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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

SEPTEMBER 3, 2021
1ST SUBMISSION

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
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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 24 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, a high density residential block and park / open space adjacent to the river.

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 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 & Roads	16.92	Singles	53	3.4	181
		Towns	547	2.7	1477
Walkway/Servicing	0.016				
Open Space	0.77				
Land by Others (South of Greenbank Road)	2.01				
Stormwater Management Block	0.69				
Greenbank Road	2.52				
TOTAL	**22.93**				

**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 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 centre 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, Kennedy Lands Development*** by McKinley Environmental Solutions dated July, 2021 (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 3*** by Paterson Group, dated August 27, 2021). The grading and servicing has been

designed to keep grades as low as possible, due to the grade raise restrictions in the area.

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

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 dated August 27, 2021.
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 dated August 27, 2021
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.

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)

- **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, August 27, 2021
  (PG5348-1 Revision 3)
- **Headwaters Drainage Assessment (HDA), Kennedy Land Development**
  McKinley Environmental Solutions, July 2021
  (McKinley HDA)

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 5.
- 300 diameter watermain on Riverboat Heights will be extended north from its current termination at Greenbank Road to Street 1.

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***.

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 on ***Figure 3***.

A complete hydraulic 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***.

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***.

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 on ***Figure 4***.

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

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
- 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 18.63 L/s.
- Peak flow at Future Greenbank Road across from Pearl Dace is 10.44 L/s.
- Total flow from the Kennedy Lands is 29.07 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***.

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 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.

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*** by Paterson Group, dated August 27, 2021). 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:

- Full site serviced by expansion of the existing Greenbank Pond to its ultimate configuration;
- Sump pumps per City technical bulletin for foundation drainage west of Street 1
- Gravity drainage east of Street 1; 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.

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

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	

The peak flow into the Ultimate Greenbank Pond from the new inlet, based on the Rational Method, is 2320 L/s.

Storm design sheets are enclosed in ***Appendix E*** for reference.

5.3 Major System

The majority of the major system flows will be conveyed through the internal network, outletting to the Ultimate Greenbank Pond, where they are treated for quality control prior to release to the Jock River.

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%). 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 SWM PDB). The preliminary design for the Ultimate Greenbank Pond is enclosed in ***Appendix E*** for reference. Refer to ***Figure 7*** for an updated conceptual 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 – Preliminary Design

The pond design characteristics, based on a 37.479 ha total ultimate drainage area to the pond, are summarized in ***Table 5.2***.

Table 5.2: Ultimate Greenbank Pond Characteristics – Greenbank PDB Design

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.

5.4.4 Ultimate Greenbank Pond – Current Design

The updated pond design characteristics based on an updated 36.381 ha total drainage area to the pond, are summarized in ***Table 5.3***.

Table 5.3: Ultimate Greenbank Pond Characteristics – Current Design

Item	Target	Comments
Drainage Area	36.781 ha	Ultimate Greenbank Pond based on Current Design
Imperviousness	66%	Designed for total ultimate drainage area of 36.781 ha
Required Permanent Pool Volume	6,621 m^3	Based on 175.67m^3/ha(1)
Required Quality Control Volume	1,471 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 68% imperviousness, enhanced protection level for wet pond, as per Table 3.2 of the SWM Planning and Design Manual.

The volumes of the preliminary Ultimate Greenbank Pond are detailed in ***Section 5.4.3***, with the provided permanent pool being 7,471 m^3 and the extended detention volume being 2,010 m^3. The provided volumes exceed the required volumes presented in ***Table 5.3***, confirming capacity.

5.5 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*** specifically considered the use of private 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).

5.6 Stormwater Conveyance Conclusion

- 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.

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 94.38 m. It is noted in the ***Geotechnical Investigation*** by Paterson Group dated August 27, 2021, that due to difference in subsurface soil, Kennedy Lands can be split into two areas: east and west of Street 1. 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. Based on the conditions on-site, a surcharge program, lightweight fill and/or other measures will be employed to reduce the risks of long-term differential settlement. 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. Overall, around half of the Kennedy Land area will be have sump pumps installed.

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. The ***Stantec MSS Addendum*** specifically considered the use of private 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. It is proposed that the subdivision be serviced partially by sump pumps due to site constraints imposed by grade raise restrictions and the proximity to Jock River stormwater outlet.

Technical Bulletins ITSB-2018-04 (June 27, 2018) and ISTB-2019-02 (July 8, 2019) and specifies that in new subdivisions designed with the use of sump pumps, the 100-year HGL can surcharge to the surface. Please refer to ***Appendix F*** for the City of Ottawa Sump Pump Detail.

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.

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.

8.0 CONCLUSIONS

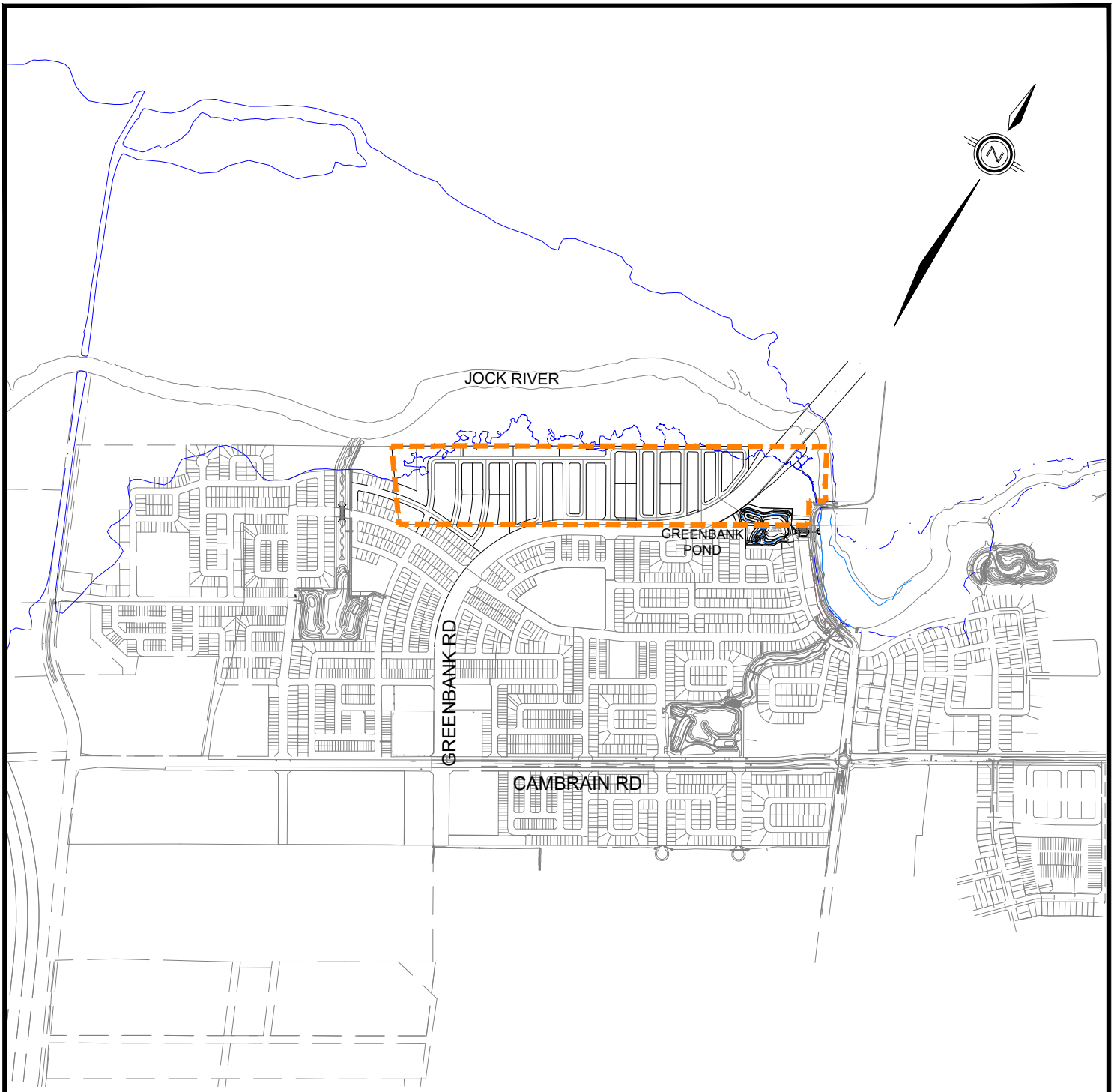
A summary of the Functional Servicing and Stormwater Management Report for the Kennedy Lands is as follows:

- 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 are 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.
- 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.

Prepared by,
David Schaeffer Engineering Ltd.

Per: Jennifer Ailey, P.Eng.

Z:\Projects\20-1182_Kennedy-Lands\B_Design\B3_Reports\B3-2_Servicing (DSEL)\2021-09-03_FSR_1st_Submission\2021-09-03_Minto_FSR_1st_Submission.docx



LEGEND

SITE BOUNDARY

MINTO KENNEDY LANDS	SITE LOCATION	DATE: AUGUST 2021
		SCALE: 1:15,000
david schaeffer engineering ltd	120 Iber Road, Unit 103 Stittsville, ON K2S 1E9 TEL: (613) 836-0856 FAX: (613) 836-7183 www.DSEL.ca	PROJECT No.: 20-1182
		FIGURE: 1

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

100-YEAR REGULATORY ELEVATIONS PER JOCK RIVER FLOOD RISK MAPPING, LIMIT SHOWN SHOWN PER SURVEY INFORMATION PROVIDED BY AOV (JOB# 20047-20) RECIEVED NOVEMBER 30, 2020

XS 4242 PER JOCK RIVER FLOOD
RISK MAP JULY 21, 2005
100-YR = 91.55

MEANDER BELT WIDTH PER GEO MORPHIX LTD. DATED SEPT. 26, 2017

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

XS 3027 PER JOCK
RISK MAP JULY 21
100-YR = 91.19

XS 3681 PE
RISK MAP
100-YR = 90

OPEN SPACE

OPEN SPACE

STREET 5

STREET 1

STREET 6

STREET 10

STREET 9

STREET 8

STREET 7

STREET 6

STREET 6

STREET 1

STREET 3

STREET 4

STREET 3

STREET 1

STREET 2

STREET 1

JOCK RIVER ENVIRONMENTAL ZONE

FUT. DEVELOPMENT

POND DESIGN FROM DSEL JOB # 13-703

6m SERVICING BLOCK

6m SERVICING BLOCK

avenue Perseus Avenue

STREET 11

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

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

JOCK RIVER

FUT. GREENBANK ROAD

EXISTING RESIDENTIAL

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

bois Celestial Grove

avenue Perseus Avenue

plat. Riverboat Heights

EXISTING RESIDENTIAL

croissant Pearl Dace Crescent

voie Finescale Way

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

EXISTING SCHOOL

david schaeffer engineering ltd

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Stittsville, Ontario, K2S 1E9
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www.DSEL.ca

