Stormwater Management and Servicing Report

Navan Stacked Town Homes
6001-6005 Renaud Road
Orleans, Ontario

Prepared for:

Landric Homes Inc.
63 chemin de Montreal Est
Gatineau (QC) J8M 1K3

Attention: Eric Danis

LRL File No.: 210216-02

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TABLE OF CONTENTS

APPENDICES

Appendix A	**Pre-consultation / Correspondence**
Appendix B	**Water Supply Calculations**
Appendix C	**Wastewater Collection Calculation**
	Supporting Documents
Appendix D	**Stormwater Management Calculation** **Supporting Documents** **Hydrovex Flow Control Unit** **Stormtech Chambers Detail**
Appendix E	**Civil Engineering Drawings**
Drawings/Figures	**Proposed Site Plan** **Legal Survey** **Ziegler Road Plan & Profile As-builts**

LIST OF TABLES

LIST OF FIGURES

1 INTRODUCTION AND SITE DESCRIPTION

LRL Associates Ltd. was retained by Landric Homes Inc. to complete a Stormwater Management Analysis and Servicing Brief for a proposed development of stacked townhomes located at 6001-6005 Renaud Rd, Orleans, Ottawa. The legal description of the property is Part of Lot 7, Concession 3, geographic Township of Gloucester**,** City of Ottawa.

Figure 1: Arial View of Proposed Development

The site at 6001-6005 Renaud Road has approximately 76.1 metres of frontage along Renaud Road (south property line), maximum side yard depth of approximately 61.0 metres. The overall lot area is approximately **0.46 ha.** The site is currently zoned DR (Development Reserve Zone) and is occupied by two detached residential dwellings (2-storey and 1.5-storey buildings). Most of the site is landscaped with some paved surfaces.

The proposed works will only take into consideration the area of site allocated to the development of the stacked townhomes and amenities. These works will be located primarily within the south portion of the lot, with the exception of a lane along the east property line (to provide site access to Ziegler). Frontage along Renaud will remain the same, at approximately 76.1m. Side yard lengths will vary; west side yard of 35.5m, east side yard of 61.0m. Rear yard lot line will be split

between the lot line abutting the future semi-detached lots at 68.5m, and abutting Ziegler street at 11.6m. The overall limits of construction area is approximately **0.29 ha**

The development proposes five (5) blocks of 3-storey stacked townhome buildings with walk-out basements, consisting of 20 units to the south of the property and 6 semi-detached houses to the north of the property. However, the 6 semi-detached house will not be considered for site plan application or within the stormwater report. The proposed development will also feature 18 surface parking spaces as well as sheltered garages to accommodate parking demands.

For the purposes of this report & design, the lots allocated to the development of future semi-detached homes will not be considered. The combined area of the future semi-detached lots is approximately 68.5m (frontage along Renaud) by 25.3m (side yard along the west property line).

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 considerations, LRL Associates Ltd. should be advised to review the report recommendations.

2 Existing Site and Drainage Description

The subject site measures ***0.29 ha*** and is gently sloped north from Renaud Road to Ziegler Street. Existing elevations range from 75.65m along south property line fronting Renaud St to 74.34m along north property line fronting Ziegler St.

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-way:

Ziegler Street:

- 200mmØ PVC DR-18 watermain
- 250mmØ PVC DR-35 sanitary sewer
- 750, 825 & 975mmØ CL 100-D 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 to obtain municipal approval for site development. No other approval requirements from other regulatory agencies are anticipated.

5 WATER SUPPLY AND FIRE PROTECTION

5.1 Existing Water Supply Services and Fire Hydrant Coverage

The subject property lies within the City of Ottawa 2E water distribution network pressure zone. The subject property is located within proximity of an existing 200 mm dia. watermain along Ziegler St. There are currently several existing fire hydrants available to service the subject property. Refer to ***Appendix B*** for the location of fire hydrants.

5.2 Water Supply Servicing Design

The subject property is proposed to be serviced via a closed loop network of 150 mm diameter watermain connected to the existing 200 mm watermain within Ziegler Street. Refer to Site Servicing Plan C.401 in ***Appendix E*** for servicing layout.

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

Table 1: ***City of Ottawa Design Guidelines Design Parameters***

Design Parameter	Value
Residential Townhouse	2.7 P/unit
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 total proposed residential development will house twenty (20) stacked town units. Based on the City of Ottawa Design guidelines for population projection, this translates to approximately 54.0 residents. Table 2 below summarizes the proposed development as interpreted using table 4.1 of the City of Ottawa Design Guidelines.

Table 2: ***Development Residential Population Estimate***

Proposed Unit type	Persons Per Unit	Number of Units	Population
Townhouse	2.7	20	54.0
		Total Residential Population	**54.0**

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

Where:

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

q = average water consumption (L/capita/day)
P = design population (capita)
M = Peak factor

Using a calculated Maximum Day Factor and Peak Hour factor of **7.5** and **11.2** respectively as per Table 3-3 in the *MOE Design Guidelines*, anticipated demands were calculated as follows:

- Average daily domestic water demand is **0.18** L/s,
- Maximum daily demand is **1.30** L/s, and
- Maximum hourly is **14.62** 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/min)	Boundary Conditions @ Renaud Road Head (m) / Pressure (psi)
Average Daily Demand	11	130.7 / 81.2
Max Day + Fire Flow (Block A)	78 + 16,000	115.5 / 59.5
Max Day + Fire Flow (Block B)	78 + 16,000	115.5 / 59.5
Peak Hour	877	126.7 / 75.5
**Assumed Ground elevation at connection point = 73.60 m.*		
Water demand calculation per City of Ottawa Water Design guidelines. ***See Appendix B*** *for details.*		

As indicated in Table 3, Average Daily Demand pressure exceeded the required pressure range (greater than 80 psi) stated in Table 1 as per City of Ottawa Design Guidelines. Pipe Pressure Losses were calculated to factor in the loss in pressure expected. Considering a PVC pipe (roughness coefficient C of 150) of 150mm inner diameter, at a length of 121.5m and an elevation variable of 1.64m, we could calculate a pipe pressure loss of **2.33 psi** within the network, resulting in an adjusted max pressure of **78.90 psi**, now falling within the allowable range.

Refer to ***Appendix B*** for Boundary Conditions & Pipe Pressure Loss Calculations.

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

- Type of construction – Wood Frame Construction;
- Occupancy type – Limited Combustibility; and
- Sprinkler Protection – Non-Sprinklered.

The estimated fire flow demand was estimated to be **16,000 L/min** for Blocks A and **16,000 L/min** for Block B. See ***Appendix B*** for details.

There are several existing fire hydrants within 300 m to the proposed buildings that are available to meet the required fire flow demands stated above. Refer to ***Appendix B*** for fire hydrant locations.

Table 4 below summarizes the approximate aggregate fire flow of the contributing hydrants within 300 m 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	Fire Hydrant(s) within 300m	Approximate Available Combined Fire Flow (L/min)
BLOCK A	16,000	2	6	-	(2 x 5678) + (6 x 3785) = 34,066
BLOCK B	16,000	2	6	-	(2 x 5678) + (6 x 3785) = 34,066

As shown in Table 4, the approximate total available fire flow from contributing hydrants is sufficient to provide adequate fire flow for the proposed buildings.

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 Forest valley trunk sewer. There is an existing 250 mm dia. sanitary sewer within Ziegler St. across from the subject site that ultimately conveys flows to the Forest Valley trunk sewer.

The subject property falls within the area contemplated in the *Gloucester East Urban Community Infrastructure Servicing Study Update (**Gloucester EUC)**,* prepared by Stantec, revision date March 2005. Refer to Drainage Plan extracted from the *Gloucester EUC* in ***Appendix C.***

The post development total wet wastewater flow was calculated to be is **0.80 L/s** as a result of proposed residential population and a small portion of infiltration. Refer to ***Appendix C*** for further information on the calculated sanitary flows.

As per the Urbantech Functional Servicing Report dated December 2020, the 250mm diameter sanitary sewer within Ziegler Street has a full capacity of 38.0 L/s. Maximum design from the current developed subdivision is expected to be 19.97 L/s. Assuming peak design flow should not exceed 85%, the current reserve capacity of the Ziegler sewer is expected to be 12.3 L/s.
The proposed Caivan residential development, directly East of the 6001/6005 Renaud site, is expected to have a peak design flow of 10.5 L/s. This would leave an allowable reserve capacity of **1.8 L/s** for the proposed residential developments at 6001/6005 Renaud Road.
Refer to ***Appendix C*** for the Caivan Functional Servicing Report referenced.

The current proposed residential developments (Block A, Block B) will require **0.80 L/s** of the sewer capacity. This would leave the sewer with a capacity of **1.00 L/s** for the future semi-detached houses (located along Ziegler Street, refer to site plan). Therefore, it is anticipated that

the existing local sanitary sewer network has sufficient capacity to accommodate the proposed development.

6.2 Sanitary Sewer Servicing Design

The proposed development will be serviced via a 150 mm dia. sanitary sewer network which will connect to the existing 250mm dia. sanitary sewer located within Ziegler Street. Refer to LRL drawing C.401 for the proposed sanitary servicing.

The parameters used to calculate the anticipated sanitary flows are; residential average population per unit of 2.7 persons for townhouse units, a residential daily demand of 280 L/p/day, a residential peaking factor of 4.0 and a total infiltration rate of 0.33 L/s/ha. Based on these parameters and the total site area of 0.29 ha, the total wet wastewater flow was calculated as **0.80 L/s**. Refer to ***Appendix C*** for the site sanitary sewer design sheet.

7 STORMWATER MANAGEMENT

7.1 Existing Stormwater Infrastructure

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

In pre-development conditions, the stormwater runoff would flow uncontrolled overland to the towards the Renaud Road right-of-way. There is an existing 750 mm diameter storm sewer within Ziegler Street 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 criteria stated in the ***Gloucester EUC Study****, a*s well as 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 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).

As per the ***Gloucester EUC Study***, the subject property falls within the tributary area of SWM Pond 3, refer to Figure 6 as well as the Drainage Plan extracted from the ***Gloucester EUC Study*** included in ***Appendix D.*** Therefore, it was determined that no further treatment is required for stormwater runoff from the proposed development. Correspondence with RVCA is included in ***Appendix A***.

7.2.2 Water Quantity

Based on ***Gloucester EUC Study***, the following stormwater management requirements were identified for the subject site:

- Meet an allowable release of 85 L/s/ha;
- Attenuate all storms up to and including the City of Ottawa 100-year storm event on site; and

The allowable release rate for the subject site was calculated to be **24.77 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 by utilizing an inlet control device to restrict flows to the allowable release rate. Storage required as a result of quantity control will be accomplished through a combination of surface storage and underground stormwater chambers in the parking lot.

The subject site is proposed to be serviced via a network of 300mm diameter storm sewers that outlet to the existing 750 mm diameter storm sewer within Ziegler street. The proposed site storm sewer and stormwater management system are shown on drawing C.401 and detailed calculations, including the design sheet, can be found in ***Appendix D***.

The existing site is delineated by catchments EWS-01 which currently drains uncontrolled towards the Renaud Road and Ziegler Street right-of-ways.

The site has been analyzed and post development watersheds have been allocated. Watershed WS-01 (0.058 ha), consisting of landscaping and a paved ramp, will flow uncontrolled. The runoff will be conveyed to the Ziegler Street right-of-way, as per the grading plan C301.

Overland flow within watershed WS-02 (0.233 ha) will be captured by catch basins CB02, CB03 and CB05. A Hydrovex 75VHV-1 vertical flow regulator is proposed at mh01 to restrict collected runoff to a specific release rate. Grading proposed will provide positive overland drainage to the proposed storm water collection and control systems.

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

Table 5: ***Drainage Areas***

Drainage Area Name	Area	Weighted Runoff Coefficient	100 Year Weighted Runoff Coefficient (25% increase)
WS-01 (uncontrolled)	0.058	0.50	0.63
WS-02 (controlled)	0.233	0.74	0.92

Table 6 below summarize the release rates and storage volumes required to meet the allowable release rate of **24.77 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-01 (uncontrolled)	0.058	18.15	0	0
WS-02 (controlled)	0.233	6.62	118.35	128.09
TOTAL	**0.291**	**24.77**	**118.35**	**128.09**

It is estimated that **18.15 L/s** of runoff will flow uncontrolled from WS-01 towards the Ziegler Street right-of-way.

Runoff collected in WS-02 will be attenuated on site and discharged at a specific release rate of 6.62 L/s via a Hydrovex 75-VHV-1 flow control unit located at the invert of MH01, refer to ***Appendix D*** for additional info on the flow control unit. Considering a halved controlled release rate (to account for variable design head due to the combination of underground and overland storage), it can be calculated that a total **118.35 m^3** of storage will be required to attenuate flows to the allowable release rate. The project runoff exceeding the allowable release rate will be stored on-site via surface ponding at the parking lot as well as Stormtech underground chambers Model MC-3500 (or approved equivalent). Total proposed surface ponding provides approx. **16.98 m^3** and the proposed underground chambers provide **111.11 m^3** to provide a total storage of **128.09 m^3**, refer to ***Appendix D*** for additional info on Stormtech chambers. The 100-year maximum ponding depths can be found on drawing "C601 – Stormwater Management Plan" of ***Appendix E***.

8 Erosion and Sediment Control

During construction, erosion and sediment controls will be provided primarily via a sediment control fence to be erected along the perimeter of the site where runoff has the potential of leaving

the site. Inlet sediment control devices are also to be provided in any catch basin and/or manholes in and around the site that may be impacted by the site construction. 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 6001/6005 Renaud 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 **16,000 L/min** for Block A and **16,000 L/min** for Block B using the FUS method.
- There are at least seven (8) existing fire hydrants within 150m available to service the proposed developments. They will provide a combined fire flow of **34,066 L/min** to the site.
- The new development/expansion will be serviced with a new 150 mmΦ closed loop watermain network to be connected to the existing 200mmΦ watermain within Ziegler Street.
- Boundary conditions received from the City of Ottawa, considering pipe pressure losses, have indicate that sufficient pressure is available to service the proposed site.

Sanitary Service

- The anticipated sanitary flow from the proposed development is **0.80 L/s.**
- The proposed development will be serviced by a 150 mm diameter sanitary sewer network that connects to the existing 250 mm dia. sanitary sewer within Ziegler Street.

Stormwater Management

- The subject property is serviced by existing SWM Pond 3 as per the ***Gloucester EUC Study***. Hence additional quality control measures are not proposed.
- The storm water release rates from the proposed development will meet the pre-allocated rate of **85 L/s/ha** stated in the ***Gloucester EUC Study***. The target release rate for the site, based on the EUC, was calculated to be **24.77 L/s**. Permitted release rate from the site (considering controlled & uncontrolled catchment areas) was calculated to be **6.62 L/s**.
- Stormwater quantity control objectives will be met through on-site storm water ponding and sub-surface storage in the parking lot.

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.

Kyle Herold

Virginia Johnson, P.Eng

APPENDIX A

Pre-consultation / Correspondance

MEMO

Date: July 16, 2021

To / Destinataire	Steve Belan, Planner
From / Expéditeur	Natasha Baird, Senior Engineer, Infrastructure Approvals
Subject / Objet	**Pre-Application Consultation** **6001 and 6007 Renaud Road** **Proposed Residential Development.**

File No. PC2020-0295

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

1. The Servicing Study Guidelines for Development Applications are available at the following address: http://ottawa.ca/en/development-application-review-process-0/servicing-study-guidelines-development-applications

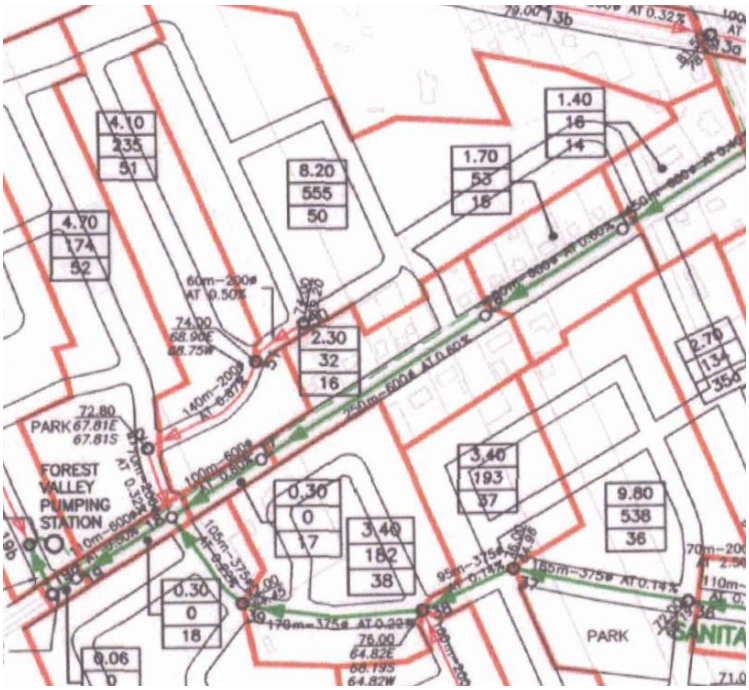
2. Servicing and site works shall be in accordance with the following documents:

   - ⇨ Ottawa Sewer Design Guidelines (October 2012)
   - ⇨ Ottawa Design Guidelines – Water Distribution (2010)
   - ⇨ Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
   - ⇨ City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
   - ⇨ City of Ottawa Environmental Noise Control Guidelines (January, 2016)
   - ⇨ City of Ottawa Park and Pathway Development Manual (2012)
   - ⇨ City of Ottawa Accessibility Design Standards (2012)
   - ⇨ Ottawa Standard Tender Documents (latest version)
   - ⇨ Ontario Provincial Standards for Roads & Public Works (2013)

3. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-2424 x.44455).

4. EUC CDP and Background Studies: The parcels are situated on East Urban Community (EUC) Phase 1 lands, and there is the Phase 1 Community Design Plan (CDP) and associated background studies which accompany this document, such as the 2005 Gloucester EUC Infrastructure Study Update (Stantec) which sets out the infrastructure plan for the CDP area, and the 2004 Geotechnical Considerations: East Urban Community study (Golder), amongst others. Note that a CDP for the Phase 2 lands (bordering Mer Bleue Rd. to the east, Mer Bleue bog to the south, and Renaud Rd. to the North) was finalized in 2013 and the direction of this CDP supersedes the requirements set out in the Phase 1 CDP. These documents are to be consulted accordingly, and the proposed design is to be consistent with these documents.

5. The sanitary servicing criteria is subject to Forest Valley PS and capacity is required. Please refer to the EUC Master Servicing Study from Stantec (dated March 2005).



6. The Stormwater Management Criteria, for the subject site, is to be based on the EUC Master Servicing Study from Stantec (dated March 2005).

7. Servicing: Renaud Road – existing 305mm watermain., existing 1350mm storm sewer, existing 600mm sanitary sewer. There is 30cm reserve at Ziegler Street, where there is existing 205mm watermain, existing 250mm sanitary sewer and 750mm and 825mm storm sewer.

8. Deep Services (Storm, Sanitary & Water Supply)

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

   ii. *Connections to trunk sewers and easement sewers are typically not permitted.*

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

iv. *Provide information on the type of connection permitted*

Sewer connections to be made above the springline of the sewermain as per:

a. Std Dwg S11.1 for flexible main sewers – *connections made using approved tee or wye fittings.*

b. Std Dwg S11 (For rigid main sewers) – *lateral must be less that 50% the diameter of the sewermain,*

c. Std Dwg S11.2 (for rigid main sewers using bell end insert method) – *for larger diameter laterals where manufactured inserts are not available; lateral must be less that 50% the diameter of the sewermain,*

d. Connections to manholes permitted when the connection is to rigid main sewers where the lateral exceeds 50% the diameter of the sewermain. – Connect obvert to obvert with the outlet pipe unless pipes are a similar size.

e. *No submerged outlet connections.*

9. Water Boundary condition requests must include the location of the service and the expected loads required by the proposed development. Please provide the following information:

i. Location of service

ii. Type of development and the amount of fire flow required (as per FUS, 1999).

iii. Average daily demand: ___ l/s.

iv. Maximum daily demand: ___l/s.

v. Maximum hourly daily demand: ___ l/s.

10. MECP ECA Requirements:

An MECP Environmental Compliance Approval (Municipal Sewage Works) will only be required if multiple parcels are proposed for this development. This

application will be under the ToR Program. For your information, I have included the email to the Ottawa District office, but you are not required to contact them.

For residential applications: moeccottawaseage@ontario.ca

11. Phase 1 ESAs and Phase 2 ESAs must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.

12. Provide comments from the conservation authority. It is recommended to consult the office prior to submitting an application. The major overland flow route is susceptible to discharge to the Mud Creek Watershed which is part of the Rideau Valley Conservation Authority. Please contact Jamie Batchelor at the RVCA: https://www.rvca.ca/contact-us. Please refer to the Mud Creek Cumulative Impact Study.

