



Stormwater Management Report and Servicing Brief

Apartment Building
3040/3044 Innes Road
Ottawa, Ontario

Prepared for:

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LRL File No.: 210374

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1 INTRODUCTION AND SITE DESCRIPTION

LRL Associates Ltd. was retained by Landric Homes Inc. to complete a Stormwater Management Analysis and Servicing Brief for the development of a proposed 4-storey apartment building with surface and underground parking area within the site boundary, located at 3040/3044 Innes Road.

The subject property consists of two (2) lots that are legally described as part of Lot 10, concession 3, in the Township of Gloucester. The subject lots are designated as residential and are zoned R2N (Residential Second Density Zone).



Figure 1: Aerial View of Proposed Development

The subject property, as a whole, is rectangular shaped and measures approximately 45 m in frontage along Innes Road and 61 m in depth. The total site area is approximately **0.28 ha**.

The proposed development will be constructed in a single phase, which includes a 4-storey apartment building consisting of a total of **42** units. One (1) underground level garage with 46 indoor parking spaces is proposed to be constructed. Approximately 14 outdoor surface parking



spaces are also proposed at the ground level. 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 **0.28 ha** and currently consists of two separate property lots each consisting currently of an existing residential dwelling. Elevations of existing site range between 85.04 m at southeast corner to 86.32 m at the southwest corner of the site. In existing site conditions approximately 0.24 ha of the site ultimately flows to the property located on the northeast side. Refer to **Appendix D** for drawings detailing the pre and post overland drainage to the NE property.

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

Innes Road:

- 406 mm diameter ductile iron watermain
- 250 mm diameter concrete sanitary sewer
- 450 mm diameter concrete storm sewer

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 in order 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 2E water distribution network pressure zone. There is an existing 406 mm watermain within Innes Road. There are currently three (3) existing fire hydrants within close proximity of the subject property. Refer to **Appendix B** for the location of fire hydrants.

5.2 Water Supply Servicing Design

Considering the presence of automatic sprinkler system inside the building and a recommended size to service the sprinkler system, the subject property is proposed to be serviced via a 150 mm diameter service lateral connected to the 406 mm watermain located within Innes Rd. Refer to Site Servicing Plan C.401 in **Appendix E** for servicing layout and connection point.

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
Other Commercial Average Daily Demand	2.8 L/m ² /d
Average Daily Demand	280 L/d/per
Minimum Depth of Cover	2.4 m from top of watermain to finished grade
Desired operating pressure range during normal operating conditions	345 kPa and 552 kPa
During maximum hourly demand conditions pressure must not drop below	276 kPa
During normal operating conditions pressure shall not exceed	552 kPa
During fire flow operating conditions pressure must not drop below	140 kPa

**Table updated to reflect technical Bulletin ISDTB-2021-03*



The interior layout and architectural floor plans have been reviewed, and it was determined that the building will house **19** one-bedroom units and **23** two-bedroom units. Based on the City of Ottawa Design guidelines for population projection, this translates to approximately **74.9** residents. *Table 2* below summarizes the anticipated development population as interpreted using Table 4.1 of the City of Ottawa Design Guidelines, and Appendix 4-A of the Sewer Design Guidelines.

Table 2: Development Residential Population Estimate

Proposed Unit type	Persons Per Unit	Number of Units	Population
Studio/1 Bedroom	1.4	19	26.6
2 Bedroom Apartment	2.1	23	48.3
Total Residential Population			74.9

The required water supply requirements for the residential units in proposed building have been calculated using the following formula:

$$Q = (q \times P \times M)$$

Where,

q = average water consumption (L/capita/day)

P = design population (capita)

M = Peak factor

The following factors were used in calculations as per Table 3-3 in the MOECP Guidelines;

- Maximum Daily Demand Residential Factor = **6.5**
- Peak Hour Demand Residential Factor = **9.7**

Using the above-mentioned factors and design parameters listed in Table 1, anticipated demands were calculated as follows:

- Average daily domestic water demand is **0.24** L/s,
- Maximum daily demand is **1.57** L/s, and
- Maximum hourly is **15.35** L/s.

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

The City of Ottawa was contacted to obtain boundary conditions associated with the estimated water demand, as indicated in the boundary request correspondence included in **Appendix B**. *Table 3* below summarizes boundary conditions for the proposed development.



Table 3: Summary of Anticipated Demands and Boundary Conditions

Design Parameter	Anticipated Demand (L/s)	Boundary Conditions @ Innes Road* (m H ₂ O / kPa)
Average Daily Demand	0.24	131.0 / 439.2
Max Day + Fire Flow (per FUS)	1.57 + 166.7	125.7 / 388.2
Peak Hour	15.35	127.1 / 401.3
*Assumed Ground elevation at connection point = 86.20 m. Water demand calculation per City of Ottawa Water Design guidelines. See Appendix B for details.		

As indicated in Table 3, pressures in all scenarios meet the required pressure range stated in Table 1 as per City of Ottawa Design Guidelines. 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, see **Appendix A** for collaborating correspondence:

- Type of construction – Wood Frame;
- Occupancy type – Limited Combustibility; and
- Sprinkler Protection – Fully Supervised Sprinkler System.

The estimated fire flow demand was estimated to be **10,000 L/min**, see **Appendix B** for details.

There are three (3) existing fire hydrants in close proximity to the proposed buildings that are available to provide the required fire flow demands of 10,000 L/min. Refer to **Appendix B** for fire hydrant locations. Table 4 below summarizes the aggregate fire flow of the contributing hydrants in close proximity to the proposed development based on Table 18.5.4.3 of *ISTB-2018-02*.

Table 4: Fire Protection Summary Table

Building	Fire Flow Demand (L/min)	Fire Hydrants(s) within 75m	Fire Hydrant(s) within 150m	Available Combined Fire Flow (L/min)
Proposed 4-storey building	10,000	1	2	(1 x 5678) + (2 x 3785) = 13,248

The total available fire flow from contributing hydrants is equal to **13,248 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

The subject property is tributary to the Innes Road Trunk. There is an existing 250 mm diameter sanitary sewer within Innes Road.

The post-development wet total flow was calculated to be is **1.06 L/s** as a result of the proposed residential population and a small portion of infiltration. Refer to **Appendix C** for further information on the calculated sanitary flows.

6.2 Sanitary Sewer Servicing Design

The proposed development will be serviced via a 150 mm dia. sanitary service connected to proposed manhole SAN MH 01 at the existing 250 mm diameter sanitary sewer within Innes Rd. Refer to LRL drawing C.401 for the proposed sanitary servicing.

The parameters used to calculate the anticipated sanitary flows are; residential average population per unit of 1.4 person for single units and 2.1 persons for two-bedroom units, a residential daily demand of 280 L/p/day, a residential peaking factor of 4.0 and a total infiltration rate of 0.33 L/s/ha. Based on these parameters and the total site area of 0.28 ha, the total anticipated wet wastewater flow was calculated to be **1.06 L/s**. Refer to **Appendix C** for the site sanitary sewer design sheet.

7 STORMWATER MANAGEMENT

7.1 Existing Stormwater Infrastructure

The subject property is tributary to the Ottawa River East sub-watershed. 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.

In pre-development conditions, drainage from the subject lots is depicted by existing watershed EWS-01 which has an area of 0.277 ha. In pre-development conditions, approximately 90% of the site drained uncontrolled overland to the property located on the northeast side of the site. The remaining 10% flowed uncontrolled towards the Innes Road ROW. Refer to plan C701 included in **Appendix E** for pre-development drainage characteristics. There is currently an existing 450 mm dia. storm sewer within Innes Rd right-of-way. Refer to **Appendix D** for drawings detailing the pre- and post-development overland drainage to the NE property.

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 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 Ottawa River East sub-watershed and is therefore subject to review by the Rideau Valley Conservation Authority (RVCA). It was determined that 'enhanced' treatment (80% TSS Removal) is required for stormwater runoff from the proposed development. Correspondence with RVCA is included in **Appendix A**.

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:

- Meet an allowable release rate based on a Rational Method runoff coefficient (C) of 0.50 or calculated pre-development C (whichever is less), employing the City of Ottawa IDF parameters for a 2-year storm with a calculated time of concentration equal to or greater than 10 minutes; and
- Attenuate all storms up to and including the City of Ottawa 100-year storm event on site.

The total allowable storm release rate was calculated to be **22.50 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

The proposed stormwater management quantity control for this development will be accomplished using roof drains with controls, a catchbasin with an Inlet Control Device (ICD) as well as a proposed cistern in the underground garage that will pump at a specified constant release rate. Storage required as a result of quantity control will be accomplished through a combination of rooftop storage, surface storage and cistern in the underground garage.

The subject site is proposed to be serviced via a catchbasin and 250 mm diameter storm sewer outlet that will connect to the existing 450 mm diameter storm sewer within Innes Rd. 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 existing site is delineated by catchments EWS-01, which currently drains uncontrolled towards Innes Rd and the property located on northeast side of the site.

The site has been analyzed and five (5) post-development watersheds have been allocated. Watershed WS-01 (0.063 ha) consisting of grass, landscaping and paved patios, which will flow uncontrolled. Runoff from WS-01 will surface drain to the Innes Road right-of-way as well as to



the property located on the north & northeast corner of the site. In pre-development conditions, approximately 0.24ha of the site were flowing uncontrolled to the neighbouring property. In post-development conditions the amount of area draining uncontrolled to the northeast property has been reduced to 0.045ha i.e. there is approximately 82% reduction of uncontrolled flow to the neighbouring property in post-development conditions. The majority of this flow is being carried over in landscaped areas from the site. Refer to **Appendix D** for drawings detailing the pre- and post-development overland drainage to the NE property.

Watershed WS-02 (0.092 ha) consists of the proposed building's envelope and will be captured via roof drains with controls.

Watershed WS-03 (0.069 ha) consists mainly of the surface parking lot, some landscaped area and drive aisle. Runoff will be captured via a proposed catchbasin manhole (CB MH01) with a restricted flow downstream at MH01 via a **Hydrovex 100VHV-1** ICD.

Watershed WS-05 (0.003 ha) consists of grass and flows uncontrolled offsite towards the City ROW.

Finally, watershed WS-04(0.051 ha) consists mainly of the paved ramp leading to the underground garage and a landscaped area above the garage. Runoff will be collected via a proposed trench drain at the end of the ramp and a proposed area drain in the landscaped area, both of which will direct captured flows to an underground cistern. The cistern is proposed to pump runoff at a constant flow towards the storm outlet pipe. Refer to grading plan C301 and servicing plan C401 in **Appendix E** for reference.

In order to achieve the allowable post-development stormwater release rate established in *Section 7.2.2*, above, the proposed development will utilize rooftop storage, surface storage in the parking lot, as well as an internal cistern to be designed by a mechanical engineer using the specified release rates determined in this analysis.

The site will be serviced via a free-flowing network of 250 mm diameter storm pipes. The proposed catchbasin in WS-03 (*CB MH01*) will capture runoff and release it downstream to the proposed Oil-Grit Separator (*OGS*) at a restricted flow rate via a **Hydrovex 100VHV-1** ICD installed at STM MH01. The building will be serviced via a 250mm diameter storm service lateral which outlets to STM MH02, downstream of the OGS. The building's storm service conveys flows from;

1. The proposed cistern pumped at a specific release rate;
2. Roof drain outlet to be connected downstream of cistern;
3. Foundation drain (sump pump) outlet to be connected downstream of cistern.

STM MH02 finally discharges flows to the existing 450 mm diameter storm sewer within Innes Rd via a 250 mm diameter storm pipe. Refer to C401 in **Appendix E** for servicing layout and connection points

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



Table 5: Drainage Areas

Drainage Area Name	Area (ha)	Weighted Runoff Coefficient	100 Year Weighted Runoff Coefficient (25% increase)
WS-01(UNCONTROLLED)	0.063	0.24	0.31
WS-02 (ROOF-CONTROLLED)	0.092	0.90	1.00
WS-03 (CONTROLLED)	0.069	0.66	0.83
WS-04 (CISTERN -CONTROLLED)	0.051	0.82	1.00
WS-05 (UNCONTROLLED)	0.003	0.20	0.25

The proposed building's rooftop was analysed and divided into five (5) ponding areas. A total of **five (5)** roof drains, each of which is restricting the discharge rate to **0.63 L/s**, resulting in a total release rate from the roof of **3.15 L/s** is proposed. Each of the roof drain flow control devices has been selected to provide a flow rate of **0.63 L/s** at a maximum flow depth of **0.15 m**. Proposed roof drains are to be **Watts RD-100-A with a closed exposed weir opening**. See **Appendix D** for more information about the selected roof drain and flow restrictor.

Based on volume analysis completed in Civil-3D, it was calculated that **42.31 m³** of rooftop storage is available in the 100-year event. For additional details on the calculations for available area of rooftop storage, refer to **Appendix D**.

Table 6 below summarizes the release rates and storage volumes required to meet the allowable release rate of **22.50 L/s** for the 100-year flow rates.

Table 6: Stormwater Release Rate & Storage Volume Summary (100 Year)

Catchment Area	Drainage Area (ha)	100-year Release Rate (L/s)	100-Year Required Storage (m ³)	Total Available Storage (m ³)
WS-01 & WS-05 (UNCONTROLLED)	0.065	9.78	0	0
WS-02 (ROOF -CONTROLLED)	0.092	3.15	40.47	42.31
WS-03 (ICD-CONTROLLED)	0.069	7.57	13.70	27.30
WS-04 (CISTERN -CONTROLLED)	0.051	2.00	21.32	22.00
TOTAL	0.277	22.50	75.49	91.61



To attenuate flows to the allowable release rate of **22.50 L/s**, it is calculated that a total of **75.49 m³** of storage will be required. The required storage is proposed to be met via a combination of building rooftop ponding, surface ponding in the paved parking lot and an internal building cistern. The total required storage and allowable release rate was divided as per the following;

- **40.47 m³** is required rooftop storage in WS-02 corresponding to a maximum restricted flow of **3.15 L/s** via roof drain controls;
- **13.70 m³** is required surface storage in WS-03 corresponding to maximum restricted flow of **7.57 L/s** via proposed Hydrovex 100VHV-1 ICD located in MH01;
- **21.32 m³** is required cistern storage in WS-04 corresponding to the maximum proposed pumping flow of **2.00 L/s**.

The 100-year maximum ponding extent can be found on drawing “C601 – Stormwater Management Plan” of **Appendix E**.

To meet stormwater quality control identified by RVCA, a **Stormceptor EF04** Oil/Grit Separator is proposed to provide enhanced (80% TSS removal) treatment. Refer to C401 for location of OGS an Appendix D for sizing report and specs.

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. Construction and maintenance requirements for erosion and sediment controls are to comply with Ontario Provincial Standard Specification OPSS 577. Refer to LRL Associates drawing C.101 for erosion and sediment control details.

9 CONCLUSION

This Stormwater Management and Servicing Report for the development proposed at 3040-3044 Innes Road 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 at **10,000 L/min** using the FUS method.
- There are at least three (3) existing fire hydrants available to service the proposed development. They will provide a combined fire flow of **13,248 L/min** to the site.



- The new development will be serviced with a new 150 mm Φ water service connection to be connected to the existing 406 mm Φ watermain within Innes Rd.
- 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 **1.06 L/s**.
- The proposed development will discharge **1.06 L/s** to the existing 250 mm dia. sanitary sewer within Innes Rd via a proposed 150 mm diameter sanitary service lateral.

Stormwater Management


- An OGS is proposed to meet the required 80% TSS removal specified as per consultation with RVCA.
- The stormwater release rates from the proposed development will meet calculated allowable release rate of **22.50 L/s**.
- Stormwater quantity control objectives will be met through on-site storm water ponding on the roof, surface parking lot, and internal building cistern.

10 REPORT CONDITIONS AND LIMITATIONS

The report 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 the compatibility with the recommendations contained in this document. If you have any questions or comments, please contact the undersigned.

Prepared by:

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APPENDIX A

Pre-consultation / Correspondence



DEVELOPMENT SERVICING STUDY CHECKLIST

Project #: 210374

2022-02-09

4.1 General Content

Executive Summary (for larger reports only).	N/A
Date and revision number of the report.	Report Cover sheet
Location map and plan showing municipal address, boundary, and layout of proposed development.	Drawings/Figures
Plan showing the site and location of all existing services.	Figure 1
Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	Section 1.0
Summary of Pre-consultation Meetings with City and other approval agencies.	Section 4.0 & Appendix A
Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defensible design criteria.	Section 5.1, 6.1, 7.1
Statement of objectives and servicing criteria.	Section 1.0
Identification of existing and proposed infrastructure available in the immediate area.	Section 5.1, 6.1, 7.1
Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	Section 7.0
Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	C301

Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts. N/A

Proposed phasing of the development, if applicable. N/A

Reference to geotechnical studies and recommendations concerning servicing. C401

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

◦Metric scale

◦North arrow (including construction North)

◦Key plan

◦Name and contact information of applicant and property owner C401

◦Property limits including bearings and dimensions

◦Existing and proposed structures and parking areas

◦Easements, road widening and rights-of-way

◦Adjacent street names

4.2 Development Servicing Report: Water

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

Availability of public infrastructure to service proposed development Section 5.1

Identification of system constraints Section 5.1

Identify boundary conditions Section 5.2

Confirmation of adequate domestic supply and pressure Section 5.2

Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development. Section 5.2

Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	Section 5.2
Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design	N/A
Address reliability requirements such as appropriate location of shut-off valves	N/A
Check on the necessity of a pressure zone boundary modification.	N/A
Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range	Section 5.2
Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	Section 5.2
Description of off -site required feeder mains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	N/A
Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Section 5.2
Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	N/A

4.3 Development Servicing Report: Wastewater

Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	Section 6.2
Confirm consistency with Master Servicing Study and/or justifications for deviations.	N/A

Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	N/A
Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 6.1
Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	Section 6.2
Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	Section 6.2 Appendix C
Description of proposed sewer network including sewers, pumping stations, and forcemains.	Section 6.2
Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	N/A
Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	Section 6.1
Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	N/A
Special considerations such as contamination, corrosive environment etc.	N/A

4.4 Development Servicing Report: Stormwater Checklist

Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)	Section 7.1
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Analysis of available capacity in existing public infrastructure.	N/A
A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	N/A
Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Section 7.2.2
Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Section 7.2.1
Description of the stormwater management concept with facility locations and descriptions with references and supporting information.	Section 7.4
Set-back from private sewage disposal systems.	N/A
Watercourse and hazard lands setbacks.	N/A
Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	N/A
Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	N/A
Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).	Section 7.4
Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	N/A
Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	Section 7.4 Appendix D

Any proposed diversion of drainage catchment areas from one outlet to another.	N/A
Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	Appendix D
If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100 year return period storm event.	N/A
Identification of potential impacts to receiving watercourses Identification of municipal drains and related approval requirements.	N/A
Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 7.4
100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	NA
Inclusion of hydraulic analysis including hydraulic grade line elevations.	N/A
Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Section 8.0
Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A
Identification of fill constraints related to floodplain and geotechnical investigation	N/A

4.5 Approval and Permit Requirements: Checklist

Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.

N/A

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

N/A

Changes to Municipal Drains.

N/A

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

N/A

4.6 Conclusion Checklist

Clearly stated conclusions and recommendations

Section 9.0

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

Noted

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

Noted

Site Plan Pre- Application Consultation Notes

Date: Monday, July 26, 2021

Site Location: 3040 Innes

Type of Development: Residential (townhomes, stacked, singles, apartments), Office Space, Commercial, Retail, Institutional, Industrial, Other: N/A

Infrastructure

Water

Existing public services:

- Innes – 406mm Ductile Iron



Watermain Frontage Fees to be paid (\$190.00 per metre) on Woodroffe Avenue **Yes** **No**

Boundary conditions:

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(s) and the expected loads required by the proposed developments. Please provide all 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
- Fire protection (Fire demand, Hydrant Locations)
- Please submit sanitary demands with the water boundary conditions to identify any capacity constraints at the local pumping station

General comments

- Service areas with a basic demand greater than 50 m³/day shall be connected with a minimum of two water services, separated by an isolation valve, to avoid creation of vulnerable service area.
- A District Metering Area Chamber (DMA) is required for services 150mm or greater in diameter.
- The existing water services must be blanked at the main.

Sanitary Sewer

Existing public services:

- Innes – 250mm Conc.



Is a monitoring manhole required on private property? Yes No

General comments

- Please submit sanitary demands with the water boundary conditions to identify any capacity constraints at the local pumping station.
- For concrete sewer pipe, maintenance holes shall be installed when the service is greater than 50% of the diameter of the mainline concrete pipe.

Storm Sewer

Existing public services:

- Innes – 450mm Conc.



General comments

- Ensure that the proposed drive ramp entrance to the underground parking garage is protected from the major overland flow route.
 - A minimum freeboard elevation of 350mm from highpoint of the ramp to the street spill elevation.
 - A minimum freeboard elevation of 300mm from the invert of the ramp drain to the 100 year HGL of the storm sewer.
 - In general conformity of City of Ottawa Standard S17.
- In order to minimize number of storm sewer connections the foundation drain and the drive ramp drain may connect to site sewer under free-flow conditions. The system must be designed to ensure that drainage does not back-up into the building drain or drive ramp.

Stormwater Management

Quality Control:

- Rideau Valley Conservation Authority to confirm quality control requirements.

Quantity Control:

- Site is located within the Mud (Green's) Creek Area Subwatershed Study Area draining to the Ottawa River
- Time of concentration (Tc): Tc = pre-development; maximum Tc = 10 min
- Allowable run-off coefficient C = 0.5
- Allowable flowrate: Allowable flowrate: Control the 100-year storm events to the 2-year storm event.

General Service Design Comments

- Existing sewer or watermain that are not reused must be decommissioned as per City Standards. Please show all road cuts on the plans.
- The City of Ottawa Standard Detail Drawings should be referenced where possible for all work within the Public Right-of-Way.

Other

Capital Works Projects within proximity to application? Yes No

References and Resources

- As per section 53 of the Professional Engineers Act, O. Reg 941/40, R.S.O. 1990, all documents prepared by engineers must be signed and dated on the seal.
- All required plans & reports are to be provided in *.pdf format (at application submission and for any, and all, re-submissions)
- Please find relevant City of Ottawa Links to Preparing Studies and Plans below:
<https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans#standards-policies-and-guidelines>
- To request City of Ottawa plan(s) or report information please contact the City of Ottawa Information Centre:
InformationCentre@ottawa.ca<mailto:InformationCentre@ottawa.ca>
(613) 580-2424 ext. 44455
- geoOttawa
<http://maps.ottawa.ca/geoOttawa/>

PLANS & STUDIES LIST

For information on preparing required studies and plans refer to:

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

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

S – Required for Site Plan Control

Z – Required for Zoning By-Law Amendment

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

Notes:

4. Geotechnical Study / Slope Stability Study – required as per Official Plan section 4.8.3. All site plan applications need to demonstrate the soils are suitable for development. A Slope Stability Study may be required with unique circumstances (Schedule K or topography may define slope stability concerns).

10. Erosion and Sediment Control Plan – required with all site plan applications as per Official Plan section 4.7.3.

11. Stormwater Management Report/Brief - required with all site plan applications as per Official Plan section 4.7.6.

Amr Salem

From: Ryan Koolwine <koolwine@project1studio.ca>
Sent: October 19, 2021 11:59 AM
To: Amr Salem
Cc: Matthew Firestone; Bailey Haskins
Subject: RE: LRL210374 - 3040/3044 Innes Rd - Fire Flow Architectural Assumptions
Attachments: 2110 210415 Prelim Design.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Hi Amr,

Please see the attached preliminary plans, there may be some adjustments to this however there will not be huge deviations. With respect to your bullet points, responses as follows:

- Unit breakdown as per the table below.

	1 Bedroom	1 Bedroom + Den	2-Bedroom	2-Bedroom + Den
Level 01		4	5	
Level 02	1	4	4	2
Level 03	1	4	4	2
Level 04	1	4	4	2
Total	3	16	17	6

- Total Floor area is listed on the first page of the attached PDF.
- The building will be sprinklered and will have a fire alarm system.
- The building will be wood framed, so I would assume ISO Class 1.

Cheers,

Ryan Koolwine

project1studio | 613 884-3939 x1

From: Amr Salem <asalem@lrl.ca>
Sent: October 5, 2021 11:11 AM
To: Ryan Koolwine <koolwine@project1studio.ca>
Cc: Matthew Firestone <matthew.firestone@landrichomes.com>
Subject: LRL210374 - 3040/3044 Innes Rd - Fire Flow Architectural Assumptions

Hey Ryan,

Kindly provide your input on the following to help us finalize our fireflow demand calculations for the proposed development at 3040/3044 Innes Rd;

- Can you please confirm breakdown of unit types?
- Can you please confirm the total floor area?
- Can you confirm if sprinklers are proposed for the building? If yes, please specify if sprinkler system is **fully supervised** and **automatic**?
- Kindly provide the **ISO class** for the building as per ISO Guide sections 1, 2 and 3. I have included a brief summary of ISO Guide (review chapter 2 for construction types) as well as the section from the City’s technical bulletin. Note that ISO refers only to fire-resistive for fire ratings not less than 1-hour.

A. Determine the type of construction.

- Coefficient **C** in the FUS method is equivalent to coefficient **F** in the ISO method:

Correspondence between FUS and ISO construction coefficients

FUS type of construction	ISO class of construction	Coefficient C
Fire-resistive construction	Class 6 (fire resistive)	0.6
	Class 5 (modified fire resistive)	0.6
Non-combustible construction	Class 4 (masonry non-combustible)	0.8
	Class 3 (non-combustible)	0.8
Ordinary construction	Class 2 (joisted masonry)	1.0
Wood frame construction	Class 1 (frame)	1.5

However, the FUS definition of fire-resistive construction is more restrictive than those of ISO construction classes 5 and 6 (modified fire resistive and fire resistive). FUS requires structural members and floors in buildings of fire-resistive construction to have a fire-resistance rating of 3 hours or longer.

- With the exception of fire-resistive construction that is defined differently by FUS and ISO, practitioners can refer to the definitions of the ISO construction classes (and the supporting definitions of the types of materials and assemblies that make up the ISO construction classes) found in the current ISO guide [4] (see Annex i) to help select coefficient **C**.
- To identify the most appropriate type of construction for buildings of mixed construction, the rules included in the current ISO guide [4] can be followed (see Annex i). For a building to be assigned a given classification, the rules require $\frac{2}{3}$ (67%) or more of the total wall area and $\frac{2}{3}$ (67%) or more of the total floor and roof area of the building to be constructed according to the given construction class or a higher class.
- New residential developments (less than 4 storeys) are predominantly of wood frame construction ($C = 1.5$) or ordinary construction ($C = 1.0$) if exterior walls are of brick or masonry. Residential buildings with exterior walls of brick or masonry veneer and those with less than $\frac{2}{3}$ (67%) of their exterior walls made of brick or masonry are considered wood frame construction ($C = 1.5$).

Thanks,

Amr Salem, PMP®

B.Eng, Civil Engineering Services

Amr Salem

From: Jamie Batchelor <jamie.batchelor@rvca.ca>
Sent: October 19, 2021 9:17 AM
To: Amr Salem
Subject: RE: LRL210374 - 3040/3044 Innes Road - SWM Quality Requirements

Follow Up Flag: Follow up
Flag Status: Flagged

Good Morning Amr,

Stormwater from this site outlets less than 2 km to a watercourse. Therefore, on-site water quality treatment would be required. The appropriate water quality target is 'enhanced' (80% TSS removal). We would strongly encourage that you explore the opportunity to incorporate LID measures into the stormwater management plan for this site.

Jamie Batchelor, MCIP, RPP
Planner, ext. 1191
[Jamie.batchelor@rvca.ca](mailto:jamie.batchelor@rvca.ca)



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

This message may contain information that is privileged or confidential and is intended to be for the use of the individual(s) or entity n may contain confidential or personal information which may be subject to the provisions of the *Municipal Freedom of Information & I* you are not the intended recipient of this e-mail, any use, review, revision, retransmission, distribution, dissemination, copying, printing, taking of any action in reliance upon this e-mail, is strictly prohibited. If you have received this e-mail in error, please contact the send and any copy of the e-mail and any printout thereof, immediately. Your cooperation is appreciated.

From: Amr Salem <asalem@lrl.ca>
Sent: Wednesday, October 6, 2021 5:39 PM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Subject: LRL210374 - 3040/3044 Innes Road - SWM Quality Requirements

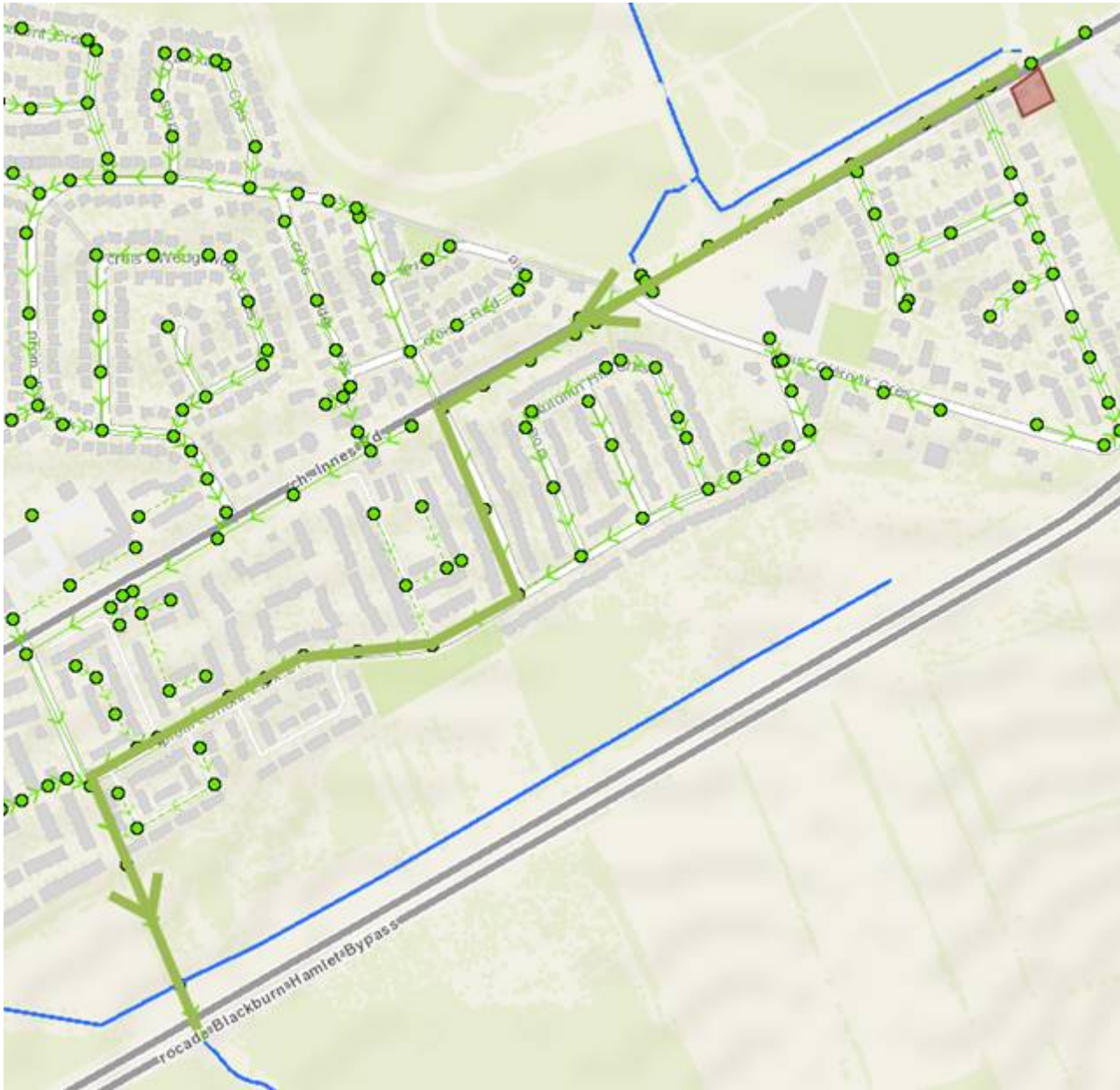
Hello Jamie,

I wanted to consult with you regarding a residential development we are working on located at 3040/3044 Innes Road.

Existing runoff from the site is tributary to Ottawa River East subwatershed and drains into municipal sewer along Innes Rd travelling approx. 1.9 km before discharging into a creek that ultimately conveys to the Rideau River.

Site area currently consists of 2 existing residential buildings with paved driveways and majority of landscaping.