MINTO KENNEDY LANDS
PROPOSED DEVELOPMENT CONCEPT

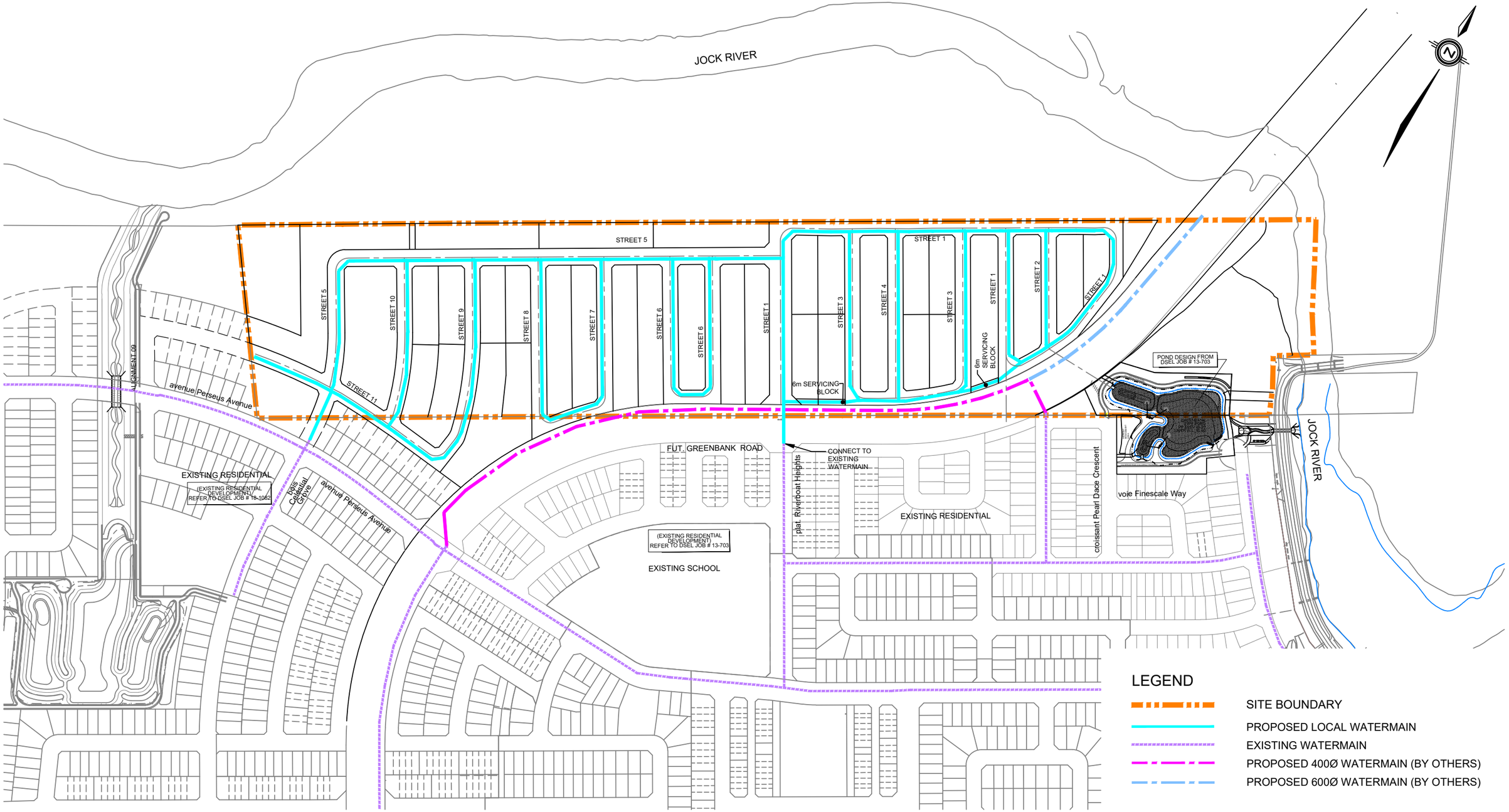
CITY OF OTTAWA

LEGEND

SITE BOUNDARY

MEANDER LIMIT

PROJECT No.:	20-1182
DATE:	AUGUST 2021
SCALE:	1:1500
FIGURE:	2



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www.DSEL.ca

WATERMAIN SERVICING PLAN
MINTO KENNEDY LANDS

PROJECT No.:	20-1182
SCALE:	1:4000
DATE:	AUGUST 2021
FIGURE:	3

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 4242 PER JOCK RIVER FLOOD RISK MAP JULY 21, 2005 100-YR = 91.55

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

XS 3027 PE RISK MAP J 100-YR = 91

MEANDER BELT WIDTH PER GEO MORPHIX LTD. DATED SEPT 26, 2017

100-YEAR REGULATORY ELEVATIONS PER JOCK RIVER FLOOD RISK MAPPING, LIMIT SHOWN SHOWN PER SURVEY INFORMATION PROVIDED BY AOV (JOB# 20047-20) RECIEVED NOVEMBER 30, 2020

OPEN SPACE

OPEN SPACE

JOCK RIVER ENVIRONMENTAL ZONE

FUT. DEVELOPMENT
SAN SERVICING OF FUT. BLOCK TO EX MH 45A
POND DESIGN FROM DSEL JOB # 13-703

6m SERVICING BLOCK

6m SERVICING BLOCK

STREET 1

STREET 2

STREET 3

STREET 4

STREET 5

STREET 6

STREET 7

STREET 8

STREET 9

STREET 10

STREET 11

STREET 1

avenue Perseus Avenue

avenue Perseus Avenue

bois Celestial Grove

FUT. GREENBANK ROAD

plat. Riverboat Heights

croissant Pearl Dace Crescent

voie Finescale Way

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

EXISTING RESIDENTIAL

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

EXISTING SCHOOL

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

CHANNEL IN=88.41
OUT=88.38

SAN CROSSING CHANNEL
SAN OBV=86.68

LEGEND

- SITE BOUNDARY
- SANITARY DRAINAGE AREA
- POPULATION DENSITY
- TOTAL POPULATION
- UPSTREAM MH
- DOWNSTREAM MH
- TRIBUTARY TYPE
- TOP OF GRATE
- PROPOSED SANITARY OBVERT
- EXISTING SANITARY SEWER
- SANITARY DRAINAGE BOUNDARY
- PROPOSED SANITARY SEWER
- SANITARY MANHOLE

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MINTO KENNEDY LANDS

CITY OF OTTAWA

SANITARY SERVICING PLAN

SCALE:	1:1500	PROJECT No.:	20-1182
DATE:	AUGUST 2021	DRAWING:	4

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

100-YEAR REGULATORY ELEVATIONS PER JOCK RIVER FLOOD RISK MAPPING, LIMIT SHOWN SHOWN PER SURVEY INFORMATION PROVIDED BY AOV (JOB# 20047-20) RECIEVED NOVEMBER 30, 2020

XS 4242 PER JOCK RIVER FLOOD RISK MAP JULY 21, 2005 100-YR = 91.55

MEANDER BELT WIDTH PER GEO MORPHIX LTD. DATED SEPT. 26, 2017

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

XS 3027 PER J RISK MAP JUL 100-YR = 91.19

OPEN SPACE

OPEN SPACE

JOCK RIVER ENVIRONMENTAL ZONE

XS 368 RISK M 100-YR

STREET 5

STREET 10

STREET 9

STREET 8

STREET 7

STREET 6

STREET 1

STREET 3

STREET 4

STREET 2

STREET 1

STREET 11

6m SERVICING BLOCK

6m SERVICING BLOCK

FUT DEVELOPMENT

FUT. DEVELOPMENT TO DISCHARGE DIRECTLY TO SWM POND

POND DESIGN FROM DSEL JOB # 13-703

100 YR INTAKE

100Yr. INTAKE

100Yr. INTAKE

FUT. GREENBANK ROAD

avenue Perseus Avenue

avenue Perseus Avenue

bois Celestial Grove

EXISTING RESIDENTIAL

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

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

EXISTING SCHOOL

plat. Riverboat Heights

EXISTING RESIDENTIAL

croissant Pearl Dace Crescent

voie Finescale Way

JOCK RIVER

GREENBANK SWM POND PF ELEV. 89.20 100YR WL 91.20

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

LEGEND

- SITE BOUNDARY
- STORM TRIBUTARY AREA
- STORM PIPE
- FUTURE STORM PIPE BY OTHERS
- OVERLAND FLOW ROUTE
- TOP OF GRATE / PROPOSED STORM OBVERT
- PROPOSED STORM MANHOLE
- MEANDER LIMIT
- 100 YR FLOOD PLAIN CROSS SECTION
- DRAINAGE AREA / RUNOFF COEFFICIENT / DOWNSTREAM MH / UPSTREAM MH / STORM FREQUENCY
- EMERGENCY FLOW ROUTE

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MINTO KENNEDY LANDS

CITY OF OTTAWA

STORM SERVICING PLAN

SCALE:	1:1500	PROJECT No.:	20-1182
DATE:	AUGUST 2021	DRAWING:	5

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

100-YEAR REGULATORY ELEVATIONS PER JOCK RIVER FLOOD RISK MAPPING, LIMIT SHOWN SHOWN PER SURVEY INFORMATION PROVIDED BY AOV (JOB# 20047-20) RECIEVED NOVEMBER 30, 2020

XS 4242 PER JOCK RIVER FLOOD RISK MAP JULY 21, 2005 100-YR = 91.55

MEANDER BELT WIDTH PER GEO MORPHIX LTD. DATED SEPT. 26, 2017

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

XS 3027 PER JC RISK MAP JULY 100-YR = 91.19

XS 3681 RISK MA 100-YR =

3:1 SLOPING TO MATCH EXISTING

OPEN SPACE

STREET 5

STREET 10

STREET 9

STREET 8

STREET 7

STREET 6

STREET 11

STREET 1

STREET 3

STREET 4

STREET 2

6m SERVICING BLOCK

100YR. INTAKE

FUT. DEVELOPMENT

POND DESIGN FROM DSEL JOB # 13-703

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

JOCK RIVER ENVIRONMENTAL ZONE

JOCK RIVER

avenue Perseus Avenue

EXISTING RESIDENTIAL

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

bois Celestial Grove

FUT. GREENBANK ROAD

plat. Riverboat Heights

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

EXISTING SCHOOL

voie Finescale Way

nt Pearl Dace Crescent

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

PROPOSED LOT | STREET 1 | FUTURE GREENBANK ROAD

ROW 94.06 | CL. OF ROAD 93.93 | ROW 93.70 | CL. OF ROAD 93.30

FINISHED GRADE

SECTION 1–1
SCALE HOR. 1:250
VER. 1:100

LEGEND

- STUDY LIMIT
- 100 YEAR FLOODPLAIN LIMIT
- EXISTING ELEVATION CONTOUR
- MAJOR OVERLAND FLOW
- MEANDER BELT WIDTH
- RETAINING WALL
- EXTERNAL GRADE
- INTERNAL GRADE
- 100 YR FLOOD PLAIN CROSS SECTION
- EMERGENCY FLOW ROUTE