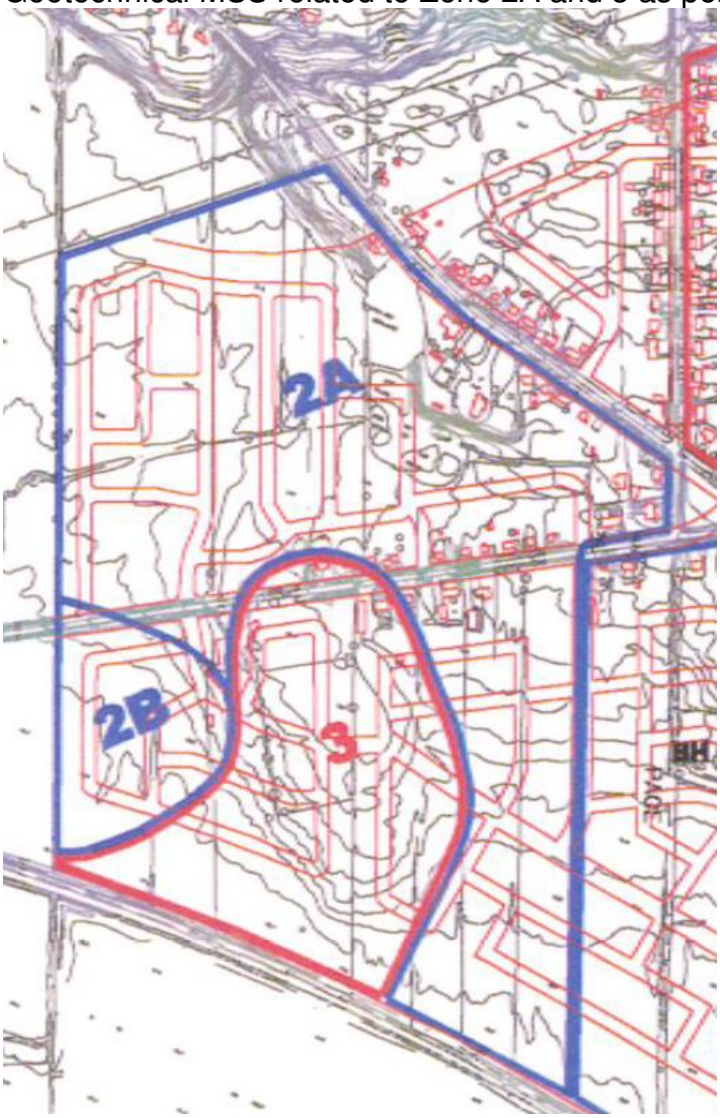
13. Development Charges (DC): The site is subject to an Area Specific DC as it falls within Area E-3 of the Gloucester East Urban Centre Stormwater Facilities By-Law 2019-165. Further information regarding DC calculations, exemptions, indexing of rates can be obtained through Gary Baker, DC Program Coordinator (gary.baker@ottawa.ca).

14. Gloucester EUC Cost Sharing Agreement dated February 2008 between participating Owners: Rivard/Monarch, Richcraft, Minto, DCR Phoenix, Claridge, and Ashcroft: The site is subject to an existing EUC Ownership Cost Sharing Agreement which is administered by a Trustee on behalf of the ownership group. It is recommended that the Applicant contact the Trustee to discuss the terms of the agreement as a Non-Participating Owner (an owner of a land shown on the plans attached in Schedule D of the Agreement, and who is not party to this Agreement). The Trustee is Kris Kilborn at Stantec Consulting Ltd. (kris.kilborn@stantec.com).

15. Geotechnical Considerations: East Urban Community study was completed in 2004 by Golder. The study covers the EUC lands and provided findings with respect to the type of development proposed and landform (topography, and the fact that the area predominantly consists of surficial sand and silty sand over sensitive marine clay soils). These can bring some constraints along with them, specifically:

    a. grade raise restrictions
    b. slope stability (around the drainage features and the escarpment)
    c. relatively high groundwater levels.

Geotechnical MSS related to Zone 2A and 3 as per the MSS:



Zone 2

Zone 2 encompasses the area south and west of Navan Road with the exception of Zone 3 and includes the Escarpment lands. The subsurface condition typically consists of discontinuous deposits of surficial sand and silty sand typically 1.5 to 2.0m in depth overlying sensitive weathered silty clay of 2.0 to 3.0m. Surficial sand and silty sand deposits exceed 3.0m in some areas and are absent in others. The soil conditions in Zone 2 are similar to Zone 1 with varying strengths and a thinner weathered crust. The un-drained shear strength of the un-weathered silty clay is in the order of 20 to 25 kPa suggesting it is compressible. Groundwater levels are shallow, ranging in depth from the ground surface to within 1.0 to 1.5m of the ground surface.

The subsurface conditions within the escarpment are similar, with a thicker crust and deeper groundwater levels reflecting better drainage.

Due to the variability in data, making it difficult to establish grade restrictions for all of Zone 2, it was divided into two parts, Zone 2A and Zone 2B. Within Zone 2A, which includes almost all of Zone 2, a maximum grade raise restriction of 0.5m is acceptable, with no grade raise preferred. Conversely, a maximum grade raise of 2.0m is acceptable in Zone 2B.

Zone 2A is not well suited for development of higher-density structures using conventional spread footings. Even with the grade raise, conventional houses may not be feasible through all of Zone 2A, requiring wider footings or shallower foundations consistent with "high ranch" style homes.

Higher density developments on conventional spread footings are possible in Zone 2B provided grade raises are minimized to allow sufficient remaining capacity to support additional structure loads.

Zone 3

Zone 3 covers a portion of the low-lying areas south of Fourth Line Road and consists of glacial till overlain by a thick deposit of weathered silty clay. There is no practical limit to the grade raise permitted in Zone 3 but, for planning purposes, a reasonable limit of 3m was proposed. The area is well suited for mid-rise and possibly high-rise buildings on conventional spread footings.

Table 1
Feasible Building Structures Supported on Spread Footings within Zones 1, 2, 3 and MUC

Building Structures	Geographical Zones			
	1	2	3	MUC
Up to 2 storey timber frame w or w/o basements and at-grade garage (i.e. conventional suburban housing and/or "high ranch" style homes)		✓ (2A) [1]		
Up to 2 storey timber frame w basements and at-grade garage (i.e. conventional suburban housing)				✓
Up to 3 storey timber frame w or w/o basements (i.e. stacked townhouses)	✓[2]			
Up to 3 storey (possibly 4 storey) timber frame w/o basements (i.e. townhouses or apartment buildings)				✓
Up to 3 storey timber frame w basements, w/o at grade garages or w garage in basement (i.e. stacked townhouses with depressed driveways)				✓
Up to 3 storey (possibly 4 storey) timber frame w concrete framed ground floor and basement level parking garages				✓
Higher density type developments		✓ (2B)	✓	

Note:
[1] Lack of good quality geotechnical information within the area and consequently guideline may be too conservative. Type of housing (conventional suburban versus "high ranch" style homes) depends on the servicing feasibility given the 0-0.5m grade raise restriction.
[2] Up to 3 storey timber framed w or w/o basements (i.e. stacked townhouses) may only be semi-feasible if supported on spread footings.

Given the grade raise and the building restrictions, please contact a geotechnical engineer to determine what possible development can occur based on the discussion in the MSS report. Further geotechnical investigation will be required to clarify the possible types of development.

Should you have any questions or require additional information, please contact me directly at (613) 580-2424, ext. 27995 or by email at Natasha.baird@ottawa.ca.

APPENDIX B

Water Supply Calculations

Water Supply Calculations

LRL File No.	210216-02
Date	June 9, 2023
Prepared by	K. Herold
Project Location	6001/6005 Renaud

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	20	54.0
	Total	**20**	**54.0**

Average Water Consumption Rate	280	L/c/d		
Average Day Demand	**15,120**	**L/d**	**0.18**	**L/s**
Maximum Day Factor	7.5		(MOE Table 3-3)	
Maximum Daily Demand	**112,697**	**L/d**	**1.30**	**L/s**
Peak Hour Factor	11.2		(MOE Table 3-3)	
Maximum Hour Demand	**1,263,509**	**L/d**	**14.62**	**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) =	$(4Q/\pi V)^{1/2}$		
=	0.102	m	
=	102	mm	
Proposed pipe diameter (d) =	**150**	mm	
=	**6**	Inches	

Fire Flow Calculations
6001 / 6005 Renaud - Block A

LRL File No.	210216-02
Date	June 9, 2023
Method	Fire Underwriters Survey (FUS)
Prepared by	K. Herold

Step	Task	Term	Options	Multiplier	Choose:	Value	Unit	Fire Flow
Structural Framing Material								
1	Choose frame used for building	Coefficient C related to the type of construction	Wood Frame	1.5	Wood Frame	**1.5**		
			Ordinary Construction	1.0				
			Non-combustible construction	0.8				
			Fire resistive construction <2 hrs	0.7				
			Fire resistive construction >2 hrs	0.6				
Floor Space Area (A)								
2	Total area (building area of 360m2, 4 stories)					**1,440**	m^2	
3	Obtain fire flow before reductions	Required fire flow	Fire Flow = 220 x C x $A^{0.5}$				L/min	**12,523**
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	**10,644**
			Limited combustible	-15%				
			Combustible	0%				
			Free burning	15%				
			Rapid burning	25%				
5	Choose reduction for sprinklers	Sprinkler reduction	Full automatic sprinklers	-30%	False	**0%**	L/min	**10,644**
			Water supply is standard for both the system and fire department hose lines	-10%	False	**0%**		
			Fully supervised system	-10%	False	**0%**		
6	Choose separation	Exposure distance between units	North side	20.1 to 30m	10%		L/min	**15,966**
			East side	3.1 to 10m	20%			
			South side	>45m	0%			
			West side	3.1 to 10m	20%	**50%**		
Net required fire flow								
7	Obtain fire flow, duration, and volume	Minimum required fire flow rate (rounded to nearest 1000)					L/min	**16,000**
		Minimum required fire flow rate					L/s	**266.7**
		Required duration of fire flow					hr	**4.25**

Fire Flow Calculations
6001 / 6005 Renaud - Block B

LRL File No.	210216-02
Date	June 9, 2023
Method	Fire Underwriters Survey (FUS)
Prepared by	K. Herold

Step	Task	Term	Options	Multiplier	Choose:	Value	Unit	Fire Flow
Structural Framing Material								
1	Choose frame used for building	Coefficient C related to the type of construction	Wood Frame	1.5	Wood Frame	**1.5**		
			Ordinary Construction	1.0				
			Non-combustible construction	0.8				
			Fire resistive construction <2 hrs	0.7				
			Fire resistive construction >2 hrs	0.6				
Floor Space Area (A)								
2	Total area (building area of 360m2, 4 stories)					**1,440**	m^2	
3	Obtain fire flow before reductions	Required fire flow	Fire Flow = 220 x C x $A^{0.5}$				L/min	**12,523**
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	**10,644**
			Limited combustible	-15%				
			Combustible	0%				
			Free burning	15%				
			Rapid burning	25%				
5	Choose reduction for sprinklers	Sprinkler reduction	Full automatic sprinklers	-30%	False	**0%**	L/min	**10,644**
			Water supply is standard for both the system and fire department hose lines	-10%	False	**0%**		
			Fully supervised system	-10%	False	**0%**		
6	Choose separation	Exposure distance between units	North side	20.1 to 30m	10%		L/min	**15,966**
			East side	3.1 to 10m	20%			
			South side	>45m	0%			
			West side	3.1 to 10m	20%	**50%**		
Net required fire flow								
7	Obtain fire flow, duration, and volume	Minimum required fire flow rate (rounded to nearest 1000)					L/min	**16,000**
		Minimum required fire flow rate					L/s	**266.7**
		Required duration of fire flow					hr	**4.25**

Pipe Pressure Losses Calculations

LRL File No. 210216-02
Project Navan Stacked Townhomes
Location: 6001/6005 Renaud Road
Date June 9, 2023
Designed: K. Herold

Piezometric Head Equation (Derived from Bernoulli's Equation)

$$h = \frac{p}{\gamma} + z$$

Where:

h = HGL (m)
p = Pressure (Pa)
γ = Specific weight (N/m3) = 9810
z = Elevation of centreline of pipe (m) = 73.6

Water Pressure on Huron Street			
HGL (m)		Pressure	
		kPa	psi
Minimum =	126.7	520.91	75.55
Maximum =	130.7	560.15	81.24
Max. Day + Fire =	115.5	411.04	59.62

Hazen Williams Equation

$$h_f = \frac{10.67 \times Q^{1.85} \times L}{C^{1.85} \times d^{4.87}}$$

Where:

h_f = Head loss over the length of pipe (m)
Q = Volumetric flow rate (m^3/s)
L = Length of pipe (m)
C = Pipe roughness coefficient
d = Pipe diameter (m)

Scenario 1: maximum daily demand

Q (L/s)	1.30
C	150
L (m.)	121.5

I.D. (mm)	150	
V (m/s)	0.07	
h_f (m)	0.01	
Head Loss (psi)	0.01	
Min. Pressure (psi)	75.54	
Max. Pressure (psi)	81.23	
Service Obv. @ Street Connection (m)	70.86	
Service Obv. @ Building Connection (m)	72.50	
Pressure Adjustment (psi)	-2.33	(due to service elevation difference from street to buildir
Adjusted Min. Pressure (psi)	73.21	(must not be less than 50psi)
Adjusted Max. Pressure (psi)	78.90	(must not be more than 80psi)

Scenario 2: maximum hourly demand

Q (L/s)	14.62	
C	150	
L (m.)	121.5	
I.D. (mm)	150	
V (m/s)	0.83	
h_f (m)	0.51	
Head Loss (psi)	0.72	
Min. Pressure (psi)	74.83	
Max. Pressure (psi)	80.52	
Service Obv. @ Street Connection (m)	70.86	
Service Obv. @ Building Connection (m)	72.50	
Pressure Adjustment (psi)	-2.33	(due to service elevation difference from street to buildir
Adjusted Min. Pressure (psi)	72.50	(must not be less than 40psi)
Adjusted Max. Pressure (psi)	78.19	(must not be more than 80psi)

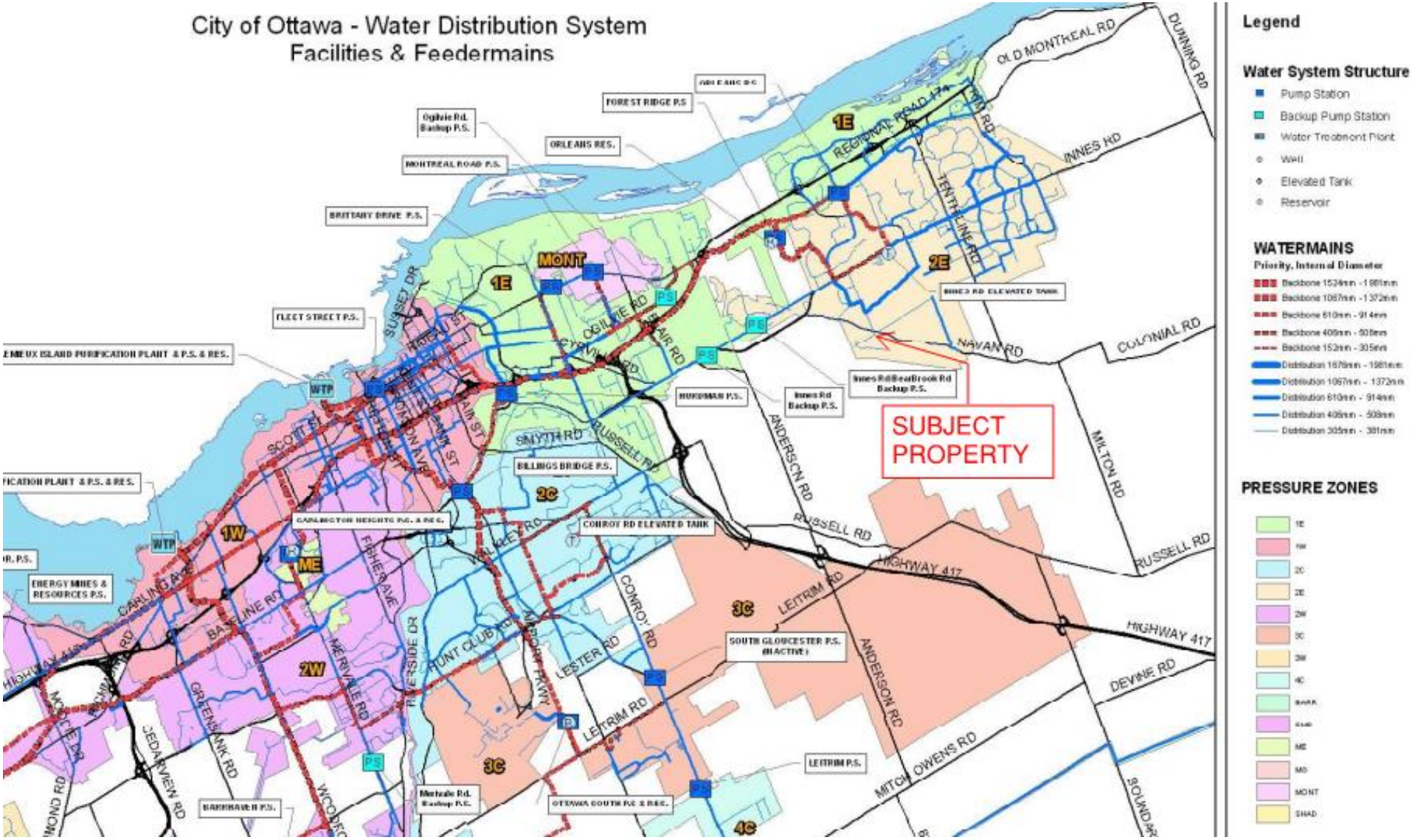
City of Ottawa Boundary Conditions (Multi-Hydrant Analysis)

	Quantity	Max Capacity (L/min)*	Available Fire Flow** (L/min)
Fire Hydrant(s) Within 76m	2	5678	11356
Fire Hydrant(s) Within 76m to 152m	6	3785	22710
Fire Hydrant(s) Within 152m to 305m		2839	0
Available Combined Fire Flow (L/min)			34066
Max Day + Fire Flow Demand (L/min)			16000

*as per Table 18.5.4.3. of ISTB-2018-02

**assumed class AA hydrants

***flow provided from all hydrants within 76m is more than adaquate to accomcodate fire flow requirements, balance of hydrants within 152m and 305m not considered in design


City of Ottawa - Water Distribution System
Facilities & Feedermains
SUBJECT PROPERTY
Legend
Water System Structure
Pump Station
Backup Pump Station
Water Treatment Plant
Well
Elevated Tank
Reservoir
WATERMAINS
Priority, Internal Diameter
PRESSURE ZONES
1E
1W
2C
2E
2W
3C
3E
4C
ME
MD
MONT
SHAD
FOREST RIDGE P.S
Ogilvie Rd. Backup P.S.
ORLEANS RES.
MONTREAL ROAD P.S.
BRITTANY DRIVE P.S.
FLEET STREET P.S.
WTP
BILLINGS BRIDGE P.S.
CONROY RD ELEVATED TANK
SOUTH GLOUCESTER P.S. (INACTIVE)
LEITRIM P.S.
BARRHAVEN P.S.
Innes Rd Backup P.S.
Innes Rd/BearBrook Rd Backup P.S.
OLD MONTREAL RD
DUNNING RD
REGIONAL ROAD 174
INNES RD
TENTH LINE RD
NAVAN RD
COLONIAL RD
MILTON RD
RUSSELL RD
ANDERSON RD
LEITRIM RD
HIGHWAY 417
DEVINE RD
MITCH OWENS RD
CONROY RD
LESTER RD
HUNT CLUB RD
MERIVALE RD
RIVERSIDE DR
GREENBANK RD
JEDBURGH RD
BASELINE RD
CARLING AVE
FISHER AVE
SCOTT ST
SMYTH RD
WALKLEY RD
OGILVIE RD
MONTREAL RD
SUSSEX DR

Boundary Conditions
6001-6005 Renaud Road

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	11	0.18
Maximum Daily Demand	78	1.30
Peak Hour	877	14.62
Fire Flow Demand #1	16,002	266.70

Location

Results

Connection 1 – Ziegler St.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.7	81.2
Peak Hour	126.7	75.5
Max Day plus Fire Flow	115.5	59.5

[1] Ground Elevation = 73.6 m

Notes

1. As per the Ontario Building Code in areas that may be occupied, the static pressure at any fixture shall not exceed 552 kPa (80 psi.) Pressure control measures to be considered are as follows, in order of preference:

a. If possible, systems to be designed to residual pressures of 345 to 552 kPa (50 to 80 psi) in all occupied areas outside of the public right-of-way without special pressure control equipment.
b. Pressure reducing valves to be installed immediately downstream of the isolation valve in the home/ building, located downstream of the meter so it is owner maintained.

