David Schaeffer Engineering Ltd.
120 Iber Road, Suite 103
Stittsville, ON K2S 1E9
613-836-0856
dsel.ca

DESIGN BRIEF

FOR

HABITAT FOR HUMANITY NATIONAL CAPITAL REGION

PROPOSED RESIDENTIAL SITE PLAN

40 BEECHCLIFFE
CITY OF OTTAWA

PROJECT NO.: 24-1416

SUBMISSION 1
JUNE 2025

DESIGN BRIEF
FOR
PROPOSED RESIDENTIAL SITE PLAN

HABITAT FOR HUMANITY NATIONAL CAPITAL REGION

PROJECT NO: 24-1403

TABLE OF CONTENTS

1.0 INTRODUCTION 1
1.1 Existing Conditions 1
1.2 Site Plan Layout 1
1.3 Consultation Summary 2
1.4 Proximity to Future LRT 2
1.5 Required Permits / Approvals 2

2.0 GUIDELINES, PREVIOUS STUDIES, AND REPORTS 4
2.1 Existing Studies, Guidelines, and Reports 4

3.0 WATER SUPPLY SERVICING 6
3.1 Existing Water Supply Services 6
3.2 Water Supply Servicing Design 6
3.3 Water Supply Conclusion 7

4.0 WASTEWATER SERVICING 8
4.1 Existing Wastewater Services 8
4.2 Wastewater Design 8
4.3 Wastewater Servicing Conclusions 8

5.0 STORMWATER MANAGEMENT 9
5.1 Existing Stormwater Services 9
5.2 Post-Development Stormwater Management Target 9
5.3 Proposed Minor System 9
5.4 Quantity Control Analysis 10
5.4.1 Pre-development 10
5.4.2 Post-development 11
5.5 Grading and Drainage Design 12
5.6 Stormwater Servicing Conclusions 12

6.0 EROSION AND SEDIMENT CONTROL 13

7.0 CONCLUSION AND RECOMMENDATIONS 14

DRAWINGS

Drawing 0	Title Page and Key Plan
Drawing 1	General Notes
Drawing 2	Details and Tables
Drawing 3	Existing Conditions and Removals
Drawings 4	General Plan
Drawings 5-6	Plan and Profiles
Drawing 7	Grading Plan
Drawing 8	Sanitary Drainage Plan
Drawing 9	Storm Drainage Plan
Drawing 10	100-Year Static Pond Area and ICDs
Drawings 11-12	Erosion and Sediment Control Plans

TABLES

Table 1:	Development Statistics
Table 2:	Potential Required Permits/Approvals
Table 3:	Water Demand Proposed Conditions
Table 4:	Water Supply Design Criteria
Table 5:	Wastewater Design Criteria
Table 6:	Storm Sewer Design Criteria
Table 7:	Phase 1(South) Target Release rate
Table 8:	Phase 2(North) Target Release rate
Table 9:	Phase 1(South) 100-year 3hr CHI Summary
Table 10:	Phase 1(South) 100-year 24hr SCS Summary
Table 11:	Phase 2(North) 100-year 3hr CHI Summary
Table 12:	Phase 2(North) 100-year 24hr SCS Summary

APPENDICES

Appendix A	General
Appendix B	Water Supply
Appendix C	Wastewater Collection
Appendix D	Stormwater Management

DESIGN BRIEF
FOR
PROPOSED RESIDENTIAL SITE PLAN
HABITAT FOR HUMANITY NATIONAL CAPITAL REGION

JUNE 2025

CITY OF OTTAWA
PROJECT NO.: 24-1416

1.0 INTRODUCTION

David Schaeffer Engineering Limited (DSEL) was retained by Habitat for Humanity National Capital Region to prepare a Design Brief in support of their application for part lot control and site plan control.

The property, located at 40 Beechcliffe Street in Ottawa's Knoxdale/Merivale Ward, is identified as PIN 04657-0598 on the attached City of Ottawa topographic survey included in ***Appendix A***. It covers approximately 1.28 ha currently owned by the City of Ottawa, whom is transferring 0.76 ha of land to Habitat for the purpose of constructing affordable housing.

This report aims to provide detailed information on the availability of site services to support the applications for site plan control application.

1.1 Existing Conditions

The subject property is an undeveloped parcel of land within the Craig Henry community adjacent to Woodroffe Ave. The site is generally flat with elevations ranging between 88.00 and 88.80.

The soil profile of the land typically consists of a large fill deposit (sand, gravel, trace organics) placed above a brown silty clay. Groundwater monitoring wells were installed by Terrapex and groundwater levels were measured around 3.5m below existing grade, however Paterson noted in their Due Diligence report that seasonal fluctuations are to be expected due to the high permeability of the soils.

Existing infrastructure exists in the Beechcliffe Street ROW along the western boundary of the subject property. Plan and profiles are attached in ***Appendix A*** for reference. Storm and sanitary sewers from the existing subdivision outlet via a servicing block which bisect the property in line with Sovereign Avenue.

The subject lands fall within the intake protection zone scored 8.1. See ***Appendix A*** for excerpt from the Mississippi-Rideau Source Protection Plan. The proposed works are not identified a significant drinking water threat in the Source Protection Plan.

1.2 Site Plan Layout

The proposed project includes 33 residential townhome units as shown on the site plan attached in ***Appendix A***. The site will be phased, where Phase 1 consisting of 26 units will be subject to an application for site plan control and the remaining units in Phase 2 will be

subdivided through part lot control. Predicted population figures for the site are outlined in ***Table 1***.

Table 1: Development Statistics

Land Use	Total Area (ha)	Projected Residential Units	Residential Population per Unit *	Projected Population
Townhouses	0.76	33	2.7	90
Total	**0.76**	**33**		**90**

** NOTE: Population projections may differ from population estimates used in background Transportation Studies, Planning Rationale, and other studies.*

1.3 Consultation Summary

The client and consultant team met with the City of Ottawa on January 15, 2025 and May 13, 2025. Correspondence summarizing these consultations can be found in ***Appendix A*** for reference.

1.4 Proximity to Future LRT

The subject lands are located adjacent to a future LRT station. Note that the subject lands will be supported by utilities from Beechcliffe and will not have located within the rear yards of the site. All basements will align with the footprint of the home.

1.5 Required Permits / Approvals

Although this project's servicing concept covers the entire property at 40 Beechcliffe Street, Habitat intends on applying for Site Plan Control for the southern 26 lots. The 7 units north of the servicing corridor will be covered under a Part Lot Control application.

The City of Ottawa must approve detailed engineering design drawings and reports prior to construction of the proposed infrastructure identified in this report.

The following additional approvals and permits listed in ***Table 2*** are expected to be required prior to construct municipal infrastructure detailed herein. Other permits and approvals may be required, as detailed in the other studies submitted as part of the Planning Act applications (e.g. *Tree Conservation Report, Phase 1 Environmental Site Assessment, etc*.).

Table 2: Potential Required Permits/Approvals

Agency	Permit/Approval Required	Trigger	Remarks
MECP / City of Ottawa	Environmental Compliance Approval	Construction of new sanitary & storm sewers.	MECP is expected to review the stormwater collection system and wastewater collection system by transfer of review.
MECP	Permit to Take Water	Construction of proposed land uses (e.g. basements for	Pumping of groundwater will be required during construction, given

		residential homes) and services.	groundwater conditions and proposed land uses/ municipal infrastructure.
City of Ottawa	MOE Form 1 – Record of Watermains Authorized as a Future Alteration	Construction of watermains.	The City of Ottawa is expected to review the watermains on behalf of the MECP.

2.0 GUIDELINES, PREVIOUS STUDIES, AND REPORTS

2.1 Existing Studies, Guidelines, and Reports

The following documents were referenced in the preparation of this report:

- **Ottawa Sewer Design Guidelines**,
  City of Ottawa, *SDG002,* October 2012.
  (City Standards)

  - **Technical Bulletin ISDTB-2014-01, Revisions to Ottawa Design Guidelines – Sewer,**
    City of Ottawa, February 5, 2014.
    (*ISDTB-2014-01*)

  - **Technical Bulletin PIEDTB-2016-01, Revisions to Ottawa Design Guidelines – Sewer,**
    City of Ottawa, September 6, 2016.
    (*PIEDTB-2016-01*)

  - **Technical Bulletin ISTB-2018-01, Revisions to Ottawa Design Guidelines – Sewer,**
    City of Ottawa, March 21, 2018.
    (*ISTB-2018-01*)

  - **Technical Bulletin ISTB-2018-03, Revisions to Ottawa Design Guidelines – Sewer,**
    City of Ottawa, June, 2018.
    (*ISTB-2018-04*)

  - **Technical Bulletin ISTB-2019-02, Revisions to Ottawa Design Guidelines – Sewer,**
    City of Ottawa, July 8, 2019.
    (*ISTB-2019-02*)

  - **Technical Bulletin IWSTB-2024-04, Revisions to Ottawa Design Guidelines – Sewer,**
    City of Ottawa, September 12, 2024.
    (*IWSTB-2024-04*)

- **Ottawa Design Guidelines – Water Distribution**
  City of Ottawa, July 2010.
  (Water Supply Guidelines)

  - **Technical Bulletin ISD-2010-2**
    City of Ottawa, December 15, 2010.
    (*ISD-2010-2*)

  - **Technical Bulletin ISDTB-2014-02**
    City of Ottawa, May 27, 2014.
    (*ISDTB-2014-02*)

- **Technical Bulletin ISTB-2018-02**
  City of Ottawa, March 21, 2018.
  (*ISTB-2018-02*)

- **Technical Bulletin ISTB-2021-03**
  City of Ottawa, August 18, 2021
  (ISTB-2021-03)

- **Technical Bulletin IWSTB-2024-05**
  City of Ottawa, November 18, 2024.
  (IWSTB-2024-05)

- **Design Guidelines for Sewage Works,**
  Ministry of the Environment, 2016.
  (MOE* Design Guidelines*)

- **Stormwater Planning and Design Manual,**
  Ministry of the Environment, March 2003.
  (SWMP Design Manual)

- **Ontario Building Code Compendium**
  Ministry of Municipal Affairs and Housing Building Development Branch, May 29, 2024.
  (OBC)

- **Mississippi-Rideau Source Water Protection Plan,**
  MVCA & RVCA, April 28, 2022.

- **Erosion & Sediment Control Guidelines for Urban Construction,**
  Greater Golden Horseshoe Area Conservation Authorities, December 2006.

3.0 WATER SUPPLY SERVICING

3.1 Existing Water Supply Services

The subject property is within the 2W2C pressure zone. The existing subdivision is serviced by a system of local watermains. A 150mm diameter watermain runs along Beechcliffe Street.

3.2 Water Supply Servicing Design

Drawing 4 and 5 illustrate the proposed watermain servicing for the site. It is proposed to remove and replace the length of watermain across the frontage of the subject property. The length along Phase 1 will be replaced with a 200mm diameter main, while Phase 2 will remain as a 150mm diameter main.

The City of Ottawa indicated that the hydrant along Phase 1 existing mains could support up to 125L/s, and 145L/s in Phase 2. Replacing the watermain along Phase 1 with a 200mm diameter main would increase available flow to Phases 1 and 2 to 150L/s and 155L/s. See correspondence included in ***Appendix B***.

Required fire flow was estimated per ***IWSTB-2024-05***, employing the OBC method for the private site. Block 4 is the largest block of units with the greatest amount of exposure. The resulting required fire flow was ***2,700L/min*** or ***45L/s***. See estimated water demands and fire flow calculations in ***Appendix B***. ***Table 3*** summarizes the estimated water demands for the subject lands. The City of Ottawa will need to confirm available pressures during the Average Day, Fire Flow, and Peak Hour scenarios.

Table 3: Water Demand Proposed Conditions

Design Parameter	Estimated Demand[1] (L/min)	Boundary Condition[2] (m H_2O / kPa)
Average Daily Demand	17.5	
Max Day + Fire Flow	85.8 + 2,700 = 2,785.8	
Peak Hour	129.5	

1) Water demand calculation per ***Water Supply Guidelines***. See ***Appendix B*** for detailed calculations.
2) Boundary conditions supplied by the City of Ottawa.

Table 4 summarizes the parameters used in the design of the water supply system.

Table 4: Water Supply Design Criteria

Design Parameter	Value
Residential Stacked Townhome	2.7 P/unit
Residential Average Daily Demand	280 L/d/p
Residential Maximum Daily Demand	4.9 x Average Daily **
Residential Maximum Hourly	7.4 x Average Daily **
System Pressure	Minimum 140kPa at ground level under maximum day demands plus fire flow conditions
Pipe Diameters	For distribution systems designed to provide fire protection, the minimum diameter of watermains shall be 150 mm except beyond the last hydrant on cul-de-sacs where the minimum diameter of watermains may be 25 mm.

	Watermain diameters shall be such that a flushing velocity of 0.8 m/s can be achieved for cleaning and flushing procedures.
Service Pipes	The minimum diameter of service pipes shall be 19 mm
Fire Hydrants	Fire hydrants shall be dry-barrel type and shall conform to the latest edition of AWWA Standard C502: Dry-Barrel Fire Hydrants. Fire hydrants shall be provided with adequate thrust blocking to prevent movement caused by thrust forces. Fire hydrant leads shall be a minimum diameter of 150 mm. In areas where the water table will rise above the hydrant drain ports, the drain ports shall be plugged.
Minimum operating pressure during normal operation	275 kPa
Maximum operation pressure during normal operation	552 kPa
Desired operating pressure	350 kPa to 480 kPa
Daily average based on Appendix 4-A from **Water Supply Guidelines* *** Residential Max. Daily and Max. Hourly peaking factors per MOE Guidelines for Drinking-Water Systems Table 3-3 for 0 to 500 persons.* *-Table updated to reflect ISD-2010-2*	

3.3 Water Supply Conclusion

The proposed site plan will be serviced by the existing local watermain network. Infrastructure upgrades are expected to help improve fire flow conditions.

Existing houses along the road will be temporarily disconnected and reconnected as the main is reinstalled.

The proposed water supply design will conform with all relevant City of Ottawa Guidelines and Policies.

4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

A 250mm diameter sanitary sewer exist along the frontage of the subject lands. The existing sewer conveys wastewater to a 525mm diameter sewer to the Woodroffe South Trunk, approximately 80m west of Beechcliffe.

4.2 Wastewater Design

Due to the number of new connections to the existing main, the wastewater design proposes to remove and replace the existing 250mm diameter sanitary sewer in the same location. Detailed layouts are shown in ***Drawings 5 and 6***, with the sanitary drainage area plan in ***Drawing 8***.

Table 5 summarizes the ***City Standards*** to be employed in the design of the proposed wastewater sewer system. See ***Appendix C*** for the wastewater calculation sheet demonstrating that sufficient capacity exist within the existing local sewers to support the proposed development.

Table 5: Wastewater Design Criteria

Design Parameter	Value
Residential – Townhome	2.7 P/unit
Average Daily Demand	280 L/d/per
Peaking Factor	Harmon's Peaking Factor. Max 4.0, Min 2.0 Harmon's Corrector Factor 0.8
Infiltration and Inflow Allowance	0.05 L/s/ha (Dry Weather) 0.28 L/s/ha (Wet Weather) 0.33 L/s/ha (Total)
Park Flows	0.33 L/s/ha
Parking Peaking Factor	9300 L/ha/d
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{2/3} S^{1/2}$
Minimum Sewer Size	200 mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2.5 m from crown of sewer to grade
Minimum Full Flowing Velocity	0.6 m/s
Maximum Full Flowing Velocity	3.0 m/s
Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012, and recent residential subdivisions in City of Ottawa (including revisions per ISTB Sewer-2018-01)	

4.3 Wastewater Servicing Conclusions

The subject property will be serviced by local sanitary sewers which will outlet to the Woodroffe South Trunk Sewer. There is residual capacity in the local sewers to accommodate the flow from the proposed development.

The proposed wastewater design conforms to all relevant ***City Standards***.

5.0 STORMWATER MANAGEMENT

5.1 Existing Stormwater Services

Stormwater runoff from the subject property is tributary to the City of Ottawa sewer system located with Beechcliffe and Woodroffe. The Woodroffe storm sewer eventually outlets into Pinecrest Creek and the Ottawa River.

