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American Iron & Metal (AIM) Ottawa East Development 2555 Sheffield Road

Development Servicing Study & Stormwater Management Report

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AMERICAN IRON & METAL (AIM)
OTTAWA EAST DEVELOPMENT
2555 SHEFFIELD ROAD

DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT

Prepared by:

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Revised June 30, 2020

Ref: R-2019-051
Novatech File No. 119007

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Engineers, Planners & Landscape Architects

June 30, 2020

American Iron & Metal (AIM)
9100 boul. Henri-Bourassa Est
Montréal, QC
H1E 2S4

Attention: Mr. Christian Brisebois, Director, Engineering & Construction

Dear Sir:

Re: Development Servicing Study and Stormwater Management Report
American Iron & Metal (AIM) – Ottawa East Development
2555 Sheffield Road, Ottawa, ON
Novatech File No.: 119007

Enclosed is a copy of the revised 'Development Servicing Study and Stormwater Management Report' for the proposed AIM development located at 2555 Sheffield Road, in the City of Ottawa.
This report addresses the approach to site servicing and stormwater management and is submitted in support of a site plan control application.

Please contact the undersigned, should you have any questions or require additional information.

Yours truly,

NOVATECH

François Thauvette, P. Eng.
Senior Project Manager

cc: Golam Sharif (City of Ottawa)
Ralph Siciliano (Miriton Ltd. - M&E)

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1.0 INTRODUCTION

Novatech has been retained to complete the site servicing and stormwater management design for the proposed American Iron & Metal (AIM) Ottawa East site.

1.1 Purpose

This report addresses the approach to site servicing and stormwater management and is being submitted in support of a site plan control application.

1.2 Location and Site Description

The 4.01 ha AIM Ottawa East metal recycling facility is located at 2555 Sheffield Road and is bordered by Sheffield Road to the west, industrial sites to the north and south and a CN Rail Line and Ramsay Creek (tributary to Green's Creek) to the east. The legal description of the subject site is designated as Part of Block A, Registered Plan 783, City of Ottawa.

Figure 1 – **Aerial Plan** provides an aerial view of the site.

1.3 Reference Material

The following reports and studies were reviewed as part of the design process:

[1] The 'Surface Water Management Plan – Bakermet Inc. - 2555 Sheffield Road (Ref. # 03-1120-895/6000), prepared by Golder Associates, dated June 2004.

[2] The 'Stormwater Management Report – 2555 Sheffield Road (Ref. #1527275), prepared by Golder Associates, dated December 2015.

[3] The Geotechnical Investigation Report (DST Ref. No. TS-SO-37029), prepared by DST Consulting Engineers Inc., dated May 21, 2019.

[4] The Desktop Review of Slope and Meander Belt Setback (DST Ref. No. TS-SO-37029), prepared by DST Consulting Engineers Inc., dated November 13, 2019.

1.4 Pre-Consultation Information

Given the nature of the proposed industrial development, the location of the municipal storm sewer outlet for the industrial park (i.e. the 1350mm dia. concrete pipe located immediately south of the subject site) and the proximity of the sensitive receiving water course (Ramsay Creek), pre-consultation discussions were held with the Municipality and the local Conservation Authority.

A pre-consultation meeting was held with the City of Ottawa on February 26, 2019, at which time the client was advised of the general submission requirements, including the stormwater management (quantity control requirements). The Rideau Valley Conservation Authority (RVCA) was also consulted regarding the proposed development and more specifically provided the stormwater quality control requirements for flows to the sensitive receiving water course (Ramsay Creek). Refer to **Appendix A** for a summary of the correspondence related to the proposed development.

An amendment to the current Environmental Compliance Approval (ECA No. 5461-AMAKBG, issued on May 24, 2017) will be required. A pre-consultation meeting has not been held with the Ministry of the Environment, Conservation and Parks (MECP). Refer to **Appendix B** for a copy of the previous SWM Report[2] and ECA for this site.

1.5 Proposed Development

The metal recycling facility will include 2 new slab-on-grade buildings. Building 'A' will be located on the west side of the subject site and will include warehouse space, loading docks, a drive-through bay as well as office space. The smaller Building 'B' will be located near the northeast property corner and will mainly consist of a service garage, with offices in the mezzanine. The proposed recycling facility will include new weigh scales, with truck access off Sheffield Road. The outdoor recycling yard will be used for temporary storage of scrap metals and other non-ferrous materials. Given the heavy traffic on site, the intent is to use a roller compacted concrete (RCC) surface for the outdoor storage yard. The intent is to maintain as much of the existing RCC yard as possible. The proposed buildings will be serviced by extending new services to the municipal sanitary sewer, storm sewer and watermain in Sheffield Road.

Under post-development conditions, the subject site will continue to direct storm runoff to the two (2) separate and distinct outlets. Stormwater runoff from the proposed building roofs, landscaped area at the front and small parking lots will continue to be directed to the existing 1050mm dia. storm sewer in Sheffield Road, while runoff from the work yard at the back will continue to be directed to the on-site storm sewer system and outlet to the existing 450mm dia. CSP sewer, via a new water quality treatment unit.

2.0 SITE SERVICING

The objective of the site servicing design is to provide proper sewage outlets, a suitable domestic water supply and to ensure that appropriate fire protection is provided for the proposed development. The expected sewage flows, and water demands are based on City of Ottawa criteria and are to conform to the requirements of the City of Ottawa municipal design guidelines for sewer and water distribution systems.

The City of Ottawa Servicing Study Guidelines for Development Applications requires that a Development Servicing Study Checklist be included to confirm that each applicable item is deemed complete and ready for review by City of Ottawa Infrastructure Approvals. A completed checklist is enclosed in **Appendix C** of the report.

2.1 Sanitary Sewage

The City of Ottawa Design Guidelines estimate the average daily sanitary sewage flow from industrial sites to be approximately 35,000 L/gross ha/day. The allowable average sewage flow from the subject site would therefore be approximately 1.62 L/s (or 35,000 L/ha/day x 4.01ha).

The proposed buildings will be serviced by a new private 200mm dia. sanitary sewer connected to the existing 375mm dia. sanitary sewer in Sheffield Road. The City of Ottawa design criteria were used to calculate the theoretical sanitary flows for the proposed development. The following design criteria were taken from Section 4 – 'Sanitary Sewer Systems' and Appendix 4-A – 'Daily Sewage Flow for Various Types of Establishments' of the City of Ottawa Sewer Design Guidelines:

- Design Population (Building 'A'): 40-50 employees (use 50 in calculations)
- Design Population (Building 'B'): 10 employees
- Average Daily Sewage Flows (Employees incl. showers): 125 L/person/day
- Average number of trucks washed per day: 0 to 4 (use 4 in calculations)
- Average Daily Sewage Flows (Wash Bay): 400 L/truck/day
- Commercial Peaking Factor = 1.5
- Infiltration Allowance: 0.33 L/s/ha x 4.01 ha site = 1.32 L/s

Table 1 identifies the theoretical sanitary flows for the proposed development based on the above design criteria.

Table 1: **Theoretical Post-Development Sanitary Flows**

Type of Use	Employees / Wash Bay	Average Flow (L/s)	Peaking Factor	Peak Flow (L/s)	Total Flow (L/s)
Bldg 'A' Staff	50 employees	0.07	1.5	0.11	0.11
Bldg 'B' Staff	10 employees	0.01	1.5	0.02	0.02
Wash Bay	4 trucks	0.02	1.5	0.03	0.03
Total	-	0.10	1.5	0.16	1.48*

*Includes an infiltration allowance of 0.33 L/s/ha

As indicated in the table above, the calculated post-development average sewage flow is significantly less than the allowable sewage flow calculated based on a rate of 35,000 L/gross ha/day.

A 200mm dia. sanitary sewer at a minimum slope of 1.0% has a full flow conveyance capacity of 34.2 L/s and will have sufficient capacity to convey the theoretical sanitary flows.

2.2 Water

The proposed site will be serviced by a new private 200mm dia. watermain network connected to the existing 300mm dia. watermain in Sheffield Road. The proposed water services will be

reduced to 150mm dia. lines before entering Building 'A' and Building 'B'. The services have been sized to provide the required domestic water demands. Shut-off valves will be provided on the proposed watermain at the property line, as well as on the individual services for isolation purposes. The water meters will be in the mechanical rooms inside the buildings; while the remote meters will be located on the exterior face of each building.

To determine if the existing 300mm dia. municipal watermain has adequate capacity to accommodate the proposed development a hydraulic analysis was completed based on boundary conditions provided by the City of Ottawa.

2.2.1 Domestic Water Demand

The City of Ottawa design criteria were used to calculate the theoretical water demand for the proposed development. The following design criteria were taken from Section 4 – 'Water Distribution Systems' of the Ottawa Design Guidelines – Water Distribution:

- Design Population (Building 'A'): 40-50 employees (use 50 in calculations)
- Design Population (Building 'B'): 10 employees
- Average Daily Water Demand (Employees incl. showers): 125 L/person/day
- Maximum Day Demand Peaking Factor = 1.5 x Avg. Day Demand (City Water Table 4.2)
- Peak Hour Demand Peaking Factor = 1.8 x Max. Day Demand (City Water Table 4.2)
- Average number of trucks washed per day: 0 to 4 (use 4 in calculations)
- Average Daily Water Demand (Wash Bay): 400 L/truck/day

Table 2 identifies the theoretical domestic water demands for the development based on the above design criteria.

Table 2: **Theoretical Water Demands for the Proposed Development**

Type of Use	Employees / Wash Bay	Average Day Demand (L/s)*	Max. Day Demand (L/s)	Peak Hour Demand (L/s)
Bldg 'A' Staff	50 employees	0.07	0.11	0.20
Bldg 'B' Staff	10 employees	0.01	0.02	0.04
Wash Bay	4 trucks	0.02	0.03	0.05
Total	-	0.10	0.16	0.29

*Values taken from **Table 1** above.

The following design criteria were taken from Section 4.2.2 – 'Watermain Pressure and Demand Objectives' of the City of Ottawa Design Guidelines for Water Distribution:

- Normal operating pressure are to range between 345 kPa (50 psi) and 482 kPa (70 psi) under Max Day demands
- Minimum system pressures are to be 276 kPa (40 psi) under Peak Hour demands
- Minimum system pressures are to be 140 kPa (20 psi) under Max Day + Fire Flow demands

2.2.1.1 Water Supply for Firefighting

The Fire Underwriters Survey (FUS) was used to estimate fire flow requirements for the proposed buildings. Non-sprinklered buildings with non-combustible construction were used in the calculations based on information provided by the architect. Based on preliminary FUS

calculations, the fire flow requirements for the larger warehouse (Building 'A') are expected to be in the order of 3,699 USGPM (or 233 L/s), while the fire flow requirements for the smaller garage (Building 'B') are expected to be in the order of 1,321 USGPM (or 83 L/s). Refer to **Appendix D** for a copy of the FUS fire flow calculations.

Based on the fire-flow requirements, a multi-hydrant approach to Firefighting will be required, which is in accordance with the City of Ottawa Technical Bulletin ISTB-2018-02. There is currently a Class AA (blue bonnet) municipal fire hydrant in front of the subject site (just north of the proposed drive-through) and another Class AA (blue bonnet) municipal hydrant in front of the 2505 Sheffield Road property. Based on the City of Ottawa Technical Bulletin ISTB-2018-02, Class AA (blue bonnet) hydrants have a minimum capacity 95 L/s (at a pressure of 20 PSI). In addition to these municipal hydrants, two (2) new private hydrants are being proposed on the subject site for fire-fighting purposes.

2.2.1.2 Water Modelling and Analysis

Preliminary domestic water demands, and fire flow requirements were provided to the City of Ottawa. These values were used to generate the municipal watermain network boundary conditions. **Table 2.1** summarizes the watermain boundary conditions, water demands, and the normal operating pressure ranges associated with the various design conditions.

Table 2.2: Hydraulic Boundary Condition Provided by the City

Municipal Watermain Boundary Condition	Boundary Condition	Water Demand (L/s)	Normal Operating Pressure Range (psi)
Minimum HGL (Peak Hour Demand)	109.5m	0.29	40 psi (min.)
Maximum HGL (Max Day Demand)	117.7m	0.16	50-70 psi
Max Day + FF HGL (Max Day + Fire Flow Demand)	95.0m	233.2	20 psi (min.)

The hydraulic model EPANET was used to analyzing the performance of the proposed watermain network for two theoretical conditions:

1) Maximum Day + Fire Flow Demand

2) Peak Hour Demand

A schematic representation of the hydraulic network depicts the node and pipe numbers used in the model. The model is based on hydraulic boundary conditions provided by the City of Ottawa. **Table 2.2**, **Table 2.3** and **Table 2.4** summarize the hydraulic model results. Refer to **Appendix D** for City of Ottawa boundary conditions, the hydraulic modeling schematic and modeling results.

Table 2.2: Maximum Day + Fire Flow Demand (Building 'A')

Operating Condition	Minimum System Pressure	Maximum System Pressure
Max Day demands of 0.11 L/s (Building A) and 0.05 L/s (Building B) + Fire Flows of 77.7 L/s at Nodes J2 and J4 (both Municipal Hydrants) and 77.7 L/s at Node J8 (Priv. Hydrant)	A minimum system pressure of 213.1 kPa (30.9 psi) is available at Node J8 (Private Hydrant)	A maximum system pressure of 308.7 kPa (44.8 psi) is available at Node J3 (Municipal watermain)

Table 2.3: Maximum Day + Fire Flow Demand (Building 'B')

Operating Condition	Minimum System Pressure	Maximum System Pressure
Max Day demands of 0.11 L/s (Building A) and 0.05 L/s (Building B) + Fire Flows of 83 L/s at Node J13 (Priv. Hydrant)	A minimum system pressure of 179.8 kPa (26.1 psi) is available at Node J13 (Private Hydrant)	A maximum system pressure of 313.9 kPa (45.5 psi) is available at Node J3 (Municipal watermain)

Table 2.4: Peak Hour Demand (Buildings 'A' and 'B')

Operating Condition	Minimum System Pressure	Maximum System Pressure
Peak Hour demands of 0.20 L/s (Building A) and 0.09 L/s (Building B)	A minimum system pressure of 407.1 kPa (59.0 psi) is available at Nodes J8, J10 and J13 (Private Hydrants/leads)	A maximum system pressure of 456.2 kPa (66.2 psi) is available at Node J3 (Municipal watermain)

The model indicates that the proposed 200mm dia. private watermain, fed off the 300mm dia. municipal watermain in Sheffield Road will provide adequate system pressures and flow for both 'Max Day + Fire Flow' and 'Peak Hour' conditions. A multi-hydrant approach to firefighting is in accordance with the City of Ottawa Technical Bulletin ISTB-2018-02.

3.0 STORM DRAINAGE AND STORMWATER MANAGEMENT

The proposed storm drainage and stormwater management design is based on the City of Ottawa Sewer Design Guidelines (October 2012) and subsequent Technical Bulletins. The previous SWM Report[1] was also reviewed as part of the proposed development to ensure consistency in the approach to on-site stormwater management. The approach for the stormwater management design for the proposed development is discussed in the subsequent sections of the report. Refer to the enclosed Stormwater Management Plan (119007-SWM) for additional details.

3.1 Existing Conditions

Under existing conditions, stormwater runoff from the site is being directed towards two (2) distinct and separate storm sewer systems, as described in the previous SWM Report[1]:

- Stormwater runoff from the existing building roof, front yard, parking lot and portion of the yard is being directed to the existing 1050mm/1200mm dia. municipal storm sewer in

Sheffield Road. This sewer then drains into the 1350mm dia. municipal storm sewer running within an easement along the south property line.

- Stormwater runoff from the remainder of the work yard is being directed to the on-site storm sewer system, which flows into the existing 450mm dia. CSP sewer running along the south property line.

Both systems discharge into Ramsay Creek, east of the subject site, through separate outlet structures. On-site stormwater management measures currently include:

- Controlling peak flows from the work yard at the back of the property using a plug type inlet control device (ICD) installed within the on-site storm sewer system.
- Providing stormwater quality control by directing flows from the work yard at the back of the property through a WaterGate WG100-type water quality treatment unit, installed at the downstream end of the on-site storm sewer system. Refer to the previous SWM Report[1], included in **Appendix B** for details.

3.2 Post-Development Conditions

Under post-development conditions, stormwater runoff from the subject site will continue to be directed to two (2) separate and distinct outlets. Stormwater runoff from the proposed building roofs, landscaped front yard and small parking lot will continue to be directed to the existing 1050mm dia. storm sewer in Sheffield Road. Stormwater runoff from the work yard at the back will continue to be directed to the on-site storm sewer system and outlet to the existing 450mm dia. CSP sewer, via a new water quality treatment unit. Further details are provided in the subsequent sections of the report.

A total storage volume of approximately 956 m^3 can be provided across the site by a combination of surface storage and rooftop storage.

3.3 Stormwater Management Criteria and Objectives

The stormwater management criteria used in the design of the proposed stormwater management system have been based on the City of Ottawa Sewer Design Guidelines (October 2012) and subsequent City of Ottawa Technical Bulletins (i.e. PIEDTB-2016-01, ISTB-2018-01, ISTB-2018-02, ISTB-2018-03, etc.). The criteria and objectives for the proposed stormwater management design are as follows:

- Provide a dual drainage system (i.e. minor system and emergency overland flow route, for events exceeding the 100-year design storm);
- Provide on-site storage for storm runoff which exceeds the allowable minor system release rate from the site, up to and including the 100-year design event;
- Ensure that no surface ponding will occur on the paved surfaces (i.e. private drive aisles, parking lots or work yard) during the 2-year storm event;
- Ponding depths are not to exceed 0.35m (static + dynamic) during storms greater than the 2-year event, up to the 100-year event;
- Control on-site the 100-year post-development flow to an allowable release rate specified by the City of Ottawa, prior to releasing flow from the site towards Ramsay Creek;

- Provide on-site water quality control equivalent to an 'Enhanced' Level of Protection (i.e., minimum 80% TSS removal) prior to releasing flows from the small parking lots and rear work yard towards Ramsay Creek (a tributary to Green's Creek);
- Provide guidelines to ensure that site preparation and construction is in accordance with the current Best Management Practices for Erosion a Sediment Control.

3.3.1 Allowable Release Rates

As specified by the City of Ottawa, the maximum allowable release rate from the site is to be calculated using the Rational Method, based on a 10-minute rainfall intensity, using a 5-year return period (City of Ottawa IDF Curves) and a runoff coefficient of 0.50.

The allowable release rate for the subject site is calculated as follows:

T_c = 10 min C =0.50
I_{5yr} = 104.2 mm/hr A = 4.01ha

Q_{allow} = 2.78 CIA
= 2.78 x 0.50 x 104.2 mm/hr x 4.01ha
= 580.8 L/s

3.4 Hydrologic & Hydraulic Modeling

The *City of Ottawa Sewer Design Guidelines* (October 2012) require hydrologic and hydraulic modeling for all dual drainage systems. The performance of the proposed storm drainage system for the subject site was evaluated using the PCSWMM hydrologic/ hydraulic model.

The PCSWMM model schematics and 100-year model output are provided in **Appendix E**. Digital copies of the modeling files and model output for all storm events are provided on the enclosed CD.

3.4.1 Design Storms

The hydrologic analysis was completed using the following synthetic design storm events. The IDF parameters used to generate the design storms were taken from the *City of Ottawa Sewer Design Guidelines* (October 2012).

Chicago Storms:	*12 Hour SCS Type II Storms:*
25mm 4-hour Chicago storm	2-year 12-hour SCS Type II Storm
2-year 3-hour Chicago storm	5-year 12-hour SCS Type II Storm
5-year 3-hour Chicago storm	100-year 12-hour SCS Type II Storm
100-year 3-hour Chicago storm	

The 3-hour Chicago distribution generates the highest peak flows for both the minor and major systems and was determined to be the critical storm distribution for the design of the storm drainage system.

To determine the water quality requirements of the site, the model was also run using the 4-hour 25mm Chicago storm event, as per MOE guidelines.

The proposed drainage system has also been stress tested using a 3-hour Chicago design storm that has a 20% higher intensity and total volume compared to the 100-year event.

3.4.2 Model Development

The PCSWMM model has been developed to account for both major and minor system flows from the subject site and ensure no adverse impacts on the receiving storm sewers and watercourse. The results of the analysis were used to:

- Determine the total major and minor system runoff from the site;
- Determine the required on-site storage volume;
- Evaluate the overland flow depths and ponding volumes during the 100-year event.

Infiltration

Infiltration losses for all catchment areas were modeled using Horton's infiltration equation, which defines the infiltration capacity of the soil over the duration of a precipitation event using a decay function that ranges from an initial maximum infiltration rate to a minimum rate as the storm progresses. The default values for the City of Ottawa were used for all catchments.

Horton's Equation:
$f(t) = f_c + (f_o - f_c)e^{-k(t)}$

Initial infiltration rate: f_o = 76.2 mm/hr
Final infiltration rate: f_c = 13.2 mm/hr
Decay Coefficient: k = 4.14/hr

Depression Storage

The default values for depression storage in the City of Ottawa were used for all catchments.

- Depression Storage (pervious areas): 4.67 mm
- Depression Storage (impervious areas): 1.57 mm

Equivalent Width

'Equivalent Width' refers to the width of the sub-catchment flow path. This parameter is calculated as described in Section 5.4.5.6 of the *Ottawa Sewer Design Guidelines*.

Impervious Values

Runoff coefficients were determined for the each of the proposed land uses. Impervious (%IMP) values for each sub-catchment area were calculated using the equation:

$$\%IMP = \frac{C - 0.2}{0.7}$$

Storm Drainage Areas

For modeling purposes, the site has been divided into sub-catchments based on the drainage areas tributary to each inlet of the proposed storm sewer system. The catchment areas are shown on the Stormwater Management Plan (119007-SWM). Refer to the enclosed General Plan of Services (119007-GP) for the proposed storm sewer layout and to the Grading and Erosion & Sediment Control Plan (119007-GR) for the location of high and low points.

The hydrologic parameters for each sub-catchment were developed based on the Stormwater Management Plan (119007-SWM). An overview of the drainage area parameters for each phase is provided in **Table 3.1**.

Table 3.1: Post-Development Drainage Area Parameters

Area ID	Catchment Area (ha)	Runoff Coefficient (C)	Percent Impervious (%)	No Depression (%)	Equivalent Width (m)	Average Slope (%)
Front Yard Areas						
A-01	0.262	0.46	37%	0%	87.45	1%
A-02	0.335	0.90	100%	0%	38.94	1%
Rear Yard Areas						
B-01	0.221	0.22	3%	0%	9.66	1%
B-02	0.174	0.90	100%	0%	53.21	1%
B-03	0.193	0.90	100%	0%	54.67	1%
B-04	0.160	0.90	100%	0%	55.22	1%
B-05	0.181	0.90	100%	0%	50.33	1%
B-06	0.356	0.90	100%	0%	51.47	1%
B-07	0.125	0.86	94%	0%	31.54	1%
B-08	0.172	0.90	100%	0%	28.73	1%
B-09	0.163	0.90	100%	0%	56.14	1%
B-10	0.307	0.90	100%	0%	69.31	1%
B-11	0.115	0.90	100%	0%	26.26	1%
B-12	0.326	0.90	100%	0%	42.92	1%
B-13	0.268	0.90	100%	0%	35.35	1%
B-14	0.042	0.23	4%	0%	18.35	1%
B-15	0.032	0.23	4%	0%	19.61	1%
Roof Areas						
R-01	0.523	0.90	100%	0%	67.15	1%
R-02	0.051	0.90	100%	0%	18.33	1%
TOTAL:	**4.01**					

As described above, stormwater runoff from the subject site will be directed to two (2) separate and distinct outlets. Stormwater runoff from the landscaped front yard and small parking lot (A-1 and A-2) and proposed building roofs (R-1 and R-2) will continue to be directed to the existing 1050mm dia. storm sewer in Sheffield Road. Stormwater runoff from the work yard at the back (B-2 to B-15) will continue to be directed to the on-site storm sewer system and outlet to the existing 450mm dia. CSP sewer, via a new water quality treatment unit. Stormwater runoff from all sub-catchment areas, excluding A-1 and B-1, will be controlled either by using ICDs or flow control roof drains, prior to being released from the site.

3.5 Model Results

The results of the PCSWMM model have been used to determine if the proposed design meets the criteria outlined in **Section 3.3**. The following sections outline the results of the PCSWMM model in further detail.

3.5.1 Orifice Controls

An ICD will be installed in the outlet pipe of CB1, located within the parking lot on the north side of Building 'A', to limit flows to the on-site storm sewer system.

Outflows from the rear work yard storm system (B-2 to B-15) will be controlled by a single ICD, installed within the outlet pipe of EX. STM MH 'A', before flowing through the proposed oil/grit separator (OGS) unit, and then into the existing 450mm CSP. Inflows to the on-site storm sewer system were modeled based on the characteristics of each inlet. All the catchbasins on site are located at low points. Inflows to the storm sewer are based on the depth of ponding at each inlet. Details for each orifice are outlined as follows in **Table 3.2**.