Disclaimer

The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

FIRE HYDRANT LOCATIONS FIGURE

Table 18.5.4.3 Maximum Fire Hydrant Fire Flow Capacity

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

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

APPENDIX C

Wastewater Collection Calculations
Supporting Documents

LRL File No. 210216-02
Project: Residential Development (20 Stacked TH)
Location: 6001/6005 Renaud Rd
Date: June 9, 2023

Sanitary Design Parameters

Average Daily Flow = 280 L/p/day
Commercial & Institutional Flow = 50000 L/ha/day
Light Industrial Flow = 35000 L/ha/day
Heavy Industrial Flow = 55000 L/ha/day
Maximum Residential Peak Factor = 4.0
Commercial & Institutional Peak Factor = 1.5
Industrial Peak Factor = as per Appendix 4-B = 7
Extraneous Flow = 0.33L/s/gross ha

Pipe Design Parameters

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

LOCATION			RESIDENTIAL AREA AND POPULATION						COMMERCIAL		INDUSTRIAL			INSTITUTIONAL		C+I+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)
SITE	MH3	MH2	0.291	54.0	0.29	54.0	4.0	0.70	0.000	0.000	0.00	0.00	7.0	0.0	0.0	0.00	0.291	0.291	0.10	0.80	66.9	150	1.50%	PVC	18.65	1.06
SITE	MH2	MH1						0.70									0.291	0.291	0.10	0.80	24.6	150	1.50%	PVC	18.65	1.06
SITE	MH1	SAN SWR						0.70									0.291	0.291	0.10	0.80	23.7	150	1.50%	PVC	18.65	1.06

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

Designed: K.H.	PROJECT: Navan Stacked Townhomes		
Checked: V.J.	LOCATION: 6001/6005 Renaud Rd		
Dwg. Reference: C401	File Ref.: 210216-02	Date: June 9 2023	Sheet No. 1 of 1

SANITARY SEWER CALCULATION SHEET

LOCATION		RESIDENTIAL AREA AND POPULATION						COMM		INDUST			INST		C+I+I	PEAK FLOW				PIPE												
FROM M.H.	TO M H	AREA (ha)	POP	CUMULATIVE AREA (ha)	CUMULATIVE POP	PEAK FACT	PEAK FLOW (L/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FACTOR (per MOE)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (L/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INF&T. FLOW (L/s)	TOTAL FLOW (L/s)	LENGTH (m)	DIAMETER NOM (mm)	DIAMETER ACT (mm)	SLOPE (%)	CAP. (FULL) (L/s)	Q/Qcap (%)	VEL (FULL) (m/s)	Upstream OG (m)	Downstream OG (m)	Upstream Invert (m)	Upstream Obvert (m)	Downstream Invert (m)	Downstream Obvert (m)	Drop Structure (m)	US Frost Depth (m)	DS Frost Depth (m)
1	2	3.75	56	3.75	56	4.00	0.91		0.00		0.00			0.00	0.00	3.75	3.25	0.91	1.82	250	200	203.2	0.32	19.35	9.4%	0.60	88.25	88.00	84.83	85.03	84.03	84.23		3.22	3.77
2	3	5.20	181	8.45	237	4.00	3.84		0.00		0.00			0.00	0.00	5.20	8.45	2.37	8.21	320	200	203.2	0.32	19.35	42.1%	0.60	88.00	87.80	84.03	84.23	83.00	83.21		3.77	4.36
3	4	19.75	995	28.20	1232	3.74	18.66		0.00		0.00			0.00	0.00	19.75	28.20	7.90	26.56	320	250	254.0	0.24	30.39	87.4%	0.60	87.60	87.50	82.95	83.21	82.18	82.44		4.39	5.06
4A	4	19.80	979	19.80	979	3.81	15.10		0.00		0.00			0.00	0.00	19.80	19.80	6.54	20.64	368	250	254.0	0.24	30.39	67.9%	0.60	88.00	87.50	83.83	84.08	82.95	83.20		3.92	4.30
4	5	7.10	185	55.10	2396	3.52	34.19		0.00		0.00		3.10	3.10	2.69	10.20	58.20	16.30	53.18	310	375	381.0	0.14	58.43	77.7%	0.60	87.50	87.50	82.06	82.44	81.62	82.00		5.06	5.60
5A	5	7.90	362	7.90	362	4.00	5.87		0.00		0.00			0.00	0.00	7.90	7.90	2.21	8.08	320	200	203.2	0.65	27.58	29.3%	0.85	87.40	87.60	84.05	84.25	81.07	82.17		3.15	5.43
5	6	2.40	170	65.40	2928	3.45	40.94		0.00		0.00			3.10	2.69	2.40	68.50	19.18	62.81	295	375	381.0	0.14	58.43	91.8%	0.60	87.50	87.50	81.62	82.00	81.21	81.59		5.80	5.91
6	7	15.90	787	81.30	3715	3.36	50.60		0.00		0.00			3.10	2.69	15.90	84.40	23.63	76.82	115	450	457.2	0.11	98.64	78.0%	0.60	87.50	87.50	81.13	81.59	81.01	81.46		5.91	6.04
7	8	6.80	353	88.10	4068	3.33	54.83		0.00		0.00			3.10	2.69	6.80	91.20	25.54	83.03	235	450	457.2	0.11	98.64	84.2%	0.60	87.50	86.90	81.01	81.46	80.75	81.21		6.04	5.69
8A	8	11.85	826	11.85	826	3.85	12.89		0.00		0.00			0.00	0.00	11.85	11.85	3.32	16.21	150	200	203.2	0.50	24.19	67.0%	0.75	86.50	86.90	81.45	81.65	80.70	80.80		4.85	6.00
8	9	2.60	128	102.55	5022	3.24	65.98		0.00		0.00		2.20	5.30	4.60	4.80	107.85	30.20	100.78	170	525	533.4	0.10	141.87	71.0%	0.63	86.90	87.00	80.37	80.90	80.20	80.73		6.00	6.27
9A	9	5.45	300	5.45	300	4.00	4.86		0.00		0.00			0.00	0.00	5.45	5.45	1.53	6.38	85	200	203.2	0.32	19.35	33.0%	0.60	87.00	87.00	81.42	81.62	81.14	81.35		5.38	5.65
9	10	2.70	0	110.70	5322	3.22	69.42		0.00		0.00			5.30	4.60	2.70	116.00	32.48	106.50	275	525	533.4	0.10	141.87	75.1%	0.63	87.00	87.00	80.20	80.73	79.92	80.46		6.27	6.58
10A	10	14.80	731	14.80	731	3.88	11.50		0.00		0.00		0.60	0.60	0.52	15.40	15.40	4.31	16.34	270	200	203.2	0.32	19.35	84.4%	0.60	87.50	87.00	83.56	83.76	82.69	82.90		3.74	4.10
10	11	4.30	117	129.80	6170	3.18	78.96		0.00		0.00		2.40	8.30	7.20	6.70	138.10	38.67	124.84	405	525	533.4	0.10	141.87	88.0%	0.63	87.00	85.50	79.92	80.46	79.52	80.05		6.58	5.45
11A	11	8.00	393	8.00	393	4.00	0.36		0.00		0.00			0.00	0.00	8.00	8.00	2.24	8.60	95	200	203.2	0.32	19.35	44.4%	0.60	85.00	85.50	80.42	80.62	80.11	80.32		5.38	5.18
11B	11	5.90	352	5.90	352	4.00	5.70		0.00		0.00			0.00	0.00	5.90	5.90	1.65	7.36	90	200	203.2	0.32	19.35	38.0%	0.60	86.00	85.50	81.69	81.89	81.40	81.60		4.11	3.90
11	12	1.90	16	145.60	6931	3.11	87.34		0.00		0.00			8.30	7.20	1.90	153.90	43.09	137.63	230	600	609.6	0.100	202.55	68.0%	0.69	85.50	83.90	78.44	80.06	79.21	79.82		5.45	4.08
25D	25C	7.40	48	7.40	48	4.00	0.78		0.00		0.00			0.00	0.00	7.40	7.40	2.07	2.85	420	200	203.2	0.32	19.35	14.7%	0.80	86.30	86.00	83.02	83.22	81.67	81.88		3.08	4.12
LOCAL PS 2	25C	4.55	22	4.55	22	4.00	0.36		0.00		0.00			0.00	0.00	4.55	4.55	1.27	1.64	300		0.0		0.00	#DIV/0!	#DIV/0!	82.00	86.00		79.50		[illegible]		2.50	2.70
25G	25E	7.40	496	7.40	496	3.98	7.99		0.00		0.00			0.00	0.00	7.40	7.40	2.07	10.06	230	200	203.2	0.32	19.35	52.0%	0.60	81.50	81.00	78.80	79.00	78.06	78.26		2.50	2.74
25F	25E	4.60	272	4.60	272	4.00	4.41		0.00		0.00			0.00	0.00	4.60	4.60	1.29	5.70	120	200	203.2	2.60	54.10	10.5%	1.67	84.00	81.00	81.30	81.50	78.30	78.50		2.50	2.50
25E	LOCAL PS 1	0.00	0	12.00	768	3.87	12.04		0.00		0.00			0.00	0.00	0.00	12.00	3.36	15.40	70	200	203.2	0.32	19.35	79.6%	0.60	81.00	81.00	78.06	78.26	77.84	78.04		2.74	2.56
LOCAL PS 1	25C	0.00	0	12.00	768	3.87	12.04		0.00		0.00			0.00	0.00	0.00	12.00	3.36	15.40	340		0.0		0.00	#DIV/0!	#DIV/0!	81.00	86.00		78.50		83.50		2.50	2.50
25C	25B	7.00	51	30.95	890	3.83	13.81		0.00		0.00			0.00	0.00	7.00	30.95	8.67	22.48	450	300	304.8	0.19	43.97	51.1%	0.60	86.00	85.50	81.57	81.88	80.70	81.00		4.12	5.50
25B	25A	11.80	337	42.75	1226	3.74	18.59		0.00		0.00			0.00	0.00	11.80	42.75	11.97	30.56	295	375	381.0	0.14	68.43	44.7%	0.60	85.50	86.50	80.62	81.00	80.21	80.59		5.50	5.91
25A	25	17.00	845	59.75	2071	3.67	29.99		0.00		0.00			0.00	0.00	17.00	59.75	16.73	46.72	405	375	381.0	0.14	68.43	68.3%	0.60	86.50	86.50	80.21	80.59	79.64	80.02		5.91	6.48
20	21	8.75	506	8.75	506	3.97	8.13		0.00		0.00		2.55	2.55	2.21	11.30	11.30	3.16	13.51	320	200	203.2	0.32	19.35	69.8%	0.60	87.00	86.80	83.91	84.11	82.88	83.09		2.69	3.71
21	22	7.00	160	15.75	666	3.91	10.53		0.00	1.00	1.00	6.50	8.30	10.85	12.05	16.30	27.60	7.73	30.31	335	300	304.8	0.19	43.97	68.9%	0.60	86.80	87.00	82.78	83.09	82.14	82.45		3.71	4.55
22	23	7.30	440	23.05	1106	3.77	15.89		0.00		1.00	6.50		10.85	12.05	7.30	34.90	9.77	38.71	275	300	304.8	0.19	43.97	88.0%	0.60	87.00	86.50	82.14	82.45	81.62	81.93		4.55	4.57
23B	23A	15.70	565	15.70	565	3.95	9.03		0.00		0.00			0.00	0.00	15.70	15.70	4.40	19.43	325	250	254.0	0.45	41.38	32.4%	0.82	86.80	86.00	82.52	82.77	81.07	81.32		4.03	4.68
23A	23	9.40	584	25.10	1149	3.76	17.50		0.00		0.00			0.00	0.00	9.40	25.10	7.03	24.53	310	300	304.8	0.19	43.97	55.8%	0.69	86.50	86.50	81.02	81.32	80.43	80.73		4.68	5.77
23	24	2.80	120	50.75	2374	3.53	33.92		0.00		1.00	6.50	3.30	14.15	14.92	5.90	65.90	18.45	57.29	315	375	381.0	0.22	65.79	78.4%	0.75	86.50	86.50	80.35	80.73	79.66	80.04		5.77	6.46
24A	24	25.10	544	25.10	544	3.96	8.72		0.00		0.00			0.00	0.00	25.10	25.10	7.03	15.74	235	200	203.2	0.32	19.35	81.3%	0.60	86.00	86.50	83.00	83.20	82.24	82.45		2.80	4.05
24	26	0.80	0	76.65	2918	3.45	40.82		0.00		1.00	6.50		14.15	14.92	0.80	91.80	25.70	81.44	235	450	457.2	0.11	98.64	82.6%	0.60	86.50	86.50	79.58	80.04	79.33	79.78		6.46	6.72
LANDFILL PS	25	0.00	0	0.00	0	4.00	0.00		0.00	10.40	10.40	4.20		0.00	17.69	10.40	10.40	2.91		120		0.0		0.00	#VALUE!	#DIV/0!	80.00	86.50	77.50	77.50		84.00		2.50	2.50
25	26	8.30	79	144.70	5089	3.24	66.75		0.00		11.40	4.15		14.15	31.45	8.30	170.25	47.67	145.87	380	600	609.6	0.10	202.55	72.0%	0.69	86.50	86.50	79.17	79.78	78.79	79.40		6.72	7.10
26A	26	6.90	360	6.90	360	4.00	6.83		0.00		0.00		1.30	1.30	1.13	8.20	8.20	2.30	9.26	175	200	203.2	0.32	19.35	47.8%	0.60	86.00	86.50	81.00	81.20	80.44	80.64		4.80	5.86
26	12	2.80	6	154.40	5455	3.21	70.93		0.00		11.40	4.15		16.45	32.58	2.80	181.25	50.75	154.26	720	600	609.6	0.10	202.55	76.2%	0.69	86.50	83.90	78.79	79.40	78.07	78.68		7.10	5.22
12	13	0.60	32	300.60	12418	2.86	143.91	0.90	0.90		11.40	4.15		23.75	40.56	1.50	336.65	94.20	278.74	60	600	609.6	0.30	350.83	79.5%	1.20	83.90	82.50	78.07	78.68	77.69	78.50		5.22	4.00
13C	13	5.60	353	5.60	353	4.00	5.71		0.00		0.00			0.00	0.00	5.60	5.60	1.57	7.28	160	200	203.2	0.66	27.79	26.2%	0.86	83.50	82.50	80.80	81.00	79.61	80.01		2.50	2.49
13B	13A	10.50	314	10.50	314	4.00	6.09		0.00		0.00			0.00	0.00	10.50	10.50	2.94	8.03	160	200	203.2	0.32	19.35	41.5%	0.60	81.50	81.50	78.80	79.00	78.28	78.49		2.50	3.01
13A	13	6.60	90	17.10	404	4.00	6.54		0.00		0.00			0.00	0.00	6.60	17.10	4.79	11.33	100	200	203.2	0.32	19.35	58.5%	0.60	81.50	82.50	78.28	78.49	77.96	78.17		3.01	4.33
13	14	0.26	0	323.56	13175	2.83	151.30	0.54	1.44		11.40	4.15		23.75	41.03	0.80	360.15	100.84	293.17	100	600	609.6	0.40	405.10	72.4%	1.39	82.50	80.80	76.91	77.52	76.51	77.12	0.65	4.98	3.68
14	15	1.40	18	324.96	13191	2.83	151.46		1.44		11.40	4.15		23.75	41.03	1.40	361.55	101.23	293.72	150	600	609.6	0.40	405.10	72.5%	1.39	80.80	78.40	75.88	76.47	75.26	75.87	0.65	4.33	2.53
15	16	1.70	63	326.66	13244	2.83	151.97		1.44		11.40	4.15		23.75	41.03	1.70	363.25	101.71	294.71	150	600	609.6	0.60	496.14	59.4%	1.70	78.40	77.00	74.76	75.37	73.86	74.47	0.50	3.03	2.53
16	17	2.30	32	328.96	13276	2.83	152.78		1.44		11.40	4.15		23.75	41.03	2.30	365.55	102.35	293.67	250	600	609.6	0.60	496.14	59.6%	1.70	77.00	73.00	73.66	74.47	72.96	73.67		3.53	3.03
17	18	0.30	0	329.26	13276	2.83	152.28		1.44		11.40	4.15		23.75	41.03	0.30	365.85	102.44	293.75	100	600	609.6	0.80	572.90	51.6%	1.96	76.00	73.00	70.66	71.27	69.86	70.47	1.70	4.73	2.53
30	31	4.80	252	4.80	252	4.00	4.06		0.00		0.00			0.00	0.00	4.80	4.80	1.34	8.43	150	200	203.2	2.50	64.10	10.0%	1.67	83.60	79.00	80.26	80.46	78.51	78.71		3.04	2.29
31	32	1.40	34	6.20	286	4.00	4.63	1.30	1.30					0.00	1.13	2.70	7.50	2.10	7.86	205	200	203.2	3.90	87.57	11.6%	2.06	79.00	71.00	76.30	76.50	68.30	68.51	0.21	2.50	2.50
32A	32	5.50	336	5.50	336	4.00	5.44		0.00		0.00			0.00	0.00	5.50	5.50	1.54	6.98	80	300	304.8	0.19	43.97	15.9%	0.60	70.50	71.00	66.24	66.54	66.08	66.39		3.96	4.61
32	33	4.05	38	15.75	659	3.91	10.44		1.30		0.00			0.00	1.13	4.05	17.05	4.77	16.35	160	300	304.8	0.19	43.97	37.2%	0.60	71.00	70.80	66.08	66.39	65.78	66.08		4.61	4.72
33A	33	4.00	252	4.00	252	4.00	4.06		0.00		0.00			0.00	0.00	4.00	4.00	1.12	5.20	85	200	203.2	0.32	19.35	26.9%	0.60	70.50	70.80	66.07	66.37	65.79	66.00		4.23	4.80
33	34	0.90	42	20.65	953	3.81	14.73		1.30		0.00		2.80	2.80	3.56	3.70	24.75	6.93	25.22	165	300	304.8	0.19	43.97	57.3%	0.60	70.80	70.50	65.69	66.00	65.34	65.55		4.80	4.85
34A	34	3.70	176	3.70	176	4.00	2.86		0.00		0.00			0.00	0.00	3.70	3.70	1.04	3.89	80	200	203.2	2.00	48.36	8.0%	1.49	71.50	70.50	68.80	69.00	67.20	67.40		2.50	3.10
34	35	3.80	227	28.15	1357	3.71	20.39		1.30		0.00			2.80	3.56	3.80	32.25	9.03	32.98	160	300	304.8	0.19	43.97	75.0%	0.60	70.50	71.00	65.34	65.65	65.04	65.34		4.65	5.66
35C	35B	7.30	445	7.30	445	4.00	7.21		0.00		0.00			0.00	0.00	7.30	7.30	2.04	9.26	160	200	203.2	1.90	47.16	19.6%	1.45	75.00	72.00	72.30	72.50	69.26	69.46		2.50	2.54
35B	35A	0.90	50	8.20	495	3.98	7.98		0.00		0.00			0.00	0.00	0.90	8.20	2.31	10.30	85	200	203.2	0.32	19.35	53.2%	0.60	72.00	72.00	69.26	69.46	68.88	69.19		2.54	2.81
35A	35	2.70	134	10.90	629	3.92	10.01		0.00		0.00			0.00	0.00	2.70	10.90	3.07	13.07	70	200	203.2	2.50	54.10	24.2%	1.67	72.00	71.00	67.99	68.20	66.24	66.45	0.99	3.80	4.55
35	36	0.73	42	39.84	2029	3.58	29.43		1.30		0.00			2.80	3.56	0.73	43.94	12.30	45.29	110	375	381.0	0.14	68.43	66.2%	0.60	71.00	72.00	64.96	65.34	64.81	65.19		5.96	6.81
36	37	9.80	538	49.64	2566	3.50	36.38		1.30		0.00			2.80	3.56	9.80	53.74	15.05	54.98	165	375	381.0	0.14	68.43	80.3%	0.60	72.00	76.00	64.81	65.19	64.58	64.96		6.81	11.04
37	38	3.40	193	53.04	2759	3.47	38.82		1.30		0.00			2.80	3.56	3.40	57.14	16.00	58.38	95	375	381.0	0.14	68.43	85.3%	0.60	76.00	76.00	64.58	64.96	64.44	64.82		11.04	11.19

N

- SANITARY SEWER AND MANHOLE (12a)
- SANITARY TRUNK SEWER AND MANHOLE (12)
- SANITARY FORCEMAIN
- SANITARY CATCHMENT AREA
- ORIGINAL GROUND / OBVERT (71.90 / 67.33)
- AREA (ha) / POPULATION / MANHOLE No. (3.25 / 56 / 2)
- AREA (ha) / POPULATION / MANHOLE No. / INST (INSTUTIONAL) ha / IND (INDUSTRIAL) ha / COM (COMMERCIAL) ha (3.25 / 56 / 2 / 3.2 INST)
- * EQUIVALENT AREA (17.7 l/s ALLOWABLE PEAK FLOW UNDER C of O SEWER USE AGREEMENT)

HYDRO CORRIDOR
PROPOSED TRANSITWAY
PROPOSED BLACKBURN BY-PASS EXTENSION
MER BLEUE ROAD
FOURTH LINE ROAD
PAGE ROAD
NAVAN ROAD
WALL ROAD
SAPHIR AVE.
GRAND PRE
ABANDONED C.P.R. RIGHT OF WAY
SUBJECT PROPERTY
SANITARY TRUNK No.1
SANITARY TRUNK No.2
SANITARY TRUNK No.3
SANITARY TRUNK No.4
SCHOOL
PARK
INSTIT.
INSTITUTIONAL
COMMERCIAL
ESCARPMENT
FIRE HALL
WSI LANDFILL
FOREST VALLEY PUMPING STATION
LOCAL PUMP STA. No.1
LOCAL PUMP STA. No.2

REVISION No.2 MARCH, 2005

CITY OF OTTAWA
GLOUCESTER EUC INFRASTRUCTURE SERVICING STUDY UPDATE

SANITARY SEWER SYSTEM

Scale: 0 40 120 200m
Dwg. No.: SAN
Dwn By: E.C.
Date: 04.10.29
Revision: 2

APPENDIX D

Stormwater Management Calculations
Supporting Documents
Hydrovex ICD
Stormtech Chaber Details

LRL Associates Ltd.
Storm Watershed Summary

LRL File No.	210216-02
Project:	Stacked Townhouses
Location:	6001/6005 RENAUD
Date:	June 9, 2023
Designed:	K. Herold
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	2273.0	0.0	641.4	2914.4	0.291	0.35
TOTAL	**2273.0**	**0.0**	**641.4**	**2914.4**	**0.291**	**0.35**

Post-Development Catchments

WATERSHED	C = 0.20	C = 0.80	C = 0.90	Total Area (m^2)	Total Area (ha)	Combined C
WS-01 (UNCONTROLLED)	275.6	0.0	154.8	430.4	0.043	0.45
WS-02 (UNCONTROLLED)	54.5	0.0	96.9	151.4	0.015	0.65
WS-03 (CONTROLLED)	549.0	0.0	1783.6	2332.6	0.233	0.74
TOTAL	**879.1**	**0.0**	**2035.3**	**2914.4**	**0.291**	**0.66**

LRL File No. 200817
Project: 6001/6005 RENAUD
Location: Hwy 17 at Old Hwy 17, Rockland
Date: April 13, 2021
Designed: Amr Salem
Drawing Ref.: C.601

Stormwater Management
100-Year 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

