SERVICING AND STORMWATER MANAGEMENT REPORT

Project Name: 555 Dealership Drive – Barrhaven Ford

Project No.: CP-18-0254

Prepared for:

BBS Construction Ltd.
1805 Woodward Drive
Ottawa, ON
K2C 0P9

Prepared by:

McIntosh Perry
115 Walgreen Road
Carp, ON
K0A 1L0

Rev3 – November 19, 2018

McINTOSH PERRY

TABLE OF CONTENTS

APPENDICES

1.0 PROJECT DESCRIPTION

1.1 Purpose

This report will address the servicing (water, sanitary, and storm) and stormwater management requirements associated with the proposed development located at 555 Dealership Drive within the City of Ottawa.

1.2 Site Description

The property is located at 555 Dealership Drive within the approved Citi Gate 416 Corporate Campus Development (City File Number D07-16-12-0023). It is described as Block 11, Registered Plan 4M-1538, City of Ottawa. The land in question covers approximately 2.72 ha and is located at the northeast corner of future Citi Gate Drive and Dealership Drive.

The existing site is currently undeveloped and is made up of grass areas, low lying vegetation and a stock pile of top soil. The proposed site will be serviced from existing water, sanitary and storm sewers from Citi Gate Drive and Dealership Drive as well as the downstream SWM facility previously constructed as part of the Citi Gate development.

The proposed development consists of a 3,291 m² automobile dealership. Parking and drive aisles will be provided throughout the site along with landscaping. There will be two site accesses for the development extending from Dealership Drive, with a future entrance proposed at the rear of the building from Citi Gate Drive.

Figure 1: Key Map: 555 Dealership Drive, Ottawa

2.0 BACKGROUND STUDIES

Background studies that have been completed for the site include review of the City of Ottawa as-built drawings, Citi Gate 416 Corporate Campus Development plans and reports, a topographical survey of the site, a geotechnical report and a traffic impact statement.

As-built drawings of the existing services within the vicinity of the site were reviewed in order to determine proper servicing and stormwater management schemes for the site.

The original Citi Gate 416 Corporate Campus Development plans and reports (City File Number D07-16-12-0023) were reviewed for the Block 11 specific design criteria.

A topographic survey of the site was completed by Farley, Smith & Denis Surveying Ltd. dated June 8, 2018 and can be found under separate cover.

3.0 PRE-CONSULTATION SUMMARY

Specific design parameters to be incorporated within this design include the following:

Based on a runoff coefficient of C = 0.80:

- 5-year peak flow can be released uncontrolled.
- The maximum release rate is not to exceed 120% of the 5-year peak flow for all storms up to and including the 100-year event.
- Ensure no overland flow for all storms up to and including the 100-year event.
- The Rideau Valley Conservation Authority (RVCA) is to be contacted during design of the subject site.

4.0 EXISTING SERVICES

4.1 Dealership Drive

There is an existing 450 mm diameter concrete sanitary main located within Dealership Drive as well as a 1,350 mm diameter concrete storm sewer. There is also a 250 mm diameter watermain within Dealership Drive that is looped to Philsar Street.

4.2 Future Citi Gate Drive

Prior to construction of the proposed site, Citi Gate Drive will have a 250 mm diameter PVC sanitary sewer as well as a 750 mm and 1200 mm diameter concrete storm sewer. The 250 mm diameter watermain will extend from Dealership Drive north along the frontage of the proposed site. Three hydrants will be located on the east boulevard.

5.0 SERVICING PLAN

5.1 Water Servicing

A new 50 mm PVC diameter water lateral will be connected to the existing 250 mm PVC watermain within Citi Gate Drive, complete with the water valve located at the property line to service the building. A private hydrant including water valve will be located within the site and will connect to the existing 250mm PVC diameter main within Dealership Drive.

The proposed building will be equipped with a sprinkler system for fire protection. The required fire flow from the Ontario Building Code (OBC) is 5,400 L/min (See Appendix 'B' for calculation). The required fire protection from the Fire Underwriters Survey (FUS) is 5,000 L/min (provided for information purposes only). This required fire flow is consistent with the flows calculated within the Citi Gate SWM report for large and medium size buildings (Section 5.3, Table 5.5 of the Citi Gate report). The Citi Gate report states that the proposed watermain is capable of meeting all design criteria for the initial and ultimate buildout. Available flows from the hydrants along Dealership Drive have been requested, however were not available for the submission of this report.

The water demands for the new buildings have been calculated as per the Ottawa Design Guidelines – Water Distribution and are as follows: the average and maximum daily demands are 1.09 L/s and 1.63 L/s respectively. The maximum hourly demand was calculated as 2.93 L/s (Refer to Appendix 'B' for flow details).

Boundary conditions have been provided by the City of Ottawa and are available in Appendix 'B'. It is anticipated the existing 250 mm watermain within Dealership Drive and Citi Gate Drive can adequately service the proposed development.

5.2 Sanitary Servicing

A new 200 mm diameter gravity sanitary service will be connected to the existing 200 mm diameter PVC sanitary stub extended from Citi Gate Drive. The sanitary service will be complete with a monitoring manhole (MMH1A) inside the property line as per the Ottawa Sewer Design Guidelines (SDG) SDG002, October 2012, City of Ottawa, Clause 4.4.4.7 and City of Ottawa Sewer-Use By-Law 2003-514 (14).

The peak design flow for the proposed site was determined to be 0.3 L/s, which is well within the available capacity of the proposed 200 mm diameter lateral (See Appendix 'C' for detailed calculations). It is anticipated that there will be no issues with capacity constraints within the proposed lateral or the existing sanitary main within Citi Gate Drive as the amount of flow leaving the site is below the flow assumption of 1.86 L/s noted within the Citi Gate report. This flow was determined using the building occupancy and car wash load.

Therefore, the proposed 200 mm sanitary lateral on site has the capacity to accommodate the sanitary flows for the proposed development.

5.3 Storm Servicing

Site runoff within the development area will sheet flow to the new storm network within the parking lot areas. The new storm sewer network will direct runoff from the site to the storm monitoring manhole at the southwest entrance of the site before it outlets the existing 1350 mm diameter storm sewer in Dealership Drive. The sewer within Dealership drive then drains to the existing MOECC approved SWM facility. The storm system will be further detailed in Section 6.0.

6.0 STORMWATER MANAGEMENT

Stormwater management for this site will be maintained through positive drainage away from the proposed building and into a new underground storm sewer system within the site. This SWM plan will protect the receiving waterways from excessive erosion by implementing velocity and quantity control strategies. The storm runoff will enter the pipe system through catchbasins (CB's) and catchbasin manholes (CBMH's) located throughout the site. The restricted stormwater runoff and emergency overland flow will be directed to the existing storm sewer located along the south side of the site along Dealership Drive. The quantitative and qualitative properties of the storm runoff for both the pre- and post-development flows are further detailed below.

6.1 Design Methodology

Runoff calculations in this report are derived using the Rational Method, given as:

Q=2.78 CIA (L/s)

Where; C=Runoff coefficient
I=Rainfall intensity in mm/hr.
A=Drainage area in hectares

It is recognized that the rational method tends to overestimate runoff rates. As a by-product of using extremely conservative prediction method, any facilities that are sized using these results are expected to function as intended in real world conditions.

In conjunction with the City of Ottawa Sewer Design Guidelines the following runoff coefficients were used to develop a balanced 'C' for each drainage area:

Building roofs, asphalt & concrete	0.90
Grass & undeveloped areas	0.20
Gravel	0.60

As per the City of Ottawa Sewer Design Guidelines, the 5-year balanced 'C' value must be increased by 25% for a 100-year storm event to a maximum of 1.0. In a revision to the guidelines, a technical bulletin was released (PIEDTB-2016-01) which states that the 2-year flow cannot be stored on the surface.

As per the pre-consultation meeting with the City of Ottawa the time of concentration (Tc) used for pre-development and post-development flows shall be calculated using a time of concentration (Tc) of 10 minutes.

6.2 Site Drainage

6.2.1 Pre-Development Drainage

The existing site has been demonstrated as drainage area A1. Drawing CP-18-0254 PRE (Appendix 'D') indicates the limits of these drainage areas.

Table 1: Pre-Development Runoff Calculations

Drainage Area	Area (ha)	C 2&5-Year	C 100-Year	Tc (min)	I (mm/hr)			Q (L/s)		
					2-Year	5-Year	100-Year	2-Year	5-Year	100-Year
A1	2.72	0.20	0.25	10	76.8	104.2	178.6	116.01	157.37	337.12
Total	**2.72**							**116.01**	**157.37**	**337.12**

(See Appendix 'F' for calculations)

6.2.2 Post-Development Drainage

The proposed site has been demonstrated as drainage areas B1-B9. Drawing CP-18-0254 Post (Appendix 'E') indicates the limits of these drainage areas.

