McINTOSH PERRY

Franklin Empire

120 Hearst Way, City of Ottawa

Site Servicing Report

Prepared for:
Broccolini Construction
130 Slater Street, Suite 1300
Ottawa, ON
K1P 6E2

Prepared by:
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May 6th, 2013

MP File No: CP-13-0007

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1.0 PROJECT DESCRIPTION

1.1 Purpose

This report will address the servicing (water, sanitary & storm) and stormwater management treatment associated with the development of the new office/warehouse building located at 120 Hearst Way within the City of Ottawa. This report should be read in conjunction with drawings C1.1 – Lot Grading, Drainage & Sediment Control Plan and C1.2 – Servicing & Utility Plan (Reference No. CP-13-0007).

1.2 Site Description

The property is located at 120 Hearst Way in the City of Ottawa and covers approximately 0.60 ha. It is described as part of Lot 1 Concession 4 (Rideau Front) Geographic Township of Gloucester City of Ottawa.

The existing site is currently undeveloped and consists largely of grass cover.

The site is bounded by highway 417 to the north, the Eagleson off ramp from highway 417 to the north east and Hearst Way to the south. The adjacent lands to the east and west are currently undeveloped. See Figure 1: Key Map.

The proposed development consists of a standalone 2,300 m^2 office/warehouse building complete with an associated parking lot, loading bay and landscaped areas. The building will be centrally located within the property. Parking will be located along the north east property line, and north side of the building. No parking will be located between the building and the south west property line.

Figure 1: Key Map 120 Hearst Way, Ottawa.

2.0 BACKGROUND STUDIES

Background studies have been completed for the site. These studies include a review of the City of Ottawa as-builts, a topographical survey of the site, a geotechnical report, a Phase I ESA and a traffic impact study.

As-builts of the existing services within the vicinity of the site were ordered from the City Ottawa and reviewed in order to determine proper servicing of the site.

A topographical survey of the existing features at the site was completed by Annis, O'Sullivan, Vollebeck Ltd. dated January 15th 2013, and can be found under separate cover.

The Geotechnical report was completed by SPL Consultants Ltd. and a report dated February 2013 has been provided under separate cover. Groundwater levels at the site were recorded to be between 2.5 and 2.6 m below the ground surface. The complete geotechnical report has been provided under separate cover.

A Noise Study dated April 2nd 2013 was completed by Gradient Microclimate Engineering Inc. and has been provided under separate cover.

A Phase I ESA was completed by Paterson Group Inc. dated November 23rd 2005, since this report is more than 7 years old an update to the report has been completed. The update was completed by Paterson Group Inc. on February 15th 2013 and has been provided under separate cover.

3.0 PRE-CONSULTATION SUMMARY

City of Ottawa staff has been pre-consulted on this project via email on January 10th 2013. Specific design parameters to be incorporated within this design include the following:

- The 100 year post development storm flows must be restricted to the 5 year pre-development flow calculated with a 'C' value of 0.7 (as per the approved drainage and grading plan for the area, attached in Appendix 'A')
- Pre development flows are to be calculated with a time of concentration (Tc) of 20 min whereas post development flows are to be calculated with a Tc of 10 min
- Maximum ponding depth shall not exceed 150mm for the 5 year storm event and 300mm for the 100 year storm event.
- Mississippi Valley Conservation Authority requires 70% total suspended solids (TSS) removal for quality treatment at this site.

Correspondence with the City and Conservation Authority can be found in Appendix 'A'.

4.0 EXISTING SERVICES

Within Hearst Way there is an existing 250 mm diameter sanitary sewer, a 300 mm diameter water main and a storm main that ranges in size from 300 mm to 600 mm as it travels towards the north east. There is a fire hydrant located on the south side of Hearst Way directly across from the site that will provide fire ptotection for the site.

There is a service easement located south west of the site that current has a 1200 mm diameter storm main, and 600 mm diameter sanitary main.

Hydro, gas, cable and bell services are available from Hearst Way.

A new storm, sanitary and water lateral will be extended from the existing mains within Hearst Way to service this site as detailed in section 5.0 below.

5.0 SERVICING PLAN

5.1 Water Servicing

A new 200 mm diameter PVC water lateral will be constructed from the existing 300 mm water main located within Hearst Way to service the proposed building complete with a water valve located at the property line.

The proposed building will be equipped with a sprinkler system for fire protection. The mechanical engineer has specified the required flow for the sprinkler system within the proposed building to be 1,450 igpm. Available flow from the hydrant (5219005) located along Hearst Way across from the site is approximately 1221 igpm, this information was provided by the City of Ottawa. (See Appendix 'B' for information sheets). This fire hydrant is located within 90 m of the principal entrance to the building; therefore a private hydrant for this development will not be required. A new Siamese connection will be located along the south east face of the proposed building and within 45m of the existing fire hydrant along Hearst Way.

The water demands for the new building have been calculated as per the Ottawa Design Guidelines – Water Distribution and are as follows; the average and maximum daily demands are 0.20 L/s and 0.31 L/s respectively. The maximum hourly demand was calculated as 0.55 L/s (Refer to Appendix 'B' for flow details).

5.2 Sanitary Servicing

A new 150 mm diameter gravity sanitary service will be connected to the existing 250 mm diameter sanitary main within Hearst Way. The building will be serviced via gravity drainage to the sanitary main. The service connection will be laid in a common trench with the proposed water and storm services complete with a sanitary service manhole located near the property line.

The proposed peak design flows for the new building were calculated using the Second Edition of the City of Ottawa Sewer Design Guidelines dated October 2012 and the calculations can be found in Appendix 'C'. The peak demand for the sanitary system was calculated to be 0.039 L/s. The proposed 150 mm diameter sanitary sewer service will adequately carry these flows.

5.3 Storm Servicing

A new storm sewer system shall be constructed from the 525 mm diameter storm main fronting the site within Hearst Way. The new on site pipe network will collect storm flows and restrict the runoff prior to leaving the site. The storm system will be further detailed in section 6.0.

6.0 STORMWATER MANAGEMENT

Stormwater management for this site is maintained through positive drainage away from the proposed building and into a new underground storm sewer system within the site. The storm runoff will drain into the underground pipe network through catch basins (CB) and catch basin manholes (CBMH) located throughout the site. The runoff will gravity drain through the underground storm pipes where it will eventually outlet to the storm main located within Hearst Way. The quantitative and qualitative properties of the storm runoff for both the pre and post development flows are further detailed below.

6.1 Design Methodology

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

Q=2.78 CIA (L/s)

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

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

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

Building roofs, Asphalt, Concrete	0.90
Grass, undeveloped areas	0.25
Gravel	0.60

Furthermore, the balanced 'C' value must increase by 25% when going from a 5-year storm event to a 100-year storm event to a maximum value of 1.0.

As per pre-consultation with the City of Ottawa the time of concentration (Tc) used for pre-development flows shall be 20 minutes, whereas a Tc of 10 minutes will be used when calculating post-development flows.

6.2 Site Drainage

6.2.1 *Pre-Development Drainage*

The existing site has been demonstrated as one large drainage area, A1. Drawing CP-13-0007 PRE (Appendix 'D') indicates the limits of this drainage area.

Drainage area A1 encompasses the entire site which sheet drains to the north corner of the property. This area is 0.62 ha and consists of grass and small vegetation. A runoff coefficient ('C') value of 0.20 was calculated for the 5-year storm event and this value was increased 0.25 for the 100-year storm event. Therefore the estimates of maximum runoff rates for typical 5 and 100-year rainfall events are 24 L/s and 52 L/s, respectively.

Table 1: Pre-Development Drainage Summary

Basin	Drainage Area (ha)	Balanced Runoff Coefficient (C) 2,5-yr	Balanced Runoff Coefficient (C) 100-yr	5-Year Flow Rate (L/s)	100-Year Flow Rate (L/s)
A1	0.63	0.20	0.25	24.5	52.3
Total	0.63			24.5	52.3

(See Appendix 'F' for Calculations)

6.2.2 *Post-Development Drainage*

The proposed site has been demonstrated as drainage areas B1 – B8 as indicated on drawing CP-13-0007 POST (Appendix 'E'). The total post-development area will increase from 0.63 ha to 0.64 ha, this is due to the portion of the City's Right of Way that will be draining onto the site. This additional area is included within area B7.

Drainage area B1 is 0.23 ha and includes the proposed buildings flat roof. This area will drain unrestricted via roof drains that will enter an internal storm network before discharging into CBMH #1 from the east corner of the building. A 'C' value of 0.90 was calculated for the 5-year storm event and this value was increased to 1.00 for the 100-year storm event. The peak flow for this area was calculated for the 5 and 100-year storm events as 60 L/s and 115 L/s, respectively.

Drainage area B2 is 0.01 ha and consists of the loading bay area. This area sheet drains towards the trench drain at the bottom of the loading area where it will gravity drain into the storm network located on site. Runoff from this area will be restricted before outletting to the existing storm main within Hearst Way. This restriction will be further detailed in section 6.3. A 'C' value of 0.90 was calculated for the 5-year storm event

and this value was increased to 1.00 for the 100-year storm event. The peak flow for this area was calculated for the 5 and 100-year storm events as 2 L/s and 5 L/s, respectively.

Drainage area B3 is 0.09 ha and encompasses the paved drive aisle along the south west property line. This area drains to the new onsite storm system through CB #6 and will be restricted before outletting to the storm system within Hearst Way. A 'C' value of 0.90 was calculated for the 5-year storm event and this value was increased to 1.00 for the 100-year storm event. The peak flow for this area was calculated for the 5 and 100-year storm events as 24 L/s and 45 L/s, respectively.

