Stormwater Management Report and Servicing Brief

Apartment Building
98/100 Bearbrook Road
Ottawa, Ontario

Prepared for:

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Attention: Eric Danis

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
3Bedroom 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:

$$\boldsymbol{Q = (q \times P \times M)}$$

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:

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

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 mmΦ water service connections to be connected to the existing 305 mmΦ 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.

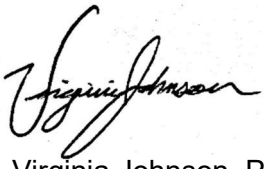
Stormwater Management

- 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 defendable 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 feedermains, 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 m^3/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 watermains 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 *C*
Fire-resistive construction	Class 6 (fire resistive)	0.6
	Class 5 (modified fire resistive)	0.6
Non-combustible construction	Class 4 (masonry non-combustible)	0.8
	Class 3 (non-combustible)	0.8
Ordinary construction	Class 2 (joisted masonry)	1.0
Wood frame construction	Class 1 (frame)	1.5

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

- With the exception of fire-resistive construction that is defined differently by FUS and ISO, practitioners can refer to the definitions of the ISO construction classes (and the supporting definitions of the types of materials and assemblies that make up the ISO construction classes) found in the current ISO guide [4] (see Annex i) to help select coefficient *C*.
- To identify the most appropriate type of construction for buildings of mixed construction, the rules included in the current ISO guide [4] can be followed (see Annex i). For a building to be assigned a given classification, the rules require ⅔ (67%) or more of the total wall area and ⅔ (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 ⅔ (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

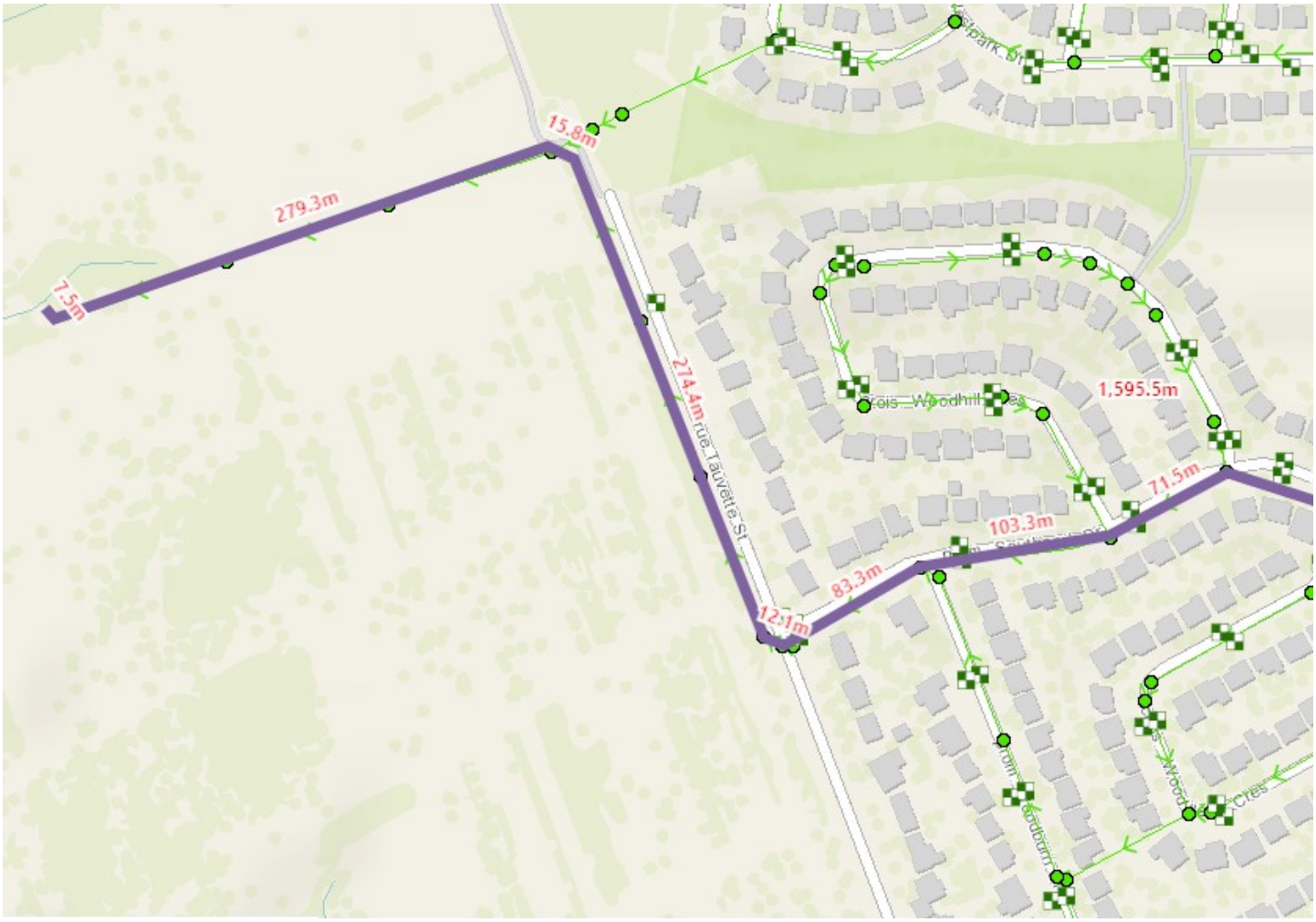
From: Amr Salem <asalem@lrl.ca>
Sent: Thursday, February 17, 2022 10:16 AM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>; Eric Lalande <eric.lalande@rvca.ca>
Subject: (LRL210628) 98/100 Bearbrook - SWM Quality Criteria

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

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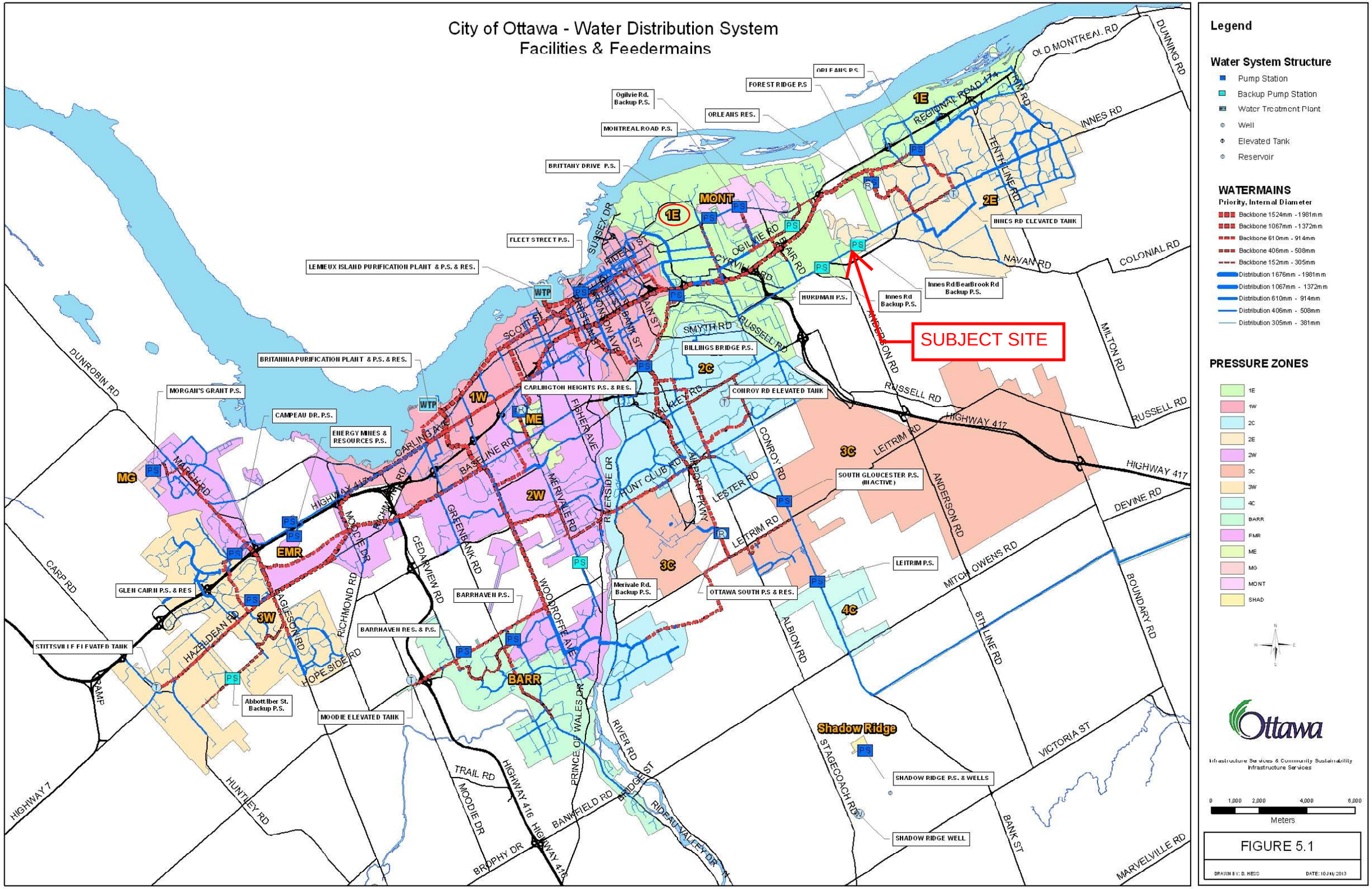
APPENDIX B

Water Supply Calculations


City of Ottawa - Water Distribution System
Facilities & Feedermains
SUBJECT SITE
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
EMR
ME
MG
MONT
SHAD
Infrastructure Services & Community Sustainability
Infrastructure Services
0 1,000 2,000 4,000 6,000
Meters
FIGURE 5.1
DRAWN BY: D. HESS
DATE: 10 July 2013

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	Fire Flow = 220 x C x $A^{0.5}$				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

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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
T (613) 842-3434 or (877) 632-5664 ext 248
F (613) 842-4338
E asalem@lrl.ca
W www.lrl.ca

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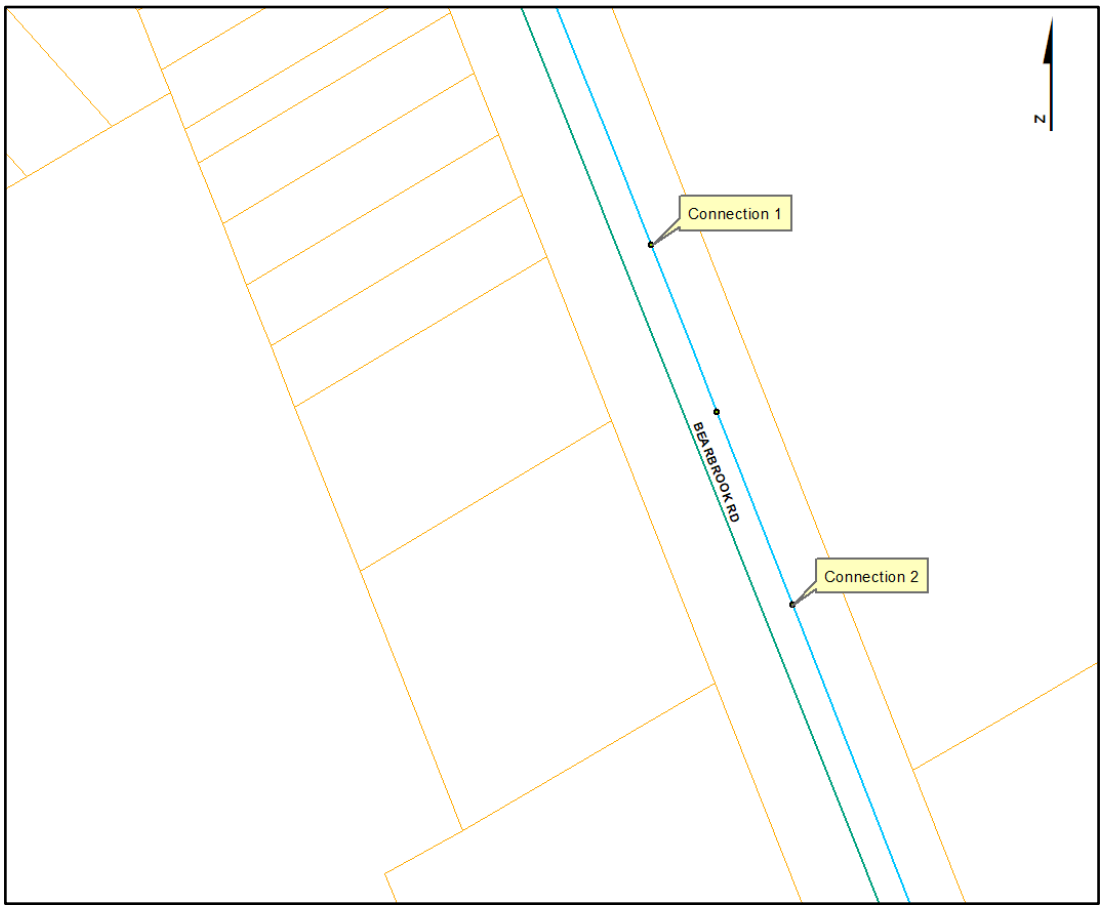
Boundary Conditions
98 & 100 Bearbrook Road

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)	Pressure[1] (psi)
Maximum HGL	115.9	59.0
Peak Hour	110.3	51.0
Max Day plus Fire 1	94.3	28.3

