SERVICING & STORMWATER MANAGEMENT REPORT
MYERS CARSTAR - 9-17 COLONNADE ROAD

Project No.: CP-18-0378

Prepared for:

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

Prepared by:

McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road
Carp, ON K0A 1L0

November 1, 2018

McINTOSH PERRY

TABLE OF CONTENTS

LIST OF TABLES

APPENDICES

1.0 PROJECT DESCRIPTION

1.1 Purpose

McIntosh Perry (MP) has been retained by BBS Construction Ltd. to prepare this Servicing and Stormwater Management Report in support of the Site Plan Control process for the proposed Myers Carstar, located at 9-17 Colonnade Road within the City of Ottawa.

The main purpose of this report is to present a servicing design for the development in accordance with the recommendations and guidelines provided by the City of Ottawa (City), the Rideau Valley Conservation Authority (RVCA), and the Ministry of the Environment and Climate Change (MOECC). This report will address the water, sanitary and storm sewer servicing for the development, ensuring that existing and available services will adequately service the proposed development.

This report should be read in conjunction with the following drawings:

- CP-18-0378, C101 – Site Grading, Drainage and Sediment & Erosion Control Plan, and
- CP-18-0378, C102 – Site Servicing Plan.

1.2 Site Description

The property is located at 9 & Part of 17 Colonnade Road within the Colonnade Business Park. It is described as Plan 4R-29469, Part of Lot 30, Concession A (Rideau Front), Geographic Township of Nepean, City of Ottawa. The land in question covers approximately 2.18 ha and is located between Merivale Road and Colonnade Road South. The development area for the proposed works is approximately 0.83ha.

See Site Location Map in Appendix 'A' for more details.

The existing site consists of a recently developed gravel automobile storage yard. Parking and drive aisles exist with landscaping along the site boundaries. There is a connection to the shared access entrance from Colonnade Road along the west property line. The existing site was part of a recent site plan approval (City File No. D07-12-17-0033).

The existing site has been serviced with water and sanitary stubs from the adjacent property to the west (City File No. D07-12-14-0022).

The proposed development consists of a proposed 1,570 m² automobile body shop. Parking and drive aisles will be provided throughout the site along with landscaping. There will continue to be a site access for the development along the shared access from Colonnade Road.

2.0 BACKROUND STUDIES

Background studies that have been completed for the proposed site include a review of City of Ottawa as-built drawings, a topographical survey, a geotechnical report and a Phase I Environmental Site Assessment (ESA).

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

A topographic survey of the site was completed by Farley, Smith & Denis Surveying Ltd. (FSD) and can be found under separate cover.

The following reports have previously been completed and are available under separate cover:

- Geotechnical Investigation - Proposed Commercial Building - 9 - 17 Colonnade Road completed by Paterson Group Inc., dated October 10th, 2018.
- Phase One Environmental Site Assessment - Myers Proposed Development Colonnade Road completed by Golder Associates Ltd., dated March 2017.

3.0 PRE-CONSULTATION SUMMARY

A pre-consultation meeting was conducted on August 25th, 2016 regarding the site and previous work that was completed. A pre-consultation took place for the proposed works on August 15th, 2018 and the specific design parameters to be incorporated within this design remained the same. They are as follows:

- Control 5 through 100-year post-development to 70 L/s/ha.
- Ponding of water shall not exceed 0.35 m for the 100-year storm event within the parking areas.
- No ponding of stormwater during the 2-year storm event.
- Quality control is provided via the existing Nepean Creek Municipal Stormwater Management Facility. No additional on-site quality controls are required for water quality as per discussions with the Rideau Valley Conservation Authority (RVCA). See Appendix ‘B’ for correspondence.

The notes from the City of Ottawa can be found in Appendix ‘B’.

4.0 WATERMAIN

4.1 Existing Watermain

There is an existing 300mm diameter PVC watermain within Colonnade Road. The watermain services the adjacent property as well as the fire hydrants along the south side of Colonnade Road. A 150mm diameter PVC water stub has been extended into the subject site within an existing 6.0 m servicing easement from the adjacent property with a temporary hydrant.

4.2 Proposed Watermain

The existing 150mm diameter watermain stub within the subject property will be extended. A new 150mm diameter PVC watermain is proposed to service the site complete with water valves. A private hydrant has been proposed within the subject site. The watermain is designed to have a minimum of 2.4m cover.

The Fire Underwriters Survey 1999 (FUS) method was utilized to determine the required fire flow for the site. The 'C' factor (type of construction) for the FUS calculation was determined to be 1.0 (ordinary type construction). The total floor area ('A' value) for the FUS calculation was determined to be 1,256 m^2. The results of the calculations yielded a required fire flow of 7,000 L/min. A fire flow of 6,300 L/min was calculated using the Ontario Building Code (OBC) requirements. The detailed calculations for the FUS and OBC can be found in Appendix 'C'.

The water demands for the proposed building have been calculated to adhere to the *Ottawa Design Guidelines – Water Distribution* manual and can be found in Appendix 'C'. The results have been summarized below:

Table 1: Water Demands

Site Area	0.83 ha
Industrial - Light	35,000 L/ha/day
Average Day Demand (L/s)	0.34
Maximum Daily Demand (L/s)	0.50
Peak Hourly Demand (L/s)	0.91
OBC Fire Flow Requirement (L/s)	105.00
FUS Fire Flow Requirement (L/s)	116.67
Max Day + Fire Flow (FUS) (L/s)	117.17

Boundary Conditions have been requested from the City however were not available at the time of submission. Once boundary conditions are provided by the City, the subject property will be hydraulically modelled using WaterCAD to confirm the system has adequate capacity for the proposed development and the required fire flows can be met.

5.0 SANITARY SEWER

5.1 Existing Sanitary Sewer

There is an existing 2,250 mm diameter concrete sanitary collection sewer (the Lynwood Collector sewer) within a 9.0 m easement that bisects the site. There is an existing private 250 mm diameter PVC sanitary stub within an existing 6.0 m servicing easement from the adjacent property. The existing sanitary sewer within the easement services the adjacent property and drains to the sanitary sewer within Merivale Road.

5.2 Proposed Sanitary Sewer

New 200 mm and 250 mm diameter gravity sanitary sewers will be connected to the existing 250mm diameter sanitary service stub sewer within the subject property. A sanitary manhole will be installed to service the site. A maintenance manhole (MH1A) will be installed inside the property line as per the *City of Ottawa – Sewer Design Guidelines*, October 2012, Clause 4.4.4.7 and City of Ottawa Sewer-Use By-Law 2003-514 (14).

The subject site is a proposed warehouse facility. The total area of the building is 1,570 m^2. The peak design flows for the proposed building were calculated using criteria from the *City of Ottawa – Sewer Design Guidelines, October 2012*. The proposed site development area (0.83ha) will generate a flow of 0.40 L/s.

The proposed 200 mm and 250 mm diameter gravity sanitary sewers will be installed throughout the subject property with a minimum full flow target velocity (cleansing velocity) of 0.6 m/s and a full flow velocity of not more than 3.0 m/s. This may not be feasible on every length of pipe, as the capture area for the uppermost mains in the system is relatively small. This issue has been dealt with by increasing the slopes of the sanitary sewers on the uppermost mains. Design parameters for the site include an infiltration rate of 0.28 l/s/ha.

The proposed service for the site will be connected to existing 250 mm diameter sanitary sewer within the subject property, it is anticipated that there will be no issues with capacity constraints within the proposed lateral or within the existing sanitary sewer within the adjacent property.

See *Sanitary Sewer Design Sheet* in Appendix 'D' of this report for more details.

6.0 STORM SEWER

6.1 Existing Storm Sewers

The subject property is currently serviced by a storm sewer network ranging in size from 300mm to 450mm that collects flows from the existing automobile storage yard. The existing storm sewer network connects to an existing 600mm storm sewer within Colonnade Road. A portion of the existing storm sewers that will remain unchanged within the subject property for the proposed development.

6.2 Proposed Storm Sewers

A new sewer system will be extended from the existing CBMH2 within the subject property. The new pipe network will collect storm flows and restrict runoff prior to leaving the site. The storm service from the proposed building will be connected to the proposed on site storm system.

Runoff from the proposed site will be collected with catchbasins and directed towards the existing CBMH2 within the subject property. The flow will be restricted in EXCBMH2 and the required storage for the subject property will be provided within the parking area. From EXCBMH2 the flow is conveyed to the existing 600mm diameter storm sewer within Colonnade Road. The proposed storm sewers will range from 200 mm to 375 mm in diameter throughout the subject property.

