Servicing & Stormwater Management Report
Wildpine Court Condominiums
Part of Lot 24, Concession 11
Geographic Township of Goulbourn
City of Ottawa

D.M.E. Project No. 2949

Prepared for:
Wildpine Holdings Inc.

Prepared by:

David McManus Engineering
A Trow Global Company

David McManus Engineering
100-2650 Queensview Drive
Ottawa, Ontario K2B 8H6

November 10, 2010

DME

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1.0 INTRODUCTION

David McManus Engineering was appointed by Wildpine Holdings Inc. to provide engineering services for the preparation of site grading, servicing and stormwater management design for the proposed development. The site is located along Wildpine Court just northeast of Stittsville Main Street within the City of Ottawa. *Figure 1* shows the site location. This Servicing and Stormwater Management Report is prepared in support of the Site Plan Application for the development.

2.0 EXISTING CONDITIONS

The site has a total area of 0.83 hectares and is bound by Wildpine Court to the north, by Poole Creek to the east, by a school playground to the south and by commercial buildings to the west. The site is currently undeveloped and consists of grass and some treed areas.

3.0 PROPOSED DEVELOPMENT

The proposed development consists of two 4 - storey condominium buildings with a total of 64 units connected by an underground parking garage. Surface parking is also proposed as a part of the proposed development. *Figure 2* shows the proposed development.

4.0 WATER SERVICING

A 152mm diameter water service is proposed to service the condominium buildings which will connect to the existing 200mm diameter watermain along Wildpine Court.

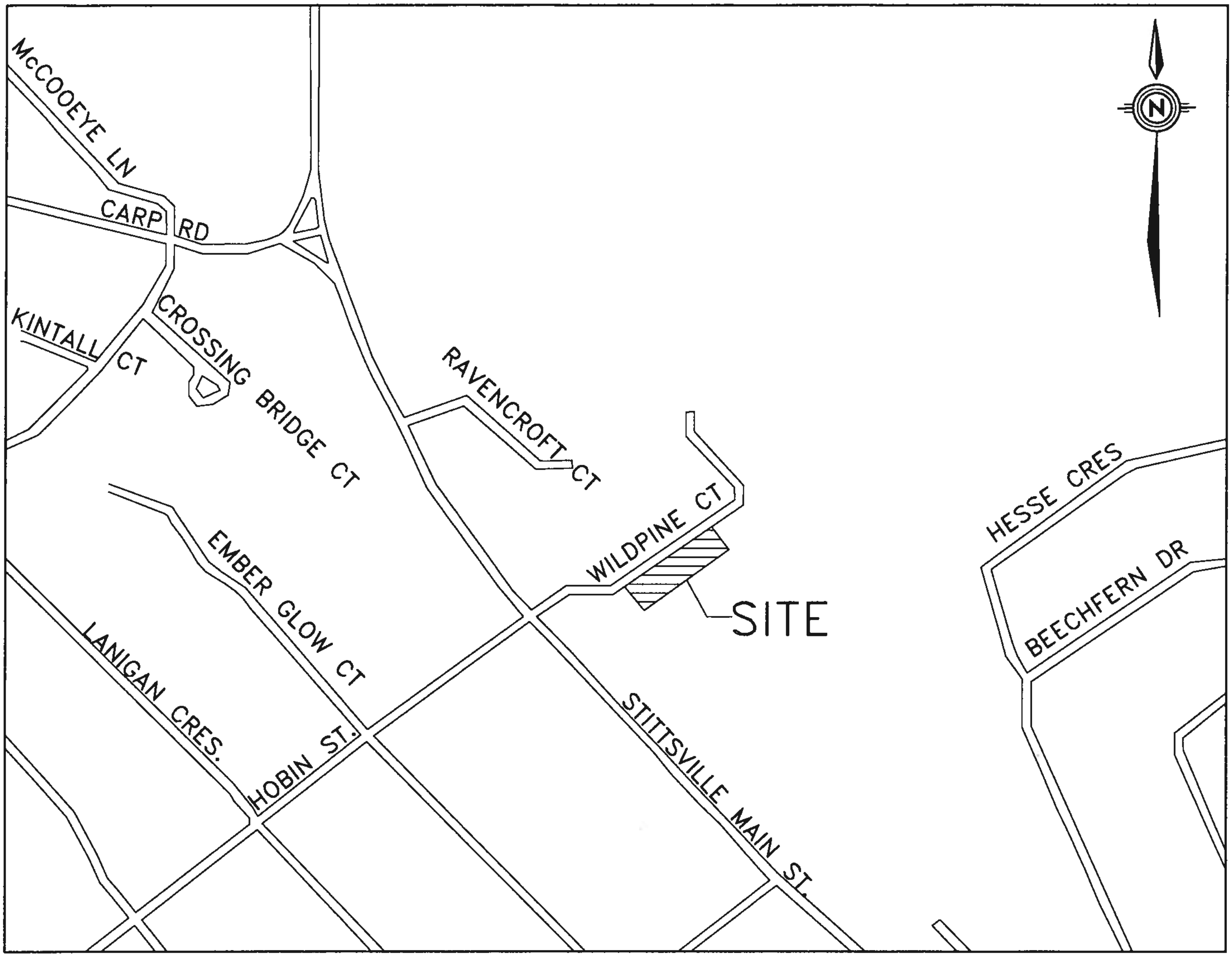
4.1 Domestic Water Demand

Domestic water demands for the proposed building have been estimated using the City of Ottawa Water Distribution Design Guidelines. These demands are as follows:

Total Units = 64
Persons/Unit = 1.8
Total Population = 1.8 x 64 = 115

Average Daily Demand:

0.35 m^3/capita day
0.35 m^3/capita day x 115 persons = 40.3 m^3/day = 0.47 L/s = 6.2 igpm



DME FILE #2949

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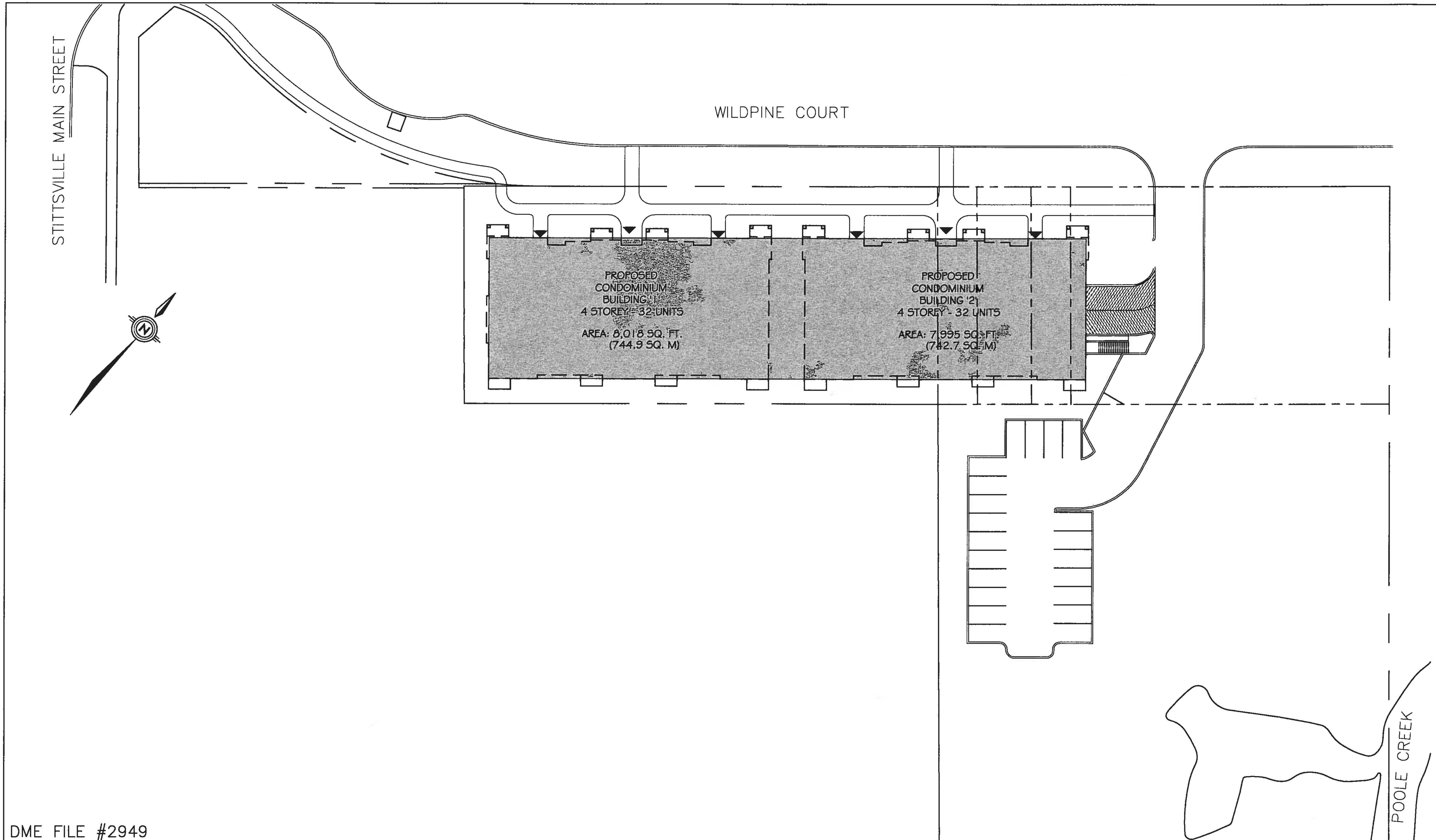
2 WILDPINE COURT
CITY OF OTTAWA, ONTARIO
FIGURE 1 – KEY MAP



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2 WILDPINE COURT
CITY OF OTTAWA, ONTARIO
FIGURE 2 – SITE MAP

Maximum Daily Demand:

2.5 x Average Daily Demand
2.5 x 40.3 m^3/day = 100.8 m^3/day = 1.17 L/s = 15.4 igpm

Maximum Hourly Demand:

2.2 x Maximum Daily Demand
2.2 x 100.8 m^3/day = 221.8 m^3/day = 2.57 L/s = 33.9 igpm

4.2 Fire Flow Demand

An existing fire hydrant is located within the Wildpine Court right-of-way fronting the property and can provide fire protection for the proposed building. Hydrant flow data has been obtained from the City of Ottawa and is included in Appendix B. This data shows that a flow of 2,140 igpm is available at the MOE's minimum residual pressure requirement of 140 kPa. Fire hydrant data is provided in Appendix B.

The buildings will be sprinklered and a fire flow requirement of 117 L/s (1,540 igpm) has been calculated as per the Fire Underwriter's Survey. Fire flow calculations are provided in Appendix B.

4.3 Total Demand

Per the City of Ottawa design guidelines, the system shall be designed to meet the maximum daily demand plus fire flow. The total of these flows is 118.17 L/s (1,559.6 igpm). This is within the flow of 2,140 igpm that is available at the hydrant directly in front of the building. Therefore, the existing system will provide adequate domestic and fire flow to the proposed buildings.

5.0 SANITARY SERVICING

The site is to be serviced with a proposed 200mm diameter sanitary service which will outlet to an existing 250mm diameter sanitary sewer within the Wildpine Court road allowance.