CUT-FILL DEPTH ALONG CENTER LINE:

CUT DEPTH (m)	FILL DEPTH (m)
0 - 0.5	0 - 0.5
0.5 - 1.0	0.5 - 1.0
1.0 - 1.5	1.0 - 1.5
1.5 - 2.0	1.5 - 2.0
>2.0	>2.0

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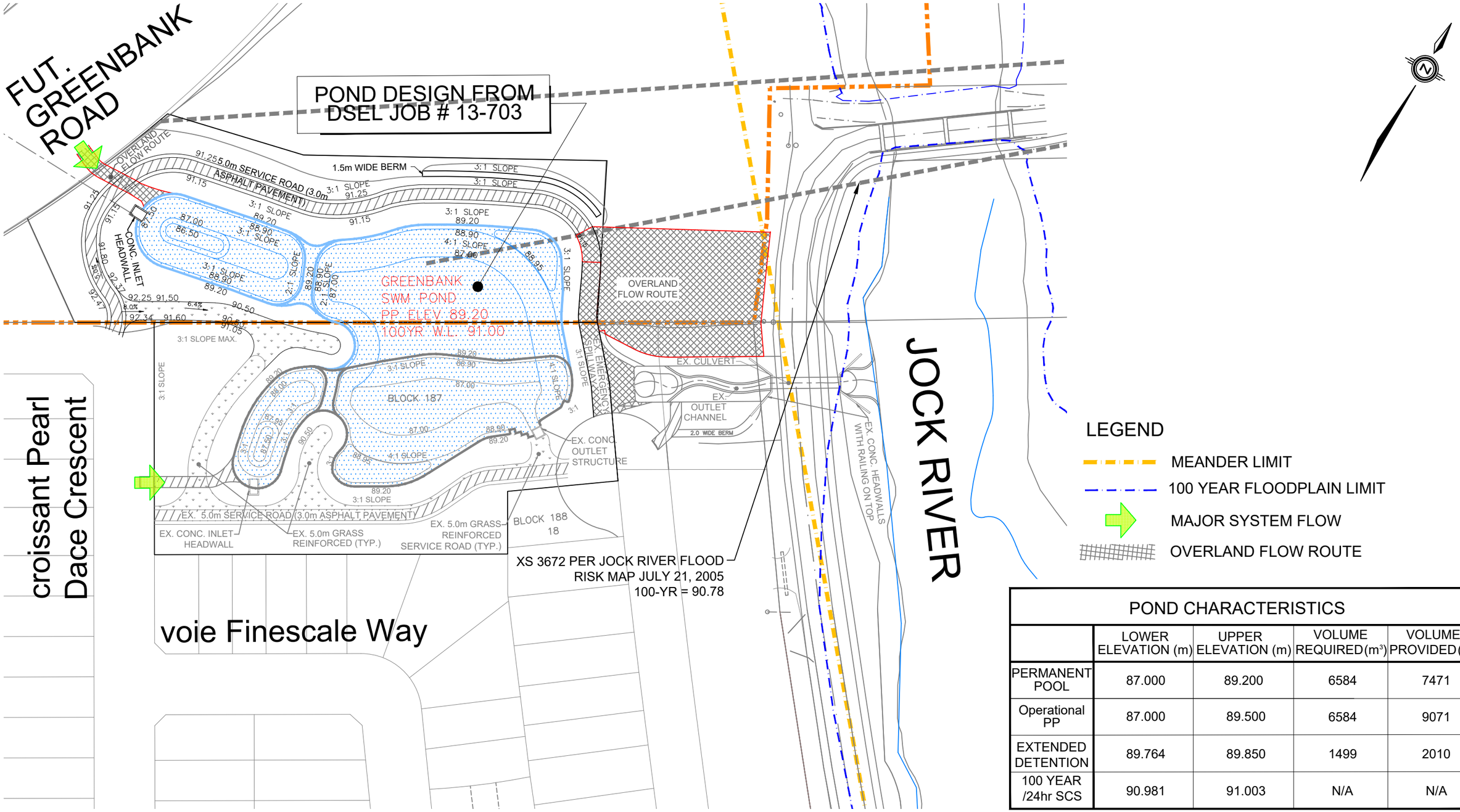
MINTO KENNEDY LANDS

CITY OF OTTAWA

GRADING PLAN

SCALE:	1:1500	PROJECT No.:	20-1182
DATE:	AUGUST 2021	DRAWING:	6



POND CHARACTERISTICS

	LOWER ELEVATION (m)	UPPER ELEVATION (m)	VOLUME REQUIRED (m^3)	VOLUME PROVIDED (m^3)
PERMANENT POOL	87.000	89.200	6584	7471
Operational PP	87.000	89.500	6584	9071
EXTENDED DETENTION	89.764	89.850	1499	2010
100 YEAR /24hr SCS	90.981	91.003	N/A	N/A

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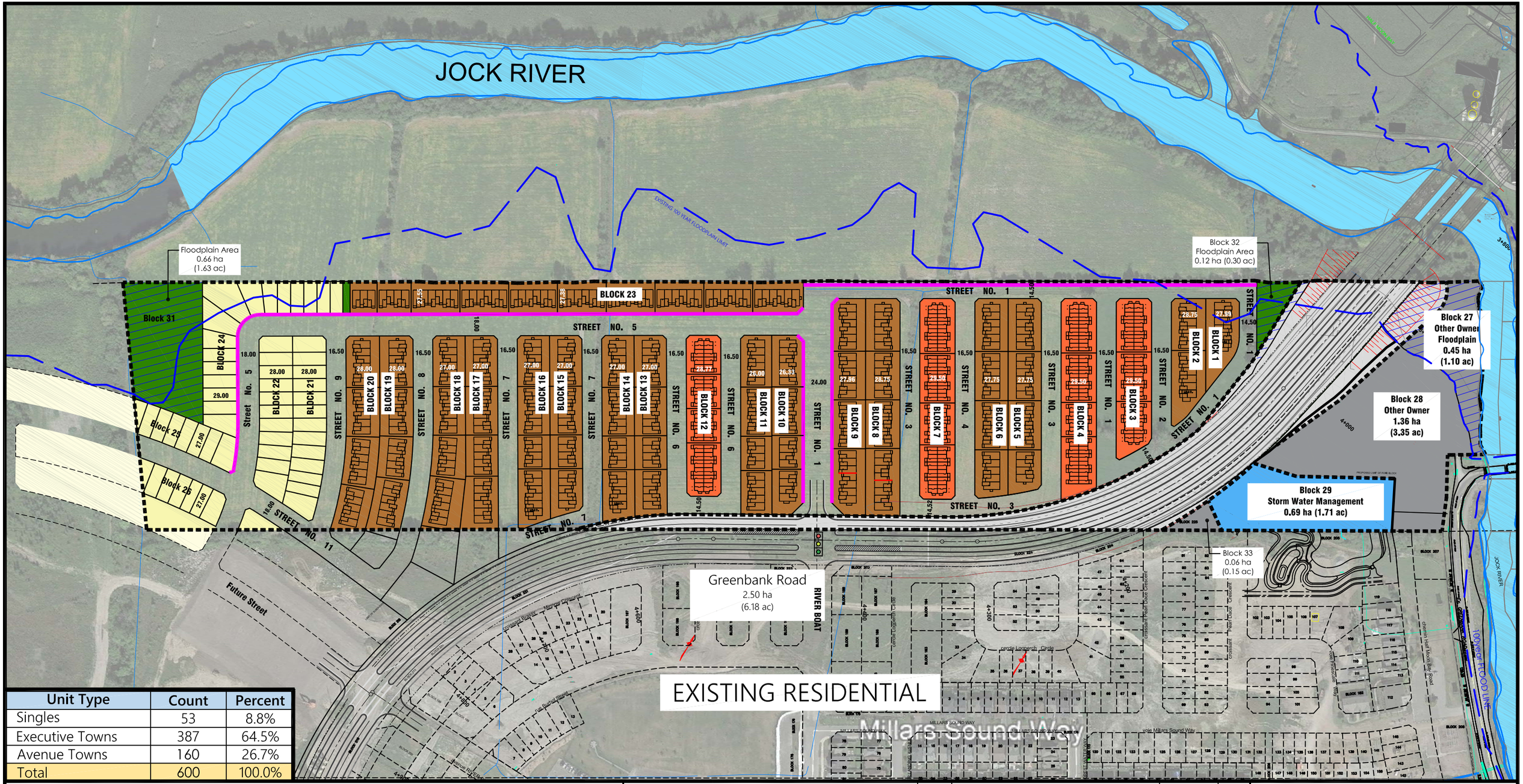
GREENBANK SWM POND
MINTO KENNEDY LANDS

PROJECT No.:	20-1182
SCALE:	1:1000
DATE:	AUGUST 2021
FIGURE:	7

APPENDIX A

CONCEPT PLAN
PRE-CONSULTATION



Unit Type	Count	Percent
Singles	53	8.8%
Executive Towns	387	64.5%
Avenue Towns	160	26.7%
Total	600	100.0%

Legend

- Single Detached Homes
- Executive Towns
- Avenue Towns
- Storm Water Management (SWM) Pond
- Parkland
- Land Owned by Others
- Area within Floodplain
- Natural Feature | Area within Floodplain
- Open Space / Pathways
- Sidewalk Locations
- Property Boundary
- Proposed Extent of Greenbank Grading

No.	Description	Date	By
0	Issued for Review	7/28/2021	K.G.

