Kanata Mews, Proposed Pad Development

329 March Road, City of Ottawa

Site Servicing and Stormwater Management Report

Prepared for:

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August 30th, 2016

CP-15-0465

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1.0 PROJECT DESCRIPTION

This report will address the servicing (water, sanitary, and storm) and stormwater management requirements associated with the proposed development located at 329 March Road within the City of Ottawa.

1.1 Site Description

The property is located at 329 March Road within the City of Ottawa. It is described as Part of Lot 6, Concession 3, Geographic Township of March, City of Kanata, Regional Municipality of Ottawa-Carleton. The land in question covers approximately 1.75 ha and is located between Steacie Drive and March Road within the City of Ottawa.

The existing site is currently developed with the existing Kanata Mews Shopping Centre. The site is made up of grass areas with asphalt drive aisles extending from March Road and Steacie Drive. There are two existing two-storey buildings on site with footprints of 1,079 m^2 and 1,239 m^2, respectively. The existing buildings will remain as part of the proposed development.

The proposed development consists of a 384 m² single-storey building with a 3-tenant design. Parking and drive aisles will be provided along the south side of the building and will tie into the existing parking lot areas. Landscaping will be added along the March Road frontage and around the new building. Site access for the development will remain off March Road and Steacie Drive, with a new sidewalk being added to the Steacie Drive entrance.

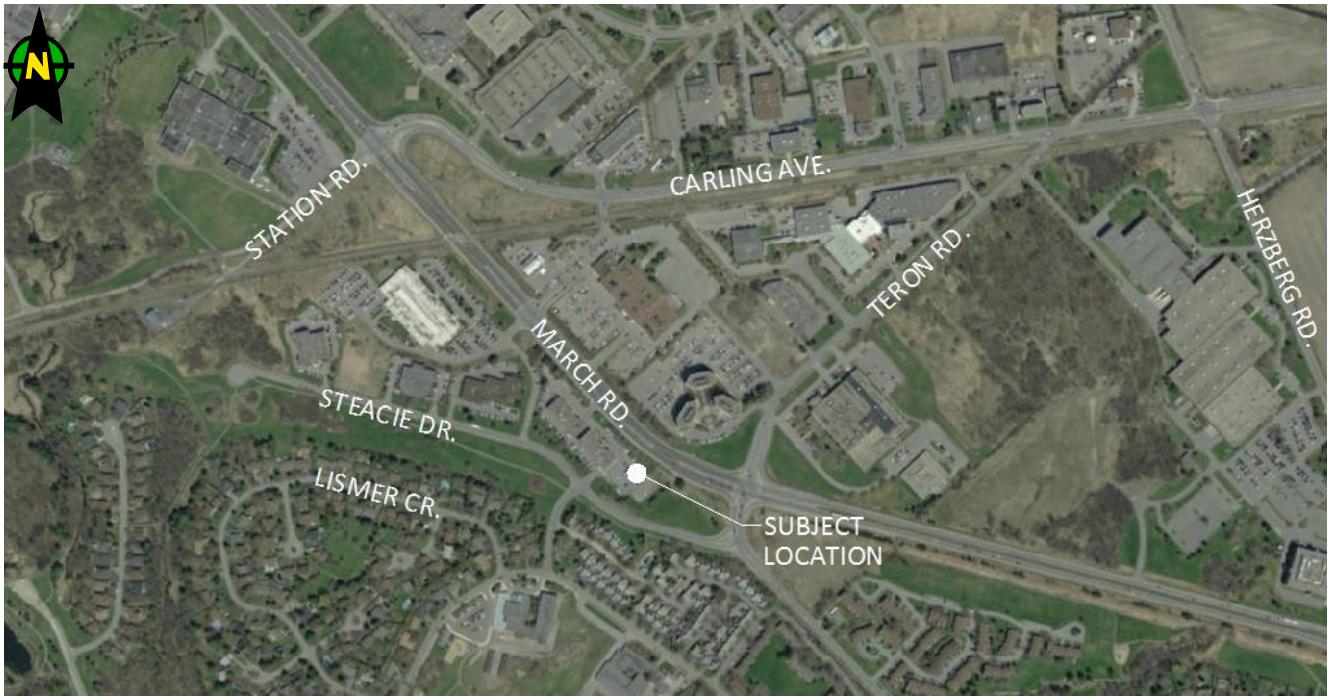

Figure 1: Key Map: 329 March Road, City of Ottawa

2.0 BACKGROUND STUDIES

Background studies that have been completed for the site include a review of the City of Ottawa as-built drawings, a topographical survey of the site, and a geotechnical report.

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

A topographic survey of the site was completed by McIntosh Perry Surveying Inc. (MPSI). dated March 2nd, 2016, and can be found under separate cover.

A Geotechnical Report was completed by McIntosh Perry (MP), dated February 2016. The investigation found that, in general, the subsoil conditions at this site consist of a layer of asphalt, underlain by fill ranging from sandy gravel to gravelly sand with noticeable amount of silt, extending to a depth of 1.6 m below the asphalt surface. This fill is underlain by 1.4 m of clay, underlain by approximately 2 m of clay trace sand trace gravel which is followed by about 400 mm of sandy silt to the investigation depth of 5.4 m. The entire report can be found under separate cover.

3.0 PRE-CONSULTATION SUMMARY

City of Ottawa staff members have been pre-consulted at an in-person meeting on March 31st, 2016 regarding this proposed development. Specific design parameters to be incorporated within this design include the following:

- Pre-development and post-development flows shall be calculated using a time of concentration (Tc) of 10 minutes, respectively.
- Maintain existing SWM design approach for the development area.
    - Review 5 and 100 year storm events.
- Ponding of water shall not exceed 0.3m for the 100-year storm event within the asphalt parking areas.

Correspondence with the City can be found in Appendix ‘A’.

4.0 EXISTING SERVICES

The existing buildings are fully serviced and are connected to the existing infrastructure within Steacie Drive. The existing water services are 100 mm diameter PVC pipe. The existing sanitary laterals are 200 mm diameter PVC pipes and will also be extended to service the new building. The storm connections will be maintained and only modified where the proposed building is to maintain the existing drainage pattern.

Hydro, Bell, and Cable will be provided by extending the existing services to the proposed building.

4.1 March Road

There is an existing 250 mm diameter sanitary main located within March Road as well as a 600 mm diameter water main. There is also a 600 mm diameter storm main within March Road. Additionally, there is a 1,050 mm diameter CSP storm main that runs through the proposed area of development that is connected to the 1500 mm storm main that runs along the west property line of the development.

There is a fire hydrant located beside the March Road site entrance that services the existing buildings. The existing hydrant is located along the southwest side of March Road and is connected the 600 mm diameter main.

