



Stormwater Management Report and Servicing Brief

Apartment Building
98/100 Bearbrook Road
Ottawa, Ontario

Prepared for:

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LRL File No.: 210628

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1 INTRODUCTION AND SITE DESCRIPTION

LRL Associates Ltd. was retained by Landric Bearbrook property Inc. to complete a Stormwater Management Analysis and Servicing Brief for the development of a proposed 9-storey apartment building with surface and underground parking area within the site boundary, located at 98/100 Bearbrook Road.

The subject property consists of two (2) lots that are legally described part of Lot 14, concession 2, in the township of Gloucester. The subject lots are zoned AM11 (Arterial Mainstreet).



Figure 1: Aerial View of Proposed Development

The subject property, as a whole, is trapezoidal shaped and measures approximately 78 m in frontage along Bearbrook Road and 51 m in depth. The total site area is approximately **0.39 Ha**.

The proposed development will be constructed in a single phase, which includes a 9-storey apartment building consisting of a total of **168** units with two (2) levels of underground. Approximately 17 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 **0.39 ha** and currently consists of two separate property lots each consisting currently of an existing residential dwelling. Elevations of existing site are generally flat and range between 75.30 m at the north side of existing buildings to 74.50 m along the perimeter of the subject 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:

Bearbrook Road:

- 305 mm diameter cast iron watermain
- 250 mm asbestos cement sanitary sewer
- 375 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 1E water distribution network pressure zone. There is an existing 305 mm watermain within Bearbrook 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

According to the City of Ottawa Water Distribution Guidelines (Technical Bulletin ISDTB-2014-02), since the subject site is anticipated to house more than 50 residential units, it is required to be serviced by two water service laterals, separated by an isolation valve, for redundancy and to avoid creation of a vulnerable service area. Additionally, 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 two (2) 150 mm diameter service laterals connected to the existing 305 mm watermain located within Bearbrook Rd. Refer to *Site Servicing Plan C.401* in **Appendix E** for servicing layout and connection points.

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



Table 1: City of Ottawa Design Guidelines Design Parameters

| Design Parameter | Value |
|---|---|
| Residential Bachelor / 1 Bedroom Apartment | 1.4 P/unit |
| Residential 2 Bedroom Apartment | 2.1 P/unit |
| Residential 3 Bedroom Apartment | 3.1 P/unit |
| Townhouse | 2.7 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 | 350 kPa and 480 kPa |
| During normal operating conditions pressure must not drop below | 275 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-2018-02*

The interior layout and architectural floor plans have been reviewed, and it was determined that the building will house **119** one-bedroom units, **39** two-bedroom units, **1** three-bedroom units and **9** townhouses. Based on the City of Ottawa Design guidelines for population projection, this translates to approximately **275.9** residents. Table 2 below summarizes the proposed development 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 | 119 | 166.6 |
| 2 Bedroom Apartment | 2.1 | 39 | 81.9 |
| 3 Bedroom Apartment | 3.1 | 1 | 3.1 |
| Townhouse | 2.7 | 9 | 24.3 |
| Total Residential Population | | | 275.9 |

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 = **3.7**
- Peak Hour Demand Residential Factor = **5.6**

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

- Average daily domestic water demand is **0.89 L/s**,
- Maximum daily demand is **3.34 L/s**, and
- Maximum hourly is **18.62 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 at Bearbrook Road | |
|---|-----------------------------|---------------------------------------|---------------------------------|
| | | Connection 1* (m H2O / kPa) | Connection 2** (m H2O / kPa) |
| Average Daily Demand | 0.89 | 115.9 / 405.4 | 115.9 / 406.8 |
| Max Day + Fire Flow (per FUS) | 3.34 + 183.3 | 92.9 / 179.3 | 94.3 / 195.1 |
| Peak Hour | 18.62 | 110.3 / 350.3 | 110.3 / 351.6 |
| *Assumed Ground elevation at connection point 1 = 74.60 m | | | |
| **Assumed Ground elevation at connection point 2 = 74.40 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 – Non-Combustible.
- Occupancy type – Limited Combustibility; and



- Sprinkler Protection – Fully Supervised Sprinkler System.

The estimated fire flow demand was estimated to be **11,000 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 9-storey building | 11,000 | 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 Bearbrook Road.

The post-development wet total flow was calculated to be is **3.24 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 200 mm dia. sanitary service connected to proposed manhole SAN MH 01 at the existing 250mm diameter sanitary sewer within Bearbrook Rd. Refer to LRL drawing C.401, included in **Appendix F**, 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, 2.1 persons for two-bedroom units, 3.1 persons for three-bedroom units and 2.7 persons for townhouses a residential daily demand of 280 L/p/day, a



residential peaking factor of 3.5 and a total infiltration rate of 0.33 L/s/ha. Based on these parameters and the total site area of 0.39 ha, the total anticipated wet wastewater flow was estimated **3.24 L/s**. Refer to **Appendix C** for the site sanitary sewer design sheet.

As requested in the pre-consultation with City staff, the calculated sanitary demands for the proposed development were coordinated with the City of Ottawa to confirm there is sufficient capacity in the downstream municipal sewers. As per correspondence attached, see **Appendix C**, the downstream municipal sewers can sufficiently accommodate the increase in sanitary flows from the proposed development.

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 subject lots is depicted by existing watershed EWS-01 (0.391 ha), drains uncontrolled overland towards Bearbrook Rd right-of-way. Refer to plan C701 included in **Appendix E** for pre-development drainage characteristics. There is currently an existing 375 mm dia. storm sewer within Bearbrook Rd right-of-way. Refer to **Appendix D** for pre- and post-development watershed information.

7.2 Design Criteria

The stormwater management criteria for this development are based on the pre-consultation with City of Ottawa officials, the City of Ottawa Sewer Design Guidelines including City of Ottawa Stormwater Management Design Guidelines, 2012 (City standards), as well as the Ministry of the Environment's Stormwater Management Planning and Design Manual, 2003 (SWMP 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 Coefficient of 0.25, employing the City of Ottawa IDF parameters for a 5-year storm with a calculated time of concentration equal to 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 **28.34 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, catchbasins with Inlet Control Devices (ICDs) 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 area drains in the surface parking lot that collect and direct runoff to the proposed cistern via the building's mechanical system, as well as, catchbasins in the drive aisle. A proposed 375 mm & 300 mm diameter free-flowing storm sewer pipes are proposed within the drive aisle, north of the proposed building, to outlet captured flows to the existing 375 mm diameter storm sewer within Bearbrook 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 site has been analyzed and four (4) post-development watersheds have been allocated. *Watershed WS-01A* (0.049ha) consisting of landscaping and interlocking pavers, will flow controlled. Runoff will be collected via two (2) area drains at opposite ends of the interlocking pavers all of which will direct captured flows to an underground cistern through the building's mechanical system. 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.

Watershed WS-01B (0.013ha) consisting of grass and landscaping area, will flow uncontrolled. Runoff will surface drain to the Bearbrook Rd right-of-way.

Watershed WS-02 (0.138ha) consists of the proposed building's envelope and will be captured via roof drains with controls.

Watershed WS-03A (0.018ha) consists mainly of the paved drive aisle north of the proposed building and landscaped areas. Runoff will be captured via another proposed catchbasin (CB-01) that will then be conveyed into the main storm sewer in the drive aisle and controlled via a Vertical Vortex 100VHV-1 IDC.

Similarly, *Watershed WS-03B* (0.030ha) consists mainly of the paved drive aisle north of the proposed building and landscaped areas. Runoff will be captured via a second proposed catchbasin (CB-02) and conveyed into the main storm sewer.

Finally, *Watershed WS-04* (0.140ha) consists mainly of the paved surface parking lot, a grassed amenity area and a ramp leading to the underground garage. Runoff will be collected via two (2) area drains and a trench drain at the end of the ramp all of which will direct captured flows to an



underground cistern through the building’s mechanical system. 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 375mm & 300mm diameter storm pipes within the proposed drive aisle north of the building. The building will be serviced via a 250mm diameter storm service lateral which outlets to STM MH200. 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 outlet to be connected *downstream* of OGS.

The proposed catchbasins (*CB-01 & CB-02*) will capture and convey runoff to 300mm diameter storm pipe at restricted flow rates via **Hydrovex 100VHV-1** ICDs. A Stormceptor Oil-Grit Separator (*OGS*) is proposed downstream of STM MH200 which will treat all captured flows from the development. The OGS finally discharges flows to the existing 375 mm diameter storm sewer within Bearbrook Rd via a 300 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 (C) | 100 Year Weighted Runoff Coefficient (25% increase) |
|------------------------------------|-----------|---------------------------------|---|
| WS-01A (CISTERN-CONTROLLED) | 0.049 | 0.85 | 1.00 |
| WS-01B (UNCONTROLLED) | 0.013 | 0.20 | 0.25 |
| WS-02 (ROOF-CONTROLLED) | 0.119 | 0.90 | 1.00 |
| WS-03A (CONTROLLED) | 0.034 | 0.86 | 1.00 |
| WS-03B (CONTROLLED) | 0.036 | 0.82 | 1.00 |
| WS-04 (CISTERN -CONTROLLED) | 0.140 | 0.82 | 1.00 |

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 **1.60 L/s**, resulting in a total



release rate from the roof of **8.00 L/s** is proposed. Each of the roof drain flow control devices has been selected to provide a flow rate of **1.60 L/s** at a maximum flow depth of **0.15 m**. Proposed roof drains are to be **MURPHCO** roof drains with **one (1) hole** per drain. See **Appendix D** for more information about the selected roof drain and flow restrictor as well as the flow control roof drainage declaration form from the mechanical and structural engineer for the building.

The total available roof storage (m^3) has been calculated using the following formula:

$$V = \left(\frac{D_{Sl} * A_{Eff}}{3} \right)$$

Where:

V = available (provided) rooftop storage (m^3)

D_{Sl} = slope ponding depth (m)

A_{Eff} = effective roof area (m^2)

Based on the equation above, it was calculated that **43.13 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 **28.34 L/s** for 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-01B (UNCONTROLLED) | 0.013 | 6.50 | 0 | 0 |
| WS-02 (ROOF CONTROLLED) | 0.119 | 8.00 | 40.76 | 43.13 |
| WS-03A & WS-03B (ICD CONTROLLED) | 0.070 | 8.63 | 17.73 | 18.07 |
| WS-01A (CISTERN CONTROLLED) | 0.049 | 5.21 | 88.45 | 89.00 |
| WS-04 (CISTERN CONTROLLED) | 0.140 | | | |



| | | | | |
|--------------|-------------|--------------|---------------|---------------|
| TOTAL | 0.39 | 28.34 | 146.94 | 150.20 |
|--------------|-------------|--------------|---------------|---------------|

To attenuate flows to the allowable release rate of **28.34 L/s**, it is calculated that a total of **146.94 m³** of storage will be required for 100-year storm event. 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;

- **40.76 m³** is required rooftop storage in WS-02 corresponding to a maximum restricted flow of **8.00 L/s** via roof drain controls;
- **17.73 m³** is required surface storage in WS-03A & WS-03B corresponding to maximum restricted flow of **8.63 L/s** via proposed Hydrovex 1000VHV-1 ICD located in STM MH-200;
- **88.45 m³** is required cistern storage in WS-04 corresponding to the maximum proposed pumping flow of **5.21 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 98/100 Bearbrook 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 **11,000 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 dual 150 mm Φ water service connections to be connected to the existing 305 mm Φ watermain within Bearbrook 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 **3.24 L/s**.
- The proposed development will discharge **3.24 L/s** to the existing 250 mm dia. sanitary sewer within Bearbrook Rd via a proposed 200 mm diameter sanitary service lateral.

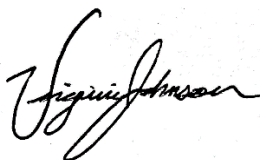
Stormwater Management

- 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 **28.34 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:
LRL Associates Ltd.



Virginia Johnson, P. Eng.
Civil Engineer



APPENDIX A
Pre-consultation / Correspondence



DEVELOPMENT SERVICING STUDY CHECKLIST

Project #: 210628

2022-03-20

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 |
|---|-------------|

| | |
|--|---------------------------|
| 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: Friday, October 29, 2021

Site Location: 98-100 Bearbrook Road

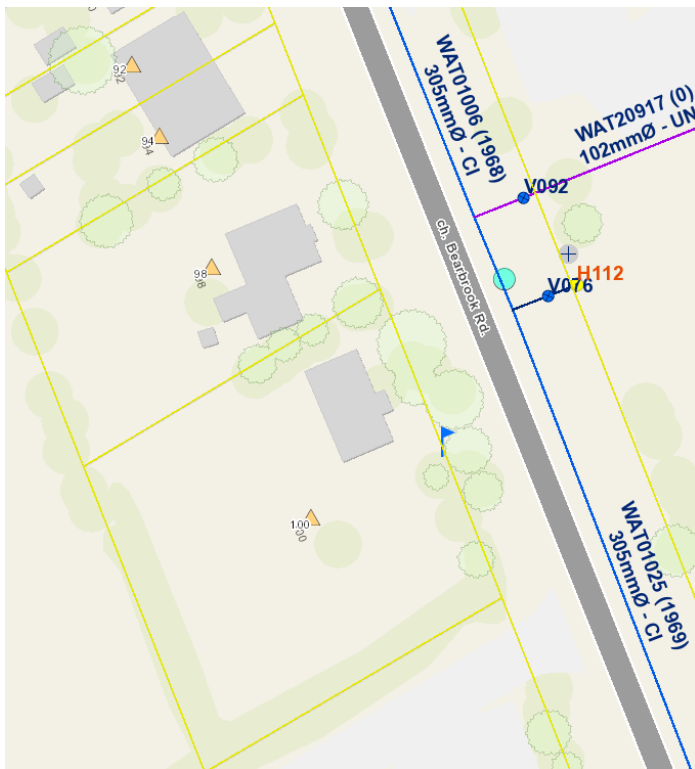
Type of Development: Residential (townhomes, stacked, singles, apartments), Office Space, Commercial, Retail, Institutional, Industrial, Other: N/A

Infrastructure

Water

Existing public services:

- Bearbrook Rd – 305mm CI



Watermain Frontage Fees to be paid (\$190.00 per metre) on Bearbrook Rd **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

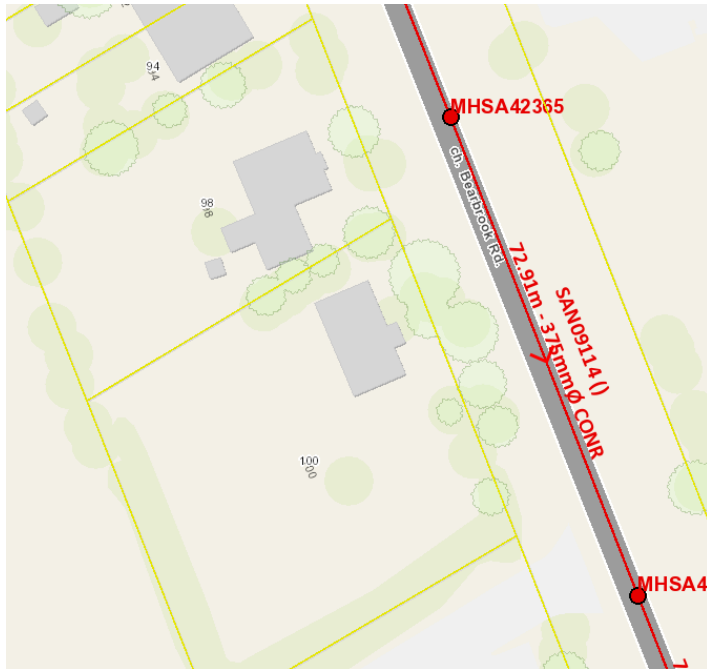
General comments

- 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:

- Bearbrook Rd – 375mm Concr



Is a monitoring manhole required on private property? Yes No

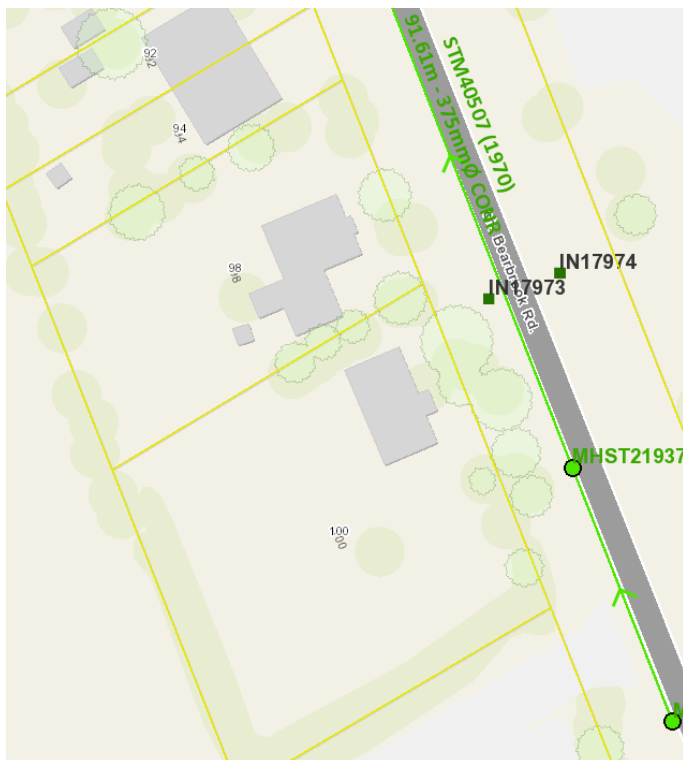
General comments

- 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:

- Bearbrook Rd – 375mm Concr



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 5-year storm event.
- When both underground and above ground storage is utilized, the release rate from the system will significantly differ than when solely one level storage is being used (i.e. greater range of head vs smaller change of head during storm event). If both levels of storage are to be accounted for then there are two options for SWM calculations: 1) use a dynamic computer model or 2) use an assumed average flow rate of half (50%) of the controlled peak flow rate of the area(s) utilizing two levels of storage.

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 | |
| S | | 3. Grade Control and Drainage Plan | 4. Geotechnical Study | S | |
| | | 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 | | 11. Storm water Management Brief | 12. Hydro-geological and Terrain Analysis | | |
| | | 13. Water main Analysis | 14. Noise / Vibration Study | | |
| | | 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: Lludd ap Gwyn <lgwyn@rossmannarchitecture.ca>
Sent: February 3, 2022 4:21 PM
To: Amr Salem
Cc: Pierre Proulx; Matthew Firestone
Subject: Re: LRL210628 - 98/100 Bearbrook - Fireflow Assumptions

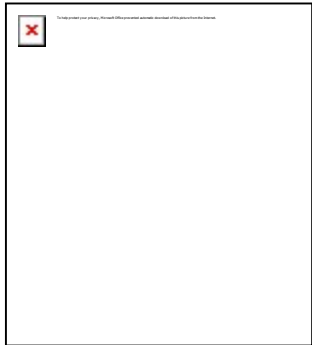
Follow Up Flag: Follow up
Flag Status: Flagged

Afternoon Amr

- Yes those units counts are correct;
- Total building area excluding garage is 14 694.2 sqm, this may change slightly;
- A sprinkler is necessary. I would imagine automatic is the way to go but I defer to Matthew?;
- For the ISO I believe we are doing steel construction with aluminium and masonry at the base so I imagine it will be class 3 or 4. Does that sound about right? Otherwise let me know what more info I can give re that.

I should have updated site plan out tomorrow. For now i've stuck with what I had but we have room to alter the ramps a bit.

Regards,



Lludd ap Gwyn

Chef de Projet - Architecte Stagiaire | Project Lead - Intern Architect

819-600-1555 x 121 | 819-303-0642
88 boul. St-Joseph, Gatineau, QC, J8Y 3W5



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On Thu, Feb 3, 2022 at 3:54 PM Amr Salem <asalem@lrl.ca> wrote:

Hey Llud,

I'm looking to get your input on the following to help me estimate the fireflow demand for the proposed development;

- Can you confirm that a total breakdown of units are as per table below;

| UNIT COUNT | TOWNHOUSE | STUDIO | 1 BEDROOM | 1 BED + DEN | 2 BEDROOM | 3 BEDROOM | TOTAL |
|--------------|-----------|--------|-----------|-------------|-----------|-----------|-------|
| GROUND FLOOR | 7 | | 3 | 4 | 4 | | 18 |
| 2ND FLOOR | (7) | 1 | 4 | 5 | 4 | | 14 |
| 3RD FLOOR | | 1 | 5 | 11 | 4 | | 21 |
| 4TH FLOOR | | 1 | 5 | 11 | 4 | | 21 |
| 5TH FLOOR | | 1 | 5 | 11 | 4 | | 21 |
| 6TH FLOOR | | 1 | 5 | 11 | 4 | | 21 |
| 7TH FLOOR | | 1 | 5 | 11 | 4 | | 21 |
| 8TH FLOOR | | 1 | 5 | 11 | 4 | | 21 |
| 9TH FLOOR | | | | | 7 | 3 | 10 |
| TOTAL | 7 | 7 | 37 | 75 | 39 | 3 | 168 |
| | | | | | | | |
| | | | | | | | |

- Can you confirm the total floor area of building? (excluding garage/basements)
- Can you confirm if sprinklers are proposed for all buildings? If yes, please specify if sprinkler system will be **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 <i>C</i> |
|------------------------------|-----------------------------------|----------------------|
| 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 ($C = 1.5$).

Thank you,

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

Amr Salem

From: Eric Lalande <eric.lalande@rvca.ca>
Sent: February 17, 2022 10:24 AM
To: Amr Salem; Jamie Batchelor
Subject: RE: (LRL210628) 98/100 Bearbrook - SWM Quality Criteria

Hi Amr,

Based on the proposed site plan and location to outlet the RVCA would require enhanced water quality protection be implemented on-site (80% TSS removal).

Additionally, best management practices are encouraged to be added where feasible to maximize quality protection.

Thanks,

Eric Lalande, MCIP, RPP
Planner, RVCA
613-692-3571 x1137

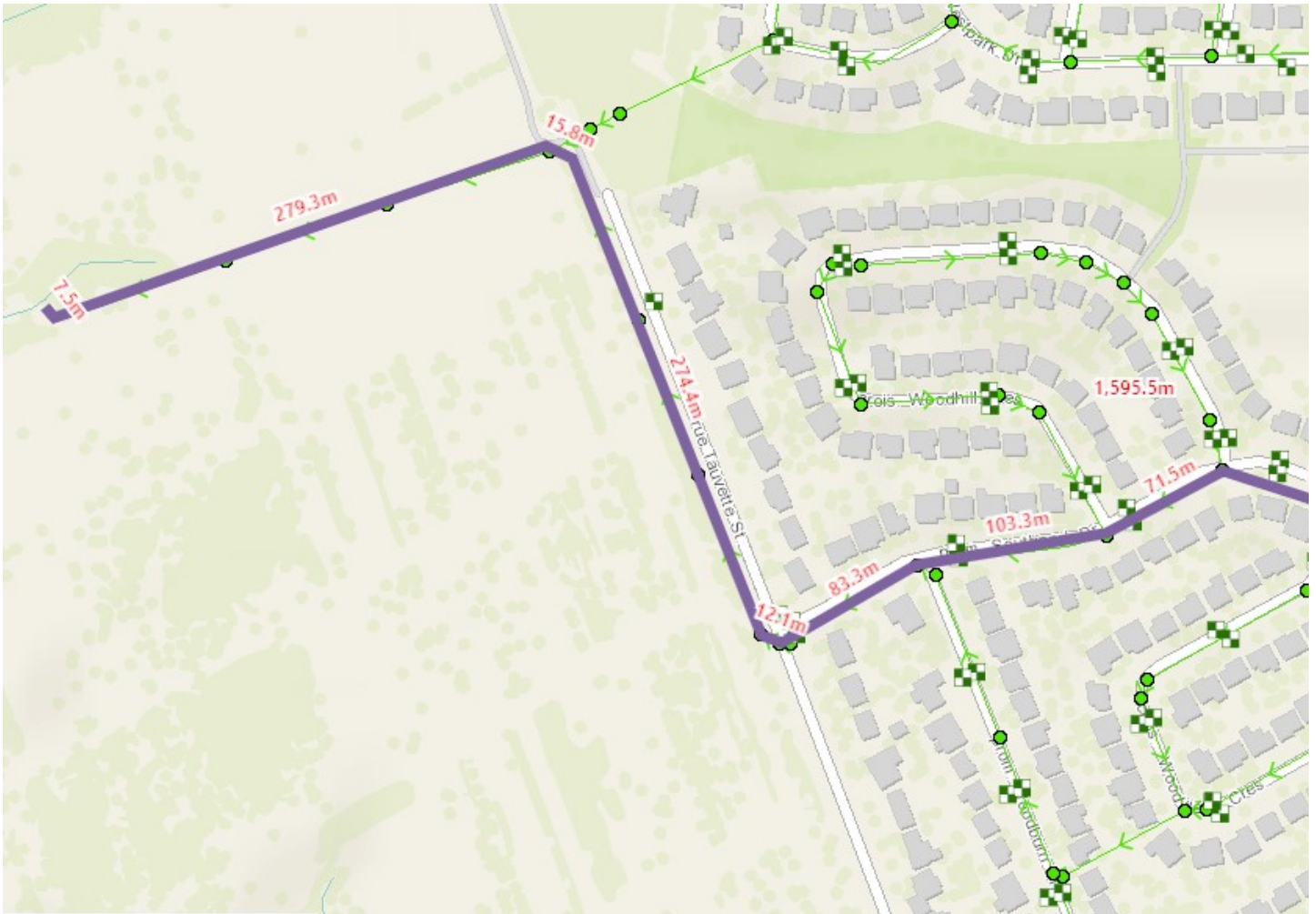
From: Amr Salem <asalem@lrl.ca>
Sent: Thursday, February 17, 2022 10:16 AM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>; Eric Lalande <eric.lalande@rvca.ca>
Subject: (LRL210628) 98/100 Bearbrook - SWM Quality Criteria

Good morning Jamie, Eric,

I'm looking to identify the SWM quality criteria required for our subject site located at 98/100 Bearbrook Rd.

The site is tributary to the Ottawa River East subwatershed and is currently occupied by 2 residential dwellings and landscaping.

The proposed development consist of a 9 storey apartment building with 2 levels of U/G parking and approx. 26 surface parking spots. Runoff from site is proposed to discharge to municipal sewer within Bearbrook and travel 1.6km before it ultimately outlets to a municipal creek.



Can you please confirm the required quality criteria?

Thank you,



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

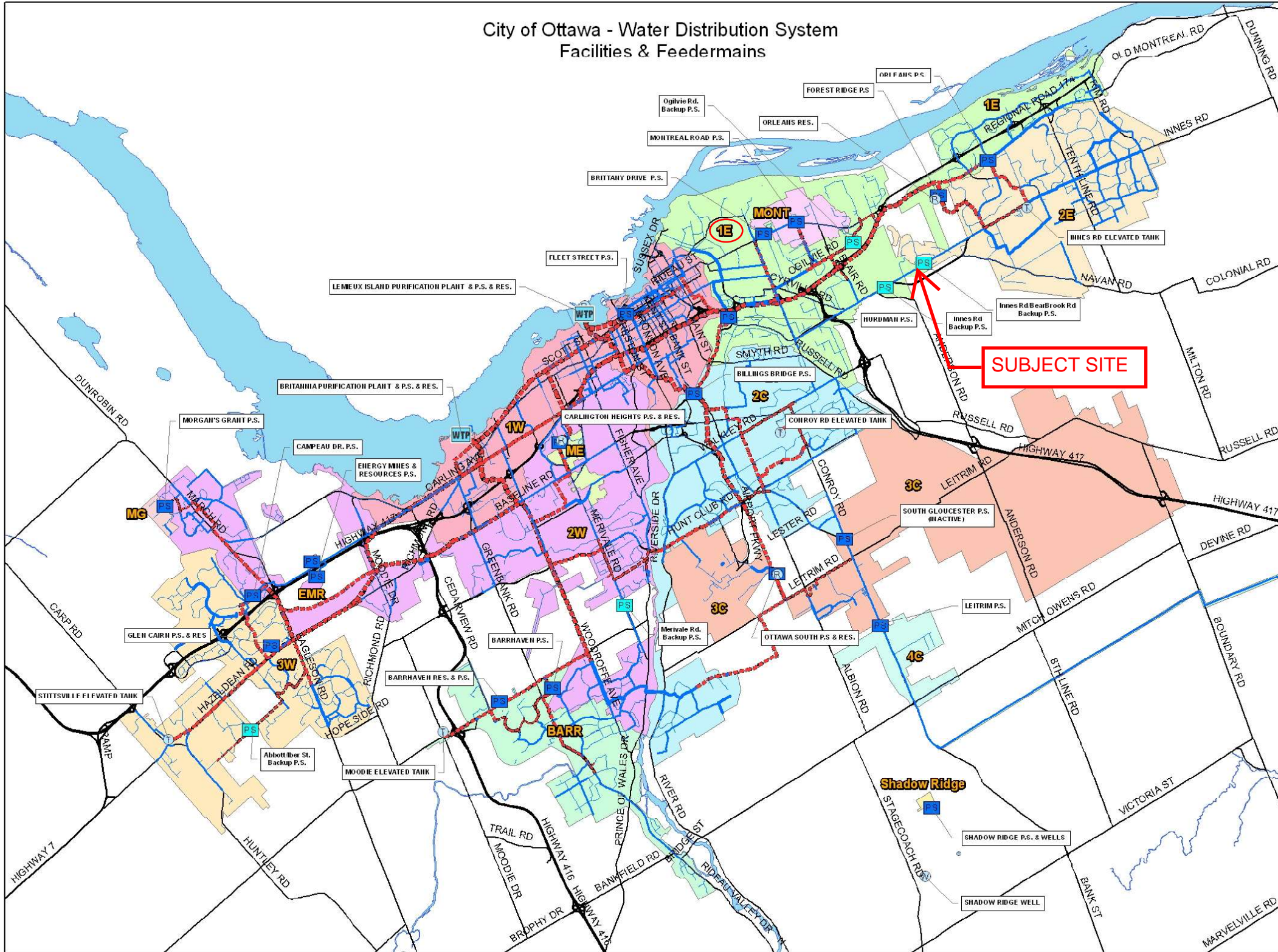
*We care deeply, so let us know how we did by completing our [Customer Satisfaction Survey](#).
 Nous nous soucions profondément de votre opinion, nous vous invitons donc à nous faire savoir
 si nous avons satisfait vos attentes en remplissant notre [sondage sur la satisfaction de la clientèle](#)*



APPENDIX B
Water Supply Calculations



City of Ottawa - Water Distribution System Facilities & Feeder mains



Legend

Water System Structure

- Pump Station
- Backup Pump Station
- Water Treatment Plant
- Well
- Elevated Tank
- Reservoir

WATERMAINS
Priority, Internal Diameter

- Backbone 1524mm - 1981mm
- Backbone 1067mm - 1372mm
- Backbone 610mm - 914mm
- Backbone 406mm - 508mm
- Backbone 152mm - 305mm
- Distribution 1676mm - 1981mm
- Distribution 1067mm - 1372mm
- Distribution 610mm - 914mm
- Distribution 406mm - 508mm
- Distribution 305mm - 381mm

PRESSURE ZONES

- 1E
- 1W
- 2C
- 2E
- 2W
- 3C
- 3W
- 4C
- BARR
- FMR
- ME
- MO
- MONT
- SHAD

Scale: 0, 1,000, 2,000, 4,000, 6,000 Meters

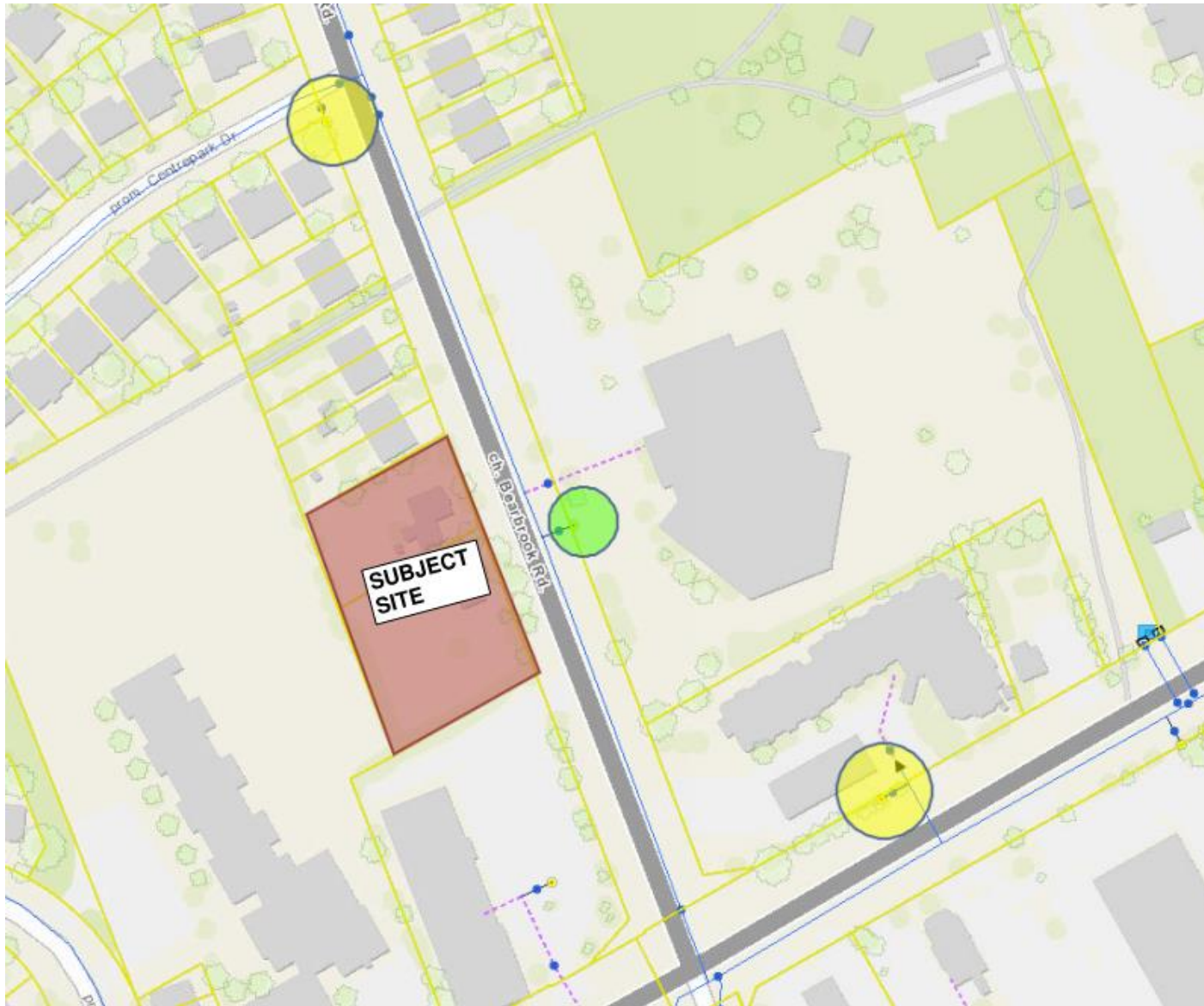
FIGURE 5.1

DRAWN BY: D. BESS DATE: 10 JAN, 2013



Infrastructure Services & Community Sustainability
Infrastructure Services

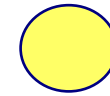
FIRE HYDRANT FIGURE



LEGEND



Hydrants within 75m



Hydrants within 150m

| Distance to buildings ^a | | Maximum capacity ^b | |
|------------------------------------|-----------------|-------------------------------|---------|
| (ft) | (m) | (gpm) | (L/min) |
| ≤ 250 | ≤ 76 | 1500 | 5678 |
| > 250 and ≤ 500 | > 76 and ≤ 152 | 1000 | 3785 |
| > 500 and ≤ 1000 | > 152 and ≤ 305 | 750 | 2839 |

^a Measured in accordance with 18.5.1.4 and 18.5.1.5.

