

**FUNCTIONAL SERVICING AND
STORMWATER MANAGEMENT
REPORT**

FOR THE

HALF MOON BAY WEST SUBDIVISION

MATTAMY HOMES

CITY OF OTTAWA

PROJECT NO.: 16-888

**MARCH 8, 2019
3RD SUBMISSION
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1.0 INTRODUCTION

This Functional Servicing and Stormwater Management Report (FSR) is submitted in support of the Half Moon Bay West Plan of Subdivision and Zoning Amendment planning applications on behalf of Mattamy (Half Moon Bay 2) Limited. This FSR has been updated due to the revised draft plan of the Half Moon Bay West development, in which park land and residential development were relocated.

The Mattamy Half Moon Bay Lands are located in the Barrhaven South Community in the City of Ottawa. The Half Moon Bay West Subdivision is more specifically located west of the Realignment of Greenbank Road, east of Cedarview Road, south of the Jock River and on the north and south of Cambrian Road, as shown on **Figure 1**. There are existing phases of development to the east of the proposed subdivision, serviced by the Todd and Greenbank Stormwater Management Ponds.

The Half Moon Bay West Subdivision is approximately 115 ha in size and will be comprised of the following, as depicted on **Figure 2**:

- Residential mix of single detached homes, townhomes and back-to-back townhomes;
- Three parks;
- Secondary school;
- Employment area;
- Two commercial blocks;
- Natural habitat corridor; and
- Stormwater Management Pond (Clarke SWM Pond) and outlet channel to the Jock River.

West of the Half Moon Bay West Subdivision is a proposed residential development by Glenview Homes (Cedarview) Ltd, approximately 20 ha in size. Servicing for the adjacent property has been coordinated with the subject lands.

The subject property is within the study area of the **Barrhaven South Master Servicing Study** by Stantec dated June 2007 (MSS) and the **Draft 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

Currently, the majority of the site has been stripped of topsoil. The site previously consisted of agricultural fields, with the exception of the southwest portion of the site where a treed area formerly existed. The existing elevations within the proposed development area generally range between 91.5 m to 94.0 m.

Five test fill piles, which are approximately 30 m by 30 m and 1.7 m to 2.1 m high, are distributed throughout the subject phase. Also, the east portion of the site is currently occupied by a surcharge fill pile within the future residential subdivision adjacent to Greenbank Road.

The Half Moon Bay West Subdivision is within the Jock River watershed and is under the jurisdiction of the Rideau Valley Conservation Authority (RVCA).

The West Clarke Drain, which was identified in previous studies as fish habitat, has been redirected and infilled according to the Authorization developed between the Barrhaven South Landowners Group (BSLO) and the Department of Fisheries and Oceans (DFO). The ultimate Clarke SWM Pond has been constructed and the outlet channel to the Jock River is under the final stages of construction. The ultimate Clarke SWM Pond replaces the temporary sediment pond, which was originally constructed as part of a temporary drainage system for HMB West. HMB West – Phase 1 has been approved and is currently under construction.

Existing ditches have been identified in the Headwater Drainage Feature Assessment (Kilgour & Associates, July 22, 2016), which are to be closed and a new natural corridor is to be provided to link the existing woodlot in the southwest quadrant of the subject property to the Jock River north of the property.

Throughout the site, the soil consists of silty sand to silty clay fill or topsoil at ground surface underlain by a relatively deep deposit of silty clay overlying glacial till. The site is subject to grade raise restrictions with permissible grade raise elevations between 93.6 m and 93.9 m for roads and between 93.3 m and 93.6 m for houses, based on the **Geotechnical Report for Half Moon Bay West** by Paterson Group (PG2246-1, Revision 6 dated March 7, 2019) (Geotechnical Investigation). 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, January 20, 2015

City of Ottawa Staff met with Mattamy Homes and Fotenn Consultants on January 20, 2015 to discuss the application and to confirm application submission requirements.

Please refer to an email from Lily Xu dated January 27, 2015, enclosed in **Appendix A** for reference.

1.3 Existing Permits / Approvals

The following permits and approvals are in place for Half Moon Bay West:

1.3.1 City of Ottawa

The Ottawa City Council met on October 24, 2007 at 10:00am and passed the by-law to provide for the abandonment of drainage works as follows:

- Todd Municipal Drain (By-Law 2007-412);
- West Clarke Municipal Drain (By-Law 2007-413);
- East Clarke Municipal Drain (By-Law 2007-414).

An excerpt from the council meeting is included in **Appendix B**.

1.3.2 Rideau Valley Conservation Authority

The following permits have been issued by the RVCA:

- Temporary Drainage System, including a diversion of the West Clarke Drain and the subsequent infilling of the existing West Clarke Drain, Reference #RV5-23/16T, dated July 7, 2016;
- Outlet Channel connecting the proposed Clarke Storm Water management Pond to the Jock River, RV5-01/18, dated March 15, 2018

The permits are included in **Appendix B**. The West Clarke Drain has been decommissioned in accordance with Permit RV5-23/16T and it is no longer a municipal drain. The diversion of the West Clarke Drain will remain in place until the ultimate Clarke SWM Pond has been fully commissioned as it has been designed to capture the West Clarke Drain flows.

Existing ditches have been identified in the Headwater Drainage Feature Assessment (Kilgour & Associates, July 22, 2016), which are to be closed and a new natural corridor is to be provided to link the existing woodlot in the southwest quadrant of the subject property to the Jock River north of the property. The closure and design of the new natural corridor are to be subject to RVCA and City review as part of a separate Headwater Assessment process associated with the Plan of Subdivision application.

Existing grades in the subject lands are below the 100-year Jock River floodplain elevation as reported by the RVCA based on their Jock River Flood Risk Map 2, enclosed in **Appendix B** for reference.

1.3.3 Ministry of the Environment, Conservation and Parks (MECP)

The MECP approvals for the HMB West development are as follows:

- HMB West Phase 1 sanitary and storm sewers, ECA #2725-B5VKYF, issued on October 30, 2018;
- HMB West Clarke Stormwater Management Pond, ECA #6068-AWUPL5, issued on April 11, 2018

The MECP approvals for the downstream sanitary sewers are as follows:

- HMB Phase 1 sanitary sewers on Cambrian Road, ECA #9531-7EZK5S, issued on June 5, 2008;
- HMB Phase 7 sanitary sewers, ECA #3029-ACNJPT, issued on August 12, 2016

The ECAs for the above noted approvals are enclosed in **Appendix B**.

A permit to take water (PTTW) has been attained from the MECP for all remaining Half Moon Bay development lands. The PTTW is 3205-A4ZLZ6 (January 27, 2016) and a copy is included in **Appendix B**.

1.3.4 Department of Fisheries and Oceans

The DFO permit File PR-05-1840 was attained to authorize the harmful alteration, disruption or destruction of fish habitat due to infilling of the existing drain channels and realignment of the West Clarke, East Clarke, Todd and Corrigan Drains. The DFO permit, included in **Appendix B**, was extended until December 31, 2017.

1.4 Required Permits / Approvals

The Half Moon Bay West lands are subject to the following permits and approvals:

1.4.1 City of Ottawa

The City of Ottawa will review the engineering design drawings and reports for each phase of the Half Moon Bay West Subdivision. The City of Ottawa will review and sign off on the sewer design and forward to the Ministry of the Environment, Conservation and Parks (MECP) for approval through their transfer of review program. After approval is granted from the MECP, the City of Ottawa will issue a commence work notification (CWN).

The City of Ottawa has reviewed the HMB West Phase 1 sanitary and storm sewers and forwarded to the MECP for approval through the transfer of review program and the CWN, File #D07-16-16-0023, was issued November 1, 2018 for HMB West Phase 1. A copy of the CWN is enclosed in **Appendix B**.

The City of Ottawa reviews watermains on behalf of the MECP. The MECP "Form 1" is submitted to the City of Ottawa for approval of watermains.

MECP "Form 1" was submitted and approved by the City of Ottawa for watermains in HMB West Phase 1. The MECP "Form 1" will be submitted for approval of watermains for the each future phase of HMB West.

1.4.2 Ministry of the Environment, Conservation and Parks (MECP)

The MECP will review the engineering design and issue Environmental Compliance Approvals (ECA) for Sanitary and Storm Sewers throughout the site.

Sanitary and storm sewers in HMB West Phase 1 have been approved as per ECA #2725-B5VKYF (October 30, 2018). ECAs will be required for all sanitary and storm sewers for the future phases of the HMB West development.

1.4.3 Rideau Valley Conservation Authority (RVCA)

The Rideau Valley Conservation Authority (RVCA) will provide approvals for any works associated with the Jock River relating to the alteration of waterways.

For this site, the following items will require a permit under Ontario Regulation 174/06, RVCA's Development, Interference with Wetlands and Alterations to Shorelines and Watercourses:

- Grading within the subject lands and new definition of the regulatory floodplain; and
- Ditches requiring closure due to development / grading and potential changes to existing ditches outletting to the Jock River

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*)
- **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*)
- **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**
Greater Golden Horseshoe Area Conservation Authorities, December 2006
(*E&S 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 Clarke Stormwater Management Pond**
JFSA and DSEL, October 19, 2017
(*Clarke SWM PDB*)
- **Barrhaven South Master Servicing Study Addendum for Half Moon Bay West Subdivision Phase 1**
DSEL, September 5, 2018
(*DSEL MSS Addendum*)
- **Design Brief for the Half Moon Bay West Subdivision Phase 1**
DSEL, October 29, 2018
(*Design Brief*)
- **Geotechnical Investigation, Proposed Residential Development, Half Moon Bay West (PG2246-1 Revision 6)**
Paterson Group, March 7, 2019
(*Geotechnical Investigation*)

3.0 WATER SUPPLY SERVICING

3.1 Existing Water Supply Services

Half Moon Bay West is located within the Barrhaven Pressure Zone (Zone BARR). The development will be fed from the existing Half Moon Bay North development, to the east, at the following locations:

- Existing 406 mm diameter watermain on Cambrian Road, north on existing Greenbank Road and east to Jockvale Road;
- 406 mm diameter watermain in Half Moon Bay North on Pearl Dace Crescent, Millars Sound Way and Half Moon Bay Road, from the Realignment of Greenbank Road east to Jockvale Road; and
- Existing 305 mm diameter watermain on River Run Avenue, east to Jockvale Road.
- Existing 406 mm diameter watermain on Realignment of Greenbank Road, between Cambrian Road and River Run Avenue

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 Half Moon Bay West Subdivision will connect to existing infrastructure at the following locations:

- 406 mm diameter watermain on Cambrian Road will be extended west from its current termination at the Realignment of Greenbank Road ;
- 305 mm diameter watermain on River Run Avenue will be extended west from its current termination at the Realignment of Greenbank Road ;

Two 305 mm diameter north – south trunks will connect the two trunk extensions noted above. The remainder of the subdivision 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 1**.

Table 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	350 L/p/day
Residential - Maximum Daily Demand	2.5 x Average Daily Demand
Residential - Maximum Hourly Demand	2.2 x Maximum Daily Demand
Commercial / Institutional Average Daily Demand	50,000 L/gross ha/day
Park Average Daily Demand	9,300 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.
Minimum Watermain Size	150 mm diameter
Service Lateral Size	19 mm dia
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
<i>Extracted from Section 4: Ottawa Design Guidelines, Water Distribution (July 2010)</i>	

The proposed water supply network is depicted on **Figure 4**.

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 the Realignment of Greenbank Road as depicted on **Figure 3** and **Figure 4**, providing reliability to the overall system.

3.4 Stantec MSS Addendum Conformance

The extension of the 406 mm diameter Cambrian Road watermain and the extension of the 305 mm diameter River Run watermain both conform to the **Stantec MSS Addendum**. The two new 305 mm diameter watermain loops through the subject site and the future 610 mm diameter watermain along the Realignment of Greenbank Road both conform to the **Stantec MSS Addendum**.

Through detailed design of HMB West Phase 1, the water supply design determined a fire flow of 15,000 L/min for back-to-back townhomes, which deviates from the 13,000 L/min fire flow documented in the **Stantec MSS Addendum**. The 15,000 L/min fire flow

is calculated as per Fire Underwriters Survey (FUS) Water Supply for Public Fire Protection Guidelines (1999) and ISTB-2018-02. Future phases of HMB West will be subject to the same FUS calculations at the time of detailed design to determine required fire flows. Please refer to the **DSEL MSS Addendum** for details on the fire flow.

3.5 Water Supply Conclusion

The proposed watermain network must meet maximum hour and maximum day plus fire flow demands. Preliminary analysis for the network indicates that the 150 mm, 200 mm and 305 mm diameter sizes satisfy these demands.

Water supply will be available within the required pressure range under the anticipated demand during average day, peak hour and fire flow conditions.

The proposed water supply design conforms to all relevant City guidelines and policies.

The proposed water supply design deviates from the **Stantec MSS Addendum** by using an updated fire flow and not including 406 mm watermain on Realignment of Greenbank Road as part of proposed design.

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 Half Moon Bay West Subdivision. The **MSS** determined that the sewer is able to accommodate sanitary flows from approximately 26,000 people in the Barrhaven South Community.

Trunk sanitary sewers exist within the existing Half Moon Bay North development, to the east, as shown on **Figure 5**. The following are the location of the existing trunk connection points:

- Existing 500 mm / 600 mm / 750 mm diameter sanitary trunk running east on Cambrian Road extending north along existing Greenbank Road and east to the South Nepean Collector. Current termination is at the Realignment of Greenbank Road; and
- Existing 600 mm diameter sanitary trunk through the Half Moon Bay North development, along Pearl Dace Crescent, the south limit of the Greenbank Pond and Half Moon Bay Road beyond existing Greenbank Road, connecting to the South Nepean Collector. The current termination is at the Realignment of Greenbank Road.

4.2 Wastewater Design

Half Moon Bay West 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 locations:

- The 500 mm / 600 mm / 750 mm trunk sanitary sewer will be extended west on Cambrian Road from its current termination;
- The 600 mm diameter trunk sanitary sewer will be extended as a 525 mm diameter trunk sanitary sewer along the Realignment of Greenbank Road from its current termination in Half Moon Bay North to the Half Moon Bay West site; and
- 450 mm diameter trunk sanitary sewer will be extended through the northern portion of the proposed development.

The proposed sanitary sewer layout is depicted on **Figure 6**.

There are two sanitary outlets for the proposed development. The northern portion of the site is serviced by Trunk 3, discharging to Trunk 1 along the Realignment of Greenbank Road. The Trunk 1 outlet is to the existing 600 mm diameter trunk sanitary

through Half Moon Bay North. Please note that external flows are considered from the Glenview Lands to the west of the Half Moon Bay West development. The southern portion of the site is serviced by Trunk 4, discharging to the existing trunk sanitary on Cambrian Road.

Table 2 summarizes the City Standards employed in the design of the proposed wastewater sewer system.

Table 2: 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	350 L/p/d
Peaking Factor Applied	Harmon's Equation $P.F. = 1 + \left(\frac{14}{4 + \left(\frac{P}{1000} \right)^{1/2}} \right) \times K$
Institutional Flows	50,000 L/ha/day
Institutional Peaking Factor	1.5
Infiltration and Inflow Allowance	0.28 L/s/ha
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{2/3} S^{1/2}$
Minimum Sewer Size	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.
<i>Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012</i>	

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

The peak flow from the northern trunks to the existing sanitary sewer in Half Moon Bay North is 72.46 L/s. The sanitary flows from Trunk 3 (HMB West) to Trunk 1 are based on the following:

- 46.5 ha of residential development, estimated population of 3920 people; and
- 2.90 ha of commercial / employment development
- 2.40 ha of institutional development
- 1.0 ha of parkland

The Half Moon Bay North trunk sanitary was designed with capacity for the following:

- 58.50 ha of residential development, estimated population of 5775 people;
- 9.66 ha of institutional development; and
- 8.62 ha of parkland

The downstream sanitary trunk for the northern portion was designed with greater capacity than required for the Half Moon Bay West Lands. The external sanitary drainage plan and corresponding design sheet excerpt from Half Moon Bay North is contained in **Appendix C**.

The peak flow from the southern trunk (Trunk 4) within Half Moon Bay West to the existing sanitary sewer on Cambrian Road is 97.94 L/s. The sanitary flows from Trunk 4 (HMB West) to Cambrian Road are based on the following:

- 56.4 ha of residential development, estimated population of 5027;
- 3.20 ha of commercial development;
- 7.60 ha of institutional development; and
- 3.5 ha of parkland;

The peak flow to the existing Cambrian Road sewer, when adding flows from the south on the Realignment on Greenbank Road per the **MSS**, is 129.43 L/s. The **Stantec MSS Addendum** was updated with the most current detailed design information at the time and the associated design sheet for Cambrian Road is the most accurate document to assess capacity. The capacity of the 500 mm diameter trunk on Cambrian Road in the **Stantec MSS Addendum** is 188.2 L/s. There is sufficient capacity in the Cambrian Road trunk and downstream infrastructure to support Half Moon Bay West.

4.3 Future Infrastructure

As per the **Stantec MSS Addendum**, there will be a trunk sanitary sewer constructed in the future along the Realignment of Greenbank Road as depicted on **Figure 6**.

4.4 Stantec MSS Addendum Conformance

For the northern portion of Half Moon Bay West, the proposed trunk sewers conform to the **Stantec MSS Addendum** with respect to location and size. The trunk sewer on the Realignment of Greenbank Road, mentioned above, was designed for the following:

- 65.29 ha of residential development, estimated population of 6,985 people;
- 2.45 ha of institutional development; and
- 10.32 ha of greenspace

Based on the proposed design, there is less tributary flow to the northern trunk from Half Moon Bay West (including the external Glenview Lands) than was expected in the **Stantec MSS Addendum**.

For the southern portion of Half Moon Bay West, the proposed trunk sewers generally conform to the **Stantec MSS Addendum**. The southern trunk sewer in the **Stantec MSS Addendum** was designed for the following:

- 27.04 ha of residential development, estimated population of 2,894 people;
- 10.02 ha of institutional development; and
- 16.99 ha of greenspace

Even though the tributary flow in the proposed design to the southern trunk from Half Moon Bay West is greater than what was expected in the **Stantec MSS Addendum**, there is sufficient capacity to convey the 97.94 L/s in the southern trunk.

Through the detailed design of HMB West Phase 1, an analysis was completed in coordination with Barrhaven South Urban Expansion Area (BSUEA) lands to confirm capacity in Trunk 4 on Cambrian Road. Per the analysis, Trunk 4 on Cambrian Road has been upsized from the **Stantec MSS Addendum** to include additional lands north and south as external flows. Refer to **DSEL MSS Addendum** for details on the upsizing of the sewer on Cambrian Road and support for the redirection of flows to existing trunks and drainage areas.

The sanitary drainage plan and design sheets from the **Stantec MSS Addendum** are contained in **Appendix C**.

4.5 Wastewater Servicing Conclusion

The proposed wastewater design follows all relevant City guidelines and policies.

There is capacity in the downstream sanitary sewer system to support the Half Moon Bay West Subdivision.

The size and location of the sanitary trunk sewers are in general conformance with the **Stantec MSS Addendum**, with the exception of the upsizing of the Cambrian Road trunk sewer.

5.0 STORMWATER CONVEYANCE

5.1 Existing Conditions

The Half Moon Bay West Subdivision is located within the West Clarke Drain watershed, which is tributary to the Jock River. The East Clarke Drain and Todd Drain watersheds were originally located to the east of the site at Half Moon Bay North.

The Todd Pond was constructed in 2008 and watershed boundaries have been modified. Refer to **Figure 7A** for a depiction of external pre-development drainage patterns. Work has been completed through the **Stantec MSS Addendum** to maximize the drainage area to the Todd Pond. Refer to **Figure 7** and **Figure 8** for the overall depiction of the current major and minor system boundaries for the subject lands, respectively.

5.2 Minor System

The Half Moon Bay West Subdivision 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. Refer to **Figure 8** for the Storm Drainage Plan (Minor).

A freeboard of 0.20 m between the 100-year hydraulic grade line and the road centerline elevation will be targeted throughout the proposed HMB West where sump pumps will be provided within residential units to protect against basement flooding. Note that recently issued City of Ottawa Technical Bulletin ISTB-2018-04 (June 27, 2018), specifies that “In new subdivisions designed with the use of sump pumps, the 100-year HGL can surcharge to the surface. ICDs will be required if the hydraulic modelling shows that the HGL is higher than the ground surface. If no ICDs are proposed, then the flow into the minor system is controlled by the type of inlet, its slope and its orientation.”

The storm sewers servicing HMB West will discharge to the proposed Clarke Pond via two inlets and discharge from the pond to the Jock River via a naturalized channel. There is an additional inlet to the Clarke Pond, which services HMBN Phase 8.

The proposed storm sewer layout is depicted on **Figure 9**. The outlet channel design and Clarke Pond design are depicted on **Figure 10** and **Figure 11**, respectively.

Table 3 summarizes the relevant City Standards employed in the design of the proposed storm sewer system referred to as the minor system.

Table 3: 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	$Q = \frac{1}{n} AR^{\frac{2}{3}} S^{\frac{1}{2}}$
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
Clearance from 100-Year HGL to building opening	0.30 m
<i>Extracted from Sections 5 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012</i>	

There are three inlets proposed for the Clarke Pond. The peak flows based on the Rational Method are 4,766 L/s and 7,758 L/s for the eastern inlet and the western inlet, respectively, for the trunks servicing HMB West. The third inlet services HMBN Phase 8 and has a peak flow based on the Rational Method of 2,374 L/s.

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

5.3 Major System

The majority of the major system flows will be conveyed through the internal network, outletting to the Clarke Pond, where they are treated for quality control prior to release to the Jock River. The small portion of the development in the northwest corner will have major system flows which will be conveyed directly 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 excess major system flow (100-year less the 5-year) flows from the existing Half Moon Bay Subdivision areas draining into the HMB West system are to be fully captured to the minor system.

The maximum depth of flow on local and collector streets is 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 Cambrian Road and Realignment of Greenbank Road.

School block major flows will be controlled on-site.

Refer to **Figure 7** for a depiction of the Storm Drainage Plan (Major).

5.4 Proposed Outlet – Stormwater Management (SWM) Pond

The Clarke Pond was identified in the **Stantec MSS Addendum** to service the Mattamy Half Moon Bay West Development and the external lands, as depicted on **Figure 7** and **Figure 8**. The Clarke Pond has been approved and constructed and further details of the design can be found in the **Design Brief for the Clarke Stormwater Management Pond for the Half Moon Bay West Subdivision** by JFSA and DSEL dated October 19, 2017 (Clarke SWM PDB).

The Clarke Pond has been sized for the entire drainage area. Based on the SWMHYMO model, the peak 5-year and 100-year inflows to the pond are approximately 14.533 m³/s and 20.119 m³/s, respectively.

The SWM Outlet Channel and the Clarke Pond are depicted on **Figure 10** and **Figure 11**, respectively.

The Clarke 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 Clarke 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 subwatershed will peak before the upstream peak in the Jock River.

5.4.3 Clarke Pond

The pond design characteristics, based on a 123.414 ha total drainage area to the pond (121.656 ha contributing minor system flows requiring quality control treatment) are summarized in **Table 4**.

Table 4: Clarke Pond Design Characteristics

Item	Target	Comments
Drainage Area	123.414 ha total 123.656 ha minor flows	121.121 ha future development, 0.535 ha existing Half Moon Bay park block, 17.58 ha major flows only from existing Half Moon Bay Subdivision
Imperviousness	67%	
Required Permanent Pool Volume	21,655 m ³	Based on 178.00 m ³ /ha ⁽¹⁾
Required Quality Control Volume	4,866 m ³	40 m ³ /ha
Allowable Release Rate for Quality Control	141 L/s	Minimum extended detention time between 24 to 48 hours

(1) Interpolated for 67% imperviousness, enhanced protection level for wet pond, as per Table 3.2 of the SWM Planning and Design Manual.

The detailed operation conditions of the Clarke Pond are provided in the **Clarke SWM PDB** for both free outfall and restrictive downstream conditions.

The provided permanent pool in the Clarke Pond is 22,400 m³, at an elevation of 89.55 m, which is more than the minimum permanent pool volume required in **Table 4**.

The provided extended detention volume in the Clarke Pond is 6,803 m³ above the operational permanent pool elevation of 90.35, which is more than the minimum quality control volume required in **Table 4**.

The extended detention level is set based on a 100-year flood level on the Jock River at the pond outlet of 91.72 m. There is a 250 mm quality control orifice at an invert of 89.55 m and a 50 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 future River Run Avenue. The channel and culvert have been sized to convey the maximum 100-year flow of 21,858 m³/s, as detailed in the **Clarke SWM PDB**.

A detailed HGL analysis must be run to confirm that there is 0.30 m freeboard above the 100-year pond level of 92.09 m.

5.5 Stantec MSS Addendum Conformance

In general, the location of the Clarke 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). The excess major system flow (100-year less the 5-year) flows from the existing Half Moon Bay Subdivision areas draining into the HMB West system are to be fully captured to the minor system.

The **Stantec MSS Addendum** specifically considered the use of private sump pumps for the development of areas with grade raise restrictions (including HMB West), 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. For further justification of the use of private sump pumps, refer to the **DSEL MSS Addendum**.

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).

- The storm sewers will outlet to the Clarke Pond, where the flows will be treated for quality prior to discharging to the Jock River.
- Sump pumps are to be implemented in the HMB West development as per City of Ottawa Technical Bulletin ISTB-2018-04 (June 27, 2018), which specifies that in new subdivisions designed with the use of sump pumps, the 100-year HGL can surcharge to the surface.
- The proposed design will target a freeboard of 0.20 m between the 100-year HGL and the road centerline elevation throughout the proposed HMB West where sump pumps are provided.
- The Clarke Pond is design 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 Half Moon Bay West Lands is restricted by the existing adjacent Half Moon Bay North Subdivision, the design grades for the Realignment of Greenbank Road and the Jock River water levels.

The Stantec MSS Addendum indicates that proposed grades for the Half Moon Bay West will vary between approximately 92.50 m and 94.50 m. Detailed grading will be completed at the time of detailed design. A conceptual grading plan is depicted on **Drawing 1** enclosed in **Appendix E**.

