Stormwater Management Report and Servicing Brief

Site Plan Control Design
652 Flagstaff Drive, Ottawa ON

Prepared for:

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Attention: Ram Balakrishnan

LRL File No.: 220775

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1 INTRODUCTION AND SITE DESCRIPTION

LRL Associates Ltd. was retained by 9621962 Canada Inc. to complete a Stormwater Management Analysis and Servicing Brief for the development of two 1-storey commercial buildings with associated surface parking at 652 Flagstaff Drive. The subject property consists of one (1) lot. The site location is legally described as Lot 66, Plan 4M-1705 in the City of Ottawa. The subject lot is zoned LC7[1694] (Local Commercial).

Figure 1: Aerial View of Subject Lands

The subject property measures approximately 80m in frontage along Flagstaff Drive and approximately 58m in frontage along Borrisokane Road. Based on locations of the existing property lines, the total site area is approximately **0.44 ha**.

The proposed development will be constructed in a single phase, which includes the surface parking lot and two commercial buildings. The commercial buildings will share the same roof. Refer to ***Site Plan*** included in ***Appendix F*** for more details***.***

This report has been prepared in consideration of the terms and conditions noted above and with the civil drawings prepared for the new development. Should there be any changes in the design features, which may relate to the stormwater and servicing considerations, LRL Associates Ltd. should be advised to review the report recommendations.

2 EXISTING SITE AND DRAINAGE DESCRIPTION

The subject site measures **0.44 ha** and is currently a green fill site. The topographical survey of the existing site shows that the site is raised and slopes down towards the rights-of-way and neighbouring properties at the property lines. The site is generally flat and elevations along the property lines range from 93.32 to 93.87.

Sewer and watermain mapping, along with as-built information collected from the City of Ottawa indicate the following existing infrastructure located within the adjacent rights-of-way:

Flagstaff Drive:

- 250mm PVC sanitary sewer
- 300mm PVC watermain

Borrisokane Road:

- Roadside storm ditch

3 SCOPE OF WORK

As per applicable guidelines, the scope of work includes the following:

Stormwater management

- Calculate the allowable stormwater release rate.
- Calculate the anticipated post-development stormwater release rates.
- Demonstrate how the target quantity objectives will be achieved.

Water services

- Calculate the expected water supply demand at average and peak conditions.
- Calculate the required fire flow as per the Fire Underwriters Survey (FUS) method.
- Confirm the adequacy of water supply and pressure during peak flow and fire flow.
- Describe the proposed water distribution network and connection to the existing system.

Sanitary services

- Describe the existing sanitary sewers available to receive wastewater from the building.
- Calculate peak flow rates from the development.
- Describe the proposed sanitary sewer system.
- Review impact of increased sanitary flow on downstream sanitary sewer.

4 REGULATORY APPROVALS

An MECP Environmental Compliance Approval is not expected to be required for installation of the proposed storm and sanitary sewers within the site. A Permit to Take Water is not anticipated to be required for pumping requirements for sewer installation. The Rideau Valley Conservation Authority will need to be consulted to obtain municipal approval for site development. No other approval requirements from other regulatory agencies are anticipated.

5 WATER SUPPLY AND FIRE PROTECTION

5.1 Existing Water Supply Services and Fire Hydrant Coverage

The subject property lies within the City of Ottawa BARR water distribution network pressure zone. There is an existing 300 mm PVC watermain located within Flagstaff Drive. There are currently at least three (3) existing fire hydrants within proximity to the subject property. Refer to ***Appendix B*** for the location of fire hydrants.

5.2 Water Supply Servicing Design

According to the City of Ottawa Water Distribution Guidelines (Technical Bulletin ISDTB-2014-02), since the basic day demand of the site will be less than 50 m^3/day a single water service will be sufficient to service the site. Additionally, considering the presence of an automatic sprinkler system inside the buildings and a recommended size to service the sprinkler system, the subject property is proposed to be serviced with a single 150 mm diameter service lateral connected to the existing 300mm PVC watermain within Flagstaff Drive. Refer to *Site Servicing Plan* C.401 in ***Appendix E*** for servicing layout and connection points.

Table 1 summarizes the City of Ottawa Design Guidelines design parameters employed in the preparation of the water demand estimate.

Table 1: City of Ottawa Design Guidelines Design Parameters

Design Parameter	Value
Residential Bachelor / 1 Bedroom Apartment	1.4 P/unit
Residential 2 Bedroom Apartment	2.1 P/unit
Residential 3 Bedroom Apartment	3.1 P/unit6
Other Commercial Average Daily Demand	2.8 L/m^2/d
Restaurant	125 L/seat/d
Average Daily Demand	280 L/d/per
Office	75 L/9.3m^2/d
Minimum Depth of Cover	2.4 m from top of watermain to finished grade
Desired operating pressure range during maximum day flow condition	345 kPa (50 psi) and 552 kPa (80 psi)
During peak hour flow condition pressure must not drop below	275 kPa (40 psi)
During fire flow operating conditions pressure must not drop below	140 kPa (20 psi)

The water demand requirements for the two, one-storey commercial buildings have been analyzed. The combined commercial floor area for the buildings is equal to **0.137ha**. To calculate the water demands for the site, Appendix 4-A and Table 4.2 from the *City of Ottawa Water Distribution Design Guidelines* was used.

The water supply requirements for the commercial space in the proposed development have been calculated using the following formulas:

$$Q = (q \times A \times M), \text{ for the commercial space.}$$

Where:
q = average water consumption (L/ha/day)
P = design population (capita)
M = Peak factor
A = area (ha)

A water consumption rate of 28,000 L/ha/d was used for the commercial space. The Maximum Daily Demand Factor and the Maximum Hourly Demand Factor were 1.5 and 1.8, respectively. *Table 2* below summarizes the anticipated water demands from the site.

Table 2: Commercial Water Demands

Property Type	Unit	Rate	Units	Demand (L/d)
Commercial Space	28,000	L/ha/d	0.137 ha	**3836.0**

Using the peak factors, the anticipated commercial demands were calculated as follows:

- Average daily domestic water demand is **0.044** L/s,
- Maximum daily demand is **0.067** L/s, and
- Maximum hourly demand is **0.080** L/s.

Refer to ***Appendix B*** for detailed water demand calculations.

The City of Ottawa was contacted to obtain boundary conditions associated with the calculated water demands, as indicated in the boundary request correspondence included in ***Appendix B***. According to the City of Ottawa, a pressure zone reconfiguration is planned for this area and provided boundary conditions at the current pressure zone and future pressure zone. The existing pressure zone is 3SW and the future pressure zone is SUC. Both configurations were analyzed to ensure that existing and future conditions will meet the required pressure ranges.

Table 3 below summarizes boundary conditions for the proposed development at the existing and future conditions.

Table 3: Summary of Boundary Conditions

Design Parameter	Anticipated Demand (L/s)	Boundary Conditions @ Flagstaff Drive Existing Condition (Pressure Zone 3SW)
		Connection 1* (m H2O / kPa)
Average Daily Demand	0.044	156.5 / 621.90
Max Day + Fire Flow	0.067+ 50.0	143.4 / 492.9
Peak Hour	0.080	142.6 / 485.3
**Ground elevation assumed at 93.1*		
Design Parameter	**Anticipated Demand (L/s)**	**Boundary Conditions @ Flagstaff Drive Future Condition (Pressure Zone SUC)**
		Connection 1* (m H2O / kPa)
Average Daily Demand	0.044	146.8 / 526.0
Max Day + Fire Flow	0.067+ 50.0	143.6 / 495.7
Peak Hour	0.080	142.8 / 487.4
**Ground elevation assumed at 93.1*		

As indicated in Table 1, pressures in all scenarios meet the required pressure range stated in the City of Ottawa Design Guidelines – Water Distribution (Section 4.2.2). However, in the existing condition with pressure zone 3SW, a pressure reducing valve will be required until the pressure zone becomes SUC. Refer to ***Appendix B*** for Boundary Conditions.

The estimated fire flow for the proposed buildings was calculated in accordance with *ISTB-2018-02*. The following parameters were provided by the Architect:

- Type of construction – Non-combustible construction
- Occupancy type – Limited Combustible
- Sprinkler Protection –Fully Automatic Sprinkler System

The fire flow demand was estimated to be **3,000 L/min**, see ***Appendix B*** for details.

There are three (3) existing fire hydrants in proximity to the proposed buildings that are available to provide the required fire flow demands of 3,000 L/min. Refer to ***Appendix G*** for fire hydrant locations. Table 4 below summarizes the aggregate fire flow of the contributing hydrants in proximity to the proposed development based on Table 18.5.4.3 of *ISTB-2018-02*.

Table 4: Fire Protection Summary Table

	Max. Fire Flow Demand (L/min)	Fire Hydrants(s) within 75m	Fire Hydrant(s) within 150m	Available Combined Fire Flow (L/min)
Contemplated Development	3,000	2	1	(2 x 5678) + (1 x 3785) = 15,141

The total available fire flow from contributing hydrants is equal to **15,141 L/min** which is sufficient to provide adequate fire flow for the proposed development. A certified fire protection system specialist will need to be employed to design the building's fire suppression system and confirm the actual fire flow demand.

The proposed water supply design conforms to all relevant City Guidelines and Policies.

6 SANITARY SERVICE

6.1 Existing Sanitary Sewer Services

There is an existing 250 mm PVC Sanitary sewer located in Flagstaff Drive. It is anticipated that the contemplated development will be connected to the existing 250 mm PVC sanitary sewer located within Flagstaff Drive.

6.2 Sanitary Sewer Servicing Design

The proposed development will be serviced via a 150mm PVC sanitary service connected to the existing 250mm PVC sanitary sewer located within Flagstaff Drive. Refer to LRL drawing C.401, included in **Appendix F,** for the proposed sanitary servicing. There is also an existing sanitary manhole located at the southeast corner of the site close to the property line. The location of this manhole is not suitable for use, and it is recommended that the manhole be removed and reused elsewhere on-site, if possible. The single sanitary service is proposed to service both buildings. This will be detailed by the mechanical engineer.

The parameters used to calculate the anticipated commercial sanitary flows are a daily flow of 28,000L/ha/day and a commercial peaking factor of 1.5. Based on these parameters and a total site area of 0.44 ha, the total anticipated wet wastewater flow was estimated to be **0.21 L/s**. Refer to ***Appendix C*** for the site sanitary sewer design sheet.

7 STORMWATER MANAGEMENT

7.1 Existing Stormwater Infrastructure

Stormwater runoff from the subject property is tributary to the City of Ottawa sewer system as such, approvals for the proposed development within this area are under the approval authority of the City of Ottawa.

There are no existing storm sewers located within the roads surrounding the site. However, there is a roadside ditch located next to the site in the ROW of Borrisokane Road. The storm network from the site is proposed to outlet to this ditch. The elevation of the ditch at the tie-in location is approximately 91.23m. In the pre-development conditions, drainage from the subject lot is depicted by existing watershed EWS-01 (0.439 ha). The site is generally flat and is raised at and approximate slope of 3:1 from the abutting rights-of-way and neighbouring properties. Refer to plan C701 included in ***Appendix E*** for pre-development drainage characteristics. Refer to ***Appendix D*** for pre-development and post-development watershed information.

7.2 Design Criteria

The stormwater management criteria for this development are based on the pre-consultation with City of Ottawa officials, the City of Ottawa Sewer Design Guidelines including City of Ottawa Stormwater Management Design Guidelines, 2012 (City standards), as well as the Ministry of the Environment's Stormwater Management Planning and Design Manual, 2003 (SWMPD Manual).

7.2.1 Water Quality

The subject property lies within the Jock River – Barrhaven Subwatershed and is therefore subject to review by the Rideau Valley Conservation Authority (RVCA). Based on the RVCA comments found in the Pre-Application Consulting Meeting Notes, 80% TSS removal for water quality protection will be required for this site. Given the limits of the floodplain adjacent to the property, Conservation Authority permits will be required prior to receiving building permits.

To achieve 80% TSS removal water quality protection, a treatment train approach is proposed for the site. 80.7% TSS removal will first occur within the StormTech chamber with an isolator row plus. An additional 54.0% TSS removal will occur in the FD-4HC Oil Grit Separator. This treatment approach will provide a total TSS removal of 90.8%. See ***Appendix D*** for more details on the ADS Treatment Train Sizing and Chamber and OGS information.

7.2.2 Water Quantity

Based on pre-consultation with the City, correspondence included in ***Appendix A***, the following stormwater management requirements were identified for the subject site:

- Design post- to pre- with the designated outlet being the roadside ditch in Borrisokane Road.
    - 5-Year post to 5-Year pre
    - 100-Year post to 100-Year pre

- Attenuate all storms up to and including the City of Ottawa 100-year storm event on site.

- 80%TSS removal required.

Based on these stormwater objectives for the subject site, it was determined that the allowable release rate for the five-year storm is **25.43 L/s,** and the 100-year is **43.58 L/s.** Refer to ***Appendix D*** for calculations.

7.3 Method of Analysis

The Modified Rational Method has been used to calculate the runoff rate from the site to quantify the detention storage required for quantity control of the development. Refer to ***Appendix D*** for storage calculations.

7.4 Proposed Stormwater Quantity Controls

Stormwater management quantity control for this development will be accomplished through using an ICD (Inlet Control Device) in one of the downstream manholes and storage requirements will be accomplished using an underground stormtech chamber and surface ponding within the asphalt parking area. The two proposed commercial buildings will share a single roof. The stormwater design does not consider any roof storage. Flows from the roof will be collected via roof drains and downspouts from the roof will direct the water to the buildings mechanical system and will later be directed from building 2 towards the onsite storm sewer network within the asphalt parking lot area.

Onsite flows from the parking lot area and drive isle will be captured via CB manholes and carried through a network of 250mm PVC sewers. Roof flows will be carried towards the buildings internal mechanical system and will be directed via a 250mm PVC storm pipe to the onsite storm system. A proposed 250mm PVC diameter storm sewer will ultimately outlet stormwater flows from the site to the existing storm ditch located within the ROW of Borrisokane Road. The proposed servicing layout and connection points are shown on drawing C.401 in ***Appendix E,*** and detailed calculations can be found in ***Appendix D***.

The site has been analyzed and six (6) post-development watersheds have been allocated.

- WS-01 (0.018) consists of the asphalt drive isle, which will be controlled through an ICD in STM MH04.
- WS-02 and WS-03 (0.199 ha) consist of the asphalt parking lot areas, which will be controlled through an ICD in STM MH04.
- WS-04 (0.158 ha) consists of the roof area. Flows from the roof will be collected via roof drains and carried to the buildings internal mechanical system and conveyed from Building 2 via a 250mm PVC storm pipe to the onsite storm network where they will ultimately be controlled through an ICD in STM MH04.
- WS-05 (0.016 ha) is a landscape buffer area located on the east side of the site. This area will remain uncontrolled.
- WS-06 (0.047 ha) consists of landscape and concrete areas surrounding the buildings on the southeast and southwest sides. This watershed will be uncontrolled and will flow towards the rights-of-way in Borrisokane Road and Flagstaff Drive.

Refer to C601, Stormwater Management Plan and C702, Post-Development Watershed Plan in ***Appendix E*** for reference.

Table 5 below summarizes post-development drainage areas. Calculations can be seen in ***Appendix D.***

Table 5: Post-Development Estimated Areas & Runoff Coefficients

WATERSHED	Total Area (ha)	Weighted Runoff Coefficient (C)
WS-01(CONTROLLED)	0.018	0.90
WS-02 (CONTROLLED)	0.098	0.90
WS-03 (CONTROLLED)	0.101	0.85
WS-04 (CONTROLLED-ROOF)	0.158	0.90
WS-05 (UN-CONTROLLED)	0.016	0.20
WS-06 (UN-CONTROLLED)	0.047	0.77
TOTAL	**0.439**	**0.85**

The allowable release rate at the 5-year storm is **25.43L/s**. At the 5-year storm the un-controlled watersheds (WS-05 & WS-06) will have an uncontrolled release rate of 10.16L/s. This leaves a remaining allowable controlled release rate of **14.07L/s** at the 5-year storm. This allowable release rate will govern and the ICD in STM MH04 will be sized to this release rate.

To ensure that no surface ponding is present at the 2-year storm, underground storage will be required. When determining the required volume of storage at the 2-year storm, the controlled release rate of the ICD is halved. Therefore, the controlled release rate used at the 2-year storm for the controlled watersheds (WS-01, WS-02, WS-03 & WS-04) will be **7.03L/s**. At this release rate an associated storage volume of **56.95m^3** will be required. This will be achieved through the use of an underground stormtech chamber. The stromtech chamber will have a volume capacity of **63.68m^3**. For details relating to the stormtech chamber, refer to ***Appendix D.*** There is also approximately **13m^3** of storage available within the remaining underground storm network. There is also a total of **143.08m^3** of available surface storage within the asphalt parking area.

The release rates of pre to post at the 5-year and 100-year storms can be seen below in **Table 6** and **Table 7.**

Table 6: Summary of Release Rates and Storage Volumes 5-Year post to 5-Year pre

CATCHMENT AREAS	DRAINAGE AREAS (ha)	5-YEAR RELEASE RATE	5-YEAR REQUIRED STORAGE (m3)	TOTAL AVAILABLE STORAGE - UNDERGROUND AND SURFACE (m3)
WS-01(CONTROLLED)	0.018	14.07	64.99	(63.68+150.41) = 214.09
WS-02 (CONTROLLED)	0.098			
WS-03 (CONTROLLED)	0.101			

WS-04 (CONTROLLED ROOF)	0.158			
Total Controlled (Through ICD)	**0.376**	**14.07**	**64.99**	**214.09**
WS-05 (UN-CONTROLLED)	0.016	11.37	0	0
WS-06 (UN-CONTROLLED)	0.047			
Total Un-Controlled =	**0.063**	**11.37**	**0.00**	**0.00**
TOTAL	**0.439**	**25.43**	**64.99**	**214.09**
Allowable Release Rate at the 5-year storm = 25.43L/s				

Table 7: Summary of Release Rates and Storage Volumes 100-Year post to 100-Year pre

CATCHMENT AREAS	DRAINAGE AREAS (ha)	100-YEAR RELEASE RATE	100-YEAR REQUIRED STORAGE (m3)	TOTAL AVAILABLE STORAGE (m3)
WS-01(CONTROLLED)	0.018	14.07	159.67	(63.68+150.41) = 214.09
WS-02 (CONTROLLED)	0.098			
WS-03 (CONTROLLED)	0.101			
WS-04 (CONTROLLED ROOF)	0.158			
Total Controlled (Through ICD)	**0.376**	**14.07**	**159.67**	**214.09**
WS-05 (UN-CONTROLLED)	0.016	24.35	0	0
WS-06 (UN-CONTROLLED)	0.047			
Total Un-Controlled =	**0.063**	**24.35**	**0.00**	**0.00**
TOTAL	**0.439**	**38.42**	**159.67**	**214.09**
Allowable Release Rate at the 100-year storm = 43.58L/s				

As can be seen in Tables 6 and 7. The release rates from the site meet the allowable release rates at the 5-year and 100-year storms. Storage requirements are also met through underground and surface storage. There will be no surface ponding at the 2-year and 5-year storms as there is enough volume capacity within the stormtech chamber and underground storm sewer network to take on the required storage volumes. For detailed release rate and storage calculations, refer to ***Appendix D***. For additional information on ICD and stormtech chamber locations, refer to drawing C.601 in ***Appendix E.***

8 EROSION AND SEDIMENT CONTROL

During construction, erosion and sediment controls will be provided primarily via a sediment control fence to be erected along the perimeter of the site where runoff has the potential of leaving the site. Inlet sediment control devices are also to be provided in any catch basin and/or manholes

in and around the site that may be impacted by the site construction. The area located along the northeast property line of the site will have an approximate slope of 3:1 and is associated with (WS-05). This area will ultimately be landscaped and will flow uncontrolled to the neighbouring property, as it did in pre-development conditions. To control sediment leaving the site the slope is to be stabilized as soon as possible with mulch or similar product until final landscape cover can be placed.

A Light Duty Straw Bail Barrier is to be installed downstream of the development's storm outlet within the Borrisokane Ditch. Straw Bail to be installed as per OPSD 219.100.

Best management practices (BMPs) shall be undertaken during the construction phase. These BMPs aim to minimize soil erosion, sedimentation, and other negative impacts on water quality and natural habitats. Some examples of BMPs for erosion and sediment control are;

- Controlling mud tracking: By means of installing, maintaining, and using stabilized construction entrances and exits at all access locations. Mud matts shall be maintained and cleaned on a regular basis.
- Inlet sediment control devices: To prevent surface erosion from entering any storm sewer system during construction, filter bags will be placed under grates of nearby catch basins and structures.
- Establish vegetation: Vegetation, such as grasses and trees, can help stabilize soil and prevent erosion. In areas where vegetation is not present, consider planting native species that are well adapted to the local soil and climate conditions.
- Install silt fences to trap sediment and prevent it from entering nearby waterways.
- Implement erosion control blankets: Erosion control blankets are made of biodegradable materials such as straw or coconut fiber and can be used to protect soil from erosion and promote vegetation growth.
- Use sediment basins: Sediment basins are temporary detention ponds that capture sediment and slow down water flow, allowing sediment to settle out before the water is discharged.
- Manage construction activities: Proper management of construction activities is essential to minimize soil disturbance and sedimentation. This may include controlling runoff from disturbed areas, using proper excavation techniques, and minimizing the amount of time that soil is exposed.
- Implement good housekeeping practices: This includes properly managing and disposing of waste materials, regularly maintaining equipment to prevent leaks and spills, and keeping work areas clean and free of debris. It's important to note that the specific BMPs used for erosion and sediment control may vary depending on the site conditions and project requirements. Therefore, it's important to ensure that the appropriate BMPs are selected and implemented for this site.

Construction and maintenance requirements for erosion and sediment controls are to comply with Ontario Provincial Standard Specification OPSS 577. For more details refer to drawing C101 Erosion and Sediment Control Plan in ***Appendix E***.

9 CONCLUSION

This Stormwater Management and Servicing Report for the development proposed at 652 Flagstaff Drive presents the rationale and details for the servicing requirements for the subject property.

In accordance with the report objectives, the servicing requirements for the development are summarized below:

Water Service

- The maximum required fire flow was calculated to be **3,000 L/min** using the FUS method.
- There are three (3) existing fire hydrants available to service the proposed development. They will provide a combined fire flow of **15,141 L/min** to the site.
- The new development will be serviced via one (1) 150mm diameter services equipped with a pressure reducing valve, that will be connected to the existing 300 mm PVC watermain within Flagstaff Drive.
- Boundary conditions received from the City of Ottawa indicate that sufficient pressure is available to service the proposed site.

Sanitary Service

- The total calculated wet wastewater flow from the proposed development is **0.21 L/s.**
- The proposed development will discharge **0.21 L/s** to the existing 250 mm PVC sanitary sewer within Flagstaff Drive via a proposed 150mm PVC sanitary service lateral.

Stormwater Management

- The stormwater release rates from the proposed development will meet the calculated allowable release rate of **25.43 L/s** at the 5-year storm and the allowable release rate of **43.58 L/s** at the 100-year storm**.**
- All controlled watersheds will be controlled by an ICD located downstream within the on-site storm sewer network.
- There will be no roof storage on this site. Flows from the roofs will be collected and carried through the buildings internal mechanical system and will outlet via a 250mm PVC storm pipe from building 2 towards the onsite storm system.
- The stormwater quantity control objectives will be met through the use of an underground stormtech chamber with a storage capacity of **63.68 m^3** and surface storage within the asphalt parking. The storage capacity within the asphalt parking area is equal to **150.41 m^3**. Storage requirements at the 2-year, 5-year and 100-year storms are met.
- There will be no surface ponding present at the 2-year and 5-year storm.
- Quality control requirement of 80% TSS removal will be achieved through a treatment train approach by use of a stormtech chamber with an isolator row and the use of a FD-4HC Oil/Grit Separator (OGS). This treatment train approach will provide a total of 90.8% TSS removal.

10 REPORT CONDITIONS AND LIMITATIONS

The report's conclusions are applicable only to this specific project described in the preceding pages. Any changes, modifications or additions will require a subsequent review by LRL Associates Ltd. to ensure compatibility with the recommendations contained in this document.

If you have any questions or comments, please contact the undersigned.

Prepared by:
LRL Associates Ltd.

Maxime Longtin
Civil Designer

Mohan Basnet, P.Eng.
Civil Engineer

APPENDIX A

Pre-consultation / Correspondance

Pre-Application Consultation Meeting Notes

Property Address: 3387 Borrisokane Road and Flagstaff Drive
PC2022-0071
2022-04-07

Applicant Attendees: Eric Forhan (JLR Richards), Alex Elgin (JLR Richards), Ram Balakrishnan.

City of Ottawa Attendees:
Josiane Gervais (TMP), Sami Rehman (Environmental), Tyler Cassidy (IMP), Mark Richardson (Forestry), Jeannette Krabicka (Parks), Aamani Sidhu (Development Review South), Selma Hassan (Urban Design), Katie O'Callaghan (Development Review South)

External Attendees: Eric Lalande (RVCA)

Regrets: Mark Richardson (Forestry)

Subject: 3387 Borrisokane Road and Flagstaff Drive

Meeting notes:

Opening & attendee introduction

- Introduction of meeting attendees
- Overview of proposal: Commercial plaza of approximately 11,830sq. ft (1,286m^2), split between retail and restaurant space with approximately 66 parking spots, as well as a patio area.

High-Level Planning Overview:

- Existing Official Plan - designated "General Urban Area" on Schedule B, Urban Policy Plan. The purpose of such designation is to permit the development of a full range and choice of housing types to meet the needs of all ages, incomes, and life circumstances, in combination with conveniently located employment, retail, service, cultural, leisure, entertainment and institutional uses.
- The New OP – designates the areas as "Suburban" with a "Neighbourhood" land use designation on Schedule B6 – Suburban (Southwest) Transect Policy Areas.
- The Suburban Transect is generally characterized by Low-to-Mid-density development. Development shall be low-rise within Neighbourhoods and along Minor Corridors
- Section 5.4.4. Provide direction for new development in the Suburban Transect
    - Policy 1) Greenfield development in the Suburban Transect will contribute to the evolution towards 15-minute neighbourhoods to the extent possible by incorporating:
    - A planned arrangement of streets, blocks, buildings, parks, public art, greenspace, active transportation corridors and linear parks that create a sense of place and orientation, by creating view corridors, focal points and generally framing a high-quality public realm
    - A fine-grained, fully connected grid street network with short blocks that encourage connectivity and walkability and define greenspaces. All streets should be access streets. Rear lands shall be encouraged where appropriate to improve urban design and minimize curb cuts along sidewalks in order to support safer and more comfortable pedestrian environments.

        a. Traffic flow and capacity may be permitted provided it minimizes negative impacts on the public realm, and maintains the priority of sustainable modes of transportation, and the safety of vulnerable road users;
    - Active transportation linkages that safely and efficiently connect residential areas to schools, places of employment, retail and entertainment, parks, recreational facilities, cultural assets and transit, natural amenities and connections to the existing or planned surrounding urban fabric, including to existing pedestrian and cycling routes
- City-Wide Policies – Policy 4.9 Water Resources
    - Section 4.9.3. Restrict or limit development and site alteration near surface water features:
    - 1) The minimum setback from surface water features shall be the development limits as established by a Council-approved watershed, sub watershed or environmental management plan.
    - 2) Where a Council-approved watershed, subwatershed or environmental management plan does not exist, or provides incomplete recommendations, the minimum setback from surface water features shall be the greater of the following:
        - Development limits as established by the conservation authority's hazard limit, which includes the regulatory flood line, geotechnical hazard limit and meander belt;
        - Development limits as established by the geotechnical hazard limit in keeping with Council approved Slope Stability Guidelines for Development Applications;
        - 30 metres from the top of bank, or the maximum point to which water can rise within the channel before spilling across the adjacent land; and
        - 15 metres from the existing stable top of slope, where there is a defined valley slope or ravine.
- The subject property falls within the Barrhaven South Community Design Plan which is a Council approved guide to the long-term growth and development of Barrhaven South. The lands have been designated "neighbourhood commercial", which provides opportunities for small-scale commercial areas that would provide commercial and personal uses to the surrounding neighbourhood.
    - A range of commercial and service uses will be permitted, such as retail stores, food stores, restaurants, personal service uses, financial institutions, business, medical and professional offices, and entertainment and recreation uses. Please refer to the policies and objectives of the CDP prior to submission.
- Zoning Information: Local Commercial, Subzone 7 [1694] LC7[1694]

Figure 1: Site Plan Prepared by Applicant

Preliminary comments and questions from staff and agencies, including follow-up actions:

Engineering (Tyler Cassidy)

List of Reports and Plans (Site Plan Control):

1. Site Servicing Plan
2. Grading Plan
3. Erosion and Sediment Control Plan
4. Storm Drainage / Ponding Plan
5. Stormwater Management and Site Servicing Report
6. Geotechnical Investigation Report

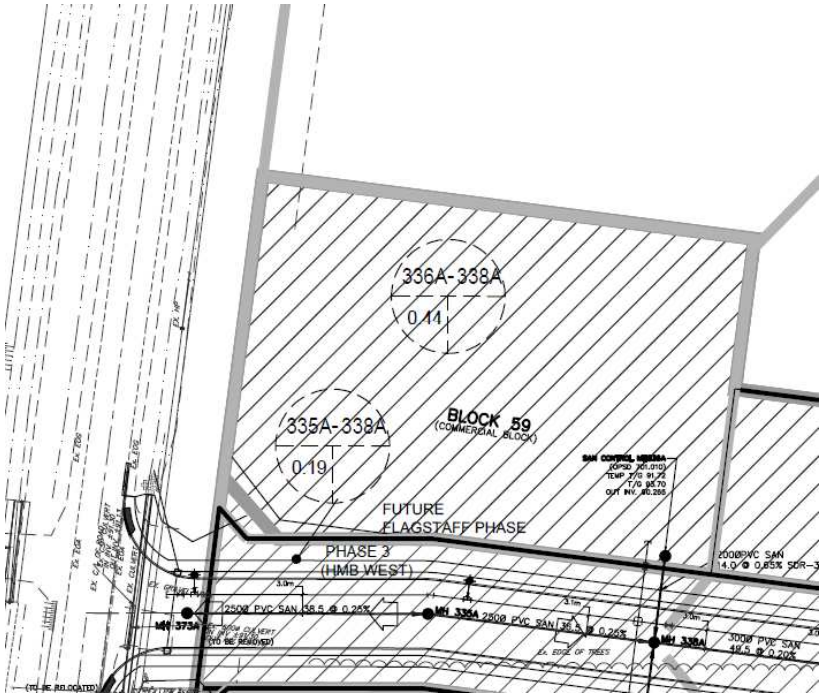
Please note the following information regarding the engineering design submissions for the above noted site:

1. The Servicing Study Guidelines for Development Applications are available at the following address: https://ottawa.ca/en/city-hall/planning-and-development/how-develop-property/development-application-review-process-2/guide-preparing-studies-and-plans
2. Servicing and site works shall be in accordance with the following documents:
   - Ottawa Sewer Design Guidelines (October 2012) 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 utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-2424 x 44455

3. The Stormwater Management Criteria, for the subject site, is to be based on the following (as established in the Half Moon Bay West Phase 3 Stormwater Management Report (**J.F. Sabourin & Associates**):
    - The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less (§ 8.3.7.3).
    - Quantity is controlled post-to-pre with the designated outlet being the roadside ditch on Borrisokane (5-year post-development flows controlled to 5-year pre-development, 100-year post-development flows controlled to the 100-year pre-development flow rate).
    - Flows to the storm sewer in excess of the pre-development flow for the respective design storm must be detained on site for storms up to the 1:100-year return.
    - Ensure no overland flow for all storms up to and including the 100-year event.
    - 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.
    - A calculated time of concentration (Cannot be less than 10 minutes).
    - Quality control requirements provided by Rideau Valley Conservation Authority (RVCA) are for "enhanced" target (80% TSS Removal).

4. Deep Services:



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:

      i. STM roadside ditch on Borrisokane Road
      ii. Existing 203 mm dia. Watermain (PVC) stub
      iii. Existing SAN Maintenance Hole (1200 mm dia.)(SAN MH 336A)

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. *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).*

iv. *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.

5. Civil consultant must request boundary conditions from the City's assigned Project Manager prior to first submission. 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:

   - Location of service(s)
   - Type of development and the amount of fire flow required (as per FUS, 1999).
   - Average daily demand: ___ l/s.
   - Maximum daily demand: ___l/s.
   - Maximum hourly daily demand: ___ l/s.
   - Hydrant location and spacing to meet City's Water Design guidelines.
   - Water supply redundancy will be required for more than 50 m3/day water demand.