Table 2: Post-Development Runoff Calculations

Drainage Area	Area (ha)	C 2&5-Year	C 100-Year	Tc (min)	I (mm/hr)			Q (L/s)		
					2-Year	5-Year	100-Year	2-Year	5-Year	100-Year
B1	0.30	0.90	1.00	10	76.8	104.2	178.6	58.32	79.12	150.65
B2	0.34	0.90	1.00	10	76.8	104.2	178.6	65.28	88.56	168.62
B3	0.16	0.85	0.94	10	76.8	104.2	178.6	28.84	39.13	74.68
B4	0.29	0.85	0.95	10	76.8	104.2	178.6	52.18	70.79	135.07
B5	0.33	0.90	1.00	10	76.8	104.2	178.6	62.83	85.24	162.31
B6	0.34	0.85	0.95	10	76.8	104.2	178.6	61.43	83.33	158.98
B7	0.42	0.87	0.97	10	76.8	104.2	178.6	79.13	107.35	204.65
B8	0.40	0.79	0.88	10	76.8	104.2	178.6	67.19	91.15	174.46
B9	0.14	0.21	0.26	10	76.8	104.2	178.6	6.12	8.31	17.68
Total	**2.71**							**481.34**	**652.98**	**1,247.10**

(See Appendix 'F' for calculations)

Runoff from areas B1 through B8 will be restricted prior to flowing to the existing storm sewer in Dealership Drive. The total flow leaving the site will be controlled by two inlet control devices located within CBMH4 and CBMH8, respectively. The inlet control devices have been sized to account for the uncontrolled flow from areas B9a & B9b (*See Appendix 'F' for calculations)*. These restrictions of runoff will be further detailed in Sections 6.3 and 6.4.

6.3 Quantity Control

The total post-development runoff for this site has been restricted to match the required flows within the Citi Gate SWM report. These values create the following allowable release rates and storage volume for the development site.

Table 3: Required Restricted Flow

Drainage Area	Area (ha)	C 2&5-Year	C 100-Year	Tc (min)	I (mm/hr)			Q (L/s)		
					2-Year	5-Year	100-Year	2-Year	5-Year	100-Year
A1	2.72	0.20	0.25	10	76.8	104.2	178.6	116.01	157.37	337.12

(See Appendix 'F' for calculations)

Reducing site flows will be achieved through flow restrictions, and will create the need for onsite storage. Runoff from areas B1 through B8 will be restricted and storage provided as detailed in the table below.

Table 4: Post-Development Restricted Runoff Calculations

Drainage Area	Unrestricted Flow (L/s)			Restricted Flow (L/s)			Storage Required (m^3)		
	2-Year	5-Year	100-Year	2-Year	5-Year	100-Year	2-Year	5-Year	100-Year
B1	58.32	79.12	150.65	159.72	159.72	159.72	35.19	71.82	237.89
B2	65.28	88.56	168.62						
B3	28.84	39.13	74.68						
B4	52.18	70.79	135.07						
B5	62.83	85.24	162.31	159.72	159.72	159.72	67.85	125.21	373.53
B6	61.43	83.33	158.98						
B7	79.13	107.35	204.65						
B8	67.19	91.15	174.46						
B9	6.12	8.31	17.68	6.12	8.31	17.68			
Total	**481.34**	**652.98**	**1,247.10**	**325.57**	**327.75**	**337.12**	**103.04**	**197.03**	**611.42**

(See Appendix 'F' for calculations)

Runoff from Areas B1 through B8 will be restricted at CBMH4 and CBMH8 with two Hydrovex 350VHV-2 ICDs or approved equivalents. Each ICD will restrict flow to 159.72 L/s for the 5 and 100-year storm events, respectively. The restriction for Areas B1 through B4 create a water surface elevation (WSEL) of 95.55 m for the 5-year storm event and 95.63 m for the 100-year storm event. The restriction for Areas B5 through B8 create a water surface elevation (WSEL) of 95.62 m for the 5-year storm event and 95.70 m for the 100-year storm event. The storage for these areas will be provided above the parking lot structures.

In the event that there is a rainfall above the 100-year storm event, or a blockage within the storm network, an emergency overland flow route has been provided such that the storm water runoff will be conveyed

towards the south east entrance to the site from Dealership Drive. An elevation difference of 0.30 m has been provided from the finished floor (96.00 m) of the building to the overland flow route elevation (95.70 m).

6.4 Quality Control

The development of this lot will employ Best Management Practices (BMP's) wherever possible. The intent of implementing stormwater BMP's is to ensure that water quality and quantity concerns are addressed at all stages of development. Lot level BMP's typically include temporary retention of the parking lot runoff, minimizing ground slopes and maximizing landscaped areas. This is consistent with the intent of the best management practices for stormwater management as outlined in the Citi Gate Report (2014) and the work invested into re-aligning and protecting the ecological health of O'Keefe drain's aquatic habitat.

As per Section 6.1.1 of the Citi Gate Report a Stormwater Management (SWM) Facility has been constructed on the west side of the O'Keefe Drain as part of the Phase 1 development of the Citi Gate Lands. This facility has been designed to accommodate runoff from all future development within the tributary drainage area, including Phases 1, 2 and adjacent lands. Additionally, the facility has been oversized to reduce the quantity control storage requirements for the lands on the east side of the O'Keefe Drain.

As the site is on the west side of the O'Keefe Drain, quality control is provided within the downstream SWM facility. The combination of the above BMP's and the sites flow control measures will aid in the thermal protection of O'Keefe Drain

7.0 SEDIMENT EROSION CONTROL

The site-grading contractor is responsible for ensuring sediment control structures are installed in accordance with the Site Grading and Drainage Plan as indicated. Silt fences shall be installed on site before construction or earth-moving operations begin, as shown on the Site Grading, Drainage and Sediment & Erosion Control Plan.

Inlet Sediment Control Devices are to be placed in all existing structures along the frontage of the site and any new structures immediately upon installation. The SCD's are to be removed only after all areas have been paved. Care shall be taken at the removal stage to ensure that any silt that has accumulated is properly handled and disposed of. Removal of silt fences without prior removal of the sediments shall not be permitted.

At the discretion of the project manager, municipal staff or conservation authority, additional silt control devices shall be installed at designated locations.

8.0 SUMMARY

- A new 3,291 m^2 automobile dealership will be constructed on the site located at 555 Dealership Drive (Block 11).
- A new 200 mm diameter sanitary service and monitoring manhole will be installed and be connected to the existing 250 mm diameter sanitary sewer in Citi Gate Drive.
- A new 50 mm diameter water lateral will be extended from the existing 250 mm diameter watermain in City Gate Drive to service the new building.
- A new private fire hydrant and 150 mm diameter lead will extend from the existing 250 mm diameter watermain in Dealership Drive.
- A new storm sewer network will be installed onsite and will connect to the existing 1,350 mm diameter storm sewer in Dealership Drive.
- The post-development flow rates conform to the allowable release rates from the Citi Gate SWM Report for the entire site area.
- Storage for the 5- through 100-year storm events will be provided within the parking lot areas above the proposed storm structures.
- An MOECC approved downstream SWM Facility (Block 12) has been constructed as part of the Citi Gate Development to ensure 80% TSS removal is achieved for the site.

9.0 RECOMMENDATIONS

We respectfully recommend that:

This report, dated November 19, 2018 and the associated Site Grading, Drainage and Sediment & Erosion Control Plan along with the Site Servicing Plan be approved for engineering details.

The sediment and erosion control plan outlined in Section 7.0 and detailed on the Site Grading, Drainage and Sediment & Erosion Control Plan notes are to be implemented by the contractor.

This report is respectfully being submitted for approval.

LICENSED PROFESSIONAL ENGINEER
2018/11/19
R. P. KENNEDY
100086734
PROVINCE OF ONTARIO

Peter Kirkimtzis, C.Tech.
Civil Engineer Technologist
McIntosh Perry
T: 613.836.2184 x 2262
E:p.kirkimtzis@mcintoshperry.com

Ryan Kennedy, P.Eng.
Practice Area Lead, Land Development
McIntosh Perry
T: 613.836.2184 x 2243
E:r.kennedy@mcintoshperry.com

H:\01 Project - Proposals\2018 Jobs\CP\0CP-18-0254 BBS_Barrhaven Ford_555 Dealership Drive\Civil\03 - Servicing\Report\Servicing_Report.docx

10.0 STATEMENT OF LIMITATIONS

This report was produced for the exclusive use of BBS Construction Ltd.. The purpose of the report is to assess the existing stormwater management system and provide recommendations and designs for the post-construction scenario that are in compliance with the guidelines and standards from the Ministry of the Environment and Climate Change, City of Ottawa and local approval agencies. McIntosh Perry reviewed the site information and background documents listed in Section 2.0 of this report. While the previous data was reviewed by McIntosh Perry and site visits were performed, no field verification/measures of any information were conducted.

Any use of this review by a third party, or any reliance on decisions made based on it, without a reliance report is the responsibility of such third parties. McIntosh Perry accepts no responsibility for damages, if any, suffered by any third party as a result of decisions or actions made based on this review.

The findings, conclusions and/or recommendations of this report are only valid as of the date of this report. No assurance is made regarding any changes in conditions subsequent to this date. If additional information is discovered or becomes available at a future date, McIntosh Perry should be requested to re-evaluate the conclusions presented in this report, and provide amendments, if required.

SERVICING AND STORMWATER MANAGEMENT REPORT

APPENDIX A
CITY OF OTTAWA PRE-CONSULTATION NOTES

McINTOSH PERRY

Peter Kirkimtzis

From: Frits Bosman <frits@bbsconstruction.ca>
Sent: Friday, May 11, 2018 10:51 AM
To: Curtis Melanson; Benjamin Clare
Subject: FW: 555 Dealership Drive

As discussed.