4.2 Steacie Drive

There is an existing 250 mm diameter sanitary main located within Steacie Drive as well as a 203 mm diameter water main. The storm network within Steacie Drive consists of CSP culverts and a roadside ditch system.

There is a fire hydrant located opposite of the site entrance off Steacie Drive that is connected the 203 mm diameter main.

5.0 SERVICING PLAN

The proposed building will utilize the existing site services where possible with new services proposed when needed. Stormwater runoff will sheet flow to the new storm network within the asphalt parking lot along the southern limits of the development area.

Hydro, Bell, and Cable will be provided by extending the existing services to the proposed building

All servicing requirements shall be approved by the City of Ottawa or the relevant utilities, as applicable.

5.1 Water Servicing

A new 150 mm diameter PVC water lateral complete with a water valve located at the property line will be constructed from existing 203 mm diameter watermain within Steacie Drive. The proposed building will be equipped with a sprinkler system for fire protection.

The required fire protection from the Ontario Building Code (OBC) is 1,800 L/min (see Appendix 'B' for Calculation). The required fire protection from the Fire Underwriters Survey (FUS) is 3,000 L/min (provided for information purposes only).

The water demands for the total proposed build-out have been calculated as per the Ottawa Design Guidelines – Water Distribution and are as follows: the average and maximum daily demands are 0.08 L/s and 0.12 L/s respectively. The maximum hourly demand was calculated as 0.21 L/s (see Appendix 'B' for details).

5.2 Sanitary Servicing

A new 200 mm diameter gravity sanitary service will be extended from the existing on site network that is connected to the existing main within Steacie Drive.

The peak design flow for the proposed site was determined to be 2.01 L/s, therefore the proposed 200 mm diameter lateral has sufficient capacity to convey the flows along with the existing site flows (See Appendix 'C' for detailed calculations). It is anticipated that there will be no issues with capacity constraints within the proposed lateral or within the existing sanitary main within Steacie Drive, as the amount of flow leaving the site would be consistent to the flow calculations completed for the original sewer main design. This flow was determined using an average industrial flow of 50,000 L/gross ha/day identified in the City of Ottawa Sewer Design Guidelines.

5.3 Storm Servicing

Site runoff within the area of development will sheet flow to the proposed storm network where it will be restricted before outletting to the re-aligned main running through the site. The proposed storm network will collect storm flows from the development area and restrict the runoff prior to it discharging to March Road as in pre-development conditions. The storm system will be further detailed in Section 6.0.

6.0 STORMWATER MANAGEMENT

Stormwater management for the development area will be maintained through positive drainage away from the proposed building and into the proposed storm network. Restricted runoff will then be directed to the March Road and to the existing ditch within Steacie 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)
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 a 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.

As per the pre-consultation meeting with the City 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, respectively.

6.2 Site Drainage

6.2.1 *Pre-Development Drainage*

The existing site has been demonstrated as drainage areas A1. Drawing CP-15-0465 PRE (Appendix 'D') indicates the limits of these drainage areas.

Table 1: Pre-Development Drainage Summary

Basin	Drainage Area (ha)	Balanced Runoff Coefficient (C) 5-yr	Balanced Runoff Coefficient (C) 100-yr	5-Year Flow Rate (l/s)	100-Year Flow Rate (l/s)
A1	0.76	0.60	0.68	132.5	257.3
Total	**0.76**			**132.5**	**257.3**

(See Appendix 'F' for Calculations)

6.2.2 *Post-Development Drainage*

The proposed site has been demonstrated as drainage areas B1-B3 Drawing CP-15-0465 Post (Appendix 'E') indicates the limits of these drainage areas.

Table 2: Post-Development Runoff Calculations

Basin	Drainage Area (ha)	Balanced Runoff Coefficient (C) 5-yr	Balanced Runoff Coefficient (C) 100-yr	5-Year Flow Rate (l/s)	100-Year Flow Rate (l/s)
B1	0.15	0.75	0.84	32.6	62.5
B2	0.40	0.69	0.77	80.3	153.6
B3	0.21	0.36	0.42	22.0	43.9
Total	**0.76**			**134.8**	**260.0**

(See Appendix 'F' for Calculations)

Runoff from areas B2 through B3 will be restricted before outletting to the existing main within March Road. The total flow leaving the site will be controlled by the inlet control device within CBMH#1 and rear swales and will adequately compensate for the unrestricted flow leaving the site. See Appendix 'F' for calculations. This restriction and quality runoff control will be further detailed in Sections 6.3 and 6.4.

6.3 Quantity Control

After discussing with City staff the stormwater management criteria for the site, the total post development runoff for this site will be restricted to the pre-development flow rates generated from the development area using an overall 'C' value and a Tc of 10 minutes (see Appendix 'A' for pre-consultation notes). These values create allowable release rates of 132.5 L/s and 257.3 L/s for the 5 and 100-year storm events, respectively.

Table 3: Allowable Release Rate

Basin	Drainage Area (ha)	Balanced Runoff Coefficient (C) 5-yr	Balanced Runoff Coefficient (C) 100-yr	5-Year Flow Rate (l/s)	100-Year Flow Rate (l/s)
A1	0.76	0.60	0.68	132.5	257.3

(See Appendix 'F' for Calculations)

Reducing site flows will be achieved using a flow restriction, and will create the need for onsite storage. Runoff from areas B2 through B3 will be restricted as detailed in the table below.

Table 4: Post-Development Restricted Runoff Calculations

Area	Post-Development Unrestricted (l/s)		Post-Development (Restricted) (l/s)		
	5-yr	100-yr	5-yr	100-yr	
B1	32.6	62.5	32.6	62.5	UNRESTRICTED
B2	80.3	153.6	70.0	70.0	RESTRICTED
B3	22.0	43.9			
Total	**134.8**	**260.0**	**102.6**	**132.5**	

(See Appendix 'F' for Calculations)

Runoff from Area B2-B3 will be restricted within the re-graded parking lot through the use of a Hydrovex 200VHV-2 inlet control device (ICD) with a design head of 2.09 m. This ICD will restrict areas B2-B3 to 70.0 L/s for the 5 and 100-year storm events, respectively. This restriction will also create a water surface elevation (WSEL) of 86.90 m for the 5-year storm event and 87.00 m for the 100-year storm event. The storage for this area will be provided above CBMH#1 and CB#2 within the re-graded parking lot.

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 property line away from the buildings, and into the existing ditch system of Steacie Drive. A minimum elevation difference of 0.70 m has been provided from the finished floor of the buildings (77.70 m) to the overland flow route elevation (77.00 m).

The following table summarizes the storage requirements and the depth of the water ponding during the 5 and 100-year storm events to meet the required storage volumes.