6. 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.

7. MECP ECA Requirements (Standard) –
   All development applications should be considered for an Environmental Compliance Approval (ECA) by the Ministry of the Environment, Conservation, and Parks (MECP);
   - 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.
   - The project will be either transfer of review (standard), transfer of review (additional), direct submission, or exempt as per O. Reg. 525/98.
   - Standard Works ToR Draft ECA's are sent to the local MECP office (moeccottawasewage@ontario.ca) for information only
   - Additional ToR draft ECAs require a project summary/design brief and require a response from the local MECP (10 business day window)
   - Site plan Approval, or Draft Approval, is required before an application is sent to the MECP

8. General/ additional comments:

   - Only one watermain connection per site. However, looping would be required if proposed demand is 50m3/day or greater.

- A pre and post construction CCTV inspection is required for re-using any existing servicing connections.

Transportation (Josaine Gervais)

- Follow Transportation Impact Assessment Guidelines:
  - A TIA is required. Submit the Scoping Report to josiane.gervais@ottawa.ca.
  - 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)
  - An update to the *TRANS Trip Generation Manual* has been completed (October 2020). This manual is to be utilized for this TIA. A copy of this document can be provided upon request.
- ROW protection on Borrisokane between Strandherd and Cambrian of 37.5m even. There is currently no timing for widening of Borrisokane.
- Corner triangles as per OP Annex 1 - Road Classification and Rights-of-Way at the following locations on the final plan will be required (measure on the property line/ROW protected line; no structure above or below this triangle): Collector Road to Arterial Road: 5 m x 5 m
- Provide clear throat length of 8m. The clear throat length is measured from the ends of the driveway curb return radii at the roadway and the point of first conflict on-site.
- Access on Flagstaff is supported. Corner clearances should follow minimum distances set out within TAC Figure 8.8.2.
- TMP includes: New Greenbank Road realignment (2031 Network Concept)
- As the proposed site is commercial and for general public use, AODA legislation applies.
  - Ensure all crosswalks located internally on the site provide a TWSI at the depressed curb, per requirements of the Integrated Accessibility Standards Regulation under the AODA.
  - Clearly define accessible parking stalls and ensure they meet AODA standards (include an access aisle next to the parking stall and a pedestrian curb ramp at the end of the access aisle, as required).
  - Please consider using the City's Accessibility Design Standards, which provide a summary of AODA requirements. https://ottawa.ca/en/city-hall/creating-equal-inclusive-and-diverse-city/accessibility-services/accessibility-design-standards-features#accessibility-design-standards
- On site plan:
  - Ensure site access meets the City's Private Approach Bylaw.
  - 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 and fall within TAC guidelines (Figure 8.5.1).
  - Show dimensions for site elements (i.e. lane/aisle widths, access width and throat length, parking stalls, sidewalks, pedestrian pathways, etc.)
  - 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.
- Noise Impact Studies required for the following:

- Stationary, if there will be any exposed mechanical equipment due to the proximity to neighboring noise sensitive land uses.

RVCA Comments (Eric Lalande)

- Floodplain mapping completed by RVCA, zoning flood overlay zone to be updated by City.
- Water Quality Protection required at 80%, please identify how it will be achieved, (downstream facility vs. on-site control)?
- Road access and buffering along watercourse corridor should include protections to minimize impacts of commercial use into the corridor. Elements such as waste disposal, snow dumping and road salt, should be factored into design.
- Enhanced planting and buffering encouraged along easterly property line.
- Given the limits of the floodplain adjacent to the property, Conservation Authority (Section 28) permits will be required prior to Building Permits, the RVCA will work through the site plan process to ensure compatibility with RVCA policies to facilitate approval of a Section 28 permit.

Environmental (Sami Rehman)

- Since the subject property is adjacent to a watercourse, an EIS will be required under the new Official Plan policies.
- Given the limited natural features in the area, we will accept a scoped EIS.
- The EIS should focus on designing the appropriate interface adjacent to the corridor and mitigating impacts from the development on the watercourse. The assessment should include, but not limited to, impacts from the refuse, salt and snow storage on the watercourse corridor.
- We would like to see locally appropriate native trees and shrubs as part of the site's design, especially along that eastern property edge adjacent to the watercourse corridor.
- The site's storm water management should also direct all stormwater to the Right of Way and not to the watercourse corridor, which is intended to be an amphibian corridor. We would also encourage incorporating LID structures into their design.
- I would also recommend consulting with the Rideau Valley Conservation Authority to determine if any permits or authorizations are required.

Parks & Facilities Planning Comments (Jeannette Krabicka)

1. Parkland Dedication Notes

a. 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 (as amended or superseded).

b. Section 13 (1) of the By-law states that:
The conveyance of land for park purposes or the payment of money in-lieu of accepting the conveyance is not required for development, redevelopment, subdivisions or consents, where it is known, or can be demonstrated that the required parkland conveyance or money in-lieu thereof has been previously satisfied in accordance with the Planning Act, unless

i) There is a change in the proposed development or redevelopment that would increase the density providing a net unit gain; or

ii) Land originally proposed for development or redevelopment for commercial or industrial purposes is now proposed for development or redevelopment for other purposes.

c. The proposed development site is located within a current Plan of Subdivision application in which the parkland dedication requirement is being satisfied for this block; the calculation for

commercial development is being used. Please refer to the Development Review file D07-16-16-0018. Furthermore, neither sub-sections 'i' nor 'ii', above, apply to the proposed development.

d. Therefore, based on the proposed use as presented in the Pre-Application Consultation meeting, this Site Plan Application proposal may be considered exempt from parkland dedication requirements.

e. Please note that the park comments are preliminary and will be finalized (and subject to change) upon receipt of the development application. Additionally, if the proposed land use changes, then the parkland dedication requirement be re-evaluated accordingly.

2. Planning Rationale

a. As part of the Planning Rationale to be submitted for circulation, please include a section which specifies how the proposed development will address the Parkland Dedication requirements (as per above); it is helpful to have this clearly outlined in the Rationale for others to see.

3. To be Noted

a. Parks & Facilities Planning is currently undertaking a legislated review for the replacement of the Parkland Dedication By-law, with the new by-law to be considered by City Council in early July 2022. To ensure you are aware of parkland dedication requirements for your proposed Parks & Facilities Planning, City of Ottawa development, we encourage you to familiarize yourself with the existing Parkland Dedication By-law and to sign up for project notifications on the Engage Ottawa project page or by emailing the project lead at Kersten.Nitsche@ottawa.ca

City Surveyor (Bill Harper)

- The determination of property boundaries, minimum setbacks and other regulatory constraints are a critical component of development. An Ontario Land Surveyor (O.L.S.) needs to be consulted at the outset of a project to ensure properties are properly defined and can be used as the geospatial framework for the development.
- Topographic details may also be required for a project and should be either carried out by the O.L.S. that has provided the Legal Survey or done in consultation with the O.L.S. to ensure that the project is integrated to the appropriate control network.

Questions regarding the above requirements can be directed to the City's Surveyor, Bill Harper, at Bill.Harper@ottawa.ca

Forestry (Mark Richardson)

- A tree permit is required prior to any tree removal on site
- Please submit a TCR with your application

TCR requirements:

1) A Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City
    a. an approved TCR is a requirement of Site Plan approval.
    b. The TCR may be combined with the LP provided all information is supplied
2. Any removal of privately-owned trees 10cm or larger in diameter, or city-owned trees of any 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.

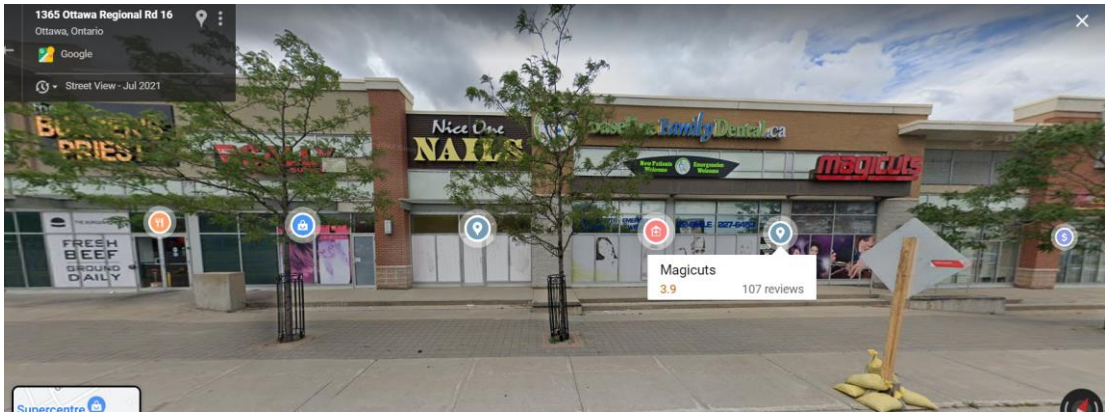
3. The Planning Forester from Planning and Growth Management as well as foresters from Forestry Services will review the submitted TCR
    a. If tree removal is required, both municipal and privately-owned trees will be addressed in a single permit issued through the Planning Forester
    b. Compensation may be required for city owned trees – if so, it will need to be paid prior to the release of the tree permit
4. the TCR must list all trees on site, as well as off-site trees if the CRZ extends into the developed area, by species, diameter and health condition
5. please identify trees by ownership – private onsite, private on adjoining site, city owned, co-owned (trees on a property line)
6. If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained
7. 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
    a. the location of tree protection fencing must be shown on the plan
    b. show the critical root zone of the retained trees
    c. if excavation will occur within the critical root zone, please show the limits of excavation
8. 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.
9. For more information on the process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca or on City of Ottawa

Urban Design (Selma Hassan)
Built Form

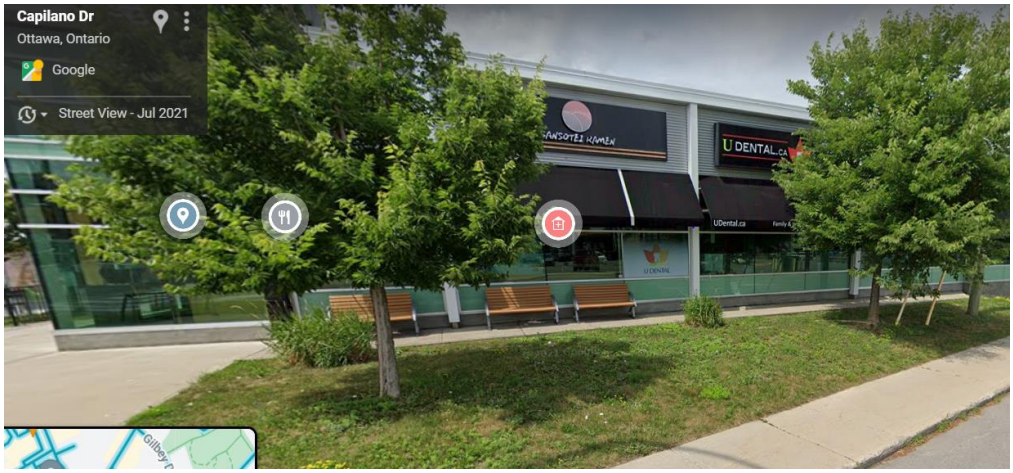
1. As discussed at the pre-consultation, the challenge with these buildings is how to deal with the realities of where parking is and where businesses will want their doors. Below are some examples of the 'problems' to try to figure out.

    Walmart Plaza on Baseline Road (near Clyde Ave.) – This is a good example of 'papered' windows and locked doors facing the main street. This often happens when the commercial use needs an area at the back for storage, an office, employee washrooms etc. It can also happen for uses like a dental clinic where you don't want people watching the medical appointments.

    While the architecture is fine and has the potential to contribute to the street, the functional realities of the commercial business mean that two entries don't work and there is little pedestrian activity along the façade.



If the applicant decides to provide commercial access from the rear (parking lot), then the street facing facades must still contribute to the streetscape. Blank walls as show in the image on the left (Meadowlands and Fisher) are not acceptable. The image on the right (Capilano and Meadowlands) is a better example of what is expected in terms for architecture facing the public street.



2. It is suggested that the applicant consider splitting the building in two (see attached sketch). This could create a better overall development, create additional patio space and, thereby, animate the space and improve pedestrian connections.
3. With the applicant's formal submission, we would expect to see building elevations for all facades. The elevations are to clearly show the materials proposed, the placement of all windows and doors, and any features such as arcades or awnings.

Pedestrians and cyclists

4. If the applicant decides to provide access doors from the pkg area, then the walkways in front of the building would seem to be redundant (see attached sketch). The walkways should be converted to landscape area, with tree planting, to enhance streetscape. Removing the dual sidewalks will also prevent people from cutting across the thin planted strip to get from one sidewalk to the next; this type of pedestrian movement would only compact the planting area and lead to poor tree growth.
5. The attached sketch shows a broad pedestrian walkway (to / from the parking area) that would also serve to create additional patio space for commercial tenants. As noted in #2, this could create a better overall development.
6. The bike racks should be placed on a firm, concrete base. The bike racks should also be in a highly visible location to enhance use, and for reasons of safety and security.

Landscape and parking

7. The parking provided is quite a bit greater than the parking required for the site. The applicant is asked to remove some parking spaces in favour of increased buffering planting, more snow storage space and better access to the garbage area (see attached sketch).
8. The landscape plan should show a row of trees along both Borrisokane and Flagstaff. The selected trees must be tolerant of urban conditions (e.g., salt, lack of moisture, compaction). There must also be adequate soil volumes for proper tree growth.
9. A landscape plan is required with the applicant's formal submission.

Planning Comments (Katie O'Callaghan)

- The project triggers a Standard Site Plan Control Application with no public consultation, the size threshold is under 1,860 square metres.
- The site is within the boundary of the Barrhaven South Community Design Plan (CDP). Please reference the CDP in the planning rationale.
- Please ensure that the required site plan contains a Zoning Table outlining how the proposal complies with the requirements of Section 161, pertaining to the LC Zone. In instances where the proposal does not comply, please note that.
- Please consider additional pedestrian connectivity throughout the site to maintain active frontages. Or consider breaking up the plaza to enhance the patio corner feature.
- Please include the number of bike stalls on the site plan and indicate the bicycle parking space dimensions.
- The City would like to see bike racks in a highly visible location for safety and ease of convenience, consider relocating the bike racks to encourage more active travel to and from the plaza.
- To minimize the heat island effect and reduce potential for salt intrusion, consider removing the additional parking to add trees that can promote a useful tree canopy.
- Please show landscaping in more detail in the submission. Should additional trees/shrubs be added to the site please consider planting pollinator species and species native to the Ottawa area. For further information, please visit: https://ottawa.ca/en/living-ottawa/environment-conservation-and-climate/wildlife-and-plants/plants
- Please ensure the site plan indicates and delineates where snow removal will be placed on the site plan. If snow is to be removed from the site, please note that on the site plan as well.
- As part of next steps, please reach out to the local ward Councilor to discuss this proposal, along with any local community associations.

Submission requirements and fees

- Outline the submission requirements and fees.
- Additional information regarding fees related to planning applications can be found here.
- Plans are to be standard A1 size (594 mm x 841 mm) sheets, utilizing an appropriate Metric scale (1:200, 1:250, 1:300, 1:400 or 1:500).
- All PDF submitted documents are to be unlocked and flattened.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	146.8	75.3
Peak Hour	142.8	69.7
Max Day plus Fire Flow #1	143.7	71.0
[1] Ground Elevation =	93.8	m

Notes

1. As per the Ontario Building Code in areas that may be occupied, the static pressure at any fixture shall not exceed 552 kPa (80 psi.) Pressure control measures to be considered are as follows, in order of preference:
    a. If possible, systems to be designed to residual pressures of 345 to 552 kPa (50 to 80 psi) in all occupied areas outside of the public right-of-way without special pressure control equipment.
    b. Pressure reducing valves to be installed immediately downstream of the isolation valve in the home/ building, located downstream of the meter so it is owner maintained.

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. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

APPENDIX B

Water Supply Calculations & Fire Hydrant Coverage

Water Supply Calculations

LRL File No.	220775
Date	2022-09-07
Project Name	Commercial Plaza SPC
Address	652 Flagstaff Drive, Ottawa Ontario
Prepared by	Tamara Harb

Commerical Demands					
Property Type	**Unit**	**Rate**	**Units**		**Demand (L/d)**
Commerical Space	28000	L/ha/d	0.137	ha	3836.0

Average Day Demand	**3,836**	**L/d**	**0.044**	**L/s**
Maximum Day Factor	1.5		(City of Ottawa Design Guidelines-Table 4.2)	
Maximum Daily Demand	**5,754**	**L/d**	**0.067**	**L/s**
Peak Hour Factor	1.8		(City of Ottawa Design Guidelines-Table 4.2)	
Maximum Hour Demand	**6,905**	**L/d**	**0.080**	**L/s**

Water Service Pipe Sizing

Q = VA

Where: V = velocity
A = area of pipe
Q = flow rate

Assuming a maximum velocity of 1.8m/s, the diameter of pipe is calculated as:

Minimum pipe diameter (d) =	$(4Q/\pi V)^{1/2}$	
=	0.008	m
=	8	mm
Proposed pipe diameter (d) =	**150**	mm
=	**6**	Inches

Fire Flow Calculations

LRL File No. 220775
Date May 5, 2023
Method Fire Underwriters Survey (FUS)
Prepared by Tamara Harb

Step	Task	Term	Options	Multiplier	Choose:	Value	Unit	Fire Flow
Structural Framing Material								
1	Choose frame used for building	Coefficient C related to the type of construction	Wood Frame	1.5	Non-combustible construction	**0.8**		
			Ordinary Construction	1.0				
			Non-combustible construction	0.8				
			Fire resistive construction <2 hrs	0.7				
			Fire resistive construction >2 hrs	0.6				
Floor Space Area (A)								
2	Building Footprint					**1,370**	m^2	
3	Obtain fire flow before reductions	Required fire flow *(rounded to nearest 1,000 L/min)*	Fire Flow = 220 x C x $A^{0.5}$				L/min	**7,000**
Reductions or surcharge due to factors affecting burning								
4	Choose combustibility of contents	Occupancy hazard reduction or surcharge	Non-combustible	-25%	Limited combustible	**-15%**	L/min	**5,950**
			Limited combustible	-15%				
			Combustible	0%				
			Free burning	15%				
			Rapid burning	25%				
5	Choose reduction for sprinklers	Sprinkler reduction	Full automatic sprinklers	-30%	True	**-30%**	L/min	**2,975**
			Water supply is standard for both the system and fire department hose lines	-10%	True	**-10%**		
			Fully supervised system	-10%	True	**-10%**		
6	Choose separation	Exposure distance between units	Northwest side	>30m	0%		L/min	**2,975**
			Southwest side	>30m	0%			
			Northeast side	>30m	0%			
			Southeast side	>30m	0%	**0%**		
Net required fire flow								
7	Obtain fire flow, duration, and volume	Minimum required fire flow rate (rounded to nearest 1000)					L/min	**3,000**
		Minimum required fire flow rate					L/s	**50.0**
		Required duration of fire flow					hr	**1**

Tamara Harb

From: Matthew Beerman <matt.beerman@258arch.com>
Sent: April 28, 2023 12:56 PM
To: Tamara Harb
Cc: Jay Lim; Mohan Basnet; Maxime Longtin
Subject: Re: 65 Borrisokane : Fire Demand Info for Boundary Conditions

Hi Tamara,

Great meeting with you this morning.

Apologies for the delay on this item, we received confirmation from the client team on the following items, please see our responses to your questions outlined in blue below:

1. **Can you confirm if sprinklers are proposed for the buildings? If yes, will the sprinkler system be fully supervised and automatic?**
   a.

   Although not technically required by code, the client has indicated that they would like the building to be sprinklered. It is intended to be a fully automatic and monitored system.

2. **Could you confirm the Type of building construction?**

The following Construction Types and Coefficients are used in the required fire flow formula:

C	=	1.5 for **Type V** Wood Frame Construction
	=	0.8 for **Type IV-A** Mass Timber Construction
	=	0.9 for **Type IV-B** Mass Timber Construction
	=	1.0 for **Type IV-C** Mass Timber Construction
	=	1.5 for **Type IV-D** Mass Timber Construction
	=	1.0 for **Type III** Ordinary Construction
	=	0.8 for **Type II** Noncombustible Construction
	=	0.6 for **Type I** Fire Resistive Construction

Client indicated that the construction is intended to be slab-on-grade construction, with a steel structure and steel stud partitions/ envelope walls.
I.E. Type II - Non-combustible construction.

3. **Please confirm the type of Occupancy contents. See info below. I have also attached the Water Supply for Public Fire Protection Guide to this email. Table 3 on page 25 provides examples of the occupancy contents.**

- *Noncombustible Contents* *-25%*
  - Includes merchandise or materials, including stock, or equipment, which in permissible quantities does not in themselves constitute an active fuel for the spread of fire.
  - May include limited or controlled amounts of combustible material, not exceeding 5% of the Total Effective Area of the occupancy. Combustible components of construction (ex. interior walls, finishes, etc.) should be included in the limit on combustible materials.
- *Limited Combustible Contents* *-15%*
  - Includes merchandise or materials, including furniture, stock, or equipment, of low combustibility, with limited concentrations of combustible materials.
- Combustible Contents 0% no adjustment
  - Includes merchandise or materials, including furniture, stock, or equipment, of moderate combustibility.
- *Free Burning Contents* *+15%*
  - Includes merchandise or materials, including furniture, stock, or equipment, which burn freely, constituting an active fuel.
- *Rapid Burning Contents* *+25%*
  - Includes merchandise or materials, including furniture, stock, or equipment, which either
    - Burn with great intensity
    - spontaneously ignite and are difficult to extinguish
    - give off flammable or explosive vapors at ordinary temperatures
    - as a result of an industrial processing, produce large quantities of dust or other finely divided debris subject to flash fire or explosion

The client has indicated that they would like to keep tenant occupancy possibilities open, therefore, the type of occupancy contents would come down to the anticipated occupancy of the different units.

According to the document provided, it appears we would be using a Limited to Combustible (-15% to 0%) value based on the fact that this would be classified as Type E - Merchantile Use (shops/stores) occupancy and/or type D - Business Use (Banks, Barbers, Beauty parlors, Dental offices, etc.). Both of these uses fall within the same combustibility range.

Regardless, as previously discussed, we would prefer to proceed with the most conservative option to allow for a wide range of possible tenant occupancies.

If you have any questions or concerns with this info, please don't hesitate to reach out to us for clarification.

Best,

Matt Beerman, Architectural Designer III
M.ARCH

25:8 Architecture + Urban Design
The Studio @ 642 Somerset Street West, Ottawa, ON. K1R 5K4

From: Tamara Harb <tharb@lrl.ca>
Sent: Tuesday, April 25, 2023 12:02 PM
To: Matthew Beerman <matt.beerman@258arch.com>
Cc: Jay Lim <jay.lim@258arch.com>; Mohan Basnet <mbasnet@lrl.ca>; Maxime Longtin <mlongtin@lrl.ca>
Subject: 65 Borrisokane : Fire Demand Info for Boundary Conditions

Boundary Conditions
652 Flagstaff Drive

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	3	0.044
Maximum Daily Demand	4	0.067
Peak Hour	5	0.080
Fire Flow Demand #1	3,000	50

Location

Results

Scenario 1

Existing Condition (Pressure Zone 3SW)

Connection 1 – Flagstaff Dr.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	156.5	90.2
Peak Hour	142.6	70.4
Max Day plus Fire Flow #1	143.4	71.5

[1] Ground Elevation = 93.1 m

Future Condition (Pressure Zone SUC)

Connection 1 – Flagstaff Dr.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	146.8	76.3
Peak Hour	142.8	70.7
Max Day plus Fire Flow #1	143.6	71.9
[1] Ground Elevation =	93.1	m

Scenario 2

Existing Condition (Pressure Zone 3SW)

Connection 1 – Flagstaff Dr.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	156.5	90.2
Peak Hour	142.6	70.4
Max Day plus Fire Flow #1	143.4	71.5
[1] Ground Elevation =	93.1	m

Connection 2 – Flagstaff Dr.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	156.5	89.2
Peak Hour	142.6	69.4
Max Day plus Fire Flow #1	143.4	70.5
[1] Ground Elevation =	93.8	m

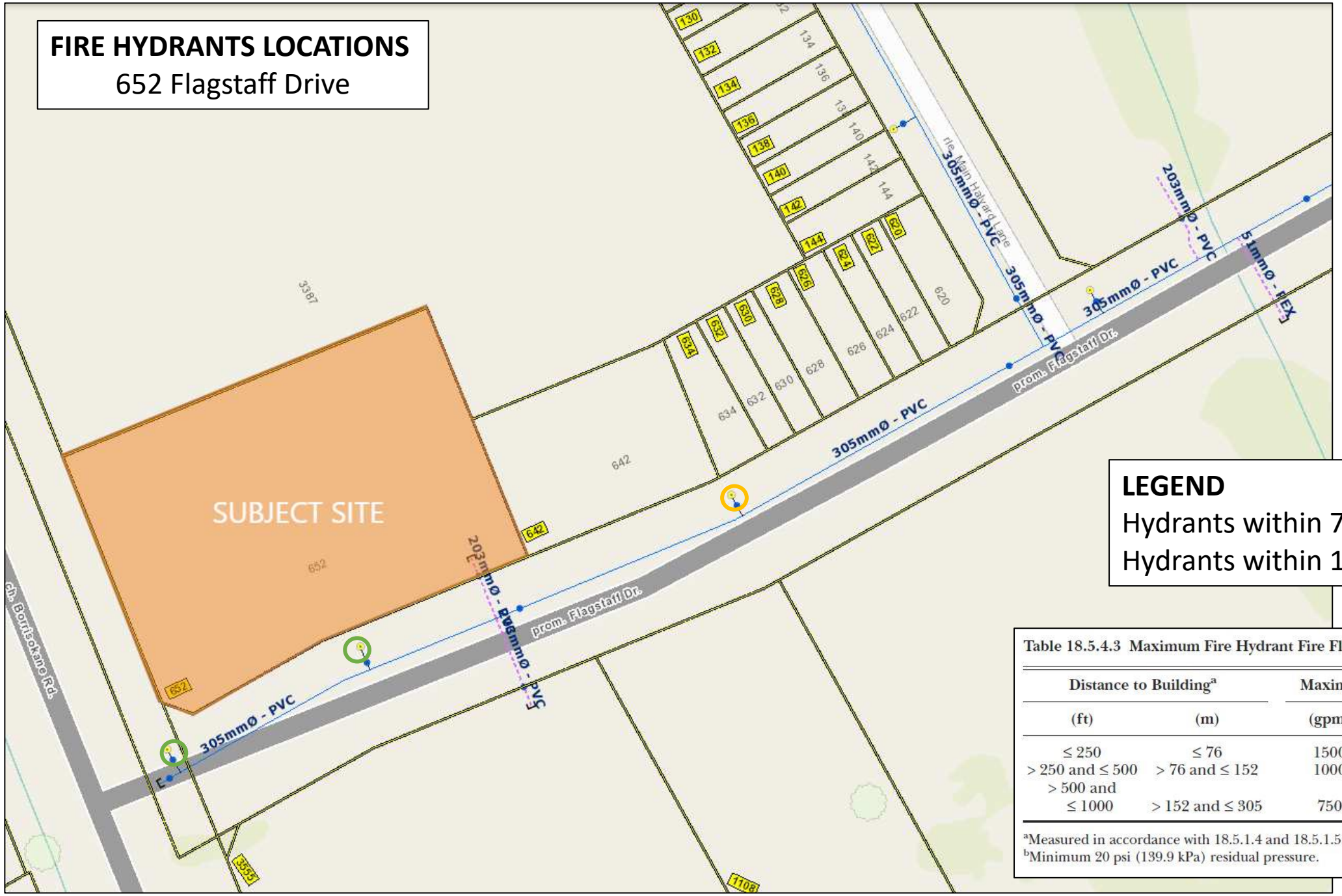
Future Condition (Pressure Zone SUC)

Connection 1 – Flagstaff Dr.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	146.8	76.3
Peak Hour	142.8	70.7
Max Day plus Fire Flow #1	143.6	71.9
[1] Ground Elevation =	93.1	m

Connection 2 – Flagstaff Dr.

FIRE HYDRANTS LOCATIONS
652 Flagstaff Drive



LEGEND
Hydrants within 75m
Hydrants within 150m

Table 18.5.4.3 Maximum Fire Hydrant Fire Flow Capacity

Distance to Building[a]		Maximum Capacity[b]	
(ft)	(m)	(gpm)	(L/min)
≤ 250	≤ 76	1500	5678
> 250 and ≤ 500	> 76 and ≤ 152	1000	3785
> 500 and ≤ 1000	> 152 and ≤ 305	750	2839

[a]Measured in accordance with 18.5.1.4 and 18.5.1.5.
[b]Minimum 20 psi (139.9 kPa) residual pressure.

APPENDIX C

Wastewater Collection Calculations

LRL File No.	220775	
Project:	Commercial Plaza Site Plan Control	
Location:	652 Flagstaff Drive, Ottawa ON	
Date:	06-16-2023	
Designed:	Tamara Harb	
Drawing Ref.:	C401	

Sanitary Design Parameters

Commercial & Institutional Flow = 28000 L/ha/day
Light Industrial Flow = 35000 L/ha/day
Heavy Industrial Flow = 55000 L/ha/day
Maximum Residential Peak Factor = 4.0
Commercial & Institutional Peak Factor = 1.5

Average Daily Flow = 280 L/p/day
Daily Flow for Places of Employment = 75L/p/day
Industrial Peak Factor = as per Appendix 4-B = 7
Extraneous Flow = 0.33L/s/gross ha

Pipe Design Parameters

Minimum Velocity = 0.60 m/s
Manning's n = 0.013

LOCATION			RESIDENTIAL AREA AND POPULATION						COMMERCIAL		INDUSTRIAL			OFFICE		C+I+I	INFILTRATION			TOTAL FLOW (l/s)	PIPE					
STREET	FROM	TO	AREA (Ha)	POP.	CUMMULATIVE AREA (Ha)	CUMMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (Ha)	ACCU. AREA (Ha)	AREA (Ha)	ACCU. AREA (Ha)	PEAK FACT.	POP	ACCU. POP	PEAK FLOW (l/s)	TOTAL AREA (Ha)	ACCU. AREA (Ha)	INFILT. FLOW (l/s)		LENGTH (m)	DIA. (mm)	SLOPE (%)	MATERIAL	CAP. (FULL) (l/s)	VEL. (FULL) (m/s)
Flagstaff Drive	Bldg	Prop SAN MH01	0.439	0.0	0.439	0.0	3.8	0.00	0.137	0.137	0.00	0.00	7.0	0.0	0.0	0.07	0.439	0.439	0.14	**0.21**	2.7	150	2.00%	PVC	**21.54**	**1.22**
Flagstaff Drive	PROP SAN MH01	EX 250mm dia. SEWER	0.000	0.0	0.00	0.0	3.8	0.00	0.000	0.137	0.00	0.00	7.0	0.0	0.0	0.07	0.000	0.439	0.14	**0.21**	12.8	150	2.00%	PVC	**21.54**	**1.22**

NOTES	Existing inverts and slopes are estimated. They are to be confirmed on-site.

