EDILESSE
CONSULTING
CIVIL
ENGINEERS

Functional Servicing &
Storm Water Management Report

Proposed Building and Servicing at Existing Self-Storage Development 3149 and 3169 Hawthorne Road, Ottawa, Ontario

City of Ottawa Project No. 18646, D07-12-21-0198

Prepared for

ACCESS PROPERTY DEVELOPMENT
ACCESS GROUP OF COMPANIES

Access Storage
100 Canadian Road
Toronto, Ontario, M1R 4Z5

November 3rd, 2021
Revised August 9th, 2023

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Executive Summary

- The site is presently operating as a self-storage facility, located at 3169 Hawthorne Road, Ottawa, Ontario. The second address, 3149 Hawthorne Road is presently vacant land, essentially located between the existing storage facility and Hawthorne Road.

  Adjacent properties are industrial and commercial buildings.

- The proposed development is for the construction of a four-story self-storage building, on the vacant land of 3149 Hawthorne, in front of the existing buildings.

- The existing site drains overland, uncontrolled, to a ditch along the south property line and then to the Mather Award Drain at the southwest side of the property.

- Storm drainage for both properties is to be collected and controlled by on-site facilities including sewers and underground storage, discharging to a connection to the culvert under Hawthorne Road. Post-development storm runoff is controlled to 50% impervious pre-development levels or better for the 2- and 5-year events and events greater than 5 years up to and including the 100-year storm are controlled to the 5-year level.

- There is a sanitary connection to the existing office which will be re-used for the new building.

- Proposed fire protection is from the existing connection to the watermain on Hawthorne Road. Existing hydrants on site are maintained. A domestic tap is to be provided to serve the office in the new building.

Existing Conditions

Background and Site Description

The site is comprised of two properties: the portion presently operating as a self-storage facility with eleven storage buildings and a small office building, owned by the applicant at 3169 Hawthorne Road, in Ottawa, Ontario and the adjacent 3149 Hawthorne Road, presently vacant and recently acquired by the applicant. Adjacent properties are commercial and industrial facilities.

Topography and Drainage

The combined area of the overall site area is 36,078.2.8m^2 of which approximately 6181.1m^2 is the front property (3149), presently vegetated and drains to ditch inlet catchbasins at the front of the site, Hawthorne Road. The balance of the site (19,897.1m^2, or 3169 Hawthorne) is almost entirely paved or buildings and drains overland, north to south, to a ditch along the south side of the property. Said ditch discharges to the Mather Award Drain, on the northeast side of Hawthorne Road.

Sub-surface Conditions

A geotechnical investigation for the site was completed by exp Services Inc. on November 12th, 2020. Although the investigation was focused on the vacant lands at the front of the property and a portion of the site at the rear to facilitate replacement of some of the existing buildings it is reasonable to infer that the soil conditions are uniform between the two areas where boreholes were obtained.

Site stratigraphy is described in the exp report as generally a layer of fill (and existing pavement structure where applicable) approximately 0.9m to 1.6m thick over clay with sand to clay. Ground water levels were noted as 4.6m to 4.9m from surface on completion and monitored holes showed groundwater 1.1m to 2.7m after 18 days of monitoring.

Recommended pavement structure from the exp report is as follows:

Pavement Layer	Compaction	Light Duty Paving	Heavy Duty Paving
Asphalt Layer (PG58-34)	92-97% MRD	65mm HL/SP 12.5 Cat. B3	40mm HL3/SP12.5 Cat B 50mm HL8/SP12.5 Cat B
OPSS 1010 Granular A	100% SPMDD	150mm	150mm
OPSS 1010 Granular B Sub-Base, Type II	100% SPMDD	450mm	600mm


SITE LOCATION
Walkley Rd
Russell Rd
Trans Canada Hwy
Hunt Club Rd
Hawthorne Rd
Ridge Rd
Ramsayville Rd
Green's Creek
Ottawa Business Park
Elizabeth Manley Park

Proposed Development

The proposed development is for the construction of a four-story self-storage building and the gradual replacement of each of the eleven existing buildings with similar buildings (similar footprints and fabrication). Additionally, the existing site drains poorly, entirely overland, with paved areas graded at less than 0.5% in all areas. To improve this situation and increase usability for tenants, a network of storm sewers is proposed.

For the purposes of this report, the two properties comprising the site will be reviewed as a single site/property. It is the owner's intent to merge the two properties.

Servicing and Drainage

Storm Flows

As noted previously, flows from the vacant land and site of the new four-story building are presently collected by two ditch inlet catchbasins along Hawthorne Road. These are to be removed as part of this proposal and replaced with catchbasins in the landscaped area at the front of the new building draining to the controlled storm outlet for the site.

The storm sewers draining the roof of the new building and the existing site will discharge to the Mather Award Drain in a similar location to the existing drainage point.

Storm Water Management

Paved and other impervious areas (such as building roofs, sidewalks, etc.) which no longer allow absorption by native soils of storm water runoff from a development site are the primary factor affecting the quantity and rate of storm runoff from the site after development. To mitigate this, roof controls and an orifice pipe are proposed to limit post-development runoff to pre-development levels. Specifically, per the requirements from City of Ottawa staff, post-development storm runoff is to be controlled based on the lesser of the predevelopment runoff coefficient or a maximum equivalent 'C' of 0.5, and proposed flows to the storm sewer in excess of the allowable 5-year storm release rate, up to and including the 100-year storm event, must be detained on site.

Pre-consultation meeting minutes are included in Appendix A hereof.

Existing Drainage Area and Runoff Coefficients

The existing site is 71.6% paved and has a runoff coefficient C of 0.715.

Existing Conditions

Existing Buildings	4904.1	
Paved Area	13762.0	m^2
Total Impervious Area:	*18666.1*	*m^2*
Landscaped Area:	7412.1	m^2
Total:	**26078.2**	**m^2**

			% of Area	Runoff Coefficient	Weighted Coefficient
Impervious	18666.1	sq.m.	71.58%	0.90	0.644
Landscaped	7412.1	sq.m.	28.42%	0.25	0.071
Total	26078.2	sq.m.	100.00%		0.715

Note: in accordance with City of Ottawa requirements, a pre-development runoff coefficient of C=0.50 and a time of concentration of 10 minutes was used to determine allowable runoff and storage volumes required.

Predevelopment Time of Concentration

The existing site drains by sheet flow directly to a ditch that runs parallel to the south property line (drainage is north-south). Considering the paved area, a distance of approximately 129m from north to south property lines, a roughness coefficient for asphalt of 0.016, and the Kerby equation, yields a time of concentration of 6.46 minutes, or less than the allowable 10 minutes. 10 minutes was used. (See Appendix B)

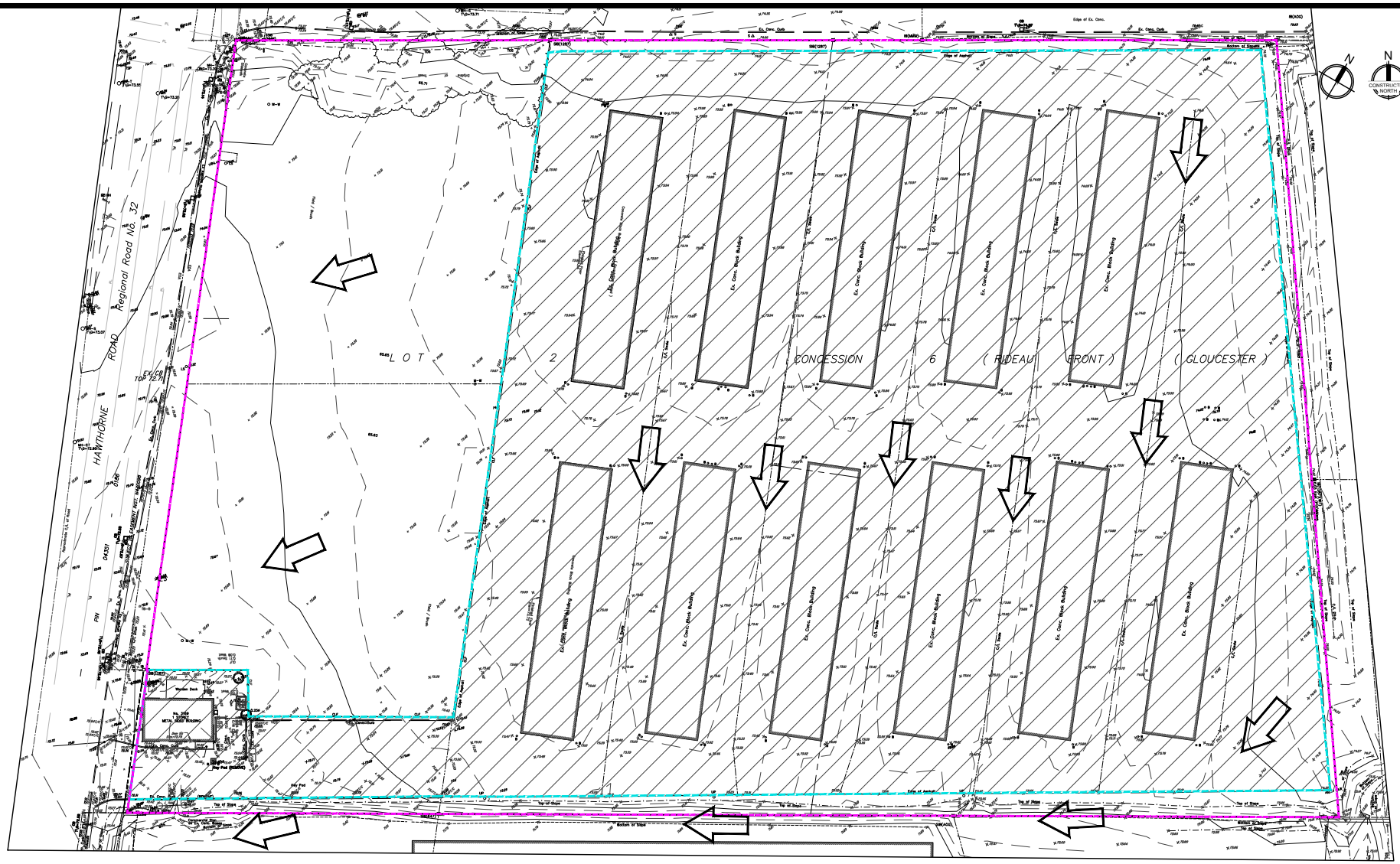
Proposed Drainage Area and Runoff Coefficient

Proposed
(Post-Development)

Proposed Building:	4483.0	m^2
Paved Area	18765.4	m^2
Total Impervious Area:	*23248.4*	*m^2*
Landscaped Area:	2829.9	m^2
Total:	**26078.2**	**m^2**

The resultant runoff coefficient for the area being developed is as follows:

Proposed:			% of Area	% of Area Excluding Roof	Runoff Coefficient	Weighted Coefficient
Paved	18765.4	sq.m.	71.96%	86.90%	0.90	0.782
Landscaped	2829.9	sq.m.	10.85%	13.10%	0.25	0.033
Subtotal	*21595.2*	*sq.m.*				
Building Roof	4483.0	sq.m.	17.19%	n/a	n/a	n/a
Total	26078.2	sq.m.	100.00%	100.00%		0.815



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NOTE:

THIS DRAWING TO BE READ IN CONJUNCTION WITH THE STORM WATER MANAGEMENT REPORT FOR THIS SITE.

DRAWING IS SCHEMATIC ONLY AND NOT FOR CONSTRUCTION.

EXISTING DRAINAGE AREA
EXISTING IMPERVIOUS AREA
(BALANCE OF SITE AREA PERVIOUS)

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ACCESS PROPERTY DEVELOPMENT

3149 & 3169 HAWTHORNE RD.
OTTAWA, ONTARIO

OWNER:
ACCESS PROPERTY DEVELOPMENT
100 CANADIAN ROAD, TORONTO, ONTARIO
M1R 4Z5 (647)555-2211

STORM DRAINAGE AREAS PRE DEVELOPMENT

SCALE	1:1000
DATE	9-AUG-23
DRAWN	MS
REF. DWG.	SWM
CHECKED	CC
DWG. NO.	DA-EX
PROJECT NO.	18646

Proposed
(Post-Development)

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Total	26078.2	sq.m.	100.00%	100.00%		0.815

NOTE:

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DRAWING IS SCHEMATIC ONLY AND NOT FOR CONSTRUCTION.

PROPOSED DRAINAGE AREA (26,078.2m²)
PROPOSED LANDSCAPED AREA (2829.9m²)
(BALANCE OF SITE AREA IMPERVIOUS)

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ACCESS PROPERTY DEVELOPMENT

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OTTAWA, ONTARIO

OWNER:
ACCESS PROPERTY DEVELOPMENT
100 CANADIAN ROAD, TORONTO, ONTARIO
M1R 4Z5 (647)555-2211

STORM DRAINAGE AREAS POST DEVELOPMENT

SCALE	1:1000
DATE	9-AUG-23
DRAWN	MS
REF. DWG.	SWM
CHECKED	CC
DWG. NO.	DA-PD
PROJECT NO.	18646

The above runoff coefficient was adjusted for low frequency events in accordance with MTO guidelines as follows:

Storm Return Period	Adjustment Factor	Adjusted Coefficient
2	1	0.815
5	1	0.815
10	1	0.815
25	1.1	0.896
50	1.2	0.978
100	1.25	1.000

Summarizing the results:

Peak Flows:

Storm Event	2 yr	5 yr	100 yr
Q achieved (m3/s)	0.1082	0.1317	0.1082
Q allowable (m3/s)	*0.2782*	*0.3774*	*0.2782*
Δ achieved vs allowable	-0.1700	-0.2456	-0.1700
	-61.1%	*-65.1%*	*-61.1%*

Per City of Ottawa guidelines, "an assumed average release rate of 50% of the peak allowable shall be used to account for additional storage requirements". Using a fixed orifice pipe as a control, this was exceeded for the 2- and 5-year events and a 42% reduction was achieved for the 100-year event.

Storage:

Storm Event	2 yr	5 yr	100 yr
Storage Required:	185.39	267.47	635.58
Storage Provided:	191.47	269.92	638.17
Δ achieved vs allowable (m3):	+6.09	+2.45	+2.59
Water Surface Elevation:	*70.81*	*70.97*	*71.83*

The required pre- to post- development flow and storage criteria are met.

Refer to Appendix B for the supporting calculations.

Overland Flow Routing

In the event of clogging of catchbasins or an exceptional storm event, flows in excess of the capacity of the proposed system are conveyed via the driveway and/or the existing swale at the south side of the property to the Mather Award Drain, in the same manner and to the same location as surface runoff would be in the current pre-development condition.

Surface Ponding

Surface storage of excess runoff is not considered for this project. While no surface ponding is expected for the 2- or 5-year event, localized ponding may occur in the event that individual catchbasins become clogged. The depth of ponding that would result before overland runoff is summarized in the table included on the Storm Drainage Area Plan, CS-203, included in Appendix F. Ponding will not exceed 0.18m at any of the inlets – with the exception of DCB3 (0.26m) in the parking area and CB1 (0.55m), CBMH10 (0.48m), and CBMH11 (0.55m) which are in landscaped areas at the front of the building.

Note that, especially because of the close proximity between the existing buildings (+/- 6m) and because the façades of all the buildings consist of a series of roll up doors, it is not possible to achieve an emergency overflow spill elevation 0.30m below the lowest opening while maintaining accessibility to individual storage units.

Water Quality

Although the proposed use is not a generator of heavy sediment loading and the site is 36% roof areas, the entire area was considered.

Enhanced stormwater quality control is required [80% removal of Total Suspended Solids (TSS)] and will be addressed by the installation of CB Shield units in all catch basins and manholes and an Oil and a StormCon SDD3-1800 OGSGrit Separator (OGS), in accordance with requirements from Rideau Valley Conservation Authority, the Ministry of Natural Resources and Forestry (MNRF) and the Ministry of the Environment and Climate Change (MOECC). This configuration achieves an annual TSS removal efficiency of 80%. Refer to Appendix C.

Sanitary Servicing

The existing office building is connected to the municipal sanitary sewer on Hawthorne Road. Note that there are few staff and limited facilities in the proposed building. It is proposed to re-use the existing sanitary lateral, with the addition of an inspection manhole at street line. A camera inspection has been completed and the existing connection has been deemed to be in good condition.

Potable and Fire Water Supply

There is an existing 150mm water service servicing the existing office and the two private hydrants on the existing portion of the site. There are also two municipal hydrants located on the Hawthorne Road boulevard, in front of the proposed building.

As with sanitary services, because of the minimal staffing at the facility there is limited domestic (potable) water demand for the proposed use. A new meter is to be provided in the new building.

The proposed building is to be sprinklered by a connection to the watermain. One of the site hydrants is to be relocated approximately 12m from its present location to distance it from the proposed loading docks and one of the municipal hydrants is to be relocated to clear the proposed sidewalk on Hawthorne Road. No other changes are proposed for the fire water supply.

Erosion and Sediment Control

During Construction

Erosion and sediment control measures are to be implemented prior to the start of construction and maintained for the duration of the works.

Since the effectiveness of erosion and sediment controls decreases with sediment loading, regular inspection and repair of damaged controls is essential. As indicated on the drawing under Siltation and Erosion Control, the following control measures or better are to be implemented:

- Silt Fences are to be installed adjacent to all property limits subject to drainage from the development area prior to topsoil stripping and in other locations, such as the base of any topsoil stockpiles.
- Discharge from point source discharges (such as dewatering pumps) to be filtered through a rock check dam (OPSD 219.210 or 219.211) and/or silt fence, as appropriate.
- A mud mat is to be provided at the entrance to ensure that mud is not tracked onto adjacent municipal roads. In the event that mud is tracked onto the adjacent roads, it is to be cleaned daily. In the event that the mud mat is deemed not sufficiently effective, truck washing may be required.
- All disturbed areas and stockpiles are to be seeded and stabilized if they are to remain disturbed for thirty days or longer (see drawing notes).
- Care must be taken when removing silt and siltation controls (particularly at catchbasins) to ensure that any accumulated sediment is not dispersed into the storm sewer network.
- Inspections of all of the erosion and sediment controls on the construction site should be undertaken
    - On a weekly basis
    - After every rainfall event
    - After significant snow melt events
    - Prior to forecasted rainfall events

  If damaged control measures are identified during inspection, the damaged or ineffective portion should be repaired and/or replaced within 48 hours.