5.2 Post-Development Stormwater Management Target

The following City standards are required for stormwater management within the subject property:

- Storm sewers on private roads are to be designed to provide a minimum 2-year level of service per the City's latest Technical Bulletin PIEDTB-2016-01;
- Quantity Control: Control all storms up to and including the 100-year to the existing 2-year release rate.
- Quality Control: no required for this development.

5.3 Proposed Minor System

The subject property is proposed to be serviced by the existing storm sewers on Beechcliffe and the existing service easement between Phases 1 and 2. See ***Drawings 4, 5, and 6*** for a detailed layout of the proposed stormwater servicing. ***Drawing 9*** illustrates the storm drainage area plan and ***Drawing 10*** shows the static ponding limits. Design sheets are available for review in ***Appendix D***.

Foundation drainage are proposed to be connected to the existing storm sewer on Beechcliffe. Rear yard and roof drainage will be collected and detained in the rear yard within the City Standard swale and proposed underground storage unit. It is proposed to control flow with Hydrovix Vertical Vortex Flow regulators. Manufacturers details included in ***Appendix D***.

Table 6 summarizes the standards that will be employed in the detailed design of the storm sewer network.

Table 6: Storm Sewer Design Criteria

Design Parameter	Value
Minimum Minor System Design Return Period	2-Year (Private Streets; Park 2-year)
Major System Design Return Period	1:100 year
Intensity Duration Frequency Curve (IDF) 2-year storm event: A = 732.951; B = 6.199; C = 0.810 5-year storm event: A = 998.071; B = 6.053; C = 0.814	$i = \frac{A}{(t_c + B)^C}$
Minimum Time of Concentration	10 minutes
Rational Method	$Q = CiA$
Storm sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} A R^{2/3} S^{1/2}$

Runoff coefficient for paved and roof areas	0.9
Runoff coefficient for landscaped areas	0.2
Minimum Sewer Size	250 mm diameter
Minimum Manning's 'n' for pipe flow	0.013
Minimum Depth of Cover	2.0m from crown of sewer to grade
Minimum Full Flowing Velocity	0.8 m/s
Maximum Full Flowing Velocity	6.0 m/s (where velocities in excess of 3.0 m/s are proposed, provision shall be made to protect against displacement of sewers by sudden movement)
Clearance from highest of 100-Yr HGL or pipe obvert to lowest building opening (USF)	0.30 m
Max. Allowable Flow Depth on Municipal Roads	35 cm above gutter (PIEDTB-2016-01)
Extent of Major System	Water levels must not touch any part of the building envelope and must remain below the lowest building opening during the stress test event (100-year + 20%) and 15cm vertical clearance is maintained between spill elevation on the street and the ground elevation at the nearest building envelope (PIEDTB-2016-01)
Stormwater Management Model	PCSWMM
Model Parameters	Fo = 76.2 mm/hr, Fc = 13.2 mm/hr, DCAY = 4.14/hr, D.Stor.Imp. = 1.57 mm, D.Stor.Per. = 4.67 mm
Imperviousness	Based on runoff coefficient (C) where Percent Imperviousness = (C - 0.2) / 0.7 x 100%.
Design Storms	Chicago 3-hour Design Storms and 24-hour SCS Type II Design Storms. Maximum intensity averaged over 10 minutes.
Historical Events	July 1st, 1979, August 4th, 1988 and August 8th, 1996
Climate Change Street Test	20% increase in the 100-year, 3-hour Chicago storm
Extracted from City of Ottawa Sewer Design Guidelines, October 2012, and Technical Bulletins	

5.4 Quantity Control Analysis

5.4.1 Pre-development

Existing hydrology was analyzed within PCSWMM to establish target release rates for the development. The existing catchments were divided into two sections based on drainage direction, resulting in four sub-catchments in total. One portion drains east, while the other drains west toward the local road, as indicated by the existing grading. Predevelopment model schematic is including in ***Appendix D***.

Subcatchments were modeled using the Alternative Runoff Method (ARM) with the Nash Instantaneous Unit Hydrograph (IUH). Time of concentration was calculated using the FAA/Airport method. A summary of catchment inputs is included in ***Appendix D***.

Under predevelopment conditions, the SCS 2-year storm produced higher peak runoff than the Chicago storm. ***Tables 7 and 8*** summarize the pre-development target release rates for Phases 1(south) and 2(north).

Table 7: Phase 1(South) Target Release rate

Storm	Release Rate (m^3/s)
2-year 3hr Chicago	0.02729
2-year 24hr SCS	0.05543

Table 8: Phase 2(North) Target Release rate

Storm	Release Rate (m^3/s)
2-year 3hr Chicago	0.00675
2-year 24hr SCS	0.01442

5.4.2 Post-development

The proposed development has controlled and uncontrolled areas. The area discharging to Beechcliffe Avenue were considered uncontrolled and the associated runoff rate was compensated for in areas with controls. ***Appendix D*** includes a model schematic of the post-development condition and a summary of sub-catchment model inputs.

Table 9: Phase 1(South) 100-year 3hr CHI Summary

Area	Release Rate (m^3/s)
Uncontrolled	0.06838
Controlled	0.001
Total	0.06938
Storage	206

Table 10: Phase 1(South) 100-year 24hr SCS Summary

Area	Release Rate (m^3/s)
Uncontrolled	0.05182
Controlled	0.001
Total	0.05282
Storage	215

As demonstrated in ***Table 9***, using the smallest control device commercially available, Phase 1 will exceed the allowable release rate by $0.042m^3/s$ (42L/s). However, the site requires the more storage to during the 24hr 100-year SCS storm, and the site meets the target release rate.

Table 11: Phase 2(North) 100-year 3hr CHI Summary

Area	Release Rate (m^3/s)
Uncontrolled	0.01925
Controlled	0.001
Total	0.02025
Storage	50

Table 12: Phase 2(North) 100-year 24hr SCS Summary

Area	Release Rate (m^3/s)
Uncontrolled	0.01464
Controlled	0.001
Total	0.01564
Storage	57

Phase 2 exceeds the target release rate in both the 100-year 3hr Chicago and 24hr SCS storms by $0.0135m^3/s$ (13.5L/s) and $0.00122m^3/s$ (1.2L/s), respectively. As with Phase 1, the smallest commercially available control unit was selected.

It is important to note that both phases are below existing 100-year release rates. Therefore, the development will result in a reduction in runoff in the post-development condition.

5.5 Grading and Drainage Design

The following additional grading criteria and guidelines are applied to detailed design, per ***City of Ottawa Guidelines*** and standard industry practices:

- Slope in grassed areas will be between 2% and 7%;
- Grades in excess of 7% will require terracing to a maximum of a 3:1 slope;
- Swales are to be 0.15m deep with 3:1 side slopes unless otherwise indicated on the drawings; and,
- Perforated pipe will be required for drainage swales if they are less than 1.5% in slope;

Drawing 7 illustrates the proposed detailed grading.

5.6 Stormwater Servicing Conclusions

The proposed development will outlet to the existing sewer on Beechcliffe and within the existing servicing block. Foundation drains are proposed connected to the existing storm sewer on Beechcliffe. A rear yard storage system will detain runoff in a underground storage unit. Flow is proposed to be controlled using a HYDROVEX® VHV/SVHV Vertical Vortex Flow Regulator.

Runoff from the proposed development is less than existing conditions for all storms up to and including the 100-year event. Runoff exceeds the target to control post-development 100-year to pre-development 2-year.

6.0 EROSION AND SEDIMENT CONTROL

Soil erosion occurs naturally and is a function of soil type, climate and topography. The extent of erosion losses is exaggerated during construction where vegetation has been removed and the top layer of soil becomes agitated. Prior to topsoil stripping, earthworks or construction, erosion and sediment controls will be implemented and will be maintained throughout construction.

Silt fencing will be installed around the perimeter of the active part of the site (and headwater features) and will be cleaned and maintained throughout construction. The silt fence will remain in place until the working areas have been stabilized and re-vegetated.

Catchbasins will have catchbasin inserts installed during construction to protect from silt entering the storm sewer system.

The following additional recommendations to the Contractor will be included in contract documents:

- Limit extent of exposed soils at any given time.
- Re-vegetate exposed areas as soon as possible.
- Minimize the area to be cleared and grubbed.
- Protect exposed slopes with plastic or synthetic mulches.
- Install silt fence to prevent sediment from entering any existing ditches.
- No refueling or cleaning of equipment near existing watercourses.
- Provide sediment traps and basins during dewatering.

The Contractor will be required to complete regular inspections and guarantee proper performance. The inspection is to include:

- Verification that water is not flowing under silt barriers.
- Clean and change inserts at catch basins.

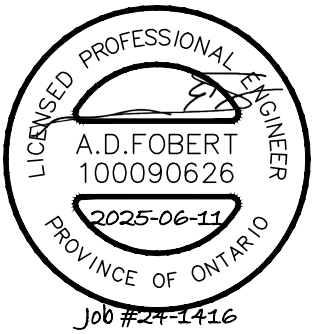
7.0 CONCLUSION AND RECOMMENDATIONS

David Schaeffer Engineering Ltd. (DSEL) has been retained by Habitat for Humanity National Capital Region to prepare a Design Brief in support of their application for part lot and site plan control. The preceding report outlines the following:

- Water – subject site will replace the existing main within Beechcliffe.
- Wastewater – aanitary sewers are available on Beechcliffe and have sufficient capacity to support the subject property.
- Stormwater – stormwater will be detained within an underground storage chamber in the rear yard of the subject lands.

The submitted materials demonstrate that the existing water, sanitary, and storm services can accommodate the contemplated development.

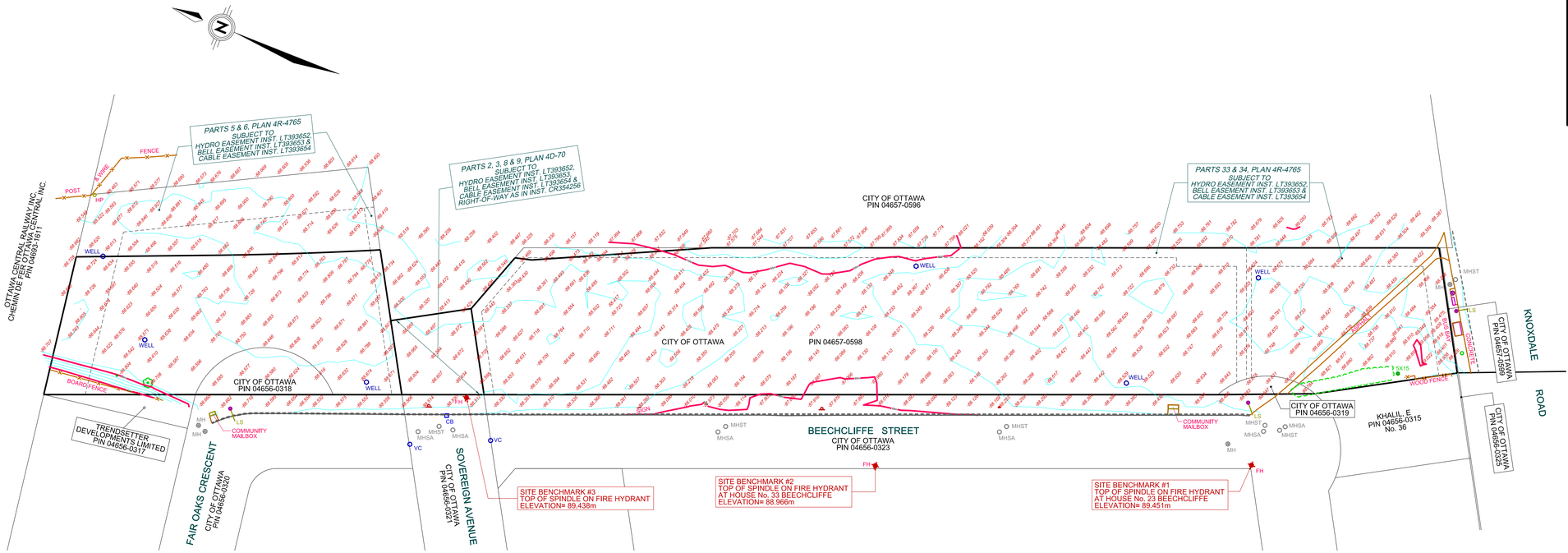
Prepared by,
David Schaeffer Engineering Ltd.

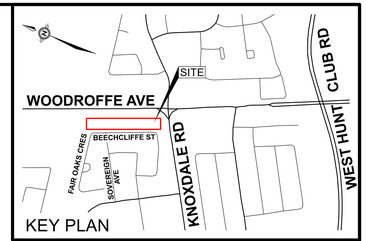


Per: Adam D. Fobert, P.Eng.

David Schaeffer Engineering Ltd.
120 Iber Road, Suite 103
Stittsville, ON K2S 1E9
613-836-0856
dsel.ca

APPENDIX A





NAD83 ORIGINAL
CGVD28

SCALE - 1 : 500
10 0 10 20
(METRES)

THIS IS NOT A PLAN OF SURVEY
Boundaries shown hereon are NOT based on an actual survey.
Contractors are required to verify boundary locations in the field prior to commencing construction.

WINTER CONDITIONS
Due to the accumulation of ice and snow, it is possible that some elements may have been overlooked during the commission of this survey.

This plan was compiled from plans and documents recorded in the Land Registry System and has been prepared for property indexing purposes only.

Easements are not noted on adjacent properties.