Designed: **TH**	PROJECT: **Commerical Plaza Site Plan Control**		
Checked: **MB**	LOCATION: **652 Flagstaff Drive**		
Dwg. Reference: **C.401**	File Ref.: **220775**	Date: **2023-06-16**	Sheet No. 1 of 1

APPENDIX D

Stormwater Management Calculations

LRL Associates Ltd.
Storm Watershed Summary

LRL File No.	220775
Project:	Commerical Plaza Site Plan Control
Location:	652 Flagstaff Drive, Ottawa ON
Date:	August 2, 2023
Designed:	Tamara Harb
Drawing Reference:	C701/C702

Pre-Development Catchments

WATERSHED	C = 0.2	C=0.7	C = 0.90	Total Area (m^2)	Total Area (ha)	Combined C
EWS-01	4390.0	0.0	0.0	4390.0	0.439	0.20
TOTAL	**4390.0**	**0.0**	**0.0**	**4390.0**	**0.439**	**0.20**

Post-Development Catchments

WATERSHED	C = 0.20	C = 0.70	C = 0.90	Total Area (m^2)	Total Area (ha)	Combined C
WS-01(CONTROLLED)	0.00	0.00	184.45	184.45	0.018	0.90
WS-02 (CONTROLLED)	0.00	0.00	981.50	981.50	0.098	0.90
WS-03 (CONTROLLED)	65.82	0.00	946.51	1012.33	0.101	0.85
WS-04 (CONTROLLED ROOF)	0.00	0.00	1581.23	1581.23	0.158	0.90
WS-05 (UN-CONTROLLED)	162.29	0.00	0.00	162.29	0.016	0.20
WS-06 (UN-CONTROLLED)	87.65	0.00	380.52	468.17	0.047	0.77
TOTAL	**315.8**	**0.0**	**4074.2**	**4390.0**	**0.439**	**0.85**

LRL File No. 220775
Project: Commerical Plaza Site Plan Control
Location: 652 Flagstaff Drive, Ottawa ON
Date: August 2, 2023
Designed: Tamara Harb
Drawing Ref.: C601

Stormwater Management
Design Sheet
2-Year Post to 2-Year Pre

Runoff Equation

Q = 2.78CIA (L/s)
C = Runoff coefficient
I = Rainfall intensity (mm/hr) = $A / (Td + C)^B$
A = Area (ha)
T_c = Time of concentration (min)

Pre-development Stormwater Management - 2 Year Storm

2 Year Storm Event:

$I2 = 732.95 / (Td + 6.199)^{0.81}$ **a = 732.951** **b = 0.810** **C = 6.199**

C =	0.20	max of 0.5 as per City of Ottawa
I =	76.8	mm/hr
Tc =	10	min
Total Area =	0.439	ha

Allowable Release Rate= **18.75** L/s

Post-development Stormwater Management

					$\sum R_{2\&5}$
	Total Site Area =	**0.439**	ha	**∑R=**	
Controlled	WS-01(CONTROLLED)	0.018	ha	R=	0.90
	WS-02 (CONTROLLED)	0.098	ha	R=	0.90
	WS-03 (CONTROLLED)	0.101	ha	R=	0.85
	WS-04 (CONTROLLED ROOF)	0.158	ha	R=	0.90
	Total Controlled through ICD	**0.376**	**ha**	**∑R=**	**0.89**
Un-controlled	WS-05 (UN-CONTROLLED)	0.016	ha	R=	0.20
	WS-06 (UN-CONTROLLED)	0.047	ha	R=	0.77
	Total Un-Controlled =	**0.063**	**ha**	**∑R=**	**0.62**

Post-development Stormwater Management (Uncontrolled Catchment WS-05 & WS-06)

2 Year Storm Event:

$I2 = 732.95 / (Td + 6.199)^{0.81}$ **a = 732.951** **b = 0.810** **C = 6.199**

Time (min)	Intensity (mm/hr)	Uncontrolled Runoff (L/s)	Controlled Release Rate Constant (L/s)	Total Release Rate (L/s)
10	76.8	8.38	0.00	8.38

Post-development Stormwater Management (WS-01, WS-02, WS-03 & WS-04)

2 Year Storm Event:

$I2 = 732.95 / (Td + 6.199)^{0.81}$ **a = 732.951** **b = 0.810** **C = 6.199**

		Storage Required				
Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate Constant (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	76.8	71.26	38.54	7.03	0.00	7.03
15	61.8	57.31	45.25	7.03	0.00	7.03
20	52.0	48.28	49.49	7.03	0.00	7.03
25	45.2	41.91	52.31	7.03	0.00	7.03
30	40.0	37.15	54.22	7.03	0.00	7.03
35	36.1	33.46	55.49	7.03	0.00	7.03
40	32.9	30.49	56.30	7.03	0.00	7.03
45	30.2	28.06	56.76	7.03	0.00	7.03
50	28.0	26.02	56.95	7.03	0.00	7.03
60	24.6	22.79	56.71	7.03	0.00	7.03
70	21.9	20.33	55.85	7.03	0.00	7.03
80	19.8	18.40	54.55	7.03	0.00	7.03
90	18.1	16.83	52.92	7.03	0.00	7.03
100	16.7	15.54	51.03	7.03	0.00	7.03
110	15.6	14.45	48.92	7.03	0.00	7.03
120	14.6	13.51	46.64	7.03	0.00	7.03

Total Storage Required = **56.95** m^3
Available Underground Storage = **63.68** m^3

There will be no surface storage at the 2 year storm.
refer to LRL Plan C601

LRL File No.	220775
Project:	Commerical Plaza Site Plan Control
Location:	652 Flagstaff Drive, Ottawa ON
Date:	August 2, 2023
Designed:	Tamara Harb
Drawing Ref.:	C601

Stormwater Management
Design Sheet
2-Year Post to 2-Year Pre

SUMMARY OF RELEASE RATES AND STORAGE VOLUMES				
CATCHMENT AREAS	**DRAINAGE AREAS (ha)**	**2-YEAR RELEASE RATE**	**2-YEAR REQUIRED STORAGE (m3)**	**TOTAL AVAILABLE STORAGE - UNDERGROUND AND SURFACE (m3)**
WS-01(CONTROLLED)	0.018	7.03	56.95	63.68
WS-02 (CONTROLLED)	0.098			
WS-03 (CONTROLLED)	0.101			
WS-04 (CONTROLLED ROOF)	0.158			
Total Controlled through ICD	**0.376**	**7.03**	**56.95**	**63.68**
WS-05 (UN-CONTROLLED)	0.016	8.38	0	0
WS-06 (UN-CONTROLLED)	0.047			
Total Un-Controlled =	**0.063**	**8.38**	**0.00**	**0.00**
TOTAL	**0.439**	**15.41**	**56.95**	**63.68**

LRL File No. 220775
Project: Commerical Plaza Site Plan Control
Location: 652 Flagstaff Drive, Ottawa ON
Date: August 2, 2023
Designed: Tamara Harb
Drawing Ref.: C601

Stormwater Management Design Sheet
5-Year Post to 5-Year Pre

Runoff Equation

Q = 2.78CIA (L/s)
C = Runoff coefficient
I = Rainfall intensity (mm/hr) = $A / (Td + C)^B$
A = Area (ha)
T_c = Time of concentration (min)

Pre-development Stormwater Management - 5 Year Storm

5 year storm

$I_5 = 998.071 / (Td + 6.053)^{0.814}$ a = 998.071 b = 0.814 C = 6.053

C =	0.20	max of 0.5 as per City of Ottawa
I =	104.2	mm/hr
Tc =	10	min
Total Area =	0.439	ha

Allowable Release Rate= 25.43 L/s

Post-development Stormwater Management

					$\sum R_{2\&5}$
	Total Site Area =	**0.439**	ha	**∑R=**	
Controlled	WS-01(CONTROLLED)	0.018	ha	R=	0.90
	WS-02 (CONTROLLED)	0.098	ha	R=	0.90
	WS-03 (CONTROLLED)	0.101	ha	R=	0.85
	WS-04 (CONTROLLED ROOF)	0.158	ha	R=	0.90
	Total Controlled (Through ICD)	**0.376**	**ha**	**∑R=**	**0.89**
Un-controlled	WS-05 (UN-CONTROLLED)	0.016	ha	R=	0.20
	WS-06 (UN-CONTROLLED)	0.047	ha	R=	0.77
	Total Un-Controlled =	**0.063**	**ha**	**∑R=**	**0.62**

Post-development Stormwater Management (Uncontrolled Catchment WS-05 & WS-06)

5 Year Storm Event:

$I_5 = 998.071 / (Td + 6.053)^{0.814}$ a = 998.071 b = 0.814 C = 6.053

Time (min)	Intensity (mm/hr)	Uncontrolled Runoff (L/s)	Controlled Release Rate Constant (L/s)	Total Release Rate (L/s)
10	104.2	11.37	0.00	11.37

Post-development Stormwater Management (WS-01, WS-02, WS-03 & WS-04)

5 Year Storm Event:

$I_5 = 998.071 / (Td + 6.053)^{0.814}$ a = 1735.688 b = 0.820 C = 6.014

		Storage Required				
Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate Constant (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	104.2	96.67	49.56	14.07	0.00	14.07
15	83.6	77.53	57.11	14.07	0.00	14.07
20	70.3	65.18	61.34	14.07	0.00	14.07
25	60.9	56.50	63.65	14.07	0.00	14.07
30	53.9	50.04	64.74	14.07	0.00	14.07
35	48.5	45.02	64.99	14.07	0.00	14.07
40	44.2	41.00	64.63	14.07	0.00	14.07
45	40.6	37.70	63.80	14.07	0.00	14.07
50	37.7	34.94	62.61	14.07	0.00	14.07
60	32.9	30.57	59.40	14.07	0.00	14.07
70	29.4	27.25	55.38	14.07	0.00	14.07
80	26.6	24.64	50.78	14.07	0.00	14.07
90	24.3	22.54	45.73	14.07	0.00	14.07
100	22.4	20.79	40.34	14.07	0.00	14.07
110	20.8	19.32	34.67	14.07	0.00	14.07
120	19.5	18.06	28.78	14.07	0.00	14.07

Total Storage Required =	**64.99**	m^3
Available Underground Storage in Stormtech Chamber =	**63.68**	m^3
Available Surface Storage =	**150.41**	m^3
Total Available Storage =	**214.09**	m^3

When the release rate is halfed to 7.635L/s, a total storage of 82.55cu.m is required. Considering 63.68cu.m available in the underground stormtech chamber the remaining 18.87cu.m will be provided in above ground storage.

LRL File No.	220775
Project:	Commerical Plaza Site Plan Control
Location:	652 Flagstaff Drive, Ottawa ON
Date:	August 2, 2023
Designed:	Tamara Harb
Drawing Ref.:	C601

Stormwater Management Design Sheet
5-Year Post to 5-Year Pre

SUMMARY OF RELEASE RATES AND STORAGE VOLUMES				
CATCHMENT AREAS	**DRAINAGE AREAS (ha)**	**5-YEAR RELEASE RATE**	**5-YEAR REQUIRED STORAGE (m3)**	**TOTAL AVAILABLE STORAGE - UNDERGROUND AND SURFACE (m3)**
WS-01(CONTROLLED)	0.018	14.07	64.99	214.09
WS-02 (CONTROLLED)	0.098			
WS-03 (CONTROLLED)	0.101			
WS-04 (CONTROLLED ROOF)	0.158			
Total Controlled (Through ICD)	**0.376**	**14.07**	**64.99**	**214.09**
WS-05 (UN-CONTROLLED)	0.016	11.37	0	0
WS-06 (UN-CONTROLLED)	0.047			
Total Un-Controlled =	**0.063**	**11.37**	**0.00**	**0.00**
TOTAL	**0.439**	**25.43**	**64.99**	**214.09**

LRL File No. 220775
Project: Commerical Plaza Site Plan Control
Location: 652 Flagstaff Drive, Ottawa ON
Date: August 2, 2023
Designed: Tamara Harb
Drawing Ref.: C601

Stormwater Management Design Sheet
100-Year Post to 100-Year Pre

Runoff Equation

Q = 2.78CIA (L/s)
C = Runoff coefficient
I = Rainfall intensity (mm/hr) = $A / (Td + C)^B$
A = Area (ha)
T_c = Time of concentration (min)

Pre-development Stormwater Management - 100 Year Storm

100 year storm

$I_{100} = 1735.688 / (Td + 6.014)^{0.820}$ **A = 1735.688** **B = 0.820** **C = 6.014**

C =	0.20	max of 0.5 as per City of Ottawa
I =	178.6	mm/hr
Tc =	10	min
Total Area =	0.439	ha

Allowable Release Rate= **43.58** L/s

Post-development Stormwater Management

					$\sum R_{2\&5}$	$\sum R100$
	Total Site Area =	**0.439**	ha	**∑R=**		
Controlled	WS-01(CONTROLLED)	0.018	ha	R=	0.90	1.00
	WS-02 (CONTROLLED)	0.098	ha	R=	0.90	1.00
	WS-03 (CONTROLLED)	0.101	ha	R=	0.85	1.00
	WS-04 (CONTROLLED ROOF)	0.158	ha	R=	0.90	1.00
	Total Controlled	**0.376**	**ha**	**∑R=**	**0.89**	**1.00**
Un-controlled	WS-05 (UN-CONTROLLED)	0.016	ha	R=	0.20	0.25
	WS-06 (UN-CONTROLLED)	0.047	ha	R=	0.77	0.96
	Total Un-Controlled =	**0.063**	**ha**	**∑R=**	**0.62**	**0.78**

Post-development Stormwater Management (Uncontrolled Catchment WS-05 & WS-06)

100 Year Storm Event:

$I_{100} = 1735.688 / (Td + 6.014)^{0.820}$ **A = 1735.688** **B = 0.820** **C = 6.014**

Time (min)	Intensity (mm/hr)	Uncontrolled Runoff (L/s)	Controlled Release Rate Constant (L/s)	Total Release Rate (L/s)
10	178.6	24.35	0.00	24.35

Post-development Stormwater Management (WS-01, WS-02, WS-03 & WS-04)

100 Year Storm Event:

$I_{100} = 1735.688 / (Td + 6.014)^{0.820}$ **A = 1735.688** **B = 0.820** **C = 6.014**

		Storage Required				
Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate Constant (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	178.6	186.62	103.53	14.07	0.00	14.07
15	142.9	149.34	121.75	14.07	0.00	14.07
20	120.0	125.37	133.56	14.07	0.00	14.07
25	103.8	108.54	141.70	14.07	0.00	14.07
30	91.9	96.02	147.51	14.07	0.00	14.07
35	82.6	86.31	151.71	14.07	0.00	14.07
40	75.1	78.54	154.73	14.07	0.00	14.07
45	69.1	72.17	156.87	14.07	0.00	14.07
50	64.0	66.84	158.33	14.07	0.00	14.07
60	55.9	58.42	159.67	14.07	0.00	14.07
70	49.8	52.04	159.48	14.07	0.00	14.07
80	45.0	47.02	158.19	14.07	0.00	14.07
90	41.1	42.97	156.07	14.07	0.00	14.07
100	37.9	39.61	153.29	14.07	0.00	14.07
110	35.2	36.79	149.99	14.07	0.00	14.07
120	32.9	34.38	146.26	14.07	0.00	14.07

Total Storage Required =	**159.67**	m^3
Available Underground Storage in Stormtech Chamber =	**63.68**	m^3
Available Surface Storage =	**150.41**	m^3
Total Available Storage =	**214.09**	m^3

refer to LRL Plan C601 for more details

LRL File No.	220775
Project:	Commerical Plaza Site Plan Control
Location:	652 Flagstaff Drive, Ottawa ON
Date:	August 2, 2023
Designed:	Tamara Harb
Drawing Ref.:	C601

Stormwater Management
Design Sheet
100-Year Post to 100-Year Pre

SUMMARY OF RELEASE RATES AND STORAGE VOLUMES				
CATCHMENT AREAS	**DRAINAGE AREAS (ha)**	**100-YEAR RELEASE RATE**	**100-YEAR REQUIRED STORAGE (m3)**	**TOTAL AVAILABLE STORAGE (m3)**
WS-01(CONTROLLED)	0.018	14.07	159.67	214.09
WS-02 (CONTROLLED)	0.098			
WS-03 (CONTROLLED)	0.101			
WS-04 (CONTROLLED ROOF)	0.158			
Total Controlled	**0.376**	**14.07**	**159.67**	**214.09**
WS-05 (UN-CONTROLLED)	0.016	24.35	0	0
WS-06 (UN-CONTROLLED)	0.047			
Total Un-Controlled =	**0.063**	**24.35**	**0.00**	**0.00**
TOTAL	**0.439**	**38.42**	**159.67**	**214.09**

LRL Associates Ltd.

Storm Design Sheet

LRL File No. 220775
Project: Commerical Plaza Site Plan Control
Location: 652 Flagstaff Drive, Ottawa ON
Date: August 2, 2023
Designed: Tamara Harb
Drawing Reference: C.401

Storm Design Parameters

Rational Method Q = 2.78CIA

Q = Peak flow in litres per second (L/s)
A = Drainage area in hectares (ha)
C = Runoff coefficient
I = Rainfall intensity (mm/hr)

Runoff Coefficient (C)
Grass 0.20
Gravel 0.70
Asphalt / rooftop 0.90

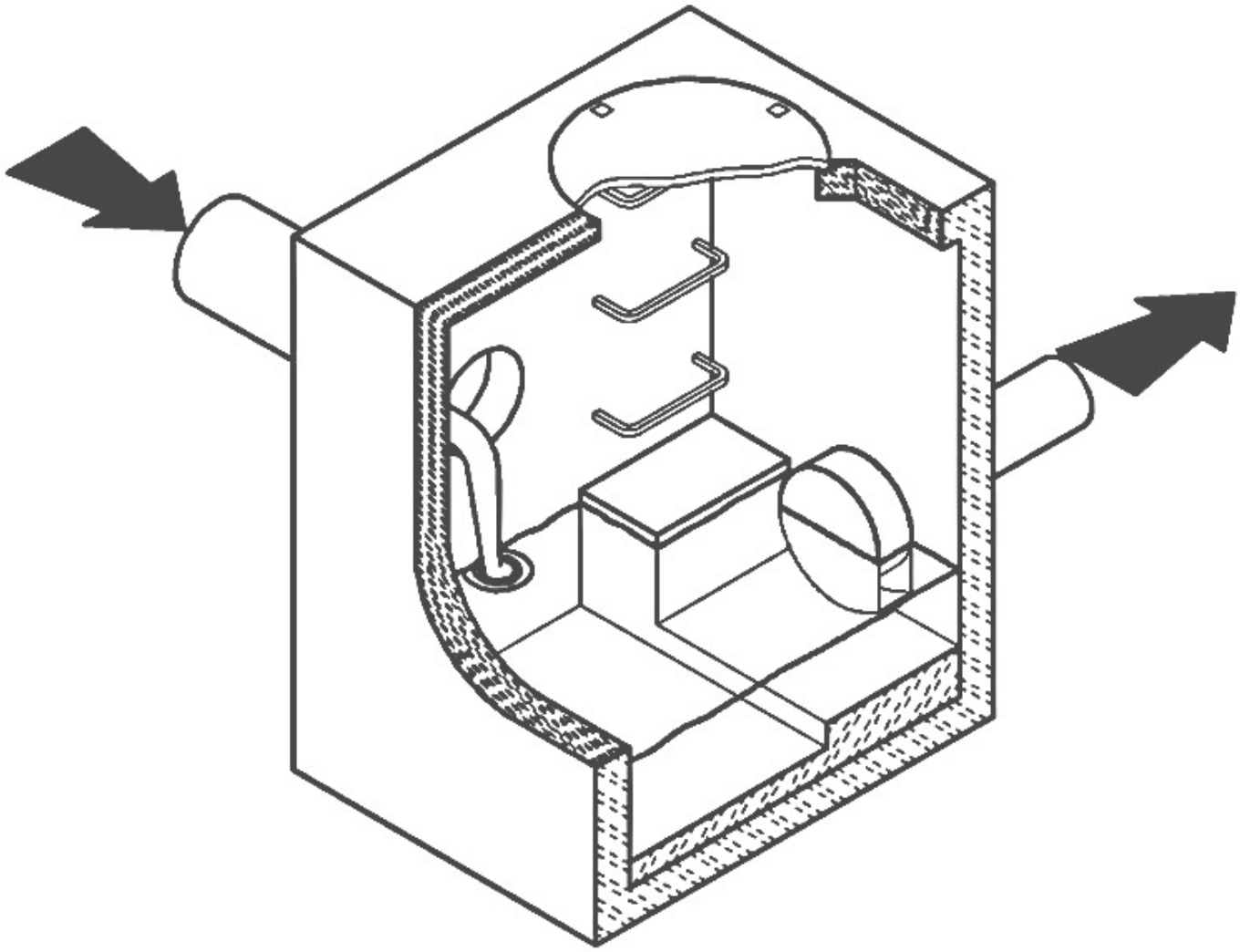
Ottawa Macdonald-Cartier International Airport IDF curve equation (10 year event, intensity in mm/hr)
I100 = 1735.688 / (Td + 6.014)0.820
Min. velocity = 0.80 m/s
Manning's "n" = 0.013

LOCATION			AREA (ha)			FLOW						STORM SEWER							
WATERSHED / STREET	FROM	TO	C = 0.20	C = 0.70	C = 0.90	Indiv. 2.78AC	Accum. 2.78AC	Time of Conc. (min.)	Rainfall Intensity (mm/hr)	Peak Flow Q (L/s)	Controlled Flow Q (L/s)	Pipe Diameter (mm)	Type	Slope (%)	Length (m)	Capacity Full (L/s)	Velocity Full (m/s)	Time of Flow (min.)	Ratio (Q/Q_{FULL})
WS-01	CB01	STM MH01	0.000	0.000	0.018	0.046	0.046	10.00	178.6	8.24	14.07	250	PVC	0.45%	24.0	39.9	0.81	0.49	0.35
WS-01	STM MH01	CB MH02	0.00	0.00	0.00	0.000	0.046	10.49	174.2	8.04	14.07	250	PVC	0.45%	27.7	39.9	0.81	0.57	0.35
WS-04	ROOFS	STM MH02	0.00	0.000	0.158	0.396	0.396	10.00	178.6	70.64	14.07	250	PVC	0.45%	9.1	39.9	0.81	0.19	0.35
WS-04	STM MH02	CB MH01	0.00	0.000	0.000	0.396	0.396	10.19	176.9	69.97	14.07	250	PVC	0.45%	17.1	39.9	0.81	0.35	0.35
WS-02, WS-04	CB MH01	CB MH02	0.000	0.000	0.098	0.246	0.641	10.54	173.8	111.43	14.07	250	PVC	0.45%	16.5	39.9	0.81	0.34	0.35
WS-01, WS-02, WS-03, WS-04	CB MH02	STM MH03	0.007	0.000	0.095	0.240	0.928	10.88	170.9	158.59	14.07	250	PVC	0.45%	3.4	39.9	0.81	0.07	0.35
WS-01, WS-02, WS-03, WS-04	STORMTECH CHAMBER	STM MH04	0.000	0.000	0.000	0.000	0.928	10.95	170.4	158.06	14.07	250	PVC	0.45%	2.6	39.9	0.81	0.05	0.35
WS-01, WS-02, WS-03, WS-04	STM MH04	PROP OGS	0.000	0.000	0.000	0.000	0.928	11.00	169.9	157.65	14.07	250	PVC	0.45%	9.3	39.9	0.81	0.19	0.35
WS-01, WS-02, WS-03, WS-04	PROP OGS	STM DITCH	0.000	0.000	0.000	0.000	0.928	11.19	168.4	156.22	14.07	250	PVC	0.45%	32.1	39.9	0.81	0.66	0.35

CSO/STORMWATER MANAGEMENT

HYDROVEX® VHV / SVHV

Vertical Vortex Flow Regulator



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APPLICATIONS

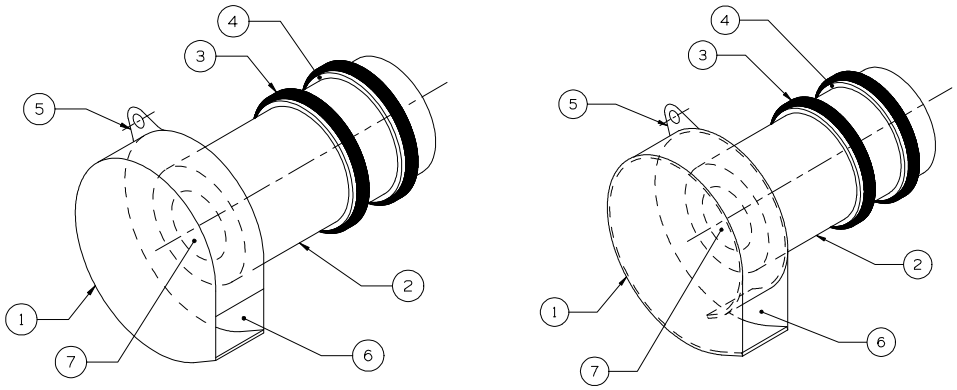
One of the major problems of urban wet weather flow management is the runoff generated after a heavy rainfall. During a storm, uncontrolled flows may overload the drainage system and cause flooding. Due to increased velocities, sewer pipe wear is increased dramatically and results in network deterioration. In a combined sewer system, the wastewater treatment plant may also experience significant increases in flows during storms, thereby losing its treatment efficiency.

A simple means of controlling excessive water runoff is by controlling excessive flows at their origin (manholes). **John Meunier Inc.** manufactures the **HYDROVEX® VHV / SVHV** line of vortex flow regulators to control stormwater flows in sewer networks, as well as manholes.

The vortex flow regulator design is based on the fluid mechanics principle of the forced vortex. This grants flow regulation without any moving parts, thus reducing maintenance. The operation of the regulator, depending on the upstream head and discharge, switches between orifice flow (gravity flow) and vortex flow. Although the concept is quite simple, over 12 years of research have been carried out in order to get a high performance.

The **HYDROVEX® VHV / SVHV** Vertical Vortex Flow Regulators **(refer to Figure 1)** are manufactured entirely of stainless steel, and consist of a hollow body (**1**) (in which flow control takes place) and an outlet orifice (**7**). Two rubber "O" rings (**3**) seal and retain the unit inside the outlet pipe. Two stainless steel retaining rings (**4**) are welded on the outlet sleeve to ensure that there is no shifting of the "O" rings during installation and use.

1. **BODY**
2. **SLEEVE**
3. **O-RING**
4. **RETAINING RINGS (SQUARE BAR)**
5. **ANCHOR PLATE**
6. **INLET**
7. **OUTLET ORIFICE**



VHV ***SVHV***

FIGURE 1: HYDROVEX® VHV-SVHV VERTICAL VORTREX FLOW REGULATORS

ADVANTAGES

- The **HYDROVEX® VHV / SVHV** line of flow regulators are manufactured entirely of stainless steel, making them durable and corrosion resistant.
- Having no moving parts, they require minimal maintenance.
- The geometry of the **HYDROVEX® VHV / SVHV** flow regulators allows a control equal to an orifice plate, having a cross section area 4 to 6 times smaller. This decreases the chance of blockage of the regulator, due to sediments and debris found in stormwater flows. **Figure 2** illustrates the comparison between a regulator model 100 SVHV-2 and an equivalent orifice plate. One can see that for the same height of water, the regulator controls a flow approximately four times smaller than an equivalent orifice plate.
- Installation of the **HYDROVEX® VHV / SVHV** flow regulators is quick and straightforward and is performed after all civil works are completed.
- Installation requires no special tools or equipment and may be carried out by any contractor.
- Installation may be carried out in existing structures.

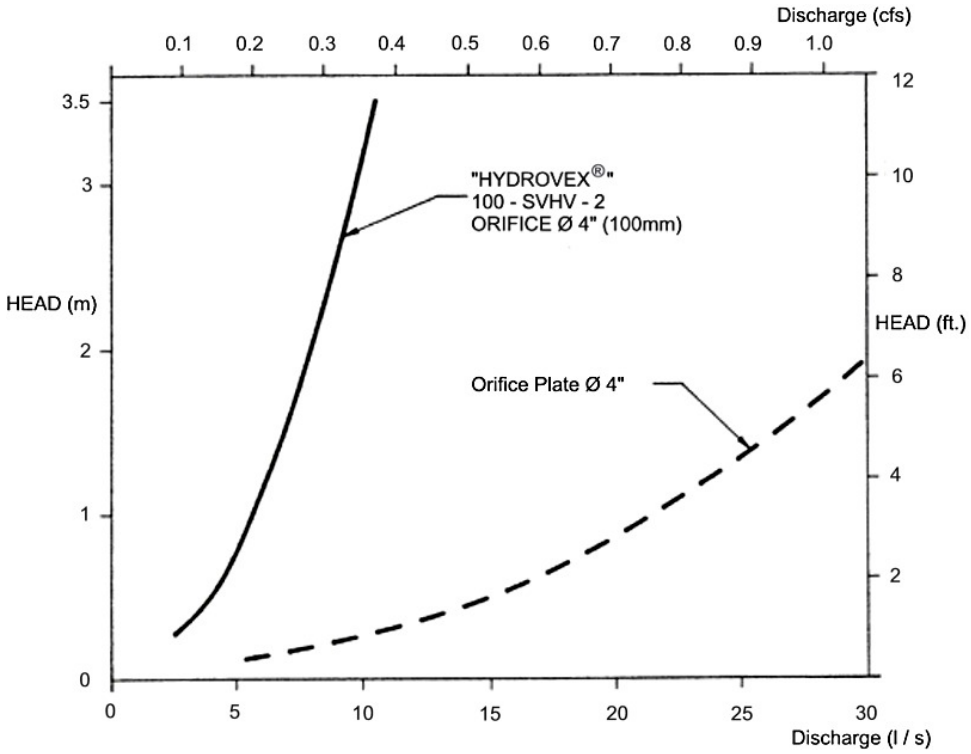


FIGURE 2: DISCHARGE CURVE SHOWING A HYDROVEX® FLOW REGULATOR VS AN ORIFICE PLATE

SELECTION

Selection of a **VHV or SVHV** regulator can be easily made using the selection charts found at the back of this brochure (see **Figure 3**). These charts are a graphical representation of the maximum upstream water pressure (head) and the maximum discharge at the manhole outlet. The maximum design head is the difference between the maximum upstream water level and the invert of the outlet pipe. All selections should be verified by John Meunier Inc. personnel prior to fabrication.