Table 3.2: ICD Orifice Parameters

Structure	ICD Size & Inlet Rate						
	Diameter (mm)	T/G (m)	Orifice Invert (m)	Target Head (m)	2-year Orifice Peak Flow (L/s)	5-year Orifice Peak Flow (L/s)	100-year Orifice Peak Flow (L/s)
CB 1	165	66.75	65.14	1.52	65.9	74.1	76.3
EX.STMH 'A'	250	67.05	64.34	2.58	184.3	202.8	206.8

The 165mm dia. ICD within the outlet pipe pf CB 1 has been sized to ensure there is no ponding at the low point during the 2-year storm event.

The 250mm dia. ICD within the outlet pipe of EX. STM MH 'A' has also been sized to ensure there is no ponding at low points during the 2-year storm event, and to control outflows from the rear work yard of the site to the capacity of the existing 450mm dia. storm sewer outlet.

Refer to **Appendix E** for detailed SWM calculations.

3.5.2 Major System Storage

Catchbasins and catchbasin manholes were modeled as storage nodes to account for the surface storage provided by the rear yard of the subject site, and the storage provided by the structure itself. The storage nodes are interconnected using short rectangular open channels to simulate flows cascading over high points when the available static storage is exceeded.

The stage-storage curves for each inlet were calculated using AutoDesk CAD software, based on the proposed surface shown on the Grading and Erosion & Sediment Control Plan (119007-GR). Based on the design, approximately 45 m^3 of storage is available within the parking area at CB 1 and 788 m^3 of storage is available within the rear work yard.

The major system network was evaluated using the PCSWMM model to ensure that the ponding depths conform to City standards. A summary of ponding depths and volumes for the 100-year event is provided in **Table 3.3**.

Table 3.3: 100-year Ponding Depths

Structure	T/G (m)	Max. Static Ponding		100-yr Event (3hr)				
		Elev. (m)	Depth (m)	Elev. (m)	Depth (m)	Cascading Flow?	Cascade Depth (m)	Max. Volume (m^3)
Front-Yard CBs								
CB01	66.75	67.05	0.30	66.95	0.20	N	0.00	45
Rear-Yard CBs								
CB02	66.85	67.10	0.25	67.06	0.21	N	0.00	100
CB03	66.95	67.20	0.25	67.16	0.21	N	0.00	50
CB04	66.85	67.10	0.25	67.10	0.25	N	0.00	59
CB05	66.85	67.12	0.27	67.10	0.25	N	0.00	16
CBMH01	66.85	67.10	0.25	67.06	0.21	N	0.00	87
CBMH02	66.95	67.20	0.25	67.10	0.15	N	0.00	6
CBMH03	66.85	67.10	0.25	67.08	0.23	N	0.00	75
CBMH04	66.90	67.15	0.25	67.13	0.23	N	0.00	73
CBMH05	66.95	67.17	0.22	67.16	0.21	N	0.00	132
CBMH06	66.95	67.20	0.25	67.16	0.21	N	0.00	22
EXMH-B09	66.85	67.10	0.25	67.09	0.24	N	0.00	64
EXMH-B10	66.85	67.10	0.25	67.09	0.24	N	0.00	105

The ponding depths vary across different structures throughout the site due to a variety of contributing factors including pipe size, slope, the hydraulic grade line, the available storage and the size of the tributary area. During the 100-year storm events, ponding depths will not exceed 0.30m across the site. Generally, ponding is confined to each low point with only some spill (cascading flow) occurring between two existing catchbasins. There will be no overland flow leaving the site during the 100-year storm event. During storm events 100-year+20% and greater, storm runoff which exceeds the available storage volume at each of these low points will either spill into an adjacent low point, or off the property along defined major drainage routes.

Ponding volumes and depths for all storm events (2yr-up to the 100yr+20%) are provided in **Appendix E**. There will be no ponding during the 2-year event, and ponding that occurs for larger storm events (5-year and greater) will not be present by the end of the event.

3.5.3 Controlled Building 'A' Roof Flows

Stormwater runoff from the Building 'A' roof (R-1) will be controlled using fourteen (14) Watts adjustable 'Accutrol' control flow roof drains (model number RD-100-A-ADJ); set between 'Fully Exposed' and 'Closed'.

Table 3.4 summarizes the post-development design flows from these sub-catchment areas as well as the type of roof drains, the maximum anticipated ponding depths, storage volumes required, and storage volumes provided for both the 5-year and the 100-year design events.

Table 3.4: Stormwater Flows and Roof Drains

Roof Drain ID & Drainage Area (ha)	Number of Roof Drains	Watts Roof Drain Model ID (Weir Opening)	Controlled Flow per Drain (L/s)		Approximate Ponding Depth Above Drains (m)		Storage Volume Required (m^3)		Max. Storage Available (m^3)
			1:5 Year	1:100 Year	1:5 Year	1:100 Year	1:5 Year	1:100 Year	
RD-1 (0.005 ha)	1	RD-100-A-ADJ (Closed)	0.32	0.32	0.10	0.13	0.7	1.7	2.1
RD-2 (0.005 ha)	1	RD-100-A-ADJ (Closed)	0.32	0.32	0.10	0.13	0.7	1.7	2.1
RD-3 (0.019 ha)	1	RD-100-A-ADJ (1/2 Exposed)	0.95	1.10	0.10	0.13	2.9	6.9	9.3
RD-4 (0.019 ha)	1	RD-100-A-ADJ (1/2 Exposed)	0.95	1.10	0.10	0.13	2.9	6.9	9.3
RD-5 (0.052 ha)	1	RD-100-A-ADJ (1/2 Exposed)	0.95	1.26	0.11	0.15	12.1	25.3	27.1
RD-6 (0.054 ha)	1	RD-100-A-ADJ (1/2 Exposed)	0.95	1.26	0.11	0.15	12.7	26.6	28.4
RD-7 (0.052 ha)	1	RD-100-A-ADJ (1/2 Exposed)	0.95	1.26	0.11	0.15	12.1	25.3	27.2
RD-8 (0.054 ha)	1	RD-100-A-ADJ (1/2 Exposed)	0.95	1.26	0.11	0.15	12.7	26.6	28.6
RD-9 (0.054 ha)	1	RD-100-A-ADJ (1/2 Exposed)	0.95	1.26	0.11	0.15	12.7	26.6	27.4
RD-10 (0.050 ha)	1	RD-100-A-ADJ (1/2 Exposed)	0.95	1.26	0.11	0.15	11.4	24.1	25.7
RD-11 (0.065 ha)	1	RD-100-A-ADJ (Fully Exposed)	1.34	1.89	0.11	0.14	14.5	29.9	33.3
RD-12 (0.066 ha)	1	RD-100-A-ADJ (Fully Exposed)	1.34	1.89	0.11	0.14	14.8	30.5	33.6
RD-13 (0.014 ha)	1	RD-100-A-ADJ (Closed)	0.32	0.32	0.11	0.15	3.0	6.9	7.0
RD-14 (0.014 ha)	1	RD-100-A-ADJ (Closed)	0.32	0.32	0.11	0.15	3.0	6.9	7.0
Total Roof (0.523 ha)	**14**	**-**	**11.56**	**14.82**	**-**	**-**	**116.2**	**245.9**	**268.1**

Refer to **Appendix F** for the Watts roof drain information and detailed SWM calculations. As indicated in the table above, the building roof will provide sufficient storage at a maximum ponding depth of 0.15m during the 100-year storm event.

3.5.1 Controlled Building 'B' Roof Flows

Stormwater runoff from the Building 'B' roof (R-2) will be controlled using two (2) Watts adjustable 'Accutrol' control flow roof drains (model number RD-100-A-ADJ); both set to '1/2 Exposed'.

Table 3.5 summarizes the post-development design flows from these sub-catchment areas as well as the type of roof drains, the maximum anticipated ponding depths, storage volumes required, and storage volumes provided for both the 5-year and the 100-year design events.

Table 3.5: Stormwater Flows and Roof Drains

Roof Drain ID & Drainage Area (ha)	Number of Roof Drains	Watts Roof Drain Model ID (Weir Opening)	Controlled Flow per Drain (L/s)		Approximate Ponding Depth Above Drains (m)		Storage Volume Required (m^3)		Max. Storage Available (m^3)
			1:5 Year	1:100 Year	1:5 Year	1:100 Year	1:5 Year	1:100 Year	
RD-15 (0.0255 ha)	1	RD-100-A-ADJ (1/2 Exposed)	0.79	1.10	0.08	0.12	9.7	20.6	31.0
RD-16 (0.0255 ha)	1	RD-100-A-ADJ (1/2 Exposed)							
Total Roof (0.051 ha)	**2**	**-**	**1.58**	**2.20**	**-**	**-**	**9.7**	**20.6**	**31.0**

Refer to **Appendix F** for the Watts roof drain information and detailed SWM calculations. As indicated in the table above, the building roof will provide sufficient storage at a maximum ponding depth of 0.15m during the 100-year storm event.

3.5.2 Peak Flows

The modeled peak flows for the outlets from the subject site for each storm event are summarized in **Table 3.6**.

Table 3.6: Peak Flows (L/s)

Storm Distribution->		4hr Chicago	3hr Chicago				12hr SCS		
Return Period->		25mm	2yr	5yr	100yr	100yr+ 20%	2yr	5yr	100yr
Front Yard	*SHEF-MIN*	71	95	114	149	170	56	76	136
	SHEF-MAJ	0	0	0	0	4	0	0	0
Rear Yard	*CREEK-MIN*	146	185	204	215	221	165	202	214
	CREEK-MAJ	0	0	0	0	10	0	0	0
TOTAL		217	280	318	363	405	221	278	351

As outlined in the table above, the Chicago 3-hour storms produce the highest peak flows. Total peak flows leaving the site will be well below the allowable 580.8 L/s.

As the outflows from the rear yard are controlled by a 250mm orifice, peak flows will not exceed the capacity of the receiving 450mm existing storm sewer. Note that this existing storm sewer does not receive flow from any other drainage area. Based on the City of Ottawa Sewer Design Guidelines Sewer Capacity Tables (Appendix 6A), a 450mm pipe at a slope of approximately 1% has a capacity of 297 L/s. As shown in the above table, the 100-year release rate (215 L/s) is below the capacity of the pipe.

3.5.3 Model Summary

The modelling results are summarized in **Table 3.7**. Included in the table are controlled and uncontrolled areas, peak flows as well as the required and provided storage volumes for the various catchment areas.

Table 3.7: Model Summary

Area ID(s)	Area (ha)	Controlled (Y/N)	Release Rate (L/s)			100-year Storage Volume Required (m3)	Storage Volume Provided (m)
			2-year	5-year	100-year		
A-01	0.262	N	21	28	58	N/A	0
A-02	0.335	Y	66	74	76	43	45
B-01	0.221	N	1	2	8	N/A	0
B-02 to B-15	2.614	Y	185	204	215	602	788
R-01	0.523	Y	12	14	15	250	250
R-02	0.051	Y	1	2	2	24	31
Total:	**4.01**	**-**	**286***	**324***	**374***	**919**	**1114**

**Note that total flows here do not match outlet peak flows. These flows do not account for pipe losses and timing of peaks from each area.*

3.5.3.1 Stormwater Quality Control

The subject site is located within the jurisdiction of the Rideau Valley Conservation Authority (RVCA) and is located within the Green's Creek watershed. An 'Enhanced' Level of Protection, equivalent to a long-term average removal of 80% Total Sus pended Solids (TSS), is required.

To achieve this level of quality control protection, two new oil-grit separator units: a Vortechs Model 5000 installed downstream of 'EX.STM MH A' on the storm sewer outlet pipe to treat the rear work yard; and a CDS unit model PMSU 20_15_4 installed downstream of 'CB 1' on the storm sewer outlet pipe to treat the north parking lot area. Stormwater runoff collected by the entire on-site storm sewer system (2.61 ha tributary area for the Vortechs unit and 0.39 ha for the CDS unit) will be directed through the respective stormwater quality control treatment units. The contributing areas include all paved parking areas (south and north sides of Building 'A') as well as the rear work yard.

As stated above, the proposed oil-grit separators have been sized to provide an 'Enhanced' Level of water quality treatment prior to discharging the stormwater towards Ramsay Creek. Echelon Environmental has modeled and analyzed the tributary areas to provide Vortechs and CDS units capable of meeting the TSS removal requirements. The model parameters for the TSS removal were based on historical rainfall data for Ottawa from the Ontario Climate Centre.

The CB and CBMH structures on site will be equipped with sumps to promote additional settling of sediment. It is expected that the proposed treatment train approach will be used to provide the requisite level of water quality control.

Maintenance and Monitoring of the Storm Sewer and Stormwater Management Systems

It is recommended that the client implement a maintenance and monitoring program for both the on-site storm sewers and the stormwater management systems: The storm drainage system should be inspected routinely (at least annually); the ICDs should be inspected to ensure they are free of debris; and the oil-grit separator should be inspected at regular intervals and maintained when necessary to ensure optimum performance. Refer to **Appendix G** for the Vortechs and CDS design parameters, sizing analyses, operations, design, performance and maintenance summary parameters as well as the annual TSS removal efficiency data.

4.0 SITE GRADING

The finished floor elevation (FFE) of the proposed buildings will be set at an elevation of 67.50m, which is slightly higher than the elevation of the existing buildings. The proposed buildings have been raised to ensure they are above the existing work yard at the back. An internal ramp will be required at the drive-through entrance of Building 'A', as Sheffield Road is approximately 2.0m lower than proposed building. Similarly, the site entrances off Sheffield Road will be sloped up into the site to access the weigh scales and work yard at the back of the property. A small retaining wall will be required near the main building entrance to make up the elevation difference down to the west property line. A larger retaining wall will be required at the back of the property, as the grade drops significantly along the east property line. Terracing with a maximum side slope of 3:1 will be required at certain locations to match into existing grades along the property lines. Refer to the enclosed Grading and Erosion & Sediment Control Plan (119007-GR) for details.

4.1 Emergency Overland Flow Route

In the case of a major rainfall event exceeding the design storms provided for, the stormwater located within the subject site will overflow towards the lower downstream sub-catchment areas and ultimately flow towards Sheffield Road and/or towards the back of the property. The Building 'A' and Building 'B' floor elevations have been set to be a minimum of 0.3m above the major system overflow points. The emergency overland flow route is shown on the enclosed Grading and Erosion & Sediment Control Plan (119007-GR).

5.0 GEOTECHNICAL INVESTIGATIONS AND MEANDER BELT ANALYSIS

A Geotechnical Investigation Report has been prepared by DST Consulting Engineers Inc. for the proposed project. Refer to the Geotechnical Report[1] for subsurface conditions, construction recommendations and geotechnical inspection requirements.

Due to the sensitive nature of the near-by Ramsay Creek, a Slope Stability and Meander Belt study was prepared by DST Consulting Engineers Inc. The DST report[4] determined that the proposed development at 2555 Sheffield Road should have no impact on the stability of the slope to Ramsay Creek.

6.0 EROSION AND SEDIMENT CONTROL

To mitigate erosion and to prevent sediment from entering the storm sewer system, temporary erosion and sediment control measures will be implemented on-site during construction in accordance with the Best Management Practices for Erosion and Sediment Control. This includes the following temporary measures:

- Filter bags will be placed under the grates of nearby catchbasins, manholes and will remain in place until vegetation has been established and construction is completed.
- Silt fencing will be placed per OPSS 577 and OPSD 219.110 along the surrounding construction limits;
- Mud mats will be installed at the site entrances.
- Street sweeping and cleaning will be performed, as required, to suppress dust and to provide safe and clean roadways adjacent to the construction site.

- On-site dewatering is to be directed to a sediment trap and/or gravel splash pad and discharged safely to an approved outlet as directed by the engineer.

The temporary erosion and sediment control measures will be implemented prior to construction and will remain in place during all phases of construction. Regular inspection and maintenance of the erosion control measures will be undertaken.

In addition, the following measures will provide permanent erosion and sediment control:

- A Vortechs Model 5000 Oil/Grit Separator will be installed to provide water quality control prior to releasing stormwater from the south parking lot and rear work yard areas.
- A CDS Model PMSU 20_15_4 Oil/Grit Separator will be installed to provide water quality control prior to releasing stormwater from the north parking lot area.

7.0 CONCLUSION

This report has been prepared in support of a site plan control application for the proposed industrial development located at 2555 Sheffield Road.

The conclusions are as follows:

- The proposed buildings will be serviced by the municipal watermain, sanitary and storm sewers in Sheffield Road.
- The rear work yard area will be serviced by the on-site storm sewer system, which currently outlets to the existing 450mm CSP sewer along the south boundary of the site.
- Storm runoff from the site will be controlled by a combination of roof drains and orifice controls upstream of the site outlets.
- Post-development flows will continue to be directed to two (2) separate and distinct outlets (i.e. the 1050mm dia. storm sewer in Sheffield Road and the 450mm dia. CSP sewer outlet running along the south property line). The 5-year total peak flow from the site will be approximately 318 L/s, and the 100-year total peak flow will be approximately 363 L/s. The total post-development peak flows are all below the allowable release rate of 580.8 L/s.
- Two (2) oil / grit separator units (a Vortechs Model 5000 and a CDS Model PMSU 20_15_4) will provide an '*Enhanced*' Level (80% long-term TSS removal) of water quality control for the portions of the site discharging to the existing 450mm private storm sewer and from the north parking lot area.
- Regular inspection and maintenance of the storm sewer system, including the orifice controls and treatment units (i.e. Vortechs and CDS units) is recommended to ensure that the storm drainage system is clean and operational.
- Erosion and sediment controls are to be provided both during construction and on a permanent basis.

It is recommended that the proposed site servicing and stormwater management design be approved for implementation.

NOVATECH

Prepared by:

Stephen Matthews, B.A. (Env.)
Senior Design Technologist

Kallie Auld, P. Eng.
Water Resources (SWM Design)

Reviewed by:

François Thauvette, P. Eng.
Senior Project Manager

APPENDIX A

Correspondence

Francois Thauvette

From: Walker, Max <max.walker@ottawa.ca>
Sent: Wednesday, March 6, 2019 11:43 AM
To: Tess Gilchrist
Cc: Sharif, Sharif
Subject: 2555 Sheffield Road
Attachments: Pre-applicationMemo_530Tremblay31Jan2019.pdf; Plans and Study list.pdf

Hi,

As a follow-up to our meeting, please find below information regarding the potential development of a new 65,000 sq. ft. warehouse at 2555 Sheffield Road. I have attached the required plans and studies list for an application for Site Plan Control (Manager Approval, Public Consultation). Should the proposed development/use change, another pre-consultation should be scheduled to discuss.

Policies/designations of the site:

- Official Plan – designated 'Employment Area' (Section 3.6.5)
- Zoning – Heavy Industrial
    - This zone permits a warehouse uses, which, by their nature, may generate noise, fumes, odours, and are hazardous or obnoxious, in accordance with the Employment Area designation of the Official Plan.

Infrastructure Comments:

- See attached memo.

Transportation Comments:

- The Screening Form has indicated that no TIA Triggers have been met, therefore no further TIA reports are required.

Planning Comments:

- The IH zone can take advantage of Section 93 of the Zoning By-law. Section 93 is applicable to a group of occupancies located in an AM, GM, LC, MC, MD, IG, IH, IL, or IP.
- If you wish to move forward using this provision, we will assess the merits of the application on the whole of the property which means that the plan and studies will have to encompass the totality of the site. The fees would also be amended to a revised Site Plan Control application.
    - The submitted Site Plan and other required documents, identified above, should clearly differentiate between the existing and the proposed buildings.
- In a scenario where you are severing the property and the site is designed, developed and managed, including site access and infrastructure servicing, individually, the scope of the Site Plan Control application with be limited to the noted site.
- There are likely different development scenarios and we would be happy to further discus.
- Parking, Queuing and Loading Provisions are detailed within Section 100-114. Please note that the subject site is located within area C – Suburban of Schedule 1A.

	I	IV
Row	**Land Use**	**Area C on Schedule 1A**
N95	Warehouse	0.8 per 100 m^2 of gross floor area

- While it is a IH zone, bicycle parking requirements are still applicable as per Section 111 - Bicycle Parking Space Rates and Provisions

(***h) animal hospital; storage yard; truck transport terminal; warehouse (Subject to By-law 2015-190)***	1 per 2000 m^2 of gross floor area
(i) all other non-residential uses	1 per 1500 m^2 of gross floor area

- Carefully review Section 113 - Loading Space Rates and Provisions
- Please ensure that the accessory structure meet the provisions of Section 69 - Setback from Watercourses.
- The minimum width of landscaping is 3 metres.
- A Environmental Site Assessment is required as per section 4.8.4 of the Official Plan which states the following:
    - *Potentially contaminated sites are sites where the environmental condition of the property (soil and/or groundwater) may have potential for adverse effects on human health, ecological health or the natural environment. In order to prevent these adverse effects, it is important prior to permitting development on these sites, to identify these sites and ensure that they are suitable or have been made suitable for the proposed use in accordance with provincial legislation and regulations.*

RVCA Comments:

- The existing storm sewer adjacent this site outlets less than 100 metres to Green's Creek. There is no municipal downstream facility which provides water quality treatment. Given the short distance from the site to the outlet, on-site water quality control of enhanced level (80% TSS removal) is required.

- There are also previous studies which were commissioned by the NCC including "Green's Creek Watershed Fluvial Risk Mapping: Appendix 2" prepared by JTB Environmental System Inc. which provided an estimated meander belt setback and slope stability setback. Based on the information of the report, the setbacks may encroach onto this property. Therefore a site specific geotechnical report which takes into account sensitive marine clays, slope stability considerations and the meander belt needs to be provided to establish any required setbacks on the property.

Environmental Comments:

- The site is adjacent to the NCC Greenbelt and according to Schedule B of the Official Plan the designation of the adjacent land is Greenbelt Rural which does not trigger an EIS. The site is also adjacent to Greens Creek with an intervening railway. Greens creek has a 30 m setback from the normal highwater mark. As long as you are not closer to the watercourse, an EIS is not required to satisfy the City's official plan policies. Further, it is unlikely we would approve a reduced setback to Greens Creek given this facility currently has a setback that appears to conform with the OP.

Fees

The fees are detailed in Table 1, below.

Table 1:

Manager Approval, Public Consultation Fee:	**$ 21,508.66**
Includes:	Planning Fee: $ 18,478
	On-Site Sign Fee: $576.30
	Legal Fee: $2,454.36 ($2,172 + $282.36 HST)
Plus	

Initial Engineering Design Review and Inspection Fee:	**$10,000 (includes HST)) (value of Hard and Soft Servicing $50,000-$300,000)**
Plus	
Conservation Authority Fee:	**$105**

Table 2:

Revision of an Existing Application	
Manager Approval, Public Consultation	**$ 20,287.13**

For information and guidance on preparing required studies and plans refer to http://ottawa.ca/en/city-hall/planning-and-development/how-develop-property/development-application-review-process-2/guide-preparing-studies-and-plans

Prior to making a complete submission, I also encourage you to discuss the proposal with the area Councilor and local community associations. Please note that these pre-consultation comments are valid for one year. If you submit a development application after this time, you may be required to meet for another pre-consultation meeting and/or the submission requirements may change.

If you have any questions regarding the above, please feel free to contact me.

Regards,

-Max

Max Walker, RPP
Planner I | Urbaniste I
Development Review (South Services) | Examen des projets d'aménagement (services sud)
Planning, Infrastructure and Economic Development | Services de planification, d'infrastructure et de développement économique
City of Ottawa | Ville d'Ottawa
☎ 613.580.2424 ext./poste 23947
ottawa.ca/planning / ottawa.ca/urbanisme

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MEMO

Date: 04-03-2019

To / Destinataire	Max, Walker
From / Expéditeur	Golam Sharif, Project Manager, Infrastructure Approvals
Subject / Objet	**Pre-Application Consultation** File No. PC2019-0029 **2555 Sheffield Rd, Ward No 18,** *Demolish and build a warehouse.*

Please note the following information regarding the engineering design submission for the above noted site:

1. The Servicing Study Guidelines for Development Applications are available at the following address: https://ottawa.ca/en/city-hall/planning-and-development/how-develop-property/development-application-review-process-2/guide-preparing-studies-and-plans

2. Servicing and site works shall be in accordance with the following documents:

   - ⇨ Ottawa Sewer Design Guidelines (October 2012), Technical Bulletin, ISDTB-2014-01, PIEDTB-2016-01 and ISTB-2018-01.
   - ⇨ Ottawa Design Guidelines – Water Distribution (2010) and Technical Bulletins ISD-2010-2, ISDTB-2014-02 and ISTB-2018-02.
   - ⇨ Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
   - ⇨ City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
   - ⇨ City of Ottawa Environmental Noise Control Guidelines (January, 2016)
   - ⇨ City of Ottawa Park and Pathway Development Manual (2012)
   - ⇨ City of Ottawa Accessibility Design Standards (2012)

- ⇨ Ottawa Standard Tender Documents (latest version)
- ⇨ Ontario Provincial Standards for Roads & Public Works (2013)

3. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-2424 x.44455).