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 92.45 m and 94.50 m. It is noted in the **Geotechnical Investigation** by Paterson Group (March 7, 2019) that the permissible grade raises vary between 93.6 m and 93.9 m for roads and between 93.3 m and 93.6 m for houses. Based on the conditions on-site, a surcharge program is underway and lightweight fill and/or other measures will be employed to reduce the risks of long-term differential settlement. Even considering the proposed surcharge program and the proposed storm drainage schemes, the proposed centerline of road grades do not allow for standard basements with a gravity connection to the storm sewer system. As such, because of the constraints for the subject property, sump pumps are proposed to be installed for all residential blocks and residential lots.

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 **Stantec MSS Addendum** specifically considered the use of private sump pumps for the development of areas with grade raise restrictions (including Half Moon Bay West), 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 entirely by sump pumps due to site constraints imposed by grade raise restrictions and the proximity to Jock River stormwater outlet.

Technical Bulletin ITSB-2018-04 (June 27, 2018) specifies that in new subdivisions designed with the use of sump pumps, the 100-year HGL can surcharge to the surface. A freeboard of 0.20 m between the 100-year hydraulic grade line and the road centerline elevation will be targeted throughout the proposed HMB West development design where sump pumps are provided. 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 raised, a permit under O. Reg 174/06 will be required. It is understood that it must be shown to the RVCA that the proposed fill is not expected to have a negative impact on the function of the Jock River and a cut / fill floodplain proposal will be required.

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 has been approved by various agencies for Half Moon Bay West. The plan includes the construction of a temporary sediment pond at the future Clarke Pond location as well as a diversion of the West Clarke Drain, which is to remain in place and be protected until the sewers and Clarke Pond are constructed. The plan allows for construction activities on-site, from preliminary earthworks movements to installation of sewers and pond structures, to occur while being able to treat and protect surface water prior to discharge to the Jock River. The approved plan has been implemented for the Half Moon Bay West Lands during 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 Half Moon Bay West Subdivision 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. Approvals for the Clarke SWM Pond and HMB West Phase 1 sanitary and storm sewers have been obtained.
- Watermains are designed as per the City of Ottawa guidelines and connect to existing watermains in existing Half Moon Bay North. Trunk watermains exist on Cambrian Road, existing Greenbank Road, across Half Moon Bay Road to Jockvale Road and Realignment of Greenbank Road. A trunk watermain will be installed along the Realignment of Greenbank Road in the future, as per the **Stantec MSS Addendum**.
- Sanitary sewers are designed as per the City of Ottawa guidelines. Sanitary sewers will connect to trunk sewers on Cambrian Road and on the Realignment of Greenbank Road to existing sewers in HMB North.
- 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).
- The storm sewers will outlet to the Clarke Pond, where the flows will be treated for quality prior to discharging to the Jock River.
- Technical Bulletin ITSB-2018-04 (June 27, 2018) specifies that in new subdivisions designed with the use of sump pumps, the 100-year HGL can surcharge to the surface.
- The proposed design targets a freeboard of 0.20 m between the 100-year hydraulic grade line and the road centerline elevation throughout the HMB West development where sump pumps will be provided within residential units to protect against basement flooding.
- The Clarke 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 Half Moon Bay West 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 design as low as possible. To achieve this, the use of sump pumps has been introduced to mitigate grade raises to be implemented as per Technical Bulletin ISTB-2018-04 (June 27, 2018).

- 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 functional servicing and stormwater management design of Half Moon Bay West 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.

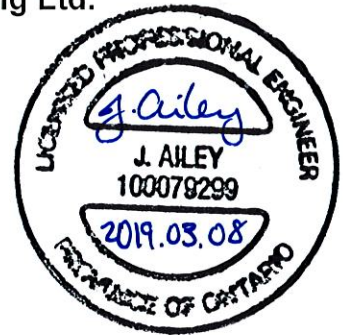


Per: Kate Anderson, E.I.T.

Reviewed by,
David Schaeffer Engineering Ltd.

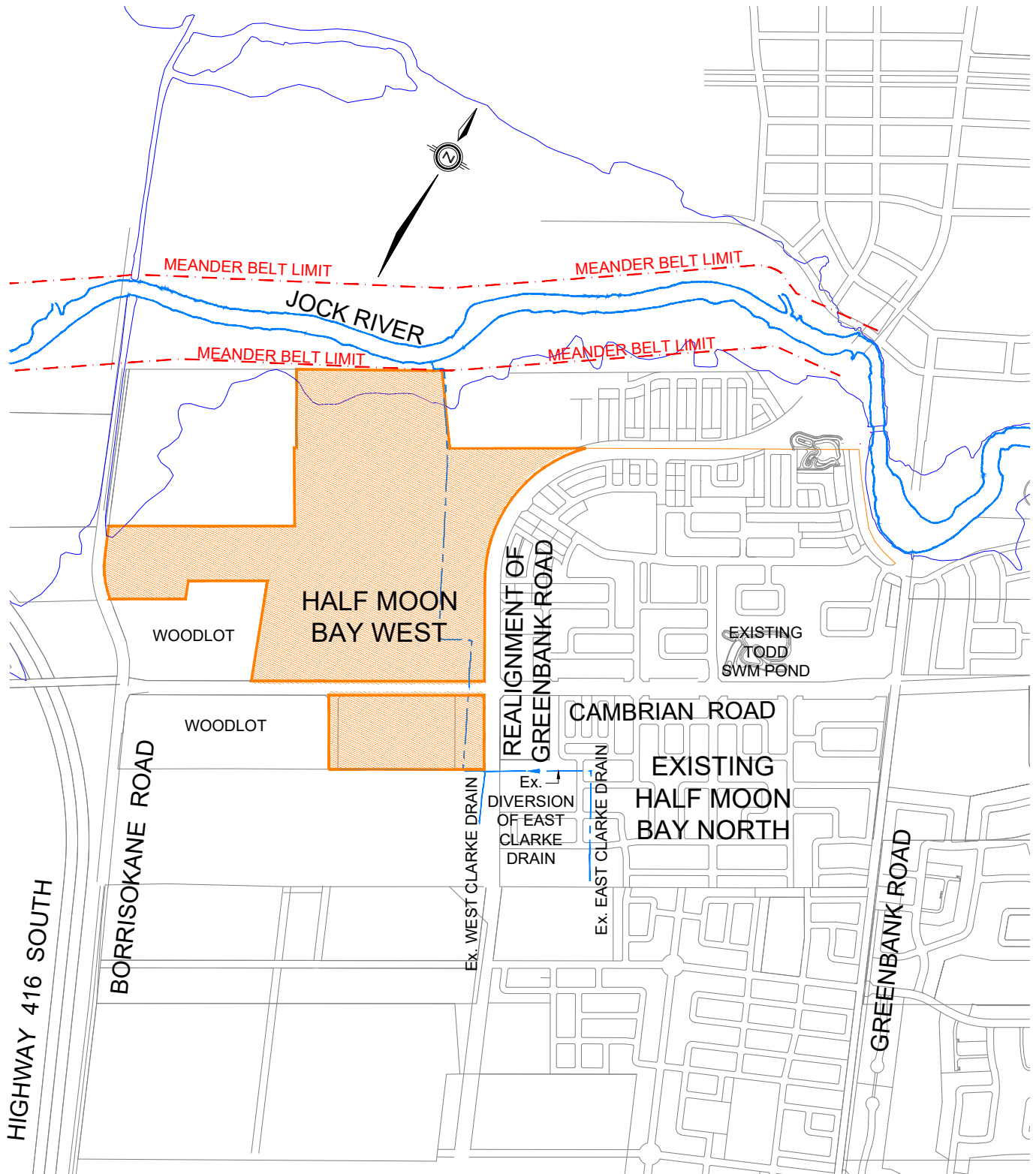


Per: Jennifer Ailey, P.Eng.



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LEGEND:

 SITE BOUNDARY

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

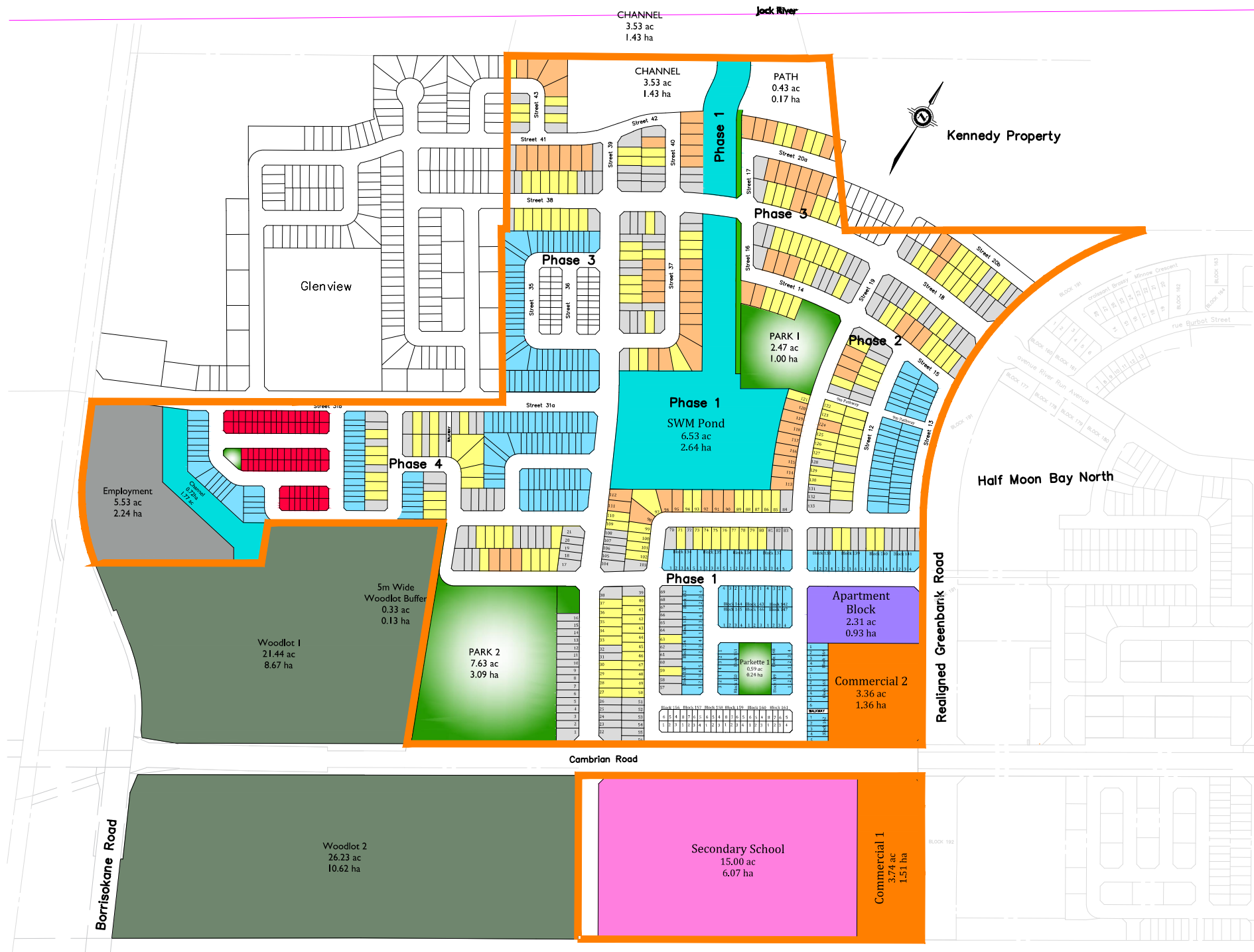
HALF MOON BAY WEST
SITE LOCATION PLAN
CITY OF OTTAWA

DATE: FEBRUARY 2019

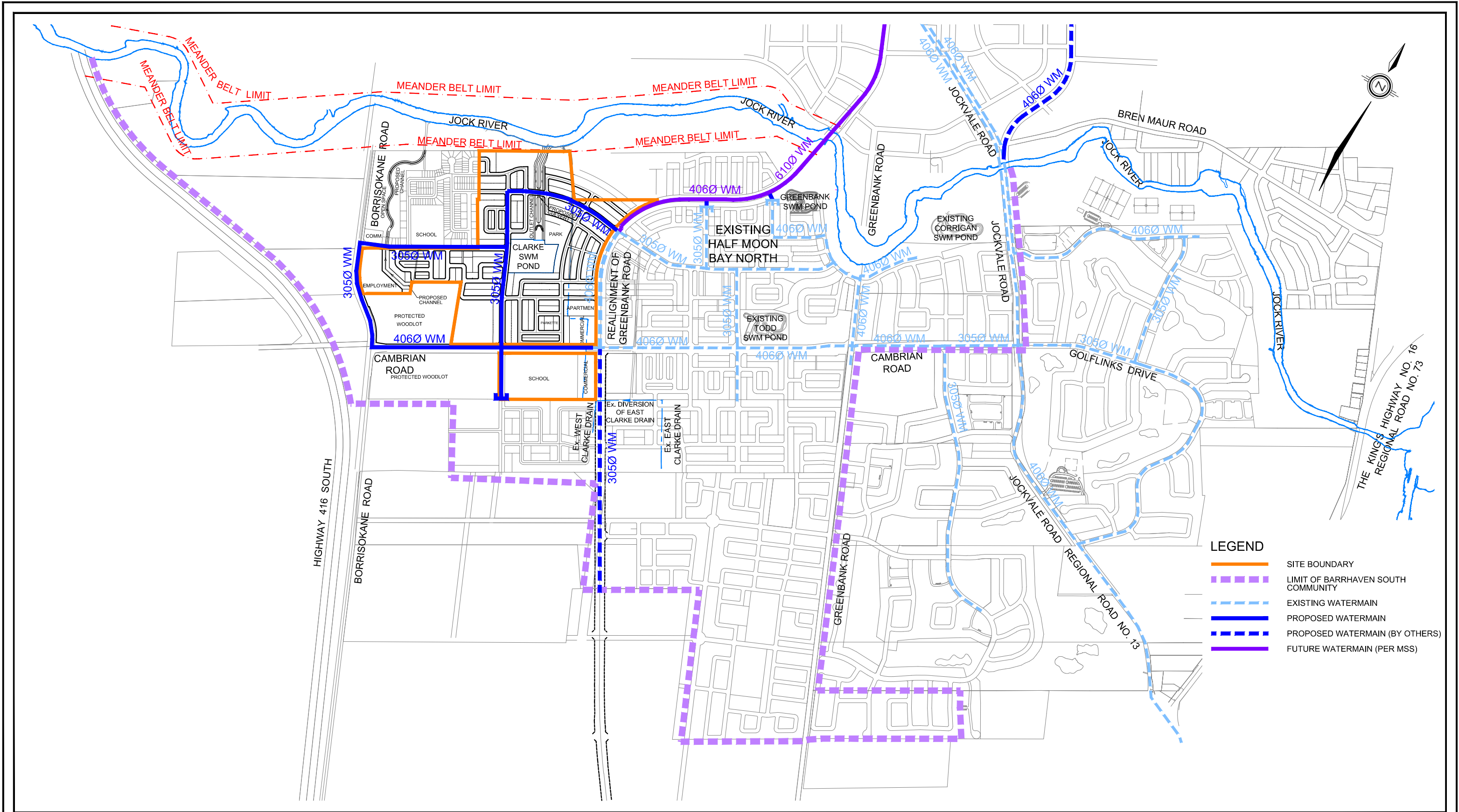
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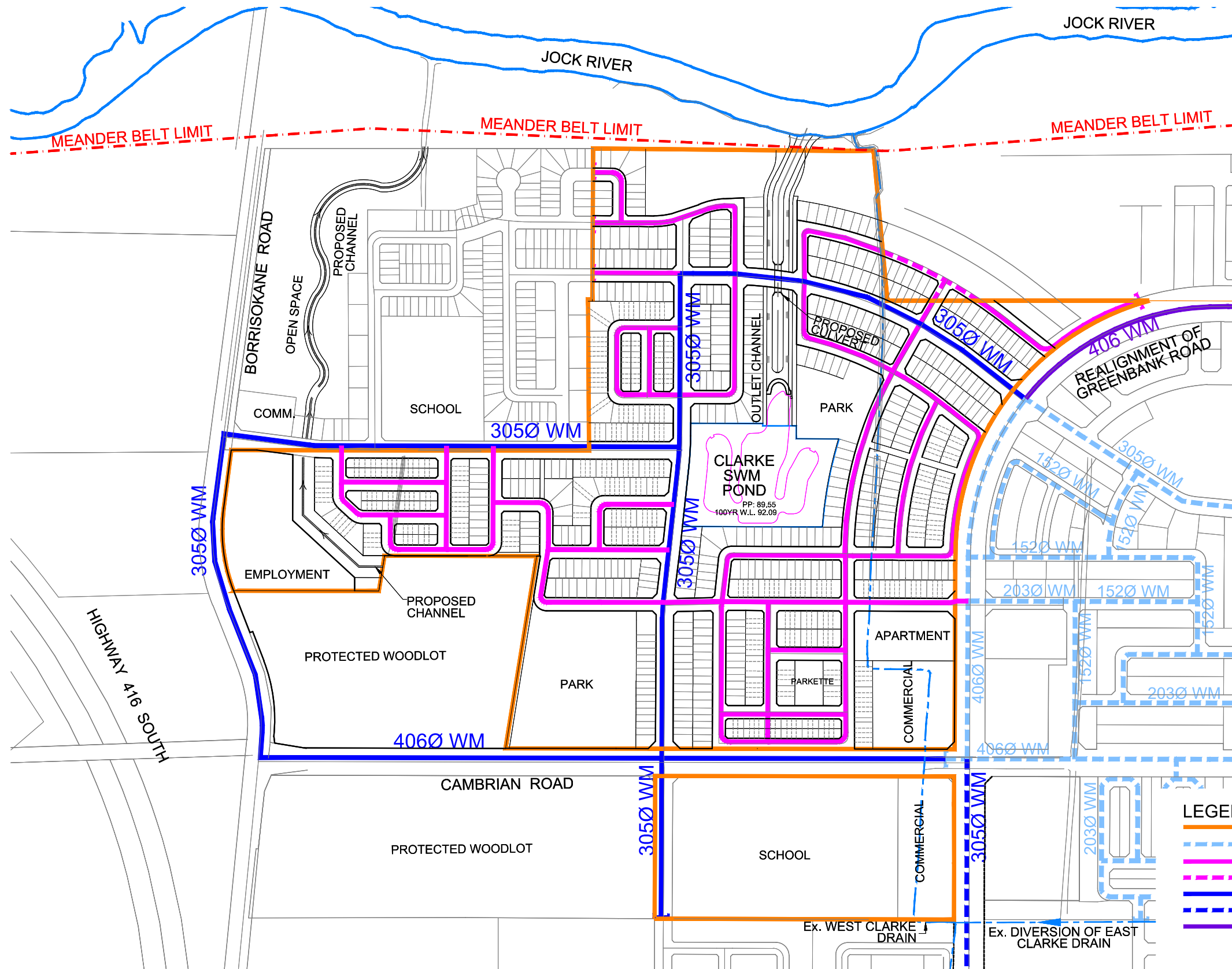
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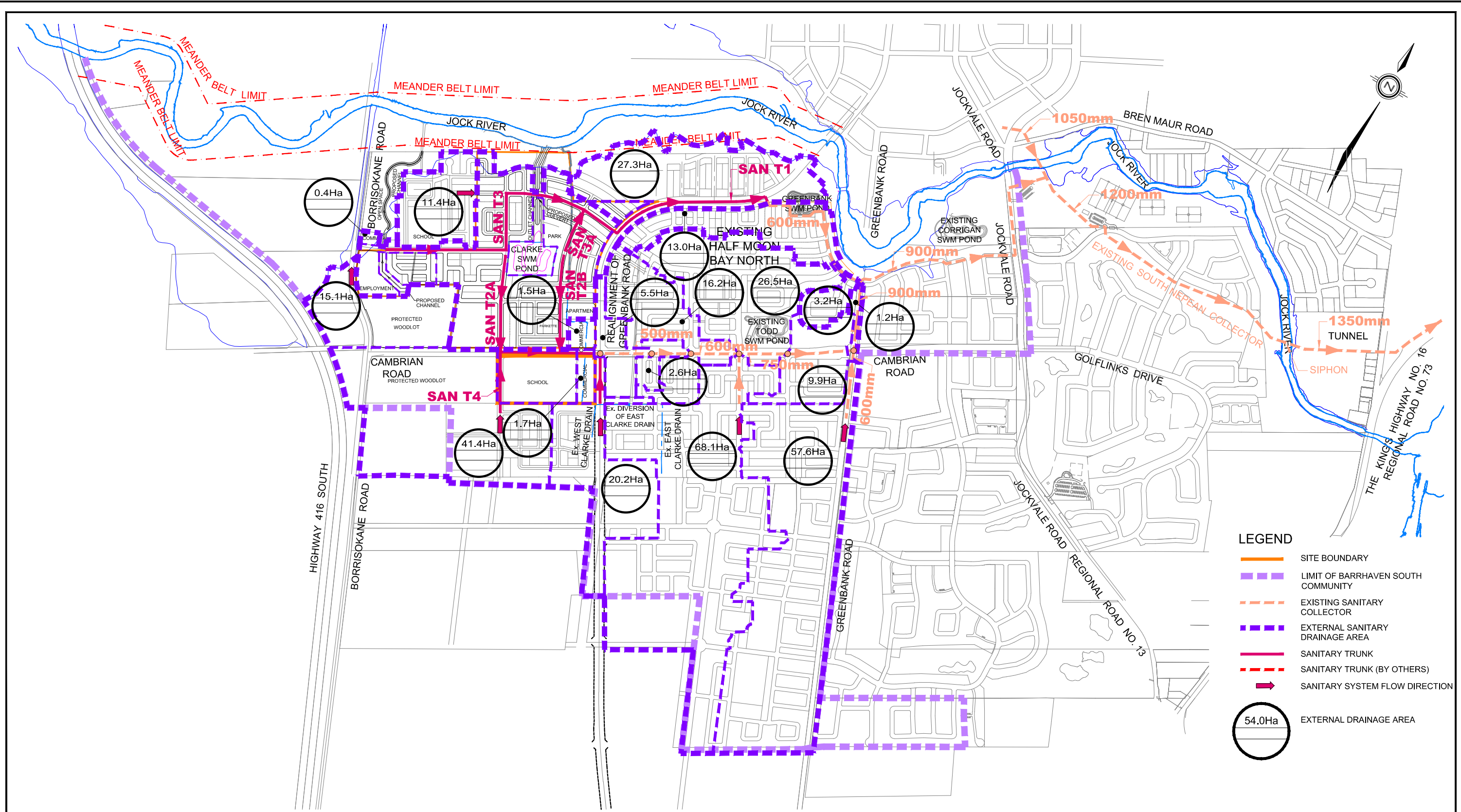
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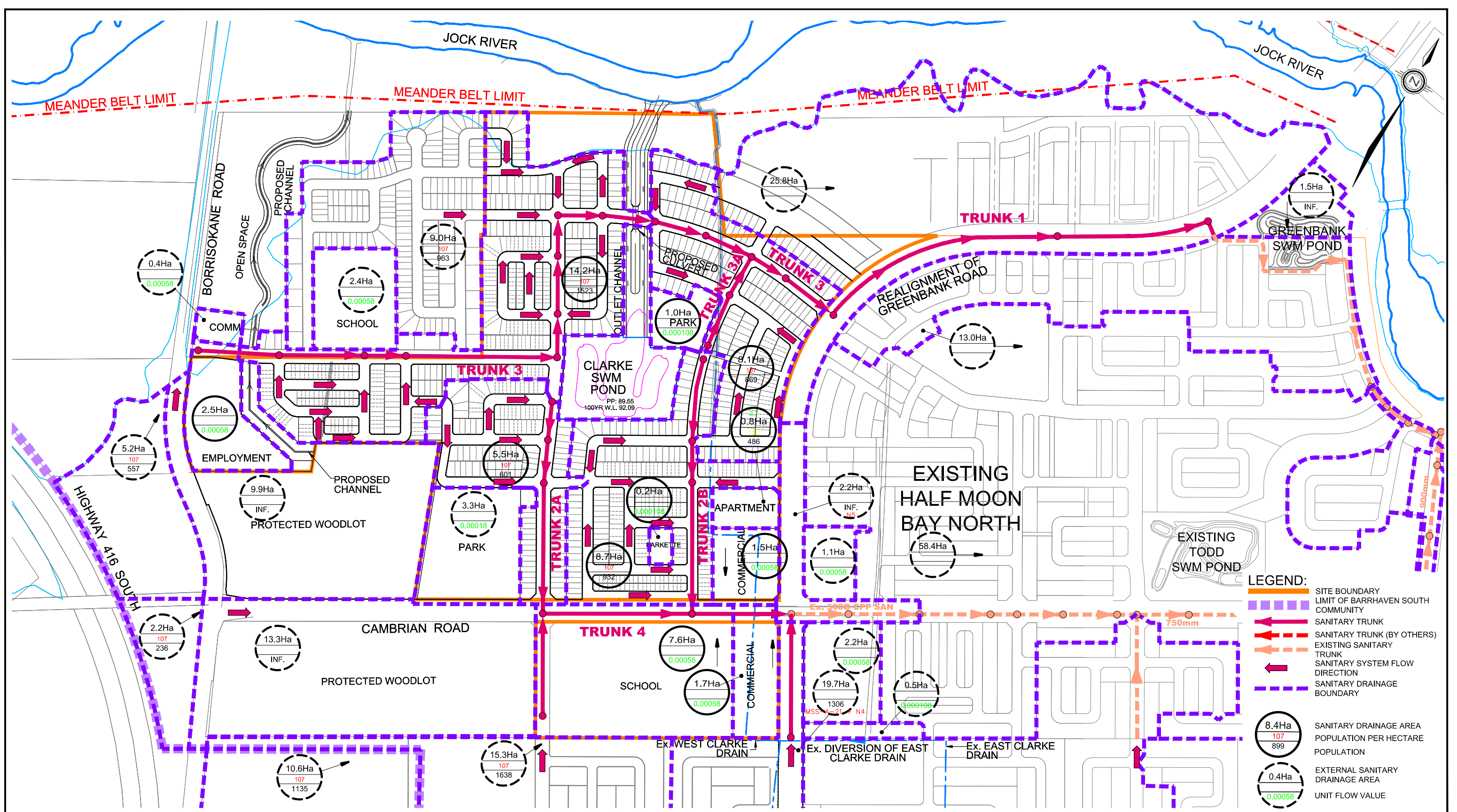