^b Minimum 20 psi (139.9 kPa) residual pressure.



Water Supply Calculations

LRL File No. 210628
 Date March 30, 2022
 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 |
|---------------------|------------------|-----------------|--------------|
| Townhouse | 2.7 | 9 | 24.3 |
| 1 Bedroom Apartment | 1.4 | 119 | 166.6 |
| 2 Bedroom Apartment | 2.1 | 39 | 81.9 |
| 3 Bedroom Apartment | 3.1 | 1 | 3.1 |
| Total | | 168 | 275.9 |

| | | |
|--------------------------------|----------------------|------------------|
| Average Water Consumption Rate | 280 L/c/d | |
| Average Day Demand | 77,252 L/d | 0.89 L/s |
| Maximum Day Factor | 3.7 | (MOE Table 3-3) |
| Maximum Daily Demand | 288,355 L/d | 3.34 L/s |
| Peak Hour Factor | 5.6 | (MOE Table 3-3) |
| Maximum Hour Demand | 1,608,479 L/d | 18.62 L/s |

Water Service Pipe Sizing

$Q = VA$

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

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

Minimum pipe diameter (d) = $(4Q/\pi V)^{1/2}$
 = 0.115 m
 = 115 mm

Proposed pipe diameter (d) = 150 mm
 = 6 Inches



Fire Flow Calculations

LRL File No. 210628
 Date February 17, 2022
 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 | Non-combustible construction | 0.8 | | | |
| | | | Ordinary Construction | 1.0 | | | | | |
| | | | Non-combustible construction | 0.8 | | | | | |
| | | | Fire resistive construction <2 hrs | 0.7 | | | | | |
| | | | Fire resistive construction >2 hrs | 0.6 | | | | | |
| Floor Space Area (A) | | | | | | | | | |
| 2 | | | Total area | | | 14,695 | m ² | | |
| 3 | Obtain fire flow before reductions | Required fire flow | $\text{Fire Flow} = 220 \times C \times A^{0.5}$ | | | | | L/min | 21,335 |
| 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 | 18,135 | |
| | | | 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 | 9,067 | |
| | | | 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 | 10.1 to 20m | 15% | | L/min | 11,334 | |
| | | | East side | >30m | 0% | | | | |
| | | | South side | 20.1 to 30m | 10% | | | | |
| | | | West side | >30m | 0% | 25% | | | |
| Net required fire flow | | | | | | | | | |
| 7 | Obtain fire flow, duration, and volume | | Minimum required fire flow rate (rounded to nearest 1000) | | | | L/min | 11,000 | |
| | | | Minimum required fire flow rate | | | | L/s | 183.3 | |
| | | | Required duration of fire flow | | | | hr | 2.25 | |

Amr Salem

From: Rasool, Rubina <Rubina.Rasool@ottawa.ca>
Sent: March 16, 2022 11:04 AM
To: Amr Salem
Subject: RE: LRL210628 - 98/100 Bearbrook Rd - BC Request + SAN Demands
Attachments: 98 & 100 Bearbrook Rd_15March2022.docx

Hi Amr,

Please see the WBC conditions attached.

Thanks,

Rubina

Rubina Rasool, E.I.T.

Project Manager

Planning, Infrastructure and Economic Development Department - Services de la planification, de l'infrastructure et du développement économique

Development Review – East Branch

City of Ottawa | Ville d'Ottawa

110 Laurier Avenue West Ottawa, ON | 110, avenue Laurier Ouest. Ottawa (Ontario) K1P 1J1 rubina.rasool@ottawa.ca

From: Amr Salem <asalem@lrl.ca>
Sent: February 17, 2022 3:53 PM
To: Rasool, Rubina <Rubina.Rasool@ottawa.ca>
Subject: LRL210628 - 98/100 Bearbrook Rd - BC Request + SAN Demands
Importance: High

CAUTION: This email originated from an External Sender. Please do not click links or open attachments unless you recognize the source.

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Hello Rubina,

I would like to kindly request boundary conditions for the proposed development at *98/100 Bearbrook rd* using the following proposed development demands:

- Type of development: **a 9-storey residential building with underground parking.**
- Proposed Connection Points:
 - **Dual connection to the existing 305mm watermain within Bearbrook Rd;**



- Please provide pressures for the following water demand scenarios required for the proposed development:

| | Demand L/s |
|----------------------|----------------------|
| Avg. Daily | 0.90 |
| Max Day + FUS | 3.34 + 183.3 |
| Peak Hour | 18.62 |

I have also attached the anticipated sanitary flow from the development to identify any capacity constraints as discussed at the preconsult stage.

Thank you,



Amr Salem, PMP®

B.Eng, Civil Engineering Services

LRL Engineering

5430 Canotek Road

Ottawa, Ontario K1J 9G2

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si nous avons satisfait vos attentes en remplissant notre [sondage sur la satisfaction de la clientèle](#)*



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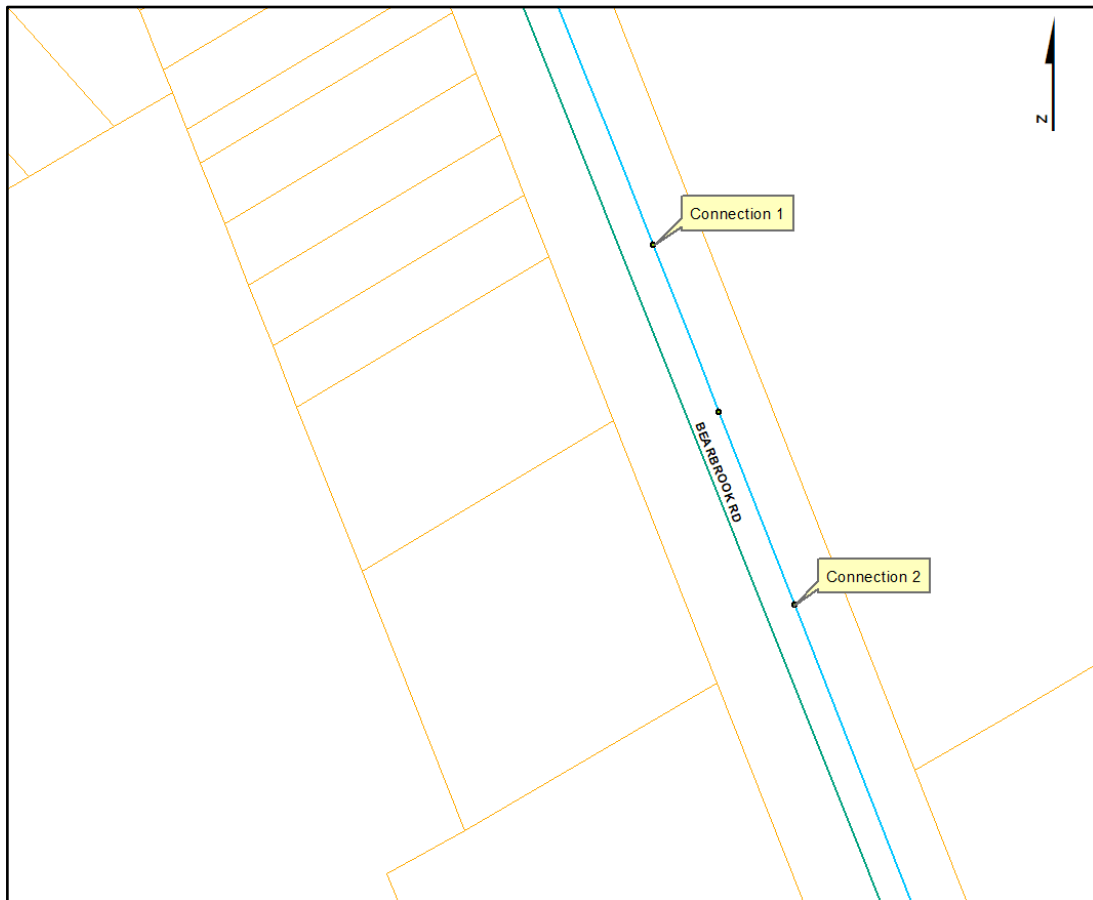
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Boundary Conditions 98 & 100 Bearbrook Road

Provided Information

| Scenario | Demand | |
|----------------------|--------|--------|
| | L/min | L/s |
| Average Daily Demand | 54 | 0.90 |
| Maximum Daily Demand | 200 | 3.34 |
| Peak Hour | 1,117 | 18.62 |
| Fire Flow Demand #1 | 11,000 | 183.33 |

Location



Results

Connection 1 – Bearbrook Rd.

| Demand Scenario | Head (m) | Pressure ¹ (psi) |
|---------------------|----------|-----------------------------|
| Maximum HGL | 115.9 | 58.8 |
| Peak Hour | 110.3 | 50.8 |
| Max Day plus Fire 1 | 92.9 | 26.0 |

Ground Elevation = 74.6 m

Connection 2 – Bearbrook Rd.

| Demand Scenario | Head (m) | Pressure¹ (psi) |
|------------------------|-----------------|-----------------------------------|
| Maximum HGL | 115.9 | 59.0 |
| Peak Hour | 110.3 | 51.0 |
| Max Day plus Fire 1 | 94.3 | 28.3 |

Ground Elevation = 74.4 m

Disclaimer

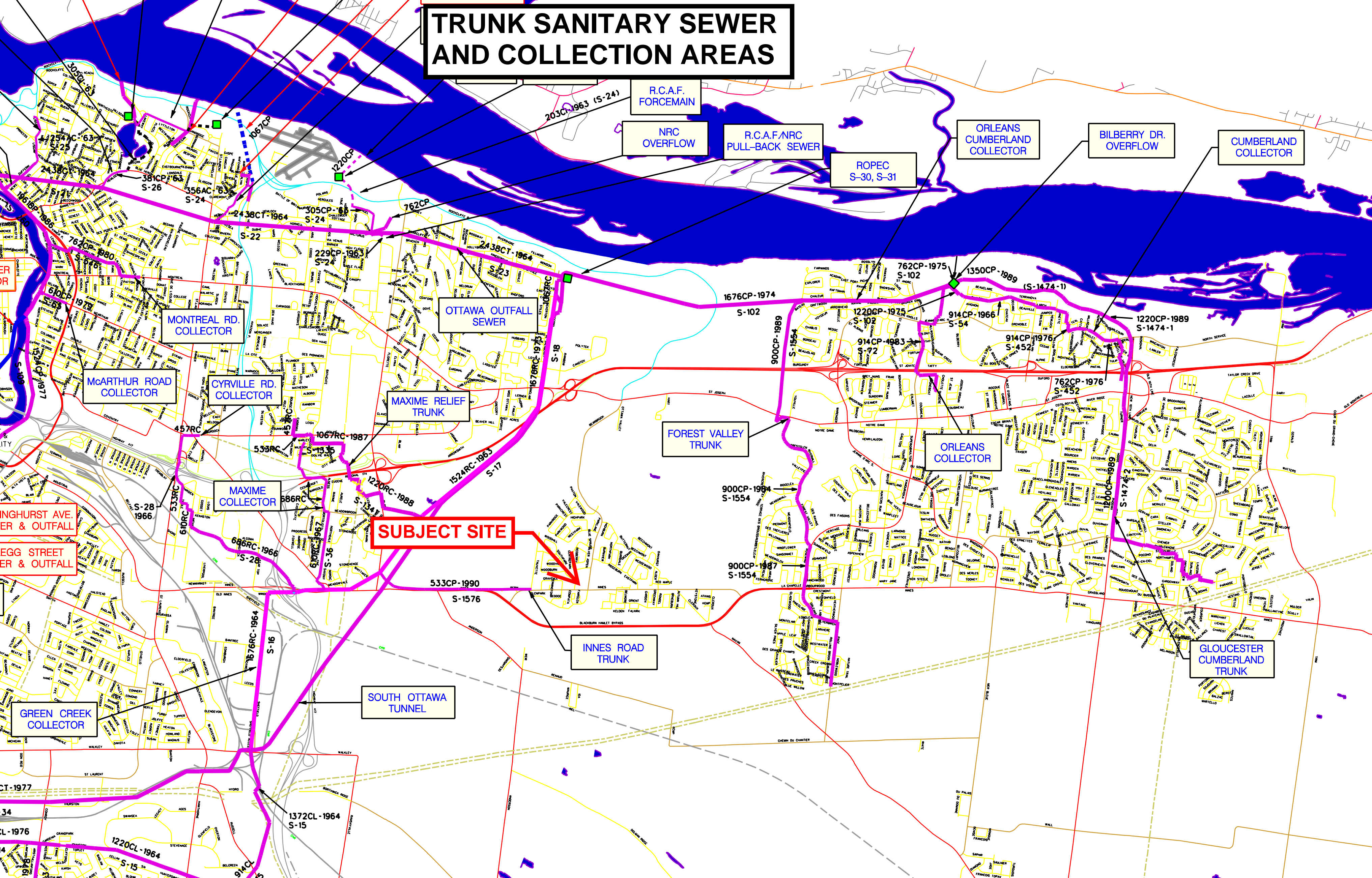
The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary 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



TRUNK SANITARY SEWER AND COLLECTION AREAS



R.C.A.F. FORCEMAIN

NRC OVERFLOW

R.C.A.F./NRC PULL-BACK SEWER

ROPEC S-30, S-31

ORLEANS CUMBERLAND COLLECTOR

BILBERRY DR. OVERFLOW

CUMBERLAND COLLECTOR

OTTAWA OUTFALL SEWER

MONTREAL RD. COLLECTOR

McARTHUR ROAD COLLECTOR

CYRVILLE RD. COLLECTOR

MAXIME RELIEF TRUNK

FOREST VALLEY TRUNK

ORLEANS COLLECTOR

MAXIME COLLECTOR

SUBJECT SITE

INGHURST AVE. OVERFLOW & OUTFALL

EGG STREET OVERFLOW & OUTFALL

INNES ROAD TRUNK

GLOUCESTER CUMBERLAND TRUNK

SOUTH OTTAWA TUNNEL

GREEN CREEK COLLECTOR



LRL File No. 210628
Project: 9-Storey Apartment Bldg
Location: 98/100 Bearbrook Rd
Date: October 20, 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+I | INFILTRATION | | | TOTAL FLOW (l/s) | 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. | | | | | | | | | | | | | | | | | | | | |
| Bearbrook Rd | SAN MH02 | EX. SAN | 0.391 | 276.7 | 0.39 | 276.7 | 3.5 | 3.12 | 0.000 | 0.000 | 0.00 | 0.00 | 7.0 | 0.0 | 0.0 | 0.00 | 0.391 | 0.391 | 0.13 | 3.24 | 13.1 | 200 | 2.00% | PVC | 46.38 | 1.48 |
| | Bldg | SAN MH 02 | 0.000 | 0.0 | 0.39 | 0.0 | 3.5 | 0.00 | | | | | | | | | 0.000 | 0.391 | 0.13 | 3.24 | 0.6 | 200 | 2.00% | PVC | 21.54 | 1.22 |

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

| | | | |
|--------------------------|----------------------------------|---------------------|---------------------|
| Designed: A.S. | PROJECT: Apartment Building | | |
| Checked: V.J. | LOCATION: 98/100 Bearbrook Rd | | |
| Dwg. Reference: C.401 | File Ref.: 210628 | Date: 2023-11-21 | Sheet No. 1 of 1 |

Amr Salem

From: Rasool, Rubina <Rubina.Rasool@ottawa.ca>
Sent: March 28, 2022 9:53 AM
To: Amr Salem
Subject: RE: LRL210628 - 98/100 Bearbrook Rd - BC Request + SAN Demands

Hi Amr,

There are no sanitary capacity concerns with the proposed flows.

Best,

Rubina

Rubina Rasool, E.I.T.

Project Manager

Planning, Infrastructure and Economic Development Department - Services de la planification, de l'infrastructure et du développement économique

Development Review – East Branch

City of Ottawa | Ville d'Ottawa

110 Laurier Avenue West Ottawa, ON | 110, avenue Laurier Ouest. Ottawa (Ontario) K1P 1J1 rubina.rasool@ottawa.ca

From: Amr Salem <asalem@lrl.ca>
Sent: March 22, 2022 2:30 PM
To: Rasool, Rubina <Rubina.Rasool@ottawa.ca>
Subject: RE: LRL210628 - 98/100 Bearbrook Rd - BC Request + SAN Demands

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Can you confirm the City has reviewed the anticipated sanitary demand as well and confirms there is sufficient capacity in the downstream municipal sewers to accommodate the proposed development?



Regards,

Amr Salem, PMP®

B.Eng, Civil Engineering Services

LRL Engineering

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Ottawa, Ontario K1J 9G2

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APPENDIX D
Stormwater Management Calculations
Watts Roof Drain Specification
Hydrovex ICD
Stormceptor OGS



LRL Associates Ltd.
Storm Watershed Summary



LRL File No. 210628
Project: New 9-Storey Apartment Building
Location: 98/100 Bearbrook Rd
Date: October 20, 2023
Designed: Amr Salem
Drawing Reference: C701/C702

Pre-Development Catchments

| WATERSHED | C = 0.2 | C = 0.80 | C = 0.90 | Total Area (m ²) | Total Area (ha) | Combined C |
|--------------|---------------|------------|--------------|------------------------------|-----------------|-------------|
| EWS-01 | 3640.0 | 0.0 | 274.0 | 3914.0 | 0.391 | 0.25 |
| TOTAL | 3640.0 | 0.0 | 274.0 | 3914.0 | 0.391 | 0.25 |

Post-Development Catchments

| WATERSHED | C = 0.20 | C = 0.70 | C = 0.90 | Total Area (m ²) | Total Area (ha) | Combined C |
|-----------------------------|--------------|--------------|---------------|------------------------------|-----------------|-------------|
| WS-01A(CISTERN-CONTROLLED) | | 130.0 | 357.0 | 487.0 | 0.049 | 0.85 |
| WS-01B (UN-CONTROLLED) | 131.0 | | | 131.0 | 0.013 | 0.20 |
| WS-02 (ROOF -CONTROLLED) | | | 1194.0 | 1194.0 | 0.119 | 0.90 |
| WS-03A (CONTROLLED) | 18.0 | | 324.0 | 342.0 | 0.034 | 0.86 |
| WS-03B (CONTROLLED) | 39.0 | | 319.0 | 358.0 | 0.036 | 0.82 |
| WS-04 (CISTERN -CONTROLLED) | 111.0 | 160.0 | 1131.0 | 1402.0 | 0.140 | 0.82 |
| TOTAL | 299.0 | 290.0 | 3325.0 | 3914.0 | 0.392 | 0.76 |



LRL File No: 210628
 Project: New 8-Storey Apartment Building
 Location: 86100 Beaufort Rd
 Date: October 20, 2023
 Designed: Ann Salem
 Drawn/Rev: C.601

Stormwater Management
 Design Sheet

Runoff Equation

$Q = 2.78CA(L/s)$
 $C =$ Runoff coefficient
 $I =$ Rainfall intensity (mm/hr) = $A / (Td + C)^2$
 $A =$ Area (ha)
 $T_c =$ Time of concentration (min)

Pre-development Stormwater Management

$I_p = 998.071 / (Td + 6.053)^{0.888}$ $a = 998.071$ $b = 0.814$ $C = 6.053$

$C = 0.25$
 $I = 106.2$ mm/hr
 $T_c = 10$ min
 Total Area = 0.391 ha
 Allowable Release Rate = 28.34 L/s

Post-development Stormwater Management

| | | | 1R ₁₀₀ | | 1R ₁₀ | |
|--------------|----------------------|-------|-------------------|-------------------|-------------------|------------------|
| | | | IR ₁₀₀ | IR ₁₀ | IR ₁₀₀ | IR ₁₀ |
| Controlled | Total Site Area = | 0.392 | ha | IR ₁₀₀ | 0.85 | 1.00 |
| | WS-03A (Catchment) | 0.048 | ha | IR ₁₀₀ | 0.85 | 1.00 |
| | WS-02 (Roof) | 0.119 | ha | IR ₁₀₀ | 0.90 | 1.00 |
| | WS-03B | 0.036 | ha | IR ₁₀₀ | 0.88 | 1.00 |
| | WS-04 (Catchment) | 0.142 | ha | IR ₁₀₀ | 0.82 | 1.00 |
| Uncontrolled | Total Uncontrolled = | 0.378 | ha | IR ₁₀₀ | 0.85 | 1.00 |
| | WS-01B | 0.013 | ha | IR ₁₀₀ | 0.85 | 1.00 |
| | Total Uncontrolled = | 0.913 | ha | IR ₁₀₀ | 0.85 | 1.00 |

Post-development Stormwater Management (Uncontrolled Catchment WS-01B)

100 Year Storm Event:

$I_{100} = 1735.688 / (Td + 6.014)^{0.888}$ $a = 1735.688$ $b = 0.820$ $C = 6.014$

| Time (min) | Intensity (mm/hr) | Uncontrolled Runoff (L/s) | Controlled Release Rate Constant (L/s) | Total Release Rate (L/s) |
|------------|-------------------|---------------------------|--|--------------------------|
| 10 | 178.6 | 6.50 | 0.00 | 6.50 |

Post-development Stormwater Management (WS-03A, WS-03B)

100 Year Storm Event:

$I_{100} = 1735.688 / (Td + 6.014)^{0.888}$ $a = 1735.688$ $b = 0.820$ $C = 6.014$

| 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 (m³) | | | |
| 10 | 178.6 | 34.95 | 15.73 | 0.03 | 0.00 | 0.03 |
| 15 | 142.9 | 27.89 | 17.33 | 0.03 | 0.00 | 0.03 |
| 20 | 120.0 | 21.41 | 17.28 | 0.03 | 0.00 | 0.03 |
| 25 | 103.8 | 20.27 | 17.45 | 0.03 | 0.00 | 0.03 |
| 30 | 91.9 | 17.93 | 16.74 | 0.03 | 0.00 | 0.03 |
| 35 | 82.6 | 16.12 | 16.72 | 0.03 | 0.00 | 0.03 |
| 40 | 75.1 | 14.67 | 14.48 | 0.03 | 0.00 | 0.03 |
| 45 | 69.1 | 13.48 | 13.08 | 0.03 | 0.00 | 0.03 |
| 50 | 64.0 | 12.48 | 11.95 | 0.03 | 0.00 | 0.03 |
| 55 | 60.0 | 11.61 | 8.25 | 0.03 | 0.00 | 0.03 |
| 60 | 56.9 | 6.72 | 4.26 | 0.03 | 0.00 | 0.03 |
| 70 | 41.1 | 8.02 | 0.00 | 0.03 | 0.00 | 0.03 |
| 80 | 35.2 | 6.87 | 0.00 | 0.03 | 0.00 | 0.03 |
| 90 | 30.9 | 6.03 | 0.00 | 0.03 | 0.00 | 0.03 |
| 100 | 27.6 | 5.39 | 0.00 | 0.03 | 0.00 | 0.03 |
| 120 | 25.0 | 4.88 | 0.00 | 0.03 | 0.00 | 0.03 |

Total Storage Required = 17.73 m³
 Available Storage = 16.07 m³ refer to LRL Plan C.601

Post-development Stormwater Management (WS-04 & WS 01-A)

100 Year Storm Event:

$I_{100} = 1735.688 / (Td + 6.014)^{0.888}$ $a = 1735.688$ $b = 0.820$ $C = 6.014$

| 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 (m³) | | | |
| 10 | 178.6 | 93.77 | 83.14 | 5.21 | 0.00 | 5.21 |
| 15 | 142.9 | 73.04 | 82.86 | 5.21 | 0.00 | 5.21 |
| 20 | 120.0 | 62.99 | 69.34 | 5.21 | 0.00 | 5.21 |
| 25 | 103.8 | 64.93 | 73.99 | 5.21 | 0.00 | 5.21 |
| 30 | 91.9 | 48.24 | 77.46 | 5.21 | 0.00 | 5.21 |
| 35 | 82.6 | 43.37 | 80.13 | 5.21 | 0.00 | 5.21 |
| 40 | 75.1 | 39.46 | 82.20 | 5.21 | 0.00 | 5.21 |
| 45 | 69.1 | 36.26 | 83.84 | 5.21 | 0.00 | 5.21 |
| 50 | 64.0 | 33.68 | 86.12 | 5.21 | 0.00 | 5.21 |
| 55 | 59.9 | 29.35 | 88.91 | 5.21 | 0.00 | 5.21 |
| 60 | 56.9 | 26.15 | 87.03 | 5.21 | 0.00 | 5.21 |
| 70 | 49.8 | 21.99 | 88.45 | 5.21 | 0.00 | 5.21 |
| 80 | 41.1 | 18.49 | 87.82 | 5.21 | 0.00 | 5.21 |
| 90 | 35.2 | 16.23 | 86.92 | 5.21 | 0.00 | 5.21 |
| 100 | 30.9 | 14.50 | 83.81 | 5.21 | 0.00 | 5.21 |
| 120 | 25.0 | 13.13 | 86.63 | 5.21 | 0.00 | 5.21 |

Total Storage Required = 88.45 m³
 Available CISTERN Storage = 89.00 m³ refer to LRL Plan C.601

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

100 Year Storm Event:

$I_{100} = 1735.688 / (Td + 6.014)^{0.888}$ $a = 1735.688$ $b = 0.820$ $C = 6.014$

| 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 (m³) | | | |
| 10 | 178.6 | 59.27 | 30.76 | 8.00 | 0.00 | 8.00 |
| 15 | 142.9 | 47.43 | 36.49 | 8.00 | 0.00 | 8.00 |
| 20 | 120.0 | 39.82 | 38.18 | 8.00 | 0.00 | 8.00 |
| 25 | 103.8 | 34.47 | 39.71 | 8.00 | 0.00 | 8.00 |
| 30 | 91.9 | 30.49 | 40.69 | 8.00 | 0.00 | 8.00 |
| 35 | 82.6 | 27.41 | 40.76 | 8.00 | 0.00 | 8.00 |
| 40 | 75.1 | 24.94 | 40.65 | 8.00 | 0.00 | 8.00 |
| 45 | 69.1 | 22.92 | 40.28 | 8.00 | 0.00 | 8.00 |
| 50 | 64.0 | 21.23 | 39.69 | 8.00 | 0.00 | 8.00 |
| 55 | 59.9 | 19.85 | 37.09 | 8.00 | 0.00 | 8.00 |
| 60 | 56.9 | 18.53 | 35.81 | 8.00 | 0.00 | 8.00 |
| 70 | 49.8 | 14.93 | 33.28 | 8.00 | 0.00 | 8.00 |
| 80 | 41.1 | 13.65 | 30.49 | 8.00 | 0.00 | 8.00 |
| 90 | 37.9 | 12.68 | 27.49 | 8.00 | 0.00 | 8.00 |
| 100 | 35.2 | 11.68 | 24.32 | 8.00 | 0.00 | 8.00 |
| 120 | 32.9 | 10.92 | 21.02 | 8.00 | 0.00 | 8.00 |



$V = (1/3) * L * H * W$

Summary of Roof Storage

Maximum Required Roof Storage (100 Year) = 40.76 m³
 Proposed Head = 160 mm
 Control Flow/Drain = 1.60 L/s
 Number of Roof Drains = 6
 Total Flow from Roof Drains = 9.60 L/s
 Available Roof Surface = 1376 m²
 Effective Roof Surface = 1005 m²
 Available Roof Storage = 43.13 m³
 Roof Drain Model = MURPHOC modulated control flow dome strainer (2 HDL)

*An Emergency overflow scupper is provided above this height.