The sanitary sewage design flow for the site has been calculated as follows using the City of Ottawa Sewer Design Guidelines:

Area of Site = 0.83
Total number of units = 64
Population = 1.8 persons per unit (average apartment)
Total population = 1.8 x 64 = 116

Peaking Factor = $1 + 14/(4 + (P)^{0.5})$ P = Population in 1000's
(Minimum of 2.0, Maximum of 4.0)

Peak Population Flow (L/s) = Total Population x 350 L/person/day x Peaking Factor/86,400 sec/day

Peak Extraneous Flow (L/s) = Cumulative Area (ha) x 0.28 L/ha/s

Peak Design Flow (L/s) = Peak Population Flow + Peak Extraneous Flow

Therefore,

Peaking Factor = $1 + 14/(4+(0.116)^{0.5})$
= 4.23 (Greater than 4.0)
= 4.0

Peak Design Flow = 116 x 350 x 4.0/86,400 + 0.83 x 0.28
= 1.88 L/s + 0.23 L/s
= **2.11 L/s**

A medium density building is allowable according to the zoning for the site from the City Official Plan. Based on a maximum medium density population of 449 persons (540 persons/net ha), the maximum design flow for the site is **7.51 L/s**. Therefore, there should be no issue outletting sanitary flows from the site to the City sanitary sewer system. However, there has been multiple studies and reports produced on the sanitary sewer systems within this area.

A report by Robinson Consultant Inc. entitled "Stittsville Sanitary Sewer System Evaluation of System Capacity dated December 1999" indicated that there were capacity issues with three main sections of sewer downstream of the subject site. These sections of sewer are:

- Main Street Trunk Sewer (along Wintergreen Drive and Carbery Drive)
- Stittsville Trunk Sewer (last section of sewer on Abbott Street upstream of the Iber intersection).
- Stittsville Trunk Sewer (sewer from Iber Road intersection to Hazeldean Pump Station).

A summary of peak flows and capacities for the system, "Table 3 – Summary of Flows and Capacities: Planned Conditions" from the Robinson report is provided in Appendix C. The subject site has been considered in the analysis of the sanitary system and is located in Area 25 as shown in a plan from the Robinson report, also provided in Appendix C. The Robinson report also recommended that sections of the existing sanitary sewer system be monitored in order to determine if forecasted flows from future development was conservative. Ainley Group Consulting Engineers subsequently produced a report based on the results of the flow monitoring entitled "City of Ottawa, Stittsville Flow Monitoring dated September 2003". The flow monitoring indicated that the calculated flows for the existing sewers were conservative. One of the flow monitoring locations was along Wintergreen Drive just east of Main Street. The measured peak flows were approximately 60 L/s as compared to the calculated flow of 271 L/s from the Robinson report. Another flow monitoring location was east of the Iber Road and Abbott Street intersection. Peak flows at this location were measured at approximately 200 L/s in comparison to calculated flows of 618 L/s from the Robinson report.

Given that the actual flows in the existing City sanitary sewer system servicing the Stittsville area are much lower than the estimated flows, there should be no capacity issues with the existing sanitary sewer system to service the subject development. In addition, it is planned to construct a Kanata West Pump Station which would divert a portion of the Main Street Trunk Sewer system flows. This would further alleviate any potential capacity issues with the Stittsville Sanitary Sewer system.

Therefore, it is our professional opinion that there is sufficient capacity within the existing City sanitary sewer system to service the subject development.

6.0 STORMWATER MANAGEMENT

The Rideau Valley Conservation Authority has indicated that both quality and quantity control of stormwater is required. Therefore, quantity control of stormwater is required to control post-development flows to pre-development conditions. A quality target of 80% removal of total suspended solids will be provided.

6.1 Existing and Proposed Drainage

The site currently sheet drains from west to east and outlets to Poole Creek along the eastern property limit.

Some areas of the site will remain unchanged as grassed area, such as the areas near the intersection of Main Street and Wildpine Court as well as the area within the 30m setback of Poole Creek. The area near Main Street will outlet to an existing catchbasin via new catchbasins and storm sewer. The unaltered area adjacent to Poole Creek will sheet flow towards the creek. In both instances the drainage patterns and outlet locations will mimic existing conditions.

The remainder of the proposed development will be serviced by storm sewers (200mm, 250mm and 300mm diameter). The proposed storm sewers will outlet to the existing 375mm diameter storm sewer along Wildpine Court which outlets to Poole Creek.

6.2 Stormwater Quantity Control

Quantity control of stormwater will be provided in order to restrict flows from the developed areas to pre-development levels. The site is divided into 5 drainage areas (see drawing 2949-SWM for details). Stormwater will be stored on the roof of the buildings, within storm sewers and on the surface within the parking areas around catchbasins. Each drainage area is described briefly below:

Area A1

- Runoff will be controlled by an inlet control device (ICD) located in the outlet pipe of STM MH 201.
- Storage will be provided in the parking lots and pipes.

Area A2

- Roof drains will control rooftop runoff to a rate of 40 L/s/ha.
- Storage will be provided across the rooftop to a maximum depth of 5 mm.

Area A3

- No flow control will be employed for this area since Areas A1 and A2 have excess storage and have been over-controlled to make up for the free-flow from Area A3.
- Since there will be no flow control for Area A3, the 100 year flow has been used as the release rate for Area A3.

Area B1

- Area B1 is almost entirely landscaped. A small area of sidewalk increases the runoff coefficient for this area to 0.24.
- Area B1 will be controlled by an ICD located in the outlet pipe of CBMH 203.
- The storage for this area is provided within the 250mm storm sewers.

Area C1

- Area C1 will remain unchanged as grassed area per existing conditions.
- No flow control. Area will sheet drain to Poole Creek, as in the pre-development condition.

The 5 year, pre-development release rate for the site is 48.5 L/s and the post-development release rate is calculated as 47.6 L/s. Therefore, the post-development release rate will not exceed the pre-development levels. A summary of the storage required, storage provided, and release rate for each drainage area is provided in Table 6.1 below. Refer to Tables 1 – 6 in Appendix D for further information regarding the storage, release rates and inlet control devices.

Table 6.1

Drainage Area	Area (ha)	Weighted Runoff Coefficient	Storage Required (m^3)		Storage Provided (m^3)		Release Rate (L/s)	Outlet
			5 Year	100 Year	5 Year	100 Year	5 Year	
A1	0.16	0.64	15.5	47.1	30.7	87.7	7.0	Stormceptor
A2	0.18	0.90	30.8	74.8	34.0	88.7	7.2	Stormceptor
A3	0.03	0.43	0.0	0.0	0.0	0.0	6.3	Stormceptor
B1	0.09	0.24	0.5	4.7	10.8	10.8	5.1	Existing CB
C1	0.38	0.20	N/A	N/A	N/A	N/A	22.0	Free Flow
TOTAL:	**0.84**	**0.44**	**46.8**	**126.6**	**75.5**	**187.2**	**47.6**	

6.3 Stormwater Quality Control

As indicated previously, a quality target of 80% removal of total suspended solids will be provided. Quality control of stormwater will be provided through the installation of a Stormceptor STC 750 unit. This unit will provide 83% removal of total suspended solids for the treated areas (A1, A2 & A3) given the site size and development conditions. Details of the stormceptor unit are provided in Appendix E.

Drainage Area B1 will not be controlled by the Stormceptor unit because of grading constraints. In the post-development condition, the runoff coefficient for this area increases from 0.20 to 0.24 and the majority of the area is landscaped per the existing condition. Runoff from Area B1 will be collected by grassed swales which will provide some level of quality control and will promote infiltration.

As stated previously, drainage area "C1" will continue to sheet flow to Poole Creek per existing conditions. Therefore, quality control will not be required for this area.

7.0 EROSION AND SEDIMENT CONTROL MEASURES

7.1 Temporary Measures

Temporary erosion and sediment control measures will be implemented during construction such as straw bales and silt fencing. Erosion and Sediment Control measures to be installed and maintained during construction are shown on the Grading Plan (drawing 2949-GR1). The straw bales and silt fencing should be inspected regularly, and especially after every rain event to determine maintenance, repair or replacement requirements. These measures will be installed prior to the commencement of construction and maintained in good order until vegetation has been established.

7.2 Permanent Measures

Best Management Practices shall be implemented as follows to reduce the transport of sediments and promote infiltration and on site ground water recharge.

- Sheet flow of existing landscaped areas to promote infiltration and match existing conditions
- Construction of swales at 1.5% slopes to promote groundwater infiltration.

8.0 CONCLUSIONS & RECOMMENDATIONS

The development can be adequately serviced with sewer and water by the existing and proposed infrastructure in the vicinity of the site.

The stormwater quantity control measures proposed will limit the release rate to pre-development conditions. A Stormceptor unit will be installed to provide the necessary quality control of stormwater.

Prepared by: LICENSED PROFESSIONAL ENGINEER A. C. FINNSON 100149736 PROVINCE OF ONTARIO ISSUED FOR COMMENT Nov. 10, 2010

Andrew Finnson, P.Eng.
Project Engineer

Reviewed by:

Cara Ruddle, P.Eng.
Project Manager

APPENDIX A

Development Servicing Study Checklist

4.1 General Content

☒ Executive Summary (for larger reports only).

Comments: n/a

☒ Date and revision number of the report.

Comments: October 26, 2010

☒ Location map and plan showing municipal address, boundary, and layout of proposed development.

Comments: Refer to Figures 1 & 2

☒ Plan showing the site and location of all existing services.

Comments: Refer to Site Servicing Plan (2949 S1)

☒ 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.

Comments: Refer to Planning Rationale

☒ Summary of Pre-consultation Meetings with City and other approval agencies.

Comments: A pre-consultation meeting with the City took place on December 7, 2009.

☒ 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.

Comments: Design criteria are in conformance with City of Ottawa and MOE standards

☒ Statement of objectives and servicing criteria.

Comments: Refer to Section 1.0

☒ Identification of existing and proposed infrastructure available in the immediate area.

Comments: Refer to Site Servicing Plan (2949 S-1) and Sections 4.0, 5.0 and 6.0

- [x] 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).

Comments: *Refer to Sections 2.0, 6.0 and 6.1*

- [x] 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.

Comments: *Refer to Site Grading Plan (2949-GR-1)*

- [x] 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.

Comments: *n/a*

- [x] Proposed phasing of the development, if applicable.

Comments: *n/a*

- [x] Reference to geotechnical studies and recommendations concerning servicing.

Comments: *a Geotechnical report (PGO 333-3) has been prepared by Paterson Group, dated February 25, 2010*

- [x] All preliminary and formal site plan submissions should have the following information:

  - [x] Metric scale
  - [x] North arrow (including construction North)
  - [x] Key plan
  - [x] Name and contact information of applicant and property owner
  - [x] Property limits including bearings and dimensions
  - [x] Existing and proposed structures and parking areas
  - [x] Easements, road widening and rights-of-way
  - [x] Adjacent street names

Comments:

4.2 Development Servicing Report: Water

☒ Confirm consistency with Master Servicing Study, if available

Comments: *n/a*

☒ Availability of public infrastructure to service proposed development

Comments: *Refer to Section 4.0*

☒ Identification of system constraints

Comments: *Refer to Appendix A, hydrant data*

☒ Identify boundary conditions

Comments: *Refer to Section 4.0*

☒ Confirmation of adequate domestic supply and pressure

Comments: *Refer to Section 4.1*

☒ 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.

Comments: *Refer to Section 4.2 and Appendix A*

☒ 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.

Comments: *n/a*

☒ Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design

Comments: *n/a*

☒ Address reliability requirements such as appropriate location of shut-off valves

Comments: *n/a*

☒ Check on the necessity of a pressure zone boundary modification.

Comments: *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

Comments: *Refer to hydrant data in Appendix A and Section 4*

☒ 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.

Comments: *n/a Only a single service proposed. Refer to Section 4.0 & Site Servicing Plan for further information*

☒ 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.

Comments: *n/a*

☒ Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.

Comments: *water demands are calculated based on City of Ottawa design guidelines*

☒ Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.

Comments: *n/a. only a single service. Hydrant data used for pressure and flow verification. See Appendix A*

4.3 Development Servicing Report: Wastewater

☒ 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).

Comments: *Refer to Section 5.0*

☒ Confirm consistency with Master Servicing Study and/or justifications for deviations.

Comments: *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.

Comments: *n/a. Extraneous flows calculated based on City of Ottawa criteria*

☒ Description of existing sanitary sewer available for discharge of wastewater from proposed development.