Revisions

Title: **Concept Plan 22**

Project: **Kennedy Lands**

North

Scale: **NTS**

Drawn By: MS
Checked By: CS

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

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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

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
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Regards,

Sean Moore, RPP/MCIP
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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

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

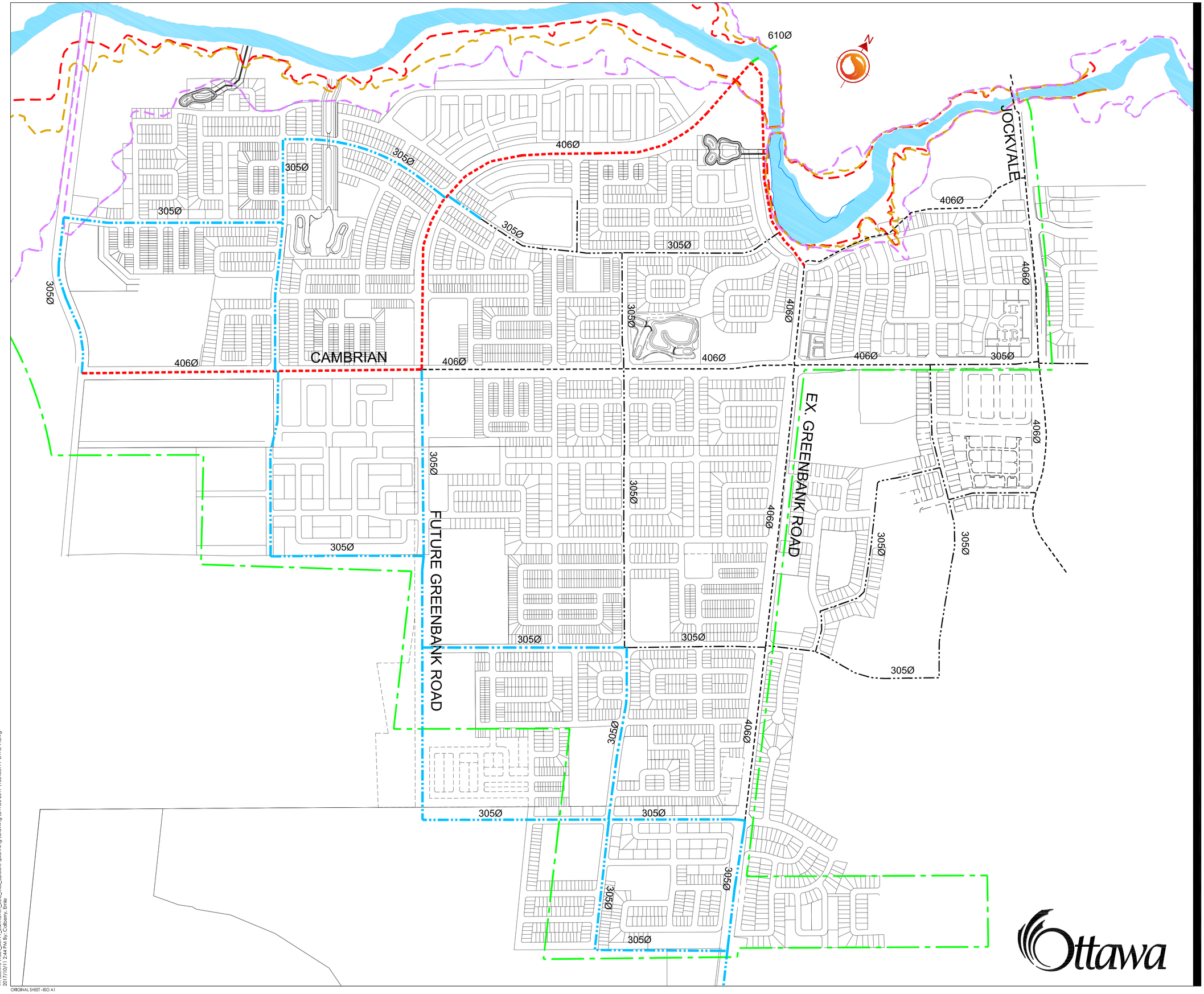
Gregory Zimmer, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

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

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

Ottawa

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 6																											
	25A	26A	0.51		55	0.51	55	3.6	0.65		0.00		0.00		0.00	0.00	0.51	0.51	0.17	0.82	82.5	200	0.65	26.44	0.03	0.84	0.38
	26A	27A	0.36		39	0.87	94	3.6	1.10		0.00		0.00		0.00	0.00	0.36	0.87	0.29	1.38	70.0	200	0.35	19.40	0.07	0.62	0.36
To STREET 5, Pipe 27A - 30A						0.87	94				0.00		0.00		0.00			0.87									
	28A	29A	0.50		54	0.50	54	3.6	0.64		0.00		0.00		0.00	0.00	0.50	0.50	0.17	0.80	84.5	200	0.65	26.44	0.03	0.84	0.37
	29A	30A	0.36		39	0.86	93	3.6	1.09		0.00		0.00		0.00	0.00	0.36	0.86	0.28	1.37	70.0	200	0.35	19.40	0.07	0.62	0.35
To STREET 5, Pipe 30A - 33A						0.86	93				0.00		0.00		0.00			0.86									
STREET 7																											
	19A	20A	0.82		88	0.82	88	3.6	1.03		0.00		0.00		0.00	0.00	0.82	0.82	0.27	1.30	101.5	200	0.65	26.44	0.05	0.84	0.43
	20A	21A	0.52		56	1.34	144	3.6	1.66		0.00		0.00		0.00	0.00	0.52	1.34	0.44	2.10	81.0	200	0.35	19.40	0.11	0.62	0.40
To STREET 5, Pipe 21A - 24A						1.34	144				0.00		0.00		0.00			1.34									
	22A	23A	0.66		71	0.66	71	3.6	0.83		0.00		0.00		0.00	0.00	0.66	0.66	0.22	1.05	87.0	200	0.65	26.44	0.04	0.84	0.41
	23A	24A	0.47		51	1.13	122	3.6	1.41		0.00		0.00		0.00	0.00	0.47	1.13	0.37	1.79	74.0	200	0.35	19.40	0.09	0.62	0.38
To STREET 5, Pipe 24A - 27A						1.13	122				0.00		0.00		0.00			1.13									
STREET 10																											
	8A	9A	0.54		58	0.54	58	3.6	0.68		0.00		0.00		0.00	0.00	0.54	0.54	0.18	0.86	66.0	200	0.65	26.44	0.03	0.84	0.38
	9A	10A	0.65		70	1.19	128	3.6	1.48		0.00		0.00		0.00	0.00	0.65	1.19	0.39	1.87	102.0	200	0.35	19.40	0.10	0.62	0.39
To STREET 5, Pipe 10A - 18A						1.19	128				0.00		0.00		0.00			1.19									
STREET 9																											
	1A	2A	0.39		42	0.39	42	3.7	0.50		0.00		0.00		0.00	0.00	0.39	0.39	0.13	0.63	52.0	200	0.65	26.44	0.02	0.84	0.35
	2A	3A	0.24		26	0.63	68	3.6	0.80		0.00		0.00		0.00	0.00	0.24	0.63	0.21	1.01	45.0	200	0.35	19.40	0.05	0.62	0.32
To STREET 5, Pipe 3A - 4A						0.63	68				0.00		0.00		0.00			0.63									
	11A	12A	0.30		33	0.30	33	3.7	0.39		0.00		0.00		0.00	0.00	0.30	0.30	0.10	0.49	61.5	200	0.65	26.44	0.02	0.84	0.32
	12A	13A	0.23		25	0.53	58	3.6	0.68		0.00		0.00		0.00	0.00	0.23	0.53	0.17	0.86	56.5	200	0.35	19.40	0.04	0.62	0.31
	13A	14A	0.19		21	0.72	79	3.6	0.93		0.00		0.00		0.00	0.00	0.19	0.72	0.24	1.16	10.5	200	0.35	19.40	0.06	0.62	0.34
	14A	15A	0.16		18	0.88	97	3.6	1.13		0.00		0.00		0.00	0.00	0.16	0.88	0.29	1.42	21.0	200	0.35	19.40	0.07	0.62	0.36
	15A	16A	0.42		45	1.30	142	3.6	1.64		0.00		0.00		0.00	0.00	0.42	1.30	0.43	2.07	49.0	200	0.35	19.40	0.11	0.62	0.40
	16A	17A	0.36		39	1.66	181	3.5	2.07		0.00		0.00		0.00	0.00	0.36	1.66	0.55	2.62	45.5	200	0.35	19.40	0.13	0.62	0.43
	17A	18A	0.65		70	2.31	251	3.5	2.84		0.00		0.00		0.00	0.00	0.65	2.31	0.76	3.60	103.0	200	0.35	19.40	0.19	0.62	0.47
To STREET 5, Pipe 18A - 21A						2.31	251				0.00		0.00		0.00			2.31									
STREET 5																											
Contribution From STREET 9, Pipe 2A - 3A						0.63	68				0.00		0.00		0.00		0.63	0.63									
			0.06		7	0.69	75				0.00		0.00		0.00		0.06	0.69									
	3A	4A	0.08		9	0.77	84	3.6	0.98		0.00		0.00		0.00	0.00	0.08	0.77	0.25	1.24	17.5	200	0.35	19.40	0.06	0.62	0.34
	4A	5A	0.25		27	1.02	111	3.6	1.29		0.00		0.00		0.00	0.00	0.25	1.02	0.34	1.63	41.0	200	0.35	19.40	0.08	0.62	0.37
	5A	6A	0.51		55	1.53	166	3.5	1.91		0.00		0.00		0.00	0.00	0.51	1.53	0.50	2.41	72.0	200	0.35	19.40	0.12	0.62	0.42
	6A	7A	0.17		19	1.70	185	3.5	2.12		0.00		0.00		0.00	0.00	0.17	1.70	0.56	2.68	11.0	200	0.35	19.40	0.14	0.62	0.43
	7A	10A	0.31		34	2.01	219	3.5	2.49		0.00		0.00		0.00	0.00	0.31	2.01	0.66	3.15	65.5	200	0.35	19.40	0.16	0.62	0.45
Contribution From STREET 10, Pipe 9A - 10A						1.19	128				0.00		0.00		0.00		1.19	3.20									
	10A	18A	0.34		37	3.54	384	3.4	4.26		0.00		0.00		0.00	0.00	0.34	3.54	1.17	5.43	72.5	200	0.35	19.40	0.28	0.62	0.53