77

(% of total roof surface)

Total Storage Required = 40.76 m³
 Available Roof Storage = 43.13 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 (m³) | Total Available Storage (m³) |
|----------------------------|--------------------|-----------------------------|--------------------------------|------------------------------|
| WS-01B | 0.013 | 6.50 | 0 | 0 |
| WS-02 (Roof Controls) | 0.119 | 8.00 | 40.76 | 41.13 |
| WS-03A & WS-03B | 0.075 | 8.63 | 17.73 | 18.07 |
| WS-03A & WS-04 (Catchment) | 0.399 | 6.21 | 86.46 | 86.69 |
| TOTAL: | 0.597 | 28.34 | 146.94 | 146.23 |



LRL File No. 210628
 Project: New 9-Storey Apartment Building
 Location: 98/100 Bearbrook Rd
 Date: October 16, 2023
 Designed: Amr Salem
 Drawing Ref.: C.601

Stormwater Management
Design Sheet

Runoff Equation

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

Pre-development Stormwater Management

$I_2 = 998.071 / (Td + 6.053)^{0.814}$ a = 998.071 b = 0.814 C = 6.053
 C = 0.25 max of 0.5 as per City of Ottawa
 I = 104.2 mm/hr
 T_c = 10 min
 Total Area = 0.391 ha
 Allowable Release Rate = 28.34 L/s

Post-development Stormwater Management

| | | | | ΣR= | ΣR _{2&5} | ΣR ₁₀₀ |
|----------------------|------------------------------|--------------|-----------|------------|-----------------------|-------------------|
| | Total Site Area = | 0.427 | ha | | 0.85 | 1.00 |
| Controlled | WS-01 A (Cistern) | 0.049 | ha | R= | 0.85 | 1.00 |
| | WS-02 (Roof) | 0.119 | ha | R= | 0.90 | 1.00 |
| | WS-03 A | 0.034 | ha | R= | 0.86 | 1.00 |
| | WS-03 B | 0.036 | ha | R= | 0.82 | 1.00 |
| | WS-04 (Cistern) | 0.140 | ha | R= | 0.82 | 1.00 |
| | Total Controlled = | 0.379 | ha | ΣR= | 0.85 | 1.00 |
| Un-controlled | WS-01 | 0.049 | ha | R= | 0.85 | 1.00 |
| | Total Un-Controlled = | 0.049 | ha | ΣR= | 0.85 | 1.00 |

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

2 Year Storm Event:
 $I_2 = 732.951 / (Td + 6.199)^{0.810}$ a = 732.951 b = 0.810 C = 6.199

| Time (min) | Intensity (mm/hr) | Uncontrolled Runoff (L/s) | Controlled Release Rate Constant (L/s) | Total Release Rate (L/s) |
|------------|-------------------|---------------------------|--|--------------------------|
| 10 | 76.8 | 8.80 | 0.00 | 8.80 |

Post-development Stormwater Management (WS-03A & WS-03B)

2 Year Storm Event:
 $I_2 = 732.951 / (Td + 6.199)^{0.810}$ a = 732.951 b = 0.810 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 | 12.61 | 4.97 | 4.32 | 0.00 | 4.32 |
| 15 | 61.8 | 10.14 | 5.24 | 4.32 | 0.00 | 4.32 |
| 20 | 52.0 | 8.54 | 5.07 | 4.32 | 0.00 | 4.32 |
| 25 | 45.2 | 7.41 | 4.65 | 4.32 | 0.00 | 4.32 |
| 30 | 40.0 | 6.57 | 4.06 | 4.32 | 0.00 | 4.32 |
| 35 | 36.1 | 5.92 | 3.37 | 4.32 | 0.00 | 4.32 |
| 40 | 32.9 | 5.39 | 2.59 | 4.32 | 0.00 | 4.32 |
| 45 | 30.2 | 4.96 | 1.75 | 4.32 | 0.00 | 4.32 |
| 50 | 28.0 | 4.60 | 0.86 | 4.32 | 0.00 | 4.32 |
| 60 | 24.6 | 4.03 | 0.00 | 4.32 | 0.00 | 4.32 |
| 70 | 21.9 | 3.60 | 0.00 | 4.32 | 0.00 | 4.32 |
| 90 | 18.1 | 2.98 | 0.00 | 4.32 | 0.00 | 4.32 |
| 110 | 15.6 | 2.56 | 0.00 | 4.32 | 0.00 | 4.32 |
| 130 | 13.7 | 2.25 | 0.00 | 4.32 | 0.00 | 4.32 |
| 150 | 12.3 | 2.01 | 0.00 | 4.32 | 0.00 | 4.32 |
| 170 | 11.1 | 1.82 | 0.00 | 4.32 | 0.00 | 4.32 |

* Controlled release rate reduced to 50% for underground storage calculations

Total Storage Required = 5.24 m³
 Available Underground Storage = 5.38 m³ refer to LRL Plan C.601

Underground Storage

| Oversized Pipe | dia (m) | A(m ²) | L(m) | V(m ³) |
|----------------|---------|--------------------|------|--------------------|
| STM Sewer | 0.200 | 0.031 | 3.4 | 0.11 |
| STM Sewer | 0.300 | 0.071 | 33.5 | 2.37 |
| Total | | | | 2.47 |
| CBMH | dia (m) | A(m ²) | H(m) | V(m ³) |
| CB01 | 0.6*0.6 | 0.360 | 1.00 | 0.36 |
| CB02 | 0.6*0.6 | 0.360 | 0.70 | 0.25 |
| STM MH 200 | 1.2 | 1.131 | 1.08 | 1.22 |
| STM MH 201 | 1.2 | 1.131 | 0.95 | 1.07 |
| Total | | | | 2.91 |

LRL Associates Ltd.
Storm Design Sheet



LRL File No. 210628
Project: New 9-Storey Apartment Building
Location: 98/100 Bearbrook Rd
Date: October 20, 2023
Designed: Amr Salem
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

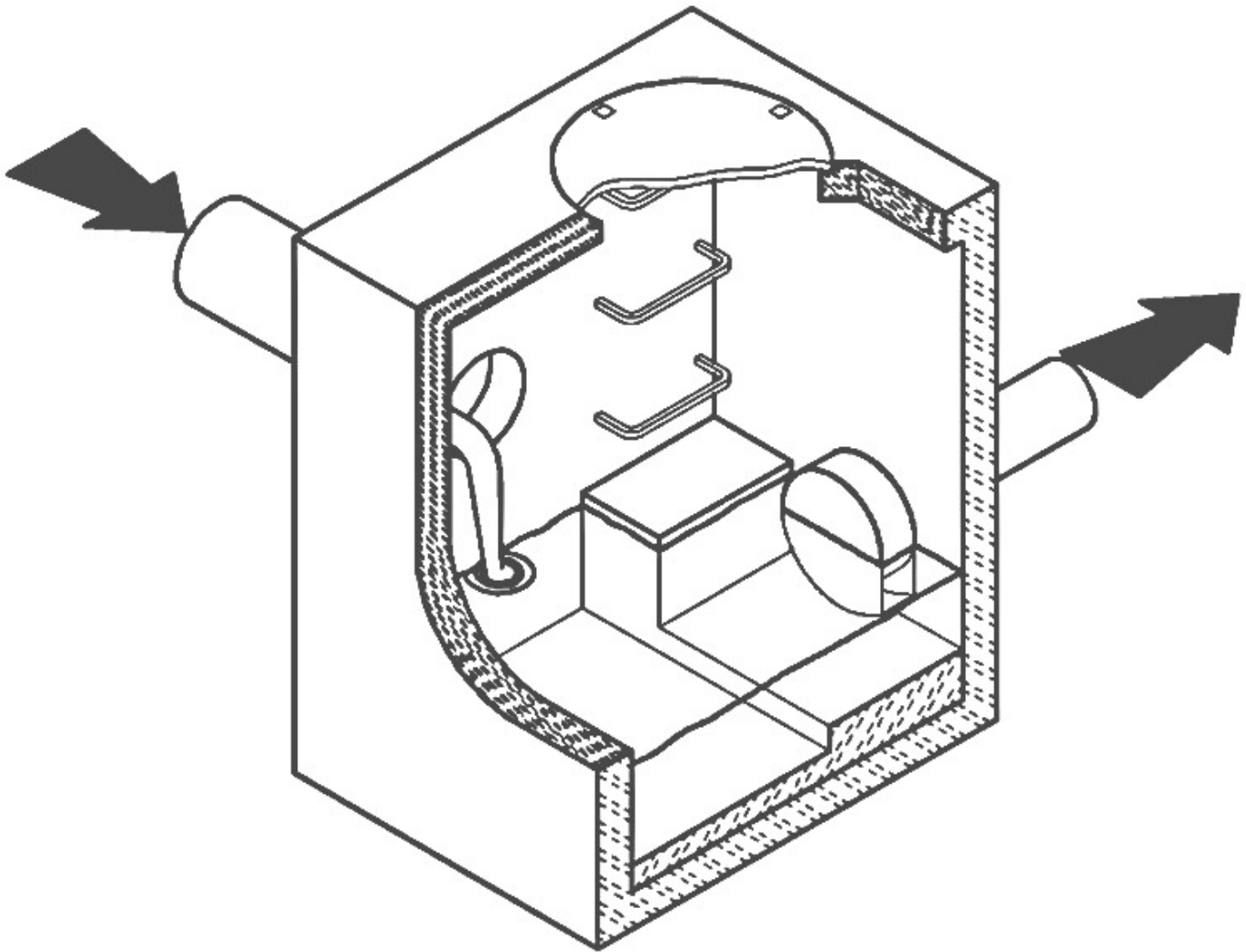
Ottawa Macdonald-Cartier International Airport IDF curve
equation (5 year event, intensity in mm/hr)
 $I_5 = 998.071 / (Td + 6.053)^{0.814}$
Min. velocity = 0.80 m/s
Manning's "n" = 0.013

| LOCATION | | | AREA (ha) | | | FLOW | | | | | | STORM SEWER | | | | | | | |
|---|------------|-----------|-----------|----------|----------|---------------|---------------|----------------------|----------------------------|-------------------|-------------------------|--------------------|------|-----------|------------|---------------------|---------------------|---------------------|------------------------------|
| WATERSHED / STREET | From MH | To MH | C = 0.20 | C = 0.70 | C = 0.90 | Indiv. 2.78AC | Accum. 2.78AC | Time of Conc. (min.) | Rainfall Intensity (mm/hr) | Peak Flow Q (L/s) | Controlled Flow Q (L/s) | Pipe Diameter (mm) | Type | Slope (%) | Length (m) | Capacity Full (L/s) | Velocity Full (m/s) | Time of Flow (min.) | Ratio (Q/Q _{FULL}) |
| WS-01 A & WS-02 & WS-03A & WS-03B & WS-04 | STM MH 200 | OGS | 0.017 | 0.029 | 0.333 | 0.898 | 0.90 | 10.00 | 104.2 | 93.53 | 21.84 | 300 | PVC | 0.50% | 7.9 | 68.4 | 0.97 | 0.14 | 1.37 |
| | OGS | STM MH100 | | | | | 0.90 | 10.14 | 103.5 | 92.89 | 21.84 | 300 | PVC | 1.00% | 11.7 | 96.7 | 1.37 | 0.14 | 0.96 |

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.

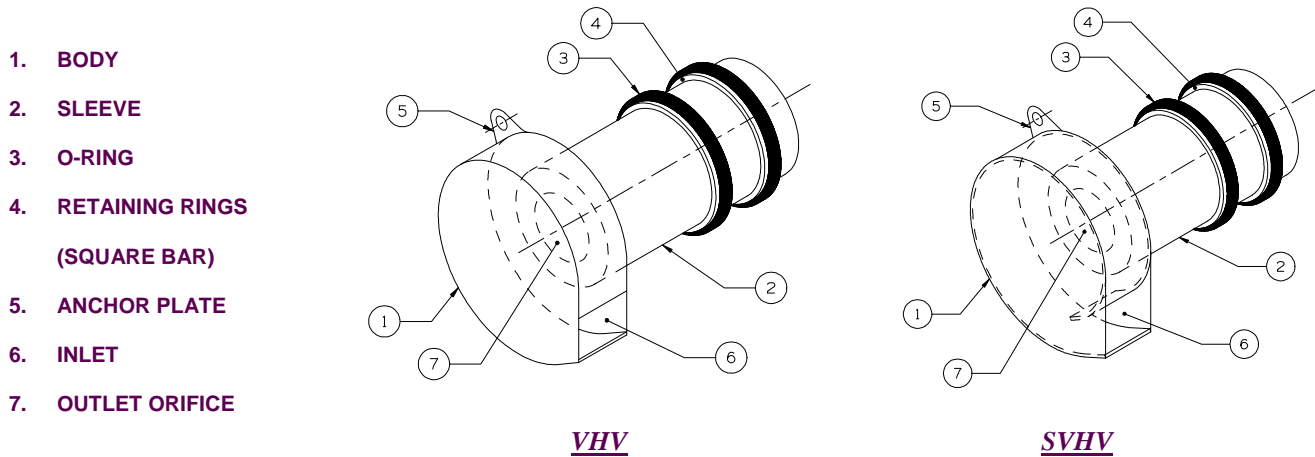


FIGURE 1: HYDROVEX® VHV-SVHV VERTICAL VORTEX FLOW REGULATORS

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.

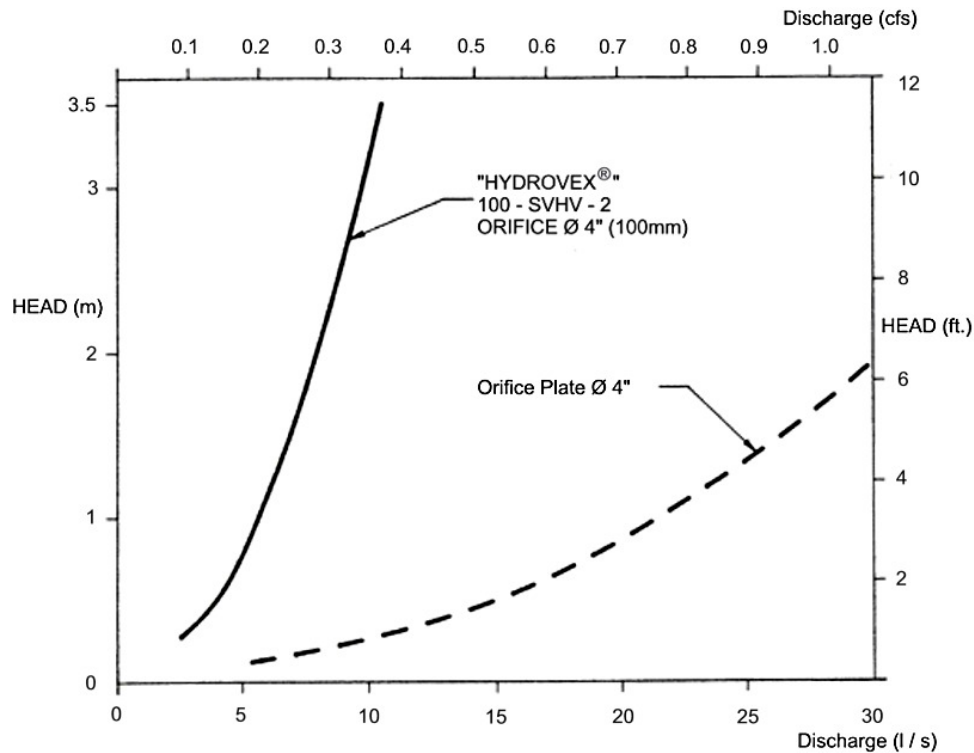


FIGURE 2: DISCHARGE CURVE SHOWING A HYDROVEX® FLOW REGULATOR VS AN ORIFICE PLATE

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

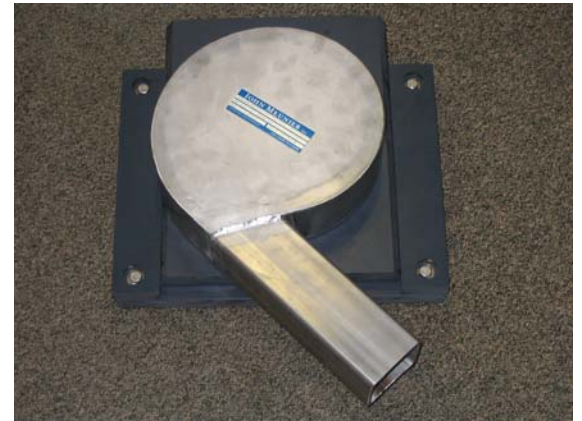
OPTIONS



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

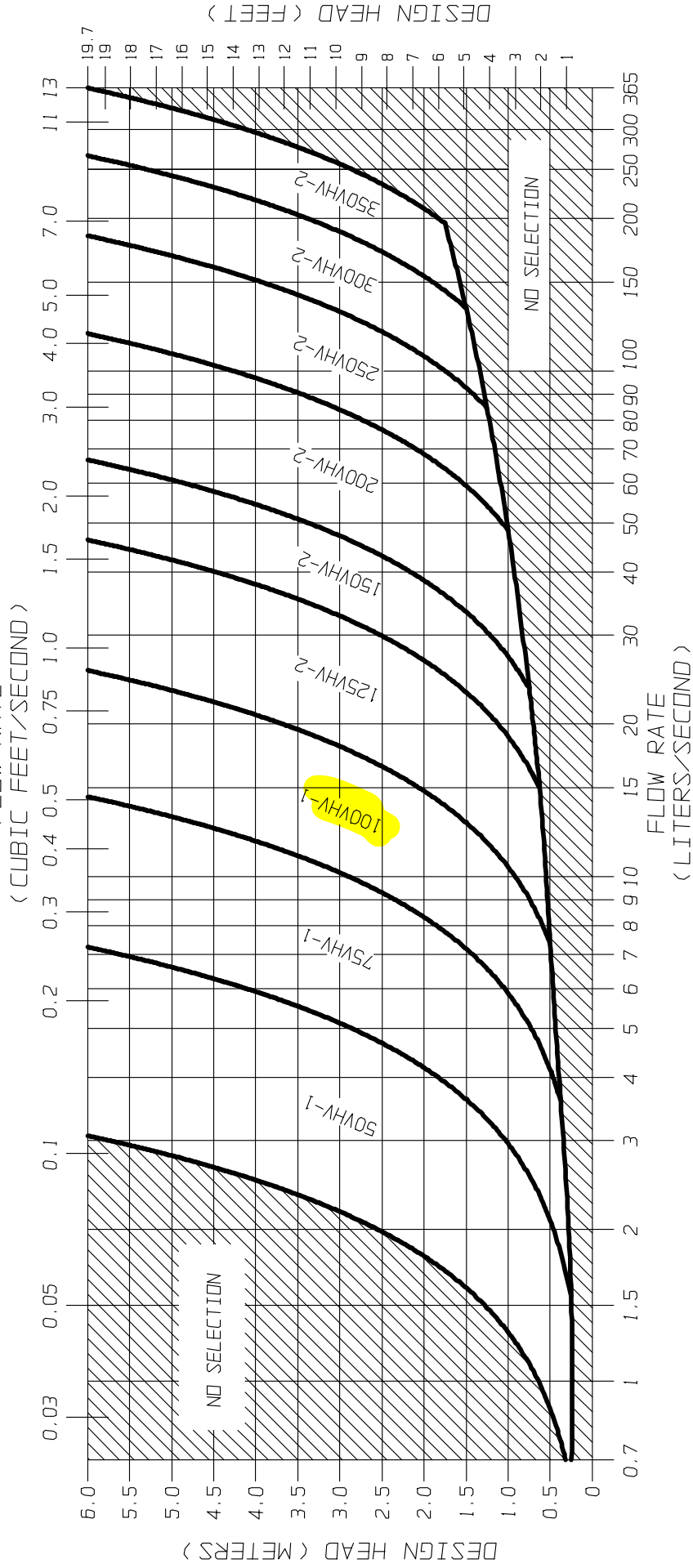


FIGURE 3 - VHV

JOHN MEUNIER



SVHV Vertical Vortex Flow Regulator

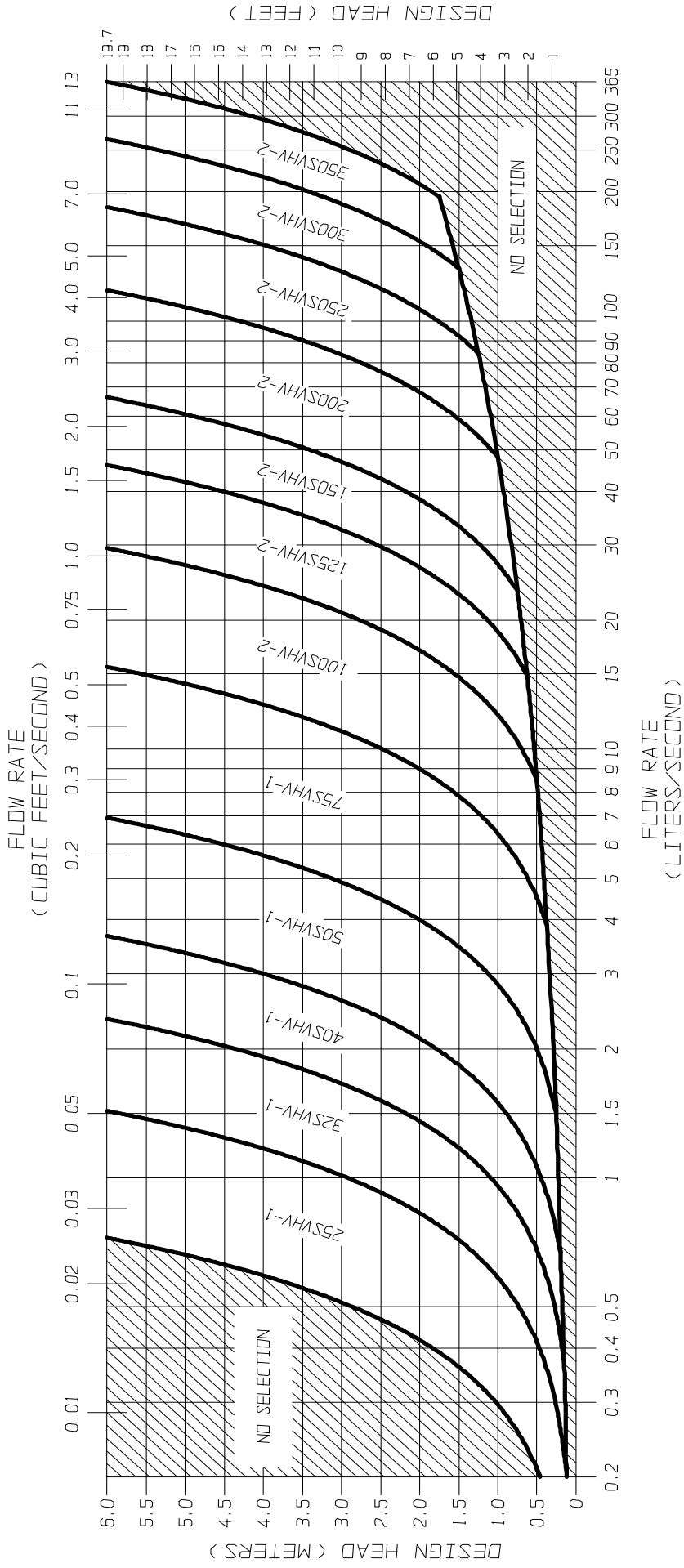
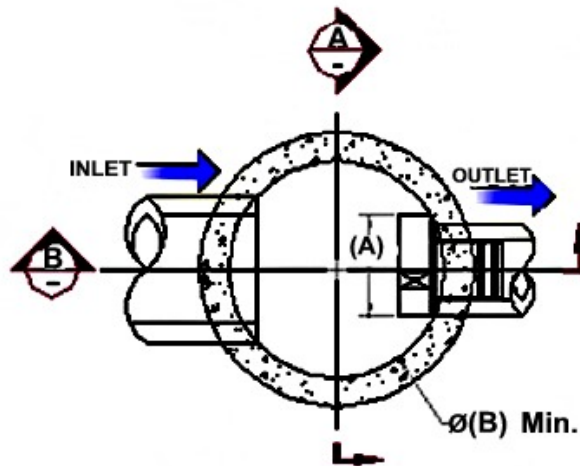


FIGURE 3 - SVHV

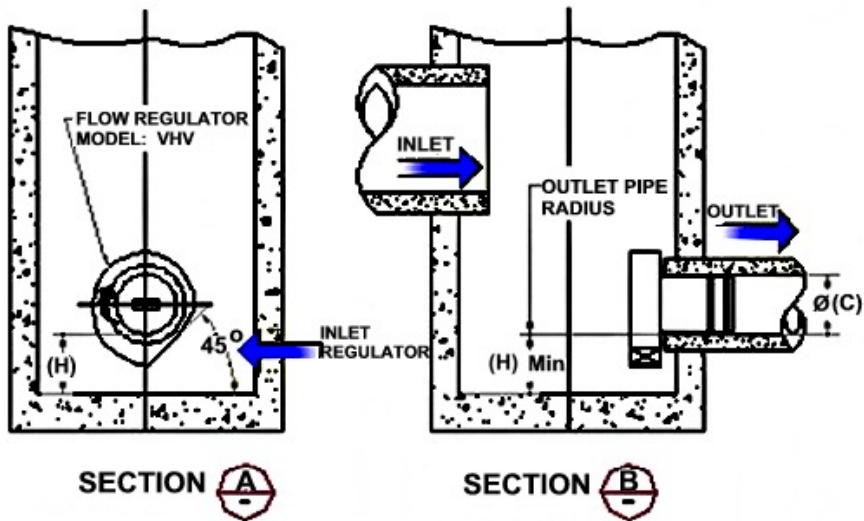
JOHN MEUNIER

**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

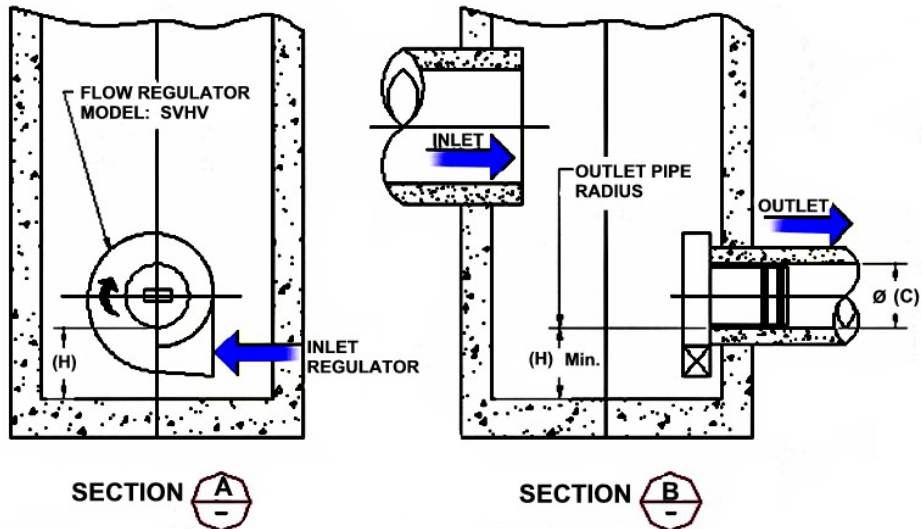
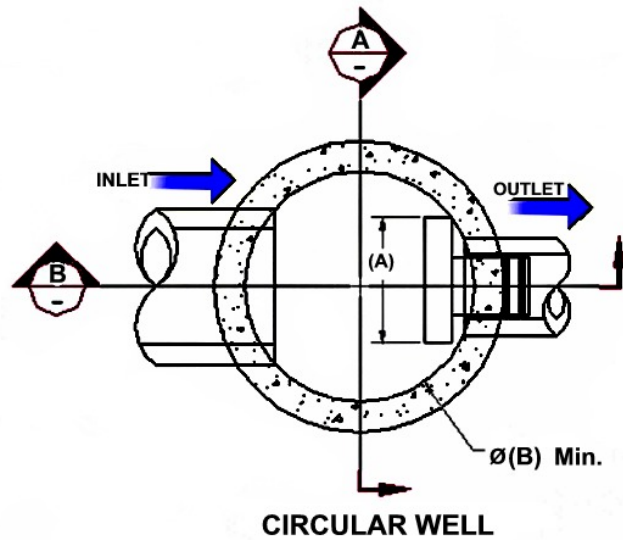


SECTION A-A

SECTION B-B

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

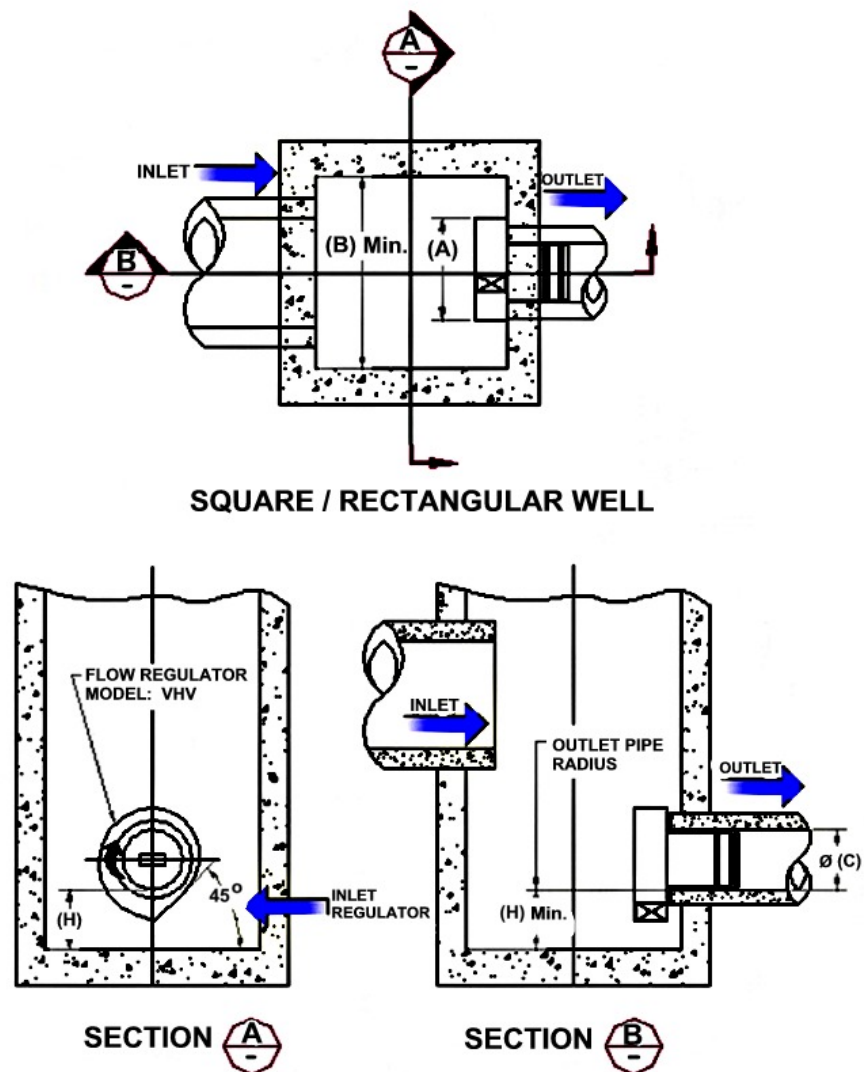
| Model Number | Regulator Diameter | | Minimum Manhole Diameter | | Minimum Outlet Pipe Diameter | | Minimum Clearance | |
|--------------|--------------------|---------|--------------------------|---------|------------------------------|---------|-------------------|---------|
| | A (mm) | A (in.) | 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 |

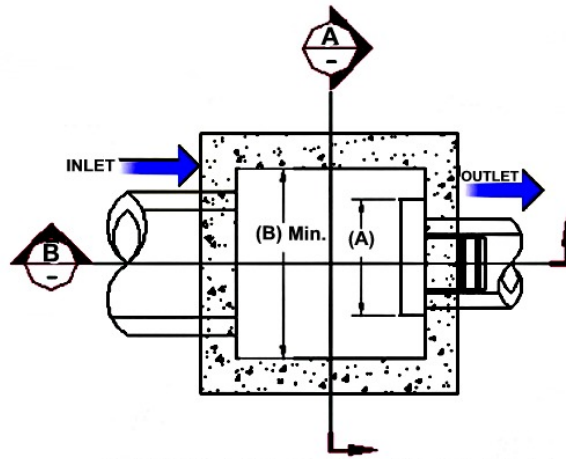
NOTE: *In the case of a square manhole, the outlet flow pipe must be centered on the wall to ensure enough clearance for the unit.*



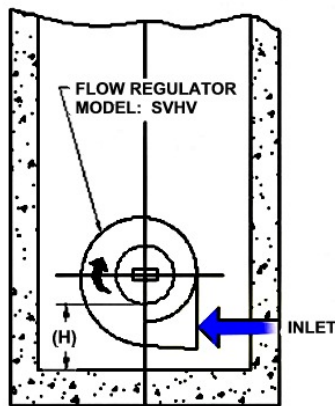
FLOW REGULATOR TYPICAL INSTALLATION IN SQUARE MANHOLE
FIGURE 4 (MODEL SVHV)

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

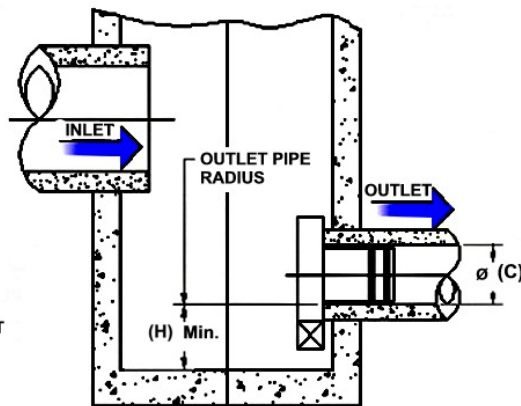
NOTE: *In the case of a square manhole, the outlet flow pipe must be centered on the wall to ensure enough clearance for the unit.*



SQUARE / RECTANGULAR WELL



SECTION A-A



SECTION B-B

INSTALLATION

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

MAINTENANCE

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

GUARANTY

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

John Meunier Inc.