The minor storm sewers will be sized for the 5-year flow without any restriction. A storm sewer design sheet was created using the rational method and City of Ottawa 5-year storm event. Storm flows will be controlled by an inlet control device (ICD) to limit flows to the specified allowable release rate.

The storm design sheet calculates the proper sizing of the storm pipes within the development. Drainage area information, along with respective pipe slopes and other necessary information was utilized to evaluate the performance of the storm sewer network. The time of concentration calculated for the storm sewer system is based on a 10 minute inlet time at the uppermost sewer run. Within the design sheet, pipe capacities and associated full flow velocities have been calculated. The design flow (peak flow) was checked against the theoretical capacity to ensure that each storm sewer pipe can convey the 5-year unrestricted flow.

See *CP-18-0378 - POST* and *Storm Sewer Design Sheet* in Appendix 'F' of this report for more details. The Stormwater Management design for the subject property will be outlined in Section 6.0.

7.0 STORMWATER MANAGEMENT

7.1 Design Criteria and Methodology

Stormwater management for the proposed site will be maintained through positive drainage away from the proposed building and into a new underground storm sewer system. The storm system will capture the parking lot runoff and restrict flow prior to outletting to the existing 600 mm storm sewer within Colonnade Road. The emergency overland flow route for the proposed site will be directed south towards an adjacent drainage ditch. The quantitative and qualitative properties of the storm runoff for both the pre & post development flows are further detailed below. Stormwater Best Management Practices (SWM BMP's) will be implemented at the "Lot level", "Conveyance" and "End of Pipe" locations. These concepts will be explained further in Section 7.6.

In summary, the following design criteria have been employed in developing the stormwater management design for the site as directed by the RVCA and City:

Quality Control

- No quality control is proposed for the site. Quality control will be provided in the existing Nepean Creek SWM Facility.

Quantity Control

- Post-development flow (5,100-year) to be restricted to a release rate of 70 L/s/ha.

7.2 Runoff Calculations

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

$$Q = 2.78CIA \text{ (L/s)}$$

Where C = Runoff coefficient

I = Rainfall intensity in mm/hr (City of Ottawa IDF curves)

A = Drainage area in hectares

It is recognized that the Rational Method tends to overestimate runoff rates. As a result, the conservative calculation of runoff ensures that any SWM facility sized using this method is expected function as intended.

The following coefficients were used to develop an average C for each area:

Impervious Area	0.90
Gravel	0.60
Pervious Area	0.20

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.

The time of concentration (Tc) used for pre-development and post-development flows shall be calculated using a Tc of 10 minutes.

7.3 Pre-Development Drainage

The existing site drainage limits are demonstrated on the Pre-Development Drainage Area Plan. A summary of the Pre-Development Runoff Calculations can be found below.

Table 2: Pre-Development Runoff Summary

Drainage Area	Area (ha)	Runoff Coefficient (2/5-Year)	Runoff Coefficient (100-Year)	2-year Peak Flow (L/s)	5-year Peak Flow (L/s)	100-year Peak Flow (L/s)
A1	0.83	0.59	0.74	70.99	95.85	204.57
Total	**0.83**			**70.99**	**95.85**	**204.57**

See *CP-18-0378 - PRE* in Appendix 'E' and Appendix 'G' for calculations.

7.4 Post-Development Drainage

The proposed site drainage limits are demonstrated on the Post-Development Drainage Area Plan. A summary of the Post-Development Runoff Calculations can be found below. See *CP-18-0378 - POST* in Appendix 'F' of this report for more details.

Table 3: Post-Development Runoff Summary

Drainage Area	Area (ha)	Runoff Coefficient (2/5-Year)	Runoff Coefficient (100-Year)	2-year Peak Flow (L/s)	5-year Peak Flow (L/s)	100-year Peak Flow (L/s)
B1	0.11	0.90	1.00	21.10	28.63	54.51
B2	0.08	0.89	0.99	16.04	21.76	41.45
B3	0.15	0.83	0.93	27.51	37.32	71.27
B4	0.14	0.90	1.00	26.65	36.16	68.85
B5	0.10	0.90	1.00	19.44	26.37	50.22
B6	0.22	0.85	0.95	39.49	53.57	102.20
B7	0.02	0.27	0.33	1.20	1.63	3.36
Total	**0.83**			**151.44**	**205.45**	**391.87**

Runoff for areas B1-B6 will be restricted and the required storage will be provided within the parking area. The flow will be controlled by an inlet control device located within EXCBMH2. The restriction device will account for the unrestricted flow (Area B7) leaving the site. See Appendix 'G' for calculations. This restriction and quality control will be further detailed in Sections 7.5 and 7.6.

7.5 Quantity Control

After discussing the stormwater management criteria for the site with City staff, the total post-development runoff for this site has been restricted to match the required restricted flow of 70 L/s/ha as per the *Colonnade Road Planning Study*. (See Appendix 'B' for pre-consultation notes). This created the following allowable release rate for the development site.

Table 4: Allowable Release Rate Summary

Drainage Area	Area (ha)	Allowable Release Rate (L/s/ha)	Required Restricted Flow (L/s)
A1	0.83	70.00	**58.10**

See Appendix 'G' for calculations.

Reducing site flows will be achieved using flow restrictions and will create the need for onsite storage. Runoff from areas B1 to B7 will be restricted as shown in the table below.

Table 5: Post-Development Restricted Runoff Summary

Drainage Area	Unrestricted Flow (L/s)			Restricted Flow (L/s)			
	2-Year	5-Year	100-Year	2-Year	5-Year	100-Year	
B1	21.10	28.63	54.51	54.74	54.74	54.74	*Restricted*
B2	16.04	21.76	41.45				
B3	27.51	37.32	71.27				
B4	26.65	36.16	68.85				
B5	19.44	26.37	50.22				
B6	39.49	53.57	102.20				
B7	1.20	1.63	3.36	1.20	1.63	3.36	*Unrestricted*
Total	**151.44**	**205.45**	**391.87**	**55.94**	**56.37**	**58.10**	

See Appendix 'G' for calculations.

Runoff from Areas B1-B6 will be restricted at EXCBMH2 through a Hydrovex VHV inlet control device or an approved equivalent (Design Head of 1.99 m). See Appendix 'G' for ICD sizing from the manufacturer. This orifice plug will restrict areas B1-B6 to 54.74 L/s for both the 5 and 100-year storm events. The restriction

creates a water surface elevation (WSEL) of 85.07 m for the 5-year storm event and 85.15 m for the 100-year storm event. The storage for this area will be provided within the dry retention area. See below table for details of the required and provided storage volumes.

Table 6: Storage Summary

Drainage Area	Depth of Ponding (m)	Storage Required (m^3)	Storage Available (m^3)	Depth of Ponding (m)	Storage Required (m^3)	Storage Available (m^3)
	5-Year			100-Year		
B1-B6	0.07-0.22	99.33	100.11	0.15-0.30	262.37	262.59

See Appendix 'G' for calculations.

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 Colonnade Road.

7.6 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. Some of these BMP's cannot be provided for this site due to site constraints and development requirements.

A Hydrovex VHV inlet control device will restrict flows from the site, causing temporary ponding. There will be an opportunity for particle settlement during this process; however the full benefits of a larger scale end-of-pipe facility will only be realized at the downstream Stormwater Management Pond. As per the discussions with the RVCA, the existing storm main within Colonnade Road ties into the Nepean Creek SWM Facility which provides appropriate quality control for the Rideau River. This facility has been designed to accommodate runoff from Colonnade Road within the tributary drainage area.

As discussed with the RVCA, quality control is provided within the downstream SWM facility, therefore no additional on-site quality treatment has been provided. The combination of the above BMP's and the proposed flow control measures will aid in the thermal protection of the natural environment.

8.0 SEDIMENT & EROSION CONTROL

8.1 Temporary Measures

Before construction begins, temporary silt fence, straw bale or rock flow check dams will be installed at all natural runoff outlets from the property. It is crucial that these controls be maintained throughout construction and inspection of sediment and erosion control will be facilitated by the Contractor or Contract Administration staff throughout the construction period.