The development proposes a residential 4-storey with 14 surface parking spots and an underground parking garage. The site will be landscape with stormwater coming primarily from rooftop, landscaped rear yard and paved area surface parking lot. Refer to draft site plan attached for reference.



Please provide your input about quality controls that may be required for this site.



Amr Salem, PMP®
B.Eng, Civil Engineering Services
LRL Engineering
5430 Canotek Road
Ottawa, Ontario K1J 9G2

T (613) 842-3434 or (877) 632-5664 ext 248
F (613) 842-4338

E asalem@lrl.ca
W www.lrl.ca

APPENDIX B

Water Supply Calculations





Water Supply Calculations

LRL File No. 210374
 Date October 27, 2021
 Prepared by Amr Salem

Residential Demand based on the City of Ottawa Design Guidelines-Water Distribution, 2010

Unit Type	Persons Per Unit	Number of Units	Population
1 Bedroom Apartment	1.4	19	26.6
2 Bedroom Apartment	2.1	23	48.3
Total		42	74.9

Average Water Consumption Rate	280 L/c/d		
Average Day Demand	20,972 L/d	0.24 L/s	
Maximum Day Factor	6.5		(MOE Table 3-3)
Maximum Daily Demand	136,068 L/d	1.57 L/s	
Peak Hour Factor	9.7		(MOE Table 3-3)
Maximum Hour Demand	1,326,195 L/d	15.35 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:

$$\begin{aligned}
 \text{Minimum pipe diameter (d)} &= (4Q/\pi V)^{1/2} \\
 &= 0.104 \text{ m} \\
 &= 104 \text{ mm} \\
 \\
 \text{Proposed pipe diameter (d)} &= 150 \text{ mm} \\
 &= 6 \text{ Inches}
 \end{aligned}$$



Fire Flow Calculations

LRL File No. 210374
 Date October 27, 2021
 Method Fire Underwriters Survey (FUS)
 Prepared by Amr Salem

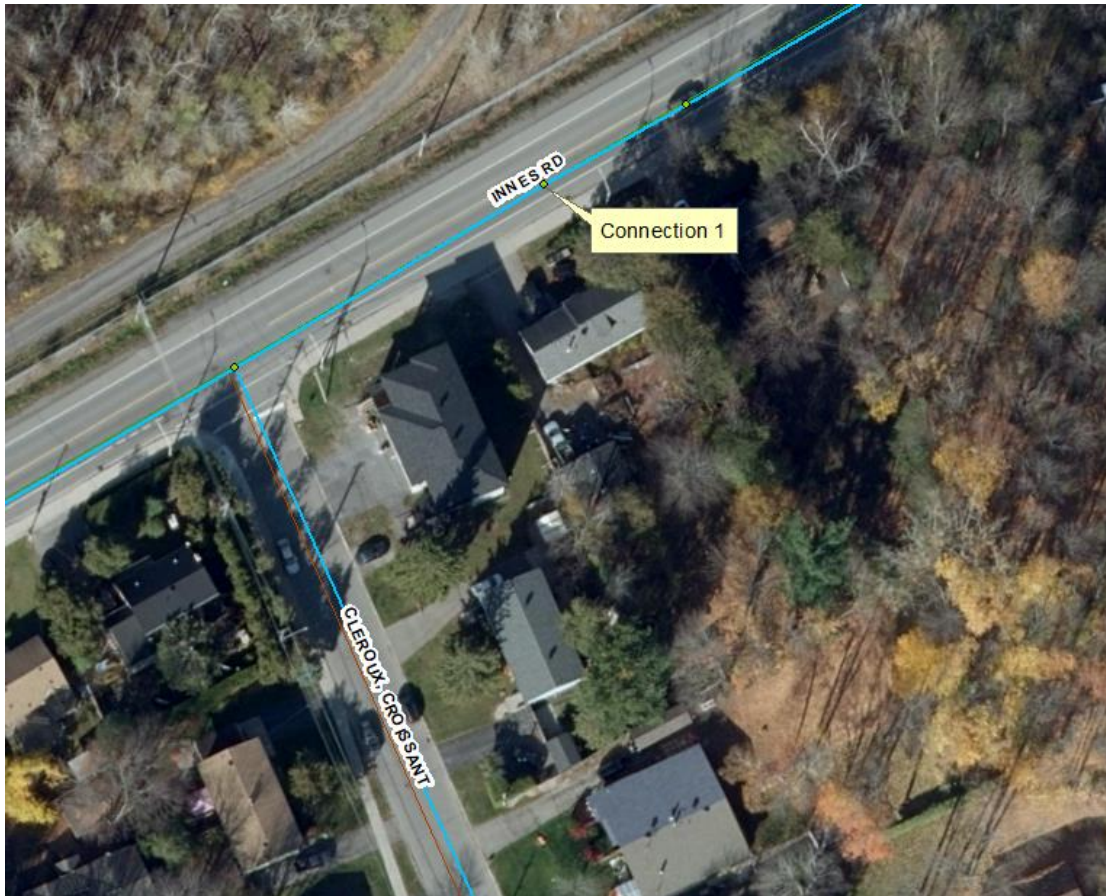
Step	Task	Term	Options	Multiplier	Choose:	Value	Unit	Fire Flow	
Structural Framing Material									
1	Choose frame used for building	Coefficient C related to the type of construction	Wood Frame	1.5	Wood Frame	1.5			
			Ordinary Construction	1.0					
			Non-combustible construction	0.8					
			Fire resistive construction <2 hrs	0.7					
			Fire resistive construction >2 hrs	0.6					
Floor Space Area (A)									
2			Total area			3,616	m ²		
3	Obtain fire flow before reductions	Required fire flow	$\text{Fire Flow} = 220 \times C \times A^{0.5}$					L/min	19,844
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	16,867	
			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	8,434	
			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	North side	>30m	0%	L/min	9,699		
			East side	>30m	0%				
			South side	>30m	0%				
			West side	10.1 to 20m	15%				
Net required fire flow									
7	Obtain fire flow, duration, and volume	Minimum required fire flow rate (rounded to nearest 1000)						L/min	10,000
		Minimum required fire flow rate						L/s	166.7
		Required duration of fire flow						hr	2

Boundary Conditions 3040 & 3044 Innes Rd

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	12	0.24
Maximum Daily Demand	94	1.57
Peak Hour	921	15.35
Fire Flow Demand #1	10,000	166.67

Location



Results

Connection 1 – Innes Rd.

Demand Scenario	Head (m)	Pressure ¹ (psi)
Maximum HGL	131.0	63.7
Peak Hour	127.1	58.2
Max Day plus Fire 1	125.7	56.3

Ground Elevation = 86.2 m

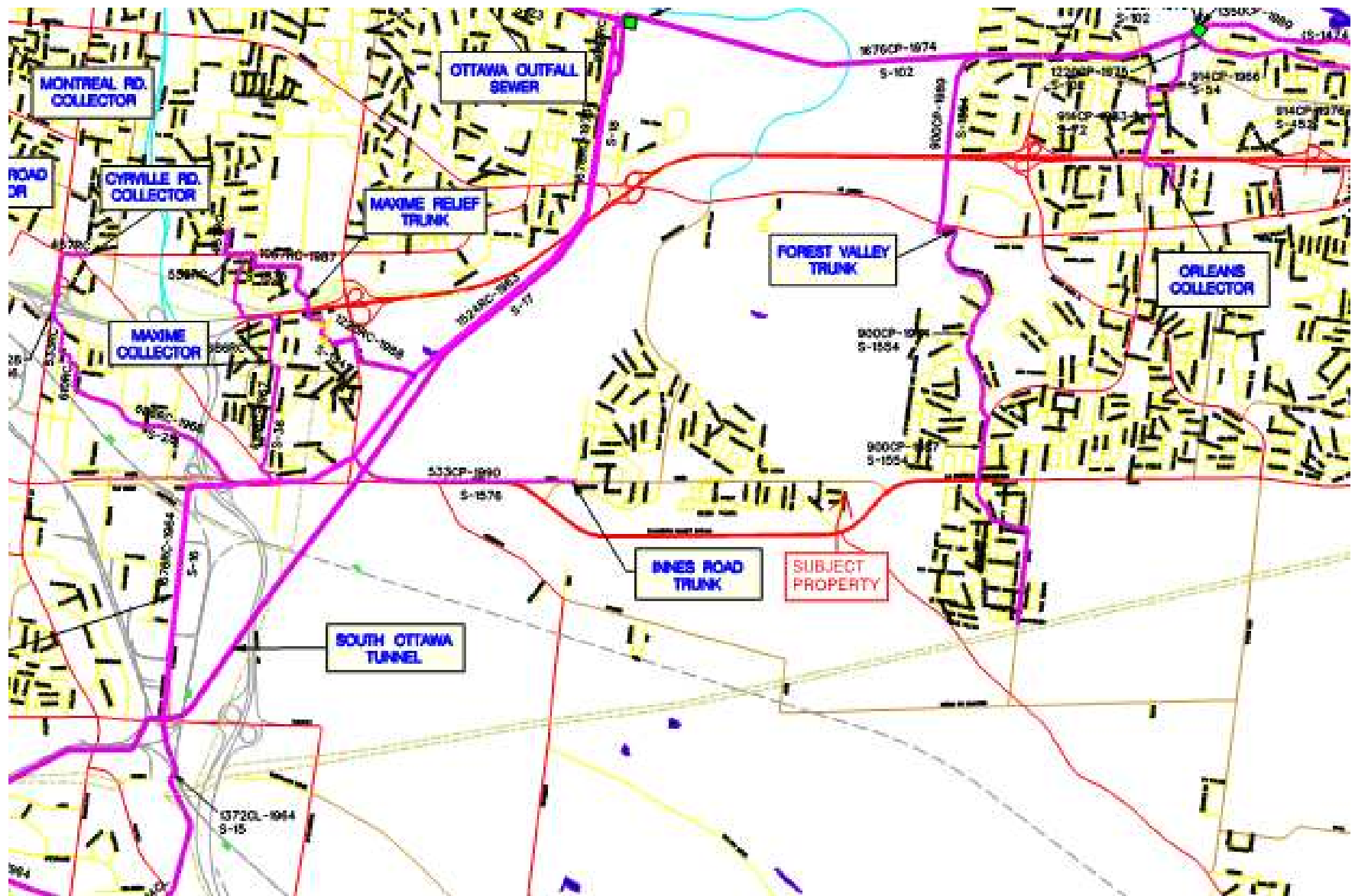
Disclaimer

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 C

Wastewater Collection Calculations







LRL File No. 210374
Project: 4-Storey Apartment Bldg
Location: 3040/3044 Innes Road
Date: January 9, 2023

Sanitary Design Parameters
 Average Daily Flow = 280 L/p/day
 Commercial & Institutional Flow = 50000 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

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			INSTITUTIONAL		C-+I			INFILTRATION			TOTAL FLOW	PIPE					
STREET	FROM MH	TO MH	AREA (Ha)	POP.	CUMMULATIVE		PEAK FACT.	PEAK FLOW (l/s)	AREA (Ha)	ACCU. AREA (Ha)	AREA (Ha)	ACCU. AREA (Ha)	PEAK FACT.	AREA (Ha)	ACCU. AREA (Ha)	PEAK FLOW (l/s)	TOTAL AREA (Ha)	ACCU. AREA (Ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	LENGTH (m)	DIA. (mm)	SLOPE (%)	MATERIAL	CAP. (FULL) (l/s)	VEL. (FULL) (m/s)		
					AREA (Ha)	POP.																						
BLDG	Bldg	SAN MH01	0.280	74.9	0.28	74.9	4.0	0.97	0.000	0.000	0.00	0.00	7.0	0.0	0.0	0.00	0.280	0.280	0.09	1.06	6.5	150	1.70%	PVC	19.86	1.12		

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

Designed: T.H.	PROJECT: Apartment Building
Checked: M.B.	LOCATION: 3040/3044 Innes Rd
Dwg. Reference: C.401	File Ref.: 210374
	Date: 2021-01-24
	Sheet No. 1 of 1

APPENDIX D
Stormwater Management Calculations
Watts Roof Drain Specification
Hydrovex ICD
Stormceptor OGS
Existing and Post Development Drainage to NE PL



LRL Associates Ltd.
Storm Watershed Summary



LRL File No. 210374
Project: New 4-Storey Apartment Building
Location: 3040/3044 Innes Rd
Date: January 17, 2023
Designed: Tamara Harb
Drawing Reference: C701/C702

Pre-Development Catchments

WATERSHED	C = 0.2	C = 0.80	C = 0.90	Total Area (m²)	Total Area (ha)	Combined C
EWS-01	2052.0	55.0	666.0	2773.0	0.277	0.38
TOTAL	2052.0	55.0	666.0	2773.0	0.277	0.38

Post-Development Catchments

WATERSHED	C = 0.20	C = 0.70	C = 0.90	Total Area (m²)	Total Area (ha)	Combined C
WS-01(UNCONTROLLED)	570.0	55.0	0.0	625.0	0.063	0.24
WS-02 (ROOF - CONTROLLED)	0.0	0.0	924.0	924.0	0.092	0.90
WS-03 (CONTROLLED)	232.3	8.0	448.3	688.5	0.069	0.66
WS-04 (CISTERN - CONTROLLED)	49.7	18.1	442.0	509.9	0.051	0.82
WS-05 (UNCONTROLLED)	25.6	0.0	0.0	25.6	0.003	0.20
TOTAL	877.6	81.1	1814.3	2773.0	0.277	0.67



LRL File No. 210374
 Project: New 4-Storey Building
 Location: 3040-3044 Innes Rd
 Date: January 17, 2023
 Designed: Tamara Harb
 Drawing Ref.: C.601

Stormwater Management
Design Sheet

Runoff Equation

$Q = 2.78CIA$ (L/s)
 C = Runoff coefficient
 $I = \text{Rainfall intensity (mm/hr)} = A / (T_d + C)^0.81$
 A = Area (ha)
 $T_c = \text{Time of concentration (min)}$

Pre-development Stormwater Management

$I_s = 732.95 / (T_d + 6.199)^{0.81}$ **a = 732.951** **b = 0.81** **C = 6.199**

 C = 0.38 max of 0.5 as per City of Ottawa
 I = 76.8 mm/hr
 T_c = 10 min
 Total Area = 0.277 ha

Allowable Release Rate = 22.50 L/s

Post-development Stormwater Management

					ΣR _{24h}	ΣR ₁₀₀
Controlled	Total Site Area =	0.277	ha	ΣR=	0.67	0.84
	WS-02 (ROOF -CONTROLLED)	0.092	ha	R=	0.90	1.00
	WS-03 (CONTROLLED)	0.069	ha	R=	0.66	0.83
	WS-04 (CISTERN -CONTROLLED)	0.051	ha	R=	0.82	1.00
	Total Controlled =	0.212	ha	ΣR=	0.80	1.00
Un-controlled	WS-01 (UNCONTROLLED)	0.063	ha	R=	0.24	0.31
	WS-05 (UNCONTROLLED)	0.003	ha	R=	0.20	0.25
	Total Un-Controlled =	0.065	ha	ΣR=	0.24	0.30

Post-development Stormwater Management (Uncontrolled Catchment WS-01 & WS-05)

2 Year Storm Event:

$I_s = 732.95 / (T_d + 6.199)^{0.81}$ **a = 732.951** **b = 0.81** **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	3.37	0.00	3.37

Post-development Stormwater Management (WS-03) - ICD

2 Year Storm Event:

$I_s = 732.95 / (T_d + 6.199)^{0.81}$ **a = 732.951** **b = 0.81** **C = 6.199**

Time (min)	Intensity (mm/hr)	Storage Required		*Controlled Release Rate Constant (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
		Controlled Runoff (L/s)	Storage Volume (m ³)			
10	76.8	9.72	3.56	3.79	0.00	3.79
15	61.8	7.82	3.63	3.79	0.00	3.79
20	52.0	6.59	3.36	3.79	0.00	3.79
25	45.2	5.72	2.90	3.79	0.00	3.79
30	40.0	5.07	2.31	3.79	0.00	3.79
35	36.1	4.57	1.64	3.79	0.00	3.79
40	32.9	4.16	0.90	3.79	0.00	3.79
45	30.2	3.83	0.12	3.79	0.00	3.79
50	28.0	3.55	0.00	3.79	0.00	3.79
60	24.6	3.11	0.00	3.79	0.00	3.79
70	21.9	2.77	0.00	3.79	0.00	3.79
90	18.1	2.30	0.00	3.79	0.00	3.79
110	15.6	1.97	0.00	3.79	0.00	3.79
130	13.7	1.73	0.00	3.79	0.00	3.79
150	12.3	1.55	0.00	3.79	0.00	3.79
170	11.1	1.41	0.00	3.79	0.00	3.79

*50% of the 100-year peak flow for underground storage calculation

Total Storage Required = 3.63 m³
 Available Underground Storage = 3.66 m³
 ICD Design Head = 1.39
 ICD Type = Hydrovex 100VHV-1

refer to LRL Plan C.601

Available Underground Storage				
Oversized Pipe	Diameter	Area (m ²)	Length (m)	Volume (m ³)
Storm Sewer	0.375	0.11	11.8	1.30
Structures	Diameter	Area (m ²)	Depth from 85.88m	Volume (m ³)
CB MH-01	1.2	1.13	1	1.13
MH-01	1.2	1.13	1.09	1.23
Total Available Underground Storage =				3.66
Required 2-Year Storage =				3.63



LRL File No. 210374
 Project: New 4-Storey Building
 Location: 3040-3044 Innes Rd
 Date: January 17, 2023
 Designed: Tamara Harb
 Drawing Ref.: C.601

Stormwater Management
 Design Sheet

Post-development Stormwater Management (WS-04) - Cistern

2 Year Storm Event:

$$I_2 = 732.95 / (Td + 6.199)^{0.81}$$

a = 732.951

b = 0.81

C = 6.199

Time (min)	Intensity (mm/hr)	Storage Required		Controlled Release Rate Constant (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
		Controlled Runoff (L/s)	Storage Volume (m ³)			
10	76.8	8.98	4.19	2.00	0.00	2.00
15	61.8	7.22	4.70	2.00	0.00	2.00
20	52.0	6.06	4.90	2.00	0.00	2.00
25	45.2	5.28	4.92	2.00	0.00	2.00
30	40.0	4.68	4.82	2.00	0.00	2.00
35	36.1	4.21	4.65	2.00	0.00	2.00
40	32.9	3.84	4.42	2.00	0.00	2.00
45	30.2	3.53	4.14	2.00	0.00	2.00
50	28.0	3.28	3.83	2.00	0.00	2.00
60	24.6	2.87	3.13	2.00	0.00	2.00
70	21.9	2.56	2.36	2.00	0.00	2.00
90	18.1	2.12	0.65	2.00	0.00	2.00
110	15.6	1.82	0.00	2.00	0.00	2.00
130	13.7	1.60	0.00	2.00	0.00	2.00
150	12.3	1.43	0.00	2.00	0.00	2.00
170	11.1	1.30	0.00	2.00	0.00	2.00

Total Storage Required = 4.92 m³ refer to LRL Plan C.601
 Available CISTERN Storage = 22.00 m³

Post-development Stormwater Management (WS-02 On Roof)

2 Year Storm Event:

$$I_2 = 732.95 / (Td + 6.199)^{0.81}$$

a = 732.951

b = 0.81

C = 6.199

Time (min)	Intensity (mm/hr)	Storage Required		Controlled Release Rate Constant (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
		Controlled Runoff (L/s)	Storage Volume (m ³)			
10	76.8	17.76	8.76	3.15	0.00	3.15
15	61.8	14.28	10.01	3.15	0.00	3.15
20	52.0	12.03	10.65	3.15	0.00	3.15
25	45.2	10.44	10.93	3.15	0.00	3.15
30	40.0	9.26	10.99	3.15	0.00	3.15
35	36.1	8.34	10.88	3.15	0.00	3.15
40	32.9	7.60	10.66	3.15	0.00	3.15
45	30.2	6.99	10.36	3.15	0.00	3.15
50	28.0	6.48	9.98	3.15	0.00	3.15
60	24.6	5.68	9.08	3.15	0.00	3.15
70	21.9	5.07	8.03	3.15	0.00	3.15
80	19.8	4.58	6.86	3.15	0.00	3.15
90	18.1	4.19	5.62	3.15	0.00	3.15
100	16.7	3.87	4.30	3.15	0.00	3.15
110	15.6	3.60	2.94	3.15	0.00	3.15
120	14.6	3.37	1.53	3.15	0.00	3.15

Summary of Roof Storage

Maximum Required Roof Storage (2 Year) = 10.99 m³
 Proposed Head = 150 mm *An Emergency overflow scupper is provided above this height.
 Control Flow/Drain = 0.63 L/s
 Number of Roof Drains = 5
 Total Flow from Roof Drain = 3.15 L/s
Available Roof Storage = 42.31 m³ (Analysed using Civil 3D)
 Roof Drain Model = Watts Roof Drain with Adjustable Flow Setting (Watts RD-100-A-ADI Weir Opening = Closed)

Total Storage Required = 10.99 m³
 Available Roof Storage = 42.31 m³ refer to LRL Plan C.601

SUMMARY OF RELEASE RATES AND STORAGE VOLUMES				
Catchment Area	Drainage Area (ha)	2-year Release Rate (L/s)	2-Year Required Storage (m ³)	Total Available Storage (m ³)
WS-01 & WS-05 (Un-Controlled)	0.065	3.37	0	0
WS-02 (Roof Controls)	0.092	3.15	10.99	42.31
WS-03 (ICD)	0.069	3.79	3.63	3.66
WS-04 (Cistern)	0.051	2.00	4.92	22.00
TOTAL	0.277	12.30	19.54	67.97



LRL File No. 210374
Project: New 4-Storey Building
Location: 3040-3044 Innes Rd
Date: January 17, 2023
Designed: Tamara Harb
Drawing Ref.: C.601

**Stormwater Management
Design Sheet**

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

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

 C = 0.38 max of 0.5 as per City of Ottawa
 I = 76.8 mm/hr
 $T_c = 10$ min
 Total Area = 0.277 ha

Allowable Release Rate = 22.50 L/s

Post-development Stormwater Management

					ΣR_{24h}	ΣR_{100}
Controlled	Total Site Area =	0.277	ha	$\Sigma R =$	0.67	0.84
	WS-02 (ROOF -CONTROLLED)	0.092	ha	R =	0.90	1.00
	WS-03 (CONTROLLED)	0.069	ha	R =	0.66	0.83
	WS-04 (CISTERN -CONTROLLED)	0.051	ha	R =	0.82	1.00
	Total Controlled =	0.212	ha	$\Sigma R =$	0.80	1.00
Un-controlled	WS-01 (UNCONTROLLED)	0.063	ha	R =	0.24	0.31
	WS-05 (UNCONTROLLED)	0.003	ha	R =	0.20	0.25
	Total Un-Controlled =	0.065	ha	$\Sigma R =$	0.24	0.30

Post-development Stormwater Management (Uncontrolled Catchment WS-01 & WS-05)

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	9.78	0.00	9.78

Post-development Stormwater Management (WS-03) - ICD

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)	Storage Required		Controlled Release Rate Constant (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
		Controlled Runoff (L/s)	Storage Volume (m ³)			
10	178.6	28.26	12.42	7.57	0.00	7.57
15	142.9	22.62	13.55	7.57	0.00	7.57
20	120.0	18.99	13.70	7.57	0.00	7.57
25	103.8	16.44	13.31	7.57	0.00	7.57
30	91.9	14.54	12.55	7.57	0.00	7.57
35	82.6	13.07	11.56	7.57	0.00	7.57
40	75.1	11.89	10.39	7.57	0.00	7.57
45	69.1	10.93	9.08	7.57	0.00	7.57
50	64.0	10.12	7.67	7.57	0.00	7.57
60	55.9	8.85	4.61	7.57	0.00	7.57
70	49.8	7.88	1.32	7.57	0.00	7.57
90	41.1	6.51	0.00	7.57	0.00	7.57
110	35.2	5.57	0.00	7.57	0.00	7.57
130	30.9	4.89	0.00	7.57	0.00	7.57
150	27.6	4.37	0.00	7.57	0.00	7.57
170	25.0	3.96	0.00	7.57	0.00	7.57

Total Storage Required = 13.70 m³
 Available Storage = 27.30 m³ refer to LRL Plan C.601
 ICD Design Head = 1.39
 ICD Type Hydrovex 100VHV-1



LRL File No. 210374
 Project: New 4-Storey Building
 Location: 3040-3044 Innes Rd
 Date: January 17, 2023
 Designed: Tamara Harb
 Drawing Ref.: C.601

Stormwater Management
 Design Sheet

Post-development Stormwater Management (WS-04) - Cistern

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)	Storage Required		Controlled Release Rate Constant (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
		Controlled Runoff (L/s)	Storage Volume (m ³)			
10	178.6	25.31	13.99	2.00	0.00	2.00
15	142.9	20.25	16.43	2.00	0.00	2.00
20	120.0	17.00	18.00	2.00	0.00	2.00
25	103.8	14.72	19.08	2.00	0.00	2.00
30	91.9	13.02	19.84	2.00	0.00	2.00
35	82.6	11.70	20.38	2.00	0.00	2.00
40	75.1	10.65	20.76	2.00	0.00	2.00
45	69.1	9.79	21.03	2.00	0.00	2.00
50	64.0	9.06	21.19	2.00	0.00	2.00
60	55.9	7.92	21.32	2.00	0.00	2.00
70	49.8	7.06	21.24	2.00	0.00	2.00
90	41.1	5.83	20.67	2.00	0.00	2.00
110	35.2	4.99	19.73	2.00	0.00	2.00
130	30.9	4.38	18.56	2.00	0.00	2.00
150	27.6	3.91	17.22	2.00	0.00	2.00
170	25.0	3.54	15.76	2.00	0.00	2.00

Total Storage Required = 21.32 m³ refer to LRL Plan C.601
 Available CISTERN Storage = 22.00 m³

Post-development Stormwater Management (WS-02 On Roof)

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)	Storage Required		Controlled Release Rate Constant (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
		Controlled Runoff (L/s)	Storage Volume (m ³)			
10	178.6	45.87	25.63	3.15	0.00	3.15
15	142.9	36.71	30.20	3.15	0.00	3.15
20	120.0	30.81	33.19	3.15	0.00	3.15
25	103.8	26.68	35.28	3.15	0.00	3.15
30	91.9	23.60	36.80	3.15	0.00	3.15
35	82.6	21.21	37.92	3.15	0.00	3.15
40	75.1	19.30	38.76	3.15	0.00	3.15
45	69.1	17.74	39.37	3.15	0.00	3.15
50	64.0	16.43	39.82	3.15	0.00	3.15
60	55.9	14.36	40.33	3.15	0.00	3.15
70	49.8	12.79	40.47	3.15	0.00	3.15
80	45.0	11.56	40.33	3.15	0.00	3.15
90	41.1	10.56	39.99	3.15	0.00	3.15
100	37.9	9.74	39.49	3.15	0.00	3.15
110	35.2	9.04	38.86	3.15	0.00	3.15
120	32.9	8.45	38.13	3.15	0.00	3.15

Summary of Roof Storage

Maximum Required Roof Storage (100 Year) = 40.47 m³
 Proposed Head = 150 mm *An Emergency overflow scupper is provided above this height.
 Control Flow/Drain = 0.63 L/s
 Number of Roof Drains = 5
 Total Flow from Roof Drain = 3.15 L/s
Available Roof Storage = 42.31 m³ (Analysed using Civil 3D)
 Roof Drain Model = Watts Roof Drain with Adjustable Flow Setting (Watts RD-100-A-ADJ Weir Opening = Closed)

Total Storage Required = 40.47 m³
 Available Roof Storage = 42.31 m³ refer to LRL Plan C.601

SUMMARY OF RELEASE RATES AND STORAGE VOLUMES				
Catchment Area	Drainage Area (ha)	100-year Release Rate (L/s)	100-Year Required Storage (m ³)	Total Available Storage (m ³)
WS-01 & WS-05 (Un-Controlled)	0.065	9.78	0	0
WS-02 (Roof Controls)	0.092	3.15	40.47	42.31
WS-03 (ICD)	0.069	7.57	13.70	27.30
WS-04 (Cistern)	0.051	2.00	21.32	22.00
TOTAL	0.277	22.50	75.49	91.61

LRL Associates Ltd.
Storm Design Sheet



LRL File No. 210374
Project: New 4-Storey Apartment Building
Location: 3040/3044 Innes Rd
Date: January 9, 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 0.80
Asphalt / rooftop 0.90

Ottawa Macdonald-Cartier International Airport IDF curve
equation (2 year event, intensity in mm/hr)
 $I_2 = 732.95 / (Td + 6.199)^{0.81}$
Min. velocity = 0.80 m/s
Manning's "n" = 0.013

LOCATION			AREA (ha)			FLOW						STORM SEWER							
WATERSHED / STREET	From MH	To MH	C = 0.20	C = 0.80	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-03	CB MH01	STM MH01	0.023	0.001	0.045	0.127	0.13	10.00	76.8	9.74		375	PVC	0.30%	11.8	96.0	0.87	0.23	0.10
	STM MH01	OGS	0.023	0.001	0.045	0.127	0.13	10.23	75.9	9.63	7.57	250	PVC	0.45%	1.6	39.9	0.81	0.03	0.19
	OGS	STM MH 02	0.000	0.000	0.000	0.000	0.13	10.26	75.8	9.62	7.57	250	PVC	0.50%	1.8	42.0	0.86	0.04	0.18
WS-04 & WS-02	CISTERN & ROOF	STM MH 02	0.005	0.002	0.137	0.349	0.35	10.00	76.8	26.77	5.15	250	PVC	0.45%	7.1	39.9	0.81	0.15	0.13
WS-02, WS-03, WS-04	STM MH02	STM MH03	0.028	0.003	0.181	0.475	0.48	10.29	75.7	35.99	12.72	250	PVC	2.00%	15.1	84.1	1.71	0.15	0.43

Information | Definition | Analysis | Statistics

Statistics	Value
General	
Revision number	0
Number of points	845
Minimum X coordinate	395969.38m
Minimum Y coordinate	5043718.53m
Maximum X coordinate	396004.51m
Maximum Y coordinate	5043766.28m
Minimum elevation	0.00m
Maximum elevation	0.15m
Mean elevation	0.05m
TIN	
Number of triangles	1500
Maximum triangle area	0.00hectares
Minimum triangle area	0.00hectares
Minimum triangle length	0.00m
Maximum triangle length	11.64m
Volume	
Base Surface	ROOF
Comparison Surface	HWL 100.15
Cut Factor	1.00
Fill Factor	1.00
Cut volume (adjusted)	0.00 Cu. M.
Fill volume (adjusted)	42.31 Cu. M.
Net volume (adjusted)	42.31 Cu. M. <Fill>
Cut volume (unadjusted)	0.00 Cu. M.
Fill volume (unadjusted)	42.31 Cu. M.
Net volume (unadjusted)	42.31 Cu. M. <Fill>

<

>

Statistics	Value
General	
Revision number	0
Number of points	685
Minimum X coordinate	379446.23m
Minimum Y coordinate	5033650.13m
Maximum X coordinate	379468.38m
Maximum Y coordinate	5033682.63m
Minimum elevation	-0.11m
Maximum elevation	0.30m
Mean elevation	0.11m
TIN	
Number of triangles	1182
Maximum triangle area	0.00hectares
Minimum triangle area	0.00hectares
Minimum triangle length	0.00m
Maximum triangle length	10.78m
Volume	
Base Surface	PROPOSED
Comparison Surface	HWL(86.18)
Cut Factor	1.00
Fill Factor	1.00
Cut volume (adjusted)	0.23 Cu. M.
Fill volume (adjusted)	31.35 Cu. M.
Net volume (adjusted)	31.12 Cu. M.<Fill>
Cut volume (unadjusted)	0.23 Cu. M.
Fill volume (unadjusted)	31.35 Cu. M.
Net volume (unadjusted)	31.12 Cu. M.<Fill>

ADJUSTABLE ACCUTROL (for Large Sump Roof Drains only)

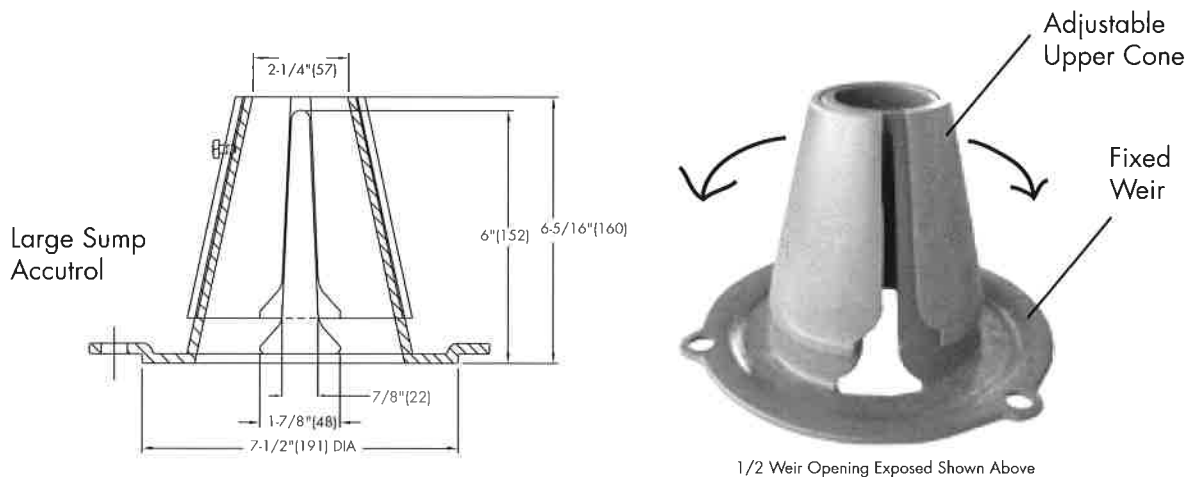
For more flexibility in controlling flow with heads deeper than 2", Watts Drainage offers the Adjustable Accutrol. The Adjustable Accutrol Weir is designed with a single parabolic opening that can be covered to restrict flow above 2" of head to less than 5 gpm per inch, up to 6" of head. To adjust the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

Note: Flow rates are directly proportional to the amount of weir opening that is exposed.