Comments: *Refer to Section 5.0*

☒ 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)

Comments: *Refer to Section 5.0*

☒ Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.

Comments: *n/a*

☒ Special considerations such as contamination, corrosive environment etc.

Comments: *n/a*

4.4 Development Servicing Report: Stormwater

☒ Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)

Comments: *Refer to Section 6.1*

☒ Analysis of available capacity in existing public infrastructure.

Comments: *n/a Post development flows will be controlled to 5 year, pre-development levels*

☒ A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.

Comments: *Refer to drawings 2949-GR1, 2949-SWM1*

☒ 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.

Comments: *Runoff will be controlled to 5 year pre development level. Refer to Section 6.2*

☒ Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.

Comments: *An enhanced level of protection will be provided. Refer to section 6.3, table 6.1 and Appendices C and D*

☒ Description of the stormwater management concept with facility locations and descriptions with references and supporting information.

Comments: *Refer to Section 6.0 & drawing 2949-SWM1*

☒ Set-back from private sewage disposal systems.

Comments: *n/a*

☒ Watercourse and hazard lands setbacks.

Comments: *Refer to drawing 2949-SWM1*

☒ Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.

Comments: *Pre-consultation meeting with MOE will take place after initial submittal to the City. Pre-consultation discussions were held with conservation authority.*

☒ Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.

Comments: *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).

Comments: *Refer to Section 6.2 and Tables 2-6 in Appendix C*

☒ Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.

Comments: *Poole Creek is identified in the report and plans. No development will take place within the setbacks.*

☒ 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.

Comments: *Refer to Appendix C and Table 6.1*

☒ Any proposed diversion of drainage catchment areas from one outlet to another.

Comments: *n/a*

☒ Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.

Comments: *Refer to drawings 2949-S1, 2949-SWM-1 and Appendix C*

☒ 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.

Comments: *n/a*

☒ Identification of potential impacts to receiving watercourses

Comments: *Quantity control and Quality control are proposed*

☒ Identification of municipal drains and related approval requirements.

Comments: *n/a*

☒ Descriptions of how the conveyance and storage capacity will be achieved for the development.

Comments: *refer to Section 6 and Appendix C*

☒ 100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.

Comments: *refer to Drawing 2949-GR1*

☒ Inclusion of hydraulic analysis including hydraulic grade line elevations.

Comments: *refer to Appendix C*

☒ Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.

Comments: *Refer to Section 7 and Drawing 2949-GR1*

☒ 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.

Comments: *Refer to Drawing 2949-GR1*

☒ Identification of fill constraints related to floodplain and geotechnical investigation.

Comments: *No development will take place within Poole Creek setbacks. DME will consult with conservation authority on fill constraints.*

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:

☒ 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.

Comments: *No development will take place within Poole Creek setbacks*

☒ Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.

Comments: *A Certificate of Approval should not be required for this site.*

☒ Changes to Municipal Drains.

Comments: *n/a*

☒ Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)

Comments: *n/a*

4.6 Conclusion Checklist

☒ Clearly stated conclusions and recommendations

Comments: *refer to section 8.0*

☒ 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.

Comments: *n/a*

☒ All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario

Comments: *Reports and Drawings are signed*

APPENDIX B

Water Servicing Information

Andrew Finnson

From: Kevin Murphy
Sent: January 21, 2010 9:30 AM
To: Andrew Finnson
Subject: FW: 2 Wildpine Court - Hydrant Data

Wildpine @ Stittsville Main.pd...

-----Original Message-----
From: Crowder, Murray [mailto:Murray.Crowder@ottawa.ca]
Sent: Thursday, January 21, 2010 9:08 AM
To: Kevin Murphy
Subject: RE: 2 Wildpine Court - Hydrant Data

` Kevin Murphy
Company: David McManus Engineering Ltd.
Tel: 225-1929 x281
Fax: 225-7330
Location: Wildpine @ Stittsville Main
Request_dt: 10-01-21-08:57:21
Email: kmurphy@dmel.on.ca

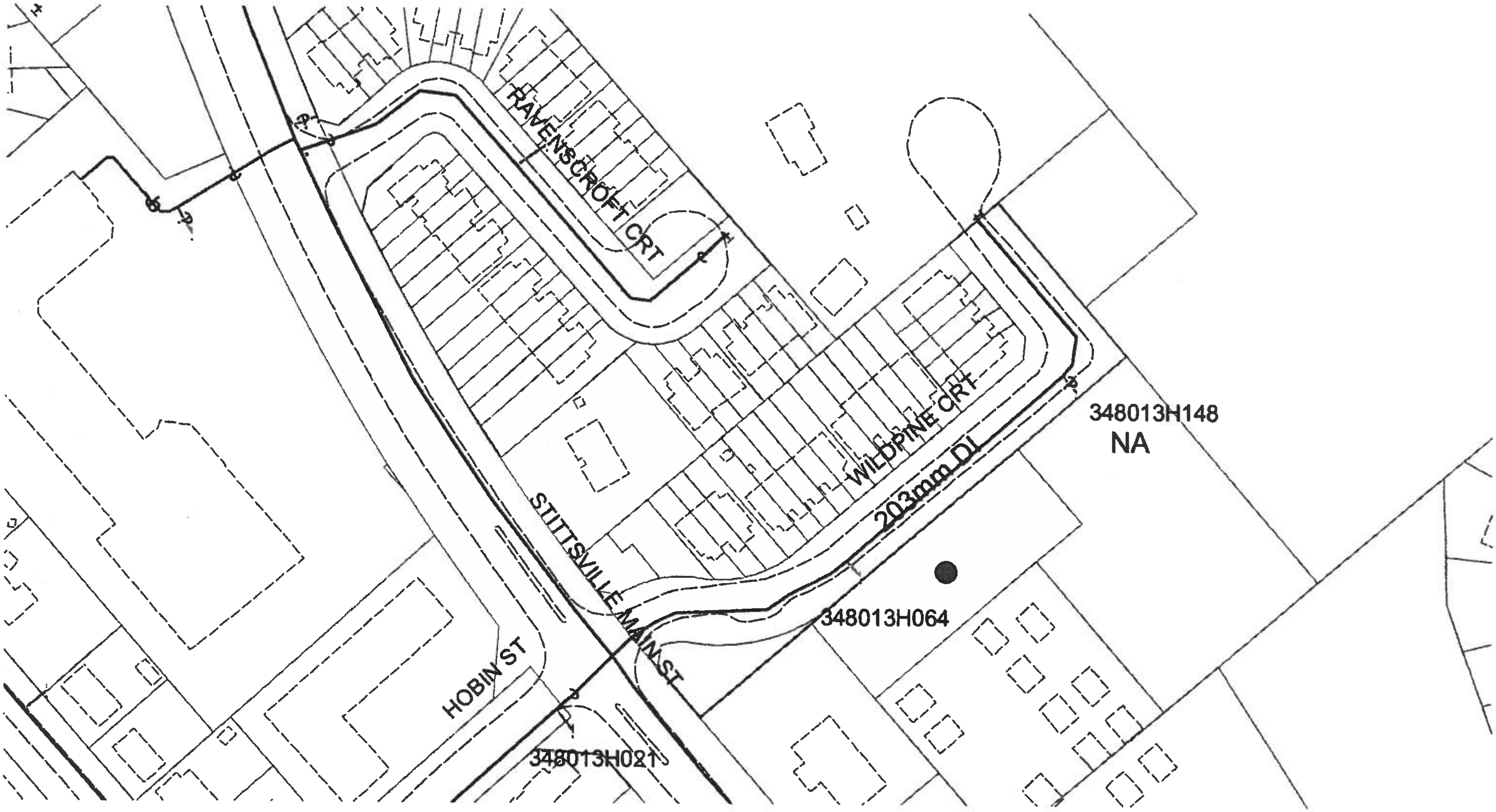
Inspection Date	Flow Hydrant	Residual Hydrant	Pressure (psi) Static	Dynamic	Pitot	Flow (igpm) actual	@ 20 psi
2009/06/18	4813064	4813021	58	>50	48	970	2251
2009/06/18	4813021	4813024	56	>48	46	950	2140

Murray Crowder
Technical Support, Drinking Water Services Infrastructure Services and Community Sustainability City of Ottawa
951 Clyde Avenue, Ottawa, On K1Z 5A6
Mail Code 06-65
Tel: (613) 580-2424 x 22231
Fax: (613) 728-4183
e-mail: murray.crowder@ottawa.ca

-----Original Message-----
From: Kevin Murphy [mailto:kmurphy@dmel.on.ca]
Sent: January 20,2010 4:30 PM
To: Crowder, Murray
Subject: 2 Wildpine Court - Hydrant Data

Hi Murray,
I'm hoping that you are able to assist me. I am looking for hydrant information in the vicinity of Wildpine Court (just off of Stittsville Main Street) in Stittsville (see attached location plan).
Any information you have in this area is appreciated.
Regards,
Kevin

Kevin L. Murphy, P.Eng.
David McManus Engineering Ltd.
400 - 30 Camelot Drive, Nepean, ON, K2G 5X8
Tel: (613) 225-1929 ext 281 | Fax: (613) 225-7330


RAVENSCROFT CRT
WILDPINE CRT
203mm DI
348013H148
NA
348013H064
STITTSVILLE MAIN ST
HOBIN ST
348013H021

Fire Flow Design Sheet
2 Wildpine Court
City of Ottawa
DME Project #2949
Apr 14 2010

DME
David McManus Engineering
A Trow Global Company

1. An estimate of the Fire Flow required for a given fire area may be estimated by: $F = 220\,C\sqrt{A}$

F = required fire flow in litres per minute
C = coefficient related to the type of construction
1.5 for wood construction (structure essentially combustible)
1.0 for ordinary construction (brick or other masonry walls, combustible floor and interior)
0.8 for noncombustible construction (unprotected metal structural components, masonry or metal walls)
0.6 for fire-resistive construction (fully protected frame, floors, roof)
A = total floor area in square metres (including all storeys, but excluding basements at least 50% below grade)

A = 6000 m^2
C = 0.8
F = 13632.9 L/min

rounded off to 14,000 L/min (min value of 2000 L/min)
Assumption: Building is composed of a two 4-storey structures with concrete slab floors.

2. The value obtained in 1. may be reduced by as much as 25% for occupancies having a low contents fire hazard.

Non-combustible	-25%
Limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Burning	25%

Reduction due to low occupancy hazard 0% x 14,000 = 14,000 L/min

3. The value obtained in 2. may be reduced by as much as 75% for buildings equipped with automatic sprinkler protection.

Non-combustible c/w Automatic Sprinkler System	-75%
Combustible c/w Automatic Sprinkler System	-50%
No Automatic Sprinkler System	0%

Reduction due to Sprinkler System -75% x 14,000 = 3,500 L/min
Assumption: Building is non-combustible and sprinklered therefore a 75% percentage decrease to be applied

4. The value obtained in 3. may be increased for structures exposed within 45 metres by the fire area under consideration.