4. The Stormwater Management Criteria, for the subject site, is to be based on the following:

   i. The 5-yr storm event using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.

   ii. The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less (§ 8.3.7.3).

   iii. A calculated time of concentration (Cannot be less than 10 minutes).

   iv. Flows to the storm sewer in excess of the 5-year storm release rate, up to and including the 100-year storm event, must be detained on site.

5. Deep Services (Storm, Sanitary & Water Supply)

i. A plan view of the existing services may be seen above. Services should ideally be grouped in a common trench to minimize the number of road cuts. The sizing of existing services is:

   a. Sheffield Road:

      i. Water – 300 mm (Conc – 1963).

ii. Sanitary – 375 mm (Concrete).

iii. Storm – 1050 mm/ 1200 mm (Concrete – 1990).

ii. As per City's Sewer Design guideline a monitoring manhole shall be required just inside the property line located in an accessible location (ie. Not in a parking area) for all non-residential and multi residential buildings connections from a private sewer to a public sewer.

iii. As per City's Sewer Design guideline it is expected that the alternative of a high level sewer in a public right-of-way and connected to the collector sewer is the preferred method of servicing properties.

iv. New connections to sewer or watermain services within the City right of way is subject to City approval and are to be made above the springline of the sewermain as per:

a. Std Dwg S11.1 for flexible main sewers – *connections made using approved tee or wye fittings.*

b. Std Dwg S11 (For rigid main sewers) – *lateral must be less that 50% the diameter of the sewermain,*

c. Std Dwg S11.2 (for rigid main sewers using bell end insert method) – *for larger diameter laterals where manufactured inserts are not available; lateral must be less that 50% the diameter of the sewermain,*

d. Connections to manholes permitted when the connection is to rigid main sewers where the lateral exceeds 50% the diameter of the sewermain. – Connect obvert to obvert with the outlet pipe unless pipes are a similar size.

e. No submerged outlet connections.

6. Water Boundary condition requests must include the location of the service and the expected loads required by the proposed development. Please provide the following information:

i. Location of service

ii. Type of development and the amount of fire flow required (as per FUS, 1999).

iii. Average daily demand: ___ l/s.

iv. Maximum daily demand: ___l/s.

v. Maximum hourly daily demand: ___ l/s.

vi. Hydrant location and spacing to meet City's Water Design guidelines.

7. Phase 1 ESAs and Phase 2 ESAs must conform to clause 4.8.4 of the Official Plan may be requires that development applications conform to Ontario Regulation 153/04.

8. MOECC ECA Requirements –

An MOECC Environmental Compliance Approval (Input Application Type - Industrial Sewage Works or Municipal/Private Sewage Works) will be required for the proposed development. Please contact Ontario Ministry of the Environment and Climate Change, Ottawa District Office to arrange a pre-submission consultation:

For I/C/I applications: Christina Des Rochers

(613) 521-3450, ext. 231

Christina.Desrochers@ontario.ca

9. Additional comments –

i. There is a 1350 mm storm sewer at the south side of the property on City easement (Plan 5R-13626). However, servicing connection to City easement is not permitted.

ii. Consult with RVCA for quality control measures for stormwater discharge (discharge to Greens Creek).

iii. Consult with RVCA if there is any specific stormwater requirement for the Green's Creek sub-watershed.

Should you have any questions or require additional information, please contact me directly at (613) 580-2424, x 20763 or by email at sharif.sharif@ottawa.ca.

Golam Sharif
Project Manager – Infrastructure Approvals
Development Review, South Branch

APPLICANT'S STUDY AND PLAN IDENTIFICATION LIST

Legend: **S** indicates that the study or plan is required with application submission.
A indicates that the study or plan may be required to satisfy a condition of approval/draft approval.

For information and guidance on preparing required studies and plans refer to:

http://ottawa.ca/en/development-application-review-process-0/guide-preparing-studies-and-plans

S/A	Number of copies	ENGINEERING		S/A	Number of copies
S	5	1. Site Servicing Plan	2. Assessment of Adequacy of Public Services / Site Servicing Study	S	3
S	5	3. Grade Control and Drainage Plan	4. Geotechnical Study	S	3
	2	5. Composite Utility Plan	6. Groundwater Impact Study		3
	3	7. Servicing Options Report	8. Wellhead Protection Study		3
S	9	9. Transportation Impact Brief	10.Erosion and Sediment Control Plan	S	3
S	3	11.Storm water Management Plan	12.Hydro geological and Terrain Analysis		3
	3	13.Hydraulic Water main Analysis	14.Noise / Vibration Study	S	3
	9	15.Roadway Modification Design Plan	16.Confederation Line Proximity Study		9

S/A	Number of copies	PLANNING / DESIGN / SURVEY		S/A	Number of copies
	10	17.Draft Plan of Subdivision	18.Plan Showing Layout of Parking Garage		2
	10	19.Draft Plan of Condominium	20.Planning Rationale	S	2
S	10	21.Site Plan/ Landscape Plan	22.Minimum Distance Separation (MDS)		3
	10	23.Concept Plan Showing Proposed Land Uses and Landscaping	24.Agrology and Soil Capability Study		5
	3	25.Concept Plan Showing Ultimate Use of Land	26.Cultural Heritage Impact Statement		3
	10	27.Landscape Plan	28.Archaeological Resource Assessment Requirements: **S** (site plan) **A** (subdivision, condo)		3
S	1	29.Survey Plan	30.Shadow Analysis		2
S	3	31.Architectural Building Elevation Drawings (dimensioned)	32.Design Brief		2
	2	33.Wind Analysis			

S/A	Number of copies	ENVIRONMENTAL		S/A	Number of copies
S	3	34.Phase 1 Environmental Site Assessment	35.Impact Assessment of Adjacent Waste Disposal/Former Landfill Site		6
	3	36.Phase 2 Environmental Site Assessment (depends on the outcome of Phase 1)	37.Assessment of Landform Features		7
	3	38.Record of Site Condition	39.Mineral Resource Impact Assessment		4
	3	40.Tree Conservation Report	41.Environmental Impact Statement / Impact Assessment of Endangered Species		2
	3	42.Mine Hazard Study / Abandoned Pit or Quarry Study			

S/A	Number of copies	ADDITIONAL REQUIREMENTS		S/A	Number of copies
S	1	43. Electronic Copy of All reports/drawings	44.		

Meeting Date: February 26, 2019

Application Type: *Site Plan Control*

File Lead (Assigned Planner): Max Walker
City Architect:

Infrastructure Approvals Project Manager: Sharif Sharif
Transportation Project Manager: Wally Dubyk

Site Address (Municipal Address): 2555 Sheffield Rd

*Preliminary Assessment: 1☐ 2☐ 3✓ 4☐ 5☐

*One (1) indicates that considerable major revisions are required before a planning application is submitted, while five (5) suggests that proposal appears to meet the City's key land use policies and guidelines. **This assessment is purely advisory and does not consider technical aspects of the proposal or in any way guarantee application approval.**

It is important to note that the need for additional studies and plans may result during application review. If following the submission of your application, it is determined that material that is not identified in this checklist is required to achieve complete application status, in accordance with the Planning Act and Official Plan requirements, the Planning and Growth Management Department will notify you of outstanding material required within the required 30 day period. Mandatory pre-application consultation will not shorten the City's standard processing timelines, or guarantee that an application will be approved. It is intended to help educate and inform the applicant about submission requirements as well as municipal processes, policies, and key issues in advance of submitting a formal development application. This list is valid for one year following the meeting date. If the application is not submitted within this timeframe the applicant must again pre-consult with the Planning and Growth Management Department.

Francois Thauvette

From: Jamie Batchelor <jamie.batchelor@rvca.ca>
Sent: Wednesday, March 13, 2019 2:45 PM
To: Francois Thauvette
Cc: Steve Matthews
Subject: Re: Request for SWM water quality control criteria - 2555 Sheffield Rd.

Good afternoon Francois,

I can confirm that the appropriate water quality target is enhanced (80% TSS removal).

From: Francois Thauvette <f.thauvette@novatech-eng.com>
Sent: March 13, 2019 2:28 PM
To: Jamie Batchelor
Cc: Steve Matthews
Subject: Request for SWM water quality control criteria - 2555 Sheffield Rd.

Hi Jamie,

We are sending this e-mail requesting the stormwater quality control criteria for a proposed industrial development located at 2555 Sheffield Road, in Ottawa. The subject site drains to the municipal storm sewer system that drains into Green's Creek (located immediately east of the subject site). The industrial development on the adjacent lot required 80% TSS removal.

Please review and advise. Do not hesitate to send us an e-mail should you have any questions or require any additional information.

Regards,

François Thauvette, P. Eng., Senior Project Manager | Land Development & Public Sector Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 219 | Cell: 613.276.0310 | Fax: 613.254.5867

APPENDIX B

Previous SWM Report and ECA for the Subject Site

Ontario

Ministry of the Environment and Climate Change
Ministère de l'Environnement et de l'Action en matière de changement climatique

ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER 5461-AMAKBG
Issue Date: May 24, 2017

American Iron & Metal GP Inc./ Fer Et Metaux Americains GP Inc.
2555 Sheffield Rd
Ottawa, Ontario
K1B 3V6

Site Location: 2555 Sheffield Road
City of Ottawa, Ontario
K1B 3V6

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

Upgraded existing Sewage Works located at the above site location, servicing a 2.667 ha metal recycling facility of which 1.38 ha is covered with a roller-compacted concrete pad , for the collection, transmission, treatment and disposal of stormwater runoff from the site, to provide enhanced level water quality protection and discharge into the municipal storm sewer along the south side of the property , consisting of the following:

Storm Sewer System

Drainage system consisting of catchbasin (CB) and Manhole (MH) that are connected as follows:

CB/MH1 (northwest of the property) discharges to CB/MH2 (northwest of the property) through a 52.5 m long 375 mm diameter HDPE pipe;

CB/MH3 (approximately centre of the property) receives flows from CB/MH2 through a 50.0 m long 525 mm diameter HDPE pipe;

CB/MH4 located at the southwest corner with a storm pipe 33.0 m long 375 mm diameter drains into CB/MH5;

CB/MH5 (south of the property) receives flows from CB/MH3 through a 48.0 m long 600 mm diameter HDPE pipe;

CB/MH6 (south east of the property) receives flows from CB/MH5 through a 39.0 m long 750 mm diameter HDPE pipe;

CB/MH7 (south east of the property) receives flows from both CB/MH6 through a 48.0 m long 750 mm diameter HDPE pipe and CB/MH8 (north east of the property) through a 50.0 m long 750 mm diameter HDPE pipe;

swale along the northern (approximately 200 m long) and eastern property (approximately 105 m long) boundary drains into the piped drainage system at DICB/MH8.

CB/MH7, equipped with a 115 mm diameter orifice control device to restrict the peak flow to the Oil and Grease Separator (OGS) described below to 38.8 L/s; draining into the OGS through a 11.0 m long 300 mm diameter storm pipe.

Oil and Grease Separator

One (1) custom-built oil/water separator, having a sediment capacity of 750 L , an oil capacity of 3,200 L, a total holding capacity of 6,100 L and a maximum treatment flow rate of 105 L per second, discharging into the municipal storm sewer along the south side of the property ;

- all other appurtenances essential for the proper operation of the aforementioned Sewage Works;

all in accordance with supporting documents listed in **Schedule A** .

For the purpose of this environmental compliance approval, the following definitions apply:

"Approval" means this entire document and any schedules attached to it, and the application;

"Director" means a person appointed by the Minister pursuant to section 5 of the EPA for the purposes of Part II.1 of the EPA;

"District Manager" means the District Manager of the Ottawa District Office of the Ministry;

"EPA" means the Environmental Protection Act , R.S.O 1990, c.E.19, as amended;

"Ministry" means the ministry of the government of Ontario responsible for the EPA and OWRA and includes all officials, employees or other persons acting on its behalf;

"Owner" means American Iron & Metal GP Inc./ Fer Et Metaux Americains GP Inc., and includes its successors and assignees;

"OWRA" means the Ontario Water Resources Act , R.S.O. 1990, c. O.40, as amended; and

"Works" means the sewage works described in the Owner's application and this Approval.

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL PROVISIONS

(1) The Owner shall ensure that any person authorized to carry out work on or operate any aspect of the Works is notified of this Approval and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

(2) Except as otherwise provided by these Conditions, the Owner shall design, build, install, operate and maintain the Works in accordance with the description given in this Approval, the application for approval of the Works and the submitted supporting documents and plans and specifications as listed in this Approval.

(3) Where there is a conflict between a provision of any submitted document referred to in this Approval and the Conditions of this Approval, the Conditions in this Approval shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

(4) Where there is a conflict between the listed submitted documents, and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.

(5) The requirements of this Approval are severable. If any requirement of this Approval, or the application of any requirement of this Approval to any circumstance, is held invalid or unenforceable, the application of such requirement to other circumstances and the remainder of this Approval shall not be affected thereby.

(6) The issuance of, and compliance with the conditions of, this Approval does not:

(a) relieve any person of any obligation to comply with any provision of any applicable statute, regulation or other legal requirement, including, but not limited to, the obligation to obtain approval from the local conservation authority necessary to construct or operate the sewage works; or

(b) limit in any way the authority of the Ministry to require certain steps be taken to require the Owner to furnish any further information related to compliance with this Approval.

2. CHANGE OF OWNER

(1) The Owner shall notify the District Manager and the Director, in writing, of any of the following changes within thirty (30) days of the change occurring:

(a) change of Owner;

(b) change of address of the Owner;

(c) change of partners where the Owner is or at any time becomes a partnership, and a copy of the most recent declaration filed under the Business Names Act , R.S.O. 1990, c.B17 shall be included in the notification to the District Manager; and

(d) change of name of the corporation where the Owner is or at any time becomes a corporation,

and a copy of the most current information filed under the Corporations Information Act , R.S.O. 1990, c. C39 shall be included in the notification to the District Manager.

3. OPERATION AND MAINTENANCE

(1) The Owner shall design, construct and operate the oil/water separator with the objective that no visible oil sheens occur in the effluent discharged from the oil/water separator.

(2) The Owner shall carry out and maintain an annual inspection and maintenance program on the operation of the oil/water separator in accordance with the manufacturer's recommendation.

(3) After a four (4) year period, the District Manager of the MOE District Office may alter the frequency of inspection of the oil/water separator if he/she is requested to do so by the Owner and considers it acceptable upon review of information submitted in support of the request.

4. EFFLUENT LIMITS

(1) The Works shall be designed, constructed and operated such that at all times, the effluent discharged from the oil/water separator to the surface area will not contain solvent extractable matter of mineral or synthetic origin in excess of 15 milligrams per litre, as measured by Oil and Grease.

(2) The pH of the effluent discharged from the oil/water separator shall be maintained within the range of 6.0 to 9.5 (inclusive) at all times.

(3) Notwithstanding any other Condition of this Approval, the Owner shall ensure that the effluent from the Works is essentially free of floating and settleable solids and does not contain oil or any other substance in amounts sufficient to create a visible film or sheen or foam in the receiving ditch.

5. EFFLUENT MONITORING AND RECORDING

The Owner shall, upon commencement of operation of the sewage works, carry out the following monitoring program:

(1) All samples and measurements taken for the purposes of this Approval are to be taken at a time and in a location characteristic of the quality and quantity of the effluent stream over the time period being monitored.

(2) Samples shall be collected and analyzed at the following sampling point, at the sampling frequencies and using the sample type specified for each parameter listed:

Table 1 - Effluent Monitoring (Effluent from the oil/water separator)	
Frequency	At least once a Month when there is Discharge
Sample Type	Grab
Parameters	Oil and Grease, pH, Phenol, Total Suspended Solids, and Dissolved Organic Carbon

(3) The methods and protocols for sampling, analysis and recording shall conform to the methods and protocols specified in the Ministry's publication "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" (August 1994), ISBN 0-7778-1880-9, as amended from time to time by more recently published editions.

(4) The *Owner* shall supplement this monitoring program with visual inspections which shall include the following:

(a) Daily inspection of the effluent from the oil/water separator during discharge of treated water for any visible oil sheen, foaming or floating debris; and

(b) Quarterly inspections of the contents of the oil/water separator for the accumulation of oil products and sediment.

(5) The measurement frequencies specified in condition 5.2 in respect of any parameter are minimum requirements which may, after 48 months of monitoring in accordance with this Condition, be modified by the District Manager in writing from time to time.

6. REPORTING EMERGENCIES

(1) As it relates to the approved works, the Owner shall ensure that, upon the occurrence of any spill, bypass or loss of any product, by product, intermediate product, oils, solvents, waste material or any other polluting substance into the environment, such occurrence be immediately reported to the Spills Action Centre for the Ministry (Telephone No. 1-800-268-6060).

(2) In furtherance to Condition 6.1, the Owner shall, within ten (10) working days of the occurrence, submit a full written report of the occurrence to the District Manager describing the cause and discovery of the spill or loss, clean-up and recovery measures taken, preventative measures to be taken and schedule of implementation.

7. RECORD KEEPING

(1) The Owner shall maintain a log-book at the site at all times, which upon request must be made available for inspection and copying by Ministry personnel. The log-book shall include the following:

(a) results of the monitoring required by Conditions 5(1), 5(2), 5(3), and 5(4); and

(b) quantity and frequency of slop oil disposal from the separator, including a copy of the disposal manifest.

(2) The Owner shall maintain the records in the log-book for a period of at least **3 years** from the date in which a particular record was created.

8. SPILL CONTINGENCY PLAN

(1) Within six (6) months from the issuance of this Approval, the Owner shall implement a spill contingency plan - that is a set of procedures describing how to mitigate the impacts of a spill within

the area serviced by the works. This plan shall include as a minimum:

(a) the name, job title and location (address) of the Owner, person in charge, management or person(s) in control of the facility;

(b) the name, job title and 24-hour telephone number of the person(s) responsible for activating the spill contingency plan;

(c) a site plan drawn to scale showing the facility, nearby buildings, streets, catchbasins & manholes, drainage patterns (including direction(s) of flow in storm sewers), any receiving body(ies) of water that could potentially be significantly impacted by a spill and any features which need to be taken into account in terms of potential impacts on access and response (including physical obstructions and location of response and clean-up equipment);

(d) steps to be taken to report, contain, clean up and dispose of contaminants following a spill;

(e) a listing of telephone numbers for: local clean-up company(ies) who may be called upon to assist in responding to spills; local emergency responders including health institution(s); and MOECC Spills Action Centre 1-800-268-6060;

(f) Materials Safety Data Sheets (MSDS) for each hazardous material which may be transported or stored within the area serviced by the works;

(g) the means (internal corporate procedures) by which the spill contingency plan is activated;

(h) a description of the spill response training provided to employees assigned to work in the area serviced by the works, the date(s) on which the training was provided and by whom;

(i) an inventory of response and clean-up equipment available to implement the spill contingency plan, location and, date of maintenance/replacement if warranted; and

(j) the date on which the contingency plan was prepared and subsequently, amended.

(2) The spill contingency plan shall be kept in a conspicuous, readily accessible location on-site.

(3) The spill contingency plan shall be amended from time to time as required by changes in the operation of the facility.

9. EFFLUENT REQUIREMENT (FUTURE)

(1) Based on the monitoring results specified in Condition 5 (2), the Director may impose additional effluent limits in the future for the effluent from the Works. The Owner shall have to submit a proposal for approval of a treatment system to meet the limits being imposed in the future.

Schedule A

Environmental Compliance Approval (ECA) supporting documents:

1. Environmental Compliance Approval Application for Sewage Works dated March 24, 2016 signed by Kamila Wirpszo of American Iron & Metal GP Inc.;

2. A document entitled “Detailed Project and Process Description”, dated March, 2016 and prepared by DST Consulting Engineers Inc.; and

3. A document entitled “Stormwater Management Report 2555 Sheffield Road, Ottawa”, dated December 2015 prepared by Golder Associates.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is imposed to ensure that the Works are built and operated in the manner in which they were described for review and upon which approval was granted. This condition is also included to emphasize the precedence of Conditions in this Approval and the practice that this Approval is based on the most current document, if several conflicting documents are submitted for review. The condition also advises the owners their responsibility to notify any person they authorized to carry out work pursuant to this Approval the existence of this Approval. Subsection (6) is included to emphasize that the issuance of this Approval does not diminish any other statutory and regulatory obligations to which the Owner is subject in the construction, maintenance and operation of the Works. The Condition specifically highlights the need to obtain any necessary conservation authority approvals. The Condition also emphasizes the fact that this Approval doesn't limit the authority of the Ministry to require further information.

2. Condition 2 is included to ensure that the Ministry records are kept accurate and current with respect to approved Works and to ensure that subsequent owners of the Works are made aware of this Approval and continue to operate the Works in compliance with it.

3. Condition 3 is imposed to ensure that the oil/water separator is operated and maintained without any adverse impact on the environment.

4. Condition 4 is imposed to ensure that the effluent discharged from the works to the environment meets the Ministry's effluent quality requirements thus minimizing environmental impact on the receiver.

5. Condition 5 is included to ensure that the Owner can demonstrate on a continual basis that the quality of the effluent from the works is consistent with the effluent limits and the approved Works does not cause any impairment in the surrounding environment.

6. Condition 6 is included to ensure that the Ministry is immediately informed of the occurrence of an emergency or otherwise abnormal situation so that appropriate steps are taken to address the immediate concerns regarding the protection of public health and the minimizing of the severity of environmental damage and to be able to devise an overall abatement strategy to prevent long term degradation and the recurrence of the situation.

7. Condition 7 is included to ensure that accurate information is readily available so that a proper and accurate assessment of the operating performance of the works may be conducted and that appropriate measures be taken should the operating performance of the works not be satisfactory.

8. Condition 8 is included to ensure that the Owner will implement the spill contingency plan, such that the environment is protected and deterioration, loss, injury or damage to any person(s) or property is prevented.

9. Condition 9 is included to make the Owner aware that the Director may impose additional effluent limits for the discharge from the Works and, if required, the Owner shall have to submit a proposal for a treatment system to comply with the imposed limits.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

a. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
b. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

1. The name of the appellant;
2. The address of the appellant;
3. The environmental compliance approval number;
4. The date of the environmental compliance approval;
5. The name of the Director, and;
6. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act
Ministry of the Environment and Climate Change
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or** www.ert.gov.on.ca

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 24th day of May, 2017

Fariha Pannu, P.Eng.
Director
appointed for the purposes of Part II.1 of
the *Environmental Protection Act*

YK/
c: District Manager, MOECC Ottawa
Bahman Bani Hashemi, DST Consulting Engineers Inc.

APPENDIX C

Development Servicing Study Checklist

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

N/A ☐ Executive Summary (for larger reports only).

☑ Date and revision number of the report.

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

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

☑ 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.

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

N/A ☐ Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.

☑ Statement of objectives and servicing criteria.

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

☑ 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).

☑ 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.

N/A ☐ 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.

☑ Reference to geotechnical studies and recommendations concerning servicing.

☑ All preliminary and formal site plan submissions should have the following information:

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

4.2 Development Servicing Report: Water

N/A ☐ Confirm consistency with Master Servicing Study, if available

☑ Availability of public infrastructure to service proposed development

☑ Identification of system constraints

☑ Identify boundary conditions

☑ Confirmation of adequate domestic supply and pressure

☑ 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.

N/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.

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

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

N/A ☐ Check on the necessity of a pressure zone boundary modification.

☑ 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

☑ Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.

N/A ☐ Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.

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

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

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).

N/A ☐ Confirm consistency with Master Servicing Study and/or justifications for deviations.

☑ 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.

☑ Description of proposed sewer network including sewers, pumping stations, and forcemains.

N/A ☐ 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.

4.4 Development Servicing Report: Stormwater Checklist

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

☑ Analysis of available capacity in existing public infrastructure.

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

☑ 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.

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

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

N/A ☐ Set-back from private sewage disposal systems.

N/A ☐ Watercourse and hazard lands setbacks.

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

N/A ☐ Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.

- [x] Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).
- [ ] N/A Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.
- [x] 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.
- [x] Any proposed diversion of drainage catchment areas from one outlet to another.
- [x] Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.
- [ ] N/A 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.
- [x] Identification of potential impacts to receiving watercourses
- [ ] N/A Identification of municipal drains and related approval requirements.
- [x] Descriptions of how the conveyance and storage capacity will be achieved for the development.
- [x] 100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.
- [x] Inclusion of hydraulic analysis including hydraulic grade line elevations.
- [x] Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.
- [ ] N/A 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.

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:

NOTED ☐ 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.

NOTED ☐ 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.)

4.6 Conclusion Checklist

☑ Clearly stated conclusions and recommendations

TBD ☐ Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.