ISO 9001 : 2008

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Fax: 215-885-4741 astele@johnmeunier.com

Stormceptor® EF Sizing Report

| STORMCEPTOR® | | ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION | | 03/15/2022 | | | | | | | | | | | | | | |
|---|--------------------------|--|-------------------------------|------------|---|--|-------------------|--------------------------|------|----|------|----|------|----|-------|----|-------|----|
| Province: | Ontario | Project Name: | 98 and 100 Bearbrook Rd. | | | | | | | | | | | | | | | |
| City: | Ottawa | Project Number: | 210628 | | | | | | | | | | | | | | | |
| 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: | 98 and 100 Bearbrook Rd. | Designer Phone: | 905-630-0359 | | | | | | | | | | | | | | | |
| Drainage Area (ha): | 0.391 | EOR Name: | Amr Salem | | | | | | | | | | | | | | | |
| Runoff Coefficient 'c': | 0.79 | 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 | | | | | | | | | | | | | | | | | |
| Oil / Fuel Spill Risk Site? | Yes | <table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2">Net Annual Sediment (TSS) Load Reduction Sizing Summary</th> </tr> <tr> <th>Stormceptor Model</th> <th>TSS Removal Provided (%)</th> </tr> </thead> <tbody> <tr> <td>EFO4</td> <td>83</td> </tr> <tr> <td>EFO6</td> <td>92</td> </tr> <tr> <td>EFO8</td> <td>96</td> </tr> <tr> <td>EFO10</td> <td>98</td> </tr> <tr> <td>EFO12</td> <td>99</td> </tr> </tbody> </table> | | | Net Annual Sediment (TSS) Load Reduction Sizing Summary | | Stormceptor Model | TSS Removal Provided (%) | EFO4 | 83 | EFO6 | 92 | EFO8 | 96 | EFO10 | 98 | EFO12 | 99 |
| Net Annual Sediment (TSS) Load Reduction Sizing Summary | | | | | | | | | | | | | | | | | | |
| Stormceptor Model | TSS Removal Provided (%) | | | | | | | | | | | | | | | | | |
| EFO4 | 83 | | | | | | | | | | | | | | | | | |
| EFO6 | 92 | | | | | | | | | | | | | | | | | |
| EFO8 | 96 | | | | | | | | | | | | | | | | | |
| EFO10 | 98 | | | | | | | | | | | | | | | | | |
| EFO12 | 99 | | | | | | | | | | | | | | | | | |
| 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 (%): 83</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

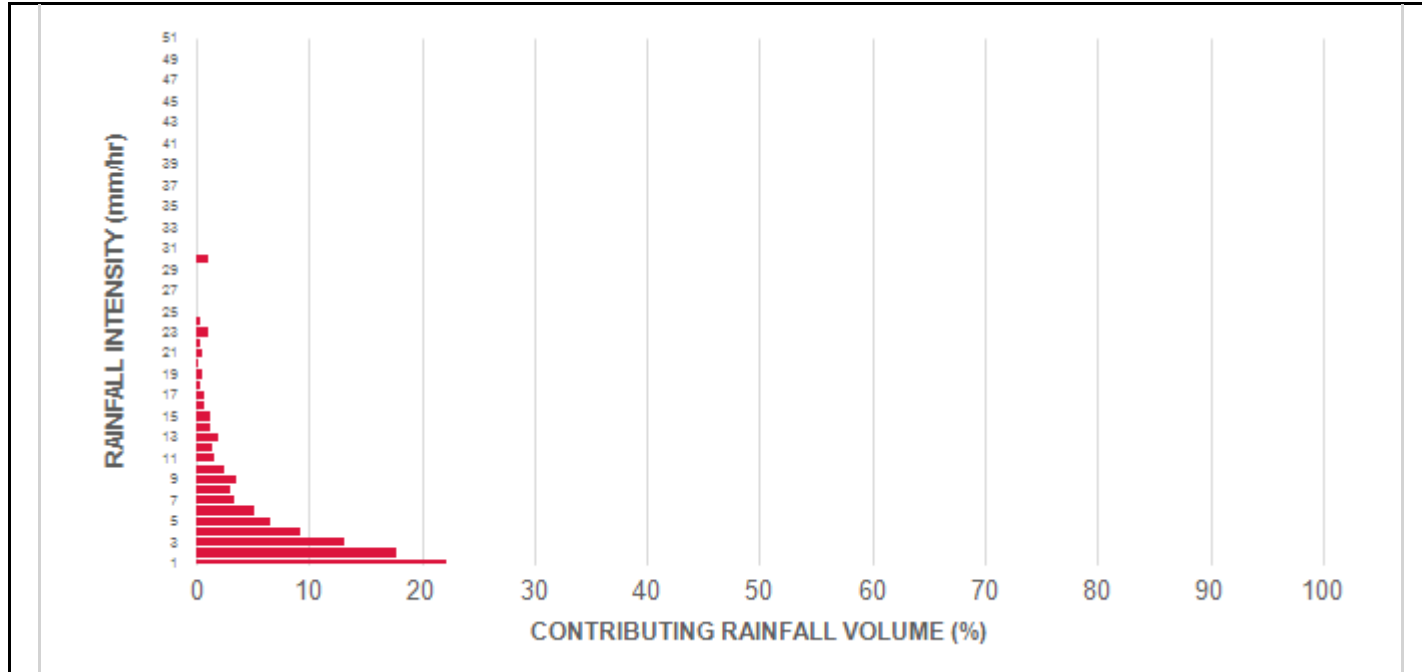
| Rainfall Intensity (mm / hr) | Percent Rainfall Volume (%) | Cumulative Rainfall Volume (%) | Flow Rate (L/s) | Flow Rate (L/min) | Surface Loading Rate (L/min/m ²) | Removal Efficiency (%) | Incremental Removal (%) | Cumulative Removal (%) |
|---|-----------------------------|--------------------------------|-----------------|-------------------|--|------------------------|-------------------------|------------------------|
| 1 | 22.3 | 22.3 | 0.86 | 51.0 | 43.0 | 100 | 22.3 | 22.3 |
| 2 | 17.8 | 40.0 | 1.71 | 103.0 | 86.0 | 91 | 16.2 | 38.5 |
| 3 | 13.1 | 53.1 | 2.57 | 154.0 | 128.0 | 87 | 11.4 | 49.9 |
| 4 | 9.2 | 62.4 | 3.43 | 206.0 | 171.0 | 81 | 7.5 | 57.3 |
| 5 | 6.5 | 68.9 | 4.28 | 257.0 | 214.0 | 77 | 5.0 | 62.3 |
| 6 | 5.1 | 74.0 | 5.14 | 308.0 | 257.0 | 75 | 3.8 | 66.1 |
| 7 | 3.4 | 77.3 | 6.00 | 360.0 | 300.0 | 73 | 2.4 | 68.6 |
| 8 | 3.0 | 80.3 | 6.85 | 411.0 | 343.0 | 71 | 2.1 | 70.7 |
| 9 | 3.6 | 84.0 | 7.71 | 463.0 | 385.0 | 69 | 2.5 | 73.2 |
| 10 | 2.5 | 86.5 | 8.57 | 514.0 | 428.0 | 68 | 1.7 | 74.9 |
| 11 | 1.7 | 88.2 | 9.42 | 565.0 | 471.0 | 66 | 1.1 | 76.0 |
| 12 | 1.4 | 89.6 | 10.28 | 617.0 | 514.0 | 64 | 0.9 | 77.0 |
| 13 | 1.9 | 91.5 | 11.13 | 668.0 | 557.0 | 62 | 1.2 | 78.1 |
| 14 | 1.3 | 92.8 | 11.99 | 719.0 | 600.0 | 60 | 0.8 | 78.9 |
| 15 | 1.3 | 94.1 | 12.85 | 771.0 | 642.0 | 60 | 0.8 | 79.7 |
| 16 | 0.8 | 94.9 | 13.70 | 822.0 | 685.0 | 59 | 0.5 | 80.2 |
| 17 | 0.8 | 95.7 | 14.56 | 874.0 | 728.0 | 59 | 0.5 | 80.6 |
| 18 | 0.4 | 96.1 | 15.42 | 925.0 | 771.0 | 59 | 0.3 | 80.9 |
| 19 | 0.5 | 96.6 | 16.27 | 976.0 | 814.0 | 59 | 0.3 | 81.2 |
| 20 | 0.2 | 96.8 | 17.13 | 1028.0 | 857.0 | 58 | 0.1 | 81.3 |
| 21 | 0.5 | 97.3 | 17.99 | 1079.0 | 899.0 | 58 | 0.3 | 81.6 |
| 22 | 0.3 | 97.6 | 18.84 | 1131.0 | 942.0 | 58 | 0.2 | 81.7 |
| 23 | 1.1 | 98.7 | 19.70 | 1182.0 | 985.0 | 57 | 0.6 | 82.4 |
| 24 | 0.3 | 99.0 | 20.56 | 1233.0 | 1028.0 | 57 | 0.2 | 82.5 |
| 25 | 0.0 | 99.0 | 21.41 | 1285.0 | 1071.0 | 56 | 0.0 | 82.5 |
| 30 | 1.0 | 100.0 | 25.70 | 1542.0 | 1285.0 | 51 | 0.5 | 83.1 |
| 35 | 0.0 | 100.0 | 29.98 | 1799.0 | 1499.0 | 46 | 0.0 | 83.1 |
| 40 | 0.0 | 100.0 | 34.26 | 2056.0 | 1713.0 | 40 | 0.0 | 83.1 |
| 45 | 0.0 | 100.0 | 38.54 | 2313.0 | 1927.0 | 35 | 0.0 | 83.1 |
| 50 | 0.0 | 100.0 | 42.83 | 2570.0 | 2141.0 | 32 | 0.0 | 83.1 |
| Estimated Net Annual Sediment (TSS) Load Reduction = | | | | | | | | 83 % |

Climate Station ID: 6105978 Years of Rainfall Data: 20

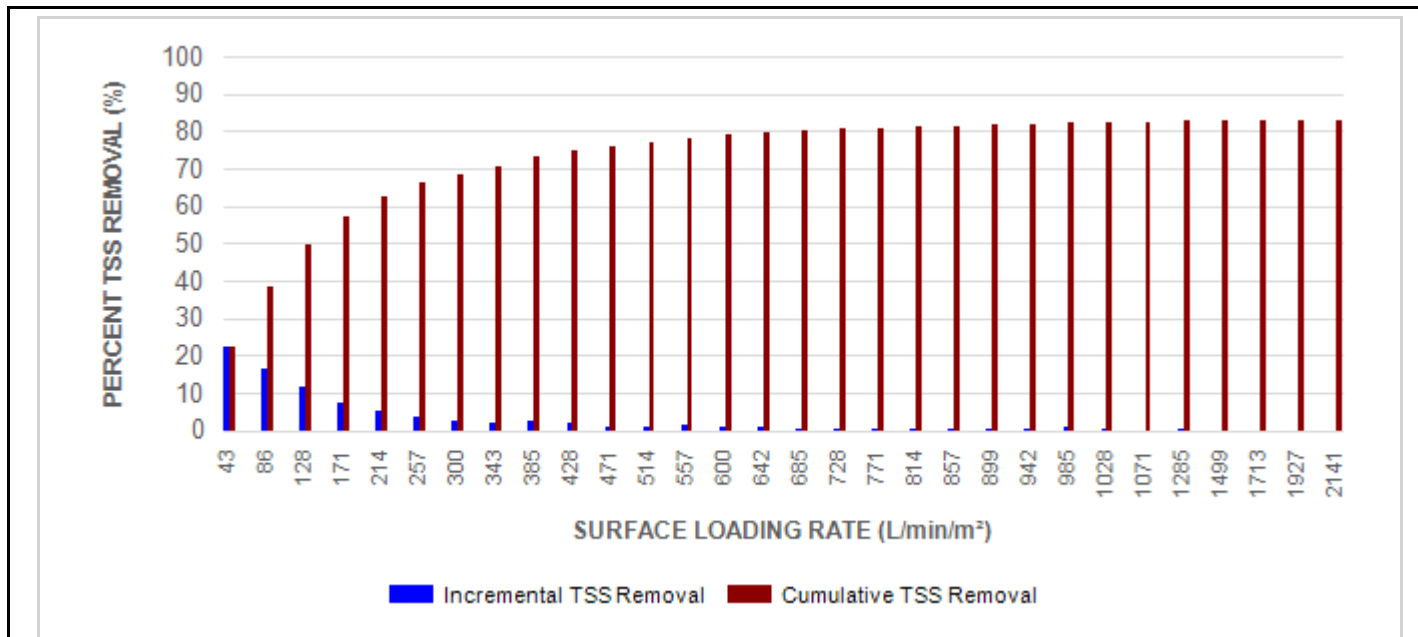


Stormceptor®EF Sizing Report

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

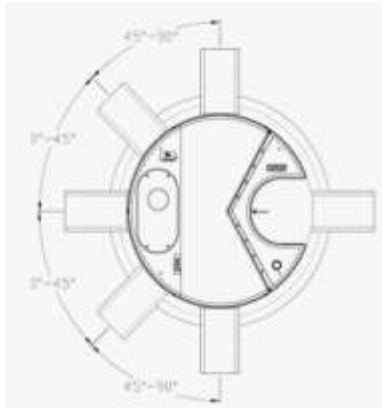
► Stormceptor® EF and EFO offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, 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 of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada, and only rainfall intensities greater than 0.5 mm/hr shall be included in sizing calculations. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m² to 1400 L/min/m², and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m² and 1400 L/min/m² shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m² shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m². No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m².

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m² shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m², and shall be calculated using a simple proportioning formula, with 1400 L/min/m² in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m².

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

Stormceptor[®] EF Sizing Report

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.

FLOW CONTROL ROOF DRAINAGE DECLARATION

THIS FORM TO BE COMPLETED BY THE MECHANICAL AND STRUCTURAL ENGINEERS RESPONSIBLE FOR DESIGN

Permit Application No.

Project Name:

93 & 100 Bearbrook, Ottawa

Building Location:

93 & 100 Bearbrook Road

Municipality:

Ottawa

The roof drainage system has been designed in accordance with the following criteria: (please check one of the following).

- M1. Conventionally drained roof (no flow control roof drains used).
- M2. Flow control roof drains meeting the following conditions have been incorporated in this design:
- (a) the maximum drain down time does not exceed 24h,
 - (b) one or more scuppers are installed so that the maximum depth of water on the roof cannot exceed 150mm,
 - (c) drains are located not more than 15m from the edge of roof and not more than 30m from adjacent drains, and
 - (d) there is at least one drain for each 900 sq.m.
- M3. A flow control drainage system that does not meet the minimum drainage criteria described in M2 has been incorporated in this design.

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name:

Chuck Clark, P.Eng.

Firm:

QM&E Engineering Inc.

Phone #:

(613)567-1487

City:

Ottawa

Province:

Ontario



Mechanical Engineer's Seal

- S1. The design parameters incorporated into the overall structural design are consistent with the information provided by the Mechanical Engineer in M2. Loads due to rain are not considered to act simultaneously with loads due to snow as per Sentence 4.1.7.3 (3) OBC.
- S2. The structure has been designed incorporating the additional structural loading due to rain acting simultaneously with the snow load. The design parameters are consistent with the control flow drainage system designed by the mechanical engineer.

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name:

Peter Goodeve, P. Eng.

Firm:

Goodeve Structural Inc.

Phone #:

613-226-4558

City:

Ottawa

Province:

ON



Structural Engineer's Seal

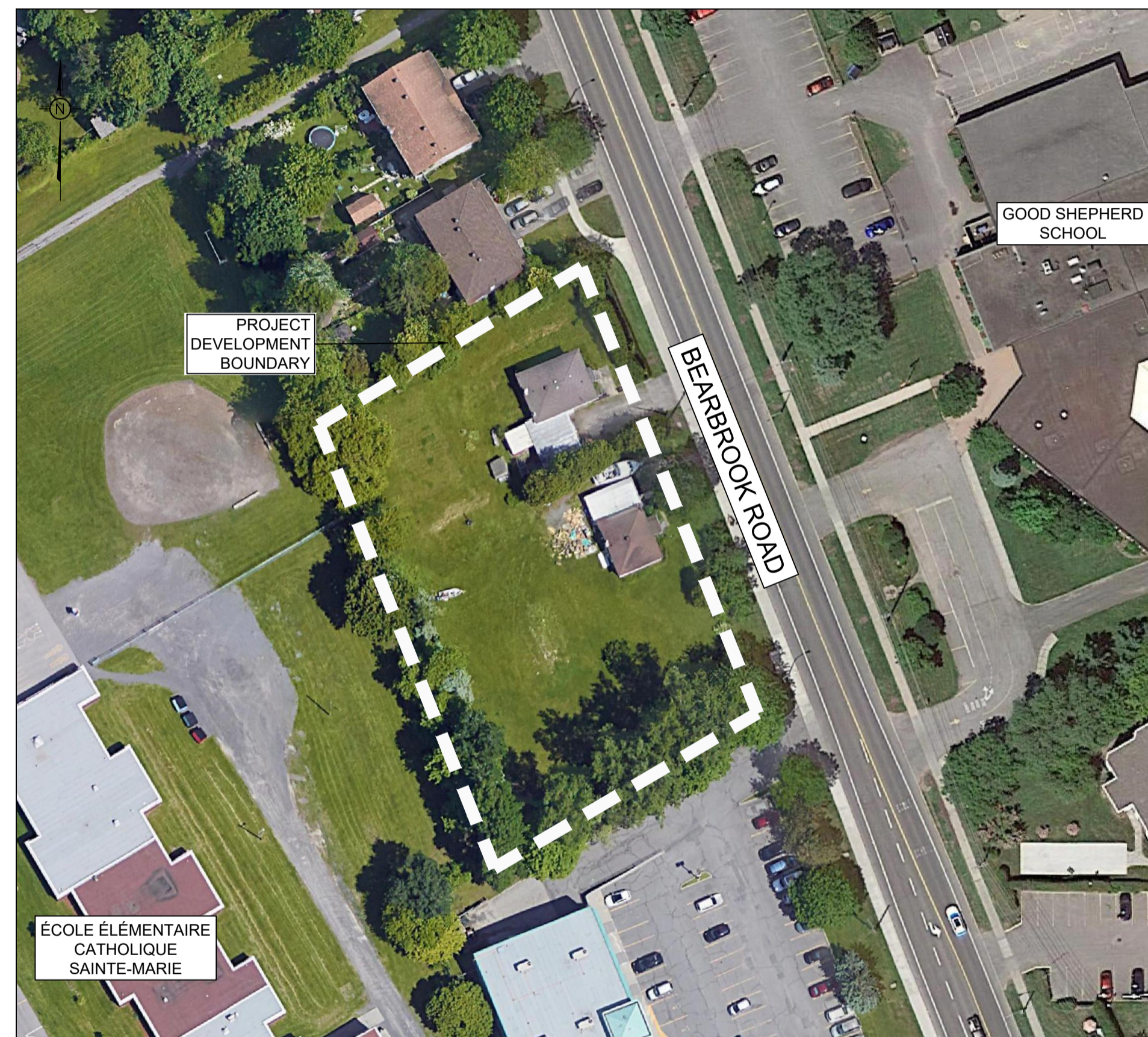
APPENDIX E

Civil Engineering Drawings



RESIDENTIAL BUILDING 98 & 100 BEARBROOK, OTTAWA, ONTARIO

REVISION 04



KEY PLAN (N.T.S.)

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



LRJ

ENGINEERING | INGÉNIERIE

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

RESIDENTIAL BUILDING
98 & 100 BEARBROOK RD, OTTAWA
REV.04 - RE-ISSUED FOR MUNICIPAL APPROVAL- NOVEMBER 23rd, 2023
LRL PROJECT NO.: 210628



GENERAL NOTES

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

EROSION AND SEDIMENT CONTROL NOTES

GENERAL

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

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

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

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

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

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

CONTRACTOR'S RESPONSIBILITIES

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

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

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

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

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

SPILL CONTROL NOTES

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

MUD MAT NOTES

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

SITE GRADING NOTES

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

ROADWORK SPECIFICATIONS

- ROADWORK TO BE COMPLETED IN ACCORDANCE WITH GEOTECHNICAL REPORT, PREPARED BY LRL ASSOCIATES, DATED NOVEMBER 2020.
- ALL TOPSOIL AND ORGANIC MATERIAL SHALL BE STRIPPED WITHIN THE ROAD ALLOWANCE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION AND STOCK PILED ON SITE AS DIRECTED BY NATIONAL MUNICIPALITY.
- THE SUBGRADE SHALL BE CROWNED AND SLOPED AT LEAST 2% AND PROOF ROLLED WITH HEAVY ROLLERS.
- SUB-EXCAVATE SOFT AREAS AND FILL WITH GRANULAR 'A', TYPE II COMPACTED IN MAXIMUM 300MM LIFTS.
- ALL GRANULAR FOR ROADS SHALL BE COMPACTED TO MINIMUM OF 100% STANDARD PROCTOR DENSITY MAXIMUM DRY DENSITY (SPMDD).

SANITARY, FOUNDATION DRAIN, STORM SEWER AND WATERMAIN NOTES

GENERAL

- LASER ALIGNMENT CONTROL TO BE UTILIZED ON ALL SEWER INSTALLATIONS.
- CLAY SEALS TO BE INSTALLED AS PER CITY STANDARD DRAWING S8. THE SEALS SHOULD BE AT LEAST 1.5M LONG (IN THE TRENCH DIRECTION) AND SHOULD EXTEND FROM TRENCH WALL TO TRENCH WALL. THE SEALS SHOULD EXTEND FROM THE FROST LINE AND FULLY PENETRATE THE BEDDING, SUB-BEDDING, AND COVER MATERIAL. THE BARRIERS SHOULD CONSIST OF RELATIVELY DRY AND COMPATIBLE BROWN SILTY CLAY PLACED IN MAXIMUM 225MM LIFTS AND COMPACTED TO A MINIMUM OF 95% SPMDD. THE CLAY SEALS SHOULD BE PLACED AT THE SITE BOUNDARIES AND AT 60M INTERVALS IN THE SERVICE TRENCHES.
- SERVICES TO BUILDING TO BE TERMINATED 1.0M FROM THE OUTSIDE FACE OF BUILDING UNLESS OTHERWISE NOTED.
- ALL MAINTENANCE STRUCTURE AND CATCH BASIN EXCAVATIONS TO BE BACKFILLED WITH GRANULAR MATERIAL COMPACTED TO 98% STANDARD PROCTOR DENSITY. A MINIMUM OF 300MM AROUND STRUCTURES.
- 'MUD-LOG' OR APPROVED PRE-CAST MAINTENANCE STRUCTURE AND CATCH BASIN ADJUSTERS TO BE USED IN LIEU OF BRICKING. PARGE ADJUSTING UNITS ON THE OUTSIDE ONLY.
- SAFETY PLATFORMS SHALL BE PER OPSD 404.02.
- DROP STRUCTURES SHALL BE IN ACCORDANCE WITH OPSD 1003.01, IF APPLICABLE.
- THE CONTRACTOR IS TO PROVIDE CCTV CAMERA INSPECTIONS OF ALL SEWERS, INCLUDING PICTORIAL REPORT, ONE (1) CD COPY AND TWO (2) VIDEO RECORDING IN A FORMAT ACCEPTABLE TO ENGINEER. ALL SEWER ARE TO BE FLUSHED PRIOR TO CAMERA INSPECTION. ASPHALT WEAR COURSE SHALL NOT BE PLACED UNTIL THE VIDEO INSPECTION OF SEWERS AND NECESSARY REPAIRS HAVE BEEN COMPLETED TO THE SATISFACTION OF THE ENGINEER.
- CONTRACTOR SHALL PERFORM LEAKAGE TESTING, IN THE PRESENCE OF THE CONSULTANT, FOR SANITARY SEWERS IN ACCORDANCE WITH OPS 407. CONTRACTOR SHALL PERFORM VIDEO INSPECTION OF ALL SEWERS. A COPY OF THE VIDEO AND INSPECTION REPORT SHALL BE SUBMITTED TO THE CONSULTANT FOR REVIEW AND APPROVAL PRIOR TO PLACEMENT OF WEAR COURSE ASPHALT.

SANITARY

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

STORM

- ALL REINFORCED CONCRETE STORM SEWER PIPE SHALL BE IN ACCORDANCE WITH CSA A257.2, OR LATEST AMENDMENT. ALL NON-REINFORCED CONCRETE STORM SEWER PIPE SHALL BE IN ACCORDANCE WITH CSA A257.1, OR LATEST AMENDMENT. PIPE SHALL BE JOINED WITH STD. RUBBER GASKETS AS PER CSA A257.3, OR LATEST AMENDMENT.
- ALL STORM SEWER TRENCH AND BEDDING SHALL BE IN ACCORDANCE WITH THE CITY OF OTTAWA STD. S6 AND S7 CLASS 'B' UNLESS OTHERWISE SPECIFIED. BEDDING AND COVER MATERIAL SHALL BE SPECIFIED BY PROJECT GEOTECHNICAL ENGINEER.
- ALL PVC STORM SEWERS ARE TO BE SDR 35 APPROVED PER C.S.A. B182.2 OR LATEST AMENDMENT, UNLESS OTHERWISE SPECIFIED.
- CATCH BASIN SHALL BE IN ACCORDANCE WITH OPSD 705.010.
- CATCH BASIN LEADS SHALL BE IN 200MM DIA. AT 1% SLOPE (MIN) UNLESS SPECIFIED OTHERWISE.
- ALL CATCH BASINS SHALL HAVE 600MM SUMPS, UNLESS SPECIFIED OTHERWISE.
- ALL CATCH BASIN LEAD INVERTS TO BE 1.5M BELOW FINISHED GRADE UNLESS SPECIFIED OTHERWISE.
- THE STORM SEWER CLASSES HAVE BEEN DESIGNED BASED ON BEDDING CONDITIONS SPECIFIED ABOVE. WHERE THE SPECIFIED TRENCH WIDTH IS EXCEEDED, THE CONTRACTOR IS REQUIRED TO PROVIDE AND SHALL BE RESPONSIBLE FOR EXTRA TEMPORARY AND/OR PERMANENT REPAIRS MADE NECESSARY BY THE WIDENED TRENCH.
- ALL ROAD AND PARKING LOT CATCH BASINS TO BE INSTALLED WITH ORTHOGONALLY PLACED SUBDRAINS IN ACCORDANCE WITH DETAIL PERFORATED SUBDRAIN FOR ROAD AND PARKING LOT CATCH BASIN SHALL BE INSTALLED PER CITY STD R1 UNLESS OTHERWISE NOTED.
- PERFORATED SUBDRAIN FOR REAR YARD AND LANDSCAPING APPLICATIONS SHALL BE INSTALLED PER CITY STD S29, S30 AND S31, WHERE APPLICABLE.
- RIP-RAP TREATMENT SEWER AND CULVERT OUTLETS PER OPSD 810.010.
- ALL STORM SEWER/ CULVERTS TO BE INSTALLED WITH FROST TREATMENT PER OPSD 803.031 WHERE APPLICABLE.
- ALL STORM MANHOLES WITH PIPE LESS THAN 900MM IN DIAMETER SHALL BE CONSTRUCTED WITH A 300MM SUMP AS PER SDC, CLAUSE 6.2.

WATERMAIN

- ALL WATERMAIN INSTALLATION SHALL CONFORM TO THE LATEST REVISIONS OF THE CITY OF OTTAWA AND THE ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) AND SPECIFICATIONS (OPSS).
- ALL PVC WATERMAINS SHALL BE AWWA C-900 CLASS 150, SDR 18 OR APPROVED EQUIVALENT.
- ALL WATER SERVICES LESS THAN OR EQUAL TO 50MM IN DIAMETER TO BE TYPE 'K' COPPER.
- WATERMAIN TRENCH AND BEDDING SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARD W17, UNLESS SPECIFIED OTHERWISE. BEDDING AND COVER MATERIAL SHALL BE SPECIFIED BY THE PROJECT GEOTECHNICAL ENGINEER.
- ALL PVC WATERMAINS, SHALL BE INSTALLED WITH A 10 GAUGE STRANDED COPPER TWU OR RWU TRACER WIRE IN ACCORDANCE WITH CITY OF OTTAWA STD. W36.
- CATHODIC PROTECTION IS REQUIRED ON ALL METALLIC FITTINGS PER CITY OF OTTAWA STD.25.5 AND W25.6.
- VALVE BOXES SHALL BE INSTALLED PER CITY OF OTTAWA STD W24.
- WATERMAIN IN FILL AREAS TO BE INSTALLED WITH RESTRAINED JOINTS PER CITY OF OTTAWA STD.25.5 AND W25.6.
- THRUST BLOCKING OF WATERMAINS TO BE INSTALLED PER CITY OF OTTAWA STD. W25.3 AND W25.4.
- THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY CAPS, PLUGS, BLOW-OFFS, AND NOZZLES REQUIRED FOR TESTING AND DISINFECTION OF THE WATERMAIN.
- WATERMAIN CROSSING OVER AND BELOW SEWERS SHALL BE IN ACCORDANCE WITH THE CITY OF OTTAWA STD. W25.2 AND W25, RESPECTIVELY.
- WATER SERVICES ARE TO BE INSULATED PER CITY STD. W03 WHERE SEPARATION BETWEEN SERVICES AND MAINTENANCE HOLES ARE LESS THAN 2.4M.
- THE MINIMUM VERTICAL CLEARANCE BETWEEN WATERMAIN AND SEWER/UTILITY IS 0.5M PER MOE GUIDELINES. FOR CROSSING UNDER SEWERS, ADEQUATE STRUCTURAL SUPPORT FOR THE SEWER IS REQUIRED TO PREVENT EXCESSIVE DEFLECTION OF JOINTS AND SETTLING. THE LENGTH OF WATER PIPE SHALL BE CENTERED AT THE POINT OF CROSSING TO ENSURE THAT THE JOINTS WILL BE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE SEWER.
- ALL WATERMAINS SHALL HAVE A MINIMUM COVER OR 2.4M, OTHERWISE THERMAL INSULATION IS REQUIRED AS PER STD DWG W22.
- GENERAL WATER PLANT TO UTILITY CLEARANCE AS PER STD DWG R20.
- FIRE HYDRANT INSTALLATION AS PER STD DWG W19, ALL BOTTOM OF HYDRANT FLANGE ELEVATIONS TO BE INSTALLED 0.10M ABOVE PROPOSED FINISHED GRADE AT HYDRANT; FIRE HYDRANT LOCATION AS PER STD DWG W18.
- BUILDING SERVICE TO BE CAPPED 1.0M OFF THE FACE OF THE BUILDING UNLESS OTHERWISE NOTED AND MUST BE RESTRAINED A MINIMUM OF 12M BACK FROM STUB.
- ALL WATERMAINS SHALL BE HYDROSTATICALLY TESTED IN ACCORDANCE WITH THE CITY OF OTTAWA AND ONTARIO GUIDELINES UNLESS OTHERWISE DIRECTED. PROVISIONS FOR FLUSHING WATER LINE PRIOR TO TESTING, ETC. MUST BE PROVIDED.
- ALL WATERMAINS SHALL BE BACTERIOLOGICALLY TESTED IN ACCORDANCE WITH THE CITY OF OTTAWA AND ONTARIO GUIDELINES. ALL CHLORINATED WATER TO BE DISCHARGED AND PRETREATED TO ACCEPTABLE LEVELS PRIOR TO DISCHARGE. ALL DISCHARGED WATER MUST BE CONTROLLED AND TREATED SO AS NOT TO ADVERSELY EFFECT ENVIRONMENT. IT IS RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT ALL MUNICIPAL AND/OR PROVINCIAL REQUIREMENTS ARE FOLLOWED.
- ALL WATERMAIN STUBS SHALL BE TERMINATED WITH A PLUG AND 50MM BLOW OFF UNLESS OTHERWISE NOTED.