EXAMPLE:

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

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


TABLE 1. Adjustable Accutrol Flow Rate Settings

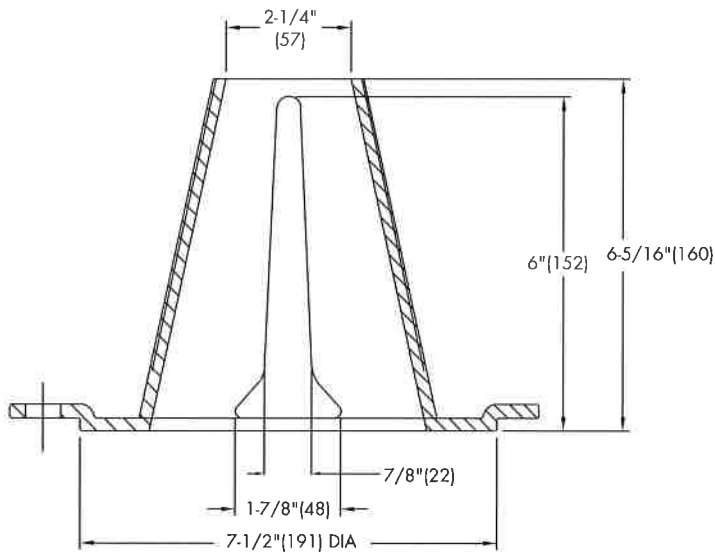
Weir Opening Exposed	Head of Water					
	1"	2"	3"	4"	5"	6"
	Flow Rate (gallons per minute)					
Fully Exposed	5	10	15	20	25	30
3/4	5	10	13.75	17.5	21.25	25
1/2	5	10	12.5	15	17.5	20
1/4	5	10	11.25	12.5	13.75	15
Closed	5	10	10	10	10	10

Job Name _____ Model No. _____
 Job Location _____ Contractor _____
 Engineer _____ Representative _____

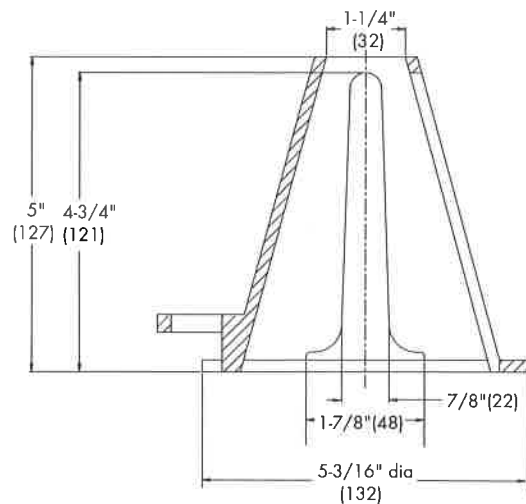
ACCUTROL WEIR FLOW CONTROL

SPECIFICATION: Watts Drainage Products epoxy coated cast iron Accutrol Weir is designed with parabolic openings which limit the flow of rain water off a roof. Each weir slot controls flow to 5 gpm per inch of head to a maximum of 30 gpm at 6" head (for large sump), 25 gpm at 5" head (for small sump). The Accutrol Weir is secured to the flashing clamp of the roof drain. The Accutrol Weir is available with 1 to 4 slots for the large sump drain and up to 3 slots for the small sump drain.

For Large Sump Roof Drains Specify the "-A" option and number of slots required. (ie. "RD-100-A2" for two slot weir)
For Small Sump Roof Drains Specify the "-A" option and number of slots required. (ie. "RD-200-A1" for one slot weir)



LARGE SUMP ACCUTROL WEIR



SMALL SUMP ACCUTROL WEIR

Job Name _____ Model No. _____

Job Location _____ Contractor _____

Engineer _____ Representative _____



Specification Drainage Products

WATTS Drainage reserves the right to modify or change product design or construction without prior notice and without incurring any obligation to make similar changes and modifications to products previously or subsequently sold. See your WATTS Drainage representative for any clarification. Dimensions are subject to manufacturing tolerances.

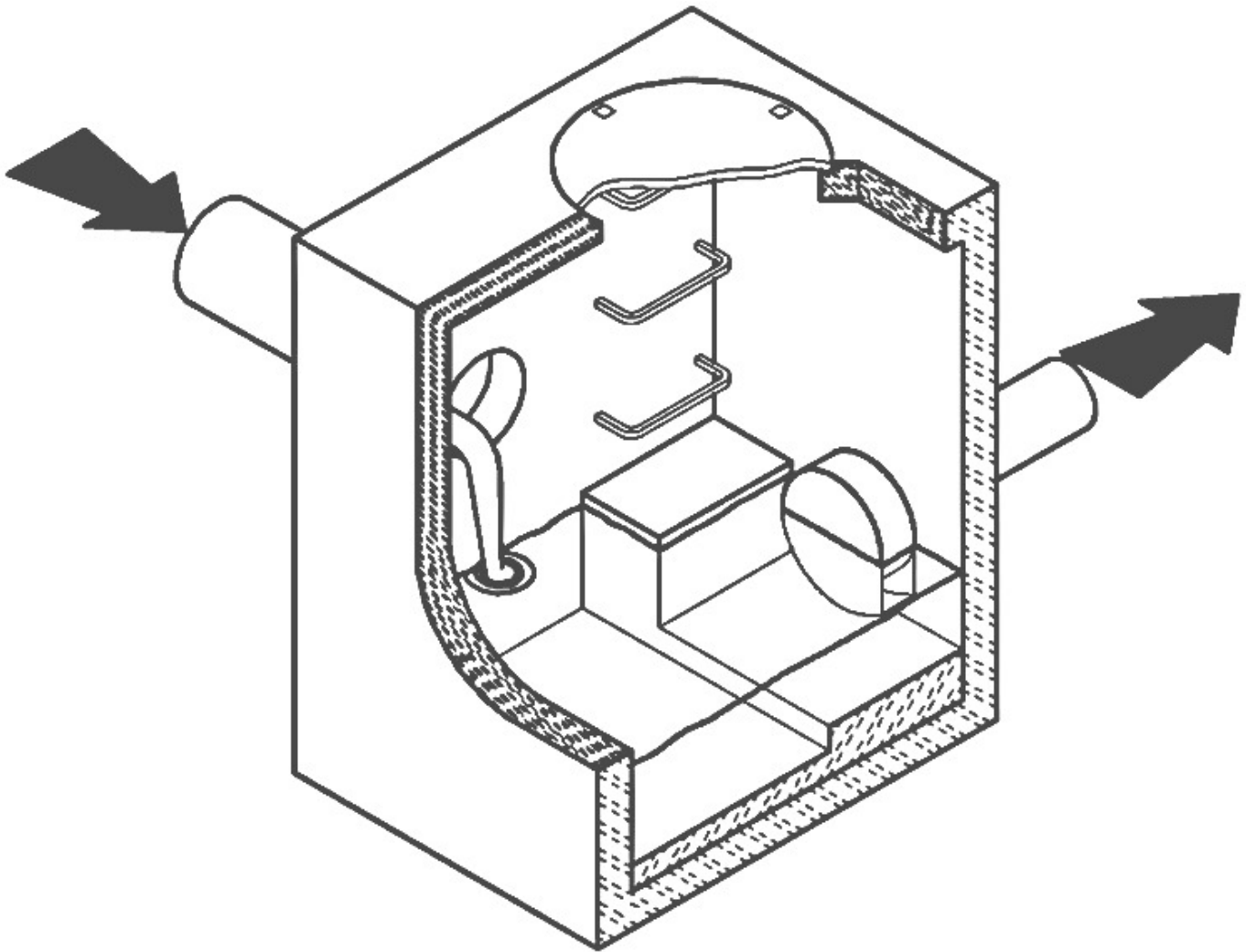


CANADA: 5435 North Service Road, Burlington, ON, L7L 5H7 TEL: 905-332-6718 TOLL-FREE: 1-888-208-8927 Website: www.wattscanada.ca

CSO/STORMWATER MANAGEMENT



HYDROVEX[®] VHV / SVHV
Vertical Vortex Flow Regulator



JOHN MEUNIER

HYDROVEX® VHV / SVHV VERTICAL VORTEX FLOW REGULATOR

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.

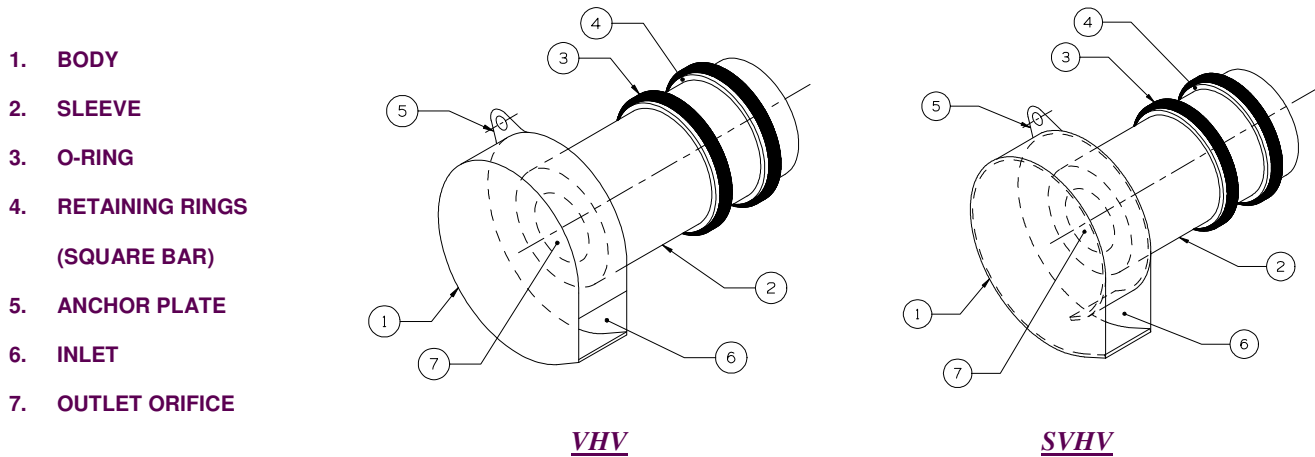


FIGURE 1: HYDROVEX® VHV-SVHV VERTICAL VORTEX FLOW REGULATORS

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.

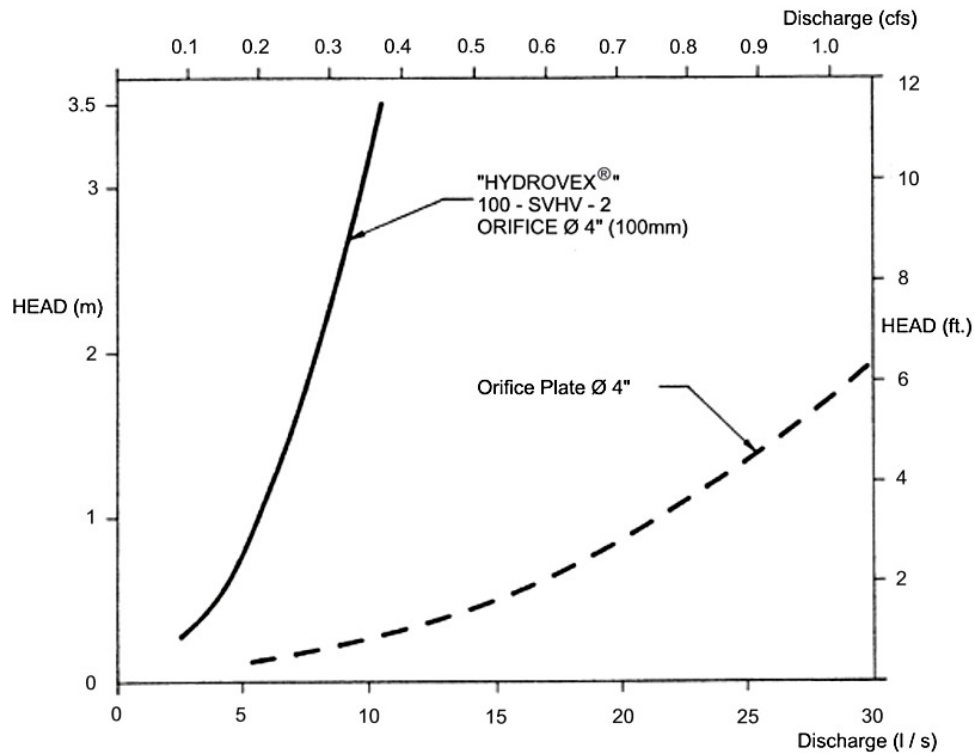


FIGURE 2: DISCHARGE CURVE SHOWING A HYDROVEX® FLOW REGULATOR VS AN ORIFICE PLATE

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

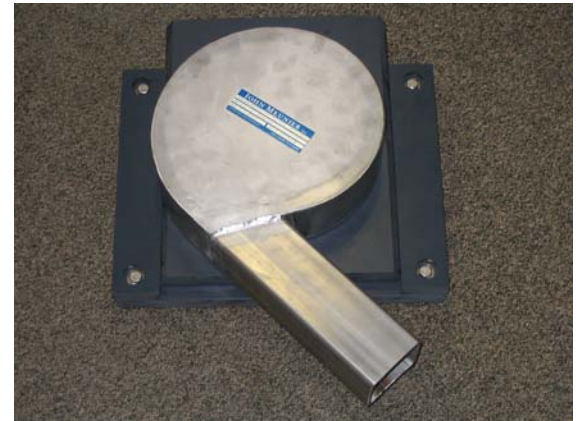
OPTIONS



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



VHV Vertical Vortex Flow Regulator

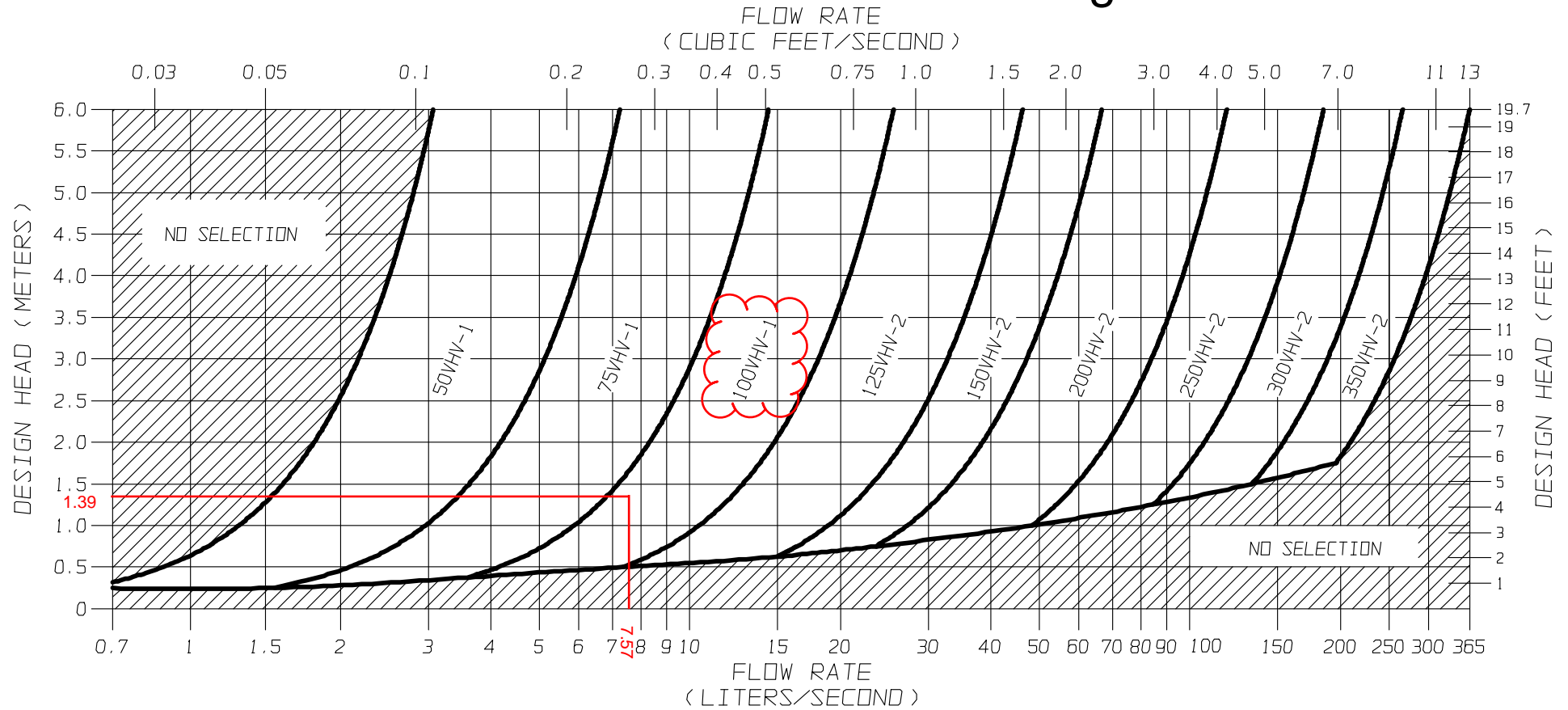


FIGURE 3 - VHV

JOHN MEUNIER



SVHV Vertical Vortex Flow Regulator

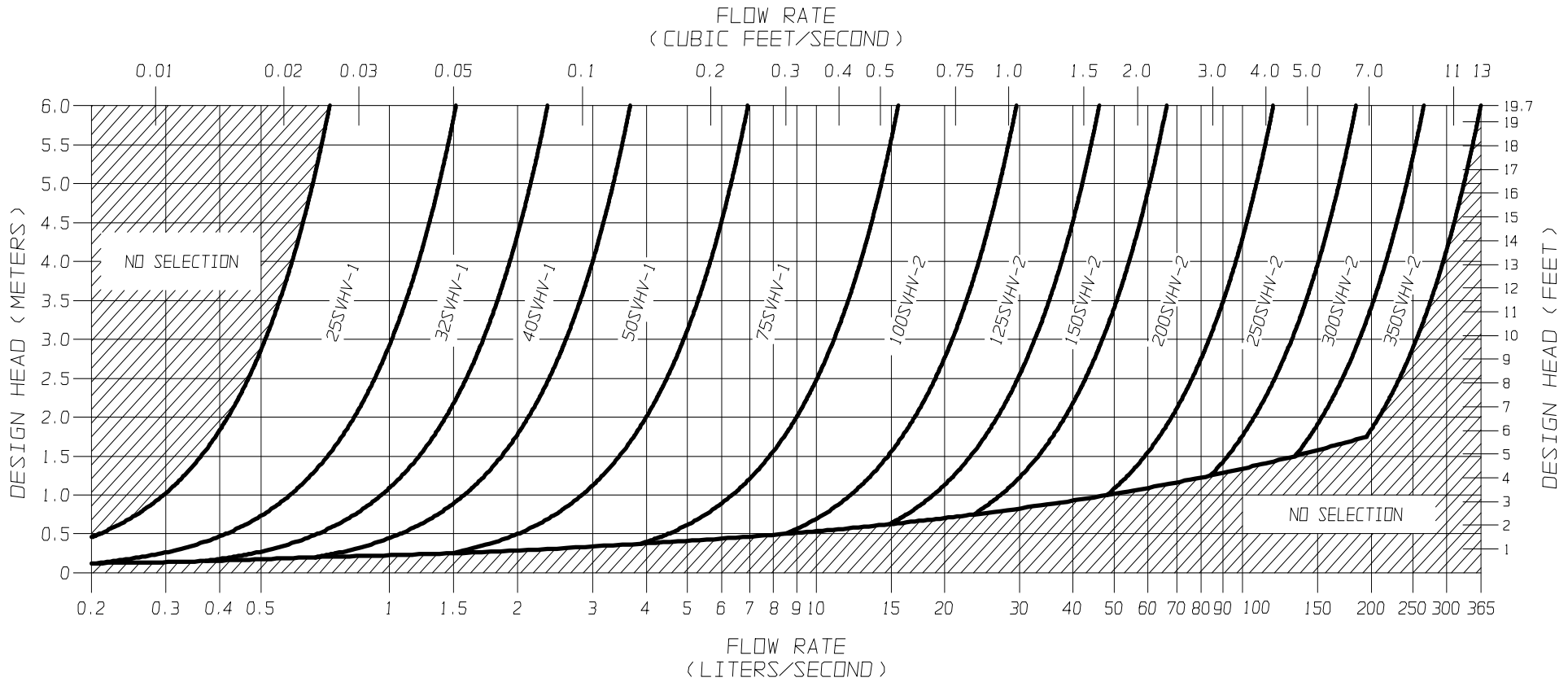
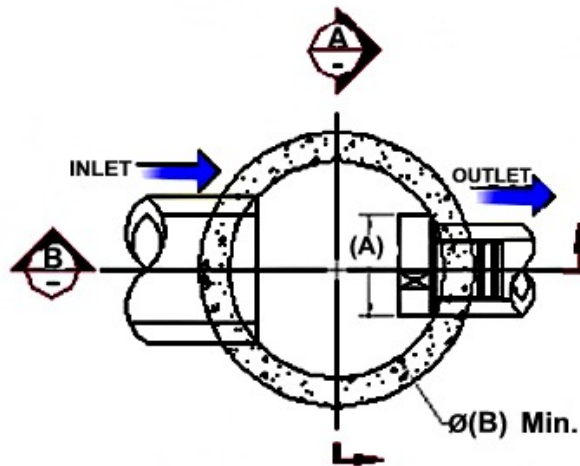


FIGURE 3 - SVHV

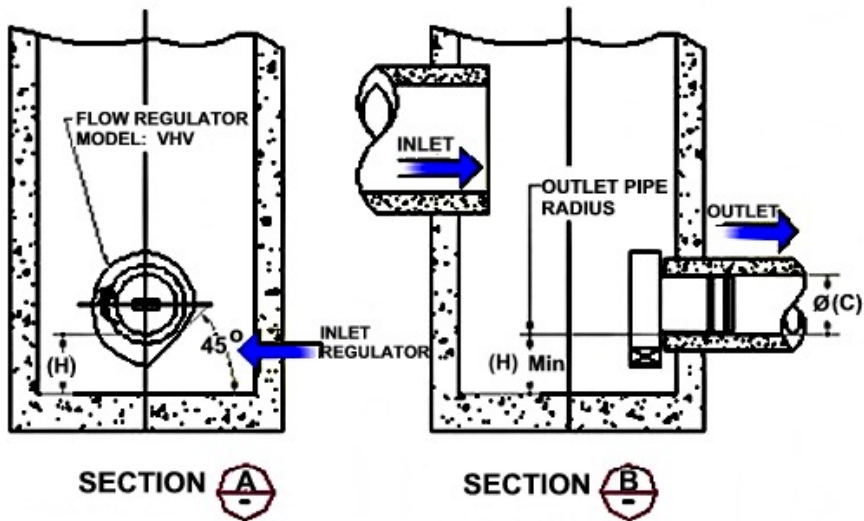
JOHN MEUNIER

**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



CIRCULAR WELL

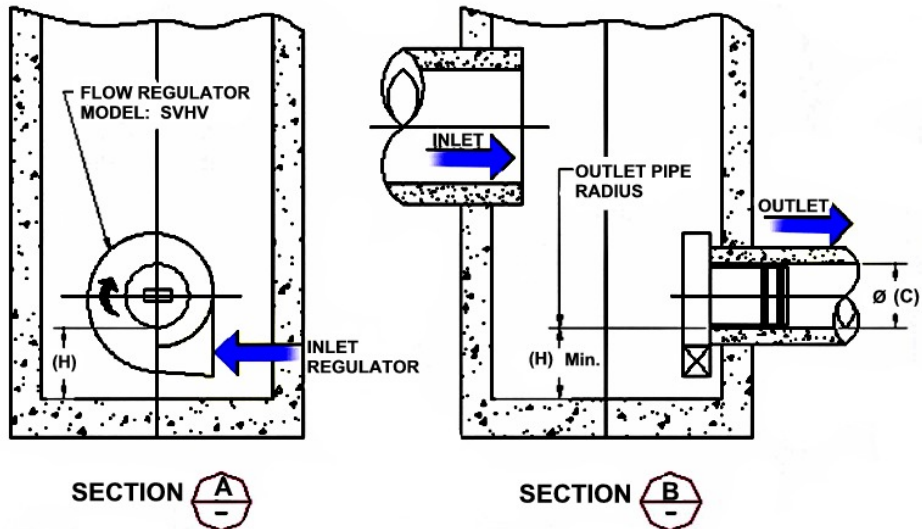
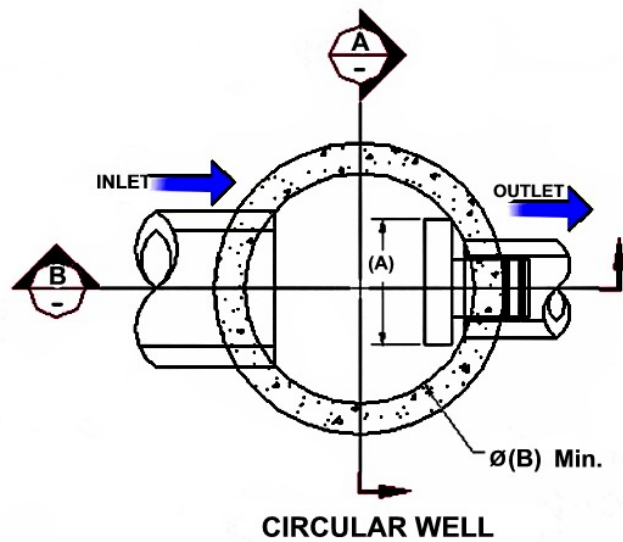


SECTION A-A

SECTION B-B

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

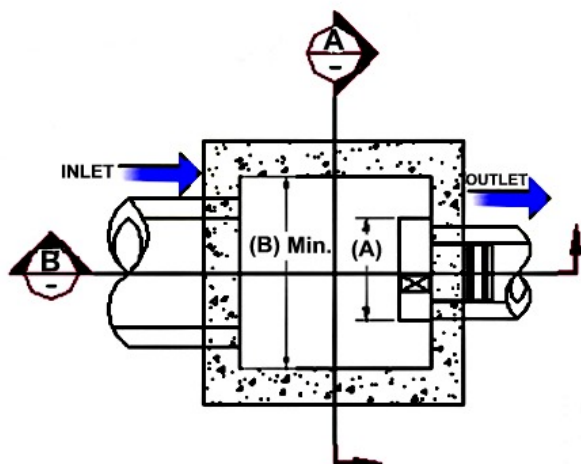
Model Number	Regulator Diameter		Minimum Manhole Diameter		Minimum Outlet Pipe Diameter		Minimum Clearance	
	A (mm)	A (in.)	B (mm)	B (in.)	C (mm)	C (in.)	H (mm)	H (in.)
25 SVHV-1	125	5	600	24	150	6	150	6
32 SVHV-1	150	6	600	24	150	6	150	6
40 SVHV-1	200	8	600	24	150	6	150	6
50 SVHV-1	250	10	600	24	150	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



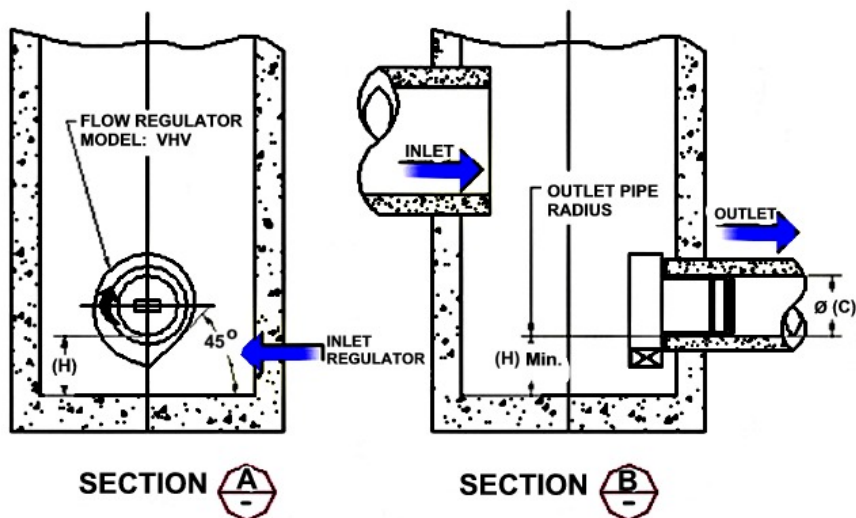
**FLOW REGULATOR TYPICAL INSTALLATION IN SQUARE MANHOLE
FIGURE 4 (MODEL VHV)**

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



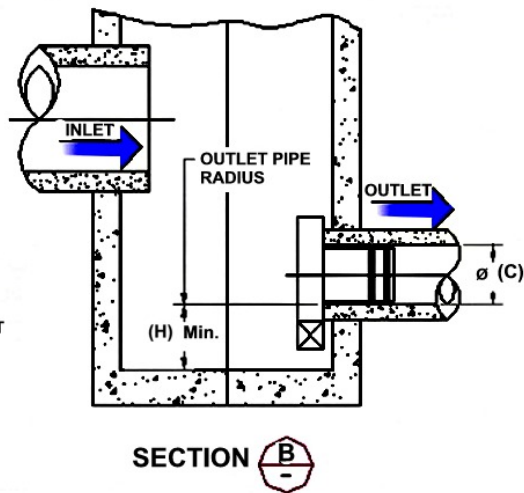
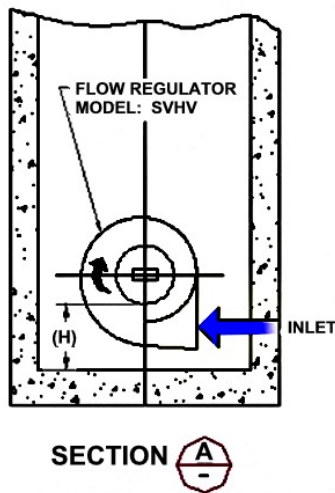
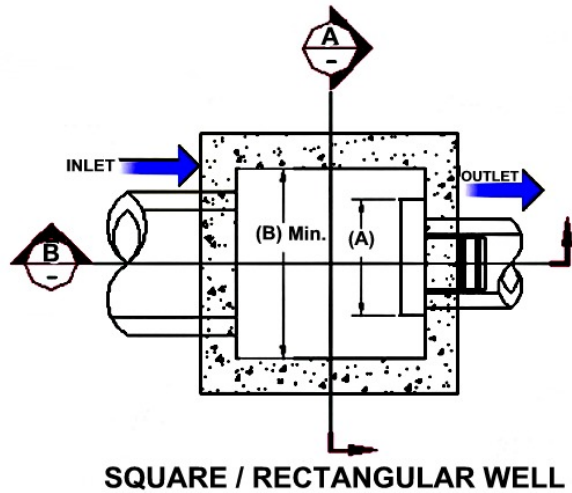
SECTION A

SECTION B

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.*



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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Stormceptor® EF Sizing Report

STORMCEPTOR®		ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION		01/20/2022														
Province:	Ontario	Project Name:	3040-3044 Innes Rd.															
City:	Ottawa	Project Number:	LRL210374															
Nearest Rainfall Station:	OTTAWA CDA RCS	Designer Name:	Brandon O'Leary															
Climate Station Id:	6105978	Designer Company:	Forterra															
Years of Rainfall Data:	20	Designer Email:	brandon.oleary@forterrabp.com															
Site Name:	3040-3044 Innes Rd.	Designer Phone:	905-630-0359															
Drainage Area (ha):	0.277	EOR Name:	Amr Salem															
Runoff Coefficient 'c':	0.66	EOR Company:	LRL Associates Ltd.															
Particle Size Distribution:	Fine	EOR Email:																
Target TSS Removal (%):	80.0	EOR Phone:																
Required Water Quality Runoff Volume Capture (%):	90.0	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">Net Annual Sediment (TSS) Load Reduction Sizing Summary</th> </tr> <tr> <th style="width: 50%;">Stormceptor Model</th> <th style="width: 50%;">TSS Removal Provided (%)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">EFO4</td> <td style="text-align: center;">89</td> </tr> <tr> <td style="text-align: center;">EFO6</td> <td style="text-align: center;">96</td> </tr> <tr> <td style="text-align: center;">EFO8</td> <td style="text-align: center;">98</td> </tr> <tr> <td style="text-align: center;">EFO10</td> <td style="text-align: center;">99</td> </tr> <tr> <td style="text-align: center;">EFO12</td> <td style="text-align: center;">100</td> </tr> </tbody> </table>			Net Annual Sediment (TSS) Load Reduction Sizing Summary		Stormceptor Model	TSS Removal Provided (%)	EFO4	89	EFO6	96	EFO8	98	EFO10	99	EFO12	100
Net Annual Sediment (TSS) Load Reduction Sizing Summary																		
Stormceptor Model	TSS Removal Provided (%)																	
EFO4	89																	
EFO6	96																	
EFO8	98																	
EFO10	99																	
EFO12	100																	
Estimated Water Quality Flow Rate (L/s):	6.27																	
Oil / Fuel Spill Risk Site?	Yes																	
Upstream Flow Control?	No																	
Peak Conveyance (maximum) Flow Rate (L/s):																		
<p>Recommended Stormceptor EFO Model: EFO4</p> <p>Estimated Net Annual Sediment (TSS) Load Reduction (%): 89</p> <p>Water Quality Runoff Volume Capture (%): > 90</p>																		



Stormceptor[®] EF Sizing Report

THIRD-PARTY TESTING AND VERIFICATION

► **Stormceptor[®] EF and Stormceptor[®] EFO** are the latest evolutions in the Stormceptor[®] oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

► **Stormceptor[®] EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterways.