Separation	Charge
0 to 3 m	25%
3.1 to 10 m	20%
10.1 to 20 m	15%
20.1 to 30 m	10%
30.1 to 45 m	5%

Side 1	4	20%
Side 2	4	20%
Side 3	7	20%
Side 4	20	15%
		75%

(Total shall not exceed 75%)

Increase due to separation 75% x 3,500 = 6,125 L/min
The seperation was taken as the closest distance to adjacent property lines

The fire flow requirement is 7,000 L/min
or **117 L/sec**
or 1,849 gpm (us)
or 1,540 gpm (uk)

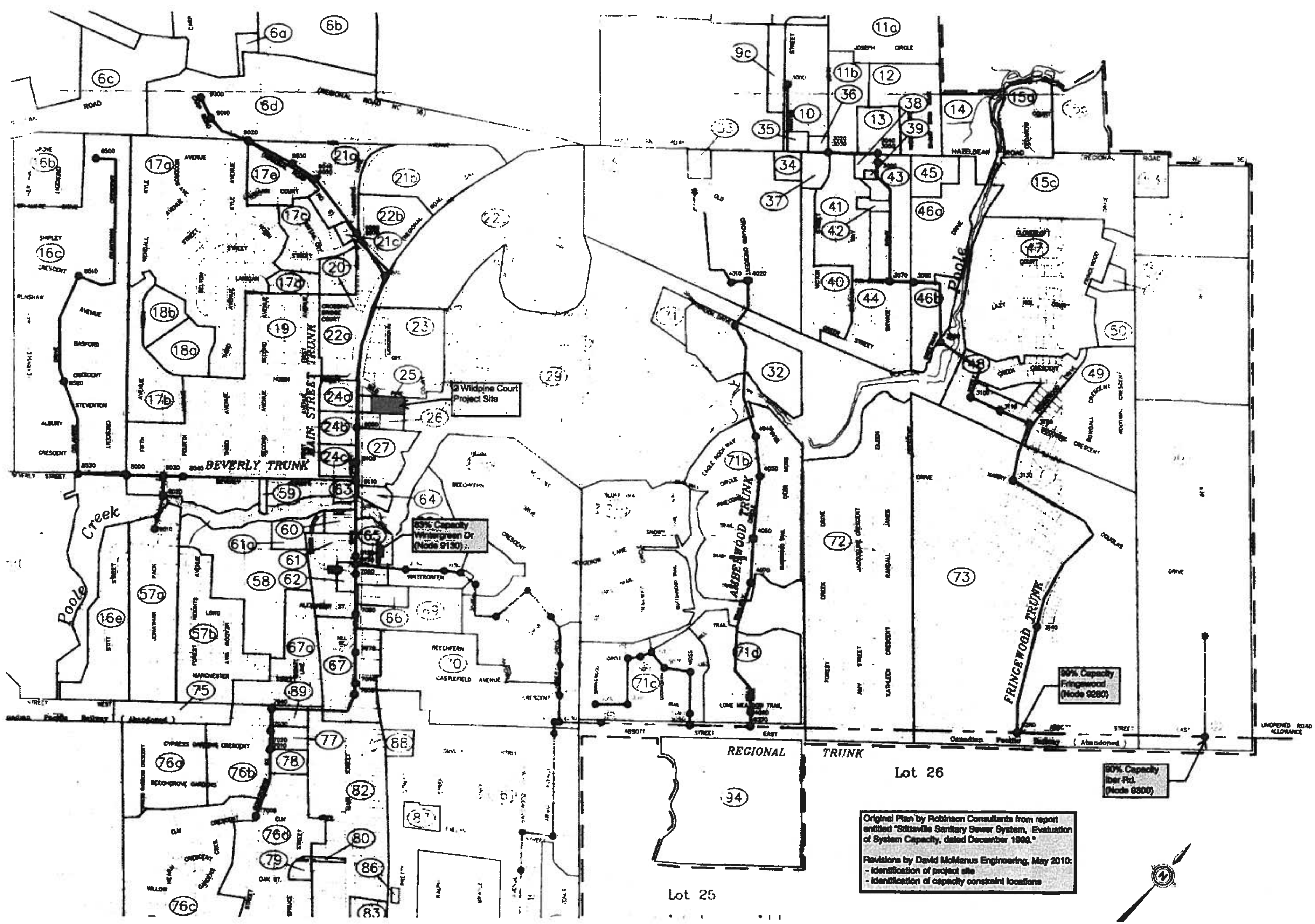
Based on method described in:
"Water Supply for Public Fire Protection - A Guide to Recommended Practice", 1991
by Fire Underwriters Survey

APPENDIX C

Sanitary Sewer Design Information

Table 3
Summary of Flows and Capacities:
Planned Conditions

Location	Node No.	Sewer Capacity	Peak Flow (l/s)	Percent Capacity Used	Commercial Area (ha)	Population
MAIN STREET TRUNK						
R.R. #248	9020	37	19	51%	16	0
McCooye Lane	9070	43	35	81%	24	240
Main Street	9080	61	40	66%	28	240
Beverly Street	9110	273	217	79%	46	6660
Wintergreen	9130	325	271	83%	56	8500
At Regional Trunk	9220	578	334	58%	56	9270
BEVERLY TRUNK						
	8500	141	68	48%	6	1720
Fifth Avenue	8000	197	141	72%	9	5150
Jonathan Avenue	8030	191	153	80%	9	5630
Main Street	8040	220	162	74%	9	6020
GOULBOURN TRUNK						
Cypress Gardens	7030	87	40	46%	0.3	1450
Main Street	7050	102	40	39%	0.3	1450
Alexander	7080	171	48	28%	5	1540
Wintergreen	7090	171	50	29%	7	1540
FERNBANK TRUNK						
Etta Street	6000	37	1	3%	0	43
Sunnyside	6080	98	22	22%	0	520
Liard Street	6110	115	61	53%	5	1920
Basswood	6140	209	83	40%	5	2830
At Regional Trunk	6180	209	113	54%	20	3210
AMBERWOOD TRUNK						
Old Orchard	4000	41	24	59%	6	400
Springbrook	4030	65	27	42%	6	600
Springbrook	4060	106	33	31%	6	1020
Lone Meadow	4080	106	36	34%	6	1220
FRINGEWOOD TRUNK						
R.R. No. 248/John Street	3030	79	24	30%	1	780
Sweetnam Drive	3090	95	51	54%	11	1350
Harry Douglas Drive	3130	119	79	66%	19	2100
REGIONAL TRUNK						
Oakfern	9250	787	388	49%	77	12480
Amberwood	9270	561	444	79%	95	14390
Fringewood	9280	561	557	99%	114	19400
Iber Road	9300	687	618	90%	166	19400


2 Wildpine Court Project Site
BEVERLY TRUNK
MAIN STREET TRUNK
AMBERWOOD TRUNK
FRINGEWOOD TRUNK
REGIONAL
TRUNK
Lot 26
Lot 25
Poole Creek
93% Capacity Wintergreen Dr. (Node 9130)
90% Capacity Fringewood (Node 9280)
90% Capacity Iber Rd. (Node 9300)
Original Plan by Robinson Consultants from report entitled "Stittsville Sanitary Sewer System, Evaluation of System Capacity, dated December 1999."
Revisions by David McManus Engineering, May 2010:
- identification of project site
- identification of capacity constraint locations

APPENDIX D

Storm Sewer Design Information

DME Project: 2949 - 2 Wildpine Court
Location: Stittsville
Client: Wildpine Holdings Inc.

Date: November 10, 2010

David McManus Engineering
A Trow Global Company

Table 1. Storm Sewer Design Sheet

LOCATION									PROPOSED SEWER								
FROM	TO	AREA (ha)	RUNOFF COEFFICIENT C	INDIV 2.78 AC	ACCUM 2.78 AC	TIME OF CONC.	RAINFALL INTENSITY I	PEAK FLOW Q (l/s)	TYPE OF PIPE	PIPE SIZE (mm)	PIPE SLOPE (%)	LENGTH (m)	CAPACITY (l/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW (min.)	EXCESS CAPACITY (l/s)	Q/Qfull
CB A1b	MAIN	0.03	0.90	0.09	0.09	10.00	104.19	9.38	PVC	203.2	2.00	6.5	48.44	1.49	0.07	39.06	0.19
CB A1c	MAIN	0.09	0.69	0.18	0.18	10.00	104.19	18.75	PVC	203.2	2.00	6.0	48.44	1.49	0.07	29.68	0.39
CB A1a	STMMH 201	0.03	0.20	0.02	0.29	10.00	104.19	30.22	PVC	254.0	0.50	53.0	43.91	0.87	1.02	13.70	0.69
STMMH 201	STORMCEPTOR	0.00	0.00	0.00	0.29	11.02	99.10	28.74	PVC	254.0	0.50	20.5	43.91	0.87	0.39	15.17	0.65
BUILDING	STMMH 202	0.18	0.90	0.45	0.45	10.00	104.19	46.89	PVC	254.0	1.00	5.0	62.10	1.22	0.07	15.21	0.76
CB A3	STMMH 202	0.03	0.43	0.04	0.04	10.00	104.19	4.17	PVC	203.2	1.00	6.0	34.25	1.06	0.09	30.08	0.12
STMMH 202	STORMCEPTOR	0.00	0.00	0.00	0.49	10.09	103.69	50.81	PVC	304.8	0.40	48.5	63.87	0.87	0.92	13.06	0.80
STORMCEPTOR	EX MAIN	0.00	0.00	0.00	0.78	11.41	97.27	75.87	PVC	381.0	0.30	13.0	100.29	0.88	0.25	24.42	0.76
RYCB B1	CBMH 203	0.05	0.20	0.03	0.03	10.00	104.19	8.13	PVC	254.0	2.90	14.0	105.75	2.08	0.11	97.63	0.08
RYCB B2	CBMH 203	0.02	0.20	0.01	0.01	10.00	104.19	6.04	PVC	254.0	0.45	30.0	41.66	0.82	0.61	35.62	0.15
CBMH 203	EX CB	0.02	0.40	0.02	0.06	10.61	101.08	11.07	PVC	254.0	0.45	8.0	41.66	0.82	0.16	30.59	0.27

DME Project: 2949 - 2 Wildpine Court
Location: Stittsville
Client: Wildpine Holdings Inc.

Date:November 10, 2010

David McManus Engineering
A Trow Global Company

Table 2. Stormwater Management Summary Sheet

Sub Area I.D.	Sub Area (ha)	C = 0.2	C = 0.9	Composite 'C'	Outlet Location	Pre-Dev Release (l/s)	Controlled Release (L/s)	5 year Storage Required (m^3)	5 year Storage Provided (m^3)	100 year Storage Required (m^3)	100 year Storage Provided (m^3)	Top of Grate (m)	Ponding Depth (m)	Invert or Pan Elev. (m)	Pipe dia (if plug type) (mm)	Head on Orifice (if plug) (m)	Diameter of Orifice (mm)	Hydrovex Model	Head on Hydrovex
A1	0.16	0.06	0.10	0.64	STORMCEPTOR	9.3	7.0	15.5	30.7	47.1	87.7	116.85	0.30	115.13	254	1.893	49	100 VHV-1	2.02
A2	0.18	0.00	0.18	0.90	STORMCEPTOR	10.4	7.2	30.8	34.0	74.8	88.7								
A3	0.03	0.02	0.01	0.43	STORMCEPTOR	1.7	6.3	0.0	0.0	1.1	0.0								
B1	0.09	0.08	0.00	0.24	EX CB	5.1	5.1	0.5	10.8	4.7	10.8	117.70	0.00	116.66	254	0.913	51	75 VHV-1	1.04
C1	0.38	0.38	0.00	0.20	FREE FLOW	22.0	22.0	N/A	N/A	N/A	N/A								
TOTALS	**0.84**	**0.54**	**0.29**	**0.45**	**Total Release**	**48.5**	**47.6**	**46.8**	**75.5**	**127.6**	**187.2**								

NOTES:
This Table to be read in conjuction with drawing 2949-SWM1, 2949-GR1, and 2949-S1, and Tables 3 through 6

DME Project: 2949 - 2 Wildpine Court
Location: Stittsville
Client: Wildpine Holdings Inc.