Frits J Bosman
President
BBS CONSTRUCTION (ONTARIO) LTD.
BBS CONSTRUCTION (CANADA) LTEE.
1805 Woodward Drive,
Ottawa, ON K2C 0P9
CANADA (613) 226-8830 Fax:(613) 226-7709

From: Charlene Brunet <charlene@butlergroup.ca>
Sent: Thursday, May 10, 2018 4:12 PM
To: Frits Bosman <frits@bbsconstruction.ca>
Subject: FW: 555 Dealership Drive

From: Robert Arnone [mailto:robert.arnone@rhcarter.com]
Sent: Thursday, May 10, 2018 3:18 PM
To: Charlene Brunet
Cc: Lynn Norton
Subject: Fw: 555 Dealership Drive

Hi Charlene,

Further to our conversation, please see the email from Melanie Gervais, Planner with the City of Ottawa, below as received on April 26th.

Her email outlines the terms of the meeting that Lynn and I had with various members of the Ottawa city staff.

The meeting was based on the review of our latest design (floor plan, site plan and elevation) that you have a copy of.

Please feel free to call me anytime to discuss further.

Regards,

Robert

Robert Arnone OAA, MRAIC, NCARB, LEED AP

robert.arnone@rhcarter.com

Office: +1 416-233-5583x225
Fax: (416) 233-5585
5040 Dundas Street West
Toronto, Ontario M9A 1B8

www.rhcarter.com

This e-mail message is intended only for the person or entity to which it is addressed and may contain CONFIDENTIAL or PRIVILEGED material. Any unauthorized review, use, disclosure or distribution is prohibited. If you are not the intended recipient, please contact the sender and destroy all copies of the original message. If you are the intended recipient but do not wish to receive communications through this medium, please so advise the sender immediately.

From: Robert Arnone
Sent: April 26, 2018 8:11 AM
To: Gervais, Melanie
Cc: Ahuva Woods; Lynn Norton
Subject: Re: 555 Dealership Drive

Thank you Melanie.

Regards,

Robert

Robert Arnone OAA, MRAIC, NCARB, LEED AP

robert.arnone@rhcarter.com

Office: +1 416-233-5583x225
Fax: (416) 233-5585
5040 Dundas Street West
Toronto, Ontario M9A 1B8

www.rhcarter.com

This e-mail message is intended only for the person or entity to which it is addressed and may contain CONFIDENTIAL or PRIVILEGED material. Any unauthorized review, use, disclosure or distribution is prohibited. If you are not the intended recipient, please contact the sender and destroy all copies of the original message. If you are the intended recipient but do not wish to receive communications through this medium, please so advise the sender immediately.

From: Gervais, Melanie <Melanie.Gervais@ottawa.ca>
Sent: April 26, 2018 7:55 AM
To: Robert Arnone
Cc: Ahuva Woods; Lynn Norton
Subject: 555 Dealership Drive

Hi Robert,

I'm so sorry about the delay I was certain I had sent off this email but it was sitting in my draft folder. If you have any questions on the information below do not hesitate to contact me.

As a follow up to last week's pre-consult meeting for 555 Dealership Drive please find attached the list of required plans and studies.

A New – Manager Approval, with Public Consultation Site Plan application will be required with an associated fee of $21,508.66 plus engineering review fees ($1000-$10,000) plus Conservation Authority Fee ($975).

The zoning of the property is IP[2044] H(33) which permits the proposed use.

The building should be brought closer to the street as per the City's Guidelines. Please link the pedestrian environment to the street and the pond. Additional landscaping will be required. You can view other Site Plans on Dealership Drive at the following links:
https://app01.ottawa.ca/postingplans/appDetails.jsf?lang=en&appId=__AT52C4
https://app01.ottawa.ca/postingplans/appDetails.jsf?lang=en&appId=__0FLZ8S

Transportation:

Need to start submitting the TIA modules (1-4) before submitting the Site Plan application. Be advised that we require steps 1 to 4 (plus any RMA or Monitoring reports, if required) to deem the Site Plan application complete. You can submit the steps 1 to 4 directly to Rosanna Baggs (Rosanna.Baggs@ottawa.ca).

Please ensure that the plans show: lane width, curb radii, depressed curbs, truck turn radii. The City does not want any loading on the street.

Engineering:

The servicing & SWM design should conform to the Citi Gate – 416 Corporate Campus – Detailed Servicing and Stormwater Management Report (Phase 1), prepared by Novatech Engineering,dated October 1, 2014.

Section 6.1.1 of the above report, outlines the Allowable Stormwater Management release rates and storage requirements for the individual sites:

Based on a runoff coefficient of C=0.80:

i. the 5 year peak flow can be released uncontrolled

ii. the maximum release rate is not to exceed 120% of the 5-year peak flow for all storms up to and including the 100-year event.

iii. Ensure no overland flow for all storms up to and including the 100-year event.

Should be no issues for water and sanitary servicing.

An MOE ECA for industrial use will be required for the operation of the service bays in the dealership, as discussed this has a typical timeline of 6 months. You can submit your ECA during the 2nd or 3rd submission of the Site Plan but the Site Plan will have to be approved before the ECA can be sent to the MOECC.

Environmental:

A Tree Conservation Report (TCR) is required to address the protection of the remaining trees on the site (i.e., the northern hedgerow) and on adjacent properties. The City's TCR Guidelines are attached. The TCR should reference the Muncaster (2012) report as background information and should provide a site-specific update on the existing conditions for this property, the locations and types of all trees on or adjacent to the site, their condition, and the measures that will be used to protect them. Trees with a trunk that crosses/touches a property line are considered co-owned by both property owners and cannot be removed without the permission of the co-owner; please identify all co-owned trees. Given that the site has already been cleared in anticipation of this development, we expect that most or all of the remaining trees should be able to be retained. Any trees that cannot be retained should be identified as such in the TCR, along with the rationale for their removal. The presence of City-owned trees adjacent to the eastern limit of this site, on the stormwater management pond property, means that Forestry Services may also be involved in the review of the TCR to ensure that the City's trees are adequately protected.

Muncaster (2012) notes the presence of an endangered tree species, butternut, in the hedgerows in this area. The TCR must specifically address this issue by identifying any butternut on or within 25 m of the site, and their condition using the provincial Butternut Health Assessment (BHA) protocol. Past butternut surveys and BHA work that would have been required to support the previous tree clearing can be used for reference, but must be updated. Butternut can only be assessed by qualified personnel, therefore please select your consultant accordingly. Also, please note that the BHA protocol can only be completed during the summer months (June through September). The presence of healthy butternut trees within 25 m of the property may trigger regulatory requirements under the provincial Endangered Species Act, 2007.

No trees should be removed from this property until the butternut survey has been completed. No trees greater than 10 cm diameter at breast height can be removed from private property without an approved Tree Permit under the City's Urban Tree Conservation By-law. The Tree Permit will be based on the approved Tree Conservation Report. No work can occur within the critical root zone of City-owned trees without prior approval under the Municipal Trees and Natural Areas Protection By-law.

RVCA:
Please contact Eric Lalande at the RVCA for comments, eric.lalande@rvca.ca

Regards,

Mélanie Gervais *MCIP, RPP*
Planner / Urbaniste
Development Review /
Examen des demandes d'aménagement
Planning, Infrastructure and Economic Development Department /
Services de la planification, de l'infrastructure et du développement économique
City of / Ville d'Ottawa

110, avenue Laurier Avenue West / Ouest,
4th Floor / 4ième étage
Ottawa, ON K1P 1J1
Tel. : 613-580-2424 ext. 24025
Fax / Télécopieur : 613-580-2576
E-mail / Courriel : Melanie.Gervais@ottawa.ca
Mail Code: 01-14

'

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

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

'

Re: Pre-Consultation Application - Dan Murphy Ford(No subject)
Robert Arnone

0
Reply all |
Wed 04-25, 5:48 PM
Gervais, Melanie <Melanie.Gervais@ottawa.ca>;
Ahuva Woods;
Lynn Norton <lnorton@butlergroup.ca>
...
Sent Items
Sent Items
You're editing this
Error! Filename not specified.
Error! Filename not specified.
DOC032618-03262018102644.pdf
34 KBSent by mail
Save to OneDrive - R.H. Carter Architects Inc. Saved to OneDrive - R.H. Carter Architects Inc..
Canceling...

Cancel Download Pending...
34 KB
Download
Save to OneDrive - R.H. Carter Architects Inc.

Hi Melanie,

I trust you are well.

I am following up on our visit with you in Ottawa on Monday March 19th and our Pre-consult meeting related to 555 Dealership Drive.

We understood that following that meeting, if the owner was to make the payment to the Cty of Ottawa for the pre-consult meeting, that you would then forward to us the minutes of our meeting so that we had an official record of the discussion.

Please see attached, the receipt for that payment that was made by Lynn Norton on March 26th and let me know if there is anything else that you need from us at this time.

If you could kindly get back to us and let us know when we could expect the meeting minutes, we would greatly appreciate it.