Drainage area B4 is 0.11 ha and is made up of the paved parking and landscaped area north of the proposed building. This area will flow into the new onsite storm system through CB #3 and will be restricted before outletting from the site. A 'C' value of 0.83 was calculated for the 5-year storm event and this value was increased to 0.92 for the 100-year storm event. The peak flow for this area was calculated for the 5 and 100-year storm events as 26 L/s and 48 L/s, respectively.

Drainage area B5 is 0.07 ha and consists of the east entrance into the site as well as the parking and sidewalk. Flow from this area will be collected by CBMH #2 and will be restricted before outletting from the site. A 'C' value of 0.90 was calculated for the 5-year storm event and this value was increased to 1.00 for the 100-year storm event. The peak flow for this area was calculated for the 5 and 100-year storm events as 18 L/s and 35 L/s, respectively.

Drainage area B6 is 0.02 ha and includes the small landscaped area and sidewalk at the east corner of the building. This area will flow into the new onsite storm system through CBMH #1 and will be restricted before leaving the site. A 'C' value of 0.56 was calculated for the 5-year storm event and this value was increased to 0.63 for the 100-year storm event. The peak flow for this area was calculated for the 5 and 100-year storm events as 3 L/s and 5 L/s, respectively.

Drainage area B7 is 0.07 ha and encompasses the landscaped area fronting the site along Hearst Way. This area also includes a portion of the grass boulevard located within the City's Right of Way (ROW) since flow from the ROW is being directed into our site. Flow from this area enters the new onsite storm system through DICB #4 and will be restricted before outletting from the site. A 'C' value of 0.20 was calculated for the 5-year storm event and this value was increased to 0.25 for the 100-year storm event. The peak flow for this area was calculated for the 5 and 100-year storm events as 4 L/s and 9 L/s, respectively.

Drainage area B8 is 0.05 ha and is the grass area along the perimeter of the property line. Runoff generated from this area flows unrestricted from the site where it will enter the existing roadside ditch adjacent to the highway as in pre-development conditions. A 'C' value of 0.20 was calculated for the 5-year storm event and this value was increased to 0.25 for the 100-year storm event. The peak flow for this area was calculated for the 5 and 100-year storm events as 3 L/s and 6 L/s, respectively.

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	0.23	0.90	1.00	60.4	115.1
B2	0.01	0.90	1.00	2.4	4.6
B3	0.09	0.90	1.00	23.6	44.9
B4	0.11	0.83	0.92	25.5	48.4
B5	0.07	0.90	1.00	18.2	34.7
B6	0.02	0.56	0.63	2.7	5.1
B7	0.07	0.20	0.25	3.9	8.5
B8	0.05	0.20	0.25	3.0	6.4
Total	**0.64**			**139.7**	**267.7**

(See Appendix 'F' for Calculations)

Due to stormwater requirements, the amount of flow that is permitted to leave the site must not exceed 85.8 L/s. This flow rate was calculated using a 'C' value of 0.70 for the pre development area of 0.63 ha (See Appendix 'F' for calculations). Since the site will have substantially higher post-development flows a flow restriction will be required, creating a need for onsite storage. This restriction will be further detailed on section 6.3 below.

6.3 Quantity Control

After discussing with city staff the stormwater management criteria for the site, the total post development runoff for this site has been restricted to the 5-year pre-development flow rate generated from the entire site area using an overall 'C' value of 0.70 and a Tc of 20 minutes (See Appendix 'A' for pre-consultation notes). These values create an allowable release rate of 85.8 L/s as mentioned above. Runoff from areas B1 through B7 will be restricted as detailed in the table below.

Table 3: 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	60.4	115.1	79.4	79.4	*Restricted*
B2	2.4	4.6			
B3	23.6	44.9			
B4	25.5	48.4			
B5	18.2	34.7			
B6	2.7	5.1			
B7	3.9	8.5			
B8	3.0	6.4	3.0	6.4	*Unrestricted*
Total	**139.7**	**267.7**	**82.4**	**85.8**	

(See Appendix 'F' for Calculations)

Runoff from areas B1 though B7 will be restricted by a Hydrovex 250VHV-2 inlet control device placed in the outlet of CBMH #1 that will restrict the flow leaving these areas to 79.4 L/s for both the 5 and 100 year storm events. This will create a water surface elevation of 93.02 m and 93.37 m respectively. All storage requirements will be met within the grass storage swale above DICB #4 located adjacent to Hearst Way.

In the event that there is a rainfall above the 100 year storm event, or a blockage within the storm network, emergency overland flow routes have been provided such that the storm water runoff will be conveyed away from the proposed buildings. There is an overland flow route for the west corner of the site that will direct runoff towards the existing roadside ditch along Highway 417. The remainder of the site will be directed towards Hearst Way should an overflow situation occur. An elevation difference of 0.35 m has been provided from the finished floor of the building (94.60 m) to the overland flow route elevation in the west corner (top of curb - 94.25 m), whereas an elevation of 0.20 m has been provided from the overland flow elevation at Hearst Way (walkway connected to Hearst Way - 94.40 m).

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

Table 4: Post-Development Storage Calculations

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)
B1 – B7	0.35	34.4	35.3	0.70	115.4	115.6

(See Appendix 'F' for Calculations)

6.4 Quality Control

Mississippi Valley Conservation Authority (MVCA) was contacted on February 14th 2013 in order to identify the quality control requirements for this site. A normal level of protection which involves a quality control of 70% Total Suspended Solids (TSS) removal is required for the site. Details can be found in Appendix 'A'.

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. There is a limited opportunity to employ these techniques at this site.

One orifice plug 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.

A quality treatment unit has been sized to provide a TSS removal rate of 70% as per MVCA requirements. The CDS20_15-4es CDS Unit will provide a water quality of 80.0% TSS (See Appendix 'G' for Calculation sheets). This treatment unit has a sediment capacity of 1060 L, total holding capacity of 1820 L, an oil storage capacity of 232 L and a treatment flow rate of 20 L/s. The CDS Unit shall be placed within the outlet pipe in order to provide the required water quality treatment for the site runoff before entering the storm main within Hearst Way. Information regarding the long-term removal rate of the CDS unit has been included within Appendix 'G' for reference.

7.0 SEDIMENT AND EROSION CONTROL

The contractor shall implement best management practices, to provide for protection of the area drainage system and the receiving watercourse, during construction activities. The site-grading contractor is responsible for ensuring sediment control structures are installed in accordance with the Site Servicing and 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 grading plan.

Filter Cloth is to be installed under the grates of all catch basins immediately upon its installation. The cloth 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 or straw bale check dams 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 2,300 m^2 office/warehouse building in the City of Ottawa is proposed at 120 Hearst Way.
- A new 150 mm sanitary and 200 mm water lateral will be extended from the existing mains within Hearst Way to service the new building.
- A new storm system will be installed onsite and convey stormwater into the existing storm sewer network located within Hearst Way.
- As discussed with the City of Ottawa staff, stormwater management will ensure that the post-development 100 year flow rate does not exceed the 5 year pre development flow rate using an overall 'C' value of 0.70.
- Storage of storm runoff will be provided within parking areas above the storm structures on site.
- Stormwater quality treatment will be designed to remove 70% TSS per MVCA requirements.

9.0 RECOMMENDATION

We respectfully recommend that:

This report, dated May 6th 2013, 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 Grading and Drainage Plan notes are to be implemented by the contractor.

This report is respectfully being submitted for approval.

LICENSED PROFESSIONAL ENGINEER
K. L. GODDARD
100045152
May 6 / 2013
PROVINCE OF ONTARIO

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APPENDIX A: City of Ottawa Pre-Consultation Notes

Curtis Melanson

From: Whittaker, Damien <Damien.Whittaker@ottawa.ca>
Sent: February-15-13 9:25 AM
To: Jonathan Jonker
Cc: Curtis Melanson
Subject: RE: Stormwater mangament - 120 Hearst Way

Jonathan,

The City concurs with the statements below. Please also enquire with MVCA about any erosion potential for the watercourse.

Regards,

Damien Whittaker, P.Eng • **Project Manager** • **Development Review, Suburban (West)**
City of Ottawa • 110 Laurier Avenue West, Ottawa, Ontario K1P 1J1
☎ 613-580-2424 x16968 • damien.whittaker@ottawa.ca • 26-61

From: Jonathan Jonker [mailto:j.jonker@mcintoshperry.com]
Sent: February 14, 2013 1:39 PM
To: Whittaker, Damien
Cc: Curtis Melanson
Subject: Stormwater mangament - 120 Hearst Way

Good Afternoon Damien,

We are moving forward with the stormwater management design for the site located at 120 Hearst Way and would like to confirm the following:

- The 100 year post development storm flows must be restricted to the 5 year pre-development flow calculated with a 'C' value of 0.7 (as per the attached drawing)
- Pre development flows are to be calculated with a Tc of 20 min whereas post development flows are to be calculated with a Tc of 10 min
- Contact MVCA for quality control measures

If you need any additional information please do not hesitate to call or email.

Thank you very much,

Jonathan Jonker
Junior Designer / Inspector - Land Development
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J.Jonker@mcintoshperry.com | www.mcintoshperry.com

Curtis Melanson

From: Myra Lavoie <mlavoie@mvc.on.ca>
Sent: February-25-13 10:55 AM
To: Jonathan Jonker
Subject: RE: 120 Hearst Way - Quality Control Requirements

Hello Jonathan,

Without further assessment, this site is assumed fish habitat and a long-term average removal of 70% of suspended solids is required.

Let me know if you have any other questions.