Example:

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

INSTALLATION REQUIREMENTS

All **HYDROVEX® VHV / SVHV** flow regulators can be installed in circular or square manholes. **Figure 4** gives the various minimum dimensions required for a given regulator. ***It is imperative to respect the minimum clearances shown to ensure easy installation and proper functioning of the regulator.***

SPECIFICATIONS

In order to specify a **HYDROVEX®** regulator, the following parameters must be defined:

- The model number (ex: 75-VHV-1)
- The diameter and type of outlet pipe (ex: 6" diam. SDR 35)
- The desired discharge (ex: 6 l/s or 0.21 CFS)
- The upstream head (ex: 2 m or 6.56 ft.) *
- The manhole diameter (ex: 36" diam.)
- The minimum clearance "H" (ex: 10 inches)
- The material type (ex: 304 s/s, 11 Ga. standard)

* ***Upstream head is defined as the difference in elevation between the maximum upstream water level and the invert of the outlet pipe where the HYDROVEX® flow regulator is to be installed.***

PLEASE NOTE THAT WHEN REQUESTING A PROPOSAL, WE SIMPLY REQUIRE THAT YOU PROVIDE US WITH THE FOLLOWING:

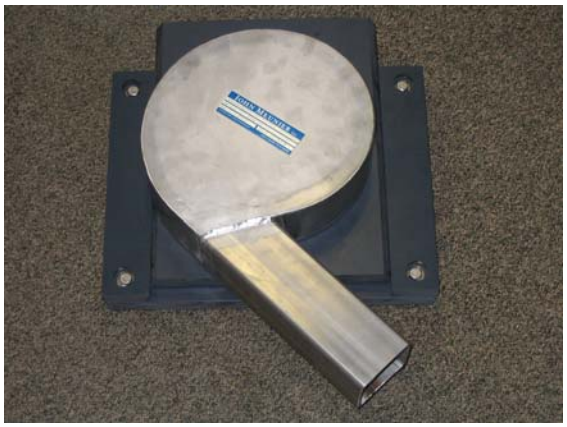
- ***project design flow rate***
- ***pressure head***
- ***chamber's outlet pipe diameter and type***

Typical VHV model in factory

OPTIONS

FV – SVHV (mounted on sliding plate)

VHV-1-O (standard model with odour control inlet)



FV – VHV-O (mounted on sliding plate with odour control inlet)

VHV with Gooseneck assembly in existing chamber without minimum release at the bottom

VHV with air vent for minimal slopes

HYDROVEX®

VHV Vertical Vortex Flow Regulator

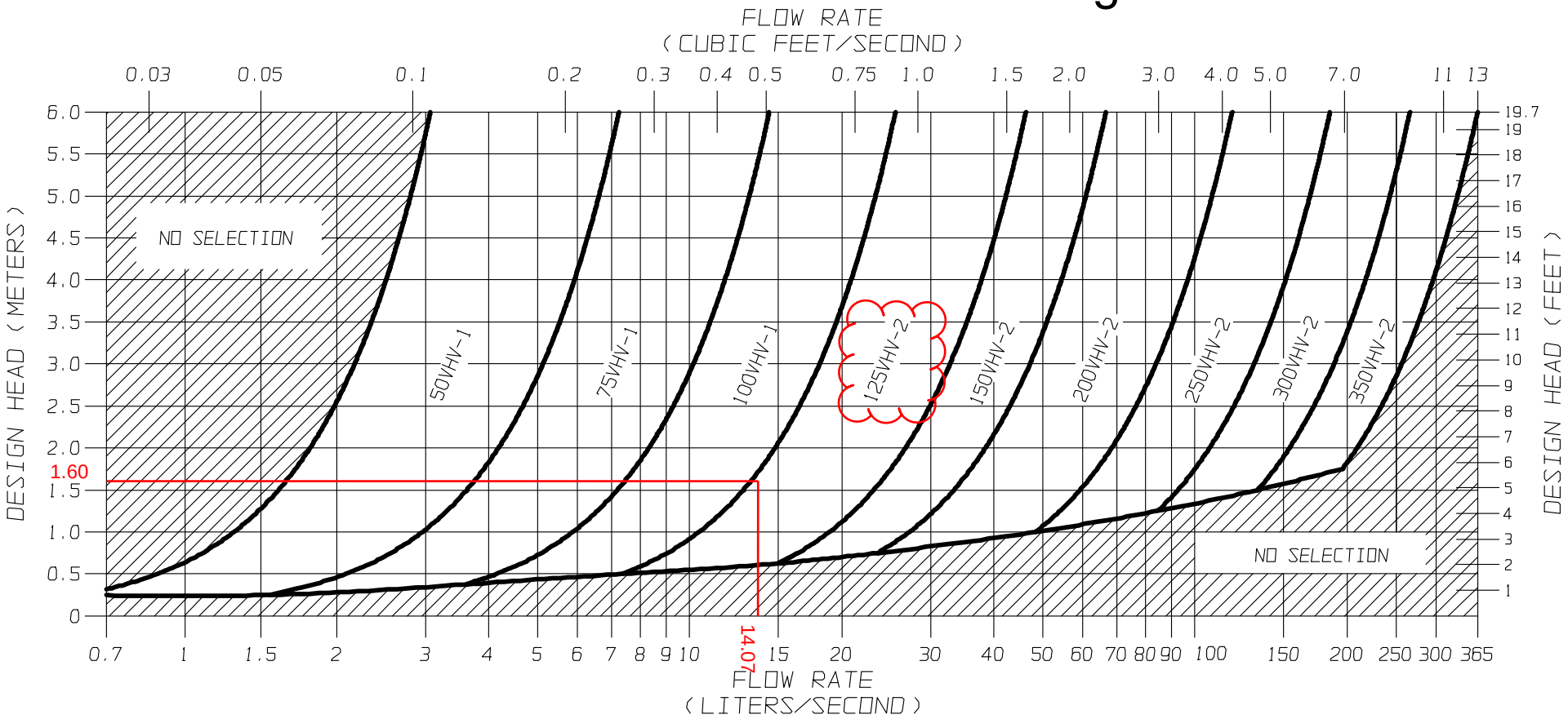


FIGURE 3 - VHV

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HYDROVEX®

SVHV Vertical Vortex Flow Regulator

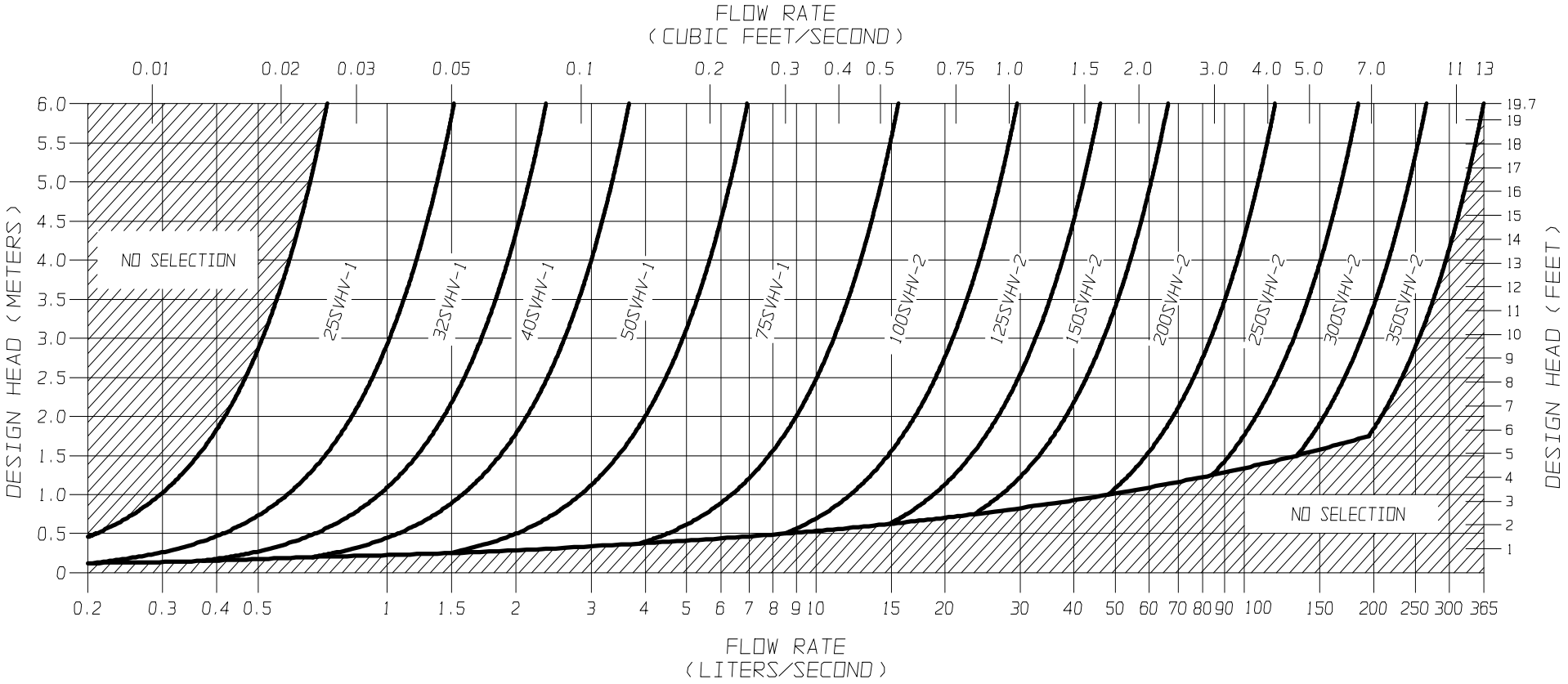

FIGURE 3 - SVHV

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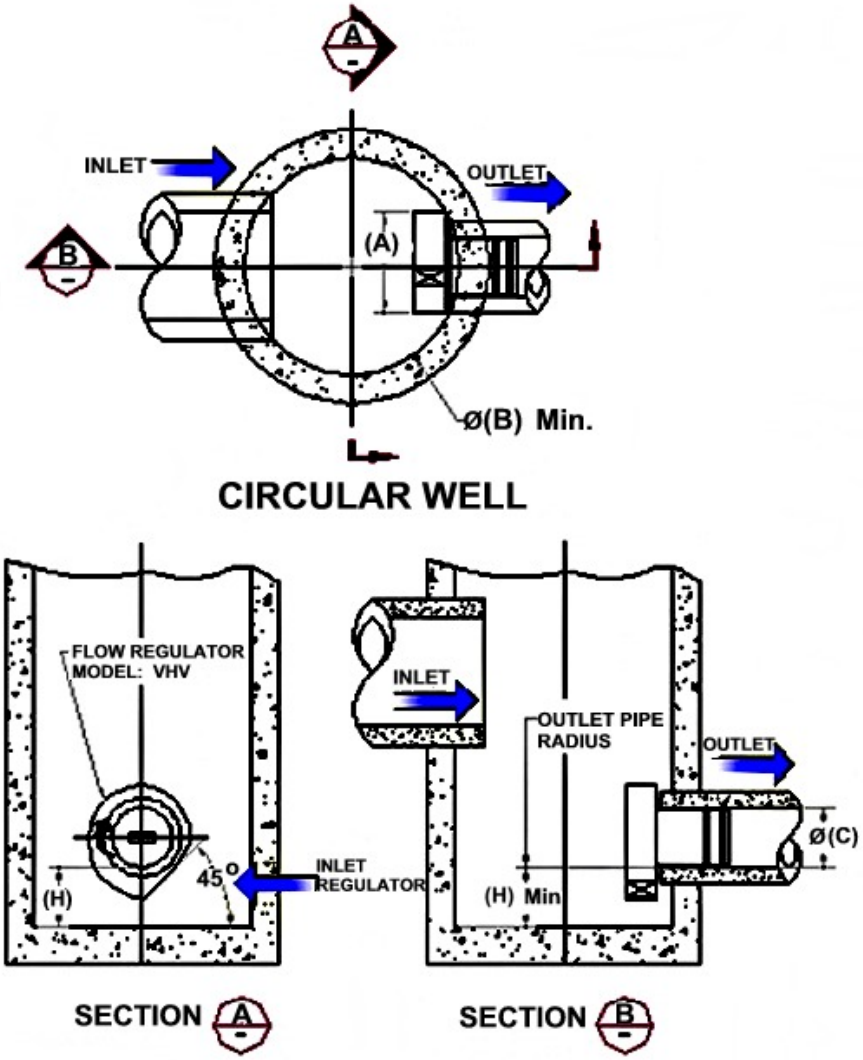
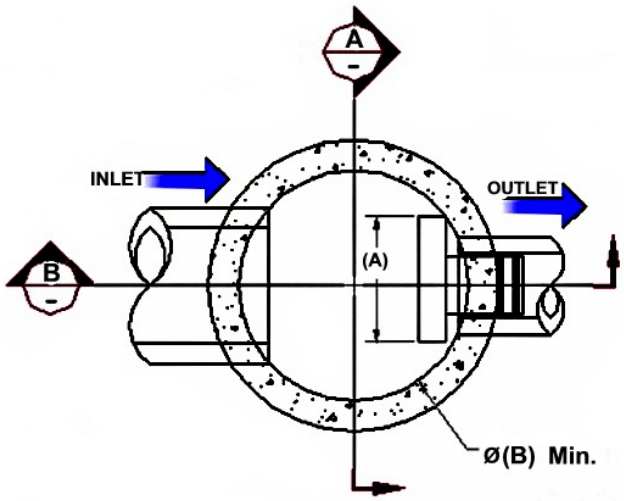
FLOW REGULATOR TYPICAL INSTALLATION IN CIRCULAR MANHOLE
FIGURE 4 (MODEL VHV)

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

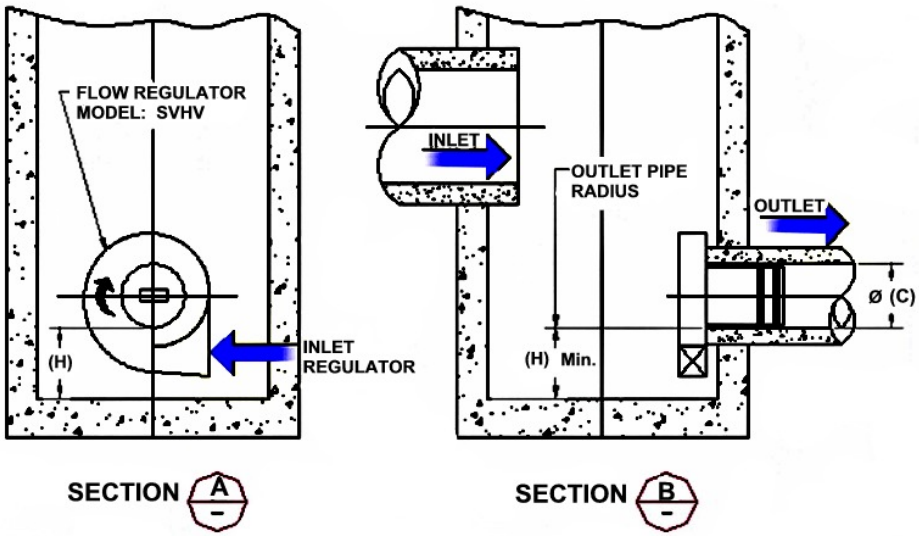


FLOW REGULATOR TYPICAL INSTALLATION IN CIRCULAR MANHOLE
FIGURE 4 (MODEL SVHV)

Model Number	Regulator Diameter		Minimum Manhole Diameter		Minimum Outlet Pipe Diameter		Minimum Clearance	
	A (mm)	**A** (in.)	**B** (mm)	**B** (in.)	**C** (mm)	**C** (in.)	**H** (mm)	**H** (in.)
25 SVHV-1	125	5	600	24	150	6	150	6
32 SVHV-1	150	6	600	24	150	6	150	6
40 SVHV-1	200	8	600	24	150	6	150	6
50 SVHV-1	250	10	600	24	150	6	150	6
75 SVHV-1	375	15	900	36	150	6	275	11
100 SVHV-2	275	11	900	36	150	6	250	10
125 SVHV-2	350	14	900	36	150	6	300	12
150 SVHV-2	425	17	1200	48	150	6	350	14
200 SVHV-2	575	23	1600	64	200	8	450	18
250 SVHV-2	700	28	1800	72	250	10	550	22
300 SVHV-2	850	34	2400	96	250	10	650	26
350 SVHV-2	1000	40	2400	96	250	10	700	28



CIRCULAR WELL

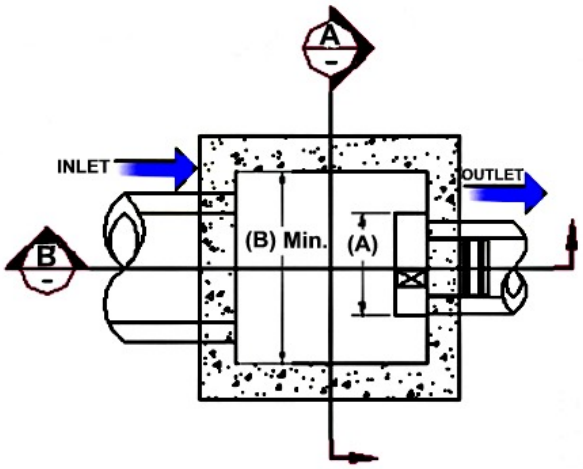


SECTION A **SECTION B**

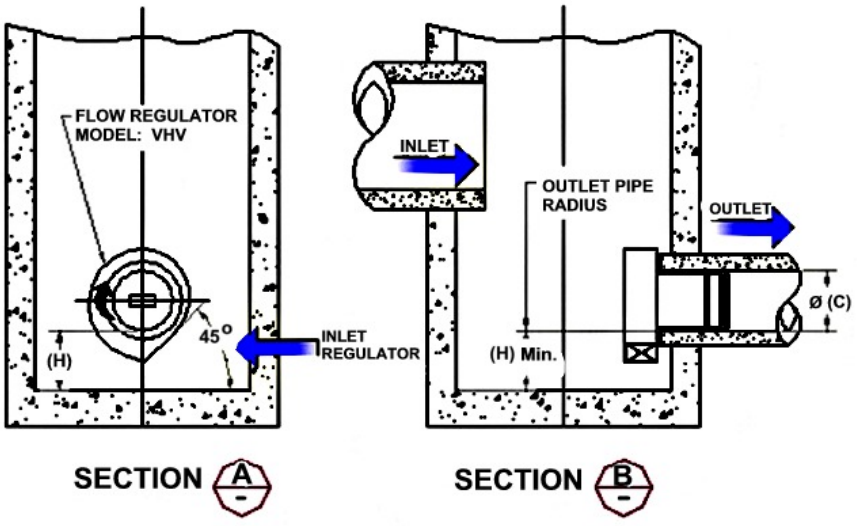
FLOW REGULATOR TYPICAL INSTALLATION IN SQUARE MANHOLE
FIGURE 4 (MODEL VHV)

Model Number	Regulator Diameter		Minimum Chamber Width		Minimum Outlet Pipe Diameter		Minimum Clearance	
	A (mm)	**A** (in.)	**B** (mm)	**B** (in.)	**C** (mm)	**C** (in.)	**H** (mm)	**H** (in.)
50VHV-1	150	6	600	24	150	6	150	6
75VHV-1	250	10	600	24	150	6	150	6
100VHV-1	325	13	600	24	150	6	200	8
125VHV-2	275	11	600	24	150	6	200	8
150VHV-2	350	14	600	24	150	6	225	9
200VHV-2	450	18	900	36	200	8	300	12
250VHV-2	575	23	900	36	250	10	350	14
300VHV-2	675	27	1200	48	250	10	400	16
350VHV-2	800	32	1200	48	300	12	500	20

NOTE: ***In the case of a square manhole, the outlet flow pipe must be centered on the wall to ensure enough clearance for the unit.***



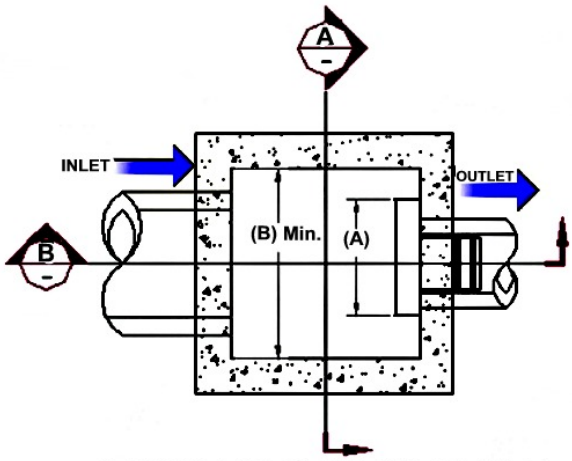
SQUARE / RECTANGULAR WELL



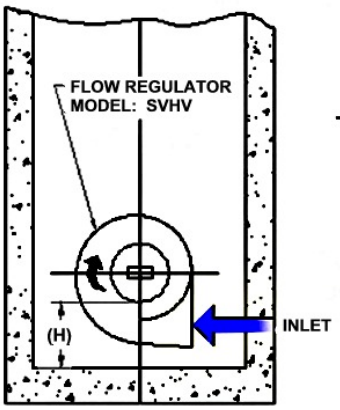
FLOW REGULATOR TYPICAL INSTALLATION IN SQUARE MANHOLE
FIGURE 4 (MODEL SVHV)

Model Number	Regulator Diameter		Minimum Chamber Width		Minimum Outlet Pipe Diameter		Minimum Clearance	
	A (mm)	**A** (in.)	**B** (mm)	**B** (in.)	**C** (mm)	**C** (in.)	**H** (mm)	**H** (in.)
25 SVHV-1	125	5	600	24	150	6	150	6
32 SVHV-1	150	6	600	24	150	6	150	6
40 SVHV-1	200	8	600	24	150	6	150	6
50 SVHV-1	250	10	600	24	150	6	150	6
75 SVHV-1	375	15	600	24	150	6	275	11
100 SVHV-2	275	11	600	24	150	6	250	10
125 SVHV-2	350	14	600	24	150	6	300	12
150 SVHV-2	425	17	600	24	150	6	350	14
200 SVHV-2	575	23	900	36	200	8	450	18
250 SVHV-2	700	28	900	36	250	10	550	22
300 SVHV-2	850	34	1200	48	250	10	650	26
350 SVHV-2	1000	40	1200	48	250	10	700	28

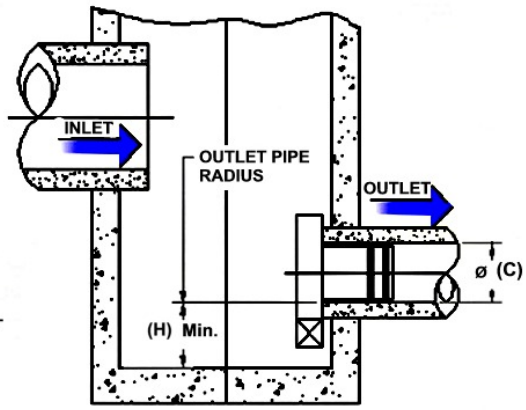
NOTE: ***In the case of a square manhole, the outlet flow pipe must be centered on the wall to ensure enough clearance for the unit.***



SQUARE / RECTANGULAR WELL



SECTION A



SECTION B

INSTALLATION

The installation of a **HYDROVEX®** regulator may be undertaken once the manhole and piping is in place. Installation consists of simply fitting the regulator into the outlet pipe of the manhole. **John Meunier Inc.** recommends the use of a lubricant on the outlet pipe, in order to facilitate the insertion and orientation of the flow controller.

MAINTENANCE

HYDROVEX® regulators are manufactured in such a way as to be maintenance free; however, a periodic inspection (every 3-6 months) is suggested in order to ensure that neither the inlet nor the outlet has become blocked with debris. The manhole should undergo periodically, particularly after major storms, inspection and cleaning as established by the municipality

GUARANTY

The **HYDROVEX®** line of **VHV / SVHV** regulators are guaranteed against both design and manufacturing defects for a period of 5 years. Should a unit be defective, **John Meunier Inc.** is solely responsible for either modification or replacement of the unit.

John Meunier Inc.
ISO 9001 : 2008

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Revised: 2011-05-03

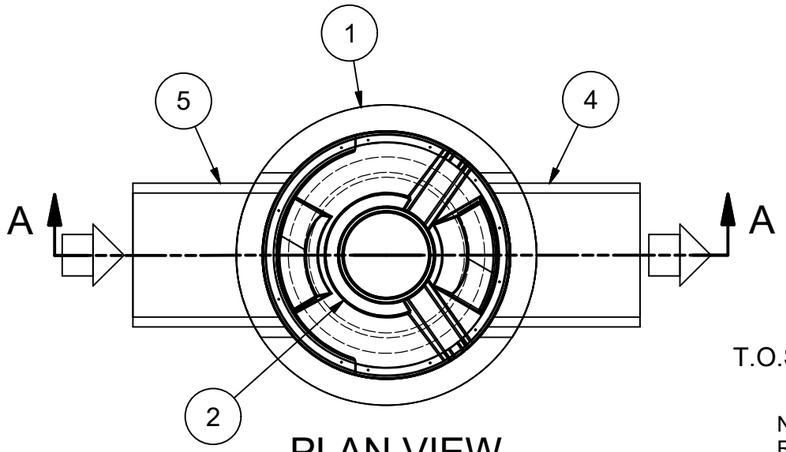
Project: **652 Flagstaff Drive**

Chamber Model -	SC-740	
Units -	**Metric**	
	-	
Number of chambers -	25	
Voids in the stone (porosity) -	40	%
Base of Stone Elevation -	91.44	m
Amount of Stone Above Chambers -	152	mm
Amount of Stone Below Chambers -	152	mm
	103.5	sq.meters

Min. Area - 78.5 sq.meters

StormTech SC-740 Cumulative Storage Volumes

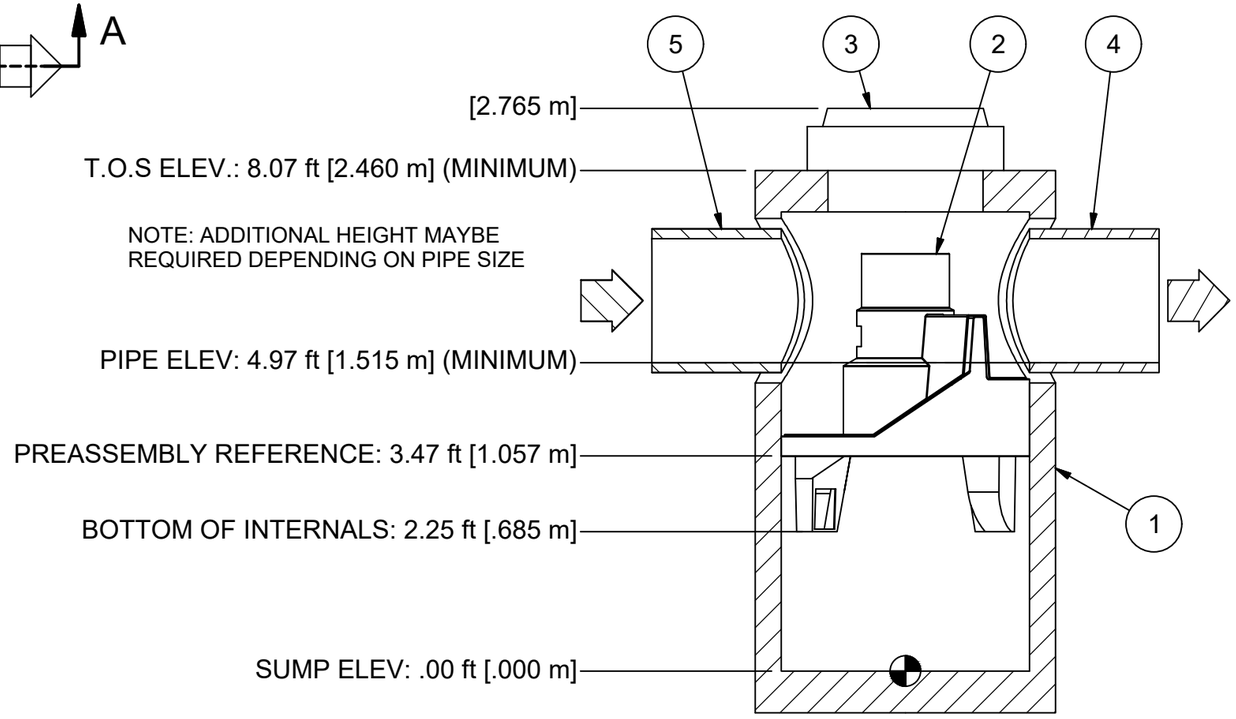
Height of System *(mm)*	Incremental Single Chamber *(cubic meters)*	Incremental Total Chamber *(cubic meters)*	Incremental Stone *(cubic meters)*	Incremental Ch & St *(cubic meters)*	Cumulative Chamber *(cubic meters)*	Elevation *(meters)*
1067	0.00	0.00	1.05	1.05	63.681	92.50
1041	0.00	0.00	1.05	1.05	62.629	92.48
1016	0.00	0.00	1.05	1.05	61.578	92.45
991	0.00	0.00	1.05	1.05	60.526	92.43
965	0.00	0.00	1.05	1.05	59.475	92.40
940	0.00	0.00	1.05	1.05	58.423	92.38
914	0.00	0.04	1.04	1.07	57.372	92.35
889	0.00	0.12	1.01	1.12	56.297	92.33
864	0.01	0.20	0.97	1.17	55.176	92.30
838	0.02	0.43	0.88	1.31	54.005	92.28
813	0.02	0.57	0.82	1.39	52.697	92.25
787	0.03	0.67	0.78	1.46	51.305	92.23
762	0.03	0.76	0.75	1.51	49.850	92.20
737	0.03	0.84	0.72	1.55	48.342	92.17
711	0.04	0.90	0.69	1.59	46.789	92.15
686	0.04	0.96	0.67	1.63	45.200	92.12
660	0.04	1.03	0.64	1.67	43.573	92.10
635	0.04	1.08	0.62	1.70	41.903	92.07
610	0.04	1.12	0.60	1.72	40.204	92.05
584	0.05	1.16	0.59	1.75	38.481	92.02
559	0.05	1.20	0.57	1.77	36.732	92.00
533	0.05	1.24	0.56	1.80	34.958	91.97
508	0.05	1.28	0.54	1.82	33.162	91.95
483	0.05	1.31	0.53	1.84	31.345	91.92
457	0.05	1.34	0.52	1.86	29.506	91.90
432	0.05	1.37	0.50	1.87	27.650	91.87
406	0.06	1.40	0.49	1.89	25.777	91.84
381	0.06	1.42	0.48	1.91	23.887	91.82
356	0.06	1.45	0.47	1.92	21.981	91.79
330	0.06	1.47	0.46	1.93	20.061	91.77
305	0.06	1.49	0.46	1.95	18.128	91.74
279	0.06	1.51	0.45	1.96	16.183	91.72
254	0.06	1.52	0.44	1.97	14.226	91.69
229	0.06	1.54	0.44	1.98	12.260	91.67
203	0.06	1.56	0.43	1.99	10.283	91.64
178	0.06	1.56	0.43	1.99	8.298	91.62
152	0.00	0.00	1.05	1.05	6.309	91.59
127	0.00	0.00	1.05	1.05	5.257	91.56
102	0.00	0.00	1.05	1.05	4.206	91.54
76	0.00	0.00	1.05	1.05	3.154	91.51
51	0.00	0.00	1.05	1.05	2.103	91.49
25	0.00	0.00	1.05	1.05	1.051	91.46



PLAN VIEW

HYDRO FRAME AND COVER (INCLUDED)

GRADE RINGS BY OTHERS
AS REQUIRED



SECTION A-A

PRODUCT SPECIFICATION:

1. PEAK HYDRAULIC FLOW: 18.0 cfs (510 l/s)
2. MIN SEDIMENT STORAGE CAPACITY: 0.7 cu. yd. (0.5 cu. m.)
3. OIL STORAGE CAPACITY: 191 gal. (723 liters)
4. MAXIMUM INLET/OUTLET PIPE DIAMETERS: 24 in. (600 mm)
5. THE TREATMENT SYSTEM SHALL USE AN INDUCED VORTEX TO SEPARATE POLLUTANTS FROM STORMWATER RUNOFF.
6. FOR MORE PRODUCT INFORMATION INCLUDING REGULATORY ACCEPTANCES, PLEASE VISIT https://hydro-int.com/en/products/first-defense

GENERAL NOTES:

1. General Arrangement drawings only. Contact Hydro International for site specific drawings.
2. The diameter of the inlet and outlet pipes may be no more than 24".
3. Multiple inlet pipes possible (refer to project plan).
4. Inlet/outlet pipe angle can vary to align with drainage network (refer to project plan.s)
5. Peak flow rate and minimum height limited by available cover and pipe diameter.
6. Larger sediment storage capacity may be provided with a deeper sump depth.

PARTS LIST

ITEM	QTY	SIZE (in)	SIZE (mm)	DESCRIPTION
1	1	48	1200	I.D. PRECAST MANHOLE
2	1			INTERNAL COMPONENTS (PRE-INSTALLED)
3	1	30	750	FRAME AND COVER (ROUND)
4	1	24 (MAX)	600 (MAX)	OUTLET PIPE (BY OTHERS)
5	1	24 (MAX)	600 (MAX)	INLET PIPE (BY OTHERS)

PROJECTION

IF IN DOUBT ASK

COMMENTS:

1. MANHOLE WALL AND SLAB THICKNESSES ARE NOT TO SCALE.

2. CONTACT HYDRO INTERNATIONAL FOR A BOTTOM OF STRUCTURE ELEVATION PRIOR TO SETTING FIRST DEFENSE MANHOLE.

3. CONTRACTOR TO CONFIRM RIM, PIPE INVERTS, PIPE DIA. AND PIPE ORIENTATION PRIOR TO RELEASE OF UNIT TO FABRICATION.

DATE:	SCALE:
11/8/2019	1:30

DRAWN BY:	CHECKED BY:	APPROVED BY
JLL3	-	

Title
4-ft DIAMETER

FIRST DEFENSE HIGH CAPACITY

GENERAL ARRANGEMENT

Hydro International
hydro-int.com
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DO NOT SCALE DRAWING
STEEL FABRICATION TOLERANCES
UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES.

LINEAR
000 - 012in = ±0.04in
012 - 024in = ±0.06in
024 - 048in = ±0.08in
048 - 120in = ±0.12in
120in >>>> = ±0.20in

ANGULAR
000 - 120in = ±1°
120 - 240in = ±0.5°
240in >>>> = ±0.25°

WEIGHT:	MATERIAL:
N/A	

STOCK NUMBER:

DRAWING NO.:
4FDHC_FDHC GA STD

SHEET SIZE:	SHEET:	Rev:
B	1 OF 1	-

ADS Treatment Train Sizing

Project Name: 652 Flagstaff Dr

Consulting Engineer: LRL Engineering

Location: Ottawa, ON

Sizing Completed By: Haider Nasrullah **Email:** haider.nasrullah@adspipe.com

Summary of Results	
Isolator Row PLUS TSS Removal:	80.7%
FD-4HC TSS Removal:	54.0%
Combined TSS Removal:	**90.8%**
Total Volume Treated:	**90.0%**

Individual OGS Results		
Model	**TSS Removal**	**Volume Treated**
FD-4HC	54.0%	>90%
FD-5HC	57.0%	>90%
FD-6HC	59.0%	>90%
FD-8HC	63.0%	>90%
FD-10HC	67.0%	>90%

Overall System Capacities	
Total Sediment Storage Capacity:	1.78 m³
Oil Storage Capacity:	723 L
Max. OGS Pipe Diameter:	600 mm
Peak OGS Flow Capacity:	510 L/s
Peak Stormtech Inlet Flow Capacity:	311 L/s
Peak IR PLUS Water Quality Flow:	35.9 L/s

OGS Specifications	
Inlet Pipe Diameter (A):	300 mm
Unit Diameter (B):	1,200 mm
Outlet Pipe Diameter (C):	300 mm
Rim Elevation (D):	0.00 m
Bottom of Sump Elevation (E):	-1.50 m
Inlet Pipe Elevation (F):	0.00 m
Outlet Pipe Elevation (G):	0.00 m

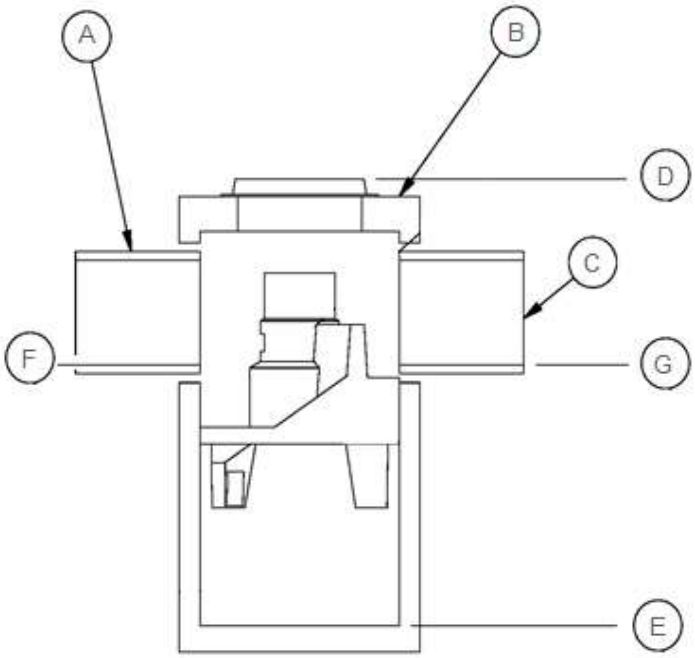
Site Details	
Site Area (ha):	0.375
Rational C:	0.89
Particle Size Distribution:	ETV
Rainfall Station:	Ottawa, ONT

Notes: OGS results based on ETV PSD and results from ETV testing protocols.