Silt fences will be installed where shown on the final engineering plans, specifically along the downstream property limits. The Contractor, at their discretion or at the instruction of the City, Conservation Authority or the Contract Administrator shall increase the quantity of sediment and erosion controls on-site to ensure that the site is operating as intended and no additional sediment finds its way off site. The rock flow, straw bale & silt fence check dams and barriers shall be inspected weekly and after rainfall events. Care shall be taken to properly remove sediment from the fences and check dams as required. Fibre roll barriers are to be installed at all existing curb inlet catchbasins and filter fabric is to be placed under the grates of all existing catchbasins and manholes along the frontage of the site and any new structures immediately upon installation. The measures for the existing/proposed structures is 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.

Although not anticipated, work through winter months shall be closely monitored for erosion along sloped areas. Should erosion be noted, the Contractor shall be alerted and shall take all necessary steps to rectify the situation. Should the Contractor's efforts fail at remediating the eroded areas, the Contractor shall contact the City and/or Conservation Authority to review the site conditions and determine the appropriate course of action. As the ground begins to thaw, the Contractor shall place silt fencing at all required locations as soon as ground conditions warrant. Please see the *Site Grading, Drainage and Sediment & Erosion Control Plan* for additional details regarding the temporary measures to be installed and their appropriate OPSD references.

8.2 Permanent Measures

Rip-rap will be placed at all locations that have the potential for concentrated flow. It is crucial that the Contractor ensure that the geotextile is keyed in properly to ensure runoff does not undermine the rip rapped area. Additional rip rap is to be placed at erosion prone locations as identified by the Contractor / Contract Administrator / Municipality or Conservation Authority.

It is expected that the Contractor will promptly ensure that all disturbed areas receive topsoil and seed/sod and that grass be established as soon as possible. Any areas of excess fill shall be removed or levelled as soon as possible and must be located a sufficient distance from any watercourse to ensure that no sediment is washed out into the watercourse. As the vegetation growth within the site provides a key component to the control of sediment for the site, it must be properly maintained once established. Once the construction is complete, it will be up to the landowner to maintain the vegetation and ensure that the vegetation is not overgrown or impeded by foreign objects.

9.0 SUMMARY

- A new 1,570m^2 automobile body shop will be constructed at 9-17 Colonnade Road.
- A new 200mm diameter watermain will be installed to service the site, along with a proposed fire hydrant.
- A new 200mm and 250mm sanitary sewer will be installed to service the subject property and connect to the existing sanitary sewer within the existing servicing easement.
- The proposed storm sewer, ranging in diameter from 200 mm to 375 mm, will be installed throughout the site and drain to the existing storm sewers on Colonnade Road.
- Storage for the 5- through 100-year storm events will be provided within the parking lot areas above the proposed storm structures.
- An existing SWM Pond (Nepean Creek SWM Facility) will provide the required quality control for the site.

10.0 RECOMMENDATION

Based on the information presented in this report, we recommend that City of Ottawa approve this Servicing and Stormwater Management Report in support of the proposed Myers Carstar at 9-17 Colonnade Road.

This report is respectfully being submitted for approval.

Regards,

McIntosh Perry Consulting Engineers Ltd.

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

Tyler Ferguson, E.I.T.
Engineering Intern, Land Development
T: 613.836.2184 x 2242
E: t.ferguson@mcintoshperry.com

11.0 STATEMENT OF LIMITATIONS

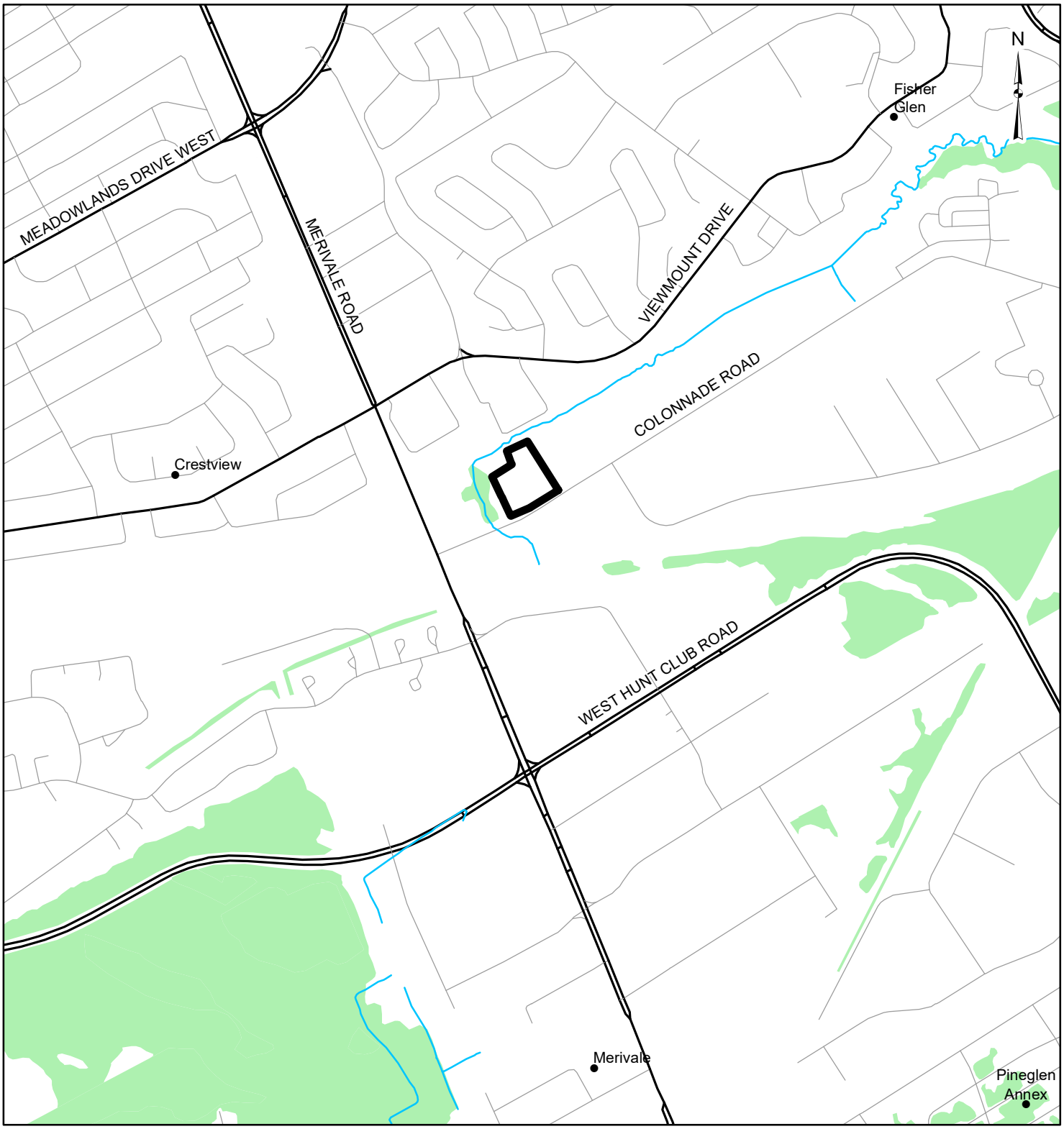
This report was produced for the exclusive use of BBS Construction Ltd. The purpose of the report is to assess the existing stormwater management system and provide recommendations and designs for the post-construction scenario that are in compliance with the guidelines and standards from the Ministry 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.

APPENDIX A
SITE LOCATION PLAN

McINTOSH PERRY



LEGEND

- Site Location
- Local Road
- Major Road
- Watercourse

500 250 0 500

1:15,000 Metres

REFERENCE

Basedata provided by the Ontario Ministry of Natural Resources and Forestry, 2018.

CLIENT: BBS CONTRUCTION LTD.

PROJECT: MYERS CARSTAR, 9-17 COLONNADE ROAD

TITLE: SITE LOCATION

McINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A1L0
Tel: 613-836-2184 Fax: 613-836-3742
www.mcintoshperry.com

PROJECT NO: CP-18-0378	
Date	Oct., 17, 2018
GIS	LC
Checked By	TF

FIGURE: 1

APPENDIX B
CITY OF OTTAWA PRE-CONSULTATION NOTES

McINTOSH PERRY

Pre-Application Consultation Meeting

9 Colonnade Road

August 15, 2018 - Room 4114E, City Hall

Attendees: Ugo Ufoegbune (Planner, City of Ottawa)
Rosanna Baggs (Project Manager, Transportation, City of Ottawa)
Santhosh Kuruvilla (Project Manager, Engineering, City of Ottawa)
Mary Dickinson (Planner, City of Ottawa)

Gavin Barrowman	Property Owner
Frits Bosman	BBS Construction
Ralph Wiesbrock	KWC Architects
Andrew Kastor	KWC Architects
Evan Garfinkel	McIntosh Perry (Planning)
Benjamin Clare	McIntosh Perry (Planning)
Tyler Ferguson	McIntosh Perry (Engineering)
Curtis Melanson	McIntosh Perry (Engineering)
Gino Aiello	Gino J. Aiello Landscape Architect

Please find below, the combined comments from our internal staff and comments from the Pre-Application Consultation meeting held on August 15, 2018 for the above noted address.