Regards,
Myra

From: Jonathan Jonker [mailto:j.jonker@mcintoshperry.com]
Sent: February-14-13 1:49 PM
To: Myra Lavoie (mlavoie@mvc.on.ca)
Cc: Curtis Melanson
Subject: 120 Hearst Way - Quality Control Requirements

Good Afternoon Myra,

We have a site that is going to be developed to include a new warehouse building and surrounding parking areas. The site is located at 120 Hearst Way, south of Highway 417 within the City of Ottawa (see attached Key Plan for reference). The existing site is undeveloped and is entirely covered with grass and small vegetation. The proposed development will consist of a warehouse building located in the center of the site and asphalt parking along the property lines. I have attached a preliminary site plan for your reference. A pre-consultation with the City was completed and they have stipulated we match the 100yr to 5yr with a max 'C' value of 0.7 for stormwater leaving the site. The City wanted us to confirm with MVCA if there were any quality control requirements for stormwater. Can you review the attached documents and let me know if there would be any quality control required for the site?

If you need any additional information please do not hesitate to call or email.

Thank you very much,

Jonathan Jonker
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J.Jonker@mcintoshperry.com | www.mcintoshperry.com

APPENDIX B: Fire Flow Information

FAX TRANSMISSION FORM - Supply Pressure/Flow Capacity

City of Ottawa
Transportation Utilities and Public Works
Customer Service & Operational Support
951 Clyde Avenue
Ottawa, On, K1Z 5A6
Joseph Hannewyk **email: joseph.hannewyk@ottawa.ca**
Business Consultant/Water Resources Analyst **phone 560-6065 x22617** **fax 728-4183**

Date/Time: 13/02/22-08:45:34
Our File: 49-01-2006

To:
Company:
Tel:
Fax:
Location:
Request_dt: 13/02/21-11:03:46
Email:

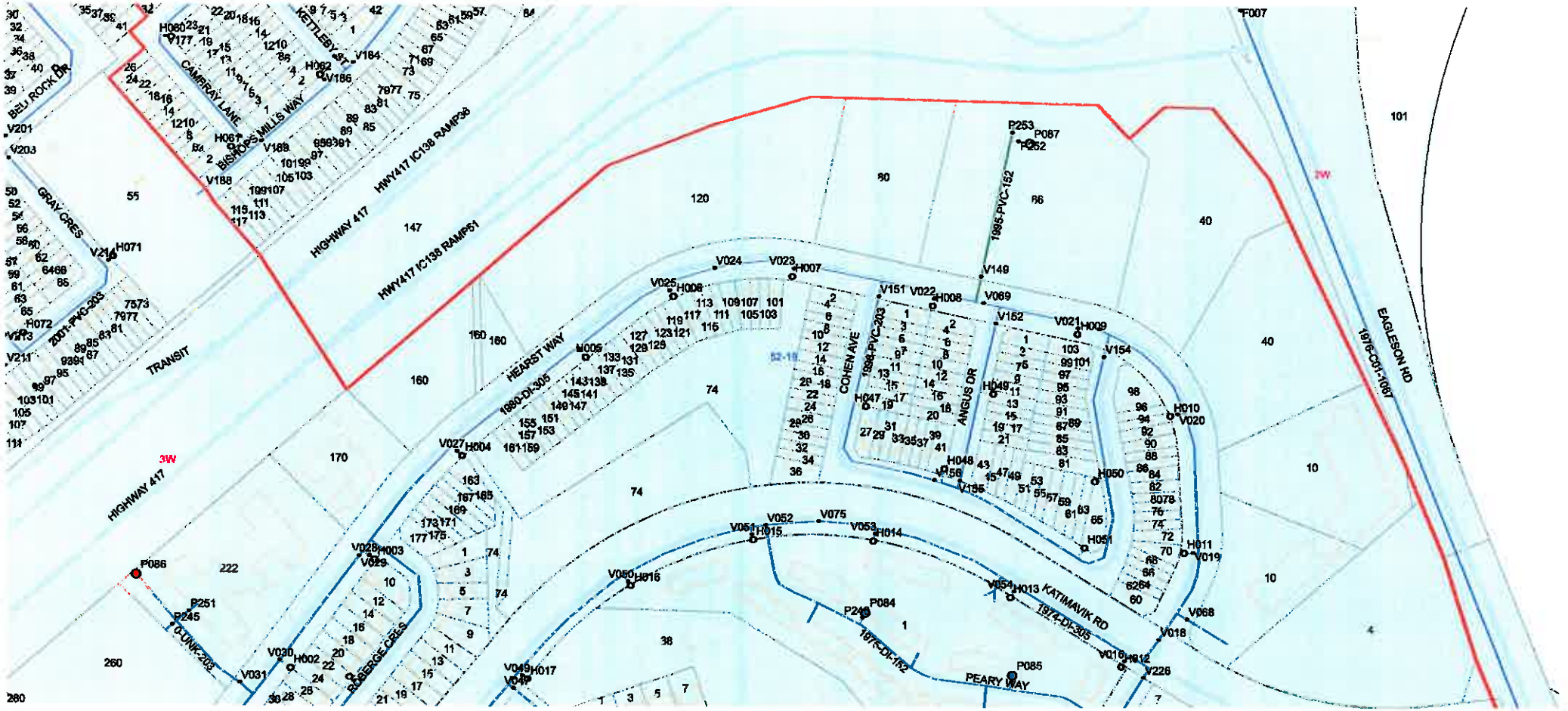
Pressure Only ? (Y): 6424

Preferred Response Method:

Inspection	Flow	Residual	Pressure (psi)			Flow (igpm)	
Date	Hydrant	Hydrant	Static	Dynamic	Pitot	Actual	@ 20 psi
2011/08/17	5219006	5219008	94	78	76	1221	2792
2011/08/17	5219004	5219005	98	78	76	1221	2546
2011/08/16	5219016	5219017	98	86	80	1253	3442
2011/08/16	5219014	5219017	98	88	82	1268	3846
2011/08/17	5219002	5219003	98	84	72	1188	3005

Note: the computed flows are approximate and performed for hydrant colour coding purposes, thus these values are not intended for design purposes.

Ref# 6424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GRAY CRES
TRANSIT
HIGHWAY 417
KETTLEBY
CAMRRAY LANE
MILLS WAY
BISHOPS
HWY417 IC138 RAMP36
HWY417 IC138 RAMP51
HEARST WAY
COHEN AVE
ANGUS DR
1995-PVC-152
1998-PVC-203
2001-PVC-203
1980-DI-305
1974-DI-305
1976-DI-152
1976-C01-1087
EAGLESON RD
KATIMAVIK RD
PEARY WAY
RIBERGE CRES
C-UNK-203
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120 Hearst Way - Water Demands

Project:	120 Hearst Way
Project No.:	CP-13-0007
Designed By:	JJ
Checked By:	CJM
Date:	April 24, 2013
Site Area:	0.63 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	0.20	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	0.31	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	0.55	L/s

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

Curtis Melanson

From: Robert McKinney <robertm@broccolini.com>
Sent: April-16-13 11:15 AM
To: Curtis Melanson
Cc: Terry Glavin
Subject: FW: Hearst Way - Mechanical

Curtis,

See below recommendation from our sprinkler subtrade.

Please advise if you require additional information.

Best Regards,

Robert McKinney
Project Coordinator
BROCCOLINI CONSTRUCTION
T. 613-244-0076 Ext. 115 C. 613-806-7630 F. 613-244-2028
130 Slater Street, Suite 1300, Ottawa, Ontario, K1P 6E2

Great people, great partners, great relationships. Discover what makes Broccolini unique – watch our video

---

From: Joe Pross [mailto:Joe.Pross@vipond.ca]
Sent: Tuesday, April 16, 2013 10:59 AM
To: Robert McKinney
Cc: Terry Glavin
Subject: RE: Hearst Way - Mechanical

Hi Robert

The water demand for rack storage warehouse requires a large volume discharge due to the Extra Hazard occupancy design and as per NFPA fire code .

The water capacity demand is a minimum 1,200 US gpm for the roof sprinklers and 250 US gpm for fire hose allowance for Siamese connection (fire department connection) via fire hydrant = Total 1,450 US gpm plus add 10% for overage. We require a minimum 8" underground water main to protect this building.

Please note that a fire department connection to a fire hydrant is to be located not more than 45 meters (147 ft 8 inches) and is unobstructed as per OBC.

We recommend to conduct a water flow test via existing fire hydrant to validate the capacity and pressure to avoid a potential fire pump. Vipond provide this service for an approx of $600.00 which includes the presents & the fees City of Ottawa crew.

Trusting that you will find the above satisfactory, please contact me if you require more clarifications on this matter.

Regards

Joe Pross
Senior Estimator / Project Manager

Vipond Fire Protection
Division of Vipond Inc
34 Bentley Avenue
Ottawa, Ontario K2E 6T8

Ph. (613) 225-0538
Fx. (613) 225-7390
Cell. (613) 223-0621
Email: joe.pross@vipond.ca
Web site: www.vipond.ca

From: Robert McKinney [mailto:robertm@broccolini.com]
Sent: April 15, 2013 8:50 PM
To: Joe Pross
Cc: Terry Glavin
Subject: RE: Hearst Way - Mechanical

Joe,

Can you prepare me the required information by tomorrow morning?

Call me tomorrow morning to discuss further.

Best Regards,

Robert McKinney
Project Coordinator
BROCCOLINI CONSTRUCTION
T. 613-244-0076 Ext. 115 C. 613-806-7630 F. 613-244-2028
130 Slater Street, Suite 1300, Ottawa, Ontario, K1P 6E2

From: Robert McKinney
Sent: Wednesday, April 10, 2013 4:29 PM
To: Joe.pross@vipond.ca
Subject: FW: Hearst Way - Mechanical

Joe,

Just a friendly reminder.