Conclusion

The impact of the proposed development on the total runoff from the area of the site being developed is mitigated to pre-development levels or better.

Fire protection, domestic water, and sanitary services are being provided for the proposed development.

The proposed development is consistent with the existing and adjacent developments and can be constructed in accordance with City of Ottawa criteria.

Respectfully submitted,
EC²E: Edilesse Consulting Civil Engineers Ltd.

per: Mauro Savoldelli, P.Eng.

Appendix A: Pre-Consultation Minutes & RVCA Quality Memo

Mauro Savoldelli

From: Jonabelle T <jonabelle@corbettlandstrategies.ca>
Sent: Monday, April 5, 2021 3:34 PM
To: Mauro Savoldelli
Subject: Fwd: Pre-Application Consultation Follow Up - 3149 Hawthorne Road
Attachments: AODA Checklist.pdf; Pre-con Applicants Study and Plan I dentification List 3149 Hawthorne.pdf

Good Afternoon Mauro,

Please see email below the pre-consultation comments for 3149 Hawthorne Road. Pleas let me know if you have any questions.

Kind Regards,

Jonabelle Ceremuga, BES
Senior Associate Development Planner
Corbett Land Strategies
483 Dundas Street West, Suite 212
Oakville L6M 1L9
Phone: (289) 795-1052
Email: Jonabelle@corbettlandstrategies.ca
www.corbettlandstrategies.ca

From: Ezzio, Sarah <sarah.ezzio@ottawa.ca>
Sent: March 25, 2021 5:18 PM
To: Candice Hood <candice@corbettlandstrategies.ca>; nick@corbettlandstrategies.ca
Cc: Sharif, Golam <sharif.sharif@ottawa.ca>; Gervais, Josiane <josiane.gervais@ottawa.ca>
Subject: Pre-Application Consultation Follow Up - 3149 Hawthorne Road

Good afternoon Candice,

Please refer to the below notes regarding the Pre-Application Consultation Meeting held on February 19, 2021 for the site at 3149 Hawthorne Road.

Project:
The proposal is to develop the site with a 4-storey self storage building on the east of the site and a 1-storey self storage building on the west of the site, as well as the associated parking areas. The site is in the same ownership as the property in behind, with the municipal address 3169 Hawthorne Road, and is an expansion of this existing self storage use. The subject property is currently vacant with mature vegetation.

Below are staff's preliminary comments:

Policies/Designations of the site

- Official Plan – designated Urban Employment Area
- Zoning – IL
    - Within Area C for Minimum Parking Requirements (Schedule 1A)

Engineering

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

- 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
- Servicing and site works shall be in accordance with the following documents:
  - Ottawa Sewer Design Guidelines (October 2012) and all the Technical Bulletins including, Technical Bulletin 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)
- Record drawings and utitlity 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
- The Stormwater Management Criteria, for the subject site, is to be based on the following:
  - Stormwater Management Criteria based on Greens Creek Subwatershed Study.
  - The 2-yr storm or 5-yr storm event using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.
  - For separated sewer system built pre-1970 the design of the storm sewers are based on a 2 year storm.
  - The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less (§ 8.3.7.3).
  - A calculated time of concentration (Cannot be less than 10 minutes).
  - Flows to the storm sewer in excess of the 5-year storm release rate, up to and including the 100-year storm event, must be detained on site.
  - For a combined sewer system the maximum C= 0.4 or the pre-development C value, whichever is less. In the absence of other information the allowable release rate shall be based on a 2 year storm event.
- Deep Services:

Hydrants

Hydrant Laterals

Water Pipes

Public

Private

Valves

Valve

TVS, A, D

Trunk Sewers

Sanitary Pipe

Combined Pipe

Storm Pipe

Storm Manholes

Storm Inlets

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

a. Connections (Private sewers on Ages Drive - Preferred):
   i. Existing 375 mm dia. STM (PVC)
   ii. 203 mm dia. Watermain (DI)
   iii. 200 mm dia. SAN (PVC)

b. Other Option (Public sewers on Hawthorne Road):

i. 975 mm dia. STM (Conc.)
ii. 406 mm dia. Watermain (DI)
iii. 250 mm dia. SAN (PVC)

c. Note: watermain can be serviced by stub dropped at 3169 Hawthorne Road if the property owners are the same or if an agreement is in place.

ii. Provide existing servicing information and the recommended location for the proposed connections. Services should ideally be grouped in a common trench to minimize the number of road cuts.

iii. Connections to trunk sewers and easement sewers are typically not permitted.

iv. Provide information on the monitoring manhole requirements – should be located in an accessible location on private property near the property line (ie. Not in a parking area).

v. Review provision of a high-level sewer.

vi. Provide information on the type of connection permitted

Sewer connections 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.

- 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.
  vii. Water supply redundancy will be required for more than 50 m3/day water demand.
- Phase 1 ESAs and Phase 2 ESAs must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.
- MECP ECA Requirements –
  All development applications should be considered for an Environmental Compliance Approval (ECA) by the Ministry of the Environment, Conservation, and Parks (MECP);
  a. Consultant determines if an approval for sewage works under Section 53 of OWRA is required. Consultant then determines what type of application is required and the City's project manager confirms. (If the consultant is not clear if an ECA is required, they will work with the City to determine what is required. If the consultant it is still unclear or there is a difference of opinion only then will the City PM approach the MECP.
  b. The project will be either transfer of review (standard), transfer of review (additional), direct submission, or exempt as per O. Reg. 525/98.

c. Pre-consultation is not required. d. Standard Works ToR Draft ECA's are sent to the local MECP office (moeccottawasewage@ontario.ca).for information only
d. Additional ToR draft ECAs require a project summary/design brief and require a response from the local MECP (10 business day window)

- Water supply redundancy will be required for more than 50 m3/day water demand. Provide watermain looped connection or with isolation valve to meet this requirement.
- Please contact RVCA for specific water quality requirement (discharge to Green Creek).
- Site Plan Approval, or Draft Approval, is required before an application is sent to the MECP
- Please contact Sharif Golam (Sharif.Sharif@ottawa.ca) or Tyler Cassidy (Tyler.Cassidy@Ottawa.ca) should you have any further questions on the engineering comments

Planning

- As proposed, the site is deficient in required parking spaces by approximately 40%.This will need to be addressed by either a Minor Zoning By-law Amendment or a Minor Variance (Rezoning may be the more appropriate route).
- Side setbacks are deficient, but this could be addressed if One Lot for Zoning Purposes (Section 93) can be applied. Please provide rationale/statement for how the two sites function together.
- Archeological Assessment is required, as this is identified as within an area of archeological potential.
- Please be advised of the ROW protection along Hawthorne.
- Please provide landscaping and trees along the building's frontage.
- Provide sidewalk along the Hawthorne street frontage.
- The size of the proposed development triggers a Complex application subtype.
- Consult with ward councilor, Diane Deans, and applicable community associations before application submission.

Urban Design

- If the two proposed buildings differ in height, the four storey portion of the building is preferred to be located at the intersection of Hawthorne Road and Ages Drive.
- We would like to see a well-landscaped street front, see that of the neighbouring site at 3103 Hawthorne Road for an example.
- The office component may be better located, perhaps to the southwest corner or the front of the site.
- A design brief is required.

Transportation

- Follow Traffic Impact Assessment Guidelines
  - A TIA is required. Screening and Scoping can be submitted together at your earliest convenience.
  - Start this process asap. The application will not be deemed complete until the submission of the draft step 1-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable).
  - Request base mapping asap if RMA is required. Contact Engineering Services (https://ottawa.ca/en/city-hall/planning-and-development/engineering-services)
- ROW protection on Hawthorne between Walkley and Hunt Club is 44.5m even.
- Clear throat requirements for the access off an arterial is 15m.
- Corner Clearances should follow minimum distances set out within TAC Figure 8.8.2.
- Site must provide new sidewalk along Hawthorne, as per City standards.
- Ensure site access meets the City's Private Approach Bylaw.
- On site plan:

    - Show all details of the roads abutting the site up to and including the opposite curb; include such items as pavement markings, accesses and/or sidewalks.
    - Turning movement diagrams required for all accesses showing the largest vehicle to access/egress the site.
    - Turning movement diagrams required for internal movements (loading areas, garbage).
    - Show all curb radii measurements; ensure that all curb radii are reduced as much as possible
    - Show lane/aisle widths.
    - Sidewalk is to be continuous across access as per City Specification 7.1.
    - Grey out any area that will not be impacted by this application.
- The City recommends development on private property be in accordance with the City's Accessibility Design Standards (see attached Site Plan Checklist, which summarizes AODA requirements). As the proposed site is for general public use, AODA legislation applies.
- Contact Josiane Gervais (Josiane.Gervais@Ottawa.ca) should you have any follow up questions on the transportation requirements.

Environmental Planning

- No EIS required
- Street trees and landscaping is required within the asphalted areas to reduce the urban heat island effect. The nearest natural feature is the Mather Award Drain located south of the site but not close enough to require a setback to it as per Section 69 of the zoning by-law.

RVCA

- There are no natural hazards identified on this property.
- There have been no natural heritage features identified on this property.
- The stormwater outlet for the storm sewers is almost immediately downstream. Based on the distance to the downstream watercourse, a water quality objective of 'enhanced' (80% TSS removal) is required. The applicant is also encouraged to explore opportunities for the implementation of LID's.

Parks & Facilities Planning

1. Parkland Dedication:

- The amount of parkland dedication that is required is to be calculated as per the City of Ottawa Parkland Dedication By-law No 2009-95.
- Section 3 of the By-law states: "No person shall develop land within the City unless the owner of the land has either, conveyed or agreed to convey to the City the amount of land that corresponds to the type of development or use identified in Table 1
- In this instance, the corresponding use is "commercial and industrial purposes". Therefore, as per Table 1 of the Parkland Dedication By-law, "Parkland requirement calculated as 2% of the gross land area of the site(s) being developed."
- The development proposes to be developed over the existing property line to the east of the site (3169 Hawthorne), as well as to utilize drive isles and parking.
- However, the gross area of this adjacent property (3169 Hawthorne) will not form a part of the parkland dedication calculation. As per Section 14 (2) (b) of the By-law these lands are exempt because "no parkland dedication conveyance of land or payment of money in-lieu is required for a change of use from commercial or industrial to another commercial or industrial use, or for the alteration of an existing building resulting in a change of use from commercial or industrial to another commercial or industrial use".
- Therefore, since the adjoining property (3169 Hawthorne) currently contains commercial / industrial uses, and the use is not proposed to change, the adjoining property is exempt from parkland dedication for the proposed development.
- Approximate parkland dedication calculation for the proposed development:
    - Gross land area of 3149 Hawthorne = approx. 6189 sq.m.

    - Parkland dedication calculation = 6188.53 x 2% = approx. 124 sq.m
- The final parkland dedication calculation will be based on the gross land area of the site as provided by a professional surveyor.
- The parkland dedication requirement is to be calculated in square meters as the unit of measurement.
- Please note that if the proposed land use changes, then the parkland dedication will be re-evaluated accordingly.

2. Form of Parkland Dedication:
- As per Section 10-1-a of the Parkland Dedication By-law, the City - Parks & Facilities Planning, will be requesting cash-in-lieu of parkland for this proposal, due to the relatively small quantity of parkland dedication required to be conveyed.

Forestry & Trees

TCR requirements are as follows:
- a Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City
    - an approved TCR is a requirement of Site Plan approval.
    - The TCR information can be combined with the Landscape Plan
- As of January 1 2021, any removal of privately or publicly (City) owned trees 10cm or larger in diameter requires a tree permit issued under the Tree Protection Bylaw (Bylaw 2020 – 340); the permit will be based on an approved TCR and made available at or near plan approval.
    - Please note on the LP if there are no trees greater than 10cm in diameter
- The Planning Forester from Planning and Growth Management as well as foresters from Forestry Services will review the submitted TCR
    - If tree removal is required, both municipal and privately-owned trees will be addressed in a single permit issued through the Planning Forester
    - Compensation may be required for city owned trees – if so, it will need to be paid prior to the release of the tree permit
- the TCR must list all trees on site by species, diameter and health condition
- the TCR must list all trees on adjacent sites if they have a critical root zone that extends onto the development site
- If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained
- All retained trees must be shown and all retained trees within the area impacted by the development process must be protected as per City guidelines available at Tree Protection Specification or by searching Ottawa.ca
- the City encourages the retention of healthy trees; if possible, please seek opportunities for retention of trees that will contribute to the design/function of the site and Ottawa's urban forest canopy.
- For more information on the process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca or on City of Ottawa

Landscape Plan and Tree Planting Requirements are as follows:
- For additional information on the following please contact Tracy.Smith@Ottawa.ca
- Minimum Setbacks
    - Maintain 1.5m from sidewalk or MUP/cycle track.
    - Maintain 2.5m from curb
    - Coniferous species require a minimum 4.5m setback from curb, sidewalk or MUP/cycle track/pathway.
    - Maintain 7.5m between large growing trees, and 4m between small growing trees. Park or open space planting should consider 10m spacing.
    - Adhere to Ottawa Hydro's planting guidelines (species and setbacks) when planting around overhead primary conductors.
- Tree specifications

- Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.
- Maximize the use of large deciduous species wherever possible to maximize future canopy coverage
- Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification; and include watering and warranty as described in the specification (can be provided by Forestry Services).
- Plant native trees whenever possible
- No root barriers, dead-man anchor systems, or planters are permitted.
- No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree)

- Hard surface planting
  - Curb style planter is highly recommended
  - No grates are to be used and if guards are required, City of Ottawa standard (which can be provided) shall be used.
  - Trees are to be planted at grade
- Soil Volume
  - Please ensure adequate soil volumes are met:

Tree Type/Size	Single Tree Soil Volume (m3)	Multiple Tree Soil Volume (m3/tree)
Ornamental	15	9
Columnar	15	9
Small	20	12
Medium	25	15
Large	30	18
Conifer	25	15

- Please follow the City's 2017 Tree Planting in Sensitive Marine Clay guidelines if in areas with sensitive Marine Clay.

This proposal is subject to a **Site Plan Control application** (Complex Subtype). If a reduced number of parking spaces than required by the by-law are proposed, a **Minor Zoning By-Law Amendment** or **Minor Variance** will be requied. The required Plans & Study List is attached to this email.

Please refer to the links to "Guide to preparing studies and plans" and fees for general information. Additional information is available related to building permits, development charges, and the Accessibility Design Standards. Be aware that other fees and permits may be required, outside of the development review process. You may obtain background drawings by contacting informationcentre@ottawa.ca.

These pre-con comments are valid for one year. If you submit a development application(s) after this time, you may be required to meet for another pre-consultation meeting and/or the submission requirements may change. You are as well encouraged to contact us for a follow-up meeting if the plan/concept will be further refined.

We are happy to discuss further or answer any follow-up questions.

All the best,

Sarah Ezzio

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
☎ 613.580.2400 ext./poste 23493
ottawa.ca/planning / ottawa.ca/urbanisme

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From: Jamie Batchelor
To: Emma Bennett; Eric Lalande; Mauro Savoldelli
Subject: RE: Water quality requirements for drainage - 3149-3169 Hawthorne Rd
Date: Monday, January 9, 2023 11:25:31 AM

Hi Mauro,

With respect to your second question, infiltration requirements would be determined by the City. It is my understanding that the City has guidelines for the implementation for LID for constraint sites. I would encourage you to reach out to the City for further information and to obtain a copy of these documents.

Jamie Batchelor, MCIP, RPP
Planner, ext. 1191
Jamie.batchelor@rvca.ca

Rideau Valley Conservation Authority
3889 Rideau Valley Drive
PO Box 599, Manotick ON K4M 1A5
T 613-692-3571 | 1-800-267-3504 F 613-692-0831 | www.rvca.ca

From: Jamie Batchelor
Sent: Monday, January 9, 2023 11:18 AM
To: Emma Bennett <emma.bennett@rvca.ca>; Eric Lalande <eric.lalande@rvca.ca>; 'mauro@ec2e.ca' <mauro@ec2e.ca>
Subject: RE: Water quality requirements for drainage - 3149-3169 Hawthorne Rd

Good Morning Mauro,

Given the distance to the downstream watercourse, the appropriate water quality target would be 'enhanced' (80% TSS Removal).

Jamie Batchelor, MCIP, RPP
Planner, ext. 1191
Jamie.batchelor@rvca.ca

Rideau Valley Conservation Authority
3889 Rideau Valley Drive
PO Box 599, Manotick ON K4M 1A5
T 613-692-3571 | 1-800-267-3504 F 613-692-0831 | www.rvca.ca

From: Emma Bennett <emma.bennett@rvca.ca>
Sent: Wednesday, December 28, 2022 4:52 PM
To: Eric Lalande <eric.lalande@rvca.ca>; Jamie Batchelor <jamie.batchelor@rvca.ca>; 'mauro@ec2e.ca' <mauro@ec2e.ca>
Subject: Water quality requirements for drainage - 3149-3169 Hawthorne Rd

Hi Mauro,

RE: Water quality requirements for drainage – 3149 Hawthorn Rd

Thanks for reaching out to our office and for providing a grading plan. Unfortunately, I could not respond prior to our office closure due to technical issues caused by the storm.

I've attached RVCA's mapping and connected you with RVCA Planners, Jamie Batchelor, and Eric Lalande, to discuss your proposal/inquiries further.

Either Jamie or Eric will connect with you as soon as they are able.