Ottawa

PLANNING, DEVELOPMENT AND
BUILDING SERVICES DEPARTMENT
SURVEYS & MAPPING BRANCH

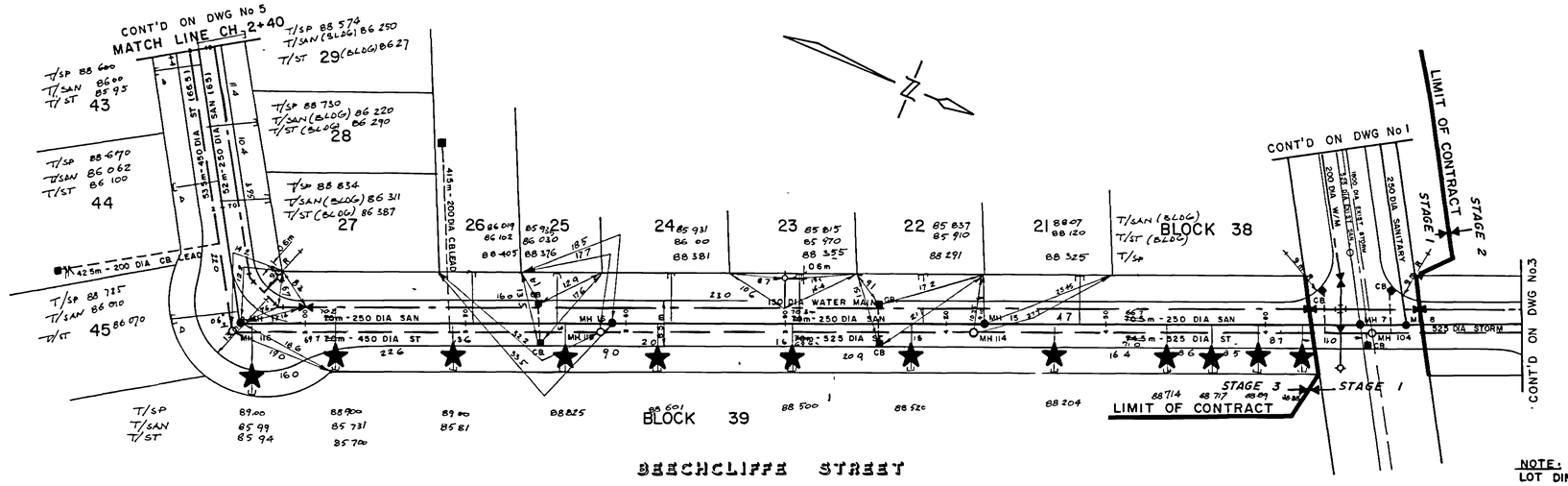
PHONE (613) 580-2400
FAX (613) 580-4764

100 CONSTELLATION DRIVE
OTTAWA, ONTARIO, K2G 6J8

PROJECT : 40 BEECHCLIFFE STREET

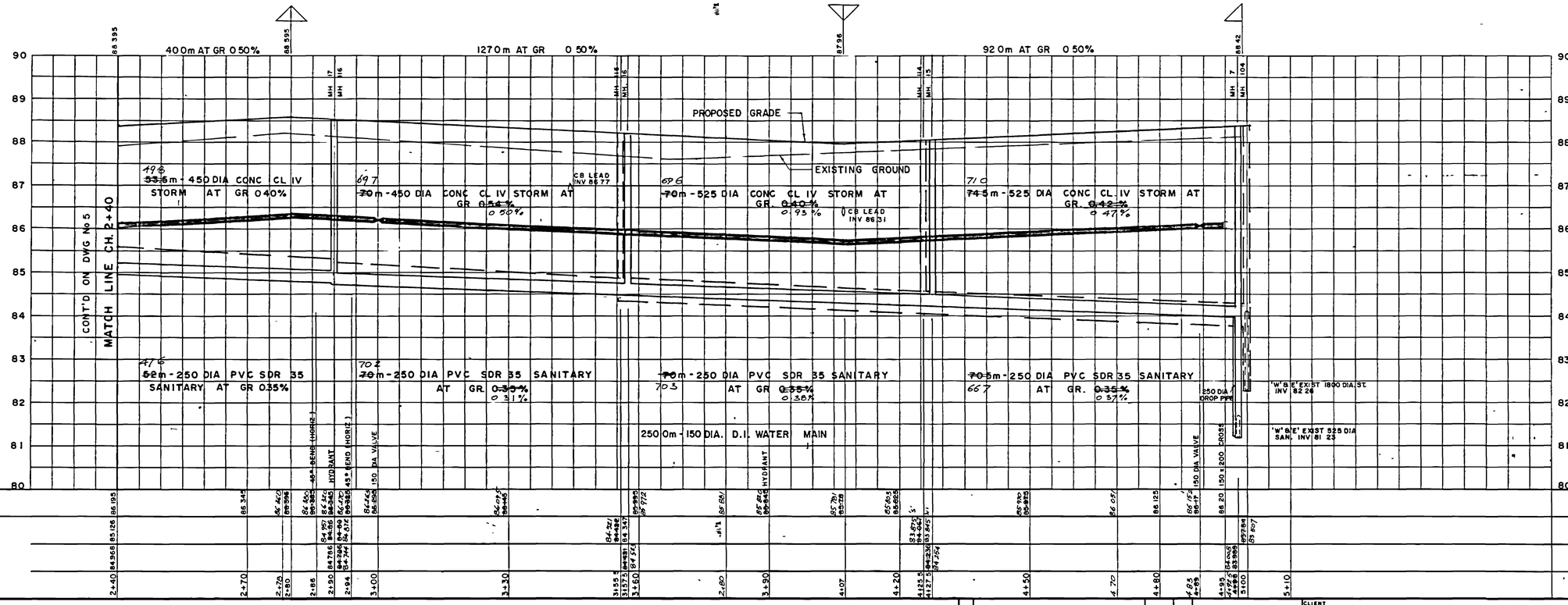
DATA COMPILATION : TOTAL STATION MAPPING	
DATA TYPE : ELECTRONIC FIELD NOTES	
HORIZONTAL AND VERTICAL DATUM : NAD 83 (ORIGINAL) ZONE 9 MTM - CGVD28	
HYPSOGRAPHIC MODEL : BREAKLINES & SPOT HEIGHTS	
RECOMMENDED HARDCOPY SCALE : 1:250	
RECOMMENDED CONTOUR INTERVAL : 0.25 m	
A - NUMBER : A-4746	
COMPUTER GRAPHICS FILE NAME : ORIG-CVGD28-24018A-m.dgn	
JOB - NUMBER : 24018-A	
FIELD DATE COLLECTED : T.A. / B.B. / C.M. / D.M.	DATE : DEC. 2024
CAD / CALCD : R.D.	DATE : JAN. 2025
MAP / CADASTRAL COMPILATION CHECK : A.R.	DATE : JAN. 2025
THIS MAP DEPICTS DIGITAL DATA	

A-4746



BEECHCLIFFE STREET

NOTE: USE LEGAL PLAN FOR LOT DIMENSIONS



NOTE
1 SEE NOTE 2 ON DWG 83-3611-1
2 ★ SAN AND ST SERVICE LATERALS DELETED AT LOT LINE
WATER SERVICE LATERALS DELETED AT MAIN (JULY 85)

OLIVER MANGIONE & ASSOCIATES LIMITED
CREATED FROM ...

No.	REVISIONS	DATE	BY
2	AS BUILT	24/5/85	JT
1	ADD READ YARD CB LOT 26	18/9/84	TJW

REGISTERED PROFESSIONAL ENGINEER — J. M. SIGNE — PROVINCE OF ONTARIO

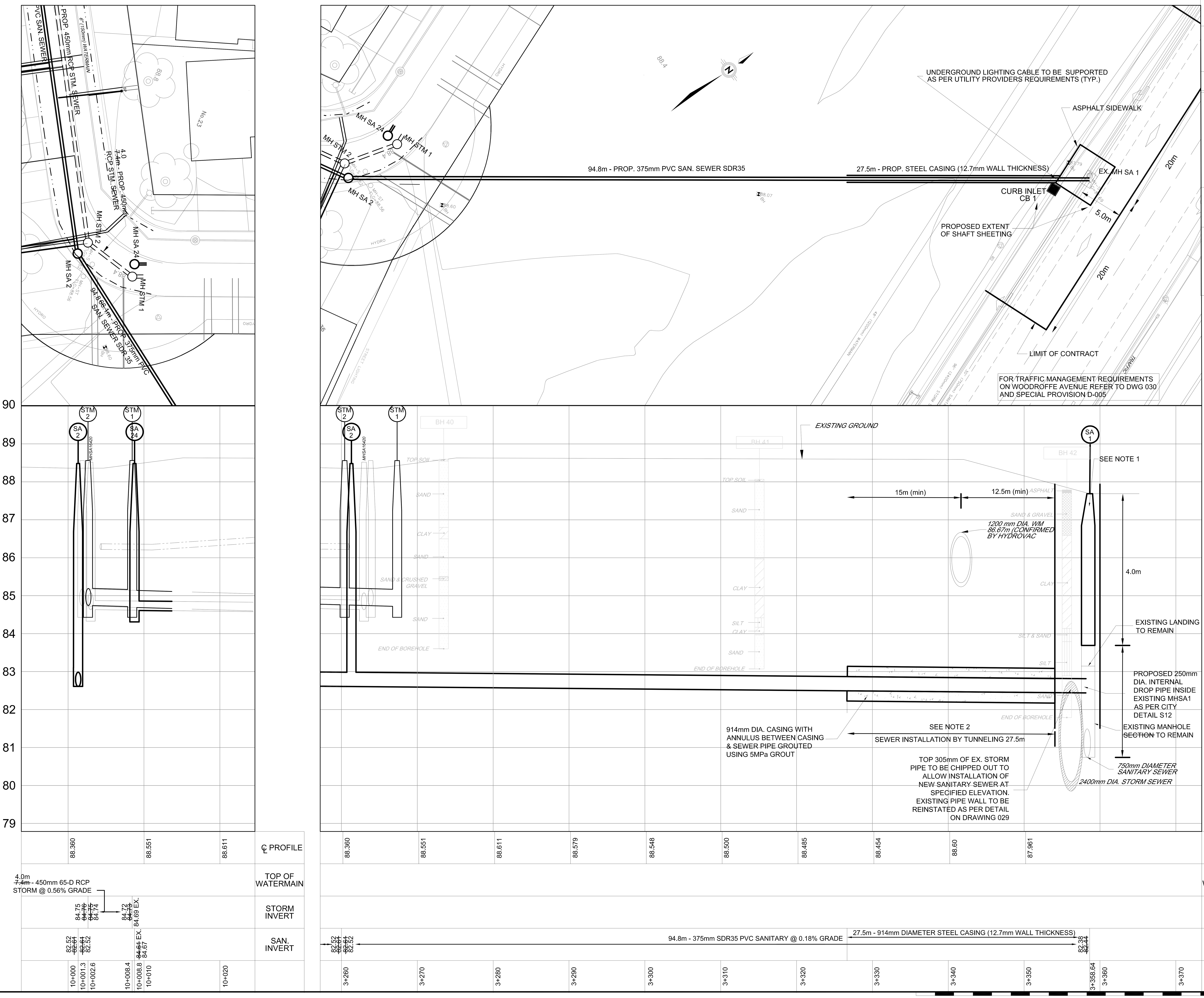
APP'D

CLIENT: THOMAS C. ASSALY CORPORATION LTD.
PROJECT: KNOXDALE AND WOODROFFE SUBDIVISION
TITLE: BEECHCLIFFE STREET
CH 2+40 to STREET 'A'

OLIVER MANGIONE McCALLA & ASSOCIATES LIMITED
Consulting Engineers — Ottawa

DESIGN	S.A.D
DRAWN	W.D.D & J.T.
CHECKED	J.B.M.
DATE	SEPT, 1984
SCALE	HORIZ 1:500 VERT. 1:50
DRAWING No.	84-4272 - 6
REV	2

Consultant Drawing Number



KNOXDALE ROAD

NEWHAVEN ST. TO WOODROFFE AVE.

BEECHCLIFFE STREET PROPOSED INFRASTRUCTURE P&P

STA. 3+260 TO STA 3+370
STA. 10+000 TO STA 10+030

L. Marineau, P.Eng. — Program Manager
Susan Johns, P.Eng. — Project Manager

Ottawa

Contract No. ISD10-5058 — Dwg. No. 016
Sheet ~~17~~ 11 of ~~34~~ 24
Index No.
Asset Group: ISD
Des: AM — Chk'd: JK
Dwn: AB — Chk'd: JK
Utility Circ. No.: -
Const. Inspector: -
Scale: HORIZONTAL 0m 2.5 5 10; VERTICAL 0m 1 2

LICENSED PROFESSIONAL ENGINEER — T.M. KEALEY 100083622 — Dec 23/13 — PROVINCE OF ONTARIO

NOTE:
The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

R.V. Anderson Associates Limited — engineering • environment • infrastructure — Project # 102032

REVISIONS

No.	Description	By	Date
03	ISSUED FOR MUNICIPAL CONSENT	JK	30/12/2010
04	ISSUED FOR MOE C of A	JK	30/12/2010
05	ISSUED FOR TENDER	JK	19/08/2011
06	ISSUED FOR CONSTRUCTION	JK	30/09/2011
07	ISSUED FOR AS BUILTS	TMK	23/12/2013

NOTES:

1. ~~EXISTING SANITARY MANHOLE TO BE REPLACED ABOVE THE LANDING ELEVATION USING NEW M-5 MH SECTIONS (1520mm x 1830mm) INCLUDING NEW LADDER, TAPER SECTION, COVER AND FRAME TO CITY OF OTTAWA STANDARDS~~

EXISTING SANITARY MANHOLE WAS PROTECTED DURING CONSTUCTION.

2. REFER TO GEOTECHNICAL REPORT FOR INFORMATION RELATING TO GROUND CONDITIONS INCLUDING REQUIREMENTS FOR WELL POINT DEWATERING.

3. FOR OTHER GENERAL NOTES, REFER TO DRAWING NO. 001

AS-BUILT
These drawings have been prepared using information from third parties. Any changes made outside the contract, or after contract completion or the date of issue (whichever is earlier) may not be reflected in the drawings. Users are advised to take sufficient steps to field verify equipment, layout, locations, dimensions and elevations. R.V. Anderson Associates Limited accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made, or actions based on, this information.

File No.: PC2025-0152

May 16, 2025

Susan Murphy
Caivan
Via email: susan.murphy@caivan.com

Subject: Pre-Consultation: Meeting Feedback
Proposed Site Plan Control Application – 40 Beechcliffe

Please find below consolidated comments from the above-noted pre-consultation meeting held on May 13, 2025.

Pre-Consultation Preliminary Assessment

1 ☐	**2** ☐	**3** ☐	**4** ☐	**5** ☒

One (1) indicates that considerable major revisions are required while five (5) suggests that the 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.

Supporting Information and Material Requirements

The attached **Study and Plan Identification List** outlines the information and material that has been identified, during this phase of pre-consultation, as either required (R) or advised (A) as part of a future complete application submission.

The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline the specific requirements that must be met for each plan or study to be deemed adequate.

Consultation with Technical Agencies

You are encouraged to consult with technical agencies early in the development process and throughout the development of your project concept. A list of technical agencies and their contact information is enclosed.

Planning

Comments:

1. Pursuant to the Official Plan the Subject Site is designated as Mainstreet Corridor and identified as a Protected Major Transit Station Area (PMTSA).

2. The Subject Site is zoned Residential Fourth Density subzone M with an exception - R4M [2995]. Townhouse dwelling is a permitted use. The exception provides additional provisions:

    i) Section 101 – minimum parking space rates does not apply.

    ii) Section 102 – minimum visitor parking space rates does not apply.

    iii) The front yard may contain a driveway with a maximum width of 3m, a walkway with a maximum width of 1.8m, and a garbage enclosure. The remainder of the front yard, with the exception of projections permitted in Section 65, must be landscaped with soft landscaping.

    iv) Minimum rear yard setback: 4.5m.

    v) Minimum rear yard area requirement: No minimum.

    vi) Maximum building height for all permitted dwelling types: the lesser of 14.5m or 4 storeys.

    vii) Communal amenity area required need not be in the rear yard.

    viii) For townhouses:

    - minimum lot width: 5m.

    - minimum lot area: no minimum.

Engineering

Comments:

3. Information regarding the servicing for this site has been previously communicated to the applicant and consultants.

4. Any existing city owned infrastructure must remain within city property.

5. **Water Quality Control**: Not required.

6. **Water Quantity Control**: Given the known capacity constraints of the receiving storm sewer system, please control post-development runoff from the subject site, up to and including the 100-year storm event, to a 2-year pre-development level.

a. The time of concentration (Tc) used to determine the pre-development condition should be calculated. Tc should not be less than 10 min. since IDF curves become unrealistic at less than 10 min; Tc of 10 minutes shall be used for all post-development calculations.

7. An MECP Environmental Compliance Approval **Private Sewage Works** will be required for the proposed development.

    a. Environmental Compliance Approval | Ontario.ca

8. Environmental

a. A Phase I ESA is required to be completed in accordance with Ontario Regulation 153/04 in support of this development proposal to determine the potential for site contamination. Depending on the Phase I recommendations a Phase II ESA may be required.

b. The Phase I ESA shall provide all the required Environmental Source Information as required by O. Reg. 153/04. ERIS records are available to public at a reasonable cost and need to be included in the ESA report to comply with O.Reg. 153/04 and the Official Plan. The City will not be in a position to approve the Phase I ESA without the inclusion of the ERIS reports.

c. Official Plan: Section 10. Protection of Health and Safety (ottawa.ca)

9. Record of Site Condition (RSC)

a. An RSC is required to be filled with the MECP for any property where there is a proposed changes in land use to a more sensitive land use. An RSC will be required for this application.

b. A memorandum prepared by an environmental consultant confirming that no potential contaminating activities have taken place within the RSC area since the filling of the RSC, may also be required.

c. Submitting a record of site condition | Ontario.ca

10. Geotechnical

a. A Geotechnical Study/Investigation shall be prepared in support of this development proposal.

b. Reducing the groundwater level in this area can lead to potential damages to surrounding structures due to excessive differential settlements of the ground. The impact of groundwater lowering on adjacent properties needs to be discussed and investigated to ensure there will be no short term and long-term damages associated with lowering the groundwater in this area.

c. Geotechnical Study shall be consistent with the Geotechnical Investigation and Reporting Guidelines for Development Applications. Geotechnical Investigation and Reporting (ottawa.ca)

d. If Sensitive marine clay soils are present in this area that are susceptible to soil shrinkage that can lead to foundation and building damages. All six (6) conditions

listed in the Tree Planting in Sensitive Marine Clay Soils-2017 Guidelines are required to be satisfied. Note that if the plasticity index of the soil is determined to be less than 40% a minimum separation between a street tree and the proposed building foundations of 4.5m will need to be achieved. A memorandum addressing the Tree in Clay Soil Guidelines prepared by a geotechnical engineer is required to be provided to the City. Tree Planting in Sensitive Marine Clay Soils - 2017 Guidelines (ottawa.ca)

11. Slope Stability Assessment Reports

a. A report addressing the stability of slopes, prepared by a qualified geotechnical engineer licensed in the Province of Ontario, should be provided wherever a site has slopes (existing or proposed) steeper than 5 horizontal to 1 vertical (i.e., 11 degree inclination from horizontal) and/or more than 2 meter in height. **The north portion of the site appears to have slopes alongs Woodroffe Avenue requiring a slope stability study.**

b. A report is also required for sites having retaining walls greater than 1 meter high, that addresses the global stability of the proposed retaining walls.

c. Slope Stability Guidelines for Development Applications (ottawa.ca)

Feel free to contact Vincent Duquette, Project Manager, for follow-up questions.