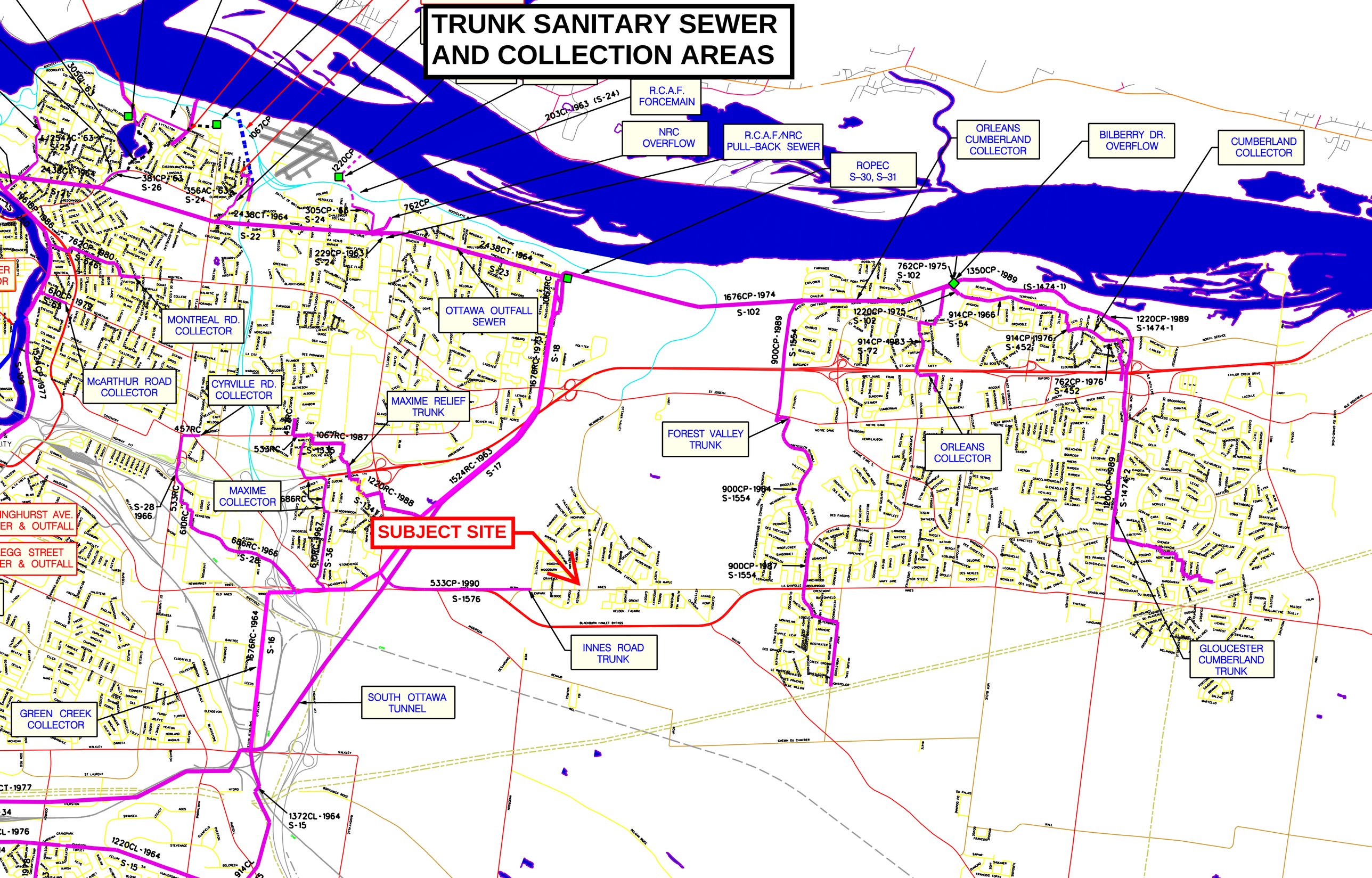
Ground Elevation = 74.4 m

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
MONTREAL RD. COLLECTOR
OTTAWA OUTFALL SEWER
McARTHUR ROAD COLLECTOR
CYRVILLE RD. COLLECTOR
MAXIME RELIEF TRUNK
FOREST VALLEY TRUNK
ORLEANS COLLECTOR
MAXIME COLLECTOR
SUBJECT SITE
INNES ROAD TRUNK
GLOUCESTER CUMBERLAND TRUNK
SOUTH OTTAWA TUNNEL
GREEN CREEK COLLECTOR
203CT-1963 (S-24)
1220CP
1067CP
762CP
2438CT-1964
S-22
305CP-'63
S-24
229CP-1963
S-24
2438CT-1964
S-23
1676CP-1974
S-102
762CP-1975
S-102
1350CP-1989
(S-1474-1)
1220CP-1975
S-102
914CP-1966
S-54
1220CP-1989
S-1474-1
914CP-1983
S-72
914CP-1976
S-452
762CP-1976
S-452
900CP-1989
S-1554
1676RC-1973
S-18
1067RC-1987
S-1335
1524RC-1963
S-17
1220RC-1988
S-1341
900CP-1984
S-1554
900CP-1987
S-1554
1200CP-1989
S-1474-2
533CP-1990
S-1576
1676RC-1964
S-16
1372CL-1964
S-15
1220CL-1964
S-15
1254AC-'63
S-25
2438CT-1964
381CP-'63
S-26
356AC-'63
S-24
1961BP-1986
762CP-1980
S-646
610CP-1979
S-63
1524CP-1977
457RC
533RC
686RC
610RC
686RC-1966
S-28
610RC-1967
S-36
S-28
1966
S-1335
CT-1977
CL-1976
914CL

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 AREA (Ha)	CUMMULATIVE POP.	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)		LENGTH (m)	DIA. (mm)	SLOPE (%)	MATERIAL	CAP. (FULL) (l/s)	VEL. (FULL) (m/s)
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

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

ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.

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
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

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 9-Storey Apartment Building
Location: 98/100 Bearbrook Rd
Date: October 20, 2023
Designed: Amr Salem
Drawing Ref.: C.601

Stormwater Management
Design Sheet

Runoff Equation

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

Pre-development Stormwater Management

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

C = 0.25
I = 104.2 mm/hr
Tc = 10 min
Total Area = 0.391 ha

Allowable Release Rate= 28.34 L/s

Post-development Stormwater Management

					ΣR_{5yr}	ΣR_{100}
	Total Site Area =	**0.392**	ha	**ΣR=**	**0.85**	**1.00**
Controlled	WS-01A (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-01B	0.013	ha	R=	0.85	1.00
	Total Un-Controlled =	**0.013**	**ha**	**ΣR=**	**0.85**	**1.00**

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

100 Year Storm Event:

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

Time (min)	Intensity (mm/hr)	Uncontrolled Runoff (L/s)	Controlled Release Rate Constant (L/s)	Total Release Rate (L/s)
10	178.6	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)$^{0.820}$ a = 1735.688 b = 0.820 C = 6.014

			Storage Required			
Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate Constant (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	178.6	34.85	15.73	8.63	0.00	8.63
15	142.9	27.89	17.33	8.63	0.00	8.63
20	120.0	23.41	17.73	8.63	0.00	8.63
25	103.8	20.27	17.45	8.63	0.00	8.63
30	91.9	17.93	16.74	8.63	0.00	8.63
35	82.6	16.12	15.72	8.63	0.00	8.63
40	75.1	14.67	14.48	8.63	0.00	8.63
45	69.1	13.48	13.08	8.63	0.00	8.63
50	64.0	12.48	11.55	8.63	0.00	8.63
60	55.9	10.91	8.20	8.63	0.00	8.63
70	49.8	9.72	4.56	8.63	0.00	8.63
90	41.1	8.02	0.00	8.63	0.00	8.63
110	35.2	6.87	0.00	8.63	0.00	8.63
130	30.9	6.03	0.00	8.63	0.00	8.63
150	27.6	5.39	0.00	8.63	0.00	8.63
170	25.0	4.88	0.00	8.63	0.00	8.63

Total Storage Required = 17.73 m^3 refer to LRL Plan C.601
Available Storage = 18.07 m^3

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

100 Year Storm Event:

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

			Storage Required			
Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate Constant (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	178.6	93.77	53.14	5.21	0.00	5.21
15	142.9	75.04	62.85	5.21	0.00	5.21
20	120.0	62.99	69.34	5.21	0.00	5.21
25	103.8	54.53	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	33.58	85.12	5.21	0.00	5.21
60	55.9	29.35	86.91	5.21	0.00	5.21
70	49.8	26.15	87.93	5.21	0.00	5.21
90	41.1	21.59	88.45	5.21	0.00	5.21
110	35.2	18.49	87.62	5.21	0.00	5.21
130	30.9	16.23	85.92	5.21	0.00	5.21
150	27.6	14.50	83.61	5.21	0.00	5.21
170	25.0	13.13	80.83	5.21	0.00	5.21

Total Storage Required = 88.45 m^3 refer to LRL Plan C.601
Available CISTERN Storage = 89.00 m^3

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

100 Year Storm Event:

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

			Storage Required			
Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate Constant (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	178.6	59.27	30.76	8.00	0.00	8.00
15	142.9	47.43	35.49	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	40.49	8.00	0.00	8.00
35	82.6	27.41	40.76	8.00	0.00	8.00
40	75.1	24.94	40.66	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
60	55.9	18.55	37.99	8.00	0.00	8.00
70	49.8	16.53	35.81	8.00	0.00	8.00
80	45.0	14.93	33.28	8.00	0.00	8.00
90	41.1	13.65	30.49	8.00	0.00	8.00
100	37.9	12.58	27.49	8.00	0.00	8.00
110	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 = (l*w)*h/3 = Ah/3

Summary of Roof Storage

Maximum Required Roof Storage (100 Year) = 40.76 m^3
Proposed Head = 150 mm *An Emergency overflow scupper is provided above this height.
Control Flow/Drain = 1.60 L/s
Number of Roof Drains = 5
Total Flow from Roof Drain = 8.00 L/s
Available Roof Surface = 1376 m^2
Effective Roof Surface = 1055 m^2 77 (% of total roof surface)
Available Roof Storage = 43.13 m^3
Roof Drain Model = *MIJRPHCO moulded control flow dome strainer (1 HOLE)*

Total Storage Required = 40.76 m^3
Available Roof Storage = 43.13 m^3 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	43.13
WS-03A &WS-03B	0.070	8.63	17.73	18.07
WS-01A & WS-04 (Cistern)	0.189	5.21	88.45	89.00
TOTAL	**0.39**	**28.34**	**146.94**	**150.20**

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

Pre-development Stormwater Management

I_5 = 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
Tc =	10	min
Total Area =	0.391	ha

Allowable Release Rate= 28.34 L/s

Post-development Stormwater Management

					$\sum R_{2\&5}$	$\sum R_{100}$
	Total Site Area =	**0.427**	ha	**∑R=**	**0.85**	**1.00**
	WS-01 A (Cistern)	0.049	ha	R=	0.85	1.00
Controlled	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**	**∑R=**	**0.85**	**1.00**
Un-controlled	WS-01	0.049	ha	R=	0.85	1.00
	Total Un-Controlled =	**0.049**	**ha**	**∑R=**	**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**

		Storage Required				
Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	*Controlled Release Rate Constant (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	76.8	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 m^3 refer to LRL Plan C.601
Available Underground Storage = 5.38 m^3

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:	February 28, 2024
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 3B	CB 02	STM SEWER	0.004		0.032	0.082	0.082	10.00	104.2	8.57	-	200	PVC	1.00%	1.7	32.8	1.04	0.03	0.26
WS 3B	STM MH 201	STM MH 200	0.004		0.032	0.082	0.082	10.00	104.2	8.54	-	300	PVC	0.40%	33.5	61.2	0.87	0.65	0.14
WS 3A	CB 01	STM MH 200	0.002		0.032	0.081	0.081	10.00	104.2	8.46	-	200	PVC	1.00%	1.7	32.8	1.04	0.03	0.26
WS-3A & WS-3B & WS-04 & WS-01	STM MH 200	OGS	0.002		0.032	0.082	0.163	10.00	104.2	17.03	13.84	300	PVC	0.50%	7.9	68.4	0.97	0.14	0.20
WS 02	ROOF	STREET			0.120	0.299	0.299	10.00	104.2	31.20	8.00	300	PVC	1.00%	11.7	96.7	1.37	0.14	0.08
	OGS	STREET									21.84	300	PVC	1.00%	11.7	96.7	1.37	0.14	0.23

Adjustable Accutrol Weir

Tag: _____

Adjustable Flow Control for Roof Drains

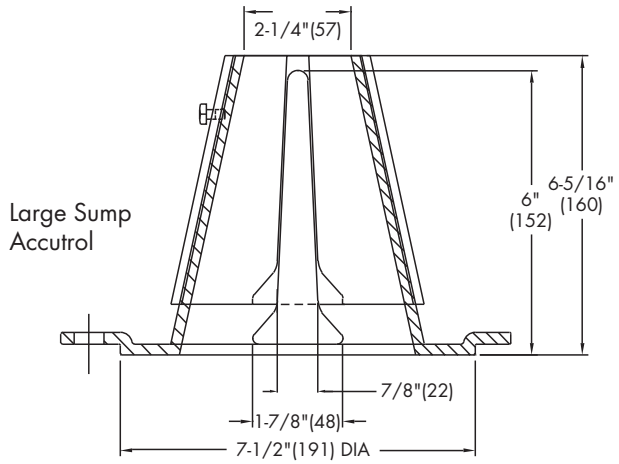
ADJUSTABLE ACCUTROL (for Large Sump Roof Drains only)

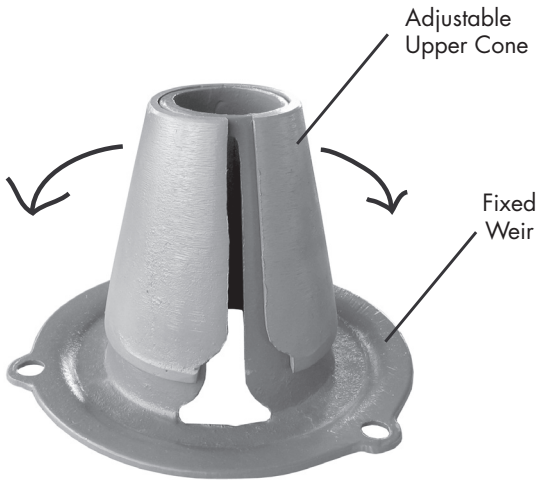
For more flexibility in controlling flow with heads deeper than 2", Watts Drainage offers the Adjustable Accutrol. The Adjustable Accutrol Weir is designed with a single parabolic opening that can be covered to restrict flow above 2" of head to less than 5 gpm per inch, up to 6" of head. To adjust the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

EXAMPLE:

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

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





1/2 Weir Opening Exposed Shown Above

TABLE 1. Adjustable Accutrol Flow Rate Settings

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

Job Name _____ Contractor _____

Job Location _____ Contractor's P.O. No. _____

Engineer _____ Representative _____

Watts product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Watts Technical Service. Watts reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Watts products previously or subsequently sold.

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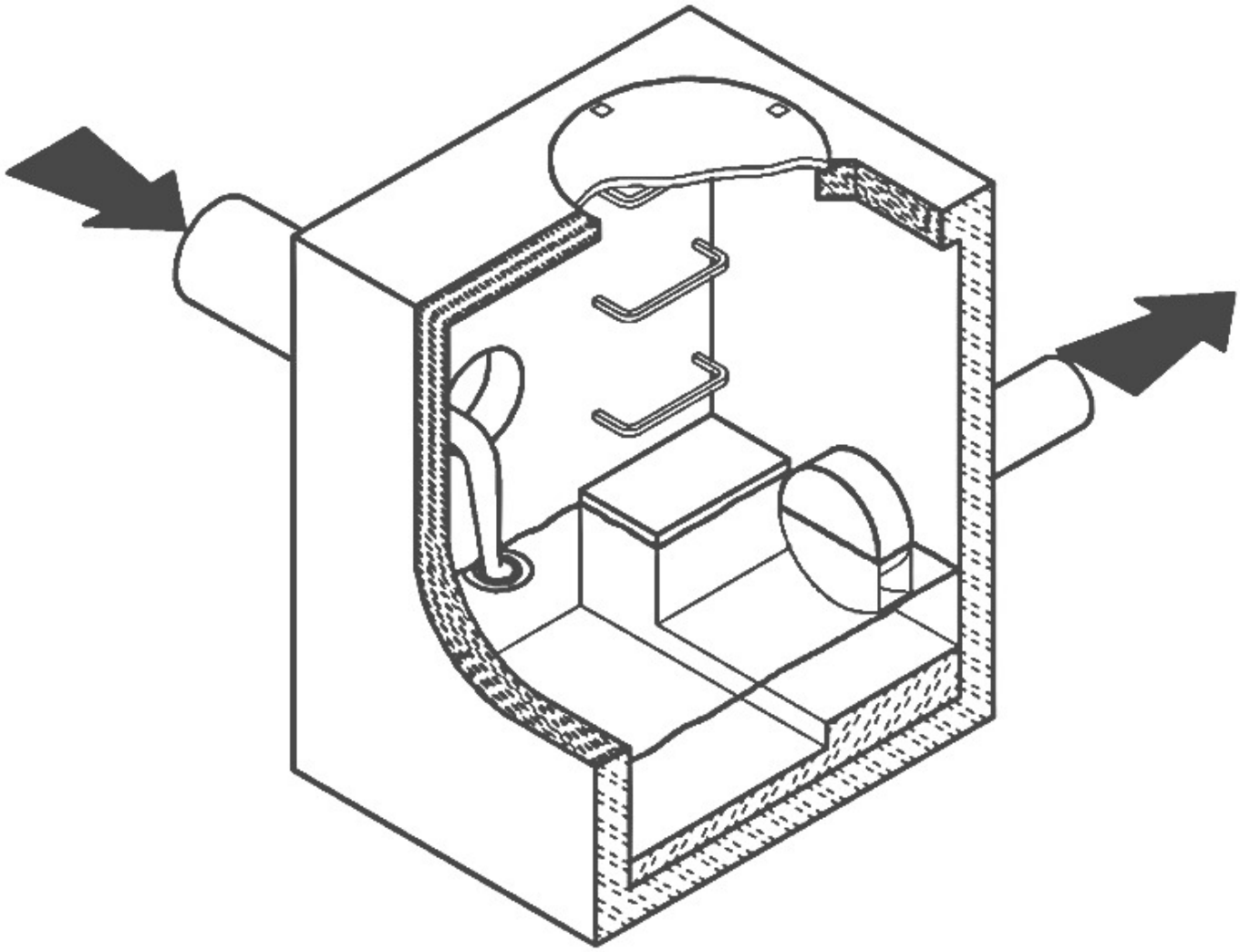
CSO/STORMWATER MANAGEMENT