Table 5: Storage Summary

Area	Depth of ponding (m) for 5-year storm	5-year required storage (m^3)	5-year available storage (m^3)	Depth of ponding (m) for 100-year storm	100-year required storage (m^3)	100-year available storage (m^3)
B2-B3	0.10-0.20	20.3	22.8	0.20-0.30	79.3	82.5

(See Appendix 'F' for Calculations)

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. BMP's at this site will be implemented at the lot level. Lot level BMP's typically include temporary retention of the parking lot runoff, minimizing ground slopes and maximizing landscaped areas.

One Hydrovex inlet control device will restrict flows from the site, causing temporary ponding. There will be an opportunity for particle settlement during this process, but the full benefits of a larger scale end-of-pipe facility will not be fully realized at this site.

The amount of additional hard surface in post-development is minimal compared to pre-development conditions as the building has been placed within the existing asphalt parking lot. The proposed roof will not increase the sediment load for the development area as roof runoff can be considered 'clean' runoff.

As the outlet for the development area is being maintained and runoff is being maintained to pre-development rates, no additional quality control is being proposed for the development area.

7.0 SEDIMENT AND 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 plan.

Geosock is to be installed under the grates of all catch basins immediately upon its installation. The Geosock 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.

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 384 m^2 building will be constructed in the northeast corner of the site located at 329 March Road.
- A new 200 mm sanitary service will be extended from the existing site services.
- A new 150 mm water lateral will be extended from the existing main within Steacie Drive to service the new building.
- A new storm network will be installed within the re-graded parking lot and will connect to the existing 1,050 mm storm sewer running through the development area.
- As discussed with the City of Ottawa staff, stormwater management design will ensure that the post-development 100-year flow rate does not exceed the 5-year pre development runoff using a combined runoff coefficient for the development area.
- Storage for the 5 and 100-year storm events will be provided above the proposed storm sewer structures within the parking lot.

9.0 RECOMMENDATION

We respectfully recommend that:

This report, dated August 30th, 2016, and the associated site grading, drainage and servicing plans be approved for engineering details.

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

This report is respectfully being submitted for approval.

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APPENDIX A: PRE-CONSULTATION NOTES

Jonathan Jonker

From:	Bernier, John <John.Bernier@ottawa.ca>
Sent:	April-07-16 4:47 PM
To:	Tony Bascelli (tbascelli@sympatico.ca); Ryan Kennedy; Curtis Melanson; Jonathan Jonker; Leonard Koffman
Subject:	329 March Road - Pre-Application Consultation
Attachments:	plan01.pdf; 329 March Road_Design Sketch.pdf; 329 MarchRoad Plans and Study list.docx; 329 March Road_PreCon Concept.pdf; PRELIMINARY SITE PLAN.pdf
Follow Up Flag:	Follow up
Flag Status:	Flagged

Good afternoon,

It was nice meeting you for a pre-consultation (PC2016-0070) on March 31, 2016. We met to discuss the possibility developing a 371 square metre commercial building on the Kanata Mews site at 329 March Road. The proposal included two patios, minor changes to the existing parking lot, and details focusing on a coffee shop as one of the tenants.

The following are the comments and suggestions formulated from this meeting:

Planning Comments:

- Ensure that corner of building (unit 2) is no closer than 3m to property line
- Please indicate where garbage enclosure will be for this business. If using existing facilities, please think about providing a space within building or enclosed outside for garbage carts.
- Confirm that patio is in compliance with Section 85 of the Zoning By-law. Specifically, a patio cannot be closer than 75 metres to a residential zone.
- Show all easement information on Site Plan. Ensure that all hydro requirements are being met for overhead lines.

Design Comments:

- Please see if a pedestrian connection to the sidewalk on March Road is possible. If not possible, please ensure that a pedestrian sidewalk connection is provided at the principal entrance to the site to connect from March Road to the private walkway in front of the existing buildings.
- Please provide a pedestrian connection at the rear of the site from the intersection of Casson Way and Steacie Drive to the rear walkway at the back of the existing buildings. This could be accomplished by reducing the width of the existing driveway/entrance at the rear of the property.
- Please provide as much glazing as possible facing March Road. An additional window may be possible in the hallway that access with interior washrooms.
- Please consider removal of the large canopy element at the south east corner of the building (proposed signage location). The scale does not complement the buiding design. This corner element is strong, and should be kept as simple as possible. (see attached sketch).

Transportation Comments:

- A Transportation Brief is required. Please have the consultant completing the study contact Riley Carter at 613-580-2424 ext 14304 or Riley.Carter@ottawa.ca prior to starting the study.
- Bicycle parking is required as per the Zoning By-law, the rates contained in the By-law are the minimum required, we strongly recommend the proponent provides additional spaces. The bicycle parking should be placed near the main entrances to the building and preferably covered.
- Fire routes must be shown on the Site Plan. General requirements are that fire routes are a minimum of 6m wide, with a 12m centreline radius and are constructed with a material that can support the additional weight of heavy trucks.
- March Rd is subject to a 44.5m ROW measured from the C/L of the road (not the painted C/L), the Site Plan must confirm no additional land is required.

Engineering Comments:

- The Servicing Study Guidelines for Development Applications are available at the following address: http://ottawa.ca/en/development-application-review-process-0/servicing-study-guidelines-development-applications
- Servicing and site works shall be in accordance with the following documents:
    - Ottawa Sewer Design Guidelines (2013)
    - Ottawa Design Guidelines – Water Distribution (2010)
    - Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
    - City of Ottawa Slope Stability Guidelines for Development Applications (2004)
    - City of Ottawa Environmental Noise Control Guidelines (2006)
    - City of Ottawa Park and Pathway Development Manual (2012)
    - City of Ottawa Accessibility Design Standards (2012)
    - Ottawa Standard Tender Documents (2013)
    - Ontario Provincial Standards for Roads & Public Works (2013)
- Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-2424 x.44455).

Sanitary sewer

- The proponent's engineer must demonstrate the availability of adequate capacity at the proposed sanitary outlet to support the development.
- Existing sewers should be CCTV'd prior to connection to confirm that they are in adequate condition;

Storm Sewer

- The proponent's engineer must demonstrate the availability of adequate capacity at the proposed storm outlet to support the development.
- Existing sewers should be CCTV'd prior to connection to confirm that they are in adequate condition;

Snow Storage

- Any portion of the subject property which is currently used or intended to be used for permanent or temporary snow storage shall be identified on the approved site plan.
- Snow storage shall not interfere with approved grading and drainage patterns or servicing.
- Snow storage areas shall be setback from property lines, foundations, fencing or landscaping a minimum of 1.5 metres. Snow storage areas shall not occupy driveways, aisles, required parking spaces or any portion of a road allowance.