Best Regards,

Robert McKinney
Project Coordinator
BROCCOLINI CONSTRUCTION
T. 613-244-0076 Ext. 115 C. 613-806-7630 F. 613-244-2028
130 Slater Street, Suite 1300, Ottawa, Ontario, K1P 6E2

From: Curtis Melanson [mailto:c.melanson@mcintoshperry.com]
Sent: Tuesday, April 09, 2013 9:37 AM
To: Robert McKinney
Subject: Hearst Way - Mechanical

Hi Robert,
Is the building going to be sprinklered? If so, I will need the mechanical engineer to provide me with the required fire flow for the suppression system. Also, I will need a location that they would like us to bring the services (water, sanitary storm) into the building.

Thanks,

Curtis Melanson
Team Lead – Site Development
115 Walgreen Road, R R 3, Carp, ON K0A 1LO
T. 613.836.2184 (2240) | F. 613.836.3742
c.melanson@mcintoshperry.com | www.mcintoshperry.com

APPENDIX C: Sanitary Calculations

Jonathan Jonker

From: Roberto Campos <rcampos@rubinrotman.com>
Sent: May-02-13 11:56 AM
To: Curtis Melanson
Subject: Occupancy Load - 120 Hearst

Curtis,

As per conversations with Franklin Empire, they have confirmed to me that a facility of this scale would be serviced by an employee count (admin, warehouse support, and retail clerks) of no more than 22 employees working at the same time within a given period. They have also confirmed to me that on their busiest day the most customers they would ever see within the same time frame would be 10-12. The average would be 5-6. Therefore we have assumed a total occupancy for this building to be 45 people. Which would bring us to 3 fixtures per sex with a total of 6.

Roberto

Roberto Campos, M.Arch | OAA | MRAIC
Director – Rubin & Rotman | Ottawa

Rubin & Rotman Associates | Architects

MONTREAL
270, rue Prince, Studio 200
Montréal, Québec
H3C 2N5
T.: 514.861.5122
F.: 514.861.5383

OTTAWA
190 Somerset St. West - Suite 206
Ottawa, Ontario
K2P 0J4
T: 613.695.6122 ext: 301
C: 613.799.1986

rcampos@rubinrotman.com

www.rubinrotman.com

APPENDIX 4-A DAILY SEWAGE FLOW FOR VARIOUS ESTABLISHMENTS

ITEM	UNIT OF MEASURE	DAILY VOLUME IN LITRES
DOG KENNELS	per closure	75
DINING HALLS – see restaurants		
DWELLINGS		
- Single family houses, apartments Condominiums, cottages, etc.	per person	350
- Each dwelling unit of -	1 bedroom	275
- Each dwelling unit of -	2 bedrooms	1100
- Each dwelling unit of -	3 bedrooms	1600
- Each dwelling unit of -	4 bedrooms	2000
- Add for each bedroom over 4	per bedroom	300
- Boarding or Rooming houses	per person	200
- Boarding or Rooming houses without meals or laundry	per person	150
- Non resident staff	per person	40
- Luxury homes – 4 bedrooms	per residence	3000
- Luxury homes – 5 bedrooms	per residence	3500
- Luxury homes – add for each bedroom over 5		500
EMPLOYEES – VARIOUS LOCATIONS		
- Factory or plant workers per day or per shift – includes showers but no industrial	per person	125
- Factory or plant workers as above but no showers	per person	75
- Various buildings and places of Employment – e.g. store employees, Office workers – depends on facilities	per person	75 *
- Medical Office buildings, dental Offices and medical clinics		
- Doctors, nurses & medical staff	per person	275
- Office staff	per person	75
- Patients	per person	25
HOTELS – See Motels		

Project Name: 120 Hearst Way
Ottawa, Ontario

Re: Sanitary Flow Calculations

---

1. **Building Occupancy**

   As per the attached email from the Architect, the maximum building occupancy will be 45 persons (10-12 customers, 22 employees).

2. **Daily Volume in Litres**

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

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

   - = 75 Liters/Person/Day

3. **Peak Flow (Q/p)**

   - Q(p) = F x P Where:
     F = 75 Litres/Person/Day (as per City of Ottawa Sewer Design Guidelines)
     P = 45 Persons (as per attached email from Architect)
   - Therefore, Q(p) = (75) x (45) = 3,375 L/Day (0.039 L/Sec)

It is anticipated that there will be no issues with capacity constraints within the existing sanitary main or lateral as the amount of flow leaving the site is negligible. Therefore, the existing 250 mm sanitary main within Hearst Way has the capacity to accommodate the new flows.

(MP File # CP-13-0007)

APPENDIX D: Pre-Development Plan

SCALE 1:400

HIGHWAY 417

N 49° 17' 10" E 90.65

N 49° 17' 10" E 3.15

N 40° 23' 30" W 1.76

EX SAN MH T/G 94.02

8.48

12.64

13.80

SERVICE EASEMENT

SERVICE EASEMENT

47.04

N 30° 10' 50" W

71.82

N 1° 20' 50" W

67.40

N 28° 07' 20" W

A2 | 0.62 ha

0.70

0.81

N 57° 07' 10" E 69.45

BOTTOM OF SLOPE

EX TOP OF SLOPE

EX STM CB T/G 94.64

EX 300mm STM SEWER

EX 525mm STM SEWER

EX 250mm SAN SEWER

EX STM CBMH T/G 94.74 INV 91.61

EX 300mm WTR MAIN

EX SAN MH T/S 94.76 W INV 90.66 E INV 90.69

JOB BENCHMARK T/S FIRE HYDRANT ELEVATION 95.65m

FH

WV

HEARST WAY

EX STM CBMH T/G 94.15 INV 91.05

EX SAN MH T/G 94.21 INV 90.99

N 77° 07' 00" E

EX STM CB T/G 94.18

EX 900mm STM SEWER

EX 900mm SAN SEWER

EX 300mm WTR MAIN

EX WTR T/S 93.

LOCATION PLAN

LEGEND

AREA | x.xx ha — AREA SIZE (HECTARES)

A1

X.XX — 5-YR RUNOFF COEFFICIENT

X.XX — 100-YR RUNOFF COEFFICIENT

No.	Revision/Issue	Date
01	ISSUED FOR SITE PLAN CONTROL	MAY 6/13

Check and verify all dimensions before proceeding with the work. Do not scale drawing.

McINTOSH PERRY

115 Walgreen Rd., R.R. #3 Carp ON. K0A 1L0
Tel.: (613) 836-2184 Fax: (613) 836-3742

Client:
BROCOLLINI CONSTRUCTION
130 SLATER AVENUE, SUITE 1300
OTTAWA, ONTARIO
K1P 6E2
P: (613) 244-0076 F: (613) 244-2026

Owner:
FRANKLIN EMPIRE

Project:
120 HEARST WAY
PROPOSED COMMERCIAL BUILDING
OTTAWA ON

Drawing Title:
PRE-DEVELOPMENT PLAN

Drawn by: CJM	Project Number: CP-13-0007
Designed by: CJM	
Checked by: KP	Drawing Number:
Scale: 1:400	SHEET 1 of 1 PRE
Date: JANUARY 25, 2013	

APPENDIX E: Post-Development Plan

SCALE 1:400

HIGHWAY 417

B3 | 0.09 ha | 0.90 | 1.00

B4 | 0.11 ha | 0.83 | 0.92

B8 | 0.05 ha | 0.20 | 0.25

B2 | 0.01 ha | 0.90 | 1.00

B1 | 0.23 ha | 0.90 | 1.00

B5 | 0.07 ha | 0.90 | 1.00

B7 | 0.07 ha | 0.20 | 0.25

B6 | 0.02 ha | 0.56

PROPOSED 1 STOREY BUILDING
2302 m²
F.F. 94.60
REFER TO STRUCTURAL DRAWINGS FOR USF
ROOF SHALL DRAIN UNRESTRICTED VIA ROOF DRAINS AND ENTER AN INTERNAL STORM NETWORK THAT WILL DISCHARGE TO CBMH#1

N 49° 17' 10" E 90.65

N 49° 17' 10" E 3.15

N 40° 23' 30" W 1.76

N 30° 10' 50" W 71.92

N 1° 20' 50" W 12.84

N 57° 01' 10" E 69.48

N 77° 07' 00" E 87.40

N 28° 07' 20" W

TIE INTO EXISTING GRADES @ ± (MAX SLOPE 3:1)

TIE INTO EXISTING GRADES ON ADJACENT PROPERTY (MAX SLOPE 3:1)

OVERLAND FLOW ROUTE

STM CBMH#5 T/G 94.00 S INV 93.10

STM CBMH#3 T/G 94.00 SE INV 92.20

STM CBMH#2 T/G 94.00 NW INV 91.93 S INV 91.88

STM CBMH#1 T/G 94.25 N INV 91.64 SW INV 91.50 NW INV 91.50 SE INV 91.47 c/w HYDROVEX 250VHV-2 RESTRICTING FLOW TO 79.4 l/s

STM DICB#4 T/G 92.67 NE INV 91.55 SW INV 91.87

CDS MODEL CDS20_15_4e T/G 94.30 NW INV 91.45 SE INV 91.43

PROPOSED 300mmx150mmx300mm 'T' CONNECTION N INV 93.00 E INV 93.08 S INV 93.00

150mmØx5m PVC STM PIPE @1.0% c/w SLEEVE

PROPOSED TRENCH DRAIN T/G 93.40 OUTLET INV 93.13 PIPE SHALL CONNECT TO STM SYSTEM BETWEEN CBMH#5 & CB#6 AS SHOWN

SLOPED CONCRETE c/w HANDRAIL ALONG TOP OF SLOPE (SEE ARCHITECTURAL & STRUCTURAL PLANS FOR DETAILS)

CONCRETE TRANSFORMER PAD c/w WOOD FENCE (SEE ARCH PLANS FOR MORE DETAILS)