USE AND INTERPRETATION OF DRAWINGS

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

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

AS INSTRUMENTS OF SERVICE, ALL DRAWINGS, SPECIFICATIONS, CAD FILES OR OTHER ELECTRONIC MEDIA AND COPIES THEREOF 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.

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THESE DRAWINGS ILLUSTRATES THE WORK TO BE DONE. THE ENGINEER IS NOT RESPONSIBLE FOR THE MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES USED TO DO THE WORK, OR THE SAFETY ASPECTS OF CONSTRUCTION, AND NOTHING ON THESE DRAWINGS EXPRESSED OR IMPLIED CHANGES THIS CONDITION. CONTRACTOR SHALL DETERMINE ALL CONDITIONS AT THE SITE AND SHALL BE RESPONSIBLE FOR KNOWING HOW THEY AFFECT THE WORK. SUBMITTAL OF A BID TO PERFORM THIS WORK IS ACKNOWLEDGEMENT OF THE RESPONSIBILITIES, AND THAT THEY HAVE BEEN FULLY CONSIDERED IN PLANNING OF THE WORK, AND THE 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 THE DRAWINGS, SPECIFICATIONS, OR OTHER CONSTRUCTION DOCUMENTS PREPARED BY LRL ASSOCIATES LTD. (LRL) WITHOUT OBTAINING LRL'S PRIOR WRITTEN CONSENT, THE CLIENT SHALL ASSUME FULL RESPONSIBILITY FOR THE RESULTS OF SUCH CHANGES. THEREFORE THE CLIENT AGREES TO WAIVE ANY CLAIM AGAINST LRL AND TO RELEASE LRL FROM ANY LIABILITY ARISING DIRECTLY OR INDIRECTLY FROM SUCH UNAUTHORIZED CHANGES.

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

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

GENERAL NOTES

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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 THE INFORMATION CONTAINED THEREIN, OR FOR PROBLEMS WHICH ARISE FROM OTHERS' FAILURE TO OBTAIN AND/OR FOLLOW THE ENGINEER'S GUIDANCE REGARDING 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.

SUBJECT TO APPROVAL

| | | | |
|----|----------------------------------|------|-------------|
| 04 | RE-ISSUED FOR MUNICIPAL APPROVAL | S.K. | 23 NOV 2023 |
| 03 | ISSUED FOR COORDINATION | S.V. | 20 OCT 2023 |
| 02 | ISSUED FOR MUNICIPAL APPROVAL | M.L. | 15 MAY 2023 |
| 01 | ISSUED FOR MUNICIPAL APPROVAL | A.S. | 01 APR 2022 |

| No. | REVISIONS | BY | DATE |
|-----|-----------|----|------|
|-----|-----------|----|------|



NOT AUTHENTIC UNLESS SIGNED AND DATED



CLIENT
LANDRIC HOMES LTD.

DESIGNED BY: **A.S.** DRAWN BY: **A.S.** APPROVED BY: **V.J.**

PROJECT
**RESIDENTIAL BUILDING
98 & 100 BEARBROOK, OTTAWA, ONTARIO**

DRAWING TITLE

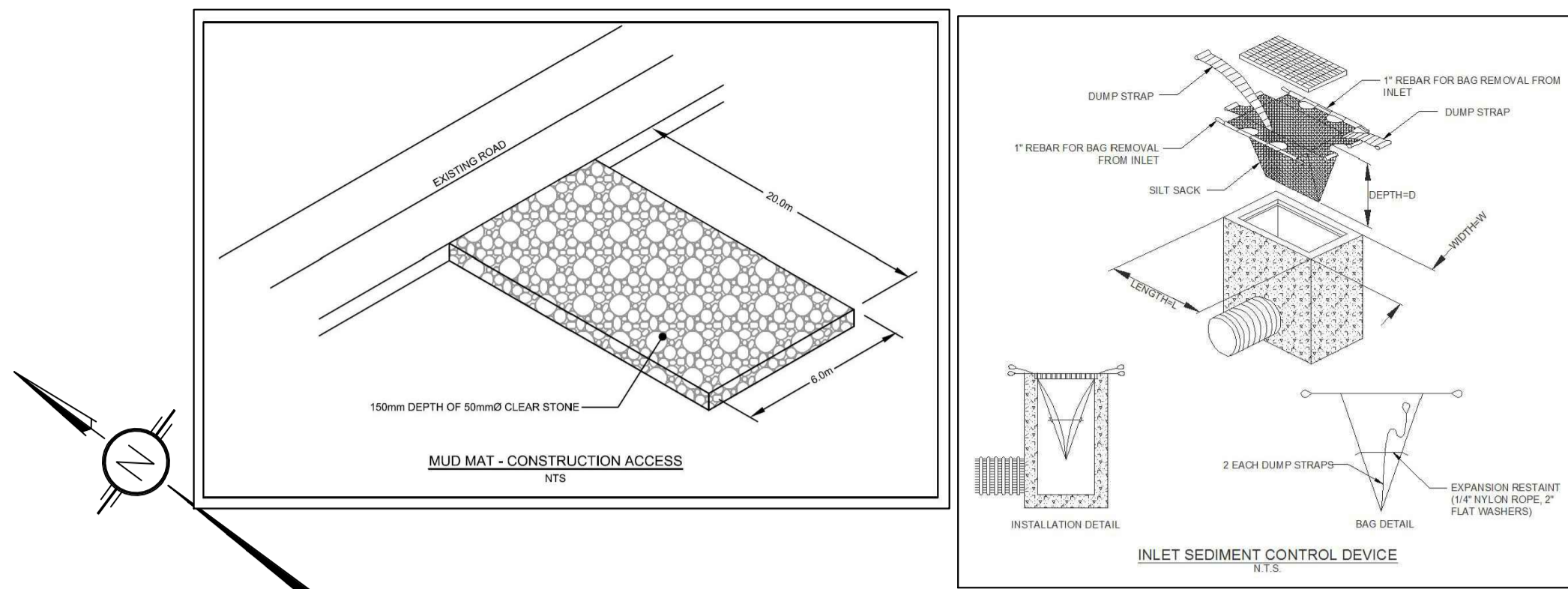
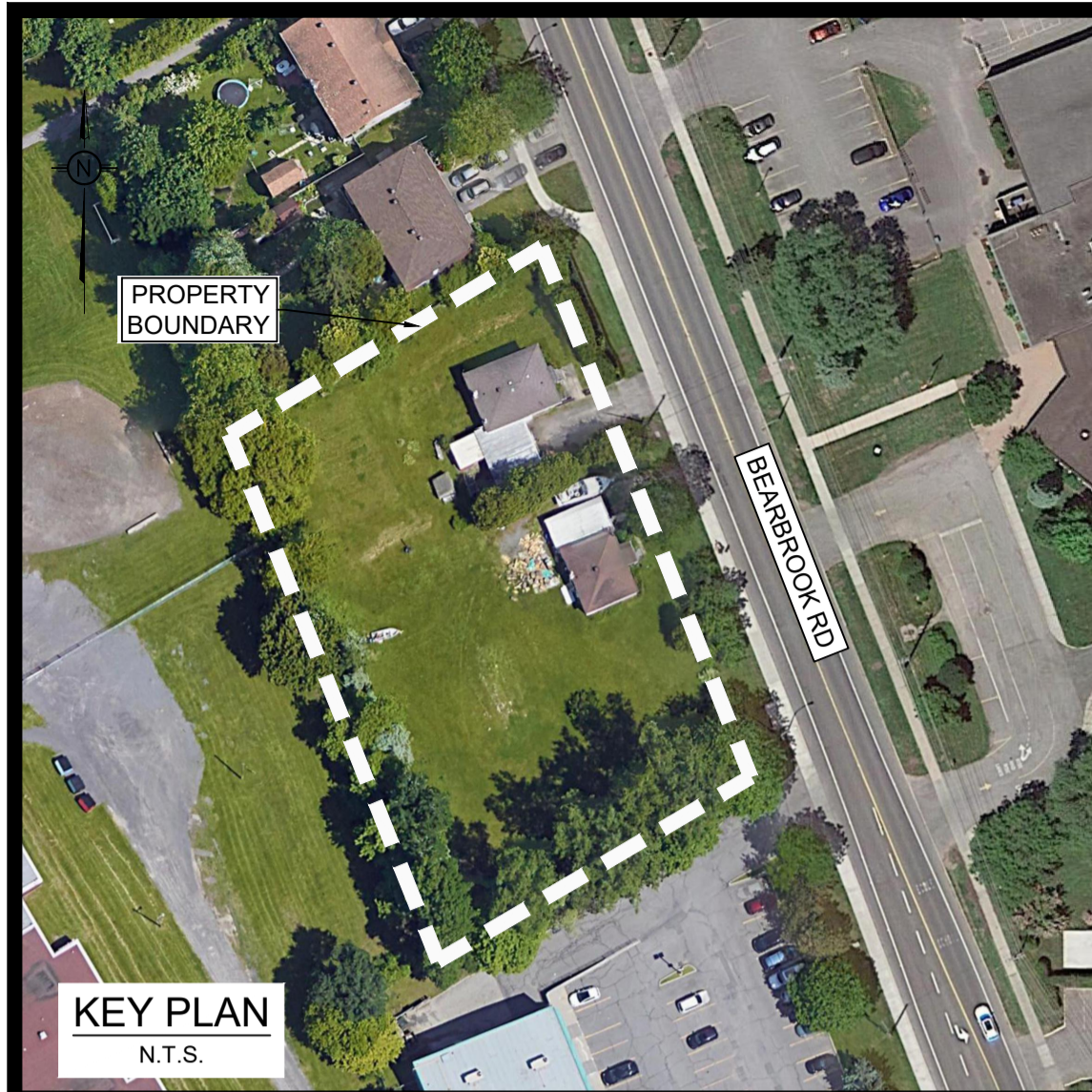
GENERAL NOTES

PROJECT NO.
210628
DATE
NOV 2021

C001

#18758

D07-12-22-0075



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 LIGHT DUTY ASPHALT |
| | PROPOSED RIP RAP |
| | +50.00 PROPOSED ELEVATION |
| | +50.00HP PROPOSED HIGH POINT ELEVATION |
| | +50.00S PROPOSED SHALE ELEVATION |
| | +50.00BC PROPOSED BOTTOM OF CURB / ASPHALT ELEVATION |
| | +50.00TC PROPOSED TOP OF CURB ELEVATION |
| | +50.00BW PROPOSED EXPOSED BOTTOM OF RETAINING WALL |
| | +50.00TW PROPOSED TOP OF RETAINING WALL |
| | +50.00EX MATCH INTO EXISTING ELEVATION |
| | EXISTING ELEVATION |
| | 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 |
| | PROPOSED MANHOLE |
| | PROPOSED AREA DRAIN |
| | PROPOSED PIPE INSULATION |
| | PROPOSED 100 YEAR HIGH WATER LEVEL |
| | STORM WATERSHED EXTENT |
| | WATERSHED NAME |
| | RUNOFF COEFFICIENT |
| | AREA IN HECTARES |

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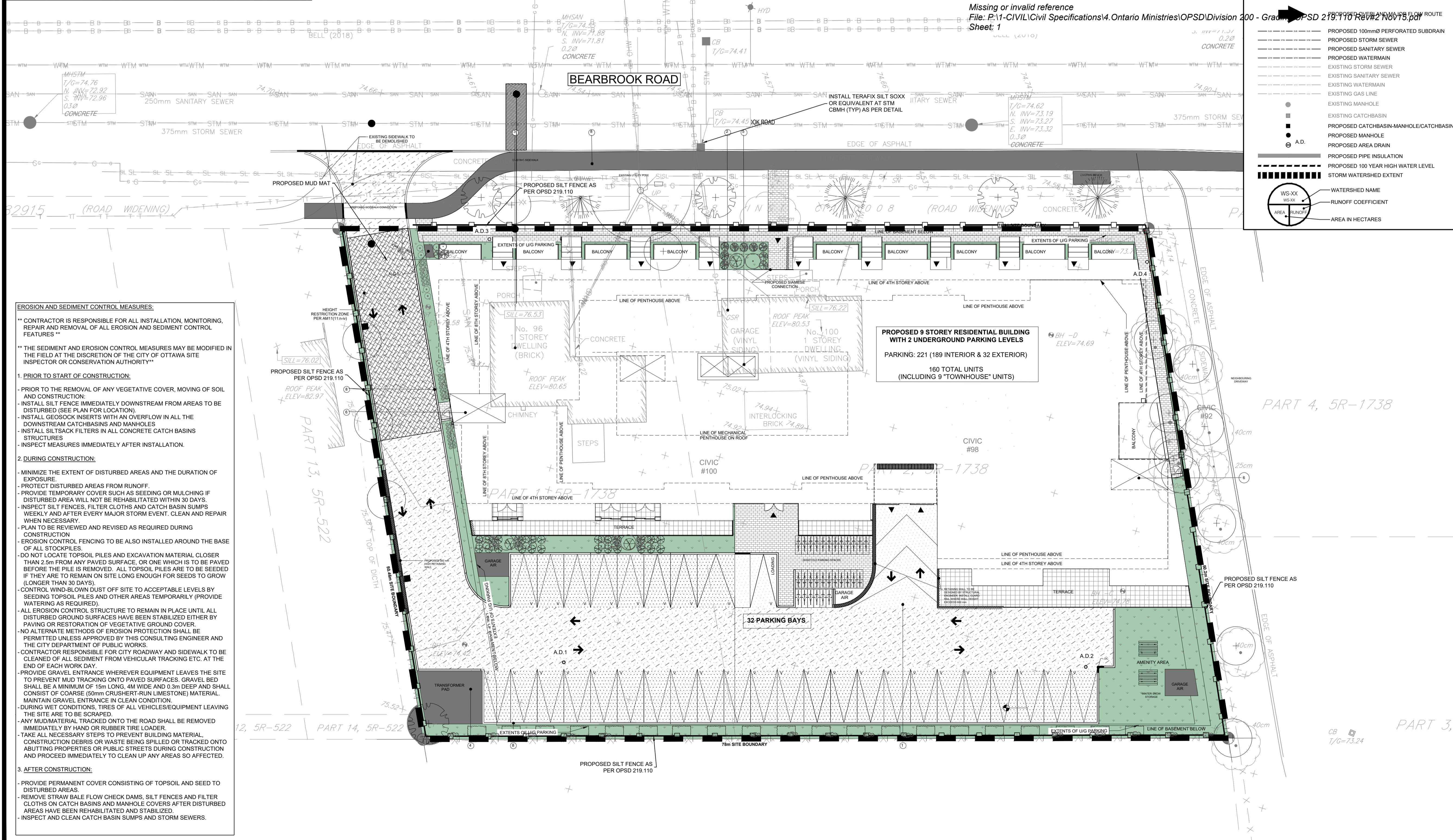
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CONTRACTOR TO VERIFY ALL DIMENSIONS AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES BEFORE WORK COMMENCES. DO NOT SCALE DRAWINGS.



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 SILT SACK FILTERS IN ALL CONCRETE CATCH BASINS 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 SUMPS 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 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 CRUSHED 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 ADJACENT PROPERTIES OR PUBLIC STREETS DURING CONSTRUCTION AND PROCEED 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 SUMPS AND STORM SEWERS.

SUBJECT TO APPROVAL

| No. | REVISIONS | BY | DATE |
|-----|-------------------------------|------|-------------|
| 04 | ISSUED FOR MUNICIPAL APPROVAL | S.K. | 23 NOV 2023 |
| 03 | ISSUED FOR COORDINATION | S.V. | 20 OCT 2023 |
| 02 | ISSUED FOR MUNICIPAL APPROVAL | M.L. | 15 MAY 2023 |
| 01 | ISSUED FOR MUNICIPAL APPROVAL | A.S. | 01 APR 2022 |



NOT AUTHENTIC UNLESS SIGNED AND DATED



CLIENT: **LANDRIC HOMES LTD.**

DESIGNED BY: A.S. DRAWN BY: A.S. APPROVED BY: V.J.

PROJECT: **RESIDENTIAL BUILDING 98 & 100 BEARBROOK, OTTAWA, ONTARIO**

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

PROJECT NO: 210628 DATE: NOV 2021

C101

#18758

D07-12-22-0075



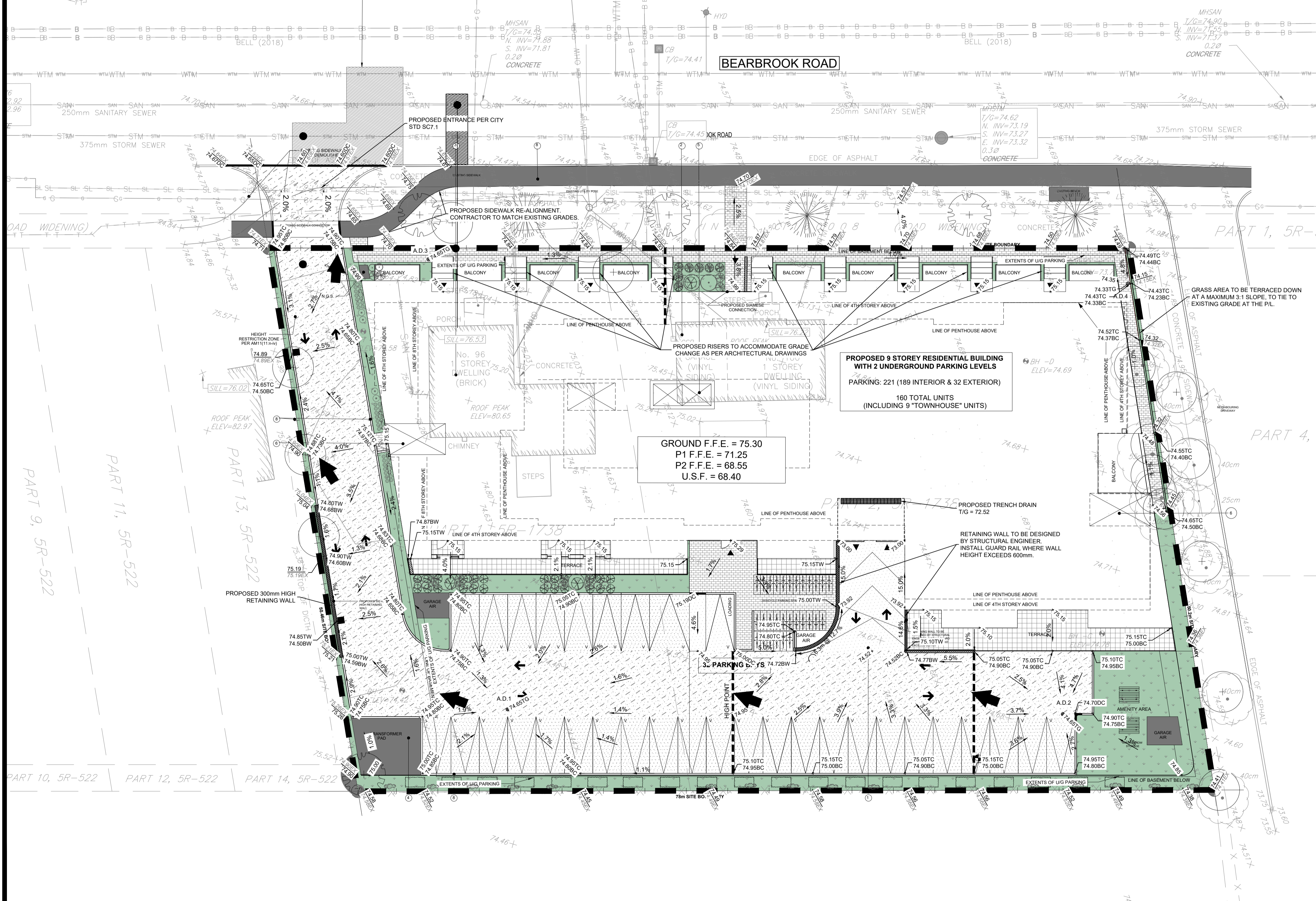
KEY PLAN
N.T.S.

ASPHALT REINSTATEMENT SHALL MATCH EXISTING GRANULAR AND ASPHALT THICKNESS WHILE MAINTAINING A MINIMUM OF:
 40mm HL-3
 50mm HL-8
 150 GRANULAR "A"
 450mm GRANULAR "B"
 CONTRACTOR TO COMPLETE ROAD CUT AS PER CITY OF OTTAWA DETAIL R10.

PAVEMENT STRUCTURE

| COURSE | MATERIAL | THICKNESS (mm) | |
|------------|---------------------------|--------------------|-----------------------------|
| | | AUTOMOBILE PARKING | TRUCK ROUTE (HEAVY TRAFFIC) |
| SURFACE | HL-3 A/C (PG 58-28) | 50 | 40 |
| BINDER | HL-8 A/C (PG 58-28) | - | 50 |
| BASECOURSE | OPSS GRANULAR "A" | 150 | 150 |
| SUBBASE | OPSS GRANULAR "B" TYPE II | 300 | 450 |

NOTE:
 PAVEMENT DESIGN AS PER GEOTECHNICAL INVESTIGATION REPORT # PG5883-1, BY PATERSON GROUP, DATED NOV 5, 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.



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 LIGHT 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 AREA DRAIN
- 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 SIMILARLY AS WORK SHOWN MORE COMPLETELY ELSEWHERE IN THE CONTRACT DOCUMENTS.

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

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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 THE CONTRACT DOCUMENTS WITHOUT THE PRIOR WRITTEN APPROVAL OF LRL AND THAT FURTHER REQUIRES THE CONTRACTOR TO INDEMNIFY BOTH LRL AND THE CLIENT FROM ANY LIABILITY OR COST ARISING FROM SUCH CHANGES MADE WITHOUT SUCH PROPER AUTHORIZATION.

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

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LICENSED PROFESSIONAL ENGINEER
 V. JOHNSON
 100510576
 11-23-2023
 PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

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

CLIENT
LANDRIC HOMES LTD.

DESIGNED BY: A.S. DRAWN BY: A.S. APPROVED BY: V.J.

PROJECT
**RESIDENTIAL BUILDING
 98 & 100 BEARBROOK, OTTAWA, ONTARIO**

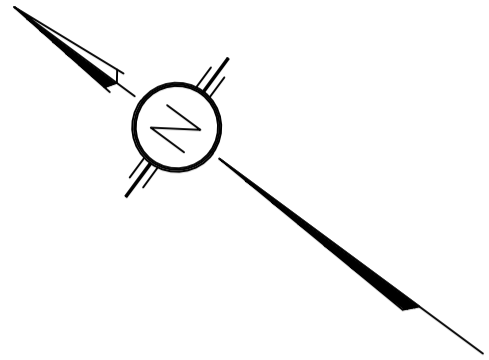
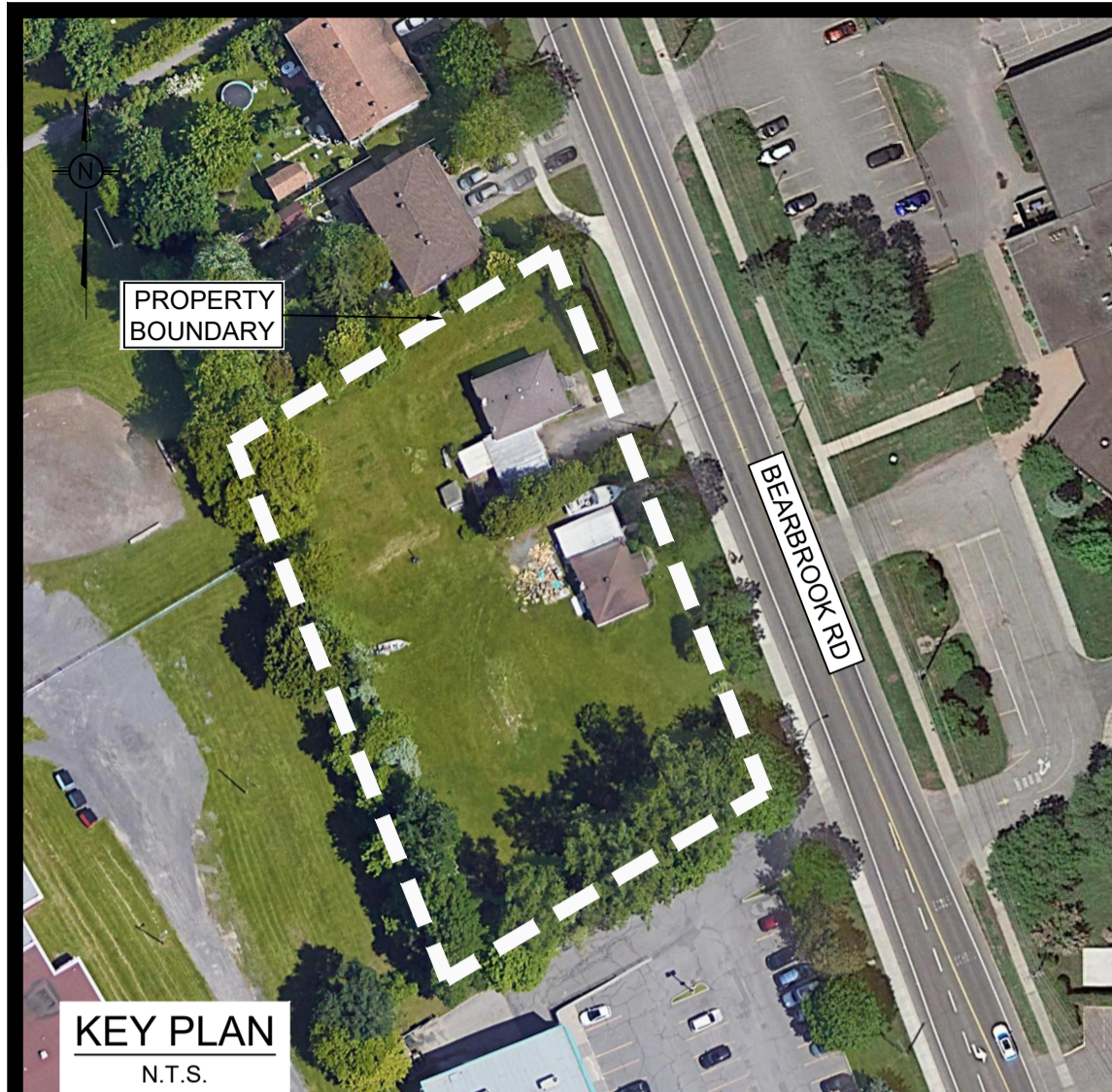
DRAWING TITLE
GRADING AND DRAINAGE PLAN

PROJECT NO.
 210628

DATE
 NOV 2021

C301

D07-12-22-0075



KEY PLAN
N.T.S.

ASPHALT REINSTATEMENT SHALL MATCH EXISTING GRANULAR AND ASPHALT THICKNESS WHILE MAINTAINING A MINIMUM OF:
40mm HL-3
50mm HL-8
150 GRANULAR "A"
450mm GRANULAR "B"
CONTRACTOR TO COMPLETE ROAD CUT AS PER CITY OF OTTAWA DETAIL R10.