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

APPENDIX D

Water Demands, FUS Calculations, Boundary Conditions, Schematic of the Hydraulic Model and Hydraulic Modeling Results

Francois Thauvette

From: Sharif, Golam <sharif.sharif@ottawa.ca>
Sent: Thursday, June 20, 2019 10:43 AM
To: Francois Thauvette
Subject: RE: 2555 Sheffield Road - Request for WM Boundary Conditions
Attachments: 2555 Sheffield June 2019.pdf

Hello Francois,

Here is the water boundary condition. If you have any question, please let me know. Thanks.

Sharif

The following are boundary conditions, HGL, for hydraulic analysis at 2555 Sheffield (zone 1E) assumed to be connected to the 305mm on Sheffield (see attached PDF for location).

Minimum HGL = 109.5m

Maximum HGL = 117.7m

MaxDay + Fireflow (267L/s) = 95.0m

These are for current conditions and are based on computer model simulation.

Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.

From: Francois Thauvette <f.thauvette@novatech-eng.com>
Sent: June 17, 2019 9:31 AM
To: Sharif, Golam <sharif.sharif@ottawa.ca>
Cc: Steve Matthews <S.Matthews@novatech-eng.com>
Subject: 2555 Sheffield Road - Request for WM Boundary Conditions

Hi Sharif,

We are working on a proposed industrial development (metal recycling facility) at 2555 Sheffield Road. We are sending you this e-mail to request watermain boundary conditions for a proposed water service connection to the 300mm dia. WM in Sheffield Road. The anticipated water demands for the proposed development (2 buildings) are as follows:

- Average Day Demand = 0.10 L/s
- Max. Day Demand = 0.16 L/s
- Peak Hour Demand = 0.29 L/s
- Max Daily + Fire Flow = 267.2 L/s (FUS fire flow of 267 L/s)*

*Based on a non-combustible, non-sprinklered buildings per the architectural design. See attached FUS calculation sheets for details. The FUS flow above if for Building 'A', which requires the largest fire flow demand.

Regards,

François Thauvette, P. Eng., Senior Project Manager | Land Development & Public Sector Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 219 | Cell: 613.276.0310 | Fax: 613.254.5867

'

'


Boundary Condition for 2555 Sheffield
N
Legend
Pipe Ownership
Ownership
Private
Public
BANTREE ST
SHEFFIELD RD
2471
2360
2475
2464
2489
101
2505
2500
2510
2510
2510
2510
2191
2575
2965
2105
2177
2191
2161
2161
2151
2574
2535
2574
2100
2555
2540
2550
2575
2590
2570
2590
2595
2600
2590
2615
2620
1275
2635
2644
2658
2625
2625
305mm
203mm
51mm
152mm
254mm
102mm

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 119007
Project Name: 2555 Sheffield Road - AIM
Date: 3/26/2020
Input By: S.Matthews
Reviewed By: F.Thauvette

Legend: Input by User; No Information or Input Required

Building Description: AIM - Building 'A'
Non-combustible construction

Step			Input		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction **C**	Wood frame		1.5	0.8	
		Ordinary construction		1		
		Non-combustible construction	Yes	0.8		
		Modified Fire resistive construction (2 hrs)		0.6		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	5230			
		Number of Floors/Storeys	1			
		Area of structure considered (m^2)			**5,230**	
	F	**Base fire flow without reductions**				**13,000**
		F = 220 **C** (**A**)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	0%	**13,000**
		Limited combustible		-15%		
		Combustible	Yes	0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**			**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	No	-30%		**0**
		Standard Water Supply		-10%		
		Fully Supervised System		-10%		
				Cumulative Total	**0%**	
5	**Exposure Surcharge (cumulative %)**				**Surcharge**	
	(3)	North Side	> 45.1m		0%	**650**
		East Side	> 45.1m		0%	
		South Side	> 45.1m		0%	
		West Side	30.1- 45 m		5%	
				Cumulative Total	**5%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**14,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**233**
				or	USGPM	3,699
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	3
		Required Volume of Fire Flow (m^3)			m^3	2520

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

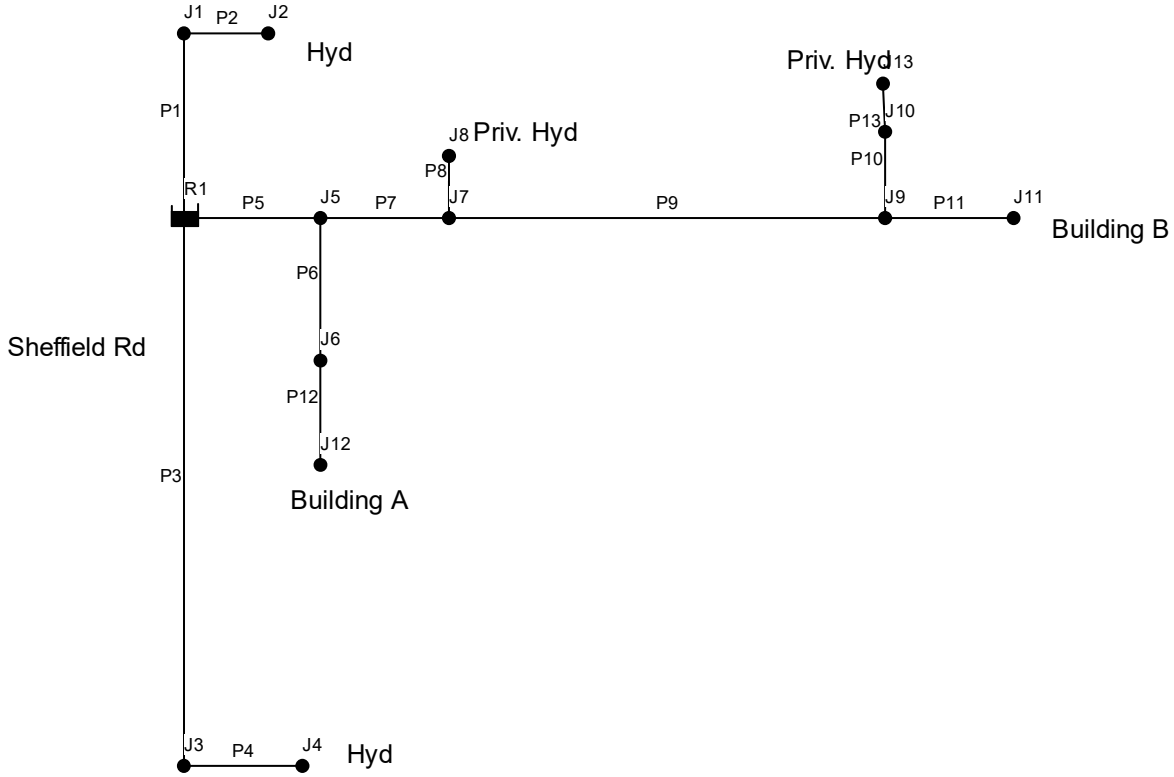
Novatech Project #: 119007
Project Name: 2555 Sheffield Road - AIM
Date: 3/26/2020
Input By: S.Matthews
Reviewed By: F.Thauvette

Legend: Input by User; No Information or Input Required

Building Description: AIM - Building 'B'
Non-combustible construction

Step			Input		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction **C**	Wood frame		1.5	0.8	
		Ordinary construction		1		
		Non-combustible construction	Yes	0.8		
		Modified Fire resistive construction (2 hrs)		0.6		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	510			
		Number of Floors/Storeys	1			
		Area of structure considered (m^2)			**510**	
	F	**Base fire flow without reductions**				**4,000**
		F = 220 **C** (**A**)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	0%	**4,000**
		Limited combustible		-15%		
		Combustible	Yes	0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**			**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	No	-30%		**0**
		Standard Water Supply		-10%		
		Fully Supervised System		-10%		
				Cumulative Total	**0%**	
5	**Exposure Surcharge (cumulative %)**				**Surcharge**	
	(3)	North Side	10.1 - 20 m		15%	**600**
		East Side	> 45.1m		0%	
		South Side	> 45.1m		0%	
		West Side	> 45.1m		0%	
				Cumulative Total	**15%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**5,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**83**
				or	USGPM	1,321
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	1.75
		Required Volume of Fire Flow (m^3)			m^3	525

2555 Sheffield Rd - AIM (119007)



2555 Sheffield

Max Day + Fire Flow Demand (Multi-hydrant approach Building 'A')
Network Table - Nodes & Pipes

Node ID	Elevation	Demand	Head	Pressure	Pressure	Pressure
	m	L/s	m	m	kPa	psi
Junc J1	63.8	0	94.86	31.06	304.70	44.19
Junc J2 (Hyd)	67	77.7	94.48	27.48	269.58	39.10
Junc J3	63	0	94.47	31.47	308.72	44.78
Junc J4 (Hyd)	66.5	77.7	94.09	27.59	270.66	39.26
Junc J5	64.6	0	93.85	29.25	286.94	41.62
Junc J6	64.8	0	93.85	29.05	284.98	41.33
Junc J7	64.7	0	91.67	26.97	264.58	38.37
Junc J8 (Priv. Hyd)	68	77.7	89.72	21.72	213.07	30.90
Junc J9	64.5	0	91.67	27.17	266.54	38.66
Junc J10	68	0	91.67	23.67	232.20	33.68
Junc J11 (Bldg B)	64.9	0.05	91.67	26.77	262.61	38.09
Junc J12 (Bldg A)	67.5	0.11	93.85	26.35	258.49	37.49
Junc J13 (Priv. Hyd)	68	0	91.67	23.67	232.20	33.68
Resvr R1	95	-233.26	95	0	0.00	0.00

Link ID	Length	Diameter	Roughness	Flow	Velocity	Unit Headloss
	m	mm		L/s	m/s	m/km
Pipe P1	30	300	120	77.7	1.1	4.67
Pipe P2	2	150	100	77.7	4.4	191.58
Pipe P3	112.5	300	120	77.7	1.1	4.67
Pipe P4	2	150	100	77.7	4.4	191.58
Pipe P5	29	200	110	77.86	2.48	39.7
Pipe P6	24	150	100	0.11	0.01	0
Pipe P7	55	200	110	77.75	2.47	39.59
Pipe P8	10.2	150	100	77.7	4.4	191.58
Pipe P9	85.2	200	110	0.05	0	0
Pipe P10	12	200	110	0	0	0
Pipe P11	24.7	150	100	0.05	0	0
Pipe P12	1.6	150	100	0.11	0.01	0
Pipe P13	2.6	150	100	0	0	0

2555 Sheffield

Max Day + Fire Flow Demand (Multi-hydrant approach Building 'B')
Network Table - Nodes & Pipes

Node ID	Elevation	Demand	Head	Pressure	Pressure	Pressure
	m	L/s	m	m	kPa	psi
Junc J1	63.8	0	95	31.2	306.07	44.39
Junc J2 (Hyd)	67	0	95	28	274.68	39.84
Junc J3	63	0	95	32	313.92	45.53
Junc J4 (Hyd)	66.5	0	95	28.5	279.59	40.55
Junc J5	64.6	0	93.7	29.1	285.47	41.40
Junc J6	64.8	0	93.7	28.9	283.51	41.12
Junc J7	64.7	0	91.24	26.54	260.36	37.76
Junc J8 (Priv. Hyd)	68	0	91.24	23.24	227.98	33.07
Junc J9	64.5	0	87.43	22.93	224.94	32.63
Junc J10	68	0	86.89	18.89	185.31	26.88
Junc J11 (Bldg B)	64.9	0.05	87.43	22.53	221.02	32.06
Junc J12 (Bldg A)	67.5	0.11	93.7	26.2	257.02	37.28
Junc J13 (Priv. Hyd)	68	83	86.33	18.33	179.82	26.08
Resvr R1	95	-83.16	95	0	0.00	0.00

Link ID	Length	Diameter	Roughness	Flow	Velocity	Unit Headloss
	m	mm		L/s	m/s	m/km
Pipe P1	30	300	120	0	0	0
Pipe P2	2	150	100	0	0	0
Pipe P3	112.5	300	120	0	0	0
Pipe P4	2	150	100	0	0	0
Pipe P5	29	200	110	83.16	2.65	44.85
Pipe P6	24	150	100	0.11	0.01	0
Pipe P7	55	200	110	83.05	2.64	44.74
Pipe P8	10.2	150	100	0	0	0
Pipe P9	85.2	200	110	83.05	2.64	44.74
Pipe P10	12	200	110	83	2.64	44.69
Pipe P11	24.7	150	100	0.05	0	0
Pipe P12	1.6	150	100	0.11	0.01	0
Pipe P13	2.6	150	100	-83	4.7	216.48

2555 Sheffield

Peak Hour Demand (Buildings 'A' and 'B')
Network Table - Nodes & Pipes

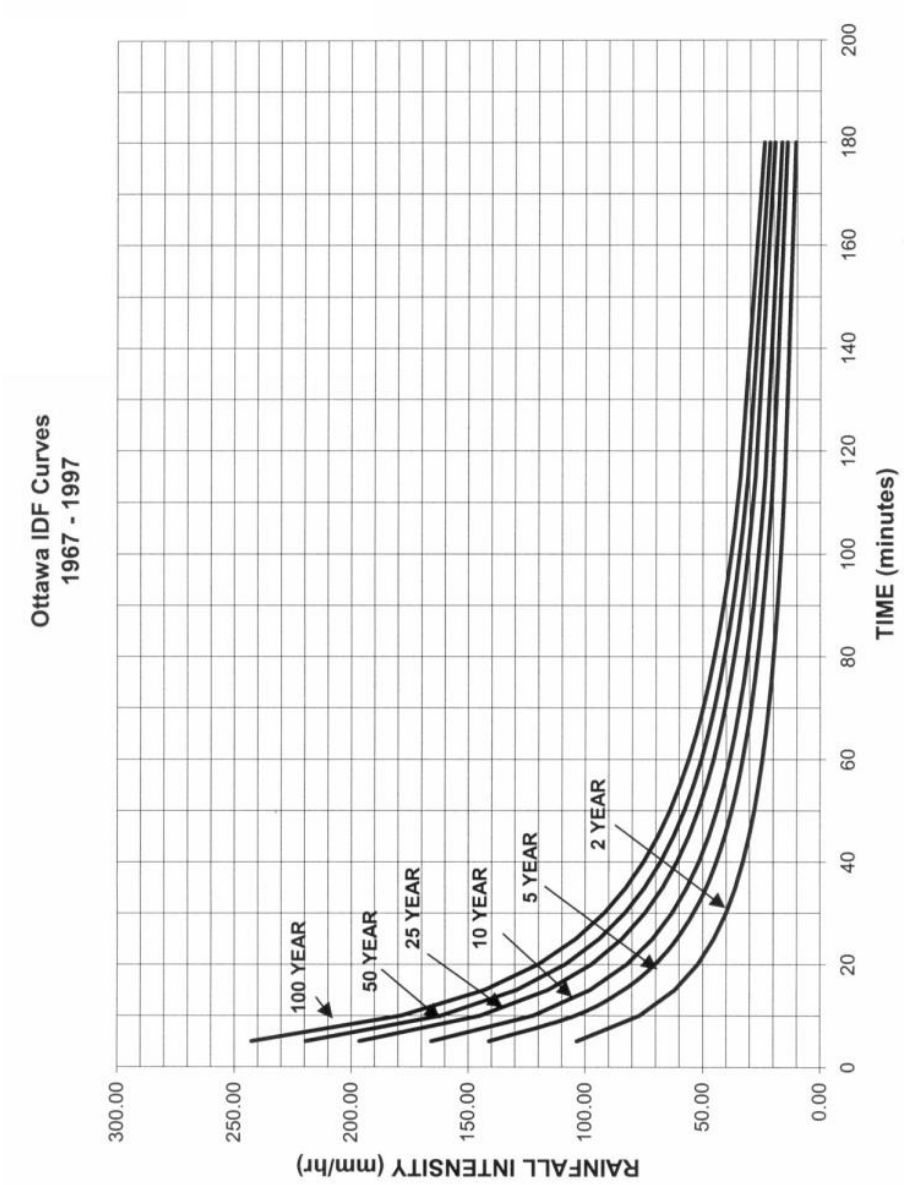
Node ID	Elevation	Demand	Head	Pressure	Pressure	Pressure
	m	L/s	m	m	kPa	psi
Junc J1	63.8	0	109.5	45.7	448.32	65.02
Junc J2 (Hyd)	67	0	109.5	42.5	416.93	60.47
Junc J3	63	0	109.5	46.5	456.17	66.16
Junc J4 (Hyd)	66.5	0	109.5	43	421.83	61.18
Junc J5	64.6	0	109.5	44.9	440.47	63.88
Junc J6	64.8	0	109.5	44.7	438.51	63.60
Junc J7	64.7	0	109.5	44.8	439.49	63.74
Junc J8 (Priv. Hyd)	68	0	109.5	41.5	407.12	59.05
Junc J9	64.5	0	109.5	45	441.45	64.03
Junc J10	68	0	109.5	41.5	407.12	59.05
Junc J11 (Bldg B)	67.5	0.09	109.5	42	412.02	59.76
Junc J12 (Bldg A)	67.5	0.2	109.5	42	412.02	59.76
Junc J13 (Priv. Hyd)	68	0	109.5	41.5	407.12	59.05
Resvr R1	109.5	-0.29	109.5	0	0.00	0.00

Link ID	Length	Diameter	Roughness	Flow	Velocity	Unit Headloss
	m	mm		L/s	m/s	m/km
Pipe P1	30	300	120	0	0	0
Pipe P2	2	150	100	0	0	0
Pipe P3	112.5	300	120	0	0	0
Pipe P4	2	150	100	0	0	0
Pipe P5	29	200	110	0.29	0.01	0
Pipe P6	24	150	100	0.2	0.01	0
Pipe P7	55	200	110	0.09	0	0
Pipe P8	10.2	150	100	0	0	0
Pipe P9	85.2	200	110	0.09	0	0
Pipe P10	12	200	110	0	0	0
Pipe P11	24.7	150	100	0.09	0.01	0
Pipe P12	1.6	150	100	0.2	0.01	0
Pipe P13	2.6	150	100	0	0	0

APPENDIX E

IDF Curves and Stormwater Management Modelling / Calculations

APPENDIX 5-A OTTAWA INTENSITY DURATION FREQUENCY (IDF) CURVE



American Iron and Metal - 2555 Sheffield Road

Overall Model Schematic

NOVATECH
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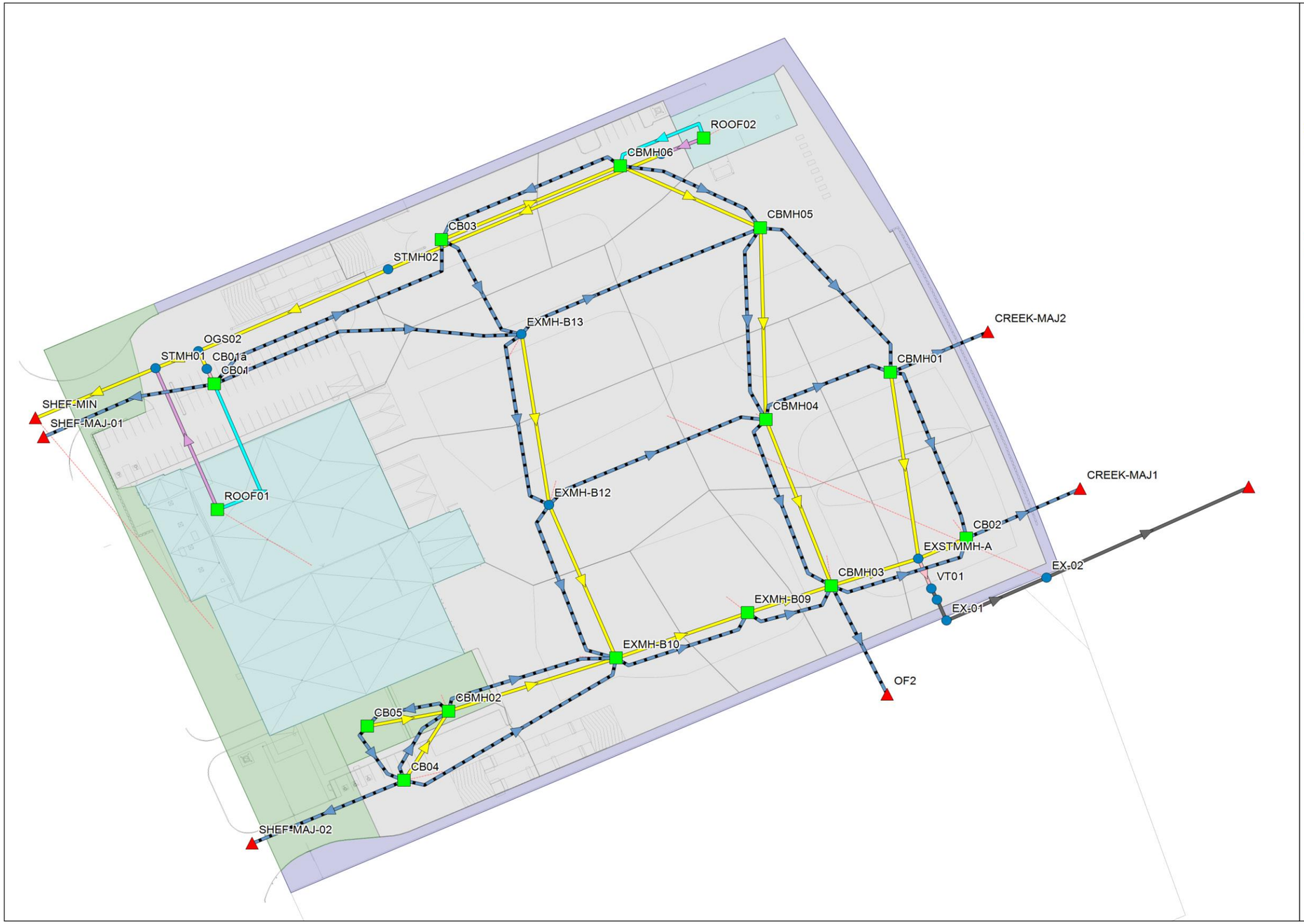

Legend

- Junctions
- Outfalls
- Storages

Conduits

- Visible
- Storm Sewers
- Major System
- CSP Pipe

- Orifices
- Weirs
- Outlets

Subcatchments

- Visible
- Front Yard
- Roof
- Offsite
- Yard
- Background

N

50 m

American Iron and Metal - 2555 Sheffield Road
Post-Development Model Parameters

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Area ID	Catchment Area (ha)	Runoff Coefficient (C)	Percent Impervious (%)	No Depression (%)	Equivalent Width (m)	Average Slope (%)
Front Yard Areas						
A-01	0.262	0.46	37%	0%	87.45	1%
A-02	0.335	0.90	100%	0%	38.94	1%
Rear Yard Areas						
B-01	0.221	0.22	3%	0%	9.66	1%
B-02	0.174	0.90	100%	0%	53.21	1%
B-03	0.193	0.90	100%	0%	54.67	1%
B-04	0.160	0.90	100%	0%	55.22	1%
B-05	0.181	0.90	100%	0%	50.33	1%
B-06	0.356	0.90	100%	0%	51.47	1%
B-07	0.125	0.86	94%	0%	31.54	1%
B-08	0.172	0.90	100%	0%	28.73	1%
B-09	0.163	0.90	100%	0%	56.14	1%
B-10	0.307	0.90	100%	0%	69.31	1%
B-11	0.115	0.90	100%	0%	26.26	1%
B-12	0.326	0.90	100%	0%	42.92	1%
B-13	0.268	0.90	100%	0%	35.35	1%
B-14	0.042	0.23	4%	0%	18.35	1%
B-15	0.032	0.23	4%	0%	19.61	1%
Roof Areas						
R-01	0.523	0.90	100%	0%	67.15	1%
R-02	0.051	0.90	100%	0%	18.33	1%
TOTAL:	**4.01**					