Date: November 10, 2010

David McManus Engineering
A Trow Global Company

Table 3. Storage Requirements for Area A1

Area	**0.16**	hectares
Runoff Coefficient =	**0.64**	post development
100 yr Runoff Coefficient =	**0.80**	

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Release	Net Runoff To Be Stored (L/s)	Storage Req'd m3
5 Year	10	104.19	29.54	7.0	22.5	13.5
	20	**70.25**	**19.92**	**7.0**	**12.9**	**15.5**
	30	53.93	15.29	7.0	8.3	14.9
	40	44.18	12.53	7.0	5.5	13.3
	50	37.65	10.68	7.0	3.7	11.0
100 Year	10	178.56	63.29	7.0	56.3	33.8
	20	119.95	42.52	7.0	35.5	42.6
	30	91.87	32.56	7.0	25.6	46.0
	40	**75.15**	**26.64**	**7.0**	**19.6**	**47.1**
	50	63.95	22.67	7.0	15.7	47.0

Table 4. Storage Requirements for Area A2

Area	**0.18**	hectares
Runoff Coefficient =	**0.90**	post development
100 yr Runoff Coefficient =	**1.00**	

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Release	Net Runoff To Be Stored (L/s)	Storage Req'd m3
5 Year	10	104.19	46.92	7.2	39.7	23.8
	20	70.25	31.64	7.2	24.4	29.3
	30	**53.93**	**24.29**	**7.2**	**17.1**	**30.8**
	40	44.18	19.90	7.2	12.7	30.5
	50	37.65	16.96	7.2	9.8	29.3
100 Year	40	75.15	37.60	7.2	30.4	73.0
	50	63.95	32.00	7.2	24.8	74.4
	60	**55.89**	**27.97**	**7.2**	**20.8**	**74.8**
	70	49.79	24.91	7.2	17.7	74.4
	80	44.99	22.51	7.2	15.3	73.5

Table 5. Storage Requirements for Area A3

Area	**0.03**	hectares
Runoff Coefficient =	**0.43**	post development
100 yr Runoff Coefficient =	**0.54**	

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Release	Net Runoff To Be Stored (L/s)	Storage Req'd m3
5 Year	**10**	**104.19**	**3.77**	**6.3**	**-2.5**	**-1.5**
	20	70.25	2.54	6.3	-3.8	-4.5
	30	53.93	1.95	6.3	-4.4	-7.8
	40	44.18	1.60	6.3	-4.7	-11.3
	50	37.65	1.36	6.3	-4.9	-14.8
100 Year	**10**	**178.56**	**8.07**	**6.3**	**1.8**	**1.1**
	20	119.95	5.42	6.3	-0.9	-1.1
	30	91.87	4.15	6.3	-2.1	-3.9
	40	75.15	3.39	6.3	-2.9	-7.0
	50	63.95	2.89	6.3	-3.4	-10.2

Table 6. Storage Requirements for Area B1

Area	**0.09**	hectares
Runoff Coefficient =	**0.24**	post development
100 yr Runoff Coefficient =	**0.30**	

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Release	Net Runoff To Be Stored (L/s)	Storage Req'd m3
5 Year	**10**	**104.19**	**6.00**	**5.1**	**0.9**	**0.5**
	20	70.25	4.05	5.1	-1.1	-1.3
	30	53.93	3.11	5.1	-2.0	-3.6
	40	44.18	2.55	5.1	-2.6	-6.1
	50	37.65	2.17	5.1	-2.9	-8.8
100 Year	**10**	**178.56**	**12.86**	**5.1**	**7.8**	**4.7**
	20	119.95	8.64	5.1	3.5	4.2
	30	91.87	6.61	5.1	1.5	2.7
	40	75.15	5.41	5.1	0.3	0.7
	50	63.95	4.60	5.1	-0.5	-1.5

Hydrovex®

VHV Vertical Vortex Flow Regulator

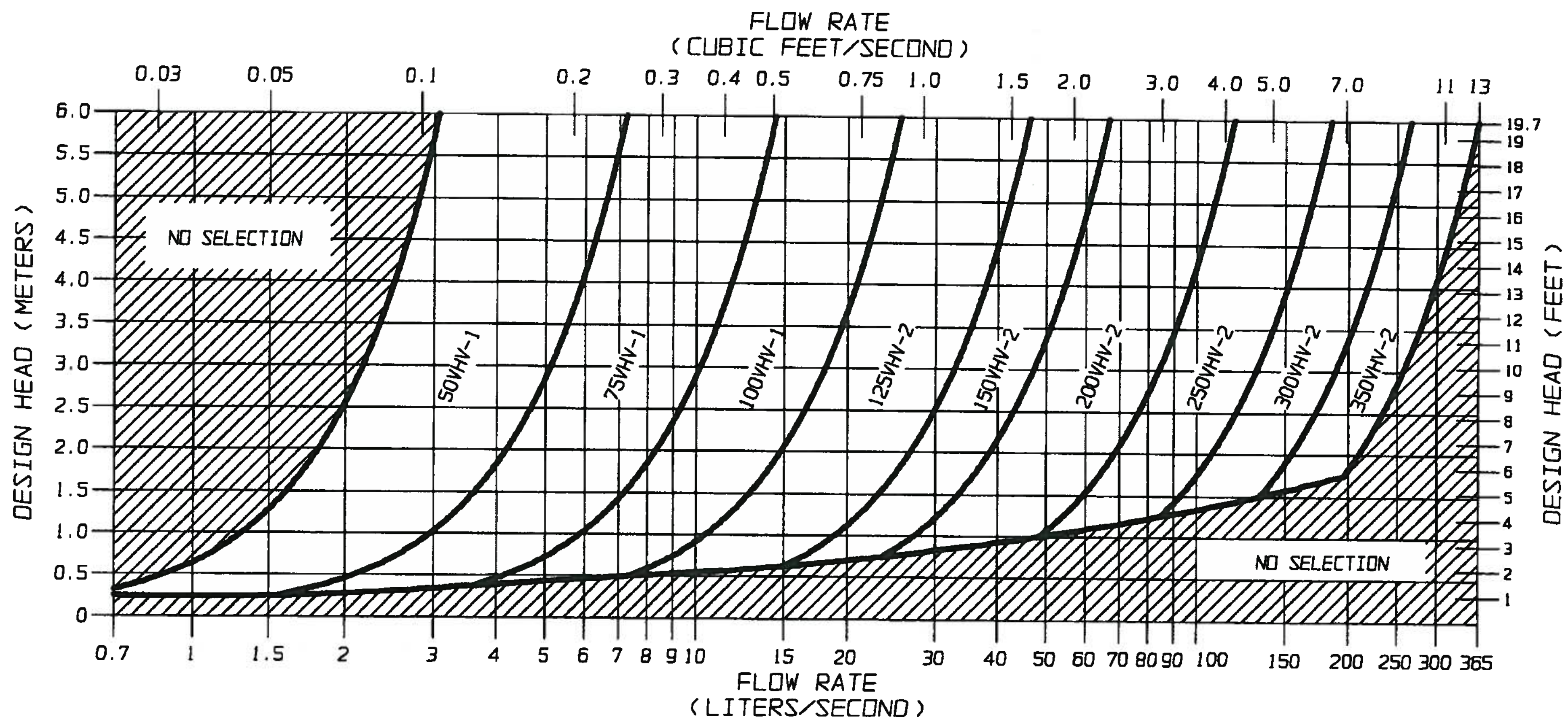


FIGURE 2 - VHV

JOHN MEUNIER INC.

APPENDIX E

Water Quality Information

Stormceptor®

Stormceptor Sizing Detailed Report

PCSWMM for Stormceptor

Project Information

Date	7/15/2010
Project Name	Wild Pine Condominiums
Project Number	2949
Location	2 Wild Pine Court, Stittsville, Ontario

Stormwater Quality Objective

This report outlines how Stormceptor System can achieve a defined water quality objective through the removal of total suspended solids (TSS). Attached to this report is the Stormceptor Sizing Summary.

Stormceptor System Recommendation

The Stormceptor System model STC 750 achieves the water quality objective removing 83% TSS for a City of Toronto (clay, silt and sand) particle size distribution.

The Stormceptor System

The Stormceptor oil and sediment separator is sized to treat stormwater runoff by removing pollutants through gravity separation and flotation. Stormceptor's patented design generates positive TSS removal for all rainfall events, including large storms. Significant levels of pollutants such as heavy metals, free oils and nutrients are prevented from entering natural water resources and the re-suspension of previously captured sediment (scour) does not occur.

Stormceptor provides a high level of TSS removal for small frequent storm events that represent the majority of annual rainfall volume and pollutant load. Positive treatment continues for large infrequent events, however, such events have little impact on the average annual TSS removal as they represent a small percentage of the total runoff volume and pollutant load.

Stormceptor is the only oil and sediment separator on the market sized to remove TSS for a wide range of particle sizes, including fine sediments (clays and silts), that are often overlooked in the design of other stormwater treatment devices.

Small storms dominate hydrologic activity, US EPA reports

"Early efforts in stormwater management focused on flood events ranging from the 2-yr to the 100-yr storm. Increasingly stormwater professionals have come to realize that small storms (i.e. < 1 in. rainfall) dominate watershed hydrologic parameters typically associated with water quality management issues and BMP design. These small storms are responsible for most annual urban runoff and groundwater recharge. Likewise, with the exception of eroded sediment, they are responsible for most pollutant washoff from urban surfaces. Therefore, the small storms are of most concern for the stormwater management objectives of ground water recharge, water quality resource protection and thermal impacts control."

"Most rainfall events are much smaller than design storms used for urban drainage models. In any given area, most frequently recurrent rainfall events are small (less than 1 in. of daily rainfall)."

"Continuous simulation offers possibilities for designing and managing BMPs on an individual site-by-site basis that are not provided by other widely used simpler analysis methods. Therefore its application and use should be encouraged."

– US EPA Stormwater Best Management Practice Design Guide, Volume 1 – General Considerations, 2004

Design Methodology

Each Stormceptor system is sized using PCSWMM for Stormceptor, a continuous simulation model based on US EPA SWMM. The program calculates hydrology from up-to-date local historical rainfall data and specified site parameters. With US EPA SWMM's precision, every Stormceptor unit is designed to achieve a defined water quality objective.

The TSS removal data presented follows US EPA guidelines to reduce the average annual TSS load. Stormceptor's unit process for TSS removal is settling. The settling model calculates TSS removal by analyzing (summary of analysis presented in Appendix 2):

- Site parameters
- Continuous historical rainfall, including duration, distribution, peaks (Figure 1)
- Interevent periods
- Particle size distribution
- Particle settling velocities (Stokes Law, corrected for drag)
- TSS load (Figure 2)
- Detention time of the system

The Stormceptor System maintains continuous positive TSS removal for all influent flow rates. Figure 3 illustrates the continuous treatment by Stormceptor throughout the full range of storm events analyzed. It is clear that large events do not significantly impact the average annual TSS removal. There is no decline in cumulative TSS removal, indicating scour does not occur as the flow rate increases.

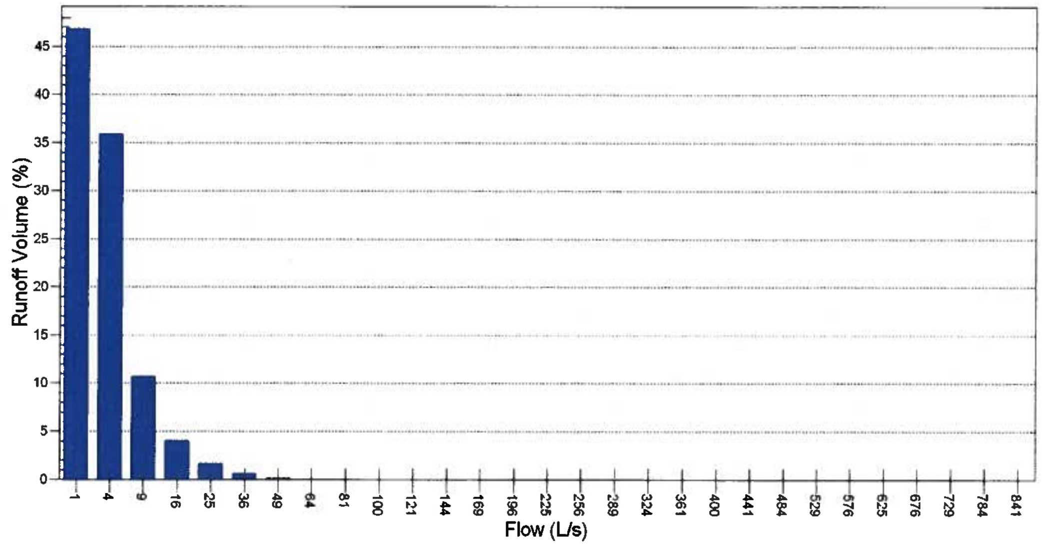


Figure 1. Runoff Volume by Flow Rate for OTTAWA MACDONALD-CARTIER INT'L A – ON 6000, 1967 to 2003 for 0.36 ha, 78% impervious. Small frequent storm events represent the majority of annual rainfall volume. Large infrequent events have little impact on the average annual TSS removal, as they represent a small percentage of the total annual volume of runoff.