Regards,

Robert

SERVICING AND STORMWATER MANAGEMENT REPORT

APPENDIX B
EXISTING WATERMAIN FLOW AND FIRE PROTECTION CALCULATIONS

McINTOSH PERRY

McINTOSH PERRY

CP-18-0254 - 555 Dealership Dr. - Water Demands

Project:	555 Dealership Dr.
Project No.:	CP-18-0254
Designed By:	SVL
Checked By:	RPK
Date:	09/18/2018
Site Area:	2.68 gross ha

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	350	L/c/d
Industrial - Light	*35,000*	*L/gross ha/d*
Industrial - Heavy	55,000	L/gross ha/d
Shopping Centres	2,500	L/(1000m² /d
Hospital	900	L/(bed/day)
Schools	70	L/(Student/d)
Trailer Parks no Hook-Ups	340	L/(space/d)
Trailer Park with Hook-Ups	800	L/(space/d)
Campgrounds	225	L/(campsite/d)
Mobile Home Parks	1,000	L/(Space/d)
Motels	150	L/(bed-space/d)
Hotels	225	L/(bed-space/d)
Tourist Commercial	28,000	L/gross ha/d
Other Commercial	28,000	L/gross ha/d
AVERAGE DAILY DEMAND	1.09	L/s

MAXIMUM DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	2.5 x avg. day	L/c/d
Industrial	*1.5 x avg. day*	*L/gross ha/d*
Commercial	1.5 x avg. day	L/gross ha/d
Institutional	1.5 x avg. day	L/gross ha/d
MAXIMUM DAILY DEMAND	1.63	L/s

MAXIMUM HOUR DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	2.2 x max. day	L/c/d
Industrial	*1.8 x max. day*	*L/gross ha/d*
Commercial	1.8 x max. day	L/gross ha/d
Institutional	1.8 x max. day	L/gross ha/d
MAXIMUM HOUR DEMAND	2.93	L/s

WATER DEMAND DESIGN FLOWS PER UNIT COUNT
CITY OF OTTAWA - WATER DISTRIBUTION GUIDELINES, JULY 2010

McINTOSH PERRY

CP-18-0254 - 555 Dealership Dr. - OBC Fire Calculations

Project:	555 Dealership Dr.
Project No.:	CP-18-0254
Designed By:	SVL
Checked By:	RPK
Date:	09/18/2018

Ontario 2006 Building Code Compendium (Div. B - Part 3)

Water Supply for Fire-Fighting - Store/Office & Warhouse Building

Building is classified as Group : F2 (from table 3.2.2.67)
Building is of noncombustable construction with fire separations and fire-resistance ratings provided in accordance with Subsection 3.2.2, including loadbearing walls, columns and arches.

From Div. B A-3.2.5.7. of the Ontario Building Code - 3. Building On-Site Water Supply:

(a) Q = K x V x Stot

where:

Q = minimum supply of water in litres

K = water supply coefficient from Table 1

V = total building volume in cubic metres

Stot = total of spatial coefficient values from the property line exposures on all sides as obtained from the formula:

Stot = 1.0 + [Sside1+Sside2+Sside3+...etc.]

K	17	(from Table 1 pg A-31) (Worst case occupancy {E / F2} 'K' value used)
V	23,783	(Total building volume in m³.)
Stot	1.0	(From figure 1 pg A-32)
Q =	404,306.75 L	

			From Figure 1 (A-32)
Snorth	52	m	0.0
Seast	43	m	0.0
Ssouth	45	m	0.0
Swest	45	m	0.0

*approximate distances

From Table 2: Required Minimum Water Supply Flow Rate (L/s)

9000 L/min (if Q >270,000 L)
2378 gpm

McINTOSH PERRY

CP-18-0254 - 555 Dealership Dr. - Fire Underwriters Survey (FUS) Fire Calculations

Project:	555 Dealership Dr.
Project No.:	CP-18-0254
Designed By:	SVL
Checked By:	RPK
Date:	09/18/2018

From the Fire Underwriters Survey (1999)

From Part II – Guide for Determination of Required Fire Flow Copyright I.S.O.:

F = 220 x C x √A Where:

F = Required fire flow in liters per minute

C = Coefficient related to the type of construction.

A = The total floor area in square meters (including all storey's, but excluding basements at least 50 percent below grade) in the building being considered.

A. Determine The Coefficient Related To The Type Of Construction

The building is considered to be of ordinary construction type. Therefore,

C = 0.80

B. Determine Ground Floor Area

As provided by the Architect:

Floor Area (One Floor) = 3,251.14 m²

A = 6,502.28 m²

This floor area represents the final build-out of the development; as outlined on the Site Plan drawing.

C. Determine Height in Storeys

From Architectural Drawings:

Number of Storeys = 2.00

D. Calculate Required Fire Flow

F = 220 x C x √A

F = 220.00 X 0.80 X √ 6502.28

F = 14,192.07 L/min.

F = 14,000.00 L/min.

E. Determine Increase or Decrease Based on Occupancy

From note 2, Page 18 of the Fire Underwriter Survey:

Non-combustible

-25% Charge

Occupancy Decrease = 3,500.00 L/min.

F = 10,500.00 L/min.

F. Determine the Decrease, if any for Sprinkler Protection

From note 3, Page 18 of the Fire Underwriter Survey:

- The flow requirement may be reduced by up to 50% for complete automatic sprinkler protection depending upon adequacy of the system.
- The credit for the system will be a maximum of 30% for an adequately designed system conforming to NFPA 13 and other NFPA sprinkler standards.
- Additional credit of 10% if water supply is standard for both the system and fire department hose lines
- If sprinkler system is fully supervised system, an additional 10% credit is granted
- The entire building will be installed with a fully automated, standardized with the City of Ottawa Fire Department and fully supervised.
- Therefore the value obtained in Step E is reduced by 30% (The building is sprinklered with a standard system and fire department hose lines)

Reduction	=	10,500.00 L/min.	X	30%
Reduction	=	3,150.00 L/min.		

G. Determine the Total Increase for Exposures

From note 4, Page 18 of the Fire Underwriter Survey:

- There are no existing buildings surrounding the site that are within 45m.
- Therefore the charge for exposure is 0% of the value obtained in Step E.

	=	10,500.00 L/min.	X	0%
Increase	=	0.00 L/min.		

H. Determine the Total Fire Demand

- To the answer obtained in E, substract the value obtained in F and add the value obtained in G
- Fire flow should be no less than 2,000L/min. and the maximum value shoul not exceed 45,000L/min.

F	=	10,500.00 L/min.	-	3,150.00	L/min.	+	0.00	L/min.
F	=	7,350.00 L/min.						

Therefore, after rounding to the nearest 1,000 L/min, the total required fire flow for the development is 7000 L/min (1849 GPM).

Average Day

Label	Elevation (m)	Demand (L/min)	Hydraulic Grade (m)	Pressure (psi)
J-1	93.93	0.00	154.30	85.69
J-2	93.95	0.00	154.30	85.66
J-3	93.60	65.40	153.41	84.89

Peak Hourly

Label	Elevation (m)	Demand (L/min)	Hydraulic Grade (m)	Pressure (psi)
J-1	93.93	0.00	148.78	77.86
J-2	93.95	0.00	148.77	77.81
J-3	93.60	175.80	143.23	70.45

Max Day + Fire

Label	Is Fire Flow Run Balanced?	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (L/min)	Fire Flow (Available) (L/min)	Pressure (psi)	Elevation (m)	Demand (L/min)
H-4	True	True	7,000.00	9,602.19	75.08	93.50	0.00
J-1	False	False	7,000.00	(N/A)	74.47	93.93	0.00
J-2	False	False	7,000.00	(N/A)	74.44	93.95	0.00
J-3	False	False	7,000.00	(N/A)	72.28	93.60	97.80

SERVICING AND STORMWATER MANAGEMENT REPORT

APPENDIX C
SANITARY SEWER CALCULATIONS

McINTOSH PERRY

McINTOSH PERRY

Project:	CP-18-0254 – 555 Dealership Drive
Designed By:	P.G.K.
Checked By:	R.P.K.
Date:	June 22, 2018

Re: Sanitary Flow Calculations

1. Building Occupancy

The maximum building occupancy will be 55 persons, similar to other BBS dealerships.

2. Daily Volume in Litres

As per the extract of the City of Ottawa Sewer Design Guidelines, Appendix 4-A;
Daily Sewage Flow for Various Establishments;

Various buildings and places of employment – e.g. store employees, office workers – depends on facility

- = 75 Liters/Person/Day

As per the extract of the City of Ottawa Sewer Design Guidelines, Appendix 4-A; Daily Sewage Flow for Various Establishments;

(Car) Wash – Hand Wash

- = 400 Liters/Car

3. Peak Flow (Q/p)

- $Q_1(p) = F \times P$ Where:
  F = Litres/Person/Day (as per City of Ottawa Sewer Design Guidelines)
  P = 55 Persons
  Therefore, $Q_1(p) = (75) \times (55) = 4{,}125$ L/Day (0.048 L/Sec)

- $Q_2(p) = F \times P$ Where:
  F = 400 Litres/Car (as per City of Ottawa Sewer Design Guidelines)
  P = 55 Cars (Daily average)
  Therefore, $Q_2(p) = (400) \times (55) = 22{,}000$ L/Day (0.255 L/Sec)

