00	2.75			0.00	0.00			0.00	0.00															
	24	25			0.00	30.90	0.85	0.40	0.95	3.70			0.00	0.00			0.00	0.00	24.68	45.55	61.42	71.83	104.74	1635	1350	1350	CONC	0.15	112.5	2067.1669	1.4442	1.2983	0.791
To POND INLET, Pipe 25 - 53						30.90				3.70				0.00				0.00	25.98														

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



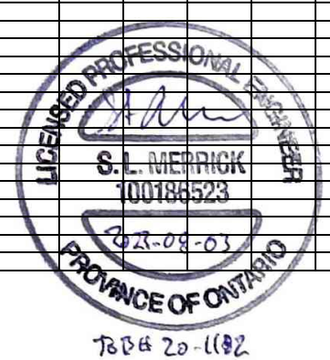
TSTM 20-1182

Designed: BNC	PROJECT: Minto - Kennedy Lands	
Checked: SLM	LOCATION: City of Ottawa	
Dwg. Reference: 5	File Ref: 20-1182	Date: 02 Aug 2023
		Sheet No. SHEET 2 OF 3

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) 2 YEAR				5 YEAR				10 YEAR				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
POND INLET																																	
Contribution From STREET 1/ STREET 3, Pipe 24 - 25						30.90				3.70				0.00				0.00	25.98														
	25	53			0.00	30.90			0.00	3.70			0.00	0.00			0.00	0.00	25.98	44.05	59.38	69.45	101.24	1581	1350	1350	CONC	0.15	24.0	2067.1669	1.4442	0.2770	0.765
	53	63			0.00	30.90			0.00	3.70			0.00	0.00			0.00	0.00	26.25	43.75	58.97	68.96	100.53	1570	1350	1350	CONC	0.15	13.5	2067.1669	1.4442	0.1558	0.760
					0.00	30.90			0.00	3.70			0.00	0.00	1.12	0.85	2.65	2.65	15.00														
					0.00	30.90			0.00	3.70			0.00	0.00	1.35	0.85	3.19	5.84	12.00														
	63	54			0.00	30.90			0.00	3.70			0.00	0.00			0.00	5.84	26.41	43.58	58.74	68.69	100.13	2148	1650	1650	CONC	0.15	20.5	3530.0106	1.6509	0.2070	0.609
					0.00	30.90			0.00	3.70			0.00	0.00	1.03	0.85	2.43	8.27	15.00														
					0.00	30.90			0.00	3.70			0.00	0.00	1.36	0.85	3.21	11.48	12.00														
	54	55			0.00	30.90			0.00	3.70			0.00	0.00			0.00	11.48	26.62	43.36	58.43	68.33	99.61	2700	1650	1650	CONC	0.15	22.0	3530.0106	1.6509	0.2221	0.765
	55	56			0.00	30.90			0.00	3.70			0.00	0.00			0.00	11.48	26.84	43.12	58.11	67.96	99.06	2685	1650	1650	CONC	0.15	10.5	3530.0106	1.6509	0.1060	0.761
Contribution From PRIVATE BLOCK SERVICING, Pipe 58 - 56					0.00					3.42				0.00				0.00	12.45														
	56	HW1			0.00	30.90			0.00	7.12			0.00	0.00			0.00	11.48	26.94	43.01	57.96	67.78	98.80	2877	1650	1650	CONC	0.15	7.5	3530.0106	1.6509	0.0757	0.815



TBD# 20-1182

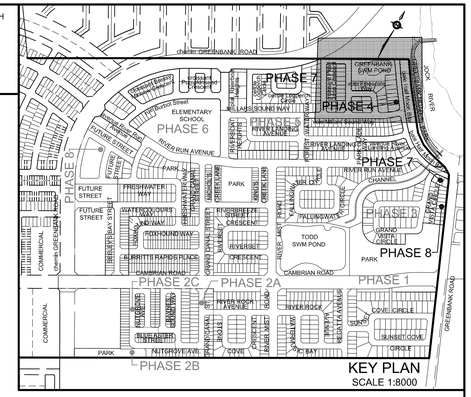
Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficient

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

Designed: BNC	PROJECT: Minto - Kennedy Lands		
Checked: SLM	LOCATION: City of Ottawa		
Dwg. Reference: 5	File Ref: 20-1182	Date: 02 Aug 2023	Sheet No. SHEET 3 OF 3

PRELIMINARY DESIGN FOR
FUTURE chemin Greenbank Road
REFER TO
STANTEC
PROJECT No. 163600886

REVIEWED BY DEVELOPMENT REVIEW BRANCH
SIGNED _____
DATE _____
PLAN NUMBER _____



LEGEND

- EXISTING ELEVATION 90.50
- PROPOSED ELEVATION 91.10
- CONTOUR ELEVATION 92.00
- OVERLAND FLOW DIRECTION
- STORM MAINTENANCE HOLE — MH 112
- CAP
- PHASING LIMITS
- PROPERTY BOUNDARY
- 100 YEAR FLOOD LINE
- MEANDER LIMIT
- EROSION SETBACK
- 100 YEAR WATER LEVEL 91.10
- EXT. DET. WATER LEVEL 90.75
- BOREHOLE BHxx-xx
- 1200ø CONC STM
- PERMANENT POOL – ELEVATION 89.20
- REINFORCED GRASSED SERVICE ROAD (SEE DETAIL ON DWG. 37)
- 5.0m SERVICE ROAD (3.0m ASPHALT PAVEMENT) (SEE DETAIL ON DWG. 37)
- GRANULAR B
- SEDIMENT MANAGEMENT AREA
- OVERLAND FLOW ROUTE
- AQUATIC FRINGE
- RIP-RAP STONE

NOTE:
FOR CROSS-SECTIONS A1–A1, B1–B1 AND C1–C1, REFER TO DWG No. 35A.