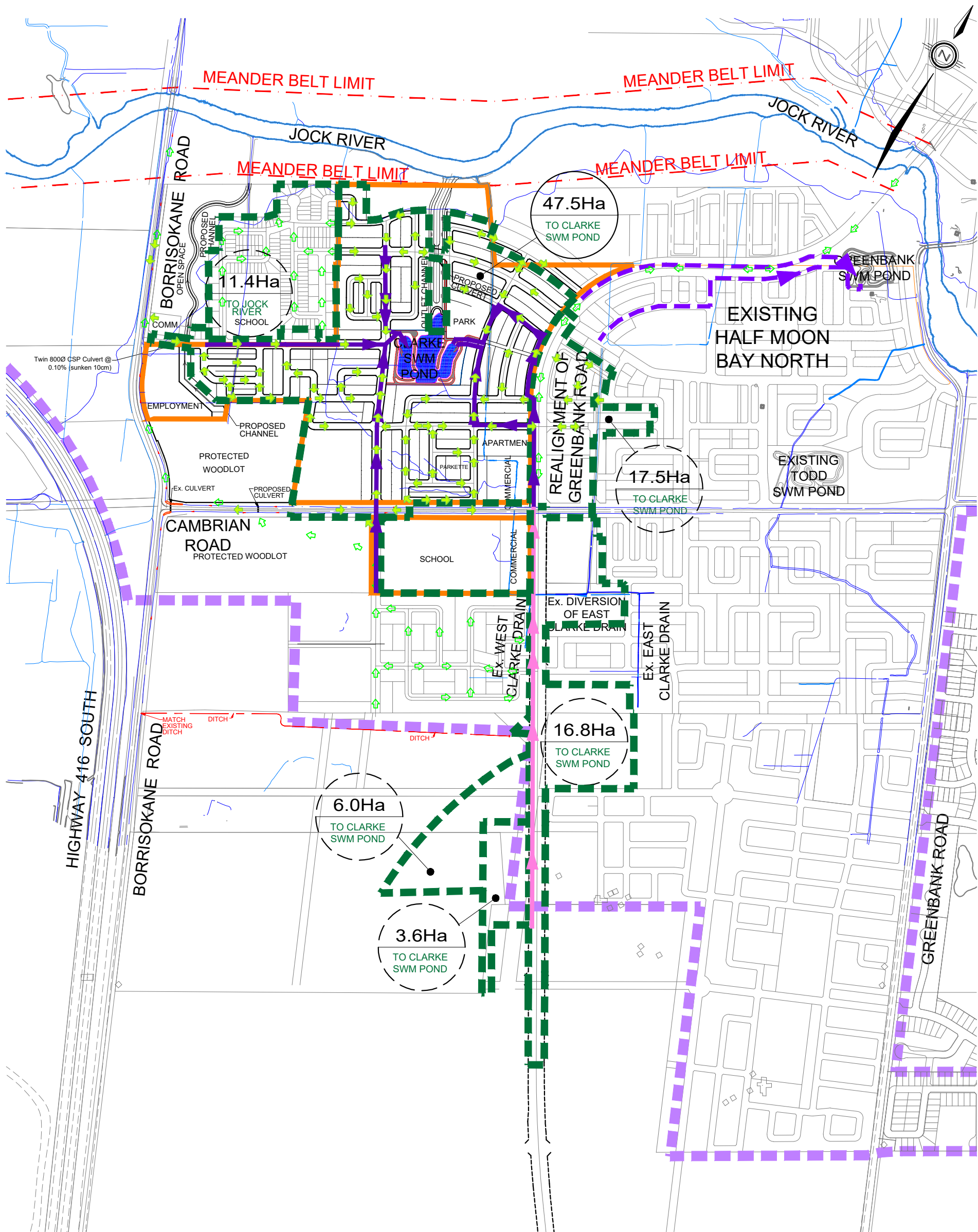
LEGEND
SITE BOUNDARY











LEGEND

- SITE BOUNDARY
- LIMIT OF BARRHAVEN SOUTH COMMUNITY
- STORM TRUNK
- STORM TRUNK (BY OTHERS)
- DRAINAGE AREA BOUNDARY
- 100 YEAR FLOOD LINE



EXTERNAL STORM OVERLAND FLOW ARROW



STORM OVERLAND FLOW ARROW



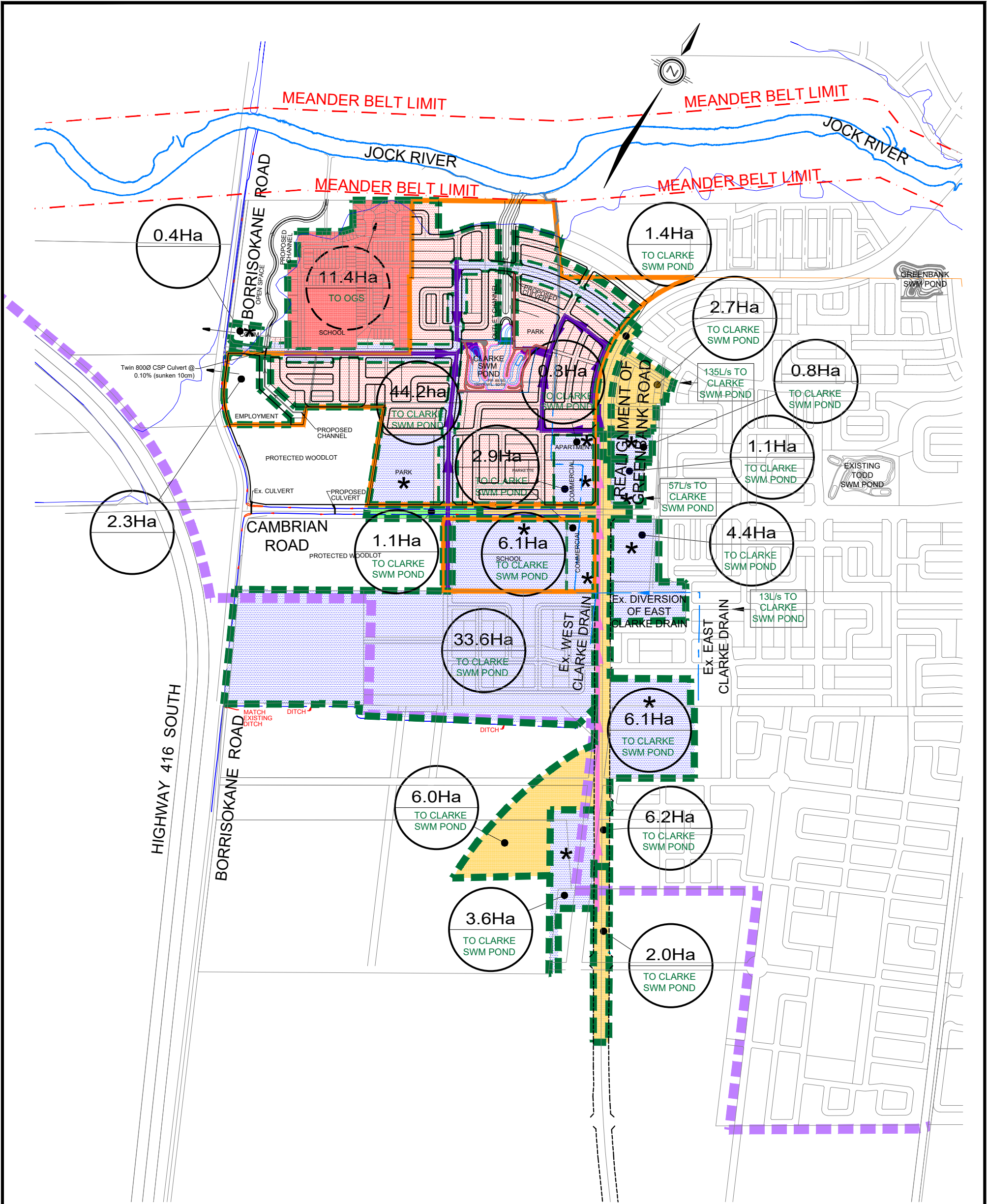
DRAINAGE AREA

DRAINAGE AREA DESTINATION



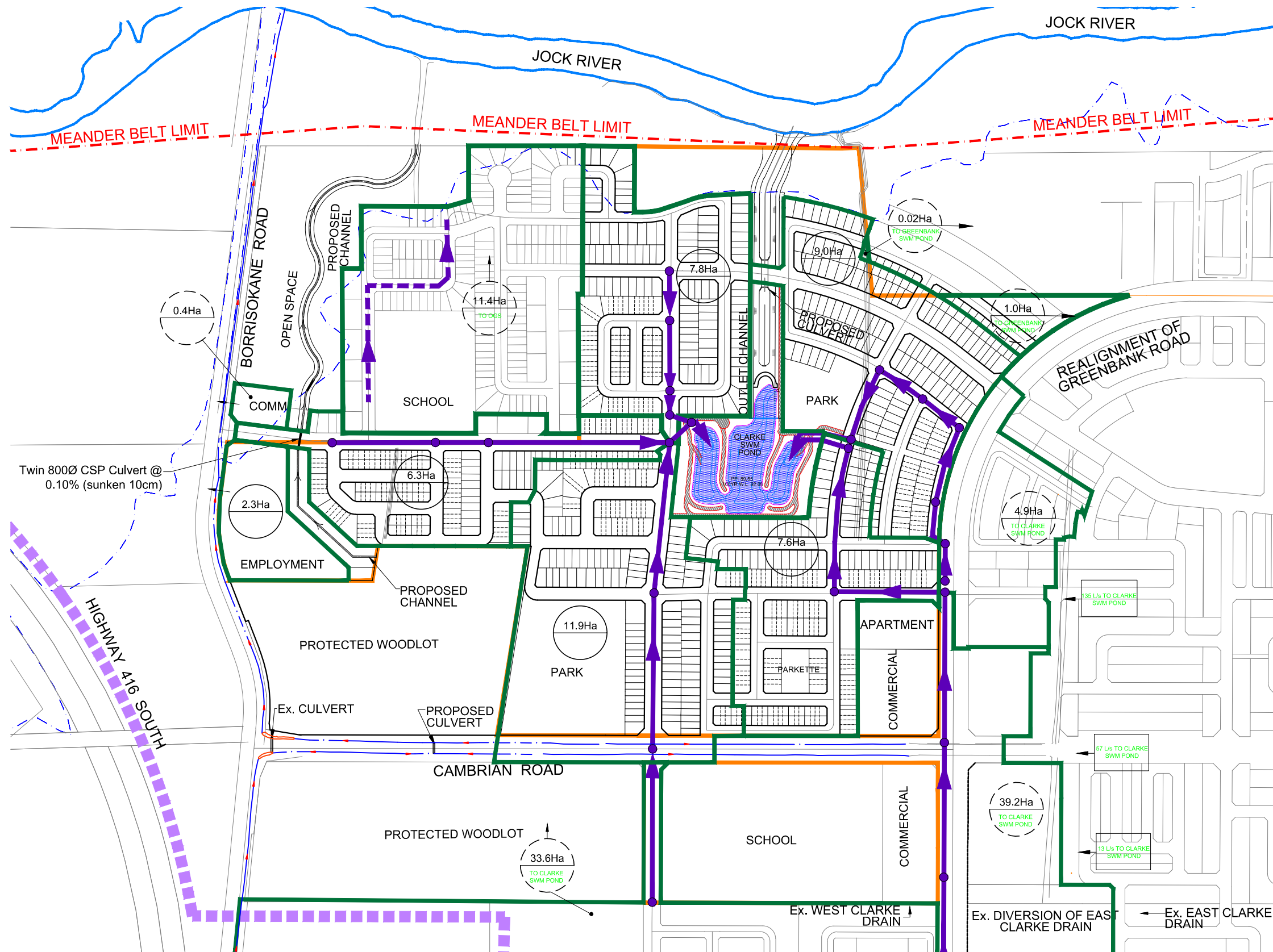
EXTERNAL DRAINAGE AREA

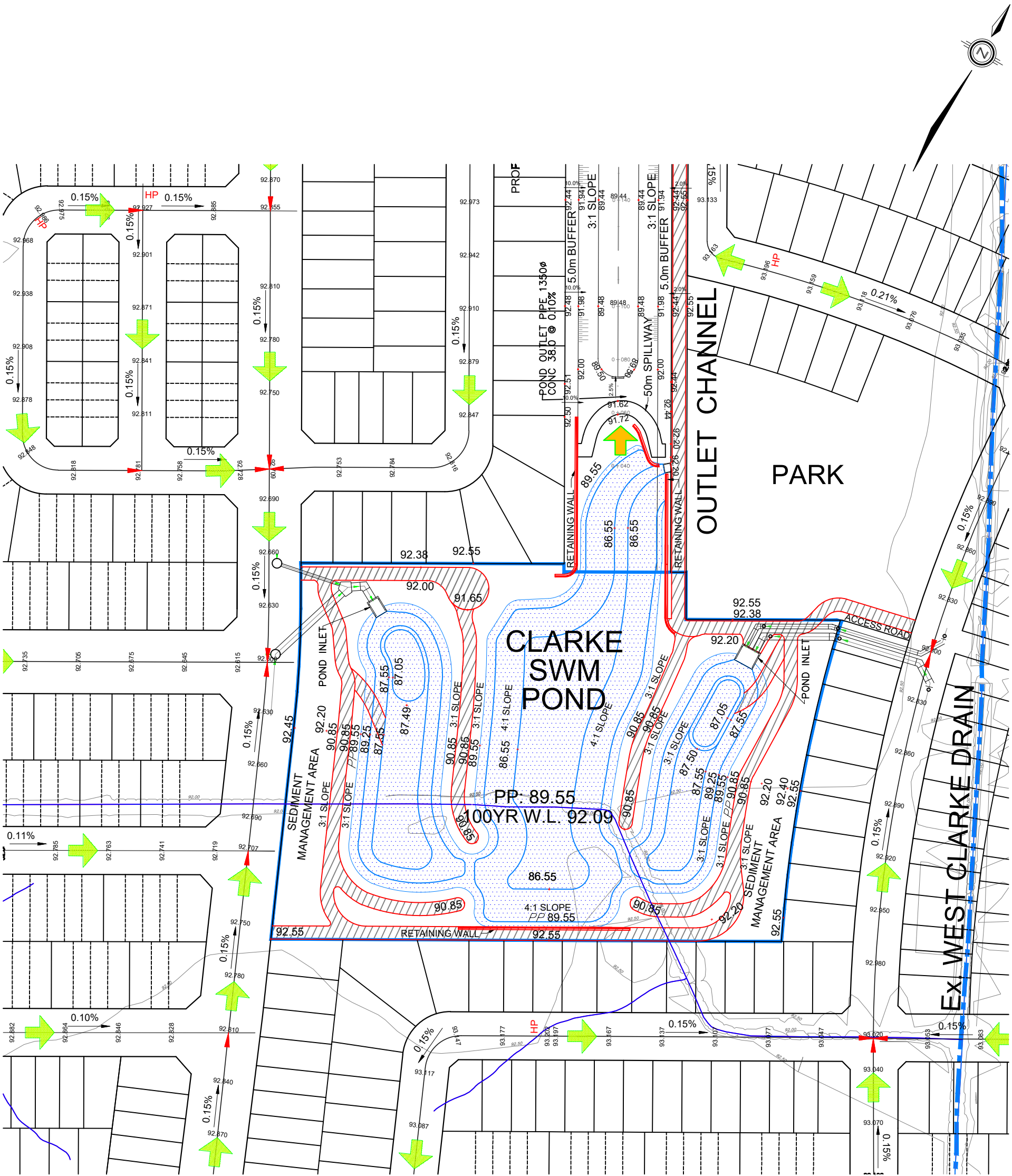
EXTERNAL DRAINAGE AREA DESTINATION



LEGEND

- | | | | | | |
|--|------------------------------------|--|-------------------------|--|-----------------------|
| | SITE BOUNDARY | | 2 YEAR CAPTURE AREA | | 100 YEAR CAPTURE AREA |
| | LIMIT OF BARRHAVEN SOUTH COMMUNITY | | 5 YEAR CAPTURE AREA | | |
| | STORM TRUNK | | 10 YEAR CAPTURE AREA | | |
| | STORM TRUNK BY OTHERS | | | | |
| | 100 YEAR FLOOD LINE | | | | |
| | DRAINAGE AREA BOUNDARY | | ONSITE 100 YEAR CONTROL | | |
| | 5.0Ha
TO CLARKE SWM POND | | | | |
| | 7.0Ha
TO CLARKE SWM POND | | | | |
| | DRAINAGE AREA | | | | |
| | DRAINAGE AREA DESTINATION | | | | |
| | EXTERNAL DRAINAGE AREA | | | | |
| | EXTERNAL DRAINAGE AREA DESTINATION | | | | |





LEGEND



STORM OVERLAND
FLOW ARROW



EMERGENCY STORM
OVERLAND FLOW ARROW

192.85

PROPOSED CENTERLINE
ELEVATION

193.50

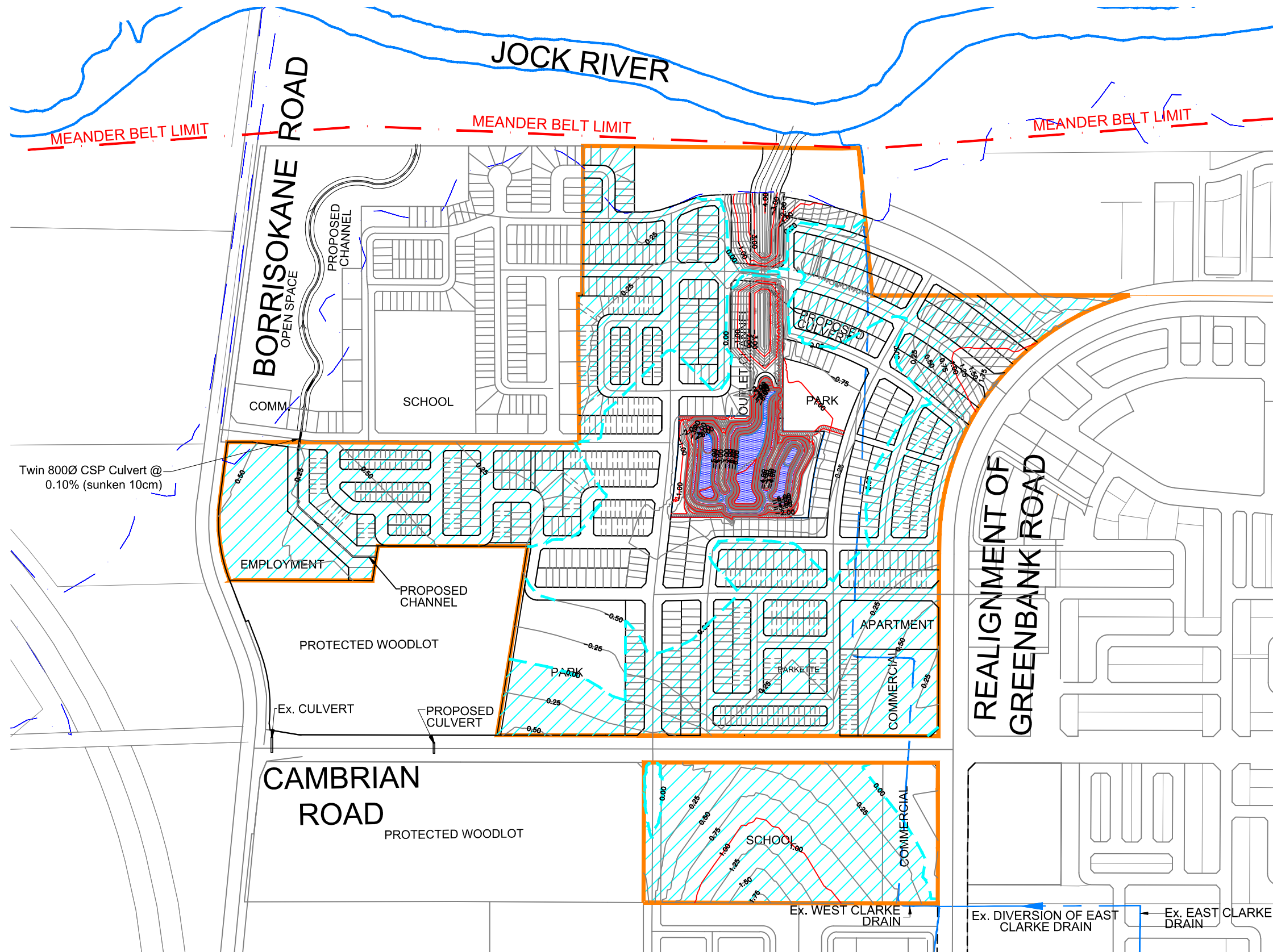
PROPOSED ELEVATION

193.50

EXISTING ELEVATION

244.50

EXISTING CONTOUR
ELEVATION



LEGEND:

- SITE BOUNDARY
- AREA EXCEEDING MAX GRADE RAISE (AS PER GEOTECHNICAL REPORT: PG2246-1 REV 5, PREPARED BY PATERSON GROUP INC, DATED NOVEMBER 12, 2018)

APPENDIX A

PRE-CONSULTATION

Jennifer Ailey

From: Xu, Lily <Lily.Xu@ottawa.ca> on behalf of Xu, Lily
Sent: Tuesday, January 27, 2015 4:19 PM
To: Kevin Murphy; 'Gordon Frenke'
Cc: 'Jocelyn Chandler'; Richardson, Mark; Rehman, Sami; Shillington, Jeffrey; Carter, Riley; Young, Mark; Xu, Lily; Krabicka, Jeannette; Jennifer Ailey; Paul Hicks
Subject: HMB West - precon follow-up
Attachments: DC1A04F05MFD20150113094536.pdf; DC1A04F05MFD20150122144353.pdf; HMB west - pre-con 2- Applicant's Study and Plan Identification List.pdf

Hi Kevin,

This is a follow-up of our Pre-Application Consultation meeting dated January 20, 2015 for the Half Moon Bay (HMB) West subdivision and rezoning. The attached "Applicant's Study and Plan Identification List" identifies the number of copies required for each report and plan in order to deem the application complete. PDF files are needed for all required reports and plans. Guidance on preparing studies and plans can be found [online](#).

Further, please note Staff's preliminary comments:

General

- Trail Waste Facility: Please be aware of the Barrhaven South CDP section 7.7 Regarding the Trail Waste Facility and land use restrictions and warning clauses regarding lands within 500 metres and 1000 metres respectively. A map is attached here to show the influence areas within 500 and 1000 metres.
- [Planning Rationale](#): please ensure to address all applicable policies and guidelines in the OP, CDP, Greenfield guidelines, as well as the community core framework document.
- School Block: Please ensure to obtain the consensus from the school board end user (OCDSB) on the relocation.
- Concept plan: shall also demonstrate pedestrian connections including all sidewalks and pathway linkages.

RVCA

- Please provide site specific floodplain elevation plotting.
- The Clark pond outlet (40 m) shall be shown as a separate block from the recreational pathway (6 m) on the draft subdivision plan.
- A Headwater Assessment must be provided and accepted by RVCA prior to draft approval.
- Please ensure to obtain necessary permits (including those expired) from RVCA prior to any works.

Transportation

- Note that the planned interchange would be at Barnsdale (MTO won't allow interchange at Cambrian) and that it is not included in the latest TMP so there is no timeline
- Please be aware of CDP Section 7.9 regarding interim Transit Service and 7.4 regarding transportation improvement for phase 3.
- Please ensure the transportation consultant will contact Riley Carter, Transportation Project Manager, at Riley.Carter@ottawa.ca or at 613-580-2424 ext. 14304, prior to the preparation of the TIS. Riley will be reviewing the Noise Brief as well.

Environment and Woodlot

- WMP: Mark Richardson, Forester, commented that the recommendation of the Woodland Management Plan (WMP) is yet to be finalized.
- Please ensure there will be zero overland flow through the woodland.

- EIS: Please ensure the EIS will address the MSS, CDP, Subwatershed Study, and the WMP. The EIS shall recommend trails in the woodlots and further address potential impact of the trails. The EIS may incorporate the Tree Conservation Report and the Headwater Assessment. For clarifications on the EIS please contact Sami Rehman, Environmental Planner at Sami.Rehman@ottawa.ca or at 613-580-2424 ext. 13364.

Parkland

- Neighbourhood park (Park 2) shall not be located adjacent to Cambrian Road.
- Suggest locating a Neighbourhood park next to Woodlot 1 to provide woodlot access and transition from active recreation to passive recreation.
- Typically, a total of 968 units will generate 3.23 ha of parkland requirement. Jeannette Krabicka, Park Planner, will compile the information of parkland in the Meadows and confirm on the parkland dedication later.

Layout and Design

- Suggest the following key principles when planning the layout:
 - o extend River Run as a collector connecting to the employment block and Cedarview;
 - o locate main parks at intersections to create sightlines and public views;
 - o locate higher density units surrounding the transit station and commercial block, where soil condition supports:
 - o consider a parkette in the high density area near the commercial block;
 - o maintain a single-loaded road north of Woodlot 1 to accommodate public accesses into the woodlot.
- The attached sketch is prepared to demonstrate the above suggestions. Feel free to contact Mark Young, Urban Designer, at Mark.Young@ottawa.ca or at 613-580-2424 ext. 41396 to discuss design considerations

Hope this helps. Please feel free to let me know if there are any questions.

Regards,

Lily Xu, MPL, MCIP, RPP, LEED Green Assoc.

Planner II, Suburban Services

Urbaniste II, Services suburbains



City of Ottawa | Ville d'Ottawa

110 Laurier Avenue West. Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1

tel/tél: 613.580.2424 ext./poste **27505**, fax/téléc: 613-580-2576, email/courriel: Lily.Xu@ottawa.ca

ottawa.ca/planning/ / ottawa.ca/urbanisme

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Metres

APPENDIX B

JOCK RIVER FLOODPLAIN MAPPING EXISTING APPROVALS

including communications necessary for that purpose, with regards to litigation with the Ottawa Lynx.