Summary of Proposed Project

- The subject site is located at 9 Colonnade Road, east of Merivale.
- A previous Site Plan Control application (D01-12-17-0033) for a gravel automobile storage yard was approved on December 22, 2017
- The applicant proposes to construct a building on the property of approximately 1,552 sm GFA, for Automobile Body Shop with a building height of 7.61 metres.
- The proposed building will include a sales room, offices, servicing and parts department.
- The applicant would like to rely on previous work done through site plan as much as possible

- The new proposal is not vastly different from the previous application.
- There is still a good amount of auto inventory for the site
- Existing access – still what is proposed, including substantial throat length, creates constraint on site for maneuvering at back for functionality.
- Also truck sewer easement at front of building.

Policy Framework

- Official Plan Designation: General Urban Area
- Zoning By-law Designation: GM(2266)

Comments

Planning/Policy (Ugo Ufoegbune)

- Zoning - hold has been lifted
- Automobile Body Shop is a permitted use in the subject site.
- Suggest you reach out to the ward councillor
- City will require Cash-in-lieu at 2% of value of land.

Landscaping

- We would like you to provide more landscaping along the western edge of the site to create a buffer between the path and the parking service bays. We are looking for a minimum landscaping of 3 metres along the western edge, however, as discussed in the pre-application meeting the applicant indicated that there might be physical difficulties in trying to provide landscaping (grass, trees and shrubs). As discussed, the Landscape Architect, Gino Aiello will investigate possibilities.
- Remove parking lot lines from areas that are not concerned with the current application and show limits of work and areas as previously approved.
- There was a discussion about the proximity of the Nepean creek at rear. Although the creek is not touching the site, we will investigate and let you know if any studies are triggered because of the proximity of the site to the creek at the rear.

Transportation (Rosanna Baggs)

My pre-consultation notes are as follows:

- Follow Traffic Impact Assessment Guidelines – A Traffic Impact Assessment is required.
    - Start this process ASAP.
    - Applicant advised that their application will not be deemed complete until the submission of the draft step 1-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable).
- ROW protection on Colonnade between Merivale and Prince of Wale is 26m even.
- Noise Impact Studies required for the following:
    - Stationary (due to the proximity to neighbouring noise sensitive land uses)
- On site plan:
    - Grey out (or clearly identify) what is existing and that will not be changed as part of this application
    - Show all details of the roads abutting the site up to and including the opposite curb; include such items as pavement markings, accesses and/or sidewalks.
    - Turning templates will be required for all accesses showing the largest vehicle to access the site (if any accesses will be modified) and for internal movements (i.e. to access loading zones).
    - Show all curb radii measurements; ensure that all curb radii are reduced as much as possible
    - Show lane/aisle widths.

Engineering (Santhosh Kuruviulla)

- Engineering dealt with the previous file.
- Use the same stormwater quantity control criteria used for the previous site plan application
- MOECC ECA is required - Industrial sewage works
- Require Oil & Grit separator for quality control
- Check with RVCA for level of stormwater quality control
- Frontage fee applies for storm, Sanitary and Water - fee amount will be provided at a later date
- As per Technical Bulletin PIEDTB-2016-01 section 8.3.11.1 (page 12 of 14), there shall be no surface ponding on private parking areas or drive aisle during the 2-year storm event
- Demonstrate there is no ponding on paved parking area or on drive aisle during a 2-year storm event
- Storage is allowed on grass swales or underground during 2-year storm events
- When including underground storage, the Modified Rational Method must be adjusted to account for the increased change in head on the orifice over the course of the storm (when calculating required storage.) Without producing a computer model, the normal

adjustment is to reduce the allowable flow by 50% in the calculation table only, which results in a higher required storage volume.
- There is existing surface storage at the proposed building location. It needs to be replaced at a proper location
- Water By-law 2018-167 71 (4) indicates: “Only one City Water Meter per Water Service shall be installed for Water Service billing purposes.”
- Do not see an issue connecting to the existing sanitary stub to service the proposed building, as long as the applicant/owner of Honda dealership had obtained MOECC ECA for servicing more than one parcel of land and the property owners (Honda and Myers) enter into a joint use and maintenance agreement
- Clearly delineate the limits of proposed work area and grey out the rest of the site.

Please visit the following links:

Guide to preparing City of Ottawa Studies and Plans:
http://ottawa.ca/en/development-application-review-process-0/guide-preparing-studies-and-plans

Servicing Study Guidelines for Development Applications:
http://ottawa.ca/en/development-application-review-process-0/servicing-study-guidelines-development-applicationsi

To request City of Ottawa plan(s) or report information please contact the City of Ottawa Information Centre:

InformationCentre@ottawa.ca
(613) 580-2424 ext. 44455

Please note that these comments are considered preliminary based on the information available to date and therefore maybe amended or the criteria provided altered as additional details become available and presented to the City.

Application Type and Requirements

This proposal will require Site Plan Control, Manager Approval, Public Consultation. Please see the following link for information and associated fees:

https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/development-application-forms#site-plan-control

- This proposal will requires a Site Plan Control application under the category of Manager Approval, Public Consultation’.

- Please find an attached Plan and Study Identification List. Note that in addition to the requested paper copies, pdf copies of all submission material is required.
- For the site plan control application, the owner may be subject to additional Engineering Design Review and Inspection Fees. A portion of these fees are captured at the time of application, where the balance is determined through the cost estimates that are provided at the end of the review process. The total owing is equal to four per cent of the value of the hard servicing (roads, sewers, watermains, sidewalks, curbs, stormwater etc.) and two per cent of the soft servicing (landscaping, parking lot construction etc.) are payable prior to the registration. Securities will also be required to be posted as a condition of approval at a rate equal to 50% of all on-site works and 100% of all works in the right of way.
- Please contact Building Code Services to determine what your approximate Development Charges and other applicable fees will be at the time of issuance of a building permit.
- Consultation with the ward councilor is strongly recommended. Early consultation with the community is supported.

Tyler Ferguson

From: Eric Lalande <eric.lalande@rvca.ca>
Sent: August-21-18 10:08 AM
To: Tyler Ferguson
Subject: RE: 9-17 Colonnade Road - Myers Carstar

Hi Tyler,

The previous comments would apply to this site:

If the stormwater is connecting to the municipal sewer on Colonnade Road, then the quality treatment required for the receiver (Rideau River) will be provided for in the Nepean Creek Municipal Stormwater Management Facility. No additional on-site quality controls are required for the protection of surface water quality and aquatic habitat.

Eric Lalande, MCIP, RPP
Planner, Rideau Valley Conservation Authority
613-692-3571 x1137

From: Tyler Ferguson <t.ferguson@mcintoshperry.com>
Sent: Monday, August 20, 2018 6:00 PM
To: Eric Lalande <eric.lalande@rvca.ca>
Subject: 9-17 Colonnade Road - Myers Carstar

Hi Eric,

Hope all is well, we have a potential development moving forward at 9-17 Colonnade Road. The property is currently a gravel parking lot and was constructed back in the fall as per the attached grading plan. They are proposing to add a building and asphalt to part of the parking lot as per the attached draft site plan.

I have attached previous correspondence with the RVCA for the site's quality control requirements. We have consulted with the City and will be providing quantity control as per their requirements, can you confirm that no quality control is required?

If you could please review and let me know. Any questions don't hesitate to contact me.