HYDROVEX® VHV / SVHV

Vertical Vortex Flow Regulator



JOHN MEUNIER

APPLICATIONS

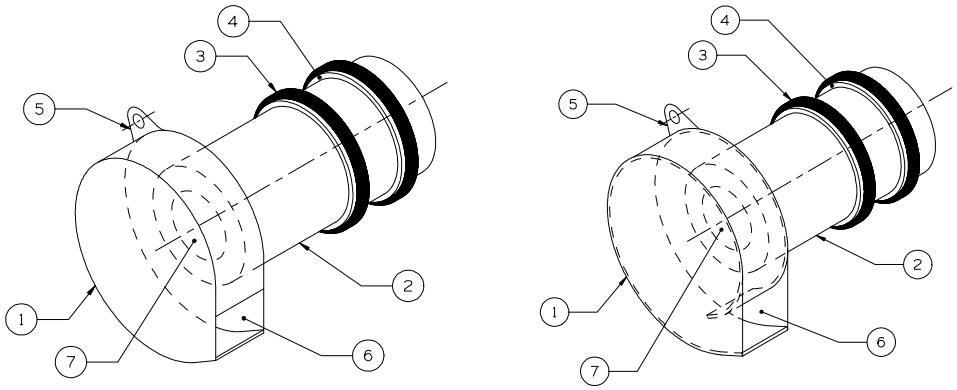
One of the major problems of urban wet weather flow management is the runoff generated after a heavy rainfall. During a storm, uncontrolled flows may overload the drainage system and cause flooding. Due to increased velocities, sewer pipe wear is increased dramatically and results in network deterioration.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

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

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

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

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



VHV ***SVHV***

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

ADVANTAGES

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

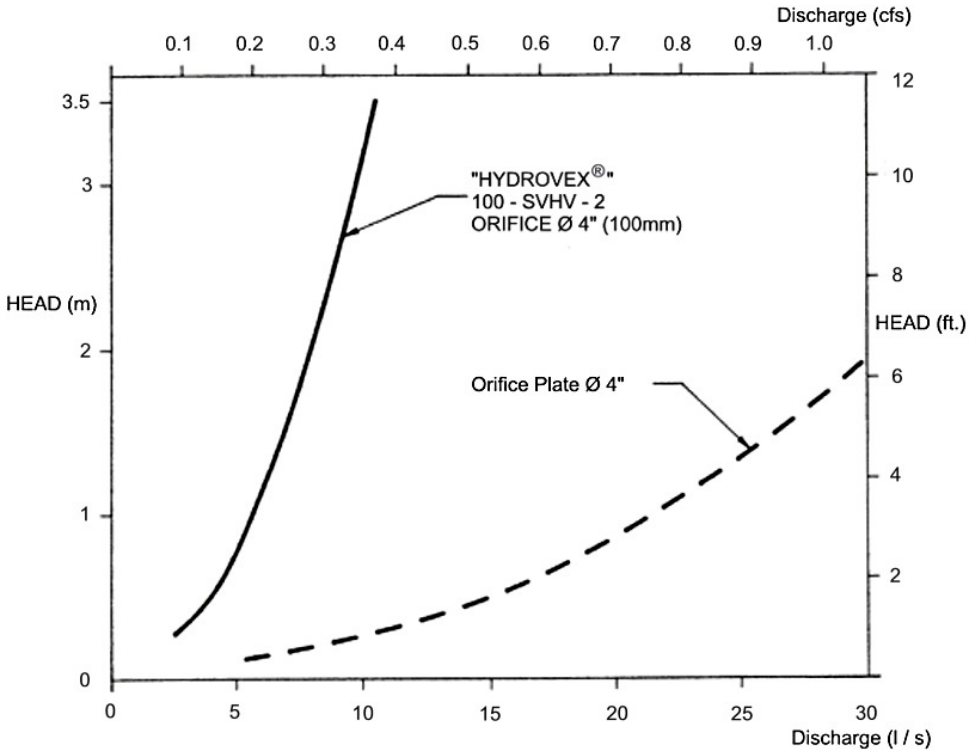


FIGURE 2: DISCHARGE CURVE SHOWING A HYDROVEX® FLOW REGULATOR VS AN ORIFICE PLATE

SELECTION

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

Example:

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

INSTALLATION REQUIREMENTS

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

SPECIFICATIONS

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

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

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

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

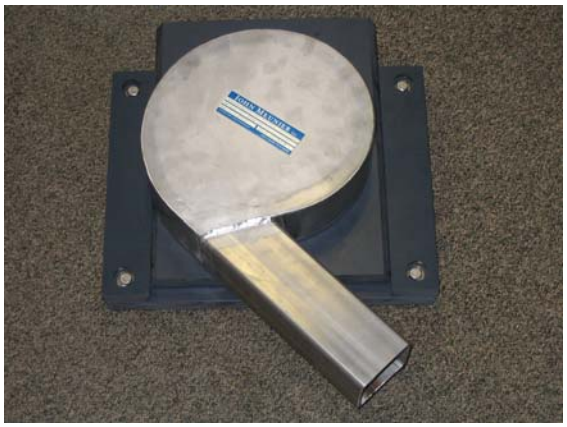
- ***project design flow rate***
- ***pressure head***
- ***chamber's outlet pipe diameter and type***

Typical VHV model in factory

OPTIONS

FV – SVHV (mounted on sliding plate)

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



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

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

VHV with air vent for minimal slopes

HYDROVEX®

VHV Vertical Vortex Flow Regulator

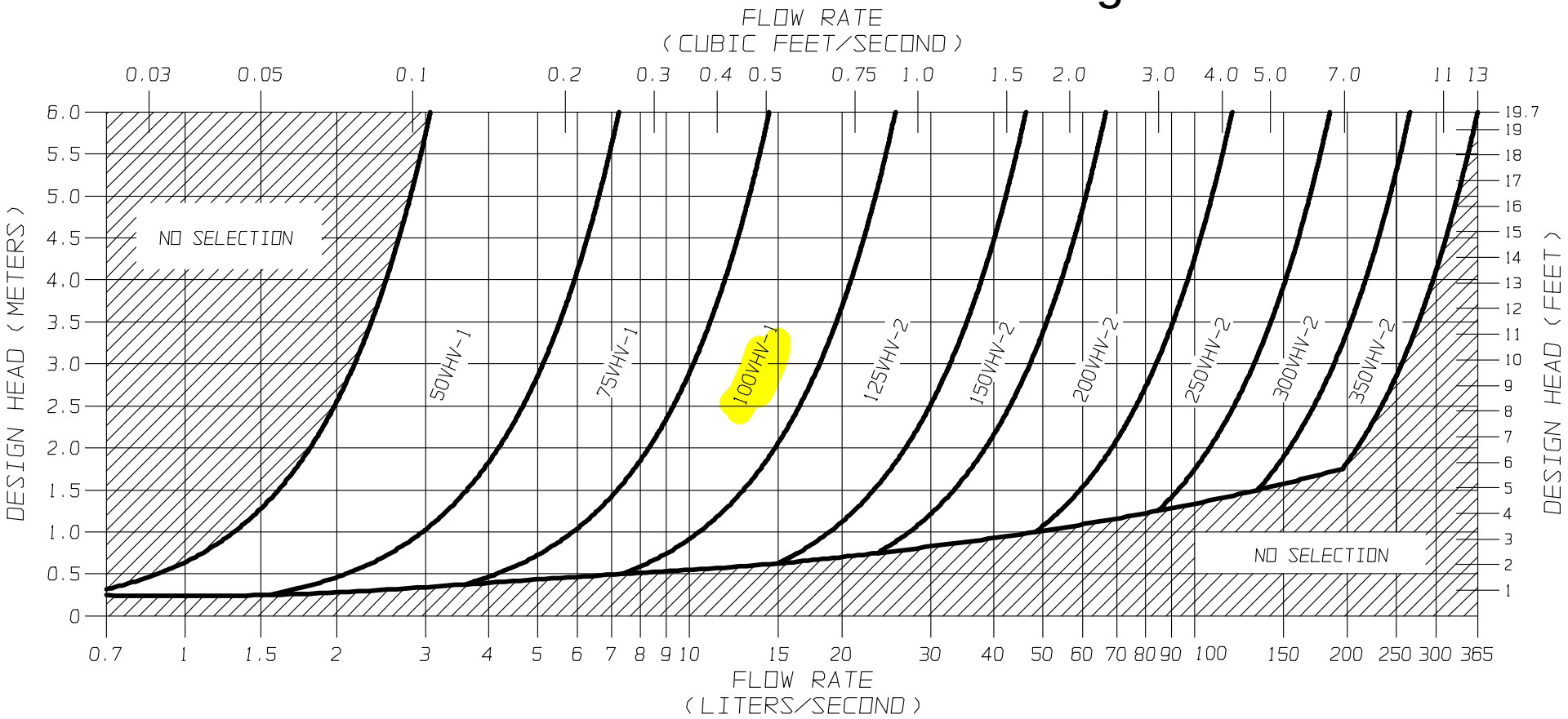


FIGURE 3 - VHV

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HYDROVEX®

SVHV Vertical Vortex Flow Regulator

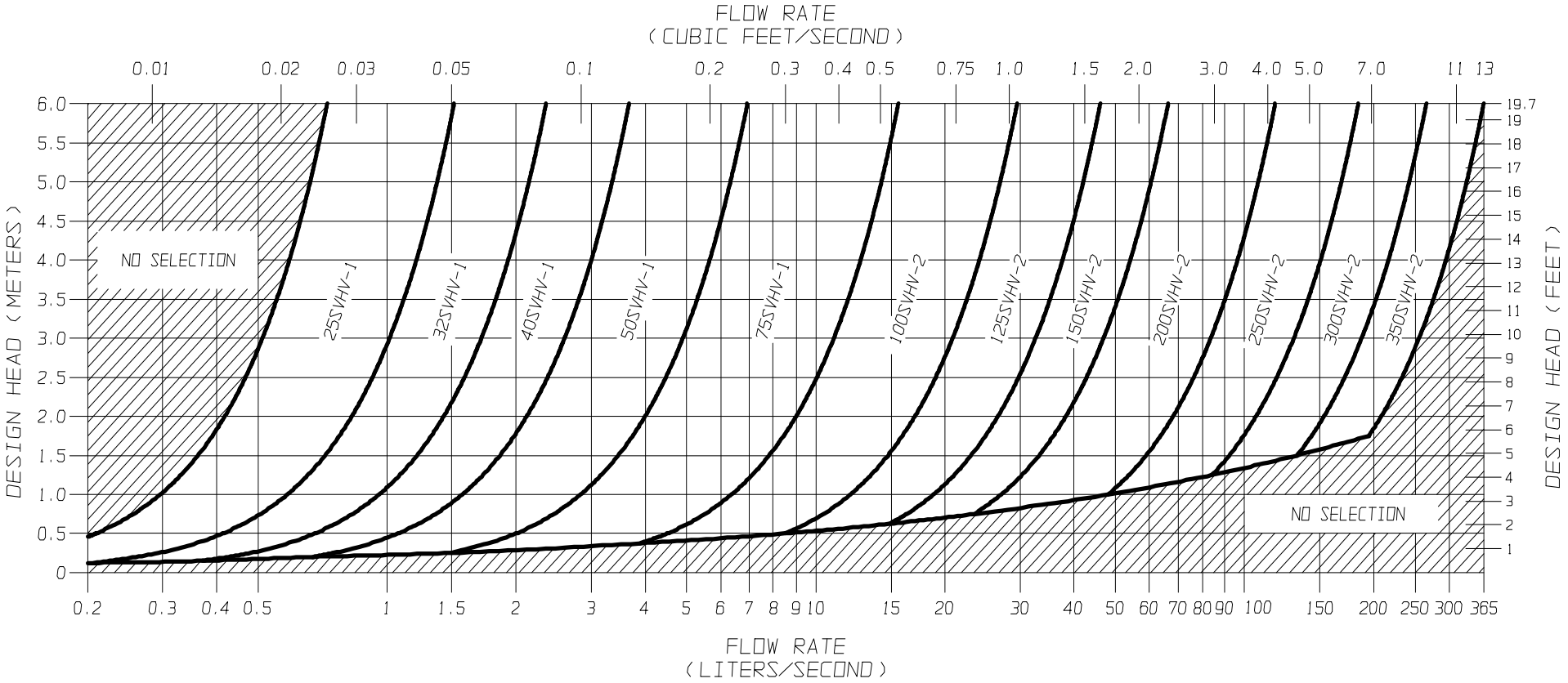

FIGURE 3 - SVHV

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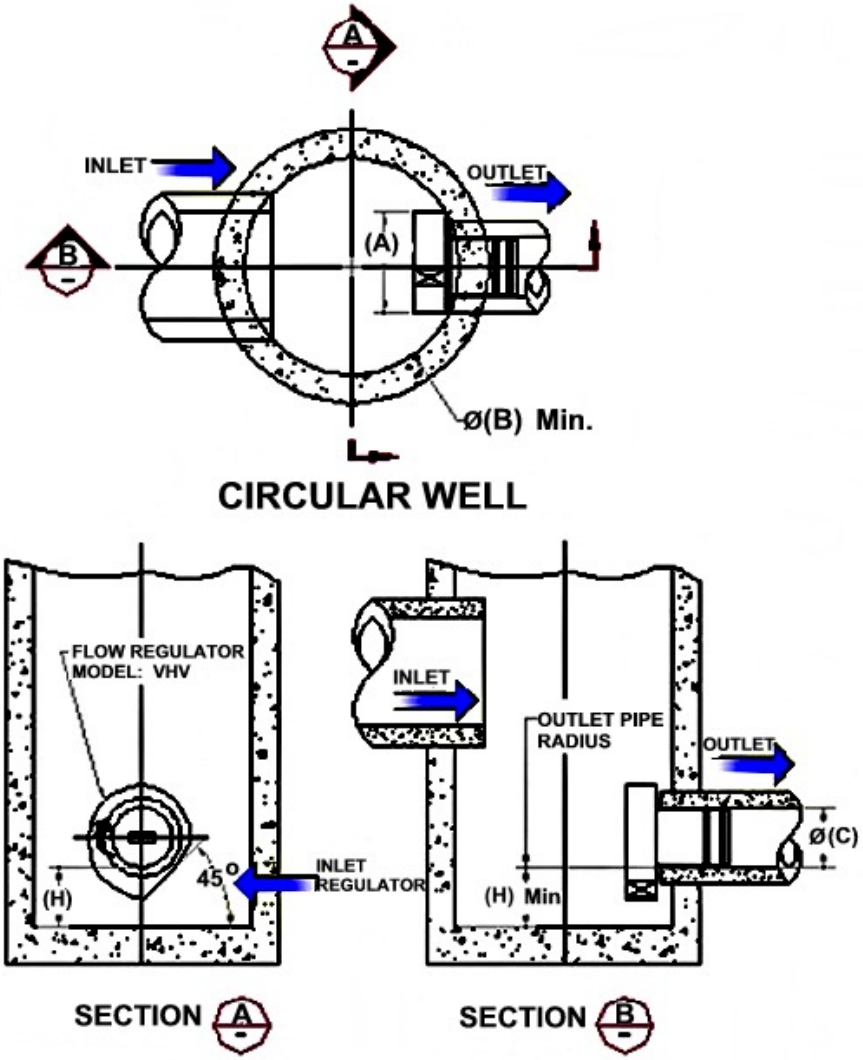
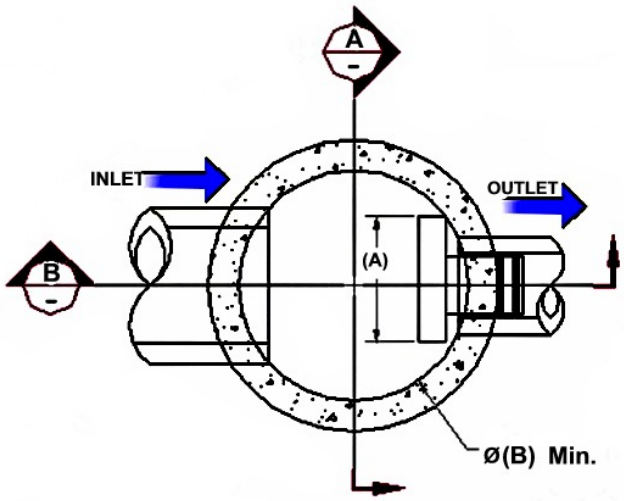
FLOW REGULATOR TYPICAL INSTALLATION IN CIRCULAR MANHOLE
FIGURE 4 (MODEL VHV)