PROP TWO (2) 150x300 TVS CONNECTIONS TO 305mmØ WATERMAIN BY CITY FORCES. EXCAVATION AND REINSTATEMENT BY CONTRACTOR.
WATERMAIN OBV = 72.55
TIG = 274.63
EX. WATERMAIN Ø = 305mm
CONCRETE
CONTRACTOR TO CONFIRM EX. TPO WATERMAIN

PROPOSED SAN MH 01
TIG = 274.55
EX. INV = 271.89
W. INV = 72.08
EX. 375mmØ CONC. STM @ ±0.25%

PROPOSED SAN MH 02
TIG = 74.61
NE INV = 72.34
SW INV = 72.40
EX. INV = 273.04
W. INV = 73.23

PROPOSED SAN MH 03
TIG = 74.61
NE INV = 72.34
SW INV = 72.40
EX. INV = 273.04
W. INV = 73.23

PROPOSED SAN MH 04
TIG = 74.61
NE INV = 72.34
SW INV = 72.40
EX. INV = 273.04
W. INV = 73.23

PROPOSED SAN MH 05
TIG = 74.61
NE INV = 72.34
SW INV = 72.40
EX. INV = 273.04
W. INV = 73.23

PROPOSED SAN MH 06
TIG = 74.61
NE INV = 72.34
SW INV = 72.40
EX. INV = 273.04
W. INV = 73.23

PROPOSED SAN MH 07
TIG = 74.61
NE INV = 72.34
SW INV = 72.40
EX. INV = 273.04
W. INV = 73.23

PROPOSED SAN MH 08
TIG = 74.61
NE INV = 72.34
SW INV = 72.40
EX. INV = 273.04
W. INV = 73.23

PROPOSED SAN MH 09
TIG = 74.61
NE INV = 72.34
SW INV = 72.40
EX. INV = 273.04
W. INV = 73.23

PROPOSED SAN MH 10
TIG = 74.61
NE INV = 72.34
SW INV = 72.40
EX. INV = 273.04
W. INV = 73.23

PROPOSED SAN MH 11
TIG = 74.61
NE INV = 72.34
SW INV = 72.40
EX. INV = 273.04
W. INV = 73.23

PROPOSED SAN MH 12
TIG = 74.61
NE INV = 72.34
SW INV = 72.40
EX. INV = 273.04
W. INV = 73.23

PROPOSED SAN MH 13
TIG = 74.61
NE INV = 72.34
SW INV = 72.40
EX. INV = 273.04
W. INV = 73.23

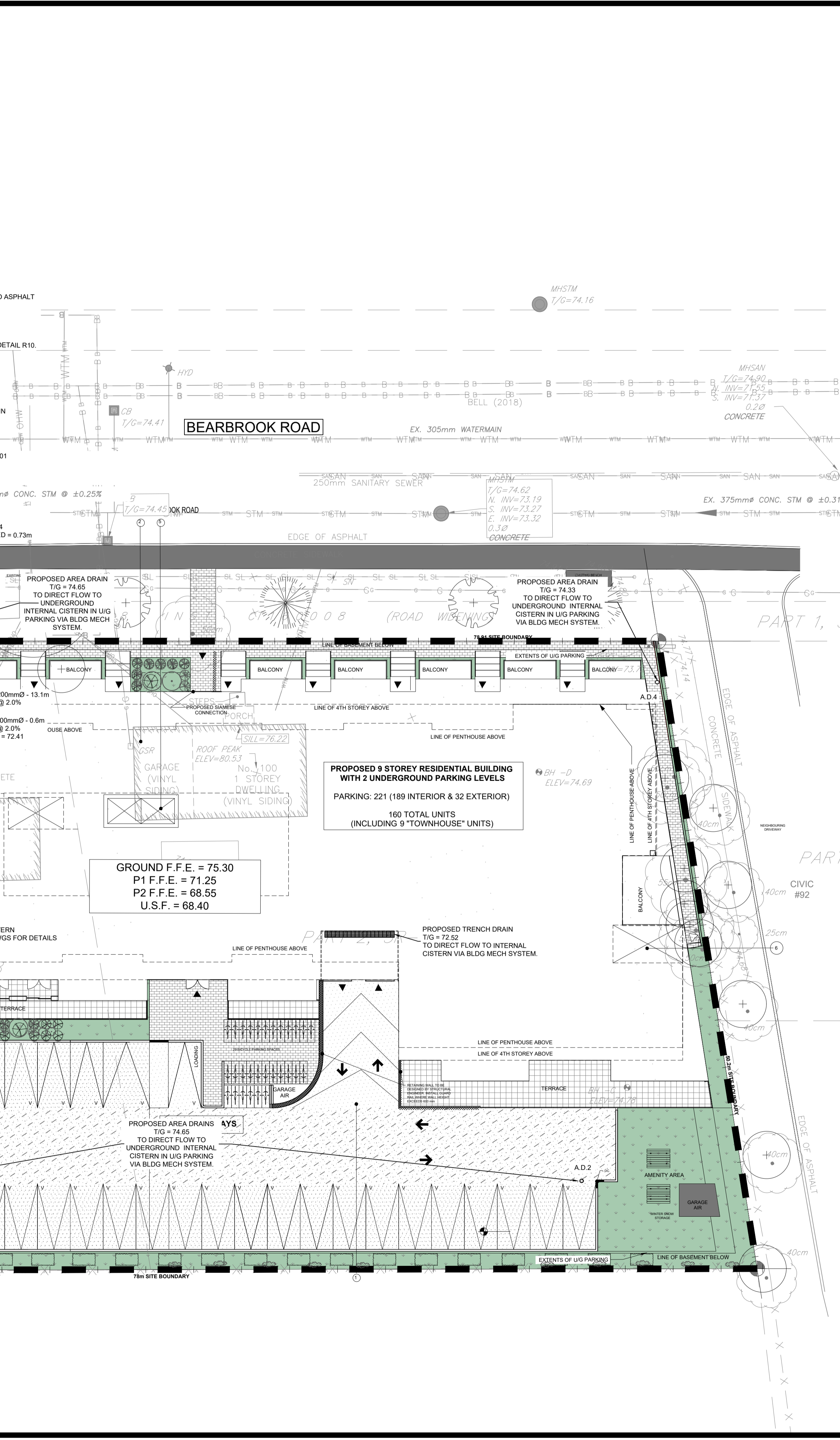
PROPOSED SAN MH 14
TIG = 74.61
NE INV = 72.34
SW INV = 72.40
EX. INV = 273.04
W. INV = 73.23

PROPOSED SAN MH 15
TIG = 74.61
NE INV = 72.34
SW INV = 72.40
EX. INV = 273.04
W. INV = 73.23

PROPOSED SAN MH 16
TIG = 74.61
NE INV = 72.34
SW INV = 72.40
EX. INV = 273.04
W. INV = 73.23

PROPOSED SAN MH 17
TIG = 74.61
NE INV = 72.34
SW INV = 72.40
EX. INV = 273.04
W. INV = 73.23

PROPOSED SAN MH 18
TIG = 74.61
NE INV = 72.34
SW INV = 72.40
EX. INV = 273.04
W. INV = 73.23



LEGEND:

| | |
|--|---|
| | EXISTING PROPERTY LINE TO REMAIN |
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| | PROPOSED DEPRESSED CURB |
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| | PROPOSED ELEVATION |
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| | PROPOSED EXPOSED BOTTOM OF RETAINING WALL |
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| | MATCH INTO EXISTING ELEVATION |
| | EXISTING ELEVATION |
| | PROPOSED OVERLAND MAJOR FLOW ROUTE |
| | PROPOSED 100mmØ PERFORATED SUBDRAIN |
| | PROPOSED STORM SEWER |
| | PROPOSED SANITARY SEWER |
| | PROPOSED WATER MAIN |
| | EXISTING STORM SEWER |
| | EXISTING SANITARY SEWER |
| | EXISTING WATER MAIN |
| | EXISTING GAS LINE |
| | EXISTING MANHOLE |
| | EXISTING CATCHBASIN |
| | PROPOSED CATCHBASIN/MANHOLE/CATCHBASIN |
| | PROPOSED MANHOLE |
| | PROPOSED AREA DRAIN |
| | PROPOSED PIPE INSULATION |
| | PROPOSED 100 YEAR HIGH WATER LEVEL |
| | STORM WATERSHED EXTENT |
| | WATERSHED NAME |
| | RUNOFF COEFFICIENT |
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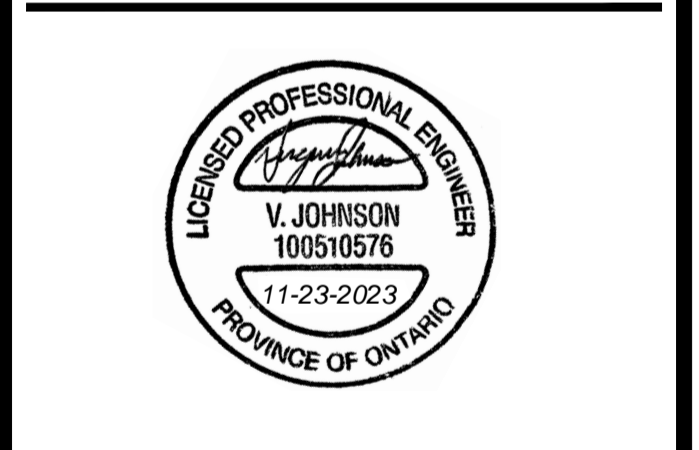
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CONTRACTOR TO VERIFY ALL DIMENSIONS AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES BEFORE WORK COMMENCES. DO NOT SCALE DRAWINGS.

SUBJECT TO APPROVAL

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NOT AUTHENTIC UNLESS SIGNED AND DATED



CLIENT: **LANDRIC HOMES LTD.**

DESIGNED BY: A.S. DRAWN BY: A.S. APPROVED BY: V.J.

PROJECT: **RESIDENTIAL BUILDING 98 & 100 BEARBROOK, OTTAWA, ONTARIO**

DRAWING TITLE: **SERVICING PLAN**

PROJECT NO: **210628**

DATE: **NOV 2021**

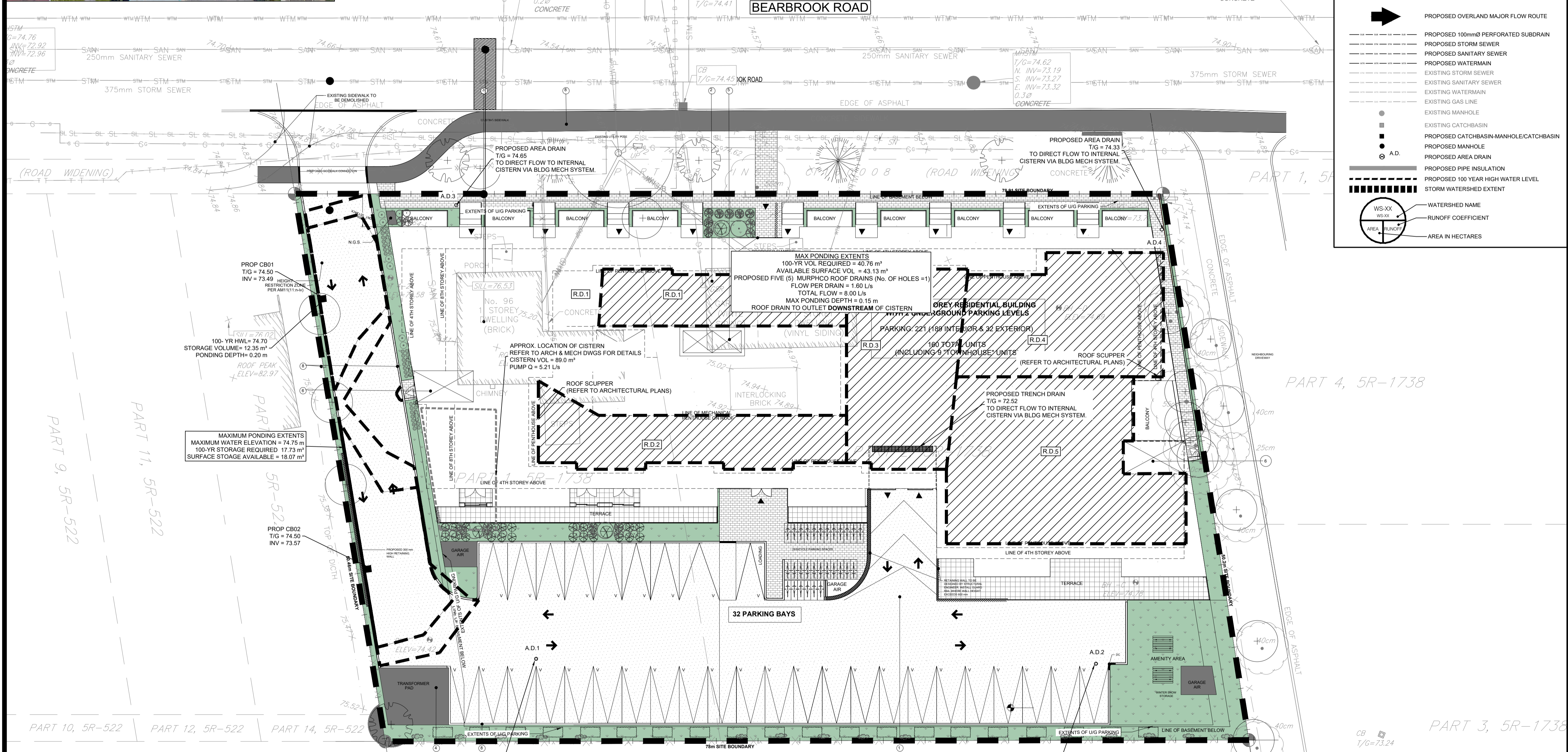
C401

D07-12-22-0075

#18758



KEY PLAN
N.T.S.



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
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- PROPOSED CONCRETE FEATURES/SLAB
- PROPOSED LIGHT DUTY ASPHALT
- PROPOSED HEAVY DUTY ASPHALT
- PROPOSED RIP RAP
- +50.00 PROPOSED ELEVATION
- +50.00HP PROPOSED HIGH POINT ELEVATION
- +50.00S PROPOSED SHALE ELEVATION
- +50.00BC PROPOSED BOTTOM OF CURB / ASPHALT ELEVATION
- +50.00TC PROPOSED TOP OF CURB ELEVATION
- +50.00BW PROPOSED EXPOSED BOTTOM OF RETAINING WALL
- +50.00TW PROPOSED TOP OF RETAINING WALL
- +50.00EX MATCH INTO EXISTING ELEVATION
- *N 10 EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- PROPOSED 100mm² 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 MANHOLE
- PROPOSED AREA DRAIN
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WS-XX WATERSHED NAME
- WS-XX-RUNOFF COEFFICIENT
- AREA-RUNOFF AREA IN HECTARES

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| 04 | ISSUED FOR MUNICIPAL APPROVAL | S.K. | 23 NOV 2023 |
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5430 Canotek Road | Ottawa, ON, K1J 9G2
www.lrl.ca | (613) 842-3434

CLIENT: **LANDRIC HOMES LTD.**

DESIGNED BY: A.S. DRAWN BY: A.S. APPROVED BY: V.J.

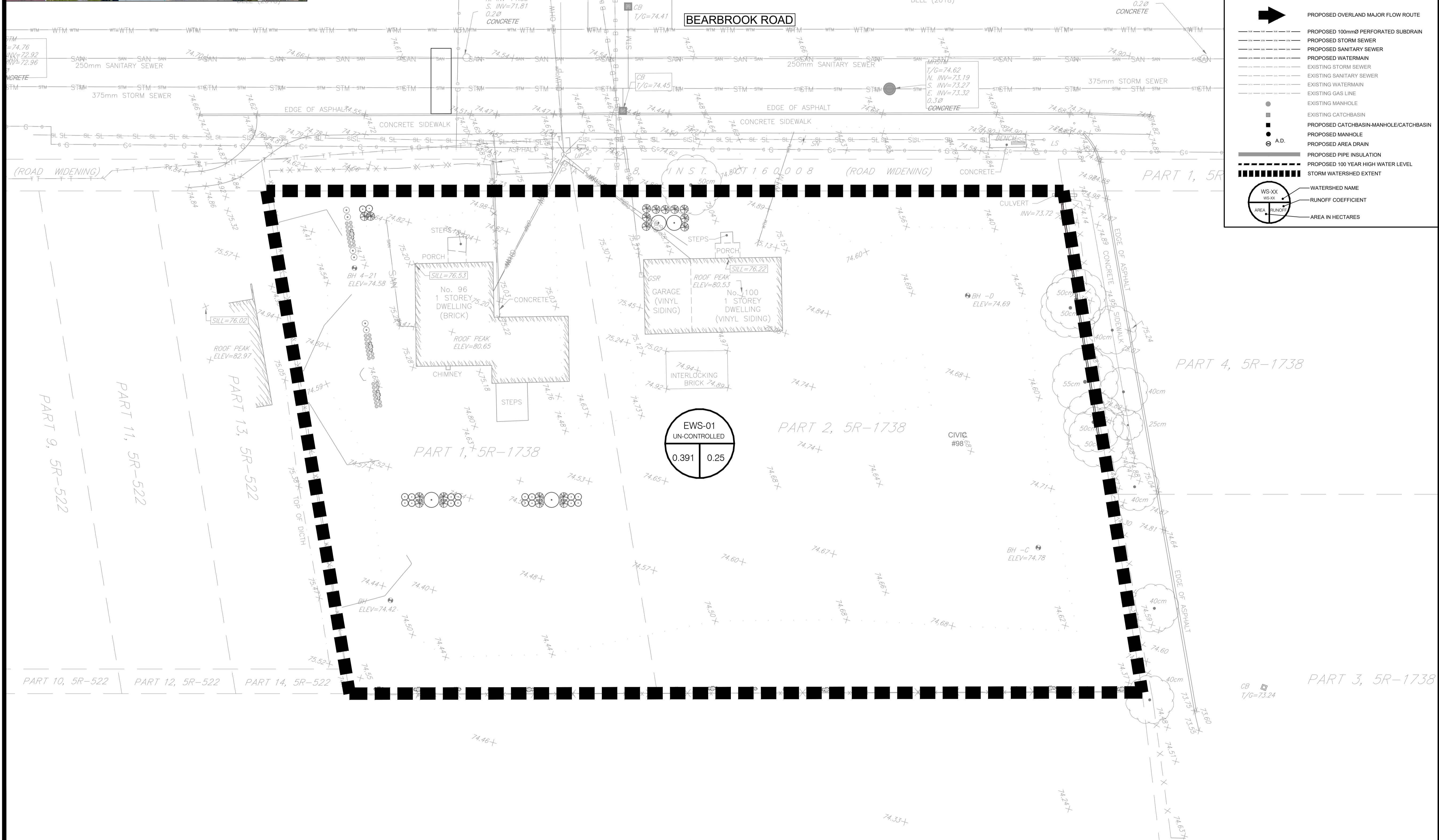
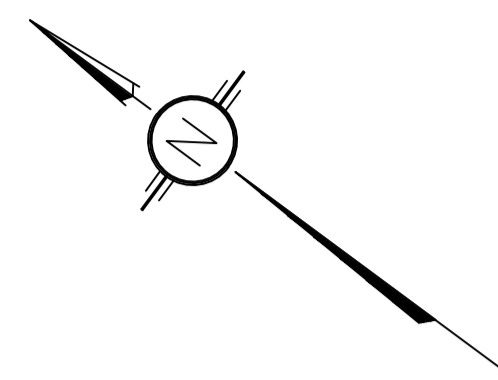
PROJECT: **RESIDENTIAL BUILDING
98 & 100 BEARBROOK, OTTAWA, ONTARIO**

DRAWING TITLE: **STORMWATER MANAGEMENT PLAN**

PROJECT NO.: 210628
DATE: NOV 2021

C601

D07-12-22-0075



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 LIGHT DUTY ASPHALT
- PROPOSED RIP RAP
- PROPOSED ELEVATION
- PROPOSED HIGH POINT ELEVATION
- PROPOSED SHALE 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 AREA DRAIN
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT

Scale: 1:200

Watershed Information:

- W.S.-XX WATERSHED NAME
- W.S.-XX RUNOFF COEFFICIENT
- W.S.-XX AREA IN HECTARES

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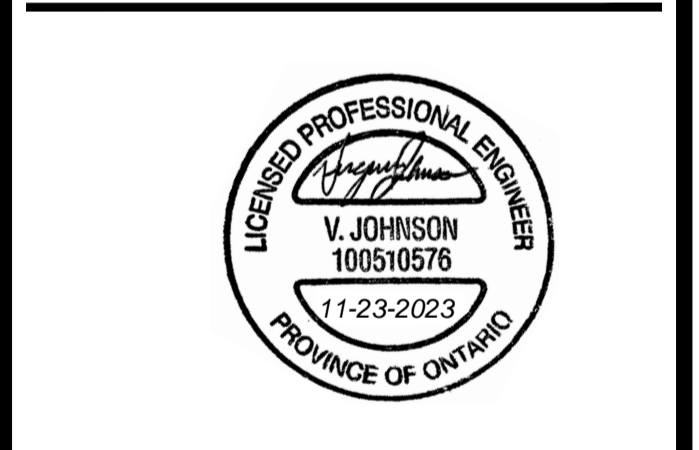
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PROJECT: **RESIDENTIAL BUILDING
98 & 100 BEARBROOK, OTTAWA, ONTARIO**