PERMISSION REQUIRED FOR WORK ON ADJACENT LANDS

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

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

NOTE RE: JOCK RIVER WATER LEVEL
JOCK RIVER WATER LEVEL ADJACENT TO THE LOCATION OF THE POND OUTLET WAS SURVEYED BY J.D. BARNES LIMITED AS 88.73m ON OCTOBER 7, 2015 AND 89.30m ON APRIL 8, 2016

NOTE RE: JOCK RIVER 2yr WATER LEVEL
JOCK RIVER 2yr WATER LEVEL AT RIVER CROSS SECTION 3633, REACH 7, WHICH IS APPROXIMATELY 23m NORTH OF THE POND OUTFALL CHANNEL, WAS 89.87m, AS PER JOCK RIVER FLOOD RISK MAPPING (WITHIN THE CITY OF OTTAWA) HYDRAULICS REPORT, NOVEMBER 2004

NOTE RE: QUALITY CONTROL ORIFICE
THE 100ø QUALITY CONTROL ORIFICE PLATE INSTALLED AT POND OUTLET STRUCTURE IS TO BE REPLACED WITH 150ø ORIFICE PLATE WITH INV. 89.20 UPON THE COMPLETION OF THE ULTIMATE POND CONSTRUCTION, SEE DETAILS ON DWG. 35A.

TOPOGRAPHIC INFORMATION
TOPOGRAPHIC INFORMATION PROVIDED BY J.D. BARNES LIMITED, PROJECT No. 06-10-675-00. SURVEY DATED OCTOBER 15, 2007.

LEGAL INFORMATION
CALCULATED DRAFT PLAN PROVIDED BY J.D. BARNES LIMITED, PROJECT No. 07-10-767-00 (HALF MOON BAY PHASE 7), RECEIVED ON MARCH 31, 2017.
CALCULATED DRAFT PLAN PROVIDED BY J.D. BARNES LIMITED, PROJECT No. 07-10-767-00 (HALF MOON BAY PHASES 4 & 8), SURVEY DATED JANUARY 25, 2017.

NOT FOR CONSTRUCTION

BENCH MARK No. 00820010126
POINT IS LOCATED 1.65km NORTH OF BARNSDALE ROAD AND 5km SOUTH OF FALLOWFIELD ROAD ON HIGHWAY 416 NORTH OF KEMPTVILLE. THE POINT IS SET EAST OF THE NORTHBOUND LANE IN THE GRASSY SHOULDER.
ELEVATION = 96.923 m

No.	BY	DATE	DESCRIPTION	BY
12	Z.L.	17-04-20	REVISED AS PER CITY COMMENTS	
11	Z.L.	17-03-27	UPDATED AS PER REVISED ACOUSTIC RECOMMENDATIONS	
10	Z.L.	17-03-03	REVISED AS PER LATEST M-PLAN AND CITY COMMENTS	
9	Z.L.	17-02-09	M-PLAN AND GREENBANK ROAD GRADING REVISIONS	
8	Z.L.	17-01-11	REVISED AS PER CITY COMMENTS	
7	Z.L.	16-12-14	4th SUBMISSION	
6	Z.L.	16-11-28	REVISED AS PER CITY COMMENTS	
5	Z.L.	16-10-17	3rd SUBMISSION	
4	Z.L.	16-08-26	REVISED AS PER CITY COMMENTS	

Ottawa CITY OF OTTAWA

PROJECT No. 13-703

LICENSED PROFESSIONAL ENGINEER Z. LI 17-04-20 PROVINCE OF ONTARIO

GREENBANK SWM POND (ULTIMATE CONDITION)

MATTAMY (HALF MOON BAY) LIMITED

HALF MOON BAY SUBDIVISION
PHASES 4, 7 & 8

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

DRAWN BY:	C.M./W.L.	CHECKED BY:	K.M.	DRAWING NO.	SHEET NO.
DESIGNED BY:	K.M.	CHECKED BY:	Z.L.		34A
SCALE:	1:500	DATE:	DECEMBER 2015		

CITY FILE No. D07-16-13-0019 CITY PLAN No. 14942

PRELIMINARY DESIGN

The above documents form the basis of this report.

2.2 Findings of the Functional Servicing and Stormwater Management Report

The ***Functional Servicing and Stormwater Management Report*** (DSEL, March 2015) established the stormwater control criteria, the pond location and the general stormwater management scheme.

The proposed stormwater management facility is to be designed with the following characteristics:

- **Water Quality Control:** The permanent pool should be sized for an enhanced level of protection. A 40 m^3/ha active volume portion for water quality control should be provided in accordance with the ***SWMP Design Manual***.
- A sediment forebay shall be provided.
- Emergency overflow conveyance will be provided to safely pass emergency flows.

A summary of the required SWM pond characteristics is provided in Table 1.

3.0 DRAINAGE ANALYSIS

The pond design characteristics and requirements, based on a 15.997 ha total drainage area to the pond, as shown in ***Figure 2***, are summarized in ***Table 1*** as follows:

Table 1
SWM Pond Design Characteristics

Item	Target	Comments
Drainage Area	15.997 ha	11.60 ha residential, 0.69 ha pond, 0.61 ha external residential, 0.58 ha external park, 2.48 ha undeveloped
Imperviousness	46%	
Required Permanent Pool Volume	2,040 m^3	Based on 127.50 m^3/ha (1)
Required Quality Control Volume	640 m^3	40 m^3/ha
Allowable Release Rate for Quality Control	16 L/s	Minimum extended detention time between 24 to 48 hours (2)

(1) Note: Interpolated for 46% imperviousness, enhanced protection level for wet pond, as per Table 3.2 of the SWM Planning and Design Manual. Refer to Tables B-1 and B-2 of ***Appendix B***.
(2) Refer to Tables B-3 and B-4 of ***Appendix B***.