Regards,

Emma Bennett, B.Sc.
Resource Specialist
emma.bennett@rvca.ca, ext. 1132

Holiday Hours: Our office will close on December 23 at 4:30 PM and re-open on January 3, 2023

Rideau Valley Conservation Authority
3889 Rideau Valley Drive
PO Box 599, Manotick ON K4M 1A5
T 613-692-3571 | 1-800-267-3504 F 613-692-0831 | www.rvca.ca

From: LRC Info <info@lrconline.com>
Sent: Wednesday, December 21, 2022 11:45 AM
To: Emma Bennett <emma.bennett@rvca.ca>
Subject: FW: Proposed Development, 3149-3169 Hawthorne Road, Ottawa

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From: Mauro Savoldelli <mauro@ec2e.ca>
Sent: Wednesday, December 21, 2022 3:16 AM
To: LRC Info <info@lrconline.com>
Subject: Proposed Development, 3149-3169 Hawthorne Road, Ottawa

Dear Emma and/or Nick,
I've been told that you are the team that can help us progress a development application.
We are working on a development at 3149 (front property) and 3169 (back property) Hawthorne Road for Access Storage. The proposal is for the construction of a new storage building in the front part of the site (presently vacant).
The site presently drains to a ditch flowing west along the south property line and discharging (overland) to the Mather Award Drain which, as you know, eventually drains to Green Creek.
I've attached the site grading plan and a key plan – let me know if you need anything else, of course.
Please note that the City has asked that we collect all storm runoff and connect to the storm sewer on Hawthorne just north of where it connects to the Mather Drain (i.e.: stop discharging to the ditch on the south side).
The question I would have for you and RVCA are:

- What would the water quality requirements be for the discharge from the site?
- Am I correct in assuming that since the site substrata (like much of the surrounding area) is dense clay, infiltration is *not* required?

Thanks in advance for the above and any other advice you can offer.
Sincerely,
Mauro

Mauro Savoldelli, P.Eng.
EC²E
Edilesse Consulting Civil Engineers Ltd.
an **edilesse group** company
185 Blake Avenue
Toronto, Ontario, M2M 1B5
Tel: 416-236-2341
Fax: 416-410-2362
Email: mauro@ec2e.ca

Appendix B: Quantity Control Calculations

Runoff was calculated using City of Ottawa IDF curves from section 5.4.2 of the Design Guidelines.

$i=A/(t+B)^C$

IDF PARAMETERS – Ottawa

Parameter	2	5	100
A	732.951	998.071	1735.688
B	6.199	6.053	6.014
C	0.81	0.814	0.82

As stated in report, flows for all storms were controlled to the pre-development runoff from the site based on a runoff coefficient of 0.50.

Time of Concentration

$$t_c = 0.83(Lns^{-0.5})^{0.467}$$

L	129	m
n	0.016	(Manning's n for rough asphalt)
s	0.006976	
t_c	6.448	minutes

Since calculated t_c is less than 10 minute minimum, a minimum t_c = 10 minutes was used

Results Summary

Orifice Summary:

Storm	2	5	100
Water Level	70.81	70.97	71.83
C.L. Orifice El.	70.48	70.48	70.48
H (m)	0.33	0.49	1.35
Orifice Diameter (mm)	300	300	300
Radius (mm)	150.0	150.0	150.0
A (sq.m.)	0.0707	0.0707	0.0707
C	0.6	0.6	0.6
Q (c.m./s)	0.1082	0.1317	0.2184
Q allowable (c.m./s.)	0.2782	0.3774	0.3774
Δ, m^3/s (-ve=less than allowable)	-0.1700	-0.2456	-0.1590
Storage Required:	185.39	267.47	636.17
Storage Provided:	191.47	269.92	638.17
Δ, m^3 (+ve=surplus)	+6.09	+2.45	+1.99

Access Property Developments
3149 Hawthorne Road
Ottawa, Ontario

Flow from a Given Area
Calculated using
Rational Method

File: APD 3149 Hawthorne
Printed: 3-Nov-21
3:09 AM

$i=A/(t+B)^C$

IDF PARAMETERS – Ottawa

Parameter	2	5	10	25	50	100
A	732.951	998.071	1174.184	1402.884	1569.58	1735.688
B	6.199	6.053	6.014	6.018	6.014	6.014
C	0.81	0.814	0.816	0.819	0.82	0.82

Runoff:

i) Pre-Development

(Roof areas included in paved areas, except Proposed Building)

Storm: **2 yr.**
Area = 2.607822 Ha.
i = 76.8 mm/hr (tc=10 min.)
C = 0.50
Q = 0.2782 c.m./s.

ii) Post-Development

(Roof areas included in paved areas, except Proposed Building)

Controlled Area:			% of Area	Weighted Percent	Runoff Coeff.	Weighted Coeff.
Paved	18765.4	sq.m.	71.96%	86.90%	0.90	0.7821
Landscaped	2829.9	sq.m.	10.85%	13.10%	0.25	0.0328
Subtotal	21595.2	sq.m.				
Roof	4483.0	sq.m.	17.19%	n/a	n/a	n/a
Total	26078.2	sq.m.	100.00%	100.00%		0.8148
					Frequency Adjustment Factor:	100.00%
					Adjusted Coefficient:	0.8148

iii) Runoff volumes:

Storm: 2 Yr
Area: 21595.22 sq.m.
2.1595 Ha
C: 0.8148

Max. Outflow Allowed: 278.19 l./s.
or: 0.2782 c.m./s

Ottawa IDF					*Allowable*		Using Pipe Orifice	
Time	Intensity	Inflow Site	Inflow Roof	Total Inflow	*Predevel. Allowed*	*Storage Volume*	Outflow Orifice	Storage Volume
(min)	(mm/hr)	(c.m./s)	(c.m./s)		*(c.m./s)*	*(c.m.)*	(c.m./s)	(c.m.)
10	76.805	0.3754	0.0084	0.3838	*0.2782*	*63.36*	0.1082	165.35
11	73.167	0.3576	0.0084	0.3660	*0.2782*	*57.96*	0.1082	170.15
12	69.893	0.3416	0.0084	0.3500	*0.2782*	*51.71*	0.1082	174.09
13	66.930	0.3271	0.0084	0.3355	*0.2782*	*44.72*	0.1082	177.30
14	64.233	0.3140	0.0084	0.3223	*0.2782*	*37.09*	0.1082	179.87
15	61.767	0.3019	0.0084	0.3103	*0.2782*	*28.89*	0.1082	181.87
20	52.031	0.2543	0.0084	0.2627	*0.2627*	*0.00*	0.1082	185.39
25	45.167	0.2208	0.0084	0.2291	*0.2291*	*0.00*	0.1082	181.41
30	40.043	0.1957	0.0084	0.2041	*0.2041*	*0.00*	0.1082	172.61
35	36.059	0.1763	0.0084	0.1846	*0.1846*	*0.00*	0.1082	160.48
40	32.864	0.1606	0.0084	0.1690	*0.1690*	*0.00*	0.1082	145.93
45	30.239	0.1478	0.0084	0.1562	*0.1562*	*0.00*	0.1082	129.53
50	28.041	0.1371	0.0084	0.1454	*0.1454*	*0.00*	0.1082	111.68
55	26.171	0.1279	0.0084	0.1363	*0.1363*	*0.00*	0.1082	92.68
60	24.558	0.1200	0.0084	0.1284	*0.1284*	*0.00*	0.1082	72.72
65	23.151	0.1132	0.0084	0.1215	*0.1215*	*0.00*	0.1082	51.97
70	21.913	0.1071	0.0084	0.1155	*0.1155*	*0.00*	0.1082	30.55
75	20.813	0.1017	0.0084	0.1101	*0.1101*	*0.00*	0.1082	8.55
80	19.830	0.0969	0.0084	0.1053	*0.1053*	*0.00*	0.1082	0.00
85	18.944	0.0926	0.0084	0.1010	*0.1010*	*0.00*	0.1010	0.00

Max. Vol. (cu.m.):	**63.36**	**185.39**

Roof, Proposed Building:

Storm:	2	Yr
Area:	4483	sq.m.
	0.4483	Ha
C:	0.9	

Outflow rate:

based on 23 l/min/in of head

Roof Rise:	4	inches
	0.1016	m
Max. Outflow:	0.0084	(c.m./s)
	8.38	(l./s.)
or	0.1509	l/s/cm. of head per weir

No. of notches:	12	
Max. Volume:	69.14	cu. m.
Depth at weir:	4.63	cm.

(Note: Iterative Solution Used)

(N.A.R.	373.6	sq.m./notch)
(Flow	18.69	l/s/Ha)

Proposed Building Roof:

Ottawa IDF

Time (min)	Intensity (mm/hr)	Inflow Roof (c.m./s)	Outflow (c.m./s)	Storage Volume (c.m.)
10	76.805	0.0861	0.0084	46.62
11	73.167	0.0820	0.0084	48.59
12	69.893	0.0783	0.0084	50.37
13	66.930	0.0750	0.0084	51.97
14	64.233	0.0720	0.0084	53.43
15	61.767	0.0692	0.0084	54.76
20	52.031	0.0583	0.0084	59.92
25	45.167	0.0506	0.0084	63.36
30	40.043	0.0449	0.0084	65.70
35	36.059	0.0404	0.0084	67.27
40	32.864	0.0368	0.0084	68.29
45	30.239	0.0339	0.0084	68.88
50	28.041	0.0314	0.0084	69.14
55	26.171	0.0293	0.0084	69.14
60	24.558	0.0275	0.0084	68.92
65	23.151	0.0259	0.0084	68.51
70	21.913	0.0246	0.0084	67.95
75	20.813	0.0233	0.0084	67.26
80	19.830	0.0222	0.0084	66.45
85	18.944	0.0212	0.0084	65.55

Max. Vol. (cu.m.):	**69.14**

Runoff:

i) Pre-Development

Storm:	**5**	**yr.**
Area =	2.607822	Ha.
i =	104.2	mm/hr (tc=10 min.)
C =	0.50	
Q =	0.3774	c.m./s.

ii) Post-Development

(Roof areas included in paved areas, except Proposed Building)

Controlled Area:			% of Area	Weighted Percent	Runoff Coeff.	Weighted Coeff.
Paved	18765.4	sq.m.	71.96%	86.90%	0.90	0.7821
Landscaped	2829.9	sq.m.	10.85%	13.10%	0.25	0.0328
Subtotal	21595.2	sq.m.				
Roof	4483.0	sq.m.	17.19%	n/a	n/a	n/a
Total	26078.2	sq.m.	100.00%	100.00%		0.8148
					Frequency Adjustment Factor:	100.00%
					Adjusted Coefficient:	0.8148

iii) Runoff volumes:

Storm:	**5**	**Yr**
Area:	21595.22	sq.m.
	2.1595	Ha
C:	0.8148	
Max. Outflow Allowed:	377.38	l./s.
or:	0.3774	c.m./s

Ottawa IDF					*Allowable*		Using Pipe Orifice	
Time (min)	Intensity (mm/hr)	Inflow Site (c.m./s)	Inflow Roof (c.m./s)	Total Inflow	*Predevel. Allowed (c.m./s)*	*Storage Volume (c.m.)*	Outflow Orifice (c.m./s)	Storage Volume (c.m.)
10	104.193	0.5093	0.0113	0.5205	*0.3774*	*85.89*	0.1317	233.28
11	99.192	0.4848	0.0113	0.4961	*0.3774*	*78.34*	0.1317	240.47
12	94.696	0.4629	0.0113	0.4741	*0.3774*	*69.64*	0.1317	246.51
13	90.630	0.4430	0.0113	0.4542	*0.3774*	*59.95*	0.1317	251.55
14	86.934	0.4249	0.0113	0.4362	*0.3774*	*49.38*	0.1317	255.73
15	83.557	0.4084	0.0113	0.4197	*0.3774*	*38.05*	0.1317	259.14
20	70.251	0.3434	0.0113	0.3546	*0.3546*	*0.00*	0.1317	267.47
25	60.896	0.2977	0.0113	0.3089	*0.3089*	*0.00*	0.1317	265.75
30	53.928	0.2636	0.0113	0.2748	*0.2748*	*0.00*	0.1317	257.59
35	48.518	0.2371	0.0113	0.2484	*0.2484*	*0.00*	0.1317	244.99
40	44.184	0.2160	0.0113	0.2272	*0.2272*	*0.00*	0.1317	229.16
45	40.629	0.1986	0.0113	0.2098	*0.2098*	*0.00*	0.1317	210.88
50	37.653	0.1840	0.0113	0.1953	*0.1953*	*0.00*	0.1317	190.68
55	35.123	0.1717	0.0113	0.1829	*0.1829*	*0.00*	0.1317	168.94
60	32.943	0.1610	0.0113	0.1723	*0.1723*	*0.00*	0.1317	145.94
65	31.044	0.1517	0.0113	0.1630	*0.1630*	*0.00*	0.1317	121.89
70	29.372	0.1436	0.0113	0.1548	*0.1548*	*0.00*	0.1317	96.95
75	27.888	0.1363	0.0113	0.1476	*0.1476*	*0.00*	0.1317	71.24
80	26.562	0.1298	0.0113	0.1411	*0.1411*	*0.00*	0.1317	44.87
85	25.369	0.1240	0.0113	0.1352	*0.1352*	*0.00*	0.1317	17.92

Max. Vol. (cu.m.):	**85.89**	**267.47**

Roof, Proposed Building:

Storm:	**5**	**Yr**
Area:	4483	sq.m.
	0.4483	Ha
C:	0.9	

Outflow rate:

based on 23 l/min/in of head

Roof Rise:	4	inches
	0.1016	m
Max. Outflow:	0.0113	(c.m./s)
	11.25	(l./s.)
or	0.1509	l/s/cm. of head per weir

No. of notches:	12	
Max. Volume:	92.84	cu. m.
Depth at weir:	6.21	cm.

(Note: Iterative Solution Used)

(N.A.R.	373.6	sq.m./notch)
(Flow	25.10	l/s/Ha)

Ottawa IDF

Time (min)	Intensity (mm/hr)	Inflow Roof (c.m./s)	Outflow (c.m./s)	Storage Volume (c.m.)
10	104.193	0.1168	0.0113	63.31
11	99.192	0.1112	0.0113	65.95
12	94.696	0.1061	0.0113	68.31
13	90.630	0.1016	0.0113	70.45
14	86.934	0.0974	0.0113	72.39
15	83.557	0.0936	0.0113	74.16
20	70.251	0.0787	0.0113	80.98
25	60.896	0.0682	0.0113	85.50
30	53.928	0.0604	0.0113	88.54
35	48.518	0.0544	0.0113	90.56
40	44.184	0.0495	0.0113	91.84
45	40.629	0.0455	0.0113	92.56
50	37.653	0.0422	0.0113	92.84
55	35.123	0.0394	0.0113	92.77
60	32.943	0.0369	0.0113	92.41
65	31.044	0.0348	0.0113	91.81
70	29.372	0.0329	0.0113	91.00
75	27.888	0.0313	0.0113	90.02
80	26.562	0.0298	0.0113	88.88
85	25.369	0.0284	0.0113	87.62

Max. Vol. (cu.m.):	**92.84**

Runoff:

i) Pre-Development

Storm:	**5 yr.**	
Area =	2.607822	Ha.
i =	104.2	mm/hr (tc=10 min.)
C =	0.50	
Q =	0.3774	c.m./s.

ii) Post-Development

(Roof areas included in paved areas, except Proposed Building)

Controlled Area:			% of Area	Weighted Percent	Runoff Coeff.	Weighted Coeff.
Paved	18765.4	sq.m.	71.96%	86.90%	0.90	0.7821
Landscaped	2829.9	sq.m.	10.85%	13.10%	0.25	0.0328
Subtotal	21595.2	sq.m.				
Roof	4483.0	sq.m.	17.19%	n/a	n/a	n/a
Total	26078.2	sq.m.	100.00%	100.00%		0.8148
					Frequency Adjustment Factor:	125.00%
					Adjusted Coefficient:	1.0000

iii) Runoff volumes:

Storm:	**100 Yr**	
Area:	21595.22	sq.m.
	2.1595	Ha
C:	1.0000	
Max. Outflow Allowed:	377.38	l./s.
or:	0.3774	c.m./s

Ottawa IDF					*Allowable*		Using Pipe Orifice	
Time (min)	Intensity (mm/hr)	Inflow Site (c.m./s)	Inflow Roof (c.m./s)	Total Inflow	*Predevel. Allowed (c.m./s)*	*Storage Volume (c.m.)*	Outflow Orifice (c.m./s)	Storage Volume (c.m.)
10	178.559	1.0711	0.0196	1.0907	*0.3774*	*427.97*	0.2184	523.37
11	169.907	1.0192	0.0196	1.0388	*0.3774*	*436.52*	0.2184	541.45
12	162.133	0.9726	0.0196	0.9921	*0.3774*	*442.62*	0.2184	557.10
13	155.107	0.9304	0.0196	0.9500	*0.3774*	*446.64*	0.2184	570.65
14	148.723	0.8921	0.0196	0.9117	*0.3774*	*448.82*	0.2184	582.38
15	142.894	0.8572	0.0196	0.8767	*0.3774*	*449.41*	0.2184	592.51
20	119.950	0.7195	0.0196	0.7391	*0.3774*	*434.06*	0.2184	624.86
25	103.847	0.6229	0.0196	0.6425	*0.3774*	*397.68*	0.2184	636.17
30	91.868	0.5511	0.0196	0.5706	*0.3774*	*347.87*	0.2184	634.07
35	82.579	0.4954	0.0196	0.5149	*0.3774*	*288.82*	0.2184	622.72
40	75.145	0.4508	0.0196	0.4703	*0.3774*	*223.07*	0.2184	604.67
45	69.050	0.4142	0.0196	0.4338	*0.3774*	*152.24*	0.2184	581.53
50	63.954	0.3836	0.0196	0.4032	*0.3774*	*77.44*	0.2184	554.43
55	59.624	0.3577	0.0196	0.3772	*0.3772*	*0.00*	0.2184	524.16
60	55.895	0.3353	0.0196	0.3549	*0.3549*	*0.00*	0.2184	491.28
65	52.647	0.3158	0.0196	0.3354	*0.3354*	*0.00*	0.2184	456.23
70	49.790	0.2987	0.0196	0.3182	*0.3182*	*0.00*	0.2184	419.34
75	47.256	0.2835	0.0196	0.3030	*0.3030*	*0.00*	0.2184	380.89
80	44.991	0.2699	0.0196	0.2894	*0.2894*	*0.00*	0.2184	341.08
85	42.954	0.2577	0.0196	0.2772	*0.2772*	*0.00*	0.2184	300.08

Max. Vol. (cu.m.):	**449.41**	**636.17**

Roof, Proposed Building:

Storm:	**100**	**Yr**
Area:	4483	sq.m.
	0.4483	Ha
C:	1	(adjusted C*1.25)

Outflow rate:

based on 23 l/min/in of head		
Roof Rise:	4	inches
	0.1016	m
Max. Outflow:	0.0196	(c.m./s)
	19.56	(l./s.)
or	0.1509	l/s/cm. of head per weir

No. of notches:	12	
Max. Volume:	180.48	cu. m.
Depth at weir:	10.80	cm.
(Note: Iterative Solution Used)		
(N.A.R.	373.6	sq.m./notch)
(Flow	43.63	l/s/Ha)

Ottawa IDF

Time (min)	Intensity (mm/hr)	Inflow Roof (c.m./s)	Outflow (c.m./s)	Storage Volume (c.m.)
10	178.559	0.2224	0.0196	121.68
11	169.907	0.2116	0.0196	126.74
12	162.133	0.2019	0.0196	131.29
13	155.107	0.1932	0.0196	135.40
14	148.723	0.1852	0.0196	139.14
15	142.894	0.1779	0.0196	142.55
20	119.950	0.1494	0.0196	155.78
25	103.847	0.1293	0.0196	164.64
30	91.868	0.1144	0.0196	170.72
35	82.579	0.1028	0.0196	174.88
40	75.145	0.0936	0.0196	177.65
45	69.050	0.0860	0.0196	179.36
50	63.954	0.0796	0.0196	180.25
55	59.624	0.0742	0.0196	180.48
60	55.895	0.0696	0.0196	180.17
65	52.647	0.0656	0.0196	179.41
70	49.790	0.0620	0.0196	178.27
75	47.256	0.0588	0.0196	176.80
80	44.991	0.0560	0.0196	175.05
85	42.954	0.0535	0.0196	173.05

Max. Vol. (cu.m.):	**180.48**

Orifice Calculations:

To determine initial orifice size, where $Q = CA\sqrt[2]{2gH}$ and $A = \frac{Q}{C\sqrt[2]{2gH}}$

For 5-year flow:

Outflow Inv.:	70.28	m.
Water Level:	70.84	
C.L. Orifice El.:	70.58	
H =	0.26	m.
Q =	CA*SQRT(2gH)	
A =	Q/C*sqrt(2gH)	
Q allowable =	377.38	l./s.
Less 50% reduction =	188.6923	l./s.
or	0.1887	c.m./s.
C =	0.6	
A =	0.1172	sq.m.
Radius =	0.1932	m.
Orifice Diameter =	386.3	mm
Use	**300**	**mm pipe**

Storage Calculations:

Storage system capacity stage-storage table on following pages

Pipe and Appurtenance Storage, 100-year Storm

High water elevation: 71.83

Pipe Storage:

From	To	Diameter	Length	Lower Invert	A (m2)	Volume
MH2	MH3	450	57.8	70.33	0.16	9.19
MH3	MH6	450	56.8	70.53	0.16	9.03
Building	MH6	300	29.5	70.91	0.07	2.09
CB4 CONN	CB4	200	10.1	71.07	0.03	0.32
MH6	MH7	375	40.0	70.87	0.11	4.42
MH7	CB5	200	31.6	71.17	0.03	0.99
Storage	MH4	450	9.3	70.63	0.16	1.48
MH4	MH5	300	48.0	71.09	0.07	3.39
CB8 CONN	CB8	200	29.8	71.18	0.03	0.94
MH4	MH9	450	57.3	70.79	0.16	9.11
MH9	DCB4	250	23.6	71.15	0.05	1.16
MH9	CB7	200	33.3	71.20	0.03	1.05
MH9	MH8	300	23.6	71.13	0.07	1.67
MH8	CB5	200	30.1	71.30	0.03	0.95
MH2	MH10	300	30.1	70.33	0.07	2.13
MH10	MH11	250	30.1	70.68	0.05	1.48
					Subtotal:	49.38

Appurtenances:

MH #	Top Elev	Invert	Diameter	Depth	Volume
MH2	72.52	70.33	1200	1.50	1.70
MH3	73.25	70.45	1200	1.38	1.56
MH4	73.48	70.72	1200	1.11	1.26
MH5	73.67	71.35	1200	0.48	0.54
MH6	73.40	70.81	1200	1.02	1.15
MH7	73.50	71.07	1200	0.76	0.86
MH8	73.50	71.24	1200	0.59	0.67
MH9	73.55	71.07	1200	0.76	0.86
MH10	72.47	70.63	1200	1.20	1.36
MH11	72.40	70.68	1200	1.15	1.30
				Subtotal:	11.25
			Total, Ponding, Pipes, and Appurtenances:		**60.64**
			(disregarding CB storage)		

APD Hawthorne GreenStorm
Stage Storage LW

Project Name	3149 Hawthorne Road									
Location	Ottawa, ON									
Date	November 3, 2021									
Chamber Model		GreenStorm-ST								
Number of Layers		2.0		Top Stone	0.15	m				
Height of Chambers		1.32	m	Bottom Stone	0.15	m				
Chamber Length		74.40		Perimeter Stone	0.15	m				
Chamber Width		4.00		Stone Qty	126.04	m^3				
Storage Void Ratio		0.96		Stone Void Ratio	40.00%					
System Perimeter		157.40								
System Area		321.21	m^2	Liner	Yes					
System Base Elevation		70.40	m							

Height of System		GreenStorm Volume		Stone Volume		Cumulative Storage Volume		Elevation		
mm	in	m^3	ft^3	m^3	ft^3	m^3	ft^3	m	ft	
1620	63.78	0.00	0.00	5.78	204.18	428.96	15,148.70	72.02	236.29	System Top
1575	62.01	0.00	0.00	3.21	113.43	423.18	14,944.51	71.98	236.14	
1550	61.02	0.00	0.00	3.21	113.43	419.97	14,831.08	71.95	236.06	
1525	60.04	0.00	0.00	3.21	113.43	416.76	14,717.65	71.93	235.97	
1500	59.06	0.00	0.00	3.21	113.43	413.55	14,604.21	71.90	235.89	
1475	58.07	14.28	504.46	0.47	16.68	410.33	14,490.78	71.88	235.81	
1425	56.10	7.14	252.23	0.24	8.34	395.58	13,969.64	71.83	235.65	Top of GreenStorm
1400	55.12	7.14	252.23	0.24	8.34	388.20	13,709.07	71.80	235.56	
1375	54.13	7.14	252.23	0.24	8.34	380.82	13,448.50	71.78	235.48	
1350	53.15	7.14	252.23	0.24	8.34	373.44	13,187.93	71.75	235.40	
1325	52.17	7.14	252.23	0.24	8.34	366.06	12,927.36	71.73	235.32	
1300	51.18	7.14	252.23	0.24	8.34	358.68	12,666.79	71.70	235.24	
1275	50.20	7.14	252.23	0.24	8.34	351.31	12,406.22	71.68	235.15	
1250	49.21	7.14	252.23	0.24	8.34	343.93	12,145.65	71.65	235.07	
1225	48.23	7.14	252.23	0.24	8.34	336.55	11,885.08	71.63	234.99	
1200	47.24	7.14	252.23	0.24	8.34	329.17	11,624.51	71.60	234.91	
1175	46.26	7.14	252.23	0.24	8.34	321.79	11,363.95	71.58	234.83	
1150	45.28	7.14	252.23	0.24	8.34	314.41	11,103.38	71.55	234.74	
1125	44.29	7.14	252.23	0.24	8.34	307.03	10,842.81	71.53	234.66	
1100	43.31	7.14	252.23	0.24	8.34	299.66	10,582.24	71.50	234.58	
1075	42.32	7.14	252.23	0.24	8.34	292.28	10,321.67	71.48	234.50	
1050	41.34	7.14	252.23	0.24	8.34	284.90	10,061.10	71.45	234.42	
1025	40.35	7.14	252.23	0.24	8.34	277.52	9,800.53	71.43	234.33	
1000	39.37	7.14	252.23	0.24	8.34	270.14	9,539.96	71.40	234.25	
975	38.39	7.14	252.23	0.24	8.34	262.76	9,279.39	71.38	234.17	
950	37.40	7.14	252.23	0.24	8.34	255.38	9,018.82	71.35	234.09	
925	36.42	7.14	252.23	0.24	8.34	248.01	8,758.25	71.33	234.01	
900	35.43	7.14	252.23	0.24	8.34	240.63	8,497.68	71.30	233.92	
875	34.45	7.14	252.23	0.24	8.34	233.25	8,237.11	71.28	233.84	
850	33.46	7.14	252.23	0.24	8.34	225.87	7,976.54	71.25	233.76	
825	32.48	7.14	252.23	0.24	8.34	218.49	7,715.98	71.23	233.68	
800	31.50	7.14	252.23	0.24	8.34	211.11	7,455.41	71.20	233.60	
775	30.51	7.14	252.23	0.24	8.34	203.74	7,194.84	71.18	233.51	
750	29.53	7.14	252.23	0.24	8.34	196.36	6,934.27	71.15	233.43	
725	28.54	7.14	252.23	0.24	8.34	188.98	6,673.70	71.13	233.35	
700	27.56	7.14	252.23	0.24	8.34	181.60	6,413.13	71.10	233.27	
675	26.57	7.14	252.23	0.24	8.34	174.22	6,152.56	71.08	233.19	
650	25.59	7.14	252.23	0.24	8.34	166.84	5,891.99	71.05	233.10	
625	24.61	7.14	252.23	0.24	8.34	159.46	5,631.42	71.03	233.02	
600	23.62	7.14	252.23	0.24	8.34	152.09	5,370.85	71.00	232.94	
575	22.64	7.14	252.23	0.24	8.34	144.71	5,110.28	70.98	232.86	
550	21.65	7.14	252.23	0.24	8.34	137.33	4,849.71	70.95	232.78	
525	20.67	7.14	252.23	0.24	8.34	129.95	4,589.14	70.93	232.69	
500	19.69	7.14	252.23	0.24	8.34	122.57	4,328.58	70.90	232.61	
475	18.70	7.14	252.23	0.24	8.34	115.19	4,068.01	70.88	232.53	
450	17.72	7.14	252.23	0.24	8.34	107.81	3,807.44	70.85	232.45	
425	16.73	7.14	252.23	0.24	8.34	100.44	3,546.87	70.83	232.37	
400	15.75	7.14	252.23	0.24	8.34	93.06	3,286.30	70.80	232.28	
375	14.76	7.14	252.23	0.24	8.34	85.68	3,025.73	70.78	232.20	
350	13.78	7.14	252.23	0.24	8.34	78.30	2,765.16	70.75	232.12	
325	12.80	7.14	252.23	0.24	8.34	70.92	2,504.59	70.73	232.04	
300	11.81	7.14	252.23	0.24	8.34	63.54	2,244.02	70.70	231.96	

Height of System		GreenStorm Volume		Stone Volume		Cumulative Storage Volume		Elevation		
mm	in	m^3	ft^3	m^3	ft^3	m^3	ft^3	m	ft	
275	10.83	7.14	252.23	0.24	8.34	56.17	1,983.45	70.68	231.87	
250	9.84	7.14	252.23	0.24	8.34	48.79	1,722.88	70.65	231.79	
225	8.86	7.14	252.23	0.24	8.34	41.41	1,462.31	70.63	231.71	
200	7.87	7.14	252.23	0.24	8.34	34.03	1,201.74	70.60	231.63	
175	6.89	7.14	252.23	0.24	8.34	26.65	941.17	70.58	231.55	
150	5.91	0.00	0.00	3.21	113.43	19.27	680.61	70.55	231.46	Bottom of GreenSto
125	4.92	0.00	0.00	3.21	113.43	16.06	567.17	70.53	231.38	
100	3.94	0.00	0.00	3.21	113.43	12.85	453.74	70.50	231.30	
75	2.95	0.00	0.00	3.21	113.43	9.64	340.30	70.48	231.22	
50	1.97	0.00	0.00	3.21	113.43	6.42	226.87	70.45	231.14	
25	0.98	0.00	0.00	3.21	113.43	3.21	113.43	70.43	231.05	
0	0.00	0.00	0.00	3.21	113.43	0.00	0.00	70.40	230.97	System Bottom

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Structural design Rigofill ST with QuadroControl

Box and QuadroControl including middle grid

Project data:

Project number	O-34981
Project	Hawthorne Road

The structural design is carried out according to the principle of Eurocode 7 (EC7) using partial safety factors for the effects and resistances.

Input values:

Object-specific data:

Number of layers of 0,66 m		=	2,0	
Cover above top of the tank	h	=	1,68	m
Tank invert level		=	3,00	m
Specific gravity of soil (Averaged)	γ_1	=	20,80	kN/m³
Specific gravity of soil under flotation	γ_2	=	10,00	kN/m³
Traffic load		=	HGV 60	
Permanent surface load	γ_3	=	0,00	kN/m²
Groundwater above bottom level		=	1,62	m
Soil friction angle	φ	=	28,00	°

General assumptions:

Partial load factor for variable effects	γ_Q	=	1,50
Partial load factor for permanent effects	γ_G	=	1,35
Material partial factor (ULS)	γ_M (ULS)	=	1,30

Partial factors on unit resistance:
(from BÜV-Empfehlungen)

Creep behaviour (ULS)	A_1 (ULS)	=	3,03
Chemical influence	A_2	=	1,00
Temperature influence	A_3	=	1,00
Inhomogenities	A_4	=	1,00
Dynamic factor	A_5	=	1,00

Structural designs:

Vertically ULS	$\frac{E_{d,Q}}{R_{d,kurz}} + \frac{E_{d,G}}{R_{d,a}}$	=	**0,59**	**≤**	**1**	**Proof provided**
Horizontally ULS	$\frac{E_{d,Q,h}}{R_{d,kurz}} + \frac{E_{d,G,h}}{R_{d,a}}$	=	**0,85**	**≤**	**1**	**Proof provided**

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Rigofill ST with QuadroControl, Proof of safety versus static uplift

(without additional provisions to prevent from uplift)

Project data:

Project number	O-34981
Project	Hawthorne Road

Input values:

Installation parameters

Height of the water column above the bottom of the tank	h_1	=	1,62	m
Height of the water column above the top of the tank	h_2	=	0,30	m
Height of cover above tank	h_3	=	1,68	m
Length of the base area	l	=	1,000	m
Width of the base area	b	=	1,000	m
Height of the tank	h_R	=	1,320	m
Specific gravity of soil	γ_B	=	21,74	kN/m³
Specific gravity with uplift force	γ_{BW}	=	10,00	kN/m³

Material properties

Specific grafity Rigofill ST with QuadroControl Box	$\gamma_{R,B}$	=	0,43	kN/m³
Specific grafity Rigofill ST with QuadroControl Half box	$\gamma_{R,Hb}$	=	0,59	kN/m³

Effect -Uplift force by displaced water:

Volume of displaced water	$V_W = l \cdot b \cdot (h_1 - h_2)$	V_W	=	1,32	m³
Weigth of displaced water	$G_W = V_W \cdot 10\ \mathrm{kN/m^3}$	G_W	=	13,200	kN
	$F_{dst} = G_W$	**F_{dst}**	**=**	**13,20**	**kN**

Resistance - Load on tank :

Base area	$A = l \cdot b$	A	=	1,00	m²
Volume of the soil under water over the tank	$V_{Wb} = A \cdot h_2$	V_{Wb}	=	0,30	m³
Specific gravity of the soil under water on the tank	$G_{Wb} = V_{Wb} \cdot \gamma_{BW}$	G_{Wb}	=	3,000	kN
Volume of the soil above the tank	$V_B = A_R \cdot (h_3 - h_2)$	V_B	=	1,38	m³
Specific gravity of the soil on the tank	$G_B = V_B \cdot \gamma_B$	G_B	=	30,000	kN
Weigt of the tank	$G_R = V_{R,B} \cdot \gamma_{R,B} + V_{R,Hb} \cdot \gamma_{R,Hb}$	G_R	=	0,779	kN
	$F_{st} = G_{Wb} + G_B + G_R$	**F_{st}**	**=**	**33,78**	**kN**

Proof:

Partial factor of effect	γ_F	=	1,05
Partial factor of resistance	γ_S	=	0,95

$$\frac{F_{dst} \cdot \gamma_F}{F_{st} \cdot \gamma_S} = \frac{13{,}86}{32{,}09} = \underline{0{,}43} < 1{,}00$$ **Proof provided**

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Annex with symbols

Symbols	Description
A	Base area
b	Width of the base area
F_{dst}	Effect -Uplift force by displaced water
F_{st}	Resistance - Load on tank
G_B	Specific gravity of the soil on the tank
G_R	Weigt of the tank
G_W	Weigth of displaced water
G_{Wb}	Specific gravity of the soil under water on the tank
h_1	Height of the water column above the bottom of the tank
h_2	Height of the water column above the top of the tank
h_3	Height of cover above tank
l	Length of the base area
V_B	Volume of the soil above the tank
$V_{R,B}$	Volume of the Rigofill Inspect Block
$V_{R,Hb}$	Volume of the Rigofill Inspect half block
V_W	Volume of displaced water
V_{Wb}	Volume of the soil under water over the tank
γ_B	Specific gravity of soil
γ_{Bw}	Specific gravity with uplift force
γ_F	Partial factor of effect
$\gamma_{R,B}$	Specific grafity Rigofill ST with QuadroControl Box
$\gamma_{R,Hb}$	Specific grafity Rigofill ST with QuadroControl Half box
γ_S	Partial factor of resistance

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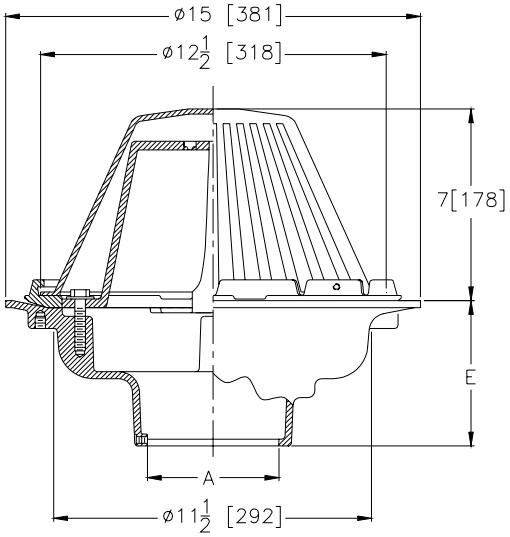
Z-105
CONTROL-FLO ROOF DRAIN
w/ Parabolic Weir

SPECIFICATION SHEET

TAG_____

Dimensional Data (inches and [mm]) are Subject to Manufacturing Tolerances and Change Without Notice



A Pipe Size Inches / [mm]	Approx. Wt. Lbs. / [kg]	Dome Open Area Sq. In. / [sq cm]
2 - 3 - 4 [51 - 76 - 102]	34 [15]	148 [955]

ENGINEERING SPECIFICATION: ZURN Z-105 "Control-Flo" roof drain for dead -level roof construction, Dura-Coated cast iron body. "Control-Flo" weir shall be linear functioning with integral membrane flashing clamp/gravel guard and Poly-Dome. All data shall be verified proportional to flow rates.