Thank you for your time,

Tyler Ferguson, EIT
Engineering Intern
115 Walgreen Road, R.R. 3, Carp, ON K0A 1L0
T. 613.836.2184 (ext 2242) | **F.** 613.836.3742
t.ferguson@mcintoshperry.com | www.mcintoshperry.com

McINTOSH PERRY

APPENDIX C
WATERMAIN CALCULATIONS

McINTOSH PERRY

McINTOSH PERRY

CP-18-0378 - 9-17 Colonnade Road - Water Demands

Project:	9-17 Colonnade Road
Project No.:	CP-18-0378
Designed By:	S.V.K.
Checked By:	R.P.K.
Site Area:	0.83 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
Othe Commercial	28,000	L/gross ha/d
AVERAGE DAILY DEMAND	**0.34**	**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	**0.50**	**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	**0.91**	**L/s**

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

McINTOSH PERRY

CP-18-0378 - 9-17 Colonnade Road - OBC Fire Calculations

Project:	9-17 Colonnade Road
Project No.:	CP-18-0378
Designed By:	S.V.K.
Checked By:	R.P.K.

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

Water Supply for Fire-Fighting - Automobile Body Shop

Building is classified as Group : F2 (from table 3.2.2.55)

Building is of noncombustable construction with fire separations and fire-resistance ratings provided in accordance with Subsection 3.2.2, including loadbearging 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	**11,948**	(Total building volume in m³.)
Stot	**1.0**	(From figure 1 pg A-32)
Q =	**203,110.90 L**	

→

			From Figure 1 (A-32)
Snorth	114	m	0.0
Seast	195	m	0.0
Ssouth	103	m	0.0
Swest	83	m	0.0

*approximate distances

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

6300 L/min (if Q >190,000 L and ≤ 270,000 L)
1664 gpm

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

McINTOSH PERRY

CP-18-0378 - 9-17 Colonnade Road - Fire Underwriters Survey (FUS) Fire Calculations

Project:	9-17 Colonnade Road
Project No.:	CP-18-0378
Designed By:	S.V.K.
Checked By:	R.P.K.

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 = 1.00

B. Determine Ground Floor Area

As provided by the Architect:

Floor Area (One Floor) = 1,570.00 m²

A = 1,570.00 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 = 1.00

D. Calculate Required Fire Flow

F = 220 x C x √A

F = 220.00 X 1.00 X √ 1570.00

F = 8,717.11 L/min.

F = 9,000.00 L/min.

E. Determine Increase or Decrease Based on Occupancy

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

Non-combustible -25%

Occupancy Decrease = 2,250.00 L/min.

F = 6,750.00 L/min.

CP-18-0378 - 9-17 Colonnade Road - Fire Underwriters Survey (FUS) Fire Calculations

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 not 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 0%.

Reduction = 6,750.00 L/min. X 0%

Reduction = 0.00 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 remainder of the site that are within 45m.
- Therefore the charge for exposure is 0% of the value obtained in Step E.

Increase = 6,750.00 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 = 6,750.00 L/min. - 0.00 L/min. + 0.00 L/min.
F = 6,750.00 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).

APPENDIX D
SANITARY CALCULATIONS

McINTOSH PERRY

SANITARY SEWER DESIGN SHEET

PROJECT: MYERS CARSTAR
LOCATION: 9-17 COLONNADE ROAD, OTTAWA
CLIENT: BBS CONSTRUCTION LTD.

McINTOSH PERRY

LOCATION				RESIDENTIAL									ICI AREAS							INFILTRATION ALLOWANCE			FLOW	SEWER DATA						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
STREET	AREA ID	FROM MH	TO MH	UNIT TYPES				AREA	POPULATION		PEAK FACTOR	PEAK FLOW (L/s)	AREA (ha)						PEAK FLOW (L/s)	AREA (ha)		FLOW (L/s)	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	DIA (mm)	SLOPE (%)	VELOCITY (full) (m/s)	AVAILABLE CAPACITY	
				SF	SD	TH	APT	(ha)	IND	CUM			INSTITUTIONAL		COMMERCIAL		INDUSTRIAL			IND	CUM								L/s	(%)
													IND	CUM	IND	CUM	IND	CUM											
		BLDG	MH1A					0.00	0.0	0.0	4.00	0.00		0.00	0.83	0.83		0.00	0.40	0.83	0.83	0.23	0.64	48.39	4.15	200	2.00	1.492	47.75	98.69
		MH1A	*EX CAP*					0.00	0.0	0.0	4.00	0.00		0.00		0.83		0.00	0.40	0.00	0.83	0.23	0.64	43.87	27.80	250	0.50	0.866	43.23	98.55
		EX CAP	*EX MH*					0.00	0.0	0.0	4.00	0.00		0.00		0.83		0.00	0.40	0.00	0.83	0.23	0.64	*43.87*	*20.00*	*250*	*0.50*	0.866	43.23	98.55

Design Parameters:

Residential			ICI Areas			
						Peak Factor
SF	3.4	p/p/u				
TH/SD	2.7	p/p/u	INST	28,000	L/Ha/day	1.5
APT	2.3	p/p/u	COM	28,000	L/Ha/day	1.5
Other	60	p/p/Ha	IND	35,000	L/Ha/day	MOE Chart

Notes:

1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 280 L/day
3. Infiltration allowance: 0.28 L/s/Ha
4. Residential Peaking Factor:
   Harmon Formula = 1+(14/(4+P^0.5))
   where P = population in thousands

Designed: T.D.F.

Checked: R.P.K.