Furthermore, the detailed design of the facility has been completed in general conformance with the ***SWMP Design Manual***.

© DSEL

JOCK RIVER

XS 4380 PER JOCK RIVER FLOOD RISK MAP JULY 21, 2005 100-YR = 91.59

XS 4241 PER JOCK RIVER FLOOD RISK MAP JULY 21, 2005 100-YR = 91.58

XS 3888 PER JOCK RIVER FLOOD RISK MAP JULY 21, 2005 100-YR = 91.45

XS 3672 PER JOCK RIVER FLOOD RISK MAP JULY 21, 2005 100-YR = 90.78

1.5m SUBMERGED
61m

1.0m SUBMERGED
187m

0.5m SUBMERGED
175m

<0.5m SUBMERGED
163m

OPEN SPACE

OPEN SPACE

PARK

JOCK RIVER ENVIRONMENTAL ZONE

JOCK RIVER

FUT. GREENBANK ROAD

FUT. DEVELOPMENT BLOCK

100Yr. INTAKE

STREET 1

STREET 2

STREET 3

STREET 4

STREET 5

STREET 6

STREET 7

STREET 8

STREET 9

STREET 10

STREET 11

avenue Perseus Avenue

EXISTING RESIDENTIAL

(EXISTING RESIDENTIAL DEVELOPMENT)
REFER TO DSEL JOB # 18-1082

bois Celestial Grove

(EXISTING RESIDENTIAL DEVELOPMENT)
REFER TO DSEL JOB # 13-703

EXISTING SCHOOL

plat. Riverboat Heights

EXISTING RESIDENTIAL

croissant Pearl Dace Crescent

voie Finescale Way

TED SEPT.

Stage (m)	Volume (m^3)	As Built Volume (m^3)	95% Active Storage (m^3)	Surface Area (m^2)	As Built Surface Area (m^2)	Comment
87.00	0.0	0.0		0.0	0.0	
87.05	23.9	20.0		478.1	409.5	
87.10	49.6	41.0		514.5	446.3	
87.15	76.0	64.0		535.1	483.7	
87.20	103.3	89.0		554.5	521.6	
87.25	131.5	116.0		574.1	569.4	
87.30	160.8	145.0		593.9	596.0	
87.35	191.1	175.0		613.9	622.6	
87.40	222.5	207.0		634.2	649.2	
87.45	254.9	240.0		654.6	675.1	
87.50	288.3	274.0		675.2	700.5	
87.55	324.3	310.0		725.2	725.2	
87.60	361.8	347.0		753.2	750.3	
87.65	400.7	385.0		780.8	776.2	
87.70	440.9	424.0		807.5	802.9	
87.75	482.6	465.0		834.8	853.3	
87.80	525.8	508.0		862.6	880.9	
87.85	570.5	553.0		891.0	909.5	
87.90	617.6	599.0		920.9	939.4	
87.95	663.4	647.0		957.3	970.7	
88.00	712.8	697.0		979.9	1053.4	
88.05	768.3	751.0		1100.8	1105.3	
88.10	826.1	807.0		1143.2	1149.0	
88.15	885.5	866.0		1178.5	1193.3	
88.20	946.7	927.0		1212.7	1238.6	
88.25	1009.8	990.0		1247.3	1287.7	
88.30	1074.7	1056.0		1282.2	1338.6	
88.35	1141.5	1124.0		1317.4	1394.2	
88.40	1210.3	1195.0		1353.0	1454.4	
88.45	1281.0	1269.0		1389.0	1519.9	
88.50	1353.7	1347.0		1425.3	1603.6	
88.55	1428.5	1429.0		1461.9	1662.5	
88.60	1505.2	1514.0		1498.9	1721.8	
88.65	1584.1	1602.0		1536.3	1781.7	
88.70	1665.0	1693.0		1573.9	1842.3	
88.75	1748.0	1787.0		1612.0	1904.1	
88.80	1938.5	1884.0		1652.5	1968.5	
88.85	1874.0	1984.0		1728.2	2035.2	
88.90	1960.4	2087.0		1728.2	2102.8	
88.95	2056.0	2194.0		1912.2	2170.4	
89.00	2155.3	2304.0		1985.0	2237.4	
89.05	2257.0	2418.0		2042.6	2306.1	
89.10	2361.7	2535.0		2100.4	2366.8	
89.15	2464.5	2655.0		2171.9	2424.2	