OPTIONS (Check/specify appropriate options)

PIPE SIZE

2,3,4 [50,75,100]
2,3,4 [50,75,100]
2,3,4 [50,75,100]
2,3,4 [50,75,100]

(Specify size/type) **OUTLET**

_____	IC	Inside Caulk
_____	IP	Threaded
_____	NH	No-Hub
_____	NL	Neo-Loc

E BODY HT. DIM.

5 1/4 [133]
3 3/4 [95]
5 1/4 [133]
4 5/8 [117]

PREFIXES

____	Z-	D.C.C.I. Body with Poly-Dome*
____	ZA-	D.C.C.I. Body with Aluminum Dome

SUFFIXES

_____	-A	Waterproof Flange
_____	-AR	Acid Resistant Epoxy Coated Finish
_____	-C	Underdeck Clamp
_____	-DP	Top Set® Roof Deck Plate (Replaces both the -C and -R)
_____	-DR	Adjustable Drain Riser Extension Assembly 3-5/8" [92] to 7-1/4" [184]
_____	-E	Static Extension 1 [25] thru 4 [102] (Specify Ht.)
_____	-EA	Adjustable Extension Assembly 1 3/4 [44] thru 3 1/2 [89]
_____	-EB	Elevating Body Plate
_____	-G	Galvanized Cast Iron
_____	-R	Roof Sump Receiver
_____	-VP	Vandal Proof Secured Top
_____	-90	90º Threaded Side Outlet Body

*REGULARLY FURNISHED UNLESS OTHERWISE SPECIFIED

REV. A DATE: 09/14/05 C.N. NO. 89837

DWG. NO. 63601 PRODUCT NO. Z-105

ZURN INDUSTRIES LIMITED ♦ 3544 Nashua Drive ♦ Mississauga, Ontario L4V 1L2 ♦ Phone: 905/405-8272 Fax: 905/405-1292
In the U.S.: ZURN INDUSTRIES, INC. ♦ SPECIFICATION DRAINAGE OPERATION ♦ 1801 Pittsburgh Ave. ♦ Erie, PA 16514
Phone: 814/455-0921 ♦ Fax: 814/454-7929 ♦ World Wide Web: www.zurn.com

Control-Flo Drain Selection Is Quick and Easy...

The exclusive Zurn “Selecta-Drain” Chart (pages 8—11) tabulates selection data for 34 localities in Canada. Proper use of this chart constitutes your best assurance of sure, safe, economical application of Zurn “Control-Flo” systems for your specific geographical area. If the “Selecta-Drain Chart does not cover your specific design criteria, contact Zurn Industries Limited, Mississauga, Ontario, for additional data for your locality. Listed below is additional information pertinent to proper engineering of the “Control-Flo” system.

ROOF USED AS TEMPORARY RETENTION

The key to economical “Control-Flo” is the utilization of large roof areas to temporarily store the maximum amount of water without overloading average roofs or creating excessive draindown time during periods of heavy rainfall. The data shown in the “Selecta-Drain” Chart enables the engineer to select notch area ratings from 232.25 m^2 (2,500 $ft.^2$) to 929m^2 (10,000 $ft.^2$) and to accurately predict all other design factors such as maximum roof load, L.P.M. (G.P.M.) discharge, draindown time and water depth at the drain. Obviously, as design factors permit the notch area rating to increase the resulting money saved in being able to use small leaders and drain lines will also increase.

ROOF LOADING AND RUN-OFF RATES

The four values listed in the “Selecta-Drain” Chart for notch area ratings for different localities will normally span the range of good design. If areas per notch below 232.25m^2 (2,500 $ft.^2$) are used considerable economy of the “Control-Flo” concept is being lost. The area per notch is limited to 929m^2 (10,000 $ft.^2$) to keep the draindown time within reasonable limits. Extensive studies show that stresses due to water load on a sloping roof for any fixed set of conditions are very nearly the same as those on a dead-level roof. A sloping roof tends to concentrate more water in the valleys and increase the water depth at this point. The greater depth around the drain leads to a faster run-off rate, particularly a faster early run -off rate. As a result, the total volume of water stored on the roof is less, and the total load on the sloping roof is less. By using the same area on the sloping roof as on the dead-level roof the increase in roof stresses due to increased water depth in the valleys is offset by the decrease in the total load due to less water stored. The net result of the maximum roof stress is approximately the same for any single span rise and fixed set of conditions. A fixed set of conditions, would be the same notch area, the same frequency store, and the same locality.

SPECIAL CONSIDERATIONS FOR STRUCTURAL SAFETY: Normal practice of roof design is based on 18kg (40 lbs.) per 929 cm^2 (sq ft.). (Subject to local codes and by-laws.) Thus it is extremely important that design is in accordance with normal load factors so deflection will be slight enough in any bay to prevent progressive deflection which could cause water depths to load the roof beyond its design limits.

ADDITIONAL NOTCH RATINGS

The ‘Selecta-Drain” Chart along with Tables I and II enables the engineer to select “Control-Flo” Drains and drain pipe sizes for most Canadian applications. These calculations are computed for a proportional flow weir that is sized to give a flow of 23 L.P.M. (5 G.P.M.) per inch of head. The 23 L.P.M. (5 G.P.M.) per inch of head notch opening is selected as the bases of design as it offers the most economical installation as applied to actual rainfall experienced in Canada.

Should you require design criteria for locations outside of Canada or for special project applications please contact Zurn Industries Limited, Mississauga, Ontario.

LEADER AND DRAIN PIPE SIZING

Since all data in the “Selecta-Drain” Chart is based on the 50-year-storm it is possible to exceed the water depth listed in these charts if a 100-year or 1000-year storm would occur. Therefore, for good design it is recommended that scuppers or other methods be used to limit water depth to the design depth and tables I and II be used to size the leaders and drain pipes. If the roof is capable of supporting more water than the design depth it is permissible to locate the scuppers or other overflow means at a height that will allow a greater water depth on the roof. However, in this case the leader and drain pipes should be sized to handle the higher flow rates possible based on a flow rate of 23 L.P.M. (5 G.P.M.) per inch of depth at the drain.

PROPER DRAIN LOCATION

The following good design practice is recommended for selecting the proper number of “Control-Flo” drains for a given area. **On dead-level roofs**, drains should be located no further than 15.25m (50 feet) from edge of roof and no further than 30.50m (100 feet) between drains. See diagram “A” page 2. **On sloping roofs**, drains should be located in the valleys at a distance no greater than 15.25m (50 feet) from each end of the valleys and no further than 30.50m (100 feet) between drains. See diagram “B” page 2. Compliance with these recommendations will assure good run off regardless of wind direction.

Storm Sewer Design Sheet

5 YearStorm

Site Location or Name: 3149 Hawthorne | min Tc: 10 | a= 998.071 | b= 6.053 | c= 0.814

City of Ottawa - Access Storage

Consultant EC²E | Prepared By M.Savoldelli | Checked By CC | Date 9-Aug-23 | File No D07-12-21-0198 | n= 0.013

Location			Drainage Data				Rational Design			Pipe Data			Analysis								EXT. INPUTS			VOLUME OF STORAGE/COVER								
										Nominal Diam						INVERTS																	
Street	From M.H.	To M.H.	A Area (ha)	R Runoff Coeff.	2.78AR	cummul 2.78AR	Tc (min)	I Rainfall Intensity (mm/hr)	Q Peak Flow (L/s)	Pipe Diam (mm)	Slope % m/m	Length (m)	Capacity (L/s)	Velocity (m/s)	Time in Section (min)	Upper Invert (m)	Min. Incr.(m)	Lower Invert (m)	Critical Slope % (m/m)	Critical Capacity @Slope L/s	Tc (min)	cummul 2.78AR	Add Base Q (L/s)	Rim Elev Upper (m)	MH Diam Upper (mm)	Type Upper	Cone Height Upper (mm)	Cone Diam Upper (mm)	Volume Grate Upper (m3)	Volume Pipe (m3)	Volume (m3)	Frost Protect Upper	Cover Obvert Upper (m)
	CB8	MH5-4	0.065	0.90	0.163	0.163	10.0	104	16.9	200	1.23%	29.8	37.9	1.17	0.4	71.55		71.18	1.53%	42.3			0.0	73.750		CB			0.0	1.0	1.0		2.000
	MH5	MH4	0.185	0.83	0.427	0.589	10.0	104	61.4	300	1.00%	48.0	100.9	1.38	0.6	71.35		70.87	1.34%	116.7			0.0	73.670	1200	MH			2.3	3.5	5.8		2.015
	CB6	MH8	0.110	0.87	0.266	0.266	10.0	104	27.7	200	1.10%	30.1	35.9	1.11	0.5	71.57		71.24	1.53%	42.3			0.0	73.850		CB			0.0	1.0	1.0		2.072
	MH8	MH9	0.065	0.90	0.163	0.429	10.0	104	44.7	300	0.48%	23.6	69.9	0.96	0.4	71.24		71.13	1.34%	116.7			0.0	73.500	1200				2.2	1.7	3.9		1.952
	CB7	MH9	0.113	0.88	0.276	0.276	10.0	104	28.8	200	1.44%	33.3	41.1	1.27	0.4	71.68		71.20	1.53%	42.3			0.0	73.880		CB			0.0	1.1	1.1		1.997
	DCB4	MH9	0.239	0.84	0.558	0.558	10.0	104	58.2	250	1.39%	23.6	73.1	1.44	0.3	71.48		71.15	1.42%	74.0			0.0	73.680		DCB			0.0	1.2	1.2		1.948
	MH9	MH4	0.134	0.90	0.335	1.599	10.5	102	162.8	450	0.49%	57.3	208.2	1.27	0.8	71.07		70.79	1.17%	321.5			0.0	73.550	1200				2.3	9.4	11.7		2.022
	CB14	MH4	0.045	0.83	0.104	0.104	10.0	104	10.8	200	1.00%	3.0	34.2	1.06	0.0	71.22		71.19	1.53%	42.3			0.0	73.420		CB			0.0	0.1	0.1		1.997
	MH4	STORAGE	0.000	0.90	0.000	2.292	10.8	100	230.0	450	1.00%	9.3	297.4	1.81	0.1	70.72		70.63	1.17%	321.5			0.0	73.480	1200				2.6	1.5	4.1		2.300
	CB10	STORAGE	0.059	0.90	0.148	0.148	10.0	104	15.4	200	1.64%	28.1	43.8	1.35	0.3	71.29		70.83	1.53%	42.3			0.0	73.490		CB			0.0	0.9	0.9		1.996
	CB15	STORAGE	0.052	0.84	0.121	0.121	10.0	104	12.7	200	3.00%	1.0	59.3	1.83	0.0	71.12		71.09	1.53%	42.3			0.0	73.320		CB			0.0	0.0	0.0		1.997
	CB11	STORAGE	0.051	0.90	0.128	0.128	10.0	104	13.3	200	1.64%	28.1	43.8	1.35	0.3	71.29		70.83	1.53%	42.3			0.0	73.490		CB			0.0	0.9	0.9		1.996
	CB16	STORAGE	0.052	0.87	0.126	0.126	10.0	104	13.1	200	3.00%	1.0	59.3	1.83	0.0	71.12		71.09	1.53%	42.3			0.0	73.290		CB			0.0	0.0	0.0		1.967
	CB12	STORAGE	0.063	0.90	0.158	0.158	10.0	104	16.4	200	1.64%	28.1	43.8	1.35	0.3	71.29		70.83	1.53%	42.3			0.0	73.490		CB			0.0	0.9	0.9		1.996
	CB17	STORAGE	0.045	0.87	0.109	0.109	10.0	104	11.3	200	3.00%	1.0	59.3	1.83	0.0	71.12		71.09	1.53%	42.3			0.0	73.180		CB			0.0	0.0	0.0		1.857
	CB4	MH7-MH6	0.115	0.87	0.278	0.278	10.0	104	29.0	200	1.14%	33.4	36.5	1.13	0.5	71.47		71.09	1.53%	42.3			0.0	73.720		CB			0.0	1.1	1.1		2.046
	CB3	MH7-MH6	0.060	0.90	0.150	0.150	10.0	104	15.6	200	3.00%	1.0	59.3	1.83	0.0	71.12		71.09	1.53%	42.3			0.0	73.500		CB			0.0	0.0	0.0		2.177
	CB5	MH7	0.113	0.87	0.273	0.273	10.0	104	28.5	200	1.25%	32.8	38.3	1.18	0.5	71.58		71.17	1.53%	42.3			0.0	73.780		CB			0.0	1.1	1.1		1.997
	MH7	MH6	0.065	0.90	0.163	0.864	10.5	102	88.0	375	0.50%	40.0	129.3	1.13	0.6	71.07		70.87	1.24%	203.8			0.0	73.500	1200				2.3	4.6	6.9		2.049
	BLDG	MH6	0.147	0.90	0.368	0.368	10.0	104	118.9	300	2.00%	29.5	142.7	1.96	0.3	71.50		70.91	1.34%	116.7	RWL 5YR FLOW		80.6	73.500	(IN ENCLOSED LOADING DOCK)				0.0	2.2	2.2		1.695
	MH6	STORAGE	0.000	0.00	0.000	1.232	11.1	99	121.9	450	0.50%	56.8	210.3	1.28	0.7	71.12		70.84	1.17%	321.5			0.0	73.400	1200				2.1	9.3	11.4		1.823
	MH11	MH10	0.115	0.56	0.179	0.179	10.0	104	18.7	250	0.40%	60.0	39.2	0.77	1.3	71.41		71.17	1.42%	74.0			0.0	72.400	1200				0.8	3.0	3.9	FROST	0.736
	CB1	MH10-MH2	0.039	0.20	0.022	0.022	10.0	104	2.3	200	3.00%	2.3	59.3	1.83	0.0	70.74		70.67	1.53%	42.3			0.0	72.400		CB			0.0	0.1	0.1	FROST	1.457
	MH10	MH2	0.042	0.23	0.027	0.228	11.3	98	22.3	300	0.40%	62.3	63.8	0.87	1.2	70.58		70.33	1.34%	116.7			0.0	72.470	1200				1.8	4.5	6.3	FROST	1.586
	MH3	MH2	450mm STM CONTROLLED BY 300mm ORIFICE PIPE D/S OF MH2 WITH UPSTREAM STORAGE																												65.6		

0.77 Minimum Velocity m/s

v>1.5 m/s 1.96 Maximum Velocity m/s

1.974 (ha) Total Area (excludes external areas downstream of headwall)

Indicates calculated cell, do not change

Indicates input cell, value required

Indicates input cell for MH, names must match exactly

EC²E

Storm Sewer Design Sheet

2 YearStorm

Site Location or Name: 3149 Hawthorne | min Tc: 10 | a= 732.951 | b= 6.199 | c= 0.81

City of Ottawa - Access Storage

Consultant EC²E | Prepared By M.Savoldelli | Checked By CC | Date 9-Aug-23 | File No D07-12-21-0198 | n= 0.013