American Iron and Metal - 2555 Sheffield Road

Ponding Calculations

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Structure	T/G	Max. Static Ponding		2-yr Event (3hr)				5-yr Event (3hr)				100-yr Event (3hr)					100-yr Event (+20%) (3hr)			
	(m)	Elev. (m)	Depth (m)	Elev. (m)	Depth (m)	Cascading Flow?	Cascade Depth (m)	Elev. (m)	Depth (m)	Cascading Flow?	Cascade Depth (m)	Elev. (m)	Depth (m)	Cascading Flow?	Cascade Depth (m)	Max. Volume (m^3)	Elev. (m)	Depth (m)	Cascading Flow?	Cascade Depth (m)
Front-Yard CBs																				
CB01	66.75	67.05	0.30	66.47	0.00	N	0.00	66.84	0.09	N	0.00	66.95	0.20	N	0.00	45	66.97	0.22	N	0.00
Rear-Yard CBs																				
CB02	66.85	67.10	0.25	66.53	0.00	N	0.00	66.96	0.11	N	0.00	67.06	0.21	N	0.00	100	67.09	0.24	N	0.00
CB03	66.95	67.20	0.25	66.60	0.00	N	0.00	67.06	0.11	N	0.00	67.16	0.21	N	0.00	50	67.19	0.24	N	0.00
CB04	66.85	67.10	0.25	66.56	0.00	N	0.00	66.99	0.14	N	0.00	67.10	0.25	N	0.00	59	67.10	0.25	N	0.00
CB05	66.85	67.12	0.27	66.56	0.00	N	0.00	66.99	0.14	N	0.00	67.10	0.25	N	0.00	16	67.12	0.27	N	0.00
CBMH01	66.85	67.10	0.25	66.53	0.00	N	0.00	66.96	0.11	N	0.00	67.06	0.21	N	0.00	87	67.09	0.24	N	0.00
CBMH02	66.95	67.20	0.25	66.56	0.00	N	0.00	66.99	0.04	N	0.00	67.10	0.15	N	0.00	6	67.12	0.17	N	0.00
CBMH03	66.85	67.10	0.25	66.55	0.00	N	0.00	66.98	0.13	N	0.00	67.08	0.23	N	0.00	75	67.11	0.26	Y	0.01
CBMH04	66.90	67.15	0.25	66.58	0.00	N	0.00	67.03	0.13	N	0.00	67.13	0.23	N	0.00	73	67.16	0.26	Y	0.01
CBMH05	66.95	67.17	0.22	66.60	0.00	N	0.00	67.05	0.10	N	0.00	67.16	0.21	N	0.00	132	67.18	0.23	Y	0.01
CBMH06	66.95	67.20	0.25	66.60	0.00	N	0.00	67.06	0.11	N	0.00	67.16	0.21	N	0.00	22	67.19	0.24	N	0.00
EXMH-B09	66.85	67.10	0.25	66.55	0.00	N	0.00	66.98	0.13	N	0.00	67.09	0.24	N	0.00	64	67.12	0.27	Y	0.02
EXMH-B10	66.85	67.10	0.25	66.55	0.00	N	0.00	66.98	0.13	N	0.00	67.09	0.24	N	0.00	105	67.12	0.27	Y	0.02

Available Surface Storage (m^3) = **833**

American Iron and Metal - 2555 Sheffield Road
ICD Rating Curves

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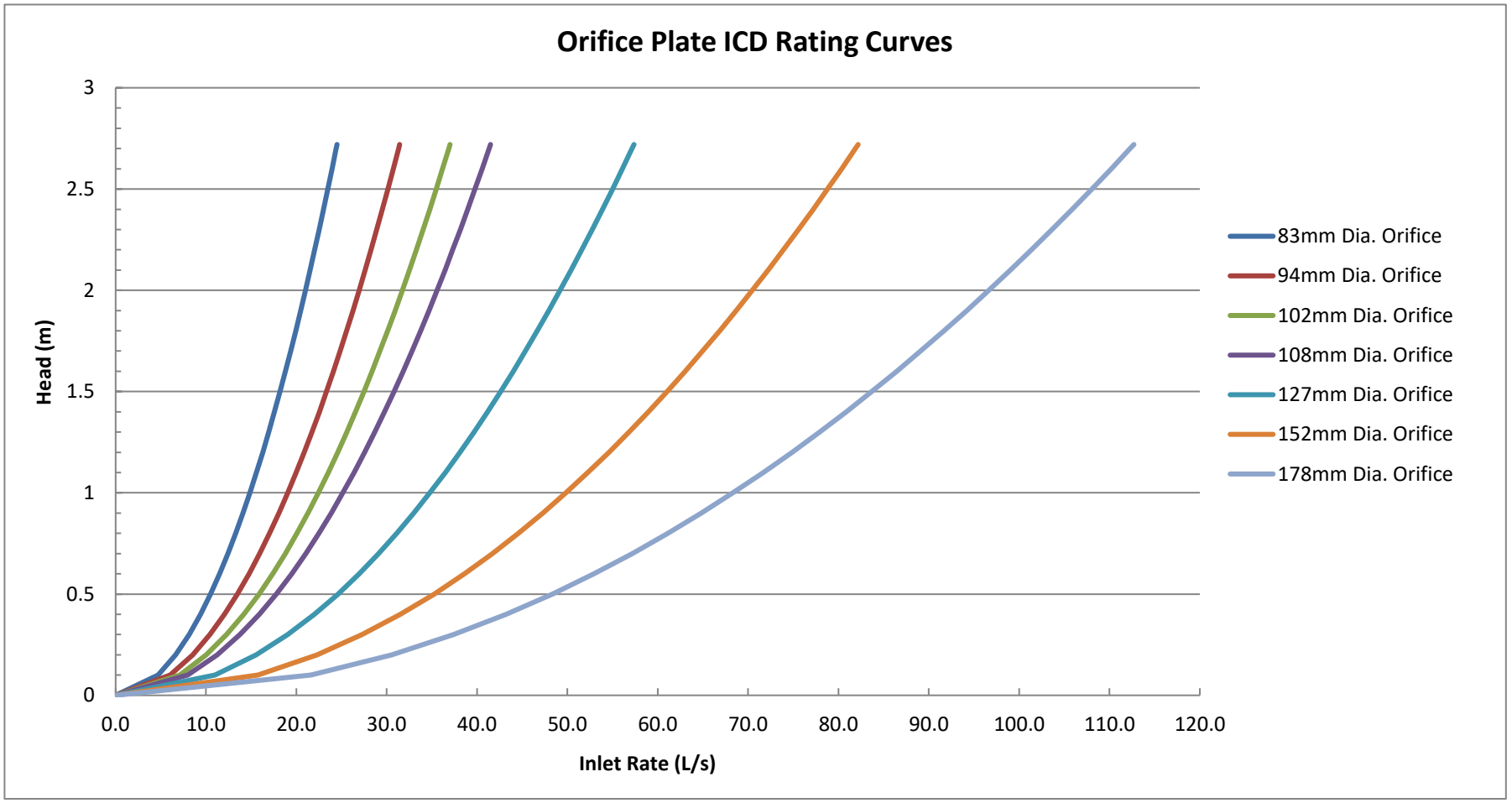
Engineers, Planners & Landscape Architects



American Iron and Metal - 2555 Sheffield Road
Design Storm Time Series Data
4-hour Chicago Design Storms

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C25mm-4.stm	
Duration	Intensity
min	mm/hr
0:00	0
0:10	1.34
0:20	1.49
0:30	1.69
0:40	1.96
0:50	2.33
1:00	2.91
1:10	3.91
1:20	6.1
1:30	14.53
1:40	58.72
1:50	17.11
2:00	8.32
2:10	5.5
2:20	4.13
2:30	3.32
2:40	2.79
2:50	2.41
3:00	2.12
3:10	1.9
3:20	1.73
3:30	1.58
3:40	1.46
3:50	1.36
4:00	1.27

American Iron and Metal - 2555 Sheffield Road

Design Storm Time Series Data

3-hour Chicago Design Storms

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C2-3.stm		C5-3.stm		C100-3.stm		C100-3+20%.stm	
Duration	Intensity	Duration	Intensity	Duration	Intensity	Duration	Intensity
min	mm/hr	min	mm/hr	min	mm/hr	min	mm/hr
0:00	0	0:00	0	0:00	0	0:00	0
0:10	2.81	0:10	3.68	0:10	6.05	0:10	6:14
0:20	3.5	0:20	4.58	0:20	7.54	0:20	9.05
0:30	4.69	0:30	6.15	0:30	10.16	0:30	12.19
0:40	7.3	0:40	9.61	0:40	15.97	0:40	19.16
0:50	18.21	0:50	24.17	0:50	40.65	0:50	48.78
1:00	76.81	1:00	104.19	1:00	178.56	1:00	214.27
1:10	24.08	1:10	32.04	1:10	54.05	1:10	64.86
1:20	12.36	1:20	16.34	1:20	27.32	1:20	32.78
1:30	8.32	1:30	10.96	1:30	18.24	1:30	21.89
1:40	6.3	1:40	8.29	1:40	13.74	1:40	16.49
1:50	5.09	1:50	6.69	1:50	11.06	1:50	13.27
2:00	4.29	2:00	5.63	2:00	9.29	2:00	11.15
2:10	3.72	2:10	4.87	2:10	8.02	2:10	9.62
2:20	3.29	2:20	4.3	2:20	7.08	2:20	8.5
2:30	2.95	2:30	3.86	2:30	6.35	2:30	7.62
2:40	2.68	2:40	3.51	2:40	5.76	2:40	6.91
2:50	2.46	2:50	3.22	2:50	5.28	2:50	6.34
3:00	2.28	3:00	2.98	3:00	4.88	3:00	5.86

American Iron and Metal - 2555 Sheffield Road
Design Storm Time Series Data
SCS Design Storms

NOVATECH
Engineers, Planners & Landscape Architects

S2-12.stm		S5-12.stm		S100-12.stm	
Duration	Intensity	Duration	Intensity	Duration	Intensity
min	mm/hr	min	mm/hr	min	mm/hr
0:00	0.00	0:00	0	0:00	0
0:30	1.27	0:30	1.69	0:30	2.82
1:00	0.59	1:00	0.79	1:00	1.31
1:30	1.10	1:30	1.46	1:30	2.44
2:00	1.10	2:00	1.46	2:00	2.44
2:30	1.44	2:30	1.91	2:30	3.19
3:00	1.27	3:00	1.69	3:00	2.82
3:30	1.69	3:30	2.25	3:30	3.76
4:00	1.69	4:00	2.25	4:00	3.76
4:30	2.29	4:30	3.03	4:30	5.07
5:00	2.88	5:00	3.82	5:00	6.39
5:30	4.57	5:30	6.07	5:30	10.14
6:00	36.24	6:00	48.08	6:00	80.38
6:30	9.23	6:30	12.25	6:30	20.47
7:00	4.06	7:00	5.39	7:00	9.01
7:30	2.71	7:30	3.59	7:30	6.01
8:00	2.37	8:00	3.15	8:00	5.26
8:30	1.86	8:30	2.47	8:30	4.13
9:00	1.95	9:00	2.58	9:00	4.32
9:30	1.27	9:30	1.69	9:30	2.82
10:00	1.02	10:00	1.35	10:00	2.25
10:30	1.44	10:30	1.91	10:30	3.19
11:00	0.93	11:00	1.24	11:00	2.07
11:30	0.85	11:30	1.12	11:30	1.88
12:00	0.85	12:00	1.12	12:00	1.88

APPENDIX F

Watts Control Flow Roof Drain Information and SWM Calculations

WATTS®	Adjustable Accutrol Weir Tag: RD-100-A-ADJ	Adjustable Flow Control for Roof Drains

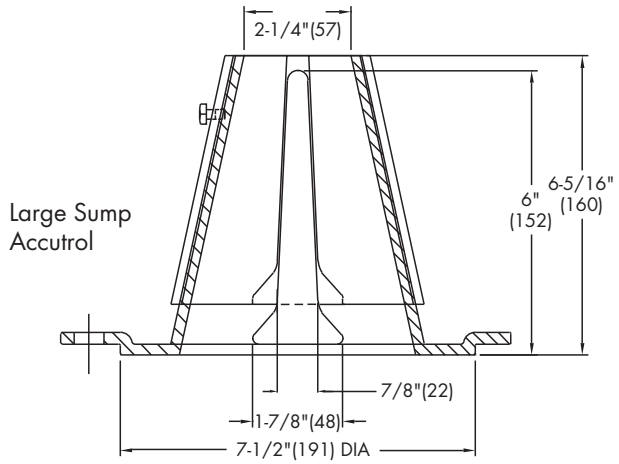
ADJUSTABLE ACCUTROL (for Large Sump Roof Drains only)

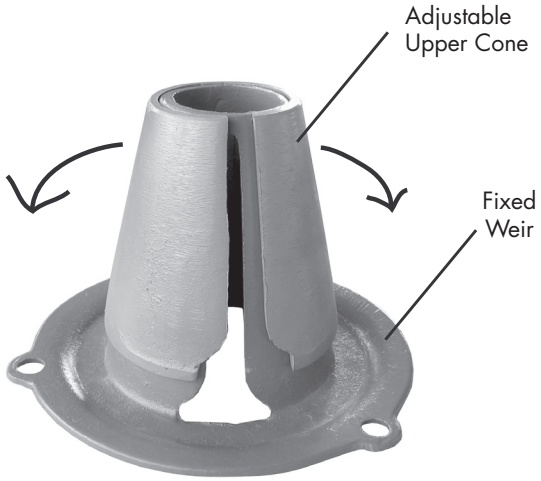
For more flexibility in controlling flow with heads deeper than 2", Watts Drainage offers the Adjustable Accutrol. The Adjustable Accutrol Weir is designed with a single parabolic opening that can be covered to restrict flow above 2" of head to less than 5 gpm per inch, up to 6" of head. To adjust the flow rate for depths over 2" of head, set the slot in the adjustable upper cone according to the flow rate required. Refer to Table 1 below.
Note: Flow rates are directly proportional to the amount of weir opening that is exposed.

EXAMPLE:

For example, if the adjustable upper cone is set to cover 1/2 of the weir opening, flow rates above 2"of head will be restricted to 2-1/2 gpm per inch of head.

Therefore, at 3"of head, the flow rate through the Accutrol Weir that has 1/2 the slot exposed will be:
[5 gpm (per inch of head) x 2 inches of head] + 2-1/2 gpm (for the third inch of head) = 12-1/2 gpm.





1/2 Weir Opening Exposed Shown Above

TABLE 1. Adjustable Accutrol Flow Rate Settings

Weir Opening Exposed	1"	2"	3"	4"	5"	6"
	Flow Rate (gallons per minute)					
Fully Exposed	5	10	15	20	25	30
3/4	5	10	13.75	17.5	21.25	25
1/2	5	10	12.5	15	17.5	20
1/4	5	10	11.25	12.5	13.75	15
Closed	5	5	5	5	5	5

Job Name _____ Contractor _____

Job Location _____ Contractor's P.O. No. _____

Engineer _____ Representative _____

USA: Tel: (800) 338-2581 • Fax: (828) 248-3929 • Watts.com
Canada: Tel: (905) 332-4090 • Fax: (905) 332-7068 • Watts.ca
Latin America: Tel: (52) 81-1001-8600 • Fax: (52) 81-8000-7091 • Watts.com

WATTS®
A Watts Water Technologies Company

2555 Sheffield Road - Building 'A'
Project No.: 119007
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 **Controlled Roof Drains 1 & 2**

OTTAWA IDF CURVE

Area =	0.005	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	0.7	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	1.77	1.45	0.43
10	104.19	1.30	0.98	0.59
15	83.56	1.05	0.73	0.65
20	70.25	0.88	0.56	0.67
25	60.90	0.76	0.44	0.66
30	53.93	0.67	0.35	0.64
35	48.52	0.61	0.29	0.60
40	44.18	0.55	0.23	0.56
45	40.63	0.51	0.19	0.51
50	37.65	0.47	0.15	0.45
55	35.12	0.44	0.12	0.39
60	32.94	0.41	0.09	0.33
65	31.04	0.39	0.07	0.27
70	29.37	0.37	0.05	0.20
75	27.89	0.35	0.03	0.13
90	24.29	0.30	-0.02	-0.09
105	21.58	0.27	-0.05	-0.32
120	19.47	0.24	-0.08	-0.55

2555 Sheffield Road - Building 'A'
Project No.: 119007
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 **Controlled Roof Drains 1 & 2**

OTTAWA IDF CURVE

Area =	0.005	ha	Qallow =	0.32	L/s
C =	1.0		Vol(max) =	1.7	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	3.37	3.05	0.92
10	178.56	2.48	2.16	1.30
15	142.89	1.99	1.67	1.50
20	119.95	1.67	1.35	1.62
25	103.85	1.44	1.12	1.69
30	91.87	1.28	0.96	1.72
35	82.58	1.15	0.83	1.74
40	75.15	1.04	0.72	1.74
45	69.05	0.96	0.64	1.73
50	63.95	0.89	0.57	1.71
55	59.62	0.83	0.51	1.68
60	55.89	0.78	0.46	1.64
65	52.65	0.73	0.41	1.61
70	49.79	0.69	0.37	1.56
75	47.26	0.66	0.34	1.52
90	41.11	0.57	0.25	1.36
105	36.50	0.51	0.19	1.18
120	32.89	0.46	0.14	0.99

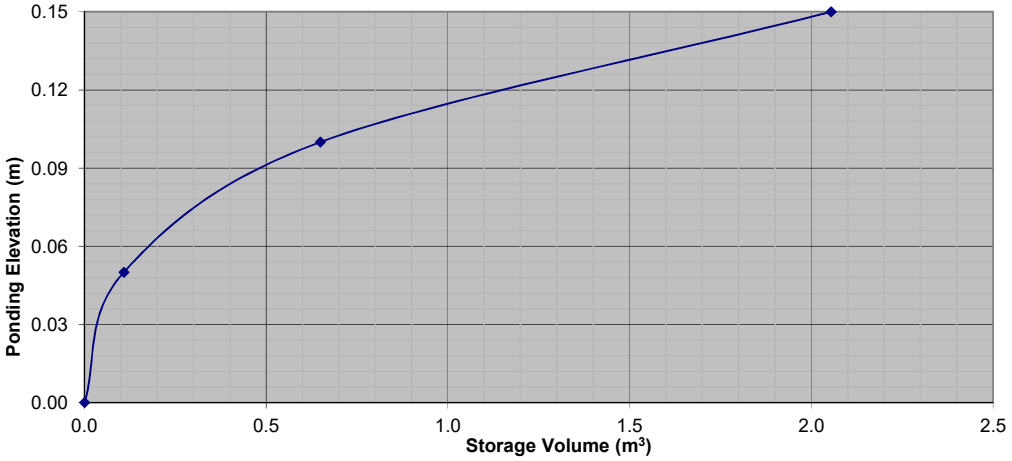
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to Closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:5 Year	0.32	0.64	10	0.7	2.1
1:100 Year	0.32	0.64	13	1.7	2.1

Roof Drain Storage Table

Elevation	Area RD 1 & 2	Total Volume
m	m^2	m^3
0.00	0	0
0.05	4.33	0.1
0.10	17.31	0.6
0.15	38.91	2.1

Stage Storage Curve: Area R-1
Controlled Roof Drains 1 & 2



2555 Sheffield Road - Building 'A'
Project No.: 119007
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 **Controlled Roof Drains 3&4**

OTTAWA IDF CURVE

Area =	0.019	ha	Qallow =	0.95	L/s
C =	0.90		Vol(max) =	2.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	6.71	5.76	1.73
10	104.19	4.95	4.00	2.40
15	83.56	3.97	3.02	2.72
20	70.25	3.34	2.39	2.87
25	60.90	2.89	1.94	2.92
30	53.93	2.56	1.61	2.90
35	48.52	2.31	1.36	2.85
40	44.18	2.10	1.15	2.76
45	40.63	1.93	0.98	2.65
50	37.65	1.79	0.84	2.52
55	35.12	1.67	0.72	2.37
60	32.94	1.57	0.62	2.22
65	31.04	1.48	0.53	2.05
70	29.37	1.40	0.45	1.87
75	27.89	1.33	0.38	1.69
90	24.29	1.15	0.20	1.10
105	21.58	1.03	0.08	0.48
120	19.47	0.93	-0.02	-0.18

2555 Sheffield Road - Building 'A'
Project No.: 119007
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 **Controlled Roof Drains 3&4**

OTTAWA IDF CURVE

Area =	0.019	ha	Qallow =	1.10	L/s
C =	1.0		Vol(max) =	6.9	m3

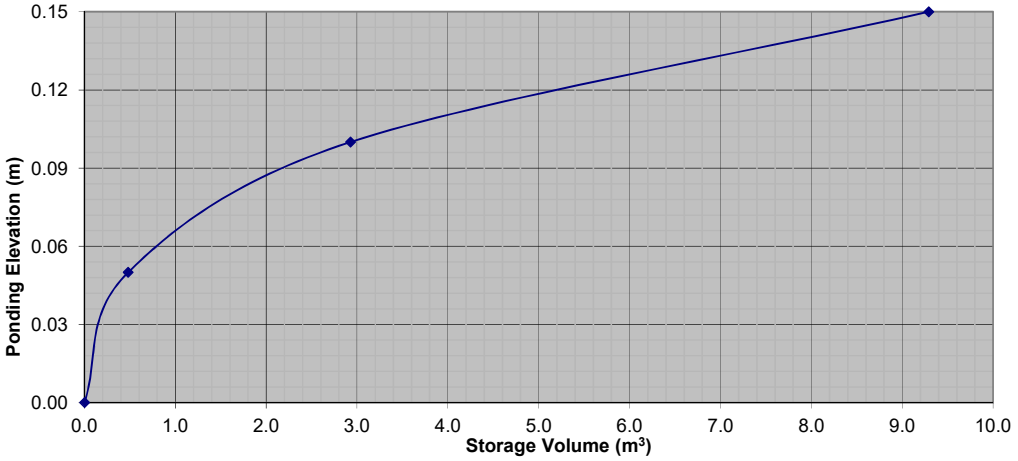
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	12.82	11.72	3.52
10	178.56	9.43	8.33	5.00
15	142.89	7.55	6.45	5.80
20	119.95	6.34	5.24	6.28
25	103.85	5.49	4.39	6.58
30	91.87	4.85	3.75	6.75
35	82.58	4.36	3.26	6.85
40	75.15	3.97	2.87	6.89
45	69.05	3.65	2.55	6.88
50	63.95	3.38	2.28	6.83
60	55.89	2.95	1.85	6.67
75	47.26	2.50	1.40	6.28
90	41.11	2.17	1.07	5.79
105	36.50	1.93	0.83	5.22
120	32.89	1.74	0.64	4.59
135	30.00	1.58	0.48	3.92
150	27.61	1.46	0.36	3.23
165	25.61	1.35	0.25	2.50

Watts Accutrol Flow Control Roof Drains:		RD-100-A-ADJ set to 1/2 Exposed			
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3)**	
				Required	**Provided**
1:5 Year	0.95	1.90	10	2.9	9.3
1:100 Year	1.10	2.20	13	6.9	9.3

Roof Drain Storage Table

Elevation	Area RD 3 & 4	Total Volume
m	m^2	m^3
0.00	0	0
0.05	19.26	0.5
0.10	78.56	2.9
0.15	176.07	9.3

Stage Storage Curve: Area R-1
Controlled Roof Drains 3 & 4



2555 Sheffield Road - Building 'A'
Project No.: 119007
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 **Controlled Roof Drain 5**

OTTAWA IDF CURVE

Area =	0.052	ha	Qallow =	0.95	L/s
C =	0.90		Vol(max) =	12.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	18.37	17.42	5.23
10	104.19	13.56	12.61	7.56
15	83.56	10.87	9.92	8.93
20	70.25	9.14	8.19	9.83
25	60.90	7.92	6.97	10.46
30	53.93	7.02	6.07	10.92
35	48.52	6.31	5.36	11.26
40	44.18	5.75	4.80	11.52
45	40.63	5.29	4.34	11.71
50	37.65	4.90	3.95	11.85
55	35.12	4.57	3.62	11.94
60	32.94	4.29	3.34	12.01
65	31.04	4.04	3.09	12.05
70	29.37	3.82	2.87	12.06
75	27.89	3.63	2.68	12.05
90	24.29	3.16	2.21	11.93
105	21.58	2.81	1.86	11.71
120	19.47	2.53	1.58	11.40

2555 Sheffield Road - Building 'A'
Project No.: 119007
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 **Controlled Roof Drain 5**

OTTAWA IDF CURVE

Area =	0.052	ha	Qallow =	1.26	L/s
C =	1.0		Vol(max) =	25.3	m3

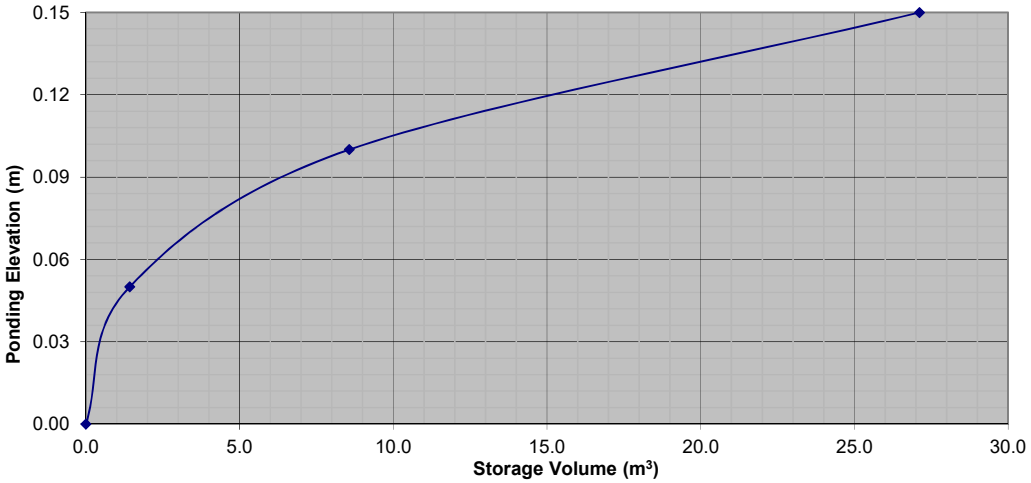
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	35.09	33.83	10.15
10	178.56	25.81	24.55	14.73
15	142.89	20.66	19.40	17.46
20	119.95	17.34	16.08	19.30
25	103.85	15.01	13.75	20.63
30	91.87	13.28	12.02	21.64
35	82.58	11.94	10.68	22.42
40	75.15	10.86	9.60	23.05
45	69.05	9.98	8.72	23.55
50	63.95	9.25	7.99	23.96
55	59.62	8.62	7.36	24.29
60	55.89	8.08	6.82	24.55
65	52.65	7.61	6.35	24.77
70	49.79	7.20	5.94	24.94
75	47.26	6.83	5.57	25.07
90	41.11	5.94	4.68	25.29
105	36.50	5.28	4.02	25.30
120	32.89	4.76	3.50	25.17