Total Area = 0.291 ha

Allowable Release Rate= 24.77 L/s **Per pre-allocated release rate of 85L/s/ha as per EUC Master Servicing Study (Stantec 2005)*

Post-development Stormwater Management

					$\sum R_{65}$	$\sum R_{100}$
Controlled	Total Site Area =	0.291	ha	$\sum R_C$	0.69	0.86
	WS-03	0.233	ha	R_C	0.74	0.92
	Total Controlled =	0.233	ha	$\sum R_C$	0.74	0.92
Un-controlled	WS-01, 02	0.058	ha	R_C	0.50	0.63
	Total Un-Controlled =	0.058	ha	$\sum R_C$	0.50	0.63

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

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	18.15	0.00	18.15

Post-development Stormwater Management (WS-02)

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	106.42	59.88	6.62	0.00	6.62
15	142.9	85.16	70.69	6.62	0.00	6.62
20	120.0	71.49	77.84	6.62	0.00	6.62
25	103.8	61.89	82.91	6.62	0.00	6.62
30	91.9	54.75	85.64	6.62	0.00	6.62
40	75.1	44.78	91.60	6.62	0.00	6.62
50	64.0	38.12	94.49	6.62	0.00	6.62
60	55.9	33.31	96.09	6.62	0.00	6.62
75	47.3	28.16	96.94	6.62	0.00	6.62
90	41.1	24.50	96.56	6.62	0.00	6.62
105	36.5	21.75	95.33	6.62	0.00	6.62
120	32.9	19.60	93.49	6.62	0.00	6.62
140	29.2	17.37	90.33	6.62	0.00	6.62
160	26.2	15.64	86.57	6.62	0.00	6.62
180	23.9	14.25	82.36	6.62	0.00	6.62
200	22.0	13.10	77.77	6.62	0.00	6.62

Post-development Stormwater Management (WS-02)
Stormwater Storage Calculations (1/2 release rate for u/g storage & variable design head)

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	106.42	61.86	3.31	0.00	3.31
15	142.9	85.16	73.67	3.31	0.00	3.31
20	120.0	71.49	81.81	3.31	0.00	3.31
25	103.8	61.89	87.87	3.31	0.00	3.31
30	91.9	54.75	92.59	3.31	0.00	3.31
40	75.1	44.78	99.54	3.31	0.00	3.31
50	64.0	38.12	104.42	3.31	0.00	3.31
60	55.9	33.31	108.01	3.31	0.00	3.31
75	47.3	28.16	111.84	3.31	0.00	3.31
90	41.1	24.50	114.43	3.31	0.00	3.31
105	36.5	21.75	116.18	3.31	0.00	3.31
120	32.9	19.60	117.32	3.31	0.00	3.31
140	29.2	17.37	118.14	3.31	0.00	3.31
160	26.2	15.64	118.35	3.31	0.00	3.31
180	23.9	14.25	118.10	3.31	0.00	3.31
200	22.0	13.10	117.49	3.31	0.00	3.31

Total Storage Required = 118.35 m^3 refer to LRL Plan C.601
Available Storage = 128.09 m^3

Summary of release Rates and Storage Volumes

Catchment Area	Drainage Area (ha)	100-year Release Rate (L/s)	100-Year Required Storage (m3)	Total Available Storage (m3)
WS-01	0.058	18.15	0	0
WS-02	0.233	6.62	118.35	128.09
TOTAL	0.291	24.77	118.35	128.09

LRL Associates Ltd.

Storm Design Sheet

LRL File No.	210216-02
Project:	36 Stacked Towns
Location:	6001/6005 RENAUD
Date:	June 9, 2023
Designed:	K. Herold
Drawing Reference:	C401

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)

$I = 998.071 / (T_c + 6.053)^{0.814}$

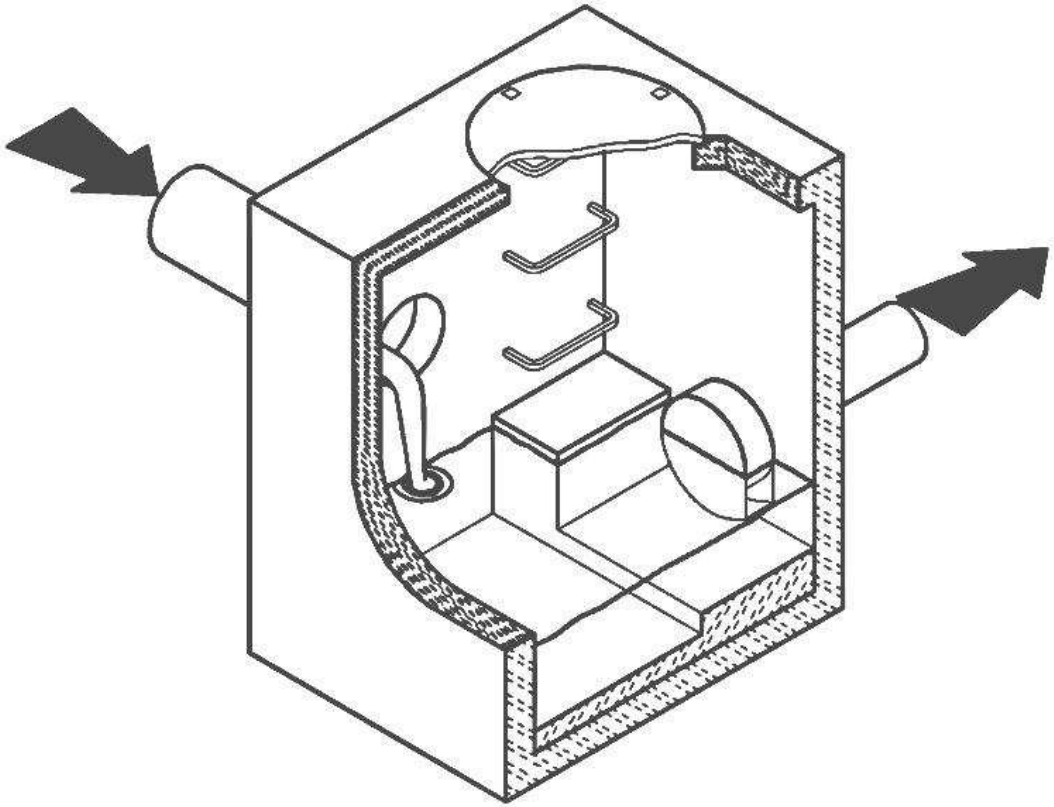
Min. velocity = 0.80 m/s

Manning's "n" = 0.013

LOCATION			AREA (ha)			FLOW						STORM SEWER							
WATERSHED / STREET	From MH	To MH	C = 0.20	C = 0.80	C = 0.90	Indiv. 2.78AC	Accum. 2.78AC	Time of Conc. (min.)	Rainfall Intensity (mm/hr)	Peak Flow Q (L/s)	Controlled Flow Q (L/s)	Pipe Diameter (mm)	Type	Slope (%)	Length (m)	Capacity Full (L/s)	Velocity Full (m/s)	Time of Flow (min.)	Ratio (Q/Q_{FULL})
WS-02	CB06	CBMH05	0.011	0.000	0.003	0.014	0.01	10.00	104.2	1.42		250	PVC	1.00%	16.5	59.5	1.21	0.23	0.02
	CBMH05	CBMH04	0.017	0.000	0.081	0.212	0.23	10.23	103.0	23.25		250	PVC	1.00%	35.5	59.5	1.21	0.49	0.39
	CBMH04	MH03	0.015	0.000	0.079	0.206	0.43	10.72	100.6	43.42		250	PVC	1.00%	17.8	59.5	1.21	0.24	0.73
	MH03	CBMH02	0.012	0.000	0.016	0.047	0.48	10.96	99.4	47.55		250	PVC	1.00%	9.2	59.5	1.21	0.13	0.80
	CBMH02	MH01	0.000	0.000	0.000	0.000	0.48	11.09	98.8	47.26		250	PVC	1.00%	13.3	59.5	1.21	0.18	0.79
	MH01	SEWER	0.000	0.000	0.000	0.000	0.48	11.27	97.9	46.85	6.62	250	PVC	1.00%	21.5	59.5	1.21	0.30	0.79

CSO/STORMWATER MANAGEMENT

HYDROVEX® VHV / SVHV
Vertical Vortex Flow Regulator



JOHN MEUNIER

HYDROVEX® VHV / SVHV VERTICAL VORTEX FLOW REGULATOR

APPLICATIONS

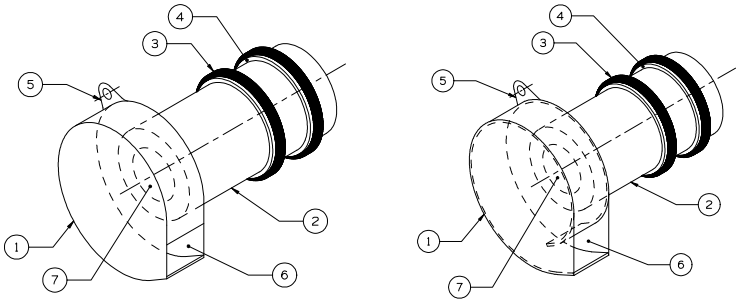
One of the major problems of urban wet weather flow management is the runoff generated after a heavy rainfall. During a storm, uncontrolled flows may overload the drainage system and cause flooding. Due to increased velocities, sewer pipe wear is increased dramatically and results in network deterioration.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

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

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

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

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.

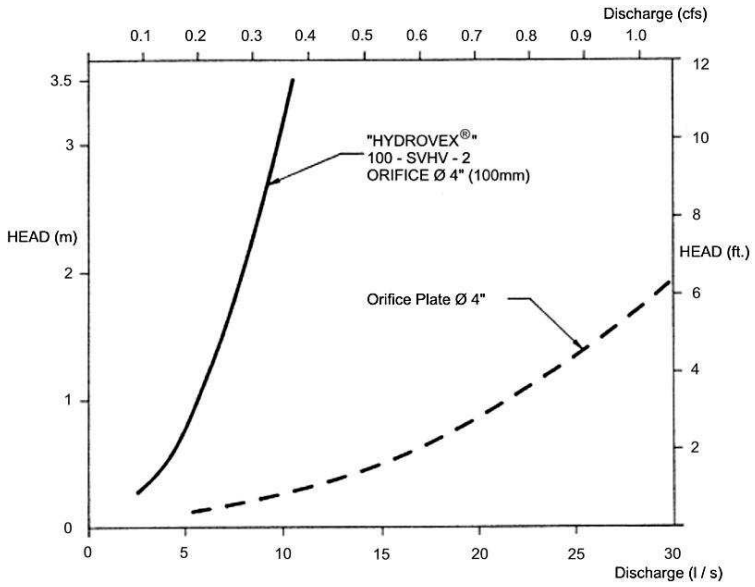


FIGURE 2: DISCHARGE CURVE SHOWING A HYDROVEX® FLOW REGULATOR VS AN ORIFICE PLATE

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

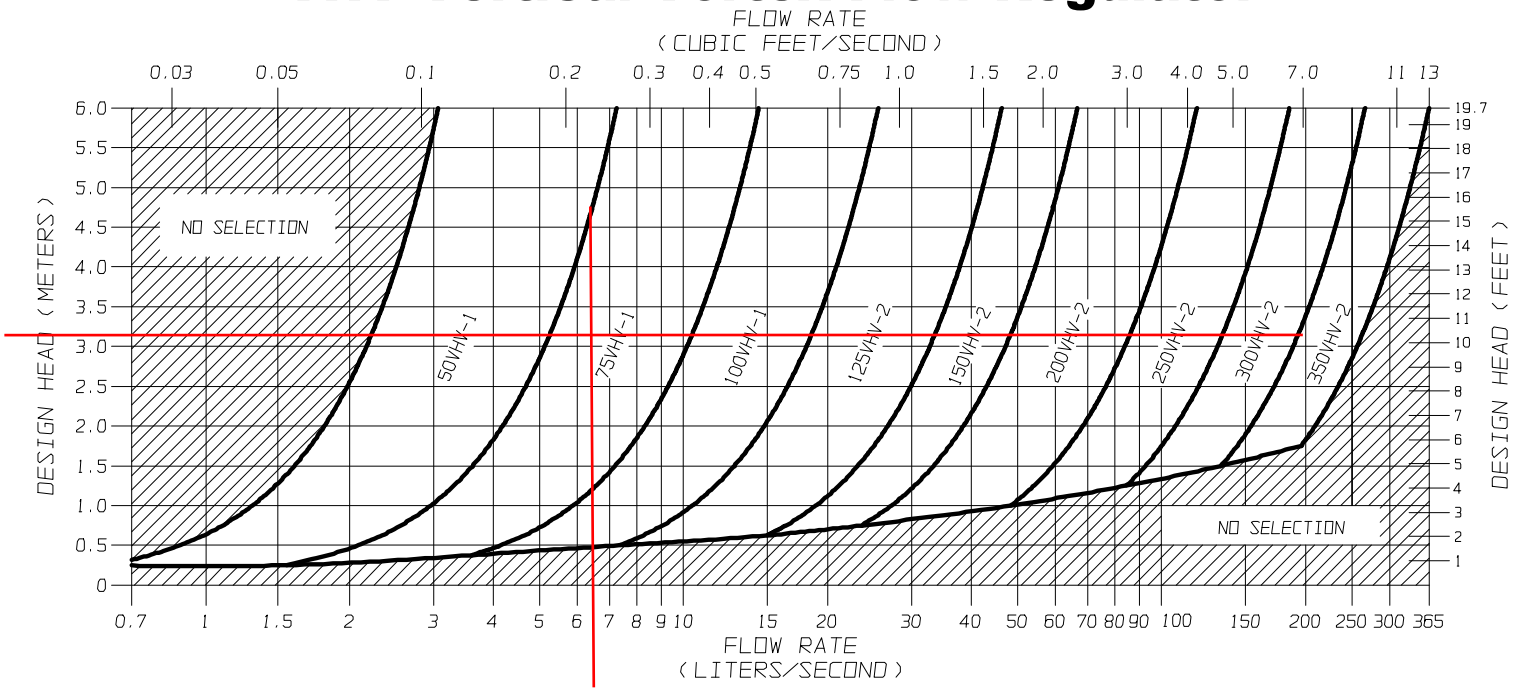


FIGURE 3 - VHV

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HYDROVEX®

SVHV Vertical Vortex Flow Regulator

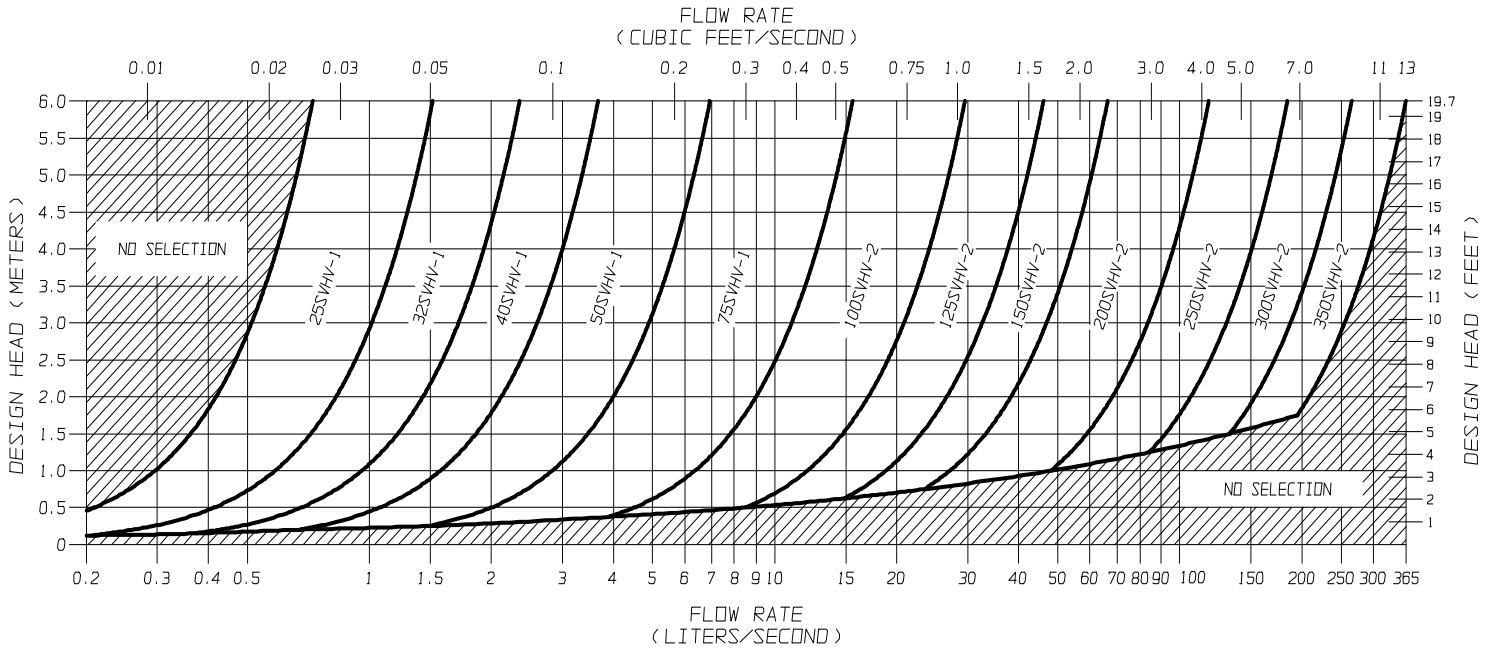
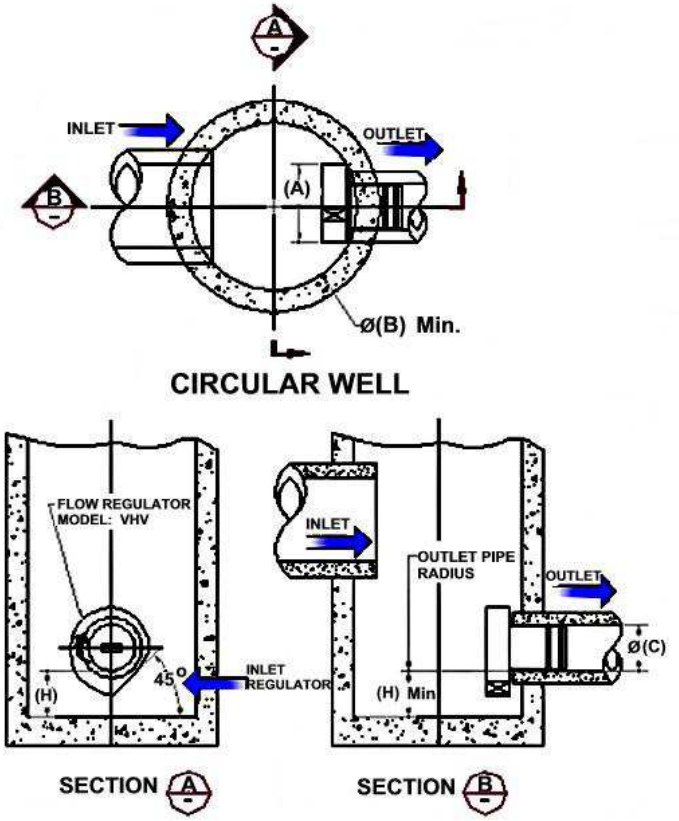


FIGURE 3 - SVHV

JOHN MEUNIER

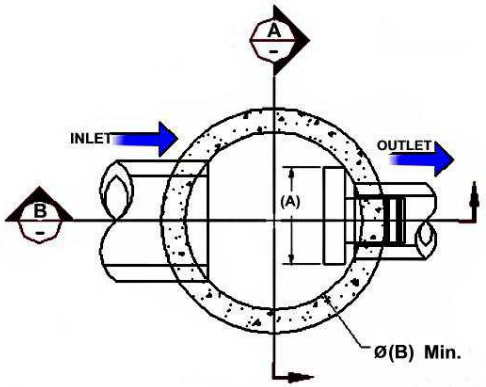
FLOW REGULATOR TYPICAL INSTALLATION IN CIRCULAR MANHOLE
FIGURE 4 (MODEL VHV)

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

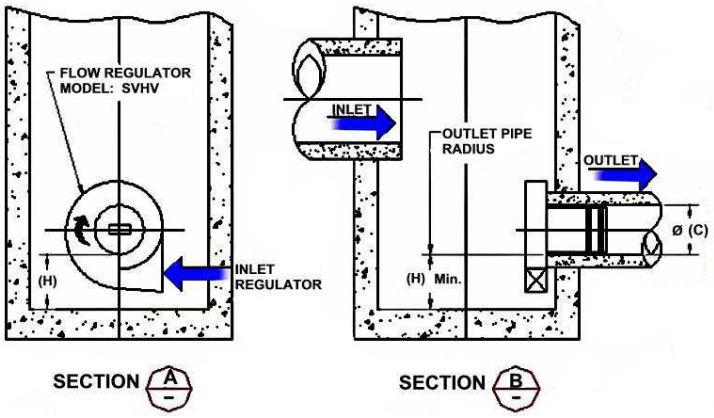


FLOW REGULATOR TYPICAL INSTALLATION IN CIRCULAR MANHOLE
FIGURE 4 (MODEL SVHV)