Location			Drainage Data				Rational Design			Pipe Data			Analysis							EXT. INPUTS			VOLUME OF STORAGE/COVER								
										Nominal Diam						INVERTS															
Street	From M.H.	To M.H.	A Area (ha)	R Runoff Coeff.	2.78AR	cummul 2.78AR	Tc (min)	I Rainfall Intensity (mm/hr)	Q Peak Flow (L/s)	Pipe Diam (mm)	Slope % m/m	Length (m)	Capacity (L/s)	Velocity (m/s)	Time in Section (min)	Upper Invert (m)	Min. Incr.(m)	Lower Invert (m)	Critical Slope % (m/m)	Critical Capacity @Slope L/s	Tc (min)	cummul 2.78AR	Add Base Q (L/s)	Rim Elev Upper (m)	MH Diam Upper (mm)	Type Upper	Cone Height Upper (mm)	Cone Diam Upper (mm)	Volume Grate Upper (m3)	Volume Pipe (m3)	Volume (m3)	Frost Protect Upper	Cover Obvert Upper (m)
	CB8	MH5-4	0.065	0.90	0.163	0.163	10.0	77	12.5	200	1.23%	29.8	37.9	1.17	0.4	71.55		71.18	1.53%	42.3			0.0	73.750		CB			0.0	1.0	1.0		2.000
	MH5	MH4	0.185	0.83	0.427	0.589	10.0	77	45.3	300	1.00%	48.0	100.9	1.38	0.6	71.35		70.87	1.34%	116.7			0.0	73.670	1200	MH			2.3	3.5	5.8		2.015
	CB6	MH8	0.110	0.87	0.266	0.266	10.0	77	20.4	200	1.10%	30.1	35.9	1.11	0.5	71.57		71.24	1.53%	42.3			0.0	73.850		CB			0.0	1.0	1.0		2.072
	MH8	MH9	0.065	0.90	0.163	0.429	10.0	77	32.9	300	0.48%	23.6	69.9	0.96	0.4	71.24		71.13	1.34%	116.7			0.0	73.500	1200				2.2	1.7	3.9		1.952
	CB7	MH9	0.113	0.88	0.276	0.276	10.0	77	21.2	200	1.44%	33.3	41.1	1.27	0.4	71.68		71.20	1.53%	42.3			0.0	73.880		CB			0.0	1.1	1.1		1.997
	DCB4	MH9	0.239	0.84	0.558	0.558	10.0	77	42.9	250	1.39%	23.6	73.1	1.44	0.3	71.48		71.15	1.42%	74.0			0.0	73.680		DCB			0.0	1.2	1.2		1.948
	MH9	MH4	0.134	0.90	0.335	1.599	10.5	75	120.1	450	0.49%	57.3	208.2	1.27	0.8	71.07		70.79	1.17%	321.5			0.0	73.550	1200				2.3	9.4	11.7		2.022
	CB14	MH4	0.045	0.83	0.104	0.104	10.0	77	8.0	200	1.00%	3.0	34.2	1.06	0.0	71.22		71.19	1.53%	42.3			0.0	73.420		CB			0.0	0.1	0.1		1.997
	MH4	STORAGE	0.000	0.90	0.000	2.292	10.8	74	169.7	450	1.00%	9.3	297.4	1.81	0.1	70.72		70.63	1.17%	321.5			0.0	73.480	1200				2.6	1.5	4.1		2.300
	CB10	STORAGE	0.059	0.90	0.148	0.148	10.0	77	11.3	200	1.64%	28.1	43.8	1.35	0.3	71.29		70.83	1.53%	42.3			0.0	73.490		CB			0.0	0.9	0.9		1.996
	CB15	STORAGE	0.052	0.84	0.121	0.121	10.0	77	9.3	200	3.00%	1.0	59.3	1.83	0.0	71.12		71.09	1.53%	42.3			0.0	73.320		CB			0.0	0.0	0.0		1.997
	CB11	STORAGE	0.051	0.90	0.128	0.128	10.0	77	9.8	200	1.64%	28.1	43.8	1.35	0.3	71.29		70.83	1.53%	42.3			0.0	73.490		CB			0.0	0.9	0.9		1.996
	CB16	STORAGE	0.052	0.87	0.126	0.126	10.0	77	9.7	200	3.00%	1.0	59.3	1.83	0.0	71.12		71.09	1.53%	42.3			0.0	73.290		CB			0.0	0.0	0.0		1.967
	CB12	STORAGE	0.063	0.90	0.158	0.158	10.0	77	12.1	200	1.64%	28.1	43.8	1.35	0.3	71.29		70.83	1.53%	42.3			0.0	73.490		CB			0.0	0.9	0.9		1.996
	CB17	STORAGE	0.045	0.87	0.109	0.109	10.0	77	8.4	200	3.00%	1.0	59.3	1.83	0.0	71.12		71.09	1.53%	42.3			0.0	73.180		CB			0.0	0.0	0.0		1.857
	CB4	MH7-MH6	0.115	0.87	0.278	0.278	10.0	77	21.4	200	1.14%	33.4	36.5	1.13	0.5	71.47		71.09	1.53%	42.3			0.0	73.720		CB			0.0	1.1	1.1		2.046
	CB3	MH7-MH6	0.060	0.90	0.150	0.150	10.0	77	11.5	200	3.00%	1.0	59.3	1.83	0.0	71.12		71.09	1.53%	42.3			0.0	73.500		CB			0.0	0.0	0.0		2.177
	CB5	MH7	0.113	0.87	0.273	0.273	10.0	77	21.0	200	1.25%	32.8	38.3	1.18	0.5	71.58		71.17	1.53%	42.3			0.0	73.780		CB			0.0	1.1	1.1		1.997
	MH7	MH6	0.065	0.90	0.163	0.864	10.5	75	64.9	375	0.50%	40.0	129.3	1.13	0.6	71.07		70.87	1.24%	203.8			0.0	73.500	1200				2.3	4.6	6.9		2.049
	BLDG	MH6	0.147	0.90	0.368	0.368	10.0	77	108.8	300	2.00%	29.5	142.7	1.96	0.3	71.50		70.91	1.34%	116.7	RWL 5YR FLOW		80.6	73.500	(IN ENCLOSED LOADING DOCK)				0.0	2.2	2.2		1.695
	MH6	STORAGE	0.000	0.00	0.000	1.232	11.1	73	89.9	450	0.50%	56.8	210.3	1.28	0.7	71.12		70.84	1.17%	321.5			0.0	73.400	1200				2.1	9.3	11.4		1.823
	MH11	MH10	0.115	0.56	0.179	0.179	10.0	77	13.8	250	0.40%	60.0	39.2	0.77	1.3	71.41		71.17	1.42%	74.0			0.0	72.400	1200				0.8	3.0	3.9	FROST	0.736
	CB1	MH10-MH2	0.039	0.20	0.022	0.022	10.0	77	1.7	200	3.00%	2.3	59.3	1.83	0.0	70.74		70.67	1.53%	42.3			0.0	72.400		CB			0.0	0.1	0.1	FROST	1.457
	MH10	MH2	0.042	0.23	0.027	0.228	11.3	72	16.4	300	0.40%	62.3	63.8	0.87	1.2	70.58		70.33	1.34%	116.7			0.0	72.470	1200				1.8	4.5	6.3	FROST	1.586
	MH3	MH2	450mm STM CONTROLLED BY 300mm ORIFICE PIPE D/S OF MH2 WITH UPSTREAM STORAGE																														

1.974 (ha) Total Area (excludes external areas downstream of headwall) | 0.77 Minimum Velocity m/s

Indicates calculated cell, do not change | v>1.5 m/s | 1.96 Maximum Velocity m/s

Indicates input cell, value required

Indicates input cell for MH, names must match exactly

Appendix C: Water Quality Calculations

CB Shield Effectiveness Calculations

INLET	DRAINAGE AREA m2	DRAINAGE AREA Ha	LS m2	PAVED m2	RUNOFF COEFF. C	CB SHIELD REMOVAL	CB TOP	PONDING ELEV'N	PONDING DEPTH
DCB1	645.89	0.065	97.8	548.06	0.79	54%	72.44	72.59	0.15
DCB2	849.52	0.085	31.9	817.58	0.87	52%	73.05	73.1	0.05
DCB3	1471.51	0.147	0.0	1471.51	0.90	49%	73.14	73.4	0.26
CB3	598.48	0.060	0.0	598.48	0.90	53%	73.5	73.58	0.08
CB4	1145.87	0.115	47.6	1098.31	0.87	50%	73.72	73.9	0.18
CB5	1127.78	0.113	47.7	1080.12	0.87	50%	73.78	73.95	0.17
CB6	1097.64	0.110	49.3	1048.34	0.87	50%	73.85	73.99	0.14
CB7	1133.07	0.113	40.1	1092.97	0.88	50%	73.88	74.03	0.15
DCB4	2390.67	0.239	196.1	2194.6	0.84	44%	73.68	73.78	0.10
CB MH7	658.25	0.066	0.0	658.25	0.90	53%	73.5	73.62	0.12
CB MH8	646.14	0.065	0.0	646.14	0.90	53%	73.5	73.62	0.12
CB MH9	715.94	0.072	0.0	715.94	0.90	52%	73.55	73.66	0.11
CB8	647.51	0.065	0.0	647.51	0.90	53%	73.75	73.83	0.08
CB9	622.61	0.062	0.0	622.61	0.90	53%	73.55	73.66	0.11
CB10	591.11	0.059	0.0	591.11	0.90	53%	73.49	73.62	0.13
CB11	512.21	0.051	0.0	512.21	0.90	53%	73.49	73.63	0.14
CB12	631.2	0.063	0.0	631.2	0.90	53%	73.49	73.63	0.14
CB MH5	1421.19	0.142	146.2	1274.99	0.83	48%	73.67	73.81	0.14
CB13	427.15	0.043	42.2	384.95	0.83	55%	73.56	73.65	0.09
CB14	448.89	0.045	46.7	402.19	0.83	55%	73.42	73.42	0.00
CB15	519.02	0.052	46.6	472.42	0.84	55%	73.32	73.41	0.09
CB16	524.53	0.052	22.9	501.63	0.87	54%	73.29	73.41	0.12
CB17	445.95	0.045	18.8	427.18	0.87	54%	73.18	73.32	0.14
CB1	388.8	0.039	388.8	0	0.20	56%	72.4	72.75	0.35
CB MH10	421.2	0.042	402.7	18.5	0.23	56%	72.47	72.89	0.42
CB MH11	1554.91	0.155	764.6	790.28	0.56	50%	72.4	72.95	0.55
ALL CATCHBASINS TO BE EQUIPPED WITH CB-SHIELD (SEE CS-201)									

Average: 52%

Zone	Area	% of Total Area	Effective TSS Removal	% Removal Over Site
Roof	4483.0	17.2%	80%	14%
Paved	18765.4	72.0%	52%	38%
Landscaped	2829.9	10.9%	80%	9%
	26078.2			60%
Upstream OGS			50%	20%
				80%

Appendix D: Domestic and Fire Flow Calculations

Fire Flows

Building Area:

Basement	0.0	sq.m.	
First Floor	4100.0	sq.m.	
Second Floor	4483.0	sq.m.	
Third Floor	4483.0	sq.m.	
Fourth Floor	4483.0	sq.m.	
Total:	17549.0	sq.m.	
Largest Floor (consider 3rd floor):	4483.0	sq.m.	
25% of Area of Floor Above:	1120.8	sq.m.	(vertical communications 1hr+ rating)
25% of Area of Floor Below:	1120.8	sq.m.	(vertical communications 1hr+ rating)
Adjusted Floor Area:	**6724.5**	**sq.m.**	

Fire Flow Requirements:

Using *Fire Underwriters Survey*, "Water Supply for Public Fire Protection, 2020" method

	Building A		
Floor Area:	6724.5	sq.m.	
Required Flow (RFF):	$=220C\sqrt{A}$		
Construction coefficient, C			
Factor Used:	80%		Type II Noncombustible Construction
Construction Adjusted Required Flow (RFF):	14432.5	l/min.	

Additional Adjustment Factors:

Contents/Occupancy Fire Hazard

Factor Used:	15%		Storage rooms medium hazard, free burning
Adjustment:	+2164.9		
Occupancy Adjusted Flow:	16597.4	l/min.	
Sprinkler Reduction			
Factor Used:	50%		Fully supervised system to NFPA13 and standard water supply
Adjustment:	-8298.7		
Occupancy Adjusted Flow:	8298.7	l/min.	

Proximity to Other Structures - Type II			
Factor Used, front:	0%		
Factor Used, left (west) side:	0%		
Factor Used, right (east) side:	8%	19.4m,	LH factor 47*3*2=282
Factor Used, front (north) side:	0%		
Factor Used, rear (south) side:	0%		
Summed factor:	8%		
Proximity Factor Used (75% max.):	8%		
Adjustment:	+663.9		
Proximity Adjusted Flow:	8962.6	l/min.	
Final Adjusted Required Flow:	**9000.0**	**l/min.**	
	150.000	*l/s*	

Domestic Flows

Site Area:	2.607822	Ha		
Site Use:	Light Industrial			
Average Day Demand:	35000	l/Ha/day		
Max. Day Factor:	1.50			
Peak Hour Factor:	1.80	(from City Table 4-2)		
Domestic Demand/minute:				
Average Daily Demand	63.4	liters per minute or	1.06	l/s
Maximum Daily Demand:	95.1	liters per minute or	1.58	l/s
Peak Hour Demand:	114.1	liters per minute or	1.90	l/s
Fire Flow (from above):	9000.0	liters per minute or	150.00	l/s
Max day plus fire	9095.1	liters per minute or	151.58	l/s

From: Cassidy, Tyler
To: Mauro Savoldelli
Subject: RE: Access Storage 3149 & 3169 Hawthorne Rd. - Water Service Boundary Conditions
Date: Thursday, February 23, 2023 6:42:56 PM
Attachments: 3149, 3169 Hawthorne Road February 2023.pdf

Hi Mauro,

Please find the boundary conditions for 3149 & 3169 Hawthorne Road below:

The following are boundary conditions, HGL, for hydraulic analysis at 3149, 3169 Hawthorne (zone 2W2C) assumed to be connected to the 406 mm on Hawthorne Road (see attached PDF for location) with dual connection and separation valve in-between.

Minimum HGL = 123.8 m

Maximum HGL = 130.0 m

MaxDay + FireFlow (150 L/s) = 124.5 m

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.

Please let me know if you have any other questions.

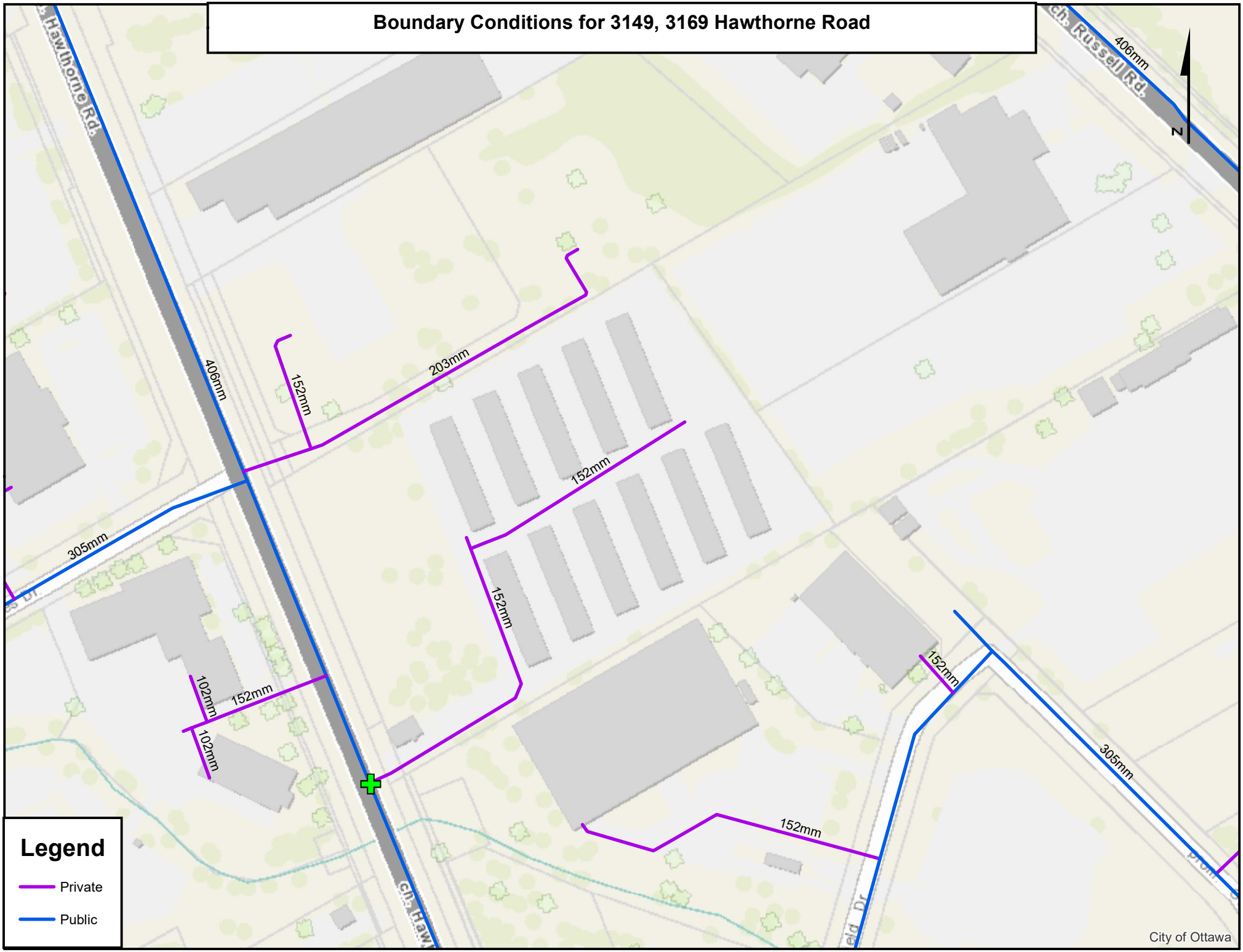
Thank you,

Tyler Cassidy, P.Eng
Infrastructure Project Manager,
Planning, Real Estate and Economic Development Department / Direction générale de la planification, des biens immobiliers et du développement économique - South Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 12977, Tyler.Cassidy@ottawa.ca

From: Cassidy, Tyler
Sent: February 22, 2023 4:43 PM
To: Mauro Savoldelli <mauro@ec2e.ca>
Subject: RE: Access Storage 3149 & 3169 Hawthorne Rd. - Water Service Boundary Conditions

Hi Mauro,

Boundary Conditions for 3149, 3169 Hawthorne Road



Appendix E: Wastewater Flow Calculations

Area:	2.608	Ha
Flow	35000	l/Ha/day (Fig. 4.3)
or	91274	l/day
or	1.056	l/s
Peaking factor	5.4	(Light Industrial, Appendix 4-B)
Infiltration:	0.28	l/s/Ha (Fig. 4.4)
	0.73019	l/s

Total Sanitary Flow:

Q= Eq. Flow*Peaking Factor+Infiltration

Q= 6.43 l/s

EC²E

CITY OF OTTAWA

SANITARY SEWER DESIGN SHEET

Date: 9-Aug-23

Designed by: MS

Checked by: CC

Project: **Access Storage**

Location: ***3149 Hawthorne Road***

Population: Residential Low Density 55 ppha
Residential High Density 135 ppha
Commercial 50000 l/Ha/day
Industrial 35000 l/Ha/day

Peaking factor: Residential: 4.0 max
Commercial & Industrial: per MOE graph
Combined Land Use: 1.5

PF minimum: 2

Average Daily Per Capita Flow: 350 l/p/d

Infiltration: 0.28 l/s/ha n= 0.013

	Manhole		Length (m)	Tributary Area (Ha)							Tributary Flow (l/s)							Average (l/s) Total	Peaking Factor PF	Max. (l/s)	Infilt-ration (l/s)	Max. Flow Expect. (l/s)	SEWER					
				Increment							Increment												Size Dia. (mm)	Slope (%)	Q (l/s)	Q / Qfull	V (m/s)	
STREET	From	To		Res. LD	Res. HD	Comm.	Ind.	Park	Total	Cumul.	Res. LD	Res. HD	Comm.	Ind.	Park	Total	Cumul.										Actual Flow	Full Flow
Building Connect.	Conn	MH1	20.5				2.61		2.61	2.61	0	0	0	1.06	0	1.06	1.06	1.056	5.400	5.7	0.730	6.44	150	1.00%	15.9	*41%*	0.87	1.11
Hawthorne	MH1	MH 206	19.3				0.00		0.00	2.61	0	0	0	0	0	0	1.06	1.056	5.400	5.7	0.730	6.44	150	2.00%	22.5	*29%*	1.23	1.58

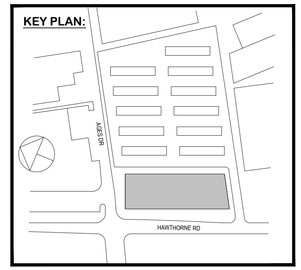
Appendix F: Site Servicing, Grading, and Drainage Plans

Provided for convenience and not for construction. Refer to full set of engineering drawings for construction purposes.