Stormwater Management

- The Stormwater Management Criteria, for the subject site, is to be based on the following:
    - The 5-yr storm event using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.
    - For separated sewer system built pre-1970 the design of the storm sewers are based on a 2 year storm.
    - The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less.
    - A calculated time of concentration (Cannot be less than 10 minutes).
    - Flows to the storm sewer in excess of the 5-year storm release rate, up to and including the 100-year storm event, must be detained on site.

Note: There may be area specific SWM Criteria that may apply. Check for any related SWM &/or Sub-watershed studies that may have been completed.

- Existing grading and drainage patterns should be maintained including existing surface storage provided for the current site;
- If any Roof Scuppers, Roof Flow Control Drains as well as ICDs and flow restrictions are proposed, they must be shown on the plans.

Water Supply

- Water Boundary condition requests must include the location of the service and the expected loads required by the proposed development. Please provide the following information:
    - Location of service
    - Type of development and the amount of fire flow required.
    - Average daily demand: ___ l/s.
    - Maximum daily demand: ___l/s.
    - Maximum hourly daily demand: ___ l/s.
- The proponent's engineering consultant is required to assess the availability of adequate water supply (flow and pressure) to meet demand and fire fighting.
- Existing onsite water supply may be used to service the addition if capacity is available.
- Adequately located hydrant should be available / provided and accessible for fire protection. If the proposed building is sprinkled, the location of the Siamese connection and that of the main entrance to the building should be identified on the plan.

Exterior site lighting

- If exterior Site Lighting is proposed, a certification by a qualified engineer confirming the design complies with the following criteria is to be provided:
    - It must be designed using fixtures that meet the criteria for Full Cut-Off (Sharp cut-off) Classification, as recognized by the Illuminating Engineering Society of North America (IESNA or IES), and;
    - It must result in minimal light spillage onto adjacent properties. As a guideline, 0.5 foot-candle is normally the maximum allowable spillage.
    - The location of the fixtures, fixture types as in make, model and part number and the mounting heights must be shown on one of the approved plans or the Site Plan.
- Existing utilities should be identified on the plans to confirm that there is no negative impact caused by the proposed development;

Hydro easement

- There is a Hydro easement crossing the site; the proponent should consult Hydro to confirm any setback or permitting requirements they may have;

Conservation Authority

- Please contact the conservation authority to confirm their requirements for quantity and quality control of stormwater that would be applicable to this site.

Additional information

As requested at the pre-application consultation meeting, find attached (plan01.pdf) the existing servicing and grading plan we have on file for the site.

Should you have any questions or require additional information, please contact the Project Manager Nadege Balima directly at (613) 580-2424, x 13477 or by email at Nadege.Balima@ottawa.ca

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Since a Site Plan cannot be found, and it is an older development, the proposal would require a full Site Plan Control (Manager Approval, Public Consultation) Application, which costs $20,648.31 (click here for exact fees), plus the engineering design review and inspection fee, as well as conservation authority fee.

Please find attached the "Applicant's Study and Identification List" including the number of copies required for each in order for the application to be deemed complete. Here is the link to the guide for preparing studies and plans: http://ottawa.ca/en/development-application-review-process-0/guide-preparing-studies-and-plans

If you have any questions please feel free to contact me.

Best regards,

John Bernier
Planner
Development Review
(Suburban Services - West)

PLANNING AND GROWTH MANAGEMENT
URBANISME ET GESTION DE LA CROISSANCE

City of Ottawa | Ville d'Ottawa
☎ 613.580.2424 ext/poste. 21576
ottawa.ca/planning / ottawa.ca/urbanisme

APPENDIX B: EXISTING WATERMAIN FLOW AND FIRE CALCULATIONS

329 March Road - OBC Fire Protection Calculations

Project:	329 March Road
Project No.:	CP-15-0465
Designed By:	JJ
Checked By:	CM
Date:	August 29, 2016

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

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

Building is classified as Group : E (from table 3.2.2.55)
Building is of noncombustible construction with fire separations and fire-resistance ratings provided in accordance with subsections 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	**2,108**	(Total building volume in cu.m.)
Stot	**1.5**	(From figure 1 pg A-32)
Q =	**53,758.08 L**	

From Figure 1 (A-32)

Snorth	4.7	m	0.5
Seast	57	m	0.0
Ssouth	47	m	0.0
Swest	197	m	0.0

*approximate distances

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

1800 L/min (if one-storey building less than 600m²)
476 gpm

329 March Road - Fire Underwriters Survey (FUS) Fire Calculations

Project:	329 March Road
Project No.:	CP-15-0465
Designed By:	JMJ
Checked By:	CJM
Date:	August 29, 2016

1. 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.

2. Determine Ground Floor Area

As provided by the Architect:

Floor Area (One Floor) = 384.00 m²

Total Floor Area = 384.00 m²

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

3. Calculate Required Fire Flow

F = 220 x C x √A

C = 1.00

A = 384.00

F = 220.00 X 1.00 X √ 384.00

F = 4,311.10 L/min.

4. Determine Height in Storeys

From Architectural Drawings:

Number of Storeys = 1.00

5. Determine Increase or Decrease Based on Occupancy

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

Combustible

No Change

F = 4,311.10 L/min.

6. 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 4,311 L/min – 50% (The building is sprinklered with a standard system and fire department hose lines)

F = 2,155.55 L/min.

7. Determine the Total Increase for Exposures

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

- Exposure distance to the existing buildings to the east of the proposed building is approximately 12.6m.
- There are no existing buildings surrounding the remainder of the site that are within 45m.
- Therefore the charge for exposure is 35% of the value obtained in Step 5.
- 2,156 L/min + (4,311 L/min x 15%)

F = 2,802.22 L/min.

Therefore, after rounding to the nearest 1,000 L/min, the total required fire flow for the development is 3,000 L/min (792.5 GPM).