PARTICLE SIZE DISTRIBUTION (PSD)

► The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Stormceptor®EF Sizing Report

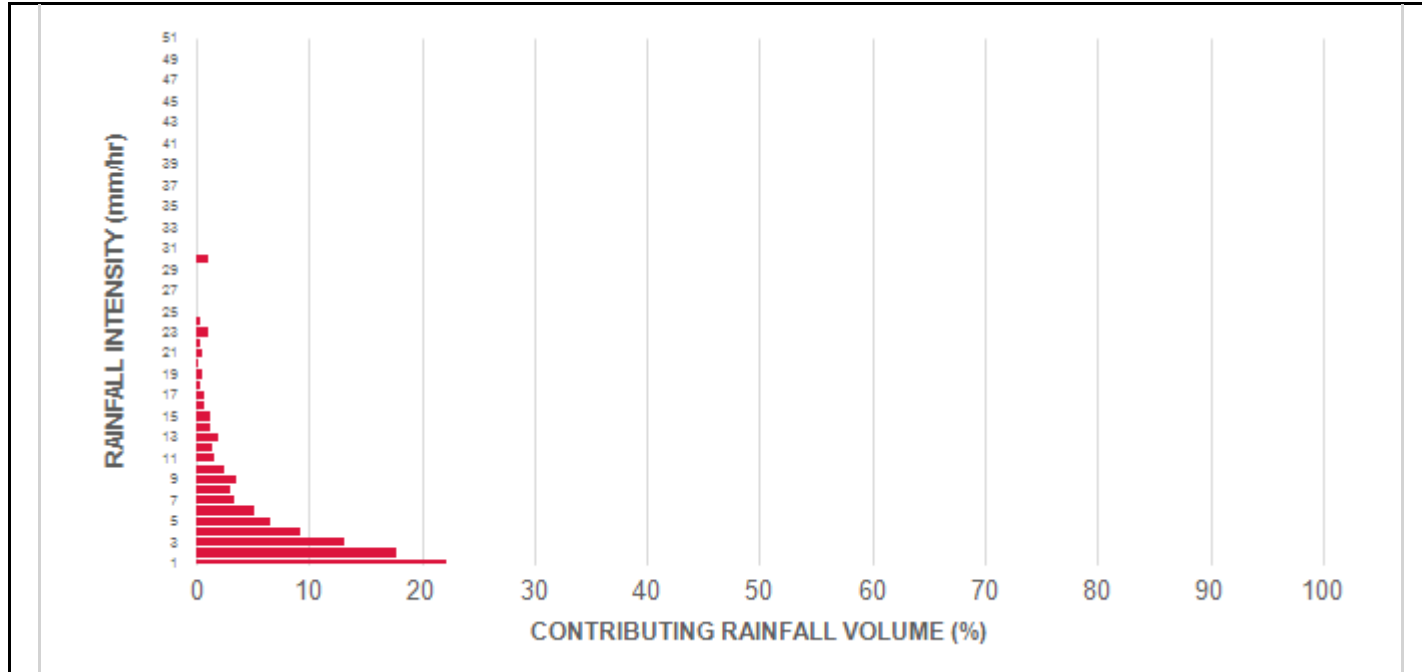
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m ²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
1	22.3	22.3	0.51	31.0	26.0	100	22.3	22.3
2	17.8	40.0	1.03	62.0	51.0	98	17.4	39.7
3	13.1	53.1	1.54	92.0	77.0	94	12.3	52.0
4	9.2	62.4	2.05	123.0	103.0	89	8.2	60.2
5	6.5	68.9	2.57	154.0	128.0	87	5.6	65.9
6	5.1	74.0	3.08	185.0	154.0	83	4.2	70.1
7	3.4	77.3	3.60	216.0	180.0	80	2.7	72.8
8	3.0	80.3	4.11	247.0	205.0	77	2.3	75.1
9	3.6	84.0	4.62	277.0	231.0	76	2.8	77.8
10	2.5	86.5	5.14	308.0	257.0	75	1.9	79.7
11	1.7	88.2	5.65	339.0	283.0	74	1.3	81.0
12	1.4	89.6	6.16	370.0	308.0	73	1.1	82.0
13	1.9	91.5	6.68	401.0	334.0	72	1.4	83.4
14	1.3	92.8	7.19	432.0	360.0	70	0.9	84.3
15	1.3	94.1	7.71	462.0	385.0	69	0.9	85.2
16	0.8	94.9	8.22	493.0	411.0	68	0.5	85.7
17	0.8	95.7	8.73	524.0	437.0	67	0.5	86.3
18	0.4	96.1	9.25	555.0	462.0	66	0.3	86.6
19	0.5	96.6	9.76	586.0	488.0	65	0.3	86.8
20	0.2	96.8	10.27	616.0	514.0	64	0.2	87.0
21	0.5	97.3	10.79	647.0	539.0	63	0.3	87.3
22	0.3	97.6	11.30	678.0	565.0	62	0.2	87.5
23	1.1	98.7	11.82	709.0	591.0	60	0.7	88.1
24	0.3	99.0	12.33	740.0	616.0	60	0.2	88.3
25	0.0	99.0	12.84	771.0	642.0	60	0.0	88.3
30	1.0	100.0	15.41	925.0	771.0	59	0.6	88.9
35	0.0	100.0	17.98	1079.0	899.0	58	0.0	88.9
40	0.0	100.0	20.55	1233.0	1027.0	57	0.0	88.9
45	0.0	100.0	23.12	1387.0	1156.0	54	0.0	88.9
50	0.0	100.0	25.69	1541.0	1284.0	51	0.0	88.9
Estimated Net Annual Sediment (TSS) Load Reduction =								89 %

Climate Station ID: 6105978 Years of Rainfall Data: 20

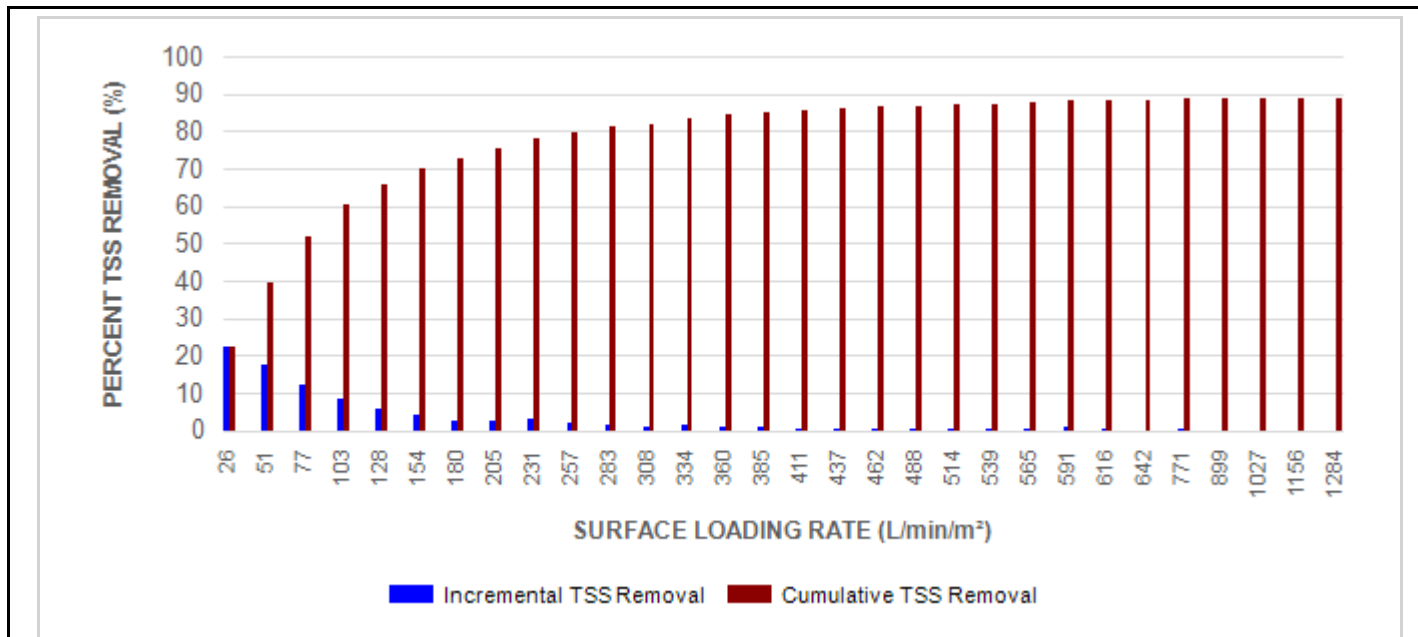


Stormceptor® EF Sizing Report

RAINFALL DATA FROM OTTAWA CDA RCS RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Stormceptor® EF Sizing Report

Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

► Stormceptor® EF and EFO feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV Procedure for Laboratory Testing of Oil-Grit Separators, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

DESIGN FLEXIBILITY

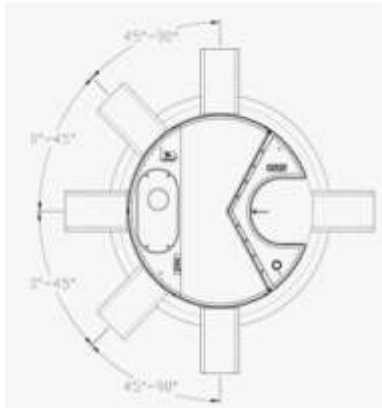
► Stormceptor® EF and EFO offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

► While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, Stormceptor® EFO has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV Procedure for Laboratory Testing of Oil-Grit Separators. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.



Stormceptor® EF Sizing Report



INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.

0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.

45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1.

For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft³)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity

** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft³)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit <http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef>

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit <http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef>



STANDARD PERFORMANCE SPECIFICATION FOR “OIL GRIT SEPARATOR” (OGS) STORMWATER QUALITY TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program’s **Procedure for Laboratory Testing of Oil-Grit Separators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m ³ sediment / 265 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m ³ sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m ³ sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m ³ sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m ³ sediment / 2,476 L oil

Stormceptor® EF Sizing Report

PART 3 – PERFORMANCE & DESIGN**3.1 GENERAL**

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing shall be determined using historical rainfall data and a sediment removal performance curve derived from the actual third-party verified laboratory testing data. The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators**.

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m².

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators**, with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m² to 2600 L/min/m²) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators**. However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

STANDARD PERFORMANCE SPECIFICATION FOR “OIL GRIT SEPARATOR” (OGS) STORMWATER QUALITY TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program’s **Procedure for Laboratory Testing of Oil-Grit Separators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The **minimum** sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4ft (1219mm) Diameter OGS Units:	1.19m ³ sediment / 265L oil
	6ft (1829mm) Diameter OGS Units:	3.48m ³ sediment / 609L oil
	8ft (2438mm) Diameter OGS Units:	8.78m ³ sediment / 1,071L oil
	10ft (3048mm) Diameter OGS Units:	17.78m ³ sediment / 1,673L oil
	12ft (3657mm) Diameter OGS Units:	31.23m ³ sediment / 2,476L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality

treatment device shall remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

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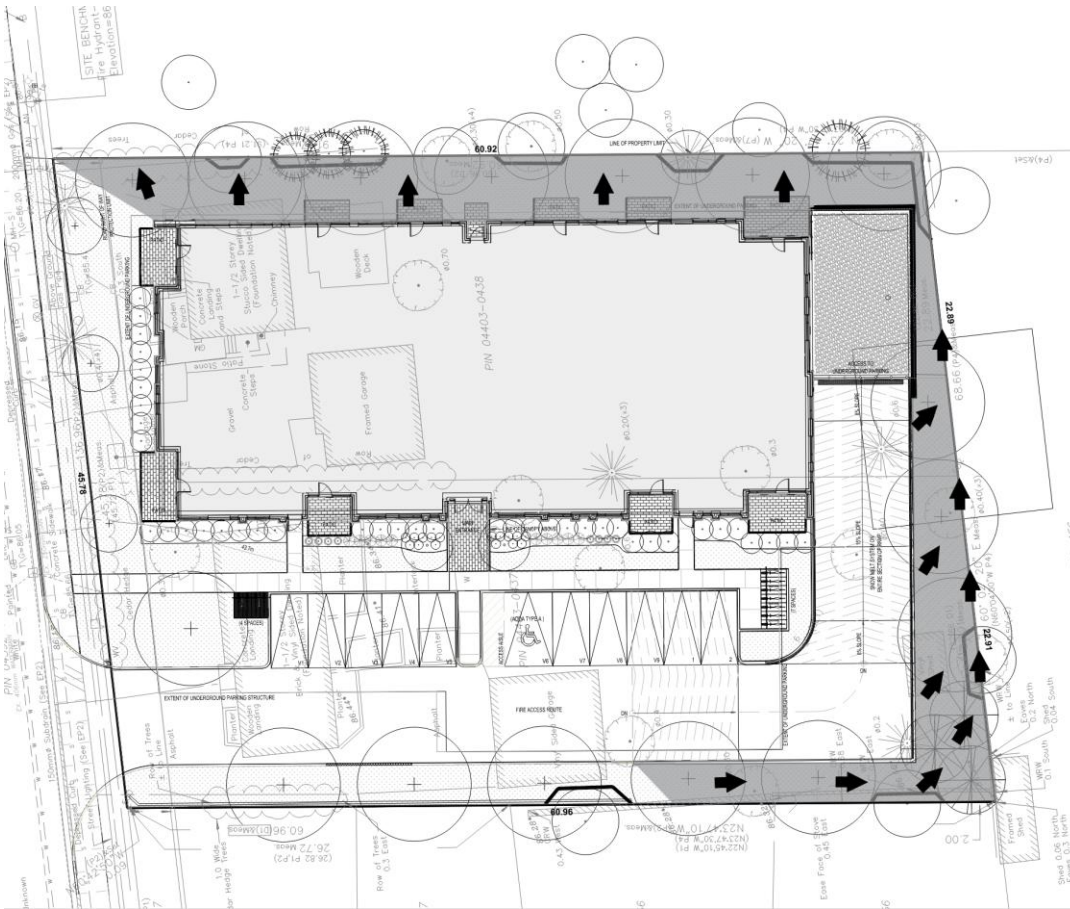
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3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m² to 2600 L/min/m²) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators**. However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.



DRAINAGE TO NE PROPERTY IN EXSITING CONDITIONS (APPROXIMATELY 0.24ha)



PROPOSED OVERLAND DRAINAGE TO NE PROPERTY IN POST DEVELOPMENT (APPROXIMATELY 0.045ha)

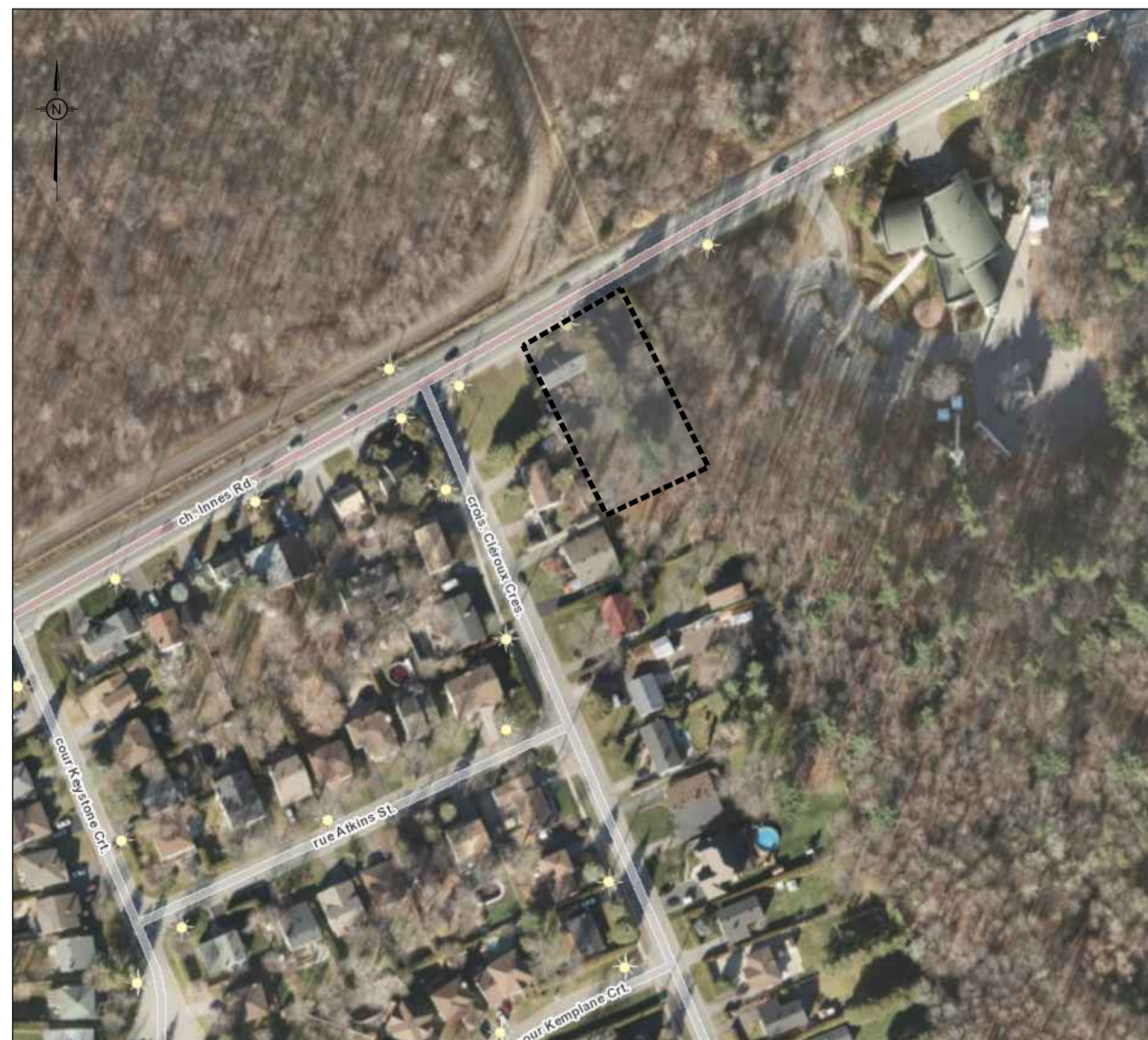
APPENDIX E

Civil Engineering Drawings



3040/3044 INNES ROAD

REVISION 03



KEY PLAN (N.T.S.)

DRAWING INDEX	
TITLE PAGE	
GENERAL NOTES	C001
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



LRJ

ENGINEERING | INGÉNIERIE

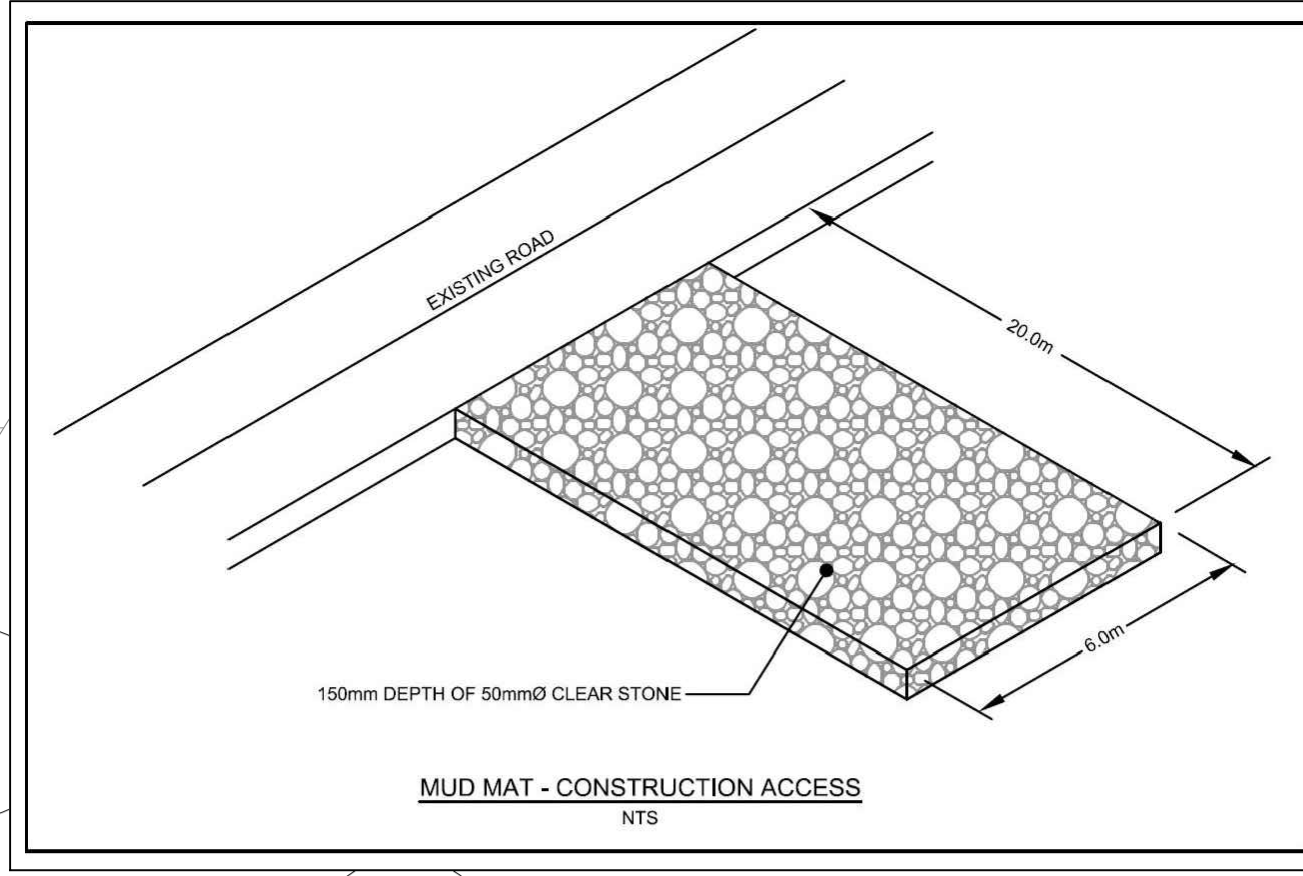
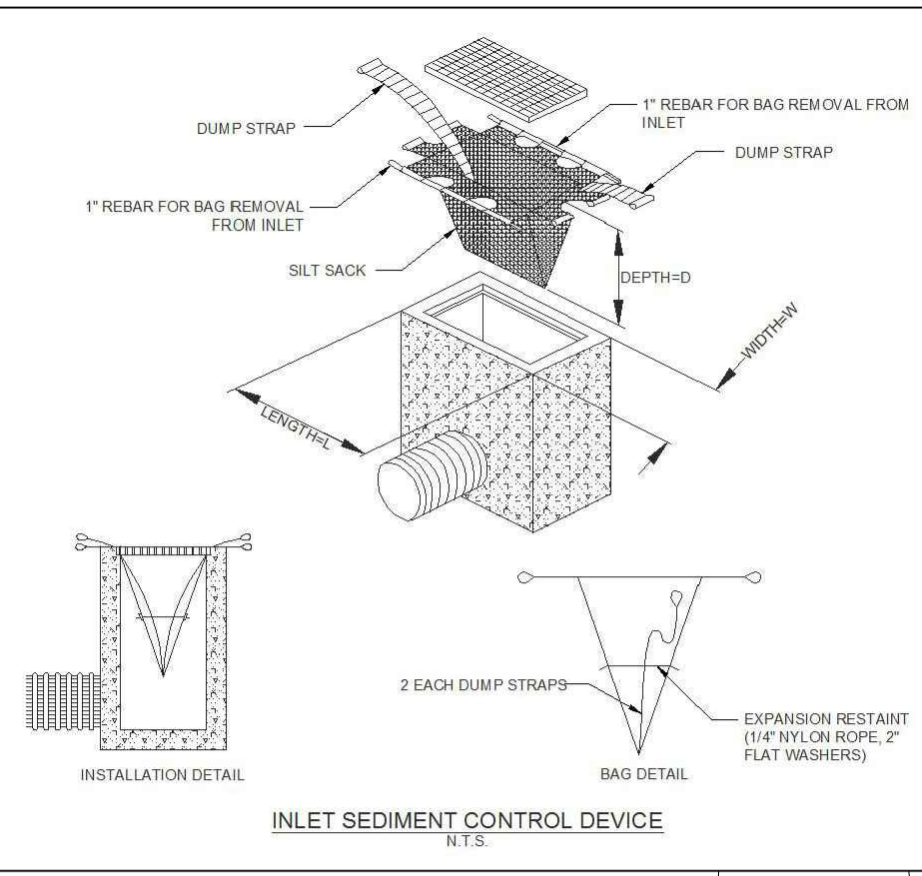
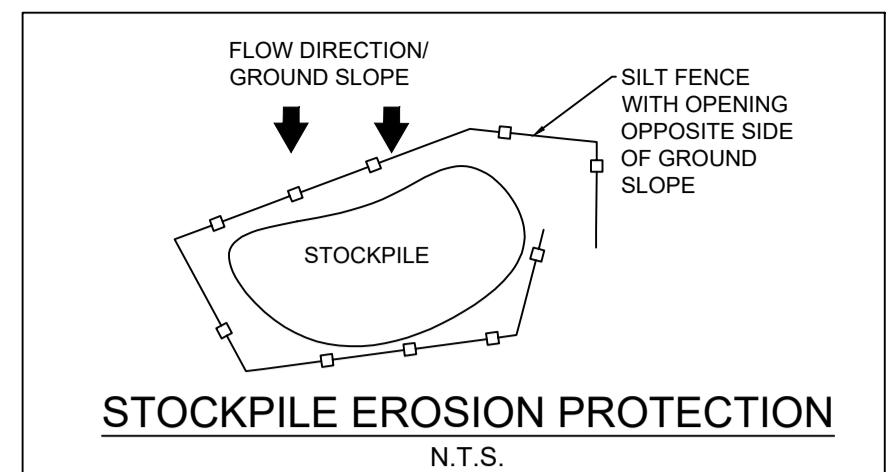
5430 Canotek Road | Ottawa, ON, K1J 9G2
www.lrl.ca | (613) 842-3434

3040/3044 INNES ROAD
REV.03 - REISSUED FOR APPROVAL - MARCH 09, 2023
LRL PROJECT no: 210374



NOT AUTHENTIC UNLESS SIGNED AND DATED

D07-12-22-0050



LEGEND:

	EXISTING PROPERTY LINE TO REMAIN
	PROPOSED CURB
	PROPOSED DEPRESSED CURB
	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 RIP RAP
	PROPOSED ELEVATION
	PROPOSED HIGH POINT ELEVATION
	PROPOSED SWALE ELEVATION
	PROPOSED BOTTOM OF CURB / ASPHALT ELEVATION
	PROPOSED TOP OF CURB ELEVATION
	PROPOSED EXPOSED BOTTOM OF RETAINING WALL
	PROPOSED TOP OF RETAINING WALL
	MATCH INTO EXISTING ELEVATION
	EXISTING ELEVATION
	PROPOSED OVERLAND MAJOR FLOW ROUTE
	PROPOSED 100mm PERFORATED SUBDRAIN
	PROPOSED STORM SEWER
	PROPOSED SANITARY SEWER
	PROPOSED WATERMAIN
	EXISTING STORM SEWER
	EXISTING SANITARY SEWER
	EXISTING WATERMAIN
	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
	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 REQUIRED BY ALL. WORK NOT COMPLETELY DELINEATED HEREON SHALL BE CONSTRUCTED OF THE SAME MATERIALS AND DETAIL SIMILAR TO 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, CAD FILES OR OTHER ELECTRONIC MEDIA AND COPIES 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 ILLUSTRATE 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 COSTS, INCLUDING REASONABLE ATTORNEY'S FEES AND COST OF DEFENSE, ARISING FROM SUCH CHANGES.