Pavement Layer	Compaction	Light Duty Paving	Heavy Duty Paving
Asphalt Layer (PG58-34)	92-97% MRD	65mm HL/SP 12.5 Cat. B3	40mm HL3/SP12.5 Cat B 50mm HL8/SP12.5 Cat B
OPSS 1010 Granular A	100% SPMDD	150mm	150mm
OPSS 1010 Granular B Sub-Base, Type II	100% SPMDD	450mm	600mm

NOTE:
THIS DRAWING TO BE READ IN CONJUNCTION WITH STANDARD DETAILS AND NOTES ON DRAWING CS-201 AND CS-202 FOR THIS PROJECT

KEY PLAN:



NOTES:

SITE PLAN:

1. THE GENERAL CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AND REPORT ALL ERRORS AND OMISSIONS IMMEDIATELY TO THE ENGINEER.
2. INFORMATION SHOWN HEREON REGARDING THE SIZE AND LOCATION OF EXISTING SERVICES AND/OR UTILITIES IS FURNISHED AS THE BEST AVAILABLE INFORMATION AND SHALL BE INTERPRETED AS THE CONTRACTOR SEES FIT WITH THE UNDERSTANDING THAT THE OWNER AND EDILESSE CONSULTING CIVIL ENGINEERS LTD. OR ITS AGENTS DISCLAIM ALL RESPONSIBILITY FOR ITS SUFFICIENCY AND/OR ACCURACY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AT ITS OWN EXPENSE, LOCATES OF ALL UTILITIES.
3. AT ALL ENTRANCES TO THE SITE THE MUNICIPAL CURB AND SIDEWALK WILL BE CONTINUOUS THROUGH THE DRIVEWAY. THE DRIVEWAY GRADE WILL BE COMPATIBLE WITH THE EXISTING SIDEWALK AND CURB DEPRESSION WILL BE PROVIDED FOR EACH ENTRANCE, AS PER MUNICIPAL STANDARDS.
4. TOPSOIL TO BE STRIPPED. CLEAN FILL TO BE PLACED AND COMPACTED TO 95% STD. PROCTOR DENSITY. GRANULAR MATERIAL TO BE COMPACTED TO 100% STD. PROCTOR DENSITY.
5. ALL GRADES TO BE WITHIN 1:4 MAX. SLOPE AT PROPERTY LINE AND WITHIN THE SITE.
6. ALL UNDERGROUND SERVICE MATERIALS AND INSTALLATIONS TO BE IN ACCORDANCE WITH THE LATEST O.B.C., MUNICIPAL AND OTHER REGULATORY STANDARDS AND CODES.
7. ALL SURFACE DRAINAGE SHALL BE SELF CONTAINED, COLLECTED AND DISCHARGED AT A LOCATION TO BE APPROVED PRIOR TO THE ISSUANCE OF A BUILDING PERMIT.
8. CONTINUOUS CONCRETE CURB TO BE PROVIDED BETWEEN LANDSCAPED AREAS AND ASPHALT PAVING EXCEPT AS NOTED.
9. ALL DISTURBED AREAS TO BE RESTORED TO THE SATISFACTION OF THE CITY OF OTTAWA, INCLUDING EXISTING CONCRETE CURB, TOPSOIL AND SODDED BOULEVARDS.
10. CLAY SEALS TO BE INSTALLED AS PER CITY STANDARD DRAWING S8. THE SEALS SHOULD BE AT LEAST 1.5M LONG (IN THE TRENCH DIRECTION) AND SHOULD EXTEND FROM TRENCH WALL TO TRENCH WALL. GENERALLY, THE SEALS SHOULD EXTEND FROM THE FROST LINE AND FULLY PENETRATE THE BEDDING, SUBBEDDING AND COVER MATERIAL. THE BARRIERS SHOULD CONSIST OF RELATIVELY DRY AND COMPACTABLE BROWN SILTY CLAY PLACED IN MAXIMUM 225MM THICK LOOSE LAYERS COMPACTED TO A MINIMUM OF 95% OF THE MATERIAL'S SPMDD. THE CLAY SEALS SHOULD BE PLACED AT THE SITE BOUNDARIES AND AT STRATEGIC LOCATIONS AT NO MORE THAN 60M INTERVALS IN THE SERVICE TRENCHES. FOR DETAILS REFER TO GEOTECHNICAL INVESTIGATION

FIRE DEPARTMENT:

1. FIRE ROUTE WILL BE DESIGNATED AS PER LOCAL BY LAW, AS AMENDED, PRIOR TO OCCUPANCY OF THE BUILDINGS.
2. ACCESS ROUTES TO BE DESIGNED TO SUPPORT A LOAD OF NOTE LESS THAN 11,363 KG PER AXLE AND HAVE A CHANGE IN GRADIENT OF NOT MORE THAN 1 IN 12.5 OVER A MINIMUM DISTANCE OF 15.0 M.
3. ALL 12.0 M TURNING RADII HAVE MIN. CLEARANCE OF 3.0 M BETWEEN THE CENTRE AND ANY CURB OR PART OF BUILDING.

STORM SEWERS:

1. ALL CONCRETE SEWER PIPES SHALL HAVE RUBBER GASKET JOINTS.
2. THE PIPE SUBGRADE MATERIAL IS ANTICIPATED TO BE CLAY. PER GEOTECHNICAL INVESTIGATION, PIPE BEDDING TO BE 300 MM THICK OPSS 1010 GRANULAR 'B' TYPE II SUB-BEDDING MATERIAL OVERLAIN BY 150 MM THICK OPSS 1010 GRANULAR 'A' BEDDING MATERIAL, COMPACTED TO AT LEAST 98 PERCENT SPMDD.
3. TRENCH BASE STABILIZATION TECHNIQUES, INCLUDING REMOVAL OF LOOSE/SOFT MATERIAL, PLACEMENT OF CRUSHED STONE SUB-BEDDING (GRANULAR B TYPE II), COMPLETELY WRAPPED IN A NON-WOVEN GEOTEXTILE, MAY BE USED IF TRENCH BASE DISTURBANCE BECOMES A PROBLEM IN WET OR SOFT AREAS.
4. IF THE BACKFILL FOR THE SERVICE TRENCHES WILL CONSIST OF GRANULAR FILL, CLAY SEALS SHOULD BE INSTALLED IN THE SERVICE TRENCHES AT SELECT INTERVALS AS PER CITY OF OTTAWA DRAWING NO. S8. THE SEALS SHOULD BE 1 M WIDE, EXTEND OVER THE ENTIRE TRENCH WIDTH AND FROM THE BOTTOM OF THE TRENCH TO THE UNDERSIDE OF THE PAVEMENT STRUCTURE. CLAY TO BE COMPACTED TO 95 PERCENT SPMDD.
5. UNDERGROUND SERVICES SHOULD BE INSTALLED IN SHORT OPEN TRENCH SECTIONS THAT ARE EXCAVATED AND BACKFILLED THE SAME DAY. ALL SEWERS SHALL BE CONSTRUCTED WITH BEDDING IN ACCORDANCE WITH CITY STD. 751, CL. 'B', UNLESS OTHERWISE NOTED.
6. ALL WORKS SHALL BE CONSTRUCTED IN ACCORDANCE WITH CURRENT CITY OF OTTAWA STANDARDS AND SPECS.
7. SINGLE CATCHBASIN LEADS TO BE 200 MM UNLESS OTHERWISE NOTED. DOUBLE CATCHBASIN LEADS TO BE 250 MM UNLESS OTHERWISE NOTED. ALL CATCHBASIN LEADS TO BE C-14-ES MINIMUM.
8. ALL BACKFILL FOR SEWERS, WATERMAINS AND UTILITIES ON THE ROAD ALLOWANCE MUST BE MECHANICALLY COMPACTED TO 95% STANDARD PROCTOR DENSITY.

SANITARY SEWERS:

1. ALL SANITARY SEWER MATERIALS AND CONSTRUCTION METHODS MUST CORRESPOND TO CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS.
2. SANITARY SEWERS AND CONNECTIONS 150mm DIA. AND SMALLER TO BE P.V.C. SDR-28 SANITARY SEWERS AND CONNECTIONS 200mm DIA. AND LARGER TO BE P.V.C. SDR-35, ASTM D3034-81, OR LATEST AMENDMENT, WITH BEDDING AS NOTED ABOVE IN STORM SEWER SECTION EXCEPT AT RISERS, UNLESS OTHERWISE NOTED.

WATERMAINS:

1. ALL WATERMAINS AND WATER SERVICE MATERIALS AND CONSTRUCTION METHODS MUST CORRESPOND TO CURRENT CITY, REGION, FIRE DEPARTMENT, AND BUILDING CODE STANDARDS AND SPECIFICATIONS.
2. WATERMAINS MUST HAVE A MIN. VERTICAL CLEARANCE OF 0.25m OVER AND 0.50m UNDER SEWERS AND ALL OTHER UTILITIES WHEN CROSSING.
3. WATERMAINS AND/OR WATER SERVICES ARE TO HAVE A MIN. COVER OF 1.7m AND A MIN. HORIZONTAL SPACING OF 1.2m FROM THEMSELVES AND OTHER UTILITIES.
4. WATERMAINS TO BE INSTALLED TO GRADE AS SHOWN ON APPROVED SITE PLAN, COPY OF GRADE SHEET MUST BE SUPPLIED TO INSPECTOR PRIOR TO COMMENCEMENT OF WORK WHERE REQUESTED BY THE INSPECTOR.
5. WATERMAIN AND WATER SERVICE MATERIALS FOR 100 mm DIAM. UP TO AND INCLUDING 300 mm DIAM. TO BE P.V.C. CLASS 150 WITH IRON PIPE O.D. MANUFACTURED TO AWWA SPEC C900-75.
6. SERVICES AND MAINS LESS THAN 100mm DIAMETER SHALL BE TYPE 'K' COPPER.
7. PROVISION FOR FLUSHING THE LINES PRIOR TO TESTING ETC. MUST BE PROVIDED WITH AT LEAST A 50 MM DIAM OUTLET ON 100 mm DIAM AND LARGER LINES. COPPER LINES ARE TO HAVE FLUSHING POINTS AT THE END THE SAME SIZE AS THE LINE. THEY MUST ALSO BE HOSED OR PIPED TO ALLOW THE WATER TO DRAIN ONTO A PARKING LOT OR DOWN A DRAIN. ON FIRE LINES, FLUSHING OUTLET TO BE 100 mm DIAM. OR A HYDRANT.
8. DUCTILE IRON WATERMAIN FITINGS TO BE CEMENT LINED TO AWWA SPEC C-110-77.
9. THRUST BLOCKS MUST BE INSTALLED ON ALL BENDS, TEES AND REDUCERS.
10. ALL CURB STOPS TO BE 1.5 m OFF THE FACE OF THE BUILDING UNLESS OTHERWISE NOTED.
11. HYDRANT AND VALVE POSITION AND INSTALLATION PER STD. W16, W19.
12. ALL HYDRANTS ARE TO HAVE PUMPER NOZZLE OUTLET.

LEGEND:

EXISTING / PROPOSED

- CURB
- STORM SEWER
- SANITARY SEWER
- WATERMAIN
- UTILITY
- PROPERTY LINE
- LIGHT STANDARD
- HYDRANT
- ELEVATION (268.55)
- SEWER OR WM TO BE REMOVED
- HANDICAPPED PARKING (3.6m X 5.5m TYPICAL)
- PAINTED PARKING LINE
- (D) DETECTOR CHECK VALVE
- (MB) METER & BACKFLOW PREVENT.
- OVERLAND FLOW ROUTE
- AREA OF POTENTIAL PONDING IN CASE OF BLOCKAGE OF CB

METRIC
DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

ELEVATION NOTE
ELEVATIONS SHOWN ARE GEODETIC AND ARE REFERRED TO THE CGVD28 GEODETIC DATUM.

A SITE BENCHMARK HAS BEEN PROVIDED ON THE TOP NUT OF THE EXISTING HYDRANT NORTH OF THE HAWTHORNE ENTRANCE, ELEVATION 73.58. BENCHMARK TO BE VERIFIED BEFORE USE.

SURVEY CREDIT:
TOPOGRAPHIC INFORMATION FROM TOPOGRAPHIC PLAN OF SURVEY OF PART OF LOT 2, CONCESSION 6 (RIDEAU FRONT), GEOGRAPHIC TOWNSHIP OF GLOUCESTER, CITY OF OTTAWA BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD. O.L.S., II CONCOURSE GATE, SUITE 500, NEPEAN, ON. (613-727-0850) DATED JUNE 15TH, 2021.

STREET UTILITY INFORMATION AND INVERTS ARE FROM CITY OF OTTAWA GIS RECORDS.

FIELD INFORMATION TO BE VERIFIED BEFORE USE.

CAUTION, NOTE:
THESE DRAWINGS HAVE BEEN PREPARED FOR THE EXPRESSED AND SOLE USE OF THE OWNER. CONTRACTORS OR ANY OTHER THIRD PARTY ASSUME FULL RESPONSIBILITY FOR THE ACCURACY, SUFFICIENCY, AND SUITABILITY OF PURPOSE OF ANY AND ALL INFORMATION CONTAINED HEREIN.

CONSTRUCTION MUST CONFORM TO ALL APPLICABLE CODES AND REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION.

ANY CONTRACTOR WORKING FROM DRAWINGS NOT SPECIFICALLY MARKED 'ISSUED FOR CONSTRUCTION' MUST ASSUME FULL RESPONSIBILITY AND BEAR ALL COSTS FOR ANY CORRECTIONS OR DAMAGES RESULTING FROM HIS WORK.

REVISIONS

#		DATE
1	ISSUED FOR PRELIMINARY SITE PLAN APPROVAL	3-NOV-21
2	REVISED PER COMMENTS	20-APR-22
3	REVISED PER CITY COMMENTS	9-AUG-23

SCALE
5 4 3 2 1 0 5 10 15 20 25
PROVIDED FOR CONVENIENCE ONLY. THIS DRAWING IS NOT TO BE SCALED.

Designed By:
LICENSED PROFESSIONAL ENGINEER
M.J.J. Savoldelli
P.ENG.
PROVINCE OF ONTARIO

OWNER:
ACCESS PROPERTY DEVELOPMENTS
100 CANADIAN RD, SUITE 300
TORONTO ON M1R 4Z5
437-427-8918

EC²E EDILESSE CONSULTING CIVIL ENGINEERS
105 Blake Avenue
Willowdale, ON, M2M 1B5
416-236-2341
info@ec2e.ca