Stormtech Details	
Chamber Model:	SC-740
No. Chambers in Isolator Row PLUS:	5
Volume Treated by Isolator Row PLUS:	>90%

Notes: Refer to Stormtech drawings for full IR+ configuration.

Isolator Row PLUS must include Flared End Ramp (FLAMP) for proper performance.



Notes:

Isolator Row PLUS removal efficiency based on verified ETV test report. For dimensions and configuration of Isolator Row PLUS, please see Stormtech drawing package.

Project Name:	652 Flagstaff Dr
Consulting Engineer:	LRL Engineering
Location:	Ottawa, ON

Net Annual Removal Efficiency Summary

Rainfall Intensity	Fraction of Rainfall	Removal Efficiency		Combined Removal Efficiency	Combined Weighted Removal Efficiency
		FD-4HC	IR PLUS(2)		
mm/hr	%	%	%	%	%
0.50	0.1%	68.4%	81.2%	94.1%	0.1%
1.00	14.1%	63.4%	81.2%	93.1%	13.1%
1.50	14.2%	60.5%	81.2%	92.6%	13.1%
2.00	14.1%	58.4%	81.2%	92.2%	13.0%
2.50	4.2%	56.8%	81.2%	91.9%	3.8%
3.00	1.5%	55.5%	81.2%	91.6%	1.4%
3.50	8.5%	54.4%	81.2%	91.4%	7.8%
4.00	5.4%	53.4%	81.2%	91.2%	5.0%
4.50	1.2%	52.5%	81.2%	91.1%	1.1%
5.00	5.5%	51.8%	81.2%	90.9%	5.0%
6.00	4.3%	50.5%	81.2%	90.7%	3.9%
7.00	4.5%	49.4%	81.2%	90.5%	4.1%
8.00	3.1%	48.4%	81.2%	90.3%	2.8%
9.00	2.3%	47.6%	81.2%	90.1%	2.1%
10.00	2.6%	46.8%	81.2%	90.0%	2.3%
20.00	9.2%	41.8%	81.2%	89.1%	8.2%
30.00	2.6%	38.9%	81.2%	88.5%	2.3%
40.00	1.2%	36.8%	78.6%	86.5%	1.0%
50.00	0.5%	0.0%	62.9%	62.9%	0.3%
100.00	0.7%	0.0%	31.4%	31.4%	0.2%
150.00	0.1%	0.0%	21.0%	21.0%	0.0%
200.00	0.0%	0.0%	15.7%	15.7%	0.0%
		Total Net Annual Removal Efficiency			**90.8%**
		Total Runoff Volume Treated			**90.0%**

Notes:

(1) Rainfall Data: 1960:2007, HLY03, Ottawa, ONT, 6105976 & 6105978.

(2) IR PLUS removal based on ETV PSD and ETV protocols.

(3) Rainfall adjusted to 5 min peak intensity based on hourly average.

(4) Combined removal efficiencies calculated based on NCDENR Stormwater BMP Manual, Section 3.9.4, where Total Removal Efficiency = 1st BMP Efficiency + 2nd BMP Efficiency - (1st BMP Efficiency x 2nd BMP Efficiency)

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	HAIDER NASRULLAH 647-850-9417 HAIDER.NASRULLAH@ADSPIPE.COM
ADS SALES REP	RYAN MARTIN 705-207-3059 RYAN.MARTIN@ADS-PIPE.COM
PROJECT NO.	S354019
ONTARIO SITE COORDINATOR:	RYAN RUBENSTEIN 519-710-3687 RYAN.RUBENSTEIN@ADS-PIPE.COM

Advanced Drainage Systems, Inc.

SiteAssist™
FOR STORMTECH
INSTALLATION INSTRUCTIONS
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652 FLAGSTAFF DRIVE

OTTAWA, ON, CANADA

SC-740 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-740.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL BE CERTIFIED TO CSA B184, "POLYMERIC SUB-SURFACE STORMWATER MANAGEMENT STRUCTURES", AND MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE CSA S6 CL-625 TRUCK AND THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 50 mm (2").
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 550 LBS/FT/%. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 23° C / 73° F), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE SC-740 SYSTEM

1. STORMTECH SC-740 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 150 mm (6") SPACING BETWEEN THE CHAMBER ROWS.
7. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 20-50 mm (3/4-2").
8. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
9. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
2. THE USE OF CONSTRUCTION EQUIPMENT OVER SC-740 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADERS, DUMP TRUCKS, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. FULL 900 mm (36") OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

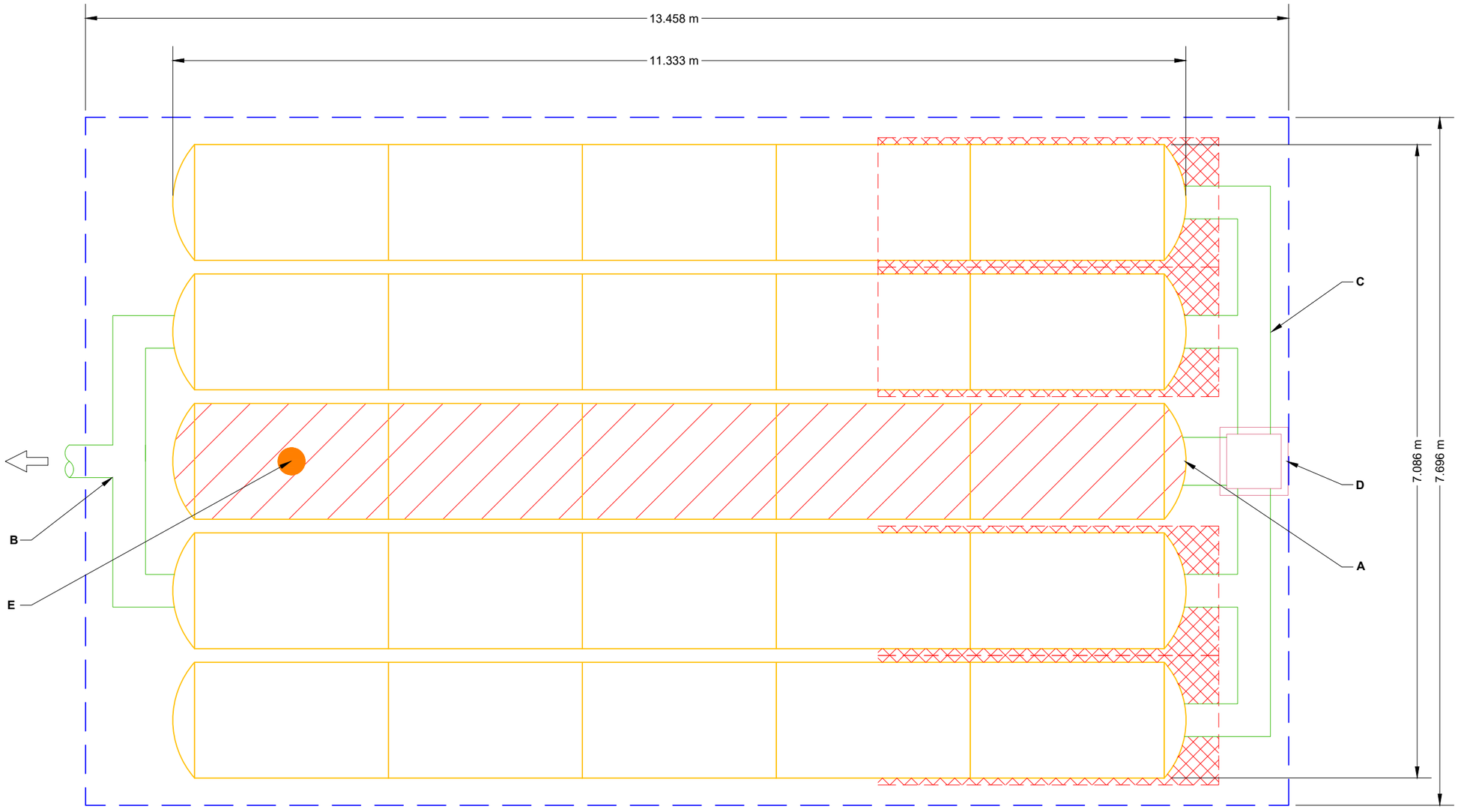
USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO THE CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT		PROPOSED ELEVATIONS:	
25	STORMTECH SC-740 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	94.850
10	STORMTECH SC-740 END CAPS	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	93.022
152	STONE ABOVE (mm)	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	92.869
152	STONE BELOW (mm)	MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	92.869
40	STONE VOID	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	92.869
63.6	INSTALLED SYSTEM VOLUME (m^3) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)	TOP OF STONE:	92.564
		TOP OF SC-740 CHAMBER:	92.412
		300 mm x 300 mm TOP MANIFOLD INVERT:	91.967
		450 mm ISOLATOR ROW INVERT:	91.690
103.5	SYSTEM AREA (m^2)	300 mm BOTTOM MANIFOLD INVERT:	91.680
42.3	SYSTEM PERIMETER (m)	BOTTOM OF SC-740 CHAMBER:	91.650
		BOTTOM OF STONE:	91.498

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED EZ END CAP	A	450 mm BOTTOM PREFABRICATED EZ END CAP, PART#: SC740ECEZ / TYP OF ALL 600 mm BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	40 mm	
MANIFOLD	B	300 mm x 300 mm BOTTOM MANIFOLD, ADS N-12	30 mm	57 L/s OUT
MANIFOLD	C	300 mm x 300 mm TOP MANIFOLD, ADS N-12	318 mm	
CONCRETE STRUCTURE	D	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		260 L/s IN
INSPECTION PORT	E	150 mm SEE DETAIL		



ISOLATOR ROW PLUS
SEE DETAIL()

PLACE MINIMUM 3.810 m OF ADSPLUS125 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

BED LIMITS

NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE.
- DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- **NOT FOR CONSTRUCTION:** THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

652 FLAGSTAFF DRIVE
OTTAWA, ON, CANADA
DATE: 05-09-2023 | DRAWN: RT | CHECKED: N/A
PROJECT #: S354019

DATE	DRW	CHK	DESCRIPTION
8-1-23	RCT	RCT	REVISED PER NEW PLAN

StormTech®
Chamber System
888-892-2694 | WWW.STORMTECH.COM

ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

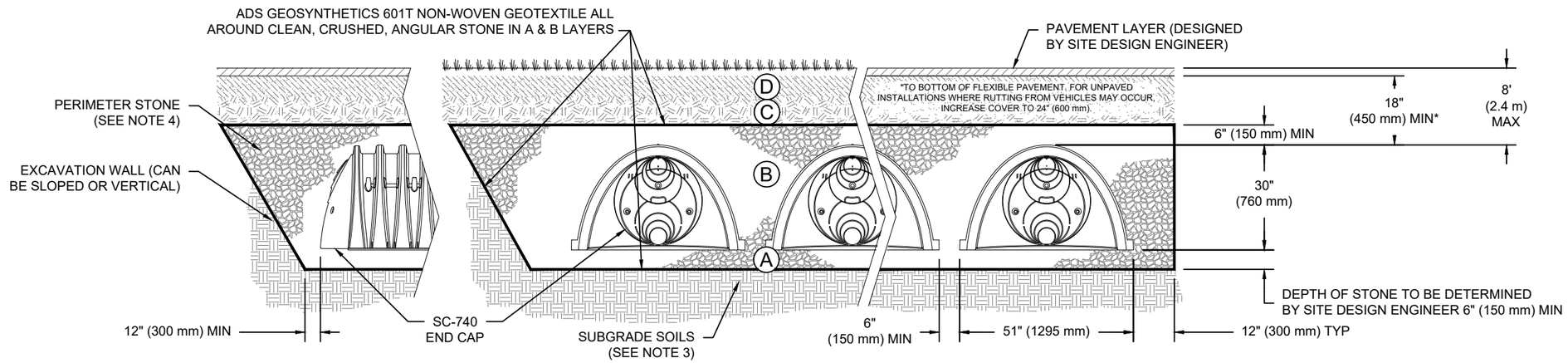
SCALE = 1 : 50

SHEET
2 OF 6

ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

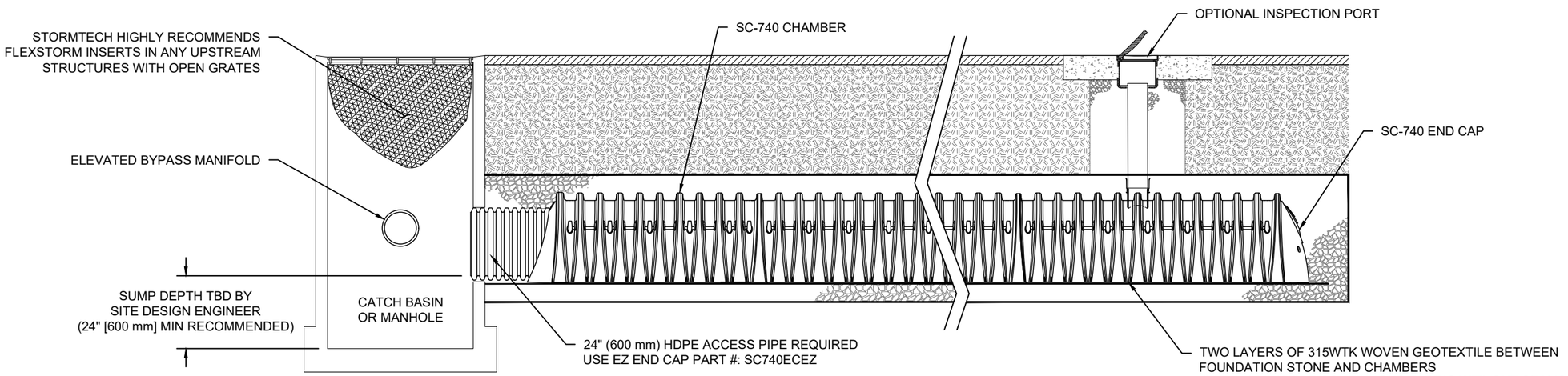
1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-740 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 550 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

652 FLAGSTAFF DRIVE
OTTAWA, ON, CANADA
DATE: 05-09-2023 | DRAWN: RT
PROJECT #: S354019 | CHECKED: N/A

DATE	DRW	CHK	DESCRIPTION
8-1-23	RCT	RCT	REVISED PER NEW PLAN

StormTech® Chamber System
888-892-2694 | WWW.STORMTECH.COM

4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473



SC-740 ISOLATOR ROW DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.

2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

SC-740 6" (150 mm) INSPECTION PORT DETAIL
NTS

652 FLAGSTAFF DRIVE
OTTAWA, ON, CANADA
DATE: 05-09-2023 | DRAWN: RT
PROJECT #: S354019 | CHECKED: N/A

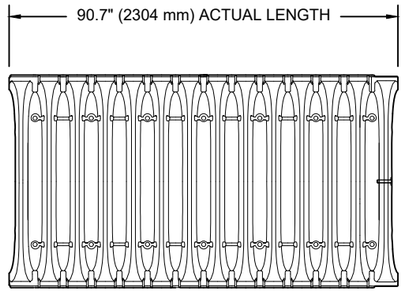
DATE	DRW	CHK	DESCRIPTION
8-1-23	RCT	RCT	REVISED PER NEW PLAN

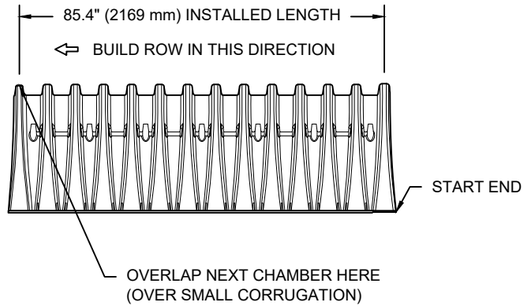
StormTech®
Chamber System
888-892-2694 | WWW.STORMTECH.COM

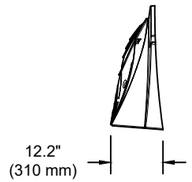
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

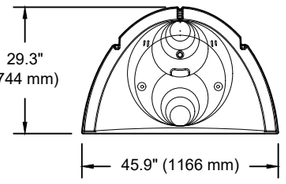
SC-740 TECHNICAL SPECIFICATION

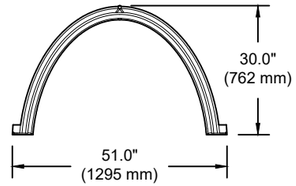
NTS







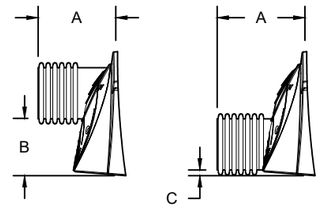




NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	51.0" X 30.0" X 85.4"	(1295 mm X 762 mm X 2169 mm)
CHAMBER STORAGE	45.9 CUBIC FEET	(1.30 m³)
MINIMUM INSTALLED STORAGE*	74.9 CUBIC FEET	(2.12 m³)
WEIGHT	75.0 lbs.	(33.6 kg)

*ASSUMES 6" (152 mm) STONE ABOVE, BELOW, AND BETWEEN CHAMBERS



PRE-FAB STUB AT BOTTOM OF END CAP WITH FLAMP END WITH "BR"
PRE-FAB STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PRE-FAB STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
PRE-CORED END CAPS END WITH "PC"

PART #	STUB	A	B	C
SC740EPE06T / SC740EPE06TPC	6" (150 mm)	10.9" (277 mm)	18.5" (470 mm)	---
SC740EPE06B / SC740EPE06BPC			---	0.5" (13 mm)
SC740EPE08T /SC740EPE08TPC	8" (200 mm)	12.2" (310 mm)	16.5" (419 mm)	---
SC740EPE08B / SC740EPE08BPC			---	0.6" (15 mm)
SC740EPE10T / SC740EPE10TPC	10" (250 mm)	13.4" (340 mm)	14.5" (368 mm)	---
SC740EPE10B / SC740EPE10BPC			---	0.7" (18 mm)
SC740EPE12T / SC740EPE12TPC	12" (300 mm)	14.7" (373 mm)	12.5" (318 mm)	---
SC740EPE12B / SC740EPE12BPC			---	1.2" (30 mm)
SC740EPE15T / SC740EPE15TPC	15" (375 mm)	18.4" (467 mm)	9.0" (229 mm)	---
SC740EPE15B / SC740EPE15BPC			---	1.3" (33 mm)
SC740EPE18T / SC740EPE18TPC	18" (450 mm)	19.7" (500 mm)	5.0" (127 mm)	---
SC740EPE18B / SC740EPE18BPC			---	1.6" (41 mm)
SC740ECEZ*	24" (600 mm)	18.5" (470 mm)	---	0.1" (3 mm)

ALL STUBS, EXCEPT FOR THE SC740ECEZ ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

* FOR THE SC740ECEZ THE 24" (600 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 1.75" (44 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL

652 FLAGSTAFF DRIVE
OTTAWA, ON, CANADA
DATE: 05-09-2023 | DRAWN: RT
PROJECT #: S354019 | CHECKED: N/A

DATE	DRW	CHK	DESCRIPTION
8-1-23	RCT	RCT	REVISED PER NEW PLAN

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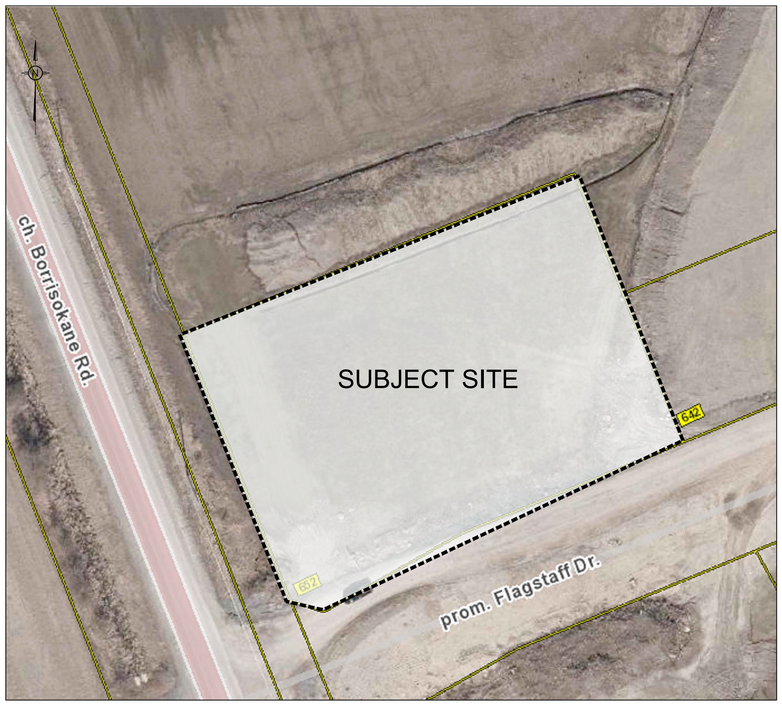
APPENDIX E

Civil Engineering Drawings

COMMERCIAL PLAZA SPC
652 FLAGSTAFF DRIVE, OTTAWA ON

REVISION 04



KEY PLAN (N.T.S.)

DRAWING INDEX	
TITLE PAGE	
SEDIMENT AND EROSION CONTROL PLAN	C101
GRADING AND DRAINAGE PLAN	C301
SERVICING PLAN	C401
STORMWATER MANAGEMENT PLAN	C601
PRE-DEVELOPMENT WATERSHED PLAN	C701
POST-DEVELOPMENT WATERSHED PLAN	C702
CONSTRUCTION DETAIL PLAN	C901

LRL
ENGINEERING | INGÉNIERIE
5430 Canotek Road | Ottawa, ON, K1J 9G2
www.lrl.ca | (613) 842-3434

COMMERCIAL PLAZA SPC
652 FLAGSTAFF DRIVE, OTTAWA ON
REVISION 04 - ISSUED FOR APPROVAL - FEBRUARY 27th, 2024
LRL PROJECT no: 220775

LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2024/02/27
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

GENERAL NOTES

1. ALL WORKS MATERIALS SHALL CONFIRM TO THE LAST REVISION OF THE STANDARDS AND SPECIFICATIONS FOR THE CITY OF OTTAWA, ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) AND SPECIFICATIONS (OPSS), WHERE APPLICABLE. LOCAL UTILITY STANDARDS AND MINISTRY OF TRANSPORTATION STANDARDS WILL APPLY WHERE REQUIRED.
2. THE CONTRACTORS SHALL CONFIRM THE LOCATION OF ALL EXISTING UTILITIES WITHIN THE SITE AND ADJACENT WORK AREAS. THE CONTRACTORS SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING UTILITIES TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR OR REPLACEMENT OF ANY SERVICES OR UTILITIES DISTURBED DURING CONSTRUCTION , TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION.
3. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION, ANY DISCREPANCIES SHALL BE REPORTED IMMEDIATELY TO THE ENGINEER. LOST TIME DUE TO FAILURE OF THE CONTRACTORS TO CONFIRM UTILITY LOCATIONS AND NOTIFY ENGINEER OF POSSIBLE CONFLICTS PRIOR TO CONSTRUCTION WILL BE AT CONTRACTORS EXPENSE.
4. ANY AREA BEYOND THE LIMIT OF THE SITE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION AT THE CONTRACTOR'S EXPENSE.
   RELOCATING OF EXISTING SERVICES AND/OR UTILITIES SHALL BE AS SHOWN ON THE DRAWINGS OR DETECTED BY THE ENGINEER AT THE EXPENSE OF DEVELOPERS.
5. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE 'OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS'. THE GENERAL CONTRACTORS SHALL BE DEEMED TO BE THE 'CONTRACTOR' AS DEFINED IN THE ACT.
6. ALL THE CONSTRUCTION SIGNAGE MUST CONFIRM TO THE MINISTRY OF TRANSPORTATION OF ONTARIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES PER LATEST AMENDMENT.
7. THE CONTRACTOR IS ADVISED THAT WORKS BY OTHERS MAY BE ONGOING DURING THE PERIOD OF THE CONTRACT. THE CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES TO PREVENT CONFLICTS.
8. ALL DIMENSIONS ARE IN METRES UNLESS SPECIFIED OTHERWISE.
9. THERE WILL BE NO SUBSTITUTION OF MATERIALS UNLESS PRIOR WRITTEN APPROVAL IS RECEIVED FROM THE ENGINEER.
10. ALL CONSTRUCTION SHALL BE CARRIED OUT IN ACCORDANCE WITH THE RECOMMENDATIONS MADE IN THE GEOTECHNICAL REPORT.
11. FOR DETAILS RELATING TO STORMWATER MANAGEMENT AND ROOF DRAINAGE REFER TO THE SITE SERVICING AND STORMWATER MANAGEMENT REPORT.
12. ALL SEWERS CONSTRUCTED WITH GRADES LESS THAN 1.0% SHALL BE INSTALLED USING LASER ALIGNMENT AND CHECKED WITH LEVEL INSTRUMENT PRIOR TO BACKFILLING.
13. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL PERMITS REQUIRED AND TO BEAR THE COST OF THE SAME.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADDITIONAL BEDDING, OR ADDITIONAL STRENGTH PIPE IF THE MAXIMUM TRENCH WIDTH AS SPECIFIED BY OPSD IS EXCEEDED.
15. ALL PIPE/CULVERT SECTION SIZES REFER TO INSIDE DIMENSIONS.
16. SHOULD DEEPLY BURIED ARCHAEOLOGICAL REMAINS BE FOUND ON THE PROPERTY DURING CONSTRUCTION ACTIVITIES, THE HERITAGE OPERATIONS UNIT OF THE ONTARIO MINISTRY OF CULTURE MUST BE NOTIFIED IMMEDIATELY.
17. ALL NECESSARY CLEARING AND GRUBBING SHALL BE COMPLETED BY THE CONTRACTOR. REVIEW WITH CONTRACT ADMINISTRATOR AND THE CITY OF OTTAWA PRIOR TO ANY TREE CUTTING/REMOVAL.
18. DRAWINGS SHALL BE READ ON CONJUNCTION WITH ARCHITECTURAL SITE PLAN.
19. THE CONTRACTOR SHALL PROVIDE THE PROJECT ENGINEER ON SET OF AS CONSTRUCTED SITE SERVICING AND GRADING DRAWINGS.
20. BENCHMARKS: IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THAT THE SITE BENCHMARK(S) HAS NOT BEEN ALTERED OR DISTURBED AND THAT ITS RELATIVE ELEVATION AND DESCRIPTION AGREES WITH THE INFORMATION DEPICTED ON THIS PLAN.

EROSION AND SEDIMENT CONTROL NOTES

GENERAL

THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.

THE CONTRACTOR ACKNOWLEDGES THAT SURFACE EROSION AND SEDIMENT RUNOFF RESULTING FROM THEIR CONSTRUCTION OPERATIONS HAS POTENTIAL TO CAUSE A DETRIMENTAL IMPACT TO ANY DOWNSTREAM WATERCOURSE OR SEWER, AND THAT ALL CONSTRUCTION OPERATIONS THAT MAY IMPACT UPON WATER QUALITY SHALL BE CARRIED OUT IN MANNER THAT STRICTLY MEETS THE REQUIREMENT OF ALL APPLICABLE LEGISLATION AND REGULATIONS.

AS SUCH, THE CONTRACTOR SHALL BE RESPONSIBLE FOR CARRYING OUT THEIR OPERATIONS, AND SUPPLYING AND INSTALLING ANY APPROPRIATE CONTROL MEASURES, SO AS TO PREVENT SEDIMENT LADEN RUNOFF ENTERING ANY SEWER OR WATERCOURSE WITHIN OR DOWNSTREAM OF THE WORKING AREA.

THE CONTRACTOR ACKNOWLEDGES THAT NO ONE MEASURE IS LIKELY TO BE 100% EFFECTIVELY FOR EROSION PROTECTION AND CONTROLLING SEDIMENT RUNOFF AND DISCHARGES FROM THE SITE. THEREFORE, WHERE NECESSARY THE CONTRACTOR SHALL IMPLEMENT ADDITIONAL MEASURES ARRANGED IN SUCH MANNER AS TO MITIGATE SEDIMENT RELEASE FROM THE CONSTRUCTION OPERATIONS AND ACHIEVE SPECIFIC MAXIMUM PERMITTED CRITERIA WHERE APPLICABLE. SUGGESTED ON-SITE MEASURES MAY INCLUDE, BUT SHALL NOT BE LIMITED TO, THE FOLLOWING METHODS: SEDIMENT PONDS, FILTER BAGS, PUMP FILTERS, SETTLING TANKS, SILT FENCE, STRAW BALES, FILTER CLOTHS, CATCH BASIN FILTERS, CHECK DAMS AND/OR OTHER RECOGNIZED TECHNOLOGIES AND METHOD AVAILABLE AT THE TIME OF CONSTRUCTION. SPECIFIC MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH REQUIREMENTS OF OPSS 577 WHERE APPROPRIATE, OR IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

WHERE, IN THE OPINION OF THE CONTRACT ADMINISTRATOR OR REGULATORY AGENCY, THE INSTALLED CONTROL MEASURES FAIL TO PERFORM ADEQUATELY, THE CONTRACTOR SHALL SUPPLY AND INSTALL ADDITIONAL OR ALTERNATIVE MEASURES AS DIRECTED BY THE CONTRACT ADMINISTRATOR OR REGULATORY AGENCY, AS SUCH, THE CONTRACTOR SHALL HAVE ADDITIONAL CONTROL MATERIALS ON SITE AT ALL TIME WHICH ARE EASILY ACCESSIBLE AND MAY BE IMPLEMENTED BY HIM AT THE MOMENT'S NOTICE.

PRIOR TO COMMENCING WORK, THE CONTRACTOR SHALL SUBMIT TO THE CONTRACT ADMINISTRATOR SIX COPIES OF A DETAILED EROSION AND SEDIMENT CONTROL PLAN (ESCP). THE ESCP WILL CONSIST OF WRITTEN DESCRIPTION AND DETAILED DRAWINGS INDICATING THE ON-SITE ACTIVITIES AND MEASURES TO BE USED TO CONTROL EROSION AND SEDIMENT MOVEMENT FOR EACH STEP OF THE WORK.

CONTRACTOR'S RESPONSIBILITIES

THE CONTRACTOR SHALL ENSURE THAT ALL WORKERS, INCLUDING SUB-CONTRACTOR, IN THE WORKING ARE ARE AWARE OF THE IMPORTANCE OF THE EROSION AND SEDIMENT CONTROL MEASURES AND INFORMED OF THE CONSEQUENCES OF THE FAILURE TO COMPLY WITH THE REQUIREMENTS OF ALL REGULATORY AGENCIES.