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

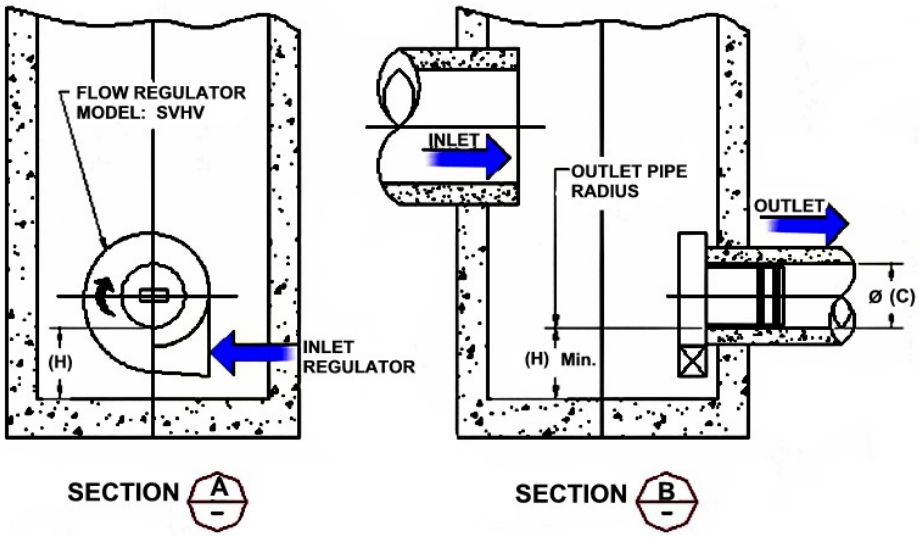


FLOW REGULATOR TYPICAL INSTALLATION IN CIRCULAR MANHOLE
FIGURE 4 (MODEL SVHV)

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



CIRCULAR WELL

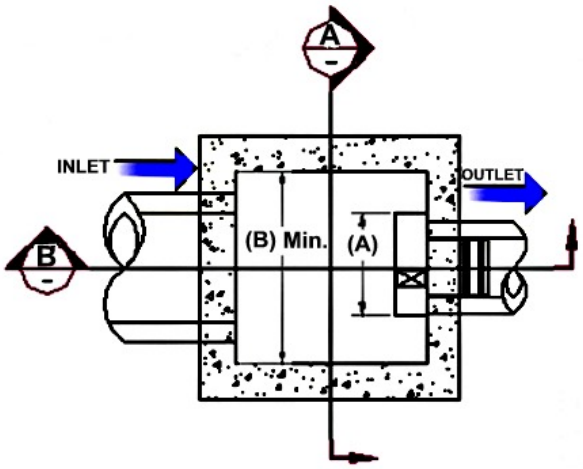


SECTION A **SECTION B**

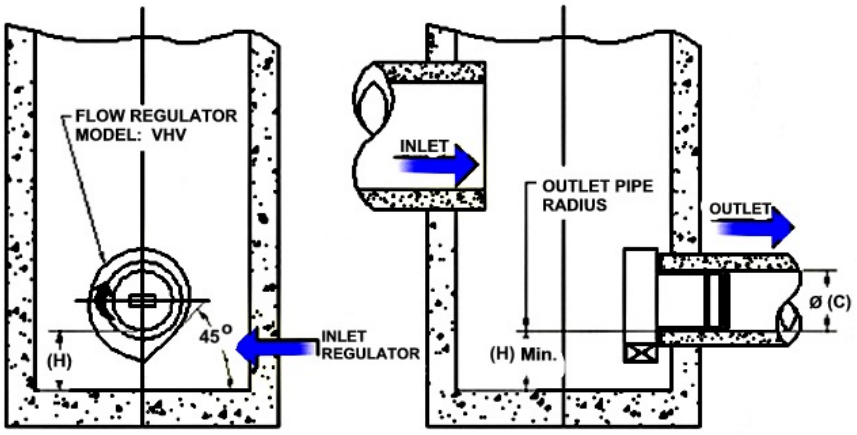
FLOW REGULATOR TYPICAL INSTALLATION IN SQUARE MANHOLE
FIGURE 4 (MODEL VHV)

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

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



SQUARE / RECTANGULAR WELL

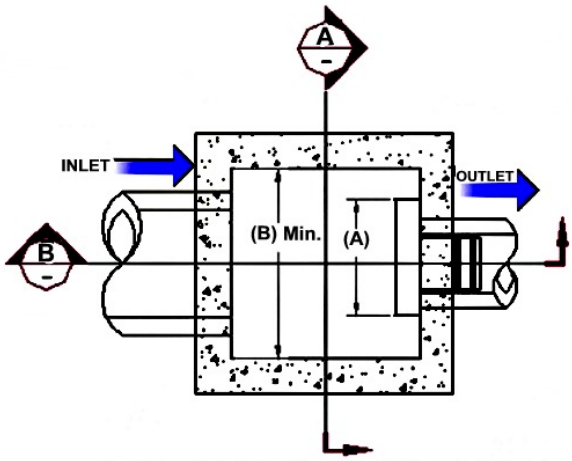


SECTION A **SECTION B**

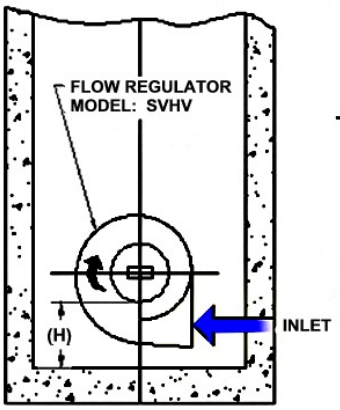
FLOW REGULATOR TYPICAL INSTALLATION IN SQUARE MANHOLE
FIGURE 4 (MODEL SVHV)

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

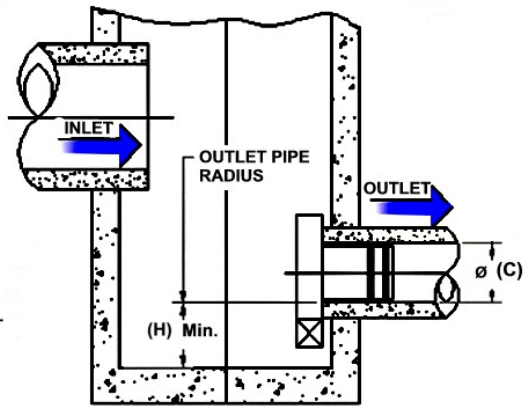
NOTE: ***In the case of a square manhole, the outlet flow pipe must be centered on the wall to ensure enough clearance for the unit.***



SQUARE / RECTANGULAR WELL



SECTION A



SECTION B

INSTALLATION

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

MAINTENANCE

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

GUARANTY

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

John Meunier Inc.
ISO 9001 : 2008

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Revised: 2011-05-03

Stormceptor®

FORTERRA

Stormceptor® EF Sizing Report

STORMCEPTOR®
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

03/15/2022

Province:	Ontario
City:	Ottawa
Nearest Rainfall Station:	OTTAWA CDA RCS
Climate Station Id:	6105978
Years of Rainfall Data:	20

Site Name:	98 and 100 Bearbrook Rd.

Drainage Area (ha):	0.391
Runoff Coefficient 'c':	0.79

Particle Size Distribution:	Fine

Target TSS Removal (%):	80.0
Required Water Quality Runoff Volume Capture (%):	90.0

Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	

Project Name:	98 and 100 Bearbrook Rd.
Project Number:	210628
Designer Name:	Brandon O'Leary
Designer Company:	Forterra
Designer Email:	brandon.oleary@forterrabp.com
Designer Phone:	905-630-0359
EOR Name:	Amr Salem
EOR Company:	LRL Associates Ltd.
EOR Email:	
EOR Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	83
EFO6	92
EFO8	96
EFO10	98
EFO12	99

Recommended Stormceptor EFO Model: EFO4

Estimated Net Annual Sediment (TSS) Load Reduction (%): 83

Water Quality Runoff Volume Capture (%): > 90

imbrium

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/m²)	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

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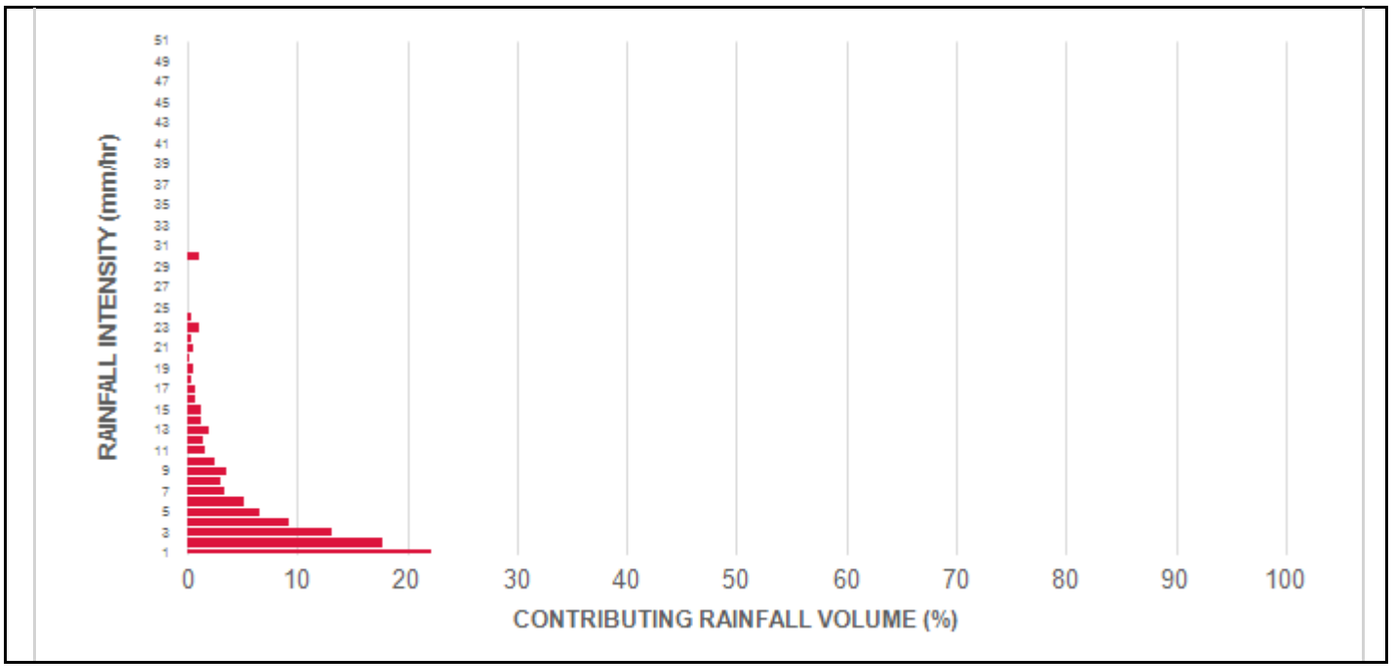
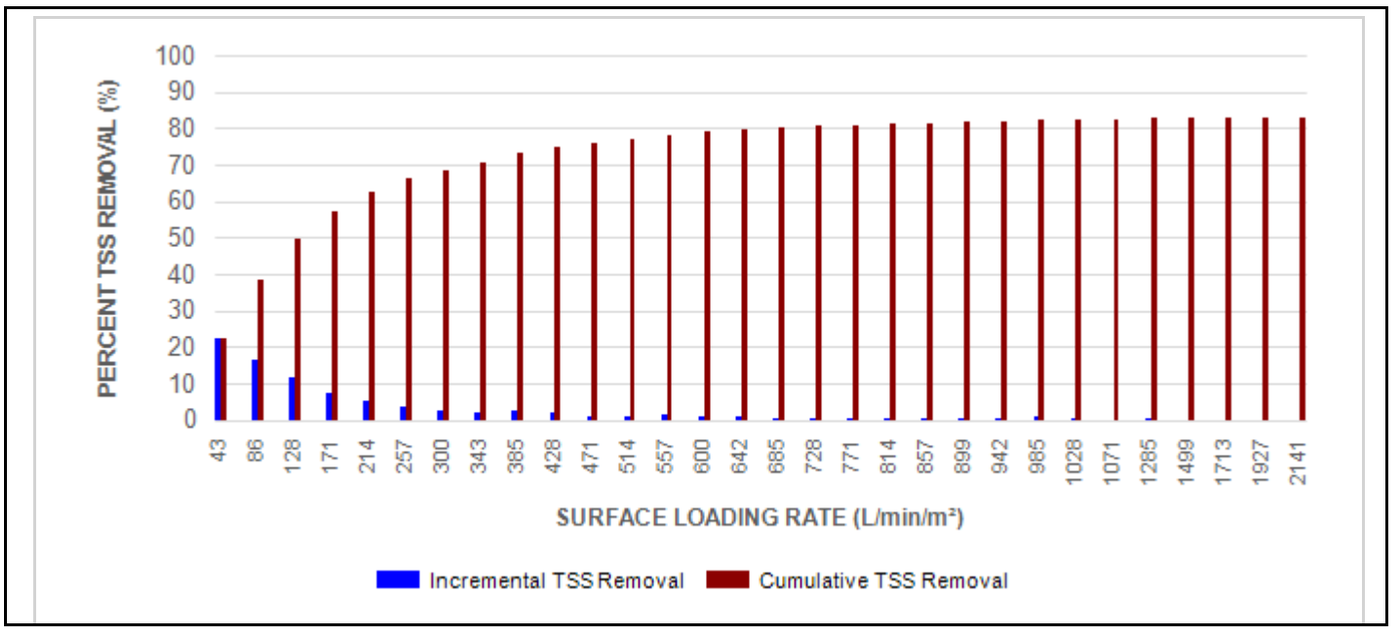
RAINFALL DATA FROM OTTAWA CDA RCS RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL
FOR THE RECOMMENDED STORMCEPTOR® MODEL



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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

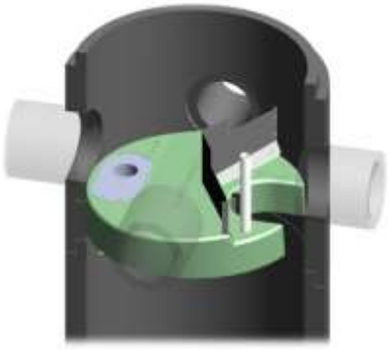
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test 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.



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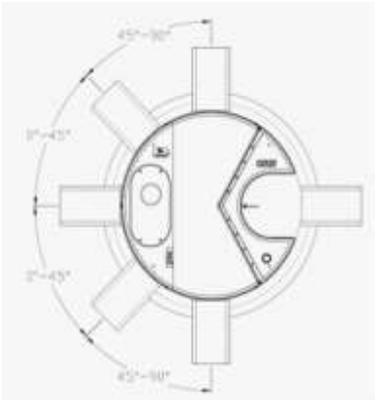

INLET-TO-OUTLET DROP

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)	(ft^3)	(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/ft^3)

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

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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** S**eparators**

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

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/m^2 to 1400 L/min/m^2, 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/m^2 and 1400 L/min/m^2 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/m^2 shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m^2. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m^2.

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m^2 shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m^2, and shall be calculated using a simple proportioning formula, with 1400 L/min/m^2 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/m^2.

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

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

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

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/m^2 to 2600 L/min/m^2) 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).