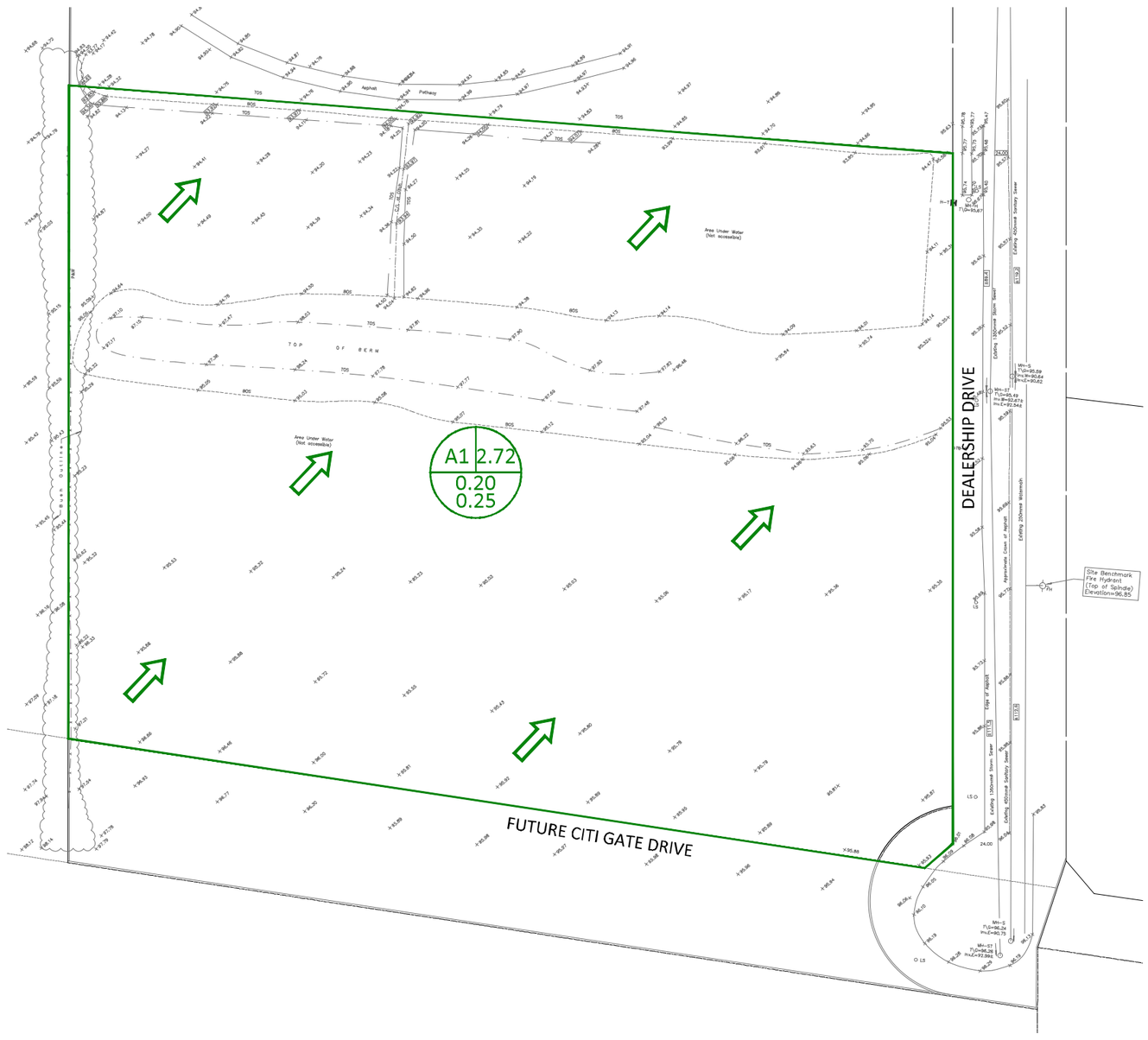
- Therefore, $Q_{TOTAL}(p) = Q_1(p) + Q_2(p) = 26{,}125$ L/Day (0.302 L/s)

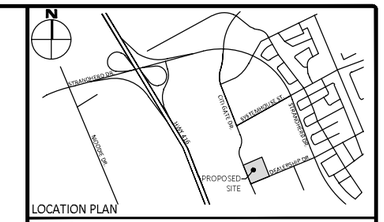
It is anticipated that there will be no issues with capacity constraints within the existing sanitary main or lateral as the amount of flow leaving the site is negligible. Therefore, the sanitary lateral to Citi Gate Drive has the capacity to accommodate the new flows

SERVICING AND STORMWATER MANAGEMENT REPORT

APPENDIX D
PRE-DEVELOPMENT DRAINAGE PLAN

McINTOSH PERRY





LOCATION PLAN

LEGEND

AREA NAME

AREA (Ha)

A1 0.25

0.90
1.00

5yr & 100yr COEFFICIENT

OVERLAND DRAINAGE FLOW

FOR REVIEW ONLY
NOT FOR CONSTRUCTION

No.	Revisions	Date
1	ISSUED FOR SITE PLAN CONTROL	JUN. 25, 2018

Check and verify all dimensions before proceeding with the work

Do not scale drawings

SCALE 1 : 500

0 10 20 30 40 50 Metres

McINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A 1L0
Tel: 613-836-2184 Fax: 613-836-3742
www.mcintoshperry.com

Stamp:

Client:
BBS CONSTRUCTION LTD.
1805 WOODWARD DRIVE
OTTAWA, ON K2C 0P9

Project:
BARRHAVEN FORD
555 DEALERSHIP DRIVE

Drawing Title:
PRE-DEVELOPMENT DRAINAGE AREA PLAN

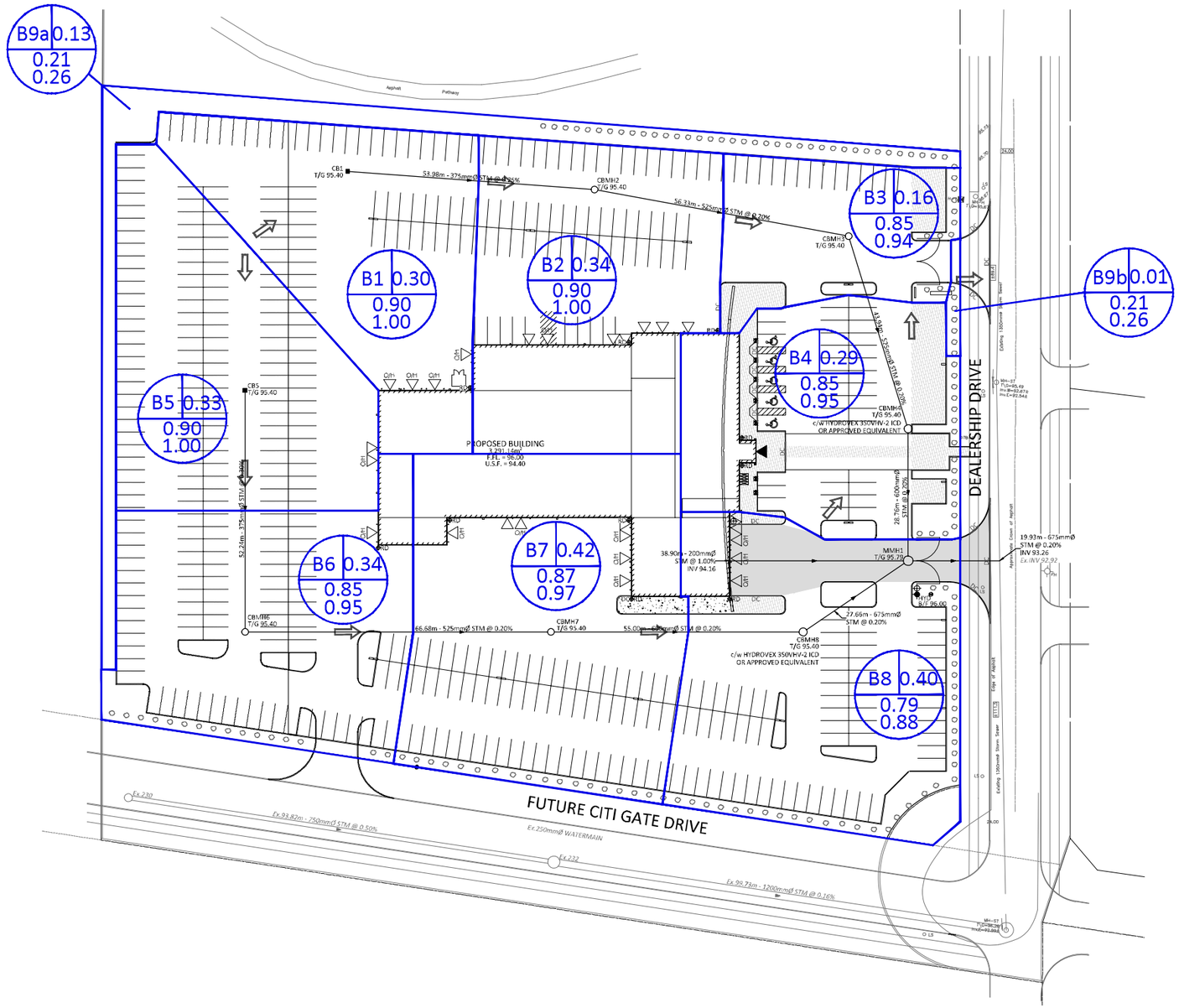
Scale: 1:500	Project Number: CP-18-0254
Drawn By: P.G.K.	
Checked By: R.P.K.	Drawing Number: PRE
Designed By: P.G.K.	