Noise

Comments:

12. Noise Impact Studies required for road and rail.

Feel free to contact Rochelle Fortier-Lesage, Transportation Project Manager, for follow-up questions.

Transportation

Comments:

13. Transportation Impact Assessment not required, but Transportation Demand Management measures are strongly recommended. Fill out and provide TDM Checklists with the submission materials.

    a. TDM-Supportive Development Design and Infrastructure Checklist

    b. TDM Measures Checklist

14. O-Train Proximity Study will be required. The Terms of Reference for a Rail Proximity Study are here: https://documents.ottawa.ca/sites/default/files/rail_proximity_tor_en.pdf

15. Ensure that the development proposal complies with the Right-of-Way protection requirements - See Schedule C16 of the Official Plan.

    a. Property requirements must follow the approved Barrhaven Light Rail Transit (Baseline Station to Barrhaven Town Centre) and Grade-Separations Planning and Environmental Assessment Study, prepared by Parsons, dated October 2024. See screenshot below and please contact Jabbar Siddique for more information.

    b. In addition to the LRT ROW, there is ROW protection listed in Schedule C16 for this section of Woodroffe.

    c. ROW must be unincumbered and conveyed at no cost to the City. Note that conveyance of the ROW will be required prior to registration of the SP agreement. Additional information on the conveyance process can be provided upon request.

    d. Any requests for exceptions to ROW protection requirements must be discussed with Transportation Planning and concurrence provided by Transportation Planning management. The applicant shall submit support evidence and rationale to support any relief to Transportation Planning satisfaction.

Feel free to contact Rochelle Fortier-Lesage, Transportation Project Manager, for follow-up questions.

Parkland

Comments:

16. If you intend to rely on the below exemption in the Parkland Dedication (By-law No. 2022-280), please provide the required documentation. For example, 'Article of Incorporation under the Canada Not-for-profit Corporations Act':

> *2. No conveyance of land or payment of cash-in-lieu under this by-law is required in the case of the development or redevelopment of:*
>
> *e. residential purposes, or the residential portion of a mixed-use development, that are erected and owned by non-profit housing, provided that satisfactory evidence is provided to the Treasurer that the dwelling units and/or rooming units are intended for persons of low or modest incomes and that the dwelling units and/or rooming units are being made available at values that are initially, and will continue to be, below current market levels in the City;*

Feel free to contact James Ireland, Planner III, for follow-up questions.

Other

17. The High Performance Development Standard (HPDS) is a collection of voluntary and required standards that raise the performance of new building projects to achieve sustainable and resilient design and will be applicable to Site Plan Control and Plan of Subdivision applications.

    a. The HPDS was passed by Council on April 13, 2022, but is not in effect at this time, as Council has referred the 2023 HPDS Update Report back to staff with the direction to bring forward an updated report to Committee at a later date. The timing of an updated report to Committee is unknown at this time, and updates will be shared when they are available.

    b. Please refer to the HPDS information at ottawa.ca/HPDS for more information.

18. Under the Affordable Housing Community Improvement Plan, a Tax Increment Equivalent Grant (TIEG) program was created to incentivize the development of affordable rental units. It provides a yearly fixed grant for 20 years. The grant helps offset the revenue loss housing providers experience when incorporating affordable units in their developments.

a. To be eligible for the TIEG program you must meet the following criteria:

    i. the greater of five units OR 15 per cent of the total number of units within the development must be made affordable

ii. provide a minimum of 15 per cent of each unit type in the development as affordable

iii. enter into an agreement with the city to ensure the units maintain affordable for a minimum period of 20 years at or below the city-wide average market rent for the entire housing stock based on building form and unit type, as defined by the Canada Mortgage and Housing Corporation

iv. must apply after a formal Site Plan Control submission, or Building Permit submission for projects not requiring Site Plan Control, and prior to Occupancy Permit issuance

b. Please refer to the TIEG information *at Affordable housing community improvement plan / Plan d'améliorations communautaires pour le logement abordable for more details or contact the TIEG coordinator via email at affordablehousingcip@ottawa.ca*.

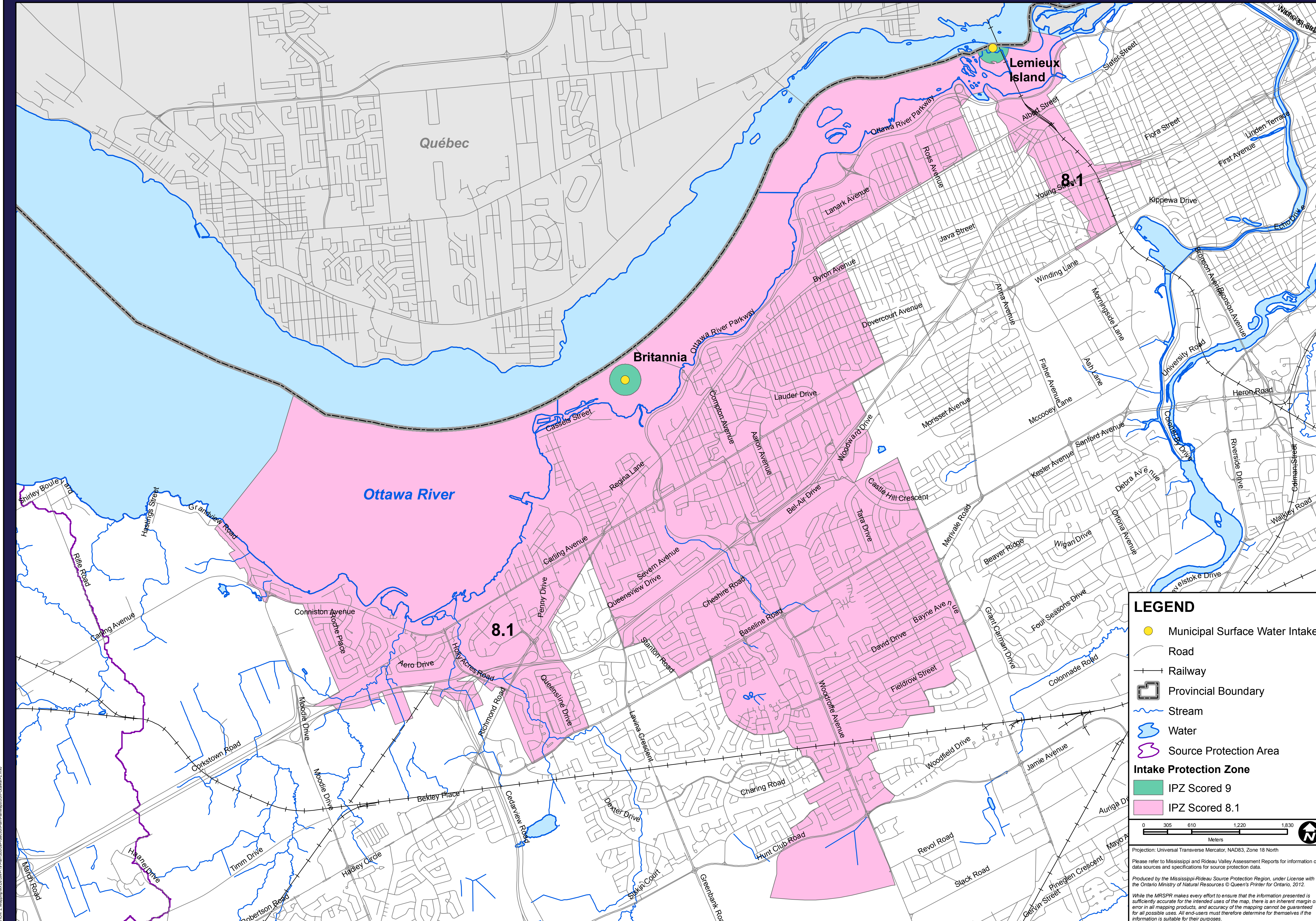
Should there be any questions, please do not hesitate to contact myself or the contact identified for the above disciplines.

Sincerely,

James Ireland, Planner III

Encl. O-Train Proximity Study Guidelines
Studies and Plans Identification List (SPIL)
List of Technical Agencies

c.c. Vincent Duquette, Infrastructure Project Manager
Rochelle Fortier-Lesage, Transportation Project Manager
Mary Dickinson, Housing Developer II
Shoma Murshid, Planner II
Erin O'Connor, Habitat for Humanity



Mississippi-Rideau Source Protection Plan 2013

Ottawa Intake Protection Zones

Schedule I

David Schaeffer Engineering Ltd.
120 Iber Road, Suite 103
Stittsville, ON K2S 1E9
613-836-0856
dsel.ca

APPENDIX B

Adam Fobert

From: Duquette, Vincent <Vincent.Duquette@ottawa.ca>
Sent: February 12, 2025 5:14 PM
To: Jeremy Chouinard
Cc: Dickinson, Mary; Grift, Justin; Mottalib, Abdul
Subject: RE: Informal boundary Condition Request - City Housing Sites

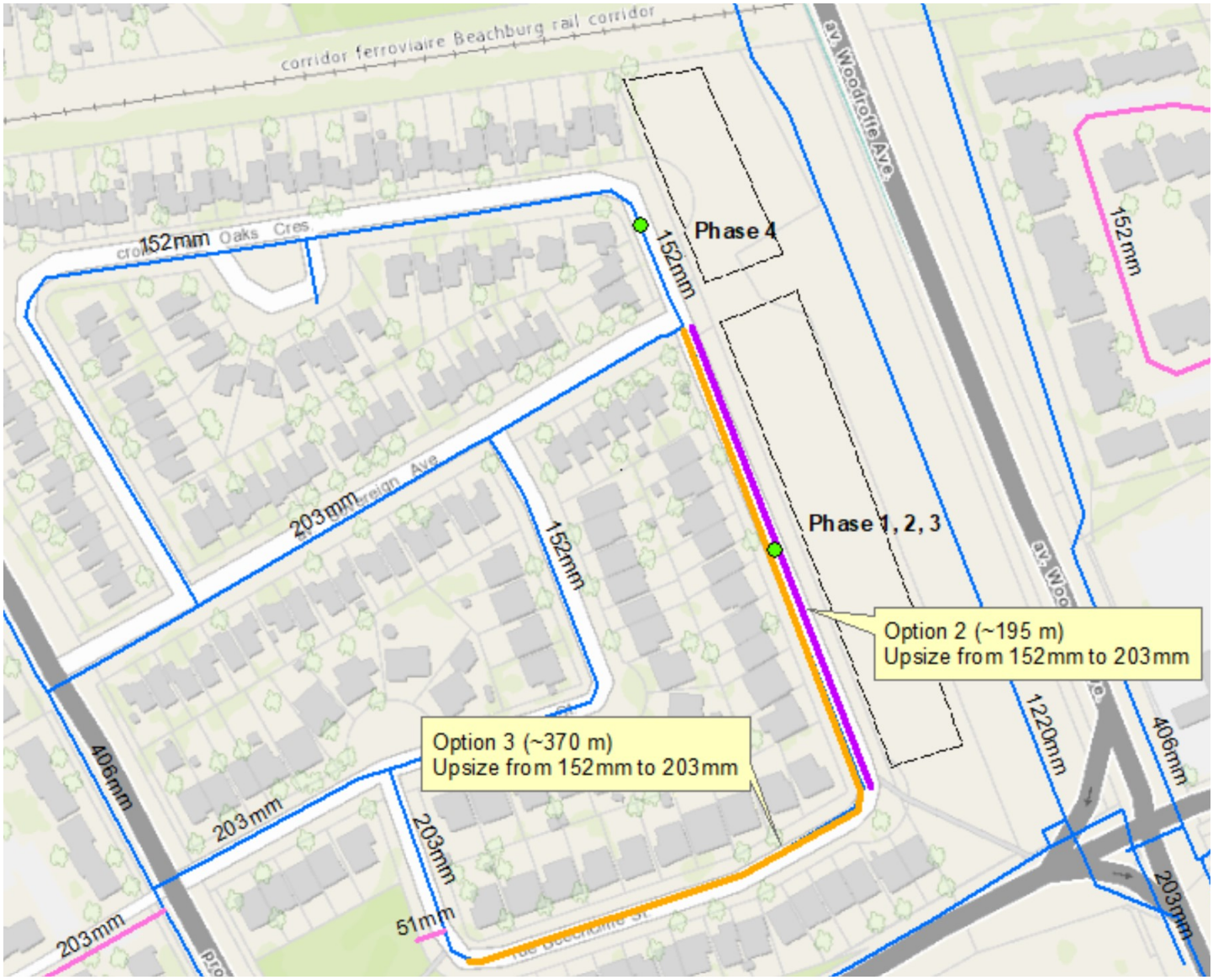
Hi Jeremy,

Thank you for your patience on the boundary condition request. Our water resource group indicated that the first scenario below to interconnect the Beechcliffe and Knoxdale watermains is not permitted because a portion of the lands where the proposed interconnecting watermain is located is reserved for utility relocation related to the future LRT. It's not clear to me how much of this area is needed for utility relocation, so you want to explore this option further, please let us know and out housing planners will reach out to the LRT group.

Below are the boundary conditions results for two watermain upgrade scenarios (refer to table and image below).

Please note that Phase 4 does not meet the 20 psi minimum residual pressure under both the options for 166.66 L/s Fire Flow. For phase 4 available fire flow at 20psi is provided in the table below for both scenario's. Given how close we are to achieving the required flow, I think it would be helpful at this stage to obtain accurate fireflow demand calculations for the proposed buildings instead of using the estimated demand of 167 L/s.

	Option 2 (Purple line) Upsize 152mm to 203mm Length ~ 195 m		Option 3 (Orange line) Upsize 152mm to 203mm Length ~ 370 m	
PHASE	Phase 1,2,3	Phase 4	Phase 1,2,3	Phase 4
Assigned Node	Front of Phase 1 to 3 ground Elevation 88.0 m		Front of Phase 4 ground Elevation 88.6 m	
Fire Flow Demand (requested)	166.66 L/s			
HGL (m)	105.5	NA	111.6	NA
Pressure (psi)	25.6	NA	33.5	NA
Available Fire Flow at 20 psi	-	**150 L/s**	-	**155 L/s**



Let me know if you have any questions.