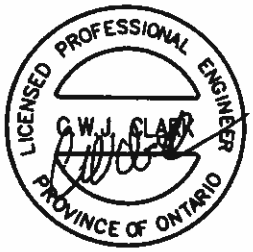
M2. ☑ Flow control roof drains meeting the following conditions have been incorporated in this design:

(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

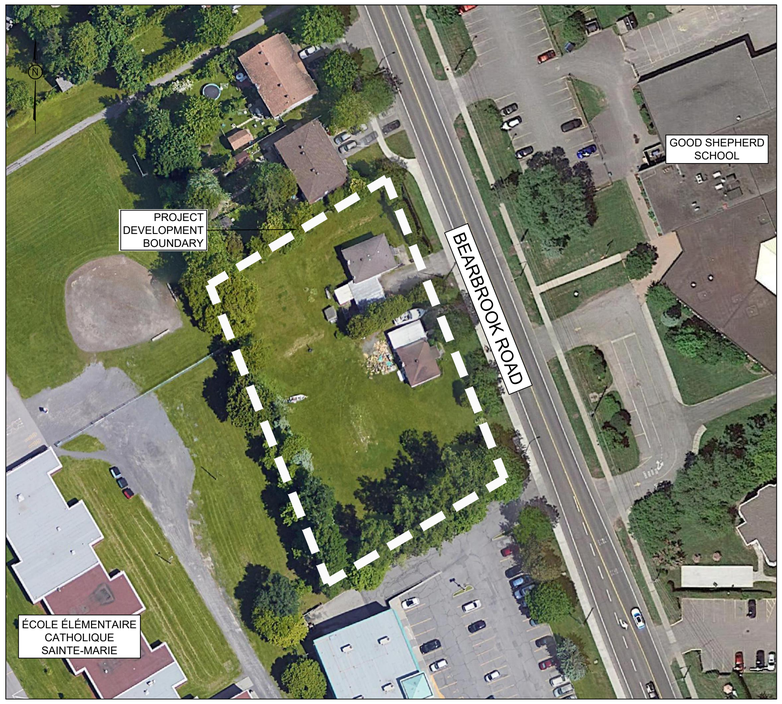
Structural Engineer's Seal

APPENDIX E

Civil Engineering Drawings

RESIDENTIAL BUILDING
98 & 100 BEARBROOK, OTTAWA, ONTARIO

REVISION 07



KEY PLAN (N.T.S.)

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

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

RESIDENTIAL BUILDING
98 & 100 BEARBROOK RD, OTTAWA
REV.07 - RE-ISSUED FOR SPC- JULY, 2024
LRL PROJECT NO.: 210628

LICENSED PROFESSIONAL ENGINEER
V. JOHNSON
100510576
07-29-2024
PROVINCE OF ONTARIO

GENERAL NOTES

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

EROSION AND SEDIMENT CONTROL NOTES

GENERAL

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

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

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

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

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

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

CONTRACTOR'S RESPONSIBILITIES

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

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

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

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

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

SPILL CONTROL NOTES

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

MUD MAT NOTES

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

SITE GRADING NOTES

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

ROADWORK SPECIFICATIONS

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

SANITARY, FOUNDATION DRAIN, STORM SEWER AND WATERMAIN NOTES

GENERAL

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

SANITARY

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

STORM

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

WATERMAIN

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

USE AND INTERPRETATION OF DRAWINGS

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

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

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

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

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

UNAUTHORIZED CHANGES:

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

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

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

GENERAL NOTES:

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

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

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

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

No.	REVISIONS	BY	DATE
07	RE-ISSUED FOR SPC	S.V.	29 JULY 2024
06	ISSUED FOR PERMIT	S.V.	11 JULY 2024
05	ISSUED FOR COORDINATION	S.V.	15 APR 2024
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

LICENSED PROFESSIONAL ENGINEER
V. JOHNSON
100510576
07-29-2024
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

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

CLIENT
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

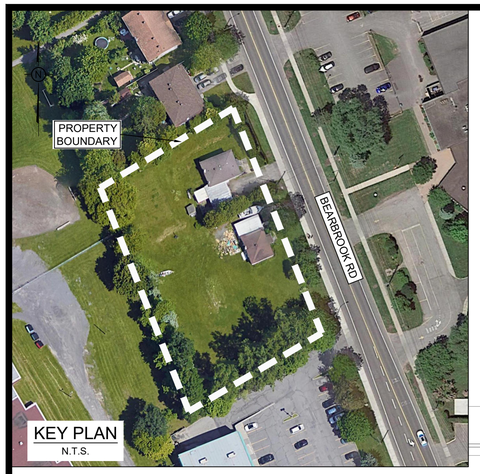
PROJECT NO.
210628

DATE
NOV 2021

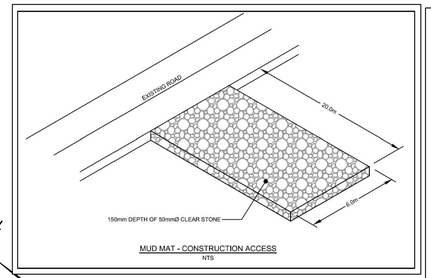
C001

D07-12-23-0137

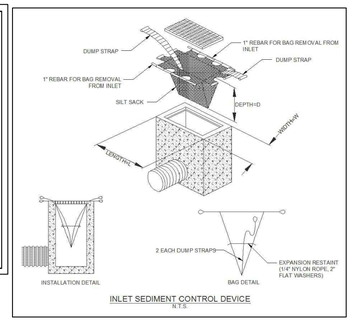
#18758



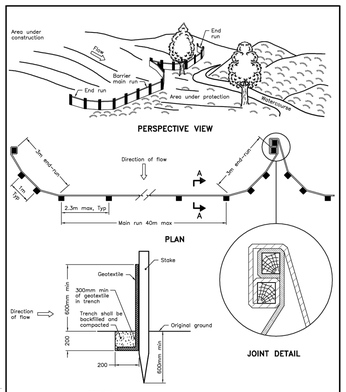
KEY PLAN
N.T.S.



MUD MAT - CONSTRUCTION ACCESS
NTS



INLET SEDIMENT CONTROL DEVICE
N.T.S.

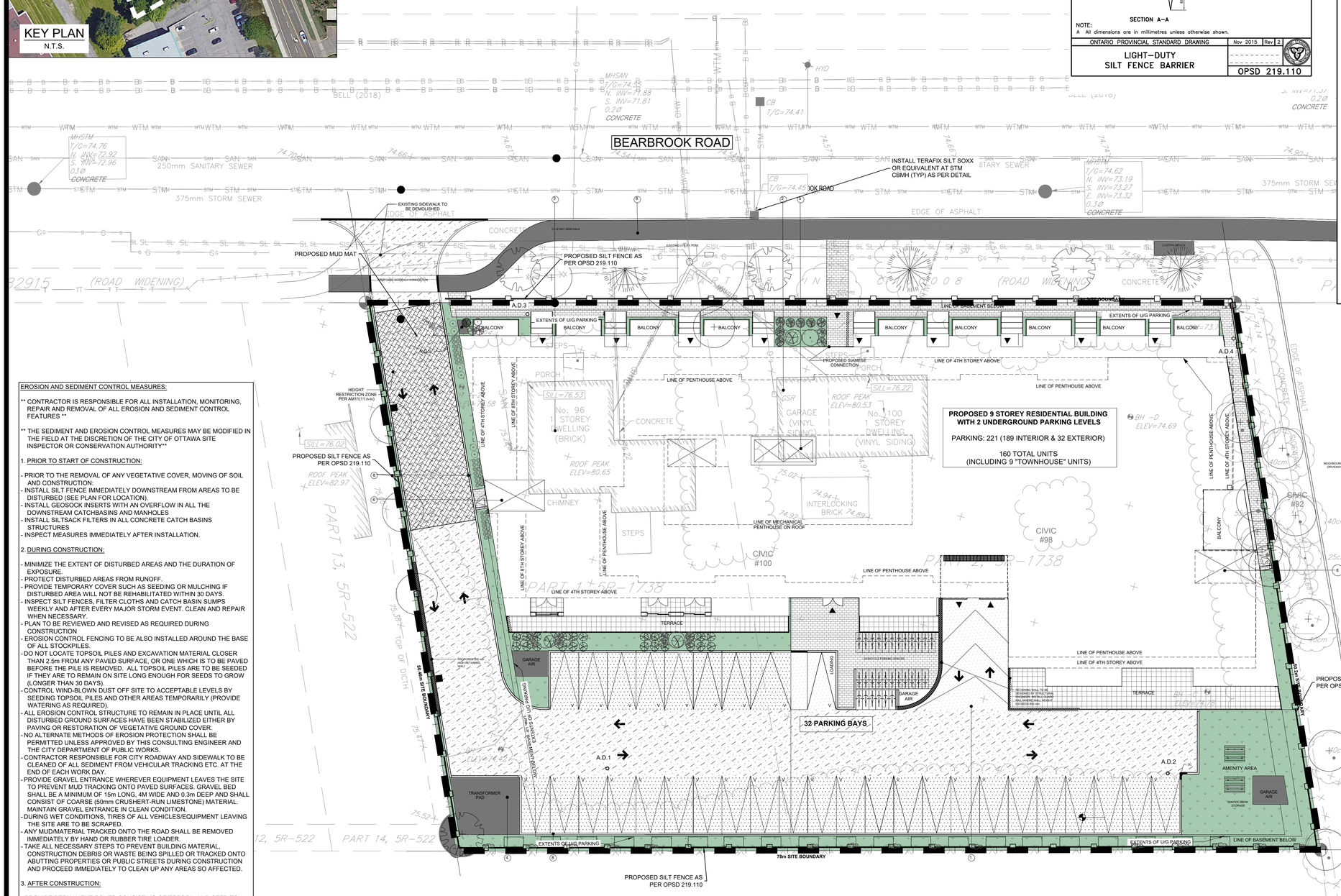


NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev. 2
LIGHT–DUTY SILT FENCE BARRIER		OPSD 219.110

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
- ×50.00 PROPOSED ELEVATION
- ×50.00HP PROPOSED HIGH POINT ELEVATION
- ×50.00S PROPOSED SWALE ELEVATION
- ×50.00BC PROPOSED BOTTOM OF CURB / ASPHALT ELEVATION
- ×50.00TC PROPOSED TOP OF CURB ELEVATION
- ×50.00BW PROPOSED EXPOSED BOTTOM OF RETAINING WALL
- ×50.00TW PROPOSED TOP OF RETAINING WALL
- ×50.00EX MATCH INTO EXISTING ELEVATION
- × EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- PROPOSED 100mmØ PERFORATED SUBDRAIN
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED WATERMAIN
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- EXISTING GAS LINE
- EXISTING MANHOLE
- EXISTING CATCHBASIN
- PROPOSED CATCHBASIN-MANHOLE/CATCHBASIN
- PROPOSED MANHOLE
- A.D. PROPOSED AREA DRAIN
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WS-XX WATERSHED NAME
- RUNOFF COEFFICIENT
- AREA IN HECTARES



EROSION AND SEDIMENT CONTROL MEASURES:

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

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

1. PRIOR TO START OF CONSTRUCTION:

- PRIOR TO THE REMOVAL OF ANY VEGETATIVE COVER, MOVING OF SOIL AND CONSTRUCTION:
- INSTALL SILT FENCE IMMEDIATELY DOWNSTREAM FROM AREAS TO BE DISTURBED (SEE PLAN FOR LOCATION).
- INSTALL GEOSOCK INSERTS WITH AN OVERFLOW IN ALL THE DOWNSTREAM CATCHBASINS AND MANHOLES
- INSTALL SILTSACK FILTERS IN ALL CONCRETE CATCH 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 GROUND SURFACES HAVE BEEN STABILIZED EITHER BY PAVING OR RESTORATION OF VEGETATIVE GROUND COVER.
- NO ALTERNATE METHODS OF EROSION PROTECTION SHALL BE PERMITTED UNLESS APPROVED BY THIS CONSULTING ENGINEER AND THE CITY DEPARTMENT OF PUBLIC WORKS.
- CONTRACTOR RESPONSIBLE FOR CITY ROADWAY AND SIDEWALK TO BE CLEANED OF ALL SEDIMENT FROM VEHICULAR TRACKING ETC. AT THE END OF EACH WORK DAY.
- PROVIDE GRAVEL ENTRANCE WHEREVER EQUIPMENT LEAVES THE SITE TO PREVENT MUD TRACKING ONTO PAVED SURFACES. GRAVEL BED SHALL BE A MINIMUM OF 15m LONG, 4M WIDE AND 0.3m DEEP AND SHALL CONSIST OF COARSE (50mm CRUSHERT-RUN LIMESTONE) MATERIAL. MAINTAIN GRAVEL ENTRANCE IN CLEAN CONDITION.
- DURING WET CONDITIONS, TIRES OF ALL VEHICLES/EQUIPMENT LEAVING THE SITE ARE TO BE SCRAPED.
- 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 ABUTTING 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.

USE AND INTERPRETATION OF DRAWINGS

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

PROJECT
RESIDENTIAL BUILDING
98 & 100 BEARBROOK, OTTAWA, ONTARIO

DRAWING TITLE
EROSION AND SEDIMENT CONTROL PLAN

PROJECT NO.
210628

DATE
NOV 2021

C101

D07-12-23-0137

#18758

KEY PLAN
N.T.S.

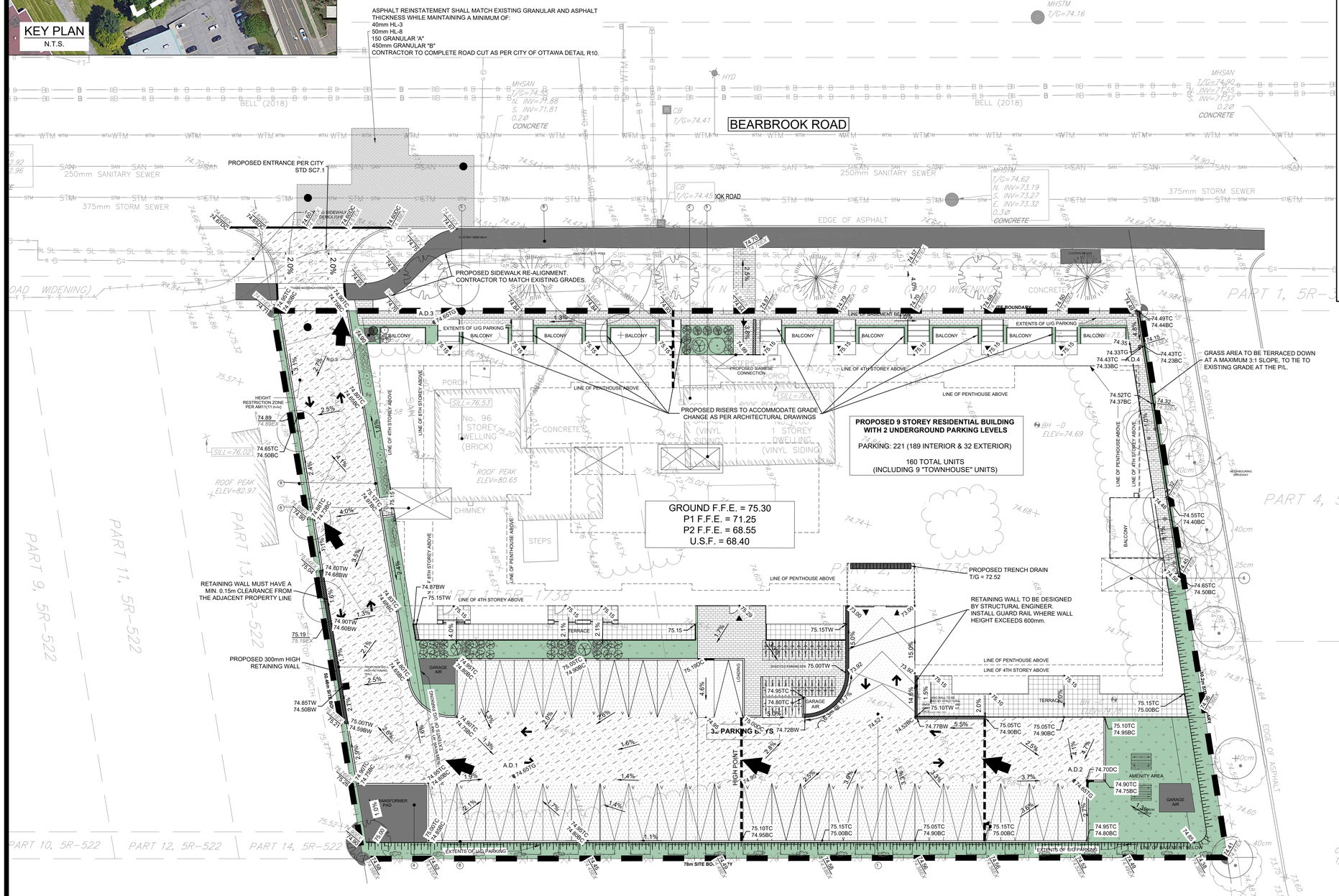
PAVEMENT STRUCTURE

COURSE	MATERIAL	THICKNESS (mm) AUTOMOBILE PARKING	THICKNESS (mm) 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 INVISTIGATION 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 SUBEXCAVATED AND REPLACED WITH SUITABLE EARTH BORROW APPROVED BY THE GEOTECHNICAL ENGINEER. THE SUBGRADE SHOULD BE SHAPED AND CROWNED TO PROMOTE DRAINAGE OF THE SITE DRAINAGE STRUCTURES. FOLLOWING APPROVAL OF THE PREPARATION OF THE SUBGRADE, THE PAVEMENT GRANULARS MAY BE PLACED.