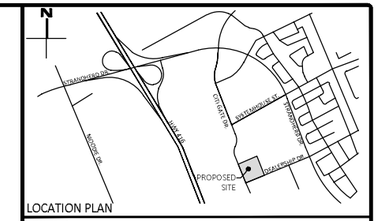
FILENAME: H:\01 Project - Proposals\2018 Jobs\CP\CP-18-0254 BBS_Barrhaven Ford_555 Dealership Drive\Civil\1 - Drawings\CP-18-0254_Presentation.dwg
PLOT SCALE: 1:1 PLOT DATE: Monday, June 25, 2018 PLOTTED BY: Mark Mentes
CAD SOFTWARE: AutoCAD Civil 3D 2017 - en-US

SERVICING AND STORMWATER MANAGEMENT REPORT

APPENDIX E
POST-DEVELOPMENT DRAINAGE PLAN

McINTOSH PERRY





LOCATION PLAN

LEGEND

AREA NAME

B1 0.25 — AREA (Ha)

0.90
1.00 — 5yr & 100yr COEFFICIENT

FOR REVIEW ONLY
NOT FOR CONSTRUCTION

No.	Revisions	Date
3	REVISED AS PER SITE PLAN ADDITIONS	NOV. 19, 2018
2	REVISED AS PER CITY COMMENTS	SEPT. 18, 2018
1	ISSUED FOR SITE PLAN CONTROL	JUN. 25, 2018

Check and verify all dimensions before proceeding with the work — Do not scale drawings

SCALE 1 : 500
0 10 20 30 40 50 Metres

McINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A 1L0
Tel: 613-836-2184 Fax: 613-836-3742
www.mcintoshperry.com

Stamp:

Client:
BBS CONSTRUCTION LTD.
1805 WOODWARD DRIVE
OTTAWA, ON K2C 0P9

Project:
BARRHAVEN FORD
555 DEALERSHIP DRIVE

Drawing Title:
POST-DEVELOPMENT DRAINAGE AREA PLAN

Scale: 1:500	Project Number: CP-18-0254
Drawn By: P.G.K.	
Checked By: R.P.K.	Drawing Number: POST
Designed By: P.G.K.	

FILENAME: H:\01 Project - Proposals\2018 Jobs\CP\CP-18-0254 BBS_Barrhaven Ford_555 Dealership Drive\Civil\15 - Drawing\CP-18-0254_Presentation.dwg
PLOT DATE: Monday, November 19, 2018 PLOTTED BY: Paul Gerard Kelly
CAD PLOTTER: DWG To PDF.pc3 PAPER SIZE: ANSI B (11.00 x 17.00 Inches)
Xref(s): Xref(s) not found. Image(s): 05-01-18 Image(s) not found.

SERVICING AND STORMWATER MANAGEMENT REPORT

APPENDIX F
STORMWATER MANAGEMENT CALCULATIONS

McINTOSH PERRY

CP-18-0254 - 555 Dealership Drive - Runoff Calculations

Pre-Development Runoff Coefficient

Drainage Area	Area (ha)	Impervious Area (m^2)	C	Gravel Area (m^2)	C	Pervious Area (m^2)	C	C_{AVG} 2&5-Year	C_{AVG} 100-Year
A1	2.72	0.00	0.90	0.00	0.60	27,165.52	0.20	0.20	0.25

Pre-Development Runoff Calculations

Drainage Area	Area (ha)	C 2&5-Year	C 100-Year	Tc (min)	I (mm/hr)			Q (L/s)		
					2-Year	5-Year	100-Year	2-Year	5-Year	100-Year
A1	2.72	0.20	0.25	10	76.8	104.2	178.6	116.01	157.37	337.12
Total	2.72							116.01	157.37	337.12

Post-Development Runoff Coefficient

Drainage Area	Area (ha)	Impervious Area (m^2)	C	Gravel Area (m^2)	C	Pervious Area (m^2)	C	C_{AVG} 2&5-Year	C_{AVG} 100-Year
B1	0.30	3,034.85	0.90	0.00	0.60	0.00	0.20	0.90	1.00
B2	0.34	3,396.97	0.90	0.00	0.60	0.00	0.20	0.90	1.00
B3	0.16	1,473.88	0.90	0.00	0.60	122.15	0.20	0.85	0.94
B4	0.29	2,672.04	0.90	0.00	0.60	195.86	0.20	0.85	0.95
B5	0.33	3,269.79	0.90	0.00	0.60	0.00	0.20	0.90	1.00
B6	0.34	3,147.52	0.90	0.00	0.60	220.50	0.20	0.85	0.95
B7	0.42	4,080.40	0.90	0.00	0.60	169.13	0.20	0.87	0.97
B8	0.40	3,352.43	0.90	0.00	0.60	648.85	0.20	0.79	0.88
B9	0.14	19.31	0.90	0.00	0.60	1,347.34	0.20	0.21	0.26

Post-Development Runoff Calculations

Drainage Area	Area (ha)	C 2&5-Year	C 100-Year	Tc (min)	I (mm/hr)			Q (L/s)		
					2-Year	5-Year	100-Year	2-Year	5-Year	100-Year
B1	0.30	0.90	1.00	10	76.8	104.2	178.6	58.32	79.12	150.65
B2	0.34	0.90	1.00	10	76.8	104.2	178.6	65.28	88.56	168.62
B3	0.16	0.85	0.94	10	76.8	104.2	178.6	28.84	39.13	74.68
B4	0.29	0.85	0.95	10	76.8	104.2	178.6	52.18	70.79	135.07
B5	0.33	0.90	1.00	10	76.8	104.2	178.6	62.83	85.24	162.31
B6	0.34	0.85	0.95	10	76.8	104.2	178.6	61.43	83.33	158.98
B7	0.42	0.87	0.97	10	76.8	104.2	178.6	79.13	107.35	204.65
B8	0.40	0.79	0.88	10	76.8	104.2	178.6	67.19	91.15	174.46
B9	0.14	0.21	0.26	10	76.8	104.2	178.6	6.12	8.31	17.68
Total	2.72							481.34	652.98	1,247.10

Required Restricted Flow

Drainage Area	Area (ha)	C 2&5-Year	C 100-Year	Tc (min)	I (mm/hr)			Q (L/s)		
					2-Year	5-Year	100-Year	2-Year	5-Year	100-Year
A1	2.72	0.20	0.25	10	76.8	104.2	178.6	116.01	157.37	337.12

*Citi Gate SWM Report Section 6.1.1. has Tc set at 10min

Post-Development Restricted Runoff Calculations

Drainage Area	Unrestricted Flow (L/s)			Restricted Flow (L/s)			Storage Required (m^3)			Storage Provided (m^3)		
	2-Year	5-Year	100-Year	2-Year	5-Year	100-Year	2-Year	5-Year	100-Year	2-Year	5-Year	100-Year
B1	58.32	79.12	150.65	159.72	159.72	159.72	35.19	71.82	237.89	24.58	18.68	66.97
B2	65.28	88.56	168.62							52.56	15.72	56.34
B3	28.84	39.13	74.68							41.67	21.66	71.69
B4	52.18	70.79	135.07							4.14	16.74	60.34
B5	62.83	85.24	162.31	159.72	159.72	159.72	67.85	125.21	373.53	23.79	65.45	167.46
B6	61.43	83.33	158.98							61.75	35.27	86.81
B7	79.13	107.35	204.65							66.77	22.21	57.81
B8	67.19	91.15	174.46							4.22	23.33	63.95
B9	6.12	8.31	17.68	6.12	8.31	17.68						
Total	481.34	652.98	1,247.10	325.57	327.75	337.12	103.04	197.03	611.42	279.46	219.06	631.37

Storage Requirements for Area B1-B4

2-Year Storm Event

Tc (min)	I (mm/hr)	B1 Runoff (L/s)	B2 Runoff (L/s)	B3 Runoff (L/s)	B4 Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
3	121.5	92.23	103.23	45.62	82.53	159.72	163.89	29.50
4	111.7	84.83	94.96	41.96	75.91	159.72	137.94	33.10
5	103.6	78.64	88.03	38.90	70.37	159.72	116.22	34.87
6	96.6	73.38	82.14	36.29	65.66	159.72	97.75	35.19
7	90.7	68.84	77.06	34.05	61.60	159.72	81.83	34.37
8	85.5	64.89	72.63	32.09	58.06	159.72	67.96	32.62
9	80.9	61.41	68.74	30.37	54.95	159.72	55.74	30.10

Maximum Storage Required 2-Year (m^3) =	35.19

5-Year Storm Event

Tc (min)	I (mm/hr)	B1 Runoff (L/s)	B2 Runoff (L/s)	B3 Runoff (L/s)	B4 Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
2	182.7	138.72	155.27	68.61	124.13	159.72	327.00	39.24
4	152.5	115.80	129.62	57.28	103.62	159.72	246.60	59.18
6	131.6	99.90	111.82	49.41	89.39	159.72	190.81	68.69
8	116.1	88.17	98.69	43.61	78.89	159.72	149.63	71.82
10	104.2	79.12	88.56	39.13	70.79	159.72	117.87	70.72
12	94.7	71.90	80.48	35.56	64.34	159.72	92.57	66.65
14	86.9	66.01	73.89	32.65	59.07	159.72	71.89	60.39