Stage (m)	Volume (m^3)	As Built Volume (m^3)	95% Active Storage (m^3)	Surface Area (m^2)	As Built Surface Area (m^2)	Comment
89.20	**2573.1**	**2778.0**		**2171.9**	**2483.3**	**Permanent Pool**
89.25	2681.7	2904.0		2171.9	2543.3	
89.30	2794.0	3033.0		2245.7	2619.1	
89.35	2907.4	3166.0		2285.6	2683.1	
89.40	3022.8	3302.0		2325.0	2742.1	
89.45	3140.1	3441.0		2363.7	2797.8	
89.50	**3259.3**	**3582.0**	**0.0**	**2402.5**	**2851.9**	**Operational Permanent Pool**
89.55	3380.5	3726.0	115.1	2441.6	2903.6	
89.60	3503.7	3872.0	232.2	2480.7	2952.7	
89.65	3628.8	4021.0	351.0	2520.1	3001.8	
89.70	3756.0	4172.0	471.9	2559.6	3050.8	
89.75	3885.2	4326.0	594.6	2599.3	3100.0	
89.80	4016.5	4482.0	719.3	2639.2	3150.1	
89.85	**4149.8**	**4641.0**	**846.0**	**2679.2**	**3201.7**	**Extended Detention Elevation**
89.90	4285.1	4802.0	974.5	2719.4	3253.6	
89.95	4422.5	4966.0	1105.0	2759.7	3305.5	
90.00	4562.0	5133.0	1237.6	2800.2	3356.2	
90.05	4703.6	5302.0	1372.1	2840.9	3407.4	
90.10	4847.3	5474.0	1508.6	2881.8	3458.8	
90.15	4993.1	5648.0	1647.1	2922.8	3510.8	
90.20	5141.1	5825.0	1787.7	2964.0	3563.2	
90.25	5291.2	6004.0	1930.3	3005.3	3615.9	
90.30	5443.5	6186.0	2075.0	3046.9	3671.3	
90.35	5597.9	6371.0	2221.7	3088.6	3726.8	
90.40	5773.6	6559.0	2388.6	3131.1	3785.2	
90.45	5919.3	6750.0	2527.0	3179.4	3850.2	
90.50	6078.3	6944.0	2678.1	3215.3	3923.5	
90.55	6246.9	7144.0	2838.2	3384.6	4053.1	
90.60	6420.4	7349.0	3003.0	3433.3	4131.1	
90.65	6598.4	7557.0	3172.1	3486.9	4204.0	
90.70	6766.8	7769.0	3332.1	3577.9	4278.9	
90.75	**6947.7**	**7985.0**	**3504.0**	**3684.1**	**4357.2**	**Quantity Control Weir**
90.80	7128.4	8205.0	3675.6	3739.9	4458.7	
90.85	7328.4	8430.0	3865.6	3790.7	4557.6	
90.90	7510.6	8660.0	4038.7	3855.4	4662.9	
90.95	7704.9	8896.0	4223.3	3922.3	4766.9	
91.00	7903.3	9137.0	4411.8	4010.4	4873.3	100 Yr.
91.05	8108.6		4606.8	4122.9		
91.10	8314.0		4802.0	4207.7		
91.15	8521.3		4998.9	4315.9		
91.20	8742.2		5208.8	4456.1		
91.25	8965.6		5421.0	4507.1		
91.30	9207.3		5650.6	4595.2		
91.35	9510.4		5938.5	4724.2		
91.40	9749.8		6166.0	4813.8		
91.45	9913.9		6321.9	4898.7		
91.50	**10146.1**		**6542.5**	**4932.8**		**Top of Berm**