GENERAL NOTES:

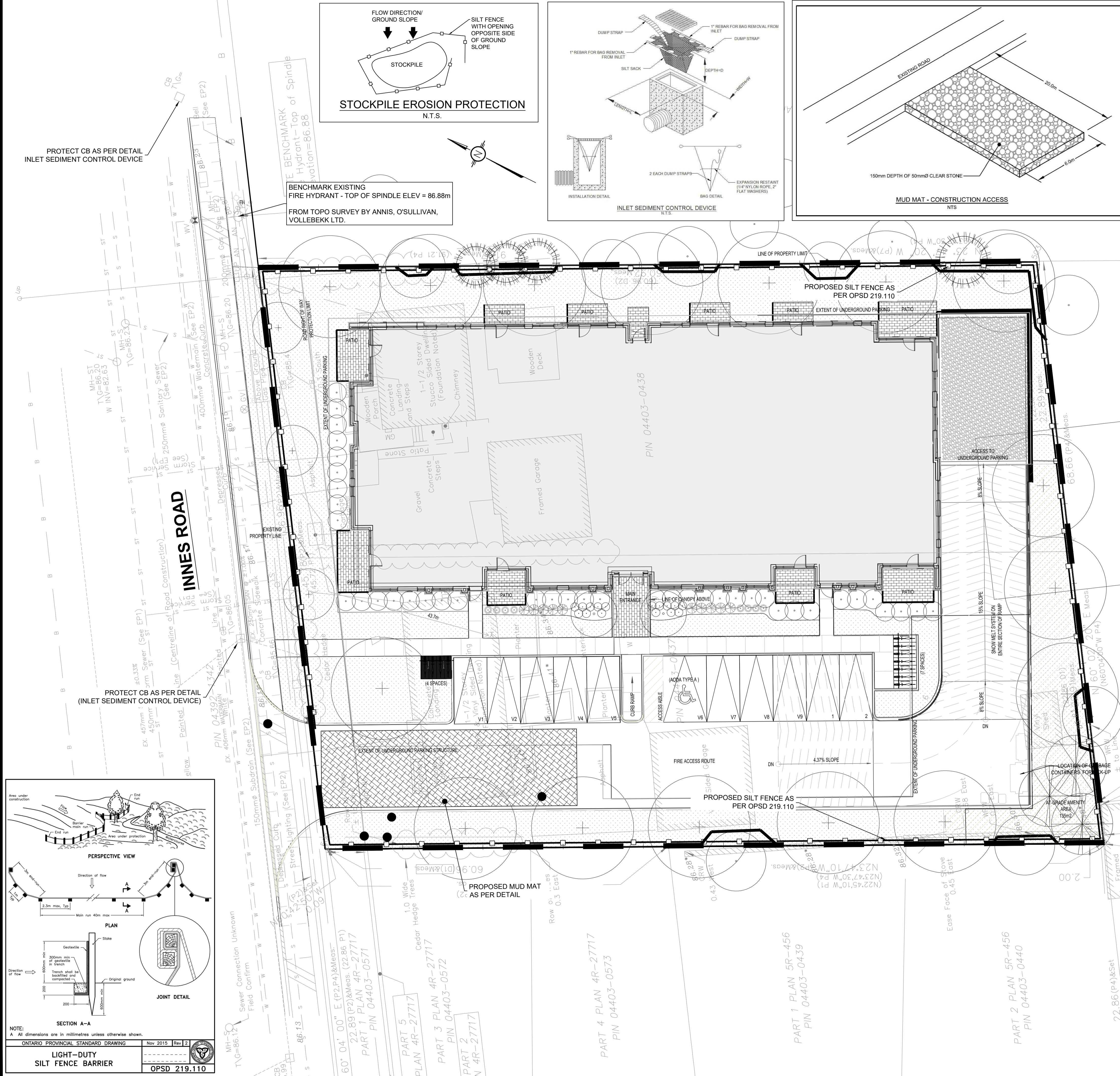
EXISTING SERVICES AND UTILITIES SHOWN ON THESE DRAWINGS ARE TAKEN FROM THE BEST AVAILABLE RECORDS, BUT MAY NOT BE COMPLETE OR TO DATE. CONTRACTOR SHALL VERIFY IN FIELD FOR LOCATION AND ELEVATION OF PIPES AND CHECK WITH THE UTILITY COMPANIES BEFORE DIGGING OR PERFORMING WORK.

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

THE ENGINEER WAIVES ANY AND ALL RESPONSIBILITY AND LIABILITY FOR PROBLEMS WHICH ARISE FROM FAILURE TO FOLLOW THESE PLANS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE, OR FOR PROBLEMS WHICH ARISE FROM OTHERS' FAILURE TO OBTAIN AND/OR FOLLOW THE ENGINEER'S GUIDANCE WITH RESPECT TO ANY ERRORS, OMISSIONS, INCONSISTENCIES, AMBIGUITIES OR CONFLICTS WHICH ARE ALLEGED.

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

3.0m 1.5m 0.0m 6.0m
SCALE: 1:150



EROSION AND SEDIMENT CONTROL MEASURES:

**** CONTRACTOR IS RESPONSIBLE FOR ALL INSTALLATION, MONITORING, REPAIR AND REMOVAL OF ALL EROSION AND SEDIMENT CONTROL FEATURES ****

**** THE SEDIMENT AND EROSION CONTROL MEASURES MAY BE MODIFIED IN THE FIELD AT THE DISCRETION OF THE CITY OF OTTAWA SITE INSPECTOR OR CONSERVATION AUTHORITY ****

1. PRIOR TO START OF CONSTRUCTION:

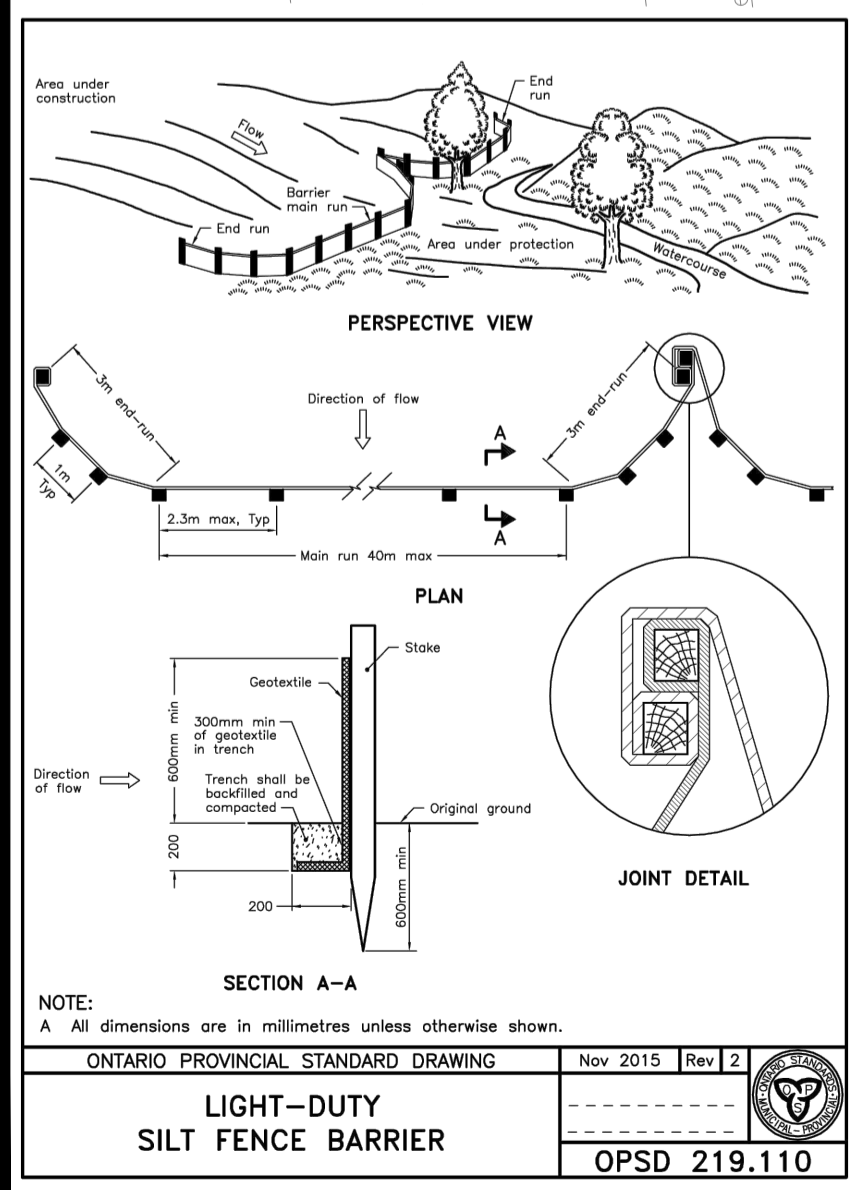
- PRIOR TO THE REMOVAL OF ANY VEGETATIVE COVER, MOVING OF SOIL, AND CONSTRUCTION:
- INSTALL SILT FENCE IMMEDIATELY DOWNSTREAM FROM AREAS TO BE DISTURBED (SEE PLAN FOR LOCATION)
- INSTALL GEOSOCK INSERTS WITH AN OVERFLOW IN ALL THE DOWNSTREAM CATCHBASINS AND MANHOLES
- INSTALL SILTSACK FILTERS IN ALL CONCRETE CATCH BASIN STRUCTURES
- INSPECT MEASURES IMMEDIATELY AFTER INSTALLATION.

2. DURING CONSTRUCTION:

- MINIMIZE THE EXTENT OF DISTURBED AREAS AND THE DURATION OF EXPOSURE
- PROTECT DISTURBED AREAS FROM RUNOFF.
- PROVIDE TEMPORARY COVER SUCH AS SEEDING OR MULCHING IF DISTURBED AREA WILL NOT BE REHABILITATED WITHIN 30 DAYS
- INSPECT SILT FENCES, FILTER CLOTHS AND CATCH BASIN SLUMPS WEEKLY AND AFTER EVERY MAJOR STORM EVENT. CLEAN AND REPAIR WHEN NECESSARY.
- PLAN TO BE REVIEWED AND REVISED AS REQUIRED DURING CONSTRUCTION
- EROSION CONTROL FENCING TO BE ALSO INSTALLED AROUND THE BASE OF ALL STOCKPILES
- DO NOT LOCATE TOPSOIL PILES AND EXCAVATION MATERIAL CLOSER THAN 2.5m FROM ANY PAVED SURFACE, OR ONE WHICH IS TO BE PAVED BEFORE THE PILE IS REMOVED. ALL TOPSOIL PILES ARE TO BE SEEDED IF THEY ARE TO REMAIN ON SITE LONG ENOUGH FOR SEEDS TO GROW LONGER THAN 30 DAYS.
- CONTROL WIND-BLOWN DUST OFF SITE TO ACCEPTABLE LEVELS BY SEEDING TOPSOIL PILES AND OTHER AREAS TEMPORARILY (PROVIDE WATERING AS REQUIRED)
- ALL EROSION CONTROL STRUCTURE TO REMAIN IN PLACE UNTIL ALL DISTURBED GROUND SURFACES HAVE BEEN STABILIZED EITHER BY PAVING OR RESTORATION OF VEGETATIVE GROUND COVER
- NO ALTERNATE METHODS OF EROSION PROTECTION SHALL BE PERMITTED UNLESS APPROVED BY THIS CONSULTING ENGINEER AND THE CITY DEPARTMENT OF PUBLIC WORKS
- CONTRACTOR RESPONSIBLE FOR CITY ROADWAY AND SIDEWALK TO BE CLEANED OF ALL SEDIMENT FROM VEHICULAR TRACKING ETC. AT THE END OF EACH WORK DAY.
- PROVIDE GRAVEL ENTRANCE WHEREVER EQUIPMENT LEAVES THE SITE TO PREVENT MUD TRACKING ONTO PAVED SURFACES. GRAVEL BED SHALL BE A MINIMUM OF 15m LONG, 4M WIDE AND 0.3m DEEP AND SHALL CONSIST OF COARSE (50mm CRUSHER-RUN LIMESTONE) MATERIAL. MAINTAIN GRAVEL ENTRANCE IN CLEAN CONDITION
- DURING WET CONDITIONS, TIRES OF ALL VEHICLES/EQUIPMENT LEAVING THE SITE ARE TO BE SCRAPPED.
- ANY MUD/MATERIAL TRACKED onto the ROAD SHALL BE REMOVED IMMEDIATELY BY HAND OR RUBBER TIRE LOADER
- TAKE ALL NECESSARY STEPS TO PREVENT BUILDING MATERIAL, CONSTRUCTION DEBRIS OR WASTE BEING SPILLED OR TRACKED ONTO ADJUTING PROPERTIES OR PUBLIC STREETS DURING CONSTRUCTION AND PROCCEED IMMEDIATELY TO CLEAN UP ANY AREAS SO AFFECTED.

3. AFTER CONSTRUCTION:

- PROVIDE PERMANENT COVER CONSISTING OF TOPSOIL AND SEED TO DISTURBED AREAS.
- REMOVE STRAW BALE FLOW CHECK DAMS, SILT FENCES AND FILTER CLOTHS ON CATCH BASINS AND MANHOLE COVERS AFTER DISTURBED AREAS HAVE BEEN REHABILITATED AND STABILIZED.
- INSPECT AND CLEAN CATCH BASIN SLUMPS AND STORM SEWERS.



No.	REVISIONS	BY	DATE
03	RE-ISSUED FOR MUNICIPAL APPROVAL	T.H.	09 MAR 2023
02	RE-ISSUED FOR MUNICIPAL APPROVAL	T.H.	21 NOV 2022
01	ISSUED FOR MUNICIPAL APPROVAL	A.S.	03 MAR 2022

NOT AUTHENTIC UNLESS SIGNED AND DATED

L.R.I.
ENGINEERING | INGENIERIE
5430 Canotek Road | Ottawa, ON, K1J 9G2
www.lrl.ca | (613) 842-3434

CLIENT: **LANDRIC HOMES INC.**

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

PROJECT: **PROPOSED 42 UNITS RESIDENTIAL DEVELOPMENTS**
3040-3044 INNES RD, OTTAWA ON

DRAWING TITLE: **EROSION AND SEDIMENT CONTROL PLAN**

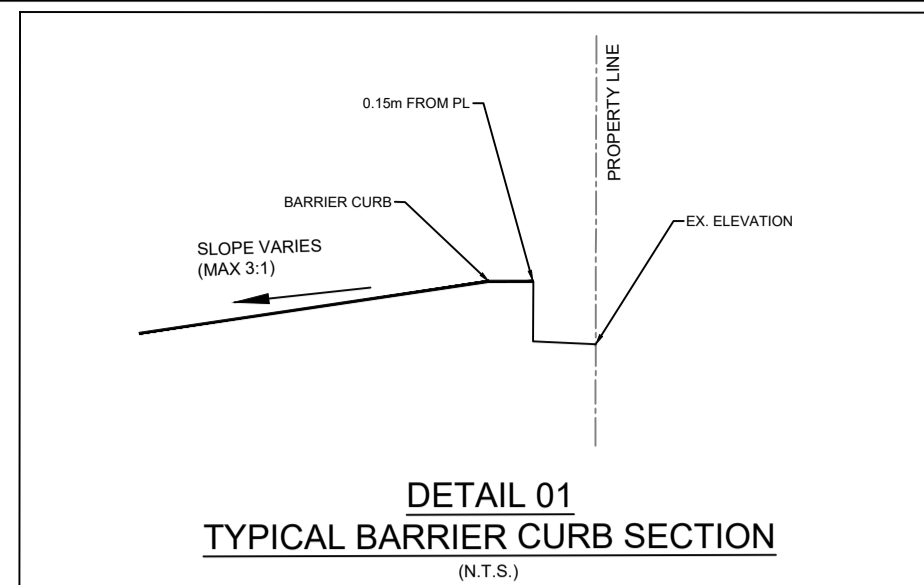
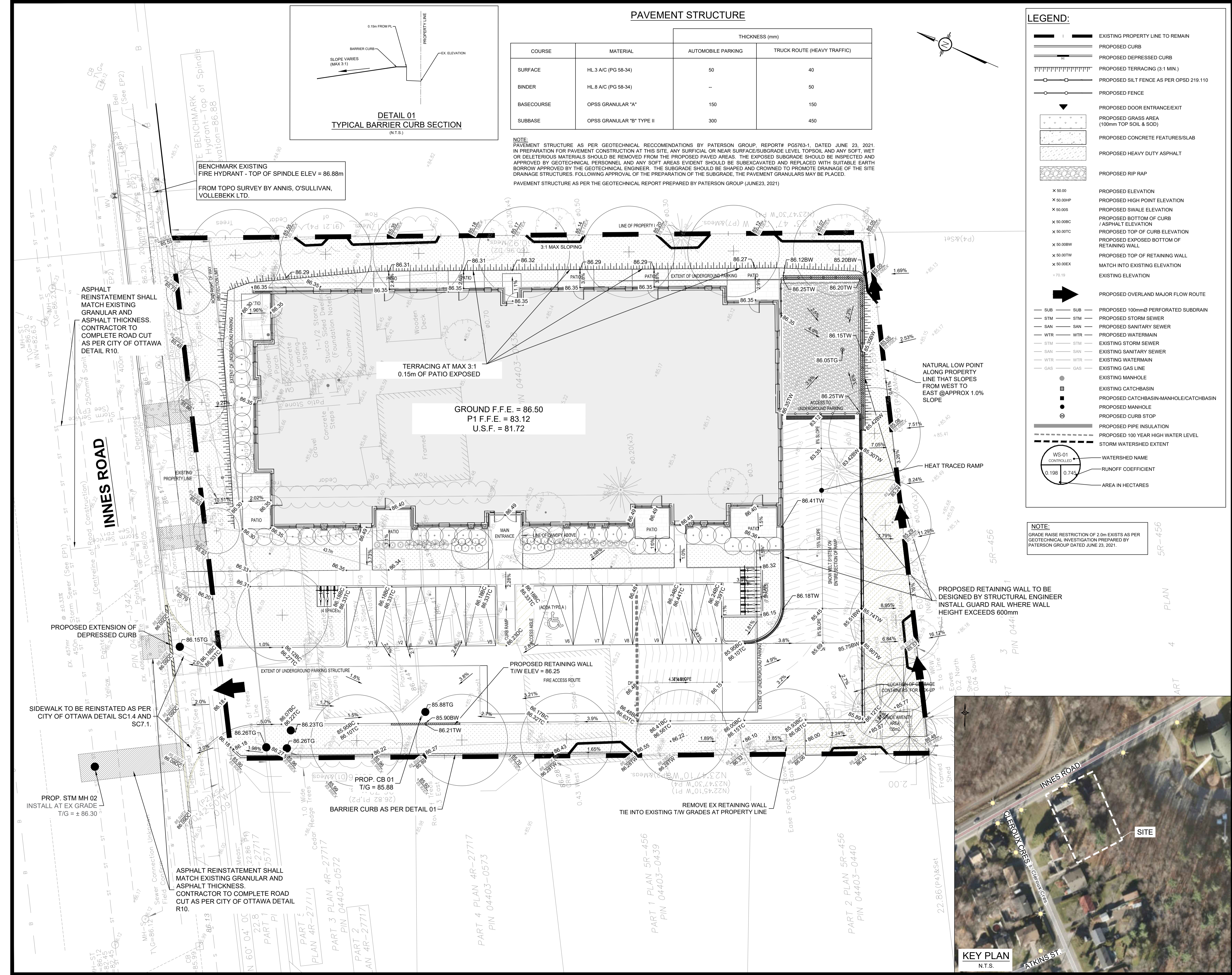
PROJECT NO: 210374
DATE: MARCH, 2023

C101

NOTE:
A. All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING Nov 2015 151 Rev 2

LIGHT-DUTY SILT FENCE BARRIER OPSD 219.110



PAVEMENT STRUCTURE

COURSE	MATERIAL	THICKNESS (mm)	
		AUTOMOBILE PARKING	TRUCK ROUTE (HEAVY TRAFFIC)
SURFACE	HL 3 A/C (PG 58-34)	50	40
BINDER	HL 8 A/C (PG 58-34)	-	50
BASECOURSE	OPSS GRANULAR "A"	150	150
SUBBASE	OPSS GRANULAR "B" TYPE II	300	450

NOTE: PAVEMENT STRUCTURE AS PER GEOTECHNICAL RECOMMENDATIONS BY PATERSON GROUP, REPORT# PG5763-1, DATED JUNE 23, 2021. 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 SUBCAVATED 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.

PAVEMENT STRUCTURE AS PER THE GEOTECHNICAL REPORT PREPARED BY PATERSON GROUP (JUNE 23, 2021)

LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
- PROPOSED CURB
- PROPOSED DEPRESSED CURB
- PROPOSED TERRACING (3:1 MIN.)
- PROPOSED SILT FENCE AS PER OPSD 219.110
- PROPOSED FENCE
- PROPOSED DOOR ENTRANCE/EXIST
- PROPOSED GRASS AREA (100mm TOP SOIL & SOD)
- PROPOSED CONCRETE FEATURES/SLAB
- PROPOSED HEAVY DUTY ASPHALT
- PROPOSED RIP RAP
- PROPOSED ELEVATION
- PROPOSED HIGH POINT ELEVATION
- PROPOSED SWALE ELEVATION
- PROPOSED BOTTOM OF CURB / ASPHALT ELEVATION
- PROPOSED TOP OF CURB ELEVATION
- PROPOSED EXPOSED BOTTOM OF RETAINING WALL
- PROPOSED TOP OF RETAINING WALL
- MATCH INTO EXISTING ELEVATION
- EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- PROPOSED 100mmØ PERFORATED SUBDRAIN
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED WATERMAIN
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- EXISTING GAS LINE
- EXISTING MANHOLE
- PROPOSED CATCHBASIN/MANHOLE/CATCHBASIN
- PROPOSED MANHOLE
- PROPOSED CURB STOP
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WATERSHED NAME
- RUNOFF COEFFICIENT
- AREA IN HECTARES

NOTE: GRADE RAISE RESTRICTION OF 2.0m EXISTS AS PER GEOTECHNICAL INVESTIGATION PREPARED BY PATERSON GROUP DATED JUNE 23, 2021.

USE AND INTERPRETATION OF DRAWINGS

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SCALE: 1:150

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LRI
ENGINEERING | INGENIERIE
5430 Canotek Road | Ottawa, ON, K1J 9G2
www.lri.ca | (613) 842-3434

CLIENT: **LANDRIC HOMES INC.**

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

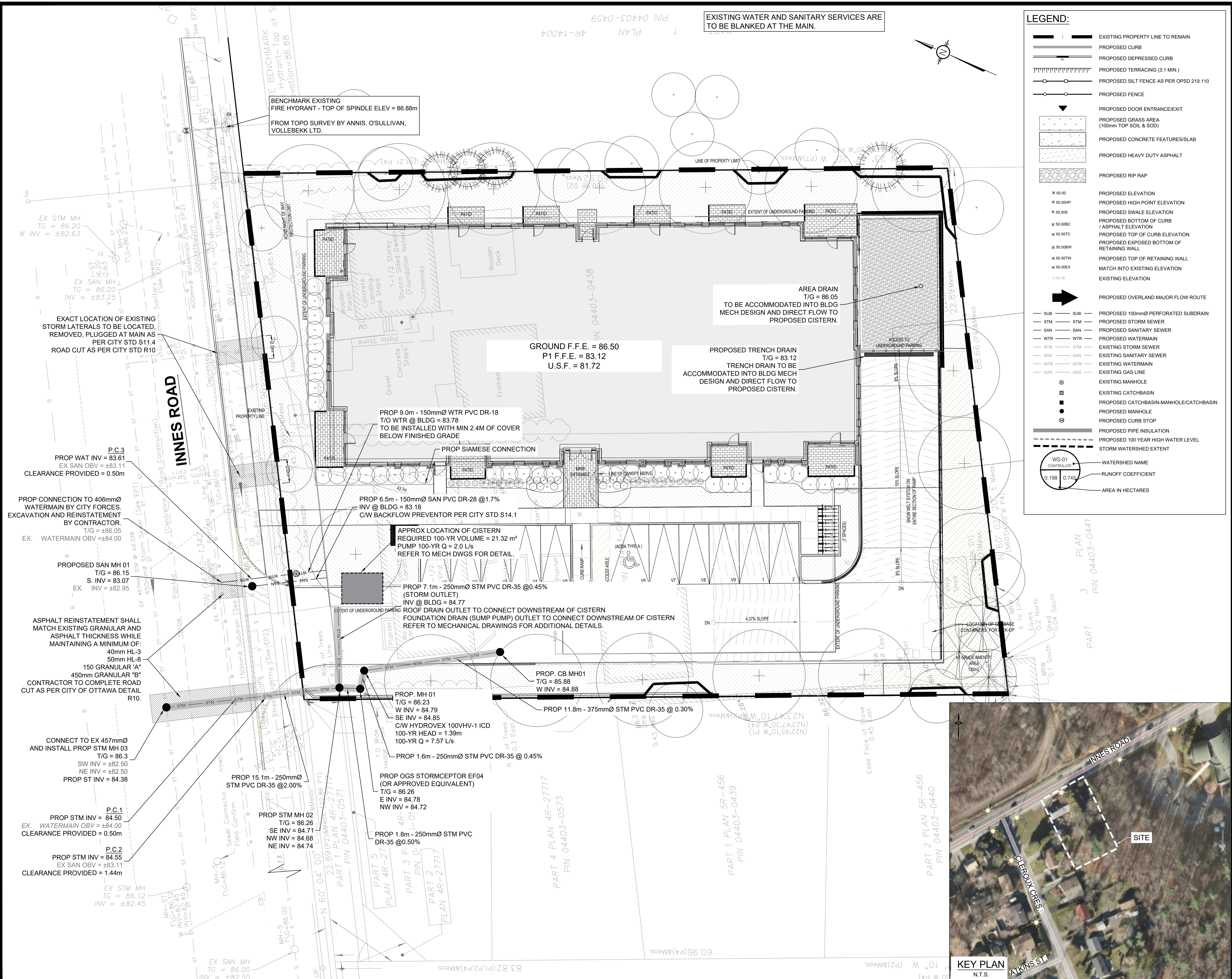
PROJECT: **PROPOSED 42 UNITS RESIDENTIAL DEVELOPMENTS 3040-3044 INNES RD, OTTAWA ON**

DRAWING TITLE: **GRADING AND DRAINAGE PLAN**

PROJECT NO: 210374 DATE: MARCH, 2023

C301





EXISTING WATER AND SANITARY SERVICES ARE TO BE BLANKED AT THE MAIN.

LEGEND:

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- PROPOSED DEPRESSIONED CURB
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- PROPOSED SILT FENCE AS PER OPD 219.110
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- MATCH INTO EXISTING ELEVATION
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- EXISTING GAS LINE
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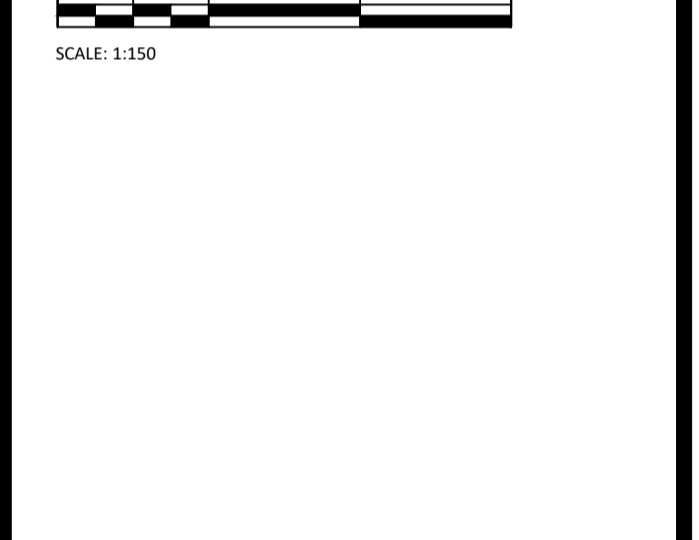
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NOT AUTHENTIC UNLESS SIGNED AND DATED

LRL
ENGINEERING | INGENIERIE
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www.lrl.ca | (613) 842-3434

CLIENT
LANDRIC HOMES INC.

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

PROJECT
PROPOSED 42 UNITS RESIDENTIAL DEVELOPMENTS
3040-3044 INNES RD, OTTAWA ON

DRAWING TITLE
SERVICING PLAN

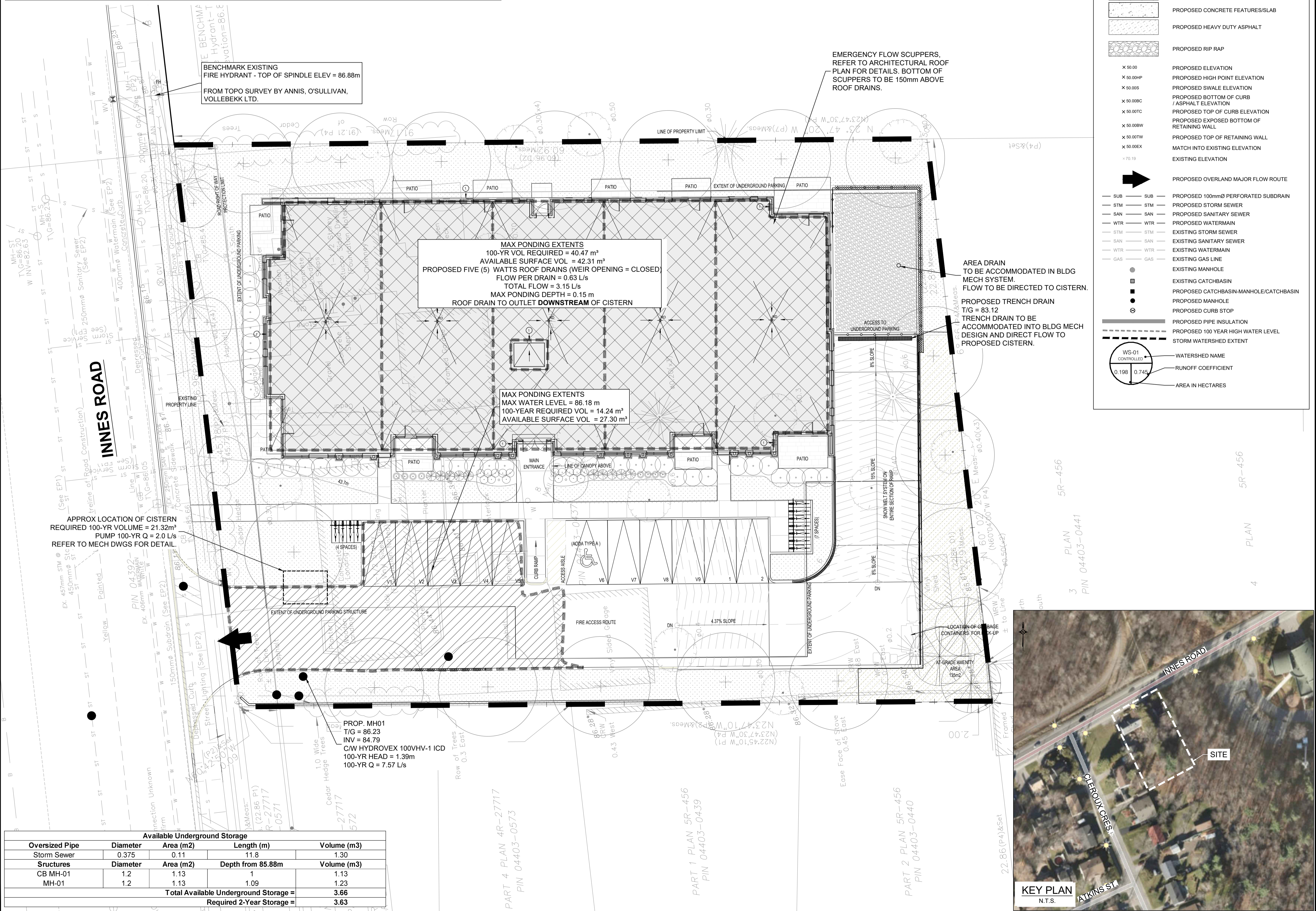
PROJECT NO. 210374
DATE MARCH, 2023

C401

KEY PLAN N.T.S.