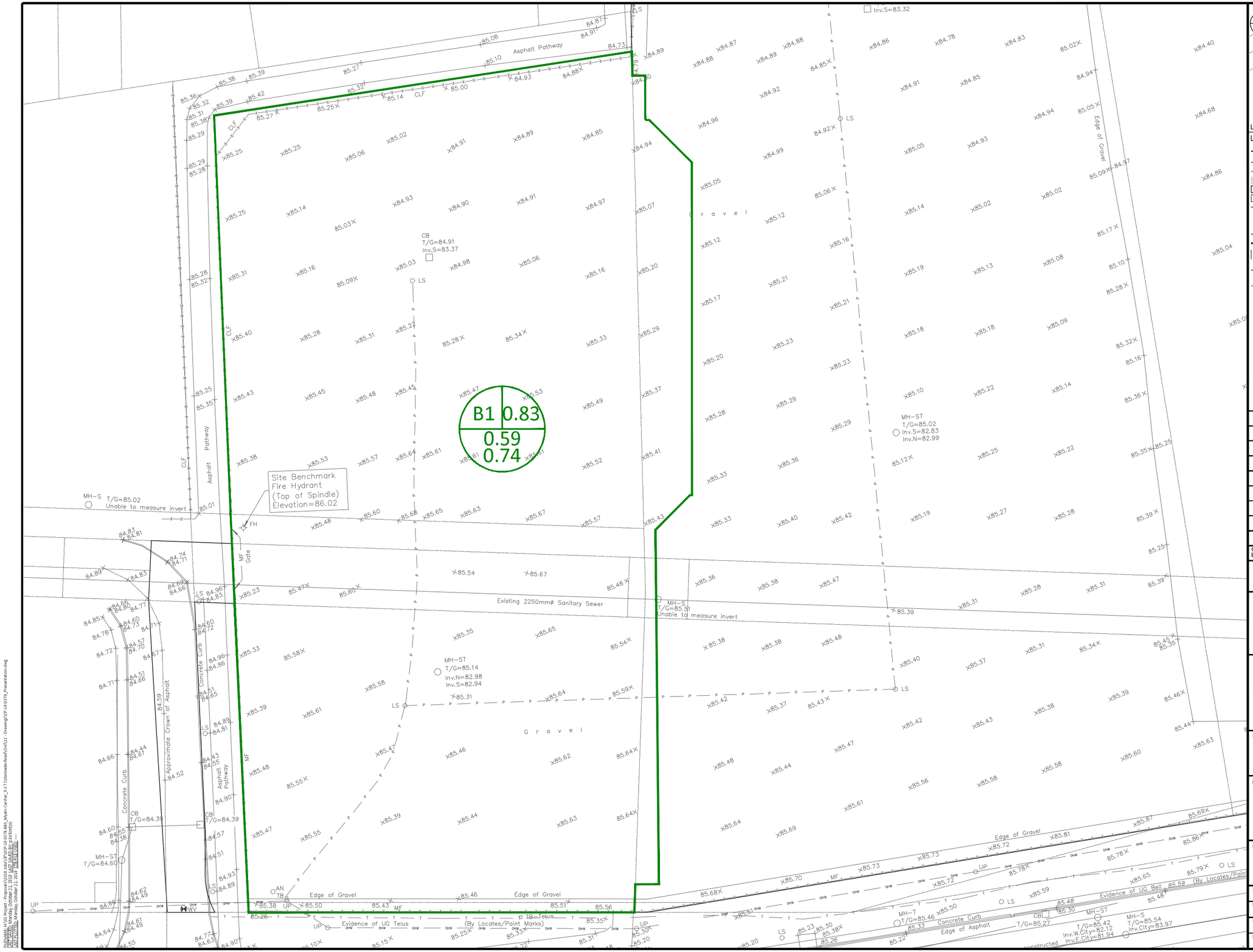
Project No.: CP-18-0378

No.	Revision	Date
1.	ISSUED FOR SITE PLAN CONTROL	01/11/2018

Sheet No: 1 of 1

APPENDIX E
PRE-DEVELOPMENT DRAINAGE PLAN

McINTOSH PERRY



LOCATION PLAN

LEGEND

- BARRIER CURB
- CURB DEPRESION
- MOUNTABLE CURB
- EASEMENT
- HEAVY DUTY ASPHALT
- CONCRETE SIDEWALK
- PAVING STONE
- STORM MANHOLE
- CATCHBASIN OR DITCH INLET
- LANDSCAPE CATCHBASIN
- SANITARY MANHOLE
- PERFORATED PIPE IN SWALES
- WATER VAVLE/CHAMBER
- FIRE HYDRANT
- CENTRELINE OF SWALE
- SLOPING AT 3:1 (UNLESS SPECIFIED)
- PROPOSED ELEVATION / EXISTING ELEVATION
- SWALE ELEVATION
- TOP OF WALL ELEVATION / BOTTOM OF WALL ELEVATION
- EMERGENCY OVERLAND FLOW ROUTE
- SILT FENCE (AS PER OPSD 219.130)
- STRAW BALE CHECK DAM (AS PER OPSD 219.180)
- AREA NAME
- AREA (Ha)
- 5yr & 100yr COEFFICIENT

B1 0.25
0.90
1.00

FOR REVIEW ONLY
NOT FOR CONSTRUCTION

No.	Revisions	Date

Check and verify all dimensions before proceeding with the work

Do not scale drawings

SCALE 1 : 400

0 10 20 30 40 Metres

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

Stamp:

Client:
MYERS AUTOMOTIVE GROUP
1200 BASELINE ROAD
OTTAWA, ON K2C 0A6

Project:
PROPOSED AUTOMOBILE BODY SHOP
9 & PART OF 17 COLONNADE ROAD
OTTAWA, ON K2E 1E1

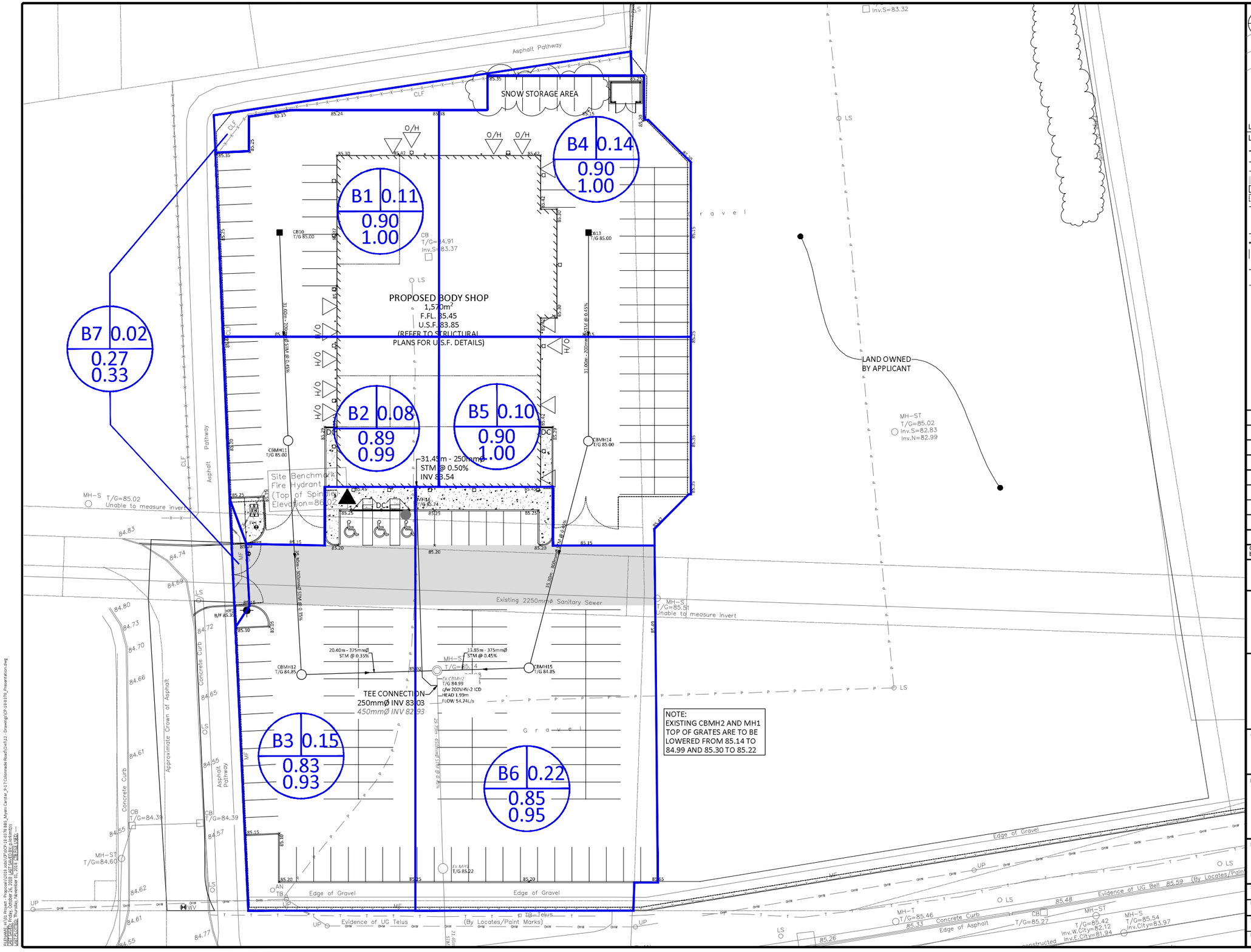
Drawing Title:
PRE-DEVELOPMENT DRAINAGE AREA PLAN

Scale:	1:250	Project Number:	CP-18-0378
Drawn By:	P.G.K.		
Checked By:	R.P.K.	Drawing Number:	PRE
Designed By:	P.G.K.		

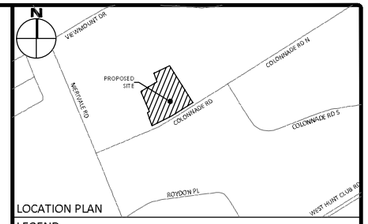
FILENAME: H:\03 Project - Proposal\2018 Jobs\CP\CP-18-0378 B&L_Myers Carstar_3-17 Colonnade Road\Civil\12 - Drawings\CP-18-0378_Presentation.dwg
LAST PLOTTED: Monday, October 22, 2018 by Paul Kehrer
LAST SAVED: Monday, October 22, 2018 by PAUL KEHRER

APPENDIX F
POST-DEVELOPMENT DRAINAGE PLAN

McINTOSH PERRY



LOCATION PLAN



LEGEND

- BARRIER CURB / CURB DEPRESSION
- MOUNTABLE CURB
- EASEMENT
- HEAVY DUTY ASPHALT
- CONCRETE SIDEWALK
- PAVING STONE
- STORM MANHOLE
- CATCHBASIN OR DITCH INLET
- LANDSCAPE CATCHBASIN
- SANITARY MANHOLE
- PERFORATED PIPE IN SWALES
- WATER VAVLE/CHAMBER
- FIRE HYDRANT
- CENTRELINE OF SWALE
- SLOPING AT 3:1 (UNLESS SPECIFIED)
- PROPOSED ELEVATION / EXISTING ELEVATION
- SWALE ELEVATION
- TOP OF WALL ELEVATION / BOTTOM OF WALL ELEVATION
- EMERGENCY OVERLAND FLOW ROUTE
- SILT FENCE (AS PER OPSD 219.130)
- STRAW BALE CHECK DAM (AS PER OPSD 219.180)
- AREA NAME / AREA (Ha) / 5yr & 100yr COEFFICIENT (e.g. B1 0.25 / 0.90 / 1.00)

FOR REVIEW ONLY
NOT FOR CONSTRUCTION

No.	Revisions	Date

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

SCALE 1 : 400
0 10 20 30 40 Metres

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

N

Stamp:

Client:
MYERS AUTOMOTIVE GROUP
1200 BASELINE ROAD
OTTAWA, ON K2C 0A6

Project:
PROPOSED AUTOMOBILE BODY SHOP
9 & PART OF 17 COLONNADE ROAD
OTTAWA, ON K2E 1E1

Drawing Title:
POST-DEVELOPMENT DRAINAGE AREA PLAN

Scale:	1:250	Project Number:	CP-18-0378
Drawn By:	P.G.K.		
Checked By:	R.P.K.	Drawing Number:	POST
Designed By:	P.G.K.		