Bet Regards,

Vincent Duquette, E.I.T
Project Manager, Infrastructure Approvals | Gestionnaire de projet, Projets d'infrastructure
Development Review – All Ward | Direction de l'examen des projets d'aménagement - Tous les quartiers
Planning, Development and Building Services Department (PDBS)| Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB)
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West | 110 avenue Laurier Ouest
Ottawa, ON K1P 1J1
613.580.2424 ext./poste 14048, vincent.duquette@ottawa.ca

From: Jeremy Chouinard <JChouinard@dsel.ca>
Sent: December 17, 2024 2:11 PM
To: Duquette, Vincent <Vincent.Duquette@ottawa.ca>
Subject: RE: Informal boundary Condition Request - City Housing Sites

40 Beechcliffe
Proposed Site Conditions

Water Demand Design Flows per Unit Count
City of Ottawa - Water Distribution Guidelines, July 2010

Domestic Demand

Type of Housing	Per / Unit	Units	Pop
Single Family	3.4	-	0
Semi-detached	2.7	-	0
Townhouse	2.7	33	90
Apartment			0
Bachelor	1.4	-	0
1 Bedroom	1.4	-	0
2 Bedroom	2.1	-	0
3 Bedroom	3.1	-	0
Average	1.8	-	0

	Pop	Avg. Daily		Max Day		Peak Hour	
		m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Total Domestic Demand	**90**	**25.2**	**17.5**	**123.5**	**85.8**	**186.5**	**129.5**

Required Fire Flow per IWSTB-2024-05 (OBC A-3.2.5.7)
Block 4

$Q = K\ V\ S_{tot}$

Where,

Q	19,241	minimum supply of water in litres
K	18	water supply coefficient from Table 1
V	534.47	total building volume in cubic metres
S_{tot}	2.00	total spacial coefficient from property line exposures

Buidling Volume	Area (m^2)	h (m)	V (m^3)
Basement	146.61	3.05	447.2
Ground	282.2	3.4	959.5
2nd floor	344.82	3.4	1172.4
Attic	172.41	3.1	534.5
			534.5

Required minimum water supply flow rate, L/min

Q (L)		RFF (L/min)	
	108,000	2700	**<---- Required Fire Flow**
108,000	135,000	3600	
135,000	162,000	4500	
162,000	190,000	5400	
190,000	270,000	6300	
270,000		9000	

Spacial Coefficient

	m	S
North	3.1	0.5
South	3.1	0.5
West	21.3	0
East	100	0

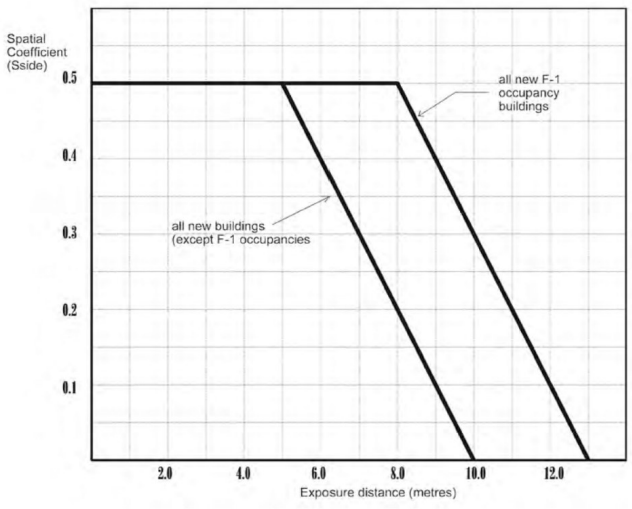


Figure 1
Spatial Coefficient vs Exposure Distance

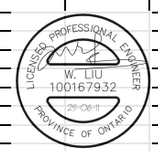
David Schaeffer Engineering Ltd.
120 Iber Road, Suite 103
Stittsville, ON K2S 1E9
613-836-0856
dsel.ca

APPENDIX C

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION									COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
FAIR OAKS CRESCENT																													
			0.18	3	3		11	0.18	11				0.00		0.00		0.00		0.18	0.18									
			0.18	8		8	22	0.36	33				0.00		0.00		0.00		0.18	0.36									
	1A	2A	2.15				129	2.51	162	3.54	1.86		0.00		0.00		0.00	0.00	2.15	2.51	0.83	2.69	52.5	250	0.15	23.03	0.12	0.47	0.31
To Ex. Servicing Easement, Ex. Pipe 2A - 3A								2.51	162				0.00		0.00		0.00			2.51									
BEECHCLIFFE STREET																													
			0.15	2	2		7	0.15	7				0.00		0.00		0.00		0.15	0.15									
	6A	5A	0.22	7		7	19	0.37	26	3.69	0.31		0.00		0.00		0.00	0.00	0.22	0.37	0.12	0.43	65.5	250	0.35	35.18	0.01	0.72	0.24
			0.25	10		10	27	0.62	53				0.00		0.00		0.00		0.25	0.62									
	5A	4A	0.28	6	6		21	0.90	74	3.62	0.87		0.00		0.00		0.00	0.00	0.28	0.90	0.30	1.17	69.5	250	0.40	37.61	0.03	0.77	0.34
			0.13	2	2		7	1.03	81				0.00		0.00		0.00		0.13	1.03									
	4A	3A	0.22	9		9	25	1.25	106	3.59	1.23		0.00		0.00		0.00	0.00	0.22	1.25	0.41	1.65	65.5	250	0.35	35.18	0.05	0.72	0.36
To Ex. Servicing Easement, Ex. Pipe 3A - 7A								1.25	106				0.00		0.00		0.00			1.25									



DESIGN PARAMETERS

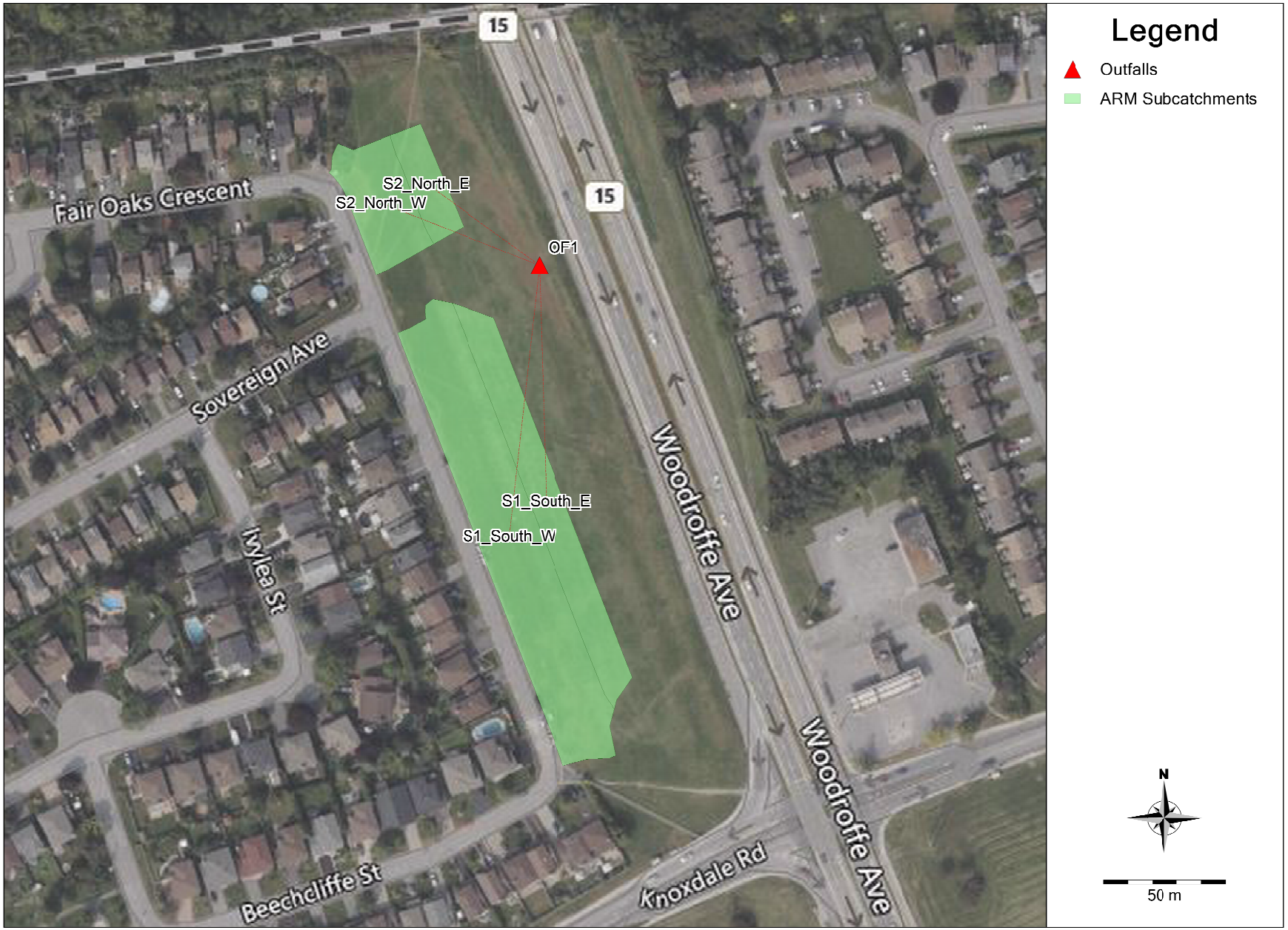
Park Flow =	9300	L/ha/da	0.10764	l/s/Ha	Industrial Peak Factor = as per MOE Graph			
Average Daily Flow =	280	l/p/day			Extraneous Flow =	0.330	L/s/ha	
Comm/Inst Flow =	28000	L/ha/da	0.3241	l/s/Ha	Minimum Velocity =	0.600	m/s	
Industrial Flow =	35000	L/ha/da	0.40509	l/s/Ha	Manning's n = (Conc)	0.013	(Pvc)	0.013
Max Res. Peak Factor =	4.00				Townhouse coeff=	2.7		
Commercial/Inst./Park Peak Factor =	1.00				Single house coeff=	3.4		
Institutional =	0.32	l/s/Ha						

Designed: A.S.	PROJECT: **40 BEECHCLIFFE STREET**		
Checked: W.L.	LOCATION: **City of Ottawa**		
Dwg. Reference: Sanitary Drainage Plan, Dwg. No. 8	File Ref: 24-1416	Date: **11 Jun 2025**	Sheet No. 1 of 1

David Schaeffer Engineering Ltd.
120 Iber Road, Suite 103
Stittsville, ON K2S 1E9
613-836-0856
dsel.ca

APPENDIX D

Pre-development Model



Project Name:	Beechcliffe
Project Number:	1416
Designed By:	AL
Checked By:	AVN
Date	09-Jun-25

DSEL
David Schaeffer Engineering Limited
600 Alden Road, Suite 606
Markham, ON L3R 0E7

Subcatchments Model Inputs - Predevelopment

Name	S1_South_E	S1_South_W	S2_North_E	S2_North_W
Runoff Method	Nash IUH	Nash IUH	Nash IUH	Nash IUH
Area (ha)	0.22	0.49	0.07	0.13
Flow Length (m)	13	26	13	27
Slope (%)	1.8	1.7	0.8	1.2
Imperv. (%)	14.3	14.3	14.3	14.3
Loss Method	Horton	Horton	Horton	Horton
Dstore Imperv (mm)	1.57	1.57	1.57	1.57
Dstore Perv (mm)	4.67	4.67	4.67	4.67
Max. Infil. Rate (mm/hr)	76.20	76.20	76.20	76.20
Min. Infil. Rate (mm/hr)	13.20	13.20	13.20	13.20
Decay Constant (1/hr)	4.14	4.14	4.14	4.14
TC Method	FAA (Airport)	FAA (Airport)	FAA (Airport)	FAA (Airport)
Runoff Coef.	0.3	0.3	0.3	0.3
Time of Concentration (min)	7.77	11.19	10.17	12.86

Project Name:	Beechcliffe
Project Number:	1416
Designed By:	LH
Checked By:	AL
Date	26-May-25

David Schaeffer Engineering Limited
600 Alden Road, Suite 606
Markham, ON L3R 0E7

Discharge Rates - Predevelopment (Chicago 3hr)

	South	North
Pre-Dev Drainage area (ha)	0.71	0.2
Imp (%)	14.3	14.3
Imp area (ha)	0.10	0.03

Pond Component	Peak Runoff South	Peak Runoff North
	m^3/s	m^3/s
2 Year Chicago 3hr	0.02729	0.00675
100 year Chicago 3hr	0.18066	0.04705

	North_W	North_E
Pre-Dev Drainage area (ha)	0.13	0.07
Imp (%)	14.3	14.3
Imp area (ha)	0.02	0.01

Pond Component	Peak Runoff	Peak Runoff
	m^3/s	m^3/s
2 Year Chicago 3hr	0.00406	0.00269
100 year Chicago 3hr	0.02898	0.01807

	South_W	South_E
Pre-Dev Drainage area (ha)	0.49	0.22
Imp (%)	14.3	14.3
Imp area (ha)	0.07	0.03

Pond Component	Peak Runoff	Peak Runoff
	m^3/s	m^3/s
2 Year Chicago 3hr	0.01726	0.01003
100 year Chicago 3hr	0.12050	0.06016

Project Name:	Beechcliffe
Project Number:	1416
Designed By:	LH
Checked By:	AL
Date	26-May-25

David Schaeffer Engineering Limited
600 Alden Road, Suite 606
Markham, ON L3R 0E7

Discharge Rates - Predevelopment (SCS 24hr)

	South	North
Pre-Dev Drainage area (ha)	0.71	0.2
Imp (%)	14.3	14.3
Imp area (ha)	0.10	0.03

Pond Component	Peak Runoff South	Peak Runoff North
	m^3/s	m^3/s
2 Year SCS 24hr	0.05543	0.01442
100 year SCS 24hr	0.17919	0.04805

	North_W	North_E
Pre-Dev Drainage area (ha)	0.13	0.07
Imp (%)	14.3	14.3
Imp area (ha)	0.02	0.01

Pond Component	Peak Runoff	Peak Runoff
	m^3/s	m^3/s
2 Year SCS 24hr	0.00905	0.00537
100 year SCS 24hr	0.03030	0.01775

	South_W	South_E
Pre-Dev Drainage area (ha)	0.49	0.22
Imp (%)	14.3	14.3
Imp area (ha)	0.07	0.03

Pond Component	Peak Runoff	Peak Runoff
	m^3/s	m^3/s
2 Year SCS 24hr	0.03655	0.01888
100 year SCS 24hr	0.11870	0.06049

Post-development Model

Project Name:	Beechcliffe
Project Number:	1416
Designed By:	AL
Checked By:	AVN
Date	09-Jun-25

DSEL
David Schaeffer Engineering Limited
600 Alden Road, Suite 606
Markham, ON L3R 0E7

Subcatchments Model Inputs - Postdevelopment Uncontrolled areas

Name	Area (ha)	Width (m)	Flow Length (m)	Slope (%)	Imperv. (%)	N Imperv	N Perv	Dstore Imperv (mm)	Dstore Perv (mm)
A1N	0.043	54	8	4.50	40	0.013	0.25	1.57	4.67
A1S	0.152	190	8	5.50	41	0.013	0.25	1.57	4.67

Subcatchments Model Inputs - Postdevelopment

Name	Area (ha)	Width (m)	Flow Length (m)	Slope (%)	Imperv. (%)	N Imperv	N Perv	Dstore Imperv (mm)	Dstore Perv (mm)
A1R1	0.038	25.33	15.00	2.40	46	0.013	0.25	1.57	4.67
A2R1	0.045	25.00	18.00	1.80	40	0.013	0.25	1.57	4.67
A3R1	0.083	48.82	17.00	1.70	49	0.013	0.25	1.57	4.67
A4R1	0.071	47.33	15.00	2.00	49	0.013	0.25	1.57	4.67
A5R1	0.064	47.41	13.50	1.90	49	0.013	0.25	1.57	4.67
A6R1	0.065	48.15	13.50	1.90	47	0.013	0.25	1.57	4.67
A7R1	0.1	51.28	19.50	1.40	49	0.013	0.25	1.57	4.67
A8R1	0.027	27.00	10.00	1.50	0	0.013	0.25	1.57	4.67
A9R1	0.082	49.70	16.50	1.90	46	0.013	0.25	1.57	4.67

Project Name:	Beechcliffe
Project Number:	241416
Designed By:	AL
Checked By:	AVN
Date	30-May-25

DSEL
David Schaeffer Engineering Limited
600 Alden Road, Suite 606
Markham, ON L3R 0E7

Target calculation and Volume requirement - Post-development - Chicago 3hr

	Predev South	Predev North	Unc. Postdev South	Unc. Postdev North
Drainage area (ha)	0.71	0.2	0.152	0.043
Imp (%)	14.3	14.3	41.0	40.0
Imp area (ha)	0.10	0.03	0.06	0.02