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



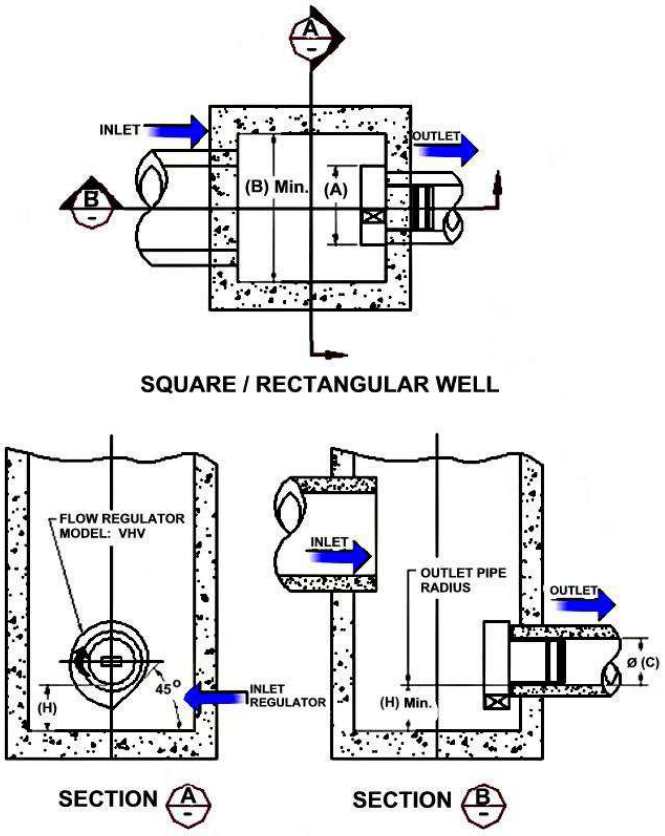
CIRCULAR WELL



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

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

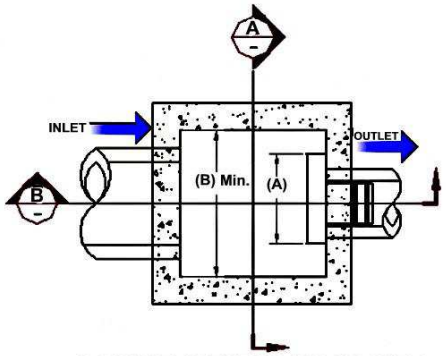
NOTE: ***In the case of a square manhole, the outlet flow pipe must be centered on the wall to ensure enough clearance for the unit.***



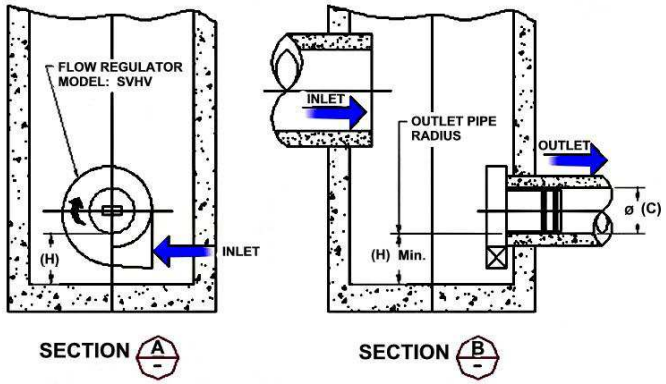
FLOW REGULATOR TYPICAL INSTALLATION IN SQUARE MANHOLE
FIGURE 4 (MODEL SVHV)

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

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



SQUARE / RECTANGULAR WELL



SECTION A **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

User Inputs

Chamber Model:	MC-3500
Outlet Control Structure:	No
Project Name:	6001/6005 Renaud
Engineer:	N/A
Project Location:	Ontario
Measurement Type:	Metric
Required Storage Volume:	102.01 cubic meters.
Stone Porosity:	40%
Stone Foundation Depth:	229 mm.
Stone Above Chambers:	305 mm.
Average Cover Over Chambers:	458 mm.
Design Constraint Dimensions:	(6.10 m. x 25.00 m.)

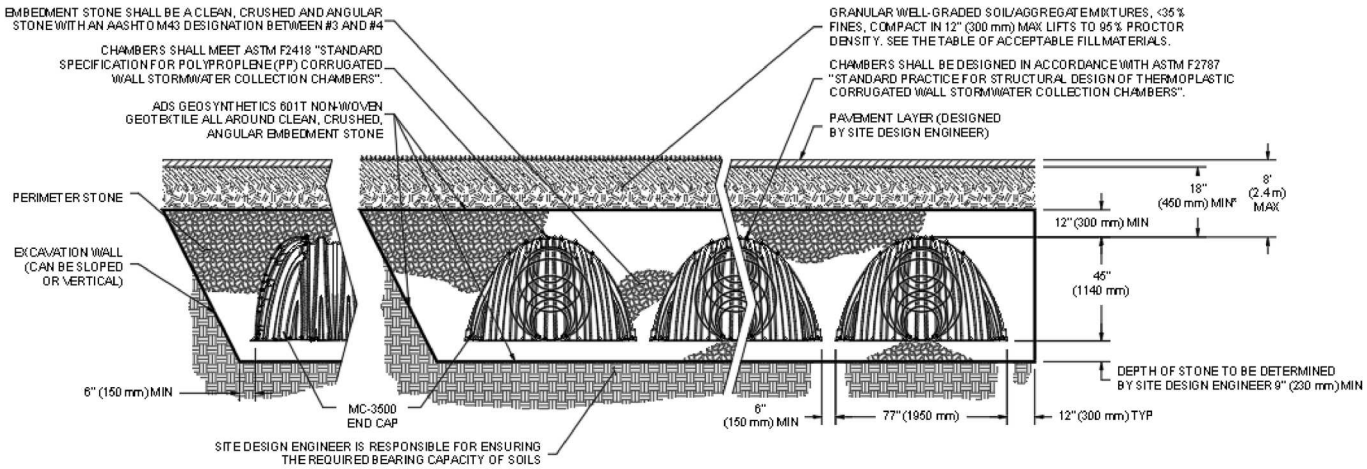
Results

System Volume and Bed Size

Installed Storage Volume:	111.11 cubic meters.
Storage Volume Per Chamber:	3.12 cubic meters.
Number Of Chambers Required:	19
Number Of End Caps Required:	4
Chamber Rows:	2
Maximum Length:	24.80 m.
Maximum Width:	4.68 m.
Approx. Bed Size Required:	111.28 square meters.

System Components

Amount Of Stone Required:	126 cubic meters
Volume Of Excavation (Not Including Fill):	187 cubic meters
Total Non-woven Geotextile Required:	386 square meters
Woven Geotextile Required (excluding Isolator Row):	14 square meters
Woven Geotextile Required (Isolator Row):	74 square meters
Total Woven Geotextile Required:	88 square meters
Impervious Liner Required:	0 square meters



FUTURE ROADS

AREAS WHERE FLOW IS DIVERTED TO ADJACENT SUB-WATERSHED

DRY POND WHICH REQUIRES EXCAVATION

DRY POND USING NATURAL DEPRESSIONS / RAVINES

STORMWATER FLOW ROUTE

POND TRIBUTARY AREA

SUB-WATERSHED BOUNDARY

PLAN IS TAKEN FROM THE CITY OF GLOUCESTER, EAST URBAN COMMUNITY, MASTER DRAINAGE PLAN BY GORE & STORRIE LIMITED, DATED SEPT. 1991.

RECOMMENDED SWM POND LOCATIONS
EAST URBAN COMMUNITY
City of Ottawa

0 0.5 1.0km

Figure 6

N

STORM SEWER AND MANHOLE
STORM TRUNK SEWER AND MANHOLE
STORM CATCHMENT AREA
30m CREEK BUFFER
ORIGINAL GROUND / OBVERT
AREA (ha) / RUNOFF COEFFICIENT / MANHOLE No.
AREAS OF INSUFFICIENT COVER

1. "PONDS 1 AND 3 EAST URBAN COMMUNITY DESIGN BRIEF" (STANTEC CONSULTING, APRIL 2001)
2. "CITY OF GLOUCESTER EAST URBAN COMMUNITY MASTER DRAINAGE PLAN" (GORE & STORRIE, 1992)
3. WATER LEVEL TO BE CONFIRMED AS PART OF THE REDESIGN OF POND 3.

HYDRO CORRIDOR
PROPOSED TRANSITWAY
PROPOSED BLACKBURN BY-PASS EXTENSION
MER BLEUE ROAD
FOURTH LINE ROAD
PAGE ROAD
NAVAN ROAD
WALL ROAD
SAPHIR AVE.
GRAND PRE
ABANDONED C.P.R. RIGHT OF WAY
WSI LANDFILL
SUBJECT PROPERTY
STORM TRUNK SEWER No.1
STORM TRUNK SEWER No.2
STORM TRUNK SEWER No.3
STORM TRUNK SEWER No.4
STORM TRUNK SEWER No.5
STORM TRUNK SEWER No.6
POND 1
100 YR. WL=83.00m
NWL=80.10m
POND 2
100 YR. WL=80.00m
(2)
POND 3
100 YR. WL=68.50m
NWL=67.00m
(3)
SCHOOL
PARK
INSTIT.
INSTITUTIONAL
COMMERCIAL
ESCARPMENT
FIRE HALL

REVISION No.2 MARCH, 2005

CITY OF OTTAWA
GLOUCESTER EUC INFRASTRUCTURE SERVICING STUDY UPDATE

STORM SEWER SYSTEM

Scale 0 40 120 200m
Dwg. No. STM
Dwn. By E.C. Date 04.10.29 Revision 2

STORM SEWER CALCULATION SHEET (RATIONAL METHOD) - POND 3

Manning's 0.013 **Return Frequency** = 5 years

		AREA (Ha)							FLOW					SEWER DATA																
From Node	To Node	R= 0.3	R= 0.5	R= 0.55	R= 0.6	R= 0.75	R= 0.79	R= 0.82	Indiv. 2.78 AC	Accum. 2.78 AC	Time of Conc.	Rainfall Intensity	Peak Flow Q (l/s)	DIA. (m) (actual)	DIA. (mm) (nominal)	TYPE	SLOPE (m/m)	LENGTH (m)	CAPACITY (l/s)	VELOCITY (m/s)	TIME OF FLOW (min.)	RATIO Q/Q full	Upstream OG	Downstream OG	Upstream Invert	Upstream Obvert	Downstream Invert	Downstream Obvert	Drop Structure	US Frost Depth	DS Frost Depth
601A	601	0.00	4.45	0.00	0.00	0.00	1.50	0.00	9.48	9.48	21.00	68.13	645.86	0.76	750	CONC	0.0035	90	687.1	1.5	1.00	0.94	86.00	85.50	81.27	82.03	80.95	81.71		3.97	3.79
601	602	0.00	4.91	0.00	0.00	0.00	1.80	0.00	10.78	20.26	22.00	66.15	1340.16	0.91	900	CONC	0.0055	220	1400.6	2.1	1.72	0.96	85.50	83.90	80.80	81.71	79.59	80.50		3.79	3.40
602	603	0.00	0.66	3.50	0.00	0.97	1.43	1.75	15.42	35.68	23.71	63.03	2248.78	0.99	975	CONC	0.01	70	2338.0	3.0	0.38	0.96	83.90	82.50	79.51	80.50	78.81	79.80	2.26	3.40	2.70
603B	603A	0.00	4.42	3.47	0.00	0.00	1.24	1.80	18.28	18.28	22.00	66.15	1208.89	0.99	975	CONC	0.003	150	1280.5	1.7	1.50	0.94	81.50	81.50	77.50	78.49	77.05	78.04		3.01	3.46
603A	603	0.00	5.58	0.00	0.00	0.00	1.08	0.38	10.99	29.27	23.50	63.39	1855.51	1.07	1050	CONC	0.0045	110	1911.0	2.1	0.86	0.97	81.50	82.50	76.97	78.04	76.48	77.54		3.46	4.96
603	604	0.00	0.66	0.00	0.00	0.00	0.28	0.00	1.53	66.48	25.96	59.41	3949.46	1.37	1350	CONC	0.006	100	4313.1	2.9	0.57	0.92	82.50	80.80	76.17	77.54	75.57	76.94	0.52	4.96	3.86
604	605	0.00	1.03	0.00	0.00	0.00	0.52	0.00	2.57	69.06	26.53	58.56	4043.75	1.37	1350	CONC	0.006	150	4313.1	2.9	0.86	0.94	80.80	78.40	75.05	76.42	74.15	75.52	0.40	4.38	2.88
605	606	0.00	0.89	0.41	0.00	0.00	0.39	0.00	2.72	71.78	27.39	57.33	4115.22	1.37	1350	CONC	0.006	150	4313.1	2.9	0.86	0.95	78.40	77.00	73.75	75.12	72.85	74.22	0.40	3.28	2.78
606	607	0.00	1.66	0.00	0.00	0.00	0.74	0.00	3.93	75.71	28.24	56.17	4252.25	1.37	1350	CONC	0.006	250	4313.1	2.9	1.43	0.99	77.00	76.00	72.45	73.82	70.95	72.32	1.60	3.18	3.68
607	608	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.55	76.26	29.67	54.33	4143.26	1.37	1350	CONC	0.006	90	4313.1	2.9	0.51	0.96	76.00	73.00	69.35	70.72	68.81	70.18	1.10	5.28	2.82
608E	608D	0.41	3.79	0.00	0.00	0.00	1.58	0.00	9.08	9.08	20.00	70.25	637.88	0.91	900	CONC	0.0013	170	680.9	1.0	2.73	0.94	71.00	71.00	68.59	69.50	68.36	69.28		1.50	1.72
608D	608	0.00	0.00	0.00	0.00	0.00	0.39	0.00	0.86	9.94	22.73	64.77	643.62	0.91	900	CONC	0.0013	150	680.9	1.0	2.41	0.95	71.00	73.00	68.36	69.28	68.17	69.08		1.72	3.92
608C	608B	0.00	2.57	3.82	0.00	0.00	1.80	0.00	13.37	13.37	19.00	72.53	969.39	0.84	825	CONC	0.005	60	1058.9	1.9	0.52	0.92	74.00	74.00	69.50	70.33	69.20	70.03		3.67	3.97
608B	608A	0.00	3.12	0.00	0.00	0.00	0.96	0.00	6.45	19.81	19.52	71.32	1412.95	0.99	975	CONC	0.005	120	1653.2	2.1	0.93	0.85	74.00	72.80	69.04	70.03	68.44	69.43		3.97	3.37
608A	608	1.26	2.29	0.00	0.00	0.00	1.25	0.00	6.98	26.79	20.45	69.27	1855.82	1.07	1050	CONC	0.005	70	2014.4	2.3	0.52	0.92	72.80	73.00	68.37	69.43	68.02	69.08		3.37	3.92
608	609	0.00	2.60	0.00	0.00	0.00	1.11	0.00	6.05	119.04	30.18	53.70	6392.78	1.98	1950	CONC	0.002	290	6638.9	2.2	2.24	0.96	73.00	76.00	67.10	69.08	66.52	68.50	0.46	3.92	7.50
700	701	16.26	2.78	0.00	0.00	1.39	4.09	0.00	29.31	29.31	25.00	60.90	1784.60	0.91	900	CONC	0.0095	170	1840.8	2.8	1.01	0.97	86.00	86.50	81.53	82.45	79.92	80.83	1.33	3.56	5.67
701A	701	0.00	6.89	0.00	0.00	0.00	0.00	1.29	12.52	12.52	15.00	83.56	1045.95	0.84	825	CONC	0.005	330	1058.9	1.9	2.87	0.99	86.50	86.50	82.96	83.80	81.31	82.15	2.65	2.70	4.35
701	702	0.00	1.56	0.00	0.00	0.00	0.46	1.30	6.14	47.97	26.01	59.33	2845.74	0.99	975	CONC	0.023	210	3545.7	4.6	0.76	0.80	86.50	79.00	78.51	79.50	73.68	74.67		7.00	4.33
702A	702	0.00	0.00	0.00	0.00	3.11	1.67	0.00	10.15	10.15	20.00	70.25	713.19	0.61	600	CONC	0.02	150	905.9	3.1	0.81	0.79	83.50	79.00	78.89	79.50	75.89	76.50	1.83	4.00	2.50
702	703	0.00	0.00	0.36	0.00	0.00	0.54	0.00	1.74	59.85	26.77	58.21	3483.92	1.07	1050	CONC	0.024	210	4413.3	4.9	0.71	0.79	79.00	71.00	73.60	74.67	68.56	69.63		4.33	1.37
703	704	5.02	0.00	0.41	0.00	0.00	0.41	0.00	5.71	65.57	27.48	57.20	3750.72	1.83	1800	CONC	0.0012	160	4154.1	1.6	1.69	0.90	71.00	70.80	67.80	69.63	67.61	69.44		1.37	1.36
704	705	0.99	0.00	0.55	0.00	3.19	0.45	0.00	9.31	74.87	29.17	54.96	4115.38	1.83	1800	CONC	0.0013	180	4323.7	1.6	1.82	0.95	70.80	70.50	67.61	69.44	67.38	69.20		1.36	1.30
705A	705	0.00	0.00	2.06	0.00	0.00	1.74	0.00	6.97	6.97	23.00	64.29	448.15	0.69	675	CONC	0.003	80	480.3	1.3	1.03	0.93	71.50	70.50	68.76	69.44	68.52	69.20		2.06	1.30
705	706	0.00	0.00	0.92	0.00	0.00	0.44	0.00	2.37	84.22	30.99	52.75	4442.71	1.98	1950	CONC	0.001	160	4694.4	1.5	1.75	0.95	70.50	71.00	67.22	69.20	67.06	69.04		1.30	1.96
		0.00	0.00	0.00	0.00	0.00	0.00	0.00																							
706C	706B	0.00	0.00	5.20	0.00	0.00	2.00	0.00	12.34	12.34	21.00	68.13	840.94	0.69	675	CONC	0.012	155	960.6	2.6	0.99	0.88	75.00	72.00	71.13	71.81	69.27	69.95		3.19	2.05
706B	706A	0.00	0.00	0.64	0.00	0.00	0.22	0.00	1.46	13.80	21.99	66.16	913.32	0.76	750	CONC	0.007	80	971.7	2.1	0.63	0.94	72.00	72.00	69.19	69.95	68.63	69.39		2.05	2.61
706A	706	0.00	0.00	1.74	0.00	0.00	1.16	0.00	5.21	19.01	22.62	64.98	1235.49	0.91	900	CONC	0.005	70	1335.4	2.0	0.57	0.93	72.00	71.00	68.48	69.39	68.13	69.04		2.61	1.96
706	707	0.00	0.00	0.50	0.00	0.00	0.21	0.00	1.23	104.46	32.74	50.81	5307.00	1.98	1950	CONC	0.0015	100	5749.5	1.9	0.89	0.92	71.00	72.00	67.06	69.04	66.91	68.89		1.96	3.11
707	708	0.00	0.00	2.66	0.00	0.00	1.20	0.00	6.70	111.16	33.63	49.87	5543.80	1.98	1950	CONC	0.0015	175	5749.5	1.9	1.56	0.96	72.00	76.00	66.91	68.89	66.65	68.63		3.11	7.37
708	609	0.00	0.00	1.38	0.00	0.00	0.67	0.00	3.58	114.74	35.20	48.33	5545.19	1.98	1950	CONC	0.0015	85	5749.5	1.9	0.76	0.96	76.00	76.00	66.65	68.63	66.52	68.50	0.46	7.37	7.50
609	610	0.00	3.00	0.00	0.00	0.00	1.21	0.00	6.83	240.60	35.96	47.62	11456.50	1.52	1500 x 4200	CONC	0.002	160	14595.0	2.3	1.15	0.78	76.00	72.00	66.52	68.04	66.20	67.72		7.96	4.28
610	Outlet	0.00	3.98	0.00	0.00	0.00	0.96	0.00	7.64	248.25	37.11	46.58	11563.06	1.52	1500 x 4200	CONC	0.002	100	14595.0	2.3	0.72	0.79	72.00	70.00	66.20	67.72	66.00	67.52		4.28	2.48
800	801	0.00	0.00	2.51	0.00	0.00	0.73	0.00	5.44	5.44	18.00	74.97	407.91	0.84	825	CONC	0.001	140	473.6	0.9	2.72	0.86	70.00	70.00	67.60	68.44	67.46	68.30		1.56	1.70
801	802	0.00	0.00	1.02	0.00	0.00	0.34	0.00	2.31	7.75	20.72	68.71	532.33	0.91	900	CONC	0.001	80	597.2	0.9	1.47	0.89	70.00	70.00	67.38	68.30	67.30	68.22		1.70	1.78
802	803	0.00	0.00	2.06	0.00	0.00	0.77	0.00	4.84	12.59	22.19	65.79	828.22	1.07	1050	CONC	0.001	195	900.9	1.0	3.22	0.92	70.00	70.00	67.15	68.22	66.96	68.02		1.78	1.98
803	804	0.00	0.00	1.60	0.00	0.00	0.75	0.00	4.09	16.68	25.41	60.25	1005.07	1.07	1050	CONC	0.0013	80	1027.1	1.1	1.16	0.98	70.00	70.00	66.96	68.02	66.85	67.92		1.98	2.08
804	805	0.00	0.00	2.76	0.00	0.00	0.83	0.00	6.04	22.72	26.57	58.50	1329.38	1.22	1200	CONC	0.0012	285	1409.0	1.2	3.94	0.94	70.00	70.00	66.70	67.92	66.36	67.58		2.08	2.42
805	806	0.00	0.00	1.51	0.00	0.00	0.70	0.00	3.85	26.57	30.51	53.32	1416.74	1.22	1200	CONC	0.0013	80	1466.5	1.3	1.06	0.97	70.00	70.00	66.36	67.58	66.26	67.47		2.42	2.53
806	807	0.86	0.00	1.24	0.00	0.00	0.41	0.00	3.51	30.08	31.57	52.09	1567.14	1.22	1200	CONC	0.0017	70	1677.0	1.4	0.81	0.93	70.00	70.00	66.26	67.47	66.14	67.36		2.53	2.64
807	Outlet	0.00	0.00	0.86	0.00	0.00	0.34	0.00	2.06	32.15	32.38	51.19	1645.68	1.22	1200	CONC	0.0017	80	1677.0	1.4	0.93	0.98	70.00	70.00	66.14	67.36	66.00	67.22		2.64	2.78

Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficient

Notes:
1) Ottawa IDF Curve
2) Min Velocity = 0.80 m/sec

Designed: B.D

Checked: F.W

Dwg. : STM / STM P1

PROJECT: Gloucester EUC Infrastructure Servicing Study Update

LOCATION: Stormwater Management Pond 3

File Ref. 1634-00493

Date: March-05

Sheet No. 1 of 1

APPENDIX E

Civil Engineering Drawings

NAVAN STACKED TOWN HOMES
6001 / 6005 RENAUD ROAD, OTTAWA, ON.