D07-12-22-0050

SUMMARY OF RELEASE RATES AND STORAGE VOLUMES				
Catchment Area	Drainage Area (ha)	100-year Release Rate (L/s)	100-Year Required Storage (m3)	Total Available Storage (m3)
WS-01 & WS-05 (Un-Controlled)	0.065	9.78	0	0
WS-02 (Roof Controls)	0.092	3.15	40.47	42.31
WS-03 (ICD)	0.069	7.57	13.70	27.30
WS-04 (Cistern)	0.051	2.00	21.32	22.00
TOTAL	0.277	22.50	75.49	91.61



Available Underground Storage				
Oversized Pipe	Diameter	Area (m2)	Length (m)	Volume (m3)
Storm Sewer	0.375	0.11	11.8	1.30
Structures	Diameter	Area (m2)	Depth from 85.88m	Volume (m3)
CB MH-01	1.2	1.13	1	1.13
MH-01	1.2	1.13	1.09	1.23
Total Available Underground Storage =				3.66
Required 2-Year Storage =				3.63

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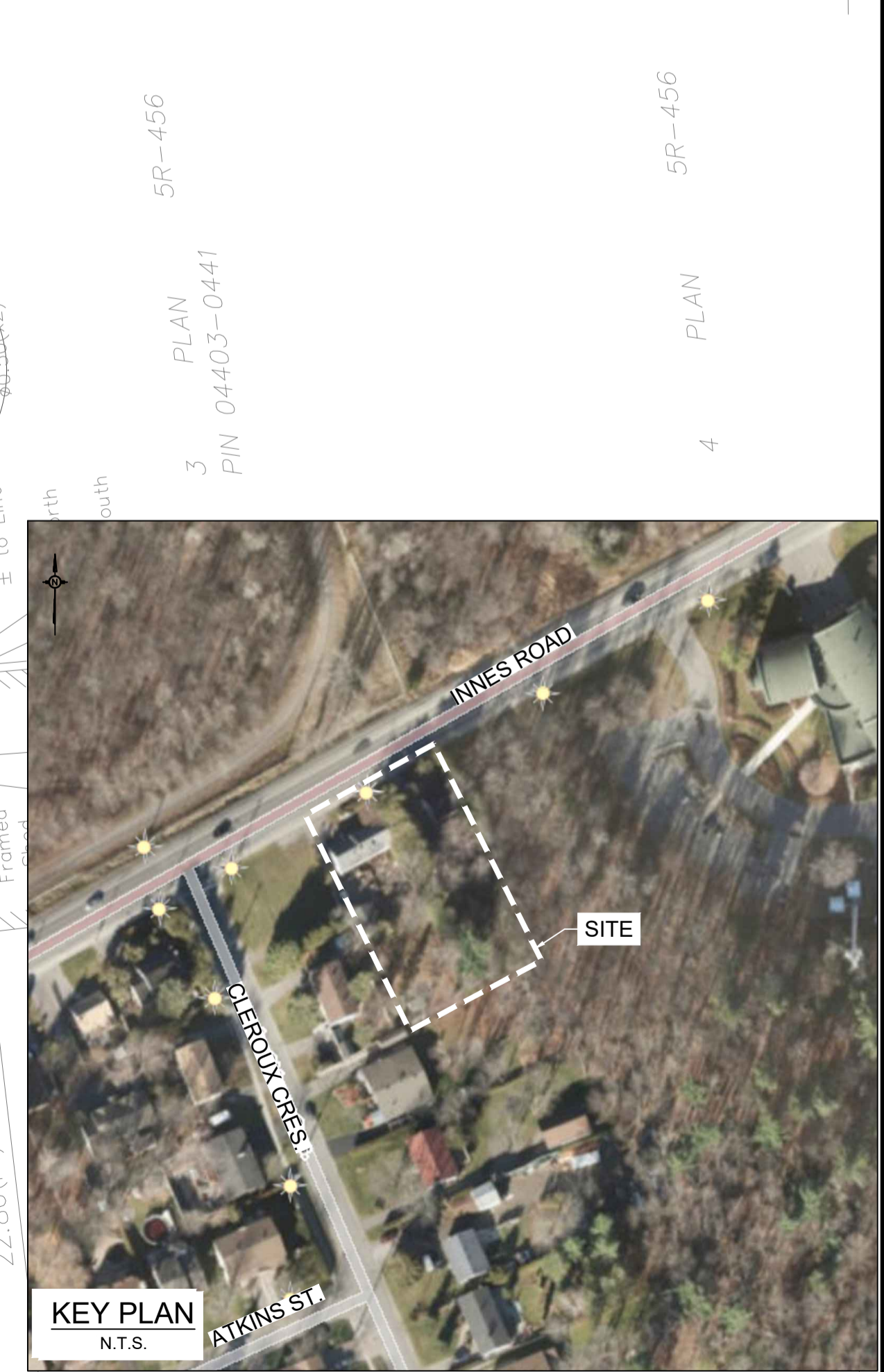
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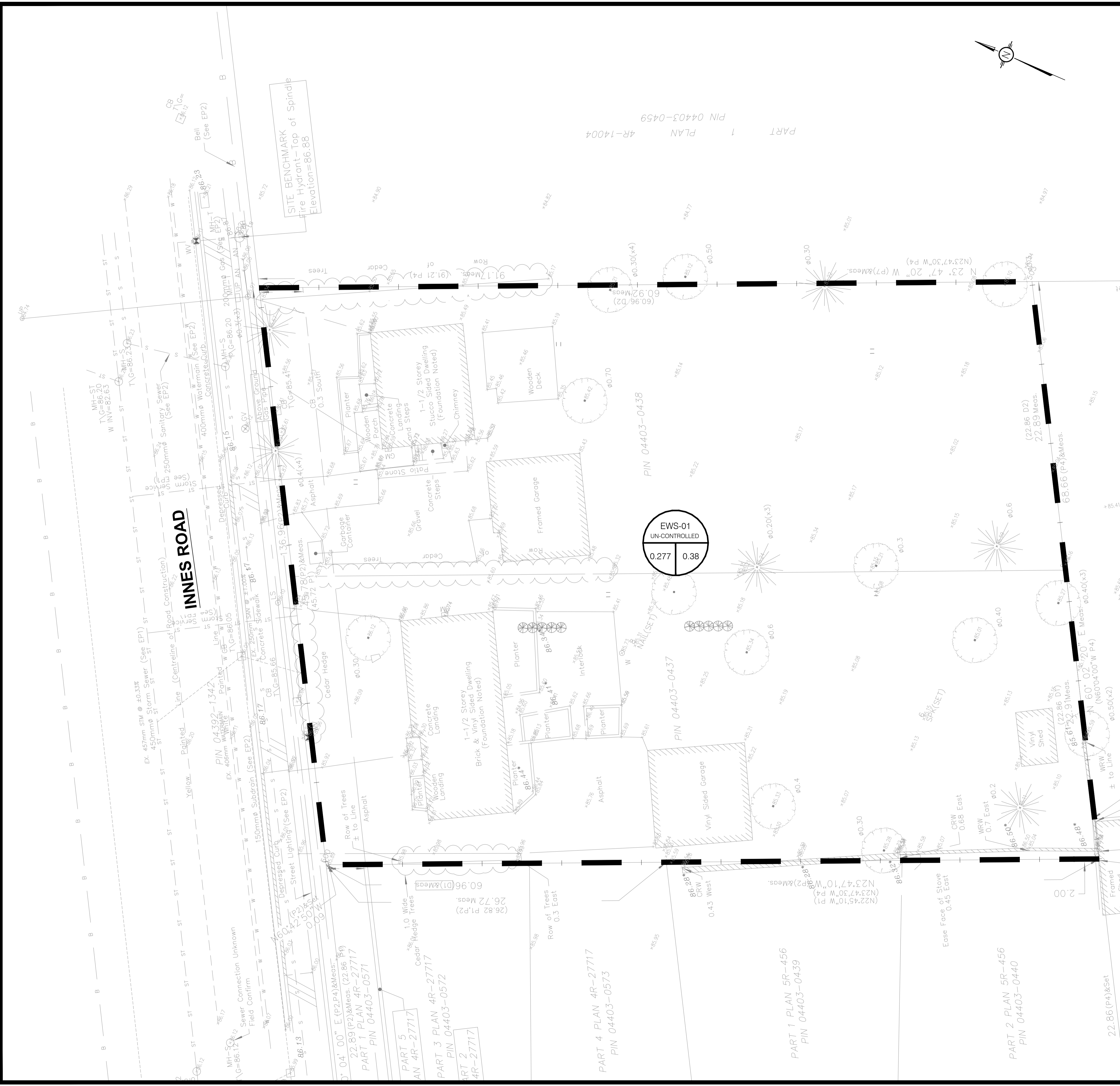
DESIGNED BY: T.H. DRAWN BY: A.O. APPROVED BY: M.B.

PROJECT: **PROPOSED 42 UNITS RESIDENTIAL DEVELOPMENTS**
 3040-3044 INNES RD, OTTAWA ON

DRAWING TITLE: **STORMWATER MANAGEMENT PLAN**

PROJECT NO: 210374
 DATE: MARCH, 2023

C601



LEGEND:

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www.lri.ca | (613) 842-3434

CLIENT: LANDRIC HOMES INC.

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

PROJECT: PROPOSED 42 UNITS RESIDENTIAL DEVELOPMENTS 3040-3044 INNES RD, OTTAWA ON

DRAWING TITLE: PRE-DEVELOPMENT WATERSHED PLAN

PROJECT NO: 210374

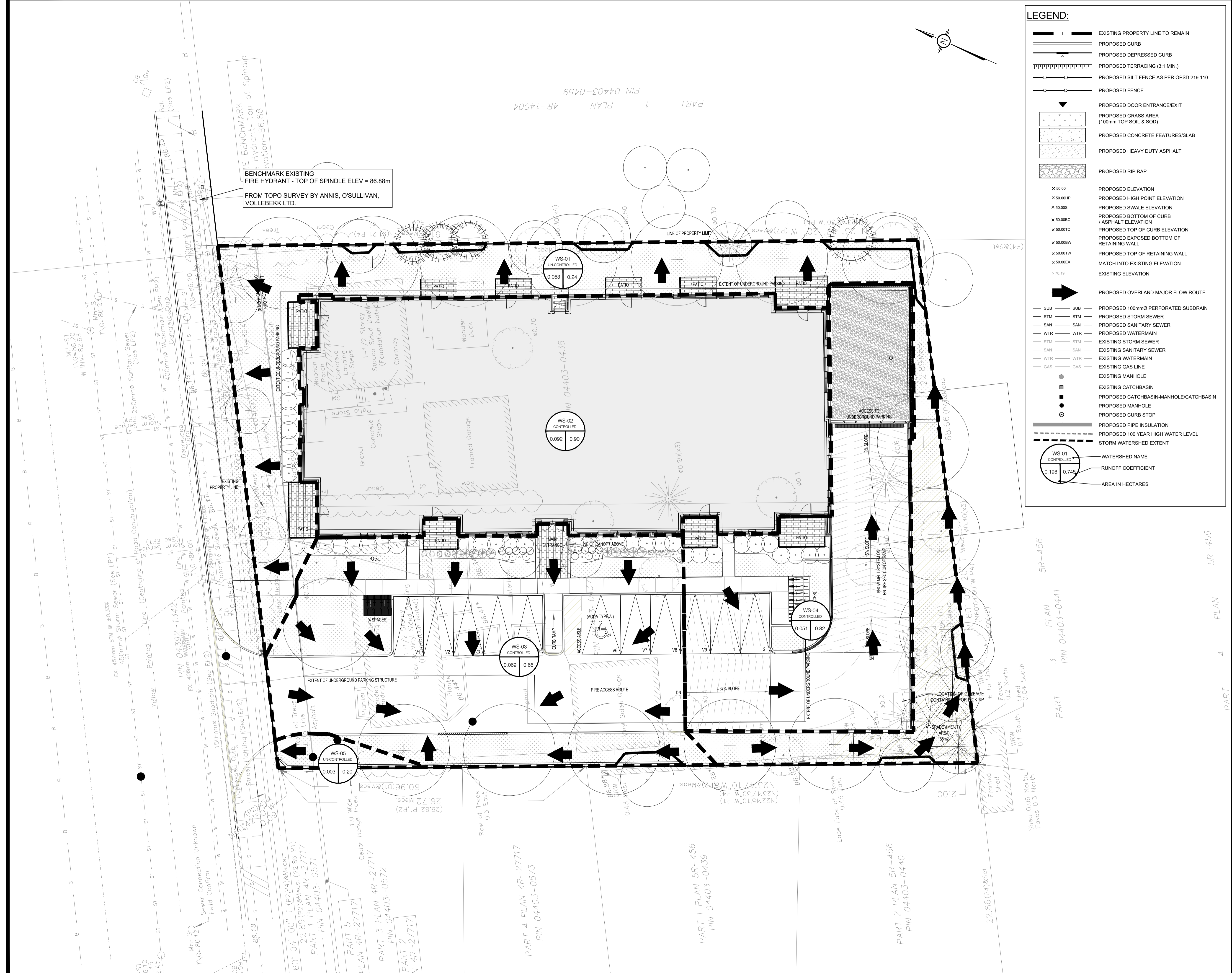
DATE: MARCH, 2023

C701

NOT AUTHENTIC UNLESS SIGNED AND DATED

PROVINCE OF ONTARIO

18716



LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
- PROPOSED CURB
- PROPOSED DEPRESSED CURB
- PROPOSED TERRACING (3:1 MIN.)
- PROPOSED SILT FENCE AS PER PSD 219.110
- PROPOSED FENCE
- PROPOSED DOOR ENTRANCE/EXIST
- PROPOSED GRASS AREA (100mm TOP SOIL & SOD)
- PROPOSED CONCRETE FEATURES/SLAB
- PROPOSED HEAVY DUTY ASPHALT
- PROPOSED RIP RAP
- PROPOSED ELEVATION
- PROPOSED HIGH POINT ELEVATION
- PROPOSED SWALE ELEVATION
- PROPOSED BOTTOM OF CURB / ASPHALT ELEVATION
- PROPOSED TOP OF CURB ELEVATION
- PROPOSED EXPOSED BOTTOM OF RETAINING WALL
- PROPOSED TOP OF RETAINING WALL
- MATCH INTO EXISTING ELEVATION
- EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- PROPOSED 100mmØ PERFORATED SUBDRAIN
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED WATERMAIN
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- 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
- 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 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.

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UNAUTHORIZED CHANGES:

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3.0m 1.5 0 3.0 6.0m
SCALE: 1:150

No.	REVISIONS	BY	DATE
03	RE-ISSUED FOR MUNICIPAL APPROVAL	T.H.	09 MAR 2023
02	RE-ISSUED FOR MUNICIPAL APPROVAL	T.H.	21 NOV 2022
01	ISSUED FOR MUNICIPAL APPROVAL	A.S.	03 MAR 2022



NOT AUTHENTIC UNLESS SIGNED AND DATED

LRJ
ENGINEERING | INGENIERIE
5430 Canotek Road | Ottawa, ON, K1J 9G2
www.lri.ca | (613) 842-3434