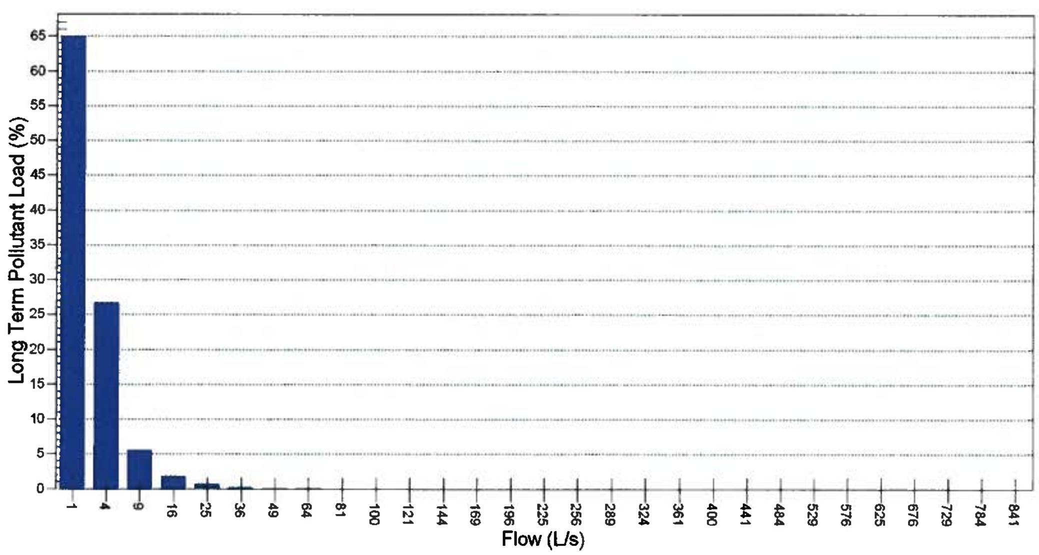
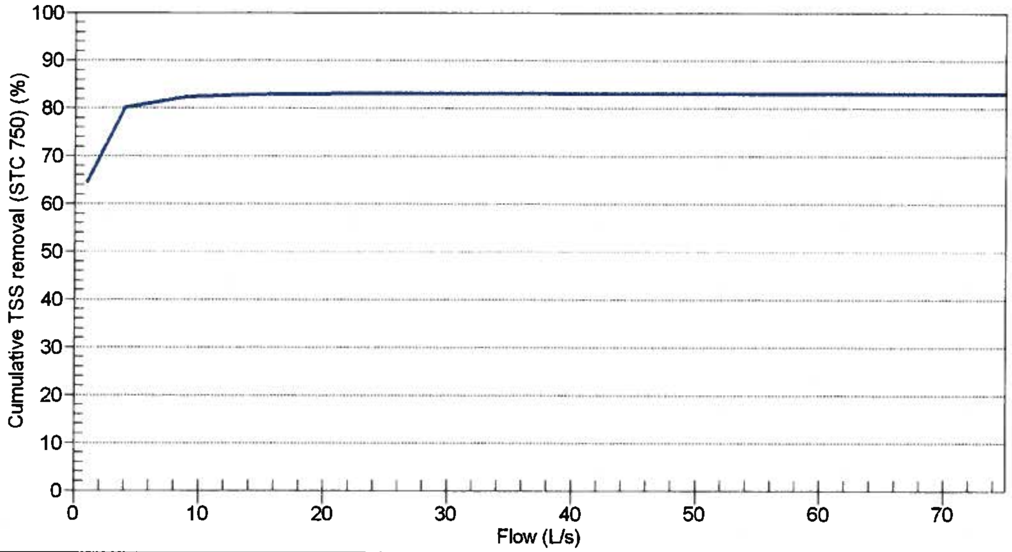


Figure 2. Long Term Pollutant Load by Flow Rate for OTTAWA MACDONALD-CARTIER INT'L A – 6000, 1967 to 2003 for 0.36 ha, 78% impervious. The majority of the annual pollutant load is transported by small frequent storm events. Conversely, large infrequent events carry an insignificant percentage of the total annual pollutant load.

Stormceptor®



Stormceptor Model	STC 750	Drainage Area (ha)	0.36
TSS Removal (%)	83	Impervious (%)	78

Figure 3. Cumulative TSS Removal by Flow Rate for OTTAWA MACDONALD-CARTIER INT'L A – 6000, 1967 to 2003. Stormceptor continuously removes TSS throughout the full range of storm events analyzed. Note that large events do not significantly impact the average annual TSS removal. Therefore no decline in cumulative TSS removal indicates scour does not occur as the flow rate increases.

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Appendix 1
Stormceptor Design Summary

Project Information

Date	7/15/2010
Project Name	Wild Pine Condominiums
Project Number	2949
Location	2 Wild Pine Court, Stittsville, Ontario

Designer Information

Company	David McManus Engineering
Contact	Andrew Finnson, P.Eng.

Notes

N/A

Drainage Area

Total Area (ha)	0.36
Imperviousness (%)	78

The Stormceptor System model STC 750 achieves the water quality objective removing 83% TSS for a City of Toronto (clay, silt and sand) particle size distribution.

Rainfall

Name	OTTAWA MACDONALD-CARTIER INT'L A
State	ON
ID	6000
Years of Records	1967 to 2003
Latitude	45°19'N
Longitude	75°40'W

Water Quality Objective

TSS Removal (%)	80

Upstream Storage

Storage (ha-m)	Discharge (L/s)
0	0

Stormceptor Sizing Summary

Stormceptor Model	TSS Removal %
STC 300	76
STC 750	83
STC 1000	84
STC 1500	85
STC 2000	88
STC 3000	89
STC 4000	91
STC 5000	92
STC 6000	93
STC 9000	95
STC 10000	95
STC 14000	96

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Particle Size Distribution

Removing silt particles from runoff ensures that the majority of the pollutants, such as hydrocarbons and heavy metals that adhere to fine particles, are not discharged into our natural water courses. The table below lists the particle size distribution used to define the annual TSS removal.

City of Toronto (clay, silt and sand)

Particle Size µm	Distribution %	Specific Gravity	Settling Velocity m/s		Particle Size µm	Distribution %	Specific Gravity	Settling Velocity m/s
10	20	2.65	0.0004					
30	10	2.65	0.0008					
50	10	2.65	0.0022					
95	20	2.65	0.0063					
265	20	2.65	0.0366					
1000	20	2.65	0.1691					

Stormceptor Design Notes

- Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor version 1.0
- Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal.
- Only the STC 300 is adaptable to function with a catch basin inlet and/or inline pipes.
- Only the Stormceptor models STC 750 to STC 6000 may accommodate multiple inlet pipes.
- Inlet and outlet invert elevation differences are as follows:

Inlet and Outlet Pipe Invert Elevations Differences

Inlet Pipe Configuration	STC 300	STC 750 to STC 6000	STC 9000 to STC 14000
Single inlet pipe	75 mm	25 mm	75 mm
Multiple inlet pipes	75 mm	75 mm	Only one inlet pipe.

- Design estimates are based on stable site conditions only, after construction is completed.
- Design estimates assume that the storm drain is not submerged during zero flows. For submerged applications, please contact your local Stormceptor representative.
- Design estimates may be modified for specific spills controls. Please contact your local Stormceptor representative for further assistance.
- For pricing inquiries or assistance, please contact Imbrium Systems Inc., 1-800-565-4801.

Stormceptor®

Appendix 2
Summary of Design Assumptions

SITE DETAILS

Site Drainage Area

Total Area (ha)	0.36	Imperviousness (%)	78

Surface Characteristics

Width (m)	120
Slope (%)	2
Impervious Depression Storage (mm)	0.508
Pervious Depression Storage (mm)	5.08
Impervious Manning's n	0.015
Pervious Manning's n	0.25

Infiltration Parameters

Horton's equation is used to estimate infiltration

Max. Infiltration Rate (mm/h)	61.976
Min. Infiltration Rate (mm/h)	10.16
Decay Rate (s^{-1})	0.00055
Regeneration Rate (s^{-1})	0.01

Maintenance Frequency

Sediment build-up reduces the storage volume for sedimentation. Frequency of maintenance is assumed for TSS removal calculations.

Maintenance Frequency (months)	12

Evaporation

Daily Evaporation Rate (mm/day)	2.54

Dry Weather Flow

Dry Weather Flow (L/s)	No

Upstream Attenuation

Stage-storage and stage-discharge relationship used to model attenuation upstream of the Stormceptor System is identified in the table below.

Storage ha-m	Discharge L/s
0	0

PARTICLE SIZE DISTRIBUTION

Particle Size Distribution

Removing fine particles from runoff ensures the majority of pollutants, such as heavy metals, hydrocarbons, free oils and nutrients are not discharged into natural water resources. The table below identifies the particle size distribution selected to define TSS removal for the design of the Stormceptor System.

City of Toronto (clay, silt and sand)

Particle Size µm	Distribution %	Specific Gravity	Settling Velocity m/s		Particle Size µm	Distribution %	Specific Gravity	Settling Velocity m/s
10	20	2.65	0.0004					
30	10	2.65	0.0008					
50	10	2.65	0.0022					
95	20	2.65	0.0063					
265	20	2.65	0.0366					
1000	20	2.65	0.1691					

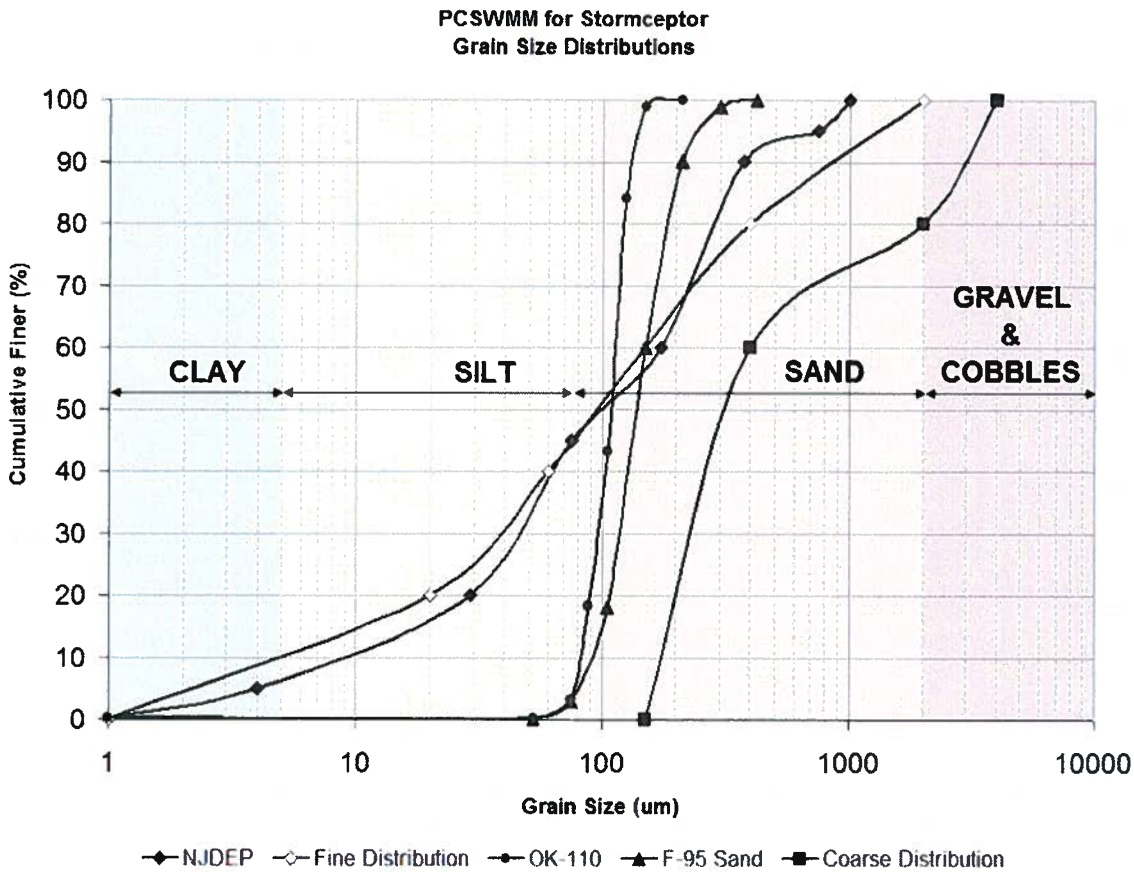

Figure 1. PCSWMM for Stormceptor standard design grain size distributions.