REVISION 02

KEY PLAN (N.T.S.)

DRAWING INDEX	
TITLE PAGE	
GENERAL NOTES	C001
SEDIMENT AND EROSION CONTROL PLAN	C101
DEMOLITION PLAN	C102
SITE DEVELOPMENT PLAN	C201
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 $\frac{1}{2}$	C901
CONSTRUCTION DETAIL PLAN $\frac{2}{2}$	C902

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

NAVAN STACKED TOWN HOMES
6001/6005 RENAUD ROAD, OTTAWA, ON.
REV.02 - ISSUED FOR CLIENT APPROVAL - JUNE 9, 2023
LRL PROJECT no: 210216-02

LICENSED PROFESSIONAL ENGINEER
V. JOHNSON
100510576
06-09-2023
PROVINCE OF ONTARIO
NOT AUTHENTIC UNLESS SIGNED AND DATED

CITY FILE # D07-12-21-0239

DWG # 18659

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 300MM AROUND ALL STRUCTURES WITHIN THE PAVEMENT AREA.
7. SUB-EXCAVATE SOFT AREAS AND FILL WITH GRANULAR 'B' COMPACTED IN MAXIMUM 300MM 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

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UNAUTHORIZED CHANGES:

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

IN ADDITION, THE CLIENT AGREES, TO THE FULLEST EXTENT PERMITTED BY LAW, TO INDEMNIFY AND HOLD HARMLESS LRL FROM ANY DAMAGES, LIABILITIES OR 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.

SUBJECT TO APPROVAL

No.	REVISIONS	BY	DATE
02	ISSUED FOR MUNICIPAL APPROVAL	K.H.	09 JUN 2023
01	ISSUED FOR MUNICIPAL APPROVAL	A.S.	24 DEC 2021

V. JOHNSON
100510576
06-09-2023

NOT AUTHENTIC UNLESS SIGNED AND DATED

LRL
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CLIENT
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1173 CYRVILLE RD, SUITE 202,
OTTAWA ON K1J 7S6

DESIGNED BY:	DRAWN BY:	APPROVED BY:
K.H.	K.H.	V.J.

PROJECT
NAVAN STACKED TOWN HOMES
6001/6005 RENAUD RD,
OTTAWA, ONTARIO

DRAWING TITLE
GENERAL NOTES

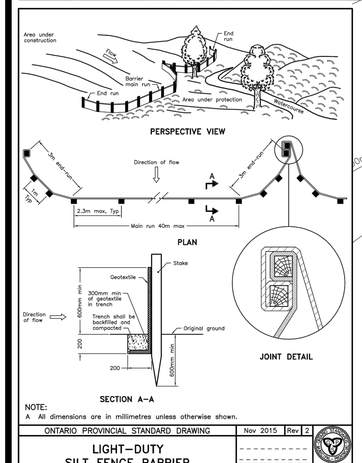
PROJECT NO.
210216

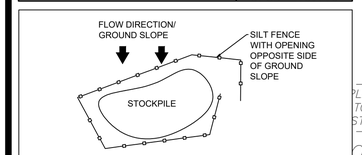
DATE
NOVEMBER 2021

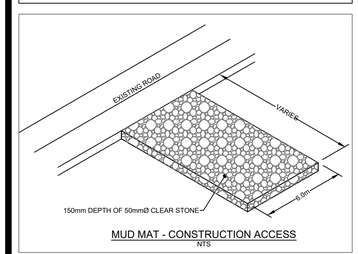
C001

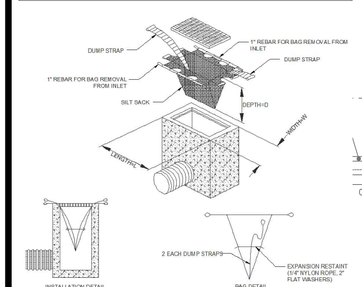
CITY FILE # D07-12-21-0239

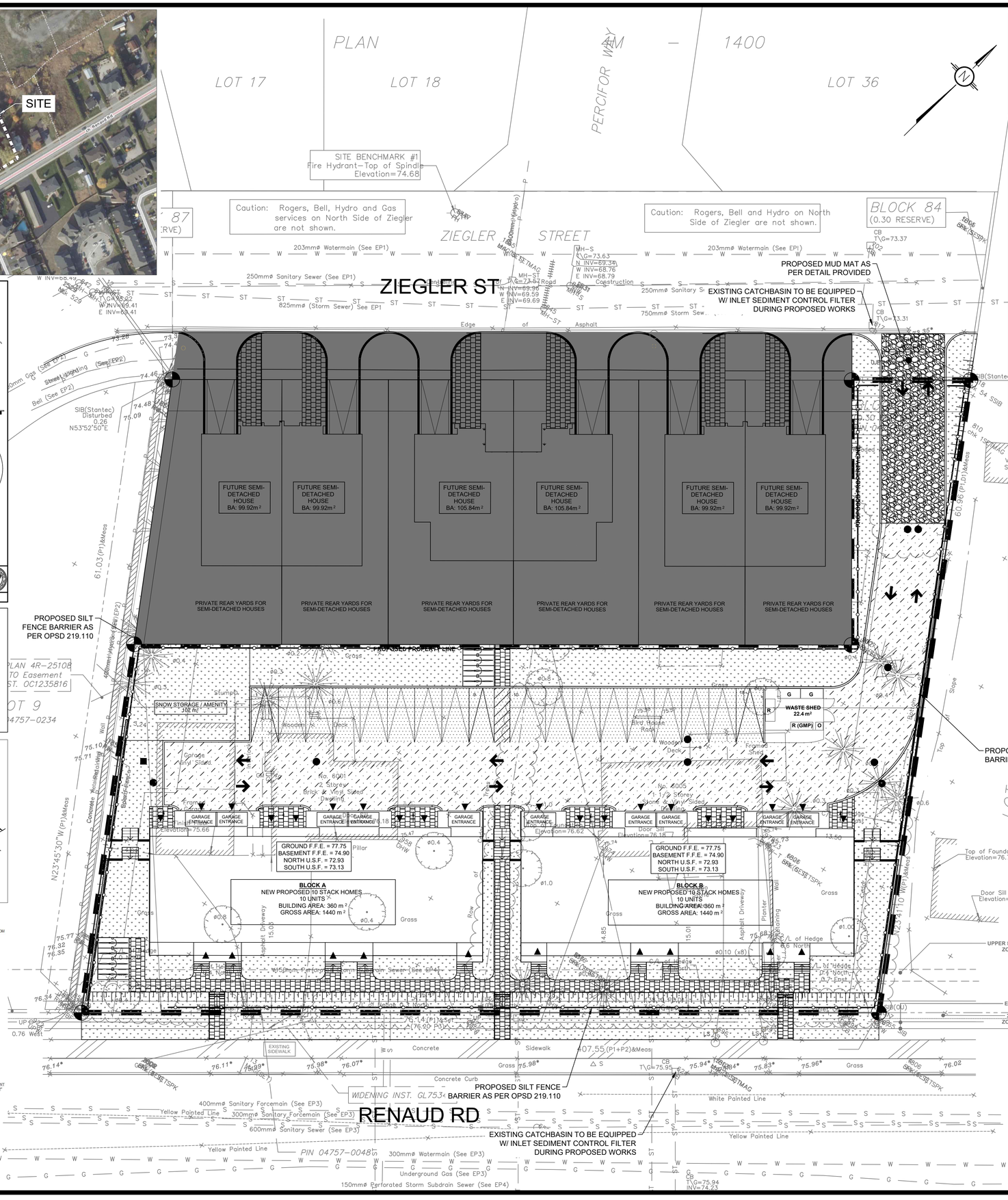
DWG # 18659











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
- ×70.19 EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED WATERMAIN
- PROPOSED 135mmØ SAN SERVICE
- PROPOSED STM SERVICE
- PROPOSED 25mmØ PEX WTR SERVICE
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- EXISTING MANHOLE
- EXISTING CATCHBASIN
- PROPOSED CATCHBASIN-MANHOLE/CATCHBASIN
- PROPOSED MANHOLE
- PROPOSED CURB STOP
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WS-XX CONTROLLER AREA RUNOFF
  - WATERSHED NAME
  - RUNOFF COEFFICIENT
  - AREA IN HECTARES

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5m 2 0 5m
SCALE: 1:200

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No.	REVISIONS	BY	DATE
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01	ISSUED FOR MUNICIPAL APPROVAL	A.S.	24 DEC 2021

LICENSED PROFESSIONAL ENGINEER
V. JOHNSON
100510576
06-09-2023
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
1173 CYRVILLE RD, SUITE 202,
OTTAWA ON K1J 7S6

DESIGNED BY:	DRAWN BY:	APPROVED BY:
K.H.	K.H.	V.J.

PROJECT
NAVAN STACKED TOWN HOMES
6001/6005 RENAUD RD,
OTTAWA, ONTARIO

DRAWING TITLE
EROSION AND SEDIMENT CONTROL PLAN

PROJECT NO.
210216
DATE
NOVEMBER 2021

C101

CITY FILE # D07-12-21-0239

DWG # 18659

PLAN — 1400

LOT 17 | LOT 18 | LOT 36

PERCIFOR WAY

SITE BENCHMARK #1
Fire Hydrant–Top of Spindle
Elevation=74.68

Caution: Rogers, Bell, Hydro and Gas services on North Side of Ziegler are not shown.

Caution: Rogers, Bell and Hydro on North Side of Ziegler are not shown.

ZIEGLER STREET

BLOCK 84
(0.30 RESERVE)

BLOCK 86
(0.30 RESERVE)
PIN 04757-0311

BLOCK 85
(0.30 RESERVE)
PIN 04757-0310

LOT 7 CONCESSION

PART 1 PLAN 5R-5324

PIN 04757-0040

PIN 04757-0019

PIN 04757-0023

PART 1 PLAN 4R-25108
SUBJECT TO Easement
INST. OC1235816

LOT 9
PIN 04757-0234

LOT 8

WIDENING INST. GL7534

EXISTING MOUNTABLE CURB TO BE REMOVED

EXISTING GARDEN TO BE REMOVED

EXISTING SEPTIC BED TO BE EXCAVATED & PROPERLY DISPOSED. BACKFILL WITH ENGINEER APPROVED SUITABLE MATERIAL.

Approximate Location of Septic Bed

EXISTING 2 STOREY HOUSE w/ATTACHED DECK TO BE DEMOLISHED & FOUNDATION REMOVED. BACKFILL WITH ENGINEER APPROVED SUITABLE MATERIAL.

EXISTING 1 ½ STOREY HOUSE w/ATTACHED DECK AND SHED TO BE DEMOLISHED & FOUNDATION REMOVED. BACKFILL WITH ENGINEER APPROVED SUITABLE MATERIAL.

LOT TO BE CLEARED AND LANDSCPAING REMOVED WHERE REQUIRED FOR SITE REDEVELOPMENT.
LOT CLEARING TO BE CONSISTENT WITH APPLICABLE ENVIRONMENTAL AND TREE CONSERVATION REPORTS.

EXISTING GARAGE & SLAB TO BE DEMOLISHED

EXISTING ASPHALT DRIVEWAY TO BE REMOVED

EXISTING BRICK PILLARS TO BE REMOVED

EXISTING ASPHALT DRIVEWAY TO BE REMOVED

EXISTING TIMBER RETAINING WALL TO BE DEMOLISHED

EXISTING LIGHT STANDARDS TO BE REMOVED

EXISTING DITCH CATCH BASIN & CATCH BASIN LEAD TO BE REMOVED

EXISTING CATCH BASIN TO REMAIN.

ALL EXISTING SERVICES ARE TO BE REMOVED AND CAPPED AT MAIN

EXISTING DEPRESSED CURB TO BE REINSTATED AS STANDARD CURB. ALL ASPHALT DRIVEWAY REMOVED TO BE REINSTATED WITH GRASS.

EXISTING DEPRESSED CURB TO BE REINSTATED AS STANDARD CURB. ALL ASPHALT DRIVEWAY REMOVED TO BE REINSTATED WITH GRASS.

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
- ×70.19 EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED WATERMAIN
- PROPOSED 135mmØ SAN SERVICE
- PROPOSED STM SERVICE
- PROPOSED 25mmØ PEX WTR SERVICE
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- EXISTING MANHOLE
- EXISTING CATCHBASIN
- PROPOSED CATCHBASIN-MANHOLE/CATCHBASIN
- PROPOSED MANHOLE
- PROPOSED CURB STOP
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WS-XX WATERSHED NAME
- CONTROLLED RUNOFF COEFFICIENT
- AREA AREA IN HECTARES

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5m 2 0 5m

SCALE: 1:200

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OTTAWA ON K1J 7S6

DESIGNED BY:	DRAWN BY:	APPROVED BY:
K.H.	K.H.	V.J.

PROJECT
NAVAN STACKED TOWN HOMES
6001/6005 RENAUD RD,
OTTAWA, ONTARIO

DRAWING TITLE
DEMOLITION PLAN

PROJECT NO.
210216

DATE
NOVEMBER 2021

C102

CITY FILE # D07-12-21-0239

DWG # 18659

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:
REFER TO GEOTECHNICAL INVESTIGATION BY PATERSON GROUP DATED APRIL 23, 2021. IN PREPARATION FOR PAVEMENT CONSTRUCTION AT THIS SITE, ANY SURFICIAL OR NEAR SURFACE/SUBGRADE LEVEL TOPSOIL AND ANY SOFT, WET OR DELETERIOUS MATERIALS SHOULD BE REMOVED FROM THE PROPOSED PAVED AREAS. THE EXPOSED SUBGRADE SHOULD BE INSPECTED AND APPROVED BY GEOTECHNICAL PERSONNEL AND ANY SOFT AREAS EVIDENT SHOULD BE 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.

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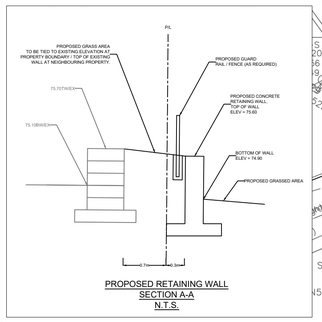
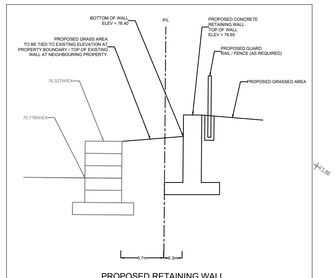
- AREA IN HECTARES



PROPOSED RETAINING WALL
SECTION A-A
N.T.S.



PROPOSED RETAINING WALL
SECTION B-B
N.T.S.

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5m 2 0 5m
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LICENSED PROFESSIONAL ENGINEER
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PROVINCE OF ONTARIO

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DESIGNED BY:	DRAWN BY:	APPROVED BY:
K.H.	K.H.	V.J.

PROJECT
NAVAN STACKED TOWN HOMES
6001/6005 RENAUD RD,
OTTAWA, ONTARIO

DRAWING TITLE
GRADING AND DRAINAGE PLAN

PROJECT NO.
210216

DATE
NOVEMBER 2021

C301

CITY FILE # D07-12-21-0239

DWG # 18659

PIPE CROSSING TABLE (±)						
CROSSING ID	PROP. 150mm WTR SERV INV	PROP. 150mm SAN SERV OBV	EX. 250mm SAN SWR OBV	EX. 750mm STM SWR OBV	EX. 750mm STM SWR INV	CLEARANCE (m)
1	70.81		69.18			1.63
2	71.14			70.64		0.50
3		69.22			69.89	0.77

CONTRACTOR TO FIELD VERIFY ALL SEWER / MAIN ELEVATIONS. ANY DISCREPANCIES IN DATA ARE TO BE REVIEWED WITH THE CIVIL ENGINEER PRIOR TO SERVICE INSTALLATION.

SITE BENCHMARK #1
Fire Hydrant–Top of Spindle
Elevation=74.68

Caution: Rogers, Bell, Hydro and Gas services on North Side of Ziegler are not shown.

Caution: Rog... Side

ZIEGLER STREET

BLOCK 87
(0.30 RESERVE)

BLOCK 84
(0.30 RESERVE)

BLOCK 85
(0.30 RESERVE)
PIN 04757-0310

PLAN 4M – 1400

LOT 18

PERCIFOR WAY

PART 1 PLAN 4R–25108
SUBJECT TO Easement
INST. OC1235816

CONCESSION

LOT

CONNECTION TO EXISTING 250mmØ AS PER CITY STD S11.
EX. SAN SWR INV = ±68.93
OBVERT TO OBVERT CONNECTION
PROP. SAN SERV INV = 69.03

PROP. CONNECTION TO EXISTING 750mmØ STM SEWER
EX. STM SWR INV. = ±69.89
EX. STM SWR S/L ELEV. = ±70.27
PROP. STM SERV INV. = 70.27

PROP CONNECTION TO 203mmØ WATERMAIN BY CITY FORCES. EXCAVATION AND REINSTATEMENT BY CONTRACTOR.
EX. WTR MAIN OBV = ±70.96
PROP. WTR SERV OBV = 70.96
TOP OF GRADE = ± 73.45

PIPE CROSSING 3
EX STM SWR INV = ±69.89
PROP SAN SERV OBV = 69.22
CLEARANCE = 0.77m

PIPE CROSSING 1
EX SAN SWR OBV = ±69.18
PROP WTR SERV INV = 70.81
CLEARANCE = 1.63m

PIPE CROSSING 2
EX STM SWR OBV = ±70.64
PROP WTR SERV INV = 71.14
CLEARANCE = 0.50m

203mmø Watermain (See EP1)
250mmø Sanitary Sewer (See EP1)
825mmø (Storm Sewer) See EP1
750mmø Storm Sewer (See EP1)

VEHICLE ACCESS

PROP. 21.5m - 300mmØ PVC-DR35 STM SERVICE @ 5.50% SLOPE

PROP. 23.7m - 150mmØ PVC-DR28 SAN SERVICE @ 2.00% SLOPE

FUTURE SEMI-DETACHED HOUSE
BA: 99.92m²

FUTURE SEMI-DETACHED HOUSE
BA: 105.84m²

PROPOSED STORMTECH MC-3500 UNDERGROUND STORMWATER STORAGE CHAMBERS (OR APPROVED EQUIVALENT).
STORAGE VOLUME PROVIDED = 111.11m³
MAX LENGTH = 24.79m, MAX WIDTH = 4.67m
REFER TO C901 FOR GREATER DETAIL.

PROP. STM CBMH05
T/G = 74.45
NE INV = 71.98
SW INV = 72.01

PROP. 35.5m - 300mmØ PVC-DR35 STM SERVICE @ 0.50% SLOPE

PROP. 17.8m - 300mmØ PVC-DR35 STM SERVICE @ 0.50% SLOPE

PROP. 16.5m - 300mmØ PVC-DR35 STM SERVICE @ 0.50% SLOPE

PROP. 69.6m - 150mmØ PVC-DR28 SAN SERVICE @ 1.50% SLOPE

PROP. NYLOPLAST FD-4HC
T/G = 74.53
SE INV = 71.84
(OR APPROVED EQUIVALENT)

PROP. STM CBMH04
T/G = 74.45
NE INV = 71.77
SW INV = 71.80
NW INV = 71.77

PROPOSED PROPERTY LINE

PROP. 121.5m - 150mmØ WATERMAIN TO BE BURIED MIN. 2.4m BELOW GRADE

PRIVATE REAR YARDS FOR SEMI-DETACHED HOUSES

PROP. STM CB06
T/G = 74.78
NE INV = 72.08
CB TO BE CBMH IF STRUCTURE DEPTH IS GREATER THAN 2.4m,

PROP. SAN MH03
T/G = 74.82
NE INV = 71.49

PROP. AUTOMATIC FLUSHING CHAMBER AS PER CITY OF OTTAWA DETAIL W3.2

SNOW STORAGE / AMENITY
302 m²

GROUND F.F.E. = 77.75
BASEMENT F.F.E. = 74.90
NORTH U.S.F. = 72.93
SOUTH U.S.F. = 73.13

BLOCK A
NEW PROPOSED 10 STACK HOMES
10 UNITS
BUILDING AREA: 360 m²
GROSS AREA: 1440 m²

BLOCK B
NEW PROPOSED 10 STACK HOMES
10 UNITS
BUILDING AREA: 360 m²
GROSS AREA: 1440 m²

WASTE SHED
22.4 m²

PROP. SAN MH01
T/G = 74.58
NW INV = 69.50
SE INV = 70.08

PROP. STM MH01
T/G = 74.60
NW INV = 71.44
SE INV = 71.47
NW INV TO BE EQUIPPED W/ HYDROVEX 75VHV-1 VERTICAL VORTEX FLOW REGULATOR
DESIGN HEAD = 3.16m
MAX FLOW RATE = 6.62L/s

PROP. 13.3m - 300mmØ PVC-DR35 STM SERVICE @ 0.50% SLOPE

PROP. 24.6m - 150mmØ PVC-DR28 SAN SERVICE @ 1.50% SLOPE

PROP. STM CBMH02
T/G = 74.45
NW INV = 71.54
SE INV = 71.57

PROP. 9.2m - 300mmØ PVC-DR35 STM SERVICE @ 0.50% SLOPE

PROP. STM MH03
T/G = 74.55
NW INV = 71.62
SW INV = 71.68

PROP. SAN MH02
T/G = 74.80
N INV = 70.39
SW INV = 70.45

UPPER 5000 mm RESTRICTION ZONE FOR HYDRO LINES

2000 mm RESTRICTION ZONE FOR HYDRO LINES

EXISTING HYDRO LINES

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
- ×70.19 EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED WATERMAIN
- PROPOSED 135mmØ SAN SERVICE
- PROPOSED STM SERVICE
- PROPOSED 25mmØ PEX WTR SERVICE
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- EXISTING MANHOLE
- EXISTING CATCHBASIN
- PROPOSED CATCHBASIN-MANHOLE/CATCHBASIN
- PROPOSED MANHOLE
- PROPOSED CURB STOP
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WS-XX CONTROLLED AREA, RUNOFF — WATERSHED NAME, RUNOFF COEFFICIENT, AREA IN HECTARES

HYDROVEX®

VHV Vertical Vortex Flow Regulator

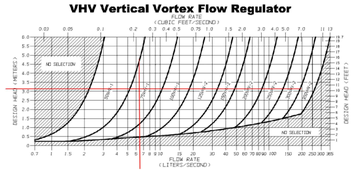

FIGURE 3 - VHV

JOHN MEUNIER

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.