Table 1					
WATER SUPPLY COEFFICIENT - K					
TYPE OF CONSTRUCTION	Classification by Group or Division in Accordance with Table 3.1.2.1. of the Building Code				
	A-2 B-1 B-2 B-3 C D	A-4 F-3	A-1 A-3	E F-2	F-1
Building is of noncombustible construction with fire separations and fire-resistance ratings provided in accordance with Subsection 3.2.2., including loadbearing walls, columns and arches.	10	12	14	17	23
Building is of noncombustible construction or of heavy timber construction conforming to Article 3.1.4.6. Floor assemblies are fire separations but with no fire-resistance rating. Roof assemblies, mezzanines, loadbearing walls, columns and arches do not have a fire-resistance rating.	16	19	22	27	37
Building is of combustible construction with fire separations and fire-resistance ratings provided in accordance with Subsection 3.2.2., including loadbearing walls, columns and arches. Noncombustible construction may be used in lieu of fire-resistance rating where permitted in Subsection 3.2.2.	18	22	25	31	41
Building is of combustible construction. Floor assemblies are fire separations but with no fire-resistance rating. Roof assemblies, mezzanines, loadbearing walls, columns and arches do not have a fire-resistance rating.	23	28	32	39	53
Column 1	2	3	4	5	6

Table 3.2.2.55.
Maximum Building Area, Group D, up to 2 Storeys
Forming Part of Sentence 3.2.2.55.(1)

No. of *Storeys*	Maximum Area, m^2		
	Facing 1 *Street*	Facing 2 *Streets*	Facing 3 *Streets*
1 2	1 000 800	1 250 1 000	1 500 1 200
Column 1	2	3	4

Table 2	
OBC Part 3 Buildings	Required Minimum Water Supply Flow Rate (L/min)
One-storey building with building area not exceeding 600 m²	1800
All other buildings	2700 (if Q ≤ 108,000 L)(1) 3600 (if Q > 108,000 L and ≤ 135,000 L)(1) 4500 (if Q > 135,000 L and ≤ 162,000 L)(1) 5400 (if Q > 162,000 L and ≤ 190,000 L)(1) 6300 (if Q > 190,000 L and ≤ 270,000 L)(1) 9000 (if Q > 270,000 L)(1)

Note to Table 2:
(1) $Q = KVS_{Tot}$ as referenced in Paragraph 3(a)

329 March Road - Water Demands

Project:	329 March Road		
Project No.:	CP-15-0465		
Designed By:	JJ		
Checked By:	CM		
Date:	August 29, 2016		
Site Area:	1.75 gross ha	2702.00	gross floor area

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/(1000m^2 /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	**0.08**	**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	**0.12**	**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	**0.21**	**L/s**

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

APPENDIX C: SANITARY SEWER CALCULATION

SANITARY SEWER DESIGN SHEET

PROJECT: 329 March Road
LOCATION: Ottawa
CLIENT: Bascorp Management

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	30	31
STREET	AREA ID	FROM MH	TO MH	UNIT TYPES				AREA (ha)	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)	FLOW DEPTH (mm)	VELOCITY (actual) (m/s)	AVAILABLE CAPACITY	
				SF	SD	TH	APT		IND	CUM			INSTITUTIONAL		COMMERCIAL		INDUSTRIAL			IND	CUM										L/s	(%)
													IND	CUM	IND	CUM	IND	CUM													
		BLDG	MH 2A						0.0	0.0	4.00	0.00		0.00	1.75	1.75		0.00	1.52	1.75	1.75	0.49	2.01	34.22	13.52	200	1.00	1.055	34.9	0.584	32.21	94.13
		MH2A	MH1A						0.0	0.0	4.00	0.00		0.00		1.75		0.00	1.52	0.00	1.75	0.49	2.01	20.24	33.07	200	0.35	0.624	44.6	0.403	18.23	90.07
		MH1A	EX MH						0.0	0.0	4.00	0.00		0.00		1.75		0.00	1.52	0.00	1.75	0.49	2.01	20.24	51.17	200	0.35	0.624	44.6	0.403	18.23	90.07

Design Parameters:

Residential			ICI Areas			
SF	3.4	p/p/u				Peak Factor
TH/SD	2.7	p/p/u	INST	50,000	L/Ha/day	1.5
APT	2.3	p/p/u	COM	50,000	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): 350 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: JMJ

Checked: CJM

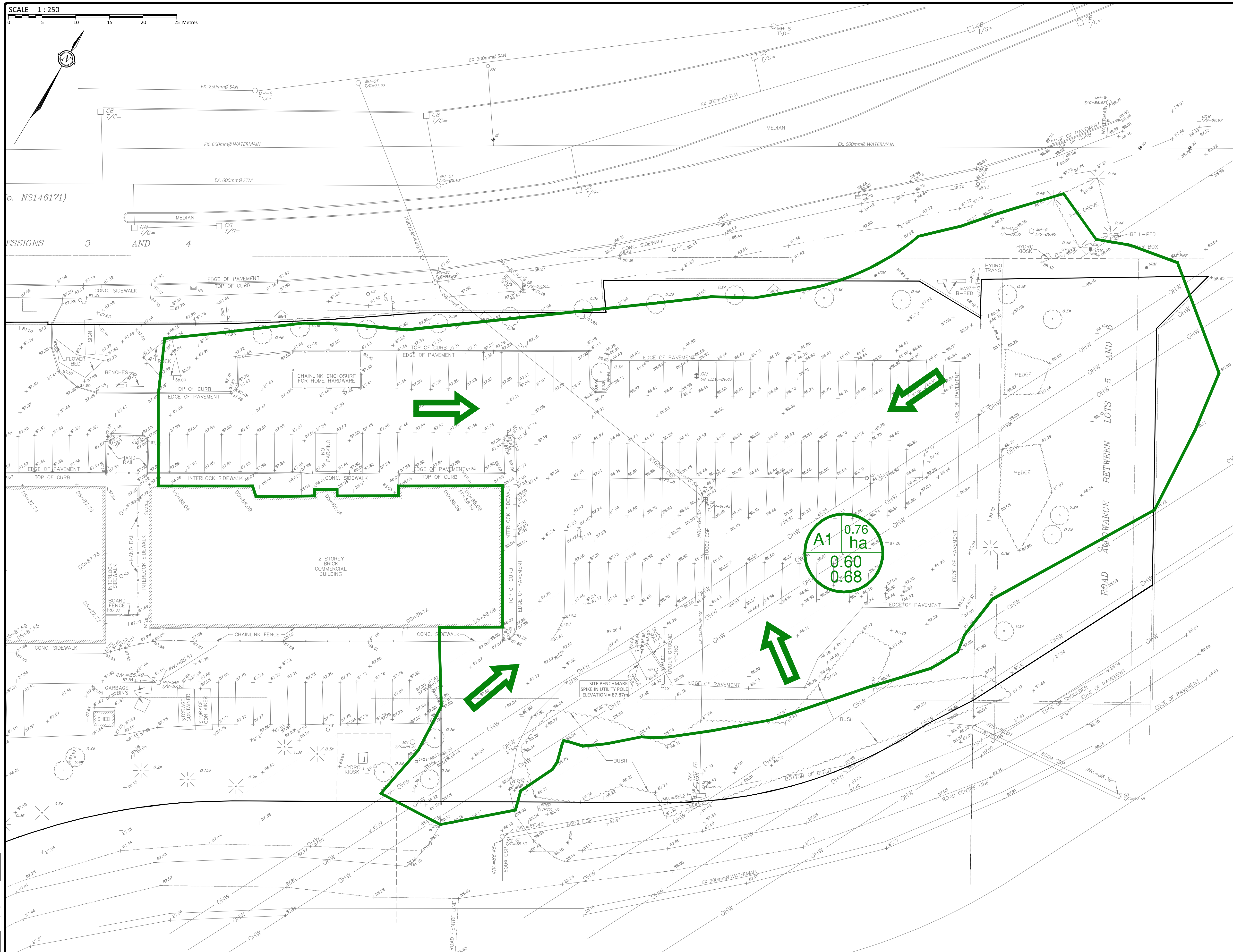
Project No.: CP-15-0465

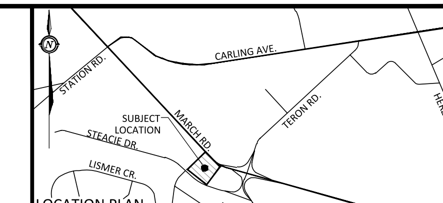
No.	Revision	Date
1.	ISSUED FOR SITE PLAN CONTROL	2016-08-30