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.



LEGEND:

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- PROPOSED 100mmØ PERFORATED SUBDRAIN
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED WATERMAIN
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- EXISTING GAS LINE
- EXISTING MANHOLE
- EXISTING CATCHBASIN
- PROPOSED CATCHBASIN-MANHOLE/CATCHBASIN
- PROPOSED MANHOLE
- A.D. PROPOSED AREA DRAIN
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WS-XX WATERSHED NAME
- WS-XX RUNOFF COEFFICIENT
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PROJECT
RESIDENTIAL BUILDING
98 & 100 BEARBROOK, OTTAWA, ONTARIO

DRAWING TITLE
GRADING AND DRAINAGE PLAN

PROJECT NO.
210628

DATE
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C301

D07-12-23-0137

#18758

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

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98 & 100 BEARBROOK, OTTAWA, ONTARIO

DRAWING TITLE
SERVICING PLAN

PROJECT NO.
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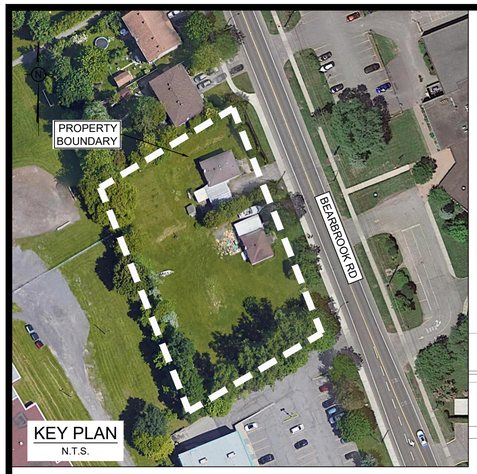
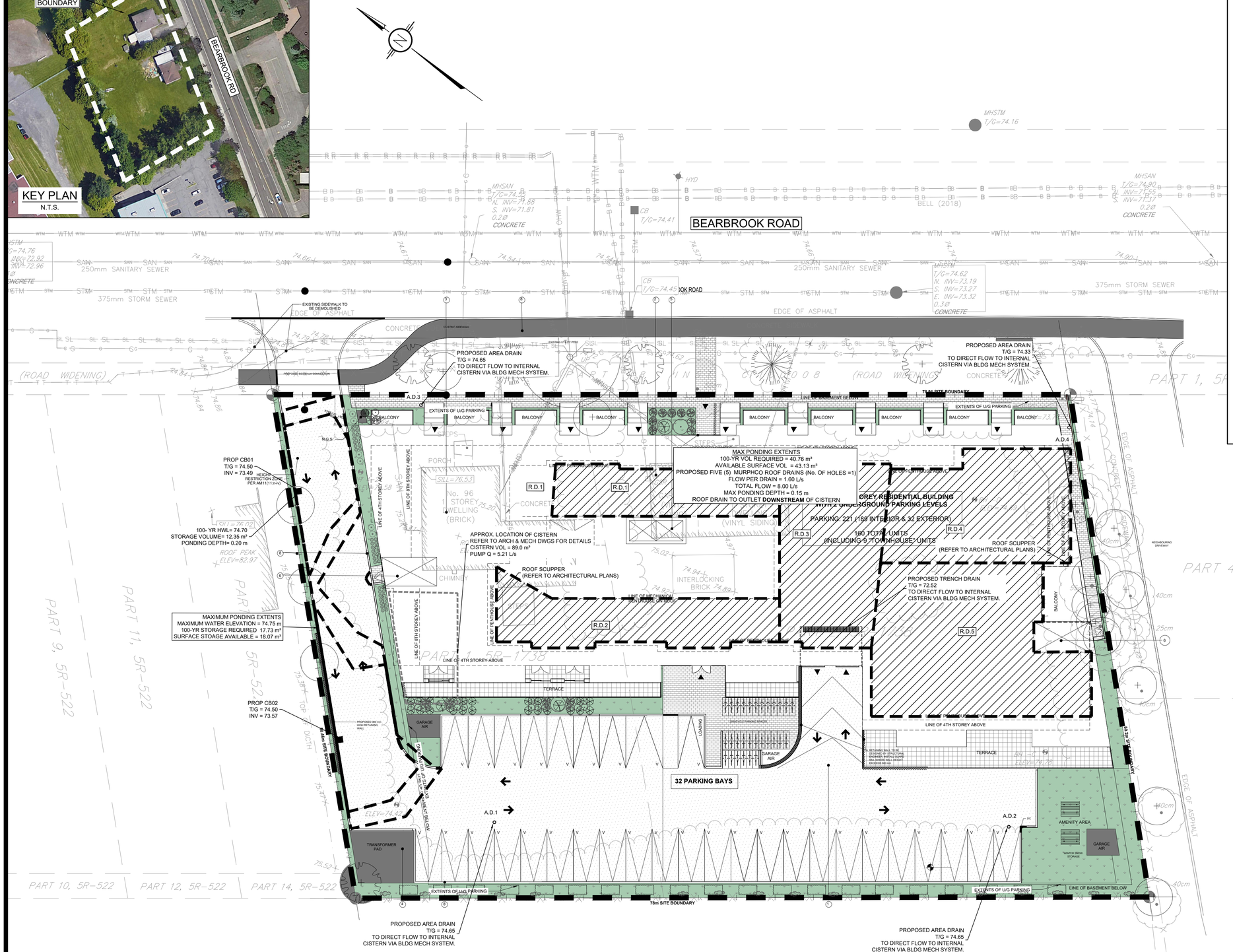
#18758





LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
- PROPOSED CURB
- PROPOSED DEPRESSED CURB
- PROPOSED TERRACING (3:1 MIN.)
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- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED WATERMAIN
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- EXISTING GAS LINE
- EXISTING MANHOLE
- EXISTING CATCHBASIN
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LICENSED PROFESSIONAL ENGINEER
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100510576
07-29-2024
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CLIENT
LANDRIC HOMES LTD.

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

PROJECT
RESIDENTIAL BUILDING
98 & 100 BEARBROOK, OTTAWA, ONTARIO

DRAWING TITLE
STORMWATER MANAGEMENT PLAN

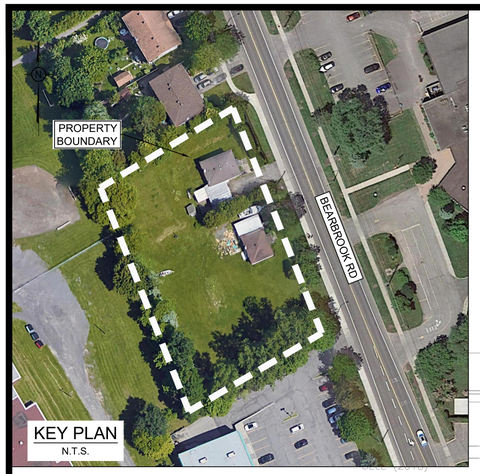
PROJECT NO.
210628

DATE
NOV 2021

C601

D07-12-23-0137

#18758



BEARBROOK ROAD

EWS-01
UN-CONTROLLED
0.391 | 0.25

PART 1, 5R-1738
PART 2, 5R-1738
PART 3, 5R-1738
PART 4, 5R-1738
PART 9, 5R-522
PART 10, 5R-522
PART 11, 5R-522
PART 12, 5R-522
PART 13, 5R-522
PART 14, 5R-522

No. 96 1 STOREY DWELLING (BRICK)
No. 100 1 STOREY DWELLING (VINYL SIDING)
GARAGE (VINYL SIDING)
CHIMNEY
PORCH
STEPS
CONCRETE
INTERLOCKING BRICK
CIVIC #98

SILL=76.53
SILL=76.22
SILL=76.02
ROOF PEAK ELEV=80.53
ROOF PEAK ELEV=80.65
ROOF PEAK ELEV=82.97

BH 4-21 ELEV=74.58
BH -C ELEV=74.78
BH -D ELEV=74.69
BH ELEV=74.42

MHSTM T/G=74.16
MHSAN T/G=74.90 N. INV=71.55 S. INV=71.57 0.2Ø CONCRETE
MHSAN T/G=74.53 N. INV=71.88 S. INV=71.81 0.2Ø CONCRETE
MHSTM T/G=74.62 N. INV=73.19 S. INV=73.27 E. INV=73.32 0.3Ø CONCRETE
HYD
CB T/G=74.41
CB T/G=74.45
CB T/G=73.24
BENCHMARK
CULVERT INV=73.72

250mm SANITARY SEWER
375mm STORM SEWER
EDGE OF ASPHALT
CONCRETE SIDEWALK
ASPHALT
(ROAD WIDENING)
TOP OF DITCH

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WS-XX
WS-XX
AREA | RUNOFF
- WATERSHED NAME
- RUNOFF COEFFICIENT
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PROJECT
RESIDENTIAL BUILDING
98 & 100 BEARBROOK, OTTAWA, ONTARIO

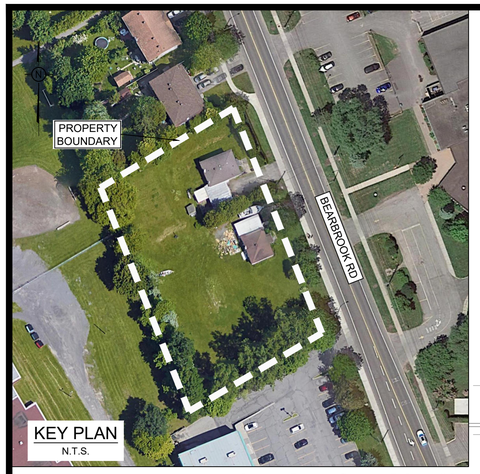
DRAWING TITLE
PRE-DEVELOPMENT
WATERSHED PLAN

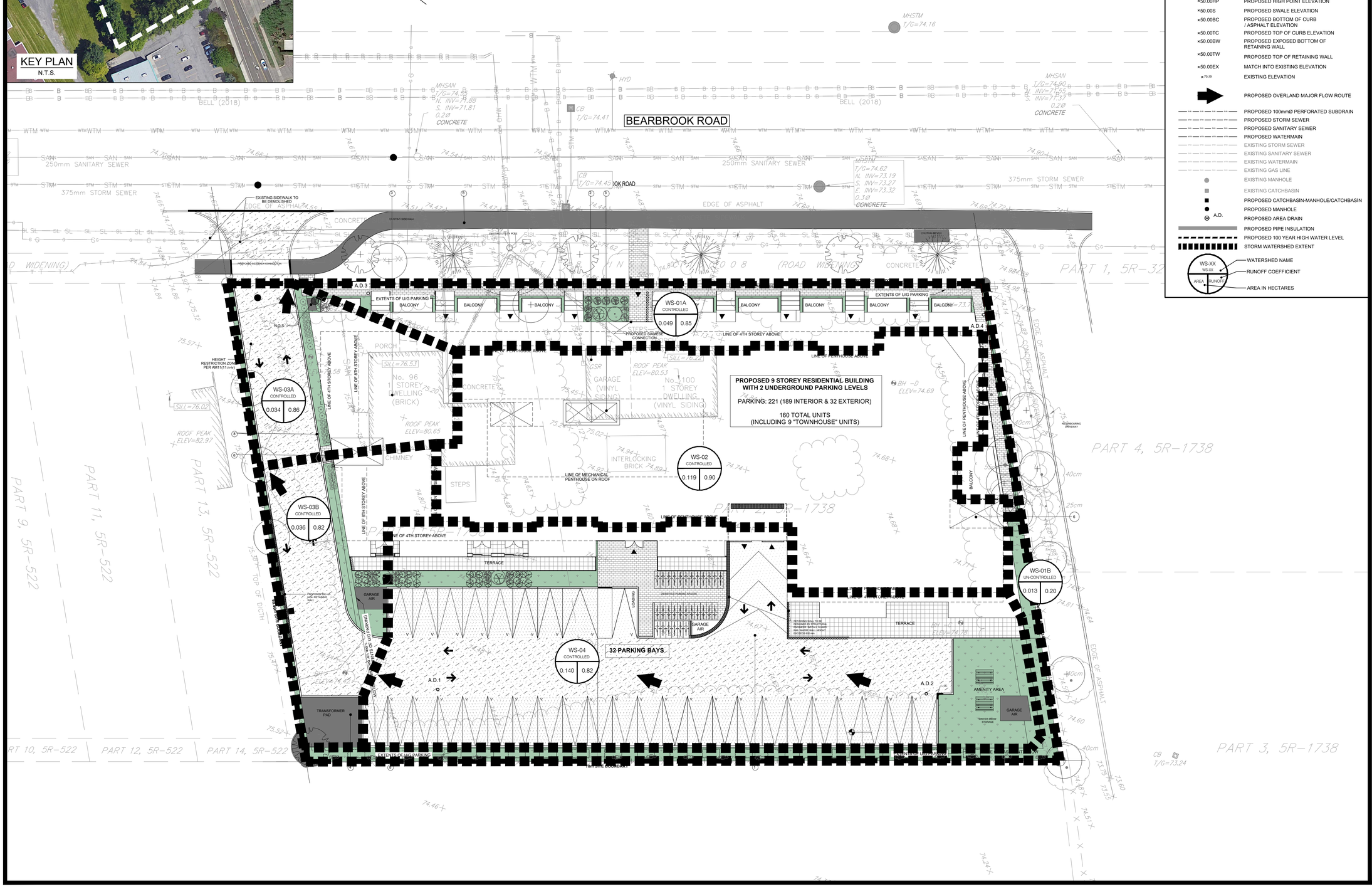
PROJECT NO.
210628
DATE
NOV 2021

C701

D07-12-23-0137

#18758





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

CLIENT
LANDRIC HOMES LTD.