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: GGG	PROJECT: **Minto Kennedy Lands**		
Checked: SLM	LOCATION: **City of Ottawa**		
Dwg. Reference: Sanitary Drainage Plan, Dwgs. No. 4	File Ref: 20-1182	Date: **26 Aug 2021**	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)
Contribution From STREET 9, Pipe 17A - 18A						2.31	251				0.00		0.00		0.00		2.31	5.85									
	18A	21A	0.31		34	6.16	669	3.3	7.21		0.00		0.00		0.00	0.00	0.31	6.16	2.03	9.24	70.5	250	0.25	29.73	0.31	0.61	0.53
Contribution From STREET 7, Pipe 20A - 21A						1.34	144				0.00		0.00		0.00		1.34	7.50									
	21A	24A	0.30		33	7.80	846	3.3	8.98		0.00		0.00		0.00	0.00	0.30	7.80	2.57	11.56	70.5	250	0.25	29.73	0.39	0.61	0.57
Contribution From STREET 7, Pipe 23A - 24A						1.13	122				0.00		0.00		0.00		1.13	8.93									
	24A	27A	0.31		34	9.24	1002	3.2	10.52		0.00		0.00		0.00	0.00	0.31	9.24	3.05	13.57	70.5	250	0.25	29.73	0.46	0.61	0.59
Contribution From STREET 6, Pipe 26A - 27A						0.87	94				0.00		0.00		0.00		0.87	10.11									
	27A	30A	0.20		22	10.31	1118	3.2	11.65		0.00		0.00		0.00	0.00	0.20	10.31	3.40	15.05	45.5	250	0.25	29.73	0.51	0.61	0.61
Contribution From STREET 6, Pipe 29A - 30A						0.86	93				0.00		0.00		0.00		0.86	11.17									
	30A	33A	0.28		30	11.45	1241	3.2	12.83		0.00		0.00		0.00	0.00	0.28	11.45	3.78	16.61	72.5	250	0.25	29.73	0.56	0.61	0.62
To STREET 1, Pipe 33A - 32A						11.45	1241				0.00		0.00		0.00			11.45									
STREET 2																											
	51A	52A	0.73		79	0.73	79	3.6	0.93		0.00		0.00		0.00	0.00	0.73	0.73	0.24	1.17	119.0	200	0.65	26.44	0.04	0.84	0.42
To STREET 1, Pipe 52A - 53A						0.73	79				0.00		0.00		0.00			0.73									
STREET 4																											
	39A	40A	0.59		64	0.59	64	3.6	0.75		0.00		0.00		0.00	0.00	0.59	0.59	0.19	0.95	90.5	200	0.65	26.44	0.04	0.84	0.39
	40A	41A	0.48		52	1.07	116	3.6	1.35		0.00		0.00		0.00	0.00	0.48	1.07	0.35	1.70	85.5	200	0.35	19.40	0.09	0.62	0.37
To STREET 1, Pipe 41A - 44A						1.07	116				0.00		0.00		0.00			1.07									
STREET 3																											
	36A	37A	0.61		66	0.61	66	3.6	0.78		0.00		0.00		0.00	0.00	0.61	0.61	0.20	0.98	100.0	200	0.65	26.44	0.04	0.84	0.40
	37A	38A	0.49		53	1.10	119	3.6	1.38		0.00		0.00		0.00	0.00	0.49	1.10	0.36	1.74	84.0	200	0.35	19.40	0.09	0.62	0.38
To STREET 1, Pipe 38A - 41A						1.10	119				0.00		0.00		0.00			1.10									
	42A	43A	0.55		59	0.55	59	3.6	0.70		0.00		0.00		0.00	0.00	0.55	0.55	0.18	0.88	80.0	200	0.65	26.44	0.03	0.84	0.38
	43A	44A	0.47		51	1.02	110	3.6	1.28		0.00		0.00		0.00	0.00	0.47	1.02	0.34	1.61	80.0	200	0.35	19.40	0.08	0.62	0.37
To STREET 1, Pipe 44A - 45A						1.02	110				0.00		0.00		0.00			1.02									
STREET 1																											
	47A	48A	0.22		24	0.22	24	3.7	0.29		0.00		0.00	0.24	0.24	0.03	0.46	0.46	0.15	0.47	37.5	200	0.65	26.44	0.02	0.84	0.32
	48A	49A	0.05		6	0.27	30	3.7	0.36		0.00		0.00		0.24	0.03	0.05	0.51	0.17	0.55	12.5	200	0.35	19.40	0.03	0.62	0.27
	49A	50A	0.13		14	0.40	44	3.7	0.52		0.00		0.00		0.24	0.03	0.13	0.64	0.21	0.76	63.5	200	0.35	19.40	0.04	0.62	0.30
	50A	52A	0.05		6	0.45	50	3.7	0.59		0.00		0.00		0.24	0.03	0.05	0.69	0.23	0.85	36.5	200	0.35	19.40	0.04	0.62	0.31
Contribution From STREET 2, Pipe 51A - 52A						0.73	79				0.00		0.00		0.00		0.73	1.42									
	52A	53A	0.07		8	1.25	137	3.6	1.58		0.00		0.00		0.24	0.03	0.07	1.49	0.49	2.10	52.5	200	0.35	19.40	0.11	0.62	0.40
To SANITARY OUTLET, Pipe 53A - 54A						1.25	137				0.00		0.00		0.24			1.49									
	35A	38A	0.10		11	0.10	11	3.7	0.13		0.00		0.00		0.00	0.00	0.10	0.10	0.03	0.17	69.0	200	0.65	26.44	0.01	0.84	0.23
Contribution From STREET 3, Pipe 37A - 38A						1.10	119				0.00		0.00		0.00		1.10	1.20									
	38A	41A	0.06		7	1.26	137	3.6	1.58		0.00		0.00		0.00	0.00	0.06	1.26	0.42	2.00	46.0	200	0.35	19.40	0.10	0.62	0.40
Contribution From STREET 4, Pipe 40A - 41A						1.07	116				0.00		0.00		0.00		1.07	2.33									
	41A	44A	0.10		11	2.43	264	3.5	2.98		0.00		0.00		0.00	0.00	0.10	2.43	0.80	3.78	72.0	200	0.35	19.40	0.19	0.62	0.47
Contribution From STREET 3, Pipe 43A - 44A						1.02	110				0.00		0.00		0.00		1.02	3.45									
	44A	45A	0.06		7	3.51	381	3.4	4.23		0.00		0.00		0.00	0.00	0.06	3.51	1.16	5.39	46.0	250	0.25	29.73	0.18	0.61	0.46
	45A	46A	0.36		39	3.87	420	3.4	4.64		0.00		0.00		0.00	0.00	0.36	3.87	1.28	5.92	78.0	250	0.25	29.73	0.20	0.61	0.47

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.10764	l/s/Ha
Average Daily Flow =	280	l/p/day		
Comm/Inst Flow =	28000	L/ha/da	0.3241	l/s/Ha
Industrial Flow =	35000	L/ha/da	0.40509	l/s/Ha
Max Res. Peak Factor =	4.00			
Commercial/Inst./Park Peak Factor =	1.00			
Institutional =	0.32	l/s/Ha		

Industrial Peak Factor = as per MOE Graph

Extraneous Flow = 0.330 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: GGG

Checked: SLM

Dwg. Reference: Sanitary Drainage Plan, Dwgs. No. 4

PROJECT: **Minto Kennedy Lands**

LOCATION: **City of Ottawa**

File Ref: 20-1182

Date: **26 Aug 2021**

Sheet No 2 of 3

1182_SAN.xlsx

SANITARY SEWER CALCULATION SHEET

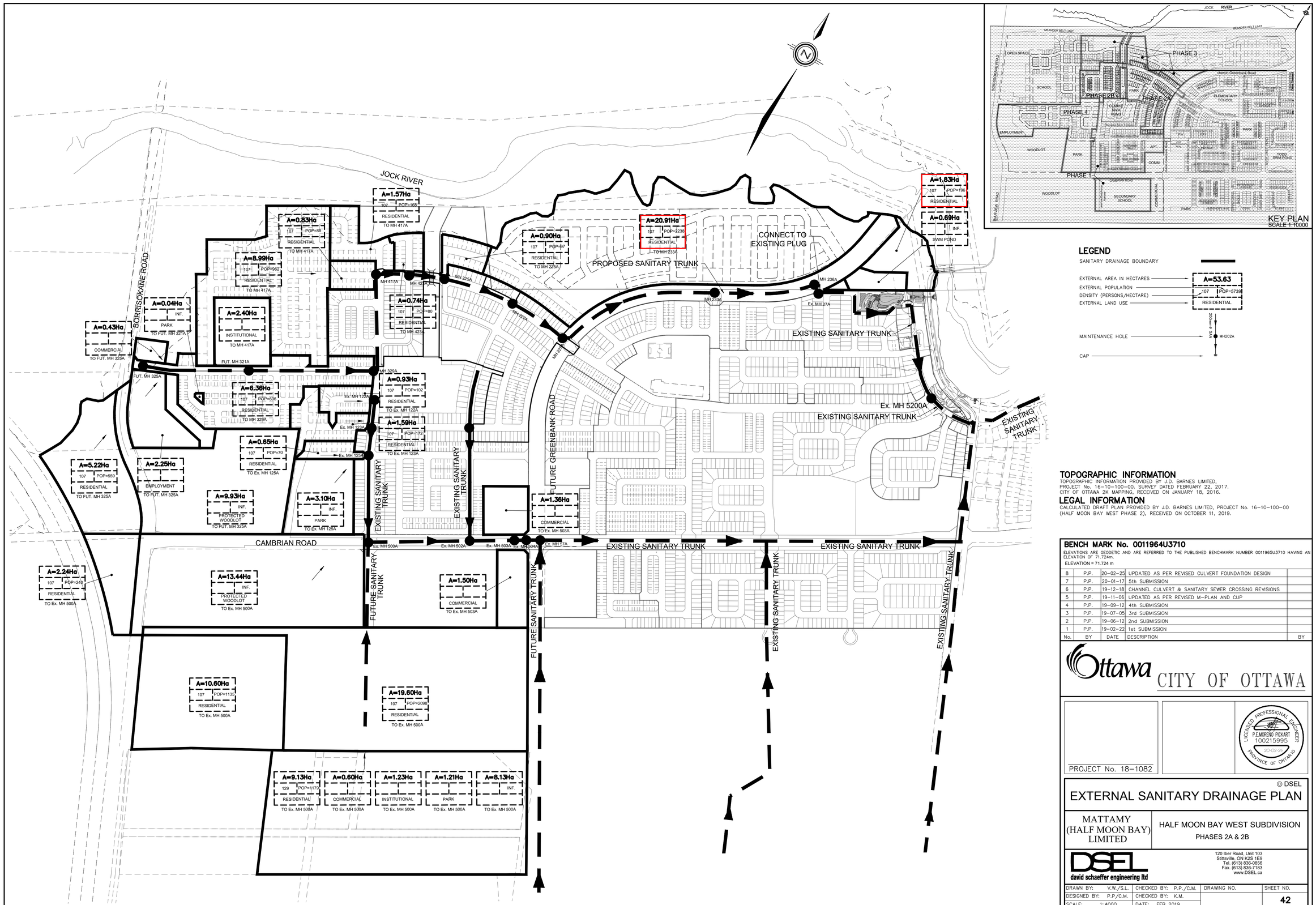
Manning's n=0.013

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)
		46A	53A	0.35		38	4.22	458	3.4	5.04		0.00		0.00		0.00	0.00	0.35	4.22	1.39	6.43	76.5	250	0.25	29.73	0.22	0.61	0.48
To SANITARY OUTLET, Pipe 53A - 54A							4.22	458				0.00		0.00		0.00			4.22									
		34A	33A	0.14		15	0.14	15	3.7	0.18		0.00		0.00		0.00	0.00	0.14	0.14	0.05	0.23	21.5	200	0.65	26.44	0.01	0.84	0.26
Contribution From STREET 5, Pipe 30A - 33A							11.45	1241				0.00		0.00		0.00		11.45	11.59									
		33A	32A	0.58		63	12.17	1319	3.2	13.57		0.00		0.00		0.00	0.00	0.58	12.17	4.02	17.59	78.0	250	0.25	29.73	0.59	0.61	0.63
		32A	31A	0.77		83	12.94	1402	3.2	14.36		0.00		0.00		0.00	0.00	0.77	12.94	4.27	18.63	116.0	250	0.25	29.73	0.63	0.61	0.64
SANITARY OUTLET																												
Contribution From STREET 1, Pipe 46A - 53A							4.22	458				0.00		0.00		0.00		4.22	4.22									
Contribution From STREET 1, Pipe 52A - 53A							1.25	137				0.00		0.00		0.24		1.49	5.71									
							5.47	595				0.00		0.00	0.50	0.74		0.50	6.21									
		53A	54A	1.15		0	6.62	595	3.3	6.45		0.00		0.00		0.74	0.08	1.15	7.36	2.43	8.96	48.0	250	0.25	29.73	0.30	0.61	0.53
FUT DEVELOPMENT																												
		100A	EX 45A	1.04		112	1.04	112	3.6	1.30		0.00		0.00	0.500	0.50	0.05	1.54	1.54	0.51	1.86	85.5	200	0.35	19.40	0.10	0.62	0.39