Pond Component	**Predev Runoff South**	**Predev Runoff North**	**Postdev Uncontrolled South**	**Postdev Uncontrolled North**	**100-year Target South (PCSWMM)**	**100-year Target North (PCSWMM)**	**100-year Target North & South (based on 25 SVHV-1)**	**Required South Volume**	**Required North Volume**	**Required Total Volume**
	m^3/s	**m^3/s**	**m^3/s**	**m^3/s**	**m3/s**	**m3/s**	**m3/s**	**m3**	**m3**	**m3**
2 Year Chicago 3hr	**0.02729**	**0.00675**	0.01436	0.00395	-0.04109	-0.01250	0.001	-	-	-
100 year Chicago 3hr	0.18066	0.04705	**0.06838**	**0.01925**				**206**	**50**	**256**

Project Name:	Beechcliffe
Project Number:	241416
Designed By:	AL
Checked By:	AVN
Date	30-May-25

DSEL
David Schaeffer Engineering Limited
600 Alden Road, Suite 606
Markham, ON L3R 0E7

Target calculation, Volume requirement & Flow Regulator Selection- Post-development - SCS 24hr

	Predev South	Predev North	Unc. Postdev South	Unc. Postdev North	HYDROVEX® VHV/SVHV Selection		
Drainage area (ha)	0.71	0.2	0.152	0.043	3.61	1	
Imp (%)	14.3	14.3	41.0	40.0	(l/s)	(l/s)	
Imp area (ha)	0.10	0.03	0.06	0.02	50 VHV-1 (1.6 to 6m Head)	25 SVHV-1 (2.5 to 6m Head)	

Pond Component	**Predev Runoff South**	**Predev Runoff North**	**Postdev Uncontrolled South**	**Postdev Uncontrolled North**	**100-year Target South (PCSWMM)**	**100-year Target North (PCSWMM)**	**100-year Target North (based on 25 SVHV-1)**	**Required South Volume**	**Required North Volume**	**Required Total Volume**
	m^3/s	**m^3/s**	**m^3/s**	**m^3/s**	**m3/s**	**m3/s**	**m3/s**	**m3**	**m3**	**m3**
2 Year SCS 24hr	**0.05543**	**0.01442**	0.01849	0.00510	0.00361	-0.00022	0.001	-	-	-
100 Year SCS 24hr	0.17919	0.04805	**0.05182**	**0.01464**				**215**	**57**	**272**

Project Name:	Beechcliffe
Project Number:	241416
Designed By:	AL
Date	10-Jun-25

David Schaeffer Engineering Limited
600 Alden Road, Suite 606
Markham, ON L3R 0E7

Storage Units Volume

Storage Unit	Required Volume (PCSWMM)	Provided Volume (ADS Stormtech MC-3500)
	m3	m3
North	57	63
South	215	217

Chamber Model: MC-3500

Location	Storage Name	Volume (m3)	Number of Chambers	Number of End Caps
North	MC-3500_11	16	3	1
North	MC-3500_22	47	9	2
South	MC-3500_1	71	14	1
South	MC-3500_2	67	13	2
South	MC-3500_3	52	10	2
South	MC-3500_4	27	5	2

Project:

Chamber Model -	MC-3500	
Units -	**Metric**	
Number of Chambers -	12	
Number of End Caps -	3	
Voids in the stone (porosity) -	40	%
Base of Stone Elevation -	0.00	m
Amount of Stone Above Chambers -	305	mm
Amount of Stone Below Chambers -	229	mm
Area of System-	59.77	sq.meters

Min. Area - 59.77 sq.meters

☑ Include Perimeter Stone in Calculations

☑ Click for Stage Area Data

☐ Click to Invert Stage Area Data

Click Here for Imperial

StormTech MC-3500 Cumulative Storage Volumes

Height of System (mm)	Incremental Single Chamber (cubic meters)	Incremental Single End Cap (cubic meters)	Incremental Chambers (cubic meters)	Incremental End Cap (cubic meters)	Incremental Stone (cubic meters)	Incremental Ch, EC and Stone (cubic meters)	Cumulative System (cubic meters)	Elevation (meters)
1676	0.000	0.000	0.00	0.00	0.61	0.61	63.26	1.68
1651	0.000	0.000	0.00	0.00	0.61	0.61	62.65	1.65
1626	0.000	0.000	0.00	0.00	0.61	0.61	62.04	1.63
1600	0.000	0.000	0.00	0.00	0.61	0.61	61.44	1.60
1575	0.000	0.000	0.00	0.00	0.61	0.61	60.83	1.57
1549	0.000	0.000	0.00	0.00	0.61	0.61	60.22	1.55
1524	0.000	0.000	0.00	0.00	0.61	0.61	59.61	1.52
1499	0.000	0.000	0.00	0.00	0.61	0.61	59.01	1.50
1473	0.000	0.000	0.00	0.00	0.61	0.61	58.40	1.47
1448	0.000	0.000	0.00	0.00	0.61	0.61	57.79	1.45
1422	0.000	0.000	0.00	0.00	0.61	0.61	57.19	1.42
1397	0.000	0.000	0.00	0.00	0.61	0.61	56.58	1.40
1372	0.002	0.000	0.02	0.00	0.60	0.62	55.97	1.37
1346	0.005	0.001	0.07	0.00	0.58	0.65	55.35	1.35
1321	0.008	0.001	0.10	0.00	0.57	0.67	54.70	1.32
1295	0.011	0.001	0.14	0.00	0.55	0.69	54.03	1.30
1270	0.019	0.002	0.23	0.01	0.51	0.75	53.34	1.27
1245	0.029	0.002	0.35	0.01	0.46	0.82	52.59	1.24
1219	0.035	0.003	0.42	0.01	0.43	0.87	51.77	1.22
1194	0.040	0.004	0.48	0.01	0.41	0.90	50.90	1.19
1168	0.045	0.004	0.53	0.01	0.39	0.94	50.00	1.17
1143	0.048	0.005	0.58	0.01	0.37	0.96	49.06	1.14
1118	0.052	0.005	0.62	0.02	0.35	0.99	48.10	1.12
1092	0.055	0.006	0.66	0.02	0.34	1.01	47.11	1.09
1067	0.058	0.006	0.69	0.02	0.32	1.03	46.10	1.07
1041	0.060	0.007	0.73	0.02	0.31	1.05	45.06	1.04
1016	0.063	0.007	0.76	0.02	0.30	1.07	44.01	1.02
991	0.065	0.008	0.78	0.02	0.28	1.09	42.94	0.99
965	0.068	0.008	0.81	0.02	0.27	1.11	41.84	0.97
940	0.070	0.008	0.84	0.02	0.26	1.12	40.74	0.94
914	0.072	0.009	0.86	0.03	0.25	1.14	39.61	0.91
889	0.073	0.009	0.88	0.03	0.24	1.15	38.47	0.89
864	0.075	0.009	0.90	0.03	0.23	1.17	37.32	0.86
838	0.077	0.010	0.92	0.03	0.23	1.18	36.16	0.84
813	0.078	0.010	0.94	0.03	0.22	1.19	34.98	0.81
787	0.080	0.011	0.96	0.03	0.21	1.20	33.79	0.79
762	0.081	0.011	0.98	0.03	0.20	1.21	32.59	0.76
737	0.083	0.011	0.99	0.03	0.20	1.22	31.37	0.74
711	0.084	0.012	1.01	0.03	0.19	1.23	30.15	0.71
686	0.085	0.012	1.02	0.04	0.18	1.24	28.91	0.69
660	0.086	0.012	1.04	0.04	0.18	1.25	27.67	0.66
635	0.088	0.012	1.05	0.04	0.17	1.26	26.42	0.64
610	0.089	0.013	1.06	0.04	0.17	1.27	25.16	0.61
584	0.090	0.013	1.08	0.04	0.16	1.28	23.89	0.58
559	0.091	0.013	1.09	0.04	0.16	1.28	22.62	0.56
533	0.091	0.014	1.10	0.04	0.15	1.29	21.33	0.53
508	0.092	0.014	1.11	0.04	0.15	1.30	20.04	0.51
483	0.093	0.014	1.12	0.04	0.14	1.30	18.74	0.48
457	0.094	0.014	1.13	0.04	0.14	1.31	17.44	0.46
432	0.095	0.015	1.14	0.04	0.14	1.32	16.13	0.43
406	0.095	0.015	1.14	0.04	0.13	1.32	14.82	0.41
381	0.096	0.015	1.15	0.04	0.13	1.33	13.49	0.38
356	0.097	0.015	1.16	0.05	0.12	1.33	12.17	0.36
330	0.097	0.015	1.17	0.05	0.12	1.34	10.84	0.33
305	0.098	0.016	1.17	0.05	0.12	1.34	9.50	0.30
279	0.099	0.016	1.18	0.05	0.12	1.34	8.16	0.28
254	0.099	0.017	1.19	0.05	0.11	1.35	6.82	0.25
229	0.000	0.000	0.00	0.00	0.61	0.61	5.47	0.23
203	0.000	0.000	0.00	0.00	0.61	0.61	4.86	0.20
178	0.000	0.000	0.00	0.00	0.61	0.61	4.25	0.18
152	0.000	0.000	0.00	0.00	0.61	0.61	3.64	0.15
127	0.000	0.000	0.00	0.00	0.61	0.61	3.04	0.13
102	0.000	0.000	0.00	0.00	0.61	0.61	2.43	0.10
76	0.000	0.000	0.00	0.00	0.61	0.61	1.82	0.08
51	0.000	0.000	0.00	0.00	0.61	0.61	1.21	0.05
25	0.000	0.000	0.00	0.00	0.61	0.61	0.61	0.03

Stage Area Data

Depth (meter)	Elevation (meter)	Area (m^2)	Area (nectare)
0.00	0.00	23.91	0.0024
0.05	0.05	23.91	0.0024
0.08	0.08	23.91	0.0024
0.10	0.10	23.91	0.0024
0.13	0.13	23.91	0.0024
0.15	0.15	23.91	0.0024
0.18	0.18	23.91	0.0024
0.20	0.20	23.91	0.0024
0.23	0.23	23.91	0.0024
0.25	0.25	53.24	0.0053
0.28	0.28	52.94	0.0053
0.30	0.30	52.76	0.0053
0.33	0.33	52.59	0.0053
0.36	0.36	52.39	0.0052
0.38	0.38	52.20	0.0052
0.41	0.41	51.99	0.0052
0.43	0.43	51.78	0.0052
0.46	0.46	51.56	0.0052
0.48	0.48	51.32	0.0051
0.51	0.51	51.07	0.0051
0.53	0.53	50.81	0.0051
0.56	0.56	50.53	0.0051
0.58	0.58	50.24	0.0050
0.61	0.61	49.94	0.0050
0.63	0.63	49.63	0.0050
0.66	0.66	49.28	0.0049
0.69	0.69	48.93	0.0049
0.71	0.71	48.56	0.0049
0.74	0.74	48.17	0.0048
0.76	0.76	47.76	0.0048
0.79	0.79	47.33	0.0047
0.81	0.81	46.87	0.0047
0.84	0.84	46.40	0.0046
0.86	0.86	45.90	0.0046
0.89	0.89	45.37	0.0045
0.91	0.91	44.82	0.0045
0.94	0.94	44.24	0.0044
0.97	0.97	43.61	0.0044
0.99	0.99	42.96	0.0043
1.02	1.02	42.26	0.0042
1.04	1.04	41.51	0.0042
1.07	1.07	40.73	0.0041
1.09	1.09	39.86	0.0040
1.12	1.12	38.95	0.0039
1.14	1.14	37.94	0.0038
1.17	1.17	36.82	0.0037
1.19	1.19	35.58	0.0036
1.22	1.22	34.15	0.0034
1.24	1.24	32.34	0.0032
1.27	1.27	29.56	0.0030
1.30	1.30	27.25	0.0027
1.32	1.32	26.34	0.0026
1.35	1.35	25.51	0.0026
1.37	1.37	24.37	0.0024
1.40	1.40	23.91	0.0024
1.42	1.42	23.91	0.0024
1.45	1.45	23.91	0.0024
1.47	1.47	23.91	0.0024
1.50	1.50	23.91	0.0024
1.52	1.52	23.91	0.0024
1.55	1.55	23.91	0.0024
1.57	1.57	23.91	0.0024
1.60	1.60	23.91	0.0024
1.63	1.63	23.91	0.0024
1.65	1.65	23.91	0.0024
1.68	1.68	23.91	0.0024

Project:

Chamber Model -	MC-3500	
Units -	**Metric**	
Number of Chambers -	42	
Number of End Caps -	7	
Voids in the stone (porosity) -	40	%
Base of Stone Elevation -	0.00	m
Amount of Stone Above Chambers -	305	mm
Amount of Stone Below Chambers -	229	mm