Maximum Storage Required 5-Year (m^3) =	71.82

100-Year Storm Event

Tc (min)	I (mm/hr)	B1 Runoff (L/s)	B2 Runoff (L/s)	B3 Runoff (L/s)	B4 Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
10	178.6	150.65	168.62	74.68	135.07	159.72	369.30	221.58
12	162.1	136.79	153.11	67.81	122.64	159.72	320.63	230.86
14	148.7	125.48	140.45	62.20	112.50	159.72	280.90	235.96
16	137.5	116.05	129.90	57.53	104.05	159.72	247.80	237.89
18	128.1	108.06	120.96	53.57	96.89	159.72	219.75	237.33
20	120.0	101.20	113.28	50.17	90.74	159.72	195.66	234.79
22	112.9	95.24	106.60	47.21	85.39	159.72	174.72	230.62

Maximum Storage Required 100-Year (m^3) =	237.89

Storage Occupied In Area B1-B4

2-Year Storm Event

Structure/Pipe	Size (mm)	Depth/ Length (m)	Area (m^2)	Volume (m^3)
CB1	600x600	1.977	0.372	0.736
CB1-CBMH2	375	53.979	0.442	23.843
CBMH2	1200	1.962	1.167	2.289
CBMH2-CBMH3	525	56.335	0.892	50.269
CBMH3	1200	2.105	1.167	2.456
CBMH3-CBMH4	525	43.941	0.892	39.210
CBMH4	1500	2.268	1.824	4.136

Storage Available (m^3) =	122.94
Storage Required (m^3) =	35.19

5-Year Storm Event

Water Elevation (m) =		95.55					
Structure	T/G (m)	Pipe dia. (mm)	OUTLET INVERT (m)	Area (m^2)	Depth (m)	Head (m)	Volume (m^3)
CB1	95.40	375	94.02	373.58	1.53	1.34	18.68
CBMH2	95.40	525	93.74	314.33	1.81	1.55	15.72
CBMH3	95.40	525	93.60	416.92	1.96	1.69	21.66
CBMH4	95.40	600	93.43	332.43	2.12	1.82	16.74

Storage Available (m^3) =	72.80	*
Storage Required (m^3) =	71.82	

100-YEAR STORM EVENT

Water Elevation (m) =		95.63					
Structure	T/G (m)	Pipe dia. (mm)	OUTLET INVERT (m)	Area (m^2)	Depth (m)	Head (m)	Volume (m^3)
CB1	95.40	375	94.02	856.28	1.61	1.42	66.97
CBMH2	95.40	525	93.74	720.00	1.89	1.63	56.34
CBMH3	95.40	525	93.60	840.23	2.04	1.77	71.69
CBMH4	95.40	600	93.43	786.52	2.20	1.90	60.34

Storage Available (m^3) =	255.34	*
Storage Required (m^3) =	237.89	

*Available Storage calculated from AutoCAD

John Meunier - Hydrovex VHV ICD Curves

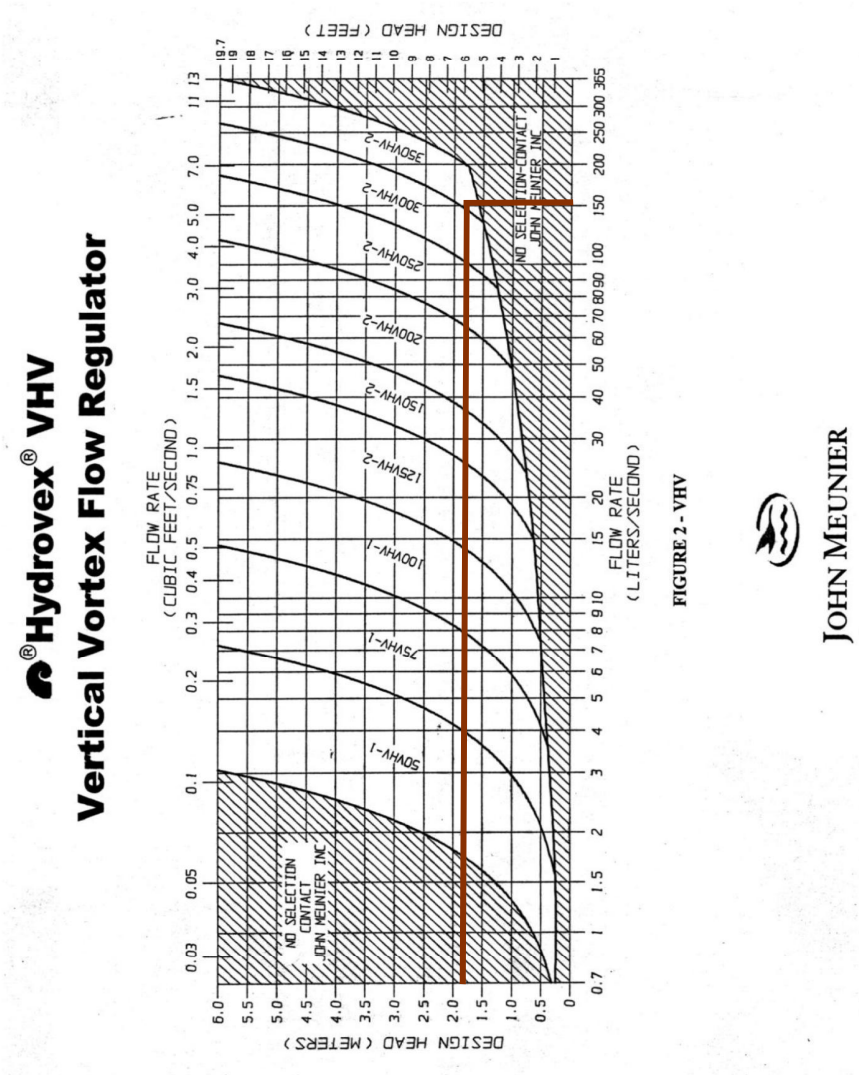


FIGURE 2 - VHV

Storage Requirements for Area B5-B8

2-Year Storm Event

Tc (min)	I (mm/hr)	B5 Runoff (L/s)	B6 Runoff (L/s)	B7 Runoff (L/s)	B8 Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
5	103.6	84.73	82.83	106.71	90.61	159.72	205.17	61.55
6	96.6	79.06	77.29	99.57	84.54	159.72	180.74	65.07
7	90.7	74.17	72.51	93.41	79.32	159.72	159.69	67.07
8	85.5	69.91	68.35	88.05	74.76	159.72	141.35	67.85
9	80.9	66.16	64.68	83.33	70.75	159.72	125.20	67.61
10	76.8	62.83	61.43	79.13	67.19	159.72	110.87	66.52
11	73.2	59.86	58.52	75.39	64.01	159.72	98.05	64.71

Maximum Storage Required 2-Year (m^3) =	67.85

5-Year Storm Event

Tc (min)	I (mm/hr)	B5 Runoff (L/s)	B6 Runoff (L/s)	B7 Runoff (L/s)	B8 Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
6	131.6	107.64	105.22	135.56	115.10	159.72	303.80	109.37
8	116.1	94.99	92.86	119.63	101.58	159.72	249.35	119.69
10	104.2	85.24	83.33	107.35	91.15	159.72	207.36	124.41
12	94.7	77.47	75.73	97.57	82.84	159.72	173.90	125.21
14	86.9	71.12	69.53	89.57	76.05	159.72	146.55	123.10
16	80.5	65.82	64.35	82.90	70.39	159.72	123.74	118.79
18	75.0	61.33	59.96	77.24	65.59	159.72	104.40	112.76

Maximum Storage Required 5-Year (m^3) =	125.21

100-Year Storm Event

Tc (min)	I (mm/hr)	B5 Runoff (L/s)	B6 Runoff (L/s)	B7 Runoff (L/s)	B8 Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
15	142.9	129.89	127.22	163.77	139.62	159.72	400.78	360.70
17	132.6	120.56	118.08	152.01	129.59	159.72	360.52	367.73
19	123.9	112.60	110.28	141.97	121.03	159.72	326.16	371.82
21	116.3	105.71	103.54	133.29	113.63	159.72	296.46	373.53
23	109.7	99.70	97.65	125.71	107.17	159.72	270.51	373.30
25	103.8	94.40	92.46	119.02	101.47	159.72	247.62	371.43
27	98.7	89.68	87.84	113.07	96.40	159.72	227.27	368.18

Maximum Storage Required 100-Year (m^3) =	373.53

Storage Occupied In Area B5-B8

2-Year Storm Event

Structure/Pipe	Size (mm)	Depth/ Length (m)	Area (m^2)	Volume (m^3)
CB5	600x600	1.915	0.372	0.713
CB5-CBMH6	375	52.244	0.442	23.076
CBMH6	1200	1.922	1.167	2.243
CBMH6-CBMH7	525	66.683	0.892	59.503
CBMH7	1200	2.130	1.167	2.485
CBMH7-CBMH8	600	55.000	1.169	64.282
CBMH8	1500	2.315	1.824	4.222

Storage Available (m^3) =	156.52
Storage Required (m^3) =	67.85

5-Year Storm Event

Water Elevation (m) =		95.62					
Structure	T/G (m)	Pipe dia. (mm)	OUTLET INVERT (m)	Area (m^2)	Depth (m)	Head (m)	Volume (m^3)
CB5	95.40	375	94.09	892.51	1.54	1.35	65.45
CBMH6	95.50	525	93.78	481.00	1.84	1.58	35.27
CBMH7	95.40	600	93.57	302.82	2.05	1.75	22.21
CBMH8	95.40	675	93.39	322.17	2.24	1.90	23.33