THE CONTRACTOR SHALL PERIODICALLY, AND WHEN REQUESTED BY THE CONTRACT ADMINISTRATOR, CLEAN OUT ACCUMULATED SEDIMENT DEPOSITS AS REQUIRED AT THE SEDIMENT CONTROL DEVICES, INCLUDING THOSE DEPOSITS THAT MAY ORIGINATE FROM OUTSIDE THE CONSTRUCTION AREA. ACCUMULATED SEDIMENT SHALL BE REMOVED IN SUCH A MANNER THAT PREVENTS THE DEPOSITION OF THIS MATERIAL INTO THE SEWER WATERCOURSE AND AVOIDS DAMAGE TO CONTROL MEASURES. THE SEDIMENT SHALL BE REMOVED FROM THE SITE AT THE CONTRACTOR'S EXPENSE AND MANAGED IN COMPLIANCE WITH REQUIREMENTS FRO EXCESS EARTH MATERIAL, AS SPECIFIED ELSEWHERE IN THE CONTRACT.

THE CONTRACTOR SHALL IMMEDIATELY REPORT TO THE CONTRACT ADMINISTRATOR ANY ACCIDENTAL DISCHARGES OF SEDIMENT MATERIAL INTO EITHER THE WATERCOURSE OR THE STORM SEWER SYSTEM. FAILURE TO REPORT WILL BE CONSTITUTE A BRACH OF THIS SPECIFICATION AND THE CONTRACTOR MAY ALSO BE SUBJECT TO THE PENALTIES IMPOSED BY THE APPLICABLE REGULATORY AGENCY. APPROPRIATE RESPONSE MEASURES, INCLUDING ANY REPAIRS TO EXISTING CONTROL MEASURES OR THE IMPLEMENTATION OF ADDITIONAL CONTROL MEASURES, SHALL BE CARRIED OUT BY THE CONTRACTOR WITHOUT DELAY.

THE SEDIMENT CONTROL MEASURES SHALL ONLY BE REMOVED WHEN, IN THE OPINION OF THE CONTRACT ADMINISTRATOR, THE MEASURE OR MEASURES, IS NO LONGER REQUIRED. NO CONTROL MEASURE MAY BE PERMANENTLY REMOVED WITHOUT PRIOR AUTHORIZATION FROM THE CONTRACT ADMINISTRATOR. ALL SEDIMENT AND EROSION CONTROL MEASURES SHALL BE REMOVED IN A MANNER THAT AVOIDS THE ENTRY OF ANY EQUIPMENT, OTHER THAN HAND-HELD EQUIPMENT, INTO ANY WATERCOURSE, AND PREVENTS THE RELEASE OF ANY SEDIMENT OR DEBRIS INTO ANY SEWER OR WATERCOURSE WITHIN OR DOWNSTREAM OF THE WORKING AREA. ALL ACCUMULATED SEDIMENT SHALL BE REMOVED FROM THE WORKING AREA AT THE CONTRACTOR'S EXPENSE AND MANAGED IN COMPLIANCE WITH THE REQUIREMENTS FOR EXCESS EARTH MATERIAL

WHERE, IN THE OPINION OF EITHER THE CONTRACT ADMINISTRATOR OR A REGULATORY AGENCY, ANY OF THE TERMS SPECIFIED HEREIN HAVE NOT BEEN COMPLIED WITH OR PERFORMED IN A SUITABLE MANNER, OR TAT ALL, THE CONTRACTOR ADMINISTRATOR OR A REGULATORY AGENCY HAS THE RIGHT TO IMMEDIATELY WITHDRAW ITS PERMISSION TO CONTINUE THE WORK BUT MAY RENEW ITS PERMISSION UPON BEING SATISFIED THAT THE DEFAULTS OR DEFICIENCIES IN THE PERFORMANCE OF THIS SPECIFICATION BY THE CONTRACTOR HAVE BEEN REMEDIED.

SPILL CONTROL NOTES

1. ALL CONSTRUCTION EQUIPMENT SHALL BE RE-FUELED, MAINTAINED, AND STORED NO LESS THAN 30 METRES FROM WATERCOURSE, STEAMS, CREEKS, WOODLOTS, AND ANY ENVIRONMENTALLY SENSITIVE AREAS, OR AS OTHERWISE SPECIFIED.
2. THE CONTRACTOR MUST IMPLEMENT ALL NECESSARY MEASURES IN ORDER TO PREVENT LEAKS, DISCHARGES OR SPILLS OF POLLUTANTS, DELETERIOUS MATERIALS, OR OTHER SUCH MATERIALS OR SUBSTANCES WHICH WOULD OR COULD CAUSE AN ADVERSE IMPACT TO THE NATURAL ENVIRONMENT.
3. IN THE EVENT OF A LEAK, DISCHARGE OR SPILL OF POLLUTANT, DELETERIOUS MATERIAL OR OTHER SUCH MATERIAL OR SUBSTANCE WHICH WOULD OR COULD CAUSE AN ADVERSE IMPACT TO THE NATURAL ENVIRONMENT, THE CONTRACTOR SHALL:
   - 3.1. IMMEDIATELY NOTIFY APPROPRIATE FEDERAL, PROVINCIAL, AND LOCAL GOVERNMENT MINISTRIES, DEPARTMENTS, AGENCIES, AND AUTHORITIES OF THE INCIDENT IN ACCORDANCE WITH ALL CURRENT LAWS, LEGISLATION, ACTS, BY-LAWS, PERMITS, APPROVALS, ETC.
   - 3.2. TAKE IMMEDIATE MEASURES TO CONTAIN THE MATERIAL OR SUBSTANCE, AND TO TAKE SUCH MEASURES TO MITIGATE AGAINST ADVERSE IMPACTS TO THE NATURAL ENVIRONMENT.
   - 3.3. RESTORE THE AFFECTED AREA TO THE ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE AUTHORITIES HAVING JURISDICTION.

MUD MAT NOTES

1. THE GRANULAR MATERIAL WILL REQUIRE PERIODIC REPLACEMENT AS IT BECOMES CONTAMINATED BY VEHICLE TRAFFIC.
2. SEDIMENT SHALL BE CLEANED FROM PUBLIC ROADS AT THE END OF EACH DAY.
3. SEDIMENT SHALL BE REMOVED FROM PUBLIC ROADS BY SHOVELING OR SWEEPING AND DISPOSED OR PROPERLY IN A CONTROLLED SEDIMENT DISPOSAL AREA.

SITE GRADING NOTES

1. PRIOR TO THE COMMENCEMENT OF THE SITE GRADING WORKS, ALL SILTATION CONTROL DEVICES SHALL BE INSTALLED AND OPERATIONAL PER EROSION CONTROL PLAN.
2. ALL GRANULAR AND PAVEMENT FOR ROADS/PARKING AREAS SHALL BE CONSTRUCTED IN ACCORDANCE WITH GEOTECHNICAL ENGINEER'S RECOMMENDATIONS.
3. ALL TOPSOIL AND ORGANIC MATERIAL SHALL BE STRIPPED WITHIN THE ROAD AND PARKING AREAS ALLOWANCE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
4. CONCRETE CURB SHALL BE IN ACCORDANCE WITH THE CITY OF OTTAWA STD. SC1.1 PROVISION SHALL BE MADE OR CURB DEPRESSIONS AS INDICATED ON ARCHITECTURAL SITE PLAN. CONCRETE SIDEWALK SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD SC1.4. ALL CURBS, CONCRETE ISLANDS, AND SIDEWALKS SHOWN O THIS DRAWING ARE TO BR PRICED IN SITE WORKS PORTION OF THE CONTRACT.
5. PAVEMENT REINSTATEMENT FOR SERVICE AND UTILITY CUTS SHALL BE IN ACCORDANCE WITH THE CITY OF OTTAWA STD. R10 AND OPSD 509.010 AND OPSS 310.
6. GRANULAR 'A' SHALL BE PLACED TO A MINIMUM THICKNESS OF 30MM AROUND ALL STRUCTURES WITHIN THE PAVEMENT AREA.
7. SUB-EXCAVATE SOFT AREAS AND FILL WITH GRANULAR 'B' COMPACTED IN MAXIMUM 30MM LIFTS.
8. ALL WORK ON THE MUNICIPAL RIGHT OF WAY AND EASEMENTS TO BE INSPECTED BY THE MUNICIPALITY PRIOR BACKFILLING.
9. CONTRACTOR TO OBTAIN A ROAD OCCUPANCY PERMIT 48 HOURS PRIOR TO COMMENCING ANY WORK WITHIN THE MUNICIPAL ROAD ALLOWANCE, IF REQUIRED BY THE MUNICIPALITY.
10. ALL PAVEMENT MARKING FEATURES AND SITE SIGNAGE SHALL BE PLACED PER ARCHITECTURAL SITE PLAN. LINE PAINTING AND DIRECTIONAL SYMBOLS SHALL BE APPLIED WITH A MINIMUM OF TWO COATS OF ORGANIC SOLVENT PAINT.
11. REFER TO ARCHITECTURAL SITE PLAN FOR DIMENSIONS AND SITE DETAILS.
12. STEP JOINTS ARE TO BE USED WHERE PROPOSED ASPHALT MEETS EXISTING ASPHALT. ALL JOINTS MUST BE SEALED.
13. SIDEWALKS TO BE 13MM & BEVELED AT 2:1 OR 6MM WITH NO BEVEL REQUIRED BELOW THE FINISHED FLOOR SLAB ELEVATION AT ENTRANCES REQUIRED TO BE BARRIER-FREE, UNLESS OTHERWISE NOTED. ALL IN ACCORDANCE WITH OBC 3.8.1.3 & OTTAWA ACCESSIBILITY DESIGN STANDARDS.
14. WHERE APPLICABLE THE CONTRACTOR IS TO SUBMIT SHOP DRAWINGS TO THE ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION. SHOP DRAWINGS MUST BE SITE SPECIFIC, SIGNED AND SEALED BY A LICENSED STRUCTURAL ENGINEER. THE CONTRACTOR WILL ALSO BE REQUIRED TO SUPPLY AND GEOTECHNICAL CERTIFICATION OF THE AS-CONSTRUCTED RETAINING WALL TO THE ENGINEER PRIOR TO FINAL ACCEPTANCE.

ROADWORK SPECIFICATIONS

15. ROADWORK TO BE COMPLETED IN ACCORDANCE WITH GEOTECHNICAL REPORT, PREPARED BY LRL ASSOCIATES. DATED NOVEMBER 2020.
16. AL TOPSOIL AND ORGANIC MATERIAL SHALL BE STRIPPED WITHIN THE ROAD ALLOWANCE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION AND STOCK PILLED ON SITE AS DIRECTED BY NATIONAL MUNICIPALITY.
17. THE SUBGRADE SHALL BE CROWNED AND SLOPED AT LEAST 2% AND PROOF ROLLED WITH HEAVY ROLLERS.
18. SUB-EXCAVATE SOFT AREAS AND FILL WITH GRANULAR 'A', TYPE II COMPACTED IN MAXIMUM 300MM LIFTS.
19. ALL GRANULAR FOR ROADS SHALL BE COMPACTED TO MINIMUM OF 100% STANDARD PROCTOR DENSITY MAXIMUM DRY DENSITY (SPMDD).
20. CONCRETE RAMP C/W TACTILE WALKING SURFACE INDICATORS COMPONENT AS PER OPSD 310.039. TACTILE WALKING SURFACE INDICATORS TO BE INSTALLED AT ALL RAMPS. MATERIAL TO BE POLYMER COMPOSITE, COLOR GREY.

SANITARY, FOUNDATION DRAIN, STORM SEWER AND WATERMAIN NOTES

GENERAL

1. LASER ALIGNMENT CONTROL TO BE UTILIZED ON ALL SEWER INSTALLATIONS.
2. 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. THE SEALS SHOULD EXTEND FROM THE FROST LINE AND FULLY PENETRATE THE BEDDING, SUB-BEDDING, AND COVER MATERIAL. THE BARRIERS SHOULD CONSIST OF RELATIVELY DRY AND COMPATIBLE BROWN SILTY CLAY PLACED IN MAXIMUM 225MM LIFTS AND COMPACTED TO A MINIMUM OF 95% SPMDD. TO HELP MAINTAIN THE GROUNDWATER LEVEL, IT IS RECOMMENDED TO INSTALL CLAY DYKES WITHIN SERVICE TRENCHES, DOWNSTREAM FROM EACH OF THE MANHOLES/ CATCH BASINS. THESE DYKES SHOULD EXTEND FROM THE BASE OF THE SERVICE TO THE SUBGRADE LEVEL, HAVING A MINIMUM WIDTH OF 1.0m.
3. SERVICES TO BUILDING TO BE TERMINATED 1.0M FROM THE OUTSIDE FACE OF BUILDING UNLESS OTHERWISE NOTED.
4. ALL MAINTENANCE STRUCTURE AND CATCH BASIN EXCAVATIONS TO BE BACKFILLED WITH GRANULAR MATERIAL COMPACTED TO 98% STANDARD PROCTOR DENSITY. A MINIMUM OF 300MM AROUND STRUCTURES.
5. "MODULOC" OR APPROVED PRE-CAST MAINTENANCE STRUCTURE AND CATCH BASIN ADJUSTERS TO BE USED IN LIEU OF BRICKING. PARGE ADJUSTING UNITS ON THE OUTSIDE ONLY.
6. SAFETY PLATFORMS SHALL BE PER OPSD 404.02.
7. DROP STRUCTURES SHALL BE IN ACCORDANCE WITH OPSD 1003.01, IF APPLICABLE.
8. THE CONTRACTOR IS TO PROVIDE CCTV CAMERA INSPECTIONS OF ALL SEWERS, INCLUDING PICTORIAL REPORT, ONE (1) CD COPY AND TWO (2) VIDEO RECORDING IN A FORMAT ACCEPTABLE TO ENGINEER. ALL SEWER ARE TO BE FLUSHED PRIOR TO CAMERA INSPECTION. ASPHALT WEAR COURSE SHALL NOT BE PLACED UNTIL THE VIDEO INSPECTION OF SEWERS AND NECESSARY REPAIRS HAVE BEEN COMPLETED TO THE SATISFACTION OF THE ENGINEER.
9. CONTRACTOR SHALL PERFORM LEAKAGE TESTING, IN THE PRESENCE OF THE CONSULTANT, FOR SANITARY SEWERS IN ACCORDANCE WITH OPSS 407. CONTRACTOR SHALL PERFORM VIDEO INSPECTION OF ALL SEWERS. A COPY OF THE VIDEO AND INSPECTION REPORT SHALL BE SUBMITTED TO THE CONSULTANT FOR REVIEW AND APPROVAL PRIOR TO PLACEMENT OF WEAR COURSE ASPHALT.

SANITARY

10. ALL SANITARY SEWER INSTALLATION SHALL CONFORM TO THE LATEST REVISIONS OF THE CITY OF OTTAWA AND THE ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD). AND SPECIFICATIONS (OPSS).
11. ALL SANITARY GRAVITY SEWER SHALL BE PVC SDR 35, IPEX 'RING-TITE' (OR APPROVED EQUIVALENT) PER CSA STANDARD B182.2 OR LATEST AMENDMENT, UNLESS SPECIFIED OTHERWISE.
12. EXISTING MAINTENANCE STRUCTURES TO BE RE-BENCHED WHERE A NEW CONNECTION IS MADE.
13. SANITARY GRAVITY SEWER TRENCH AND BEDDING SHALL BE PER CITY OF OTTAWA STD. S6 AND S7 CLASS 'B' BEDDING, UNLESS SPECIFIED OTHERWISE.
14. SANITARY MAINTENANCE STRUCTURE FRAME AND COVERS SHALL BE PER CITY OF OTTAWA STD. S24 AND S25.
15. SANITARY MAINTENANCE STRUCTURES SHALL BE BENCHED PER OPSD 701.021.
16. 100MM THICK HIGH-DENSITY GRADE 'A' POLYSTYRENE INSULATION TO BE INSTALLED IN ACCORDANCE WITH CITY STD W22 WHERE INDICATED ON DRAWING SSP-1.

STORM

17. ALL REINFORCED CONCRETE STORM SEWER PIPE SHALL BE IN ACCORDANCE WITH CSA A257.2, OR LATEST AMENDMENT. ALL NON-REINFORCED CONCRETE STORM SEWER PIPE SHALL BE IN ACCORDANCE WITH CSA A257.1, OR LATEST AMENDMENT. PIPE SHALL BE JOINED WITH STD. RUBBER GASKETS AS PER CSA A257.3, OR LATEST AMENDMENT.
18. ALL STORM SEWER TRENCH AND BEDDING SHALL BE IN ACCORDANCE WITH THE CITY OF OTTAWA STD. S6 AND S7 CLASS 'B' UNLESS OTHERWISE SPECIFIED. BEDDING AND COVER MATERIAL SHALL BE SPECIFIED BY PROJECT GEOTECHNICAL ENGINEER.
19. ALL PVC STORM SEWERS ARE TO BE SDR 35 APPROVED PER C.S.A. B182.2 OR LATEST AMENDMENT, UNLESS OTHERWISE SPECIFIED.
20. CATCH BASIN SHALL BE IN ACCORDANCE WITH OPSD 705.010.
21. CATCH BASIN LEADS SHALL BE IN 200MM DIA. AT 1% SLOPE (MIN) UNLESS SPECIFIED OTHERWISE.
22. ALL CATCH BASINS SHALL HAVE 600MM SUMPS, UNLESS SPECIFIED OTHERWISE.
23. ALL CATCH BASIN LEAD INVERTS TO BE 1.5M BELOW FINISHED GRADE UNLESS SPECIFIED OTHERWISE.
24. THE STORM SEWER CLASSES HAVE BEEN DESIGNED BASED ON BEDDING CONDITIONS SPECIFIED ABOVE. WHERE THE SPECIFIED TRENCH WIDTH IS EXCEEDED , THE CONTRACTOR IS REQUIRED TO PROVIDE AND SHALL BE RESPONSIBLE FOR EXTRA TEMPORARY AND/OR PERMANENT REPAIRS MADE NECESSARY BY THE WIDENED TRENCH.
25. ALL ROAD AND PARKING LOT CATCH BASINS TO BE INSTALLED WITH ORTHOGONALLY PLACED SUBDRAINS IN ACCORDANCE WITH DETAIL. PERFORATED SUBDRAIN FOR ROAD AND PARKING LOT CATCH BASIN SHALL BE INSTALLED PER CITY STD R1 UNLESS OTHERWISE NOTED.
26. PERFORATED SUBDRAIN FOR REAR YARD AND LANDSCAPING APPLICATIONS SHALL BE INSTALLED PER CITY STD S29, S30 AND S31, WHERE APPLICABLE.
27. RIP-RAP TREATMENT SEWER AND CULVERT OUTLETS PER OPSD 810.010.
28. ALL STORM SEWER/ CULVERTS TO BE INSTALLED WITH FROST TREATMENT PER OPSD 803.031 WHERE APPLICABLE.
29. ALL STORM MANHOLES WITH PIPE LESS THAN 900MM IN DIAMETER SHALL BE CONSTRUCTED WITH A 300MM SUMP AS PER SDG, CLAUSE 6.2.6.

WATERMAIN

30. ALL WATERMAIN INSTALLATION SHALL CONFORM TO THE LATEST REVISIONS OF THE CITY OF OTTAWA AND THE ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) AND SPECIFICATIONS (OPSS).
31. ALL PVC WATERMAINS SHALL BE AWWA C-900 CLASS 150, SDR 18 OR APPROVED EQUIVALENT.
32. ALL WATER SERVICES LESS THAN OR EQUAL TO 50MM IN DIAMETER TO BE TYPE 'K' COPPER.
33. WATERMAIN TRENCH AND BEDDING SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARD W17. UNLESS SPECIFIED OTHERWISE. BEDDING AND COVER MATERIAL SHALL BE SPECIFIED BY THE PROJECT GEOTECHNICAL ENGINEER.
34. ALL PVC WATERMAINS, SHALL BE INSTALLED WITH A 10 GAUGE STRANDED COPPER TWU OR RWU TRACER WIRE IN ACCORDANCE WITH CITY OF OTTAWA STD. W.36.
35. CATHODIC PROTECTION IS REQUIRED ON ALL METALLIC FITTINGS PER CITY OF OTTAWA STD.25.5 AND W25.6.
36. VALVE BOXES SHALL BE INSTALLED PER CITY OF OTTAWA STD W24.
37. WATERMAIN IN FILL AREAS TO BE INSTALLED WITH RESTRAINED JOINTS PER CITY OF OTTAWA STD.25.5 AND W25.6.
38. THRUST BLOCKING OF WATERMAINS TO BE INSTALLED PER CITY OF OTTAWA STD. W25.3 AND W25.4.
39. THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY CAPS, PLUGS, BLOW-OFFS, AND NOZZLES REQUIRED FOR TESTING AND DISINFECTION OF THE WATERMAIN.
40. WATERMAIN CROSSING OVER AND BELOW SEWERS SHALL BE IN ACCORDANCE WITH THE CITY OF OTTAWA STD. W25,2 AND W25, RESPECTIVELY.
41. WATER SERVICES ARE TO BE INSULATED PER CITY STD. W23 WHERE SEPARATION BETWEEN SERVICES AND MAINTENANCE HOLES ARE LESS THAN 2.4M.
42. THE MINIMUM VERTICAL CLEARANCE BETWEEN WATERMAIN AND SEWER/UTILITY IS 0.5M PER MOE GUIDELINES. FOR CROSSING UNDER SEWERS, ADEQUATE STRUCTURAL SUPPORT FOR THE SEWER IS REQUIRED TO PREVENT EXCESSIVE DEFLECTION OF JOINTS AND SETTLING. THE LENGTH OF WATER PIPE SHALL BE CENTERED AT THE POINT OF CROSSING TO ENSURE THAT THE JOINTS WILL BE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE SEWER.
43. ALL WATERMAINS SHALL HAVE A MINIMUM COVER OR 2.4M, OTHERWISE THERMAL INSULATION IS REQUIRED AS PER STD DWG W22.
44. GENERAL WATER PLANT TO UTILITY CLEARANCE AS PER STD DWG R20.
45. FIRE HYDRANT INSTALLATION AS PER STD DWG W19, ALL BOTTOM OF HYDRANT FLANGE ELEVATIONS TO BE INSTALLED 0.10M ABOVE PROPOSED FINISHED GRADE AT HYDRANT; FIRE HYDRANT LOCATION AS PER STD DWG W18.
46. BUILDING SERVICE TO BE CAPPED 1.0M OFF THE FACE OF THE BUILDING UNLESS OTHERWISE NOTED AND MUST BE RESTRAINED A MINIMUM OF 12M BACK FROM STUB.
47. ALL WATERMAINS SHALL BE HYDROSTATICALLY TESTED IN ACCORDANCE WITH THE CITY OF OTTAWA AND ONTARIO GUIDELINES UNLESS OTHERWISE DIRECTED. PROVISIONS FOR FLUSHING WATER LINE PRIOR TO TESTING, ETC. MUST BE PROVIDED.
48. ALL WATERMAINS SHALL BE BACTERIOLOGICALLY TESTED IN ACCORDANCE WITH THE CITY OF OTTAWA AND ONTARIO GUIDELINES. ALL CHLORINATED WATER TO BE DISCHARGED AND PRETREATED TO ACCEPTABLE LEVELS PRIOR TO DISCHARGE. ALL DISCHARGED WATER MUST BE CONTROLLED AND TREATED SO AS NOT TO ADVERSELY EFFECT ENVIRONMENT. IT IS RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT ALL MUNICIPAL AND/OR PROVINCIAL REQUIREMENTS ARE FOLLOWED.
49. ALL WATERMAIN STUBS SHALL BE TERMINATED WITH A PLUG AND 50MM BLOW OFF UNLESS OTHERWISE NOTED.

USE AND INTERPRETATION OF DRAWINGS

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01	ISSUED FOR CLIENT APPROVAL	T.H.	03 AUG 2023

LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2024/02/27
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

LRL
ENGINEERING | INGÉNIERIE
5430 Canotek Road | Ottawa, ON, K1J 9G2
www.lrl.ca | (613) 842-3434

CLIENT
9621962 CANADA INC.

DESIGNED BY: T.H.
DRAWN BY: T.H.
APPROVED BY: M.B.

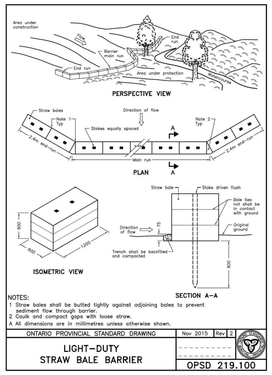
PROJECT
COMMERCIAL PLAZA SPC
652 FLAGSTAFF DRIVE
OTTAWA, ON

DRAWING TITLE
GENERAL NOTES

PROJECT NO.
220775

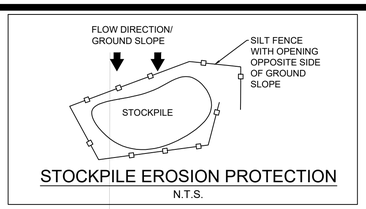
DATE
FEBRUARY 2024

C001

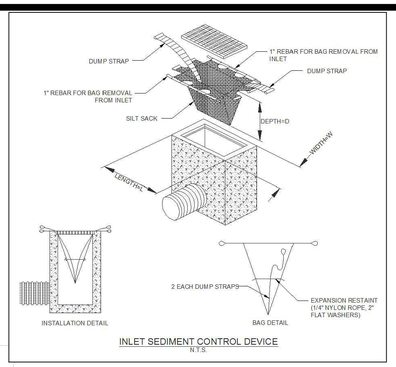


NOTES:
1 Straw bales shall be butted tightly against adjoining bales to prevent sediment flow through barrier.
2 Caulk and compact gaps with loose straw.
A All dimensions are in millimetres unless otherwise shown.

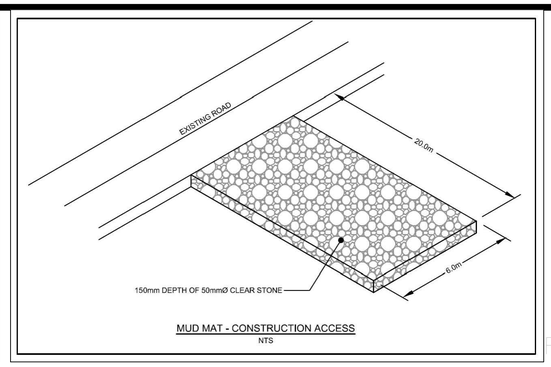
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev 2
LIGHT-DUTY STRAW BALE BARRIER		
	OPSD 219.100	



STOCKPILE EROSION PROTECTION
N.T.S.



INLET SEDIMENT CONTROL DEVICE
N.T.S.



MUD MAT - CONSTRUCTION ACCESS
NTS

LEGEND:

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- PROPOSED CURB
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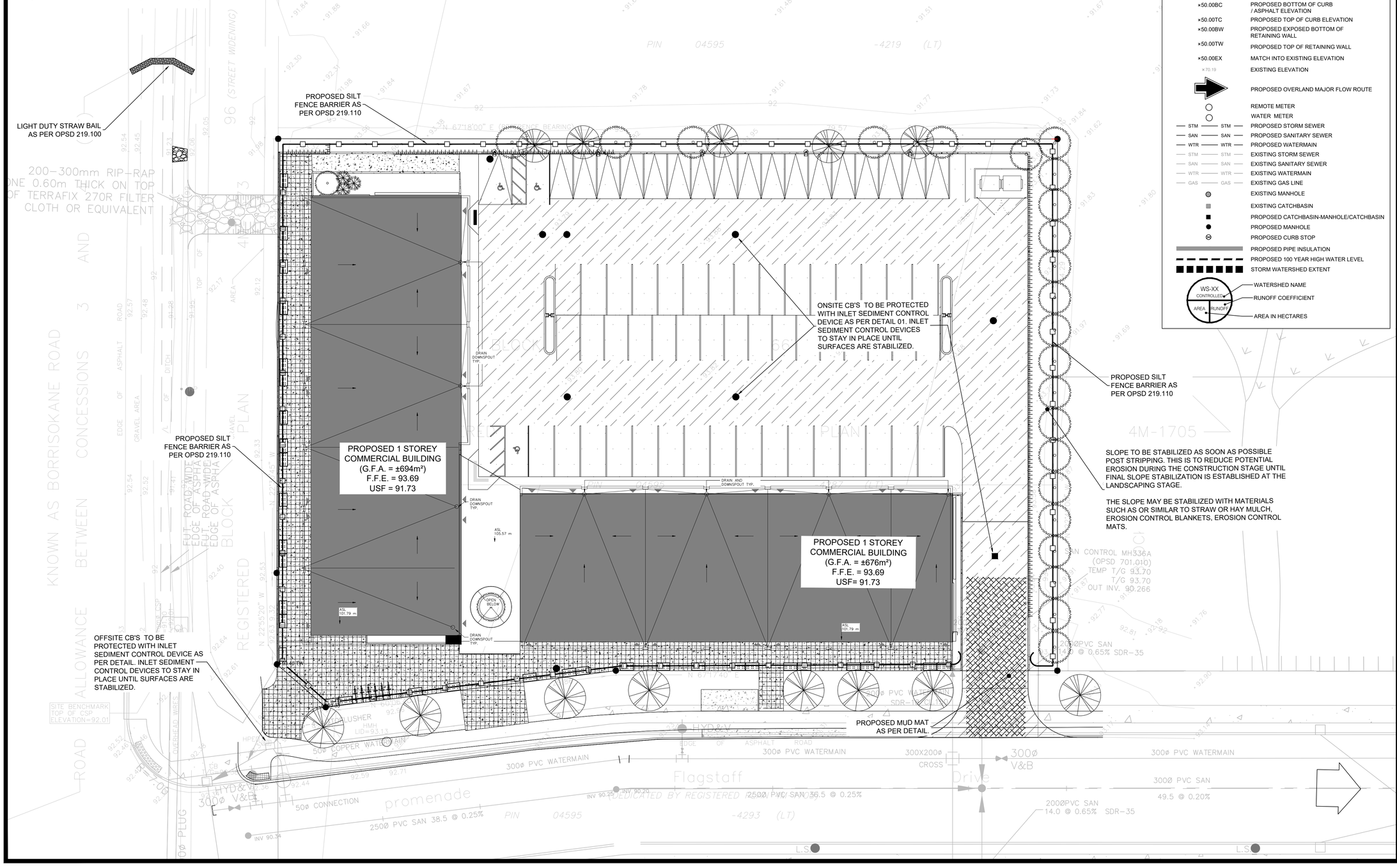

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5m 2 0 5m
SCALE: 1:200

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LICENSED PROFESSIONAL ENGINEER M. BASNET 100501996 2024/02/27 PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

LRL
ENGINEERING | INGÉNIERIE
5430 Canotek Road | Ottawa, ON, K1J 9G2
www.lrl.ca | (613) 842-3434

CLIENT
9621962 CANADA INC.

DESIGNED BY:	DRAWN BY:	APPROVED BY:
T.H.	T.H.	M.B.

PROJECT
COMMERCIAL PLAZA SPC
652 FLAGSTAFF DRIVE
OTTAWA, ON

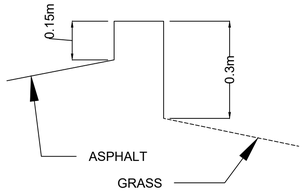
DRAWING TITLE
EROSION AND SEDIMENT CONTROL PLAN

PROJECT NO. 220775
DATE FEBRUARY 2024

C101

DETAIL 01

CURB DETAIL (NE SIDE OF PARKING LOT)



PAVEMENT STRUCTURE

COURSE	MATERIAL	THICKNESS (mm) AUTOMOBILE PARKING	THICKNESS (mm) TRUCK ROUTE (HEAVY TRAFFIC)
SURFACE	HL.3 A/SP12.5 A/C (PG 58-34)	50	40
BINDER	HL.8/ SP19.0 A/C (PG 58-34)	--	50
BASECOURSE	OPSS GRANULAR "A"	150	150
SUBBASE	OPSS GRANULAR "B" TYPE II	400	550

NOTE:
IN PREPARATION FOR PAVEMENT CONSTRUCTION AT THIS SITE, ANY SURFICIAL OR NEAR SURFACE/SUBGRADE LEVEL TOPSOIL AND ANY SOFT, WET OR DELETERIOUS MATERIALS SHOULD BE REMOVED FROM THE PROPOSED PAVED AREAS. THE EXPOSED SUBGRADE SHOULD BE INSPECTED AND APPROVED BY GEOTECHNICAL PERSONNEL AND ANY SOFT AREAS EVIDENT SHOULD BE SUBEXCAVATED AND REPLACED WITH SUITABLE EARTH BORROW APPROVED BY THE GEOTECHNICAL ENGINEER. THE SUBGRADE SHOULD BE SHAPED AND CROWNED TO PROMOTE DRAINAGE OF THE SITE DRAINAGE STRUCTURES. FOLLOWING APPROVAL OF THE PREPARATION OF THE SUBGRADE, THE PAVEMENT GRANULARS MAY BE PLACED. SEE GEOTECHNICAL INVESTIGATION REPORT COMPLETED BY LRL ENGINEERING ON MARCH 2023.