Area of System- 203.93 sq.meters Min. Area - 203.93 sq.meters

☑ Include Perimeter Stone in Calculations

☑ Click for Stage Area Data

☐ Click to Invert Stage Area Data

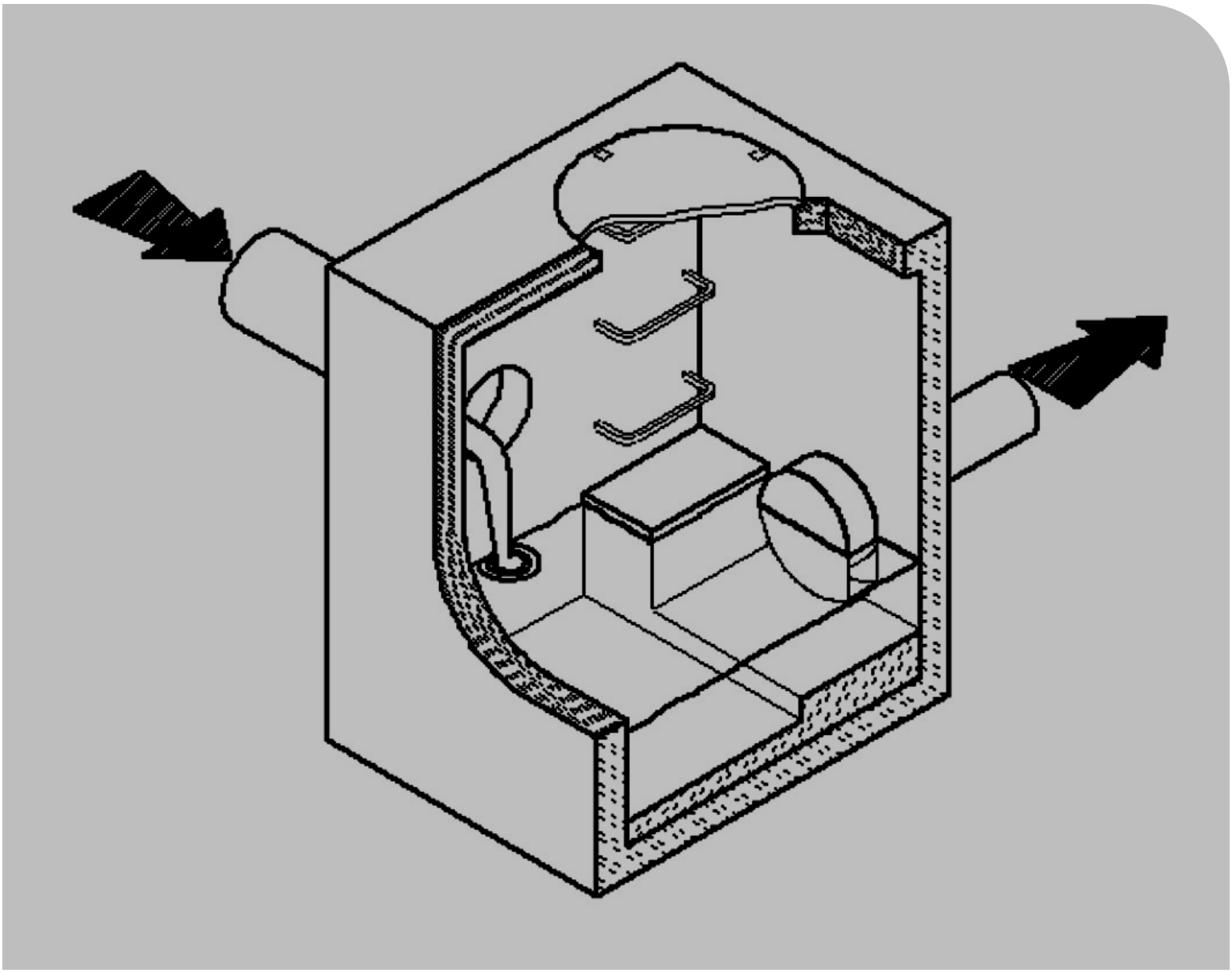
Click Here for Imperial

StormTech MC-3500 Cumulative Storage Volumes

Height of System (mm)	Incremental Single Chamber (cubic meters)	Incremental Single End Cap (cubic meters)	Incremental Chambers (cubic meters)	Incremental End Cap (cubic meters)	Incremental Stone (cubic meters)	Incremental Ch, EC and Stone (cubic meters)	Cumulative System (cubic meters)	Elevation (meters)
1676	0.000	0.000	0.00	0.00	2.07	2.07	216.98	1.68
1651	0.000	0.000	0.00	0.00	2.07	2.07	214.91	1.65
1626	0.000	0.000	0.00	0.00	2.07	2.07	212.84	1.63
1600	0.000	0.000	0.00	0.00	2.07	2.07	210.77	1.60
1575	0.000	0.000	0.00	0.00	2.07	2.07	208.69	1.57
1549	0.000	0.000	0.00	0.00	2.07	2.07	206.62	1.55
1524	0.000	0.000	0.00	0.00	2.07	2.07	204.55	1.52
1499	0.000	0.000	0.00	0.00	2.07	2.07	202.48	1.50
1473	0.000	0.000	0.00	0.00	2.07	2.07	200.41	1.47
1448	0.000	0.000	0.00	0.00	2.07	2.07	198.33	1.45
1422	0.000	0.000	0.00	0.00	2.07	2.07	196.26	1.42
1397	0.000	0.000	0.00	0.00	2.07	2.07	194.19	1.40
1372	0.002	0.000	0.07	0.00	2.04	2.11	192.12	1.37
1346	0.005	0.001	0.23	0.00	1.98	2.21	190.01	1.35
1321	0.008	0.001	0.35	0.01	1.93	2.29	187.79	1.32
1295	0.011	0.001	0.48	0.01	1.88	2.37	185.51	1.30
1270	0.019	0.002	0.82	0.01	1.74	2.57	183.14	1.27
1245	0.029	0.002	1.22	0.02	1.58	2.82	180.57	1.24
1219	0.035	0.003	1.49	0.02	1.47	2.98	177.75	1.22
1194	0.040	0.004	1.69	0.03	1.39	3.10	174.78	1.19
1168	0.045	0.004	1.87	0.03	1.31	3.21	171.68	1.17
1143	0.048	0.005	2.03	0.03	1.25	3.31	168.46	1.14
1118	0.052	0.005	2.17	0.04	1.19	3.40	165.15	1.12
1092	0.055	0.006	2.30	0.04	1.13	3.48	161.76	1.09
1067	0.058	0.006	2.43	0.04	1.08	3.55	158.28	1.07
1041	0.060	0.007	2.54	0.05	1.04	3.62	154.72	1.04
1016	0.063	0.007	2.65	0.05	0.99	3.69	151.10	1.02
991	0.065	0.008	2.74	0.05	0.95	3.75	147.41	0.99
965	0.068	0.008	2.84	0.06	0.92	3.81	143.66	0.97
940	0.070	0.008	2.92	0.06	0.88	3.86	139.85	0.94
914	0.072	0.009	3.01	0.06	0.84	3.91	135.99	0.91
889	0.073	0.009	3.08	0.06	0.81	3.96	132.08	0.89
864	0.075	0.009	3.16	0.07	0.78	4.01	128.12	0.86
838	0.077	0.010	3.23	0.07	0.75	4.05	124.11	0.84
813	0.078	0.010	3.30	0.07	0.73	4.09	120.06	0.81
787	0.080	0.011	3.36	0.07	0.70	4.13	115.97	0.79
762	0.081	0.011	3.42	0.08	0.67	4.17	111.84	0.76
737	0.083	0.011	3.48	0.08	0.65	4.21	107.67	0.74
711	0.084	0.012	3.53	0.08	0.63	4.24	103.46	0.71
686	0.085	0.012	3.58	0.08	0.61	4.27	99.22	0.69
660	0.086	0.012	3.63	0.09	0.59	4.30	94.95	0.66
635	0.088	0.012	3.68	0.09	0.57	4.33	90.65	0.64
610	0.089	0.013	3.72	0.09	0.55	4.36	86.32	0.61
584	0.090	0.013	3.76	0.09	0.53	4.39	81.96	0.58
559	0.091	0.013	3.81	0.09	0.51	4.41	77.57	0.56
533	0.091	0.014	3.84	0.10	0.50	4.43	73.16	0.53
508	0.092	0.014	3.88	0.10	0.48	4.46	68.73	0.51
483	0.093	0.014	3.91	0.10	0.47	4.48	64.27	0.48
457	0.094	0.014	3.95	0.10	0.45	4.50	59.79	0.46
432	0.095	0.015	3.98	0.10	0.44	4.52	55.29	0.43
406	0.095	0.015	4.01	0.10	0.43	4.54	50.77	0.41
381	0.096	0.015	4.03	0.10	0.42	4.56	46.23	0.38
356	0.097	0.015	4.06	0.11	0.41	4.57	41.68	0.36
330	0.097	0.015	4.09	0.11	0.39	4.59	37.11	0.33
305	0.098	0.016	4.11	0.11	0.38	4.60	32.52	0.30
279	0.099	0.016	4.14	0.11	0.37	4.62	27.91	0.28
254	0.099	0.017	4.17	0.12	0.36	4.64	23.29	0.25
229	0.000	0.000	0.00	0.00	2.07	2.07	18.65	0.23
203	0.000	0.000	0.00	0.00	2.07	2.07	16.58	0.20
178	0.000	0.000	0.00	0.00	2.07	2.07	14.50	0.18
152	0.000	0.000	0.00	0.00	2.07	2.07	12.43	0.15
127	0.000	0.000	0.00	0.00	2.07	2.07	10.36	0.13
102	0.000	0.000	0.00	0.00	2.07	2.07	8.29	0.10
76	0.000	0.000	0.00	0.00	2.07	2.07	6.22	0.08
51	0.000	0.000	0.00	0.00	2.07	2.07	4.14	0.05
25	0.000	0.000	0.00	0.00	2.07	2.07	2.07	0.03

Stage Area Data

Depth (meter)	Elevation (meter)	Area (m^2)	Area (nectare)
0.00	0.00	81.57	0.0082
0.05	0.05	81.57	0.0082
0.08	0.08	81.57	0.0082
0.10	0.10	81.57	0.0082
0.13	0.13	81.57	0.0082
0.15	0.15	81.57	0.0082
0.18	0.18	81.57	0.0082
0.20	0.20	81.57	0.0082
0.23	0.23	81.57	0.0082
0.25	0.25	182.83	0.0183
0.28	0.28	181.90	0.0182
0.30	0.30	181.28	0.0181
0.33	0.33	180.67	0.0181
0.36	0.36	180.01	0.0180
0.38	0.38	179.36	0.0179
0.41	0.41	178.65	0.0179
0.43	0.43	177.93	0.0178
0.46	0.46	177.16	0.0177
0.48	0.48	176.34	0.0176
0.51	0.51	175.49	0.0175
0.53	0.53	174.59	0.0175
0.56	0.56	173.66	0.0174
0.58	0.58	172.66	0.0173
0.61	0.61	171.63	0.0172
0.63	0.63	170.56	0.0171
0.66	0.66	169.36	0.0169
0.69	0.69	168.16	0.0168
0.71	0.71	166.92	0.0167
0.74	0.74	165.58	0.0166
0.76	0.76	164.15	0.0164
0.79	0.79	162.67	0.0163
0.81	0.81	161.11	0.0161
0.84	0.84	159.47	0.0159
0.86	0.86	157.76	0.0158
0.89	0.89	155.94	0.0156
0.91	0.91	154.04	0.0154
0.94	0.94	152.03	0.0152
0.97	0.97	149.88	0.0150
0.99	0.99	147.62	0.0148
1.02	1.02	145.23	0.0145
1.04	1.04	142.64	0.0143
1.07	1.07	139.93	0.0140
1.09	1.09	136.95	0.0137
1.12	1.12	133.79	0.0134
1.14	1.14	130.29	0.0130
1.17	1.17	126.44	0.0126
1.19	1.19	122.12	0.0122
1.22	1.22	117.18	0.0117
1.24	1.24	110.87	0.0111
1.27	1.27	101.19	0.0101
1.30	1.30	93.15	0.0093
1.32	1.32	90.01	0.0090
1.35	1.35	87.14	0.0087
1.37	1.37	83.20	0.0083
1.40	1.40	81.57	0.0082
1.42	1.42	81.57	0.0082
1.45	1.45	81.57	0.0082
1.47	1.47	81.57	0.0082
1.50	1.50	81.57	0.0082
1.52	1.52	81.57	0.0082
1.55	1.55	81.57	0.0082
1.57	1.57	81.57	0.0082
1.60	1.60	81.57	0.0082
1.63	1.63	81.57	0.0082
1.65	1.65	81.57	0.0082
1.68	1.68	81.57	0.0082



VEOLIA

HYDROVEX® VHV/SVHV
Vertical Vortex Flow Regulator
CSO, SSO, Stormwater Management

WATER TECHNOLOGIES

HYDROVEX® VHV / SVHV Vertical Vortex Flow Regulator

Application

One of the major problems of urban wet weather flow management is the runoff generated by heavy rainfall. During a storm event, uncontrolled flows may overload the drainage system and cause flooding. Wear and deterioration on the network are increased dramatically as a result of increased flow velocities. In a combined sewer system, the wastewater treatment plant will experience a significant increase in flows during storms, thereby losing its treatment efficiency. A simple means of managing excessive storm water runoff is to control the flows at their point of origin, the manhole.

The HYDROVEX® VHV / SVHV line of vortex flow regulators is ideal for point source control of low to medium stormwater flows in manholes, catch basins and other retention structures. The HYDROVEX® VHV / SVHV design is based on the fluid mechanics principle of the forced vortex. The discharge is controlled by an air-filled vortex which reduces the effective water passage area without physically reducing orifice size. This effect grants precise flow regulation without the use of moving parts or electricity, and allows for larger inlet and outlet openings compared to the basic orifice. Although the concept is quite simple, many years of research and testing have been invested to optimize the performance of our vortex technology.

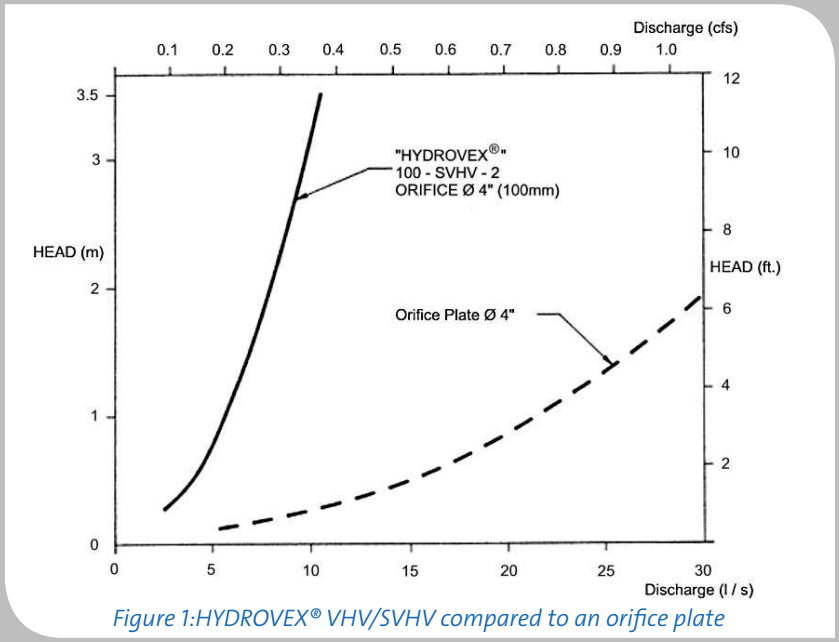


Figure 1:HYDROVEX® VHV/SVHV compared to an orifice plate

Vortex valves have openings typically 4 to 6 times larger than an orifice plate for the same design. Larger opening sizes decrease the chance of blockage caused by sediments and debris found in storm water flows. Figure 1 shows the discharge curve of a vortex regulator compared to an equally sized orifice plate. For an identical opening size, the flow is approximately four times smaller than the orifice plate for the same upstream water pressure.

Advantages

- Large inlet/outlet openings reduce the chance of clogging
- Openings typically 4-6 times larger than the basic orifice (Figure 1)
- Outlet orifice always equal or larger than inlet
- Ideal for precise control of low to medium stormwater flow applications
- Submerged inlet for floatables control
- No moving parts or electricity required
- Durable and robust stainless steel construction
- Minimal maintenance
- Easy to install

Selection

Selecting a VHV/SVHV regulator is easily achieved using Figure 3. Each selection is made using the maximum allowable flow rate and the maximum allowable upstream water pressure (head). The area in which the design point falls will designate the required model. The maximum design head is defined as the difference between the maximum upstream water level and the invert of the outlet pipe. All selections should be verified by a John Meunier Inc. representative prior to fabrication.

Design example:

- Maximum discharge: 6 L/s (0.2 cfs)*
- Maximum design head 2m (6.56 ft.)**
- Using Figure 3, model 75 VHV-1 is selected

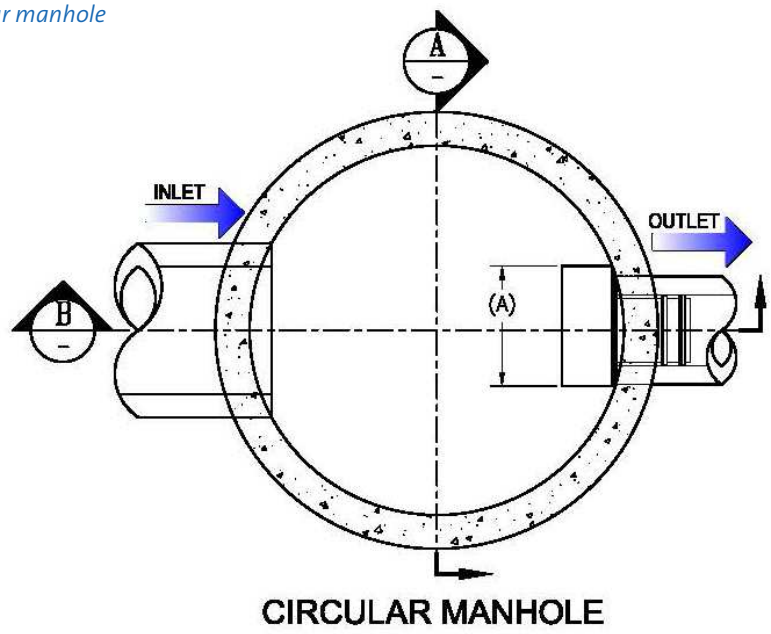
**The selection chart provided assumes free flowing downstream conditions. Should the outlet pipe be >80% full at design flow, a larger pipe diameter should be used. In the above example, the minimum outlet pipe diameter and slope would be 150mm (6in), 0.3%.*

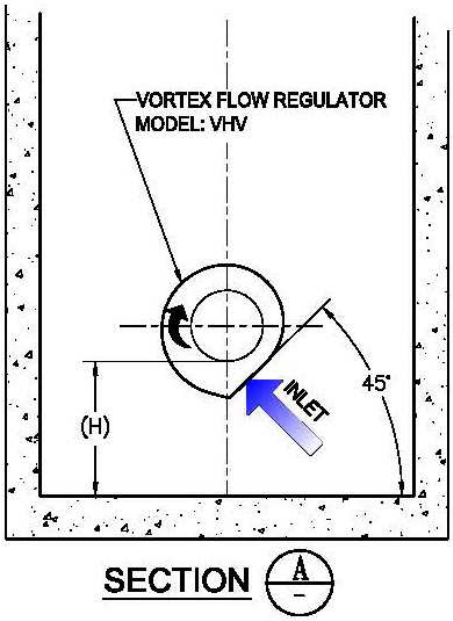
***The design head is defined as the difference between the maximum upstream water level and the outlet pipe invert.*

The HYDROVEX® VHV / SVHV vortex flow regulators can be installed in circular or square manholes. The table below lists the minimum dimensions and clearances required for each regulator model. It is imperative to respect the minimum clearances shown to ensure ease of installation and proper functioning of the regulator.