Storage Available (m^3) =	146.26	*
Storage Required (m^3) =	125.21	

100-YEAR STORM EVENT

Water Elevation (m) =		95.70					
Structure	T/G (m)	Pipe dia. (mm)	OUTLET INVERT (m)	Area (m^2)	Depth (m)	Head (m)	Volume (m^3)
CB5	95.40	375	94.09	1,659.63	1.62	1.43	167.46
CBMH6	95.50	525	93.78	868.08	1.92	1.66	86.81
CBMH7	95.40	600	93.57	563.09	2.13	1.83	57.81
CBMH8	95.40	675	93.39	707.34	2.32	1.98	63.95

Storage Available (m^3) =	376.03	*
Storage Required (m^3) =	373.53	

*Available Storage calculated from AutoCAD

John Meunier - Hydrovex VHV ICD Curves

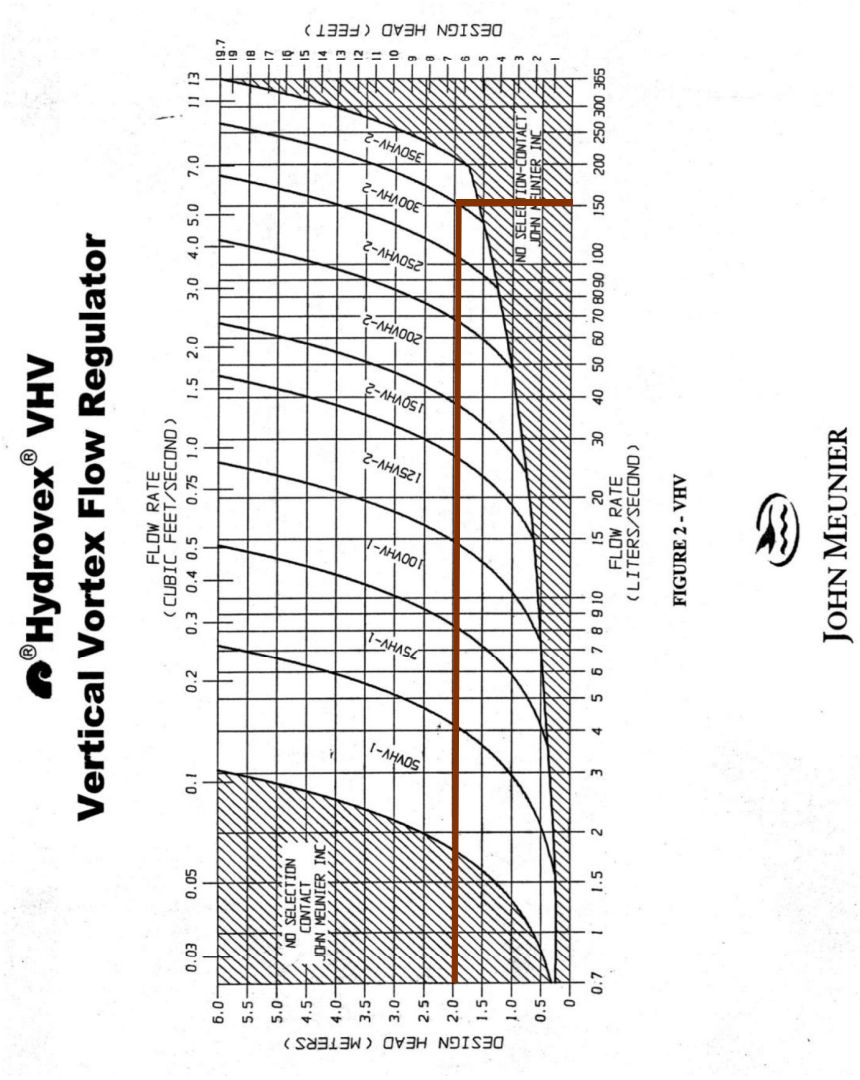


FIGURE 2 - VHV

115 Walgreen Road, R.R.3. Carp, ON K0A 1L0 | T. 613-836-2184 | F. 613-836-3742
info@mcintoshperry.com | www.mcintoshperry.com

SERVICING AND STORMWATER MANAGEMENT REPORT

APPENDIX H
CITY OF OTTAWA DESIGN CHECKLIST

McINTOSH PERRY

City of Ottawa

4. Development Servicing Study Checklist

The following section describes the checklist of the required content of servicing studies. It is expected that the proponent will address each one of the following items for the study to be deemed complete and ready for review by City of Ottawa Infrastructure Approvals staff.

The level of required detail in the Servicing Study will increase depending on the type of application. For example, for Official Plan amendments and re-zoning applications, the main issues will be to determine the capacity requirements for the proposed change in land use and confirm this against the existing capacity constraint, and to define the solutions, phasing of works and the financing of works to address the capacity constraint. For subdivisions and site plans, the above will be required with additional detailed information supporting the servicing within the development boundary.

4.1 General Content

Criteria	Location (if applicable)
☐ Executive Summary (for larger reports only).	N/A
☐ Date and revision number of the report.	On Cover
☐ Location map and plan showing municipal address, boundary, and layout of proposed development.	Appendix 'E'
☐ Plan showing the site and location of all existing services.	Site Servicing Plan
☐ Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	1.1 Purpose 1.2 Site Description 6.0 Stormwater Management
☐ Summary of Pre-consultation Meetings with City and other approval agencies.	Appendix 'A'
☐ Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	1.1 Purpose 1.2 Site Description 6.0 Stormwater Management
☐ Statement of objectives and servicing criteria.	3.0 Pre-Consultation Summary

☐ Identification of existing and proposed infrastructure available in the immediate area.	N/A
☐ Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	Lot Grading, Drainage Plan, Sediment and Erosion Control Plan
☐ Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	Lot Grading, Drainage Plan, Sediment and Erosion Control Plan
☐ Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	N/A
☐ Proposed phasing of the development, if applicable.	N/A
☐ Reference to geotechnical studies and recommendations concerning servicing.	See Geotech
☐ All preliminary and formal site plan submissions should have the following information: ○ Metric scale ○ North arrow (including construction North) ○ Key plan ○ Name and contact information of applicant and property owner ○ Property limits including bearings and dimensions ○ Existing and proposed structures and parking areas ○ Easements, road widening and rights-of-way ○ Adjacent street names	Lot Grading, Drainage Plan, Sediment and Erosion Control Plan

4.2 Development Servicing Report: Water

Criteria	Location (if applicable)
☐ Confirm consistency with Master Servicing Study, if available	N/A
☐ Availability of public infrastructure to service proposed development	N/A
☐ Identification of system constraints	N/A
☐ Identify boundary conditions	N/A
☐ Confirmation of adequate domestic supply and pressure	N/A
☐ Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	Appendix 'B'
☐ Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	N/A
☐ Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design	N/A
☐ Address reliability requirements such as appropriate location of shut-off valves	N/A
☐ Check on the necessity of a pressure zone boundary modification.	N/A
☐ Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range	N/A

☐ Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	N/A
☐ Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	N/A
☐ Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Appendix 'B'
☐ Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	N/A

4.3 Development Servicing Report: Wastewater

Criteria	Location (if applicable)
☐ Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	N/A
☐ Confirm consistency with Master Servicing Study and/or justifications for deviations.	N/A
☐ Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	N/A
☐ Description of existing sanitary sewer available for discharge of wastewater from proposed development.	5.2 Sanitary Servicing

☐ Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	N/A
☐ Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	N/A
☐ Description of proposed sewer network including sewers, pumping stations, and forcemains.	5.2 Sanitary Servicing
☐ Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	N/A
☐ Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	N/A
☐ Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
☐ Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	N/A
☐ Special considerations such as contamination, corrosive environment etc.	N/A

4.4 Development Servicing Report: Stormwater Checklist

Criteria	Location (if applicable)
☐ Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)	6.0 Stormwater Management
☐ Analysis of available capacity in existing public infrastructure.	N/A
☐ A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Pre- and Post-Development Plans
☐ Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	6.0 Stormwater Management
☐ Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	6.0 Stormwater Management
☐ Description of the stormwater management concept with facility locations and descriptions with references and supporting information.	6.0 Stormwater Management
☐ Set-back from private sewage disposal systems.	N/A
☐ Watercourse and hazard lands setbacks.	N/A
☐ Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	N/A
☐ Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	N/A

☐ Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).	Appendix 'F'
☐ Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	Sediment and Erosion Control Plan
☐ Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	6.0 Stormwater Management, Appendix 'F'
☐ Any proposed diversion of drainage catchment areas from one outlet to another.	6.0 Stormwater Management
☐ Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	6.0 Stormwater Management
☐ If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100 year return period storm event.	Appendix 'A'
☐ Identification of potential impacts to receiving watercourses	N/A
☐ Identification of municipal drains and related approval requirements.	N/A
☐ Descriptions of how the conveyance and storage capacity will be achieved for the development.	6.0 Stormwater Management
☐ 100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	Lot Grading, Drainage Plan & sediment Control Plan
☐ Inclusion of hydraulic analysis including hydraulic grade line elevations.	N/A

☐ Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	7.0 Sediment and Erosion Control
☐ Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A
☐ Identification of fill constraints related to floodplain and geotechnical investigation.	N/A

4.5 Approval and Permit Requirements: Checklist

The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development as well as the relevant issues affecting each approval. The approval and permitting shall include but not be limited to the following:

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

4.6 Conclusion Checklist

Criteria	Location (if applicable)
☐ Clearly stated conclusions and recommendations	8.0 Summary 9.0 Recommendations
☐ Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	All are stamped
☐ All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario	All are stamped