Date: 2016-08-30

Sheet No: 1 of 1

APPENDIX D: PRE-DEVELOPEMENT PLAN





LOCATION PLAN

LEGEND

AREA — A1 | 2.10 ha — AREA SIZE (HECTARES)
0.20 — 5-YR RUNOFF COEFFICIENT
0.25 — 100-YR RUNOFF COEFFICIENT

OVERLAND FLOW ROUTE

FOR REVIEW ONLY
NOT FOR CONSTRUCTION

No.	Revision/Issue	Date
01	ISSUED FOR SITE PLAN CONTROL	AUG 30, 2016

Check and verify all dimensions before proceeding with the work

Do not scale drawings

McINTOSH PERRY
115 Walgreen Road R.R. #3, Carp, ON K0A 1L0
Tel: 613-836-2184 Fax: 613-836-3742

Stamp:

Stamp:

Client:
BASCORP
1805 WOODWARD DRIVE
OTTAWA, ON K2C 0P9

Project:
329 MARCH ROAD
KANATA MEWS

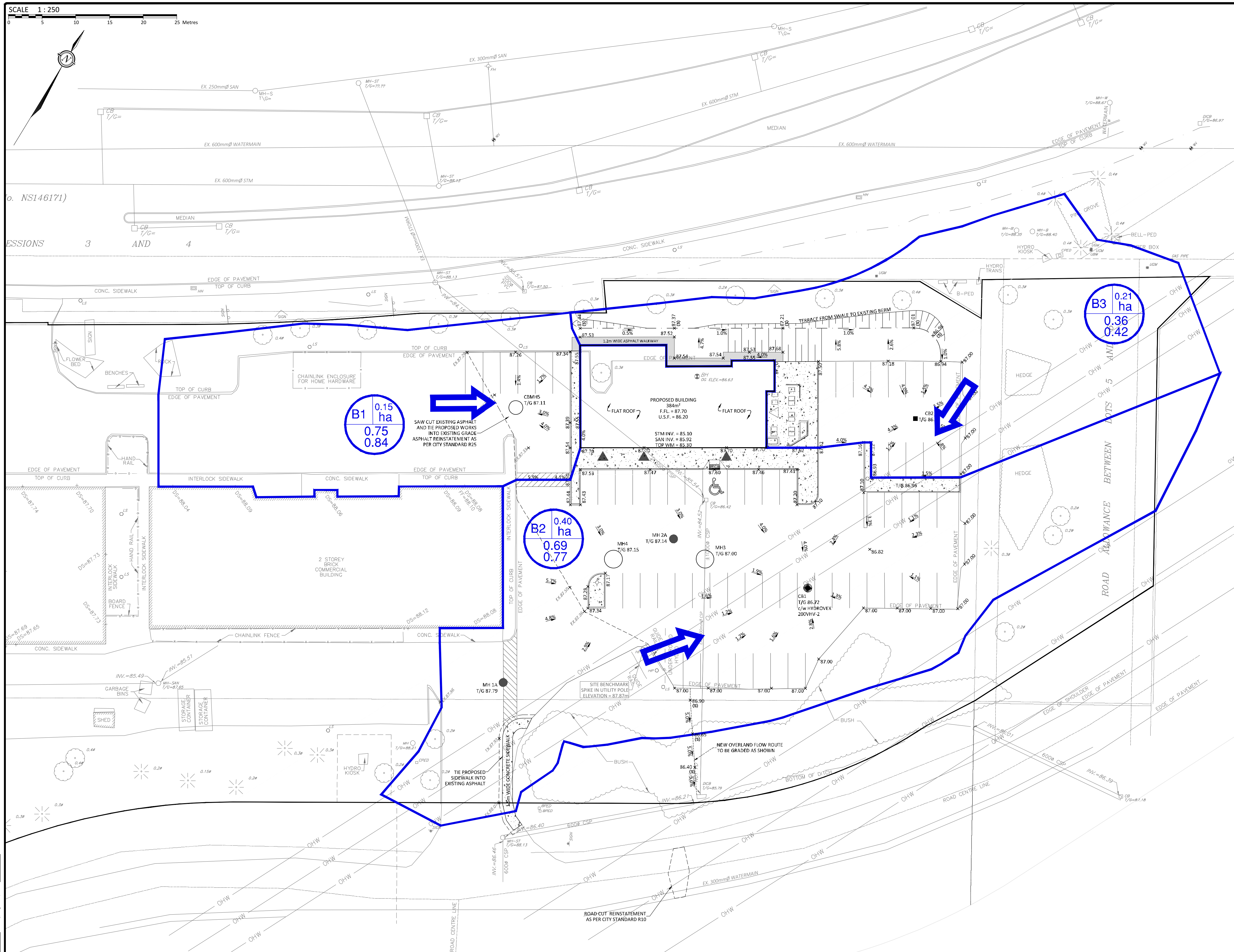
OTTAWA ONTARIO

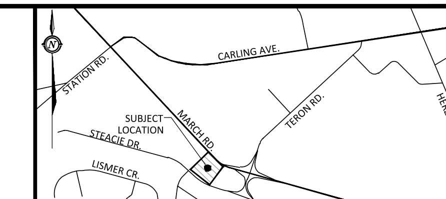
Drawing Title:
PRE-DEVELOPMENT DRAINAGE AREA PLAN

Scale:	1:250	Project Number:	CP-15-0465
Drawn by:	P.G.K.		
Checked By:	C.J.M. & R.P.K.	Drawing Number:	
Designed By:	P.G.K.		
Date:	JUL. 25, 2016	SHEET 1 of 2	PRE