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TSS LOADING

TSS Loading Parameters

TSS Loading Function	Buildup / Washoff

Parameters

Target Event Mean Concentration (EMC) (mg/L)	125
Exponential Buildup Power	0.4
Exponential Washoff Exponential	0.2

HYDROLOGY ANALYSIS

PCSWMM for Stormceptor calculates annual hydrology with the US EPA SWMM and local continuous historical rainfall data. Performance calculations of the Stormceptor System are based on the average annual removal of TSS for the selected site parameters. The Stormceptor System is engineered to capture fine particles (silts and sands) by focusing on average annual runoff volume ensuring positive removal efficiency is maintained during all rainfall events, while preventing the opportunity for negative removal efficiency (scour).

Smaller recurring storms account for the majority of rainfall events and average annual runoff volume, as observed in the historical rainfall data analyses presented in this section.

Rainfall Station

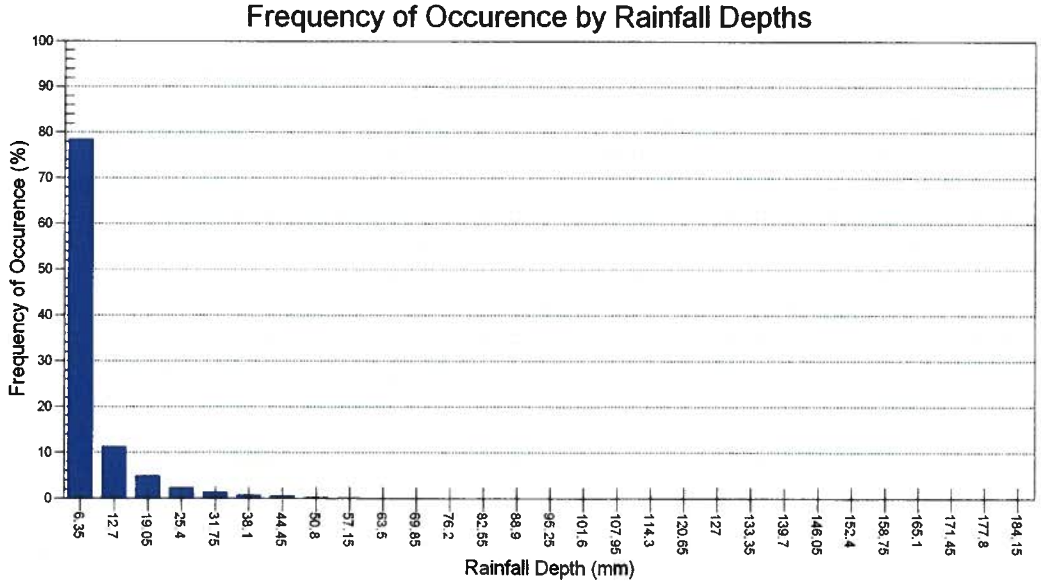
Rainfall Station	OTTAWA MACDONALD-CARTIER INT'L A		
Rainfall File Name	ON6000.NDC	Total Number of Events	4536
Latitude	45°19'N	Total Rainfall (mm)	20974.3
Longitude	75°40'W	Average Annual Rainfall (mm)	566.9
Elevation (m)	371	Total Evaporation (mm)	1471.8
Rainfall Period of Record (y)	37	Total Infiltration (mm)	4602.7
Total Rainfall Period (y)	37	Percentage of Rainfall that is Runoff (%)	71.6

Stormceptor®

Rainfall Event Analysis

Rainfall Depth mm	No. of Events	Percentage of Total Events %	Total Volume mm	Percentage of Annual Volume %
6.35	3563	78.5	5667	27.0
12.70	508	11.2	4533	21.6
19.05	223	4.9	3434	16.4
25.40	102	2.2	2244	10.7
31.75	60	1.3	1704	8.1
38.10	33	0.7	1145	5.5
44.45	28	0.6	1165	5.6
50.80	9	0.2	416	2.0
57.15	5	0.1	272	1.3
63.50	1	0.0	63	0.3
69.85	1	0.0	64	0.3
76.20	1	0.0	76	0.4
82.55	0	0.0	0	0.0
88.90	1	0.0	84	0.4
95.25	0	0.0	0	0.0
101.60	0	0.0	0	0.0
107.95	0	0.0	0	0.0
114.30	1	0.0	109	0.5
120.65	0	0.0	0	0.0
127.00	0	0.0	0	0.0
133.35	0	0.0	0	0.0
139.70	0	0.0	0	0.0
146.05	0	0.0	0	0.0
152.40	0	0.0	0	0.0
158.75	0	0.0	0	0.0
165.10	0	0.0	0	0.0
171.45	0	0.0	0	0.0
177.80	0	0.0	0	0.0
184.15	0	0.0	0	0.0
190.50	0	0.0	0	0.0
196.85	0	0.0	0	0.0
203.20	0	0.0	0	0.0
209.55	0	0.0	0	0.0
>209.55	0	0.0	0	0.0

Frequency of Occurence by Rainfall Depths



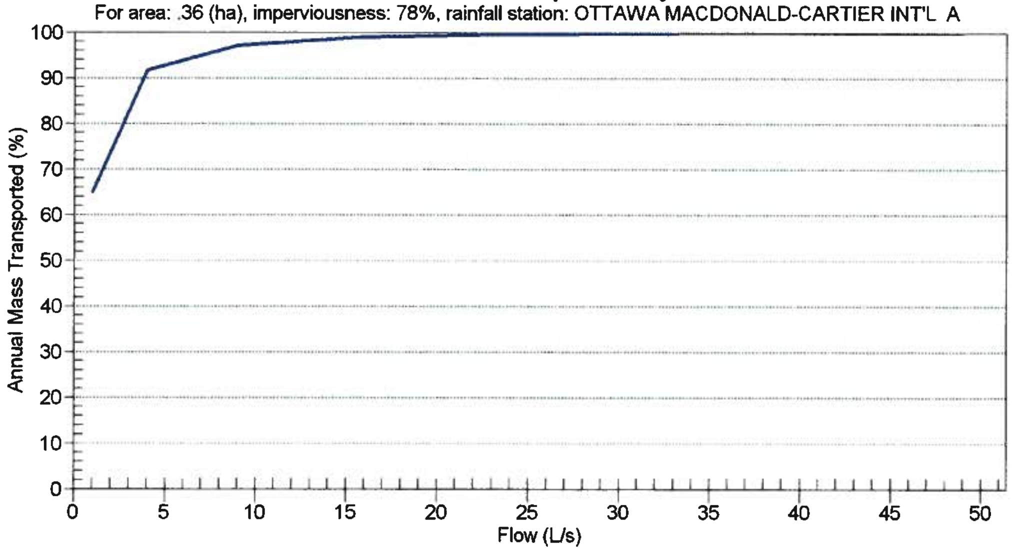
Stormceptor®

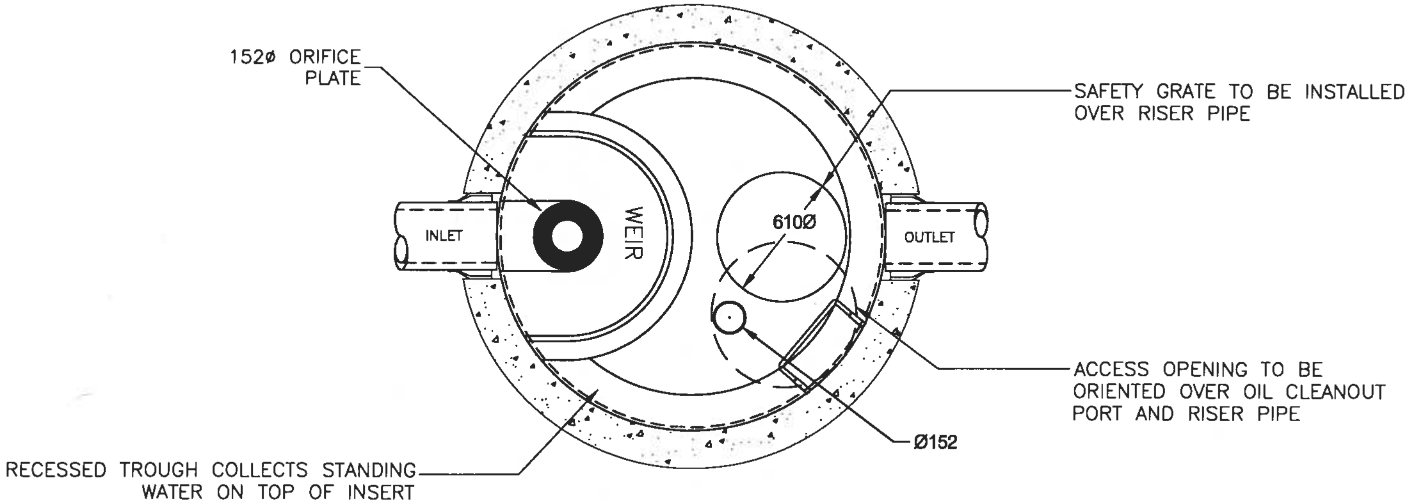
Pollutograph

Flow Rate L/s	Cumulative Mass %
1	65.0
4	91.7
9	97.2
16	99.0
25	99.7
36	99.9
49	100.0
64	100.0
81	100.0
100	100.0
121	100.0
144	100.0
169	100.0
196	100.0
225	100.0
256	100.0
289	100.0
324	100.0
361	100.0
400	100.0
441	100.0
484	100.0
529	100.0
576	100.0
625	100.0
676	100.0
729	100.0
784	100.0
841	100.0
900	100.0