CARRIED

IN CAMERA SESSION

IN COUNCIL

Motion to Adopt Reports

MOTION NO. 23/9

Moved by Councillor G. Brooks
Seconded by Councillor D. Holmes

That Agriculture and Rural Affairs Committee Report 12, Community and Protective Services Committee Report 14 and 15 (*In Camera*), Corporate Services and Economic Development Committee Report 15, Planning and Environment Committee Report 16A, Transportation Committee Report 10 and the report from Deputy City Manager, Public Works and Services entitled "Director, Solid Waste Services - *In Camera* - Personal Matters About An Identifiable Individual Including Employees be received and adopted as amended.

CARRIED

By-laws

Three Readings

MOTION NO. 23/10

Moved by Councillor G. Brooks
Seconded by Councillor D. Holmes

That the following by-laws be enacted and passed:

2007- 411 A by-law of the City of Ottawa to authorize participation of the Ottawa Fire Service in the Province of Ontario's Mutual Aid Plan and Program.

2007- 412 A by-law of the City of Ottawa to provide for the abandonment of drainage easements in the City of Ottawa - Todd Municipal Drain and its three branches.

- 2007- 413 A by-law of the City of Ottawa to provide for the abandonment of drainage works in the City of Ottawa - West Clarke Municipal Drain between Station 8-58 and Station 52-19.
- 2007- 414 A by-law of the City of Ottawa to provide for the abandonment of drainage works in the City of Ottawa - East Clarke Municipal Drain between Station 14-31 and Station 57-47.
- 2007- 415 A by-law of the City of Ottawa to provide for the abandonment of drainage works in the City of Ottawa - Fraser Clarke Municipal Drain between Station 1-00 and Station 66-50.
- 2007- 416 A by-law of the City of Ottawa to stop up and close part of Innes Road adjacent to 4275-4279 Innes Road.
- 2007- 417 A by-law of the City of Ottawa to stop up and close part of Innes Road adjacent to 3843 Innes Road.
- 2007- 418 A by-law of the City of Ottawa to designate certain lands at 314 Central Park Drive, as being exempt from Part Lot Control.
- 2007- 419 A by-law of the City of Ottawa to designate certain lands at 3584 Jockvale Road, as being exempt from Part Lot Control.
- 2007- 420 A by-law of the City of Ottawa to designate certain lands at 582 Moodie Drive, as being exempt from Part Lot Control.
- 2007- 421 A by-law of the City of Ottawa to designate certain lands at 91 - 200 Bridgestone Drive and 199 - 319 Waymark Crescent, as being exempt from Part Lot Control.
- 2007- 422 A by-law of the City of Ottawa to amend By-law No. 2006-300 in respect of the administrative wording regarding fees and charges for solid waste services.
- 2007- 423 A by-law of the City of Ottawa to amend By-law No. 2003-230 of the City of Ottawa to change the zoning for part of the property known municipally as 2368 9th Line Road.
- 2007- 424 A by-law of the City of Ottawa to amend By-law Number 138-93 of the former City of Kanata to change the zoning for the property known municipally as 20 Frank Neighbor Place.
- 2007- 425 A by-law of the City of Ottawa to amend By-law No. 266 of 1981 of the

**LETTER OF PERMISSION – ONTARIO REGULATION 174/06,
SECTION 28 CONSERVATION AUTHORITIES ACT 1990, AS AMENDED.**

Date: July 7, 2016.
File: RV5-23/16T
Contact: Hal Stimson
(613) 692-3571 ext: 1127
hal.stimson@rvca.ca

Mr. Rob Pierce
c/o Mattamy (Half Moon Bay) Ltd.
50 Hines Rd Suite 100
Kanata, Ontario
K2K 2M5

Permit to alter a waterway under Section 28 of the Conservation Authorities Act for Alteration to Waterway at Lots 10 to 12, Concession 3 former City of Nepean now in the City of Ottawa.

Dear Mr. Pierce

The Rideau Valley Conservation Authority has reviewed your application and understands the proposal to be for: the establishment of a temporary drainage system to divert flows during construction and consisting of a temporary sediment pond which outlets to the West Clarke Drain and the diversion of the West Clarke drain including the installation of temporary road crossing culverts. The road culverts replacements on Cambrian Road must be completed only with the appropriate authorisation of the City of Ottawa.

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. 1, for Project 12-7614 titled Erosion Control Plan Half Moon Bay West dated 16-05-06, revision # 5 as prepared by DSEL and stamped by J. Ailey, P. Eng.
 - Drawing Sheet No. 2, for Project 12-7614 titled Siltation Control Plan Details Half Moon Bay West dated 16-05-06, revision # 5 as prepared by DSEL and stamped by J. Ailey, P. Eng.
 - Figure 1 for Project No. 12-614 titled Half Moon Bay West Site Location Plan dated Sept. 2014 as prepared by DSEL.
 - Figure 2 for Project No. 12-614 titled Half Moon Bay West Key Plan dated May 2016 as prepared by DSEL.
 - Figure 3 for Project No. 12-614 titled Half Moon Bay West Clarke Drain Tributary Drainage Area dated May 2016 as prepared by DSEL.
 - Letter dated May 31, 2016 from J. Ailey, P. Eng. to H. Stimson RVCA describing the proposed project.

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

2. The work must ensure adequate drainage outlet for any upstream properties is maintained at all times in order to ensure no upstream flooding shall occur.
3. The proposed road culvert replacements on Cambrian Road must be completed only with the appropriate authorisation of the City of Ottawa.
4. 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. Only clean non-contaminated fill material will be used and all work is to occur on your property, or if on other property only with full authorization of the owner(s).
5. **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.**
6. 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.
7. Work 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 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.
8. 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.

9. 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.
10. 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. Soil type, slope of land, drainage area, weather, predicted sediment load and deposition should be considered when selecting the type of sediment/erosion control.
11. 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.
12. The waters of the drain 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
13. All disturbed soil areas must be appropriately stabilized to prevent erosion.
14. 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.
15. 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.
16. 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.

17. A new application must be submitted should any work as specified in this letter be ongoing or planned for or after July 7, 2018.
18. That the Authority be given twenty-four hours notice prior to the start of construction and within twenty-four hours of project completion.
19. 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, the Fisheries Act and any stormwater or site plan approvals.

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.



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

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: _____ (print)

Signed: _____ Date: _____

**LETTER OF PERMISSION - ONTARIO REGULATION 174/06,
SECTION 28 CONSERVATION AUTHORITIES ACT 1990, AS AMENDED.**

Date March 15, 2018
File: RV5-01/18
Contact: Hal Stimson
(613) 692-3571 ext. 1127
hal.stimson@rvca.ca

Mr. Jason Rumer
Mattamy (Half Moon Bay) Ltd
50 Hines Road, Suite 100
Ottawa, Ontario
K2K 2M5

Permit to alter a waterway under Section 28 of the Conservation Authorities Act for stormwater outlet at Lot 11-13 Concession 3, former City of Nepean, and now in the City of Ottawa

Dear Mr. Jason Rumer

The Rideau Valley Conservation Authority has reviewed your application on behalf of Mattamy Ltd. and understands the proposal to be for the construction of an outlet channel for a proposed storm water management facility which will outlet/connect the proposed Clarke Storm Water Management Pond to the Jock River

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 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 drawings including:

- Drawing Nos. P2, P4, P7, P8, (4 sheets) for Project No. 16-888 titled Half Moon Bay West Clarke SWM Pond, all revision No. 4, dated 17-12-07 as prepared by DSEL Engineering Ltd. and stamped by W. Liu, P. Eng.
- Drawing Nos. GEO-1, GEO-2, DET-1, DET-2 (4 sheets) for Project No. 17125 titled Half Moon Bay West Mattamy Homes, all revision No. 1, dated Dec 17 as prepared by GEOMorphix and stamped by Paul V. Villard, P. Geo.
- Drawing Sheet L0, L1, L2 (3 sheets) for Job No. 18-012 titled Mattamy Homes Clarke Pond Half Moon Bay West, all revision No. 1, dated Jan. 15/18 as prepared by NAK Design Strategies and stamped by Silvano Tardella, L.A.
- Report titled Design Brief for the Clarke Stormwater Management Pond for the Half Moon Bay West Subdivision Davidson Lands by DSEL Project No. 16-888 dated Revised October 19, 2017.
- Report titled Technical Design Brief: Clarke SWM Pond Outlet Channel and Spillway Design by Geomorphix, dated December 1, 2017.

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

2. **A De-watering Plan and Sediment and Erosion Control Plan must be submitted to this office by the contractor for review prior to construction activities.**
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. It is recommended that you retain the services of a professional engineer to conduct on-site inspections to ensure adequacy of the work, verify stability of the final grade and slopes and confirm all imported fill is of suitable type and has been adequately placed and compacted.
5. **There will be no in-water works between March 15 and June 30, of any given year to protect local aquatic species populations during their spawning and nursery time periods.**
6. 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.
7. 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.
8. 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.
9. 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.

10. 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. Soil type, slope of land, drainage area, weather, predicted sediment load and deposition should be considered when selecting the type of sediment/erosion control.
11. 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. 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.
12. The waters of the creek/drain 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.
13. Demolition or construction debris is not to be deposited in the waters of any creek; inert concrete/asphalt debris will be considered a deleterious substance. An emergency spill kit should be kept on site in case of fluid leaks or spills from machinery.
14. All disturbed soil areas must be appropriately stabilized to prevent erosion.
15. Only clean material free from particulate matter may be placed in the water.
16. Develop a response plan that is to be implemented immediately in the event of 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.
17. The RVCA is to receive 48 hours' notice of the proposed commencement of the works to ensure compliance with all conditions. 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.
18. A new application must be submitted should any work as specified in this letter be ongoing or planned for or after March 15, 2020.

19. 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 Drainage Act, the Endangered Species Act, the Ontario Water Resources Act, Environmental Protection Act, Public Lands Act, or 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.



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

c.c: 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: _____ (print)

Signed: _____ Date: _____



02 18 3604 50114

MAP No. 2
CARTE No.

RIDEAU VALLEY CONSERVATION
AUTHORITY

OFFICE DE PROTECTION DE LA
NATURE DE LA VALLEE RIDEAU

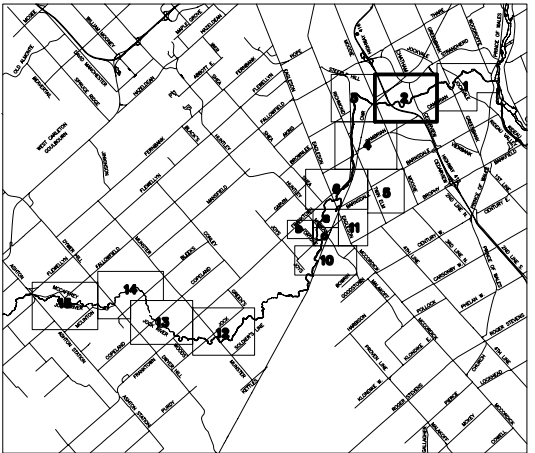
FLOOD RISK MAP JOCK RIVER CARTE DU RISQUE D'INONDATION

LÉGENDE

LEGENDE

Aerial Cableway	Telepherique	Rollroad	Chemin de fer
Boundary	Frontiere	Single Track	Voie Unique
International	Internationale	Abandoned	Desaffecte
Interprovincial	de provinces	Turnable	Plaque Tourante
District/Township	Limite de district, de comte, de Reserve Indienne	Rapids	Rapides
Approximate	Approximatif	Double line river with multiple rapids	Riviere a ligne double avec plusieurs chutes
Approximate	Approximatif	Double line river with multiple rapids	Riviere a ligne double avec plusieurs chutes
Annotation	Annotation	Reservoir	Reservoir
Park Boundary	Limite de parc	River, Stream, Canal	Fleuve, Riviere, Canal
Bridge	Pont	Approximatif	Approximatif
Road, Railroad	de route, de chemin, de fer	Second	Second
Foot Bridge	Ponton	Direction of Flow	Direction du courant
Building	Batiment	Road	Route
Chimney	Chimnee	Hwy, County, Township	Chemin de Comte Canton
Cliff, Pit, Pile	Falaise, Gravier ou Sablere, Pile	Access (road of doubtful maintenance or significant driveway)	Chemin d'acces (entretien douteux ou entree privee)
Contours	Courbes de niveau	Tail, Bush, Road (outcrop, way)	Serpier, Chemin de Bois (sortie, route)
Intermediate	Intermediaires	Rock	Roche
Auxiliary	Auxiliaires	Significant	Significatif
Indefinite	Approximatives	Shoal	Banc
Depression	Courbes de cuvettes	Spot Deviation (old elevations)	Point Cote (elevation du plan d'eau)
Control Points	Points de controle	Tower	Tour
Horizontal	Horizontal	Transmission Line	Ligne de transport d'energie
Vertical	Vertical	Pole	Poteau
Culvert	Passeoie	Pylon	Pylone
Dam	Barrage	Tunnel	Tunnel
Ditch	Fosse	Utility Pole	Poteau Cable, Beam, Joist
Dyke	Digue	Wooded Area	Region Boisee
Falls	Chutes	Groyne	Gpi
Double line river	Riviere a ligne double	FLOOD PLAIN INFORMATION	RENSEIGNEMENTS DES PLAINES INONDABLES
Fence, Hedge, Wall	Cloiture, Haie, Mur	Regulatory floodline	La crue reglementaire
Feature Outline (construction features etc.)	Limites (en construction, etc.)	Flood Line	Ligne de remblai
Flooded Land	Region Inondee		
Lake, Pond	Lac, Bassin		
Lock	Ecluse		
Marsh or Swamp	Marais ou Maroche		
Mast	Mât		
Pipeline (above ground)	Pipe-Line (au dessus de la terre)		

SHEET INDEX TABLEAU D'ASSEMBLAGE



Reformatted July 21, 2005
Based on original mylar
dated May 31, 2005

15

1:5000 Map Sheet

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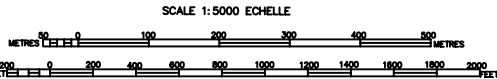
1:2000 Map Sheet

CONTOUR INTERVAL 1.0 METRE
WITH 0.5 METRE AUXILIARY CONTOUR
NORTH AMERICAN DATUM 1983

EQUIDISTANCE DES COURBES DE NIVEAU 1.0 METRE
AVEC COURBES DE NIVEAU AUXILIERE DE 0.5 METRE
SYSTEME DE REFERENCE GEODESIQUE NORD-AMERIQUE 1983

COMPILATION NOTE:
Production technique used in the preparation of this map are
designed for Class "A" standards.

PHOTOGRAMMETRY:
Les normes de production de cette carte se conforment aux
standards de premiere classe.



GENERAL INFORMATION:
Vertical datum
Horizontal datum
Map Projection
Central Meridian
Grid Spacing
Aerial Photography

RESEIGNEMENTS GENERAUX:
Niveau de reference
Système geodesique
Projection
Meridian central
Quadrillage de
Photographies aeriennes

Ottawa



Responsible for provision
of topographic mapping

Responsible for flood plain
delineation and hydrotechnical
analysis

02 18 3604 50114

ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER 2725-B5VKYF

Issue Date: October 30, 2018

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

Site Location: Half Moon Bay West – Phase 1
Lots 10-12, 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:

the establishment of wastewater infrastructure Works located in the City of Ottawa, consisting of the following:

- **storm sewers** on rue Apolune Street (from Station 0-021.13 to Station 0+466.68), croissant Aphelion Crescent (West Leg) (from Station 0-005.38 to Station 0+186.83), croissant Aphelion Crescent (South Leg) (from Station 0-005.74 to Station 0+171.59), croissant Aphelion Crescent (East Leg) (from Station 0-021.38 to Station 0+189.60), place Umbra Place (from Station 0+002.00 to Station 0+146.41), chemin Greenbank Road (from Station 4+976.10 to Station 5+387.68), cours Bellatrix Walk (from Station 0-001.99 to Station 0+175.00), voie Merak Way (from Station 0+002.00 to Station 0+104.49), voie Watercolours Way (from Station 0-011.89 to Station 0+386.39), bois Celestial Grove (from Station 0-001.99 to Station 0+235.66), terrasse Alcor Terrace (from Station 0-002.84 to Station 0+242.86), Cambrian Road (from Station 0+812.53 to Station 971.08), Stormwater Management Pond Inlet Headwall 2 and Servicing Block (from Station 0+000.00 to Station 0+221.12), and Stormwater Management Pond Inlet Headwall 1 (from Station 0-000.714 to Station 0+060.00), discharging to the Clarke Stormwater Management Pond, located in Half Moon Bay West;
- **sanitary sewers** on rue Apolune Street (from Station 0-004.67 to Station 0+356.20), croissant Aphelion Crescent (West Leg) (from Station 0-005.05 to Station 0+189.60), croissant Aphelion Crescent (South Leg) (from Station 0-005.74 to Station 0+171.59), croissant Aphelion Crescent (East Leg) (from Station 0-020.00 to Station 0+189.60), place Umbra Place (from Station 0+000.00 to Station 0+148.41), cours Bellatrix Walk (from Station 0+000.00 to Station 0+177.03), voie Merak Way (from Station 0+000.00 to Station 0+106.51), voie Watercolours Way (from Station 0-011.89 to Station 0+388.55), bois Celestial Grove (from Station 0+000.00 to Station 0+214.79), terrasse Alcor Terrace (from Station 0-000.57 to Station 0+242.86), and Cambrian Road (from Station 0+556.66 to Station 950.81), discharging to existing sanitary sewers, located on Cambrian Road;

- **temporary diversion ditch** in Half Moon Bay West – Phase 1, discharging to the Clarke Stormwater Management Pond located in Half Moon Bay West: Leg 1 – approximately 413.0 metres long at 0.32% average bottom slope, 3:1 side slopes, approximately 2.0 metres bottom width; Leg 2 – approximately 32.0 metres long at 0.79% average bottom slope, 2.5:1 side slopes, approximately 4.0 metres bottom width; Leg 3 – approximately 136.7 metres long at 1.80% average bottom slope, 3:1 side slopes, approximately 4.0 metres bottom width; and
- **temporary culvert** in Half Moon Bay West – Phase 1, 1600 millimetre diameter, approximately 39.0 metres long at 0.50% slope, discharging to the temporary diversion ditch and Clarke Stormwater Management Pond, located in Half Moon Bay West;

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 entire document and any schedules attached to it, and the application;
2. "Director" means a person appointed by the Minister pursuant to section 5 of the EPA for the purposes of Part II.1 of the EPA;
3. "District Manager" means the District Manager of the appropriate local District Office of the Ministry, where the Works are geographically located;
4. "EPA" means the *Environmental Protection Act*, R.S.O. 1990, c.E.19, as amended;
5. "Interim Works" means the interim Works, described in this Approval and that are to be used for short-term purposes only in accordance with this Approval, until otherwise approval for an extension of this period has been granted;
6. "Ministry" means the ministry of the government of Ontario responsible for the EPA and OWRA and includes all officials, employees or other persons acting on its behalf;
7. "Owner" means Mattamy (Half Moon Bay) Limited, and includes its successors and assignees;
8. "OWRA" means the Ontario Water Resources Act, R.S.O. 1990, c. O.40, as amended;
9. "Works" means the sewage Works described in the Owner's application, and 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 CONDITIONS

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.
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.
3. Where there is a conflict between a provision of any document in the schedule 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 documents in the schedule, the document bearing the most recent date shall prevail.
4. Where there is a conflict between the documents listed in Schedule "A" and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.
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.

2. EXPIRY OF APPROVAL

1. This Approval will cease to apply to those parts of the Works which have not been constructed within five (5) years of the date of this Approval.
2. In the event that completion and commissioning of any portion of the Works is anticipated to be delayed beyond the specified expiry period, the Owner shall submit an application of extension to the expiry period, at least twelve (12) months prior to the end of the period. The application for extension shall include the reason(s) for the delay, whether there is any design change(s) and a review of whether the standards applicable at the time of Approval of the Works are still applicable at the time of request for extension, to ensure the ongoing protection of the environment.
3. This Approval to the Interim Works shall expire and become null and void on October

26, 2023.

3. CHANGE OF OWNER

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; or
 - 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.
2. In the event of any change in ownership of the Works, other than a change to a successor municipality, the Owner shall notify in writing the succeeding owner of the existence of this Approval, and a copy of such notice shall be forwarded to the District Manager and the Director.
3. The Owner shall ensure that all communications made pursuant to this condition refer to the number at the top of this Approval.

4. OPERATION AND MAINTENANCE

1. If applicable, any proposed storm sewers or other stormwater conveyance in this Approval can be constructed but not operated until the proposed stormwater management facilities in this Approval or any other Approval that are designed to service the storm sewers or other stormwater conveyance are in operation.

Schedule "A"

1. Application for Environmental Compliance Approval, dated October 4, 2018, received on October 11, 2018, submitted by Mattamy (Half Moon Bay) Limited;
2. Transfer of Review Letter of Recommendation, dated October 9, 2018 and signed by Jeff Shillington, P.Eng., Project Manager, Development Review, Planning, Infrastructure and Economic Development Department, City of Ottawa;
 - a. Final Plans and Specifications prepared by David Schaeffer Engineering Ltd.
 - b. Pipe Data Form - Watermain, Storm Sewer, Sanitary Sewer, and Forcemain Design Supplement to Application for Approval for Water and Sewage Works.
 - c. Hydraulic Design Sheets prepared by David Schaeffer Engineering Ltd.
3. Emails dated October 24, 2018 and October 25, 2018 from Jeff Shillington, P.Eng., Project Manager, Development Review, Planning, Infrastructure and Economic Development Department, City of Ottawa to Florence Poon, MECP.

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

1. Condition 1 is imposed to ensure that the Works are constructed and operated in the manner in which they were described 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 the approved Works and to ensure that subsequent owners of the Works are made aware of the Approval and continue to operate the Works in compliance with it.
4. Condition 4 is included to prevent the operation of stormwater pipes and other conveyance until such time that their required associated stormwater management Works are also constructed.

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:

- a. 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;
- b. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

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

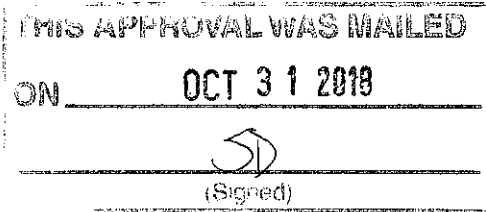
AND

The Director appointed for the purposes of
Part II.1 of the Environmental Protection Act
Ministry of the Environment,
Conservation and Parks
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 30th day of October, 2018



Christina Labarge, P.Eng.

Director

appointed for the purposes of Part II.1 of the
Environmental Protection Act

FP/

c: District Manager, MECP Ottawa

Clerk, City of Ottawa (File No. D07-16-16-0023)

Jeff Shillington, P.Eng., Project Manager, City of Ottawa

Peter McKay, Infrastructure Renewal Program Manager, Infrastructure Assessment - Water Resources, City of Ottawa

Jennifer Ailey, P.Eng., David Schaeffer Engineering Ltd. ✓

AMENDED ENVIRONMENTAL COMPLIANCE APPROVALNUMBER 6068-AWUPL5
Issue Date: April 11, 2018

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

Site Location: Half Moon Bay West – Clarke Stormwater Management Pond
Part of Lot 10, 11, 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:

An amendment to the interim stormwater management system with the replacement of the existing sediment control pond, temporary drainage swales and erosion and sediment control measures with the establishment of the proposed wet pond and outlet channel serving Half Moon Bay West, Half Moon Bay North, Meadows in Half Moon Bay and Half Moon Bay South in Barrhaven South, located in the vicinity of Cambrian Road, east of Borrisokane Road (formerly Cedarview Road), for the collection, transmission, treatment and disposal of stormwater run-off from a total catchment area of approximately 123.41 ha, within the Jock River watershed, in the City of Ottawa providing Enhanced Level water quality control, consisting of the following:

Proposed Works:

one (1) wet pond, located within the Half Moon Bay West lands, serving a total drainage area of 123.41 hectares and having a total length of 180 m and a total width of 160 m, consisting of:

- two (2) riprap-lined sediment forebays that have a minimum length-to-width ratio of 2:1, a depth of 2.0 m, and are separated from the main cell via a berm;
- a main cell that has a minimum permanent storage volume of 22400 m³, a minimum active storage volume of 6803 m³, a maximum permanent pool depth of 3.0 m and a maximum available depth of 5.543 m, including a freeboard of 0.3 m;

- an inlet structure consisting of a 3000 mm diameter storm inlet pipe and a concrete headwall;
- an inlet structure consisting of a 1800 mm diameter storm inlet pipe, a 2700 mm diameter storm inlet pipe and a concrete headwall;
- two (2) overland flow routes with 5 m bottom width and erosion control mat located on the east and west side of the pond;
- a low flow outlet structure comprised of a 1350 mm diameter storm outlet pipe equipped with a 250 mm diameter orifice plate and a 700 mm long weir, allowing a maximum discharge of 1389 L/s under the 100-year storm event to a proposed outlet channel and the Jock River located north of the pond;
- a high flow outlet structure consisting of a 50 m long broad crested weir, spillway and scour pool. Outlet structure to include toe wall and concrete block surface treatment. Designed to convey flows of 0.469 m³/s (2 year event) to 17.946 m³/s (100 year event) and to function as an emergency overflow.

AND

- **an outlet channel**, 340 m long, with 15.0 m bottom width, 0.1% longitudinal slope and 3:1 side slopes, complete with a 9000 mm x 2400 mm culvert crossing under Street 18.