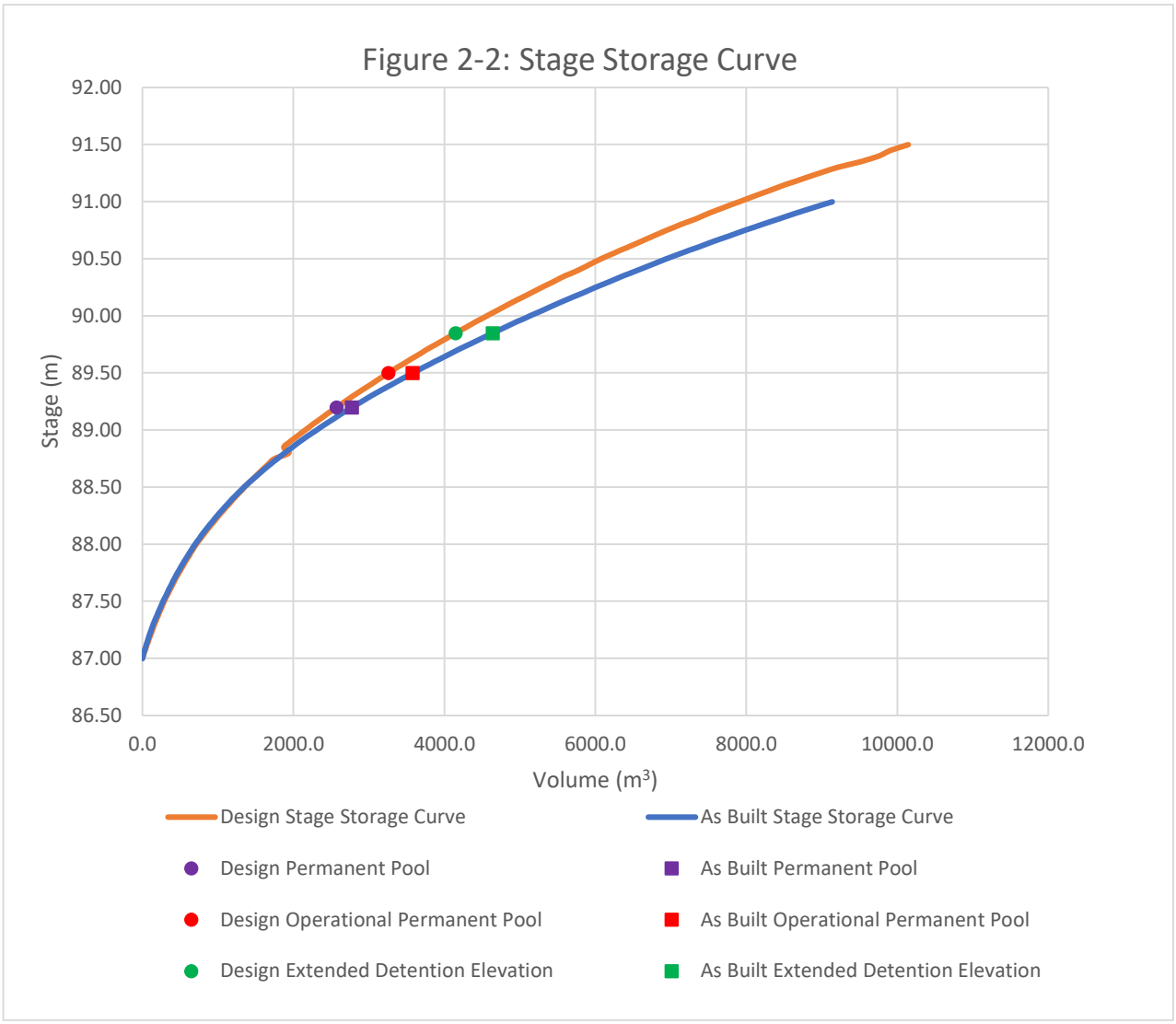


Figure 2-2: Stage Storage Curve
92.00
91.50
91.00
90.50
90.00
89.50
89.00
88.50
88.00
87.50
87.00
86.50
Stage (m)
0.0
2000.0
4000.0
6000.0
8000.0
10000.0
12000.0
Volume (m³)
Design Stage Storage Curve
As Built Stage Storage Curve
Design Permanent Pool
As Built Permanent Pool
Design Operational Permanent Pool
As Built Operational Permanent Pool
Design Extended Detention Elevation
As Built Extended Detention Elevation

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

MEMORANDUM

DATE: March 28, 2023

TO: **Development Review – City of Ottawa**

SUBJECT: **Greenbank Pond Expansion Modifications**

OUR FILE: 1182

ATTACHMENTS:
- SWM Pond, Minto Kennedy Lands, Engineering Drawing (DSEL, February 17, 2023)
- Select comments from the Kennedy Lands Functional Servicing and Stormwater Management Report 2nd Submission (DSEL, 2022-03-30)

The following memo has been prepared in support of the proposed expansion of the existing interim Greenbank Pond to allow for the planned development of lands to the northwest, known as the Kennedy Lands, and to the northeast, within the Barrhaven South Community and the Jock River Watershed.

The interim Greenbank Pond has been approved and constructed to service the Mattamy Half Moon Bay North Phase 4 and 7 lands. The ultimate Greenbank Pond will service the Kennedy Lands, a portion of the future Greenbank Road, and a 1.54 ha parcel east of future Greenbank Road, adjacent to the pond. An additional inlet and forebay is being proposed to service these areas. The updated drainage area is approximately 38.9 ha with an average imperviousness of 69%.

As detailed in the Stantec Master Servicing Study Addendum (June 2007), water quality control targets are set at the MECP Enhanced Level of Protection, or 80% long term TSS removal. The Ultimate Greenbank Pond has been designed to meet quality control, forebay sizing, permanent pool volume, and sediment drying area objectives set out in the MECP Stormwater Management Planning and Design Manual guidelines.

No quantity control measures are required for flood control to the Jock River, as noted in the MSS Addendum. The redesigned ultimate pond has been designed to provide suitable permanent pool, extended detention, and 100 year event storage volumes and to maintain serviceability of upstream developments.

The ultimate pond will include the addition of a north service road for access and maintenance, as well as a 1m to 2m retaining wall along the edge of the pond block to provide the necessary storage volume.

The ultimate pond will continue to use the same outlet as the in-service interim pond; however, the spillway configuration will change. The new proposed outlet features an 40m wide spillway just below the 100yr water level, sized to allow for an emergency outflow. This spillway will lead to a ditch that will direct the water to the existing outlet channel just downstream of the existing pond outlet. The spillway ditch has been sized to accommodate the peak flow expected for the 100-year event. The entrance to this outlet channel will be modified to accept the overflow configuration, but the existing box culvert under existing Greenbank Road will be maintained.

City comments pertaining to the Ultimate Greenbank pond design, submitted as part of the functional servicing report, have been appended to this memo with our responses.

Laurence Coulson, P.Eng.
Junior Project Manager

DSEL

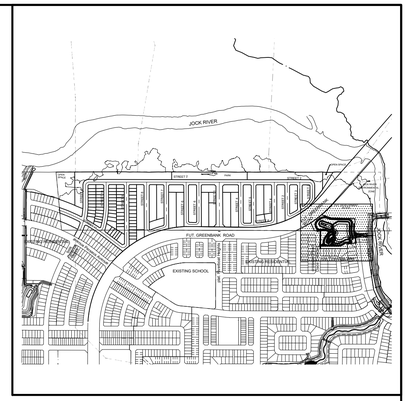
david schaeffer engineering ltd.

phone: (613) 845-2114
cell: (343) 575-8218
email: lcoulson@dsel.ca

The following are select comments from the City of Ottawa in reference to the second submission of the Functional Servicing and Stormwater Management Report for the Kennedy Subdivision, which includes the Ultimate Greenbank Pond design. These select comments are those that are impacted by the proposed changes to the ultimate pond configuration. These interim responses address the comments with regard to the updated ultimate pond.