FILEPATH: I:\10 Project - Proposals\2018 Jobs\CP\CP-18-0378 883_Myers Cantar_9-17 Colonnade Road\Civil\12 - Drawings\CP-18-0378_Presentation.dwg
PLOTTED: Friday, October 26, 2018 1:45:44 PM by Kimberley Hamilton
LAST SAVED: Friday, October 26, 2018 1:45:38 PM by Kimberley Hamilton

APPENDIX G
STORMWATER MANAGEMENT CALCULATIONS

McINTOSH PERRY

CP-18-0378 - 9 & 17 Colonnade Road - 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	0.83	0.00	0.90	8,140.42	0.60	117.89	0.20	0.59	0.74

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	0.83	0.59	0.74	20	52.0	70.3	120.0	70.99	95.85	204.57
Total	**0.83**							**70.99**	**95.85**	**204.57**

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	0.11	1,098.18	0.90	0.00	0.60	0.00	0.20	0.90	1.00
B2	0.08	833.08	0.90	0.00	0.60	7.48	0.20	0.89	0.99
B3	0.15	1,397.69	0.90	0.00	0.60	152.14	0.20	0.83	0.93
B4	0.14	1,387.04	0.90	0.00	0.60	0.00	0.20	0.90	1.00
B5	0.10	1,011.71	0.90	0.00	0.60	0.00	0.20	0.90	1.00
B6	0.22	2,024.13	0.90	0.00	0.60	139.14	0.20	0.85	0.95
B7	0.02	21.13	0.90	0.00	0.60	186.56	0.20	0.27	0.33

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	0.11	0.90	1.00	10	76.8	104.2	178.6	21.10	28.63	54.51
B2	0.08	0.89	0.99	10	76.8	104.2	178.6	16.04	21.76	41.45
B3	0.15	0.83	0.93	10	76.8	104.2	178.6	27.51	37.32	71.27
B4	0.14	0.90	1.00	10	76.8	104.2	178.6	26.65	36.16	68.85
B5	0.10	0.90	1.00	10	76.8	104.2	178.6	19.44	26.37	50.22
B6	0.22	0.85	0.95	10	76.8	104.2	178.6	39.49	53.57	102.20
B7	0.02	0.27	0.33	10	76.8	104.2	178.6	1.20	1.63	3.36
Total	**0.83**							**151.44**	**205.45**	**391.87**

Required Restricted Flow

Drainage Area	Area (ha)	Required Release Rate* (L/s/ha)	Q (L/s)		
			2-Year	5-Year	100-Year
A1	0.83	70.0	58.10	58.10	58.10

*Stormwater release rate is 70L/s/ha as per the Colonnade Road Planning Study

CP-18-0378 - 9 & 17 Colonnade Road - Runoff Calculations

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	21.10	28.63	54.51	54.74	54.74	54.74	59.57	99.33	262.37	61.06	100.11	262.59
B2	16.04	21.76	41.45									
B3	27.51	37.32	71.27									
B4	26.65	36.16	68.85									
B5	19.44	26.37	50.22									
B6	39.49	53.57	102.20									
B7	1.20	1.63	3.36	1.20	1.63	3.36						
Total	**151.44**	**205.45**	**391.87**	**55.94**	**56.37**	**58.10**	**59.57**	**99.33**	**262.37**	**61.06**	**100.11**	**262.59**

CP-18-0378 - 9 & 17 Colonnade Road - STORAGE REQUIREMENTS

Storage Requirements for Area B1-B6

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)	B5 Runoff (L/s)	B6 Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
11	73.2	20.10	15.28	26.21	25.39	18.52	37.62	54.74	88.39	58.34
12	69.9	19.20	14.60	25.03	24.26	17.69	35.94	54.74	81.98	59.03
13	66.9	18.39	13.98	23.97	23.23	16.94	34.41	54.74	76.19	59.43
14	64.2	17.65	13.42	23.01	22.29	16.26	33.03	54.74	70.91	59.57
15	61.8	16.97	12.90	22.12	21.44	15.64	31.76	54.74	66.09	59.48
16	59.5	16.35	12.43	21.31	20.65	15.06	30.60	54.74	61.66	59.19
17	57.4	15.78	11.99	20.56	19.93	14.53	29.52	54.74	57.58	58.73

Maximum Storage Required 2-Year (m^3) =	59.57

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)	B5 Runoff (L/s)	B6 Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
13	90.6	24.90	18.93	32.46	31.45	22.94	46.60	54.74	122.55	95.59
15	83.6	22.96	17.45	29.93	29.00	21.15	42.96	54.74	108.71	97.84
17	77.6	21.32	16.21	27.80	26.93	19.64	39.90	54.74	97.07	99.01
19	72.5	19.93	15.15	25.98	25.17	18.36	37.29	54.74	87.13	99.33
21	68.1	18.72	14.23	24.40	23.64	17.25	35.03	54.74	78.53	98.95
23	64.3	17.66	13.43	23.03	22.31	16.27	33.05	54.74	71.02	98.00
25	60.9	16.73	12.72	21.81	21.13	15.41	31.31	54.74	64.38	96.58

Maximum Storage Required 5-Year (m^3) =	99.33

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)	B5 Runoff (L/s)	B6 Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
29	94.0	28.70	21.82	37.52	36.25	26.44	53.81	54.74	149.82	260.68
31	89.8	27.42	20.85	35.85	34.64	25.26	51.42	54.74	140.71	261.72
33	86.0	26.27	19.97	34.34	33.17	24.20	49.24	54.74	132.45	262.26
35	82.6	25.21	19.17	32.96	31.84	23.23	47.27	54.74	124.94	262.37
37	79.4	24.25	18.43	31.70	30.62	22.34	45.46	54.74	118.06	262.09
39	76.5	23.36	17.76	30.54	29.50	21.52	43.79	54.74	111.74	261.46
41	73.8	22.54	17.14	29.47	28.47	20.77	42.26	54.74	105.91	260.53

Maximum Storage Required 100-Year (m^3) =	262.37

CP-18-0378 - 9 & 17 Colonnade Road - STORAGE REQUIREMENTS

Storage Occupied In Area B1-B6

2-Year Storm Event

Structure/Pipe	Size (mm)	Depth/ Length (m)	Area (m^2)	Volume (m^3)
CB10	600x600	2.12	0.37	0.79
CB10-CBMH11	250	31.00	0.20	6.09
CBMH11	1200	2.01	1.17	2.35
CBMH11-CBMH12	300	35.30	0.28	9.98
CBMH12	1200	2.06	1.17	2.40
CBMH12-*Ex.CBMH2*	375	20.40	0.44	9.01
CB13	600x600	2.10	0.37	0.78
CB13-CBMH14	250	31.00	0.20	6.09
CBMH14	1200	1.99	1.17	2.32
CBMH14-CBMH15	300	35.30	0.28	9.98
CBMH15	1200	2.07	1.17	2.42
CBMH15-*Ex.CBMH2*	375	13.85	0.44	6.12
Ex.CBMH2	1200	2.35	1.17	2.74

Storage Available (m^3) =	**61.06**
Storage Required (m^3) =	**59.57**

5-Year Storm Event

Water Elevation (m) =		85.07	OUTLET INVERT (m)	Area (m^2)	Depth of Ponding (m)	Head (m)	Volume (m^3)
Structure	T/G (m)	Pipe dia. (mm)					
CB10	85.00	200	83.48	33.33	0.07	1.50	0.82
CBMH11	85.00	300	83.29	32.85	0.07	1.63	0.77
CBMH12	84.85	375	83.09	641.10	0.22	1.80	51.32
CB13	85.00	200	83.50	77.48	0.07	1.47	1.87
CBMH14	85.00	300	83.31	34.16	0.07	1.61	0.80
CBMH15	84.85	375	83.08	553.90	0.22	1.81	44.53
Ex.CBMH2	84.99	450	82.94	0.00	0.08	1.91	0.00