Previous Works:

Interim West Clarke Drain realignment (catchment area approximately 109 hectares):

- construction of a new ditch to redirect the West Clarke Drain flows consisting of:
- a ditch approximately 1.0 m deep with a 4.0 m wide bottom and 3:1 side slopes, with approximately 595 m at a slope of 0.12% and approximately 572.5 m at a slope of 0.10%, designed to convey the 100-year flows of 4.62 m³/s and 4.85 m³/s respectively;

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 entire document and any schedules attached to it, and the application;

2. "*Director* " means a person appointed by the Minister pursuant to section 5 of the *EPA* for the purposes of Part II.1 of the *EPA* ;
3. "*District Manager* " means the District Manager of the appropriate local District Office of the *Ministry* , where the *Works* are geographically located;}
4. "*EPA* " means the *Environmental Protection Act*, R.S.O. 1990, c.E.19, as amended;
5. "*Equivalent* " means a substituted oil and grit separator that meets the required quality and performance standards of the approved oil and grit separator;
6. "*Interim Works* " means the interim stormwater management works, described in this *Approval* and that are to be used for short-term purposes only in accordance with this *Approval*, until otherwise approval for an extension of this period has been granted;
7. "*Ministry* " means the ministry of the government of Ontario responsible for the *EPA* and *OWRA* and includes all officials, employees or other persons acting on its behalf;
8. "*Owner* " means Mattamy (Half Moon Bay) Limited, and includes its successors and assignees;
9. "*OWRA* " means the *Ontario Water Resources Act*, R.S.O. 1990, c. O.40 , as amended;
10. "*Previous Works* " means those portions of the sewage Works previously approved under an *Approval*;
11. "*Proposed Works* " means the sewage works described in the *Owner's* application, this *Approval* , to the extent approved by this *Approval* ;
12. "*Works* " means the sewage Works described in the *Owner's* application, and this *Approval* , and includes *Proposed Works* and *Previous Work* .

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 CONDITIONS

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.

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* .
3. Where there is a conflict between a provision of any document in the schedule 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 documents in the schedule, the document bearing the most recent date shall prevail.
4. Where there is a conflict between the documents listed in Schedule "A" and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.
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.
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/MNR 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* .

2. EXPIRY OF APPROVAL

1. This *Approval* will cease to apply to those parts of the Work which have not been constructed within five (5) years of the date of this *Approval* .
2. In the event that completion and commissioning of any portion of the *Works* is anticipated to be delayed beyond the specified expiry period, the *Owner* shall submit an application of extension to the expiry period, at least twelve (12) months prior to the end of the period. The application for extension shall include the reason(s) for the delay, whether there is any design change(s) and a review of whether the standards applicable at the time of Approval of the *Works* are still applicable at the time of request for extension, to ensure the ongoing protection of the environment.
3. This Approval to the Interim Works shall become null and void on March 21, 2023.

3. CHANGE OF OWNER

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* ; or
 - 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* .
2. In the event of any change in ownership of the *Works* , other than a change to a successor municipality, the *Owner* shall notify in writing the succeeding owner of the existence of this *Approval* , and a copy of such notice shall be forwarded to the *District Manager* and the *Director* .
3. The *Owner* shall ensure that all communications made pursuant to this condition refer to the number at the top of this *Approval* .
4. Notwithstanding any other requirements in this *Approval* , upon transfer of the ownership or assumption of the *Works* to a municipality if applicable, any reference to the *District Manager* shall be replaced with the *Water Supervisor* .

4. OPERATION AND MAINTENANCE

1. If applicable, any proposed storm sewers or other stormwater conveyance in this *Approval* can be constructed but not operated until the proposed stormwater management facilities in this *Approval* or any other *Approval* that are designed to service the storm sewers or other stormwater conveyance are in operation.
2. The *Owner* shall make all necessary investigations, take all necessary steps and obtain all necessary approvals so as to ensure that the physical structure, siting and operations of the *Works* do not constitute a safety or health hazard to the general public.
3. The *Owner* shall inspect and ensure that the design minimum liquid retention volume is maintained in the *Works* at all times, except when maintenance is required.

4. The *Owner* shall undertake an inspection of the condition of the *Works* , at least once a year, and undertake any necessary cleaning and maintenance to ensure that sediment, debris and excessive decaying vegetation are removed from the *Works* to prevent the excessive build-up of sediment, oil/grit, debris and/or decaying vegetation, to avoid reduction of the capacity and/or permeability of the *Works* , as applicable. The *Owner* shall also regularly inspect and clean out the inlet to and outlet from the *Works* to ensure that these are not obstructed.
5. The *Owner* shall design, construct and operate the *Works* with the objective that the effluent from the *Works* is essentially free of floating and settleable solids and does not contain oil or any other substance in amounts sufficient to create a visible film, sheen, foam or discoloration on the receiving waters.
6. The *Owner* shall maintain a logbook to record the results of these inspections and any cleaning and maintenance operations undertaken, and shall keep the logbook at the *Owner's* administration office for inspection by the *Ministry* . The logbook 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 and method of clean-out of the *Works* .
7. The *Owner* shall prepare an operations manual prior to the commencement of operation of the *Works* that includes, but is not necessarily limited to, the following information:
 - a. operating and maintenance procedures for routine operation of the *Works* ;
 - b. inspection programs, including frequency of inspection, for the *Works* and the methods or tests employed to detect when maintenance is necessary;
 - c. repair and maintenance programs, including the frequency of repair and maintenance for the *Works* ;
 - d. contingency plans and procedures for dealing with potential spills and any other abnormal situations and for notifying the *District Manager* ; and
 - e. procedures for receiving, responding and recording public complaints, including recording any follow-up actions taken.
8. The *Owner* shall maintain the operations manual current and retain a copy at the location of the *Works* for the operational life of the *Works* . Upon request, the *Owner* shall make the manual available to *Ministry* staff.

5. TEMPORARY EROSION AND SEDIMENT CONTROL

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.
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.

6. MONITORING AND RECORDING

The *Owner* shall, upon commencement of operation of the *Works*, carry out the following monitoring program:

1. All samples and measurements taken for the purposes of this *Approval* are to be taken at a time and in a location characteristic of the quality and quantity of the effluent stream over the time period being monitored.
2. Samples shall be collected at the following sampling points, at the frequency specified, by means of the specified sample type and analyzed for each parameter listed and all results recorded, as outlined in Schedule "B".
3. 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; and
 - 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.

7. REPORTING

1. One (1) week prior to the start-up of the operation of the *Works* , the *Owner* shall notify the *District Manager* (in writing) of the pending start-up date.
2. The *Owner* shall, upon request, make all manuals, plans, records, data, procedures and supporting documentation available to *Ministry* staff.
3. The *Owner* shall prepare and submit a performance report to the *District Manager* on an annual basis, within ninety (90) days following the end of the period being reported upon. The first such report shall cover the first annual period following the commencement of operation of the *Works* and subsequent reports shall be submitted to cover successive annual periods following thereafter. The reports shall contain, but shall not be limited to, the following information:
 - a. a summary and interpretation of all monitoring data and an overview of the success and adequacy of the *Works* , including demonstration using the monitoring data that the appropriate level of quality control has been achieved;
 - b. a description of any operating problems encountered and corrective actions taken;
 - c. a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the *Works* , including an estimate of the quantity of any materials removed from the *Works* ;
 - d. a summary of the calibration and maintenance carried out on all monitoring equipment;
 - e. a summary of any complaints received during the reporting period and any steps taken to address the complaints;
 - f. a summary of all spill or abnormal discharge events; and
 - g. any other information the *District Manager* requires from time to time.

SCHEDULE "A"

1. Application for Approval of Sewage Works , dated November 2, 2012, submitted by Mark Parsons, President of Mattamy (Half Moon Bay) Limited, and supporting documentation;
2. Email from Jennifer Ailey of David Schaeffer Engineering Ltd. to the Ministry, dated February 1, 2013;
3. Application for Approval of Municipal and Private Sewage Works, dated December 4, 2013 and received on February 28, 2014, submitted by the City of Ottawa;
4. Copy of letter from Jennifer Ailey of David Schaeffer Engineering Ltd. to the City of Ottawa, dated February 24, 2013, and supporting documentation;
5. Erosion Control Plan, Sheet 1 and Siltation Control Plan Details, Sheet 2, dated January 20, 2014, prepared by David Schaeffer Engineering Ltd.;
6. E-mail from Jennifer Ailey of David Schaeffer Engineering Ltd. to the Ministry, dated May 30, 2014;
7. Application for Approval of Municipal and Private Sewage Works, dated June 7, 2016 and received on June 9, 2016, submitted by the Mattamy (Half Moon Bay) Limited;
8. Application for Environmental Compliance Approval, dated February 13, 2018, and received on February 15, 2018, including final plans and specifications prepared by David Schaeffer Engineering Ltd.;
9. Transfer of Review Letter of Recommendation, dated February 9, 2018 and signed by Charles Warnock, Program Manager, Development Review, City of Ottawa.
10. Emails from Jennifer Ailey, David Schaeffer Engineering Ltd., dated March 19, 2018 and Jeffrey Shillington, dated March 20, 2018 and March 21, 2018 responses to draft ECA sent by Ricki Allum, Ministry of the Environment and Climate Change dated March 16, 2018.

SCHEDULE "B"

Table 1: Effluent Monitoring

(Samples to be collected from the influent and effluent streams of the Half Moon Bay West - Clarke Stormwater Management Pond)

Sample Type	Grab
Frequency	Three (3) rainfall <i>Wet Events</i> per year, with two (2) of the events occurring between May and September
Parameters	Total Suspended Solids, Phosphorus and Temperature

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

1. Condition 1 is imposed to ensure that the *Works* are constructed and operated in the manner in which they were described 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. Condition 1.6 is included to emphasize that the issuance of this *Approval* does not diminish any other statutory and regulatory obligations to which the *Owner* is subject in the construction, maintenance and operation of the *Works*. The Condition specifically highlights the need to obtain any necessary conservation authority approvals. The Condition also emphasizes the fact that this *Approval* doesn't limit the authority of the *Ministry* to require further information.
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 subsequent owners of the *Works* are made aware of the *Approval* and continue to operate the *Works* in compliance with it.
4. Condition 4 is included to prevent the operation of stormwater pipes and other conveyance until such time that their required associated stormwater management *Works* are also constructed. This Condition is included as regular inspection and necessary removal of sediment and excessive decaying vegetation from the *Works* are required to mitigate the impact of sediment, debris and/or decaying vegetation on the treatment capacity of the *Works*. The Condition also ensures that adequate storage is maintained in the *Works* at all times as required by the design. Furthermore, this Condition is included to ensure that the *Works* are operated and maintained to function as designed.
5. Condition 5 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.
6. Condition 6 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 to the receiving watercourse or the environment.
7. Condition 7 is included to provide a performance record for future references, to ensure that the *Ministry* is made aware of problems as they arise, and to provide a compliance record for all the terms and conditions outlined in this *Approval*, so that the *Ministry* can work with the *Owner* in resolving any problems in a timely manner.

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s).
1153-ACHP3E issued on August 17, 2016

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:

- a. 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;
- b. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

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

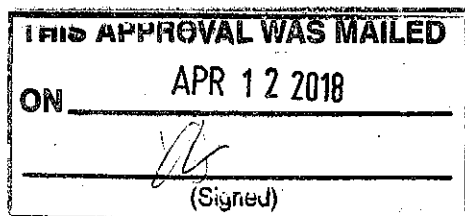
AND

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 11th day of April, 2018



Christina Labarge, P.Eng.
Director

appointed for the purposes of Part II.1 of the
Environmental Protection Act

RA/

c: District Manager, MOECC Ottawa
Jason Rumer, Mattamy (Half Moon Bay) Limited
Jeffery Shillington, City of Ottawa
Jennifer Ailey, David Schaeffer Engineering Ltd.



Ministry of the Environment
Ministère de l'Environnement

CERTIFICATE OF APPROVAL
MUNICIPAL AND PRIVATE SEWAGE WORKS
NUMBER 9531-7EZK5S
Issue Date: June 5, 2008

Mattamy (Half Moon Bay) Limited
123 Huntmar Dr
Ottawa, Ontario
K2S 1B9

Site Location: Half Moon Bay - Phase 1
Lot 12, Concession 3
Ottawa City, Ontario

You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:

- **sanitary sewers** to be constructed on Cambrian Road, River Rock Avenue, Stone Cove Crescent, Watermusic Bay, Regatta Avenue, Sunset Cove Circle, Foxhound Way, Burritts Rapids Place, Grand Canal Street, Riverbreeze Street, Riverset Crescent, Fallingwater Circle, Greenbank Road, River Run Avenue, River Mist Road, Prentiss Way, Half Moon Bay and Two (2) Easements (8 metres wide, adjacent to Nichol Creek Lane, between the back of the townhouse properties and the park - from Riverbreeze Street to River Run Avenue; and 6.5 metres wide, adjacent to King's Creek Lane, between the back of the townhouse properties and the park - from Riverbreeze Street to River Run Avenue); and

- **storm sewers** to be constructed on Cambrian Road, River Rock Avenue, Stone Cove Crescent, Watermusic Bay, Regatta Avenue, Sunset Cove Circle, Foxhound Way, Burritts Rapids Place, Grand Canal Street, Riverbreeze Street, Riverset Crescent, Fallingwater Circle, Greenbank Road, River Run Avenue, River Mist Road, Prentiss Way, Half Moon Bay, King's Creek Lane and Parkglade Way; all discharging (flows controlled by inlet control devices in catchbasins - included as part of the stormwater management system within the Phase 1 subdivision development);

- **Geotube® containers** or equivalent approved by the *District Manager*, required for the management and treatment of stormwater, drainage waters and groundwater during construction; receiving flows from the 'drainage collection system' under Ministry of the Environment Reference No. **0088-7F4LRQ** (as amended from time to time);

as part of Half Moon Bay - Phase 1, in the City of Ottawa (Barhaven South);

all in accordance with:

1. Application for Municipal and Sewage Works, dated May 12, 2008 and received on May 16, 2008, including final plans and specifications prepared by David Schaeffer Engineering Limited; and

2. the procedure, dated May 29, 2008, published as electronic file "3798.pdf" and co-signed by Frank Cairo, Mattamy Homes Ottawa and Jeff Mulcock, Taggart Construction Ltd."

3. Revised Engineering Drawings entitled "Half Moon Bay Subdivision Phase 1 (Project 07-314)", Drawing No.s **27, 28, 29, 30, 36, 37, 40, 50, 52** and **79**, date of issue June **3**, 2008 and received on June **4**, 2008, prepared by David Schaeffer Engineering Limited;

4. Revised Engineering Drawings entitled "Half Moon Bay Subdivision Phase 1 (Project 07-314)", Drawing No.s **27** and **50**, date of issue June **3**, 2008 and received on June **5**, 2008, prepared by David Schaeffer Engineering Limited;

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions

apply:

- (1) "*Certificate*" means this entire Certificate of Approval document, issued in accordance with Section 53 of the *Ontario Water Resources Act*, and includes any schedules;
- (2) "*District Manager*" means the District Manager of the Ottawa District Office of the Ministry;
- (3) "*Ministry*" means the Ontario Ministry of the Environment;
- (4) "*Owner*" means Mattamy (Half Moon Bay) Limited, and includes its successors and assignees; and
- (5) "*Works*" means the sewage works described in the *Owner's* application, this *Certificate* and in the supporting documentation referred to herein, to the extent approved by this *Certificate*.

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

TERMS AND CONDITIONS

1. GENERAL CONDITIONS

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 *Certificate* 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 *Certificate*, the application for approval of the works and the submitted supporting documents and plans and specifications as listed in this *Certificate*.

1.3 Where there is a conflict between a provision of any submitted document referred to in this *Certificate* and the Conditions of this *Certificate*, the Conditions in this *Certificate* 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 requirements of this *Certificate* are severable. If any requirement of this *Certificate*, or the application of any requirement of this *Certificate* to any circumstance, is held invalid or unenforceable, the application of such requirement to other circumstances and the remainder of this *Certificate* shall not be affected thereby.

2. EXPIRY OF APPROVAL

2.1 The approval issued by this *Certificate* will cease to apply to those parts of the *Works* which have not been constructed within five (5) years of the date of this *Certificate*.

3. UPON COMPLETION OF CONSTRUCTION

3.1 The Works covered under this Approval can be constructed but not operated until the application, approval and completion of construction of the proposed drainage collection system, under the Ministry of the Environment Reference No. **2211-7DWNQQ** (as amended from time to time), to capture the stormwater runoff from the proposed Half Moon Bay - Phase 1 development.

4. SPECIAL CONDITION – CONSTRUCTION PROCEDURE

4.1 The written procedure issued on May 29, 2008, published as electronic file "3798.pdf" and co-signed by Frank Cairo,

Mattamy Homes Ottawa and Jeff Mulcock, Taggart Construction Ltd., representing the Owner, shall be carried out for as long as the District Manager has not given his/her consent in writing to discontinue its use.

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 *Certificate* and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review. The condition also advises the *Owner(s)* their responsibility to notify any person they authorized to carry out work pursuant to this *Certificate* the existence of this *Certificate*.
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, when the *Works* are constructed, the stormwater discharge from the proposed Half Moon Bay - Phase 1 development, will be captured by a drainage collection system approved by the *Ministry* that has the capacity to adequately mitigate any adverse environmental impacts to ensure the ongoing protection of the environment.
4. Condition 4 is included to ensure that established and accepted procedures are used during construction of the *Works* to minimize the potential for adverse environmental impacts on the receiver.

In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, 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 101 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the 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 Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

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, 15th Floor
Toronto, Ontario
M5G 1E5

AND

The Director
Section 53, *Ontario Water Resources Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.

DATED AT TORONTO this 5th day of June, 2008

Zafar Bhatti, P.Eng.
Director
Section 53, *Ontario Water Resources Act*

RS/

c: District Manager, MOE Ottawa District Office
City Clerk, City of Ottawa

Stephen Pichette, P. Eng., David Schaeffer Engineering Limited



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), Loggerch 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)

**Ministry of the Environment and
Climate Change**

Eastern Region
Technical Support Section
Water Resources
1259 Gardiners Rd, PO Box 22032
Kingston, ON
K7P 3J6
Tel: (613) 549-4000

**Ministère de l'Environnement et de
l'Action en matière de changement
climatique**

Direction régionale de l'Est
Section du Soutien Technique
Ressource en eau
1259 Chemin Gardiners, CP 22032
Kingston, ON
K7P 3J6
Tél: (613) 549-4000



January 27, 2016

Bronwyn Anderson
Mattamy (Half Moon Bay) Limited
2360 Bristol Circle
Oakville, Ontario
L6H 6M5

Dear Sir/Madam:

RE: Permit To Take Water 3205-A4ZLZ6
Proposed Multi-Use Development - Half Moon Bay
Lot: 8-12, Concession: 3
Geographic Township of Nepean
Ottawa
Reference Number 6071-A3PQPJ

Please find attached Permit to Take Water 3205-A4ZLZ6 which authorizes the withdrawal of water in accordance with the application for this Permit to Take Water, dated October 7, 2015 and signed by Bronwyn Anderson.

Please note this Permit expires December 31, 2025 and cancels and replaces Permit 1413-8H9LLY. This Permit has been amended to more accurately reflect the water takings at the site.

Please also note that it is the responsibility of the Permit Holder to ensure that all other approvals required by law are obtained for this project. Such approvals may include but are not limited to a Section 53, Ontario Water Resources Act, R.S.O. 1990 (Sewage Works Environmental Compliance Approval).

Ontario Regulation 387/04 (Water Taking and Transfer) requires all water takers to report daily water taking amounts to the Water Taking Reporting System (WTRS) electronic database (<https://www.lrcsde.lrc.gov.on.ca/wtrs/>). Daily water taking must be reported on a calendar year basis. If no water is taken, then a "no taking" report must be entered. Please consult the Regulation and Section 4 of this Permit for monitoring requirements.

If you have questions about reporting requirements, please call the WTRS Help Desk at 416-235-6322 (toll free: 1-877-344-2011) or by email, WTRSHelpdesk@ontario.ca. It is preferred that you submit your data directly and electronically to the WTRS. Where this is impracticable, please contact the WTRS Help Desk to arrange for written submission of your data.

Please note that the contact information for the Environmental Review Tribunal has recently changed. The Environmental Review Tribunal's new contact information is as follows:

New public inquiry telephone number: (416) 212-6349; toll free: 1 (866) 448-2248

New fax number: (416) 326-5370; toll free: 1 (844) 213-3474

Take notice that in issuing this Permit, terms and conditions pertaining to the taking of water and to the results of the taking have been imposed. The terms and conditions have been designed to allow for the development of water resources, while providing reasonable protection to existing water uses and users.

Yours truly,



Greg Faaren

Director, Section 34.1, Ontario Water Resources Act, R.S.O. 1990
Eastern Region

File Storage Number: SI OT 3205 220 (TS)

c: Michael Laflamme, Paterson Group, mlaflamme@patersongroup.ca

Ottawa District Office

AMENDED PERMIT TO TAKE WATER

Surface and Ground Water

NUMBER 3205-A4ZLZ6

Pursuant to Section 34.1 of the Ontario Water Resources Act, R.S.O. 1990 this Permit To Take Water is hereby issued to:

Mattamy (Half Moon Bay) Limited
2360 Bristol Circle
Oakville, Ontario L6H 6M5
Canada

*For the water
taking from:*

Housing Excavation - North (S1)
Site Servicing Excavation - North (S2)
Greenbank Stormwater Management Pond Excavation (S3)
Housing Excavation - West (S4)
Site Servicing Excavation - West (S5)
Clarke Stormwater Management Pond Excavation (S6)
Housing Excavation - South (S7)
Site Servicing Excavation - South (S8)

Located at: Lot 8-12, Concession 3, Geographic Township of Nepean
Ottawa

For the purposes of this Permit, and the terms and conditions specified below, the following definitions apply:

DEFINITIONS

- (a) "Director" means any person appointed in writing as a Director pursuant to section 5 of the OWRA for the purposes of section 34.1, OWRA.
- (b) "Provincial Officer" means any person designated in writing by the Minister as a Provincial Officer pursuant to section 5 of the OWRA.
- (c) "Ministry" means Ontario Ministry of the Environment and Climate Change.
- (d) "District Office" means the Ottawa District Office.
- (e) "Permit" means this Permit to Take Water No. 3205-A4ZLZ6 including its Schedules, if any, issued in accordance with Section 34.1 of the OWRA.

- (f) "Permit Holder" means Mattamy (Half Moon Bay) Limited.
- (g) "OWRA " means the *Ontario Water Resources Act*, R.S.O. 1990, c. O. 40, as amended.

You are hereby notified that this Permit is issued subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. Compliance with Permit

- 1.1 Except where modified by this Permit, the water taking shall be in accordance with the application for this Permit To Take Water, dated October 7, 2015 and signed by Bronwyn Anderson, and all Schedules included in this Permit.
- 1.2 The Permit Holder shall ensure that any person authorized by the Permit Holder to take water under this Permit is provided with a copy of this Permit and shall take all reasonable measures to ensure that any such person complies with the conditions of this Permit.
- 1.3 Any person authorized by the Permit Holder to take water under this Permit shall comply with the conditions of this Permit.
- 1.4 This Permit is not transferable to another person.
- 1.5 This Permit provides the Permit Holder with permission to take water in accordance with the conditions of this Permit, up to the date of the expiry of this Permit. This Permit does not constitute a legal right, vested or otherwise, to a water allocation, and the issuance of this Permit does not guarantee that, upon its expiry, it will be renewed.
- 1.6 The Permit Holder shall keep this Permit available at all times at or near the site of the taking, and shall produce this Permit immediately for inspection by a Provincial Officer upon his or her request.
- 1.7 The Permit Holder shall report any changes of address to the Director within thirty days of any such change. The Permit Holder shall report any change of ownership of the property for which this Permit is issued within thirty days of any such change. A change in ownership in the property shall cause this Permit to be cancelled.

2. General Conditions and Interpretation

- 2.1 Inspections
The Permit Holder must forthwith, upon presentation of credentials, permit a Provincial Officer to carry out any and all inspections authorized by the OWRA, the *Environmental Protection Act*, R.S.O. 1990, the *Pesticides Act*, R.S.O. 1990, or the *Safe Drinking Water Act*, S. O. 2002.

2.2 Other Approvals

The issuance of, and compliance with this Permit, does not:

- (a) relieve the Permit Holder or any other person from any obligation to comply with any other applicable legal requirements, including the provisions of the *Ontario Water Resources Act* , and the *Environmental Protection Act* , and any regulations made thereunder; or
- (b) limit in any way any authority of the Ministry, a Director, or a Provincial Officer, including the authority to require certain steps be taken or to require the Permit Holder to furnish any further information related to this Permit.

2.3 Information

The receipt of any information by the Ministry, the failure of the Ministry to take any action or require any person to take any action in relation to the information, or the failure of a Provincial Officer to prosecute any person in relation to the information, shall not be construed as:

- (a) an approval, waiver or justification by the Ministry of any act or omission of any person that contravenes this Permit or other legal requirement; or
- (b) acceptance by the Ministry of the information's completeness or accuracy.

2.4 Rights of Action

The issuance of, and compliance with this Permit shall not be construed as precluding or limiting any legal claims or rights of action that any person, including the Crown in right of Ontario or any agency thereof, has or may have against the Permit Holder, its officers, employees, agents, and contractors.

2.5 Severability

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

2.6 Conflicts

Where there is a conflict between a provision of any submitted document referred to in this Permit, including its Schedules, and the conditions of this Permit, the conditions in this Permit shall take precedence.

3. Water Takings Authorized by This Permit

3.1 Expiry

This Permit expires on **December 31, 2025**. No water shall be taken under authority of this Permit after the expiry date.

3.2 Amounts of Taking Permitted

The Permit Holder shall only take water from the source, during the periods and at the rates and amounts of taking specified in Table A. Water takings are authorized only for the purposes specified in Table A.

Table A

	Source Name / Description:	Source: Type:	Taking Specific Purpose:	Taking Major Category:	Max. Taken per Minute (litres):	Max. Num. of Hrs Taken per Day:	Max. Taken per Day (litres):	Max. Num. of Days Taken per Year:	Zone/ Easting/ Northing:
1	Housing Excavation - North (S1)	Pond Dugout	Other - Dewatering	Dewatering	8,500	24	5,000,000	365	18 441394 5011476
2	Site Servicing Excavation - North (S2)	Pond Dugout	Other - Dewatering	Dewatering	8,500	24	6,000,000	210	18 441394 5011476
3	Greenbank Stormwater Management Pond Excavation (S3)	Pond Dugout	Other - Dewatering	Dewatering	5,000	24	2,000,000	210	18 441840 5011790
4	Housing Excavation - West (S4)	Pond Dugout	Other - Dewatering	Dewatering	8,500	24	5,000,000	365	18 440999 5010853
5	Site Servicing Excavation - West (S5)	Pond Dugout	Other - Dewatering	Dewatering	8,500	24	5,000,000	210	18 440999 5010853
6	Clarke Stormwater Management Pond Excavation (S6)	Pond Dugout	Other - Dewatering	Dewatering	5,000	24	3,500,000	210	18 440817 5010974
7	Housing Excavation - South (S7)	Pond Dugout	Other - Dewatering	Dewatering	8,500	24	6,000,000	365	18 442168 5010109
8	Site Servicing Excavation - South (S8)	Pond Dugout	Other - Dewatering	Dewatering	8,500	24	6,000,000	210	18 442168 5010109
						Total Taking:	38,500,000		

3.3 Notwithstanding Table A above, water shall only be taken from the Stormwater Management Ponds (Source 3 and Source 6) during construction of the ponds for construction purposes.