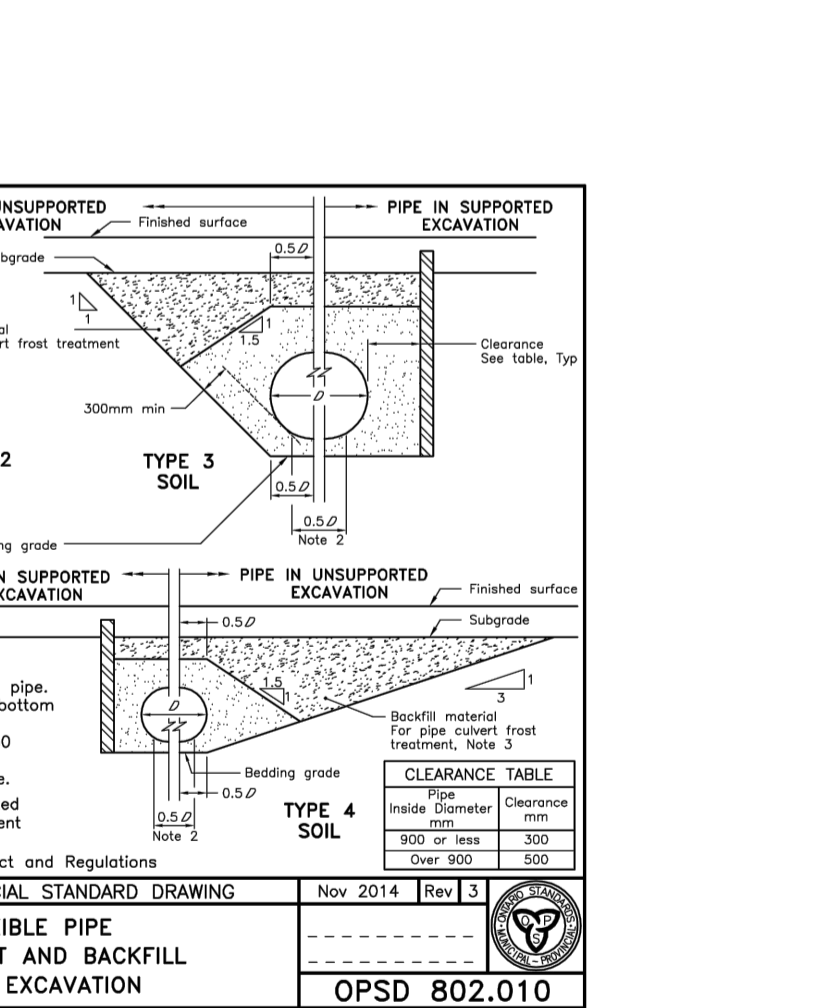
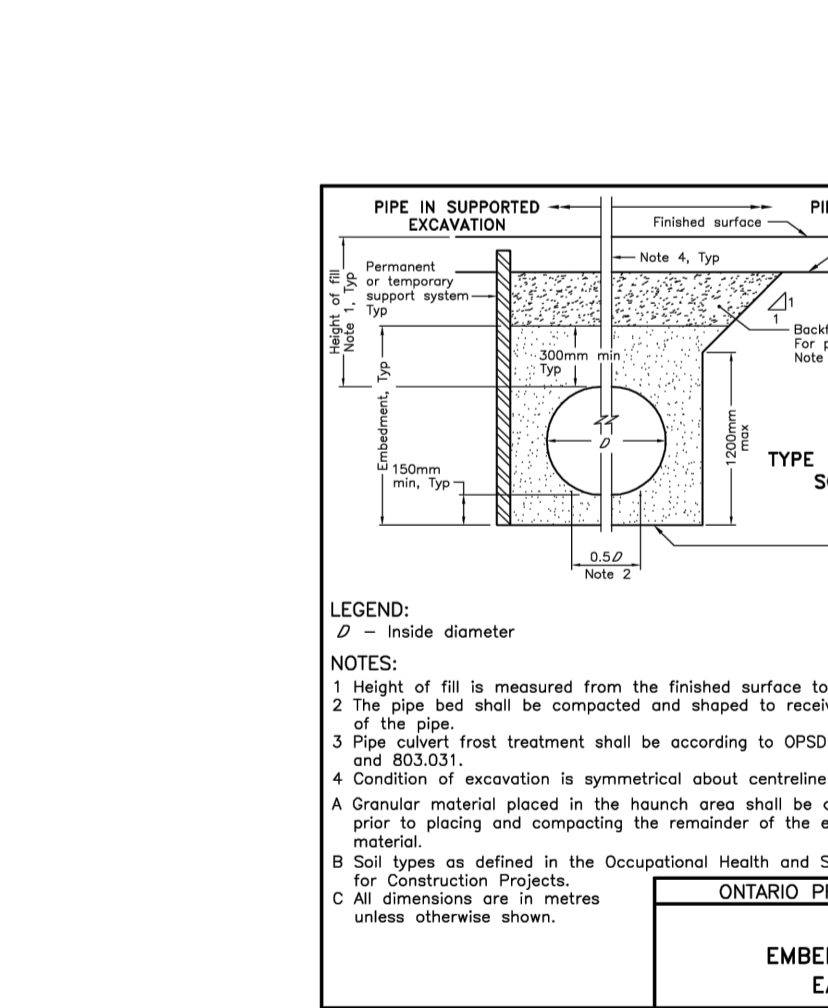
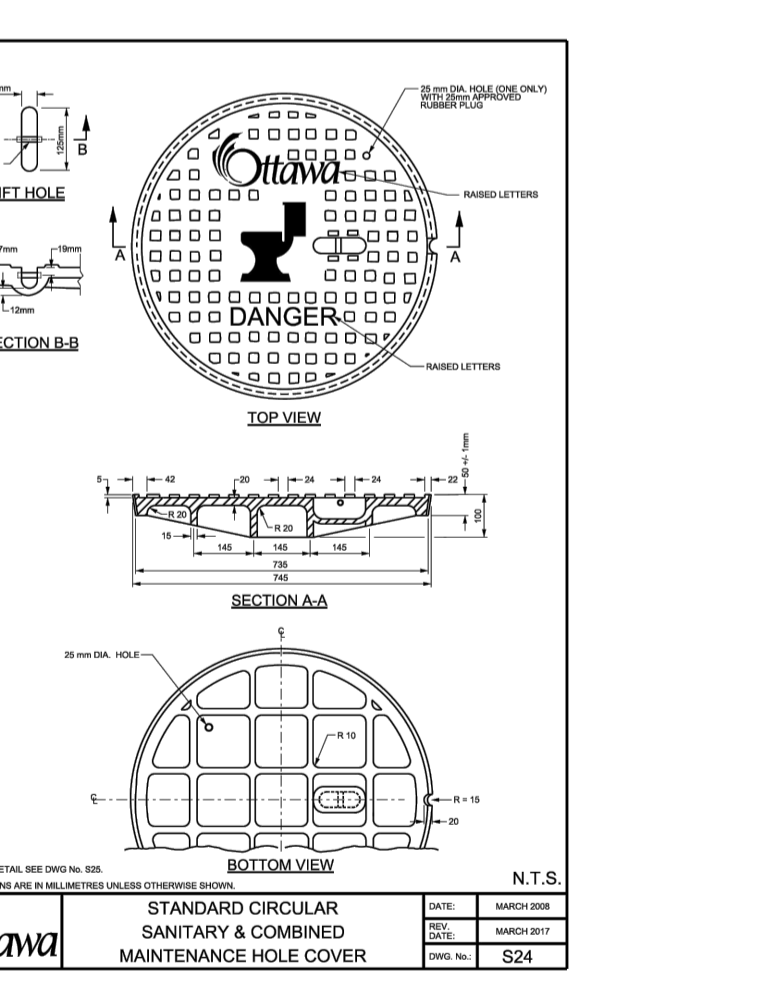
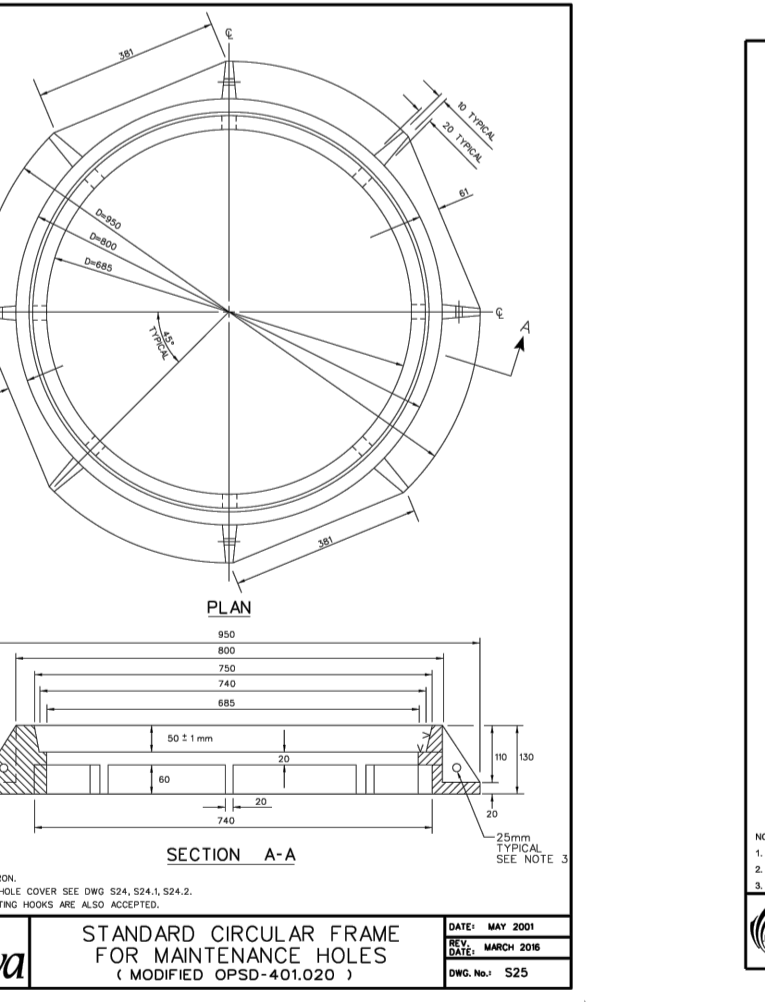
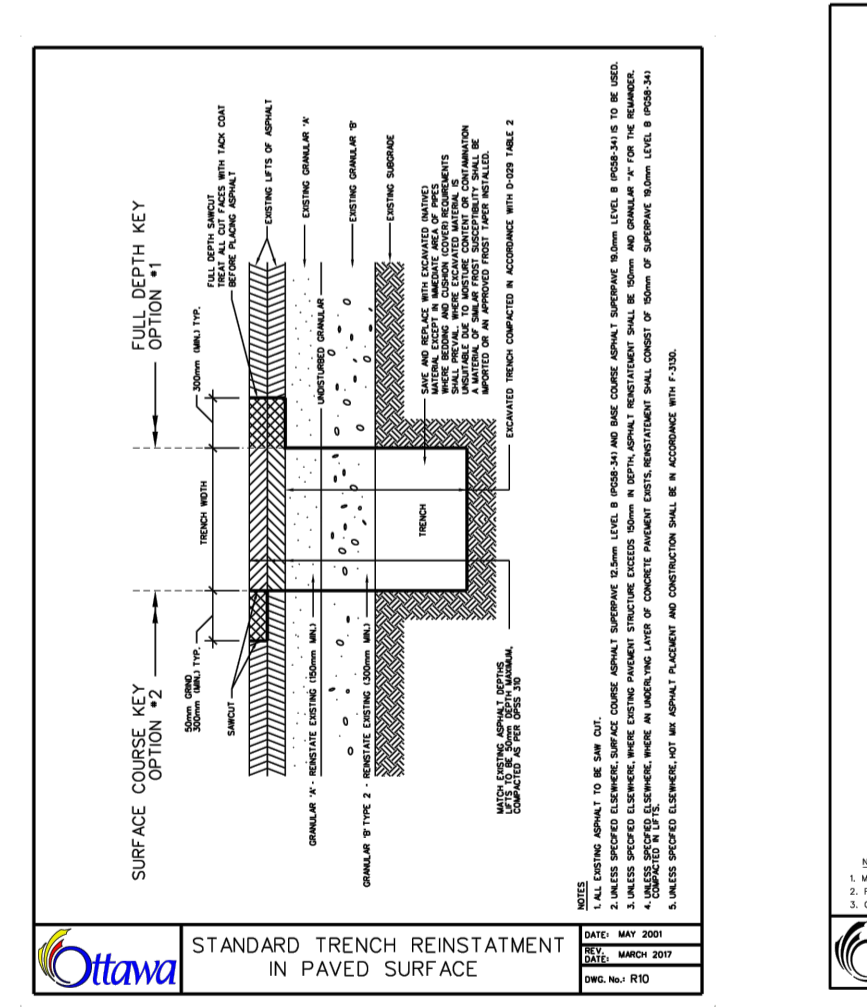
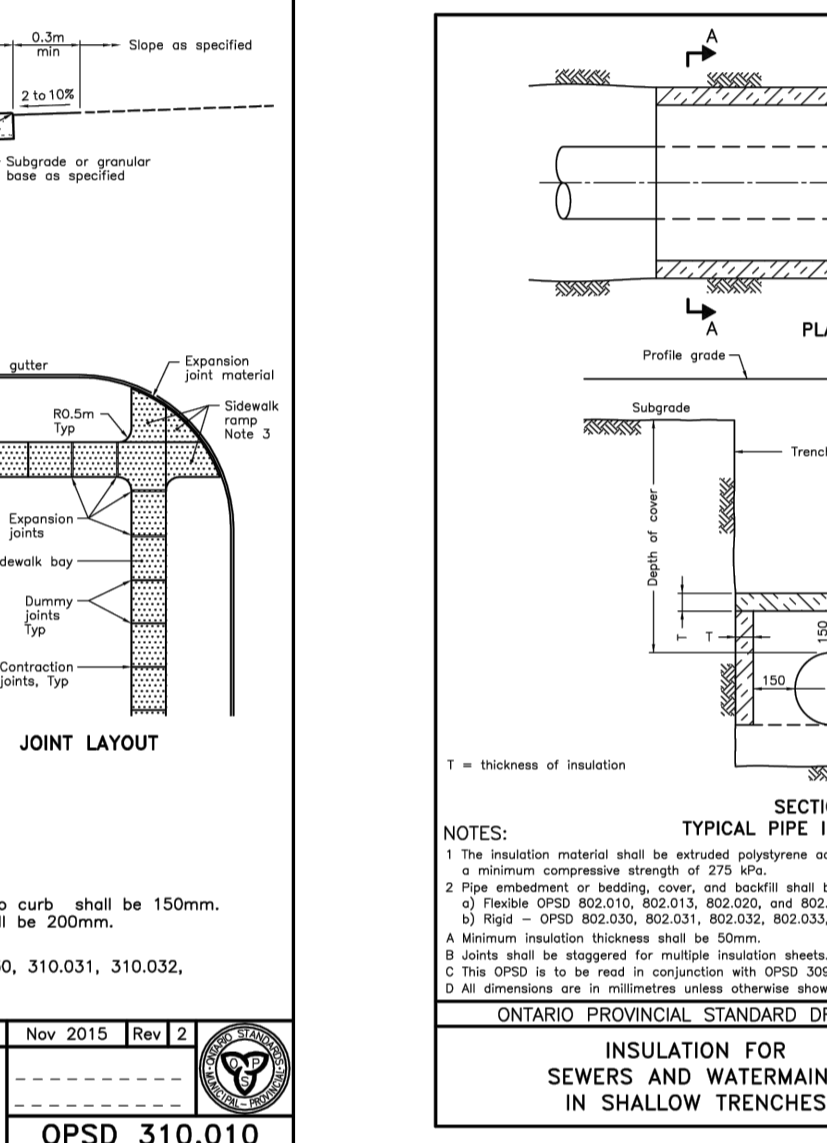
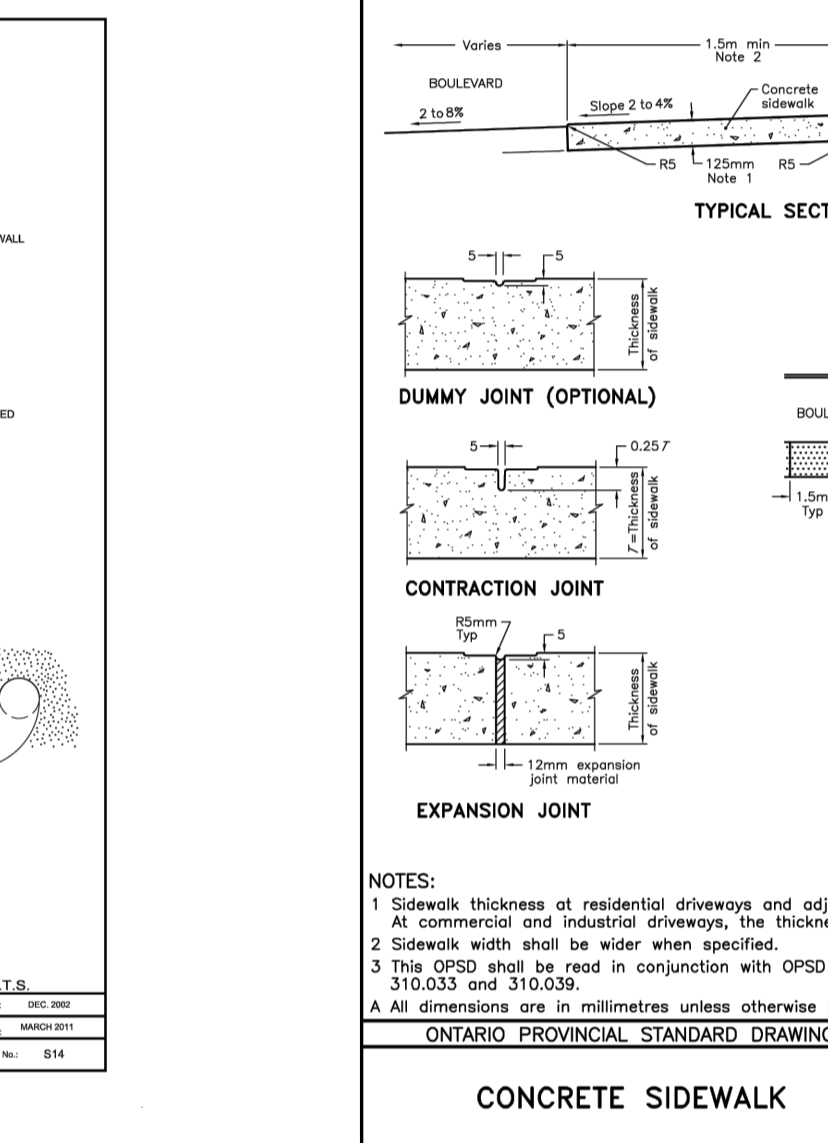
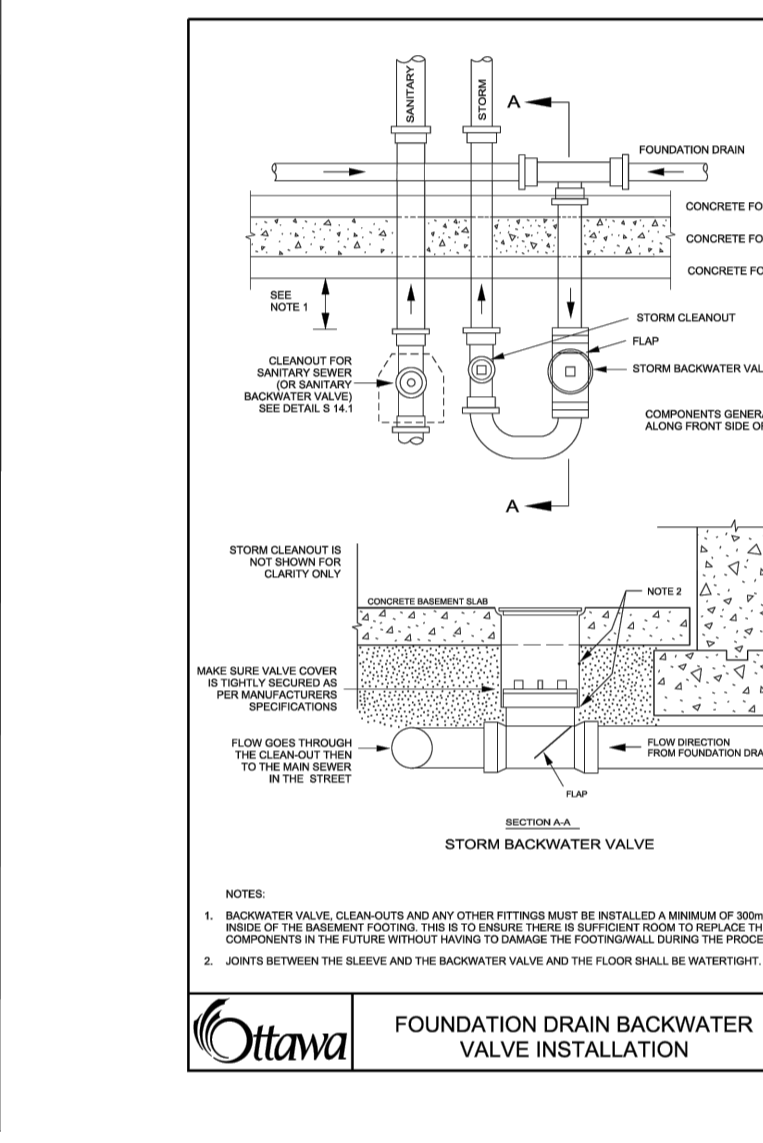
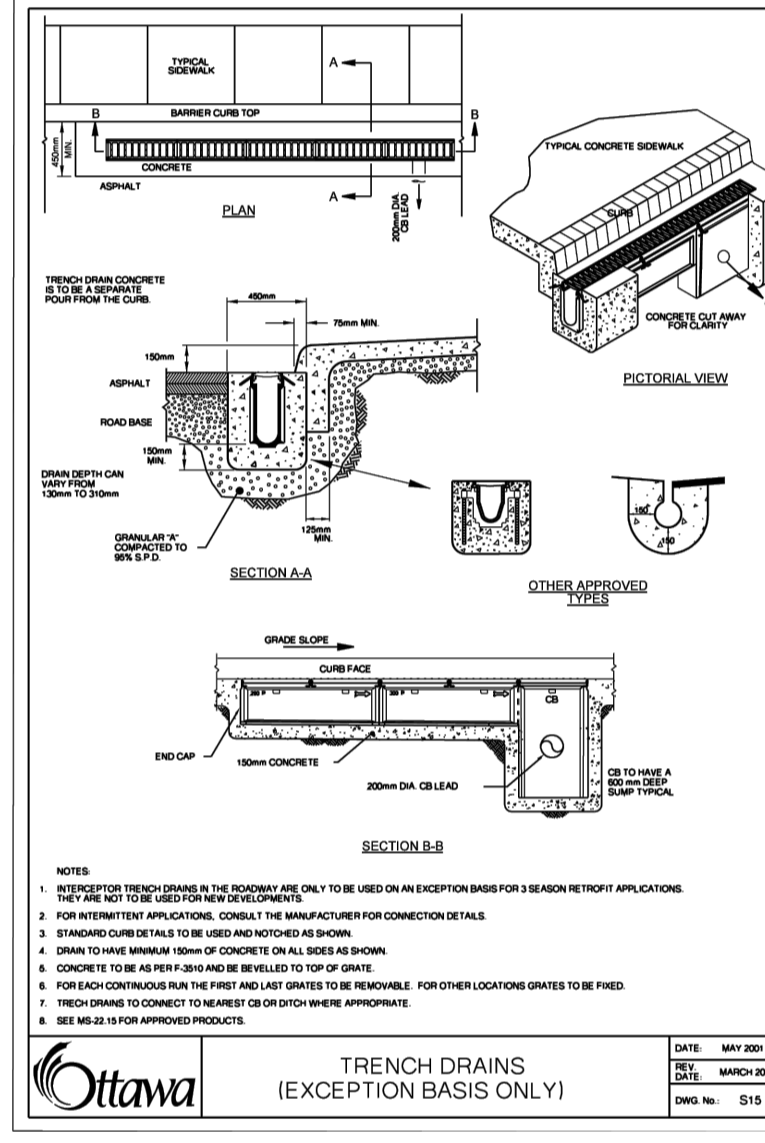
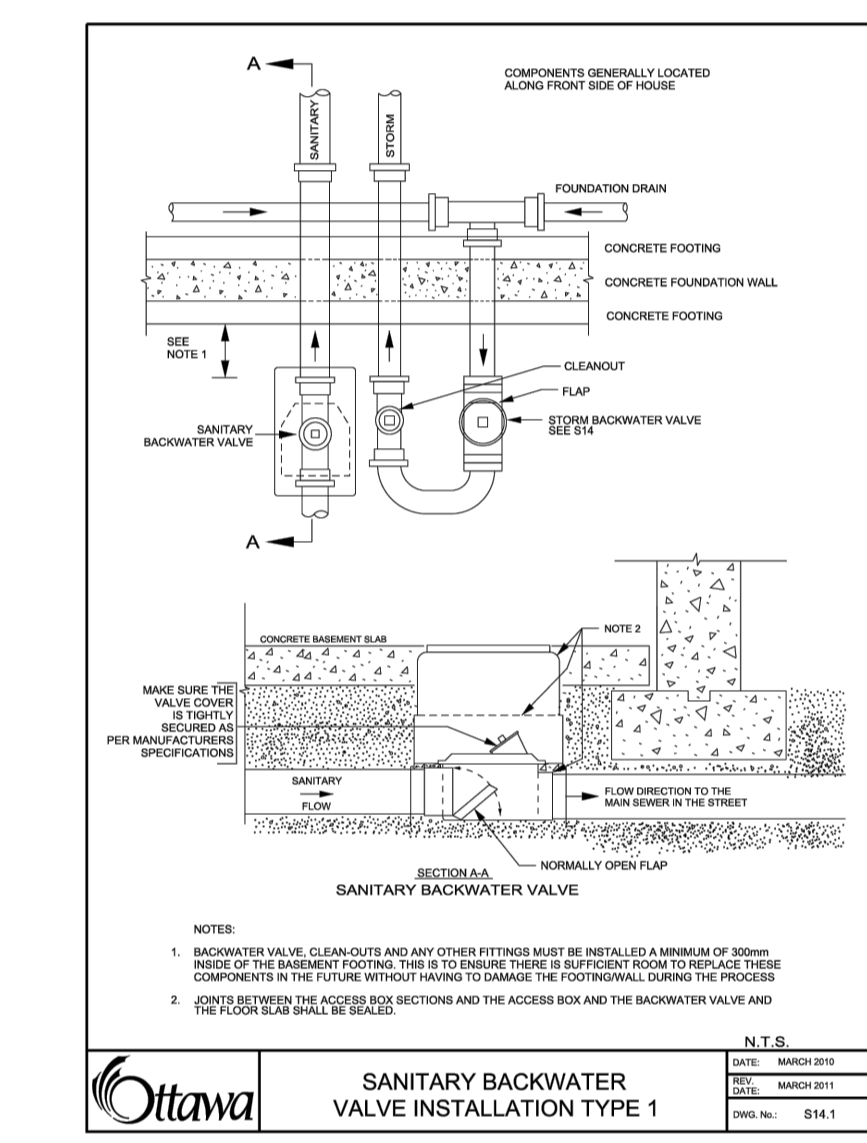
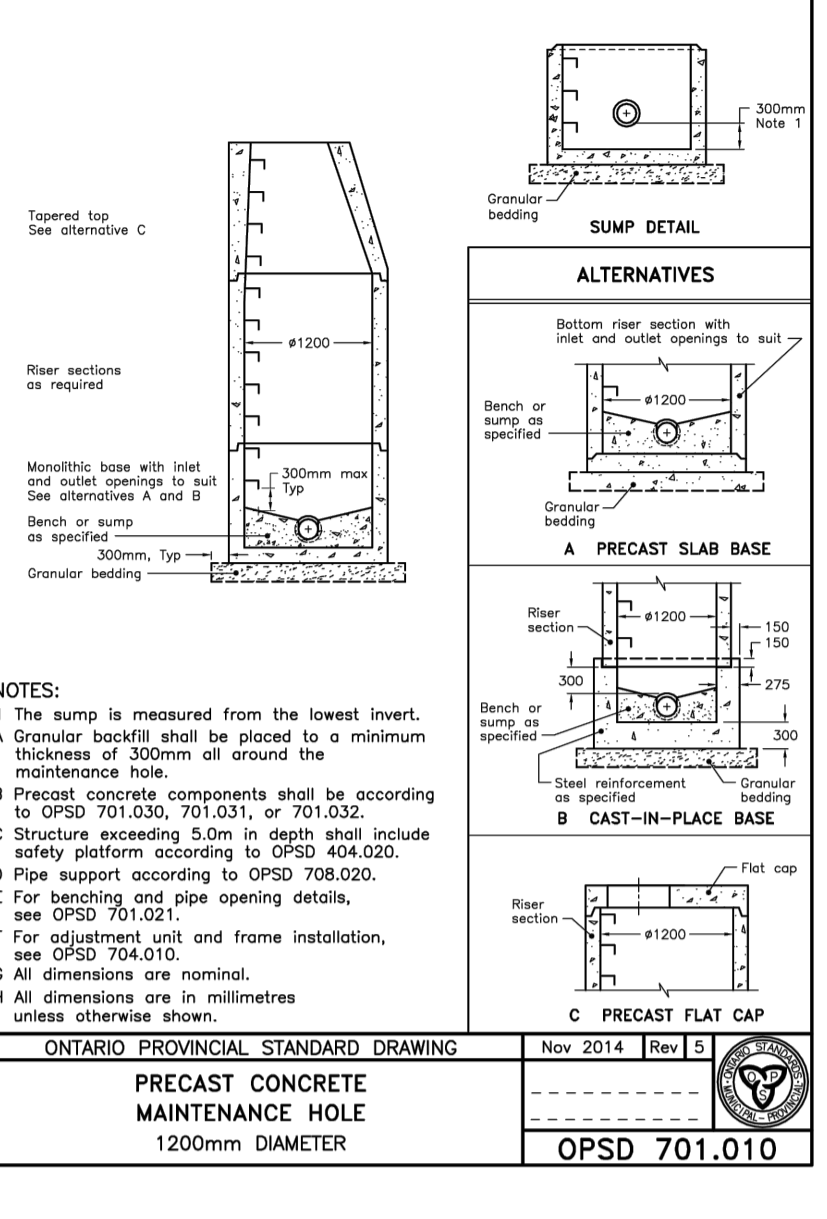
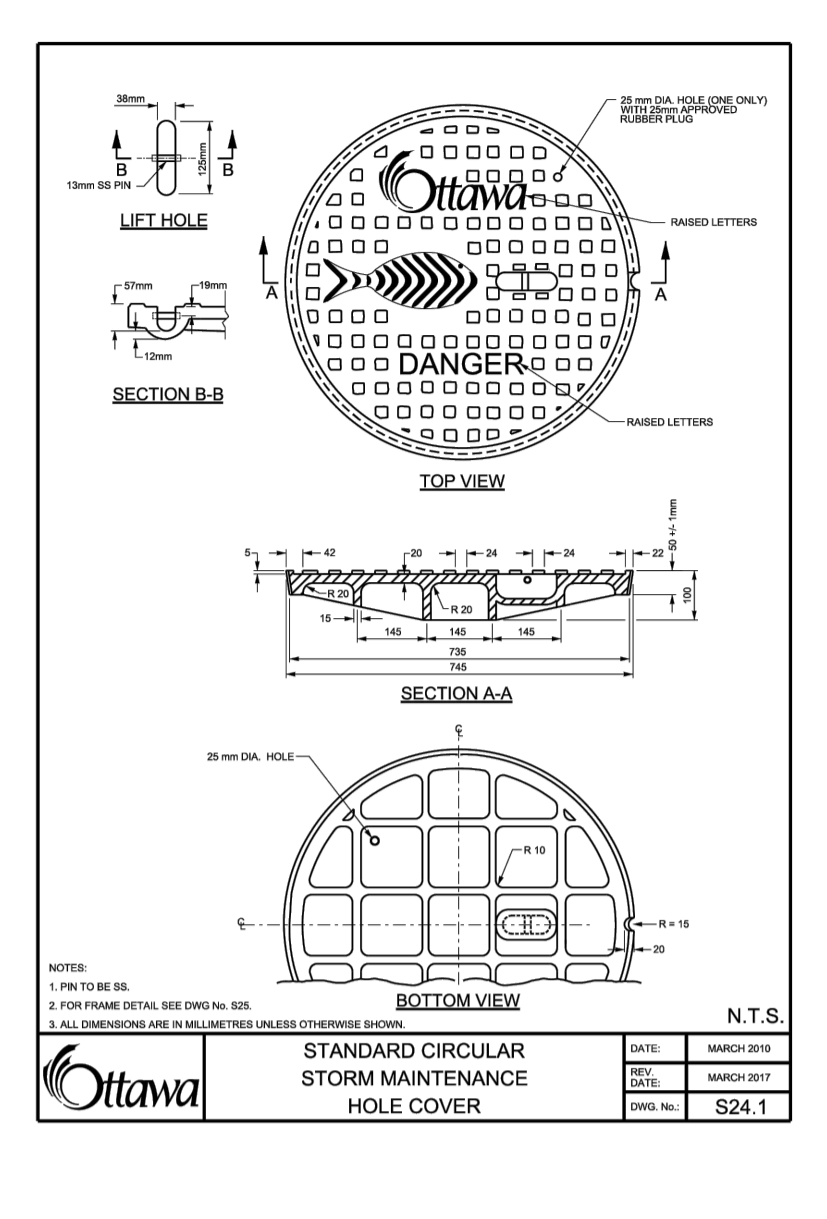
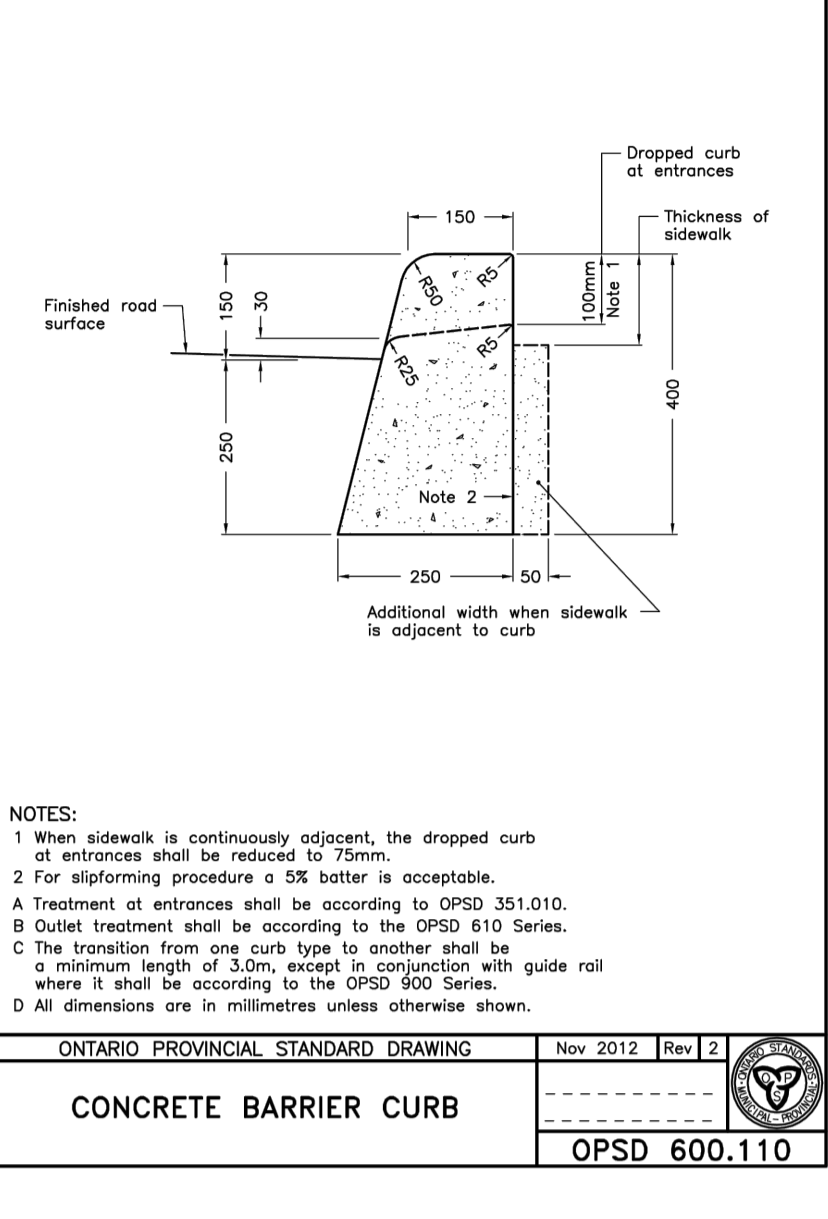
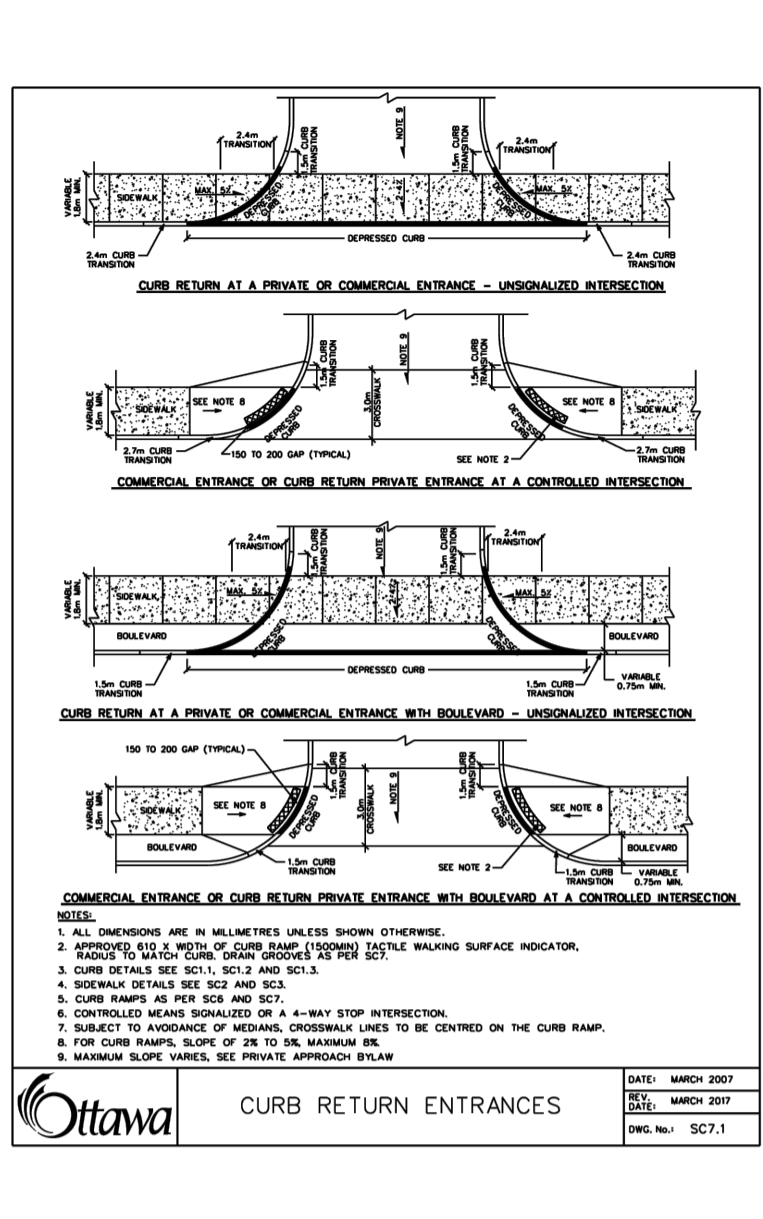
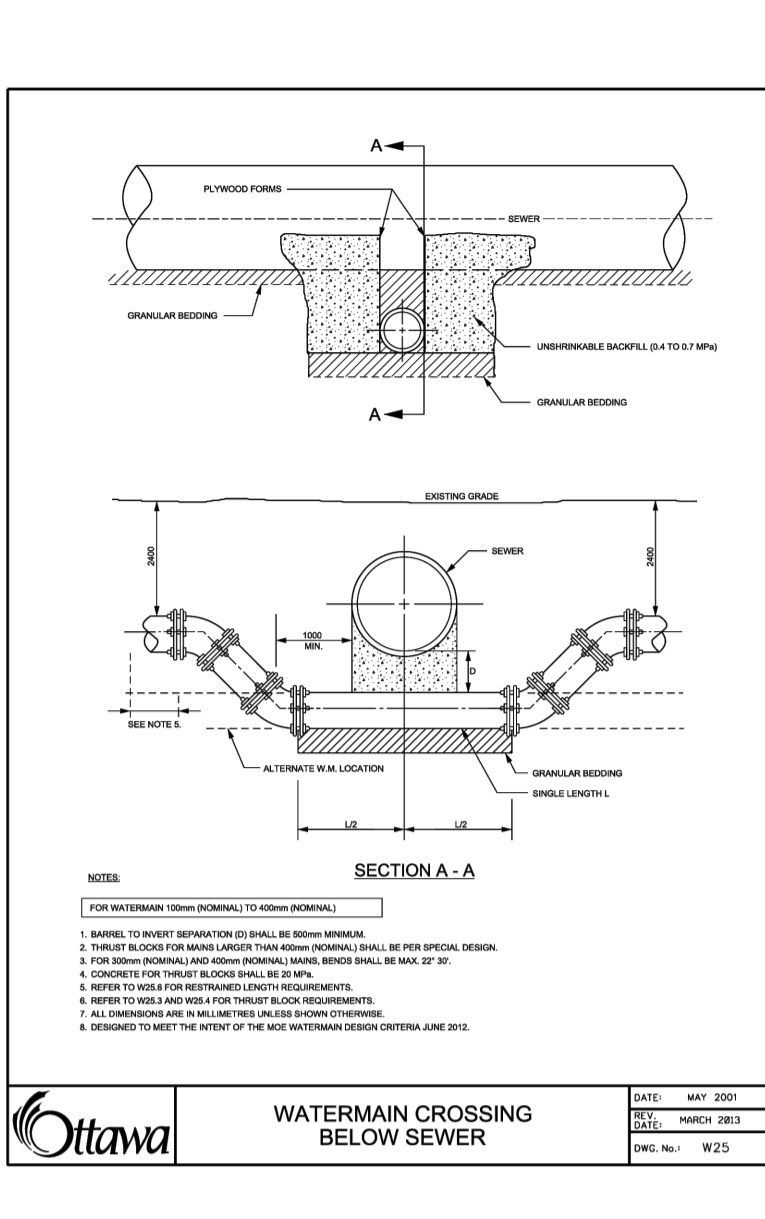
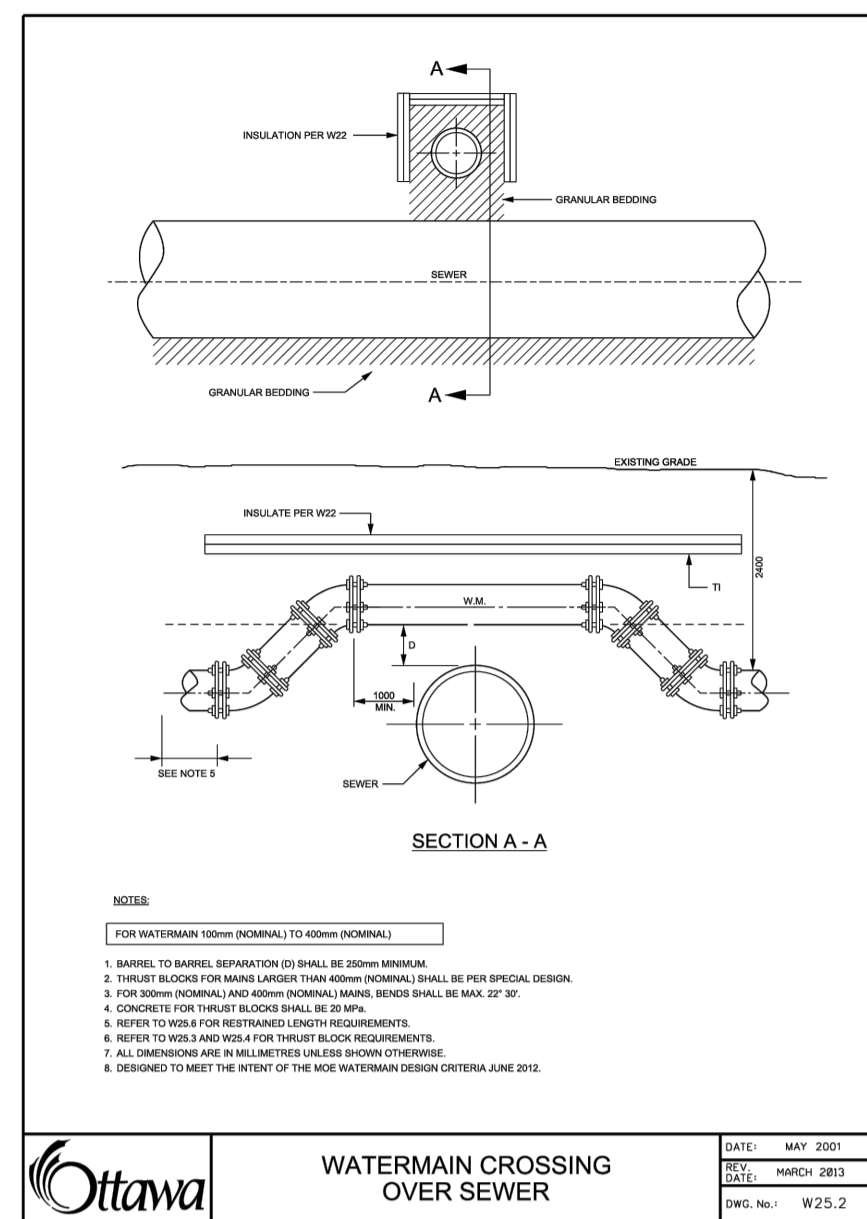
DRAWING TITLE: **PRE-DEVELOPMENT
WATERSHED PLAN**

PROJECT NO.: **210628**
DATE: **NOV 2021**

C701

#18758

D07-12-22-0075



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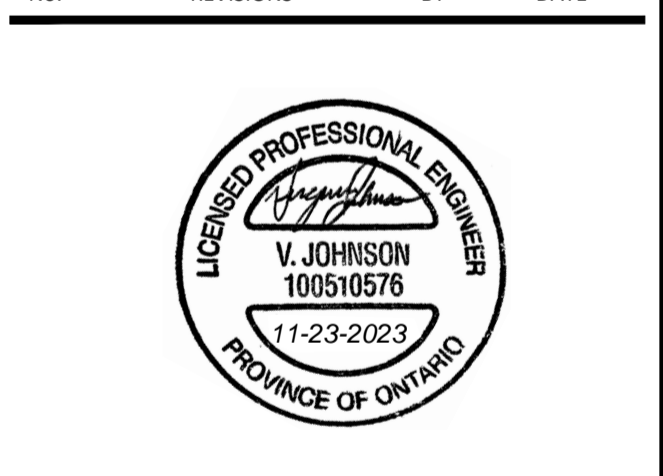
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PROJECT: **RESIDENTIAL BUILDING 98 & 100 BEARBROOK, OTTAWA, ONTARIO**

DRAWING TITLE: **CONSTRUCTION DETAIL PLAN**

PROJECT NO: 210628
 DATE: NOV 2021

C901

DRAWINGS/FIGURES

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



NOT FOR PERMITS
CONSTRUCTION

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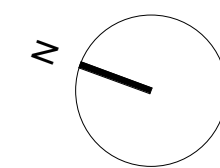
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GENERAL NOTES

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- NOTE-B :**
ALL GENERAL SITE INFORMATION AND CONDITIONS HAVE BEEN COMPILED FROM EXISTING PLANS AND SURVEYS.
- NOTE-C :**
CONTRACTOR IS RESPONSIBLE TO CHECK AND VERIFY ALL DIMENSIONS ON SITE AND REPORT ALL ERRORS AND / OR OMISSIONS TO THE ARCHITECT.
- NOTE-D :**
REFER TO LANDSCAPE PLAN FOR ALL EXTERIOR LANDSCAPING.
- NOTE-E :**
DO NOT SCALE DRAWINGS.
- NOTE-F :**
ALL CONTRACTORS MUST COMPLY WITH ALL APPLICABLE CODES AND REGULATIONS.