FILENAME: G:\2015\CP\CP-15-0465 - Bascorp - Site Plan - 329 March Road\01 - Drawing\DCP-15-0465 Presentation.dwg
LAST SAVED: Tuesday, August 30, 2016 LAST SAVED BY: j.jonker
LAST PLOTTED: Tuesday, August 30, 2016 CTB FILE USED: ---

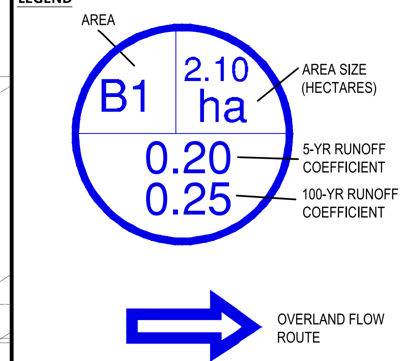
APPENDIX E: POST-DEVELOPMENT PLAN





LOCATION PLAN

LEGEND



FOR REVIEW ONLY
NOT FOR CONSTRUCTION

No.	Revision/Issue	Date
01	ISSUED FOR SITE PLAN CONTROL	AUG 30, 2016

Check and verify all dimensions before proceeding with the work

Do not scale drawings

McINTOSH PERRY
115 Walgreen Road R.R. #3, Carp, ON K0A 1L0
Tel: 613-836-2184 Fax: 613-836-3742

Stamp:

Stamp:

Client:
BASCORP
1805 WOODWARD DRIVE
OTTAWA, ON K2C 0P9

Project:
329 MARCH ROAD
KANATA MEWS
OTTAWA ONTARIO

Drawing Title:
POST DEVELOPMENT DRAINAGE AREA PLAN

Scale: 1:250	Project Number: CP-15-0465
Drawn by: P.G.K.	
Checked By: C.J.M. & R.P.K.	Drawing Number:
Designed By: P.G.K.	
Date: JUL. 25, 2016	SHEET 1 of 2 POST

APPENDIX F: STORMWATER MANAGEMENT CALCULATIONS

AVERAGE PRE-DEVELOPMENT RUNOFF COEFFICIENT CALCULATIONS

Area A1	EXISTING DRAINGE AREA				
Type	**C (5-yr)**	**C (100-yr)**	**Area (m^2)**	**Product (5-yr)**	**Product (100-yr)**
ASPHALT/CONCRETE	0.90	1.00	4359.94	3,923.94	4,359.94
GRASS	0.20	0.25	3,262.70	652.54	815.68
Avg C	**0.60**	**0.68**			

AVERAGE POST-DEVELOPMENT RUNOFF COEFFICIENT CALCULATIONS

Area B1	NORTH SIDE DEVELOPMENT - UNRESTRICTED FLOW				
Type	**C (5-yr)**	**C (100-yr)**	**Area (m^2)**	**Product (5-yr)**	**Product (100-yr)**
ASPHALT/CONCRETE	0.90	1.00	1,186.72	1,068.05	1,186.72
GRASS	0.20	0.25	311.62	62.32	77.90
Avg C	**0.75**	**0.84**			

Area B2	WEST SIDE DEVELOPMENT - DRAINS TO CBMH#1				
Type	**C (5-yr)**	**C (100-yr)**	**Area (m^2)**	**Product (5-yr)**	**Product (100-yr)**
ASPHALT/CONCRETE	0.90	1.00	2,802.68	2,522.41	2,802.68
GRASS	0.20	0.25	1,215.84	243.17	303.96
Avg C	**0.69**	**0.77**			

Area B3	EAST SIDE DEVELOPMENT - DRAINS TO CB#2				
Type	**C (5-yr)**	**C (100-yr)**	**Area (m^2)**	**Product (5-yr)**	**Product (100-yr)**
ASPHALT/CONCRETE	0.90	1.00	468.08	421.27	468.08
GRASS	0.20	0.25	1,637.72	327.54	409.43
Avg C	**0.36**	**0.42**			

Time of concentration (min.)	5-Year (mm/hr)	100-Year (mm/hr)	
10.00	104.2	178.6	PRE-DEVELOPMENT
10.00	104.2	178.6	POST-DEVELOPMENT

PRE-DEVELOPMENT RUNOFF COEFFICIENT CALCULATIONS

Basin	Drainage Area (ha)	Balanced Runoff Coefficient (C) 5-yr	Balanced Runoff Coefficient (C) 100-yr	5-Year Flow Rate (l/s)	100-Year Flow Rate (l/s)
A1	0.76	0.60	0.68	132.5	257.3
Total	**0.76**			**132.5**	**257.3**

POST-DEVELOPMENT RUNOFF COEFFICIENT CALCULATIONS

Basin	Drainage Area (ha)	Balanced Runoff Coefficient (C) 5-yr	Balanced Runoff Coefficient (C) 100-yr	5-Year Flow Rate (l/s)	100-Year Flow Rate (l/s)
B1	0.15	0.75	0.84	32.6	62.5
B2	0.40	0.69	0.77	80.3	153.6
B3	0.21	0.36	0.42	22.0	43.9
Total	**0.76**			**134.8**	**260.0**

REQUIRED STORAGE VOLUME

Basin	Drainage Area (ha)	Balanced Runoff Coefficient (C) 5-yr	5yr-Allowable Flow Rate (l/s)
A1	0.76	0.60	132.5

ACTUAL STORM WATER RUNOFF FROM SITE (L/s)

Area	Post-Development Unrestricted (l/s)		Post-Development (Restricted) (l/s)		
	5-yr	100-yr	5-yr	100-yr	
B1	32.6	62.5	32.6	62.5	UNRESTRICTED
B2	80.3	153.6	70.0	70.0	RESTRICTED
B3	22.0	43.9			
Total	**134.8**	**260.0**	**102.6**	**132.5**	

STORAGE REQUIRMENTS FOR AREAS B2-B3

5-YEAR STORM EVENT

Tc	I (mm/hr)	Runoff (l/s) B2	Runoff (l/s) B3	Allowable Outflow (l/s)	Runoff To Be Stored (l/s)	Storage Required (m^3)
5	141.2	108.8	29.8	70.0	68.6	20.6
10	104.2	80.3	22.0	70.0	32.3	19.4
15	83.6	64.4	17.6	70.0	12.1	10.9
20	70.3	54.2	14.8	70.0	-1.0	-1.2
25	60.9	46.9	12.8	70.0	-10.2	-15.3
30	53.9	41.5	11.4	70.0	-17.1	-30.8
35	48.5	37.4	10.2	70.0	-22.4	-47.0
40	44.2	34.1	9.3	70.0	-26.6	-63.9
45	40.6	31.3	8.6	70.0	-30.1	-81.4
50	37.7	29.1	7.9	70.0	-33.0	-99.0