4. Monitoring

- 4.1 The Permit Holder shall maintain a record of all water takings. This record shall include the dates and times of water takings, the rates of taking and an estimated calculation of the total amounts of water taken per day for each day that water is taken under the authorization of this Permit. A separate record shall be maintained for each source. The Permit Holder shall keep all required records up to date and available at or near the site of the taking and shall produce the records immediately for inspection by a Provincial Officer upon his or her request.

5. Impacts of the Water Taking

5.1 Notification

The Permit Holder shall immediately notify the local District Office of any complaint arising from the taking of water authorized under this Permit and shall report any action which has been taken or is proposed with regard to such complaint. The Permit Holder shall immediately notify the local District Office if the taking of water is observed to have any significant impact on the surrounding waters. After hours, calls shall be directed to the Ministry's Spills Action Centre at 1-800-268-6060.

5.2 For Surface-Water Takings

The taking of water (including the taking of water into storage and the subsequent or simultaneous withdrawal from storage) shall be carried out in such a manner that streamflow is not stopped and is not reduced to a rate that will cause interference with downstream uses of water or with the natural functions of the stream.

For Groundwater Takings

If the taking of water is observed to cause any negative impact to other water supplies obtained from any adequate sources that were in use prior to initial issuance of a Permit for this water taking, the Permit Holder shall take such action necessary to make available to those affected, a supply of water equivalent in quantity and quality to their normal takings, or shall compensate such persons for their reasonable costs of so doing, or shall reduce the rate and amount of taking to prevent or alleviate the observed negative impact. Pending permanent restoration of the affected supplies, the Permit Holder shall provide, to those affected, temporary water supplies adequate to meet their normal requirements, or shall compensate such persons for their reasonable costs of doing so.

If permanent interference is caused by the water taking, the Permit Holder shall restore the water supplies of those permanently affected.

5.3 Prevention of Adverse Effects:

The Permit Holder shall ensure the taking of water under authority of this Permit does not result in an adverse effect on area waters.

5.4 Prevention of Structural Adverse Effects:

The Permit Holder shall take all measures necessary to prevent damage to buildings, bridges, structures, roads and/or railway lines that may be impacted either directly or indirectly by this taking.

- 5.5 The Permit Holder shall ensure that any water that is taken for dewatering purposes and discharged to the City of Ottawa sewer system is in accordance with a City of Ottawa Sewer Use Agreement.
- 5.6 The Permit Holder shall ensure that any water that is taken for dewatering purposes and discharged to the on-site Stormwater Management Ponds is in accordance with an Environmental Compliance Approval issued by this Ministry.
- 5.7 The Permit Holder shall ensure that any water that is taken for dewatering purposes and discharged to the temporary holding ponds labelled as Housing or Site Services Excavation ponds and numbered as Sources S1, S2, S4, S5, S7 and S8 in Section 3.0 of this Permit is analyzed for turbidity and meets the criteria in Condition 5.12 prior to discharge to the Jock River or the requirements in Condition 5.5 if discharged to the City of Ottawa sewer system.
- 5.8 The Permit Holder shall keep a record of all discharge dates to either the Jock River or the City of Ottawa sewer system from either the housing excavation or site servicing ponds and/or the Greenbank and Clarke Stormwater Management Ponds as well as a record of the water quality analyses conducted to determine if the discharge water quality meets the requirements of Condition 5.5 and Condition 5.12.
- 5.9 Discharge Control Measures for Water that is Discharged to the Natural Environment: Siltation control measures shall be installed at the discharge site(s) and shall be sufficient to control the volumes. Continuous care shall be taken to properly maintain the siltation control devices.
- 5.10 The discharge of water shall be controlled in such a way as to avoid erosion and sedimentation in the receiving stream.
- 5.11 The Permit Holder shall ensure that any water discharged to the natural environment does not result in scouring, erosion or physical alteration of stream channels or banks and that there is no flooding in the receiving area or water body, downstream water bodies, ditches or properties caused or worsened by this discharge.
- 5.12 The Permit Holder shall not discharge turbid water to any watercourse. Turbid water shall be defined as any discharge water from the excavation or diverted water with a maximum increase of 8 NTUs above the receiving stream's background levels.

6. Director May Amend Permit

The Director may amend this Permit by letter requiring the Permit Holder to suspend or reduce the taking to an amount or threshold specified by the Director in the letter. The suspension or reduction in taking shall be effective immediately and may be revoked at any time upon notification by the Director. This condition does not affect your right to appeal the suspension or reduction in taking to the Environmental Review Tribunal under the *Ontario Water Resources Act* , Section 100 (4).

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

1. Condition 1 is included to ensure that the conditions in this Permit are complied with and can be enforced.
2. Condition 2 is included to clarify the legal interpretation of aspects of this Permit.
3. Conditions 3 through 6 are included to protect the quality of the natural environment so as to safeguard the ecosystem and human health and foster efficient use and conservation of waters. These conditions allow for the beneficial use of waters while ensuring the fair sharing, conservation and sustainable use of the waters of Ontario. The conditions also specify the water takings that are authorized by this Permit and the scope of this Permit.

*In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, you may by written notice served upon me, the Environmental Review Tribunal and the Environmental Commissioner, **Environmental Bill of Rights**, R.S.O. 1993, Chapter 28, within 15 days after receipt of this Notice, require a hearing by the Tribunal. The Environmental Commissioner will place notice of your appeal on the Environmental Registry. Section 101 of the Ontario Water Resources Act, as amended provides that the Notice requiring a hearing shall state:*

1. The portions of the Permit or each term or condition in the Permit 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.

In addition to these legal requirements, the Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Permit to Take Water number;
6. The date of the Permit to Take Water;
7. The name of the Director;
8. The municipality within which the works are located;

This notice must be served upon:

*The Secretary
Environmental Review Tribunal
655 Bay Street, 15th Floor
Toronto ON
M5G 1E5
Fax: (416) 326-5370
Email:
ERTTribunalsecretary@ontario.ca*

AND

*The Environmental Commissioner
1075 Bay Street
6th Floor, Suite 605
Toronto, Ontario M5S 2W5*

AND

*The Director, Section 34.1,
Ministry of the Environment and
Climate Change
1259 Gardiners Rd, PO Box
22032
Kingston, ON
K7P 3J6*

Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal:

by Telephone at

(416) 212-6349

Toll Free 1(866) 448-2248

by Fax at

(416) 326-5370

Toll Free 1(844) 213-3474

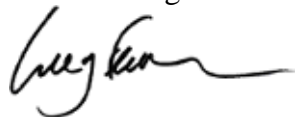
by e-mail at

www.ert.gov.on.ca

*This instrument is subject to Section 38 of the **Environmental Bill of Rights** that allows residents of Ontario to seek leave to appeal the decision on this instrument. Residents of Ontario may seek to appeal for 15 days from the date this decision is placed on the Environmental Registry. By accessing the Environmental Registry, you can determine when the leave to appeal period ends.*

This Permit cancels and replaces Permit Number 1413-8H9LLY, issued on 2011/05/30.

Dated at Kingston this 27th day of January, 2016.



Greg Faaren

Director, Section 34.1

Ontario Water Resources Act , R.S.O. 1990

Schedule A

This Schedule “A” forms part of Permit To Take Water 3205-A4ZLZ6, dated January 27, 2016.



Fisheries and Oceans
Canada

Pêches et Océans
Canada

Central and Arctic Region
520 Exmouth Street
Sarnia, Ontario
N7T 8B1

Région du centre et de l'arctique
520 rue Exmouth
Sarnia (Ontario)
N7T 8B1

APR 08 2015

05-HCAA-CA4-01840

Mattamy Homes

50 Hines Road
Ottawa, Ontario
K2K 2M5

Attention: Kevin Murphy – Project Manager, Land Development

Dear Mr. Murphy:

Subject: Notification of modifications to dates in conditions of Paragraph 35(2)(b)
Fisheries Act authorization (PR-05-1840)

The Fisheries Protection Program (the Program) of Fisheries and Oceans Canada hereby modifies the conditions that relate to the period during which the work, undertaking or activity that will result in serious harm to fish can be carried on, for the authorization issued to you under paragraph 35(2)(b) of the *Fisheries Act* on October 26, 2013.

The period during which the work, undertaking, or activity can be carried on is modified as follows:

From
Date of Issuance

To
December 31, 2017

The Program also acknowledges that the proponent name and contact information for this project has changed from Barrhaven South Land Owners Inc. to Mattamy Homes. At your request, we are re-issuing the original letter sent to you on February 6, 2015 with the correct proponent information.

The Program has determined that the modification of the dates in the conditions of authorization will not increase the level of harm to fish and habitat described in the authorization.

A copy of this authorization and a copy of this letter must be kept on site while the work is in progress. Work crews must be familiar with and able to adhere to the conditions.

Failure to comply with the conditions of the authorization may lead to prosecution under the *Fisheries Act*.

If you or anyone conducting work on your behalf have any questions, please contact Gary Cooper at our Burlington office at 905-336-6248, or by email at gary.cooper@dfo-mpo.gc.ca.

Sincerely,



David Burden
Regional Director General
Central and Arctic Region
Fisheries and Oceans Canada

ATTACHMENT: AUTHORIZATION

c.c.: Gary Cooper – DFO
Liza Hamilton – Kilgour & Associates Ltd.



Fisheries and Oceans Canada Pêches et Océans Canada

401 King Street West
Prescott, ON
K0E 1T0

October 21, 2010

Your file Votre référence

Our file Notre référence
05-HCAA-CA4-01840

Barrhaven South Land Owners Inc
Ursula K. Melinz
427 Laurier Ave West. Suite 900
Ottawa, Ontario
K1R Y72
Dear Ms. Melinz:

Subject: Amendment to Fisheries Act Authorization

Fisheries and Oceans Canada is hereby amending the *Fisheries Act* Authorization issued to you on November 13, 2007 and amended on April 14, 2009.

The changes to the Authorization 05-HCAA-CA4-01840 covered by this Amendment include:

The valid authorization period for the harmful alteration, disruption or destruction of fish habitat associated with the work or undertaking is:

From
Date of Issuance

To
December 31, 2013

We have determined that the extent of the changes to the Authorization will not result in any impacts to fish and fish habitat greater than previously authorized nor significantly alter the mitigation measures. Therefore an additional environmental assessment is not required. The changes described above have been included on the attached original *Fisheries Act* Authorization.

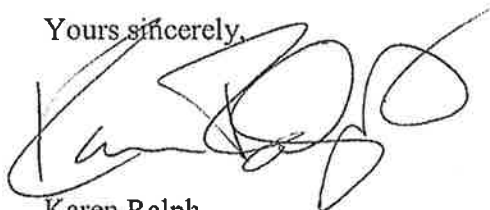
Failure to comply with all the conditions of the amended Authorization may lead to prosecution under the *Fisheries Act*.

A copy of this Authorization should be kept on site while the work is in progress. Work crews should be familiar with and able to adhere to the conditions.

Canada

If you or anyone conducting work on your behalf have any questions, please contact Mark Ferguson at our Prescott office at (613) 925- 2865 ext 145, by fax at (613) 925-2245, or by email at Mark.Ferguson@dfo-mpo.gc.ca.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Karen Ralph', written over a horizontal line.

Karen Ralph
A/Director, Ontario Great Lake Area
Fisheries & Oceans Canada
ATTACHMENT-AUTHORIZATION



DFO File No.: 05-HCAA-CA4-000-
001840

Referral File No.: PR-05-1840
Authorization 2
No.:

AUTHORIZATION FOR WORKS OR UNDERTAKINGS AFFECTING FISH HABITAT

Authorization issued to:

Barrhaven South Land Owners Inc.
427 Laurier Avenue West, Suite 900
Ottawa, ON
K1R 7Y2

Location of Project

The work or undertaking is located at

East Clarke Municipal Drain

From Latitude: 45°15'26.4" Longitude: 75° 45'3.1" to Latitude: 45°14'41.6" Longitude: 75° 44'26.4"

West Clarke Municipal Drain

From Latitude: 45° 15'16.6" Longitude: 75° 45'16.8" to Latitude: 45° 14'42.4" Longitude: 75° 44'43.9"

Todd Municipal Drain

From Latitude: 45° 15'23" Longitude: 75° 44'20" to Latitude: 45° 15'4" Longitude: 75° 44'26"

Corrigan Drain

From Latitude: 45° 15'28.1" Longitude: 75° 44'9.7" to Latitude: 45° 15'16.1" Longitude: 75° 44'0.3"

In the City of Ottawa, Ontario

Valid Authorization Period

The valid authorization period for the harmful alteration, disruption or destruction of fish habitat associated with the work or undertaking is:

From
Date of Issuance

To
December 31, 2013

The valid authorization periods for other conditions of the authorization are as set out below.

Description of Works or Undertakings (Type of work, schedule, etc.)

The harmful alteration, disruption or destruction of fish habitat hereby authorized is the destruction of 13268m² of fish habitat due to infilling of the existing drain channels and realignment of West Clarke Municipal Drain, East Clarke Municipal Drain, Todd Municipal Drain and Corrigan Drain.

Conditions of Authorization

1. The conditions of this Authorization notwithstanding, should the above works or undertaking, due to weather conditions, different soil or other natural conditions, or for any other reason, appear, in the opinion of the Department of Fisheries and Oceans ("DFO") likely to cause greater impacts than the parties previously contemplated, then DFO may direct Barrhaven South Land Owners Inc and City of Ottawa ("the Proponent") and its agents and contractors, to suspend or alter works and activities associated with the project, to avoid or mitigate adverse impacts to fisheries resources. DFO may also direct the Proponent and its agents and contractors, to carry out at the Proponent's expense any works or activities deemed necessary by DFO to avoid or mitigate further adverse impacts to fisheries resources. In circumstances where DFO is of the view that greater impacts may occur than were contemplated by the parties DFO may also modify or rescind this authorization. If the authorization is to be changed the Proponent will be given an opportunity to discuss any proposed modifications or rescission.
2. Conditions that relate to the **Proponent plan**:
 - 2.1 The Proponent confirms that all plans and specifications relating to this authorization have been duly prepared and reviewed by appropriate professionals working on behalf of the Proponent. The Proponent acknowledges that (s)he is solely responsible for all design, safety and workmanship aspects of all the works associated with this Authorization.
 - 2.2 The construction must comply with those criteria as identified within this Authorization. Harmful alteration, disruption or destruction of fish habitat other than that specifically identified within this Authorization is not permitted.
 - 2.3 Works will be conducted following the practices outlined in the following reports:
 - 2.3.1 *Application for the Authorization for works or undertakings affecting fish habitat, submitted by Barrhaven South Land Owners Inc., signed by Alan Cohen and dated October 4, 2007.*
 - 2.3.2 *Application for the Authorization for works or undertakings affecting fish habitat,*

submitted by the City of Ottawa, signed by Gordon MacNair and dated October 4, 2007.

- 2.3.3 *Barrhaven South Development and Fish Habitat Compensation, Department of Fisheries and Oceans Canada Permit Application, Prepared by Stantec Consulting Ltd. August 2007.*
- 2.3.4 *Barrhaven South Fish Compensation, Clarke Pond Tributary Design, "Clarke 3" prepared by Stantec Consulting Ltd. July 2007.*
- 2.3.5 *Barrhaven South Fish Compensation, Todd Pond Tributary Design "Todd 3" prepared by Stantec Consulting Ltd. July 2007.*
- 2.3.6 *Barrhaven South Fish Habitat Compensation, Plan and Profile Fish Habitat Compensation Pond, Prepared by Stantec Consulting Ltd.*

3. Conditions that relate to the **mitigation** of potential harmful alteration, disruption or destruction of fish habitat. The following measures shall be implemented:

- 3.1 No in-water work shall occur from **March 15th to June 30th** to protect local fish populations during their spawning and nursery periods.
- 3.2 All materials and equipment used for the purpose of site preparation and project completion shall be operated and stored in a manner that prevents any deleterious substance (e.g. petroleum products, debris etc.) from entering the water.
 - 3.2.1 Any stockpiled materials shall be stored and stabilized away from the water.
 - 3.2.2 Vehicle and equipment re-fuelling and maintenance shall be conducted in a controlled manner so as to prevent fuel spillage and away from the water where feasible.
 - 3.2.3 Any part of equipment entering the water shall be free of fluid leaks and externally cleaned/degreased to prevent any deleterious substance from entering the water.
 - 3.2.4 Vehicles or heavy machinery operating at a watercourse shall be equipped with a spill kit.
 - 3.2.5 Only clean material free of fine particulate matter shall be placed in the water.
 - 3.2.6 A spill kit shall be kept on site during construction.
- 3.3 Sediment and erosion control measures shall be implemented prior to work and maintained during the work phase, to prevent entry of sediment into the water.
 - 3.3.1 All sediment and erosion control measures shall be inspected daily to ensure that they are functioning properly and are maintained and/or upgraded as required.
 - 3.3.2 If the sediment and erosion control measures are not functioning properly, no further work shall occur until the sediment and/or erosion problem is addressed.
 - 3.3.3 Sediment and erosion control measures shall be left in place until all disturbed areas have been stabilized.
 - 3.3.4 All disturbed areas susceptible to erosion/soil loss with potential for transport into the

water, shall be stabilized and re-vegetated as required upon completion of work and restored to a pre-disturbed state or better.

- 3.3.5 To prevent sediment release earthen "plugs" shall be maintained at the upstream and downstream limits of the newly constructed channel during construction phases and shall be removed only after the newly constructed channel and riparian vegetative cover is established and the site stabilized before permanent flows are directed to the channel.
 - 3.4 Except material used to restore the streambed, materials used for the project shall not be taken from the shoreline or bed of any water body.
 - 3.5 Dredged or excavated material shall be disposed of on land above the high water level and suitably contained/stabilized to prevent the material from re-entering the water.
 - 3.6 All in-stream work shall be completed *in the dry* by de-watering the work area and diverting and/or pumping flows around cofferdams placed at the limits of the work area.
 - 3.6.1 Existing stream flows shall be maintained downstream of the de-watered work area without interruption, during all stages of the work.
 - 3.6.2 A fish stranding program shall be implemented if necessary by a qualified fisheries person, who is experienced in this area, immediately following isolation and prior to de-watering to ensure that fish are removed from any dewatered area and released alive immediately downstream of the work area.
 - 3.6.3 Flow dissipaters and/or filter bags, or equivalent, shall be placed at water discharge points to prevent erosion and sediment release.
 - 3.6.4 Silt or debris that has accumulated around the temporary cofferdams shall be removed prior to their withdrawal.
 - 3.7 Construction debris and litter shall not be allowed to enter the water or left on the shoreline.
 - 3.8 An environmental inspector with fish habitat experience shall be on site to verify all in-water fish habitat compensation and restoration works are constructed as designed.
 - 4. Conditions that relate to the **compensation** for the loss of 13268m² of fish habitat.
 - 4.1 A new outlet channel from the Clarke stormwater management pond will be constructed using principles of natural channel design. It will be 400m in length and 1m wide therefore 400m² of fish habitat will be created. This channel will be a linear wetland interspersed with refugia pools. At the confluence with the Jock River there will be an embayment designed to promote submergent plant growth. The riparian zone will be revegetated with a variety of native shrubs and trees to provide > 70% canopy cover.
 - 4.2 A new outlet channel from the Todd stormwater management pond will be constructed using the principles of natural channel design. It will be 400m in length and 1 m wide therefore 400m² of fish habitat will be created. This channel will contain rock riffle and pool habitats. At the confluence with the Jock River the channel will be wider and shallower to promote emergent macrophyte growth. The riparian zone will be revegetated with a variety of native shrubs and trees to provide >70% canopy cover.
-

4.3 A new outlet channel from the Corrigan stormwater management pond will be constructed using principles of natural channel design. It will be 300m in length and 2m in width therefore 600m² of fish habitat will be created. The channel design, embayment and riparian planting will be similar to the outlet channel from the Todd stormwater management pond.

4.3.1 Detailed design drawings for the Corrigan outlet channel shall be submitted to DFO by November 30, 2007 for review.

4.4 A habitat pond will be constructed within the floodplain of the Jock River. The new pond will have an approximate surface area of 8930m² at the high water mark. This pond will be designed to provide spawning and nursery habitat for northern pike and muskellunge in the spring and nursery and refugia habitat in the summer and fall.

4.4.1 The pond will be connected to the Jock River by way of 1m deep inlet and outlet channels to provide inflow and outflow of water year round.

4.4.2 The depth of the pond will match the Jock River adjacent to the site. The deepest area of the pond will be on the south side with bank slopes between 3:1 and 5:1. On the north side of the pond slopes will gradually decrease to between 1:10 and 1:20 with 2m wide finger channels throughout leading to grassy hummocks of *Carex* sp. or meadow grass. The hummocks will be partially submerged during spring flows.

4.4.3 The pond will contain large woody debris consisting of tree trunks with root wads attached.

4.4.4 The pond margins and finger channel banks will be planted with native lowland riparian plant species including red osier dogwood, speckled alder, white cedar and *Salix* sp.

5. Conditions that relate to the **monitoring** of the **Proponent plan**, the mitigation and the compensation, the "Monitoring Program".

A **monitoring program** shall be implemented from start of construction to the end of the two year post-construction monitoring to ensure that the compensation and mitigation measures are installed, maintained and function as intended. The monitoring program shall include the following:

Construction Phase Monitoring

5.1 The monitoring program shall be conducted by an environmental inspector with fish habitat experience. The environmental inspector must be present on site during in water works and implementation of the compensation measures.

5.2 The effectiveness of the sediment and erosion controls will be inspected a minimum of once a week. Additional inspections will be undertaken after and/or in anticipation of rain events.

5.3 A photographic record showing that all works and undertakings have been completed according to the plan and conditions of this Authorization shall be prepared.

5.3.1 The photographic record shall include, but not be limited to, a record of existing conditions, the work phase including sediment and erosion control measures, and completed works including compensation measures, site stabilization and restoration.

5.3.2 The photographs for each period of documentation shall be taken from the same vantage

point(s), direction and angle of view.

5.3.3 All photographs shall be clearly labelled with the date, location and viewing direction. The photographic locations and viewing directions shall be indicated on a plan view drawing of the work site and clearly indexed to the photographs.

5.4 Copies of the construction monitoring reports prepared by the environmental inspector shall be provided by fax or email to the Prescott Office of DFO within two working days of the date of the inspection.

5.5 Construction phase monitoring shall end when all fish habitat compensation measures are completed and site is stabilized.

Post-construction Monitoring:

5.6 A photographic record of completed fish habitat compensation measures and site stabilization measures as outlined in section 5.3.3 of construction phase monitoring.

5.7 A survey of fish presence and use of the fish habitat compensation measures shall be conducted each spring and summer for 2 years following construction.

5.8 An assessment of the stability of newly constructed channels, habitat pond and the fish habitat structures.

5.9 The success of all vegetative plantings shall be assessed not less than once each spring and fall for 2 years following planting. If at any time during monitoring any plantings are dead or dying, measures shall be implemented to reduce the risk of future failure and the plants shall be replaced and monitoring continued.

5.10 A written report and the photographic record summarizing the above monitoring results shall be submitted to the Prescott Office of DFO on or before November 30 for each year of the monitoring program.

6 Notification of the commencement of in-water works or undertaking shall be provided the Prescott Office of DFO via facsimile (fax) at (613) 925-2245, within ten days prior to the initiation of the works or undertaking.

6.1. The notification shall include the Section 35 Authorization number, PR-05-1840 and the date when in-water works or undertakings are scheduled to take place.

7. Any deviation from the approved plan, work schedule or compensation and mitigation measures stated above, shall be discussed with and approved in writing by the Prescott Office of DFO, prior to implementation.

8. All compensation and mitigation measures shall be implemented to the satisfaction of the Prescott Office of DFO.


The holder of this authorization is hereby authorized under the authority of section 35(2) of the Fisheries Act, R.S.C., 1985, c.F. 14, to carry out the work or undertaking described herein. This authorization is valid only with respect to fish habitat and for no other purposes. It does not purport to release the applicant from any obligation to obtain permission from or to comply with the requirements of any other regulatory agencies.

Failure to comply with any condition of this authorization may result in charges being laid under the Fisheries Act.

This authorization form should be held on site and work crews should be made familiar with the conditions attached.

Date of Issuance: Oct 26 2010

Approved by:


Karen Ralph
A/Area Director, Ontario Great Lakes Area
Central & Arctic Region
Fisheries and Oceans Canada



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

Attention: Melissa Pettem

Dear Ms. Pettem,

Re: Half Moon Bay West Phase 1
3345 Borrisokane Road
Ward 3 - Barrhaven, Councillor Jan Harder
Commence Work Notification- Early Servicing

Please be advised that the City of Ottawa has reviewed the engineering designs for this subdivision and presently finds the submission to be satisfactory to enable the installation of services to commence. In addition, please review the following conditions for proceeding with the required works:

Required Information Received

- The Ministry of Environment Environmental Compliance Approval for Storm and Sanitary Sewers, No. MOE ECA No. 2725-B5VKYF;
- The Ministry of Environment Compliance Approval for the Stormwater Management System, No. MOE ECA No. 6068-AWUPL5;
- An irrevocable Letter of Credit in the amount of \$50,000.00 for on-site works (L.C. no. SLC2503312T) and an irrevocable Letter of Credit in the amount of \$2,925,573.75 for off-site works (L.C. no. SLC2503310T)
- A Certificate of Insurance for a minimum of \$ 5,000,000.00
- A Letter of Acknowledgement and Indemnity for the installation of the underground services satisfactory to the City of Ottawa.