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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.

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

THE ENGINEER WAIVES ANY AND ALL RESPONSIBILITY AND LIABILITY FOR PROBLEMS WHICH ARISE FROM FAILURE TO FOLLOW THESE PLANS, SPECIFICATIONS AND THE 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.

5m 2 0 5m
SCALE: 1:200

SUBJECT TO APPROVAL

No.	REVISIONS	BY	DATE
02	ISSUED FOR MUNICIPAL APPROVAL	K.H.	09 JUN 2023
01	ISSUED FOR MUNICIPAL APPROVAL	A.S.	24 DEC 2021

LICENSED PROFESSIONAL ENGINEER
V. JOHNSON
100510576
06-09-2023
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
1173 CYRVILLE RD, SUITE 202,
OTTAWA ON K1J 7S6

DESIGNED BY:	DRAWN BY:	APPROVED BY:
K.H.	K.H.	V.J.

PROJECT
NAVAN STACKED TOWN HOMES
6001/6005 RENAUD RD,
OTTAWA, ONTARIO

DRAWING TITLE
SERVICING PLAN

PROJECT NO.
210216

DATE
NOVEMBER 2021

C401

CITY FILE # D07-12-21-0239

DWG # 18659

PLAN — 1400

LOT 17 | LOT 18 | LOT 36

PERCIFOR WAY

SITE BENCHMARK #1
Fire Hydrant–Top of Spindle
Elevation=74.68

Caution: Rogers, Bell, Hydro and Gas services on North Side of Ziegler are not shown.

Caution: Rogers, Bell and Hydro on North Side of Ziegler are not shown.

BLOCK 84
(0.30 RESERVE)

ZIEGLER STREET

ZIEGLER ST

203mmø Watermain (See EP1)

250mmø Sanitary Sewer (See EP1)

825mmø (Storm Sewer) See EP1

750mmø Storm Sewer (See EP1)

MH–S
G=73.63
N INV=69.34
W INV=68.76
E INV=68.79

MH–ST
TG=73.54 Road
W INV=69.59
E INV=69.69

MH–ST
TG=73.37

CB
TG=73.31

VEHICLE ACCESS

BLOCK 86
(0.30 RESERVE)
PIN 04757–0311

PROPOSED OVERLAND STORAGE EXTENT CBMH04
100 YEAR STORMPONDING EXTENT (HWL = 74.60)
PONDING DEPTH = 0.15m, STORAGE = 6.19m³

PROPOSED OVERLAND STORAGE EXTENT CBMH02
100 YEAR STORMPONDING EXTENT (HWL = 74.60)
PONDING DEPTH = 0.15m, STORAGE = 5.64m³

PROPOSED STORMTECH MC-3500 UNDERGROUND STORMWATER STORAGE CHAMBERS (OR APPROVED EQUIVALENT).
STORAGE VOLUME PROVIDED = 111.11m³
MAX LENGTH = 24.79m, MAX WIDTH = 4.67m
REFER TO C901 FOR GREATER DETAIL.

FUTURE SEMI-DETACHED HOUSE
BA: 99.92m²

FUTURE SEMI-DETACHED HOUSE
BA: 105.84m²

PROPOSED OVERLAND STORAGE EXTENT CBMH05
100 YEAR STORMPONDING EXTENT (HWL = 74.60)
PONDING DEPTH = 0.15m, STORAGE = 5.15m³

PART 1 PLAN 5R–5324

PIN 04757–0040

PIN 04757–0019

PRIVATE REAR YARDS FOR SEMI-DETACHED HOUSES

PROPOSED PROPERTY LINE

PART 1 PLAN 4R–25108
SUBJECT TO Easement
INST. OC1235816

LOT 9
PIN 04757–0234

LOT 8

SNOW STORAGE / AMENITY
302 m²

WASTE SHED
22.4 m²
R (GMP) | O

No. 6001
2 Storey
Brick & Vinyl Siding
Dwelling

No. 6005
2 Storey
Stone & Vinyl Siding
Dwelling

GROUND F.F.E. = 77.75
BASEMENT F.F.E. = 74.90
NORTH U.S.F. = 72.93
SOUTH U.S.F. = 73.13

BLOCK A
NEW PROPOSED 10 STACK HOMES
10 UNITS
BUILDING AREA: 360 m²
GROSS AREA: 1440 m²

BLOCK B
NEW PROPOSED 10 STACK HOMES
10 UNITS
BUILDING AREA: 360 m²
GROSS AREA: 1440 m²

Asphalt Driveway 15.00

Top of Foundation Elevation=76.74

Door Sill Elevation=77.00

MAX SURFACE PONDING ELEVATION AND OVERLAND SPILLOVER POINT (ELEV = 74.60)

UPPER 5000 mm RESTRICTION ZONE FOR HYDRO LINES

EXISTING HYDRO LINES

2000 mm RESTRICTION ZONE FOR HYDRO LINES

BLOCK 85
(0.30 RESERVE)
PIN 04757–0310

RENAUD RD

WIDENING INST. GL75344

Concrete Curb

Sidewalk

400mmø Sanitary Forcemain (See EP3)
300mmø Sanitary Forcemain (See EP3)
600mmø Sanitary Sewer (See EP3)
300mmø Watermain (See EP3)
Underground Gas (See EP3)
150mmø Perforated Storm Subdrain Sewer (See EP4)

PIN 04757–0048

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
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- ×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
- ×70.19 EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED WATERMAIN
- PROPOSED 135mmø SAN SERVICE
- PROPOSED STM SERVICE
- PROPOSED 25mmø PEX WTR SERVICE
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- EXISTING MANHOLE
- EXISTING CATCHBASIN
- PROPOSED CATCHBASIN-MANHOLE/CATCHBASIN
- PROPOSED MANHOLE
- PROPOSED CURB STOP
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WS-XX (WATERSHED NAME)
- CONTROLLED (RUNOFF COEFFICIENT)
- AREA (AREA IN HECTARES)

USE AND INTERPRETATION OF DRAWINGS

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5m 2 0 5m
SCALE: 1:200

SUBJECT TO APPROVAL

No.	REVISIONS	BY	DATE
02	ISSUED FOR MUNICIPAL APPROVAL	K.H.	09 JUN 2023
01	ISSUED FOR MUNICIPAL APPROVAL	A.S.	24 DEC 2021

LICENSED PROFESSIONAL ENGINEER
V. JOHNSON
100510576
06-09-2023
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

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

CLIENT
LANDRIC HOMES
1173 CYRVILLE RD, SUITE 202,
OTTAWA ON K1J 7S6

DESIGNED BY:	DRAWN BY:	APPROVED BY:
K.H.	K.H.	V.J.

PROJECT
NAVAN STACKED TOWN HOMES
6001/6005 RENAUD RD,
OTTAWA, ONTARIO

DRAWING TITLE
STORMWATER MANAGEMENT PLAN

PROJECT NO.
210216

DATE
NOVEMBER 2021

C601

CITY FILE # D07-12-21-0239

DWG # 18659

LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
- PROPOSED CURB
- PROPOSED DEPRESSED CURB
- PROPOSED TERRACING (3:1 MIN.)
- PROPOSED SILT FENCE AS PER OPSD 219.110
- PROPOSED FENCE
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- ×50.00 PROPOSED ELEVATION
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- PROPOSED OVERLAND MAJOR FLOW ROUTE
- STM STM STM PROPOSED STORM SEWER
- SAN SAN SAN PROPOSED SANITARY SEWER
- WTR WTR WTR PROPOSED WATERMAIN
- PROPOSED 135mmØ SAN SERVICE
- PROPOSED STM SERVICE
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- STM STM STM EXISTING STORM SEWER
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- EXISTING CATCHBASIN
- PROPOSED CATCHBASIN-MANHOLE/CATCHBASIN
- PROPOSED MANHOLE
- PROPOSED CURB STOP
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WS-XX CONTROLLED / UNCONTROLLED
- AREA | RUNOFF
- WATERSHED NAME
- RUNOFF COEFFICIENT
- AREA IN HECTARES

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5m 2 0 5m

SCALE: 1:200

SUBJECT TO APPROVAL

No.	REVISIONS	BY	DATE
02	ISSUED FOR MUNICIPAL APPROVAL	K.H.	09 JUN 2023
01	ISSUED FOR MUNICIPAL APPROVAL	A.S.	24 DEC 2021

LICENSED PROFESSIONAL ENGINEER V. JOHNSON 100510576 06-09-2023 PROVINCE OF ONTARIO

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1173 CYRVILLE RD, SUITE 202,
OTTAWA ON K1J 7S6

DESIGNED BY:	DRAWN BY:	APPROVED BY:
K.H.	K.H.	V.J.

PROJECT
NAVAN STACKED TOWN HOMES
6001/6005 RENAUD RD,
OTTAWA, ONTARIO

DRAWING TITLE
PRE-DEVELOPMENT
WATERSHED PLAN

PROJECT NO. 210216

DATE NOVEMBER 2021

C701

CITY FILE # D07-12-21-0239

DWG # 18659

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
- ×70.19 EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED WATERMAIN
- PROPOSED 135mmØ SAN SERVICE
- PROPOSED STM SERVICE
- PROPOSED 25mmØ PEX WTR SERVICE
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- EXISTING MANHOLE
- EXISTING CATCHBASIN
- PROPOSED CATCHBASIN-MANHOLE/CATCHBASIN
- PROPOSED MANHOLE
- PROPOSED CURB STOP
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WS-XX CONTROLLED AREA RUNOFF — WATERSHED NAME / RUNOFF COEFFICIENT / AREA IN HECTARES

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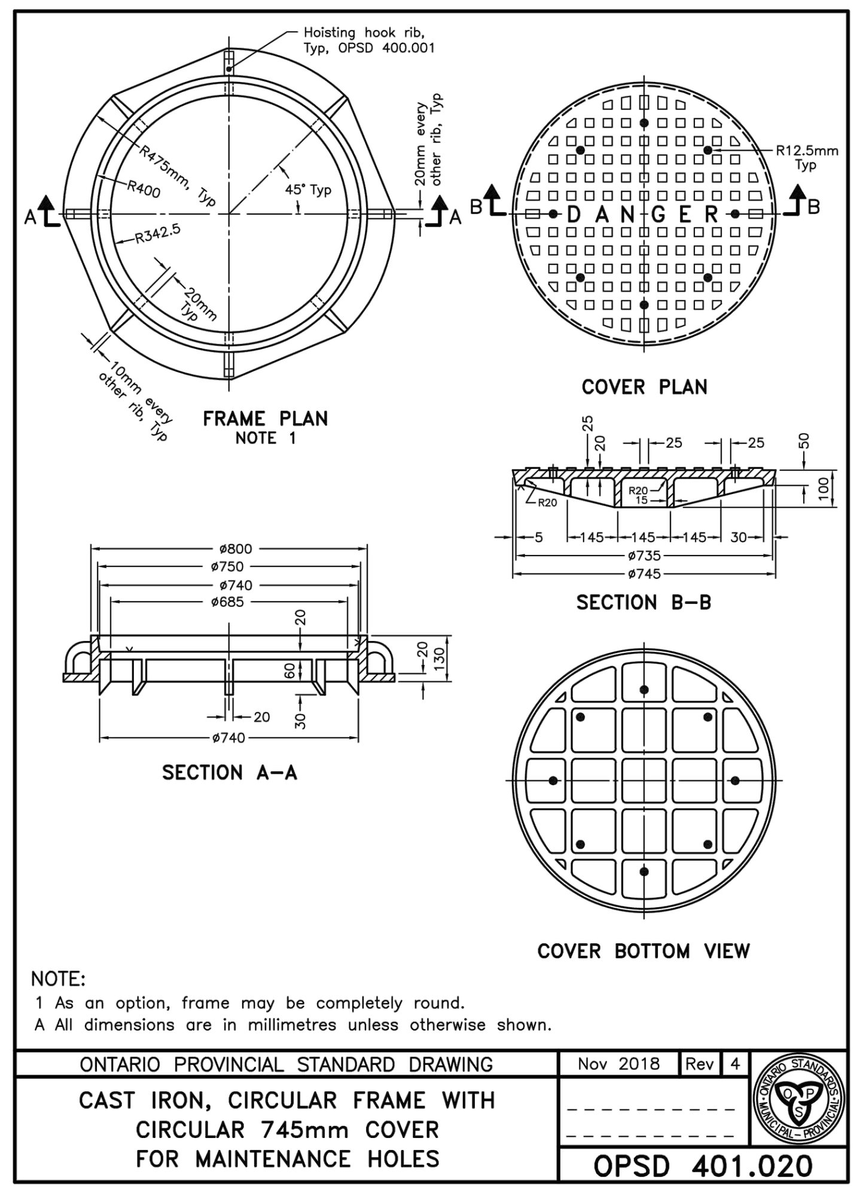
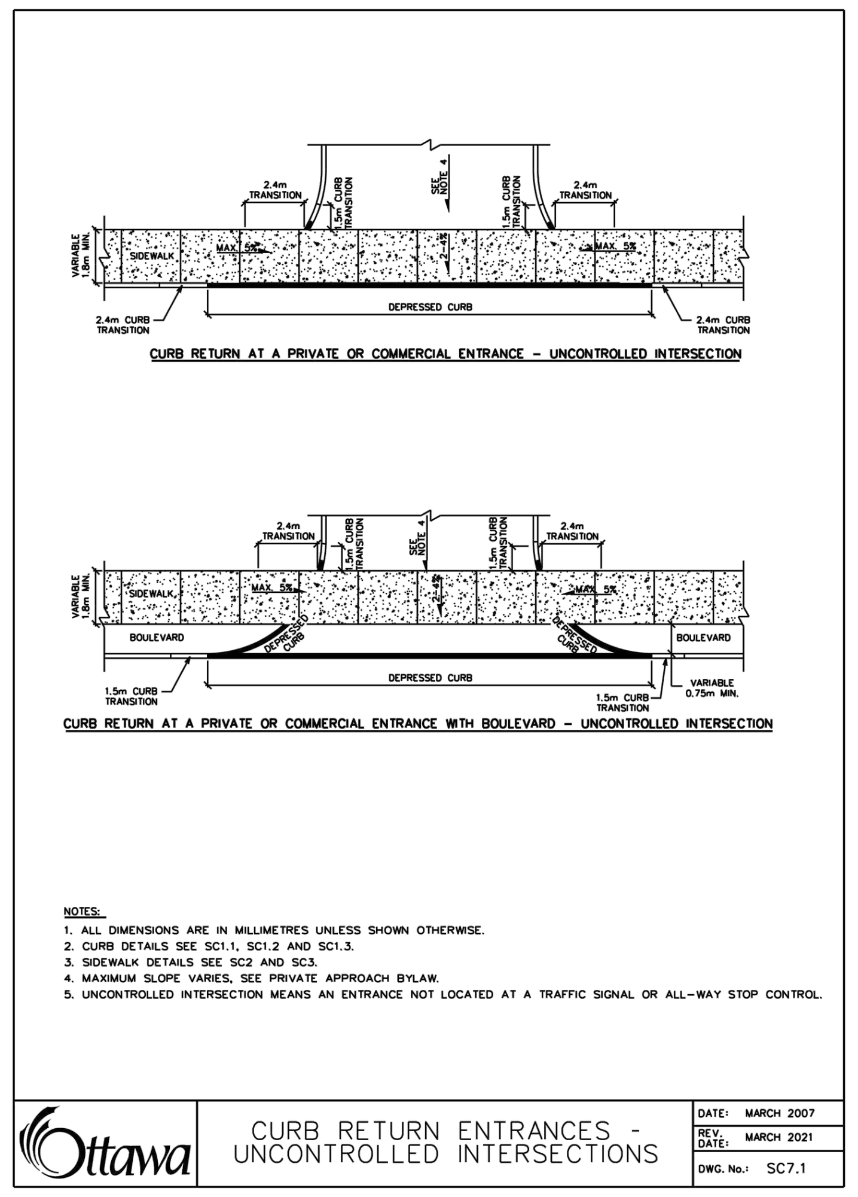
PROJECT
NAVAN STACKED TOWN HOMES
6001/6005 RENAUD RD,
OTTAWA, ONTARIO

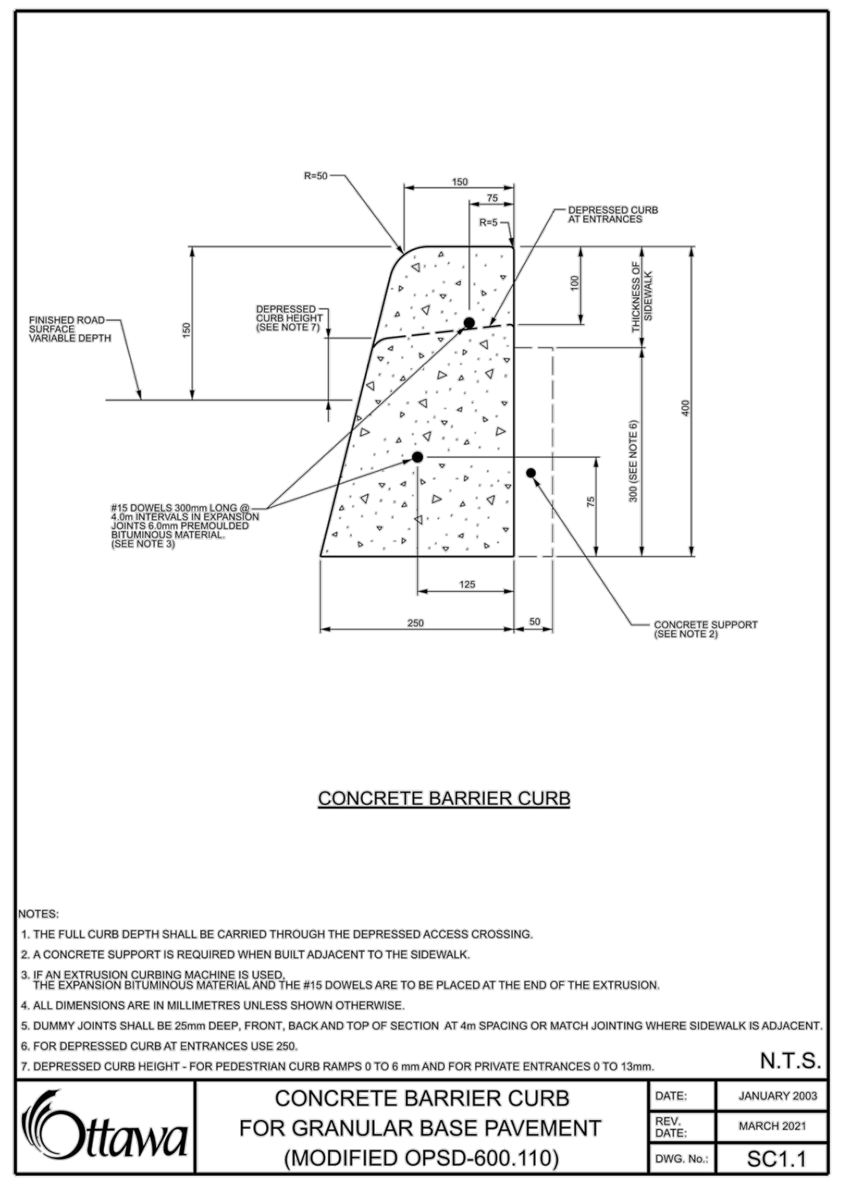
DRAWING TITLE
POST-DEVELOPMENT
WATERSHED PLAN