#		Comment	Response
26	Engineering Drawings - Storm Water	Section 5.4.2. The storm trunk should be designed to bypass pond in events larger than the water quality event.	Kennedy development will direct larger storm flows directly to the Jock River, bypassing the pond. The development lands to the east are also anticipated to direct major overland flow directly to the Jock River. Larger flows that would utilise a bypass have been reduced.
27	Engineering Drawings - Storm Water	Section 5.3 of the report states that the majority of major overland flows will be through the internal network. Does this mean the minor system? It is noted that the SWM pond is on the opposite side of an arterial road. Can the major flows be sent directly to the Jock River to the north? The grading plan shows overland flow to the north adjacent lands, if possible, Parks wishes to only have one major overland flow route through the park. A license of occupation will be required for any overland flow route.	The internal network is in reference to the internal road network. Overland flow routes to the north will be routed to the Jock River per the MSS. The route is being explored as part of the latest development plan currently being designed.
29	Engineering Drawings - Storm Water	In the detail design C values based on zoning will be required. Is a C value 0.75 for back-to-back towns reasonable? Please verify that the C values used in this design are the same as those used in the design of the SWM pond.	C values will be prepared based on maximum zoning. Sample calculations will be provided. C values used to determine characteristics of the proposed pond are based on best knowledge of the development plans under design review. The overall imperviousness has increased which is one of the factors that has led to the redesign of the ultimate Greenbank Pond.
30	Engineering Drawings - Storm Water	The report needs to clearly illustrate that the block for the SWM pond expansion is of sufficient area. This should include as-built information (Section 5.4 refers to a preliminary design of the SWM pond) of the existing pond combined with proposed area of the new pond. All assuming the design water levels of the existing	As built information has been prepared and has been verified as part of the pond assumption process. The Kennedy subdivision is under design review to satisfy other City comments. The imperviousness has been estimated based on the latest information and details on the final

		pond. This should include as-built grading, outlet infrastructure, etc. Show how the as-built storage volumes compare with the design values. Also show how the 66% imperviousness is arrived at. Does the existing development and the proposed development still meet the same land use and percent imperviousness assumed for the existing pond (Table 5.2 and 5.3)?	calculation will be provided on resubmission Functional Servicing and Stormwater Management Report.
32	Engineering Drawings - Storm Water	Stormwater Facilities has requested that the Greenbank Pond be turned over to the City by Mattamy to ensure all deficiencies are corrected, prior to any work being completed by Minto. Following this transition, the pond can then be expanded as required by Minto.	Noted, the process of turning over the pond has been initiated.
33	Engineering Drawings - Storm Water	Pond expansion requires to demonstrate a sufficient sediment management area is available and an appropriate setback from eastern neighboring property is minimum 5m.	Sediment storage has been expanded for the ultimate pond design. Calculations to be provided in revised Functional Servicing and Stormwater Management Report
34	Engineering Drawings - Storm Water	The design drawings for the SWM facility must graphically distinguish between existing conditions and the proposed design.	The pond drawings have been updated to differentiate the existing and proposed linework.



PROPOSED LIMIT OF POND BLOCK

RETAINING WALL

5.0m REINFORCED GRASS SERVICE ROAD

GRANULAR 'B' ACCESS ROAD TO FOREBAY

EXT. DET. W.L. 89.85

GREENBANK SWM POND
PP ELEV 89.20
100YR W.L. 91.00

LIMIT OF SUBDIVISION

SEDIMENT MANAGEMENT AREA TO BE EXPANDED

SEDIMENT MANAGEMENT AREA

100 YR. W.L. 91.00

AQUATIC FRINGE EL 88.95

FUT POND ACCESS ROAD

EXISTING RESIDENTIAL DEVELOPMENT
DSEL JOB# 703

47.0m WIDE SPILLWAY EROSION TREATMENT AS PER FLUVIAL CONSULTANT'S RECOMMENDATION (SEE FLUVIAL DWG. GEO-1 AND DET-1 FOR DETAILS)

9.8m WIDE BOTTOM OUTFALL CHANNEL (SEE FLUVIAL DWG. GEO-1 AND DET-1 FOR DETAILS)

TIE INTO EXISTING CHANNEL

PLUNGE POOL TO BE RELOCATED

RELOCATE RETAINING WALL

EROSION SETBACK

LIMIT OF SUBDIVISION

Greenbank Road

Pearl Dace Crescent

Ex. Greenbank Road

BLOCK 200 (0.30m RESERVE)

BLOCK 208 (CHANNEL)

BLOCK 186 (CHANNEL)

BLOCK 188 (TURN CIRCLE)

PHASE 7

PHASE 8

TOPOGRAPHIC INFORMATION
TOPOGRAPHIC INFORMATION PROVIDED BY J.D. BARNES LIMITED, PROJECT No. 06-10-675-00. SURVEY DATED OCTOBER 15, 2007.

LEGAL INFORMATION
CALCULATED DRAFT PLAN PROVIDED BY J.D. BARNES LIMITED, PROJECT No. 07-10-767-00 (HALF MOON BAY PHASE 7), SURVEY DATED OCTOBER 04, 2016.
CALCULATED DRAFT PLAN PROVIDED BY J.D. BARNES LIMITED, PROJECT No. 07-10-767-00 (HALF MOON BAY PHASES 4 & 8), SURVEY DATED OCTOBER 05, 2016.

NOT FOR CONSTRUCTION

BENCH MARK No. 00820010126
POINT IS LOCATED 1.65km NORTH OF BARNSDALE ROAD AND 5km SOUTH OF FALLOWFIELD ROAD ON HIGHWAY 416 NORTH OF KEMPTVILLE. THE POINT IS SET EAST OF THE NORTHBOUND LANE IN THE GRASSY SHOULDER.
ELEVATION = 96.923 m

No.	BY	DATE	DESCRIPTION
1	B.N.C.	23-02-17	ISSUED FOR CITY COORDINATION

CITY OF OTTAWA

PROJECT No. 20-1182

MINTO COMMUNITIES | MINTO KENNEDY LANDS

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

© DSEL

SWM POND

DRAWN BY: CB	CHECKED BY: BC	PROJECT No.	20-1182
DESIGNED BY: BC	CHECKED BY: SM		
SCALE: HORIZ. 1: 400 (0 10 20)		SHEET No.	1 OF 1

CITY PLAN No. 18754
CITY FILE No. D07-16-20-0021

APPENDIX F

PROPOSED SUMP PUMP DETAIL

08 July 2019

To: All holders of the *Ottawa Design Guidelines – Sewer*, Second Edition, October 2012

Subject: TECHNCAL BULLETIN ISTB-2019-02

Revisions to *Ottawa Design Guidelines – Sewer* dated 2012

This Technical Bulletin is being issued to amend sump pump configuration details of the *Ottawa Design Guidelines – Sewer*, Second Edition, dated October 2012 and all subsequent Technical Bulletins. It is to be applied on all tenders issued as of July 8, 2019.