STM OUTLET INV 92.90 c/w RODENT GRATE

100 YR PONDING ELEV 93.37 DEPTH=0.70m VOLUME=115.59m³

5 YR PONDING ELEV 93.02 DEPTH=0.35m VOLUME=35.38m³

9.2m WIDE GRASS STORAGE SWALE WITH A 2.5m FLAT BOTTOM SLOPED @0.5% TOWARDS DICB#4, BOTTOM OF SWALE LINED WITH RIVERSTONE (REFER TO LANDSCAPE PLAN FOR DETAILS)

150mmØx5m PVC SUB DRAIN @0.5%

PROPOSED BOLLARD

PROPOSED 1.5m CONCRETE SIDEWALK ADJACENT TO EXISTING BARRIER CURB

PROPOSED SIDEWALK TO MATCH EXISTING TOP OF CURB GRADE

DEPRESSED CURB

ENTRANCE AS PER CITY STD DWG SC7.1

CONNECT TO EX 525mmØ STM SEWER AS PER CITY STD DWG S11.2 (ABOVE SPRING LINE OF SEWER MAIN) ELEV 91.40

JOB BENCHMARK T/S FIRE HYDRANT ELEVATION 95.65m

EX 300mm STM SEWER

EX 525mm STM SEWER

EX 250mm SAN SEWER

EX 300mm WTR MAIN

EX STM CB T/G 94.64

EX STM CBMH T/G 94.76 W INV 92.56 E INV 92.69

EX STM CB T/G 94.15 NW INV 91.00

EX SAN MH T/G 94.21 INV 90.99

EX 600mm STM SEWER

EX 900mm STM SEWER

HEARST WAY

SERVICE EASEMENT

LOCATION PLAN

LEGEND

AREA
B1 | x.xx ha — AREA SIZE (HECTARES)
X.XX — 5-YR RUNOFF COEFFICIENT
X.XX — 100-YR RUNOFF COEFFICIENT

No.	Revision/Issue	Date
01	ISSUED FOR SITE PLAN CONTROL	MAY 6/13

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

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Owner:
FRANKLIN EMPIRE

Project:
120 HEARST WAY
PROPOSED COMMERCIAL BUILDING
OTTAWA ON

Drawing Title:
POST-DEVELOPMENT PLAN

Drawn by: CJM	Project Number: CP-13-0007
Designed by: CJM	
Checked by: KP	Drawing Number:
Scale: 1:400	SHEET 1 of 1
Date: JANUARY 25, 2013	POST

APPENDIX F: Stormwater Calculations

AVERAGE PRE-DEVELOPMENT RUNOFF COEFFICIENT CALCULATIONS

Area A1	UNDRESTRICTED FLOW TO THE NORTH EAST				
Type	**C (5-yr)**	**C (100-yr)**	**Area (m²)**	**Product (5-yr)**	**Product (100-yr)**
Grass	0.20	0.25	6277.0	1255.4	1569.3
Avg C	**0.20**	**0.25**			

AVERAGE POST-DEVELOPMENT RUNOFF COEFFICIENT CALCULATIONS

Area B1	Proposed Building				
Type	**C (5-yr)**	**C (100-yr)**	**Area (m²)**	**Product (5-yr)**	**Product (100-yr)**
Building	0.90	1.00	2318.5	2086.6	2318.5
Avg C	**0.90**	**1.00**			

Area B2	Loading Bay Area				
Type	**C (5-yr)**	**C (100-yr)**	**Area (m²)**	**Product (5-yr)**	**Product (100-yr)**
Asphalt	0.90	1.00	92.2	83.0	92.2
Avg C	**0.90**	**1.00**			

Area B3	Drive Aisle on West Side				
Type	**C (5-yr)**	**C (100-yr)**	**Area (m²)**	**Product (5-yr)**	**Product (100-yr)**
Asphalt	0.90	1.00	889.6	800.6	889.6
Curb/Sidewalk	0.90	1.00	14.5	13.0	14.5
Avg C	**0.90**	**1.00**			

Area B4	Parking in North Corner of Site				
Type	**C (5-yr)**	**C (100-yr)**	**Area (m²)**	**Product (5-yr)**	**Product (100-yr)**
Asphalt	0.90	1.00	912.4	821.1	912.4
Curb/Sidewalk	0.90	1.00	41.8	37.6	41.8
Grass	0.20	0.25	106.5	21.3	26.6
Avg C	**0.83**	**0.92**			

Area B5	Parking and Entrance East of Proposed Building				
Type	**C (5-yr)**	**C (100-yr)**	**Area (m²)**	**Product (5-yr)**	**Product (100-yr)**
Asphalt	0.90	1.00	569.0	512.1	569.0
Curb/Sidewalk	0.90	1.00	129.9	116.9	129.9
Avg C	**0.90**	**1.00**			

Area B6	Entrance to Proposed Building				
Type	**C (5-yr)**	**C (100-yr)**	**Area (m²)**	**Product (5-yr)**	**Product (100-yr)**
Grass	0.20	0.25	80.8	16.2	20.2
Curb/Sidewalk	0.90	1.00	83.4	75.0	83.4
Avg C	**0.56**	**0.63**			

Area B7	Landscaped Area fronting Hearst Way				
Type	**C (5-yr)**	**C (100-yr)**	**Area (m²)**	**Product (5-yr)**	**Product (100-yr)**
Curb/Sidewalk	0.90	1.00	1.4	1.2	1.4
Grass	0.20	0.25	679.7	135.9	169.9
Avg C	**0.20**	**0.25**			

Area B8	Landscaped Area Around Perimeter of Site				
Type	**C (5-yr)**	**C (100-yr)**	**Area (m²)**	**Product (5-yr)**	**Product (100-yr)**
Grass	0.20	0.25	516.9	103.4	129.2
Avg C	**0.20**	**0.25**			

Time of concentration (min.)	5-Year (mm/hr)	100-Year (mm/hr)
20.00	70.3	120.0
10.00	104.2	178.6

As per discussions with City staff pre-development flows will be calculated with a Tc of 20min whereas post development flows will be calculated with a Tc of 10min. See Appendix 'A' for correspondence.

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	0.63	0.20	0.25	24.5	52.3
Total	**0.63**			**24.5**	**52.3**

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	0.23	0.90	1.00	60.4	115.1
B2	0.01	0.90	1.00	2.4	4.6
B3	0.09	0.90	1.00	23.6	44.9
B4	0.11	0.83	0.92	25.5	48.4
B5	0.07	0.90	1.00	18.2	34.7
B6	0.02	0.56	0.63	2.7	5.1
B7	0.07	0.20	0.25	3.9	8.5
B8	0.05	0.20	0.25	3.0	6.4
Total	**0.64**			**139.7**	**267.7**

The Total Drainage Area for the site has increased in post development conditions, this is due to the additional area within the City's ROW that is draining onto our site. This additional drainage will be managed within the site.

REQUIRED RESTRICTED FLOW (0.70 RUNOFF COEFFICIENT)

Basin	Drainage Area (ha)	Balanced Runoff Coefficient (C) 5-yr	5-Year Flow Rate (l/s)
A1	0.63	0.70	85.8
Total	**0.63**		85.8

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	60.4	115.1	79.4	79.4	*RESTRICTED*
B2	2.4	4.6			
B3	23.6	44.9			
B4	25.5	48.4			
B5	18.2	34.7			
B6	2.7	5.1			
B7	3.9	8.5			
B8	3.0	6.4	3.0	6.4	*UNRESTRICTED*
Total	**139.7**	**267.7**	82.4	85.8	

STORAGE REQUIRMENTS FOR AREA B1 - B7

5-YEAR STORM EVENT

Tc	I (mm/hr)	Runoff (l/s) B1	Runoff (l/s) B2	Runoff (l/s) B3	Runoff (l/s) B4	Runoff (l/s) B5	Runoff (l/s) B6	Runoff (l/s) B7	Allowable Outflow (l/s)	Runoff To Be Stored (l/s)	Storage Required (m^3)
10	104.2	60.4	2.4	23.6	25.5	18.2	2.7	3.9	79.4	57.3	34.4
20	70.3	40.8	1.6	15.9	17.2	12.3	1.8	2.7	79.4	12.9	15.4
30	53.9	31.3	1.2	12.2	13.2	9.4	1.4	2.0	79.4	-8.7	-15.6
40	44.2	25.6	1.0	10.0	10.8	7.7	1.1	1.7	79.4	-21.4	-51.3
50	37.7	21.9	0.9	8.5	9.2	6.6	1.0	1.4	79.4	-29.9	-89.8
60	32.9	19.1	0.8	7.4	8.1	5.8	0.8	1.2	79.4	-36.2	-130.4
70	29.4	17.1	0.7	6.6	7.2	5.1	0.8	1.1	79.4	-40.8	-171.4

Maximum Storage Required (m^3) = 34.4

100-YEAR STORM EVENT

Tc	I (mm/hr)	Runoff (l/s) B1	Runoff (l/s) B2	Runoff (l/s) B3	Runoff (l/s) B4	Runoff (l/s) B5	Runoff (l/s) B6	Runoff (l/s) B7	Allowable Outflow (l/s)	Runoff To Be Stored (l/s)	Storage Required (m^3)
10	178.6	115.1	4.6	44.9	48.4	34.7	5.1	8.5	79.4	181.9	109.1
20	120.0	77.3	3.1	30.2	32.6	23.3	3.5	5.7	79.4	96.2	115.4
30	91.9	59.2	2.4	23.1	24.9	17.9	2.6	4.4	79.4	55.1	99.1
40	75.1	48.4	1.9	18.9	20.4	14.6	2.2	3.6	79.4	30.5	73.2
50	64.0	41.3	1.6	16.1	17.4	12.4	1.8	3.0	79.4	14.2	42.7
60	55.9	36.0	1.4	14.0	15.2	10.9	1.6	2.6	79.4	2.4	8.6
70	49.8	32.1	1.3	12.5	13.5	9.7	1.4	2.4	79.4	-6.5	-27.5