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: GGG	PROJECT: **Minto Kennedy Lands**
Checked: SLM	LOCATION: **City of Ottawa**
Dwg. Reference: Sanitary Drainage Plan, Dwgs. No. 4	File Ref: 20-1182
Date: **26 Aug 2021**	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

LICENSED PROFESSIONAL ENGINEER P.E.MORENO PICKART 100215995 20-02-26 PROVINCE OF ONTARIO

PROJECT No. 18-1082

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										

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

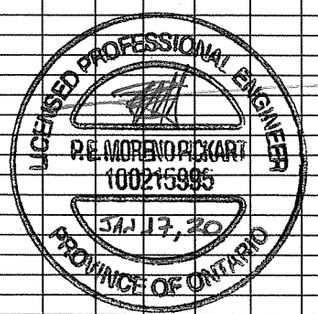
Designed: P.P.
Checked: K.M.
Dwg. Reference: Sanitary Drainage Plan, Dwgs. No. 39, 40 & 41

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 (Nominal) (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

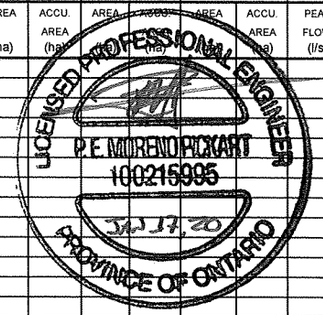
PROJECT: **Half Moon Bay West - Phases 2A & 2B**
LOCATION: **City of Ottawa**
File Ref: 18-1082
Date: Date: Jan 2020
Sheet No. 2 of 3

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

Ottawa

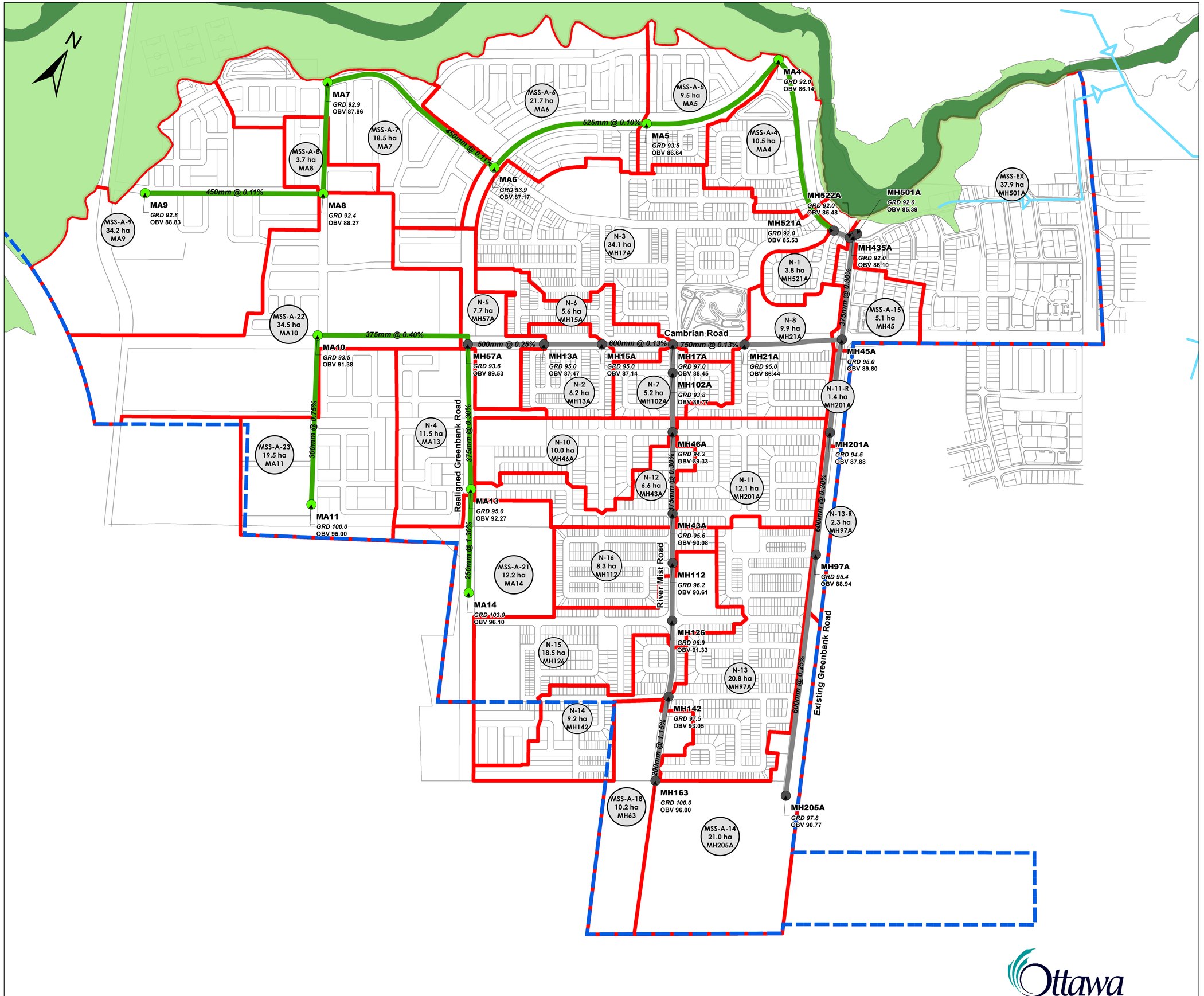
LOCATION			RESIDENTIAL AREA AND POPULATION							COMM	INSTIT	PARK	C+I+I	INFILTRATION				PIPE							
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (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
Tel. 613.722.4420
www.stantec.com

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.	Scale	Drawing No.	Sheet	Revision
163400999	1:5,000 (0 75 150 300 Meters)	A-4	4 of 9	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

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

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

	LOCATION		AREA (Ha)														FLOW						SEWER DATA								
			2 YEAR				5 YEAR				10 YEAR				100 YEAR				Time of	Intensity	Intensity	Intensity	Intensity	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO
			AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	Conc.	2 Year	5 Year	10 Year	100 Year										
Location	From Node	To Node	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(min)	(mm/h)	(mm/h)	(mm/h)	(mm/h)	Q (l/s)	(actual)	(nominal)		(%)	(m)	(l/s)	(m/s)	LOW (min	Q/Q full
STREET 4																																	
	40	41	0.56	0.75	1.17	1.17			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	90	450	450	CONC	0.20	90.0	127.5033	0.8017	1.8710	0.703
	41	42	0.48	0.75	1.00	2.17			0.00	0.00			0.00	0.00			0.00	0.00	11.87	70.30	95.25	111.61	163.09	152	525	525	CONC	0.20	87.0	192.3297	0.8885	1.6320	0.793
To STREET 1, Pipe 42 - 45						2.17				0.00				0.00				0.00	13.50														
STREET 3																																	
	37	38	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	450	450	CONC	0.20	99.5	127.5033	0.8017	2.0685	0.804
	38	39	0.49	0.75	1.02	2.36			0.00	0.00			0.00	0.00			0.00	0.00	12.07	69.68	94.40	110.61	161.63	164	525	525	CONC	0.25	85.5	215.0311	0.9933	1.4346	0.763
To STREET 1, Pipe 39 - 42						2.36				0.00				0.00				0.00	13.50														
	43	44	0.57	0.75	1.19	1.19			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	91	450	450	CONC	0.20	81.5	127.5033	0.8017	1.6943	0.716
	44	45	0.45	0.75	0.94	2.13			0.00	0.00			0.00	0.00			0.00	0.00	11.69	70.86	96.02	112.52	164.42	151	525	525	CONC	0.20	81.5	192.3297	0.8885	1.5289	0.784
To STREET 1, Pipe 45 - 48						2.13				0.00				0.00				0.00	13.22														
STREET 6																																	
	26	27	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	89.0	127.5033	0.8017	1.8503	0.666
	27	28	0.35	0.75	0.73	1.83			0.00	0.00			0.00	0.00			0.00	0.00	11.85	70.36	95.34	111.72	163.25	129	600	600	CONC	0.15	70.0	237.8056	0.8411	1.3871	0.543
To STREET 5, Pipe 28 - 31						1.83				0.00				0.00				0.00	13.24														
	29	30	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	88.5	127.5033	0.8017	1.8399	0.653
	30	31	0.34	0.75	0.71	1.79			0.00	0.00			0.00	0.00			0.00	0.00	11.84	70.40	95.38	111.77	163.32	126	600	600	CONC	0.15	70.0	237.8056	0.8411	1.3871	0.531
To STREET 5, Pipe 31 - 34						1.79				0.00				0.00				0.00	13.23														
STREET 7																																	
	20	21	0.84	0.70	1.63	1.63			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	126	600	600	CONC	0.15	101.5	237.8056	0.8411	2.0113	0.528
	21	22	0.51	0.70	0.99	2.63			0.00	0.00			0.00	0.00			0.00	0.00	12.01	69.86	94.65	110.90	162.05	184	600	600	CONC	0.15	82.5	237.8056	0.8411	1.6348	0.772
To STREET 5, Pipe 22 - 25						2.63				0.00				0.00				0.00	13.65														
	23	24	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	91.5	237.8056	0.8411	1.8132	0.427
	24	25	0.45	0.70	0.88	2.20			0.00	0.00			0.00	0.00			0.00	0.00	11.81	70.48	95.50	111.91	163.52	155	600	600	CONC	0.15	74.0	237.8056	0.8411	1.4664	0.652
To STREET 5, Pipe 25 - 28						2.20				0.00				0.00				0.00	13.28														
STREET 10																																	
	8	9	0.19	0.70	0.37	0.37			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	28	300	300	PVC	0.35	21.5	57.2089	0.8093	0.4427	0.496
	9	10	0.35	0.70	0.68	1.05			0.00	0.00			0.00	0.00			0.00	0.00	10.44	75.15	101.91	119.45	174.61	79	450	450	CONC	0.20	43.5	127.5033	0.8017	0.9043	0.619
	10	11	0.66	0.70	1.28	2.34			0.00	0.00			0.00	0.00			0.00	0.00	11.35	71.99	97.58	114.35	167.12	168	600	600	CONC	0.15	104.5	237.8056	0.8411	2.0708	0.707
To STREET 5, Pipe 11 - 19						2.34				0.00				0.00				0.00	13.42														