Specifically, the following criteria have been added/revised:

- Revisions to Appendix 9 - Drawing P01 – *Standard Sump Pump Configuration Greenfield Subdivisions with Clay Soils and Full Municipal Services* to address observed field installation issues

For more information, please contact Ms. Anna Valiant, P.Eng., Senior Engineer, Guidelines and Standards at Anna.Valliant@ottawa.ca or Ms. Sandra Majkic, Senior Engineer, Guidelines and Standards at Sandra.Majkic@ottawa.ca.

Thank you,

Alain Gonthier, P.Eng.

Director, Infrastructure Services

08 July 2019

TECHNICAL BULLETIN ISTB-2019-02

THE DOCUMENT ENTITLED *Ottawa Design Guidelines – Sewer*, Second Edition, October 2012 and all subsequent Technical Bulletins, are amended by the following additions and changes:

Criteria Review

All criteria presented in the *Ottawa Design Guidelines – Sewer* are considered valid and remain unchanged unless modifications/clarifications of specific criteria are provided below. This bulletin serves to modify configuration details to address observed field installation issues.

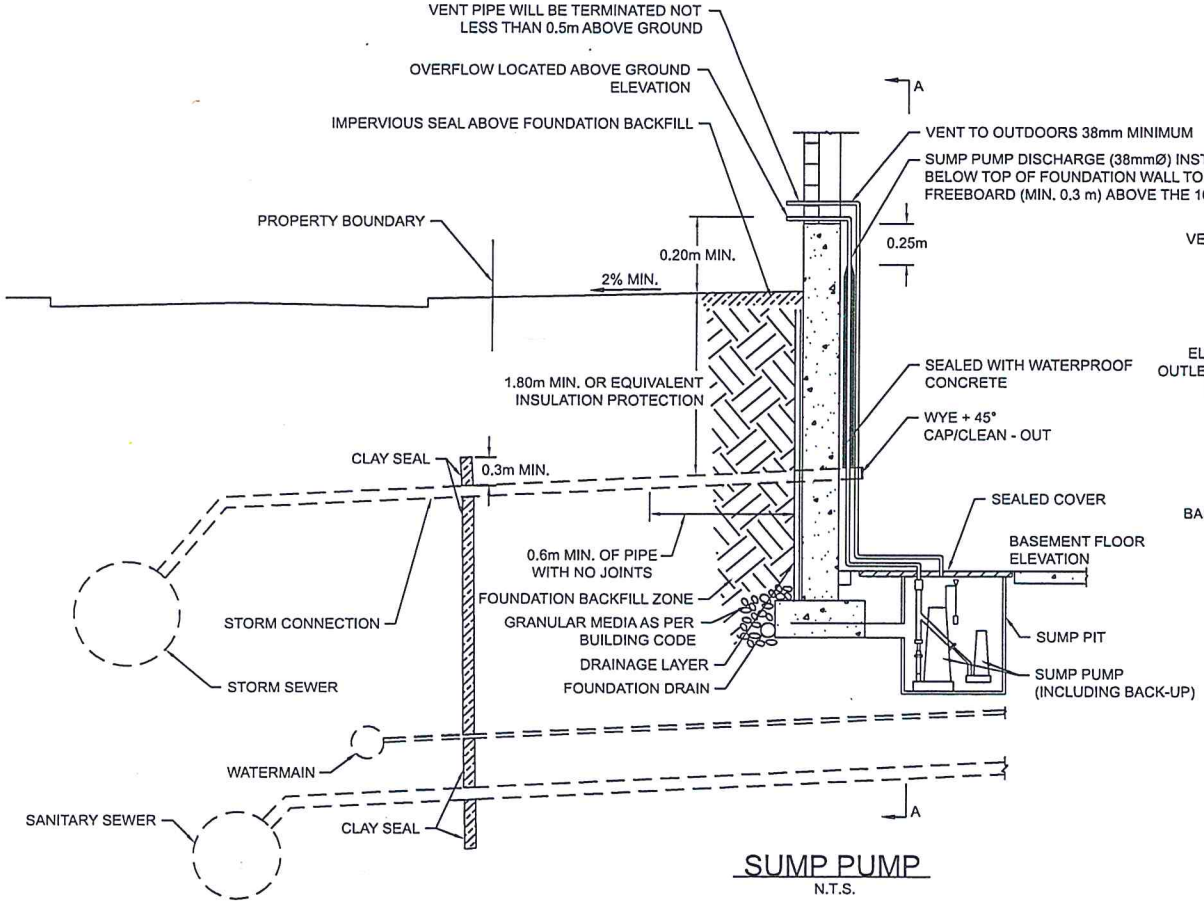
Specifically, the following criteria has added/revised:

1. Revisions to Appendix 9 - Drawing P01 – Standard Sump Pump Configuration Greenfield Subdivisions with Clay Soils and Full Municipal Services