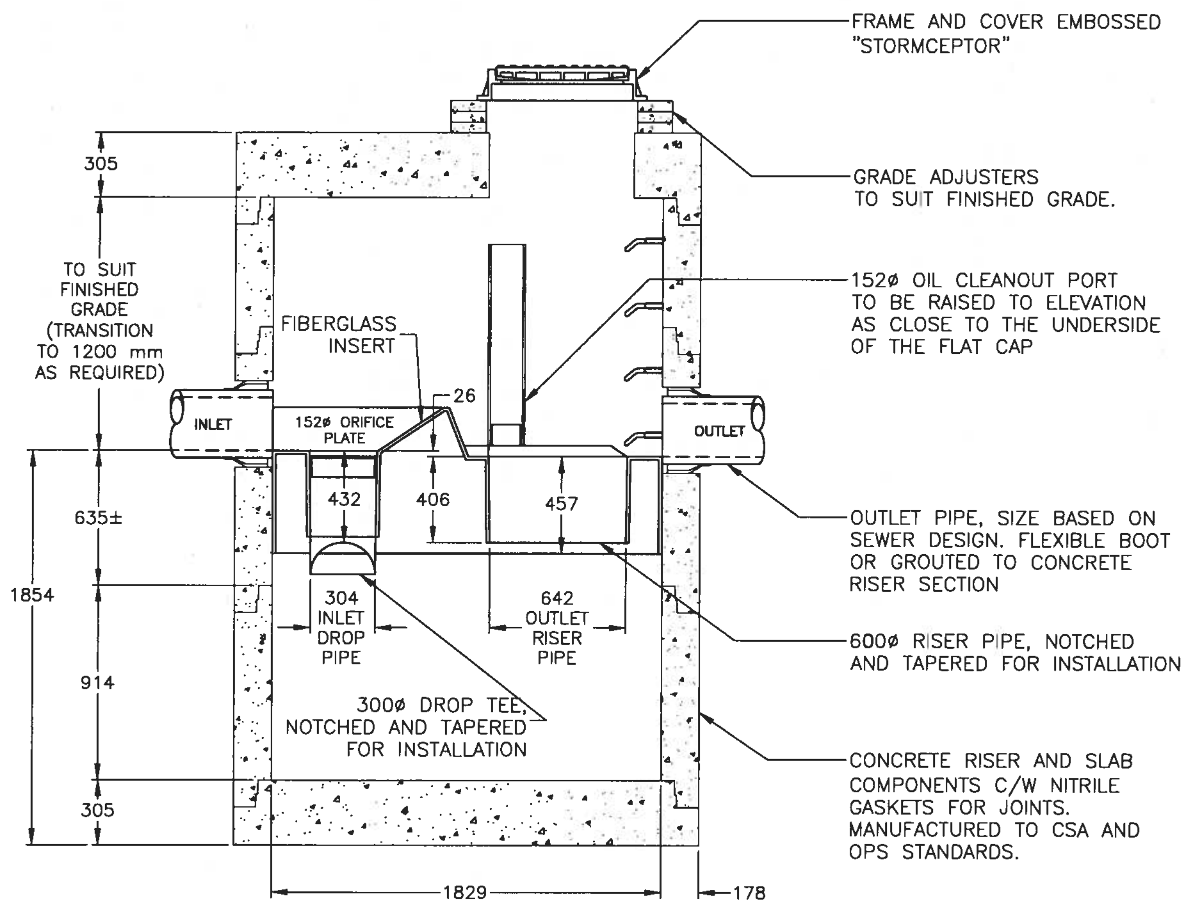
Cumulative Mass Transported by Flow Rate

For area: .36 (ha), imperviousness: 78%, rainfall station: OTTAWA MACDONALD-CARTIER INT'L A





PLAN VIEW



SECTION VIEW

STC 750 CAPACITIES		
SEDIMENT CAPACITY (L)	OIL CAPACITY (L)	TOTAL CAPACITY L (IMP GAL)
3000	915	4070 (895)

****NOT FOR CONSTRUCTION****

THE STORMCEPTOR SYSTEM IS PROTECTED BY ONE OR MORE OF THE FOLLOWING PATENTS:

CANADIAN PATENT NO. 2,009,208
CANADIAN PATENT NO. 2,137,942
CANADIAN PATENT NO. 2,175,277
CANADIAN PATENT NO. 2,180,305
CANADIAN PATENT NO. 2,180,383
CANADIAN PATENT NO. 2,206,338

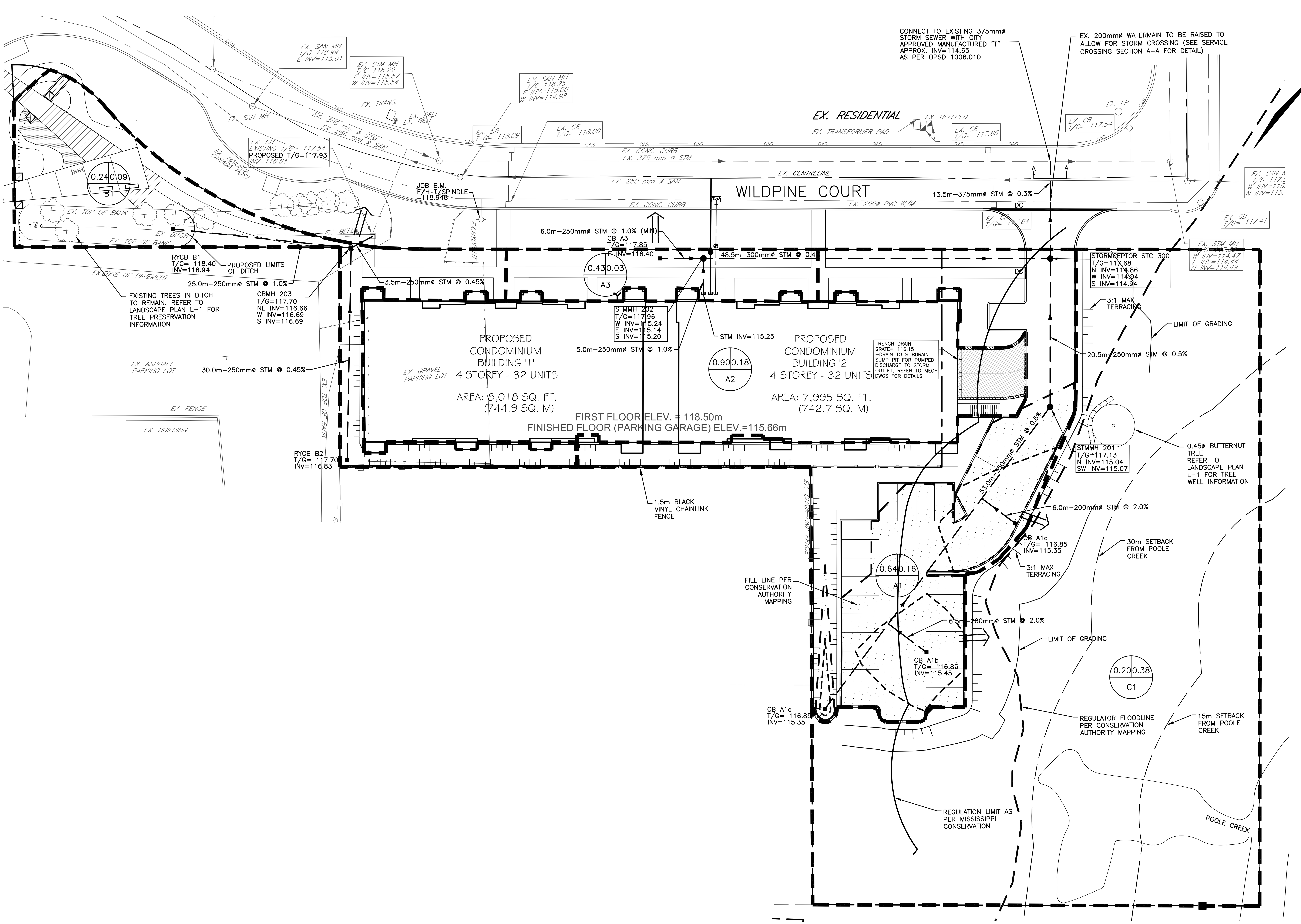
Hanson

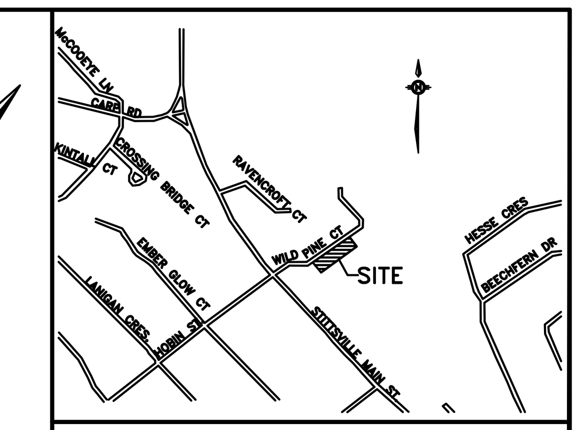
Stormceptor®

R.R. 2, CAMBRIDGE, ONTARIO N1R 5S3
TEL. 519-622-7574
1-800-565-3222
FAX 519-621-8233 MAIN OFFICE
519-621-7750 TECHNICAL SERVICES

IN-LINE STORMCEPTOR MODEL STC 750

DATE	D.B.	UNITS	DWG No.
14 OCT 03	S.K.	METRIC	G-2





LEGEND

- PROPOSED STORM
- PROPOSED CATCHBASIN
- PROPOSED STORM MANHOLE
- OVERLAND FLOW ROUTE
- STORM DRAINAGE AREA BOUNDARY
- RUNOFF COEFFICIENT / STORM DRAINAGE AREA (Ha) / STORM DRAINAGE AREA NUMBER (0.51 0.11 A1)
- 100 YEAR PONDING AREA (0.30m DEPTH)
- 5 YEAR PONDING AREA (0.15m DEPTH)
- FLOODLINE PER CONSERVATION AUTHORITY MAPPING
- MAJOR OVERLAND FLOW DIRECTION

ORIFICE SUMMARY

LOCATION	TYPE	DIAMETER OR RELEASE & HEAD	PIPE DIAMETER
STMMH 201	100 VHV-1	7.0 L/S @ 2.0m	250mm
CBMH 203	75 VHV-1	5.1 L/S @ 1.0m	250mm

STORAGE VOLUME SUMMARY

STORM DRAINAGE AREA	5 YEAR STORAGE PROVIDED (cu.m)	100 YEAR STORAGE PROVIDED (cu.m)
A1	30.7	87.7
A2	34.0	88.7
A3	0.0	0.0
B1	10.8	10.8
C1	N/A	N/A

NOTES:

A1 – STORAGE VOLUMES INCLUDE SURFACE STORAGE AS WELL AS 16.0 m³ OF PIPE STORAGE

A2 – 5 YEAR STORAGE: 0.02m OF DEPTH ACROSS ROOF AREA
100 YEAR STORAGE: 0.05m OF DEPTH ACROSS ROOF AREA

A3 – NO STORAGE PROVIDED, NO FLOW CONTROL EMPLOYED

B1 – STORAGE VOLUME OF 10.8 m³ IS ENTIRELY PIPE STORAGE. NO SURFACE STORAGE REQUIRED.

C1 – STORM DRAINAGE AREA C1 IS ENTIRELY LANDSCAPE AREA AND WILL SHEET FLOW TO THE CREEK, JUST AS IN THE PRE-DEVELOPMENT CONDITION. NO QUALITY OR QUANTITY CONTROL IS PROPOSED FOR THIS AREA.

NOTE
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

Ottawa

NOT FOR CONSTRUCTION

No.	REVISION	DATE	BY
2.	ISSUED FOR SITE PLAN APPLICATION	NOV 10/10	CJR
1.	ISSUED FOR CLIENT REVIEW	MAY 7/10	KLM

DME
David McManus Engineering
A Trow Global Company
100–2650 Queensview Drive
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E-mail: mcmanus@dmel.on.ca
Ph.613-688-1899 Fax 613-225-7330

BASEPLAN	DME
DESIGN	ACF
CHECKED	CJR
CAD	ACF
PROJ. MGR.	SMC
APPROVED	KLM

SCALE 1:250
0 2.5 5 7.5 10

2 WILDPINE COURT PROPOSED BUILDING CITY OF OTTAWA

DRAINAGE AREA PLAN

PROJECT No.	2949
SURVEY BY	DME
DATE	APR 2010
DRAWING No.	2949–SWM