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

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

Designed: GGG	PROJECT: Minto Kennedy Lands		
Checked: SLM	LOCATION: City of Ottawa		
Dwg. Reference: 5	File Ref: 20-1182	Date: 26 Aug 2021	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)																FLOW						SEWER DATA							
			2 YEAR				5 YEAR				10 YEAR				100 YEAR				Time of	Intensity	Intensity	Intensity	Intensity	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO
			AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	Conc.	2 Year	5 Year	10 Year	100 Year										
Location	From Node	To Node	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(min)	(mm/h)	(mm/h)	(mm/h)	(mm/h)	Q (l/s)	(actual)	(nominal)		(%)	(m)	(l/s)	(m/s)	LOW (min	Q/Q full
STREET 9																																
	1	2	0.31	0.70	0.60	0.60			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	46	375	375	PVC	0.30	53.5	96.0323	0.8695	1.0255	0.482
	2	3	0.20	0.70	0.39	0.99			0.00	0.00			0.00	0.00			0.00	0.00	11.03	73.08	99.07	116.11	169.70	73	375	375	PVC	0.30	41.5	96.0323	0.8695	0.7955	0.755
To STREET 5, Pipe 3 - 4						0.99				0.00				0.00				0.00	11.82														
	12	13	0.22	0.70	0.43	0.43			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	33	300	300	PVC	0.35	64.5	57.2089	0.8093	1.3282	0.575
	13	14	0.16	0.70	0.31	0.74			0.00	0.00			0.00	0.00			0.00	0.00	11.33	72.06	97.66	114.45	167.27	53	375	375	PVC	0.30	52.5	96.0323	0.8695	1.0063	0.555
	14	15	0.14	0.70	0.27	1.01			0.00	0.00			0.00	0.00			0.00	0.00	12.33	68.87	93.29	109.30	159.70	70	375	375	PVC	0.30	10.5	96.0323	0.8695	0.2013	0.726
	15	16	0.13	0.70	0.25	1.26			0.00	0.00			0.00	0.00			0.00	0.00	12.54	68.27	92.47	108.34	158.28	86	450	450	CONC	0.20	18.5	127.5033	0.8017	0.3846	0.677
	16	17	0.44	0.70	0.86	2.12			0.00	0.00			0.00	0.00			0.00	0.00	12.92	67.16	90.94	106.54	155.64	142	525	525	CONC	0.20	48.0	192.3297	0.8885	0.9004	0.741
	17	18	0.36	0.70	0.70	2.82			0.00	0.00			0.00	0.00			0.00	0.00	13.82	64.70	87.57	102.57	149.82	183	600	600	CONC	0.15	45.5	237.8056	0.8411	0.9016	0.768
	18	19	0.66	0.70	1.28	4.11			0.00	0.00			0.00	0.00			0.00	0.00	14.72	62.43	84.46	98.92	144.46	256	675	675	CONC	0.15	106.0	325.5584	0.9098	1.9419	0.787
To STREET 5, Pipe 19 - 22						4.11				0.00				0.00				0.00	16.66														
STREET 5																																
Contribution From STREET 9, Pipe 2 - 3						0.99				0.00				0.00				0.00	11.82														
			0.06	0.70	0.12	1.11			0.00	0.00			0.00	0.00			0.00	0.00															
	3	4	0.07	0.70	0.14	1.25			0.00	0.00			0.00	0.00			0.00	0.00	11.82	70.46	95.47	111.87	163.47	88	450	450	CONC	0.20	13.5	127.5033	0.8017	0.2807	0.688
	4	5	0.24	0.70	0.47	1.71			0.00	0.00			0.00	0.00			0.00	0.00	12.10	69.58	94.26	110.45	161.39	119	525	525	CONC	0.20	40.5	192.3297	0.8885	0.7597	0.620
	5	6	0.52	0.70	1.01	2.72			0.00	0.00			0.00	0.00			0.00	0.00	12.86	67.32	91.17	106.81	156.04	183	600	600	CONC	0.15	73.0	237.8056	0.8411	1.4466	0.771
	6	7	0.16	0.70	0.31	3.04			0.00	0.00			0.00	0.00			0.00	0.00	14.31	63.45	85.86	100.56	146.87	193	600	600	CONC	0.20	13.5	274.5943	0.9712	0.2317	0.701
	7	11	0.30	0.70	0.58	3.62			0.00	0.00			0.00	0.00			0.00	0.00	14.54	62.88	85.07	99.64	145.51	228	675	675	CONC	0.15	63.5	325.5584	0.9098	1.1633	0.699
Contribution From STREET 10, Pipe 10 - 11						2.34				0.00				0.00				0.00	13.42														
	11	19	0.32	0.70	0.62	6.58			0.00	0.00			0.00	0.00			0.00	0.00	15.70	60.16	81.35	95.26	139.09	396	825	825	CONC	0.15	72.5	555.9418	1.0400	1.1619	0.712
Contribution From STREET 9, Pipe 18 - 19						4.11				0.00				0.00				0.00	16.66														
	19	22	0.32	0.70	0.62	11.31			0.00	0.00			0.00	0.00			0.00	0.00	16.86	57.69	77.98	91.29	133.27	652	975	975	CONC	0.15	70.5	867.9562	1.1625	1.0107	0.751
Contribution From STREET 7, Pipe 21 - 22						2.63				0.00				0.00				0.00	13.65														
	22	25	0.32	0.70	0.62	14.56			0.00	0.00			0.00	0.00			0.00	0.00	17.88	55.72	75.29	88.13	128.63	811	1050	1050	CONC	0.15	76.5	1057.6053	1.2214	1.0439	0.767
Contribution From STREET 7, Pipe 24 - 25						2.20				0.00				0.00				0.00	13.28														
	25	28	0.28	0.70	0.54	17.30			0.00	0.00			0.00	0.00			0.00	0.00	18.92	53.84	72.72	85.11	124.20	931	1050	1050	CONC	0.20	64.5	1221.2174	1.4103	0.7622	0.763
Contribution From STREET 6, Pipe 27 - 28						1.83				0.00				0.00				0.00	13.24														
	28	31	0.22	0.70	0.43	19.56			0.00	0.00			0.00	0.00			0.00	0.00	19.68	52.55	70.96	83.04	121.17	1028	1050	1050	CONC	0.25	51.5	1365.3626	1.5768	0.5443	0.753
Contribution From STREET 6, Pipe 30 - 31						1.79				0.00				0.00				0.00	13.23														
	31	34	0.26	0.70	0.51	21.86			0.00	0.00			0.00	0.00			0.00	0.00	20.23	51.67	69.76	81.63	119.10	1130	1050	1050	CONC	0.30	67.0	1495.6798	1.7273	0.6465	0.755
To STREET 1, Pipe 34 - 35						21.86				0.00				0.00				0.00	20.87														
STREET 1																																
	46	47	0.43	0.75	0.90	0.90			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	69	375	375	PVC	0.30	71.5	96.0323	0.8695	1.3705	0.717
	47	48	0.29	0.75	0.60	1.50			0.00	0.00			0.00	0.00			0.00	0.00	11.37	71.91	97.47	114.23	166.93	108	450	450	CONC	0.25	71.5	142.5531	0.8963	1.3295	0.757
	541	49	0.09	0.70	0.18	0.18			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	13	300	300	PVC	0.35	57.0	57.2089	0.8093	1.1738	0.235
	49	50			0.00	0.18			0.00	0.00			0.00	0.00			0.00	0.00	11.17	72.57	98.38	115.29	168.50	13	300	300	PVC	0.35	14.0	57.2089	0.8093	0.2883	0.222
			0.18	0.70	0.35	0.53			0.00	0.00			0.00	0.00			0.00	0.00															
	50	51			0.00	0.53	0.24	0.40	0.27	0.27			0.00	0.00			0.00	0.00	11.46	71.61	97.06	113.74	166.21	64	300	300	PVC	0.70	40.0	80.9057	1.1446	0.5825	0.785
	51	52	0.06	0.70	0.12	0.64			0.00	0.27			0.00	0.00			0.00	0.00	12.04	69.76	94.51	110.73	161.80	70	300	300	PVC	0.85	13.5	89.1537	1.2613	0.1784	0.785
	52	53	0.17	0.70	0.33	0.97			0.00	0.27			0.00	0.00			0.00	0.00	12.22	69.21	93.75	109.85	160.51	92	450	450	CONC	0.25	64.5	142.5531	0.8963	1.1994	0.648
	53	55	0.04	0.70	0.08	1.05			0.00	0.27			0.00	0.00			0.00	0.00	13.42	65.76	89.03	104.29	152.34	93	450	450	CONC	0.30	34.0	156.1591	0.9819	0.5771	0.595
To POND INLET, Pipe 55 - 216						1.05				0.27				0.00				0.00	14.00														
	32	33			0.00	0.00	0.70	0.70	1.36	1.36			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	142	600	600	CONC	0.15	81.0	237.8056	0.8411	1.6051	0.597
	33	34			0.00	0.00	0.53	0.70	1.03	2.39			0.00	0.00			0.00	0.00	11.61	71.15	96.42	112.98	165.11	231	675	675	CONC	0.15	76.0	325.5584	0.9098	1.3923	0.709
Contribution From STREET 5, Pipe 31 - 34						21.86				0.00				0.00				0.00	20.87														
	34	35	0.09	0.70	0.18	22.04			0.00	2.39			0.00	0.00			0.00	0.00	20.87	50.67	68.39	80.03	116.75	1280	1050	1050	CONC	0.35	19.5	1615.5188	1.8657	0.1742	0.792
	35	36	0.04	0.70	0.08	22.11			0.00	2.39			0.00	0.00			0.00	0.00	21.05	50.41	68.03	79.61	116.13	1278	1200	1200	CONC	0.20	13.5	1743.5652	1.5417	0.1459	0.733
	36	39	0.10	0.70	0.19	22.31			0.00	2.39			0.00	0.00			0.00	0.00	21.19	50.19	67.74	79.26	115.62	1282	1350	1350	CONC	0.15	73.0	2067.1669	1.4442	0.8425	0.620
Contribution From STREET 3, Pipe 38 - 39						2.36				0.00				0.00				0.00	13.50														
	39	42	0.05	0.70	0.10	24.76			0.00	2.39			0.00	0.00			0.00	0.00	22.04	48.97	66.08	77.31	112.77	1371	1350	1350	CONC	0.15	40.0	2067.1669	1.4442	0.4616	0.663