Watts Accutrol Flow Control Roof Drains:		RD-100-A-ADJ set to 1/2 Exposed			
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3) Required**	**Provided**
1:5 Year	0.95	0.95	11	12.1	27.1
1:100 Year	1.26	1.26	15	25.3	27.1

Roof Drain Storage Table

Elevation	Area RD 5	Total Volume
m	m^2	m^3
0.00	0	0
0.05	57.09	1.4
0.10	228.38	8.6
0.15	513.84	27.1

Stage Storage Curve: Area R-1
Controlled Roof Drain #5



2555 Sheffield Road - Building 'A'
Project No.: 119007
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 **Controlled Roof Drain 6**

OTTAWA IDF CURVE

Area =	0.054	ha	Qallow =	0.95	L/s
C =	0.90		Vol(max) =	12.7	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	19.07	18.12	5.44
10	104.19	14.08	13.13	7.88
15	83.56	11.29	10.34	9.31
20	70.25	9.49	8.54	10.25
25	60.90	8.23	7.28	10.92
30	53.93	7.29	6.34	11.40
35	48.52	6.56	5.61	11.77
40	44.18	5.97	5.02	12.05
45	40.63	5.49	4.54	12.26
50	37.65	5.09	4.14	12.41
55	35.12	4.75	3.80	12.52
60	32.94	4.45	3.50	12.60
65	31.04	4.19	3.24	12.65
70	29.37	3.97	3.02	12.68
75	27.89	3.77	2.82	12.68
90	24.29	3.28	2.33	12.59
105	21.58	2.92	1.97	12.39
120	19.47	2.63	1.68	12.10

2555 Sheffield Road - Building 'A'
Project No.: 119007
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 **Controlled Roof Drain 6**

OTTAWA IDF CURVE

Area =	0.054	ha	Qallow =	1.26	L/s
C =	1.0		Vol(max) =	26.6	m3

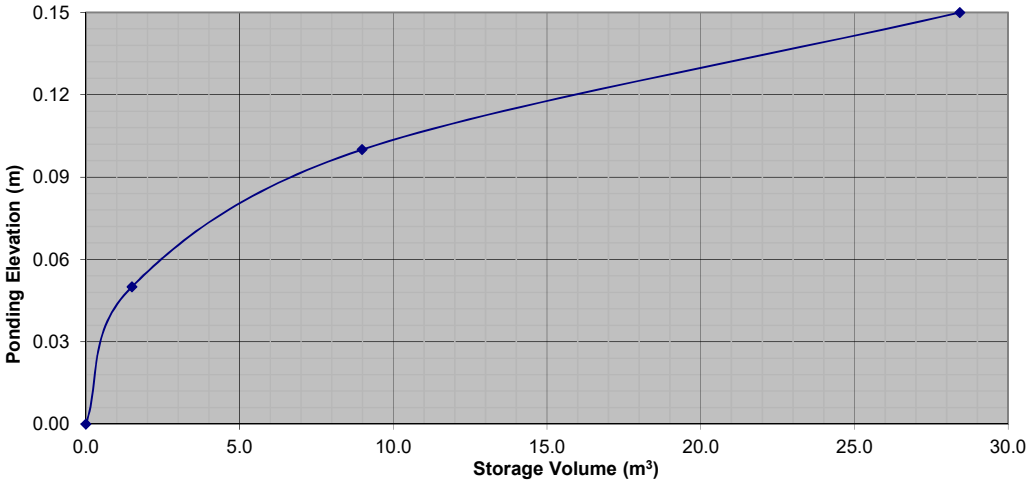
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	36.43	35.17	10.55
10	178.56	26.81	25.55	15.33
15	142.89	21.45	20.19	18.17
20	119.95	18.01	16.75	20.10
25	103.85	15.59	14.33	21.49
30	91.87	13.79	12.53	22.56
35	82.58	12.40	11.14	23.39
40	75.15	11.28	10.02	24.05
45	69.05	10.37	9.11	24.59
50	63.95	9.60	8.34	25.02
55	59.62	8.95	7.69	25.38
60	55.89	8.39	7.13	25.67
65	52.65	7.90	6.64	25.91
70	49.79	7.47	6.21	26.10
75	47.26	7.09	5.83	26.25
90	41.11	6.17	4.91	26.52
105	36.50	5.48	4.22	26.58
120	32.89	4.94	3.68	26.48

Watts Accutrol Flow Control Roof Drains:		RD-100-A-ADJ set to 1/2 Exposed			
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3) Required**	**Provided**
1:5 Year	0.95	0.95	11	12.7	28.4
1:100 Year	1.26	1.26	15	26.6	28.4

Roof Drain Storage Table

Elevation	Area RD 6	Total Volume
m	m^2	m^3
0.00	0	0
0.05	59.86	1.5
0.10	239.44	9.0
0.15	538.73	28.4

Stage Storage Curve: Area R-1
Controlled Roof Drain #6



2555 Sheffield Road - Building 'A'
Project No.: 119007
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 **Controlled Roof Drain 7**

OTTAWA IDF CURVE

Area =	0.052	ha	Qallow =	0.95	L/s
C =	0.90		Vol(max) =	12.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	18.37	17.42	5.23
10	104.19	13.56	12.61	7.56
15	83.56	10.87	9.92	8.93
20	70.25	9.14	8.19	9.83
25	60.90	7.92	6.97	10.46
30	53.93	7.02	6.07	10.92
35	48.52	6.31	5.36	11.26
40	44.18	5.75	4.80	11.52
45	40.63	5.29	4.34	11.71
50	37.65	4.90	3.95	11.85
55	35.12	4.57	3.62	11.94
60	32.94	4.29	3.34	12.01
65	31.04	4.04	3.09	12.05
70	29.37	3.82	2.87	12.06
75	27.89	3.63	2.68	12.05
90	24.29	3.16	2.21	11.93
105	21.58	2.81	1.86	11.71
120	19.47	2.53	1.58	11.40

2555 Sheffield Road - Building 'A'
Project No.: 119007
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 **Controlled Roof Drain 7**

OTTAWA IDF CURVE

Area =	0.052	ha	Qallow =	1.26	L/s
C =	1.0		Vol(max) =	25.3	m3

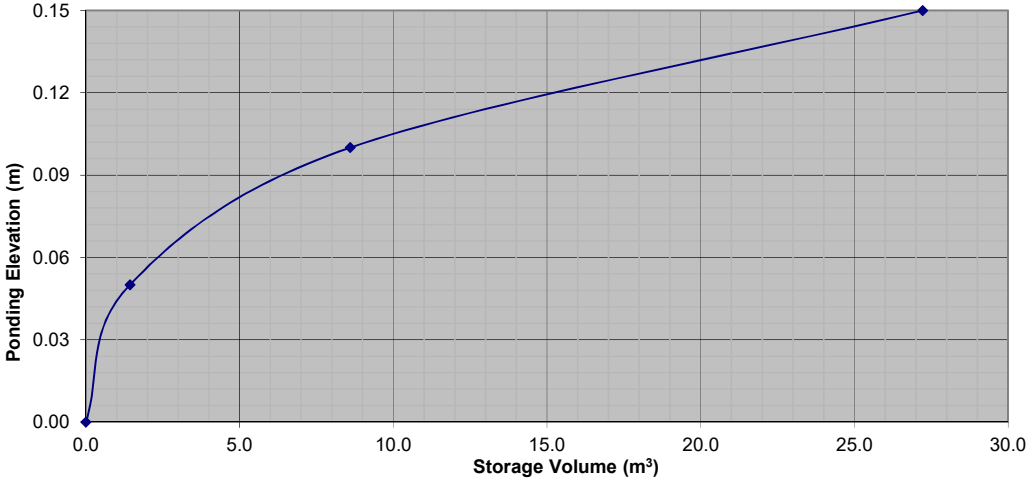
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	35.09	33.83	10.15
10	178.56	25.81	24.55	14.73
15	142.89	20.66	19.40	17.46
20	119.95	17.34	16.08	19.30
25	103.85	15.01	13.75	20.63
30	91.87	13.28	12.02	21.64
35	82.58	11.94	10.68	22.42
40	75.15	10.86	9.60	23.05
45	69.05	9.98	8.72	23.55
50	63.95	9.25	7.99	23.96
55	59.62	8.62	7.36	24.29
60	55.89	8.08	6.82	24.55
65	52.65	7.61	6.35	24.77
70	49.79	7.20	5.94	24.94
75	47.26	6.83	5.57	25.07
90	41.11	5.94	4.68	25.29
105	36.50	5.28	4.02	25.30
120	32.89	4.76	3.50	25.17

Watts Accutrol Flow Control Roof Drains:		RD-100-A-ADJ set to 1/2 Exposed			
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3) Required**	**Provided**
1:5 Year	0.95	0.95	11	12.1	27.2
1:100 Year	1.26	1.26	15	25.3	27.2

Roof Drain Storage Table

Elevation	Area RD 7	Total Volume
m	m^2	m^3
0.00	0	0
0.05	57.31	1.4
0.10	229.23	8.6
0.15	515.78	27.2

Stage Storage Curve: Area R-1
Controlled Roof Drain #7



2555 Sheffield Road - Building 'A'
Project No.: 119007
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 **Controlled Roof Drain 8**

OTTAWA IDF CURVE

Area =	0.054	ha	Qallow =	0.95	L/s
C =	0.90		Vol(max) =	12.7	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	19.07	18.12	5.44
10	104.19	14.08	13.13	7.88
15	83.56	11.29	10.34	9.31
20	70.25	9.49	8.54	10.25
25	60.90	8.23	7.28	10.92
30	53.93	7.29	6.34	11.40
35	48.52	6.56	5.61	11.77
40	44.18	5.97	5.02	12.05
45	40.63	5.49	4.54	12.26
50	37.65	5.09	4.14	12.41
55	35.12	4.75	3.80	12.52
60	32.94	4.45	3.50	12.60
65	31.04	4.19	3.24	12.65
70	29.37	3.97	3.02	12.68
75	27.89	3.77	2.82	12.68
90	24.29	3.28	2.33	12.59
105	21.58	2.92	1.97	12.39
120	19.47	2.63	1.68	12.10

2555 Sheffield Road - Building 'A'
Project No.: 119007
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 **Controlled Roof Drain 8**

OTTAWA IDF CURVE

Area =	0.054	ha	Qallow =	1.26	L/s
C =	1.0		Vol(max) =	26.6	m3

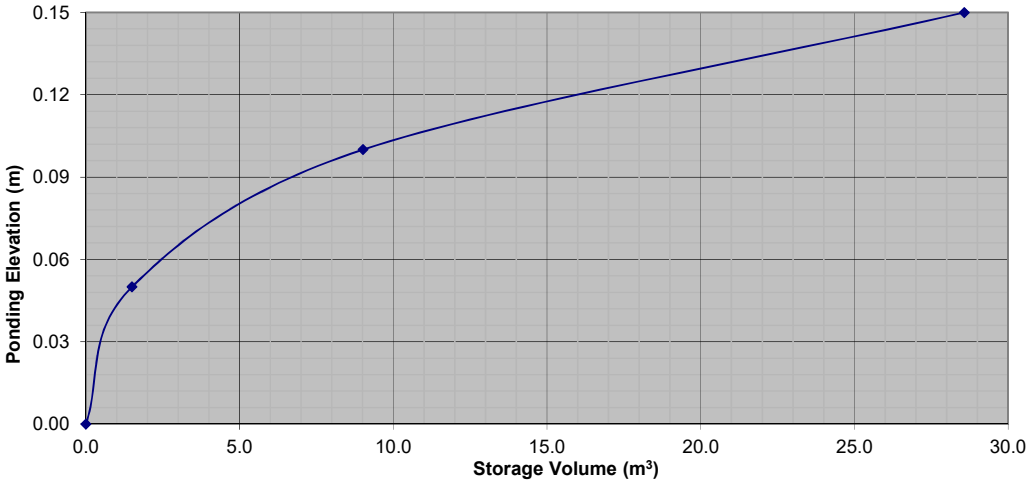
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	36.43	35.17	10.55
10	178.56	26.81	25.55	15.33
15	142.89	21.45	20.19	18.17
20	119.95	18.01	16.75	20.10
25	103.85	15.59	14.33	21.49
30	91.87	13.79	12.53	22.56
35	82.58	12.40	11.14	23.39
40	75.15	11.28	10.02	24.05
45	69.05	10.37	9.11	24.59
50	63.95	9.60	8.34	25.02
55	59.62	8.95	7.69	25.38
60	55.89	8.39	7.13	25.67
65	52.65	7.90	6.64	25.91
70	49.79	7.47	6.21	26.10
75	47.26	7.09	5.83	26.25
90	41.11	6.17	4.91	26.52
105	36.50	5.48	4.22	26.58
120	32.89	4.94	3.68	26.48

Watts Accutrol Flow Control Roof Drains:		RD-100-A-ADJ set to 1/2 Exposed			
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3) Required**	**Provided**
1:5 Year	0.95	0.95	11	12.7	28.6
1:100 Year	1.26	1.26	15	26.6	28.6

Roof Drain Storage Table

Elevation	Area RD 8	Total Volume
m	m^2	m^3
0.00	0	0
0.05	60.08	1.5
0.10	240.32	9.0
0.15	542.29	28.6

Stage Storage Curve: Area R-1
Controlled Roof Drain #8



2555 Sheffield Road - Building 'A'
Project No.: 119007
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 **Controlled Roof Drain 9**

OTTAWA IDF CURVE

Area =	0.054	ha	Qallow =	0.95	L/s
C =	0.90		Vol(max) =	12.7	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	19.07	18.12	5.44
10	104.19	14.08	13.13	7.88
15	83.56	11.29	10.34	9.31
20	70.25	9.49	8.54	10.25
25	60.90	8.23	7.28	10.92
30	53.93	7.29	6.34	11.40
35	48.52	6.56	5.61	11.77
40	44.18	5.97	5.02	12.05
45	40.63	5.49	4.54	12.26
50	37.65	5.09	4.14	12.41
55	35.12	4.75	3.80	12.52
60	32.94	4.45	3.50	12.60
65	31.04	4.19	3.24	12.65
70	29.37	3.97	3.02	12.68
75	27.89	3.77	2.82	12.68
90	24.29	3.28	2.33	12.59
105	21.58	2.92	1.97	12.39
120	19.47	2.63	1.68	12.10

2555 Sheffield Road - Building 'A'
Project No.: 119007
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 **Controlled Roof Drain 9**

OTTAWA IDF CURVE

Area =	0.054	ha	Qallow =	1.26	L/s
C =	1.0		Vol(max) =	26.6	m3

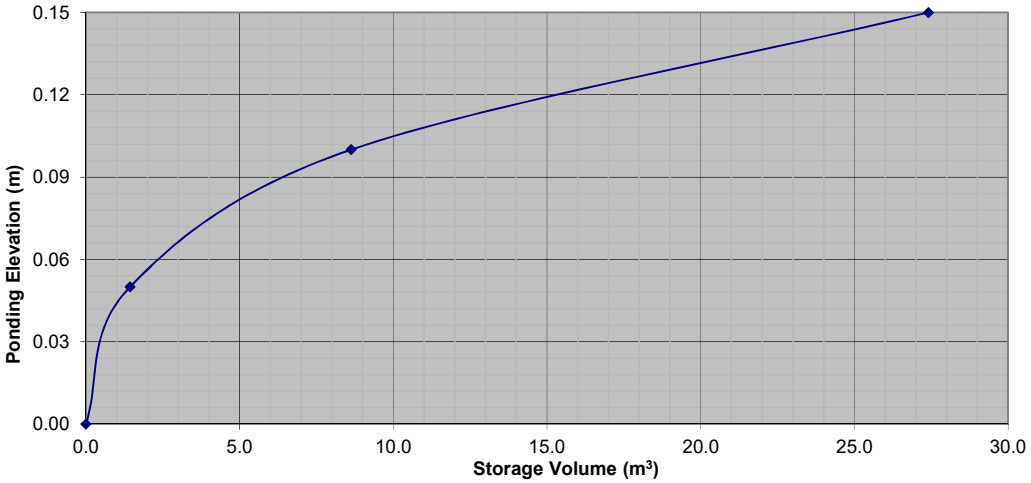
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	36.43	35.17	10.55
10	178.56	26.81	25.55	15.33
15	142.89	21.45	20.19	18.17
20	119.95	18.01	16.75	20.10
25	103.85	15.59	14.33	21.49
30	91.87	13.79	12.53	22.56
35	82.58	12.40	11.14	23.39
40	75.15	11.28	10.02	24.05
45	69.05	10.37	9.11	24.59
50	63.95	9.60	8.34	25.02
55	59.62	8.95	7.69	25.38
60	55.89	8.39	7.13	25.67
65	52.65	7.90	6.64	25.91
70	49.79	7.47	6.21	26.10
75	47.26	7.09	5.83	26.25
90	41.11	6.17	4.91	26.52
105	36.50	5.48	4.22	26.58
120	32.89	4.94	3.68	26.48

Watts Accutrol Flow Control Roof Drains:		RD-100-A-ADJ set to 1/2 Exposed			
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3) Required**	**Provided**
1:5 Year	0.95	0.95	11	12.7	27.4
1:100 Year	1.26	1.26	15	26.6	27.4

Roof Drain Storage Table

Elevation	Area RD 9	Total Volume
m	m^2	m^3
0.00	0	0
0.05	57.57	1.4
0.10	230.06	8.6
0.15	521.13	27.4

Stage Storage Curve: Area R-1
Controlled Roof Drain #9



2555 Sheffield Road - Building 'A'
Project No.: 119007
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 **Controlled Roof Drain 10**

OTTAWA IDF CURVE

Area =	0.050	ha	Qallow =	0.95	L/s
C =	0.90		Vol(max) =	11.4	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	17.66	16.71	5.01
10	104.19	13.03	12.08	7.25
15	83.56	10.45	9.50	8.55
20	70.25	8.79	7.84	9.41
25	60.90	7.62	6.67	10.00
30	53.93	6.75	5.80	10.43
35	48.52	6.07	5.12	10.75
40	44.18	5.53	4.58	10.99
45	40.63	5.08	4.13	11.16
50	37.65	4.71	3.76	11.28
55	35.12	4.39	3.44	11.36
60	32.94	4.12	3.17	11.42
65	31.04	3.88	2.93	11.44
70	29.37	3.67	2.72	11.44
75	27.89	3.49	2.54	11.42
90	24.29	3.04	2.09	11.28
105	21.58	2.70	1.75	11.02
120	19.47	2.44	1.49	10.69

2555 Sheffield Road - Building 'A'
Project No.: 119007
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 **Controlled Roof Drain 10**

OTTAWA IDF CURVE

Area =	0.050	ha	Qallow =	1.26	L/s
C =	1.0		Vol(max) =	24.1	m3

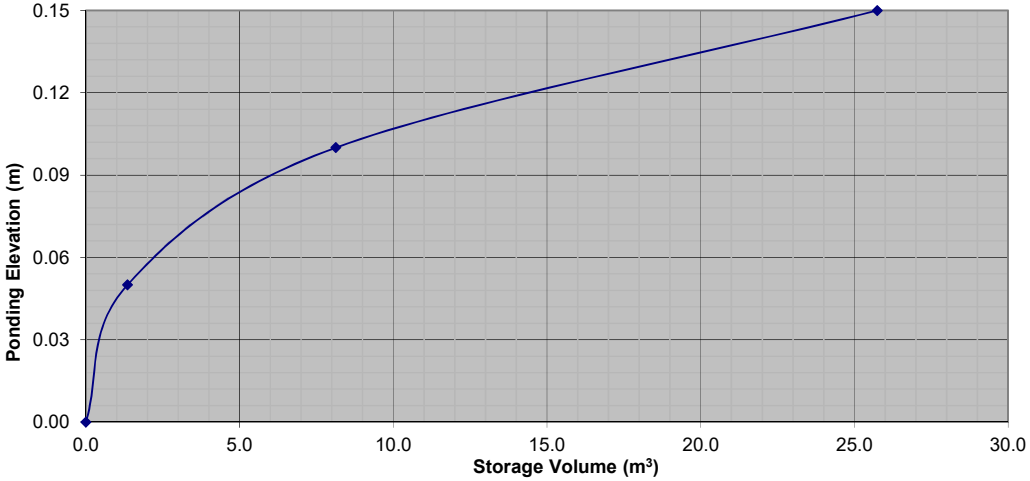
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	33.74	32.48	9.74
10	178.56	24.82	23.56	14.14
15	142.89	19.86	18.60	16.74
20	119.95	16.67	15.41	18.50
25	103.85	14.43	13.17	19.76
30	91.87	12.77	11.51	20.72
35	82.58	11.48	10.22	21.46
40	75.15	10.45	9.19	22.04
45	69.05	9.60	8.34	22.51
50	63.95	8.89	7.63	22.89
55	59.62	8.29	7.03	23.19
60	55.89	7.77	6.51	23.43
65	52.65	7.32	6.06	23.63
70	49.79	6.92	5.66	23.78
75	47.26	6.57	5.31	23.89
90	41.11	5.71	4.45	24.05
105	36.50	5.07	3.81	24.02
120	32.89	4.57	3.31	23.85

Watts Accutrol Flow Control Roof Drains:		RD-100-A-ADJ set to 1/2 Exposed			
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3) Required**	**Provided**
1:5 Year	0.95	0.95	11	11.4	25.7
1:100 Year	1.26	1.26	15	24.1	25.7

Roof Drain Storage Table

Elevation	Area RD 10	Total Volume
m	m^2	m^3
0.00	0	0
0.05	54.2	1.4
0.10	216.79	8.1
0.15	487.78	25.7

Stage Storage Curve: Area R-1
Controlled Roof Drain #10



2555 Sheffield Road - Building 'A'
Project No.: 119007
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 **Controlled Roof Drain 11**

OTTAWA IDF CURVE

Area =	0.065	ha	Qallow =	1.34	L/s
C =	0.90		Vol(max) =	14.5	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	22.96	21.62	6.49
10	104.19	16.94	15.60	9.36
15	83.56	13.59	12.25	11.02
20	70.25	11.42	10.08	12.10
25	60.90	9.90	8.56	12.85
30	53.93	8.77	7.43	13.37
35	48.52	7.89	6.55	13.76
40	44.18	7.19	5.85	14.03
45	40.63	6.61	5.27	14.22
50	37.65	6.12	4.78	14.35
55	35.12	5.71	4.37	14.43
60	32.94	5.36	4.02	14.46
65	31.04	5.05	3.71	14.46
70	29.37	4.78	3.44	14.43
75	27.89	4.54	3.20	14.38
90	24.29	3.95	2.61	14.09
105	21.58	3.51	2.17	13.67
120	19.47	3.17	1.83	13.15

2555 Sheffield Road - Building 'A'
Project No.: 119007
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 **Controlled Roof Drain 11**

OTTAWA IDF CURVE

Area =	0.065	ha	Qallow =	1.89	L/s
C =	1.0		Vol(max) =	29.9	m3

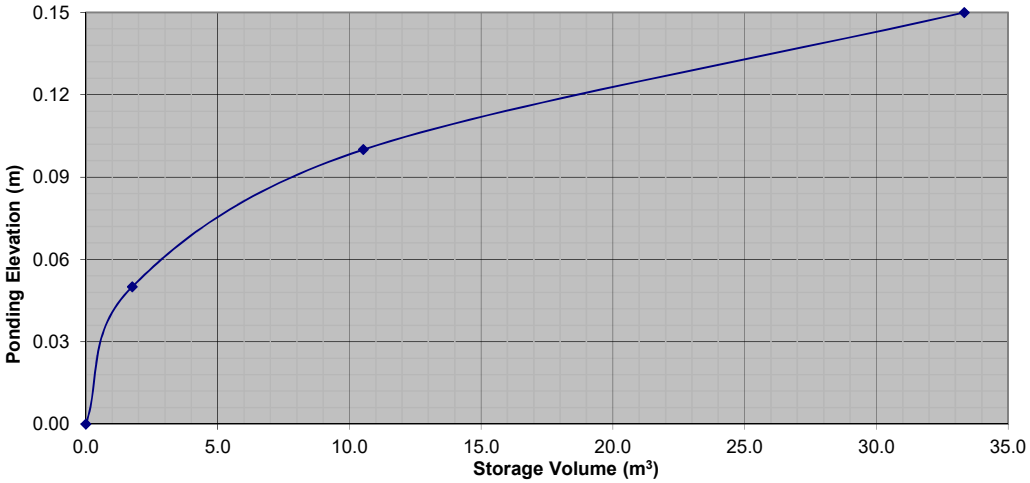
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	43.86	41.97	12.59
10	178.56	32.27	30.38	18.23
15	142.89	25.82	23.93	21.54
20	119.95	21.68	19.79	23.74
25	103.85	18.77	16.88	25.31
30	91.87	16.60	14.71	26.48
35	82.58	14.92	13.03	27.37
40	75.15	13.58	11.69	28.05
45	69.05	12.48	10.59	28.59
50	63.95	11.56	9.67	29.00
55	59.62	10.77	8.88	29.32
60	55.89	10.10	8.21	29.56
65	52.65	9.51	7.62	29.73
70	49.79	9.00	7.11	29.85
75	47.26	8.54	6.65	29.92
90	41.11	7.43	5.54	29.91
105	36.50	6.60	4.71	29.64
120	32.89	5.94	4.05	29.19