PROJECT
PROPOSED BUILDING
3149 HAWTHORNE ROAD
OTTAWA, ONTARIO

ACCESS PROPERTY DEVELOPMENT
ACCESS GROUP OF COMPANIES

DRAWING
SITE GRADING PLAN

DATE 3 NOV 21	ARCHITECT'S PROJ NO. 219-0058
DRAWN M.S.	DRAWING NO. CS-101
CHECKED C.C.	
SCALE 1:400	

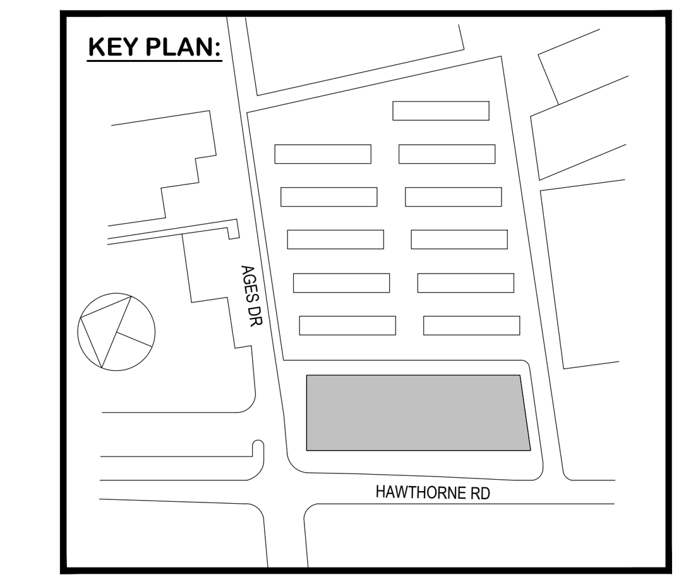
PLAN No. 18646

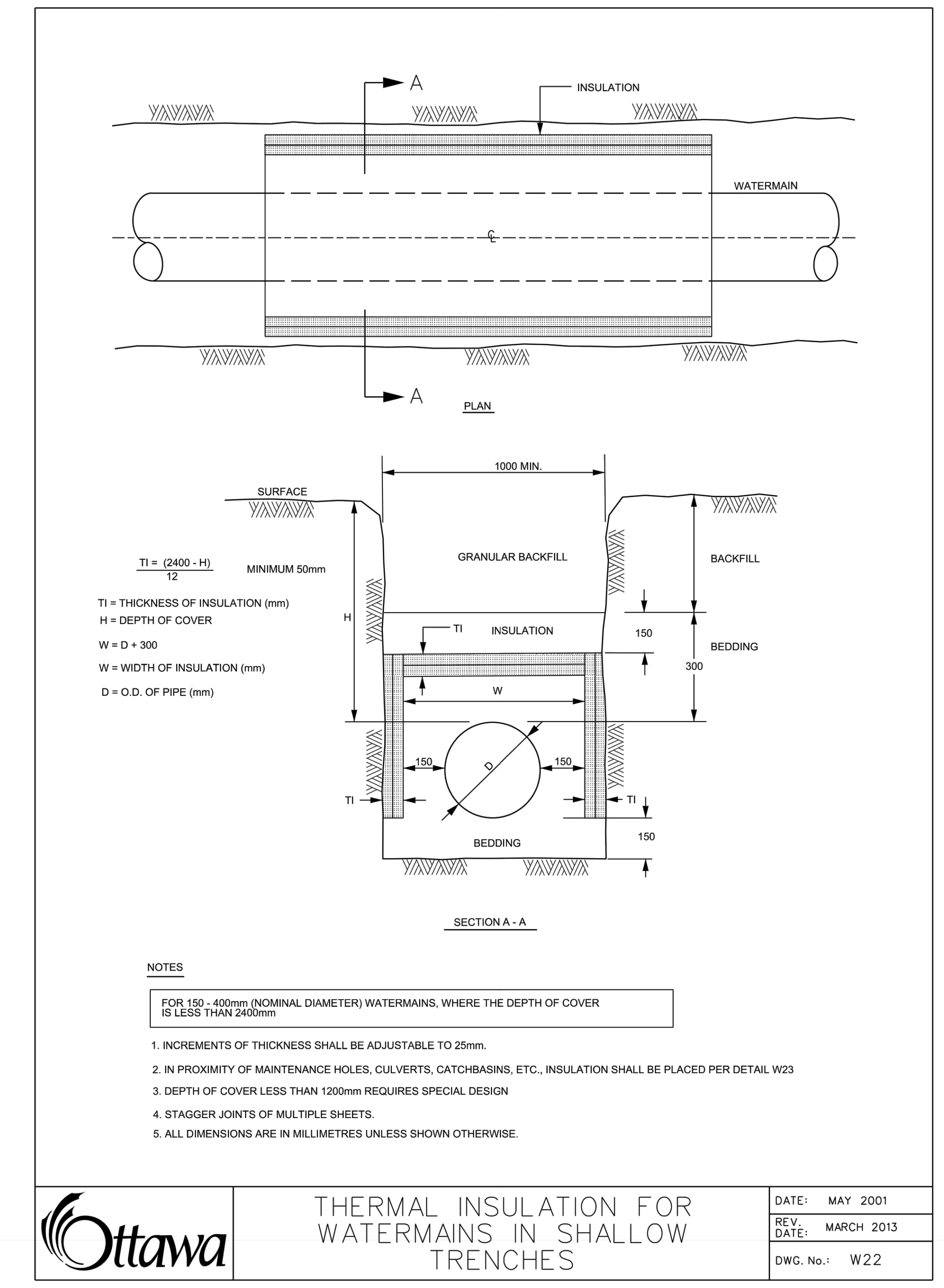
007-12-21-0198

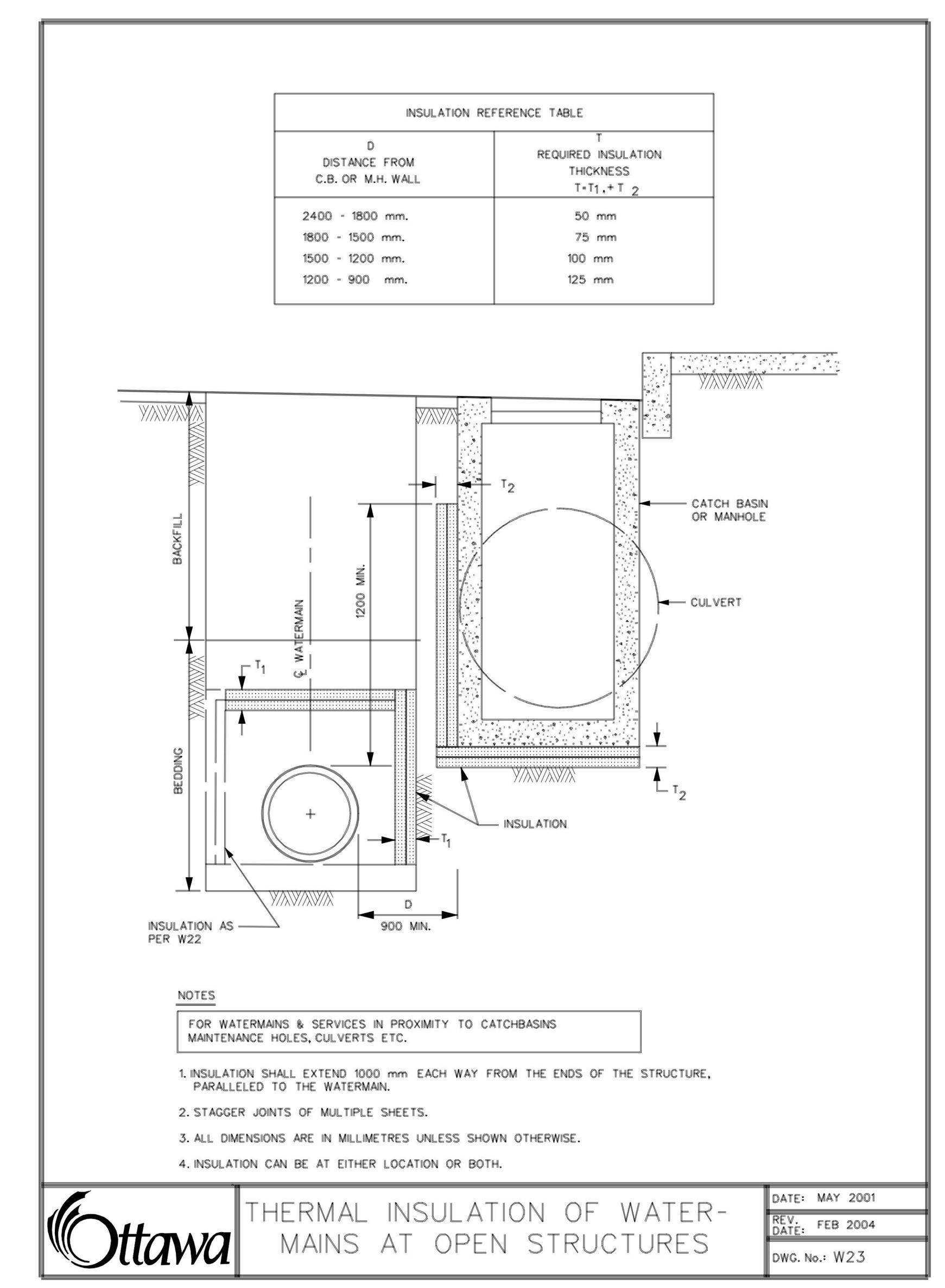
CROSSING	PIPE	INV	PIPE	OBV	CLEARANCE	GROUND	COVER	FROST PROT
X1	SAN	71.06	STM	70.72	0.34	72.82	1.66	X
X2	STM	71.19	WM	70.66	0.53	73.3	2.64	
X3	WM	71.64	STM	71.39	0.25	73.64	1.85	X
X4	WM	71.56	STM	71.31	0.25	73.64	1.93	X
X5	WM	71.54	STM	71.29	0.25	73.64	1.95	X
X6	WM	71.58	STM	71.33	0.25	73.73	2.00	X
X7	STM	70.40	WM	69.87	0.53	72.85	2.83	
X8	STM	70.39	WM	69.86	0.53	72.70	2.69	

WATER MAIN CROSSINGS TO COMPLY WITH CITY OF OTTAWA STANDARDS W25 AND W25.2 AS APPLICABLE

CLAY SEALS TO BE INSTALLED AS PER CITY STANDARD DRAWING S8. THE SEALS SHOULD BE AT LEAST 1m LONG (IN THE TRENCH DIRECTION) AND SHOULD EXTEND FROM TRENCH WALL TO TRENCH WALL. GENERALLY, THE SEALS SHOULD EXTEND FROM THE UNDERSIDE OF THE PAVEMENT STRUCTURE AND FULLY PENETRATE THE BEDDING, SUBBEDDING AND COVER MATERIAL. THE BARRIERS SHOULD CONSIST OF COMPACTABLE BROWN SILTY CLAY PLACED IN MAXIMUM 300mm THICK LOOSE LAYERS COMPACTED TO A MINIMUM OF 95% OF THE MATERIAL'S SPMDD. THE CLAY SEALS SHOULD BE PLACED AT THE SITE BOUNDARIES AND AT STRATEGIC LOCATIONS AT NO MORE THAN 60m INTERVALS IN THE SERVICE TRENCHES. FOR DETAILS REFER TO GEOTECHNICAL INVESTIGATION







LEGEND:

EXISTING	PROPOSED	
		CURB
		STORM SEWER
		SANITARY SEWER
		WATERMAIN
		UTILITY
		PROPERTY LINE
		LIGHT STANDARD
FH		HYDRANT
+268.55	×(268.55)	ELEVATION

- SEWER OR WM TO BE REMOVED
- FROST PROTECTION
- HANDICAPPED PARKING (3.6m X 5.5m TYPICAL)
- PAINTED PARKING LINE
- (D) DETECTOR CHECK VALVE
- (M)(B) METER & BACKFLOW PREVENT.
- (RM) REMOTE METER LOCATION
- OVERLAND FLOW ROUTE
- AREA OF POTENTIAL PONDING IN CASE OF BLOCKAGE OF CB

METRIC

DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

ELEVATION NOTE

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A SITE BENCHMARK HAS BEEN PROVIDED ON THE TOP NUT OF THE EXISTING HYDRANT NORTH OF THE HAWTHORNE ENTRANCE, ELEVATION 73.58. BENCHMARK TO BE VERIFIED BEFORE USE.

SURVEY CREDIT:

TOPOGRAPHIC INFORMATION FROM TOPOGRAPHIC PLAN OF SURVEY OF PART OF LOT 2, CONCESSION 6 (RIDEAU FRONT), GEOGRAPHIC TOWNSHIP OF GLOUCESTER, CITY OF OTTAWA BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD. O.L.S., 11 CONCOURSE GATE, SUITE 500, NEPEAN, ON. [613-727-0850] DATED JUNE 15TH, 2021.

STREET UTILITY INFORMATION AND INVERTS ARE FROM CITY OF OTTAWA GIS RECORDS.

FIELD INFORMATION TO BE VERIFIED BEFORE USE.

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REVISIONS

#		DATE
1	ISSUED FOR PRELIMINARY SITE PLAN APPROVAL	3-NOV-21
2	REVISED PER COMMENTS	20-APR-22
3	REVISED PER CITY COMMENTS	9-AUG-23

SCALE

5 4 3 2 1 0 5 10 15 20 25

PROVIDED FOR CONVENIENCE ONLY. THIS DRAWING IS NOT TO BE SCALED.

Designed By:

LICENSED PROFESSIONAL ENGINEER M.U.J. Savoldelli 9 AUG 23 PROVINCE OF ONTARIO

OWNER:
ACCESS PROPERTY DEVELOPMENTS
100 CANADIAN RD, SUITE 300
TORONTO ON M1R 4Z5
437-427-8918

EC²E Edilesse Consulting Civil Engineers
185 Blake Avenue
Willowdale, ON, M2M 1B5
416-236-2341
info@ec2e.ca

PROJECT

**PROPOSED BUILDING
3149 HAWTHORNE ROAD
OTTAWA, ONTARIO**

ACCESS PROPERTY DEVELOPMENT
ACCESS GROUP OF COMPANIES

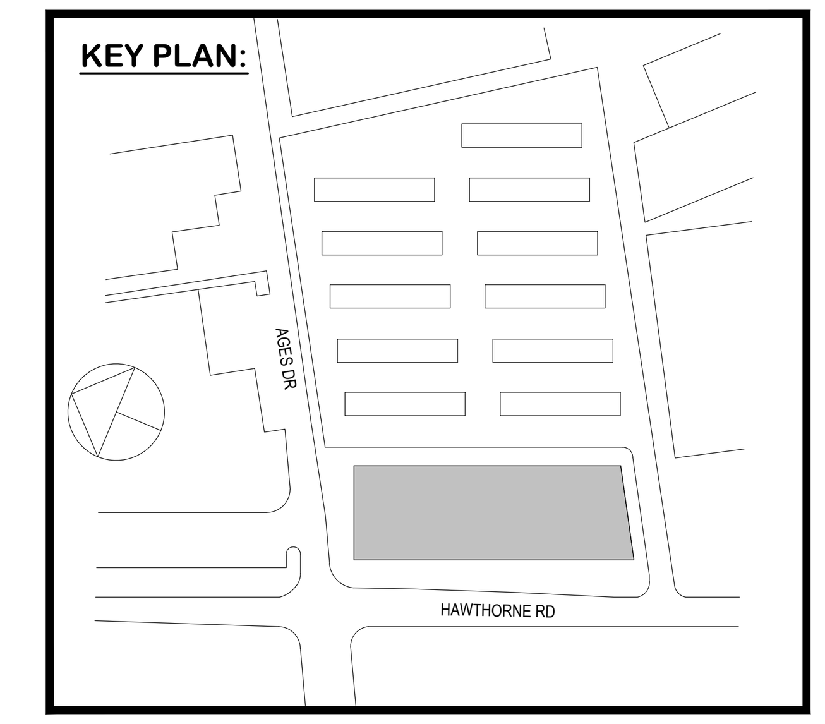
DRAWING

SITE SERVICING PLAN

DATE 3 NOV 21	ARCHITECT'S PROJ. NO. 219-0058
DRAWN M.S.	DRAWING NO.
CHECKED C.C.	CS-102
SCALE 1:400	

D07-12-21-0198

PLAN No. 18646



INLET	DRAINAGE AREA m2	DRAINAGE AREA Ha	LS m2	PAVED m2	RUNOFF COEFF. C	CB SHIELD REMOVAL	CB TOP	PONDING ELEV'N	PONDING DEPTH
DCB1	645.89	0.065	97.8	548.06	0.79	54%	72.44	72.59	0.15
DCB2	849.52	0.085	31.9	817.58	0.87	52%	73.05	73.1	0.05
DCB3	1471.51	0.147	0.0	1471.51	0.90	49%	73.14	73.4	0.26
CB3	598.48	0.060	0.0	598.48	0.90	53%	73.5	73.58	0.08
CB4	1145.87	0.115	47.6	1098.31	0.87	50%	73.72	73.9	0.18
CB5	1127.78	0.113	47.7	1080.12	0.87	50%	73.78	73.95	0.17
CB6	1097.64	0.110	49.3	1048.34	0.87	50%	73.85	73.99	0.14
CB7	1133.07	0.113	40.1	1092.97	0.88	50%	73.88	74.03	0.15
DCB4	2390.67	0.239	196.1	2194.6	0.84	44%	73.68	73.78	0.10
CB MH7	658.25	0.066	0.0	658.25	0.90	53%	73.5	73.62	0.12
CB MH8	646.14	0.065	0.0	646.14	0.90	53%	73.5	73.62	0.12
CB MH9	715.94	0.072	0.0	715.94	0.90	52%	73.55	73.66	0.11
CB8	647.51	0.065	0.0	647.51	0.90	53%	73.75	73.83	0.08
CB9	622.61	0.062	0.0	622.61	0.90	53%	73.55	73.66	0.11
CB10	591.11	0.059	0.0	591.11	0.90	53%	73.49	73.62	0.13
CB11	512.21	0.051	0.0	512.21	0.90	53%	73.49	73.63	0.14
CB12	631.2	0.063	0.0	631.2	0.90	53%	73.49	73.63	0.14
CB MH5	1421.19	0.142	146.2	1274.99	0.83	48%	73.67	73.81	0.14
CB13	427.15	0.043	42.2	384.95	0.83	55%	73.56	73.65	0.09
CB14	448.89	0.045	46.7	402.19	0.83	55%	73.42	73.42	0.00
CB15	519.02	0.052	46.6	472.42	0.84	55%	73.32	73.41	0.09
CB16	524.53	0.052	22.9	501.63	0.87	54%	73.29	73.41	0.12
CB17	445.95	0.045	18.8	427.18	0.87	54%	73.18	73.32	0.14
CB1	388.8	0.039	388.8	0	0.20	56%	72.4	72.95	0.55
CB MH10	421.2	0.042	402.7	18.5	0.23	56%	72.47	72.95	0.48
CB MH11	1554.91	0.155	764.6	790.28	0.56	50%	72.4	72.95	0.55

ALL CATCHBASINS TO BE EQUIPPED WITH CB-SHIELD (SEE CS-201)

NOTE:
THIS DRAWING TO BE READ IN CONJUNCTION WITH STANDARD DETAILS AND NOTES ON DRAWINGS CS-101, CS-201, AND CS-202 FOR THIS PROJECT

LEGEND:

EXISTING / PROPOSED	
	CURB
	STORM SEWER
	SANITARY SEWER
	WATERMAIN
	UTILITY
	PROPERTY LINE
LS / LS	LIGHT STANDARD
FH	HYDRANT
268.55 / (268.55)	ELEVATION
	SEWER OR WM TO BE REMOVED
	FROST PROTECTION
	HANDICAPPED PARKING (3.6m X 5.5m TYPICAL)
	PAINTED PARKING LINE
D	DETECTOR CHECK VALVE
MB	METER & BACKFLOW PREVENT.
RM	REMOTE METER LOCATION
	OVERLAND FLOW ROUTE
	AREA OF POTENTIAL PONDING IN CASE OF BLOCKAGE OF CB

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Designed By:
LICENSED PROFESSIONAL ENGINEER
M.U.J. Savoldelli
9 AUG 23
PROVINCE OF ONTARIO

OWNER:
ACCESS PROPERTY DEVELOPMENTS
100 CANADIAN RD, SUITE 300
TORONTO ON M1R 4Z5
437-427-8918

EC²E Edilesse Consulting Civil Engineers
185 Blake Avenue
Willowdale, ON, M2M 1B5
416-236-2341
info@ec2e.ca

PROJECT
PROPOSED BUILDING
3149 HAWTHORNE ROAD
OTTAWA, ONTARIO
ACCESS PROPERTY DEVELOPMENT
ACCESS GROUP OF COMPANIES

DRAWING
STORM DRAINAGE AREA PLAN

DATE: 3 NOV 21	ARCHITECT'S PROJ. NO.: 219-0058
DRAWN: M.S.	DRAWING NO.
CHECKED: C.C.	**CS-203**
SCALE: 1:400	

D07-12-21-0198

PLAN No. 18646