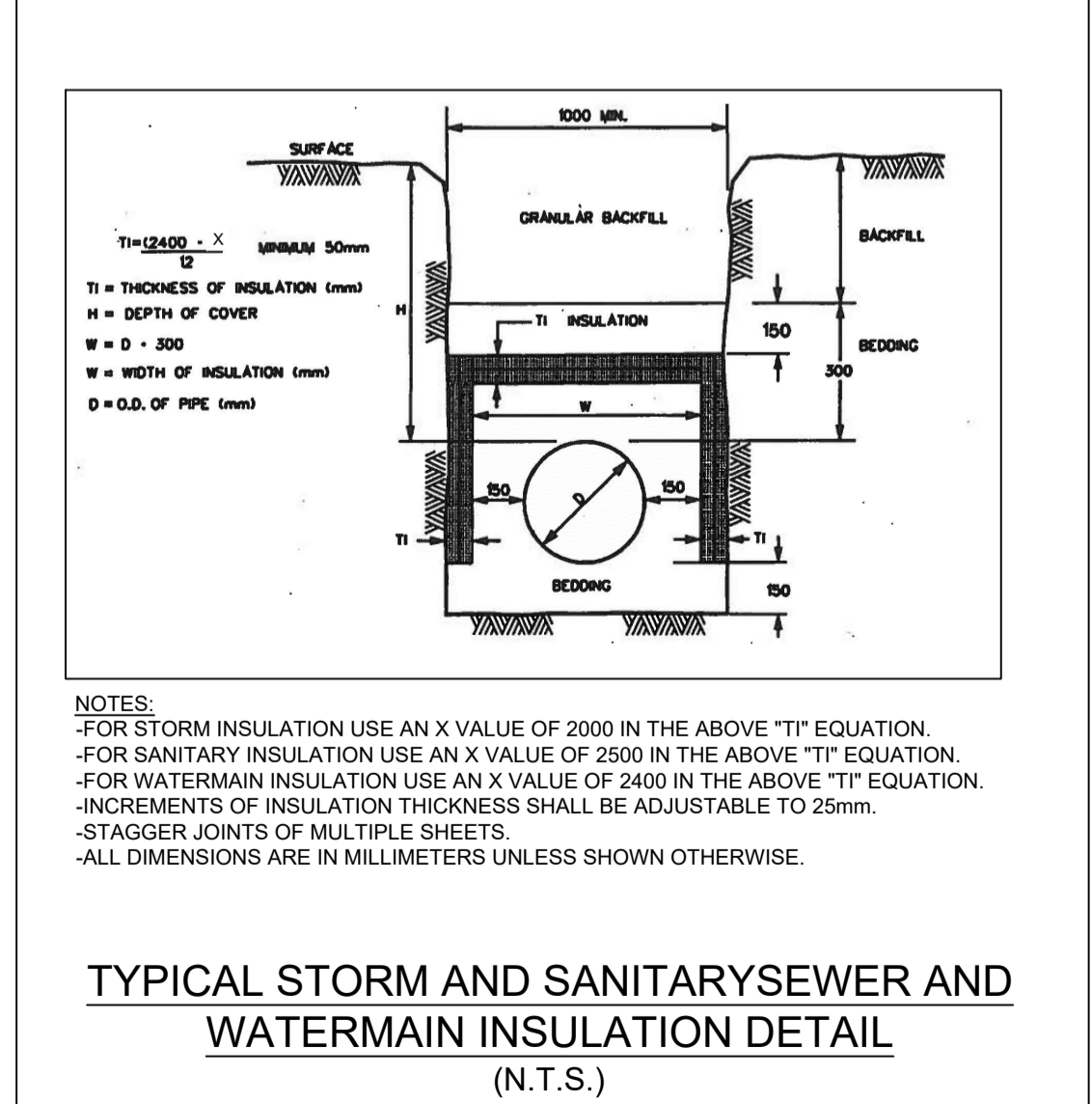
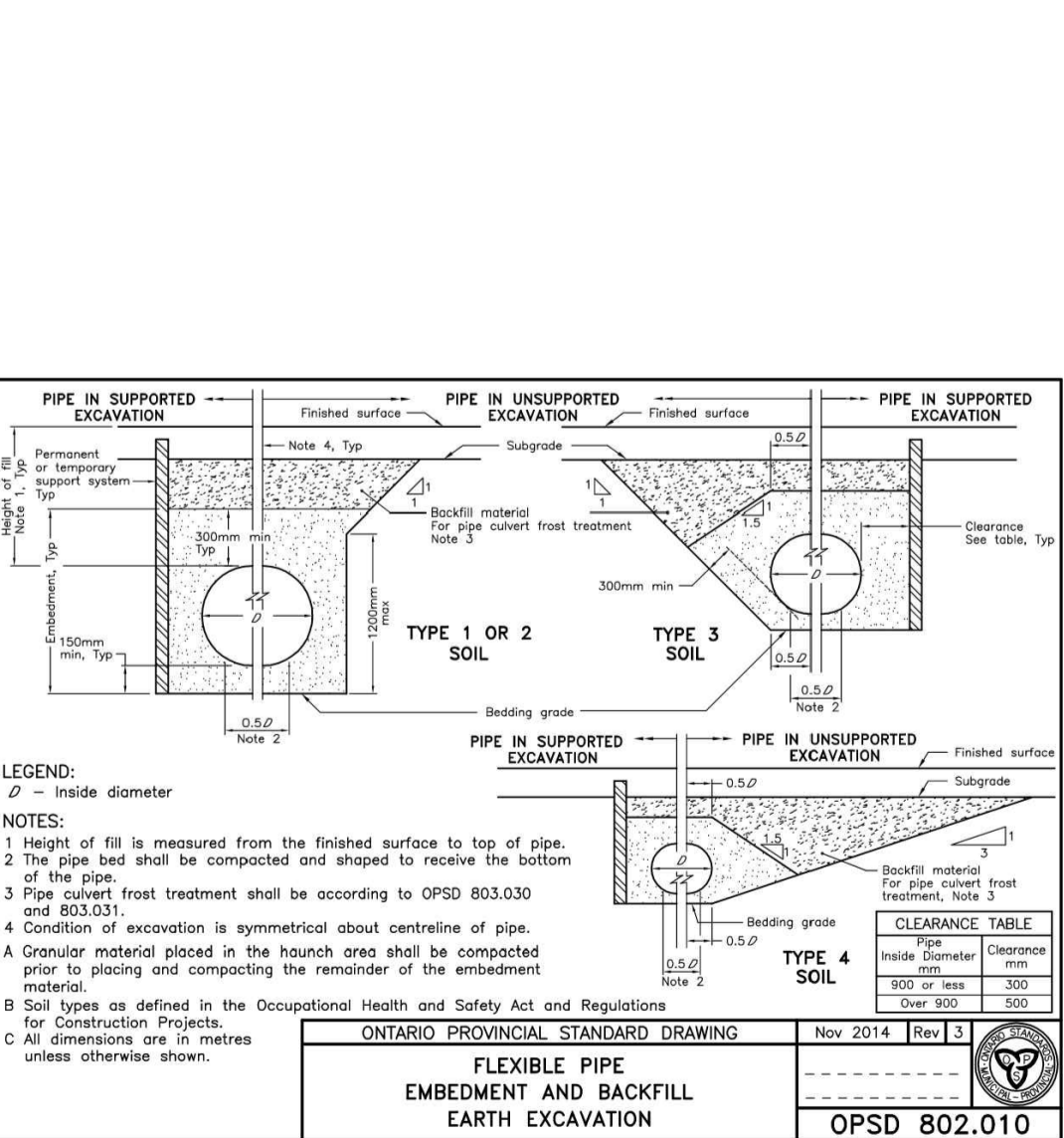
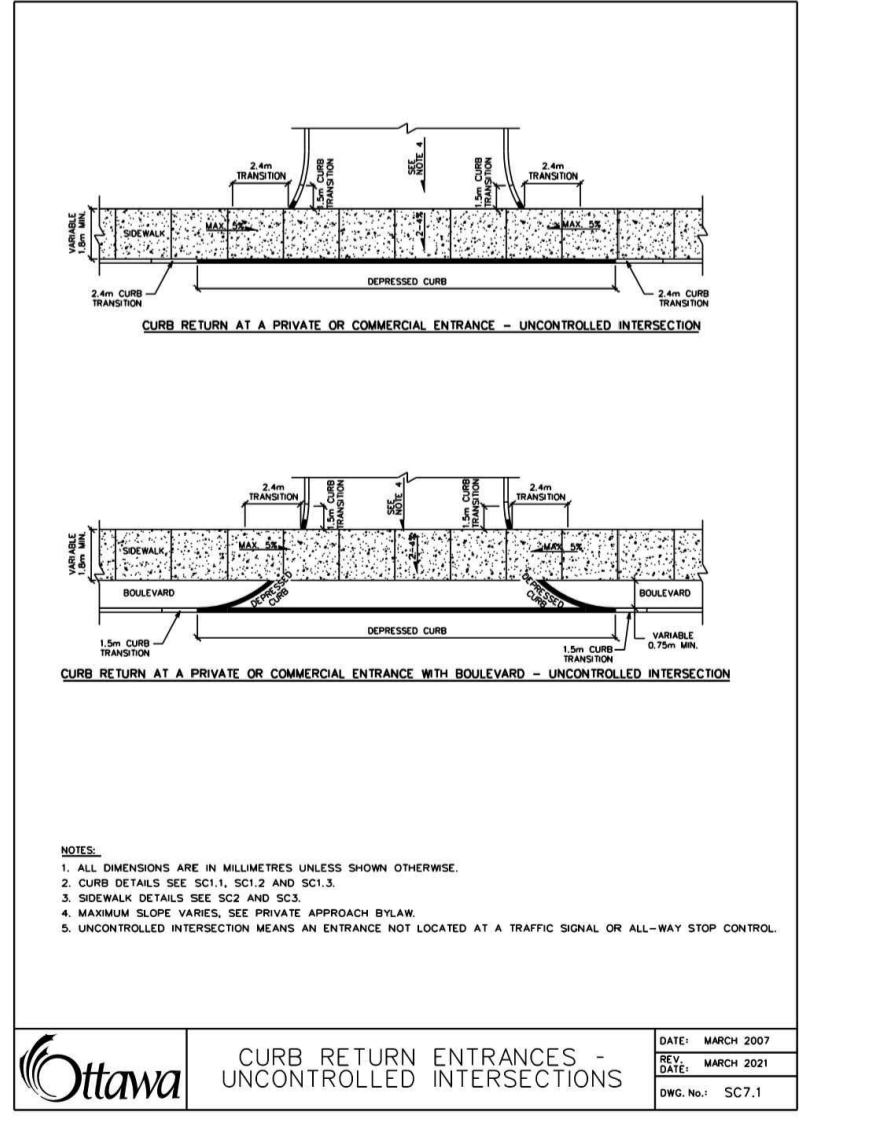
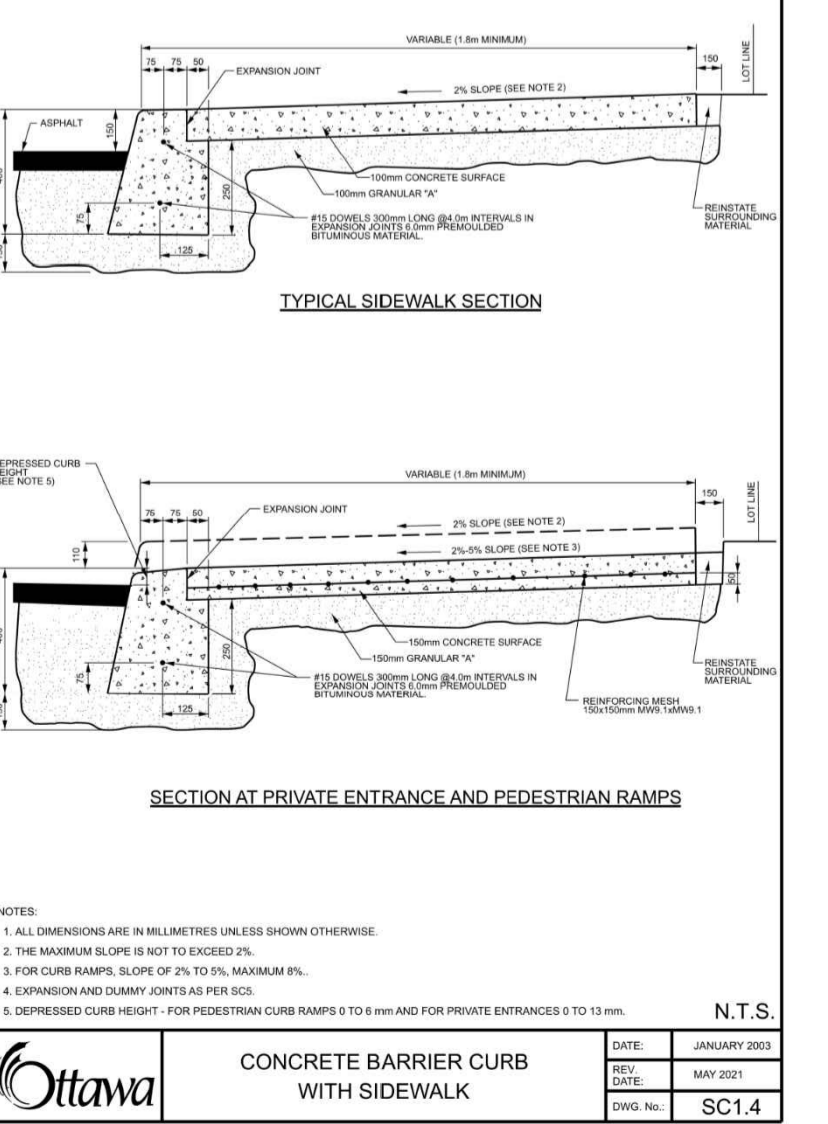
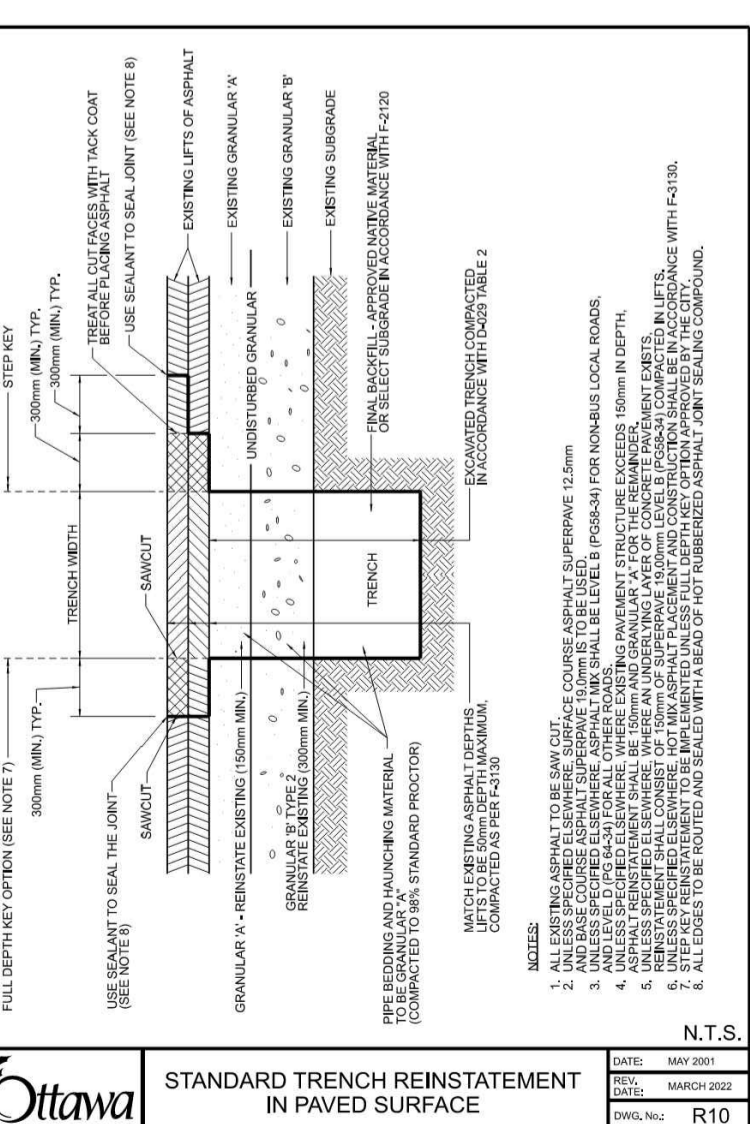
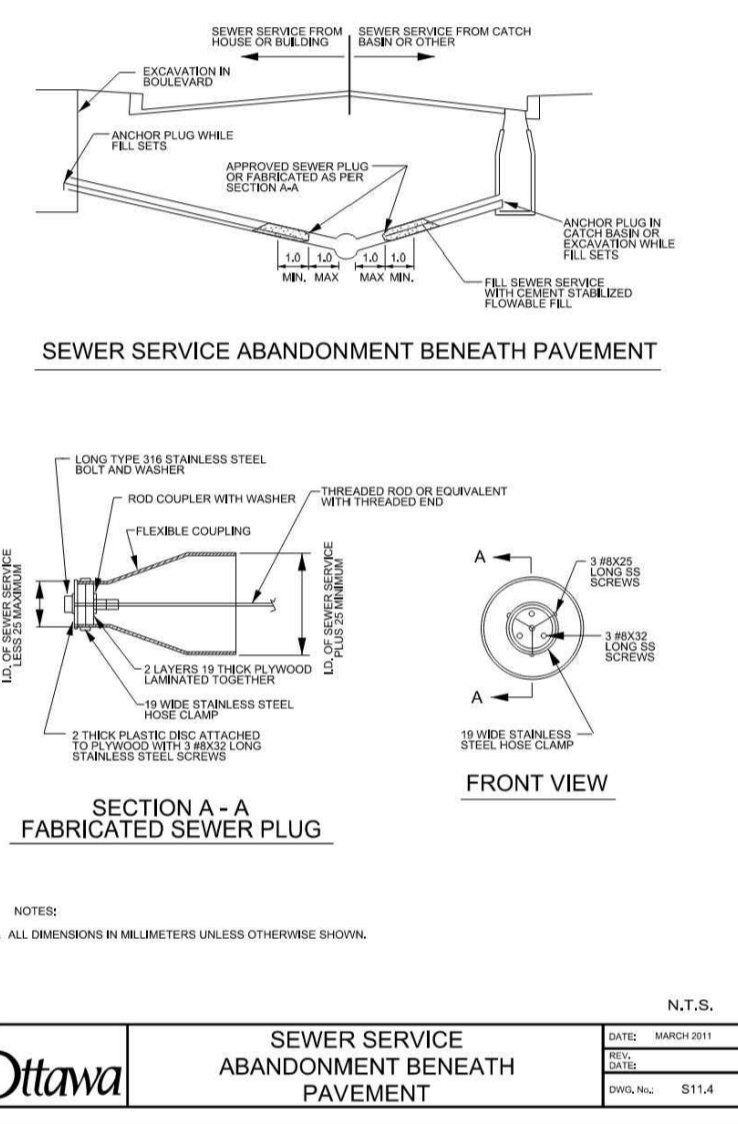
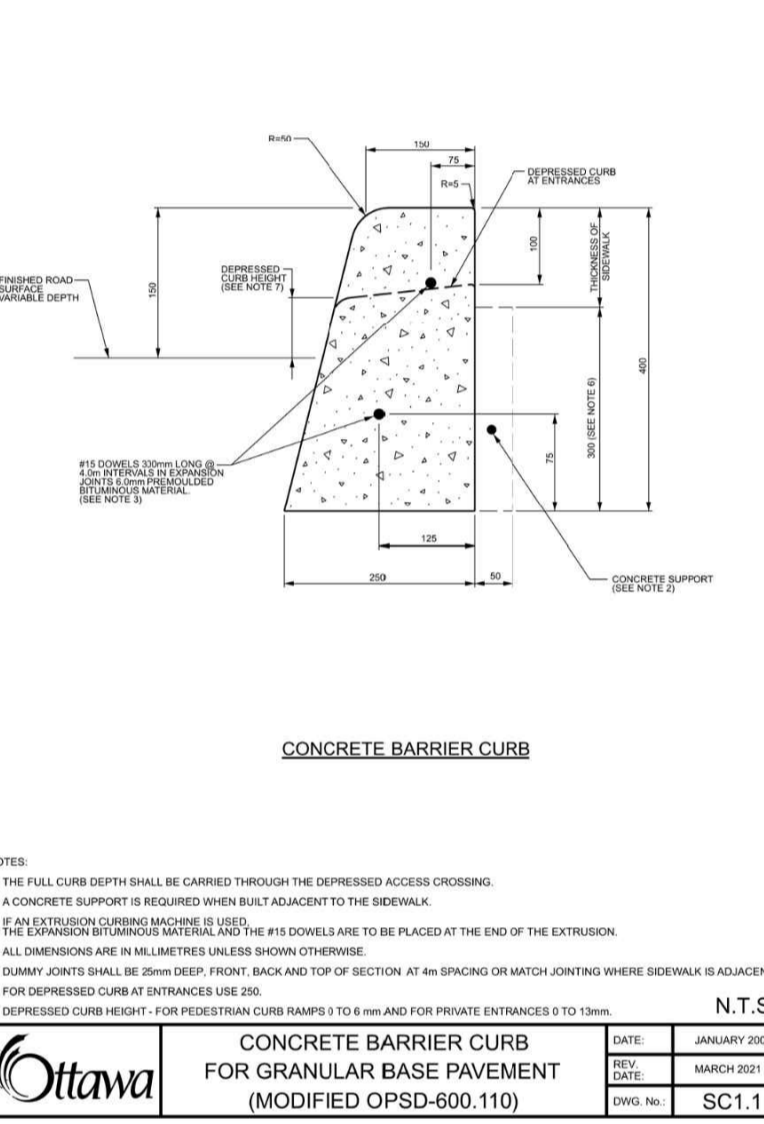
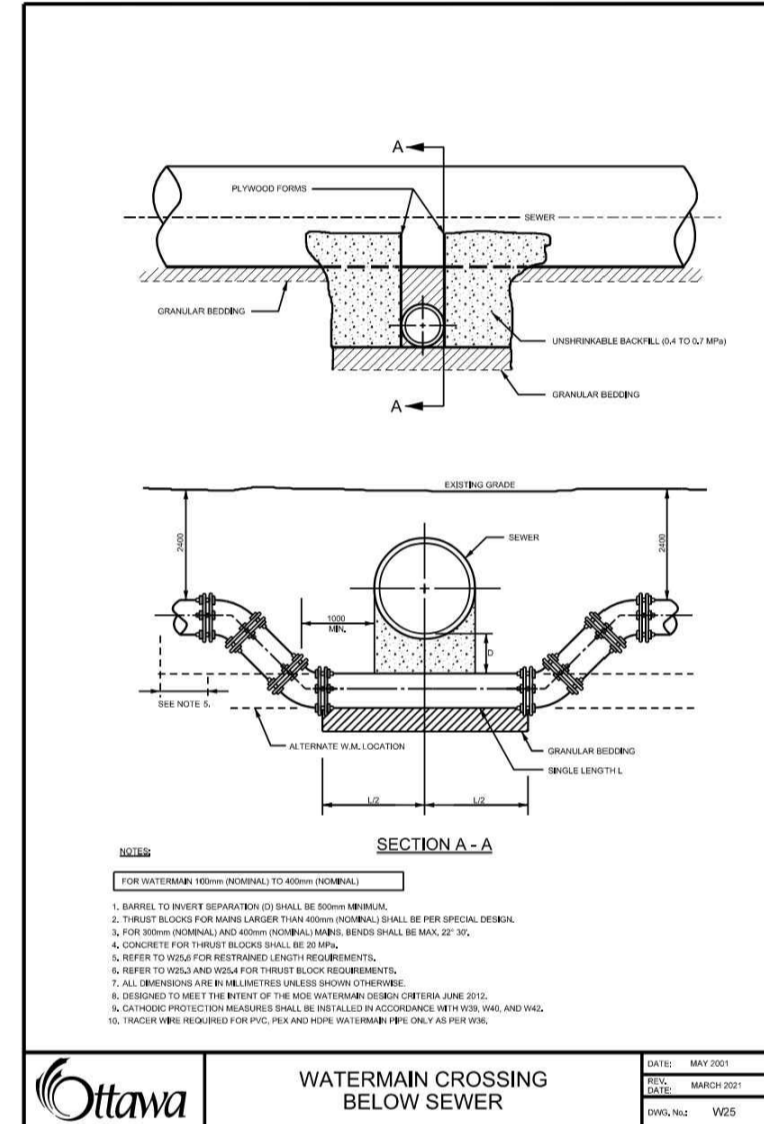
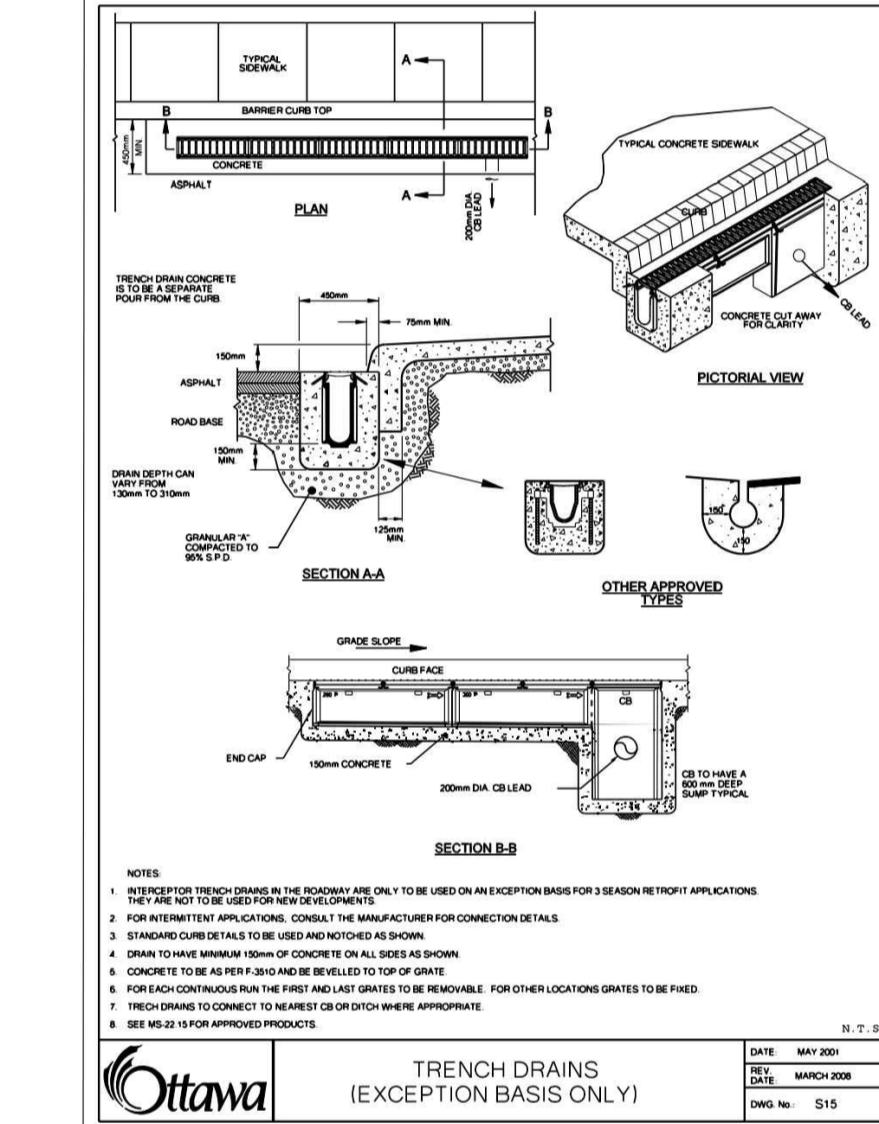
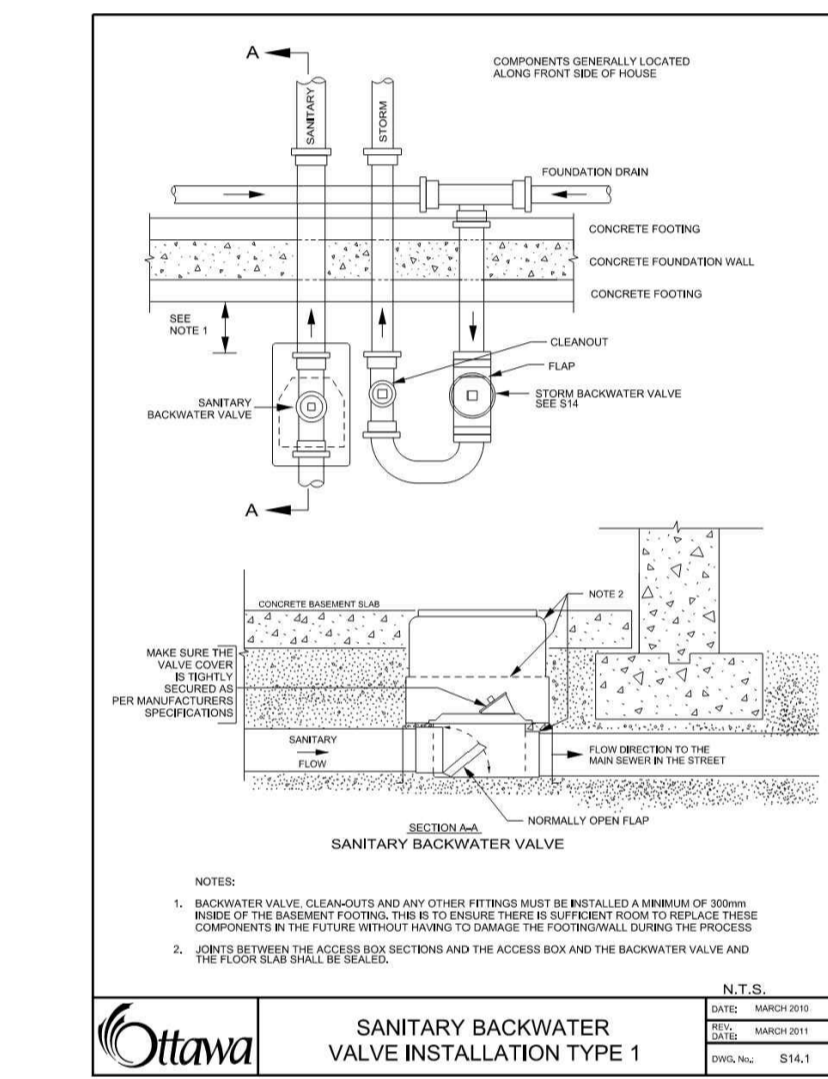
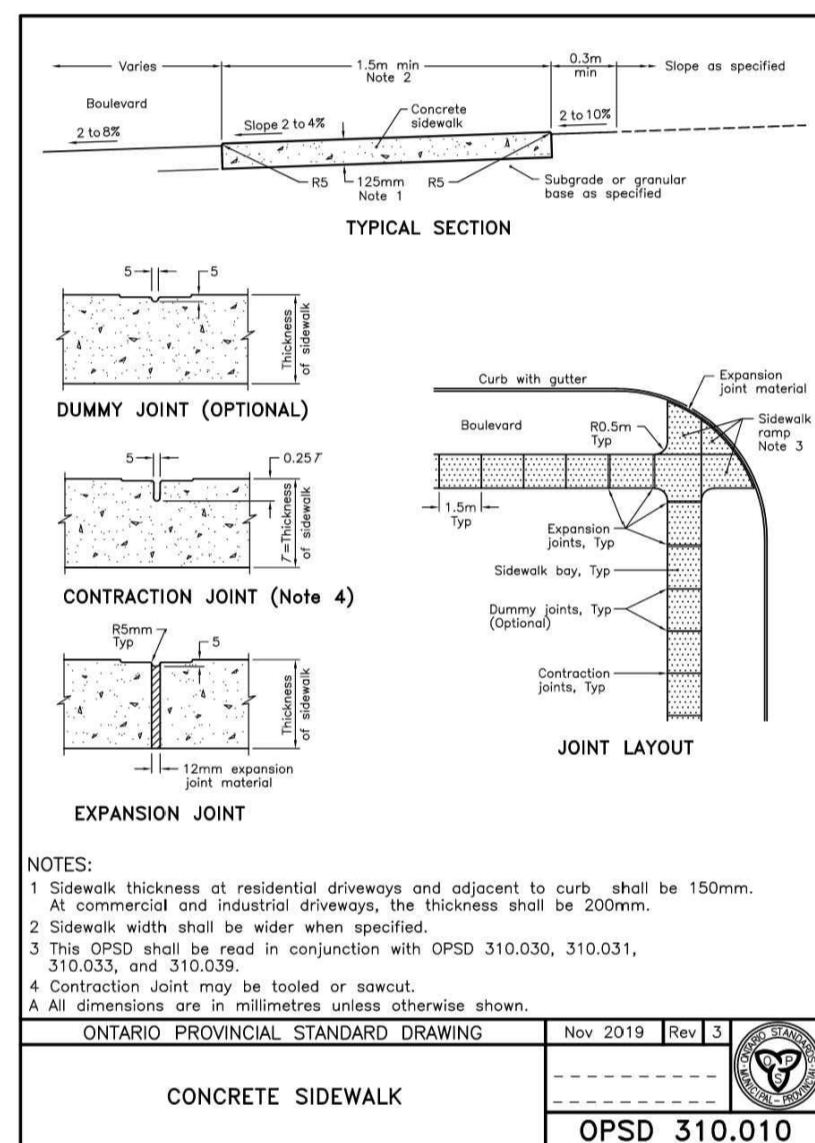
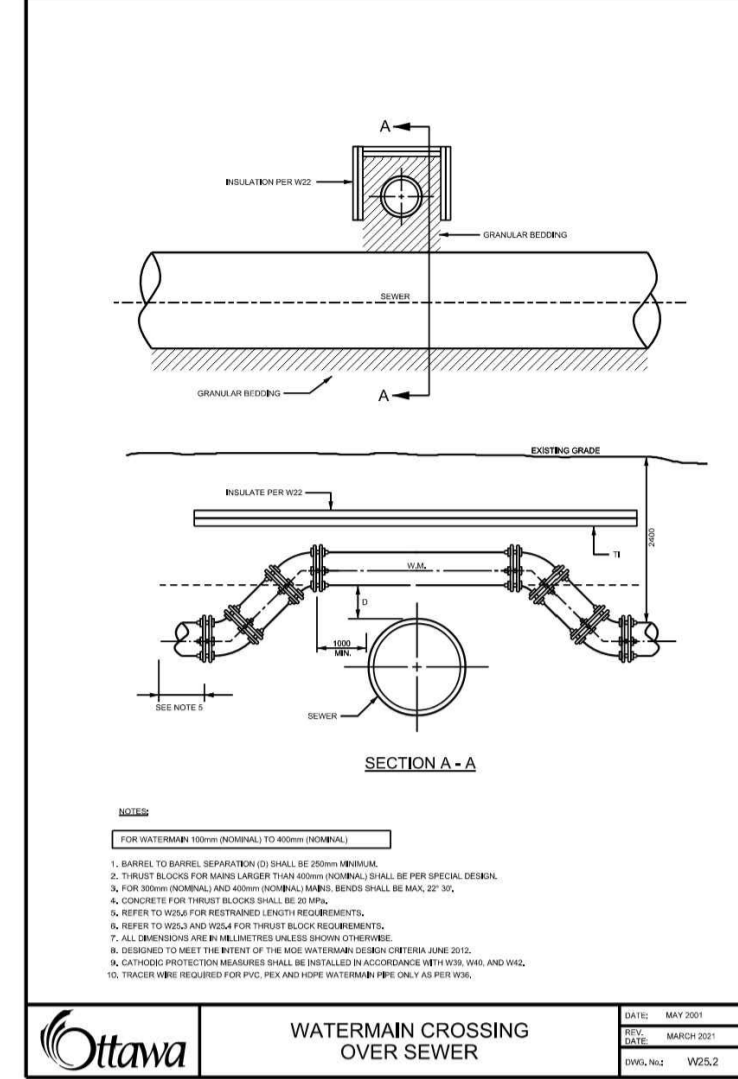
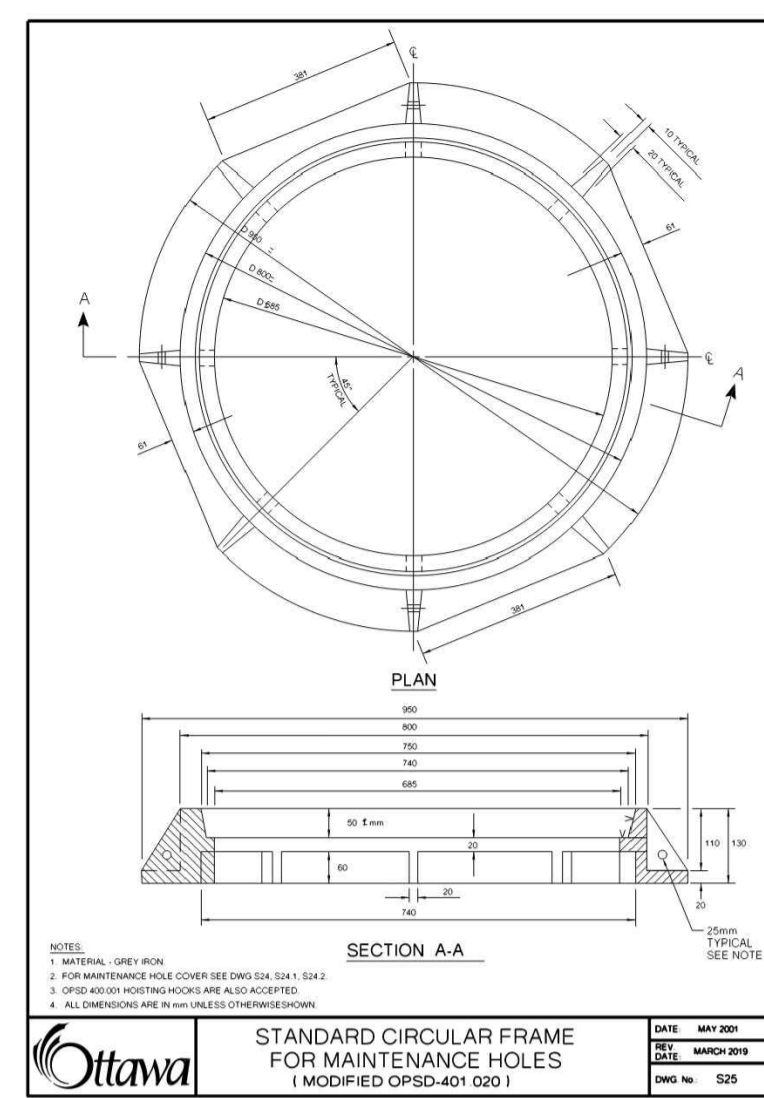
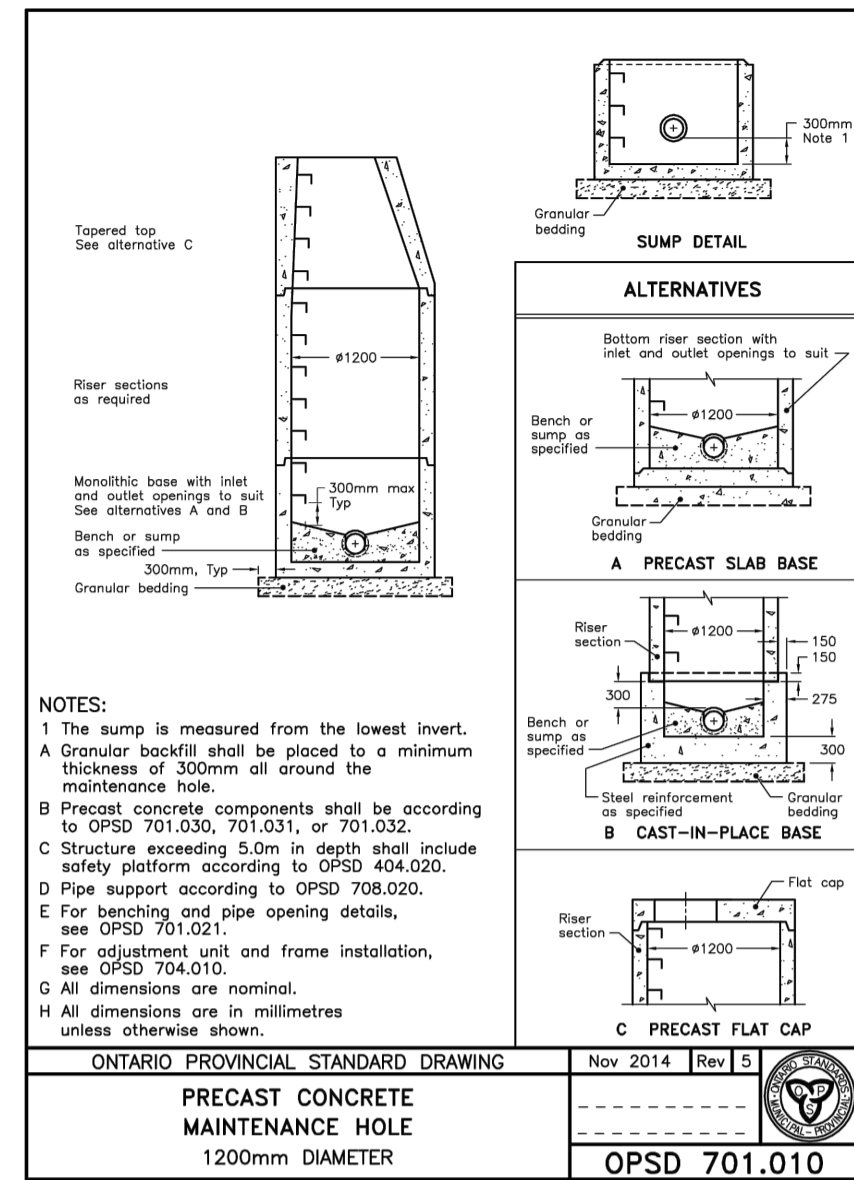
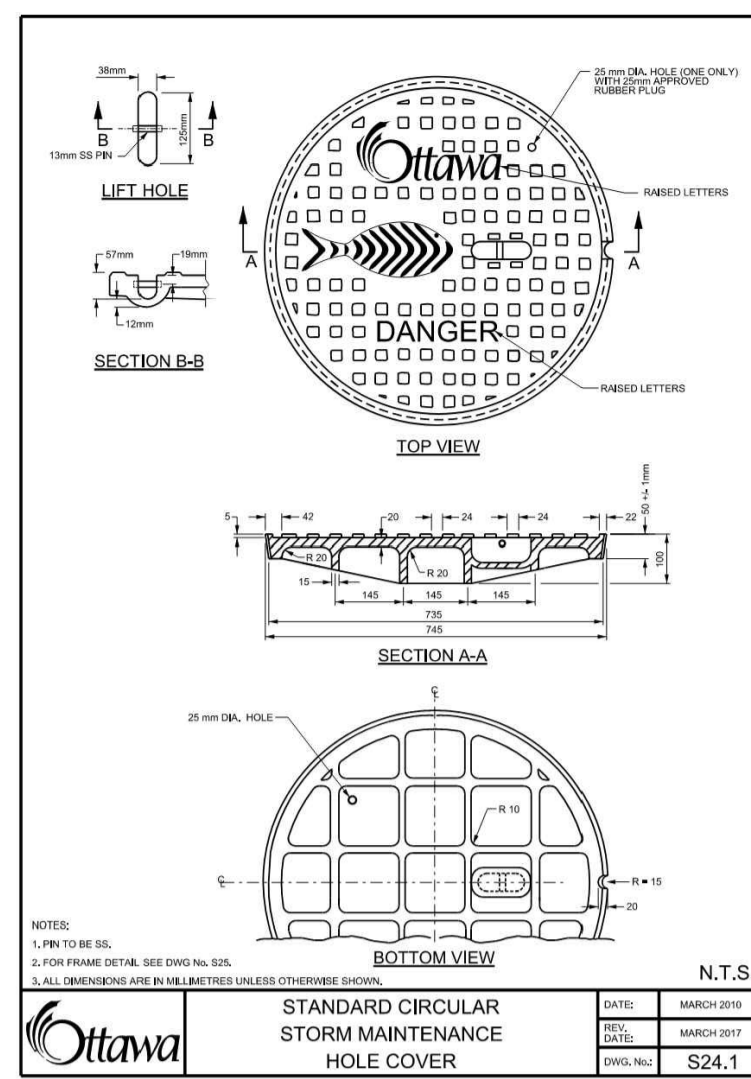
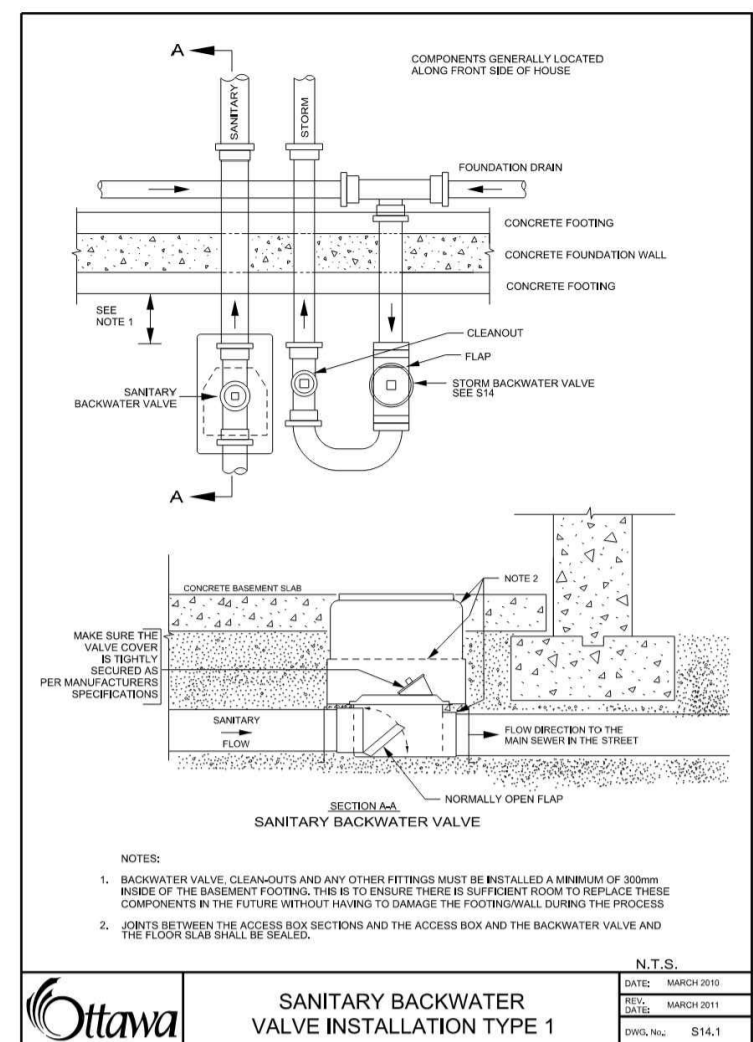
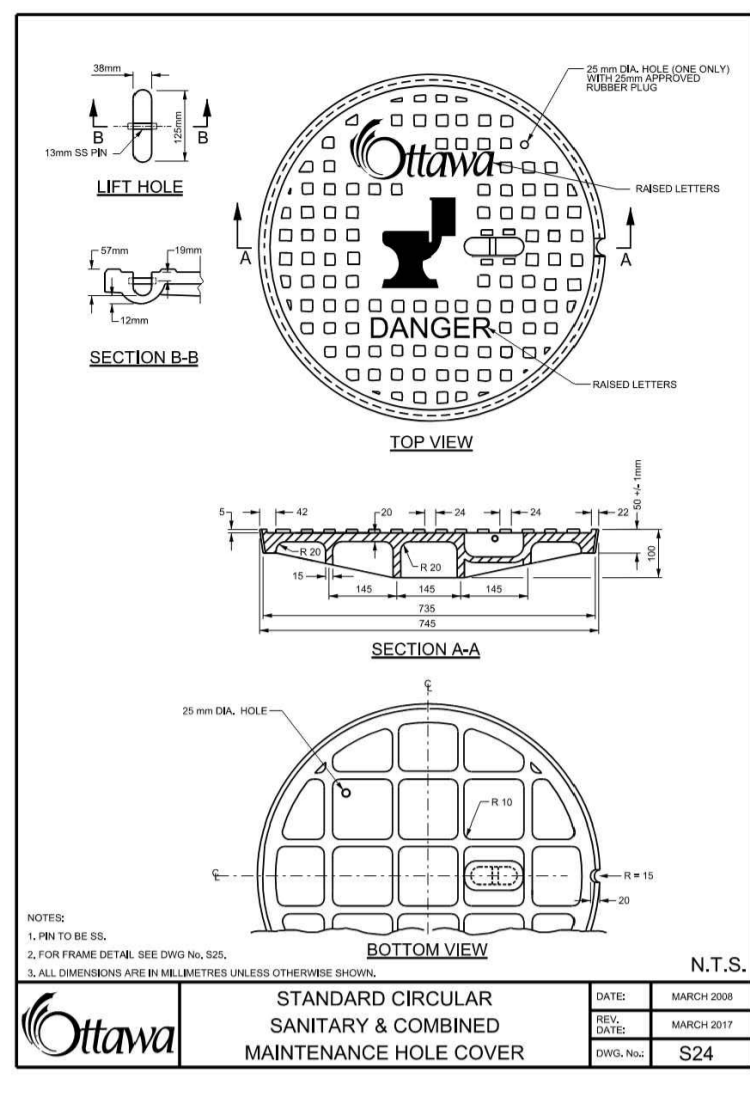
CLIENT	DESIGNED BY:	DRAWN BY:	APPROVED BY:
LANDRIC HOMES INC.	T.H.	A.O.	M.B.