SURVEY INFO

TOPOGRAPHIC SURVEY OF :
Stantec Geomatics Ltd.



PROJECT INFORMATION

SITE SUMMARY 98-100 BEARBROOK RD,
GLOUCESTER, OTTAWA
ADDRESS
CURRENT ZONING AM11
SITE AREA 3553.55 m²
PROPOSED USE RESIDENTIAL
BUILDING AREA 1812.30 m²

| ZONING SUMMARY | | |
|---------------------------|---------------------|------------------------|
| LOT AREA | REQUIRED | PROPOSED |
| 3553.55 m ² | 30.00 m | 3553.55 m ² |
| LOT WIDTH | 0.00 m | 78.91 m |
| MAX. BUILDING HEIGHT | 30.00 m | 30.00 m |
| MAX. PARAPET HEIGHT | 0.00 m | 0.90 m |
| SET BACKS : | | |
| - FRONT YARD | 3.00 m (min.) | 3.00 m |
| - CORNER SIDE YARD | 0.00 m (min.) | 0.00 m |
| - INTERIOR SIDE YARD | 7.50 m (min.) | 7.50 m |
| Abutting Residential Zone | | |
| - INTERIOR SIDE YARD | 0.00 m | 1.50 m |
| All other cases | | |
| - REAR YARD | 10.00 m (min.) | 12.73 m |
| MIN LANDSCAPED AREA | 0.00 m ² | 605.41 m ² |

| PARKING | | |
|--------------------------------|-----------------|-------------------|
| VEHICULAR | REQUIRED | PROPOSED |
| MID-RISE: 1.2 / UNIT | 173 (10% red.) | 176 |
| VISITORS: 0.2 / UNIT | 32 | 32 |
| ACCESSIBLE (inc. in count) | 3 | 3 |
| BICYCLE: | | |
| BICYCLE: 0.5 / UNIT | 80 | 86 |
| WASTE MANAGEMENT CONTAINERS | | |
| REQUIRED | PROVIDED | |
| GARBAGE (160X0.11Yx18Y) | 4Y ² | 5X4Y ² |
| RECYCLING (160X038Yx6Y) | 4Y ² | 2X4Y ² |
| ORGANICS (240L per 50 UNITS=4) | 240L | 4 |

| AMENITY AREA | | |
|--|--------------------|------------------------|
| | REQUIRED | PROPOSED |
| PRIVATE | 480 m ² | 1832.26 m ² |
| COMMUNAL | 480 m ² | 543 m ² |
| (CALC: 6 m ² / UNIT - MIN 50% MUST BE COMMUNAL) | | |

SUMMARY OF PROPOSED:
160 APARTMENTS: Four bed 'Townhouses' x 2
Two bed 'Townhouses' x 7
Studio x 7;
1 Bed x 36;
1 Bed + Den x 74;
2 Bed x 31;
3 Bed x 3;

PARKING BAYS: 32 Exterior + 189 Interior = 221 Total
PARKING GARAGE: 3306.99m² x 2= 6613.98 m²

TOTAL BUILDING AREA: 14 463.88 m² (excl. garage)
PROPOSED COVERAGE: 51.00 % (1828.44 m²)

- KEYNOTE DESCRIPTIONS**
- GARAGE ENTRANCE
 - 100 BEARBROOK TO BE DEMOLISHED
 - 98 BEARBROOK TO BE DEMOLISHED
 - TRANSFORMER PAD
 - ELEVATOR SHAFT
 - STAIRCASE SHAFT
 - TOWNHOUSE ENTRANCE
 - CONCRETE CURB



| CLIENT : | | | |
|--------------|--------------------|----------|--|
| 1.13 | Structural Co-Ord | 23-03-08 | |
| 1.12 | Structural Change | 23-02-27 | |
| 1.11 | SITE PLAN | 23-01-13 | |
| COORDINATION | | | |
| 1.9 | SPA2 Co-Ordination | 22-12-07 | |
| 1.8 | City Discussion | 22-11-16 | |
| 1.7 | Coordination | 22-11-07 | |
| 1.6 | Coordination | 22-10-13 | |
| 1.5 | SPA Submission | 22-03-15 | |
| revisions | description | date | |

PROJECT NAME / NOM DU PROJET :

98-100 Bearbrook Rd

DRAWING NAME / NOM DU DESSIN :
GENERAL SITE PLAN CONTROL

PROJECT NO. / NO. DE PROJET : 21046

DATE : 2023-02-27

DRAWN BY / DESSINÉ PAR : MA, ET

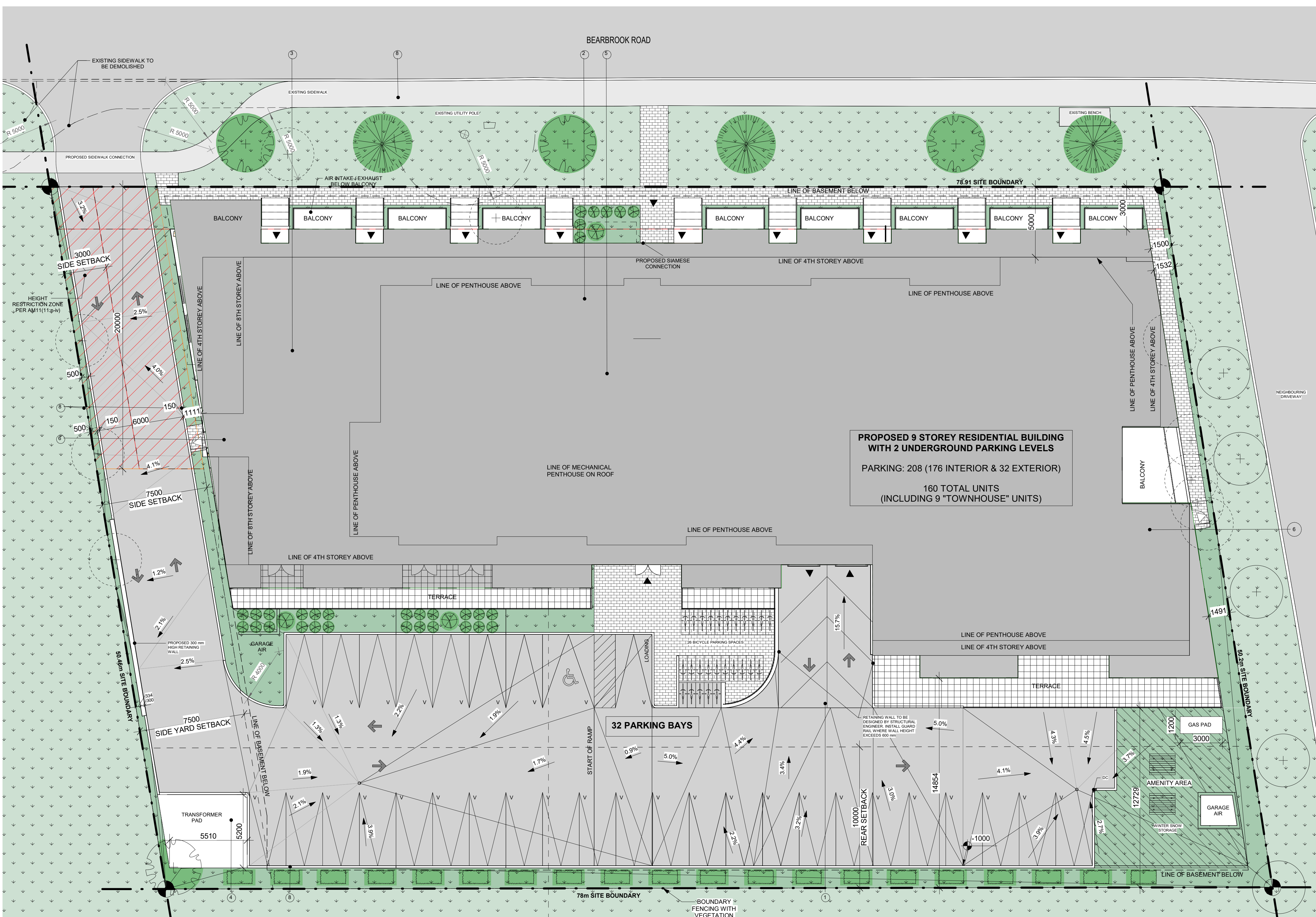
REVIEWED BY / VÉRIFIÉ PAR : LaG

SCALE / ÉCHELLE : 1 : 150

PROJECT PHASE / PHASE DU PROJET : 1

DWG NO. / NO. DESSIN : A003

REVISION NO. / NO. DE RÉVISION : 1.13



PROPOSED 9 STOREY RESIDENTIAL BUILDING WITH 2 UNDERGROUND PARKING LEVELS
PARKING: 208 (176 INTERIOR & 32 EXTERIOR)
160 TOTAL UNITS (INCLUDING 9 "TOWNHOUSE" UNITS)

32 PARKING BAYS

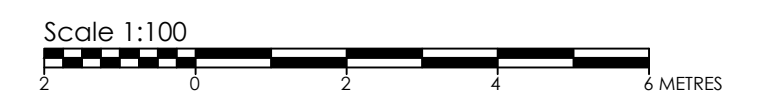
| UNIT COUNT | 2 Bedroom "TOWNHOUSE" | 4 Bedroom "TOWNHOUSE" | STUDIO | 1 BEDROOM | 1 BED + DEN | 2 BEDROOM | 3 BEDROOM | TOTAL |
|---------------------|-----------------------|-----------------------|--------|-----------|-------------|-----------|-----------|-------|
| GROUND FLOOR | 7 | 2 | | 1 | 4 | 2 | | 16 |
| 2ND FLOOR | (7) | (2) | 1 | 4 | 5 | 2 | | 12 |
| 3RD FLOOR | | | 1 | 5 | 11 | 4 | | 21 |
| 4TH FLOOR | | | 1 | 5 | 11 | 4 | | 21 |
| 5TH FLOOR | | | 1 | 5 | 11 | 4 | | 21 |
| 6TH FLOOR | | | 1 | 5 | 11 | 4 | | 21 |
| 7TH FLOOR | | | 1 | 5 | 11 | 4 | | 21 |
| 8TH FLOOR | | | 1 | 5 | 11 | 4 | | 21 |
| 9TH FLOOR | | | 1 | 6 | 10 | 3 | | 20 |
| TOTAL | 7 | 2 | 7 | 36 | 74 | 31 | 3 | 160 |

1 SITE PLAN
A003 1 : 150



THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR In accordance with Regulation 1026, Section 29(3)

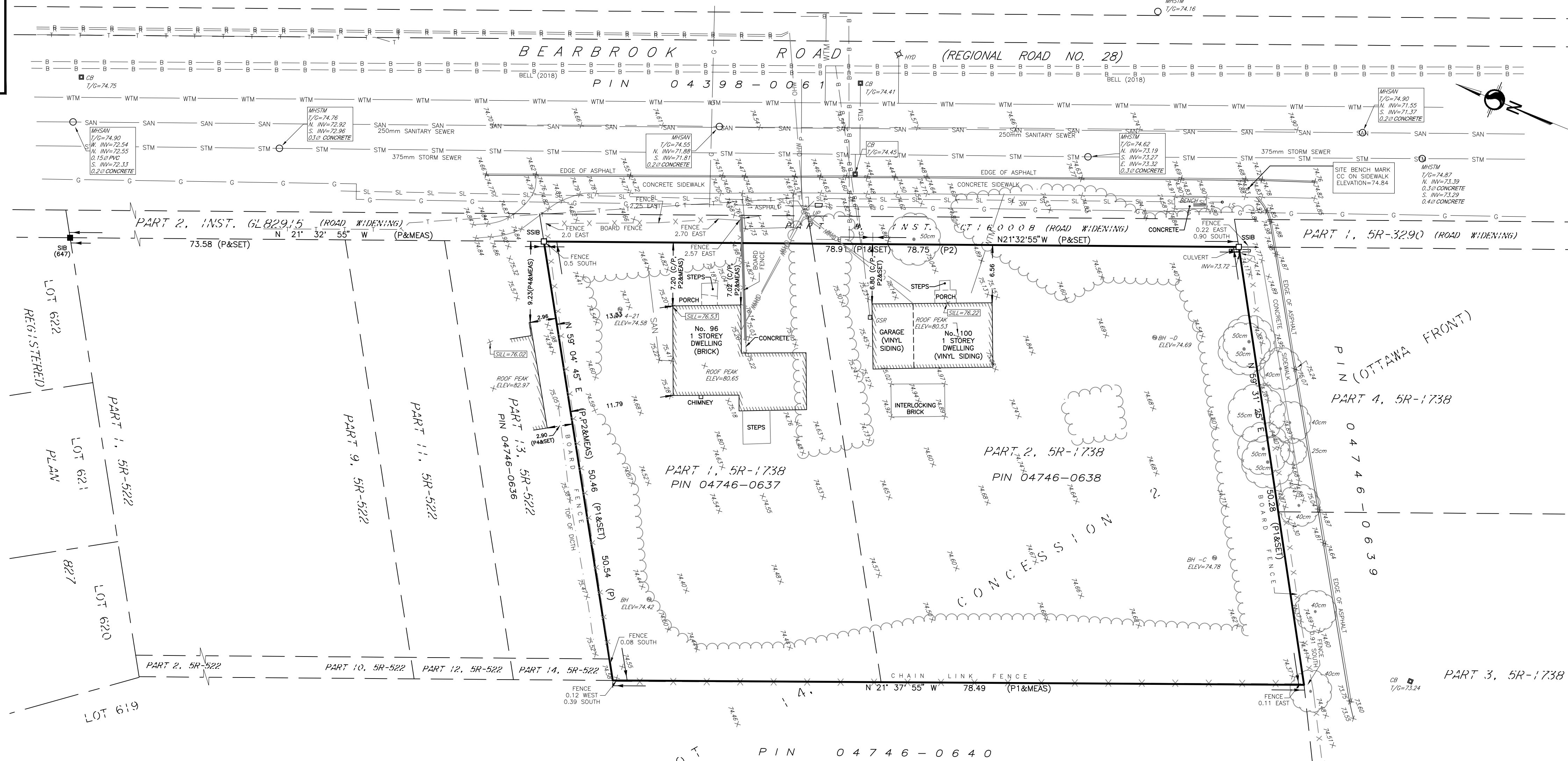
SURVEYOR'S REAL PROPERTY REPORT PART 1 - PLAN OF SURVEY PART OF LOT 14 CONSESSION 2 (OTTAWA FRONT) (GEOGRAPHIC TOWNSHIP OF GLOUCESTER) CITY OF OTTAWA



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LEGEND (IF APPLICABLE)

Table with columns for symbols, DENOTES, and FOUND MONUMENTS. Includes symbols for iron bars, manholes, valves, and various types of monuments.



NOTE: THIS PLAN OF SURVEY IS TO BE READ IN CONJUNCTION WITH THE REPORT SUMMARY NOTED AS PART 2 HEREON. PART 2: This Report was prepared for Landric Homes and the undersigned accepts no responsibility for the use by other parties.

METRIC CONVERSION

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

BEARING NOTE

BEARINGS ARE GRID, DERIVED FROM CAN-NET VRS NETWORK GPS OBSERVATIONS ON NCC HORIZONTAL CONTROL MONUMENTS 19773035 AND 19680191, CENTRAL MERIDIAN, 76° 30' WEST LONGITUDE MTM ZONE 9, NAD83 (ORIGINAL).

19773035 N:5006060.42 E:324888.04 19680191 N:5033564.26 E:388064.94

FOR BEARING COMPARISONS, A ROTATION OF 0°41'05" COUNTER-CLOCKWISE HAS BEEN APPLIED TO BEARINGS ON (P) AND A ROTATION OF 0°41'25" COUNTER-CLOCKWISE HAS BEEN APPLIED TO BEARINGS ON (P1).

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 THE 28th DAY OF JULY, 2021.

July 30, 2021 DATE

Francis Lau Ontario Land Surveyor

Stantec Geomatics Ltd. logo and contact information including address, phone, and website.

BLACKBURN ROAD

CONT'D ON DRWG 9492-101

CENTRE PARK DRIVE

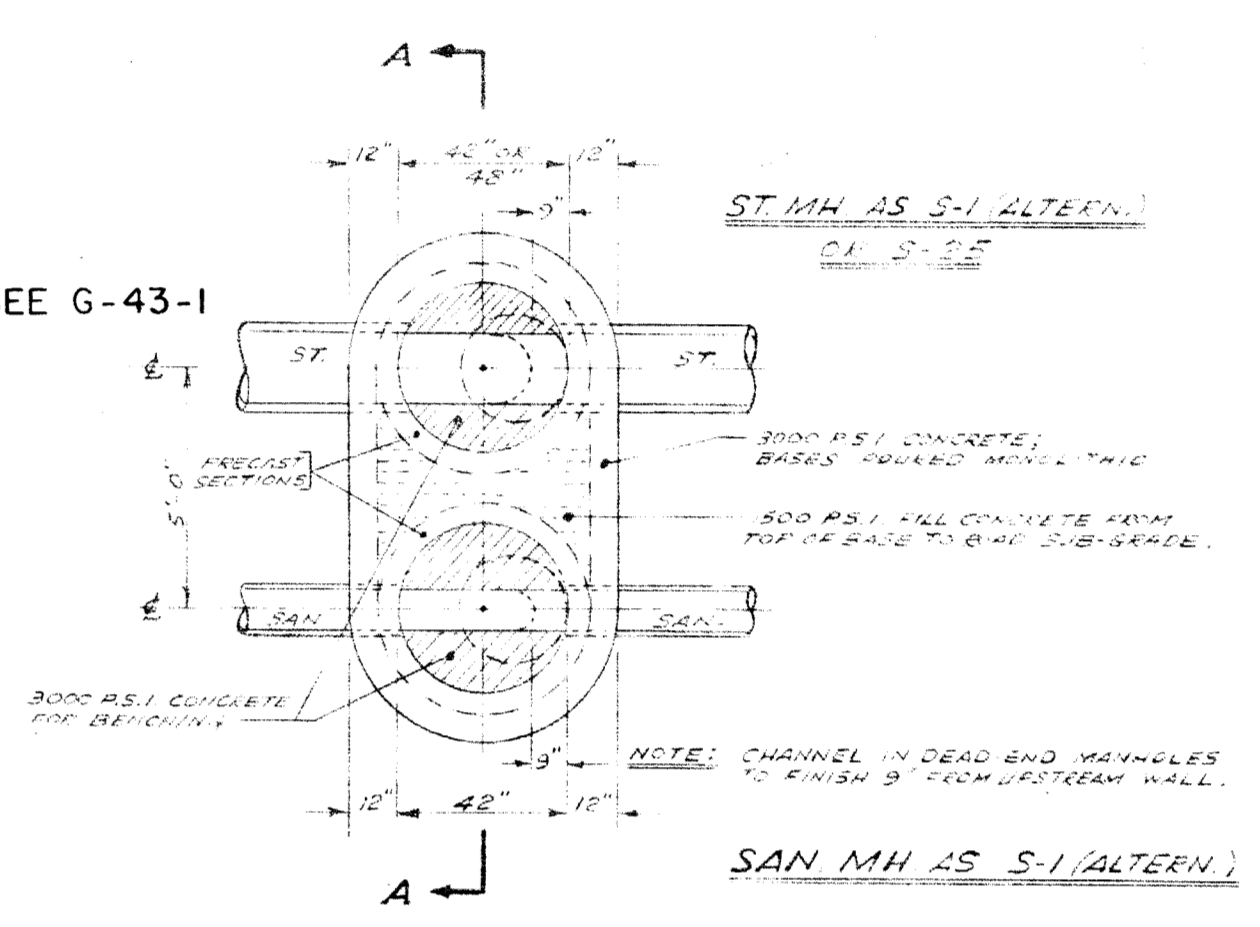
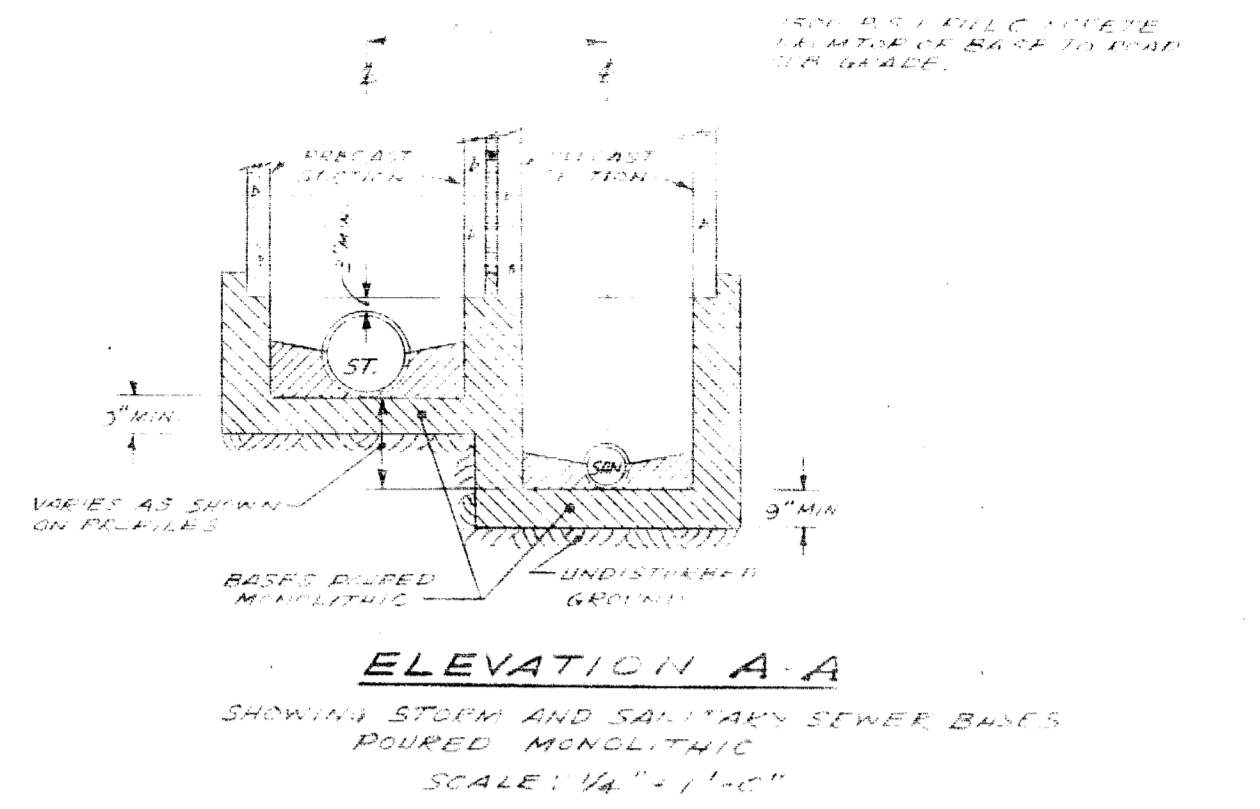
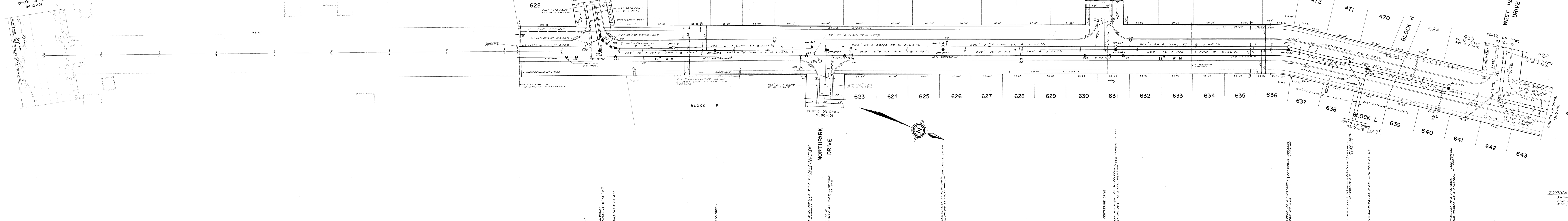
CONT'D ON DRWG 9550-102

CENTRE PARK DRIVE

CONT'D ON DRWG 9550-102

WEST PARK DRIVE

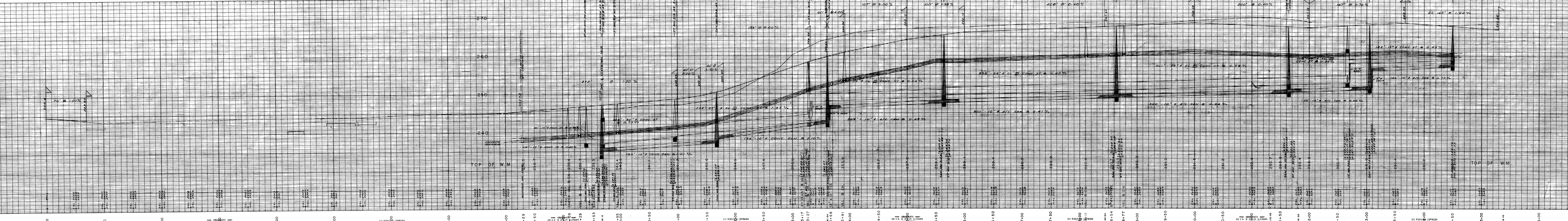
CONT'D ON DRWG 9390-102



- NOTES**
1. ALL CONCRETE SEWER PIPE UP TO AND INCLUDING 12" DIAMETER SHALL BE EQUAL TO A S.T.M. SPECIFICATIONS C-12, E.S. OR LATEST AMENDMENT, UNLESS OTHERWISE NOTED.
 2. ALL CONCRETE SEWER PIPE 18" AND OVER SHALL BE EQUAL TO A S.T.M. SPECIFICATIONS C-18, E.S. OR LATEST AMENDMENT, UNLESS OTHERWISE NOTED.
 3. ALL ASBESTOS CEMENT PIPE FOR SANITARY SEWERS SHALL BE EQUAL TO A S.T.M. SPECIFICATION C-183-CB, CLASS 2400 OR LATEST AMENDMENT UNLESS OTHERWISE NOTED.
 4. FOR DIMENSIONS AND DETAILS NOT SHOWN SEE STANDARD DRAWINGS REFERRED TO ON THE PROFILE.
 5. ALL WATERWAYS SHALL HAVE 7'-0" DEPTH OF COVER, UNLESS GREATER DEPTH IS SPECIFIED ON THE PROFILE.
 6. ALL STORM AND SANITARY SEWER MAINS HOUSE CONNECTIONS AND CATCHBINS SHALL BE FITTED WITH APPROVED RUBBER BASKET JOINTS.
 7. UNLESS OTHERWISE NOTED, WATER, STORM AND SANITARY SEWER CONNECTION SHALL BE MADE IN COMMON TRENCH TO THE CENTRE LINE OF THE FRONTAGE OF EACH LOT.
 8. WATERWAYS TO BE LAID OUT ON OFFICE PLANS FROM A BENCH MARK SHOWN TO BE 1.00' FROM THE INTERSECTION OF THE MAINS TO THE FRONTAGE OF EACH LOT. CLEARANCE FROM CATCHBINS SHALL BE 3' MIN. CLEARANCE FROM CATCHBINS.

BENCHMARKS
 NE 3489 BRASS CAP N.W. CORNER OF INNES ROAD 800' E. OF JUNCTION WITH CHIVILLE ROAD UNDER STREET POWER LINE N.W. CORNER OF EXTENSION TO E.E. WOODBURN'S FARM 75' N.W. OF E. OF ROAD ELEV. 20.890

LOC. B.M. SPIKE N.W. CORNER OF ELM CENTER OF BLOCK A ELEV. 248.70



| | | |
|--------------|--|----------------------|
| APPROVED BY: | AS. BUILT W.M. | JULY/83 J.C. |
| DATE: | NO. REVISIONS | DATE BY |
| DESIGNED BY: | TOWNSHIP OF GLOUCESTER | |
| CHECKED BY: | ENGINEERING DEPARTMENT | |
| SCALE: | COSTAIN ESTATE LIMITED | |
| | BLACKBURN HAMLET - PHASE 3 | |
| | BEARBROOK ROAD | |
| | INNES ROAD TO WEST PARK DRIVE | |
| | CUNNING - COCKBURN ENGINEERING LIMITED | |
| | 388 YONGE STREET TORONTO, ONT. M5E 1K5 | |
| | DESIGNED BY: K.M.A. | DATE: MARCH 22, 1988 |
| | CHECKED BY: K.M.A. | DATE: MARCH 22, 1988 |
| | SCALE: 1" = 40' | DATE: MARCH 22, 1988 |
| | VERT. 1" = 6' | DATE: MARCH 22, 1988 |
| | | DRW. NO. 9550-101 |

G-55-1

BLACKBURN ROAD ELEV. 248.70