Storage Available (m^3) =	**100.11**	*
Storage Required (m^3) =	**99.33**	

100-YEAR STORM EVENT

Water Elevation (m) =		85.15	OUTLET INVERT (m)	Area (m^2)	Depth of Ponding (m)	Head (m)	Volume (m^3)
Structure	T/G (m)	Pipe dia. (mm)					
CB10	85.00	200	83.48	144.35	0.15	1.58	7.41
CBMH11	85.00	300	83.29	150.84	0.15	1.72	7.54
CBMH12	84.85	375	83.09	1,027.23	0.30	1.88	118.71
CB13	85.00	200	83.50	335.56	0.15	1.55	16.82
CBMH14	85.00	300	83.31	156.86	0.15	1.69	7.84
CBMH15	84.85	375	83.08	950.84	0.30	1.89	104.27
Ex.CBMH2	84.99	450	82.94	0.00	0.16	1.99	0.00

Storage Available (m^3) =	**262.59**	*
Storage Required (m^3) =	**262.37**	

*Available Storage calculated from AutoCAD

ICD Curve for Areas B1-B4

John Meunier - Hydrovex VHV ICD Curves

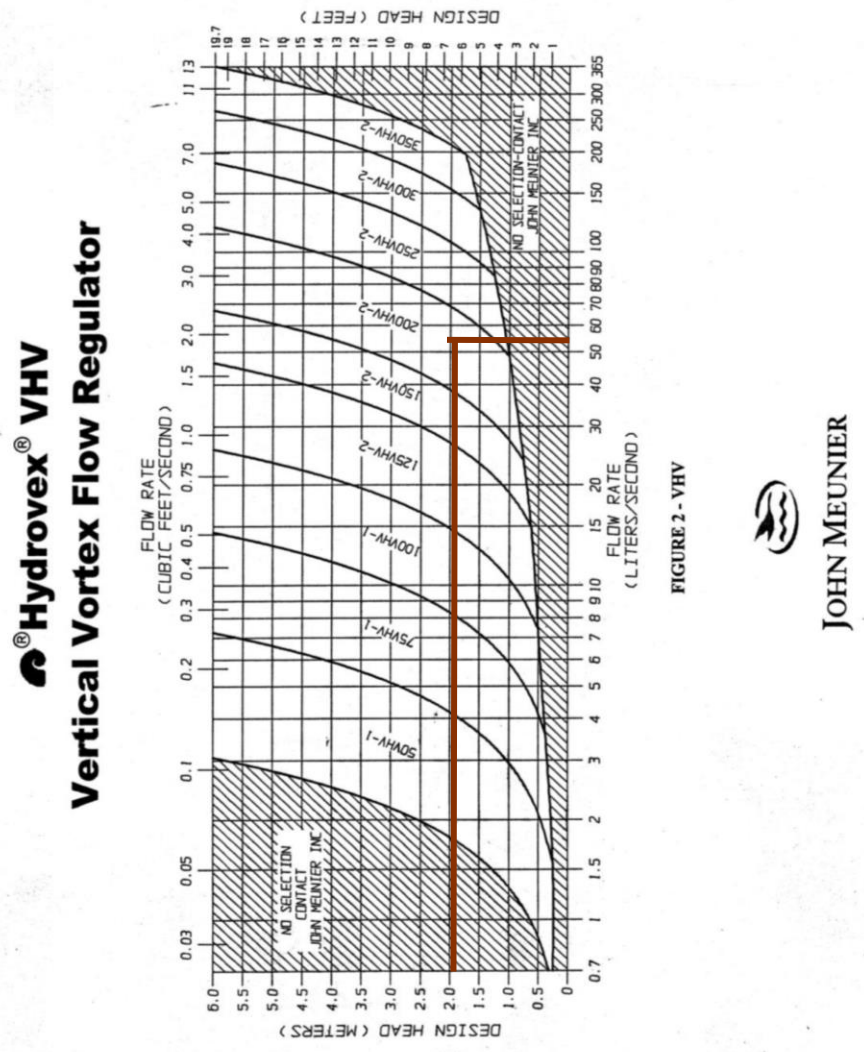


FIGURE 2 - VHV

STORM SEWER DESIGN SHEET

PROJECT: MYERS CARSTAR
LOCATION: 9-17 COLONNADE ROAD, OTTAWA
CLIENT: BBS CONSTRUCTION LTD.

LOCATION				CONTRIBUTING AREA (ha)								RATIONAL DESIGN FLOW											SEWER DATA								
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
STREET	AREA ID	FROM MH	TO MH	C-VALUE						INDIV AC	CUMUL AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	FIXED FLOW (L/s)	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm)			SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (5yr)	
				0.20	0.80	0.83	0.85	0.89	0.90																DIA	W	H			(L/s)	(%)
	B1	CB10	CBMH11						0.11	0.10	0.10	10.00	0.63	10.63	104.19	122.14	178.56	28.68				28.68	41.62	31.00	250			0.45	0.821	12.94	31.10%
	B2	CBMH11	CBMH12					0.08		0.07	0.17	10.63	0.72	11.35	100.98	118.36	173.01	47.78				47.78	59.68	35.30	300			0.35	0.818	11.90	19.94%
	B3	CBMH12	*Ex.CBMH2*			0.15				0.12	0.29	11.35	0.36	11.71	97.57	114.34	167.11	79.94				79.94	108.21	20.40	375			0.35	0.949	28.27	26.13%
	B4	CB13	CBMH14						0.14	0.13	0.13	10.00	0.63	10.63	104.19	122.14	178.56	36.50				36.50	41.62	31.00	250			0.45	0.821	5.12	12.30%
	B5	CBMH14	CBMH15						0.10	0.09	0.22	10.63	0.63	11.26	100.98	118.36	173.01	60.64				60.64	67.67	35.30	300			0.45	0.927	7.04	10.40%
	B6	CBMH15	*Ex.CBMH2*				0.22			0.19	0.40	11.26	0.21	11.48	97.96	114.80	167.78	109.75				109.75	122.70	13.85	375			0.45	1.076	12.95	10.55%
		Ex.CBMH2	*Ex.MH1*							0.00	0.70	11.71	0.41	12.12	95.97	112.45	164.33	186.14				186.14	199.52	29.79	450			0.45	1.215	13.39	6.71%
		Ex.MH1	*Ex.MH2*							0.00	0.70	12.12	0.21	12.32	94.21	110.38	161.29	182.72				182.72	196.15	*21.40*	375			*1.15*	1.720	13.43	6.84%

Definitions:
Q = 2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (ha)
i = Rainfall intensity in millimeters per hour (mm/hr)
[i = 998.071 / (TC+6.053)^0.814] 5 YEAR
[i = 1174.184 / (TC+6.014)^0.816] 10 YEAR
[i = 1735.688 / (TC+6.014)^0.820] 100 YEAR

Notes:
1. Mannings coefficient (n) = 0.013

Designed: P.G.K.

Checked: R.P.K.

Project No.: CP-18-0378

No.	Revision	Date
1.	ISSUED FOR SITE PLAN CONTROL	01/11/2018

Sheet No: 1 of 1

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 (C102)
☐ 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).	Site Grading, Drainage, Sediment & Erosion Control Plan (C101)
☐ 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.	Site Grading, Drainage, Sediment & Erosion Control Plan (C101)
☐ Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	N/A
☐ Proposed phasing of the development, if applicable.	N/A
☐ Reference to geotechnical studies and recommendations concerning servicing.	Section 2.0 Backround Studies
☐ 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	Site Grading, Drainage, Sediment & Erosion Control Plan (C101)

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.	Section 5.2 Sanitary Sewer

☐ 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.	Section 5.2 Sanitary Sewer
☐ 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)	Section 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 & 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.	Section 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.	Section 6.0 Stormwater Management
☐ Description of the stormwater management concept with facility locations and descriptions with references and supporting information.	Section 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.	Site Grading, Drainage, Sediment & 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.	Section 6.0 Stormwater Management Appendix F
☐ Any proposed diversion of drainage catchment areas from one outlet to another.	Section 6.0 Stormwater Management
☐ Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	Section 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.	Section 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.	Site Grading, Drainage, Sediment & Erosion Control Plan (C101)
☐ Inclusion of hydraulic analysis including hydraulic grade line elevations.	N/A

☐ Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Section 7.0 Sediment & 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	Section 8.0 Summary Section 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