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

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

Designed:	GGG	PROJECT:	Minto Kennedy Lands
Checked:	SLM	LOCATION:	City of Ottawa
Dwg. Reference:	5	File Ref: 20-1182	Date: 26 Aug 2021 — 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)																FLOW						SEWER DATA								
			2 YEAR				5 YEAR				10 YEAR				100 YEAR				Time of	Intensity	Intensity	Intensity	Intensity	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO
			AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	Conc.	2 Year	5 Year	10 Year	100 Year											
Location	From Node	To Node	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(min)	(mm/h)	(mm/h)	(mm/h)	(mm/h)	Q (l/s)	(actual)	(nominal)		(%)	(m)	(l/s)	(m/s)	LOW (min	Q/Q full
Contribution From STREET 4, Pipe 41 - 42						2.17				0.00				0.00				0.00	13.50														
	42	45	0.09	0.70	0.18	27.11			0.00	2.39			0.00	0.00			0.00	0.00	22.50	48.33	65.21	76.29	111.27	1466	1350	1350	CONC	0.15	72.0	2067.1669	1.4442	0.8309	0.709
Contribution From STREET 3, Pipe 44 - 45						2.13				0.00				0.00				0.00	13.22														
	45	48	0.06	0.70	0.12	29.35			0.00	2.39			0.00	0.00			0.00	0.00	23.33	47.23	63.70	74.52	108.68	1539	1350	1350	CONC	0.15	46.0	2067.1669	1.4442	0.5309	0.744
	48	54	0.07	0.75	0.15	31.00			0.00	2.39			0.00	0.00			0.00	0.00	23.86	46.55	62.78	73.44	107.09	1593	1350	1350	CONC	0.15	52.0	2067.1669	1.4442	0.6001	0.771
To STREET 2, Pipe 54 - 55						31.00				2.39				0.00				0.00	24.46														
STREET 2																																	
Contribution From STREET 1, Pipe 48 - 54						31.00				2.39				0.00				0.00	24.46														
	54	55	0.69	0.75	1.44	32.44			0.00	2.39			0.00	0.00			0.00	0.00	24.46	45.81	61.77	72.25	105.36	1634	1350	1350	CONC	0.15	133.5	2067.1669	1.4442	1.5407	0.790
To POND INLET, Pipe 55 - 216						32.44				2.39				0.00				0.00	26.00														
POND INLET																																	
Contribution From STREET 1, Pipe 53 - 55						1.05				0.27				0.00				0.00	14.00														
Contribution From STREET 2, Pipe 54 - 55						32.44				2.39				0.00				0.00	26.00														
	55	216			0.00	33.49			0.00	2.66			0.00	0.00			0.00	0.00	26.00	44.03	59.35	69.40	101.18	1632	1350	1350	CONC	0.20	19.5	2386.9588	1.6676	0.1949	0.684
					0.00	33.49			0.00	2.66	3.04	0.85	7.18	7.18			0.00	0.00	20.10														
					0.00	33.49			0.00	2.66	-2.16	0.85	-5.10	2.08			0.00	0.00															
					0.00	33.49			0.00	2.66	-2.05	0.85	-4.84	-2.76			0.00	0.00															
					0.00	33.49			0.00	2.66	1.17	0.85	2.76	0.00			0.00	0.00															
					0.00	33.49			0.00	2.66			0.00	0.00	2.05	0.85	4.84	4.84															
	216	217			0.00	33.49			0.00	2.66			0.00	0.00	2.16	0.85	5.10	9.95	26.19	43.81	59.05	69.06	100.68	2626	1800	1800	CONC	0.20	54.0	5140.6126	2.0201	0.4455	0.511

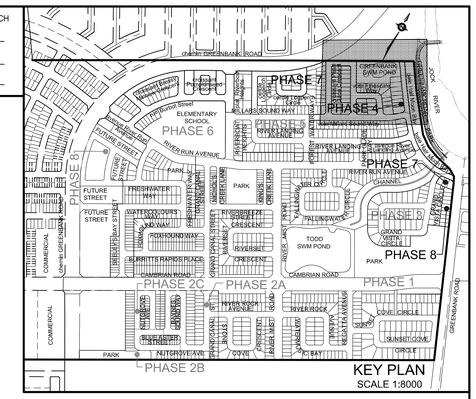
Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficient

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

Designed: GGG	PROJECT: Minto Kennedy Lands		
Checked: SLM	LOCATION: City of Ottawa		
Dwg. Reference: 5	File Ref: 20-1182	Date: 26 Aug 2021	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
- 1200M 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

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	

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.

PRELIMINARY DESIGN

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

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

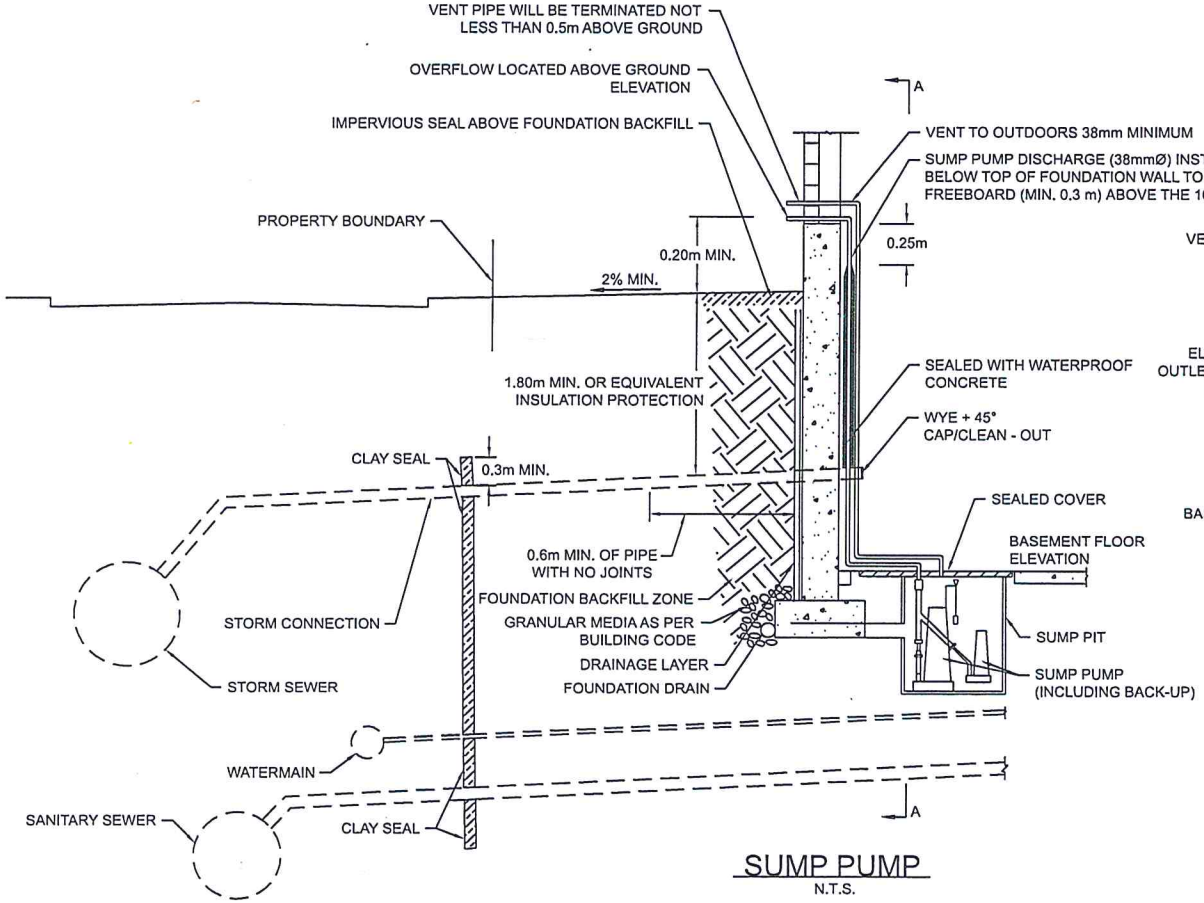
DSEL david schaeffer engineering ltd
120 Iber Road, Unit 103
Stittsville, ON K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

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		

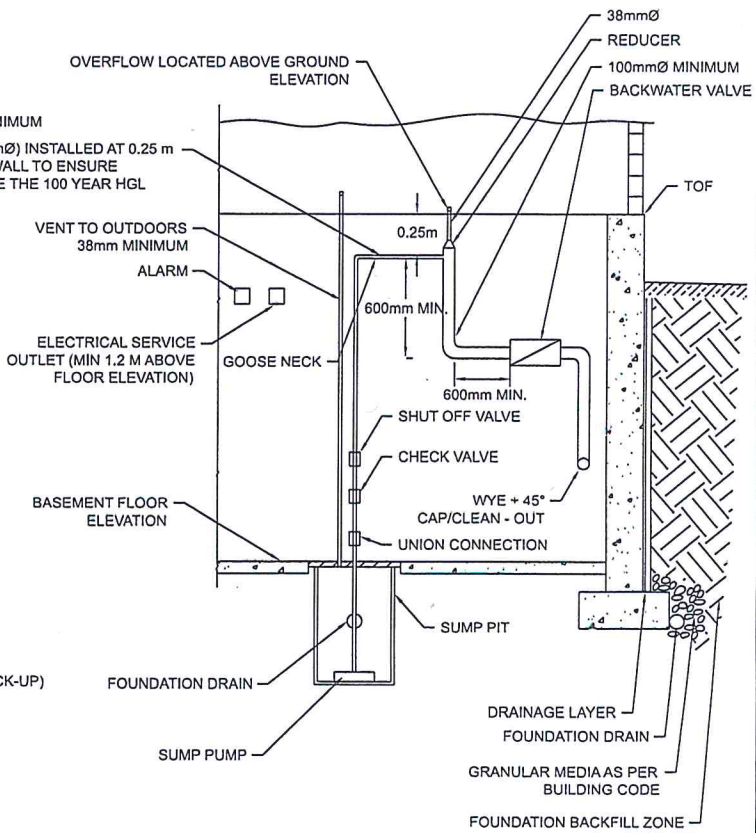
CITY FILE No. D07-16-13-0019 CITY PLAN No. 14942

APPENDIX F

PROPOSED SUMP PUMP DETAIL



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