Maximum Storage Required (m^3) = 115.4

STORAGE OCCUPIED IN AREA B7

5-YEAR STORM EVENT

Storage Areas on Site		Water Elev. (m) =		93.02	
Location	T/G	INV. (out)	Area (m^2)	Depth (m)	Volume (m^3)
Above DICB#4	92.67	91.55	182.31	0.35	35.3
				Total	35.3

Storage Available (m^3) = 35.3
Storage Required (m^3) = 34.4

100-YEAR STORM EVENT

Storage Areas on Site		Water Elev. (m) =		93.37	
Location	T/G	INV. (out)	Area (m^2)	Depth (m)	Volume (m^3)
Above DICB#4	92.67	91.55	278.34	0.70	115.6
				Total	115.6

Storage Available (m^3) = 115.6
Storage Required (m^3) = 115.4

$S_2 = S_1 + ((H_2-H_1)/3)*(A_{S1}+A_{S2}+(A_{S1}*A_{S2})^{0.5})$

Swale - 5/100 -Year Rainfall Storage Volumes

ELEV. (m)	H1 (Distance Of A1 From Top of Grate - m)	A1 (Surface Area of Ponding Water At H1 - m^2)	H2 (Distance Of A2 from A1 - m)	A2 (Surface Area of Ponding Water At H2 - m^2)	(H2-H1)/3	A1+A2+(A1*A2)^0.5	S1 (Volume at H1 - m^3)	S2 (Volume at H2 - m^3)
92.67	0.00	0.00	0.05	27.09	0.0167	27.09	0.00	0.45
92.72	0.05	27.09	0.10	56.10	0.0167	122.17	0.45	2.49
92.77	0.10	56.10	0.15	88.53	0.0167	215.10	2.49	6.07
92.82	0.15	88.53	0.20	124.62	0.0167	318.19	6.07	11.38
92.87	0.20	124.62	0.25	156.61	0.0167	420.93	11.38	18.39
92.92	0.25	156.61	0.30	169.41	0.0167	488.90	18.39	26.54
92.97	0.30	169.41	0.35	182.31	0.0167	527.46	26.54	35.33
93.02	**0.35**	**182.31**	**0.40**	**195.31**	**0.0167**	**566.32**	**35.33**	**44.77**
93.07	0.40	195.31	0.45	208.40	0.0167	605.46	44.77	54.86
93.12	0.45	208.40	0.50	221.59	0.0167	644.88	54.86	65.61
93.17	0.50	221.59	0.55	234.88	0.0167	684.61	65.61	77.02
93.22	0.55	234.88	0.60	248.27	0.0167	724.63	77.02	89.10
93.27	0.60	248.27	0.65	266.75	0.0167	772.36	89.10	101.97
93.32	0.65	266.75	0.70	278.34	0.0167	817.57	101.97	115.59
93.37	**0.70**	**278.34**	**0.75**	**289.02**	**0.0167**	**850.99**	**115.59**	**129.78**
93.42	0.75	289.02	0.80	302.80	0.0167	887.65	129.78	144.57
93.47	0.80	302.80	0.85	316.68	0.0167	929.14	144.57	160.06
93.52	0.85	316.68	0.90	330.66	0.0167	970.93	160.06	176.24
93.57	0.90	330.66	0.95	0.00	0.0167	330.66	176.24	181.75
93.62	0.95		1.00	0.00	0.0167	0.00	181.75	181.75
93.67	1.00		1.05	0.00	0.0167	0.00	181.75	181.75
93.72	1.05		1.10	0.00	0.0167	0.00	181.75	181.75
93.77	1.10		1.15	0.00	0.0167	0.00	181.75	181.75

STORM SEWER DESIGN SHEET

Project: 120 Hearst Way
Project No.: CP-13-0007
Designed By: CJM
Checked By: KP
Date: April 26, 2013

LOCATION				CONTRIBUTING AREA				FLOW			STORM SEWER DESIGN									Confirmation	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
STREET	FROM	TO	AREA ID	AREA "A" (ha)	RUNOFF FACTOR "C"	SECTION CA (ha)	ACC. CA (ha)	TIME OF CONCEN (min)	RAINFALL INTENSITY "I" (mm/hr)	FLOW Q 2.78x(8)x(10) (L/s)	LENGTH (m)	SLOPE (%)	DIA. (mm)	FULL FLOW CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW IN PIPE (min)	TIME OF CONCEN AFT PIPE (min)	FALL IN PIPE SECTION (m)	COMMENTS	Sufficient Velocity	Sufficient Capacity
		CB#3	B4--> B5	0.11	0.83	0.091															
	CB#3	CBMH#2	B4--> B5				0.091	10.00	104.193	26.45	27.0	1.00	300	96.70	1.37	0.33	10.33	0.27		YES	YES
		CBMH#2	B5--> B6	0.07	0.90	0.063															
	CBMH#2	CBMH#1	B5--> B6				0.154	10.33	102.489	43.96	24.0	1.00	300	96.70	1.37	0.29	10.62	0.24		YES	YES
		TRENCH DRAIN	B2--> B3	0.01	0.90	0.009															
	TRENCH	CB#6	B2--> B3				0.009	10.00	104.193	2.61	24.0	1.00	300	96.70	1.37	0.29	10.29	0.24		YES	YES
		CB#6	B3--> B7	0.09	0.90	0.081															
	CB#6	SWALE	B3--> B7				0.090	10.29	102.675	25.69	40.0	0.34	300	56.39	0.80	0.83	11.13	0.14		YES	YES
		ROOF	B1-->B6	0.23	0.90	0.207															
	ROOF	CBMH#1	B1-->B6				0.207	11.13	98.602	56.74	6.0	2.50	300	152.90	2.16	0.05	11.17	0.15		YES	YES
		SWALE	B7-->B6	0.07	0.20	0.014															
	ROOF	CBMHR2	B4/B5-->B1				0.221	11.17	98.387	60.45	14.0	0.43	300	63.41	0.90	0.26	11.43	0.06		YES	YES
		CDS UNIT	B6->EX	0.02	0.56	0.011															
	CDS UNIT	EX MAIN	B6-->EX				0.477	11.43	97.194	128.75	10.0	0.34	375	102.23	0.93	0.18	11.61	0.03	FLOW RESTRICTED TO 79.4 L/s BEFORE OUTLETTING TO EX MAIN	YES	YES

Notes:

Td = Time of Duration (min)
A = 998.071

B = 0.814
C = 6.053

Mannings, n = 0.013

$$Intensity = \left[\frac{A}{(Td + C)^{B}}\right]$$

John Meunier - Hydrovex VHV ICD Curves

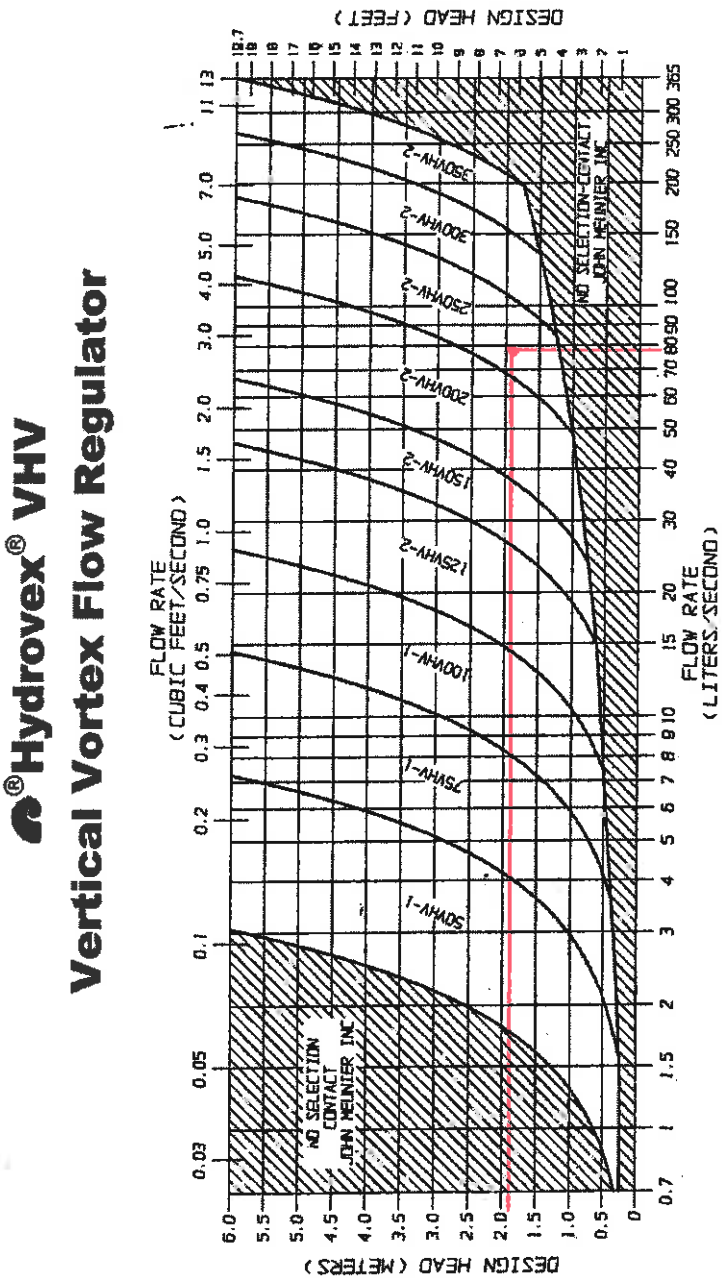
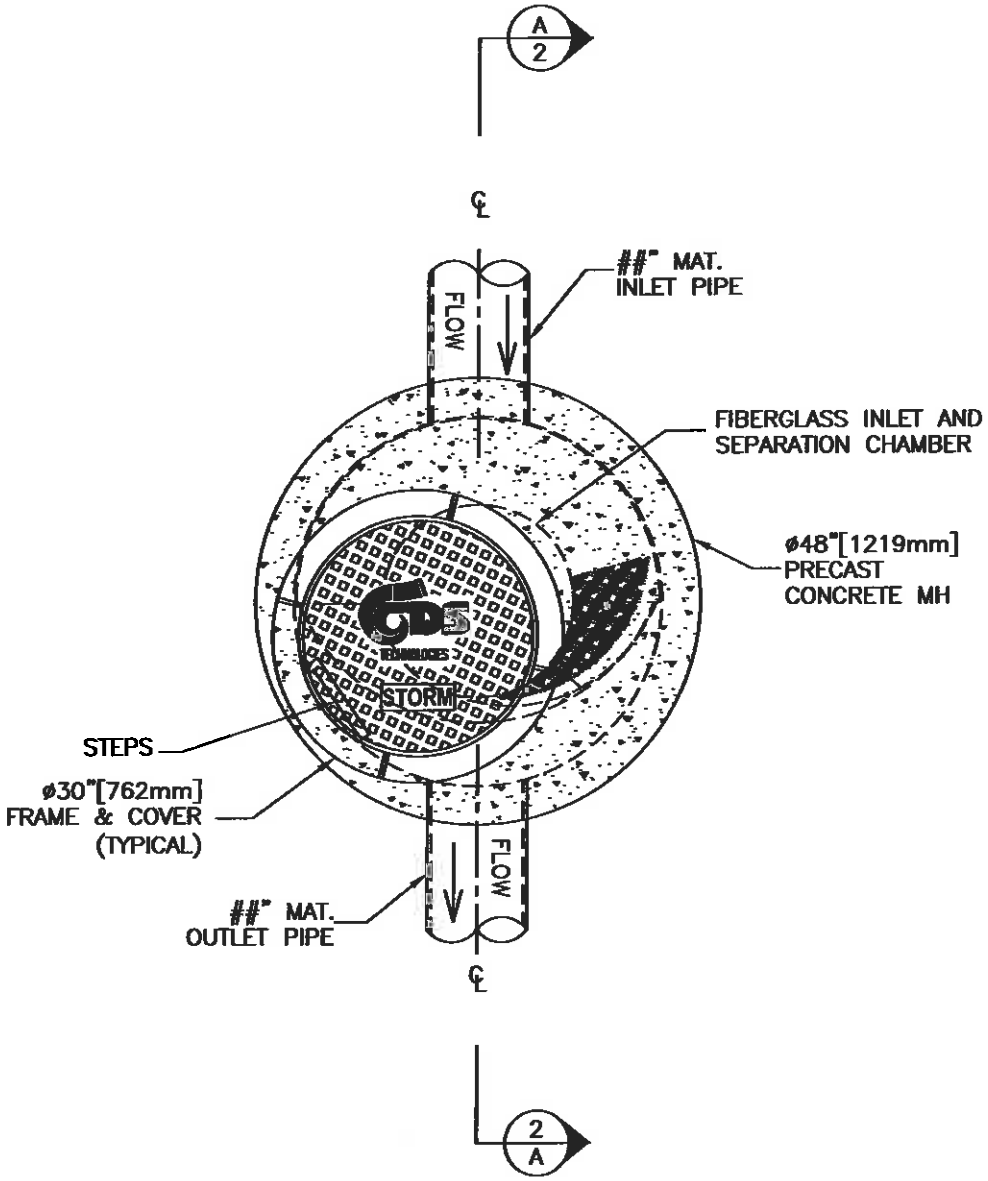


FIGURE 2 - VHV

JOHN MEUNIER

APPENDIX G: CDS Unit

PLAN VIEW

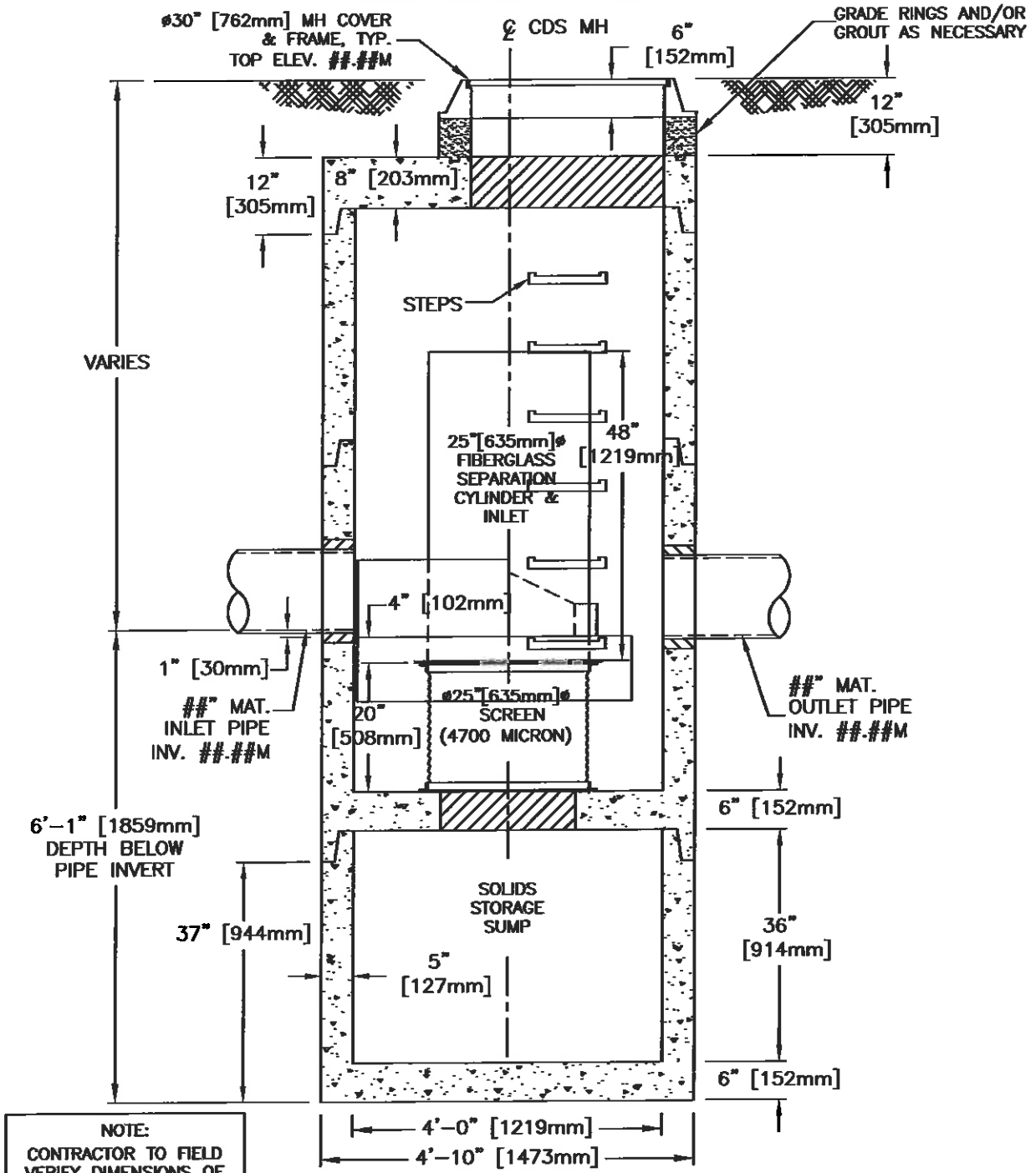


CDS MODEL PMSU20_15_4es
STORMWATER TREATMENT UNIT

CONTECH STORMWATER SOLUTIONS	PROJECT NAME CITY, STATE	JOB# XX-##-###	SCALE 1" = 2'
		DATE ##/##/##	SHEET
		DRAWN INITIALS	1
		APPROV.	

Echelon Environmental 505 Hood Road, Unit 26, Markham, Ontario L3R 5V6 Tel: (905) 948-0000 Fax: (905) 948-0577
CONTECH Stormwater Solutions Inc. 930 Woodcock Road, Suite 101, Orlando, Florida 32803 Tel: (800) 848-9955

SECTION A–A
ELEVATION VIEW



NOTE:
CONTRACTOR TO FIELD VERIFY DIMENSIONS OF OR CONCRETE SECTIONS

CDS MODEL PMSU20_15_4es
STORMWATER TREATMENT UNIT

CONTECH STORMWATER SOLUTIONS

PROJECT NAME
CITY, STATE

JOB#	XX–##–###	SCALE 1" = 2'
DATE	##/##/##	SHEET 2
DRAWN	INITIALS	
APPROV.		