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

PROJECT
RESIDENTIAL BUILDING
98 & 100 BEARBROOK, OTTAWA, ONTARIO

DRAWING TITLE
POST-DEVELOPMENT WATERSHED PLAN

PROJECT NO.
210628

DATE
NOV 2021

C702

D07-12-23-0137

#18758

USE AND INTERPRETATION OF DRAWINGS

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

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

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

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

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

UNAUTHORIZED CHANGES:

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

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

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

GENERAL NOTES:

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

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

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

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

No.	REVISIONS	BY	DATE
07	RE-ISSUED FOR SPC	S.V.	29 JULY 2024
06	ISSUED FOR PERMIT	S.V.	11 JULY 2024
05	ISSUED FOR COORDINATION	S.V.	15 APR 2024
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

LICENSED PROFESSIONAL ENGINEER
V. JOHNSON
100510576
07-29-2024
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

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

CLIENT
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
CONSTRUCTION DETAIL PLAN

PROJECT NO.
210628

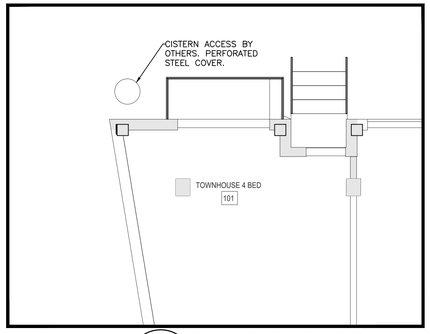
DATE
NOV 2021

C901

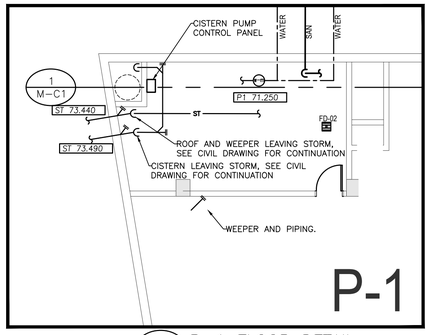
D07-12-23-0137

#18758

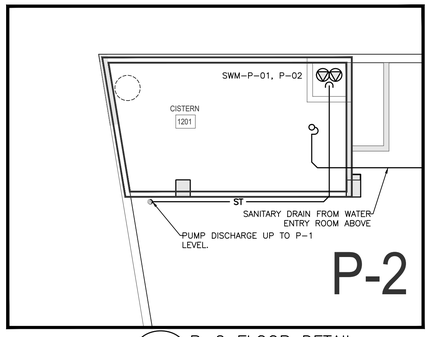
24 x 36 SAFE ZONE



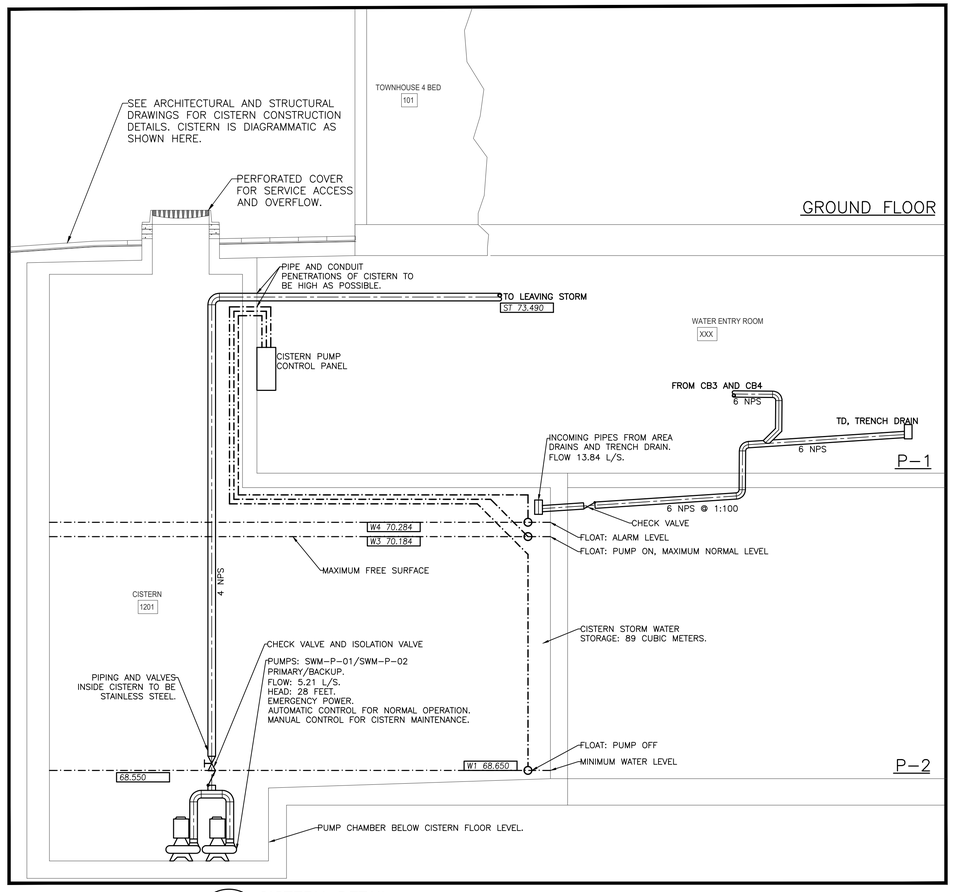
2 M-C1 GROUND FLOOR DETAIL



3 M-C1 P-1 FLOOR DETAIL



4 M-C1 P-2 FLOOR DETAIL



1 M-C1 CISTERN DETAIL
NTS

CISTERN NOTES

1. SEE CIVIL ENGINEER'S SERVICES STORMWATER MANAGEMENT REPORT FOR ADDITIONAL SUPPORTING INFORMATION FOR THE SYSTEM. THAT REPORT SHALL FORM PART OF THE SUPPORTING DOCUMENTS FOR THIS CONTRACT. CONTRACTOR SHALL READ THE REPORT PRIOR TO SUBMITTING CONTRACT PRICE.
2. CISTERN VOLUME TO BE 89 CUBIC METERS.
3. CISTERN PUMP RELEASE RATE TO BE 5.21 L/S.
4. THIS CONTRACTOR TO PROVIDE PIPING, CONTROLS, CONDUIT, WIRING AND EQUIPMENT FOR THE CISTERN. CISTERN DETAIL DESIGN BY OTHERS AND TO BE PROVIDED BY GENERAL CONTRACTOR.
5. ALL PIPING SHALL BE PRESSURE PIPING INCLUDING STORM UP 1 METER ABOVE TO THE INLET OF THE OVERFLOW/ACCESS.
6. ALL PENETRATIONS OF THE CISTERN SHALL BE MADE PRESSURE AND WATER TIGHT.
7. THIS CONTRACTOR TO MEASURE AREA OF CISTERN AFTER IT IS FORMED AND DETERMINE HEIGHTS OF ALL WATER LEVELS, FLOAT LEVELS AND PIPE PENETRATIONS. SUBMIT FABRICATION SKETCH TO ENGINEER FOR REVIEW PRIOR TO STARTING WORK. ALL PIPE AND CONTROLS OPENINGS TO BE CORED IN THE CISTERN AFTER IT IS FORMED.
8. INCOMING STORM PIPING AND ANY SANITARY PIPING FROM FLOOR ABOVE, PASSING THROUGH THE CISTERN, TO ENTER THE CISTERN ABOVE THE HIGH WATER LEVEL.
9. WATER LEVELS OR FLOAT LEVELS ARE INDICATED BY "W" TAGS.
10. FLOOR ELEVATIONS ARE NOMINAL AND ARE TO BE CONFIRMED ON SITE. RELATIVE ELEVATIONS TO BE ADHERED TO.

THIS DRAWING, OR PARTS THEREOF, MAY NOT BE REPRODUCED OR USED IN ANY FORM, BY ANY METHOD, FOR ANY PURPOSE, WITHOUT THE WRITTEN PERMISSION OF QM&E ENGINEERING INC.

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE SPECIFICATION. WHERE CONFLICT ARISES THE MORE STRINGENT OF THE TWO SHALL APPLY.

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23-058

THE CONTRACT DOCUMENTS ARE THE PROPERTY OF QM&E ENGINEERING INC. (QM&E)

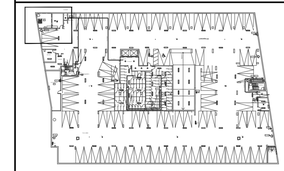
THE CONTRACTOR SHALL OBTAIN A FULL SET OF ALL CONSULTANTS DESIGN DOCUMENTS PRIOR TO STARTING WORK.

QM&E BEARS NO RESPONSIBILITY FOR INTERPRETATIONS OF THESE DOCUMENTS BY OTHERS.

UPON WRITTEN APPLICATION QM&E WILL PROVIDE WRITTEN CLARIFICATION REGARDING THE INTENT OF THE CONTRACT DOCUMENTS.

QM&E REVIEW OF SHOP DRAWINGS SUBMITTED BY THE CONTRACTOR IS FOR DESIGN CONFORMANCE ONLY.

DRAWINGS ARE NOT TO BE SCALED FOR CONSTRUCTION. CONTRACTOR TO VERIFY ALL CONDITIONS AND DIMENSIONS, ON SITE, REQUIRED TO PERFORM THE WORK AND REPORT ANY DISCREPANCIES WITH THE CONTRACT DOCUMENTS TO THE DESIGN TEAM BEFORE COMMENCING WORK.



KEY PLAN

No.	DESCRIPTION	DD/MM/YY
2	ISSUED FOR SP COORDINATION	24 JULY 2024
1	ISSUED FOR COORDINATION	31 MAY 2024

NORTH ARROW: PROJECT NORTH

NORTH ARROW: TRUE NORTH

CLIENT: Landric HOMES

ARCHITECT: ROSSMANN ARCHITECTURE
88 Saint-Joseph Boulevard, Gatineau QC J8Y 3W5
Tel : 819-600-1555

BEARBROOK
APARTMENT BUILDING

98-100 BEARBROOK RD

Q|M&E
9 GURDWARA ROAD, UNIT 200, ONTARIO, K2E 7X6
TEL.: (613) 366-4763
e-mail: mail@qmeengineering.com

REVISION:

SCALE	1 : 100
DRAWN	CWC
DESIGNED	CWC
CHECKED	LVDL
PROJECT	23-058

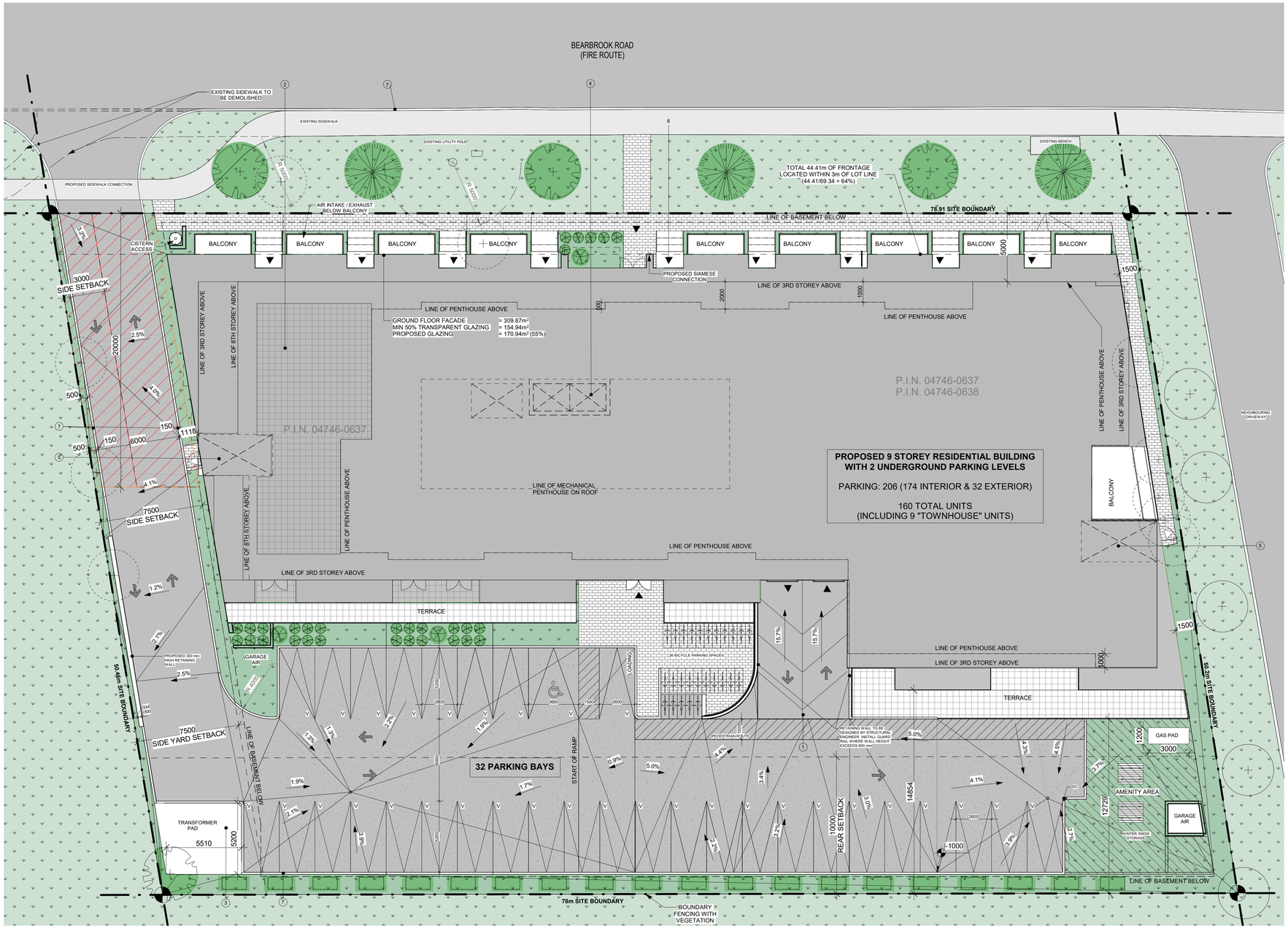
LICENSED PROFESSIONAL ENGINEER C.W.J. CLARK PROVINCE OF ONTARIO

M-C1

CISTERN DETAILS

DRAWINGS/FIGURES

Proposed Site Plan
Legal Survey
As-builts



1 / A003 SITE PLAN
1 : 150

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	6	10	3		20
9TH FLOOR						4	3	7
TOTAL	7	2	7	36	74	31	3	160

SITE CONTEXT

LEGEND

SURFACES

- GRASS
- POURED CONCRETE
- CONCRETE PAVERS
- ASPHALT PAVING
- PROPOSED NEW BUILDING
- PEDESTRIAN ROUTE
- HEIGHT RESTRICTION ZONE PER AM11(11:n-iv)

LINES

- PROPERTY LINE
- SETBACK LINE
- EXISTING FENCE
- NEW FENCE
- OHW OHW — OVERHEAD WIRES

VEGETATION

- TREE: EXISTING TO REMAIN
- TREE: EXISTING TO BE REMOVED
- TREE: NEW PROPOSED
- SHRUB: NEW PROPOSED

SYMBOLS

- DIRECTIONAL ARROWS
- BUILDING ACCESS
- BUILDING EGRESS
- SIAMESE CONNECTION
- UP — UTILITY POLE
- FH — FIRE HYDRANT
- CATCH BASIN / MANHOLE
- DEPRESSED CURB
- LANDSCAPE LIGHT
- LIGHT POLE
- WALL MOUNTED LIGHT
- XX.XXm — EXISTING GRADE ELEVATION
- XX.XXm — PROPOSED GRADE ELEVATION
- LOT CORNERS

PARKING

- BIKE PARKING H: HORIZONTAL 0.6M x 1.8M V: VERTICAL 0.5M x 1.5M S: STACKED 0.37M x 1.8M
- CAR PARKING R: RESIDENTIAL V: VISITOR
- BF PARKING R: RESIDENTIAL V: VISITOR
- BF PARKING (TYPE A) R: RESIDENTIAL V: VISITOR
- BF PARKING (TYPE B) R: RESIDENTIAL V: VISITOR

GENERAL NOTES

NOTE-A :
- ALL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS AND SPECIFICATIONS, INCLUDING OTHER CONSULTANTS DRAWINGS AND SPECIFICATIONS. ANY DISCREPANCIES BETWEEN DRAWINGS WILL BE REPORTED TO THE PROJECT LEAD IMMEDIATELY FOR CLARIFICATION PRIOR TO COMMENCING ANY CONSTRUCTION.