Model	Regulator Diameter A (mm) [in]	CIRCULAR Minimum Manhole Diameter B (mm) [in]	SQUARE Minimum Chamber Width B (mm) [in]	Minimum Outlet Pipe Diameter C (mm) [in]	Minimum Clearance H (mm) [in]
25 SVHV-1	125 [5]	600 [24]	600 [24]	150 [6]	150 [6]
32 SVHV-1	150 [6]	600 [24]	600 [24]	150 [6]	150 [6]
40 SVHV-1	200 [8]	600 [24]	600 [24]	150 [6]	150 [6]
50 VHV-1	150 [6]	600 [24]	600 [24]	150 [6]	150 [6]
75 VHV-1	250 [10]	600 [24]	600 [24]	150 [6]	150 [6]
100 VHV-1	325 [13]	900 [36]	600 [24]	150 [6]	200 [8]
125 VHV-2	275 [11]	900 [36]	600 [24]	150 [6]	200 [8]
150 VHV-2	350 [14]	900 [36]	600 [24]	150 [6]	225 [9]
200 VHV-2	450 [18]	1200 [48]	900 [36]	200 [8]	300 [12]
250 VHV-2	575 [23]	1200 [48]	900 [36]	250 [10]	350 [14]
300 VHV-2	675 [27]	1600 [64]	1200 [48]	250 [10]	400 [16]
350 VHV-2	800 [32]	1800 [72]	1200 [48]	300 [12]	500 [20]

Figure 2a: Minimum dimensions and clearances, circular manhole





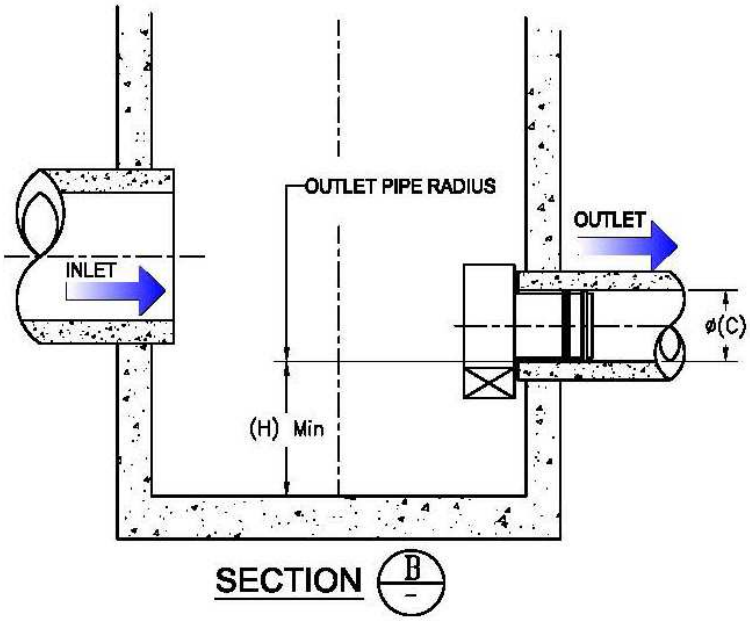
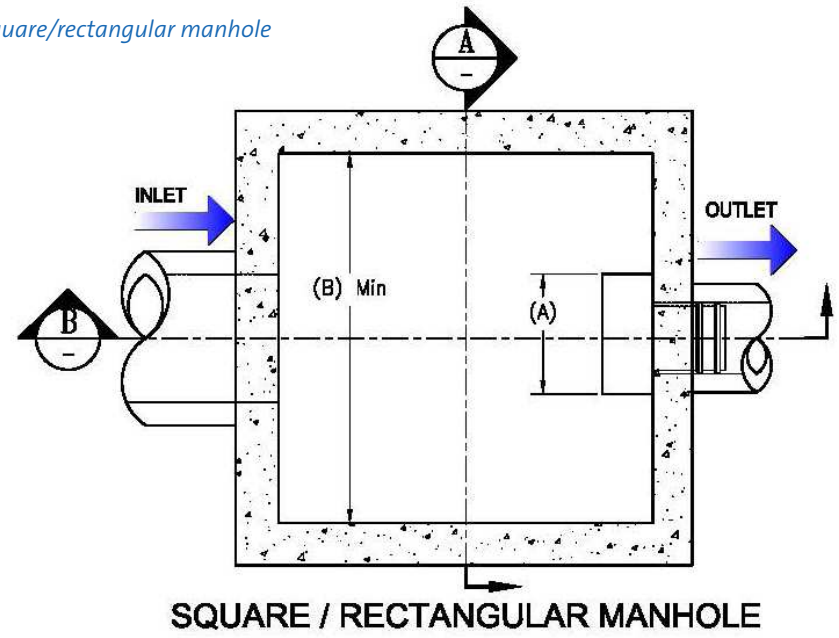
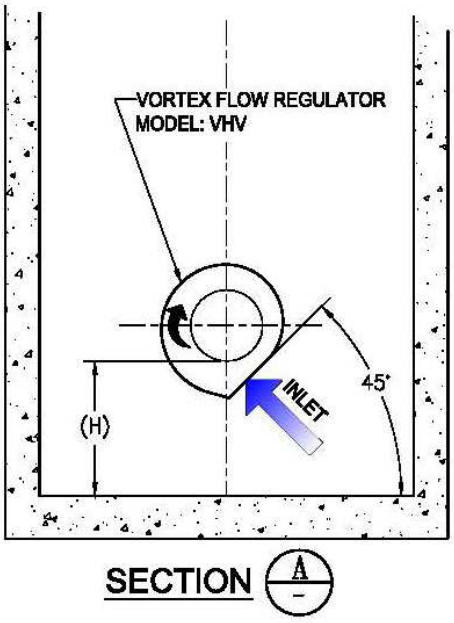
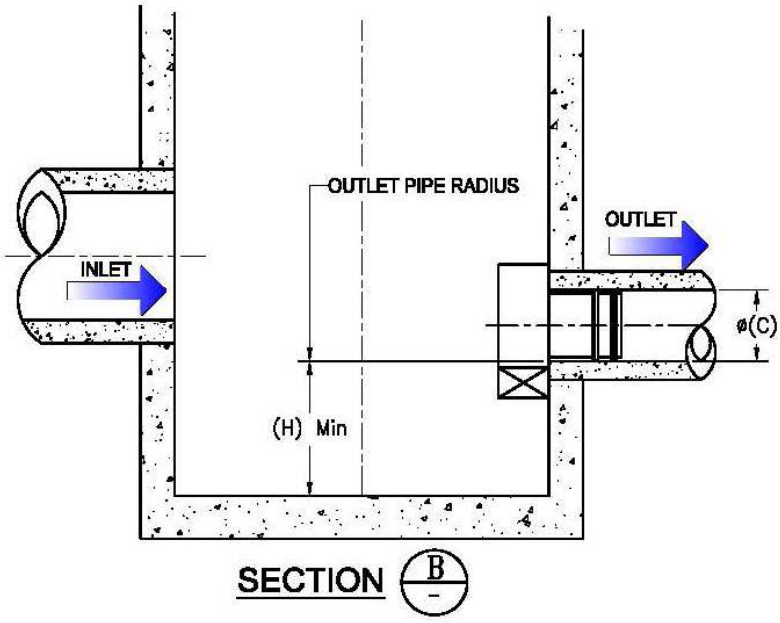


Figure 2b: Minimum dimensions and clearances, square/rectangular manhole







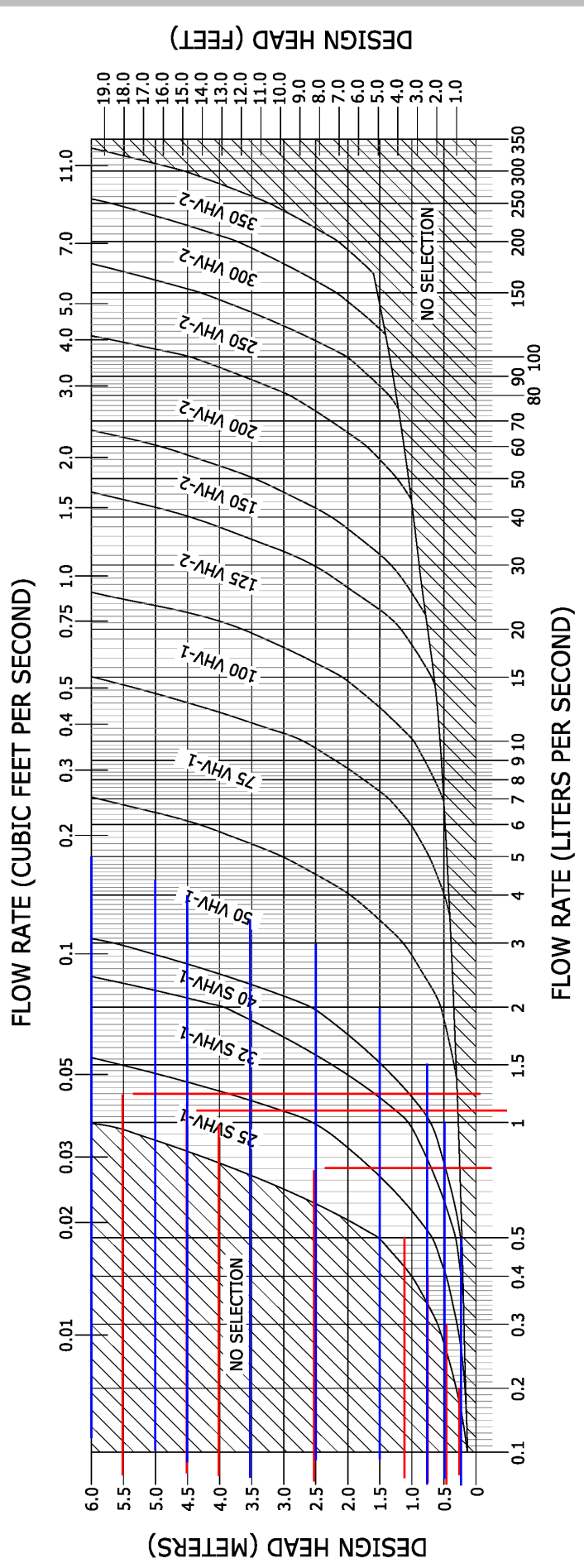


Figure 3 : HYDROVEX® VHV/SVHV Selection Chart

Options

A variety of options are available for the HYDROVEX® VHV / SVHV vortex flow regulators, including:

- Type O: extended inlet for odor control
- FV-VHV: sliding plate mounted
- Gooseneck: for shallow or no sump installations
- Vent: for low slope applications

DT: roof drainage applications

Specifications

In order to specify a HYDROVEX® VHV/SVHV flow regulator, the following parameters must be clearly indicated:

- Model number, ex: 75-VHV-1
- Outlet pipe diameter and type, ex: ø 150mm [6”], SDR 35
- Design discharge rate, ex: 6.0 L/s [0.21 CFS]
- Design head, ex: 2.0 m [6.56 ft] *
- Manhole diameter, ex: ø 900 mm [ø 36”]
- Minimum clearance “H”, ex: 150 mm [6 in]
- Construction material type (304 stainless steel standard)

**The design head is defined as the difference between the maximum upstream water level and the outlet pipe invert.*

Installation

The installation of a HYDROVEX® VHV/SVHV flow regulator can be accomplished quickly and does not require any special tools. The sleeve of the vortex flow regulator is simply inserted into the outlet pipe of the manhole and the unit is then secured to the concrete wall using the supplied anchor.

Maintenance

HYDROVEX® regulators are designed to minimize maintenance requirements. We recommend a periodic visual inspection in order to ensure that the unit is free of debris. The manhole sump beneath the unit should be inspected and cleaned with a vacuum truck periodically to remove accumulated sediments.

Guaranty

The HYDROVEX® line of VHV / SVHV regulators are guaranteed against both design and manufacturing defects for a period of 5 years after sale. The unit will be modified or replaced should it be found to be defective within the guarantee period.

Resourcing the world

Veolia Water Technologies

4105 Sartelon • Saint-Laurent, Quebec • H4S 2B3 Canada

T.: 514-334-7230 • F.: 514-334-5070 • Sales Direct Line: 1-855-564-3747

cso@veolia.com • www.veoliawatertechnologies.ca

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

Local Roads Return Frequency = 2 years
Collector Roads Return Frequency = 5 years
Manning 0.013 Arterial Roads Return Frequency = 10 years

	LOCATION		AREA (Ha)														FLOW						SEWER DATA								
			2 YEAR				5 YEAR				10 YEAR				100 YEAR				Time of	Intensity	Intensity	Intensity	Intensity	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO
			AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	Conc.	2 Year	5 Year	10 Year	100 Year										
Location	From Node	To Node	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(min)	(mm/h)	(mm/h)	(mm/h)	(mm/h)	Q (l/s)	(actual)	(nominal)		(%)	(m)	(l/s)	(m/s)	LOW (min	Q/Q full
REAR YARD STORAGE PIPES																																
	CBMH 1	CBMH 2	0.08	0.52	0.12	0.12			0.00	0.00			0.00	0.00			0.00	0.00	10.05	76.61	103.93	121.83	178.10	9	600	600	HDPE	0.50	25.0	434.1717	1.5356	0.2713	0.020
	CBMH 2	Ex. STM Pipe	0.04	0.52	0.06	0.17			0.00	0.00			0.00	0.00			0.00	0.00	10.32	75.59	102.53	120.18	175.67	*1	250	250	PVC	3.00	11.5	103.0008	2.0983	0.0913	0.010
To Ex. Servicing Easement, Ex. Pipe 1 - 2						0.17				0.00				0.00				0.00	10.41														
	Chamber Cap	CBMH 6	0.20	0.49	0.27	0.27			0.00	0.00			0.00	0.00			0.00	0.00	11.28	72.22	97.89	114.71	167.65	20	600	600	HDPE	0.45	13.0	411.8915	1.4568	0.1487	0.048
	CBMH 6	CBMH 5	0.06	0.54	0.09	0.36			0.00	0.00			0.00	0.00			0.00	0.00	11.43	71.72	97.21	113.91	166.47	26	600	600	HDPE	0.20	27.0	274.5943	0.9712	0.4634	0.095
	CBMH 5	CBMH 4	0.07	0.54	0.11	0.47			0.00	0.00			0.00	0.00			0.00	0.00	11.89	70.23	95.16	111.50	162.93	33	600	600	HDPE	0.15	33.0	237.8056	0.8411	0.6539	0.138
	CBMH 4	CBMH 3	0.08	0.54	0.12	0.59			0.00	0.00			0.00	0.00			0.00	0.00	12.55	68.24	92.43	108.29	158.21	40	600	600	HDPE	0.15	35.5	237.8056	0.8411	0.7035	0.169
	CBMH 3	Ex. STM Pipe	0.05	0.48	0.07	0.65			0.00	0.00			0.00	0.00			0.00	0.00	13.25	66.23	89.68	105.05	153.46	*3.6	250	250	PVC	3.00	15.5	103.0008	2.0983	0.1231	0.035
To Ex. Servicing Easement, Ex. Pipe 1 - 2						0.65				0.00				0.00				0.00	13.37														
																								*Peak flow as per SWM modeling results								

Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficient

Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min. Velocity = 0.80 m/s

Designed: A.S.	PROJECT: **40 BEECHCLIFFE STREET**		
Checked: W.L.	LOCATION: **City of Ottawa**		
Dwg. Reference: DWG. 9	File Ref: 24-1416	Date: 11 Jun 2025	Sheet No. SHEET 1 OF 1

LICENSED PROFESSIONAL ENGINEER
W. LIU
100167932
25-06-11
PROVINCE OF ONTARIO