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- PROPOSED DEPRESSED CURB
- PROPOSED TERRACING (3:1 MIN.)
- PROPOSED SILT FENCE AS PER OPSD 219.110
- PROPOSED FENCE
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- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WS-XX CONTROLLED / AREA / RUNOFF — WATERSHED NAME; RUNOFF COEFFICIENT; AREA IN HECTARES

PROPOSED RETAINING WALL (REFER TO STRUCTURAL DESIGN)
- ELEVATION AT TOP OF WALL VARIES
- INSTALL GUARD RAIL WHERE WALL HEIGHT EXCEEDS 0.6m.
- WALL TO TRANSITION AND TIE TO EXISTING ELEVATIONS

RETAINING WALL TO BE A MINIMUM OF 0.15m WITHIN THE PROPERTY.

PROPOSED 1 STOREY COMMERCIAL BUILDING (G.F.A. = ±694m²) F.F.E. = 93.69 USF = 91.73

PROPOSED 1 STOREY COMMERCIAL BUILDING (G.F.A. = ±676m²) F.F.E. = 93.69 USF= 91.73

SEE DETAIL 01 FOR CURB ALONG NE OF PARKING LOT.

EMERGENCY SPILLOVER ELEVATION @ 93.34m

EMERGENCY SPILLOVER ELEVATION @ 93.32m

PAVED AREA

SITE ENTRANCE TO BE CONSTRUCTED BY DEVELOPER. CURB, SIDEWALK, LANDSCAPED AREAS AND TREES ARE PROPOSED AND TO BE CONSTRUCTED BY OTHERS.

PROPOSED ENTRANCE PER CITY STD DETAIL DRAWINGS SC7.1.

200-300mm RIP-RAP APPROX. 0.60m THICK ON TOP OF TERRAFIX 270R FILTER CLOTH OR EQUIVALENT

SCALE: 1:200

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LICENSED PROFESSIONAL ENGINEER — M BASNET — 100501996 — 2024/02/27 — PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

LRL
ENGINEERING | INGÉNIERIE
5430 Canotek Road | Ottawa, ON, K1J 9G2
www.lrl.ca | (613) 842-3434

CLIENT
9621962 CANADA INC.

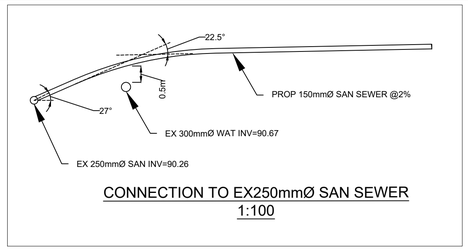
DESIGNED BY:	DRAWN BY:	APPROVED BY:
T.H.	T.H.	M.B.

PROJECT
COMMERCIAL PLAZA SPC
652 FLAGSTAFF DRIVE
OTTAWA, ON

DRAWING TITLE
GRADING AND DRAINAGE PLAN

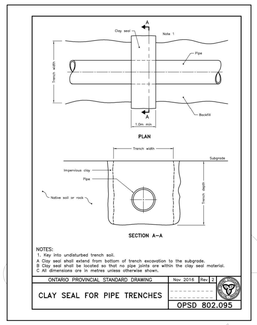
PROJECT NO. 220775
DATE FEBRUARY 2024

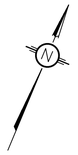
C301



CONNECTION TO EX250mmØ SAN SEWER
1:100

NOTES:
* TO HELP MAINTAIN THE GROUNDWATER LEVEL, IT IS RECOMMENDED TO INSTALL CLAY DYKES WITHIN SERVICE TRENCHES, DOWNSTREAM FROM EACH OF THE MANHOLES/CATCHBASINS. THESE DYKES SHOULD EXTEND FROM THE BASE OF THE SERVICE TRENCH TO THE SUBGRADE LEVEL, HAVING A MINIMUM WIDTH OF 1M.





LEGEND:

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- ×50.00EX MATCH INTO EXISTING ELEVATION
- ×70.19 EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- RM REMOTE METER
- WM WATER METER
- STM STM PROPOSED STORM SEWER
- SAN SAN PROPOSED SANITARY SEWER
- WTR WTR PROPOSED WATERMAIN
- STM STM EXISTING STORM SEWER
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- WTR WTR EXISTING WATERMAIN
- GAS GAS EXISTING GAS LINE
- EXISTING MANHOLE
- EXISTING CATCHBASIN
- PROPOSED CATCHBASIN-MANHOLE/CATCHBASIN
- PROPOSED MANHOLE
- PROPOSED CURB STOP
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WS-XX CONTROLLED AREA RUNOFF — WATERSHED NAME / RUNOFF COEFFICIENT / AREA IN HECTARES

EX. BOTTOM OF DITCH INV = 91.23
PROP INV = 91.45
C/W IN-LINE CHECK VALVE , RODENT GRATE AND RIP-RAP AT OUTLET.

PROP OGS FD-4HC
T/G = 93.39
NE INV = 91.65
SW INV = 91.59
SEE NOTE *

PROP 32.1m - 250mmØ
STM PVC DR-35 @ 0.45%

PROP 9.3m - 250mmØ
STM PVC DR-35 @ 0.45%

PROP 3.4m - 250mmØ STM PVC DR-35 @ 0.45%

PROP STM MH 04
T/G = 93.30
W INV =91.69, SE INV = 91.75
C/W HYDROVEX 125VHV-2 ICD (OR APPROVED EQUIVALENT)
100-YR HEAD = 1.60m, 100-YR Q = 14.07 L/s
SEE NOTE *

PROP STM MH03
T/G = 93.09
NE INV = 91.76

PROP STM CB MH02
T/G = 93.04
W INV = 91.75
SW INV = 91.78
SE INV = 91.84
E INV= 91.84
SEE NOTE *

PROP 27.7m - 250mmØ
STM PVC DR-35 @ 0.45%

PROP STM MH01
T/G = 93.44
W INV = 91.97
SE INV = 92.03
SEE NOTE *

PROP 2.6m - 250mmØ
STM PVC DR-35 @ 0.45%
INV@ CHAMBER = 91.76

PROP STORMTECH CHAMBER SYSTEM C/W ISOLATOR ROW PLUS
DIM =13.48m x 7.697m
STORAGE VOLUME = 63.68 m³
REFER TO STORMTECH CHAMBER DESIGN BY ADS

PROP 16.5m - 250mmØ
STM PVC DR-35 @ 0.45%

PROP STM MH02
T/G = 93.30
NE INV = 92.05
SW INV = 92.11
SEE NOTE *

PROP 17.2m - 250mmØ
STM PVC DR-35 @ 0.45%

PROP STM CB MH01
T/G = 93.04
NW INV = 91.91
SW INV = 91.97
SEE NOTE *

PROP 24.0m - 250mmØ
STM PVC DR-35 @ 0.45%

PROP 9.9m - 250mmØ
STM PVC DR-35 @ 0.45%
INV @ BLDG = 92.15

PROP 80.5m - 150mmØ WTR PVC DR-18
TO BE INSTALLED WITH MIN 2.4M OF COVER
BELOW FINISHED GRADE

PROPOSED 1 STOREY
COMMERCIAL BUILDING
(G.F.A. = ±694m²)
F.F.E. = 93.69
USF = 91.73

PROP STM CB01
T/G = 93.21
NW INV = 92.14
SEE NOTE *

LOCATION OF MECHANICAL ROOM

PROPOSED 1 STOREY
COMMERCIAL BUILDING
(G.F.A. = ±676m²)
F.F.E. = 93.69
USF= 91.73

PROP 2.7m - 150mmØ
SAN PVC DR-35 @ 2.0%
INV@BLG = 92.17

PROP SAN MH01
T/G = 93.01
NW INV = 92.12
SE INV = 92.06
SEE NOTE *

EX WATER STUB TO BE REMOVED.

EX SAN MH
TO BE REUSED
ONSITE IF POSSIBLE

PROP 13.1m - 150mmØ
SAN PVC DR-35 @ 2.0%
150mmØ PROP SAN INV @CONNECTION = 90.38
250mmØ EX SAN SPRING LINE = 90.38
CONNECTION TO EX 250mmØ PVC AS PER CITY
STANDARD DETAIL DRAWING S11.1

CROSSING
EX 300mmØ WAT OBV=90.97
PROP 150mmØ SAN INV=91.47
CLEARANCE = 0.5m
GROUND SURFACE = 93.50

EX SAN SERVICE TO BE REMOVED AND CAPPED AT EX SAN MH AS PER S11.4.

PROPOSED TVS CONNECTION TO 300mmØ WATERMAIN BY CITY FORCES. EXCAVATION AND REINSTATEMENT BY CONTRACTOR.
EX. WATERMAIN OBV TO BE CONFIRMED

EXISTING 4 WAY CONNECTION TO BE REPLACED WITH A 200X300TEE FOR THE BLANKING.

ASPHALT REINSTATEMENT SHALL MATCH EXISTING GRANULAR AND ASPHALT THICKNESS.
CONTRACTOR TO COMPLETE ROAD CUT AS PER CITY OF OTTAWA DETAIL R10. ASPHALT REINSTATEMENT TO BE AS PER PRE-DEVELOPMENT CONDITIONS OR GREATER. CONTRACTOR TO ENSURE TIE-IN ELEVATIONS ARE CONSISTENT WITH PRE-DEVELOPMENT ELEVATIONS AND GRADING IS CONTINUOUS FOR ENTIRE REINSTATED ASPHALT SURFACE.

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DESIGNED BY:	DRAWN BY:	APPROVED BY:
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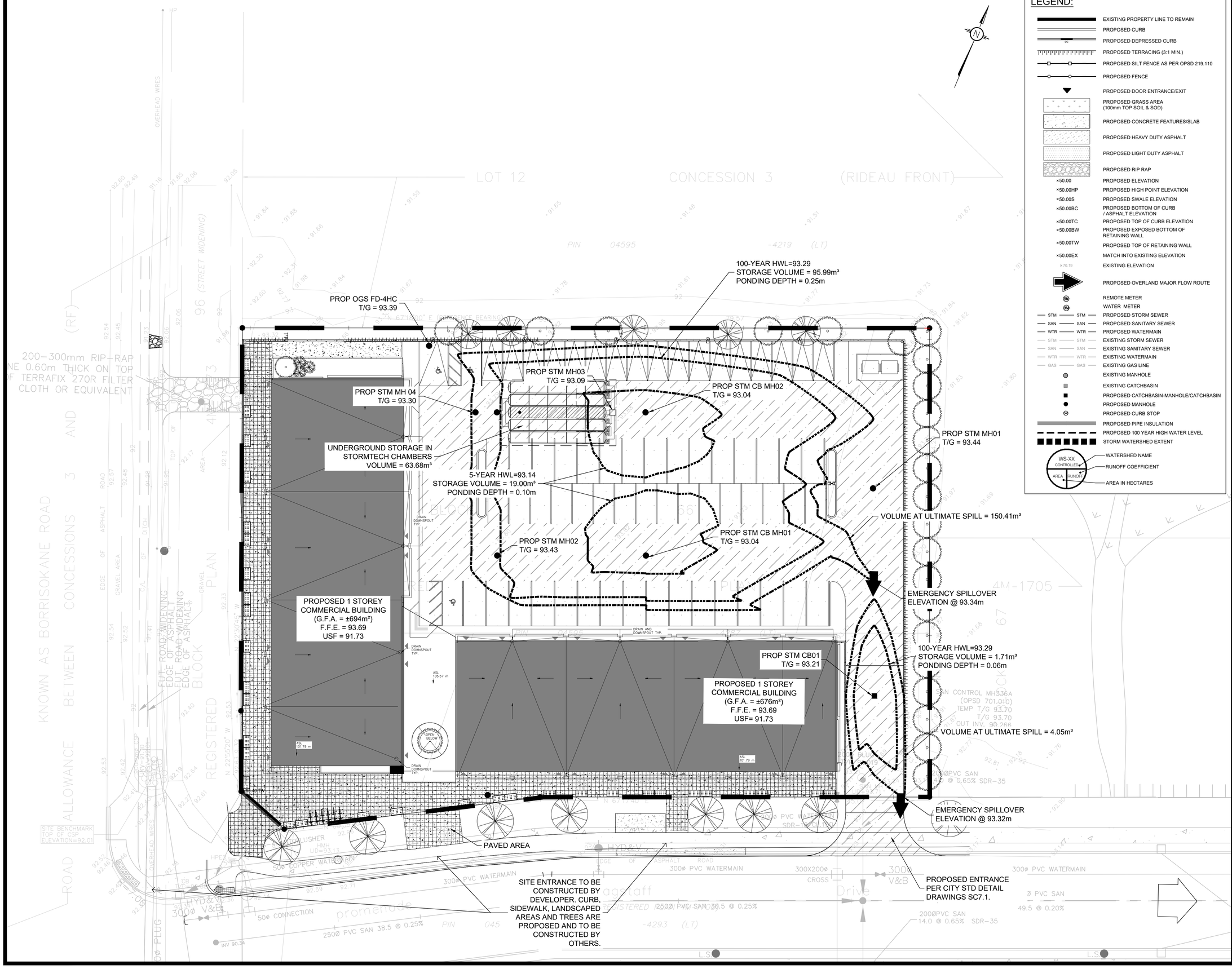
PROJECT
COMMERCIAL PLAZA SPC
652 FLAGSTAFF DRIVE
OTTAWA, ON

DRAWING TITLE
SERVICING PLAN

PROJECT NO.
220775
DATE
FEBRUARY 2024

C401



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WS-XX (CONTROLLED) — WATERSHED NAME
AREA — RUNOFF — RUNOFF COEFFICIENT
AREA IN HECTARES

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LRL
ENGINEERING | INGÉNIERIE
5430 Canotek Road | Ottawa, ON, K1J 9G2
www.lrl.ca | (613) 842-3434

CLIENT
9621962 CANADA INC.

DESIGNED BY:	DRAWN BY:	APPROVED BY:
T.H.	T.H.	M.B.

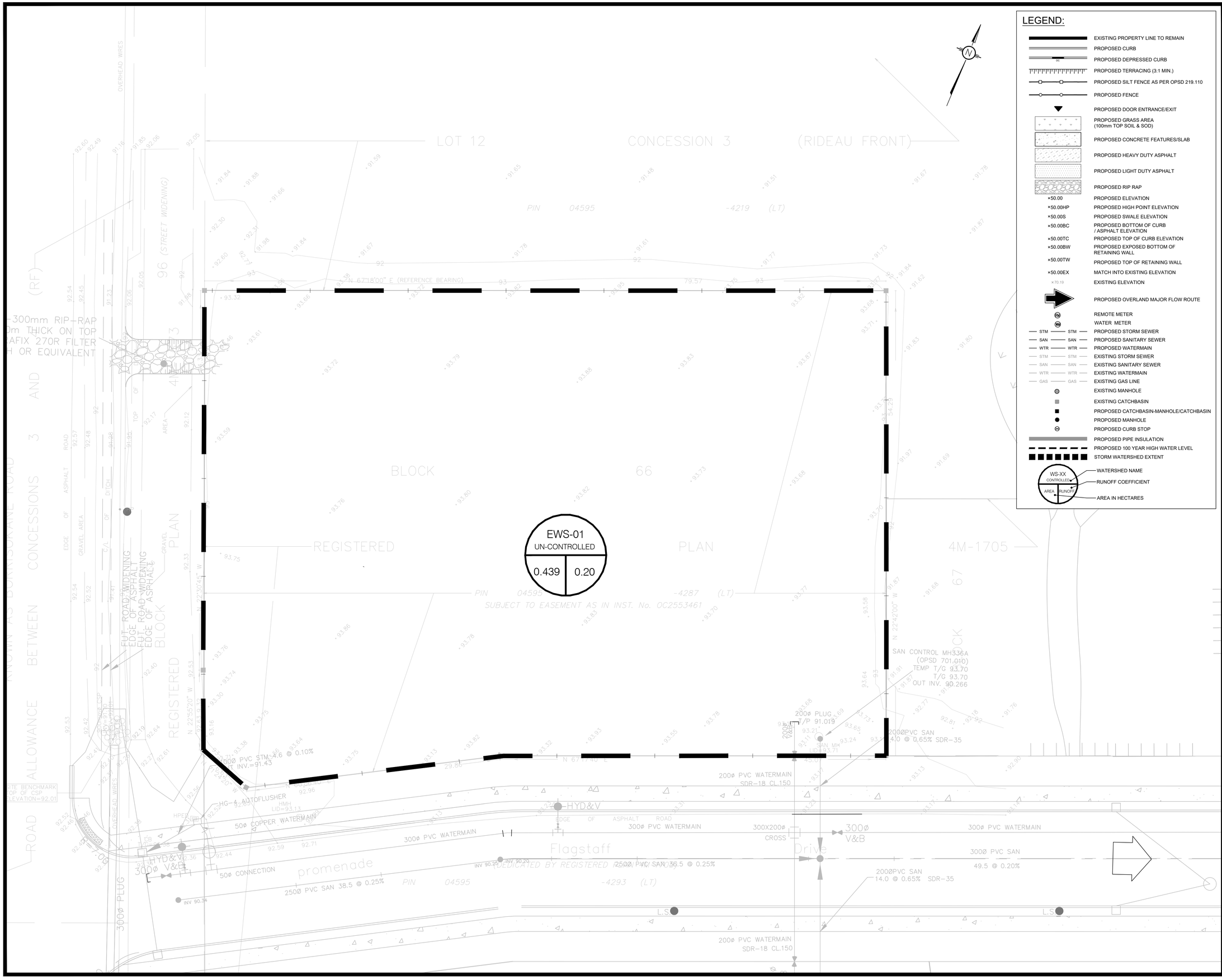
PROJECT
COMMERCIAL PLAZA SPC
652 FLAGSTAFF DRIVE
OTTAWA, ON

DRAWING TITLE
STORMWATER MANAGEMENT PLAN

PROJECT NO.
220775

DATE
FEBRUARY 2024

C601



LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
- PROPOSED CURB
- PROPOSED DEPRESSED CURB (SC)
- PROPOSED TERRACING (3:1 MIN.)
- PROPOSED SILT FENCE AS PER OPSD 219.110
- PROPOSED FENCE
- PROPOSED DOOR ENTRANCE/EXIT
- PROPOSED GRASS AREA (100mm TOP SOIL & SOD)
- PROPOSED CONCRETE FEATURES/SLAB
- PROPOSED HEAVY DUTY ASPHALT
- PROPOSED LIGHT DUTY ASPHALT
- PROPOSED RIP RAP
- ×50.00 PROPOSED ELEVATION
- ×50.00HP PROPOSED HIGH POINT ELEVATION
- ×50.00S PROPOSED SWALE ELEVATION
- ×50.00BC PROPOSED BOTTOM OF CURB / ASPHALT ELEVATION
- ×50.00TC PROPOSED TOP OF CURB ELEVATION
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- PROPOSED OVERLAND MAJOR FLOW ROUTE
- RM REMOTE METER
- WM WATER METER
- STM STM PROPOSED STORM SEWER
- SAN SAN PROPOSED SANITARY SEWER
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- STM STM EXISTING STORM SEWER
- SAN SAN EXISTING SANITARY SEWER
- WTR WTR EXISTING WATERMAIN
- GAS GAS EXISTING GAS LINE
- EXISTING MANHOLE
- EXISTING CATCHBASIN
- PROPOSED CATCHBASIN-MANHOLE/CATCHBASIN
- PROPOSED MANHOLE
- PROPOSED CURB STOP
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT

WS-XX (CONTROLLED / UNCONTROLLED)
AREA | RUNOFF

- WATERSHED NAME
- RUNOFF COEFFICIENT
- AREA IN HECTARES

USE AND INTERPRETATION OF DRAWINGS

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION ARE PART OF THE CONTRACT DOCUMENTS AND DESCRIBE USE AND INTENT OF THE DRAWING. THE CONTRACT DOCUMENTS INCLUDE NOT ONLY THE DRAWINGS, BUT ALSO THE OWNER-CONTRACTOR AGREEMENTS, CONDITIONS OF THE CONTRACT, THE SPECIFICATIONS, ADDENDA, AND MODIFICATIONS ISSUED AFTER EXECUTION OF THE CONTRACT. THESE CONTRACT DOCUMENTS ARE COMPLEMENTARY, AND WHAT IS REQUIRED BY ANY ONE SHALL BE BINDING AS IF REQUIRED BY ALL. WORK NOT COMPLETELY DELINEATED HEREON SHALL BE CONSTRUCTED OF THE SAME MATERIALS AND DETAILED SIMILARLY AS WORK SHOWN MORE COMPLETELY ELSEWHERE IN THE CONTRACT DOCUMENTS.

BY USE OF THE DRAWINGS FOR CONSTRUCTION OF THE PROJECT, THE OWNER CONFIRMS THAT HE HAS REVIEWED AND APPROVED THE DRAWINGS. THE CONTRACTOR CONFIRMS THAT HE HAS VISITED THE SITE, FAMILIARIZED HIMSELF WITH THE LOCAL CONDITIONS, VERIFIED FIELD DIMENSIONS AND CORRELATED HIS OBSERVATIONS WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

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5m 2 0 5m

SCALE: 1:200

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LICENSED PROFESSIONAL ENGINEER
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100501996
2024/02/27
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

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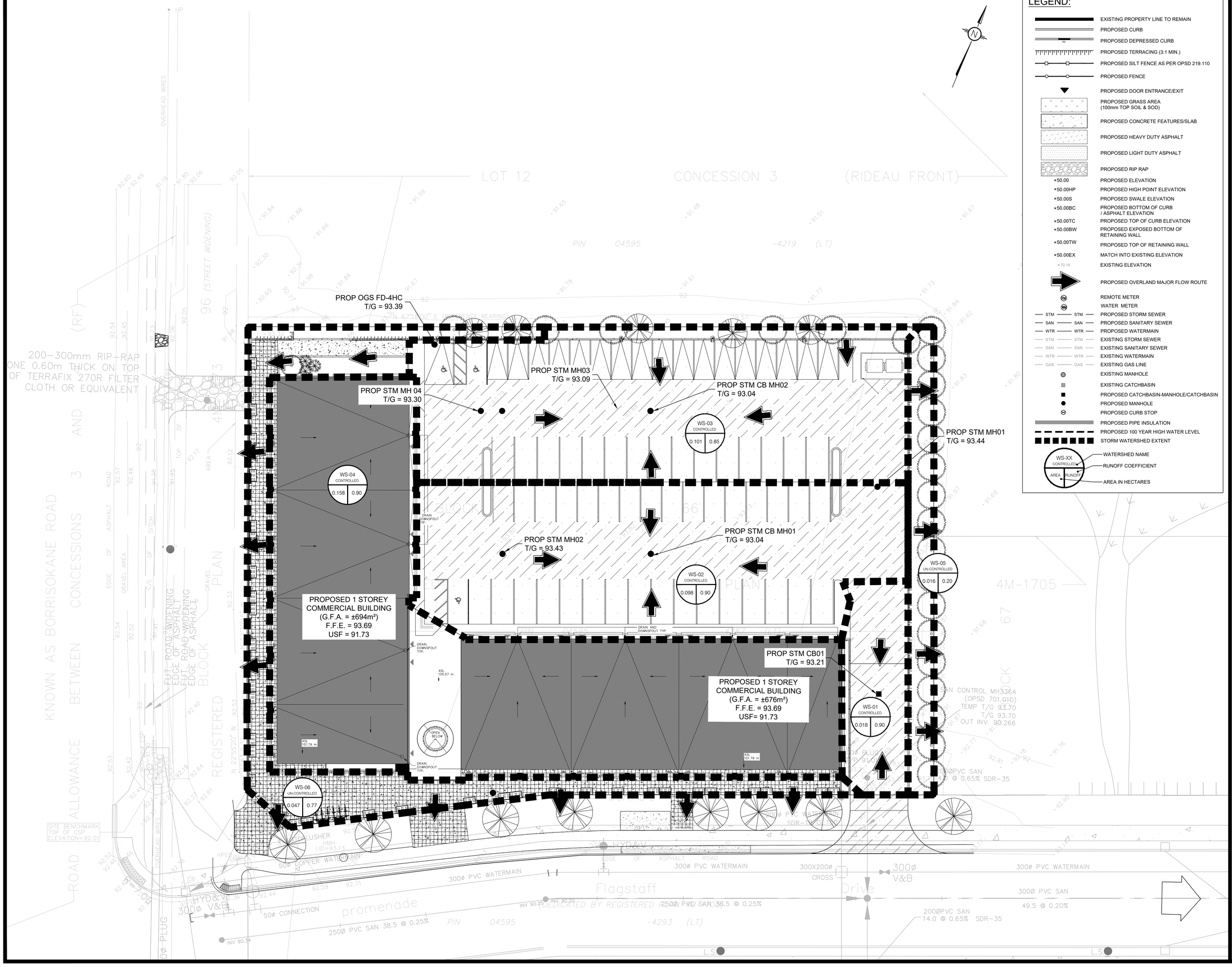

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LICENSED PROFESSIONAL ENGINEER
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652 FLAGSTAFF DRIVE
OTTAWA, ON

DRAWING TITLE
POST-DEVELOPMENT
WATERSHED PLAN

PROJECT NO.
220775

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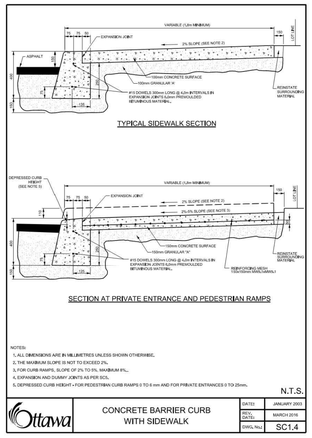
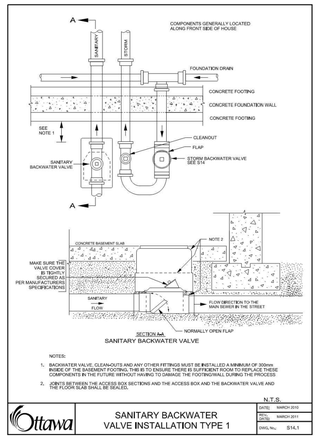
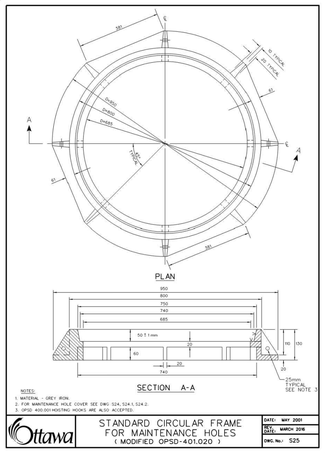
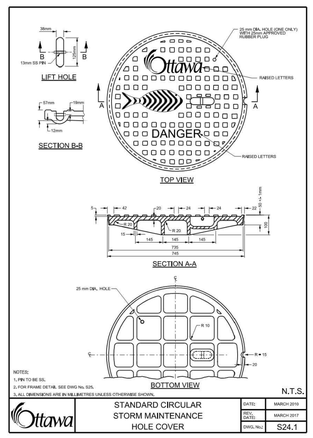
FEBRUARY 2024

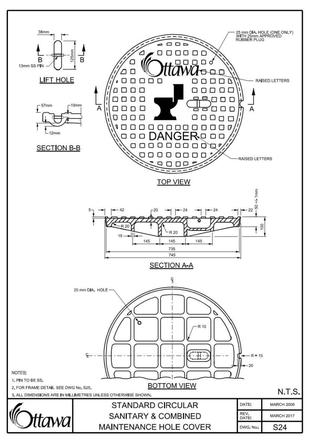
C702

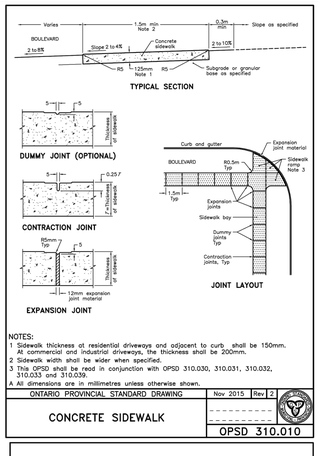


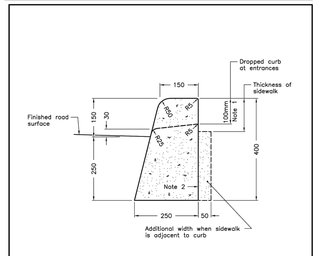


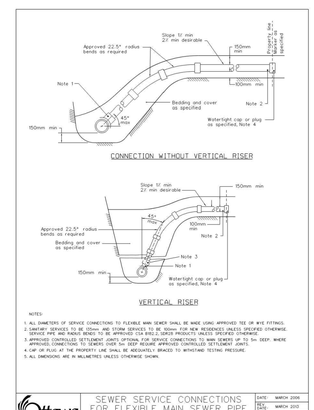


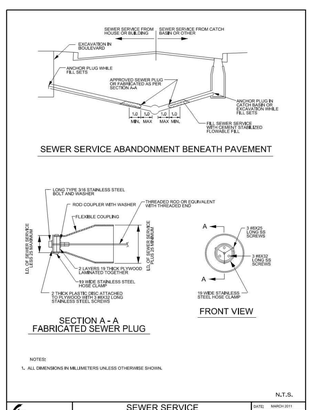


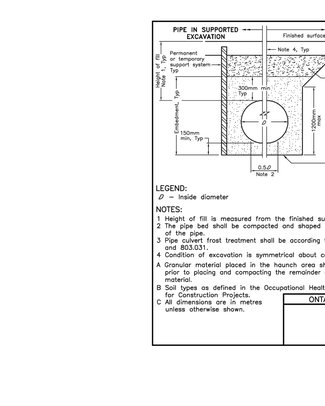


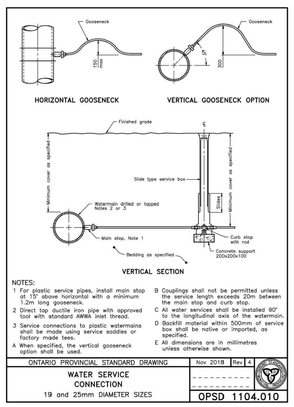


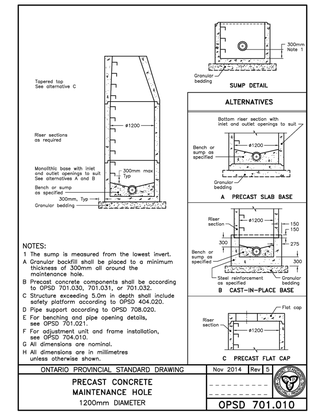


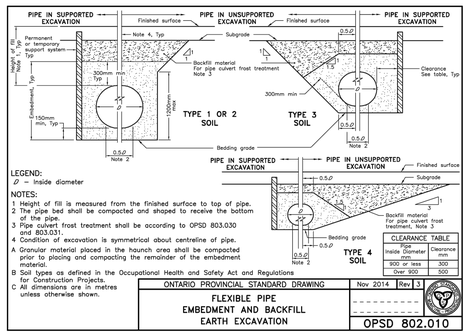


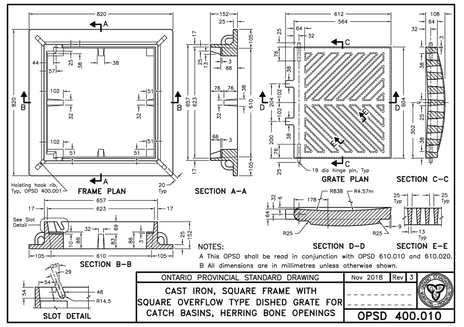












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CONTRACTOR TO VERIFY ALL DIMENSIONS AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES BEFORE WORK COMMENCES. DO NOT SCALE DRAWINGS.

No.	REVISIONS	BY	DATE
04	REISSUED FOR CITY APPROVAL	M.L.	27 FEB 2024
03	REISSUED FOR CITY APPROVAL	T.H.	08 FEB 2024
02	REISSUED FOR CITY APPROVAL	T.H.	07 DEC 2023
01	ISSUED FOR CLIENT APPROVAL	T.H.	03 AUG 2023

LICENSED PROFESSIONAL ENGINEER M BASNET 100501996 2024/02/27 PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

LRL
ENGINEERING | INGÉNIERIE
5430 Canotek Road | Ottawa, ON, K1J 9G2
www.lrl.ca | (613) 842-3434

CLIENT
9621962 CANADA INC.

DESIGNED BY:	DRAWN BY:	APPROVED BY:
T.H.	T.H.	M.B.