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.
PART OF LOT 14, CONCESSION 2 (OTTAWA FRONT) GEOGRAPHIC TOWNSHIP OF GLOUCESTER, CITY OF OTTAWA

N

PROJECT INFORMATION

SITE SUMMARY

ADDRESS	98-100 BEARBROOK RD. GLOUCESTER, OTTAWA
CURRENT ZONING	AM11
SITE AREA	3914.04 m²
PROPOSED USE	RESIDENTIAL
BUILDING AREA	1812.30 m²

ZONING SUMMARY

	REQUIRED	PROPOSED
LOT AREA	3914.04 m²	3914.04 m²
LOT WIDTH	0.00 m	78.91 m
MAX. BUILDING HEIGHT	30.00 m	30.00 m
MAX. PARAPET HEIGHT *Above max. building*	0.00 m	0.90 m
SET BACKS :		
- FRONT YARD	3.00 m *(min.)* 5.00 m *(max.)*	3.00 m
- CORNER SIDE YARD	0.00 m *(min.)*	0.00 m
- INTERIOR SIDE YARD Abutting Residential Zone	7.50 m *(min.)*	7.50 m
- INTERIOR SIDE YARD All other case	0.00 m	1.50 m
- REAR YARD	10.00 m *(min.)*	12.73 m
MIN LANDSCAPED AREA	0.00 m²	605.41 m²

PARKING

		REQUIRED	PROPOSED
VEHICULAR:			
MID-RISE:	*1.2 / UNIT*	*173 (10% red.)*	*175*
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 (*160X0.11Y=18Y³*)	*4Y³*	*5X4Y³*
RECYCLING (*160X038Y=6Y³*)	*4Y³*	*2X4Y³*
ORGANICS (*240L per 50 UNITS=4*)	*240L*	*4*

AMENITY AREA

	REQUIRED	PROPOSED
PRIVATE	480 m2	1760.18 m2
COMMUNAL	480 m2	543 m2

(CALC: 6 m² / 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 + 176 Interior = 208 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

1. GARAGE ENTRANCE
2. PROPOSED ROOFTOP TERRACE (NINTH FLOOR)
3. TRANSFORMER PAD
4. ELEVATOR SHAFT
5. STAIRCASE SHAFT
6. TOWNHOUSE ENTRANCE
7. CONCRETE CURB

ROSSMANN ARCHITECTURE

88 Saint-Joseph Boulevard, Gatineau QC J8Y 3W5
Tel : 819-600-1555

ONTARIO ASSOCIATION OF ARCHITECTS
ERNEST D. SOULIERE
LICENCE
10254

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CLIENT :

Landric HOMES

revisions	description	date
1.32	ISS. FOR BUILDING PERMIT	24-07-10
1.30	SPA4 SUBMISSION	24-05-07
1.26	SPA3 SUBMISSION	23-09-27
1.20	SITE PLAN	23-05-18
1.8	CITY DISCUSSION	22-11-16
1.5	SPA SUBMISSION	22-03-15

PROJECT NAME / NOME DU PROJET :

98-100 Bearbrook Rd

DRAWING NAME / NOM DU DESSIN :

GENERAL SITE PLAN CONTROL

PROJECT NO. / NO. DE PROJET : 21046

DATE : 2024-07-08

DRAWN BY / DESSINÉ PAR : M.ALLEN

REVIEWED BY / VÉRIFIÉ PAR : E.SOULIERE

SCALE / ÉCHELLE : 1 : 150

PROJECT PHASE / PHASE DU PROJET : 1

DWG NO. / NO. DESSIN : A003

REVISION NO. / NO. DE RÉVISION : 1.32

D07-12-23-0137

#18758

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
2169193

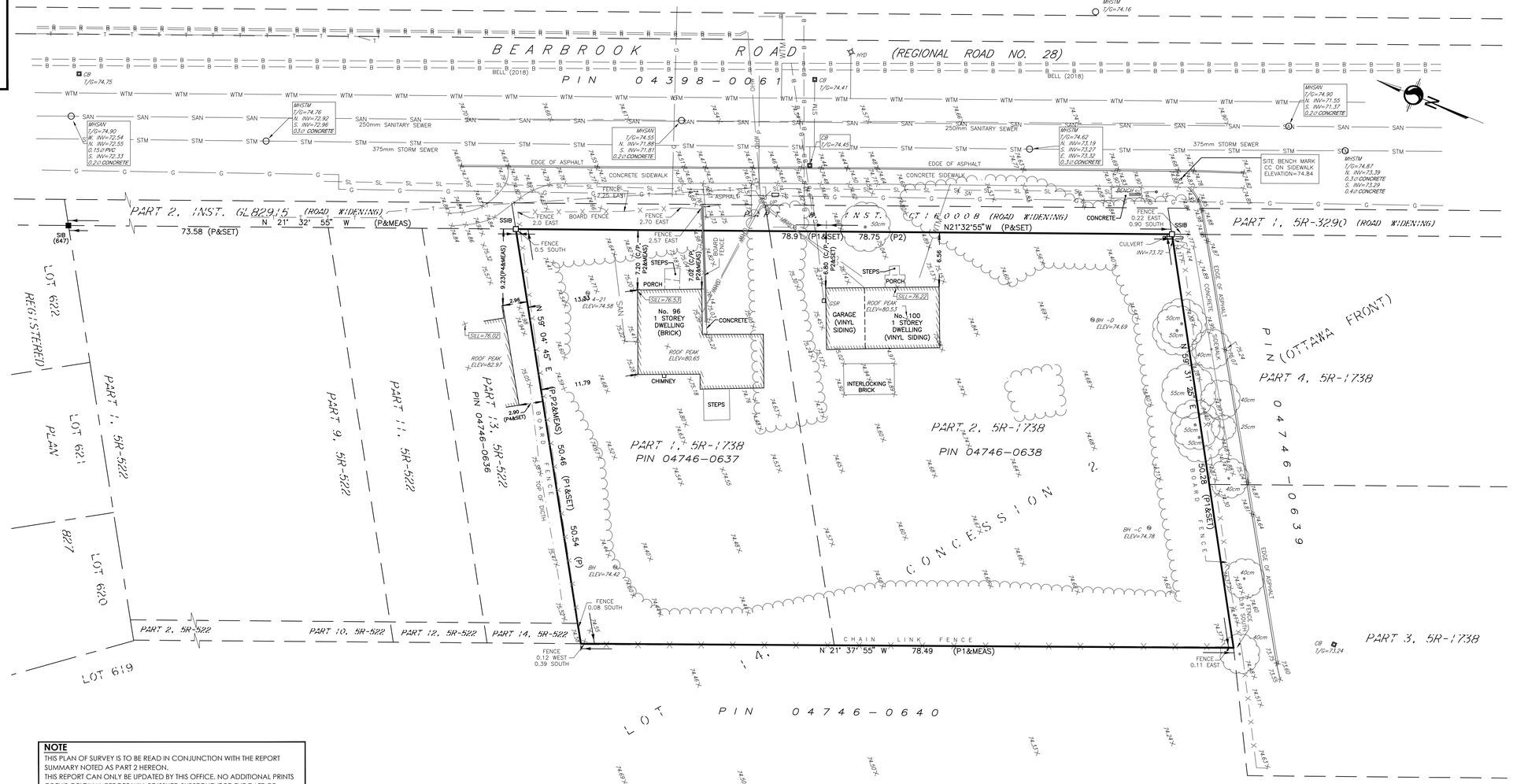
THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR
In accordance with Regulation 1026, Section 29(3)

SURVEYOR'S REAL PROPERTY REPORT
PART 1 - PLAN OF SURVEY

PART OF LOT 14
CONCESSION 2 (OTTAWA FRONT)
(GEOGRAPHIC TOWNSHIP OF GLOUCESTER)

CITY OF OTTAWA

Scale 1:100
2 0 2 4 6 METRES



LEGEND (IF APPLICABLE)

■	DENOTES	FOUND MONUMENTS
□	"	SET MONUMENTS
IB	"	IRON BAR
IBØ	"	ROUND IRON BAR
SIB	"	STANDARD IRON BAR
SSIB	"	SHORT STANDARD IRON BAR
CC	"	CUT CROSS
CP	"	CONCRETE PIN
WIT	"	WITNESS
PIN	"	PROPERTY IDENTIFICATION NUMBER
MEAS	"	MEASURED
PROP	"	PROPORTIONED
OU	"	ORIGIN UNKNOWN
SG	"	STANTEC GEOMATICS LTD.
P	"	PLAN SR-522
P1	"	PLAN SR-1738
P2	"	PLAN BY 647 DATED MAY 18, 1971
C/	"	CALCULATED PER
ACU	"	AIR CONDITIONING UNIT
AN	"	ANCHOR
BH	"	BOREHOLE
BENCH	"	BENCH
CB	"	CATCH BASIN
DCB	"	DOUBLE CB
CBMH	"	CB MANHOLE
DCBMH	"	DOUBLE CB MANHOLE
GP	"	POLE GUYWIRE
GSR	"	GAS SERVICE REGULATOR
GV	"	GAS VALVE
HLS	"	HYDRO LIGHT STANDARD
HM	"	HYDRO METER
HTN	"	HYDRO TRANSFORMER
HW	"	HAND WELL
HYD	"	FIRE HYDRANT
JBX	"	JUNCTION BOX
LS	"	LIGHT STANDARD
MB	"	MAILBOX
MP	"	MONITORING PIN
MH	"	MAINTENANCE HOLE UNIDENTIFIED
MHSAN	"	MAINTENANCE HOLE SANITARY
MHSTM	"	MAINTENANCE HOLE STORM
MHT	"	MAINTENANCE HOLE TRAFFIC
MW	"	MONITORING WELL
SN	"	SIGN
TB BELL	"	TERMINAL BOX - BELL
TB CATV	"	TERMINAL BOX - CABLE
TCB	"	TRAFFIC CONTROL BOX
TPIT	"	TEST PIT
TSL	"	TRAFFIC SIGNAL LIGHT
UP	"	UTILITY POLE
VB	"	VALVE BOX
VC	"	VALVE CHAMBER
WV	"	WATER VALVE
	"	TREE STUMP
	"	TREE CONIFEROUS
	"	TREE DECIDUOUS

T T T — TRAFFIC
P P P — UNDERGROUND TELEPHONE
WTM WTM WTM — WATERMAIN
G G G — GASMAIN
STM STM STM — STORM SEWER
SAN SAN SAN — SANITARY SEWER
R R R R R — ROGERS CABLE
B B B B B — BELL CANADA

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NOTE
THIS PLAN OF SURVEY IS TO BE READ IN CONJUNCTION WITH THE REPORT SUMMARY NOTED AS PART 2 HEREON.
THIS REPORT CAN ONLY BE UPDATED BY THIS OFFICE. NO ADDITIONAL PRINTS OF THIS ORIGINAL REPORT WILL BE ISSUED SUBSEQUENT TO THE DATE OF CERTIFICATION.
ALL TIES ARE MINIMUM UNLESS OTHERWISE NOTED.
ALL TIES TO CURVED BOUNDARY ARE RADIAL TO ARC.
RISK OF UNDERGROUND SERVICES, MONUMENTATION PLANTED ACCORDINGLY.

PART 2
This Report was prepared for Landric Homes and the undersigned accepts no responsibility for the use by other parties.
1. REGISTERED RIGHTS-OF-WAY/EASEMENTS
No rights-of-way or easements were found to be registered against the subject property.
2. PROPERTY IMPROVEMENTS
There are two 1 storey dwellings situate wholly within the subject lands. See Part 1 (Plan) of this Report for further property improvements.
3. COMPLIANCE WITH MUNICIPAL ZONING BYLAWS
Compliance is not certified by this report.
4. ADDITIONAL REMARKS
Invert information shown hereon obtained in the field from clients contractor

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

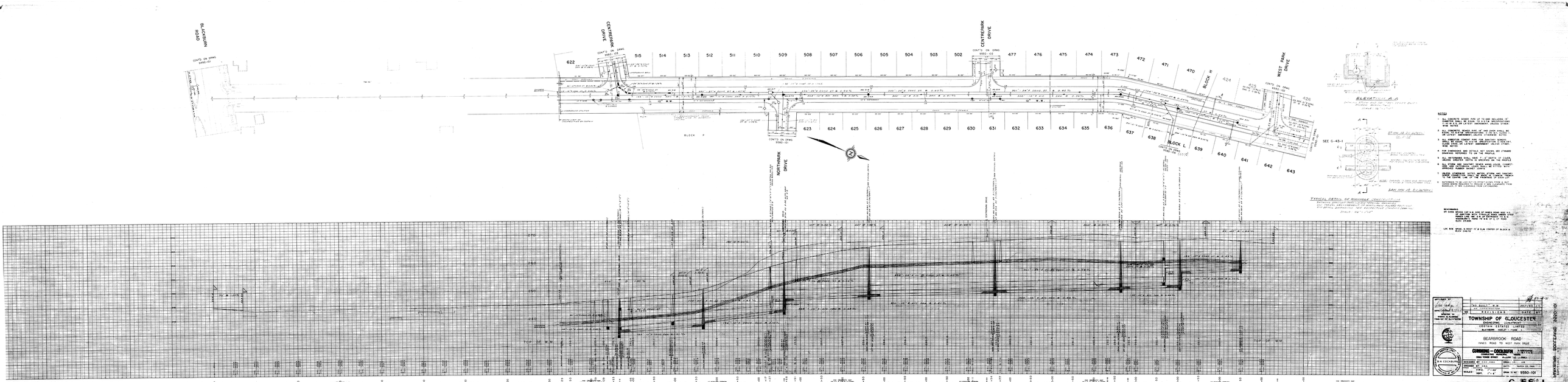
SRO MAP COORD.= 377912.34, 5032958.26

Stantec Geomatics Ltd.
CANADA LANDS SURVEYORS
ONTARIO LAND SURVEYORS
1331 CLYDE AVENUE, SUITE 400
OTTAWA, ONTARIO, K2C 3G4
TEL. 613.722.4420
stantec.com

DRAWN: NJ	CHECKED: KJ	PM: KJ	FIELD: ES/KC	PROJECT No.: 161614422-110

This plan was signed with a scanned signature as a result of the Emergency Order related to the COVID-19 pandemic.

30 July 2021 10:44 AM
N:\active\161614422\vsr\drawing\161614422-110-d1-r36.dwg


BLACKBURN ROAD
CENTREPARK DRIVE
NORTHPARK DRIVE
WEST PARK DRIVE
BLOCK P
BLOCK H
BLOCK L
TOP OF W.M.
ELEVATION A-A
TYPICAL DETAIL OF MANHOLE CONSTRUCTION
NOTES
1. ALL CONCRETE SEWER PIPE UP TO AND INCLUDING 12" DIAMETER SHALL BE EQUAL TO C.S.A.M. SPECIFICATIONS FOR CLASS 100 LOW HEAD HARDPACKED UNLESS OTHERWISE NOTED.
2. ALL CONCRETE SEWER PIPE 15" AND OVER SHALL BE EQUAL TO C.S.A.M. SPECIFICATIONS FOR CLASS 65-D LOW HEAD OR LOWER HARDPACKED UNLESS OTHERWISE NOTED.
3. ALL CONCRETE CEMENT PIPE FOR SANITARY SEWERS SHALL BE EQUAL TO C.S.A.M. SPECIFICATIONS FOR CLASS 65-D LOW HEAD HARDPACKED UNLESS OTHERWISE NOTED.
4. PIPE CONNECTIONS AND DETAILS NOT SHOWN SEE STANDARD DRAWING NO. 1 OF THE M.M.P.W.S.S.
5. ALL MANHOLES SHALL HAVE 7'-0" DEPTH OF FLOWS, UNLESS GREATER DEPTH IS INDICATED ON THE PROFILE.
6. ALL TYPES AND SANITARY SEWER HOUSE CONNECTIONS SHALL BE CONSTRUCTED AS PER DETAIL WITH APPROVED RUBBER GASKET JOINTS.
7. UNLESS OTHERWISE NOTED WATER STOPS ARE NOT SHOWN. ALL WATER STOPS SHALL BE CONSTRUCTED AT RIGHT ANGLES TO THE CENTRE LINE OF THE PIPELINE, UP SLOPE.
8. MATERIALS OF BLOCK OUT ON EXISTING SEWER TO BE AS SPECIFIED FOR NEW SEWER. ALL BLOCK OUTS TO BE DONE NEATLY AND WORKMANLIKE TO MIN. CLEARANCE FROM EXISTING PIPE.
BENCHMARKS
UP SAND DETAIL TOP N.W. SIDE OF INNES ROAD 300 FT. WEST OF CENTREPARK DRIVE
BLACKBURN ROAD AND CENTREPARK DRIVE
ELEV. 348.78
U/S N.W. BRICK 4 FEET +/- E ELM CENTRE OF BLOCK A
ELEV. 348.78
SAN MH #8 S.I. DETAIL
SEE G-43-1
AS BUILT - N.W.
AS CONSTRUCTED
REVISIONS
DATE BY
TOWNSHIP OF GLOUCESTER
ENGINEERING DEPARTMENT
CONSTRUCTION
COSTAIN ESTATES LIMITED
BLACKBURN - INNES - PARK
SEARBROOK ROAD
INNES ROAD TO WEST PARK DRIVE
CORKUM - GOULDEN & ASSOCIATES
CONSULTING ENGINEERS
OTTAWA, ONTARIO
DESIGNED BY J.C.C. / R.H.
CHECKED BY R.H.G.
SCALE: HORIZ. 1"=40'
VERT. 1"=4'
DRAWING NO. 9550-101
G-55-1