Watts Accutrol Flow Control Roof Drains:		RD-100-A-ADJ set to Fully Exposed			
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3) Required**	**Provided**
1:5 Year	1.34	1.34	11	14.5	33.3
1:100 Year	1.89	1.89	14	29.9	33.3

Roof Drain Storage Table

Elevation	Area RD 11	Total Volume
m	m^2	m^3
0.00	0	0
0.05	70.18	1.8
0.10	280.71	10.5
0.15	631.6	33.3

Stage Storage Curve: Area R-1
Controlled Roof Drain #11



2555 Sheffield Road - Building 'A'
Project No.: 119007
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 **Controlled Roof Drain 12**

OTTAWA IDF CURVE

Area =	0.066	ha	Qallow =	1.34	L/s
C =	0.90		Vol(max) =	14.8	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	23.31	21.97	6.59
10	104.19	17.21	15.87	9.52
15	83.56	13.80	12.46	11.21
20	70.25	11.60	10.26	12.31
25	60.90	10.06	8.72	13.07
30	53.93	8.91	7.57	13.62
35	48.52	8.01	6.67	14.01
40	44.18	7.30	5.96	14.30
45	40.63	6.71	5.37	14.50
50	37.65	6.22	4.88	14.63
55	35.12	5.80	4.46	14.72
60	32.94	5.44	4.10	14.76
65	31.04	5.13	3.79	14.77
70	29.37	4.85	3.51	14.74
75	27.89	4.61	3.27	14.69
90	24.29	4.01	2.67	14.42
105	21.58	3.56	2.22	14.01
120	19.47	3.21	1.87	13.50

2555 Sheffield Road - Building 'A'
Project No.: 119007
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 **Controlled Roof Drain 12**

OTTAWA IDF CURVE

Area =	0.066	ha	Qallow =	1.89	L/s
C =	1.0		Vol(max) =	30.5	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	44.53	42.64	12.79
10	178.56	32.76	30.87	18.52
15	142.89	26.22	24.33	21.90
20	119.95	22.01	20.12	24.14
25	103.85	19.05	17.16	25.75
30	91.87	16.86	14.97	26.94
35	82.58	15.15	13.26	27.85
40	75.15	13.79	11.90	28.55
45	69.05	12.67	10.78	29.10
50	63.95	11.73	9.84	29.53
55	59.62	10.94	9.05	29.86
60	55.89	10.26	8.37	30.12
65	52.65	9.66	7.77	30.30
70	49.79	9.14	7.25	30.43
75	47.26	8.67	6.78	30.51
90	41.11	7.54	5.65	30.53
105	36.50	6.70	4.81	30.28
120	32.89	6.04	4.15	29.85

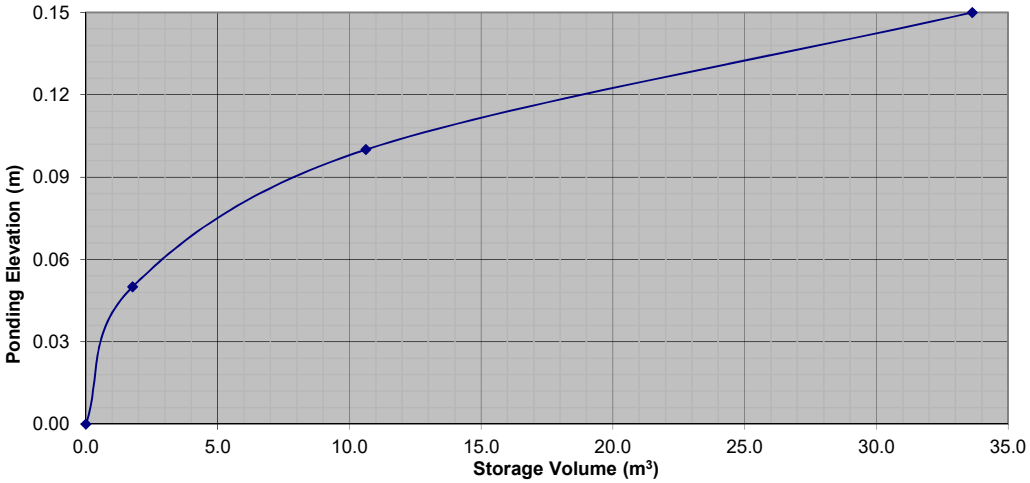
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to Fully Exposed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:5 Year	1.34	1.34	11	14.8	33.6
1:100 Year	1.89	1.89	14	30.5	33.6

Roof Drain Storage Table

Elevation	Area RD 12	Total Volume
m	m^2	m^3
0.00	0	0
0.05	70.82	1.8
0.10	283.28	10.6
0.15	637.37	33.6

Stage Storage Curve: Area R-1
Controlled Roof Drain #12



2555 Sheffield Road - Building 'A'
Project No.: 119007
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 **Controlled Roof Drains 13&14**

OTTAWA IDF CURVE

Area =	0.014	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	3.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	4.95	4.63	1.39
10	104.19	3.65	3.33	2.00
15	83.56	2.93	2.61	2.35
20	70.25	2.46	2.14	2.57
25	60.90	2.13	1.81	2.72
30	53.93	1.89	1.57	2.82
35	48.52	1.70	1.38	2.90
40	44.18	1.55	1.23	2.95
45	40.63	1.42	1.10	2.98
50	37.65	1.32	1.00	3.00
55	35.12	1.23	0.91	3.00
60	32.94	1.15	0.83	3.00
65	31.04	1.09	0.77	2.99
70	29.37	1.03	0.71	2.98
75	27.89	0.98	0.66	2.96
90	24.29	0.85	0.53	2.87
105	21.58	0.76	0.44	2.75
120	19.47	0.68	0.36	2.61

2555 Sheffield Road - Building 'A'
Project No.: 119007
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 **Controlled Roof Drains 13&14**

OTTAWA IDF CURVE

Area =	0.014	ha	Qallow =	0.32	L/s
C =	1.0		Vol(max) =	6.9	m3

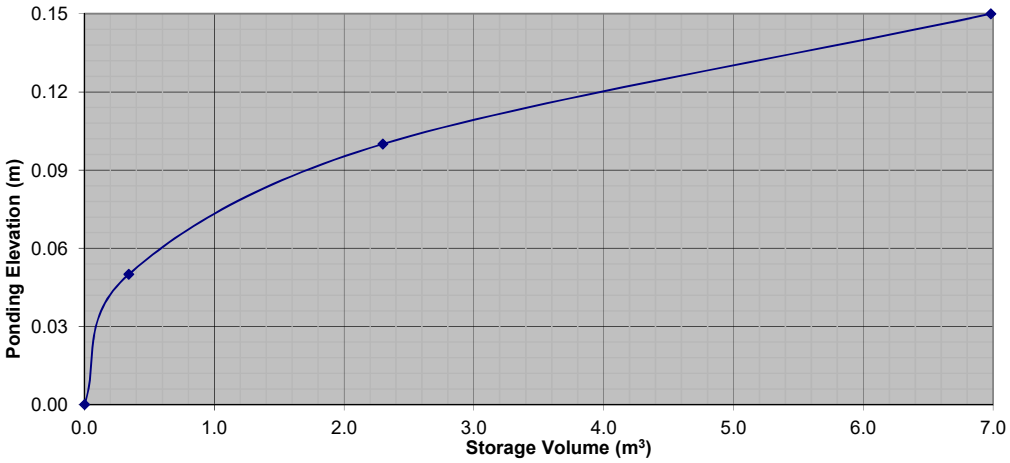
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	9.45	9.13	2.74
10	178.56	6.95	6.63	3.98
15	142.89	5.56	5.24	4.72
20	119.95	4.67	4.35	5.22
25	103.85	4.04	3.72	5.58
30	91.87	3.58	3.26	5.86
35	82.58	3.21	2.89	6.08
40	75.15	2.92	2.60	6.25
45	69.05	2.69	2.37	6.39
50	63.95	2.49	2.17	6.51
55	59.62	2.32	2.00	6.60
60	55.89	2.18	1.86	6.68
65	52.65	2.05	1.73	6.74
70	49.79	1.94	1.62	6.79
75	47.26	1.84	1.52	6.84
90	41.11	1.60	1.28	6.91
105	36.50	1.42	1.10	6.93
120	32.89	1.28	0.96	6.91

Watts Accutrol Flow Control Roof Drains:		RD-100-A-ADJ set to Closed			
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3) Required**	**Provided**
1:5 Year	0.32	0.64	11	3.0	7.0
1:100 Year	0.32	0.64	15	6.9	7.0

Roof Drain Storage Table

Elevation	Area RD 13 & 14	Total Volume
m	m^2	m^3
0.00	0	0
0.05	13.65	0.3
0.10	64.6	2.3
0.15	122.84	7.0

Stage Storage Curve: Area R-1
Controlled Roof Drains 13 & 14



2555 Sheffield Road - Building 'B'
Project No.: 119007
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2 **Controlled Roof Drains 15&16**

OTTAWA IDF CURVE

Area =	0.051	ha	Qallow =	1.58	L/s
C =	0.90		Vol(max) =	9.7	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	18.01	16.43	4.93
10	104.19	13.30	11.72	7.03
15	83.56	10.66	9.08	8.17
20	70.25	8.96	7.38	8.86
25	60.90	7.77	6.19	9.29
30	53.93	6.88	5.30	9.54
35	48.52	6.19	4.61	9.68
40	44.18	5.64	4.06	9.74
45	40.63	5.18	3.60	9.73
50	37.65	4.80	3.22	9.67
55	35.12	4.48	2.90	9.58
60	32.94	4.20	2.62	9.45
65	31.04	3.96	2.38	9.29
70	29.37	3.75	2.17	9.11
75	27.89	3.56	1.98	8.90
90	24.29	3.10	1.52	8.20
105	21.58	2.75	1.17	7.40
120	19.47	2.48	0.90	6.51

2555 Sheffield Road - Building 'B'
Project No.: 119007
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2 **Controlled Roof Drains 15&16**

OTTAWA IDF CURVE

Area =	0.051	ha	Qallow =	2.20	L/s
C =	1.0		Vol(max) =	20.6	m3

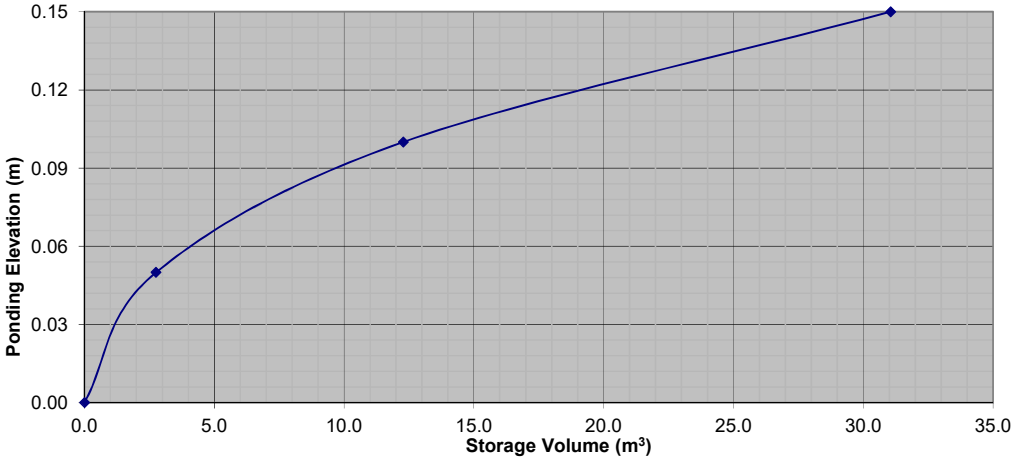
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	34.41	32.21	9.66
10	178.56	25.32	23.12	13.87
15	142.89	20.26	18.06	16.25
20	119.95	17.01	14.81	17.77
25	103.85	14.72	12.52	18.79
30	91.87	13.03	10.83	19.49
35	82.58	11.71	9.51	19.97
40	75.15	10.65	8.45	20.29
45	69.05	9.79	7.59	20.49
50	63.95	9.07	6.87	20.60
55	59.62	8.45	6.25	20.64
60	55.89	7.92	5.72	20.61
65	52.65	7.46	5.26	20.53
70	49.79	7.06	4.86	20.41
75	47.26	6.70	4.50	20.25
90	41.11	5.83	3.63	19.60
105	36.50	5.17	2.97	18.74
120	32.89	4.66	2.46	17.74

Watts Accutrol Flow Control Roof Drains:		RD-100-A-ADJ set to 1/2 Exposed			
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3) Required**	**Provided**
1:5 Year	0.79	1.58	8	9.7	31.0
1:100 Year	1.10	2.20	12	20.6	31.0

Roof Drain Storage Table

Elevation	Area RD 15 & 16	Total Volume
m	m^2	m^3
0.00	0	0
0.05	110.36	2.8
0.10	270.47	12.3
0.15	480.31	31.0

Stage Storage Curve: Area R-2
Controlled Roof Drains 15 & 16



APPENDIX G

Water Quality Treatment Unit Information

Steve Matthews

From: Patrick <patrick@echelonenvironmental.ca>
Sent: Friday, June 26, 2020 12:32 PM
To: Steve Matthews
Cc: Francois Thauvette; Kallie Auld
Subject: RE: CDS Unit - Minor Pipe Revisions - 2555 Sheffield Road (AIM Building) in Ottawa

Hi Steve,

I hope everything is going well. There are no issues with these changes and I really appreciate you keeping me in the loop! We will incorporate the pipe locations and angles into our submission at time of order, for now, the sample drawings you have are sufficient.

Enjoy your weekend,

Patrick Graham
Project Manager
ECHELON ENVIRONMENTAL
505 Hood Road, Unit #26
Markham, ON.
L3R 5V6

Ph. 905-948-0000 ext. 223
Cell: 416-460-5819
Fax 905-948-0577
Email patrick@echelonenvironmental.ca

From: Steve Matthews <S.Matthews@novatech-eng.com>
Sent: Friday, June 26, 2020 11:43 AM
To: Patrick <patrick@echelonenvironmental.ca>
Cc: Francois Thauvette <f.thauvette@novatech-eng.com>; Kallie Auld <k.auld@novatech-eng.com>
Subject: RE: CDS Unit - Minor Pipe Revisions - 2555 Sheffield Road (AIM Building) in Ottawa

Hi Patrick,

You had sized two OGS units for us on our 2555 Sheffield Road project (one Vortechs Unit at the rear of the property; and one CDS unit on the front parking lot area).

The CDS unit that was sized in the email chain below has had some minor revisions to the inlet/outlet pipes and we wanted to ensure you have the most current design information on your end for when the contractor calls to order the units. I don't believe there should be any impact on the sizing or performance of the unit, but would appreciate it if you could confirm that by email for me.

The parameters that changed are:

- The **outlet pipe** has been **increased in size** from 250mm **to be a 300mm dia. PVC DR35** pipe
- The **invert elevations of all three pipes** (300 outlet + 250 inlet at 180 degrees + 250 inlet at 90 degrees) **have been revised slightly**

Please see the attached PDF sketch showing the recent revisions highlighted in 'green'. The 'yellow' highlighting indicates information that is unchanged from the previous design.

If any performance parameters of the unit change due to these revisions, please send me a revised PDF package for our inclusion in the SWM Report that will be issued to the MECP.
If nothing changes for the unit, please update your specifications on file with the revised pipe information and let me know by email that the information we currently have on file is still adequate.

Thanks,
Steve

Stephen Matthews, B.A.(Env), Senior Design Technologist
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 223 | Fax: 613.254.5867

From: Patrick <patrick@echelonenvironmental.ca>
Sent: Wednesday, March 18, 2020 3:38 PM
To: Steve Matthews <S.Matthews@novatech-eng.com>
Cc: Francois Thauvette <f.thauvette@novatech-eng.com>
Subject: RE: CDS Sizing Request - 2555 Sheffield Road (AIM Building) in Ottawa

Good afternoon Steve,

Thanks for reaching out for another design. For this site we recommend a CDS PMSU 2015_4 which has a treatment flow rate of 20 L/s and an approximate budget price of $17,500. Capacities are below, all other required information is available within the report.

- The sediment storage capacity in m3: 838 L
- The oil storage capacity in L: 232 L
- The total unit storage capacity in L: 1590 L

Best regards,

Patrick Graham
Project Manager
ECHELON ENVIRONMENTAL
505 Hood Road, Unit #26
Markham, ON.
L3R 5V6

Ph. 905-948-0000 ext. 223
Fax 905-948-0577
Email Patrick@echelonenvironmental.ca

From: Steve Matthews <S.Matthews@novatech-eng.com>
Sent: Wednesday, March 18, 2020 11:18 AM
To: Patrick <patrick@echelonenvironmental.ca>

Cc: Francois Thauvette <f.thauvette@novatech-eng.com>
Subject: CDS Sizing Request - 2555 Sheffield Road (AIM Building) in Ottawa

Hi Patrick,

You recently sized a CDS unit for me on one of our job sites in Ottawa and we are currently working on another project that requires a secondary stormwater quality control unit for a small parking lot area adjacent to the proposed building. There is an existing primary stormwater quality control unit that treats the majority of the property and the rear yard tributary areas on this project. The primary unit is sized and we are only looking for sizing of the small secondary unit for the parking lot area (A-2) at this time.

The project is for the American Iron and Metal (AIM) located at 2555 Sheffield Road in the City of Ottawa.
The project details for this secondary stormwater quality control unit are as follows:

Tributary area = **0.39 ha** (combination of 0.34 ha controlled parking lot + 0.05 ha controlled building roof)
Imperviousness = **100%**
Time of concentration = 10min
IDF Curve = City of Ottawa (104.2mm/hr Intensity for 5yr) (178.6mm/hr Intensity for 100yr)

We have a requirement to provide a level of quality control treatment to meet the **MOE 'Enhanced' Level of Protection** guidelines (i.e. **80% TSS removal** and **90% of annual runoff treated**). The proposed unit will be installed on a new 250mm dia. PVC pipe with 180 degrees of separation through the structure, a second input from a new 250mm dia. PVC pipe at 90 degrees to the outlet pipe and approximately 2.1m cover on all the pipes. A standard particle distribution (**Fines**) is the minimum that is required for the design. Anticipated peak flow should be in the order of 60 L/s based on the City's requirement to control the site to pre-development runoff levels. As a result, there will be some upstream attenuation due to ICDs within the paved parking area and CB structure as well as control flow drains on a small proposed building roof (0.05 ha) at the rear of the property. See attached excerpt from the proposed stormwater management plan for a sketch of the area and proposed water quality treatment unit location (highlighted in yellow).

Can you please **size a CDS unit** for us and provide the design details as well as an **approximate cost estimate.**

We will also need the following information on the unit for our SWM Report:

- % of net annual TSS removal
- % of net annual treatment volume for the tributary area
- The treatment capacity in L/s
- The sediment storage capacity in m^3
- The oil storage capacity in L
- The total unit storage capacity in L

Thank you for your time and consideration in this matter. We are hoping to get this information for inclusion in our stormwater management report that is scheduled to be submitted next week. If there is any further information you require, please do not hesitate to call.

Regards,
Steve

Stephen Matthews, B.A.(Env), Senior Design Technologist
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 223 | Fax: 613.254.5867

Steve Matthews

From: Gurvinder Mundi <gurvinder@echelonenvironmental.ca>
Sent: Friday, January 31, 2020 12:04 PM
To: Steve Matthews
Cc: Kallie Auld; Francois Thauvette
Subject: RE: Vortechs Sizing Confirmation - 2555 Sheffield Road in Ottawa - AIM
Attachments: 624306-10 EFFY V5000 50 micron 01-31-20.pdf

Good morning Steve,

Please find attached revised sizing calculations for the Vortech 5000 unit. I can confirm that the revised drainage area of 2.52ha is still suitable for the Votech 5000 unit to meet the MOE requirements.

Please note that the ground water level may influence the pricing, if the structure requires to have anti-buoyancy measures.

Please let me know if you have any questions or need anythign else.

Regards,

Gurvinder Mundi, EIT, PhD | Project Manager
Echelon Environmental
505 Hood Road, Unit #26 | Markham, ON., L3R 5V6
Main 905-948-0000 ext. 228 | Fax 905-948-0577
Gurvinder@echelonenvironmental.ca
www.echelonenvironmental.ca

From: Steve Matthews [mailto:S.Matthews@novatech-eng.com]
Sent: Thursday, January 30, 2020 5:21 PM
To: Gurvinder Mundi
Cc: Kallie Auld; Francois Thauvette
Subject: RE: Vortechs Sizing Confirmation - 2555 Sheffield Road in Ottawa - AIM

Hi Gurvinder,

You helped us out last summer with sizing for a Vortechs unit on our AIM project located at 2555 Sheffield Road in Ottawa.
The architect has made some revisions to the site plan that resulted in our tributary area to the Vortechs 5000 unit increasing from 2.42 ha to **2.52 ha**.

Can you please confirm that the Vortechs 5000 unit (50 microns) will still meet the MOE requirements for providing an 'Enhanced Level of Protection' for quality control (i.e. 80% TSS removal and 90% of annual runoff treated).

The tributary area is now 2.52 ha, however, the imperviousness of the site remains unchanged at C=0.9 (100% impervious).
The 100-yr maximum flow rate through the unit will be approximately 215 L/s.

The T/G elevation is 67.08m and the invert elevation of the outlet pipe is proposed at 64.18m.

If there is any further information you might require, please do not hesitate to call me directly.

Regards,
Steve

Stephen Matthews, B.A.(Env), Senior Design Technologist
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 223 | Fax: 613.254.5867

From: Kallie Auld <k.auld@novatech-eng.com>
Sent: Wednesday, July 10, 2019 8:51 AM
To: Francois Thauvette <f.thauvette@novatech-eng.com>; Steve Matthews <S.Matthews@novatech-eng.com>
Subject: FW: OGS unit sizing

Vortechs unit sizing attached. The 4000 doesn't have the proper flow capacity…. so we can ignore that one and go with the 5000.

Kallie Auld, P.Eng., Project Coordinator | Water Resources
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 294 | Fax: 613.254.5867 | Email: k.auld@novatech-eng.com

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From: Gurvinder Mundi <gurvinder@echelonenvironmental.ca>
Sent: Tuesday, July 09, 2019 4:22 PM
To: Kallie Auld <k.auld@novatech-eng.com>
Subject: RE: OGS unit sizing

Hi Kallie,

Thanks for providing the additional information. The units sized are Vortechs 4000 (80 micron) and Vortechs 5000 (50 micron) with a budgetary price of $45,000 and $50,000, respectively. Please see attached sizing and sample drawings for your reference. Assumptions used: HS-20 loading and groundwater at or below pipe invert. See table below for capacities of the two models.

Model	Sediment Storage (L)	Oil Storage (L)	Total Holding (L)	Treatment (L/s)
Vortechs 4000	1,840	1,105	6,116	169.9
Vortechs 5000	2,450	1,383	7,731	240.7

Please review the calculations and let me know if you have any questions or need anything else.

Regards,

Gurvinder Mundi, EIT, Ph.D.
Project Manager

ECHELON ENVIRONMENTAL
505 Hood Road, Unit #26
Markham, ON., L3R 5V6
Ph 905-948-0000 ext. 228
Fax 905-948-0577
Email Gurvinder@echelonenvironmental.ca
Website www.echelonenvironmental.ca

From: Kallie Auld [mailto:k.auld@novatech-eng.com]
Sent: Tuesday, July 09, 2019 11:41 AM
To: Gurvinder Mundi
Subject: RE: OGS unit sizing

Hi Gurvinder,

The site is located at 2555 Sheffield Road in Ottawa, project name is 'American Iron & Metal (AIM), Ottawa East Development'.

Drainage area is 2.42ha and the runoff coefficient is 0.90 (100% impervious). Yes – please use the 50 and 80um PSD.