Required Information for Permitting

- The owner shall make reference to the approved City of Ottawa plan number # **17586**.
- Water Permit will be required for the proposed water works associated with the proposed development. The owner shall pay the cost of materials supplied by the City of Ottawa estimated at **\$40,000.00**, exclusive of excavation, backfilling and reinstatement. The statement amount is adjustable upon the project's completion. The charges are in accordance with the Regulatory Code and are subject to revisions annually effective April 1. Please contact the service desk at 613-580-2424 extension 22268, 951 Clyde Avenue.

- The owner shall contact the City of Ottawa permit office to apply for all required permits that may be required. Please contact the service desk at 613-580-2424, extension 16000, 100 Constellation Crescent.
- The owner acknowledges and agrees that any changes required as a result of the Geometric Road Design Drawing circulation will be required to be implemented at the sole cost of the owner. As a result of this circulation, changes may be required to above and below ground servicing infrastructure. Should changes be required following the installation of any such items, the owner is required to implement the changes as required.
- The owner acknowledges and agrees that new storm sewers shall not be connected to the City's existing storm sewer system until such time as either;
 - (a) - a Certificate of Conformance has been received from a professional engineer certifying that all required Inlet Control Devices have been properly installed, and that the storm sewer system has also been installed in accordance with, both, the City-approved engineering drawings, and
 - the City's Sewer Design Guidelines (as amended), and
 - is free of any debris;
 - Or
 - (b) - that a flow limiting orifice plate, designed by an engineer to the satisfaction of the City, has been installed at the storm water outlet prior to connecting upstream storm sewers, such orifice plate not to be removed until (a) has been satisfied.
- The owner acknowledges and agrees that new sanitary sewers shall be restricted from discharging into the City's existing sanitary sewer system until such time as a Certificate of Conformance has been received from a professional engineer currently licensed in Ontario certifying;
 - that the sanitary sewer system has been installed in accordance with the City-approved engineering drawings and City's Sewer Design Guidelines (as amended), and
 - is free of any debris.
- The owner acknowledges and agrees that they shall erect Temporary Street Name Signs that are in accordance with schedule B of By-Law 2014-78. The owner shall also ensure that all street construction, servicing, and addressing are in accordance with City requirements for Emergency services and that all Standards and By-Laws are met prior to applying for any building permits.
- The owner acknowledges and agrees that the City of Ottawa will not issue any building permits for the above site until such time as;
 - Preliminary Approval of the Works has been issued by the Inspections Unit, and
 - The Grading Plan and Composite Utility Plan are approved in writing by the Development Review Branch, and
 - Re-calculated as-constructed sewer design sheets and as-constructed watermain sheets have been re-submitted and reviewed by Development Review Services.

Please advise your engineer and contractor that they are permitted to commence the installation of the municipal services. The contractor is also reminded that they are

required to contact the Inspections Unit in order to organize a pre-construction meeting and to ensure all applicable permits have been received prior to commencement of the works; please contact Matthew Wilson, 613-580-2424 ext. 33263 and/or matthew.wilson@ottawa.ca.

If you have any questions, please contact the undersigned at 613-580-2424, Ext 16960.

Sincerely,



Jeff Shillington, P.Eng.
Project Manager
Development Review, South Branch
Planning, Infrastructure and Economic Development Department
City of Ottawa

cc:

- Sean Moore, Planner, DR South Branch
- Don Herweyer, Manager, DR South Branch
- Rosanna Baggs, Transportation Project Manager, DR South Branch
- Matthew Wilson, Supervisor, Development Inspections, ROW, Heritage & Urban Services (incl. 3 copies and copy of MOECC ECA, if required) MC 26-14
- Arthur Melbourne - West District ROW Approvals Officer, Right of Way Unit (1 set of plans, include MOECC ECA) MC 26-61
- ISD Information Centre Unit (electronic copy of approved reports and drawings) MC 26-61
- Jennifer Ailey, DSEL, via email
- Everett Paulin, Wastewater Collection Process Engineering Unit, (digital copy of plans, via email)
- Sewer Use Unit, via email
- ROW, via email
- Lila Bradley, Supervisor – Permits and Data Services, Water Permits, (incl. 4 copies) MC 06-65 (& send water permit to Water Permits)
- Linda Carkner, Program Manager, Right of Way Unit MC 26-61
- Krista Tanaka, Program Manager, Road Safety & Traffic Investigations, Transportation Services Department, via email
- Barrie Forrester, Supervisor- Street Lighting Asset Management (1 set of plans) MC 02-63
- Douglas Durham (Mail Code 04-11), Program Manager - Permit Approvals, Building Code Services, (electronic copy of approved Geotechnical Report)
- Roch Vaillancourt, GIS & Data Services Co-ordinator, GIS & Data Management Unit, PIEDD, MC 26-61
- Scott Laberge, Wastewater Collection Program Manager, Wastewater Collection Branch, via email
- Eva Spal, Stormwater Infrastructure Operations Engineer, Surface Water Monitoring and Invasive Species Management, SWM Pond ECA, via email
- Jennifer Therkelsen, Co-ordinator- By-law Enforcement, emergency & Protective Services, via email

APPENDIX C

**HMB WEST – SANITARY DRAINAGE AREA PLAN
HMB WEST – SANITARY DESIGN SHEET**

**HMBN PHASE 7 – SANITARY DRAINAGE AREA PLAN
HMBN PHASE 7 – SANITARY DESIGN SHEET**

**STANTEC MSS ADDENDUM – SANITARY SERVICING PLAN
STANTEC MSS ADDENDUM – SANITARY SEWER DESIGN SHEET**

SANITARY SEWER CALCULATION SHEET



Manning's n=0.013

LOCATION				RESIDENTIAL AREA AND POPULATION							COMM		PARK		INSTIT		C+P+I	INFILTRATION					PIPE					
STREET		FROM M.H.	TO M.H.	AREA (ha)	UNITS	POP.	CUMULATIVE		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)	VEL.		
							AREA (ha)	POP.																		(FULL) (m/s)	(ACT.) (m/s)	
TRUNK 2A																												
		202A	203A	1.2		129	1.20	129	4.00	2.09		0.0		0.0		0.0	0.00	1.20	1.20	0.336	2.43	65.0	200	0.40	20.74	0.66	0.44	
		203A	204A	2.1		225	3.30	354	4.00	5.74		0.0		0.0		0.0	0.00	2.10	3.30	0.924	6.66	73.0	200	0.40	20.74	0.66	0.58	
Park											3.3	3.3					2.86	3.30	6.60									
		204A	402A	2.2		236	5.50	590	3.94	9.42		3.3		0.0		0.0	2.86	2.20	8.80	2.464	14.74	220.5	250	0.25	29.73	0.61	0.61	
To Trunk 4, Pipe 402A - 403A							5.50	590				3.3							8.80									
TRUNK 2B																												
		207A	208A	1.0		107	1.00	107	4.00	1.73		0.0		0.0		0.0	0.00	1.00	1.00	0.280	2.01	140.0	200	0.40	20.74	0.66	0.42	
		208A	209A	1.3		140	2.30	247	4.00	4.00		0.0		0.0		0.0	0.00	1.30	2.30	0.644	4.64	69.5	200	0.40	20.74	0.66	0.53	
Parkette												0.0	0.2	0.2		0.0	0.03	0.20	2.50									
				0.8		486	3.10	733										0.80	3.30									
		209A	403A	6.4		685	9.50	1418	3.70	21.25		0.0		0.2		0.0	0.03	6.40	9.70	2.716	24.00	222.5	300	0.20	43.25	0.61	0.62	
To Trunk 4, Pipe 403A - Ex. 57A							9.50	1418						0.2					9.70									
TRUNK 4 WEST																												
External				10.6		1135	10.60	1135										10.60	10.60									
External		401A	402A	15.3		1638	25.90	2773	3.47	38.98		0.0		0.0		0.0	0.00	15.30	25.9	7.252	46.23	173.0	300	0.75	83.75	1.18	1.21	
Protected Woodlot				13.3		0	39.20	2773				0.0		0.0		0.0	0.00	13.30	39.20									
Contribution from Trunk 2A							5.50	590				3.30						8.80										
School												3.3		0.0	7.6	7.6		7.60	55.60									
External		402A	403A	2.2		236	46.90	3599	3.37	49.13		3.3		0.0		7.6	9.48	2.20	57.80	16.184	74.79	252.0	500	0.12	130.80	0.67	0.69	
Commercial											3.2	6.5		0.0		7.6	12.25	3.20	61.00									
Contribution from Trunk 2B							9.50	1418						0.2		7.6		9.70										
		403A	57A	0.0		0	56.40	5017	3.24	65.85		6.5		0.2		7.6	12.29	0.00	70.70	19.796	97.94	167.5	500	0.13	136.14	0.69	0.75	
To Ex. MH 57A							56.40	5017				6.5		0.2		7.6		70.70										
MSS-A-21		14	13	4.8		514	4.80	514	3.97	8.27					7.5	7.5	6.53	12.30	12.30	3.444	18.24	295.0	250	1.30	67.80	1.38	1.16	
N-4		13	57A	7.4		792	12.20	1306	3.72	19.68			0.5	0.5		7.5	6.61	7.90	20.20	5.656	31.95	413.1	375	0.30	96.03	0.87	0.78	
Contribution from Trunk 4							56.40	5017				6.5		0.2		7.6		70.70										
N-5		57A	13A	2.2		0	70.80	6323	3.15	80.68	1.1	7.6		0.7		15.1		1.10	92.0									
To Ex. Pipe 13A - 14A							70.80	6323				9.8		0.7		15.1		96.40										
TRUNK 3A																												
Park												0.0	1.0	1.0		0.0	0.16	1.00	1.00									
		310A	311A	0.4		43	0.40	43	4.00	0.70		0.0		1.0		0.0	0.16	0.40	1.40	0.392	1.25	104.0	200	0.40	20.74	0.66	0.36	
		311A	309A	4.3		461	4.70	504	3.97	8.11		0.0		1.0		0.0	0.16	4.30	5.70	1.596	9.87	74.5	200	0.35	19.40	0.62	0.62	
To Trunk 3, Pipe 309A - 2000A							4.70	504						1.0				5.70										

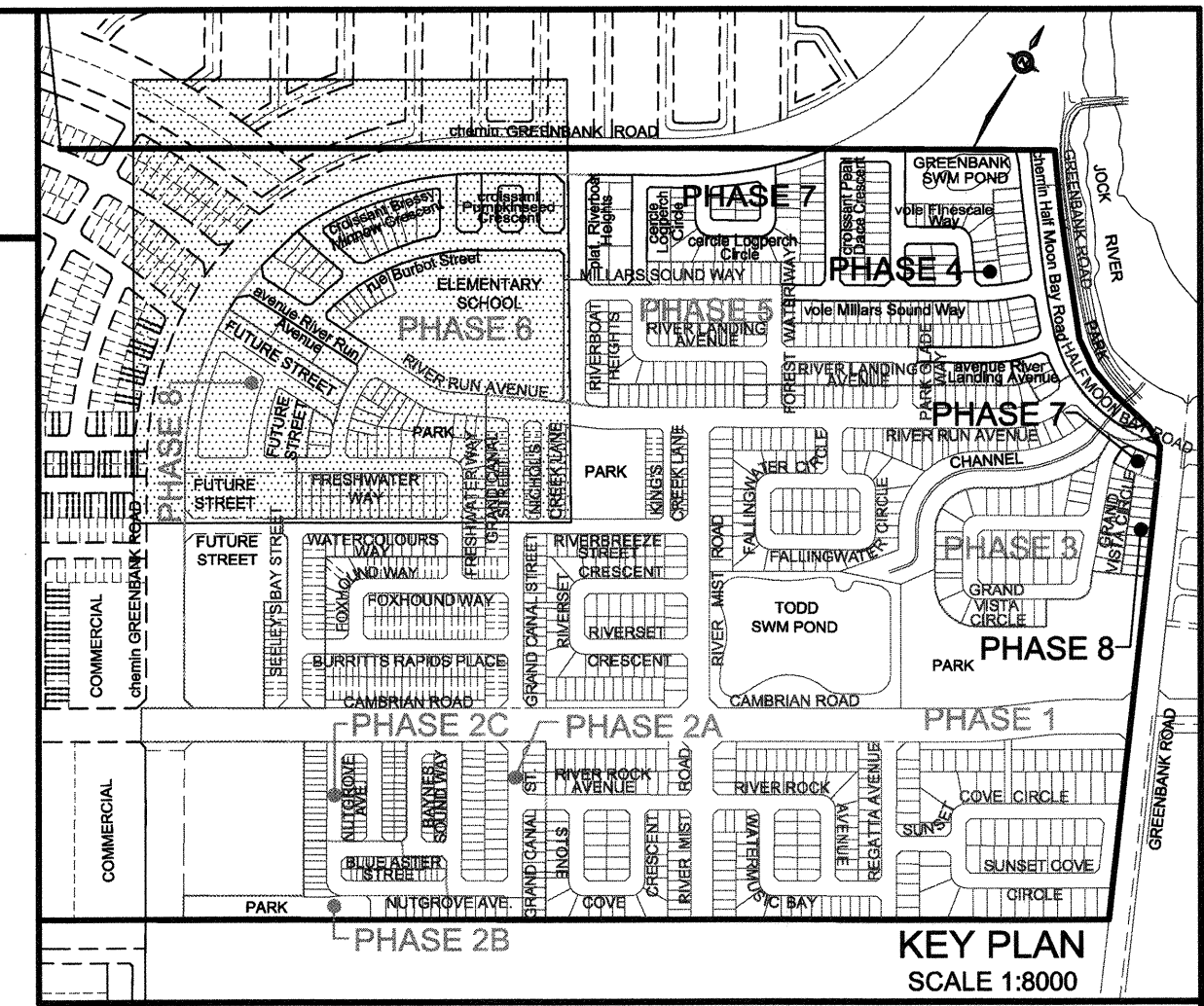
DESIGN PARAMETERS					Designed:		PROJECT:					
Park Flow =	9300	L/ha/da			P.P		HALF MOON BAY WEST FSR - SUBMISSION 3					
Average Daily Flow =	350	l/p/day	Industrial Peak Factor = as per MOE Graph									
Comm/Inst Flow =	50000	L/ha/da	Extraneous Flow =		0.280	L/s/ha						
Industrial Flow =	35000	L/ha/da	Minimum Velocity =		0.600	m/s						
Max Res. Peak Factor =	4.00		Manning's n =		0.013							
Commercial/Inst peak Factor =	1.50		Townhouse coeff=		2.7							
Institutional	0.58	l/s/Ha	Single house coeff=		3.4							
					Dwg. Reference:		File Ref:		Date:		Sheet No.	
					APP01		16-888		February, 2019		1 of 2	

SANITARY SEWER CALCULATION SHEET

Manning's $n=0.013$ [illegible]

DESIGN PARAMETERS				Designed:	PROJECT:			
Park Flow =	9300	L/ha/da		P.P	HALF MOON BAY WEST FSR - SUBMISSION 3			
Average Daily Flow =	350	l/p/day	Industrial Peak Factor = as per MOE Graph	Checked:	LOCATION:			
Comm/Inst Flow =	50000	L/ha/da	Extraneous Flow = 0.280 L/s/ha	K.M	City of Ottawa			
Industrial Flow =	35000	L/ha/da	Minimum Velocity = 0.600 m/s					
Max Res. Peak Factor =	4.00		Manning's n = 0.013					
Commercial/Inst peak Factor =	1.50		Townhouse coeff= 2.7	Dwg. Reference:	File Ref:	Date:	Sheet No.	
Institutional	0.58	l/s/Ha	Single house coeff= 3.4	APP01	16-888	February, 2019	2 of 2	

REVIEWED BY DEVELOPMENT REVIEW BRANCH
SIGNED *David Schaeffer*
DATE *Sept 2, 2016*
PLAN NUMBER *14942*



LEGEND

- SANITARY DRAINAGE BOUNDARY
SANITARY SUB-DRAINAGE BOUNDARY
- UPSTREAM MH TO DOWNSTREAM MH
AREA IN HECTARES
POPULATION
- UPSTREAM MH TO DOWNSTREAM MH
AREA IN OTHER PHASES IN HECTARES
POPULATION
- EXTERNAL AREA IN HECTARES
EXTERNAL POPULATION
DENSITY (PERSONS/HECTARE)
EXTERNAL LAND USE
- MAINTENANCE HOLE
CAP

TOPOGRAPHIC INFORMATION

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

LEGAL INFORMATION

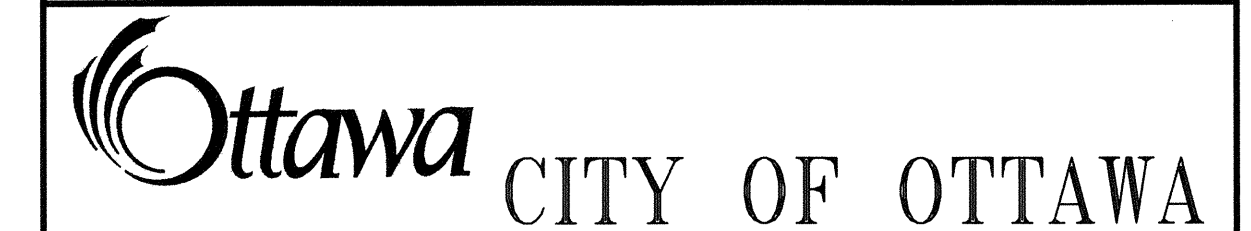
CALCULATED DRAFT PLAN PROVIDED BY J.D. BARNES LIMITED,
PROJECT No. 07-10-767-00 (HALF MOON BAY PHASE 4 AND 7),
SURVEY DATED APRIL 22, 2016.

2nd RE-SUBMISSION 16-07-22


BENCH MARK No. 00820010126

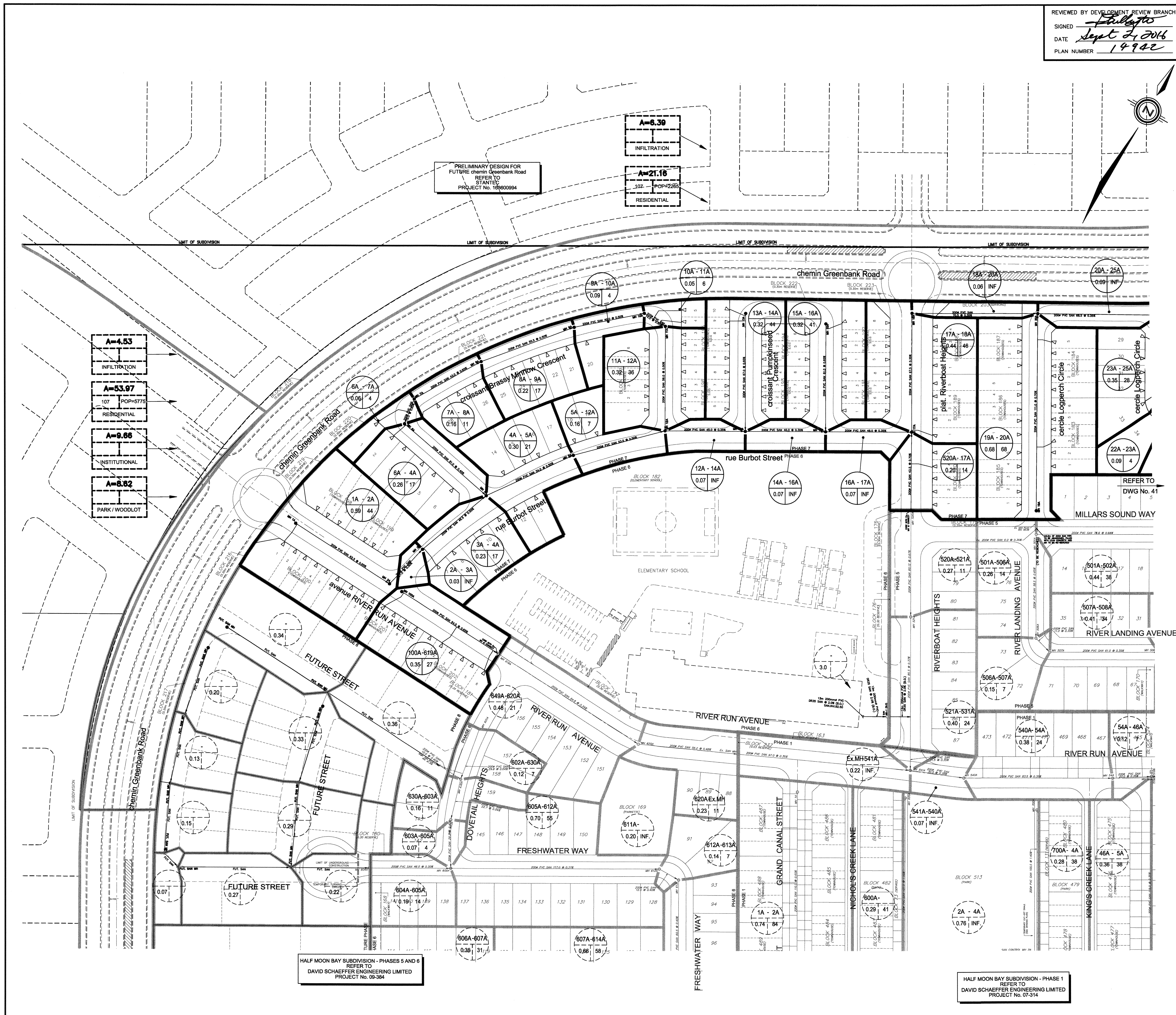
POINT IS LOCATED 1.65km NORTH OF BARNSDALE ROAD AND 5km SOUTH OF FALLOWFIELD ROAD ON HIGHWAY 416
NORTH OF KEMPVILLE. THE POINT IS SET EAST OF THE NORTHBOUND LANE IN THE GRASSY SHOULDER.
ELEVATION = 96.923 m

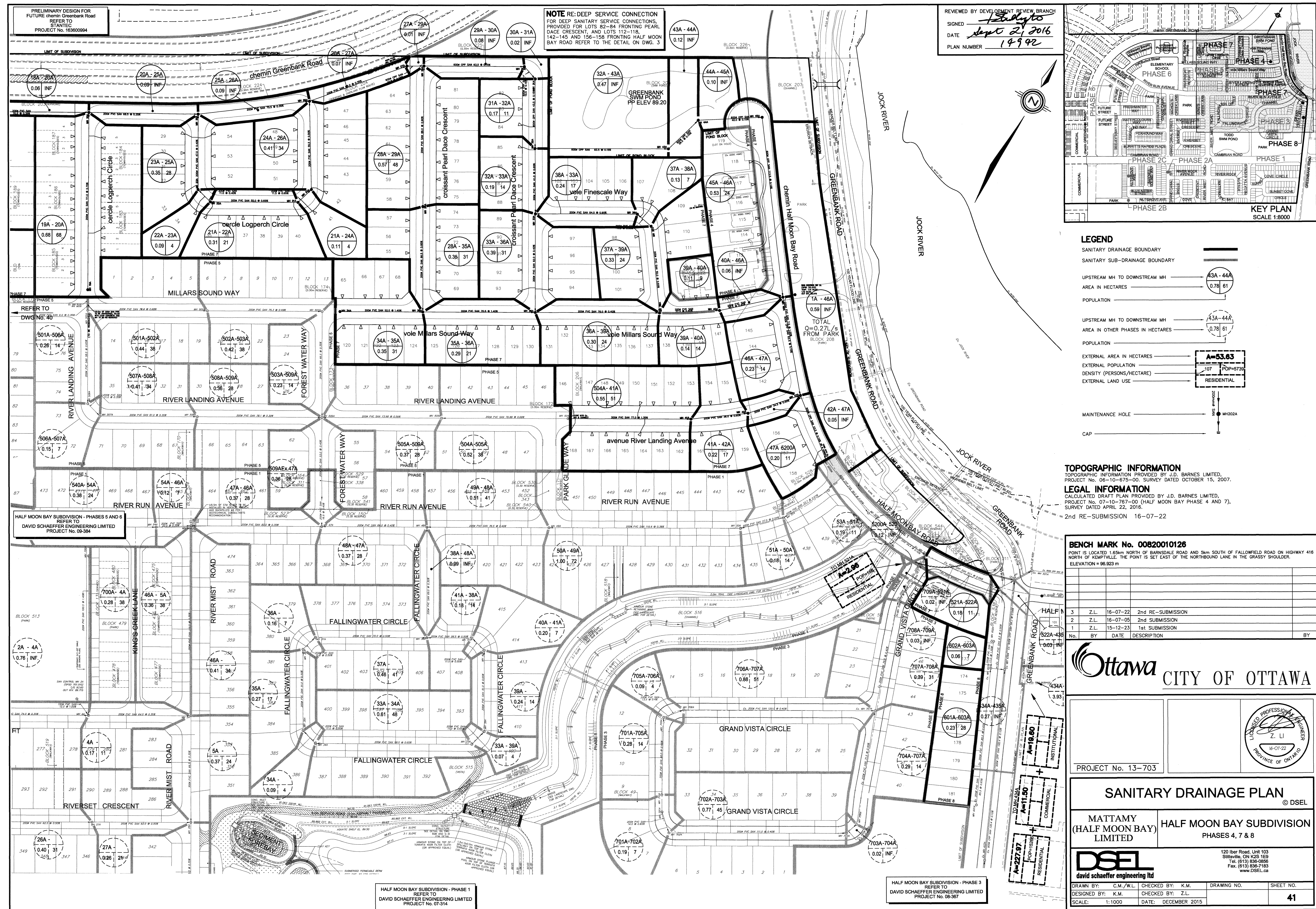
No.	BY	DATE	DESCRIPTION	BY
3	Z.L.	16-07-22	2nd RE-SUBMISSION	
2	Z.L.	16-07-05	2nd SUBMISSION	
1	Z.L.	15-12-23	1st SUBMISSION	



PROJECT No. 13-703	
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SANITARY DRAINAGE PLAN			
© DSEL			
MATTAMY (HALF MOON BAY) LIMITED		HALF MOON BAY SUBDIVISION PHASES 4, 7 & 8	
		120 Iber Road, Unit 103 Stittsville, ON K2S 1E9 Tel. (613) 836-0586 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.		
SCALE: 1:1000	DATE: DECEMBER 2015		40