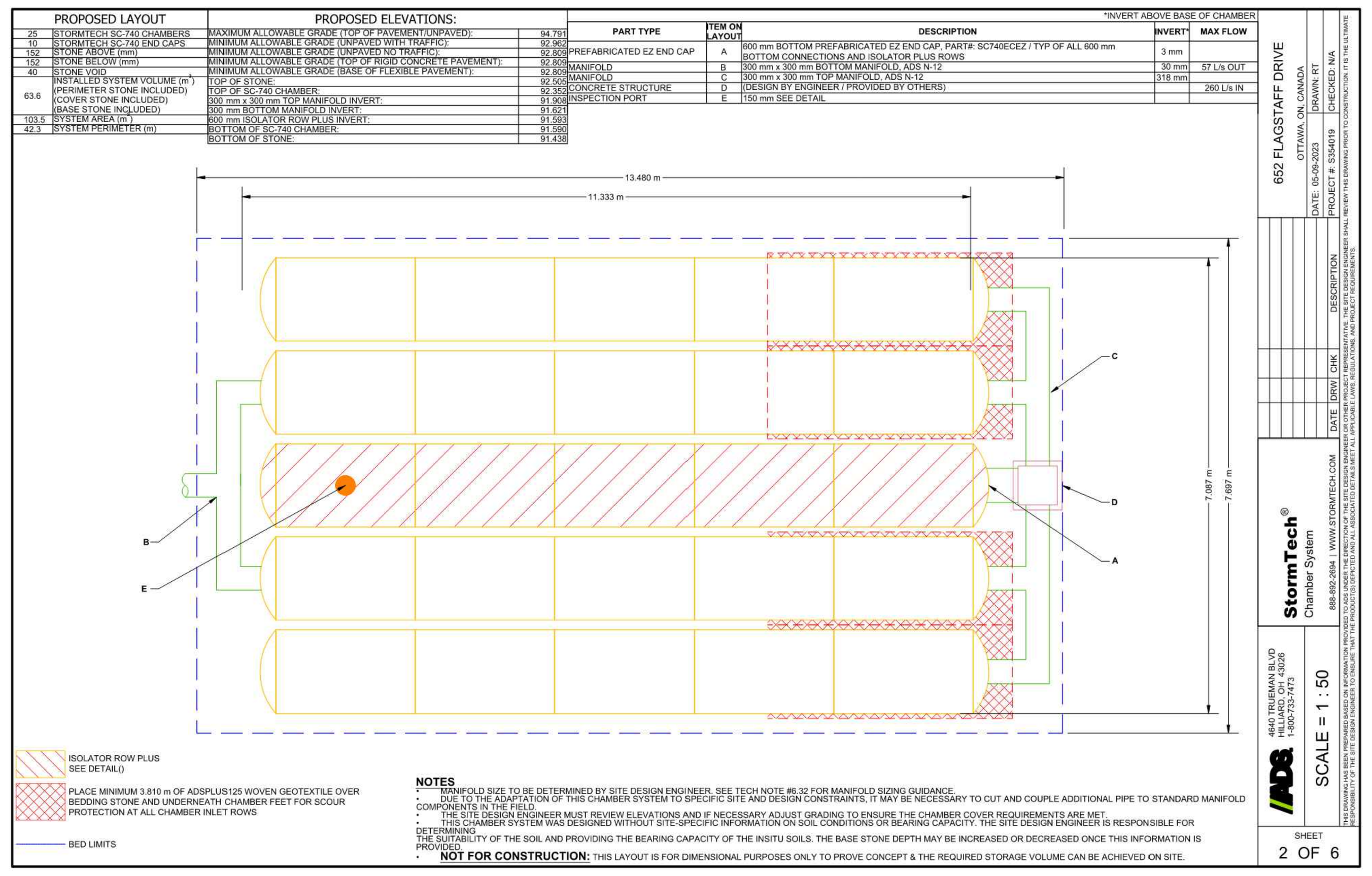
PROJECT
COMMERCIAL PLAZA SPC
652 FLAGSTAFF DRIVE
OTTAWA, ON

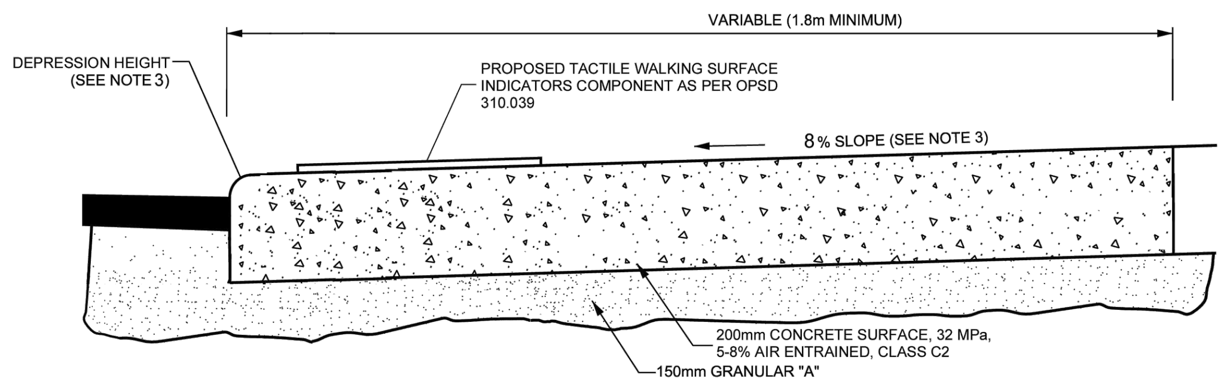
DRAWING TITLE
CONSTRUCTION DETAIL PLAN

PROJECT NO.
220775

DATE
FEBRUARY 2024

C901

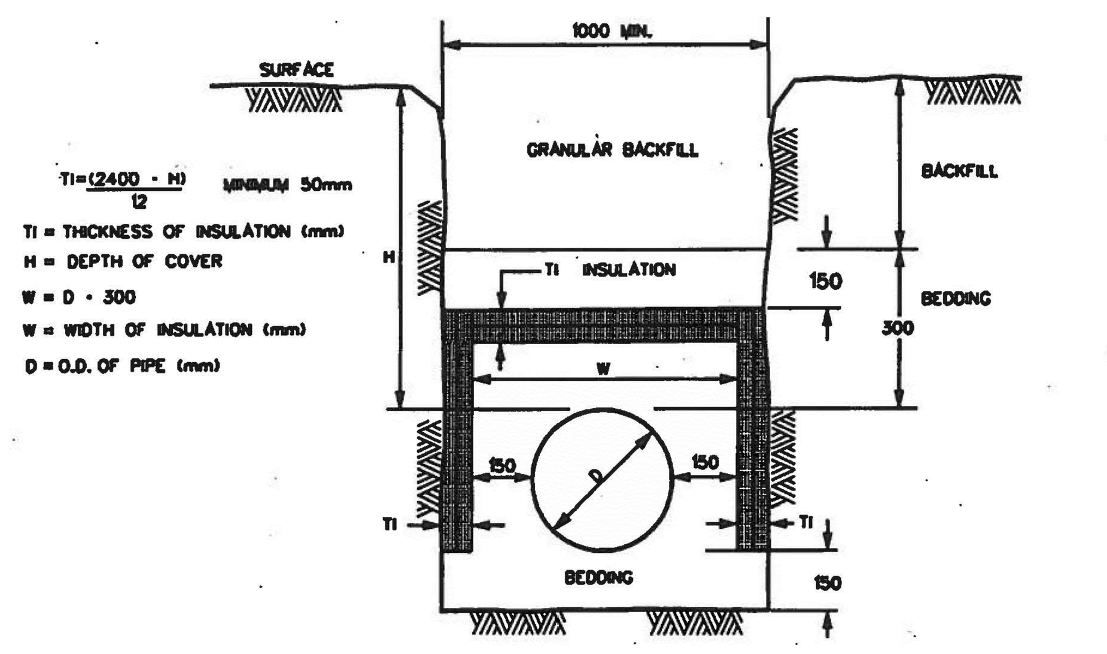




SIDEWALK SECTION AT PRIVATE ENTRANCE AND PEDESTRIAN RAMPS

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
2. FOR CURB RAMPS, SLOPE OF 2% TO 5%, MAXIMUM 8%.
3. DEPRESSION HEIGHT 0 TO 6 mm



NOTES:
-FOR STORM INSULATION USE AN X VALUE OF 2000 IN THE ABOVE "TI" EQUATION.
-FOR SANITARY INSULATION USE AN X VALUE OF 2500 IN THE ABOVE "TI" EQUATION.
-FOR WATERMAIN INSULATION USE AN X VALUE OF 2400 IN THE ABOVE "TI" EQUATION.
-INCREMENTS OF INSULATION THICKNESS SHALL BE ADJUSTABLE TO 25mm.
-STAGGER JOINTS OF MULTIPLE SHEETS.
-ALL DIMENSIONS ARE IN MILLIMETERS UNLESS SHOWN OTHERWISE.

TYPICAL STORM AND SANITARYSEWER AND WATERMAIN INSULATION DETAIL
(N.T.S.)

USE AND INTERPRETATION OF DRAWINGS

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION ARE PART OF THE CONTRACT DOCUMENTS AND DESCRIBE USE AND INTENT OF THE DRAWING. THE CONTRACT DOCUMENTS INCLUDE NOT ONLY THE DRAWINGS, BUT ALSO THE OWNER-CONTRACTOR AGREEMENTS, CONDITIONS OF THE CONTRACT, THE SPECIFICATIONS, ADDENDA, AND MODIFICATIONS ISSUED AFTER EXECUTION OF THE CONTRACT. THESE CONTRACT DOCUMENTS ARE COMPLEMENTARY, AND WHAT IS REQUIRED BY ANY ONE SHALL BE BINDING AS IF REQUIRED BY ALL. WORK NOT COMPLETELY DELINEATED HEREON SHALL BE CONSTRUCTED OF THE SAME MATERIALS AND DETAILED SIMILARLY AS WORK SHOWN MORE COMPLETELY ELSEWHERE IN THE CONTRACT DOCUMENTS.

BY USE OF THE DRAWINGS FOR CONSTRUCTION OF THE PROJECT, THE OWNER CONFIRMS THAT HE HAS REVIEWED AND APPROVED THE DRAWINGS. THE CONTRACTOR CONFIRMS THAT HE HAS VISITED THE SITE, FAMILIARIZED HIMSELF WITH THE LOCAL CONDITIONS, VERIFIED FIELD DIMENSIONS AND CORRELATED HIS OBSERVATIONS WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

AS INSTRUMENTS OF SERVICE, ALL DRAWINGS, SPECIFICATIONS, CADD FILES OR OTHER ELECTRONIC MEDIA AND COPIED THERE OF FURNISHED BY THE ENGINEER ARE HIS PROPERTY. THEY ARE TO BE USED ONLY FOR THIS PROJECT AND ARE NOT TO BE USED ON ANY OTHER PROJECT, INCLUDING REPEATS OF THE PROJECT. CHANGES TO THE DRAWINGS MAY ONLY BE MADE BY THE ENGINEER.

UNLESS THE REVISION TITLE IS "ISSUED FOR CONSTRUCTION", THESE DRAWINGS SHALL BE CONSIDERED PRELIMINARY AND SHALL NOT BE USED AS A CONSTRUCTION DOCUMENT.

THESE DRAWINGS ILLUSTRATES THE WORK TO BE DONE. THE ENGINEER IS NOT RESPONSIBLE FOR THE MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES USED TO DO THE WORK, OR THE SAFETY ASPECTS OF CONSTRUCTION, AND NOTHING ON THESE DRAWINGS EXPRESSED OR IMPLIED CHANGES THIS CONDITION. CONTRACTOR SHALL DETERMINE ALL CONDITIONS AT THE SITE AND SHALL BE RESPONSIBLE FOR KNOWING HOW THEY AFFECT THE WORK. SUBMITTAL OF A BID TO PERFORM THIS WORK IS ACKNOWLEDGEMENT OF THE RESPONSIBILITIES, AND THAT THEY HAVE BEEN FULLY CONSIDERED IN PLANNING OF THE WORK, AND THE BID PRICE. NO CLAIMS FOR EXTRA CHARGES DUE TO THESE CONDITIONS WILL BE FORTHCOMING.

UNAUTHORIZED CHANGES:

IN THE EVENT THE CLIENT, THE CLIENT'S CONTRACTORS OR SUBCONTRACTORS, OR ANYONE FOR WHOM THE CLIENT IS LEGALLY LIABLE MAKES OR PERMITS TO BE MADE ANY CHANGES TO ANY REPORTS, PLANS, SPECIFICATIONS OR OTHER CONSTRUCTION DOCUMENTS PREPARED BY LRL ASSOCIATES LTD. (LRL) WITHOUT OBTAINING LRL'S PRIOR WRITTEN CONSENT, THE CLIENT SHALL ASSUME FULL RESPONSIBILITY FOR THE RESULTS OF SUCH CHANGES. THEREFORE THE CLIENT AGREES TO WAIVE ANY CLAIM AGAINST LRL AND TO RELEASE LRL FROM ANY LIABILITY ARISING DIRECTLY OR INDIRECTLY FROM SUCH UNAUTHORIZED CHANGES.

IN ADDITION, THE CLIENT AGREES, TO THE FULLEST EXTENT PERMITTED BY LAW, TO INDEMNIFY AND HOLD HARMLESS LRL FROM ANY DAMAGES, LIABILITIES OR COST, INCLUDING REASONABLE ATTORNEY'S FEES AND COST OF DEFENSE, ARISING FROM SUCH CHANGES.

IN ADDITION, THE CLIENT AGREES TO INCLUDE IN ANY CONTRACTS FOR CONSTRUCTION APPROPRIATE LANGUAGE THAT PROHIBITS THE CONTRACTOR OR ANY SUBCONTRACTORS OF ANY TIER FROM MAKING ANY CHANGES OR MODIFICATIONS TO LRL'S CONSTRUCTION DOCUMENTS WITHOUT THE PRIOR WRITTEN APPROVAL OF LRL AND THAT FURTHER REQUIRES THE CONTRACTOR TO INDEMNIFY BOTH LRL AND THE CLIENT FROM ANY LIABILITY OR COST ARISING FROM SUCH CHANGES MADE WITHOUT SUCH PROPER AUTHORIZATION.

GENERAL NOTES:

EXISTING SERVICES AND UTILITIES SHOWN ON THESE DRAWINGS ARE TAKEN FROM THE BEST AVAILABLE RECORDS, BUT MAY NOT BE COMPLETE OR TO DATE. CONTRACTOR SHALL VERIFY IN FIELD FOR LOCATION AND ELEVATION OF PIPES AND CHECK WITH THE UTILITY COMPANIES BEFORE DIGGING OR PERFORMING WORK.

CONTRACTOR IS ADVISED TO COLLECT INFORMATION ON SOIL CONDITIONS BEFORE START OF CONSTRUCTION.

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LICENSED PROFESSIONAL ENGINEER
M BASNET
100501996
2024/02/27
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

LRL
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5430 Canotek Road | Ottawa, ON, K1J 9G2
www.lrl.ca | (613) 842-3434

CLIENT
9621962 CANADA INC.

DESIGNED BY:	DRAWN BY:	APPROVED BY:
T.H.	T.H.	M.B.

PROJECT
COMMERCIAL PLAZA SPC
652 FLAGSTAFF DRIVE
OTTAWA, ON

DRAWING TITLE
CONSTRUCTION DETAIL PLAN

PROJECT NO.
220775

DATE
FEBRUARY 2024

C902

APPENDIX F

Proposed Site Plan
Legal Survey
As-builts

DRAWING LEGEND

1 Ref / Ref / A101 — INTERIOR ELEVATION
1 Ref / 1 / A101 — SECTION
101 — DOOR #
Room name / 101 — ROOM #
OUTLET
SWITCH
LIGHT FIXTURE
1 — SHEET NOTE NUMBER
X — WALL TAG
X / X mm — CEILING TAG - WITH HEIGHT
BUILDING ENTRANCE
U.O.N. — UNLESS OTHERWISE NOTED
N.I.C — NOT INCLUDED IN CONTRACT

SITE PLAN LEGEND

ROOF OVERHANG
PROPERTY LINE
ZONING SETBACKS
HYDRO SETBACK
HYDRO LINES ABOVE
UTILITIES BEYOND
AREA OF SETBACK
PROPOSED AREA OF BUILDING
AREA OF PERMEABLE PAVERS
AREA OF CAST-IN-PLACE CONC.
LIGHTING MAST (SINGLE HEAD)
LIGHTING MAST (DOUBLE HEAD)
MOVABLE PLANTER BOX

ZONING STATISTICS

ZONE: LC7 [1694]	TYPE: LOCAL COMMERCIAL ZONE	
	REQUIRED	PROVIDED
MIN. LOT WIDTH:	NO MIN.	
MIN. LOT AREA:	NO MIN.	47,248 m² / 4.72 HA
MIN. FRONT YARD SETBACK:	3 m	3 m
MIN. CORNER SIDE YARD SETBACK	3 m	3 m
MIN. INTERIOR SIDE YARD SETBACK:	5 m	5 m
MIN. REAR YARD SETBACK:	NO MINIMUM	5 m
MIN. LANDSCAPE AREA	FRONT YARD:	3 m buffer	3 m buffer
MAX. BUILDING HEIGHT:	12.5 m	6.97 m
MAX. FLOOR SPACE INDEX:	NO MAX.	31%

PARKING STATISTICS

ZONE: LC7 [1694]	TYPE: LOCAL COMMERCIAL ZONE	
	REQUIRED	PROVIDED
FULL-SIZED PARKING SPACES (5.2m D x 2.6m W)	3.4 per 100 m2 of gross leasable floor area : 46	33
COMPACT-SIZED PARKING SPACES (4.6m D x 2.4m W) As per section 106 (2) - Parking Space provisions	Max. 50% of Regular sized parking spaces : 35	31
		TOTAL SPACES : 67
BARRIER-FREE PARKING SPACES	1 Space for 20-99 vehicle parking spaces	3
BIKE PARKING SPOTS	1 per 250 m2 of gross floor area : 6	6
MIN. DRIVE AISLE WIDTH	6.7 m	6.7 m

PARKING SPACE LEGEND

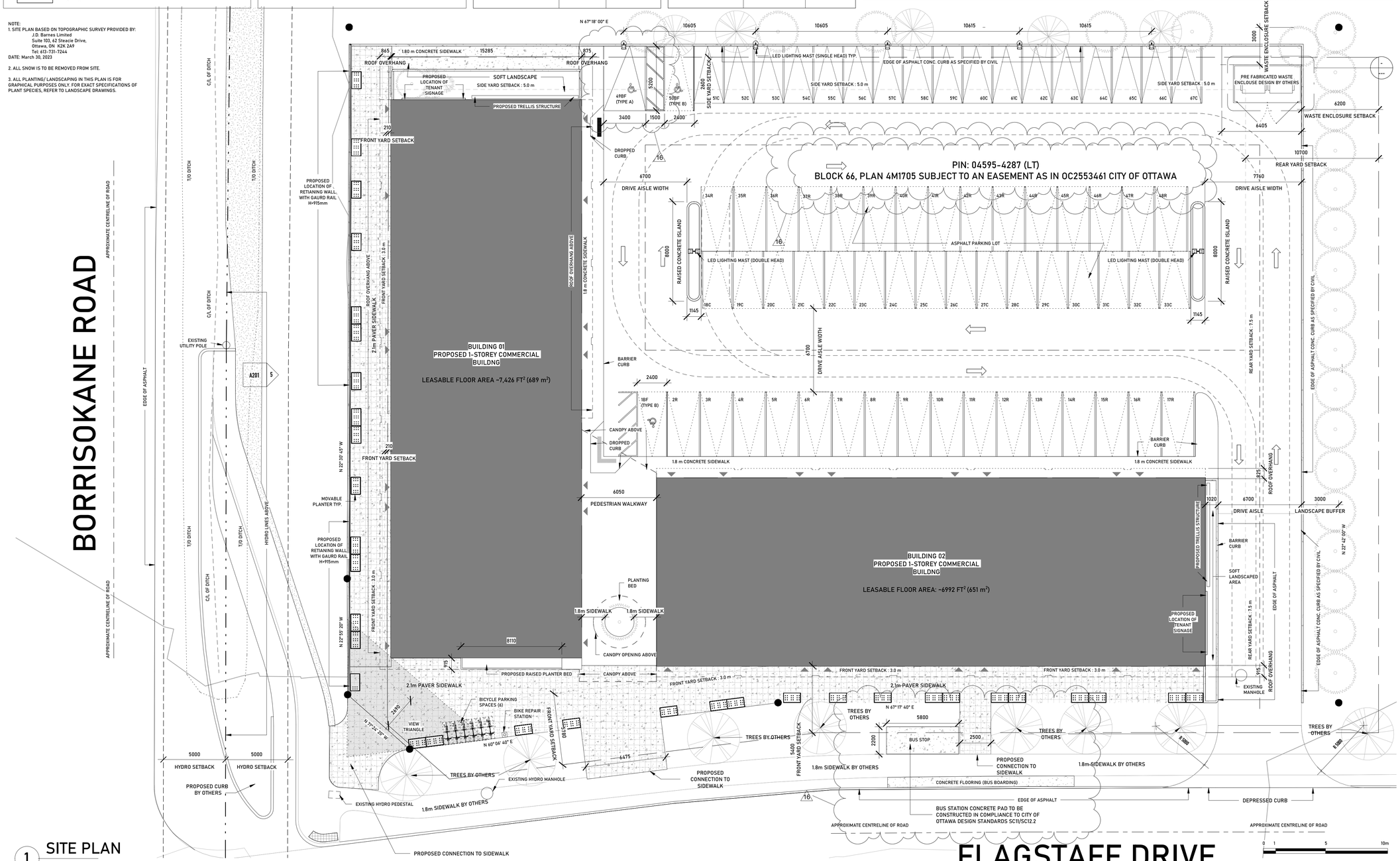
BARRIER-FREE PARKING SPACE COUNT : 3 — 3660 × 5200 — #BF
FULL-SIZED PARKING SPACE COUNT : 34 — 2600 × 5200 — #R
COMPACT PARKING SPACE COUNT : 34 — 2400 × 4600 — #C
BICYCLE PARKING SPACE COUNT : 6 — 400 × 1800

CONTEXT PLAN

NOTE:
1. SITE PLAN BASED ON TOPOGRAPHIC SURVEY PROVIDED BY:
J.D. Barnes Limited
Suite 103, 62 Steacie Drive,
Ottawa, ON K2K 2A9
Tel: 613-731-7244
DATE: March 30, 2023

2. ALL SNOW IS TO BE REMOVED FROM SITE.

3. ALL PLANTING/ LANDSCAPING IN THIS PLAN IS FOR GRAPHICAL PURPOSES ONLY. FOR EXACT SPECIFICATIONS OF PLANT SPECIES, REFER TO LANDSCAPE DRAWINGS.



1 SITE PLAN
1 : 150

Note: Should there be any conflict between drawings, Contractor is to confirm intent with Owner prior to the execution of work.

TTF ENGINEERING
DESIGN & SYSTEMS
FOTENN Planning + Design
CGH TRANSPORTATION
Palmer
GRADIENTWIND ENGINEERS & SCIENTISTS
Ruhland & Associates Ltd
LRL ENGINEERING
NUKK
2 5 8 ARCHITECTURE URBAN DESIGN

No.	Description	Date
1	ISSUED FOR PRE-DESIGN MEETING	2022.10.19
2	ISSUED FOR CLIENT COORDINATION	2022.11.22
3	ISSUED FOR 75% SK PRESENTATION	2023.02.10
4	ISSUED FOR COORDINATION	2023.03.22
5	ISSUED FOR CIVIL COORDINATION	2023.04.05
6	ISSUED FOR MARKETING PLANS	2023.04.25
7	ISSUED FOR PLANNER COORDINATION	2023.04.24
8	ISSUED FOR TRANSPORTATION COORDINATION	2023.05.02
9	RE-ISSUED FOR COORDINATION	2023.05.26
10	ISSUED FOR SITE PLAN CONTROL	2023.06.09
11	ISSUED FOR 50% DD	2023.06.21
12	ISSUED FOR COORDINATION	2023.07.14
13	RE-ISSUED FOR MARKETING PLANS	2023.07.13
14	RE-ISSUED FOR COORDINATION	2023.07.14
15	ISSUED FOR SITEPLAN CONTROL	2023.11.23
16	ISSUED FOR PLANNING RESUBMISSION	2024.02.09

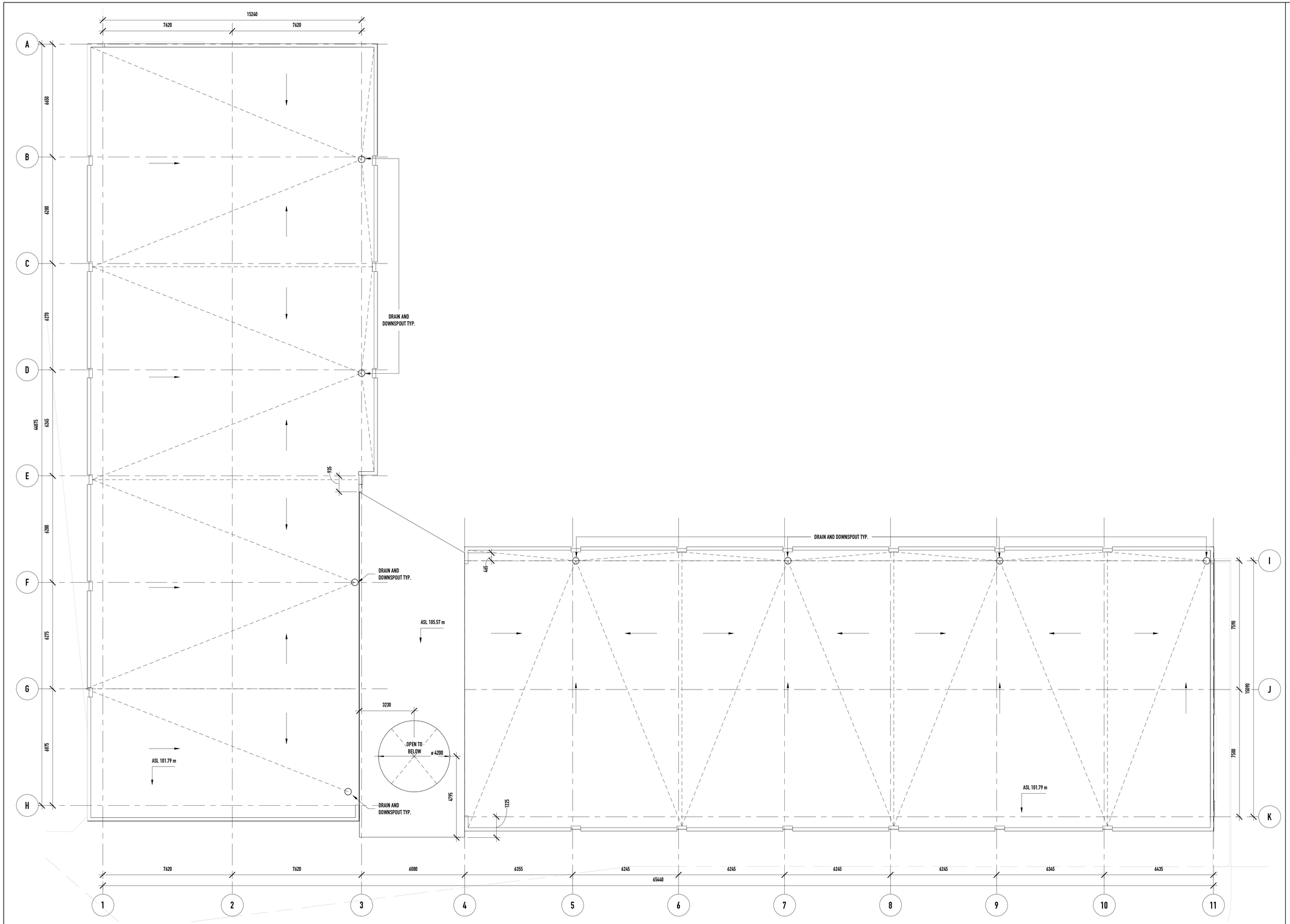
THE NUKK

652 FLAGSTAFF DRIVE
OTTAWA, ON

SITE PLAN

Project number	22021
Date	2024.02.06
Drawn by	GLM
Checked by	JSL
	SP01
Scale	As indicated

2024-02-22 4:44:15 PM



1 T/O CANOPY ROOF

1 : 100

Note: Should there be any conflict between drawings, Contractor is to confirm intent with Owner prior to the execution of work.

25:8 ARCHITECTURE URBAN DESIGN

No.	Description	Date
1	ISSUED FOR CLIENT COORDINATION	2022.11.22
2	ISSUED FOR 75% SK PRESENTATION	2023.02.10
3	ISSUED FOR COORDINATION	2023.03.22
4	ISSUED FOR TRANSPORTATION COORDINATION	2023.05.02
5	RE-ISSUED FOR COORDINATION	2023.05.26
6	ISSUED FOR SITE PLAN CONTROL	2023.06.09
7	ISSUED FOR 50% DD	2023.06.21
8	RE-ISSUED FOR COORDINATION	2023.07.14

THE NUKK

652 FLAGSTAFF DRIVE
OTTAWA, ON

ROOF PLAN

Project number	22021
Date	2023.11.14
Drawn by	MB
Checked by	JSL

A101

Scale 1 : 100

2023-11-14 3:38:28 PM

PLAN OF SURVEY SHOWING
TOPOGRAPHIC DETAIL OF

BLOCK 66
REGISTERED PLAN 4M-1705
CITY OF OTTAWA

SCALE 1 : 250

5 0 5 10 15 metres

J.D. BARNES LIMITED

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

NOTES

BEARINGS ARE MTM GRID, AND ARE REFERRED TO THE NORTHERLY LIMIT OF BLOCK 66, HAVING A BEARING OF N67°18'00" E AS SHOWN ON REGISTERED PLAN 4M-1705 MTM ZONE 09, NAD83 (ORIGINAL)

ELEVATIONS

ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM CGVD28:78 AND ARE DERIVED FROM THEPUBLISHED BENCH MARK No 0011964U3710 HAVING A PUBLISHED ELEVATION OF 91.724 METRES.

IT IS THE RESPONSIBILITY OF THE USER OF THIS INFORMATION TO VERIFY THAT THE SITE BENCHMARK HAS NOT BEEN ALTERED OR DISTRUBED AND THAT ITS' RELATIVE ELEVATION AND DESCRIPTION AGREES WITH THE INFORMATION SHOWN ON THIS DRAWING.

LEGEND

■ DENOTES SURVEY MONUMENT FOUND

ALL BEARINGS AND DISTANCES AGREE WITH REGISTERED PLAN 4M-1705

ALL FOUND MONUMENTS ARE PLASTIC BARS (PB)

ALL FOUND MONUMENTS WERE SET BY J.D. BARNES LTD. (JDB)

TOPOGRAPHIC LEGEND

CB	DENOTES CATCHBASIN
HPED	DENOTES HYDRO PEDESTAL
HMH	DENOTES HYDRO MANHOLE
SAN MH	DENOTES SANITARY MANHOLE
HP	DENOTES HYDRO POLE
T/G	DENOTES TOP OF GRATE
INV.	DENOTES INVERT
OBV.	DENOTES OBVERT
CSP.	DENOTES CORRUGATED STEEL PIPE
×XX.XX	DENOTES SPOT HEIGHT (RANDOM ELEVATION)
—E—	DENOTES OVERHEAD WIRES
	CONTOUR INTERVALS ARE SHOWN AS 1m FOR MAJOR AND 0.25m FOR MINOR
	DENOTES MAJOR CONTOUR
	DENOTES MINOR CONTOUR

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE REGULATIONS MADE UNDER THEM.

2. THE SURVEY WAS COMPLETED ON NOVEMBER 3, 2022.

DECEMBER 6, 2022
DATE

C.M. FOX
ONTARIO LAND SURVEYOR

THIS PLAN OF SURVEY RELATES TO AOLS PLAN SUBMISSION FORM NUMBER V-41842

J.D.BARNES LIMITED
SURVEYING MAPPING GIS
LAND INFORMATION SPECIALISTS
62 STEACIE DRIVE, SUITE 103, KANATA, ON K2K 2A9
T: (613) 731-7244 F: (613) 254-8659 www.jdbarnes.com

DRAWN BY:	CHECKED BY:	REFERENCE NO.:
CE	CF	22-10-123-00
PLOTTED: 12/06/22		DATED: 12/06/22

FILE: G:\22-10-123\00\Drawing\22-10-123 3D.dgn