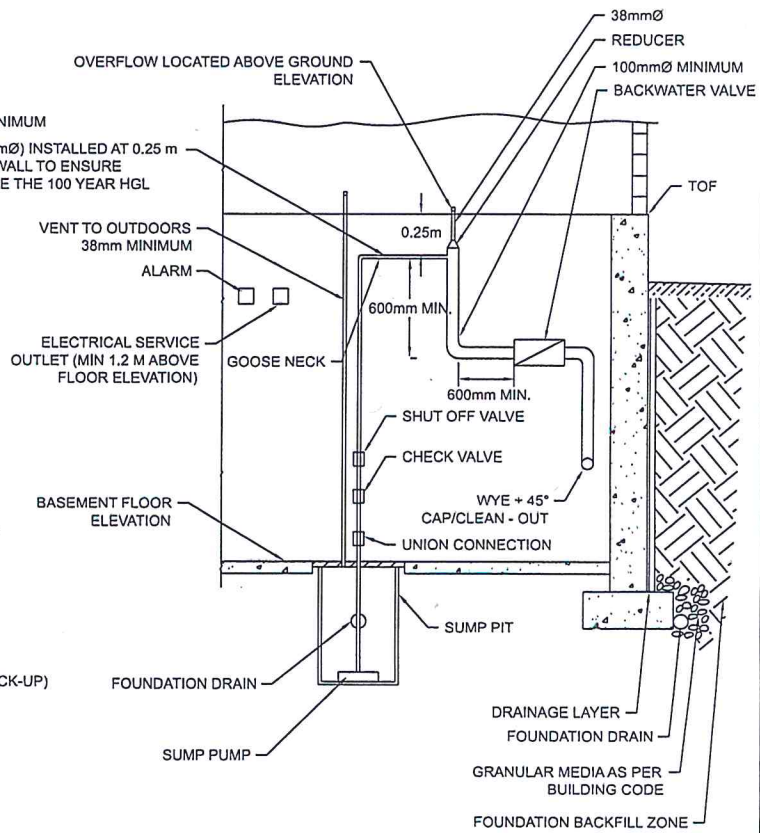
Specific Changes

Based on the above overview, the specific changes to the text of the *Ottawa Design Guidelines – Sewer* are shown below.

Section	Section Title	Revision
Appendix 9	Drawing P01 – *Standard Sump Pump Configuration Greenfield Subdivisions with Clay Soils and Full Municipal Services*	Revise drawing as follows: • Revise note 8 by adding "*as per City standard S6 and S7 unless otherwise specified in approved geotechnical report.*" • Revise note 9 by adding the following "*except around service lateral where backfill placed as per note 8.*" • Add new note 12 as follows: "*12. Sewer laterals that pass through porch foundation must have no joints for a length of 0.6m measured from the exterior porch wall.*" • Revise minimum jointless length of storm sewer lateral shown on P01 from 2.4m to 0.6m • Add new note 13 as follows: "*13. Rodent guard/screen to be provided at both the end of the overflow (emergency discharge) pipe and vent pipe.*" The revised drawing is provided below.



SUMP PUMP
N.T.S.



SECTION A-A
N.T.S.

NOTES:

1. WORKS TO BE COMPLETED IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS, POLICIES AND GUIDELINES.
2. PRIMARY DISCHARGE TO STORM SEWER WITH OVERFLOW TO GRADE, AS INDICATED.
3. SERVICE TRENCH WILL HAVE CLAY SEAL TO PREVENT GROUNDWATER FLOW THROUGH SERVICE TRENCH TO FOUNDATION.
4. INSULATION DETAIL MUST BE PROVIDED BY PROFESSIONAL ENGINEER.
5. BACKWATER VALVE TO BE CSA APPROVED AND COMPLETE WITH ADEQUATE SUPPORT.
6. REFER TO GUIDELINES FOR SUMP PIT LOCATION.
7. IMPERVIOUS SEAL TO EXTEND BEYOND THE LINE OF EXCAVATION, SLOPED AWAY FROM BUILDING A MINIMUM OF 2% AFTER SETTLING OF BACKFILL. SEAL CAN BE CLAY, OR A MEMBRANE OR LOW-PERMEABILITY INSULATION BOARD PLACED JUST BELOW GROUND.
8. FILL PLACED IN SERVICE TRENCH MUST BE COMPACTED TO AT LEAST 98% OF ITS STANDARD PROCTOR MAXIMUM DRY DENSITY AS PER CITY STANDARD S6 AND S7 UNLESS OTHERWISE SPECIFIED IN APPROVED GEOTECHNICAL REPORT.
9. FOUNDATION BACKFILL ZONE WILL CONSIST OF CLAY WITH A MINIMUM HORIZONTAL WIDTH OF 1.5m EXCEPT AROUND SERVICE LATERALS WHERE BACKFILL IS PLACED AS PER NOTE 8.
10. DRAINAGE LAYER REQUIRED AS PER BUILDING CODE.
11. EVERY SERVICE TRENCH REQUIRES CLAY SEAL AS PER CITY STANDARD S8. CLAY SEAL TO EXTEND A MINIMUM 0.3m ABOVE THE OBVERT OF THE STORM SERVICE PIPE.
12. SEWER LATERALS THAT PASS THROUGH PORCH FOUNDATION MUST HAVE NO JOINTS FOR A LENGTH OF 0.6m MEASURED FROM THE EXTERIOR PORCH WALL.
13. RODENT GUARD/SCREEN TO BE PROVIDED AT THE END OF THE OVERFLOW (EMERGENCY DISCHARGE) PIPE AND AT THE END OF THE VENT PIPE.

Ottawa	STANDARD SUMP PUMP CONFIGURATION GREENFIELD SUBDIVISIONS WITH CLAY SOILS AND FULL MUNICIPAL SERVICES	DATE:	JUNE 2018
		REV. DATE:	JULY 2019
		DWG. No.:	P 01