Echelon Environmental 505 Hood Road, Unit 26, Markham, Ontario L3R 5V6 Tel: (905) 948-0000 Fax: (905) 948-0577
CONTECH Stormwater Solutions Inc. 930 Woodcock Road, Suite 101, Orlando, Florida 32803 Tel: (800) 848-9955

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION
BASED ON THE RATIONAL RAINFALL METHOD
BASED ON AN AVERAGE PARTICLE SIZE OF 75 MICRONS
120 Hearst Way
Ottawa, ON

Area	0.64	ha	Rainfall Station #	215	
c =	0.77		Particle size d50 =	75	micron
Tc	10	minutes	CDS Treatment Capacity	20	l/s
CDS Model	2015				
	CDS20_15_4es				

Rainfall Intensity[1] (mm/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (l/s)	Treated Flowrate (l/s)	Operating Rate (%)	Removal Efficiency (%)	Incremental Removal (%)
0.5	9.2%	9.2%	0.7	0.7	3.5	97.9	9.0
1.0	10.6%	19.8%	1.4	1.4	6.9	96.9	10.3
1.5	9.9%	29.7%	2.1	2.1	10.4	95.9	9.5
2.0	8.4%	38.1%	2.7	2.7	13.8	94.9	8.0
2.5	7.7%	45.8%	3.4	3.4	17.3	93.9	7.2
3.0	5.9%	51.7%	4.1	4.1	20.7	92.9	5.5
3.5	4.4%	56.1%	4.8	4.8	24.2	91.9	4.0
4.0	4.7%	60.7%	5.5	5.5	27.6	90.9	4.2
4.5	3.3%	64.0%	6.2	6.2	31.1	89.9	3.0
5.0	3.0%	67.1%	6.8	6.8	34.6	89.0	2.7
6.0	5.4%	72.4%	8.2	8.2	41.5	87.0	4.7
7.0	4.4%	76.8%	9.6	9.6	48.4	85.0	3.7
8.0	3.5%	80.3%	11.0	11.0	55.3	83.0	2.9
9.0	2.8%	83.2%	12.3	12.3	62.2	81.0	2.3
10.0	2.2%	85.3%	13.7	13.7	69.1	79.0	1.7
15.0	7.0%	92.3%	20.5	19.8	100.0	67.7	4.7
20.0	4.5%	96.9%	27.4	19.8	100.0	50.8	2.3
25.0	1.4%	98.3%	34.2	19.8	100.0	40.6	0.6
30.0	0.7%	99.0%	41.1	19.8	100.0	33.9	0.2
35.0	0.7%	99.7%	47.9	19.8	100.0	29.0	0.2
40.0	0.7%	100.3%	54.8	19.8	100.0	25.4	0.2
45.0	0.7%	101.0%	61.6	19.8	100.0	22.6	0.2
50.0	0.7%	101.7%	68.5	19.8	100.0	20.3	0.1
							86.5
						Removal Efficiency Adjustment[2] =	6.5%
						Predicted Net Annual Load Removal Efficiency =	**80.0%**
						Predicted % Annual Rainfall Treated =	96.5%

1 - Based on 42 years of hourly rainfall data from Canadian Station 6105976, Ottawa ON
2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes

CDS Stormwater Treatment Unit Performance:

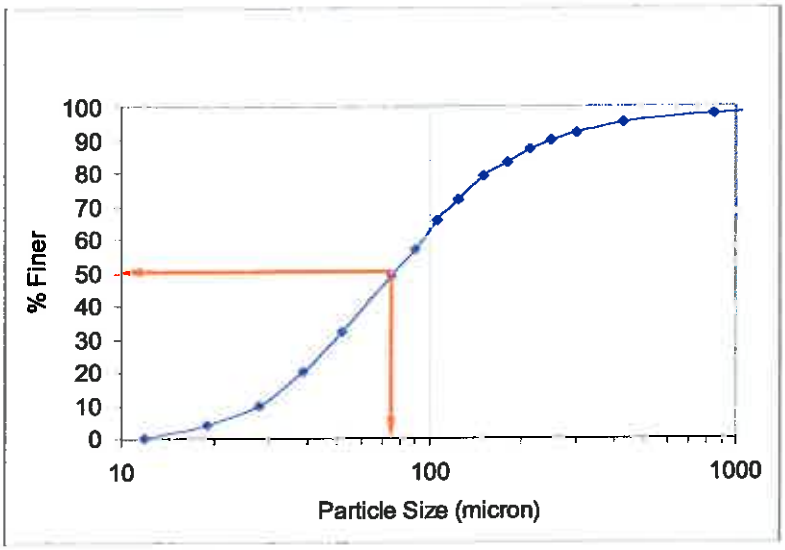


Figure 1. PSD for d_{50} of 75-µm

Removal Efficiencies – CDS Unit Testing Under Various Flow Rates

The following performance curves are based on controlled tests using a full scale CDS Model PMSU20_20 (2400 micron screen), 1.1-cfs (494-gpm) capacity treatment unit.

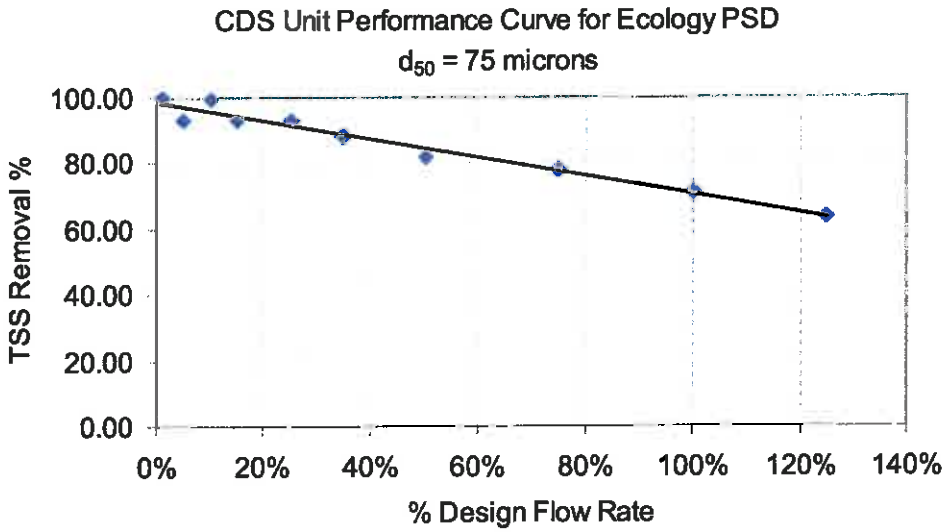


Figure 2. CDS Unit Performance for Specific PSDs
CDS Unit Performance Testing Protocol

Tests were conducted using two types of sand – U.S. Silica OK-110 and UF sediment (a mixture of U.S. Silica sands). Particle size gradations for the two types of sand are illustrated in Figure 3.

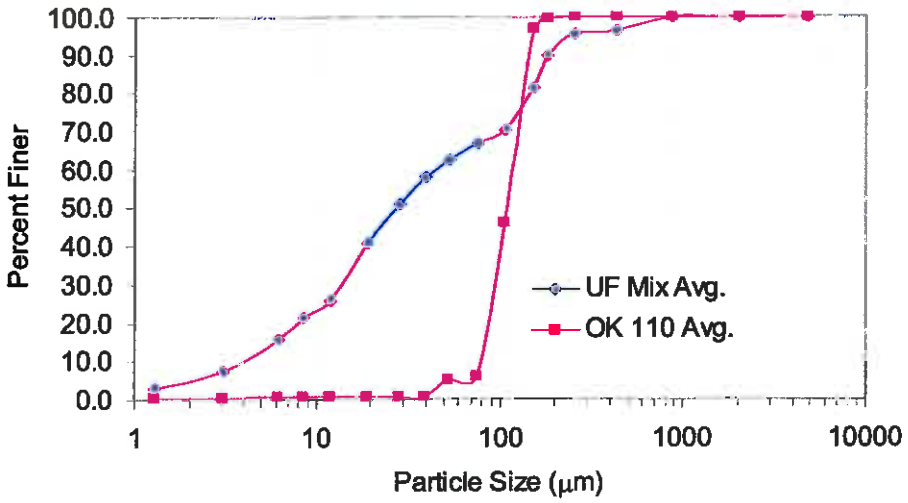


Figure 3. Test material particle size gradations - CDS Model PMSU20_20 test
(Analytical results provided by MACTEC Engineering and Consulting Inc. FL
ASTM D-422 with Hydrometer method)

The influent concentration (mg/L) for the test was set at 200-mg/L and verified from slurry feeding. Effluent samples were taken at fixed time intervals during each test run at various flow rates. The composite effluent samples were sent to Test American Analytical Testing Lab, OR for TSS analysis (ASTM D3977-97).

TSS removal rates for the specified PSD (d_{50} of 75 μm) under various flow rates were calculated from Figure 2 shows the removal efficiency as a function of operating flow rate. This removal efficiency curve as a function of percent flow rate can be applied to all CDS unit models.

APPENDIX H: City of Ottawa Checklist

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 F
☐ Plan showing the site and location of all existing services.	Lot, Grading and Drainage Plan Site Servicing Plan
☐ Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	1.0 Project Description
☐ Summary of Pre-consultation Meetings with City and other approval agencies.	3.0 Pre-Consultation Summary
☐ 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.	1.0 Project Description, 2.0 Background Studies and 3.0 Pre-Consultation Summary
☐ Statement of objectives and servicing criteria.	1.0 Project Description and 3.0 Pre-Consultation Summary

☐ Identification of existing and proposed infrastructure available in the immediate area.	4.0 Existing Services
☐ 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 and Drainage 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 and Drainage 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 by SPL Consultants
☐ All preliminary and formal site plan submissions should have the following information: o Metric scale o North arrow (including construction North) o Key plan o Name and contact information of applicant and property owner o Property limits including bearings and dimensions o Existing and proposed structures and parking areas o Easements, road widening and rights-of-way o Adjacent street names	Lot Grading and Drainage 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	5.1 Water Servicing
☐ 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.	5.1 Water Servicing
☐ 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	5.1 Water Servicing
☐ 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	5.1 Water Servicing

hydrants) including special metering provisions.	
☐ 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.	5.1 Water Servicing
☐ 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).	5.2 Sanitary Servicing
☐ 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.	N/A
☐ 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	6.0 Stormwater Management

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.	
☐ Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	6.4 SWMF Quality Control
☐ Description of the stormwater management concept with facility locations and descriptions with references and supporting information.	6.3 SWMF
☐ 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.	3.0 Pre-Consultation Summary
☐ 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 G
☐ Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	7.0 Sediment and Erosion Control
☐ 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 G
☐ Any proposed diversion of drainage catchment areas from one outlet to another.	N/A
☐ Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater	6.0 Stormwater Management

management facilities.	
☐ 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.	N/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 and Drainage 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	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.	N/A
☐ All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario	All are stamped