I unfortunately don't have the HWL or depth to bedrock. We are replacing an existing OGS unit for an existing scrap metal yard.

Thanks very much,

Kallie Auld, P.Eng., Project Coordinator | Water Resources
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 294 | Fax: 613.254.5867 | Email: k.auld@novatech-eng.com

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From: Gurvinder Mundi <gurvinder@echelonenvironmental.ca>
Sent: Tuesday, July 09, 2019 11:09 AM
To: Kallie Auld <k.auld@novatech-eng.com>
Subject: RE: OGS unit sizing

Good morning Kallie,

Thanks for sending in your sizing request. I will get started on it. Would you be able to share the project name, address, and location. Also, if you could share high ground water level (HWL) (Geotechnical Report) and depth to bedrock, if available?

Can you please confirm the PSD to use, the 50um and 80um PSD?

Please let me know if you have any questions.

Regards,

Gurvinder Mundi, EIT, Ph.D.
Project Manager
ECHELON ENVIRONMENTAL

505 Hood Road, Unit #26
Markham, ON., L3R 5V6
Ph 905-948-0000 ext. 228
Fax 905-948-0577
Email Gurvinder@echelonenvironmental.ca
Website www.echelonenvironmental.ca

From: Kallie Auld [mailto:k.auld@novatech-eng.com]
Sent: Tuesday, July 09, 2019 9:00 AM
To: Gurvinder Mundi
Subject: OGS unit sizing

Good morning Gurvinder,

Could you please give me a preliminary size for an in-line Vortechs unit based on the following criteria:

- 80% TSS removal
- 100-year/ max flow rate of 185 L/s (controlled by a mm orifice)
- Up-stream storage of approximately 650m^3

Approximate T/G = 67.05
Approximate inlet pipe invert = 64.23

All of the flow leaving the site is to go through the OGS unit, so it must be in-line with no bypass. Please let me know if you need any more information.

Thanks very much,

Kallie Auld, P.Eng., Project Coordinator | Water Resources
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 294 | Fax: 613.254.5867 | Email: k.auld@novatech-eng.com

VORTECHS SYSTEM® ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION
BASED ON AN AVERAGE PARTICLE SIZE OF 50 MICRONS
AMERICAN IRON & METAL (AIM), OTTAWA EAST DEVELOPMENT
OTTAWA, ON
MODEL 5000 IN-LINE

CONTECH ENGINEERED SOLUTIONS

Design Ratio[1] = $\frac{\text{(2.52 hectares) x (0.9) x (2.775)}}{\text{(3.6 m2)}}$ **= 1.75**

Rainfall Intensity mm/hr	Operating Rate[2] % of capacity	Flow Treated (l/s)	% Total Rainfall Volume[3]	Rmvl. Effcy[4] (%)	Rel. Effcy (%)
0.5	1.0	2.4	9.2%	98.0%	9.0%
1.0	2.0	4.8	10.6%	97.0%	10.3%
1.5	3.0	7.2	9.9%	95.8%	9.5%
2.0	4.0	9.6	8.4%	94.1%	7.9%
2.5	5.0	12.0	7.7%	92.6%	7.1%
3.0	6.0	14.4	5.9%	91.2%	5.4%
3.5	7.0	16.9	4.4%	90.0%	3.9%
4.0	8.0	19.3	4.7%	88.3%	4.1%
4.5	9.0	21.7	3.3%	87.1%	2.9%
5.0	10.0	24.1	3.0%	85.8%	2.6%
6.0	12.0	28.9	5.4%	82.2%	4.4%
7.0	14.0	33.7	4.4%	79.1%	3.4%
8.0	16.0	38.5	3.5%	75.8%	2.7%
9.0	18.0	43.3	2.8%	72.3%	2.0%
10.0	20.0	48.2	2.2%	69.7%	1.5%
15.0	30.0	72.2	7.0%	57.1%	4.0%
20.0	40.0	96.3	4.5%	46.0%	2.1%
25.0	50.0	120.4	1.4%	33.4%	0.5%
30.0	60.0	144.5	0.7%	21.0%	0.1%
35.0	70.0	168.6	0.5%	12.0%	0.1%
40.0	80.0	192.7	0.5%	5.4%	0.0%
					83.6%

Predicted Annual Runoff Volume Treated =	95.0%
Assumed Removal Efficiency of remaining % =	0.0%
Removal Efficiency Adjustment[5] =	0.0%
Predicted Net Annual Load Removal Efficiency =	**84%**

1 - Design Ratio = (Total Drainage Area) x (Runoff Coefficient) x (Rational Method Conversion) / Grit Chamber Area
- The Total Drainage Area and Runoff Coefficient are specified by the site engineer.
- The rational method conversion based on the units in the above equation is 2.775.

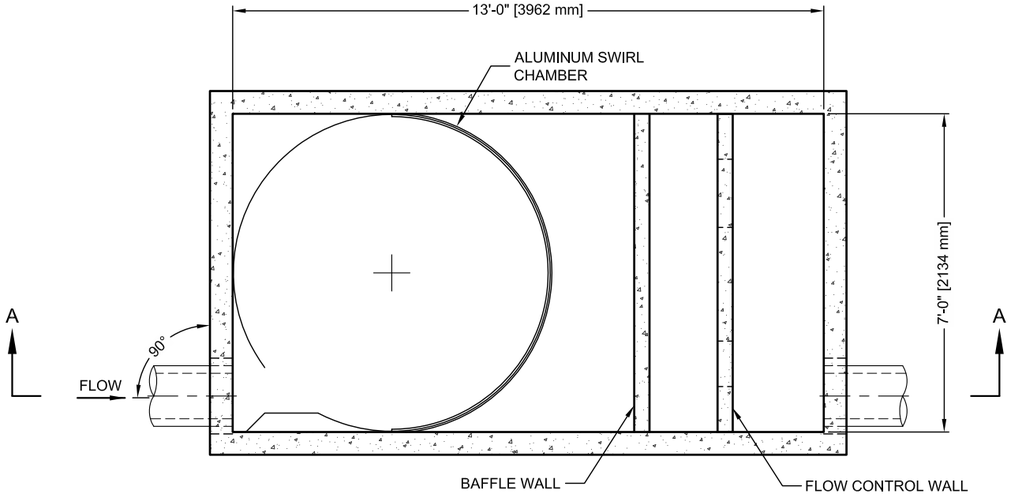
2 - Operating Rate (% of capacity) = percentage of peak operating rate of 68 l/s/m^2.

3 - Based on 42 years of hourly rainfall data from Canadian Station 6105976, Ottawa CDA, ON

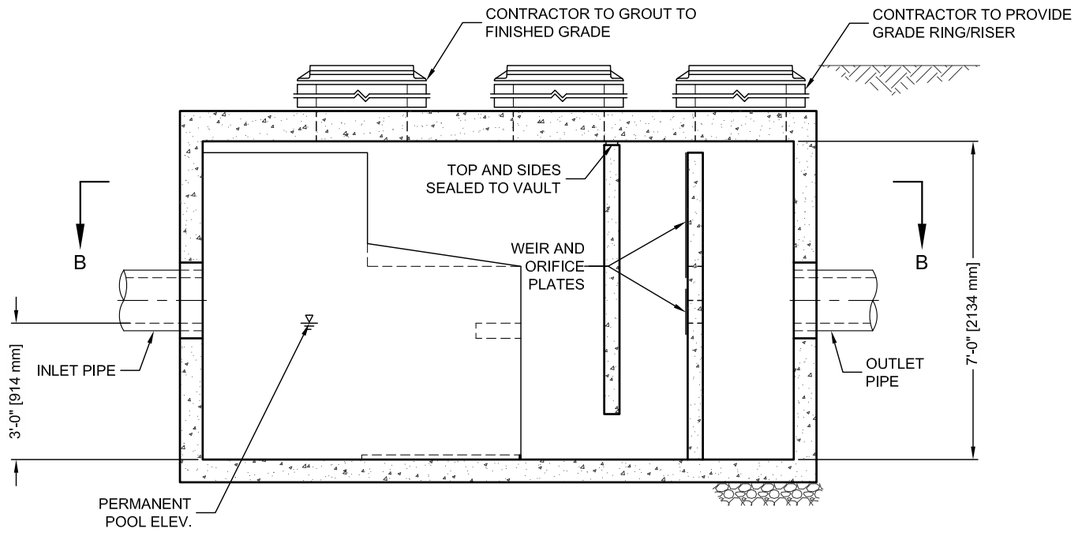
4 - Based on Contech Construction Products laboratory verified removal of an average particle size of 50 microns (see Technical Bulletin #1).

5- Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

Calculated by:	JAK	1/31	Checked by:



SECTION B-B



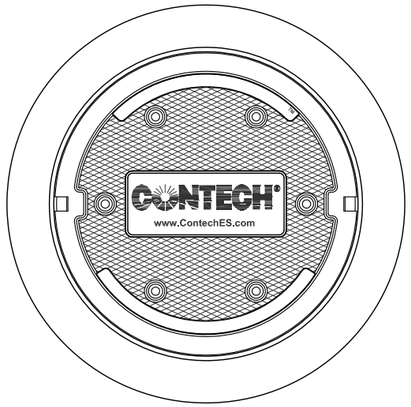
SECTION A-A

Vortechs®

VORTECHS 5000 DESIGN NOTES

VORTECHS 5000 RATED TREATMENT CAPACITY IS 8.5 CFS, OR PER LOCAL REGULATIONS. IF THE SITE CONDITIONS EXCEED RATED TREATMENT CAPACITY, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.

THE STANDARD INLET/OUTLET CONFIGURATION IS SHOWN. FOR OTHER CONFIGURATION OPTIONS , PLEASE CONTACT YOUR CONTECH REPRESENTATIVE. www.ContechES.com



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	*
WATER QUALITY FLOW RATE (CFS)	*
PEAK FLOW RATE (CFS)	*
RETURN PERIOD OF PEAK FLOW (YRS)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH REPRESENTATIVE. www.ContechES.com
4. VORTECHS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET AASHTO M306 LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. INLET PIPE(S) MUST BE PERPEDICULAR TO THE VAULT AND AT THE CORNER TO INTRODUCE THE FLOW TANGENTIALLY TO THE SWIRL CHAMBER. DUAL INLETS NOT TO HAVE OPPOSING TANGENTIAL FLOW DIRECTIONS.
7. OUTLET PIPE(S) MUST BE DOWN STREAM OF THE FLOW CONTROL BAFFLE AND MAY BE LOCATED ON THE SIDE OR END OF THE VAULT. THE FLOW CONTROL WALL MAY BE TURNED TO ACCOMODATE OUTLET PIPE KNOCKOUTS ON THE SIDE OF THE VAULT.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE VORTECHS STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

VORTECHS 5000
STANDARD DETAIL

Steve Matthews

From: Patrick <patrick@echelonenvironmental.ca>
Sent: Wednesday, March 18, 2020 3:38 PM
To: Steve Matthews
Cc: Francois Thauvette
Subject: RE: CDS Sizing Request - 2555 Sheffield Road (AIM Building) in Ottawa
Attachments: CDS TSSR - 2555 Sheffield Road - PMSU 2015_4.pdf

Good afternoon Steve,

Thanks for reaching out for another design. For this site we recommend a CDS PMSU 2015_4 which has a treatment flow rate of 20 L/s and an approximate budget price of $17,500. Capacities are below, all other required information is available within the report.

- The sediment storage capacity in m3: 838 L
- The oil storage capacity in L: 232 L
- The total unit storage capacity in L: 1590 L

Best regards,

Patrick Graham
Project Manager
ECHELON ENVIRONMENTAL
505 Hood Road, Unit #26
Markham, ON.
L3R 5V6

Ph. 905-948-0000 ext. 223
Fax 905-948-0577
Email Patrick@echelonenvironmental.ca

From: Steve Matthews <S.Matthews@novatech-eng.com>
Sent: Wednesday, March 18, 2020 11:18 AM
To: Patrick <patrick@echelonenvironmental.ca>
Cc: Francois Thauvette <f.thauvette@novatech-eng.com>
Subject: CDS Sizing Request - 2555 Sheffield Road (AIM Building) in Ottawa

Hi Patrick,

You recently sized a CDS unit for me on one of our job sites in Ottawa and we are currently working on another project that requires a secondary stormwater quality control unit for a small parking lot area adjacent to the proposed building. There is an existing primary stormwater quality control unit that treats the majority of the property and the rear yard tributary areas on this project. The primary unit is sized and we are only looking for sizing of the small secondary unit for the parking lot area (A-2) at this time.

The project is for the American Iron and Metal (AIM) located at 2555 Sheffield Road in the City of Ottawa.
The project details for this secondary stormwater quality control unit are as follows:

Tributary area = **0.39 ha** (combination of 0.34 ha controlled parking lot + 0.05 ha controlled building roof)
Imperviousness = **100%**
Time of concentration = 10min
IDF Curve = City of Ottawa (104.2mm/hr Intensity for 5yr) (178.6mm/hr Intensity for 100yr)

We have a requirement to provide a level of quality control treatment to meet the **MOE 'Enhanced' Level of Protection** guidelines (i.e. **80% TSS removal** and **90% of annual runoff treated**). The proposed unit will be installed on a new 250mm dia. PVC pipe with 180 degrees of separation through the structure, a second input from a new 250mm dia. PVC pipe at 90 degrees to the outlet pipe and approximately 2.1m cover on all the pipes. A standard particle distribution (**Fines**) is the minimum that is required for the design. Anticipated peak flow should be in the order of 60 L/s based on the City's requirement to control the site to pre-development runoff levels. As a result, there will be some upstream attenuation due to ICDs within the paved parking area and CB structure as well as control flow drains on a small proposed building roof (0.05 ha) at the rear of the property. See attached excerpt from the proposed stormwater management plan for a sketch of the area and proposed water quality treatment unit location (highlighted in yellow).

Can you please **size a CDS unit** for us and provide the design details as well as an **approximate cost estimate.**

We will also need the following information on the unit for our SWM Report:

- % of net annual TSS removal
- % of net annual treatment volume for the tributary area
- The treatment capacity in L/s
- The sediment storage capacity in m^3
- The oil storage capacity in L
- The total unit storage capacity in L

Thank you for your time and consideration in this matter. We are hoping to get this information for inclusion in our stormwater management report that is scheduled to be submitted next week. If there is any further information you require, please do not hesitate to call.

Regards,
Steve

Stephen Matthews, B.A.(Env), Senior Design Technologist
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 223 | Fax: 613.254.5867

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION
BASED ON THE RATIONAL RAINFALL METHOD
BASED ON A FINE PARTICLE SIZE DISTRIBUTION

Project Name: 2555 Sheffield Road
Location: Ottawa, ON
OGS #: 1

Engineer: Novatech
Contact: Stephen Matthews, B.A.(Env)
Report Date: 18-Mar-20

Area 0.390 ha
Weighted C 0.90
CDS Model 2015-4

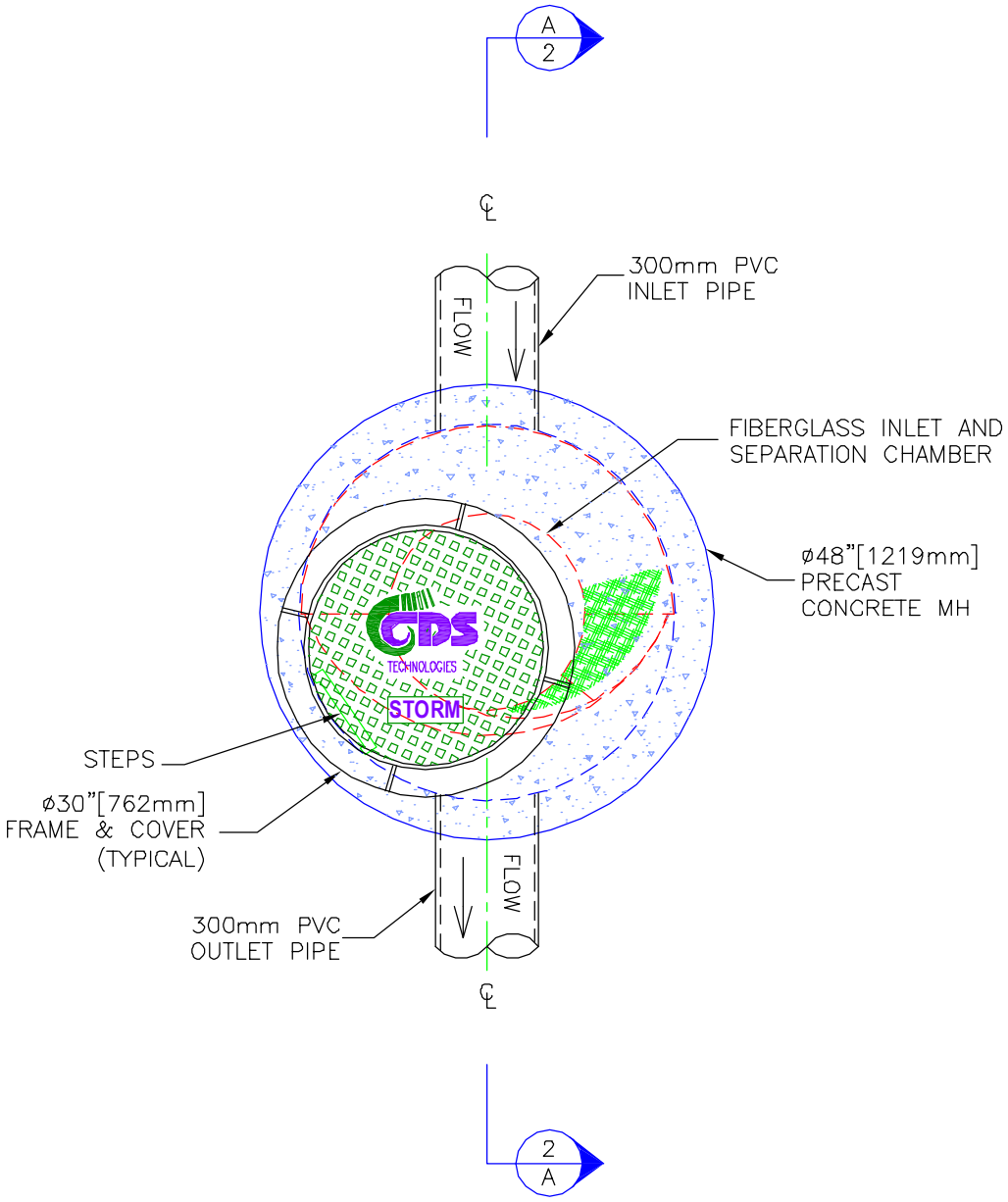
Rainfall Station # 215
Particle Size Distribution FINE
CDS Treatment Capacity 20 l/s

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 (%)
1.0	10.6%	19.8%	1.0	1.0	4.9	97.4	10.4
1.5	9.9%	29.7%	1.5	1.5	7.4	96.7	9.6
2.0	8.4%	38.1%	2.0	2.0	9.8	96.0	8.0
2.5	7.7%	45.8%	2.4	2.4	12.3	95.3	7.3
3.0	5.9%	51.7%	2.9	2.9	14.8	94.6	5.6
3.5	4.4%	56.1%	3.4	3.4	17.2	93.9	4.1
4.0	4.7%	60.7%	3.9	3.9	19.7	93.2	4.3
4.5	3.3%	64.0%	4.4	4.4	22.1	92.5	3.1
5.0	3.0%	67.1%	4.9	4.9	24.6	91.8	2.8
6.0	5.4%	72.4%	5.9	5.9	29.5	90.4	4.9
7.0	4.4%	76.8%	6.8	6.8	34.5	89.0	3.9
8.0	3.5%	80.3%	7.8	7.8	39.4	87.6	3.1
9.0	2.8%	83.2%	8.8	8.8	44.3	86.2	2.4
10.0	2.2%	85.3%	9.8	9.8	49.2	84.7	1.9
15.0	7.0%	92.3%	14.6	14.6	73.8	77.7	5.4
20.0	4.5%	96.9%	19.5	19.5	98.4	70.6	3.2
25.0	1.4%	98.3%	24.4	19.8	100.0	57.0	0.8
30.0	0.7%	99.0%	29.3	19.8	100.0	47.5	0.3
35.0	0.5%	99.5%	34.2	19.8	100.0	40.7	0.2
40.0	0.5%	100.0%	39.0	19.8	100.0	35.7	0.2
45.0	0.0%	100.0%	43.9	19.8	100.0	31.7	0.0
50.0	0.0%	100.0%	48.8	19.8	100.0	28.5	0.0
							90.5

Removal Efficiency Adjustment[2] = 6.5%
Predicted Net Annual Load Removal Efficiency = 84.0%
Predicted Annual Rainfall Treated = 98.5%

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.
3 - CDS Efficiency based on testing conducted at the University of Central Florida
4 - CDS design flowrate and scaling based on standard manufacturer model & product specifications

PLAN VIEW

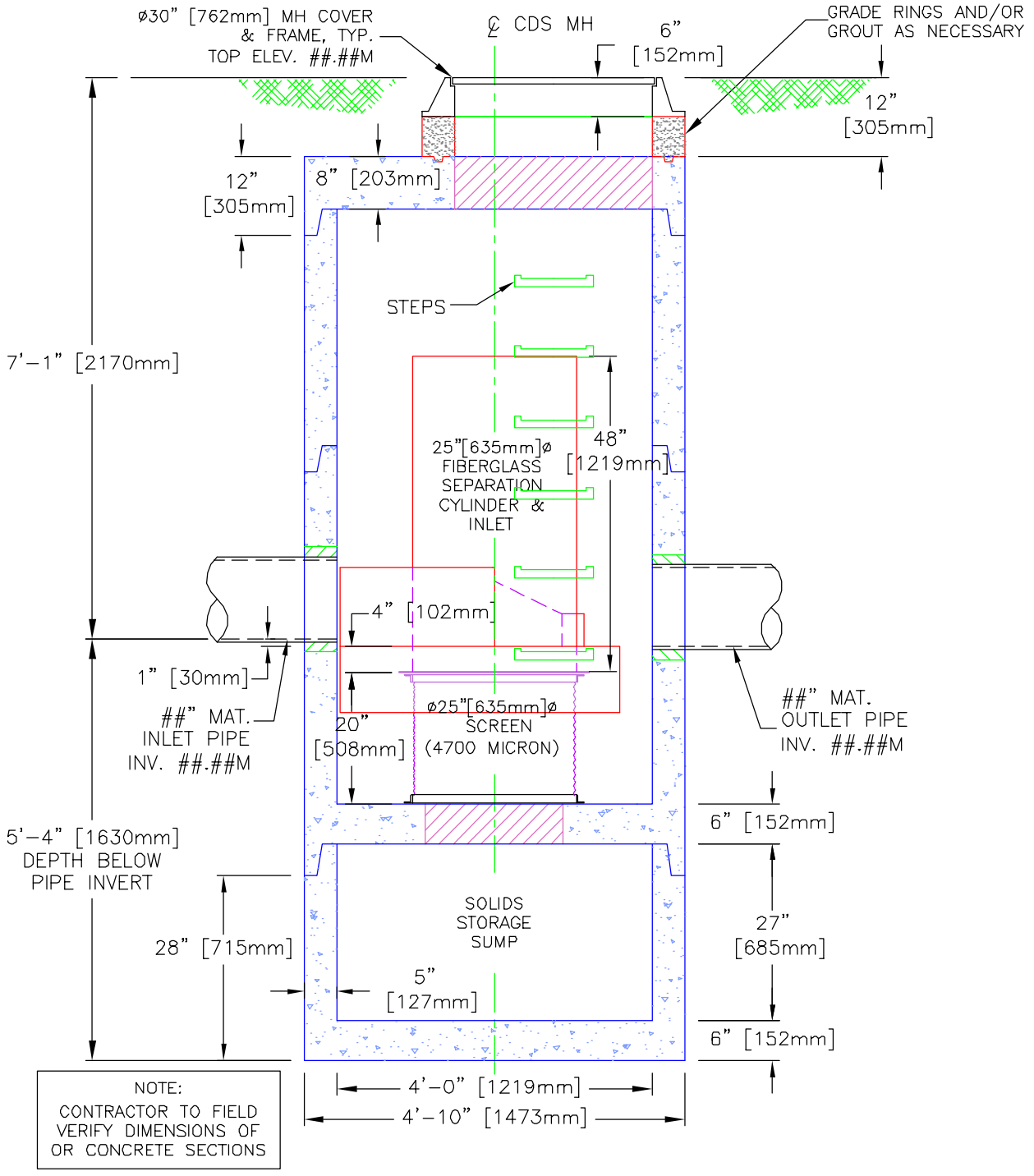


CDS MODEL PMSU20_15_4m
STORMWATER TREATMENT UNIT

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

SECTION A–A
ELEVATION VIEW



NOTE:
CONTRACTOR TO FIELD VERIFY DIMENSIONS OF OR CONCRETE SECTIONS

CDS MODEL PMSU20_15_4m
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