PROJECT
PROPOSED 42 UNITS RESIDENTIAL DEVELOPMENTS
3040-3044 INNES RD, OTTAWA ON

DRAWING TITLE
POST-DEVELOPMENT WATERSHED PLAN

PROJECT NO.	DATE
210374	MARCH, 2023

C702



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03	RE-ISSUED FOR MUNICIPAL APPROVAL	T.H.	09 MAR 2023
02	RE-ISSUED FOR MUNICIPAL APPROVAL	T.H.	21 NOV 2022
01	ISSUED FOR MUNICIPAL APPROVAL	A.S.	03 MAR 2022
No.	REVISIONS	BY	DATE

LICENCED PROFESSIONAL ENGINEER
M. BASNET
 100501996
 2023/03/09
 PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

LRJ
 ENGINEERING | INGENIERIE
 5430 Canotek Road | Ottawa, ON, K1J 9G2
 www.lri.ca | (613) 842-3434

CLIENT: **LANDRIC HOMES INC.**

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

PROJECT: **PROPOSED 42 UNITS RESIDENTIAL DEVELOPMENTS**
 3040-3044 INNES RD, OTTAWA ON

DRAWING TITLE: **CONSTRUCTION DETAIL PLAN**

PROJECT NO: 210374
 DATE: MARCH, 2023
C901

APPENDIX F DRAWINGS/FIGURES

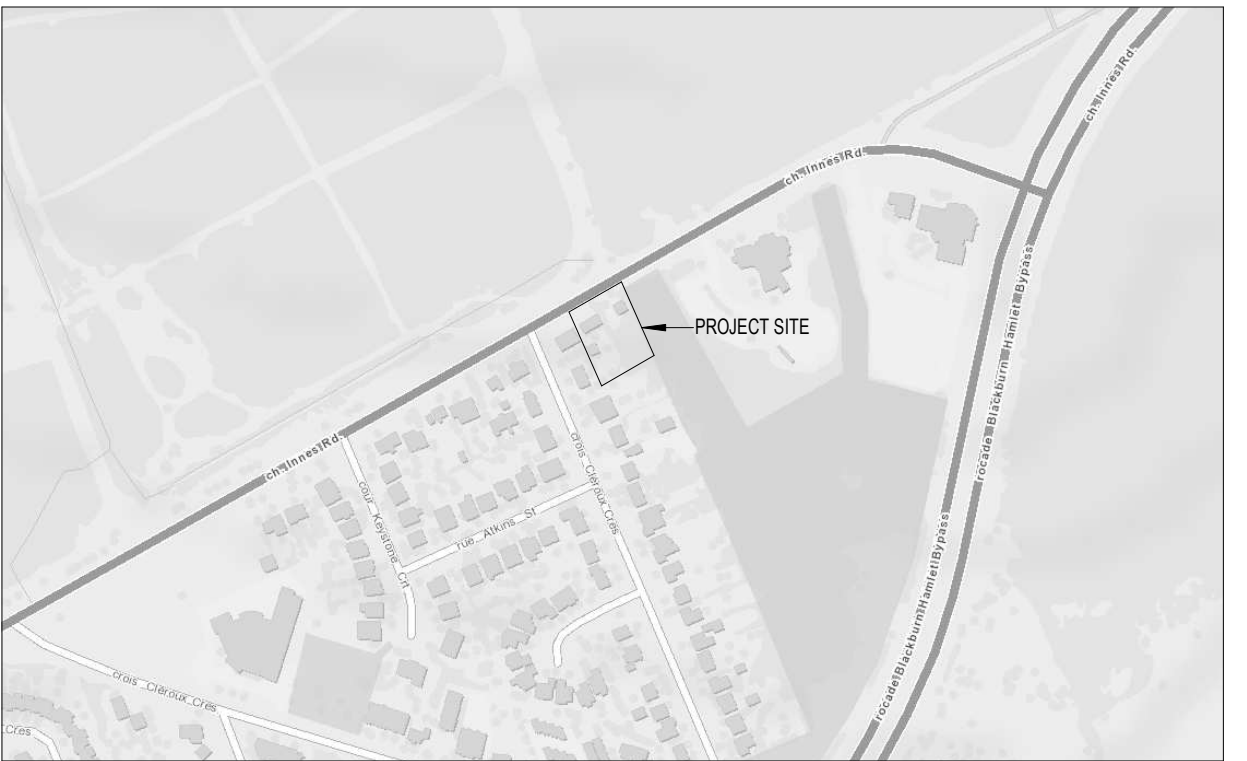
**Proposed Site Plan
Legal Survey
As-builts**



TOPOGRAPHIC PLAN OF SURVEY OF PART OF LOT 10 CONCESSION 3 (OTTAWA FRONT) (GEOGRAPHIC TOWNSHIP OF GLOUCESTER) CITY OF OTTAWA
ANNIS, O'SULLIVAN, VOLLEBECK LTD. SURVEY COMPLETED ON APRIL 19, 2021
PLEASE NOTE PINS AND BEARINGS ARE INDICATED FOR REFERENCE ONLY. SEE SURVEY PLAN.

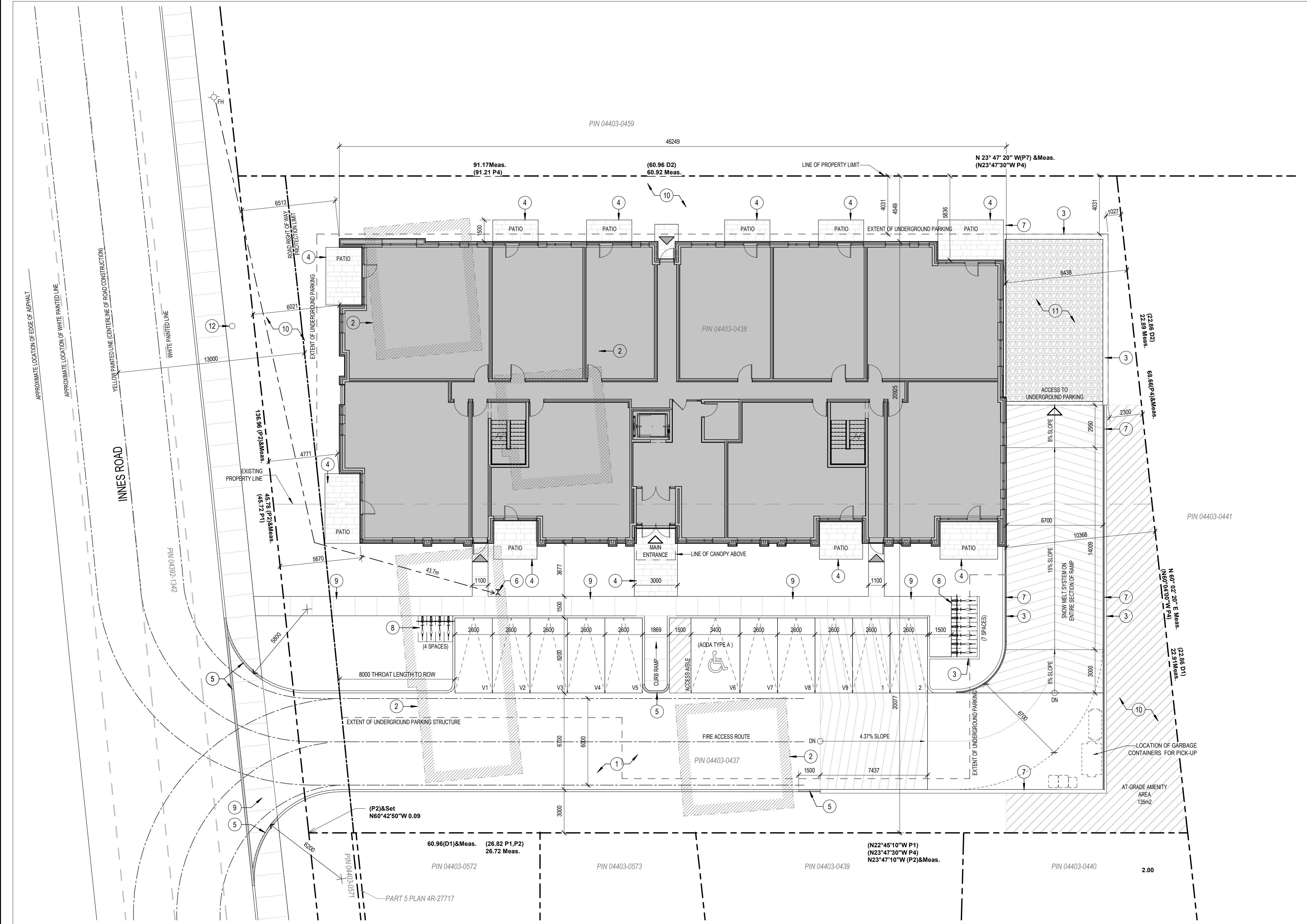
5 SURVEY INFO
SP-01 SCALE: N.T.S.

- 1 EXISTING STRUCTURE TO BE DEMOLISHED
- 2 EXISTING STRUCTURE TO BE DEMOLISHED
- 3 RETAINING WALL
- 4 INTERLOCKING STONE PAVERS
- 5 DEPRESSED CURB
- 6 FIRE DEPARTMENT CONNECTION
- 7 STEEL GUARD MOUNTED TO TOP OF RETAINING WALL
- 8 OUTDOOR BICYCLE PARKING SPACES
- 9 NEW CONCRETE SIDEWALK
- 10 SOFT LANDSCAPING, REFER TO LANDSCAPE DRAWINGS
- 11 RIVERSTONE
- 12 LIGHT STANDARD



3 LOCATION PLAN
SP-01 SCALE: N.T.S.

4 KEYNOTE LEGEND
SP-01 SCALE: N.T.S.



Site Statistics

Zoning Designation:	R4Z
Lot Width:	45.78m
Total Lot Area:	2,775.8m ²

Proposed Development - 43 Unit Low-Rise Apartment

Zoning Mechanism	Required	Provided
Minimum Lot Width	18m	45.78m
Minimum Lot Area	450m ²	2,775.6m ²
Min. Front Yard Setback	3m	4.78m
Min. Interior Side Yard Setback	6m	6m
Min Rear Yard Setback	1m <i>(Where the rear lot line abuts the interior side lot line of an abutting lot, the minimum required rear yard setback is equal to the minimum required interior side yard setback of the abutting lot along each point of the shared lot line.)</i>	8.438m <i>(1m at corner of parking structure)</i>
Maximum Building height	15m	12.41m
Parking Space Rates Table 101	52 Spaces <i>(1.2spaces/unit Row R11 - Area "C")</i>	52 Spaces 50 Underground Spaces 2 Surface Parking Spaces
Minimum Visitor Parking Rates Table 102	9 Spaces <i>(0.2spaces/unit - Area "C")</i>	9 Spaces <i>(9 provided at grade)</i>
Bicycle Parking Rates Table 111A(B)(i)	22 Spaces <i>(43 units x 0.5)</i>	25 Spaces <i>(11 provided at grade)</i>
Soft Landscaping	833m ² <i>(30% of Lot Area)</i>	866m ² <i>(31.2%)</i>
Total Amenity Area Table 137 (11)	330m ² <i>(15m²/unit @ 8 units + 6m²/unit @ 35 units)</i>	372m ²
Communal Amenity Area Table 137 (11)	120m ² <i>(100% of Amenity Area @ 8 units)</i>	135m ²

2 ZONING
SP-01 SCALE: N.T.S.

TOTAL AMENITY AREA CALCULATION

AT-GRADE AMENITY AREA	135m ²
LEVEL 01 PATIOS	80m ²
LEVEL 02 BALCONIES	49m ²
LEVEL 03 BALCONIES	56m ²
LEVEL 04 BALCONIES	52m ²
TOTAL	372m ²

COMMUNAL AMENITY AREA CALCULATION

AT-GRADE AMENITY AREA	135m ²
-----------------------	-------------------

GENERAL ARCHITECTURAL NOTES:

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- Drawings are not to be scaled. The Contractor is responsible for checking and verifying all levels and dimensions and shall report all discrepancies to the Architect and obtain clarification prior to commencing work.
- Upon notice in writing, the Architect will provide written/graphic clarification or supplementary information regarding the intent of the Contract Documents.
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- Positions of exposed or finished Mechanical or Electrical devices, fittings and fixtures are indicated on the Architectural Drawings. Locations shown on the Architectural Drawings shall govern over Mechanical and Electrical Drawings. Mechanical and Electrical items not clearly located will be located as directed by the Architect.
- These documents are not to be used for construction unless specifically noted for such purpose.

3 REISSUED FOR SITE PLAN CONTROL 23-02-09
2 REISSUED FOR SITE PLAN CONTROL 22-11-14
1 ISSUED FOR SITE PLAN CONTROL 22-03-07

ISSUE RECORD



project1 studio
Project1 Studio Incorporated
[613.884.9339 | email@project1studio.ca]

3040 INNES ROAD
3040 Innes Road
Ottawa, ON

PROJ: 2110 SCALE: NOTED DRAWN: BH REVIEWED: RMK

SITE PLAN


SP-01

1 SITE PLAN
SP-01 SCALE: 1 : 150

GENERAL ARCHITECTURAL NOTES:

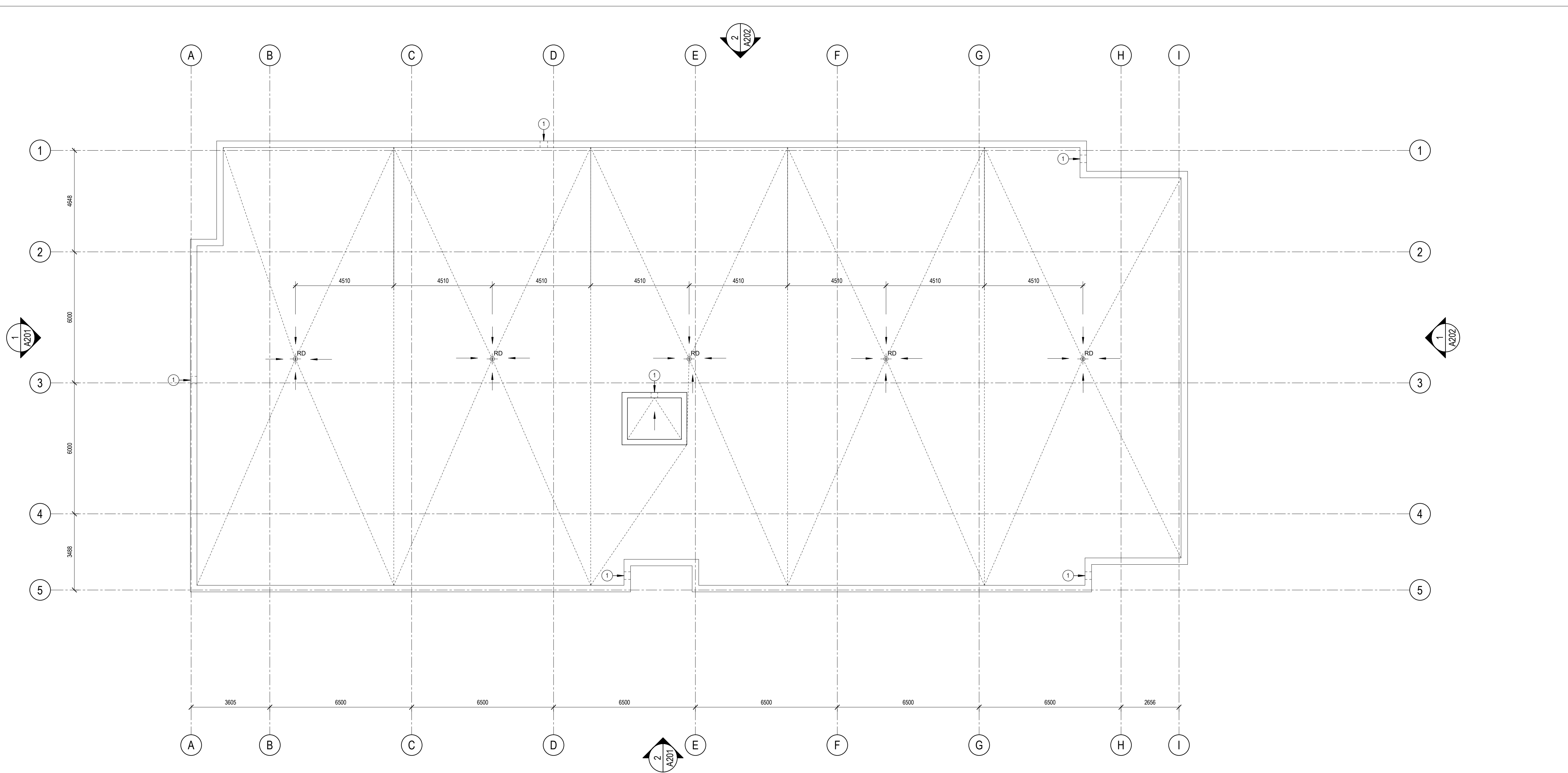
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1 SCUPPER



2 KEYNOTE LEGEND

A105



3	REISSUED FOR SITE PLAN CONTROL	23-02-09
2	REISSUED FOR SITE PLAN CONTROL	22-11-14
1	ISSUED FOR SITE PLAN CONTROL	22-03-07

ISSUE RECORD



project1 studio
 Project1 Studio Incorporated
 (613) 884-3939 | mail@project1studio.ca

3040 INNES ROAD
 3040 Innes Road
 Ottawa, ON

PROJ	SCALE	DRAWN	REVIEWED
2110	1 : 100	BH	RMK

ROOF PLAN

A105

1 ROOF PLAN
 A105 SCALE: 1 : 100

TOPOGRAPHICAL PLAN OF SURVEY OF
PART OF LOT 10
CONCESSION 3 (OTTAWA FRONT)
(Geographic Township of Gloucester)
CITY OF OTTAWA

Surveyed by Annis, O'Sullivan, Vollebek Ltd.
Scale 1 : 250



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

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 April 19, 2021.

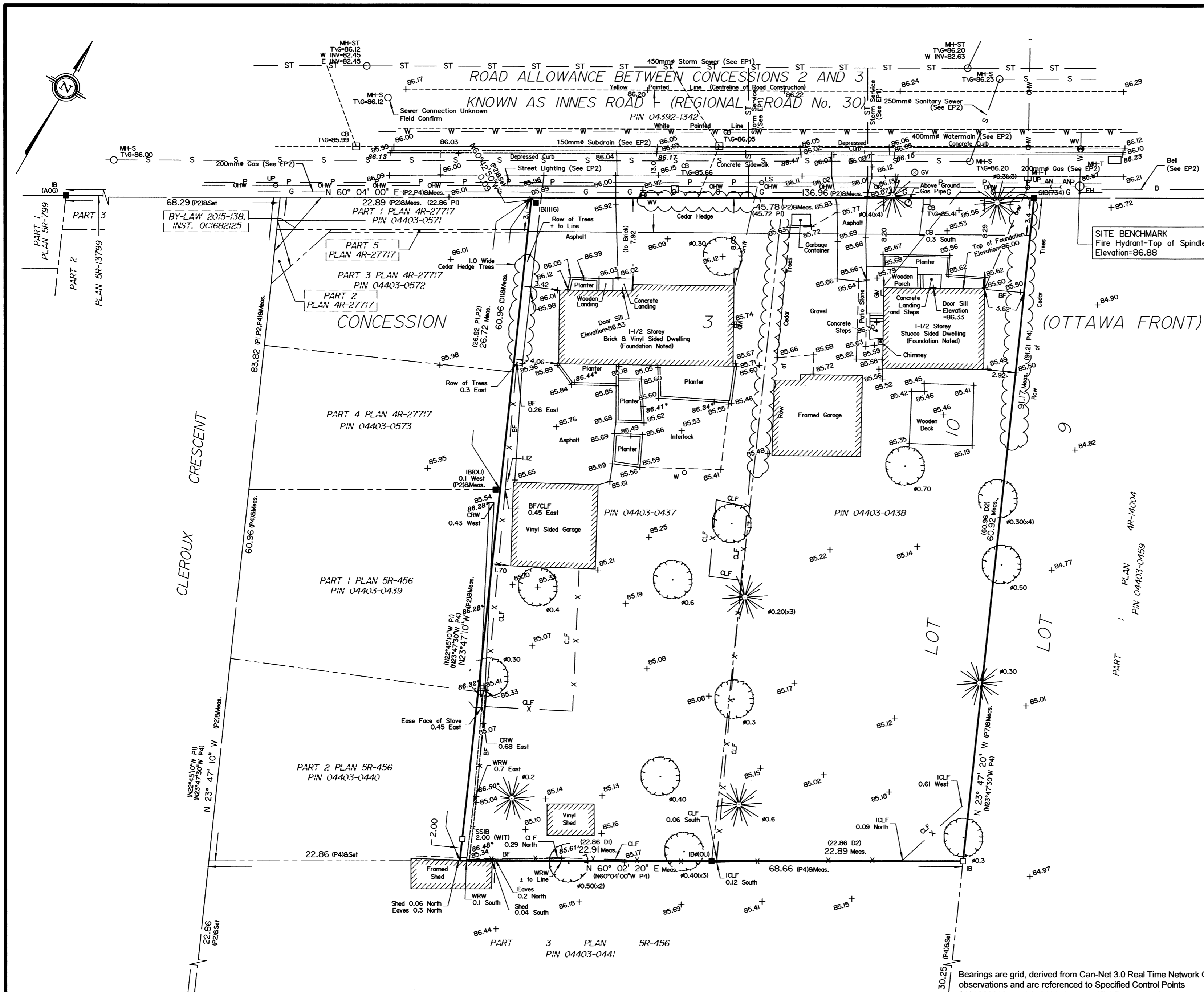
April 20, 2021
Date
Tyler J. Allison
Ontario Land Surveyor

Notes & Legend

- Denotes
- +— Survey Monument Planted
 - Survey Monument Found
 - SIB Standard Iron Bar
 - SSIB Short Standard Iron Bar
 - IB Iron Bar
 - (OU) Origin Unknown
 - (WIT) Witness
 - Meas. Measured
 - (AOG) Annis, O'Sullivan, Vollebek Ltd.
 - (P1) Plan 4R-27717
 - (P2) Plan by Arpentage Dutrisc Surveying Inc. Index No. GL-OF-3-10-2
 - (P3) Plan 5R-799
 - (P4) Plan 5R-456
 - (P5) (AOG) Plan Dated September 21, 1977
 - (P6) Plan by Webster & Simmons Surveying Ltd. Ref. No. 4-CON 3 O.F.
 - (P7) Plan 4R-14004
 - (DI) Inst. N644579
 - (D2) Inst. NS159597
 - EP2 Plan and Profile Drawing of Innes Road Storm Sewer Extension, Drawing 3077-106 Rev. 1 "As-Built" Dated Aug./77 City of Ottawa U.C.C. Central Registry Data, Sheets H-28-04 and H-28-05 Dated May 2021
 - ⊙ Deciduous Tree
 - ⊙ Coniferous Tree
 - ⊙ FH Fire Hydrant
 - ⊙ WV Water Valve
 - ⊙ MH-S Maintenance Hole (Sanitary)
 - ⊙ MH-ST Maintenance Hole (Storm Sewer)
 - ⊙ MH Maintenance Hole (Unidentified)
 - ⊙ MH-T Maintenance Hole (Traffic)
 - ⊙ W Concrete Well
 - ⊙ GV Gas Valve
 - ⊙ GM Gas Meter
 - ⊙ CB Catch Basin
 - T/G Top of Grate
 - ICLF Irregular Chain link Fence
 - BF Board Fence
 - CLF Chain link Fence
 - WRW Wood Retaining Wall
 - CRW Concrete Retaining Wall
 - ⊙ UP Utility Pole
 - ⊙ AN Anchor
 - ⊙ LS Light Standard
 - ⊙ Diameter
 - +65.00 Location of Elevations
 - +65.00 Top of Concrete Curb Elevations
 - +65.00 Top of Retaining Wall Elevations
 - B — Underground Bell
 - OHW — Overhead Wires
 - P — Underground Hydro
 - G — Underground Gas

ASSOCIATION OF ONTARIO
LAND SURVEYORS
PLAN SUBMISSION FORM
V-11264

THIS PLAN IS NOT VALID UNLESS
IT IS AN EMBOSSED ORIGINAL
COPY ISSUED BY THE SURVEYOR
IN ACCORDANCE WITH
Regulation 1026, Section 29 (3)



ELEVATION NOTES

1. Elevations shown are geodetic and are referred to the CGVD28 geodetic datum.
2. It is the responsibility of the user of this information to verify that the job benchmark has not been altered or disturbed and that its relative elevation and description agrees with the information shown on this drawing.

UTILITY NOTES

1. This drawing cannot be accepted as acknowledging all of the utilities and it will be the responsibility of the user to contact the respective utility authorities for confirmation.
2. Only visible surface utilities were located.
3. A field location of underground plant by the pertinent utility authority is mandatory before any work involving breaking ground, probing, excavating etc.
4. Underground information (including invert elevations) is compiled from EP1 and EP2 and is subject to field confirmation.

ANNIS, O'SULLIVAN, VOLLEBEK LTD. grants to Landric Homes ("The Client"), their solicitors, mortgagees, and other related parties, permission to use original, signed, sealed copies of the Topographical Plan of Survey in transactions involving The Client.

Bearings are grid, derived from Can-Net 3.0 Real Time Network GPS observations and are referenced to Specified Control Points 01919680184 and 019198434761, MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

01919680184 Northing 5040610.16 Easting 384736.56
019198434761 Northing 5036178.12 Easting 372436.11

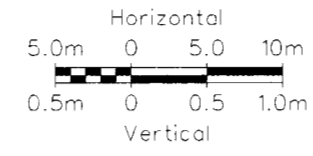
For bearing comparisons a rotation of 0°22'10" counterclockwise was applied to Plan (P2).
For bearing comparisons a rotation of 0°40'20" counterclockwise was applied to Plan (P4).

Rev.	Date	Comment
Rev. 1	May 28, 2021	Add Underground Information
Rev. 2	February 2, 2022	Add Sanitary Manhole

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Ontario Land Surveyors Job No. E-1150-21



NO.	REVISION	BY	DATE
1	ISSUED FOR TENDER	E.D.V.	4/28/03
2	ISSUED FOR CONSTRUCTION	E.D.V.	6/18/03
3	ASBUILT	A.S.	4/28/04

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

INNES ROAD RECONSTRUCTION
EASTPARK DRIVE WEST TO CLEROUX CRESCENT EAST

GRADING AND DRAINAGE
STA. 3+900 TO STA. 4+200

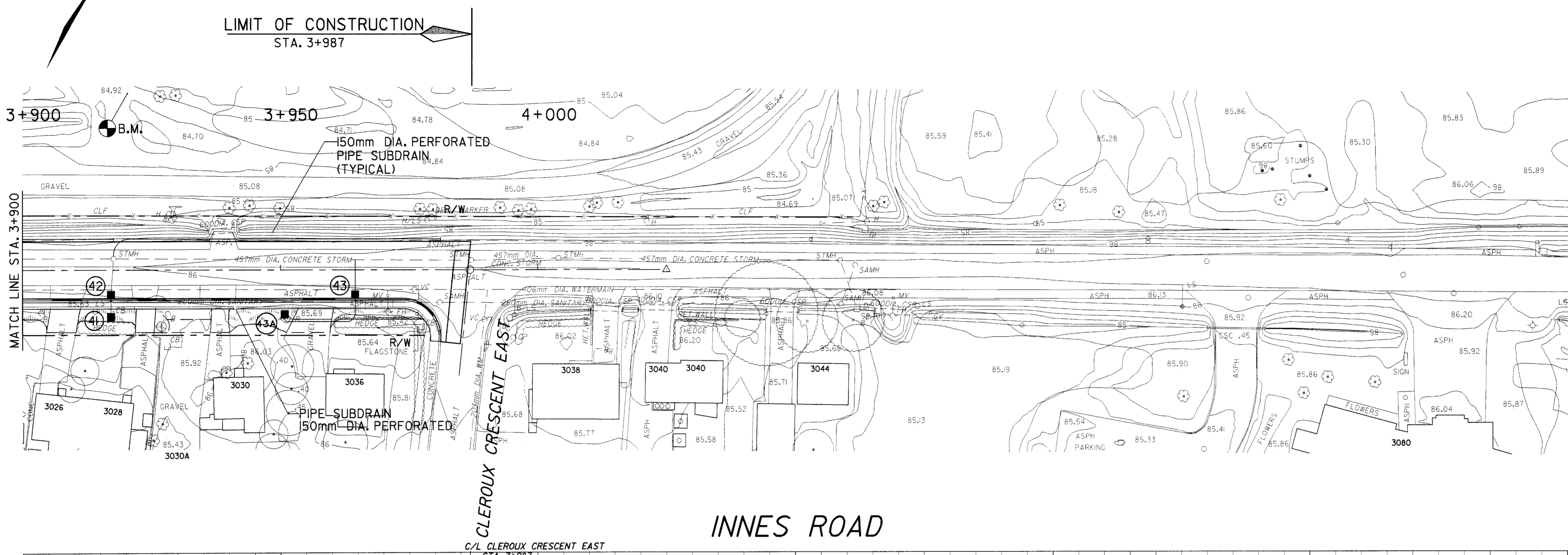
R.G. HEWITT, P.ENG. Director Infrastructure Services
W. BENNETT, P.ENG. Manager Construction Services

Drawn: V.F. Checked: E.D.V. Design: L.D.S. Checked: E.D.V.

Ottawa

CONTRACT NO. ISB03-5045
DWG. NO. 5045-09
SHEET 9 OF 17
Date: APRIL 2003
Scale: Horiz. 1:500 Vert. 1:50

- NOTE:**
1. OFFSETS AND GRATE ELEVATIONS FOR CATCHBASINS REFER TO THE CENTER OF THE GRATE.
 - **2. LOCATION AND INVERT ELEVATIONS TO BE CONFIRMED IN FIELD BY ENGINEER UPON EXPOSURE OF EXISTING UNDERGROUND UTILITIES BY CONTRACTOR.
 3. CONTRACTOR TO PROVIDE EXCAVATION, DEWATERING, BEDDING AND BACKFILLING FOR RELOCATION OF EXISTING FIRE HYDRANT BY THE CITY OF OTTAWA.



Final Measurements:

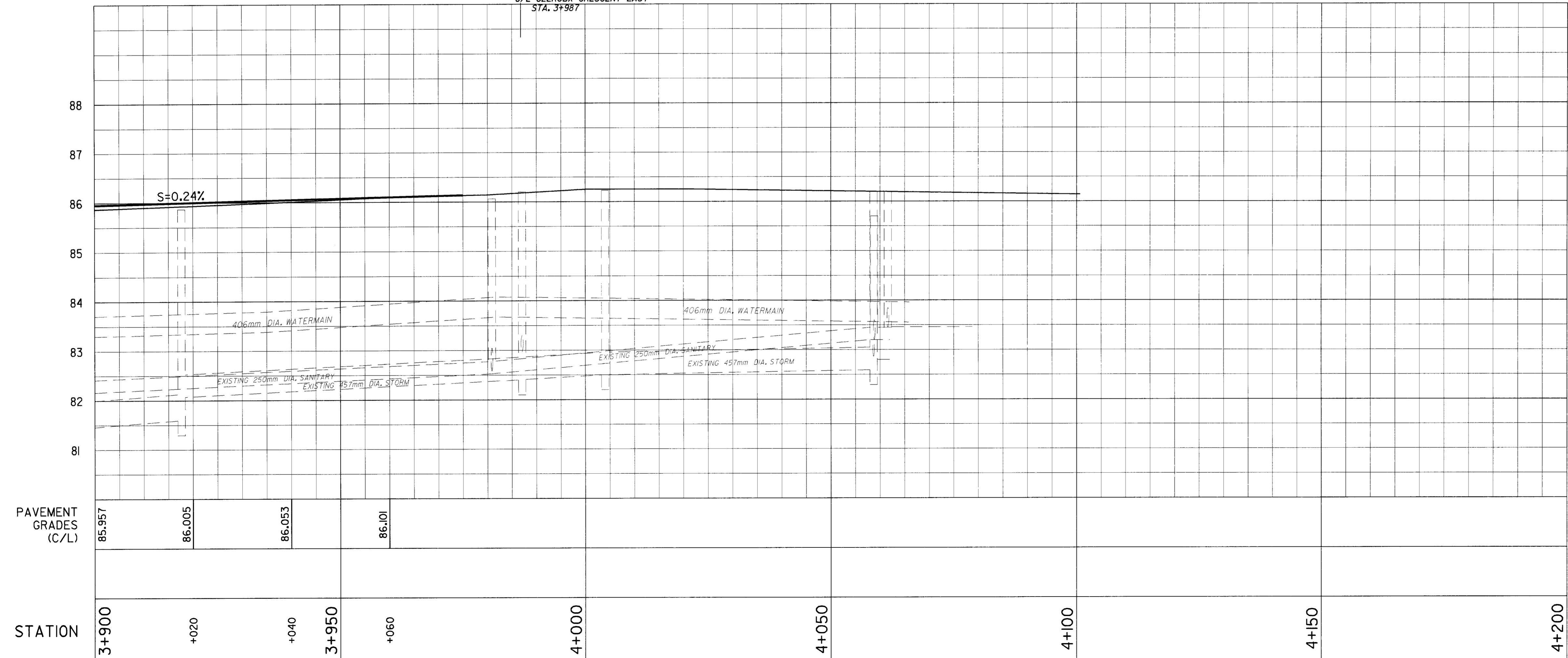
Construction Type	Inspector
Road Reconstruction	A. Scordis
Work Commenced	Project Manager
July 17, 2003	John Macdonald
Work Completed	Final Date
Nov 21, 2003	
Contractor	Date
Shades Paving & Materials Ltd.	
Drafting Revisions	Date / Checked By

CATCHBASIN & MANHOLE DATA

NO.	STATION	OFFSET (m)	TYPE		ELEVATION	
			Structure	Cover	Grate	Low Inv.
41	3+917	9.0 RT	S27	S21	85.400	84.400
42	3+917	5.2 RT	705.010(S)	S19	85.823	84.200
43	3+965	5.2 RT	705.010(S)	S19	85.938	84.338
43A	3+951.5	RT	S27	S21		

SEWER DATA

NO. to NO.	SIZE (mm)	LENGTH (m)	CLASS	INVERTS	
				Inlet	Outlet
41	42	200	3.8	PVCSDR35	84.400 84.300
42	EXIST.	300	6.2	PVCSDR35	84.200 83.900
43	EXIST.	200	6.2	PVCSDR35	84.338 82.51
43A	43	200	17.0	PVCSDR35	



PAVEMENT GRADES (C/L)

STATION