Maximum Storage Required (m^3) = 20.6

100-YEAR STORM EVENT

Tc	I (mm/hr)	Runoff (l/s) B2	Runoff (l/s) B3	Allowable Outflow (l/s)	Runoff To Be Stored (l/s)	Storage Required (m^3)
5	242.7	208.8	59.7	70.0	198.4	59.5
10	178.6	153.6	43.9	70.0	127.5	76.5
15	142.9	122.9	35.1	70.0	88.1	79.3
20	120.0	103.2	29.5	70.0	62.7	75.3
25	103.8	89.3	25.5	70.0	44.8	67.2
30	91.9	79.1	22.6	70.0	31.6	57.0
35	82.6	71.1	20.3	70.0	21.4	44.9
40	75.1	64.6	18.5	70.0	13.1	31.4
45	69.1	59.4	17.0	70.0	6.4	17.4
50	64.0	55.1	15.7	70.0	0.8	2.4

Maximum Storage Required (m^3) = 79.3

STORAGE OCCUPIED IN AREA B2-B3

5-YEAR STORM EVENT

Other Storage Areas on Site		Water Elev. (m) =		86.90	
Location	T/G	INV. (out)	Area (m^2)	Depth (m)	Volume (m^3)
CBMH#1	86.70	84.91	293.70	0.20	19.6
CB#2	86.80	85.25	74.28	0.10	3.2
				Total	22.8

Storage Available (m^3) = 22.8
Storage Required (m^3) = 20.6

100-YEAR STORM EVENT

Other Storage Areas on Site		Water Elev. (m) =		87.00	
Location	T/G	INV. (out)	Area (m^2)	Depth (m)	Volume (m^3)
CBMH#1	86.70	84.91	656.59	0.30	66.0
CB#2	86.80	85.25	196.45	0.20	16.5
				Total	82.5

Storage Available (m^3) = 82.5
Storage Required (m^3) = 79.3

John Meunier - Hydrovex VHV ICD Curves

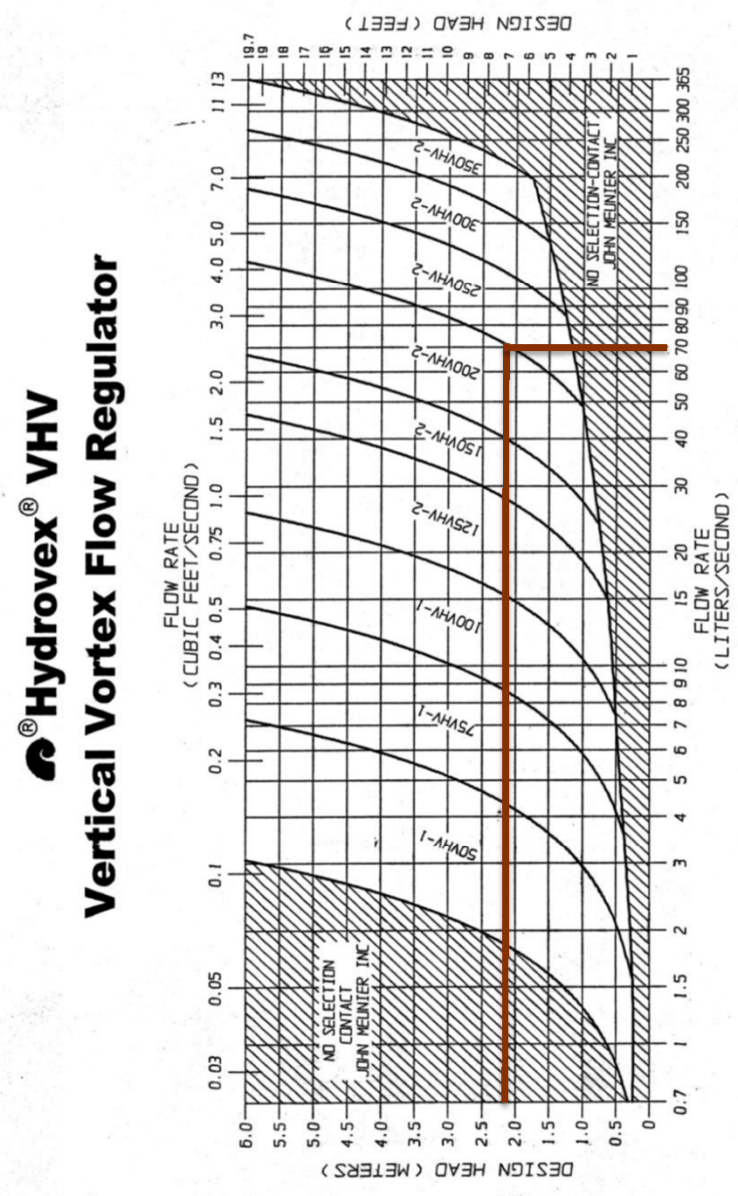


FIGURE 2 - VHV

JOHN MEUNIER

STORM SEWER DESIGN SHEET

PROJECT: KANATAN MEWS
LOCATION: 329 MARCH ROAD
CLIENT: BASCORP MANAGEMENT
PAGE: 5 OF 5

LOCATION				CONTRIBUTING AREA (ha)							RATIONAL DESIGN FLOW											SEWER DATA								
1	2	3	4	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		AREA			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)	
																								DIA	W	H			(L/s)	(%)
	B3	CB#2	CBMH#1	0.36		0.21			0.08	0.08	10.00	0.47	10.47	104.19	122.14	178.56	21.96				21.96	34.22	30.00	200			1.00	1.055	12.26	35.83%
	B2	CBMH#1	MH#3	0.69		0.40			0.28	0.35	10.47	0.33	10.80	101.75	119.27	174.34	99.88				99.88	100.88	27.33	300			1.00	1.383	1.00	0.99%
		MH#3	MH#4							0.35	10.80	1.18	11.99	100.13	117.36	171.53	98.29				98.29	900.87	71.51	1050			0.10	1.008	802.58	89.09%
		MH#4	CBMH#5							0.35	10.80	0.41	11.21	100.13	117.36	171.53	98.29				98.29	900.87	24.62	1050			0.10	1.008	802.58	89.09%
	B1	CBMH#5	EX MH	0.75		0.15			0.11	0.47	11.21	0.26	11.47	98.21	115.09	168.20	127.08				127.08	900.87	15.91	1050			0.10	1.008	773.79	85.89%

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: JMJ
Checked: CJM
Project No.: CP-15-0465

No.	Revision	Date
1.	ISSUED FOR SITE PLAN CONTROL	2016-08-30

Date: 2016-08-30
Sheet No: 5 of 5

APPENDIX G: QUALITY TREATMENT DESIGN CALCULATIONS

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.	Existing Conditions 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 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 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 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	Appendix 'F'

conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).	
☐ 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