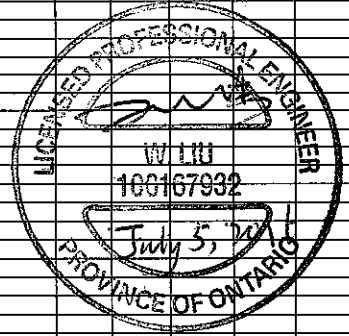


SANITARY SEWER CALCULATION SHEET

Manning's n=0.013



LOCATION		RESIDENTIAL AREA AND POPULATION						EMPLOYMENT		INSTITUTIONAL		COMMERCIAL		PARK		C+H		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)
Block 203 (Servicing)																											
Contribution From plat. Riverboat Heights, Pipe 17A - 18A						3.96	329										3.96	3.96									
	18A	20A	0.06	0	0	4.02	329	4.00	5.33								0.06	4.02	1.126	6.46	70.5	200	0.35	19.40	0.33	0.62	0.56
To circle Logperch Circle, Pipe 20A - 25A						4.02	329																				
circle Logperch Circle																											
	19A	20A	0.68	25	68	0.68	68	4.00	1.10								0.68	0.68	0.190	1.29	111.0	200	0.70	27.44	0.05	0.87	0.44
Contribution From Block 203 (Servicing), Pipe 18A - 20A						4.02	329										4.02	4.70									
	20A	25A	0.09	0	0	4.79	397	4.00	6.43								0.09	4.79	1.341	7.77	68.5	200	0.35	19.40	0.40	0.62	0.59
Contribution From circle Logperch Circle, Pipe 23A - 25A						0.75	53										0.75	5.54									
	25A	26A	0.09	0	0	5.63	450	4.00	7.29								0.09	5.63	1.576	8.87	70.5	200	0.35	19.40	0.46	0.62	0.60
To Block 204, Pipe 26A - 27A						5.63	450																				
	21A	22A	0.31	6	21	0.31	21	4.00	0.34								0.31	0.31	0.087	0.43	55.0	200	0.65	26.44	0.02	0.84	0.30
	22A	23A	0.09	1	4	0.40	25	4.00	0.41								0.09	0.40	0.112	0.52	11.0	200	0.40	20.74	0.03	0.66	0.27
	23A	25A	0.35	8	28	0.75	53	4.00	0.86								0.35	0.75	0.210	1.07	47.0	200	0.40	20.74	0.05	0.66	0.34
To circle Logperch Circle, Pipe 26A - 26A						0.75	53																				
	21A	24A	0.11	1	4	0.11	4	4.00	0.06								0.11	0.11	0.031	0.09	11.5	200	0.65	26.44	0.003	0.84	0.19
	24A	26A	0.41	10	34	0.52	38	4.00	0.62								0.41	0.52	0.146	0.77	55.5	200	0.50	23.19	0.03	0.74	0.33
To circle Logperch Circle, Pipe 26A - 27A						0.52	38																				
Block 204 (Servicing & Overland Flow Route)																											
Contribution From STREET 5, Pipe 25A - 26A						5.63	450										5.63	5.63									
Contribution From STREET 6, Pipe 24A - 26A						0.52	38										0.52	6.15									
	26A	27A	0.07	0	0	6.22	488	3.98	7.87								0.07	6.22	1.742	9.61	65.0	200	0.35	19.40	0.50	0.62	0.62
			58.50		5775	58.50	5775										58.50	64.72									
Contribution From Greenbank Road						27.55	2265	3.05	99.34					9.66	9.66	8.62	45.83	110.55	30.954	140.07	5.0	600	0.15	237.81	0.59	0.84	0.87
	27A	29A	0.01	0	0	92.28	8528	3.02	104.33						9.66	9.78	0.01	110.56	30.957	145.07	10.5	800	0.15	237.81	0.61	0.84	0.88
To croissant Pearl Dace Crescent, Pipe 27A - 29A						92.28	8528								9.66	8.62											
croissant Pearl Dace Crescent																											
	28A	35A	0.35	9	31	0.35	31	4.00	0.50								0.35	0.35	0.098	0.60	66.5	200	0.85	30.24	0.02	0.96	0.37
To voie Millars Sound Way, Pipe 35A - 36A						0.35	31																				
	28A	29A	0.57	14	48	0.57	48	4.00	0.78								0.57	0.57	0.160	0.94	88.0	200	0.90	31.12	0.03	0.99	0.43
Contribution From Block 204 (Servicing & Overl. Flow Route), Pipe 27A - 29A						92.28	8528							9.66	9.66		110.56	111.13									
	29A	30A	0.08	0	0	92.93	8576	3.02	104.92						9.66	8.62	0.08	111.21	31.139	145.84	63.0	600	0.15	237.81	0.61	0.84	0.88
	30A	31A	0.02	0	0	92.95	8576	3.02	104.92						9.66	8.62	0.02	111.23	31.144	145.84	10.5	800	0.15	237.81	0.61	0.84	0.88
	31A	32A	0.17	3	11	93.12	8587	3.02	105.05						9.66	8.62	0.17	111.40	31.192	146.02	43.5	600	0.15	237.81	0.61	0.84	0.88
To Pond Block, Pipe 32A - 43A						93.12	8587								9.66	8.62											
	32A	33A	0.19	4	14	0.19	14	4.00	0.23								0.19	0.19	0.053	0.28	41.0	200	0.65	26.44	0.01	0.84	0.27
Contribution From voie Finescale Way, Pipe 38A - 33A						0.37	24										0.37	0.56									
	33A	36A	0.39	9	31	0.95	69	4.00	1.12								0.39	0.95	0.266	1.39	62.0	200	0.40	20.74	0.07	0.66	0.37
To voie Millars Sound Way, Pipe 36A - 39A						0.95	69																				



DESIGN PARAMETERS										Designed:		PROJECT:			
Average Daily Flow =		350	l/p/day	Industrial Peak Factor = as per MOE Graph				K.M.		HALF MOON BAY SUBDIVISION, PHASES 4, 7 & 8					
Employment/Comm/Inst Flow =		50000	L/ha/da	Extraneous Flow =		0.280	L/s/ha	Checked:		LOCATION:					
Park Average Flow =		9300	L/ha/da	Minimum Velocity =		0.60	m/s	Z.L.		City of Ottawa					
Max Res. Peak Factor =		4.00		Manning's n =		0.013		Dwg. Reference:		File Ref:		Date:	Sheet No.		
Employment / Comm / Inst / Park peak Factor =		1.50		Townhouse coeff=		2.7		Sanitary Drainage Plan, Dwg. 40.41		13-703		July, 2016	2 of 4		
				Single house coeff=		3.4									



The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.

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 BARRHAVEN SOUTH COMMUNITY
BOUNDARY

 FUTURE NODES

 FUTURE SEWER

— EXISTING SEWER (FROM 2007 MSS)

 RIVER

 100 YEAR FLOOD PLAIN

 SANITARY DRAINAGE CATCHMENTS

Area Name Area (ha) SANITARY CATCHMENT INFORMATION

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	14.11.2014
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project

CITY OF OTTAWA

BARRHAVEN SOUTH MASTER
SERVICING STUDY ADDENDUM

Ottawa, ON

Title
SANITARY SERVICING PLAN

Project No. 163400999

Scale 0 75 150
1:5,000
Meters

Drawing No.	Sheet	Revision
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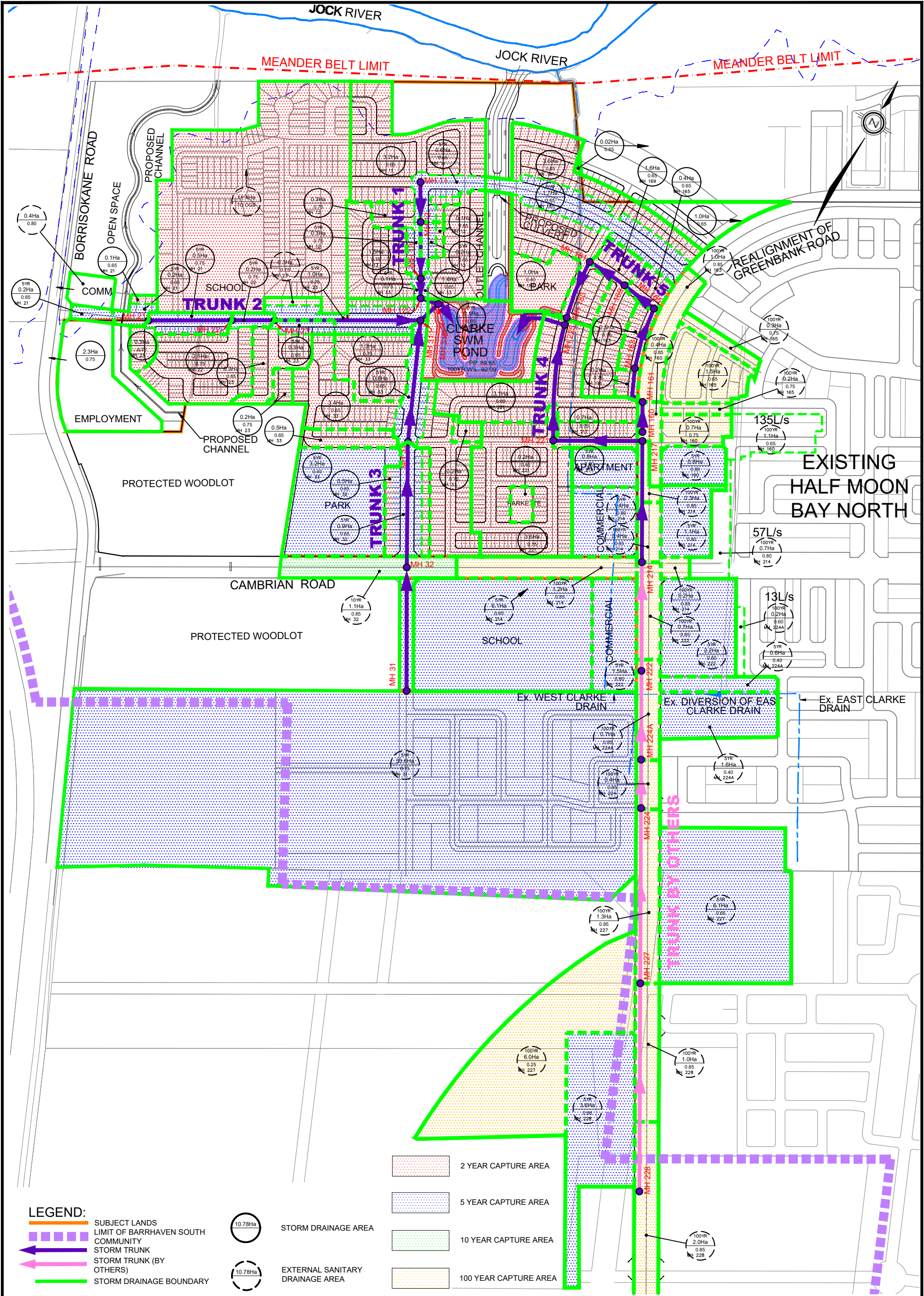
A-4 1



		Area:		BARRHAVEN SOUTH MASTER SERVICING STUDY		SANITARY SEWER DESIGN SHEET (City of Ottawa)										DESIGN PARAMETERS																As per CDP (units/ha)						
DATE:		2017/09/29		FILE NUMBER:		163400999		Colour code:		HMB values		MAX PEAK FACTOR (RES.)=		4.0		AVG. DAILY FLOW / PERSON		350 L/p/day		MINIMUM VELOCITY		0.60 m/s		LOW DENSITY RESIDENTIAL		26												
REVISION:		2						MIN PEAK FACTOR (RES.)=		2.0		COMMERCIAL		50,000 L/ha/day		MAXIMUM VELOCITY		3.00 m/s		SEMI-DETACHED		52																
DESIGNED BY:		LP						PEAKING FACTOR (INDUSTRIAL):		2.4		INDUSTRIAL (HEAVY)		55,000 L/ha/day		MANNINGS n		0.013		TOWN HOUSES		82																
CHECKED BY:		/						PEAKING FACTOR (COMM., INST.):		1.5		INDUSTRIAL (LIGHT)		35,000 L/ha/day		BEDDING CLASS		B		APARTMENTS		120																
								Calculated value		Estimated value		PERSONS / SINGLE UNIT		3.4		INSTITUTIONAL		50,000 L/ha/day		MINIMUM COVER		2.50 m		COMMUNITY CORE		60												
								updated value		Value from subdivision design		PERSONS / TOWNHOME		2.7		INFILTRATION		0.28 L/s/ha																				
												PERSONS / APARTMENT		1.8										AVERAGE PERSONS/ha		107												
LOCATION				RESIDENTIAL AREA AND POPULATION										COMMERCIAL		INDUSTRIAL (L)		INDUSTRIAL (H)		INSTITUTIONAL		GREEN / UNUSED		C++I		INFILTRATION			TOTAL	PIPE								
AREA ID NUMBER		Source		FROM M.H.	TO M.H.	DEV AREA (ha)	DEV POP	ADD'N RES AREA (ha)	ADD'N POP	TOTAL AREA (ha)	TOTAL 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)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (L/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (L/s)	TOTAL FLOW (L/s)	LENGTH (m)	DIA (mm)	MATERIAL	SLOPE (%)	CAP. (FULL) (L/s)	CAP. V PEAK FLOW (%)	VEL. (FULL) (m/s)	VEL. (ACT.) (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	2.8	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	2.8	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	2.8	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
		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	2.8	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	2.8	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	2.8	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
		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	4.9	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
		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	4.9	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	4.9	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	4.9	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
		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	4.9	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	4.9	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	4.9	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
		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	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	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	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		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	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			

APPENDIX D

**HMB WEST – STORM DRAINAGE AREA PLAN
HMB WEST - STORM DESIGN SHEETS**



STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

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



Manning0.013

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			
Location	From Node	To Node	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	Conc. (min)	2 Year (mm/h)	5 Year (mm/h)	10 Year (mm/h)	100 Year (mm/h)	Q (l/s)	(actual)	(nominal)		(%)	(m)	(l/s)	(m/s)	FLOW (min.)	Q/Q full		
CONCENTRATED FLOWS CALCULATION																																			
Ex. Rear Yards (Phase 2) to MH 224A																																			
							0.20	0.60	0.33	0.33					0.20	0.60	0.33	0.33	28.29					95.60	32	(100 YR)									
																					56.10				19	(5 YR)									
																								13	(100 - 5) YR										
Ex. Rear Yards and Half of Street (Phase 6) to MH 214																0.70	0.80	1.56	1.56	31.23					89.37	139	(100 YR)								
							0.70	0.80	1.56	1.56											52.47				82	(5 YR)									
																								57	(100 - 5) YR										
Ex. Rear Yards and Part of Street (Phase 6) to MH 160																1.10	0.65	1.99	1.99	11.85					163.25	324	(100 YR)								
							1.10	0.65	1.99	1.99														190	(5 YR)										
																								135	(100 - 5) YR										
Greenbank Road to MH 160															0.30	0.85	0.71	0.71	10.00					178.56	127	(100 YR)									
																								87	(10 YR)										
																								40	(100 - 10) YR										
TRUNK BY OTHERS																																			
	228	227				0.00	3.60	0.66	6.61	6.61					2.00	0.85	4.73	4.73											Estimated Length =	350 m	Estim. tc =	12.92			
Ex. Pre-Development						0.00				6.61					0.00	1.00	0.85	2.36	7.09	12.92	67.17	90.95	106.55	155.67	1704	900	900	CONC	1.70	361.0	2360	3.71	1.62	0.72	
	227	224				0.00	6.10	0.65	11.02	17.63					0.00	1.30	0.85	3.07	14.33	26.67	43.30	58.35	68.24	99.48	2454	1200	1200	CONC	1.70	304.0	5083	4.49	1.13	0.48	
	224	224A				0.00				17.63					0.00	0.40	0.85	0.95	15.28	27.80	42.13	56.77	66.38	96.75	2479	1500	1500	CONC	0.50	84.0	4998	2.83	0.49	0.50	
	224A	222				0.00	2.20	0.40	2.45	20.07					0.00	0.70	0.85	1.65	16.93	28.29	41.64	56.10	65.60	95.60	13	(100 - 5) YR									
						0.00	2.20	0.80	4.89	24.97					0.00				16.93																
	222	214				0.00	1.50	0.80	3.34	28.30					0.00	0.70	0.85	1.65	18.58	29.62	40.39	54.40	63.60	92.68	3275	2100	2100	CONC	0.15	188.0	6715	1.94	1.62	0.49	
To TRUNK 4, Pipe 214 - 217						0.00				28.30					0.00				18.58	31.23						13	(100 - 5) YR								
TRUNK 4																																			
Contribution from Trunk By Others						0.00				28.30					0.00				18.58	31.23						13	(100 - 5) YR								
						0.00				39.33					0.00	0.20	0.85	0.47	19.06																
						0.00	6.10	0.65	11.02	41.77					0.00	1.20	0.85	2.84	21.89																
						0.00	0.80	0.80	1.78	43.55					0.00	0.40	0.85	0.95	22.84																
	214	217				0.00	1.40	0.80	3.11	46.67					0.00	0.30	0.85	0.71	23.55	31.23	38.97	52.47	61.34	89.37	4624	2550	2550	CONC	0.15	210.0	11270	2.21	1.59	0.41	
	217	221	0.70	0.75	1.46	1.46				46.67					0.00				23.55	32.82	37.68	50.72	59.29	86.36	4526	2550	2550	CONC	0.15	154.5	11270	2.21	1.17	0.40	
			3.60	0.75	7.51	8.97				46.67					0.00				23.55																
			3.10	0.65	5.60	14.57				46.67					0.00				23.55																
	221	225	0.20	0.40	0.22	14.79				46.67					0.00				23.55	33.99	36.80	49.52	57.87	84.29	4910	2700	2700	CONC	0.15	208.0	13126	2.29	1.51	0.37	
	225	HW				14.79				46.67					0.00				23.55	35.50	35.71	48.04	56.15	81.77	4766	2700	2700	CONC	0.15	72.5	13126	2.29	0.53	0.36	
To Clarke SWM Pond						14.79				46.67					0.00				23.55	36.02						71	(100 - 5) YR								
TRUNK 5																																			
						0.00				0.00					0.00	0.70	0.75	1.46	1.46							40	(100 - 10) YR								
	160	161				0.00	0.80	0.80	1.78	1.78					0.00	0.40	0.85	0.95	2.40	11.85	70.36	95.34	111.72	163.25	135	(100 - 5) YR						Estim. tc =	11.85		
	161	163	0.20	0.75	0.42	0.42				1.78					0.00				2.40	12.40	68.67	93.02	108.99	159.24	737	1050	1050	CONC	0.25	52.0	1365	1.58	0.55	0.54	
	163	165	0.50	0.75	1.04	1.46				1.78					0.00	1.00	0.85	2.36	4.77	13.04	66.81	90.47	105.98	154.83	752	1050	1050	CONC	0.30	66.5	1496	1.73	0.64	0.50	
						1.46				1.78					0.00	1.50	0.65	2.71	7.48																
						1.46				1.78					0.00	0.20	0.75	0.42	7.90																
	165	169	0.40	0.65	0.72	2.18				1.78					0.00	0.30	0.75	0.63	8.52	14.71	62.46	84.51	98.97	144.53	1693	1500	1500	CONC	0.12	79.0	2449	1.39	0.95	0.69	
	169	181	1.60	0.65	2.89	5.07				1.78					0.00				8.52	15.66	60.25	81.48	95.41	139.32	1813	1500	1500	CONC	0.12	77.5	2449	1.39	0.93	0.74	
	181	183	3.60	0.65	6.51	11.58	1.70	0.65	3.07	4.85					0.00				8.52	16.59	58.25	78.74	92.19	134.59	2378	1800	1800	CONC	0.15	91.5	4452	1.75	0.87	0.53	
	183	HW	1.00	0.40	1.11	12.69				4.85					0.00				8.52	17.46	56.50	76.36	89.39	130.48	2374	1800	1800	CONC	0.15	83.5	4452	1.75	0.80	0.53	
To Clarke SWM Pond						12.69				4.85					0.00				8.52	18.26						175	*Additional calculated flow (see above)								
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: P.P.				PROJECT: HALF MOON BAY WEST FSR - SUBMISSION 3			
																								Checked: K.M.				LOCATION: City of Ottawa							
Dwg. Reference: APP02																								File Ref: 16-888				Date: February, 2019				Sheet No. 1 of 2			

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

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

[illegible]

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

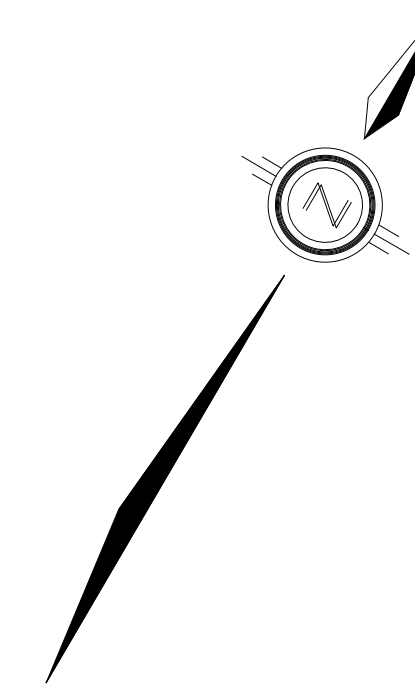
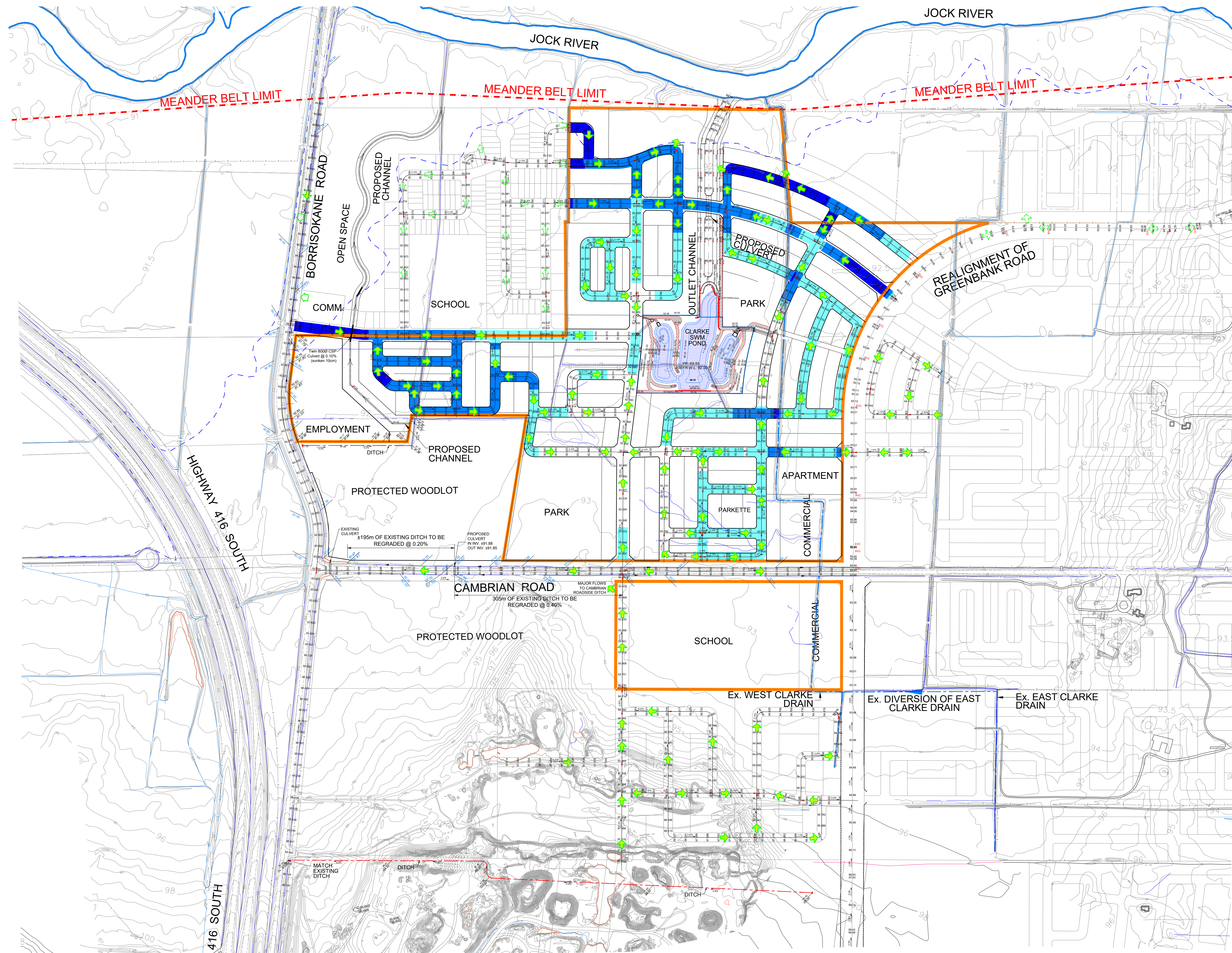
Notes:

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

Designed: P.P.	PROJECT: HALF MOON BAY WEST FSR - SUBMISSION 3		
Checked: K.M.	LOCATION: City of Ottawa		
Dwg. Reference: APP02	File Ref: 16-888	Date: Febuary, 2019	Sheet No. 2 of 2

APPENDIX E

FULL SIZE GRADING PLAN



NOTE:
GREENBANK ROAD GRADING AS
PER STANTEC, GREENBANK ROAD
REALIGNMENT, JUNE 2017.

LEGEND:

- SITE BOUNDARY
- STORM OVERLAND FLOW ARROW
- PROPOSED CENTERLINE ELEVATION
- PROPOSED ELEVATION
- EXISTING ELEVATION
- EXISTING CONTOUR ELEVATION

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	> 1.5



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**HALF MOON BAY WEST
CONCEPTUAL GRADING PLAN
SUMP PUMPS / SUBMERGED SEWER
CITY OF OTTAWA**

PROJECT No. : 16-888
SCALE: 1:3500
DATE: FEBRUARY 2019
DRAWING No. 1

APPENDIX F

PROPOSED SUMP PUMP DETAIL

TECHNICAL BULLETIN ISTB-2018-04