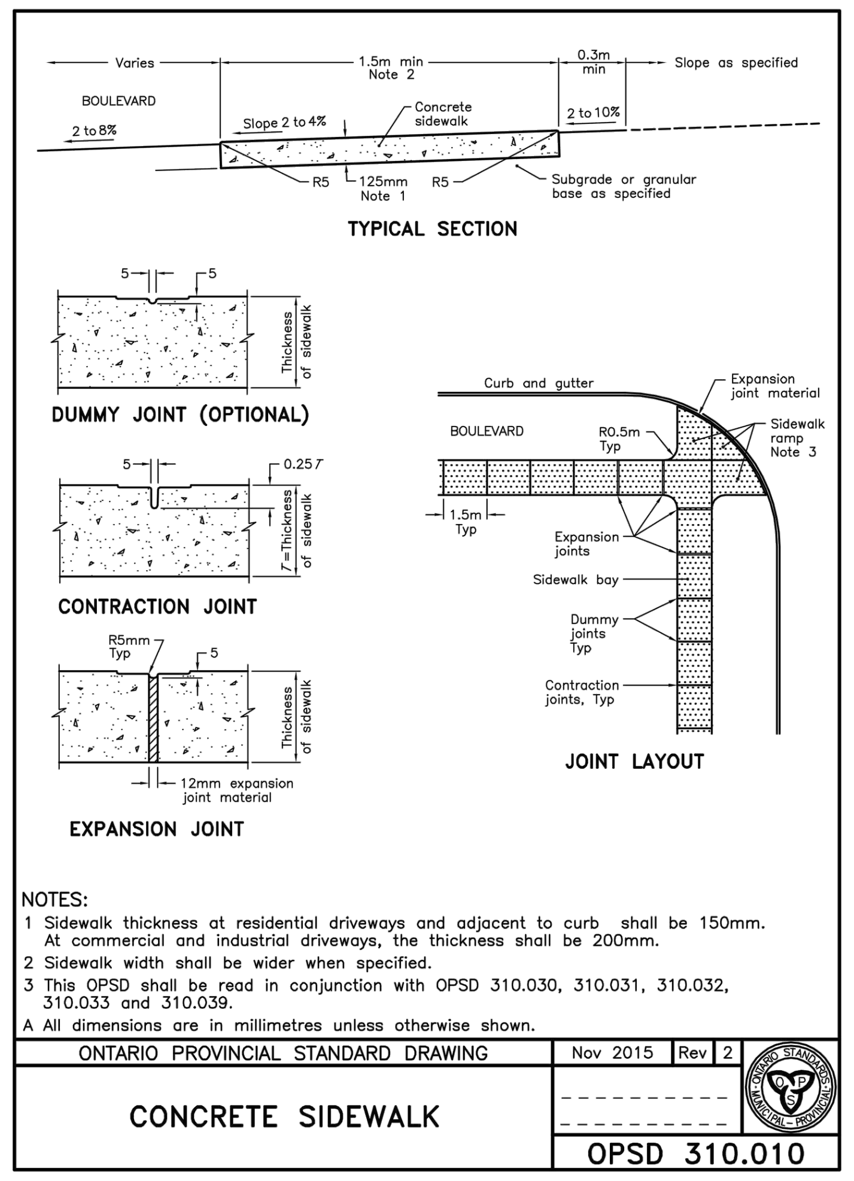
PROJECT NO. 210216
DATE NOVEMBER 2021
C702

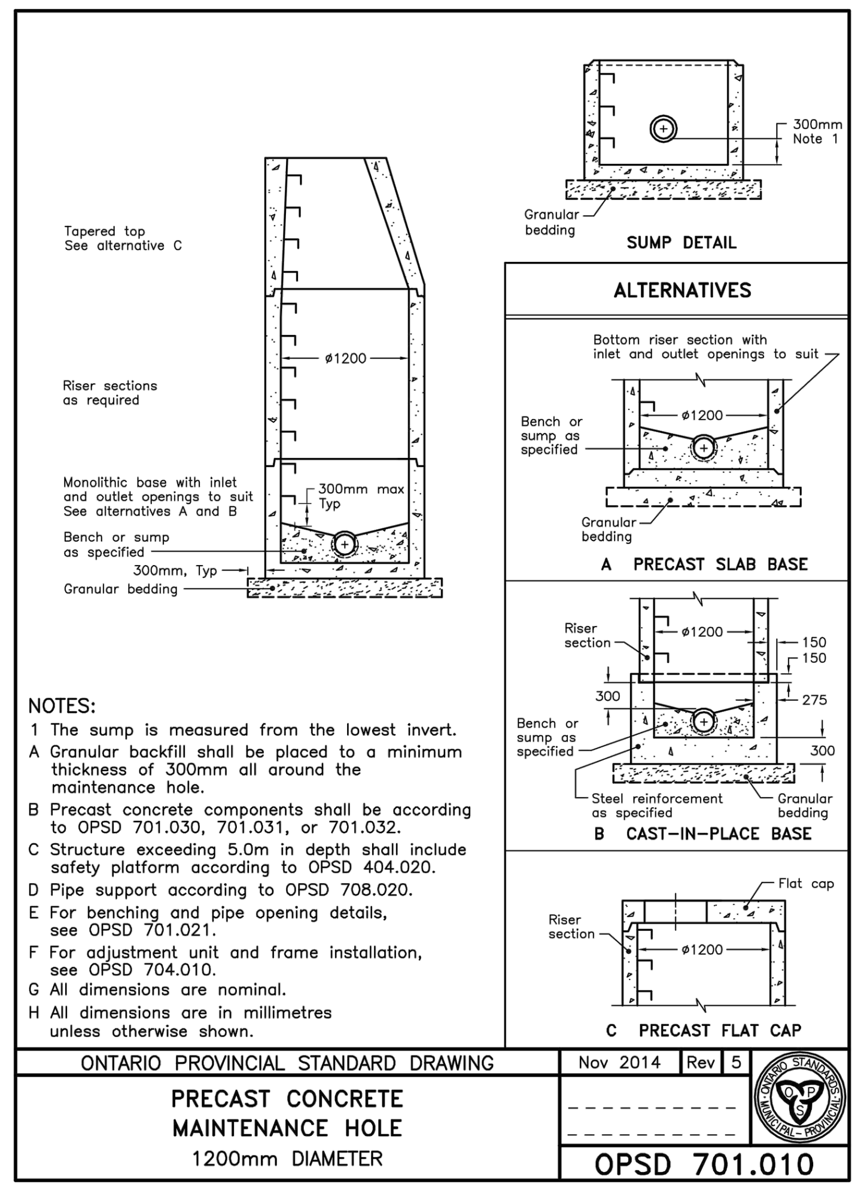
CITY FILE # D07-12-21-0239
DWG # 18659

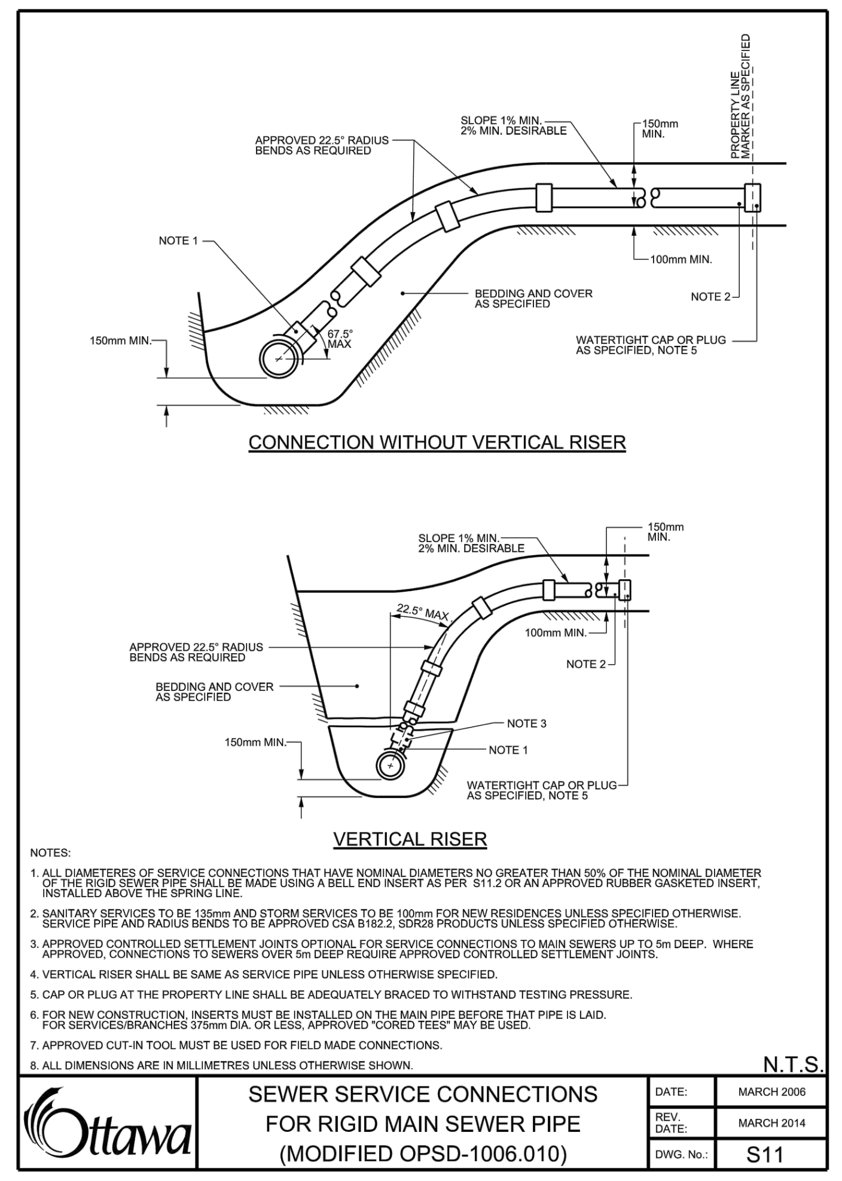


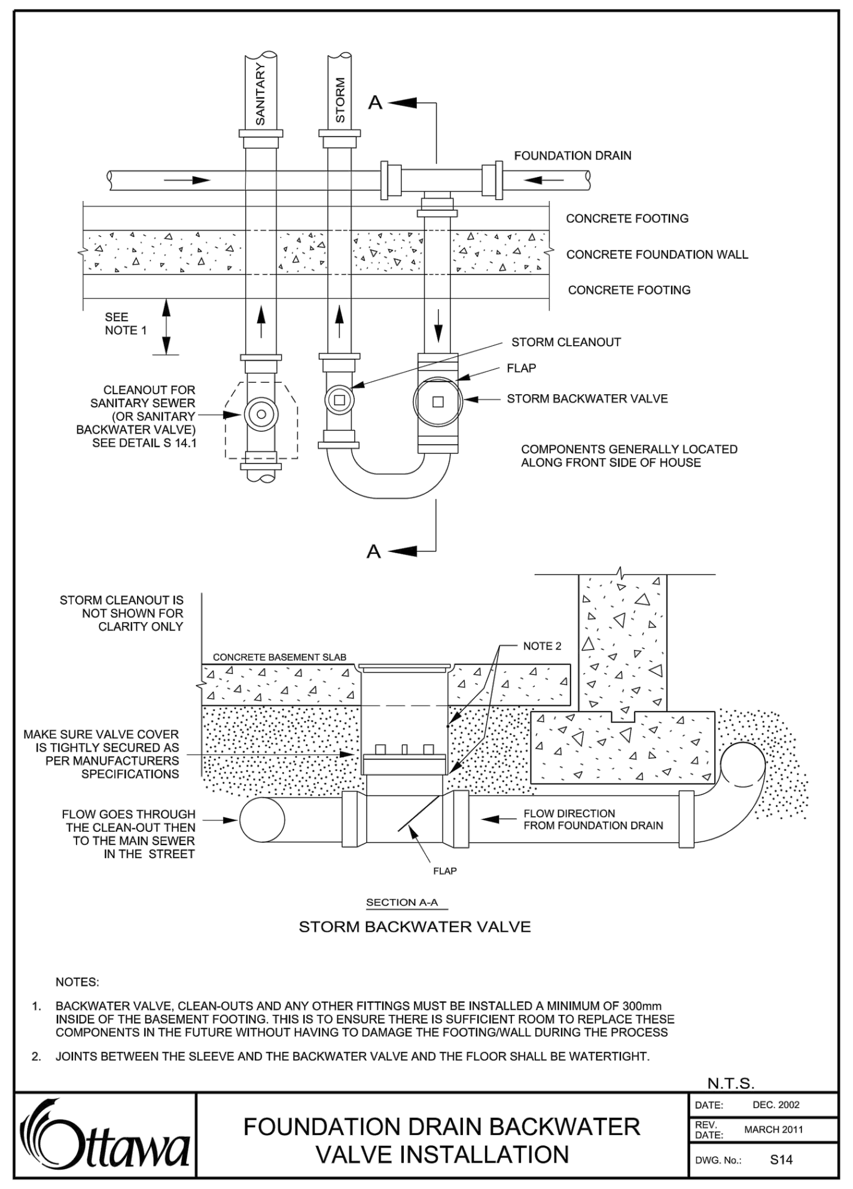


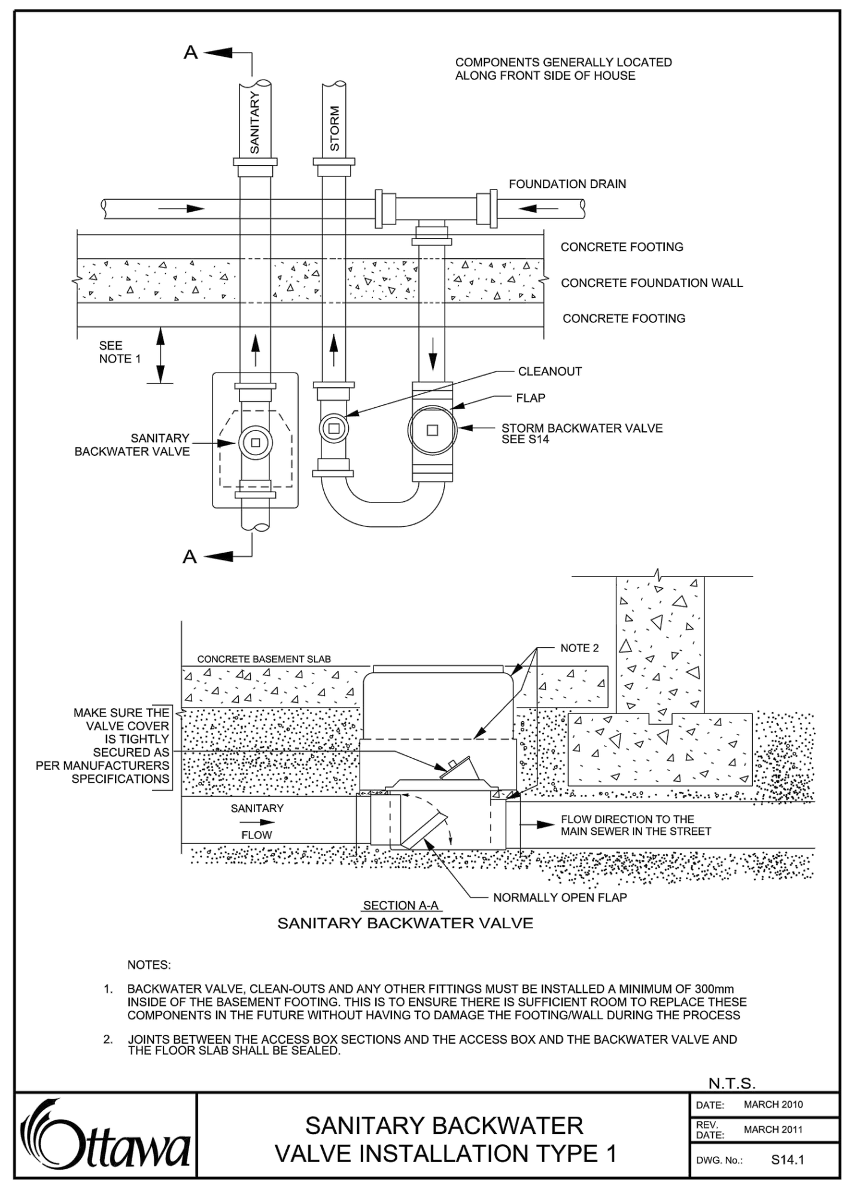


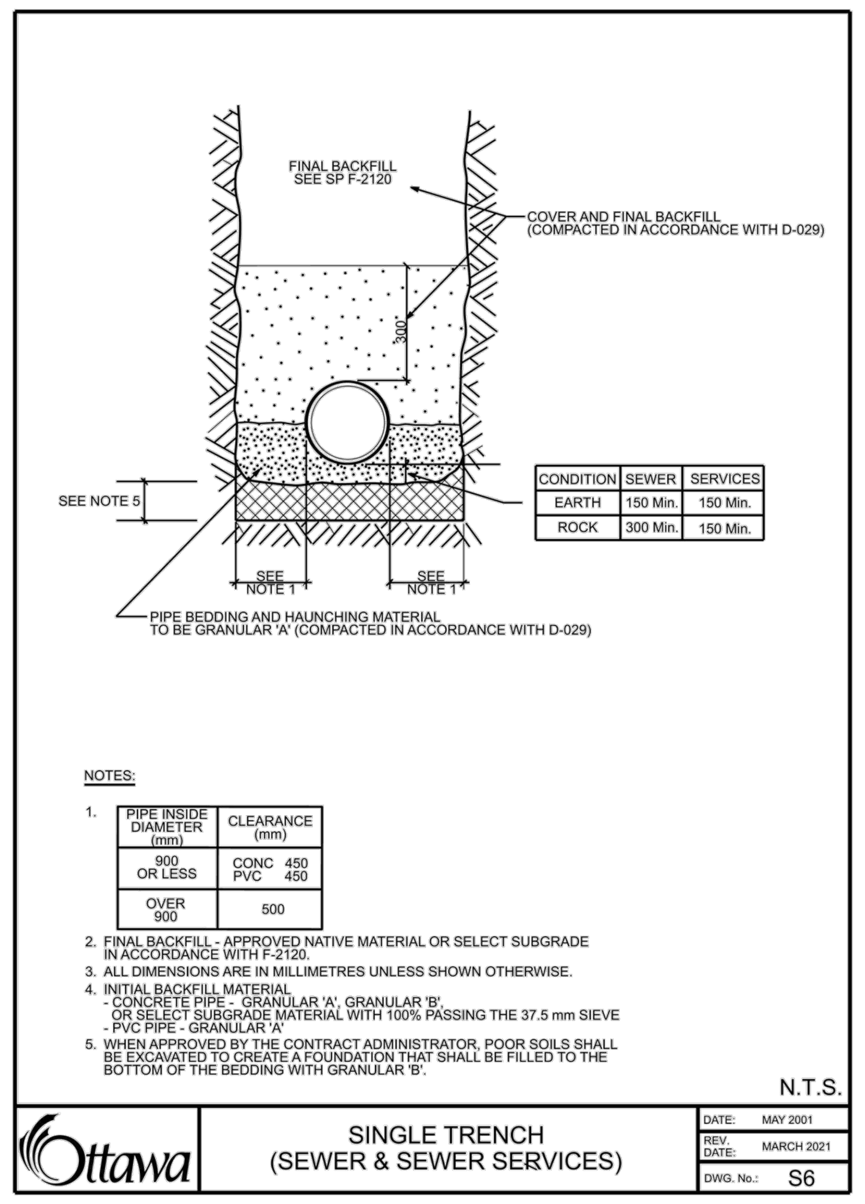


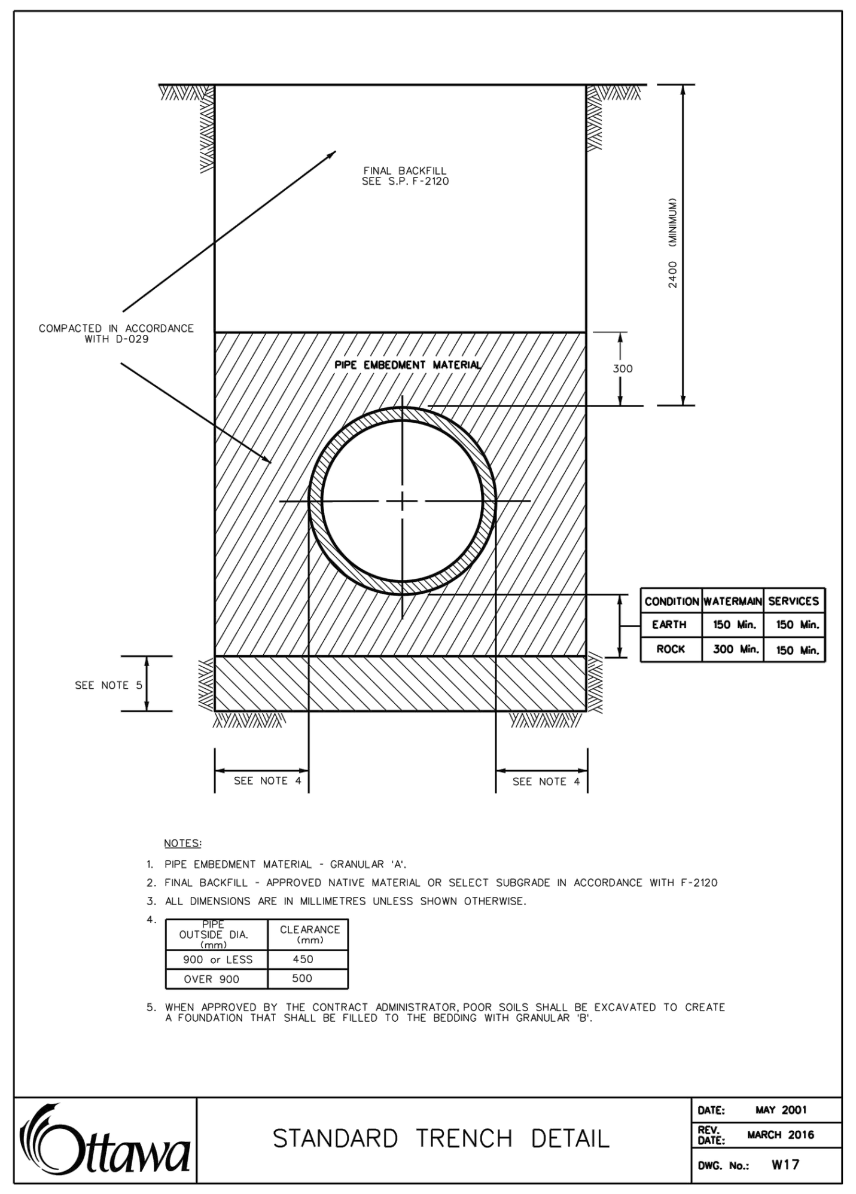


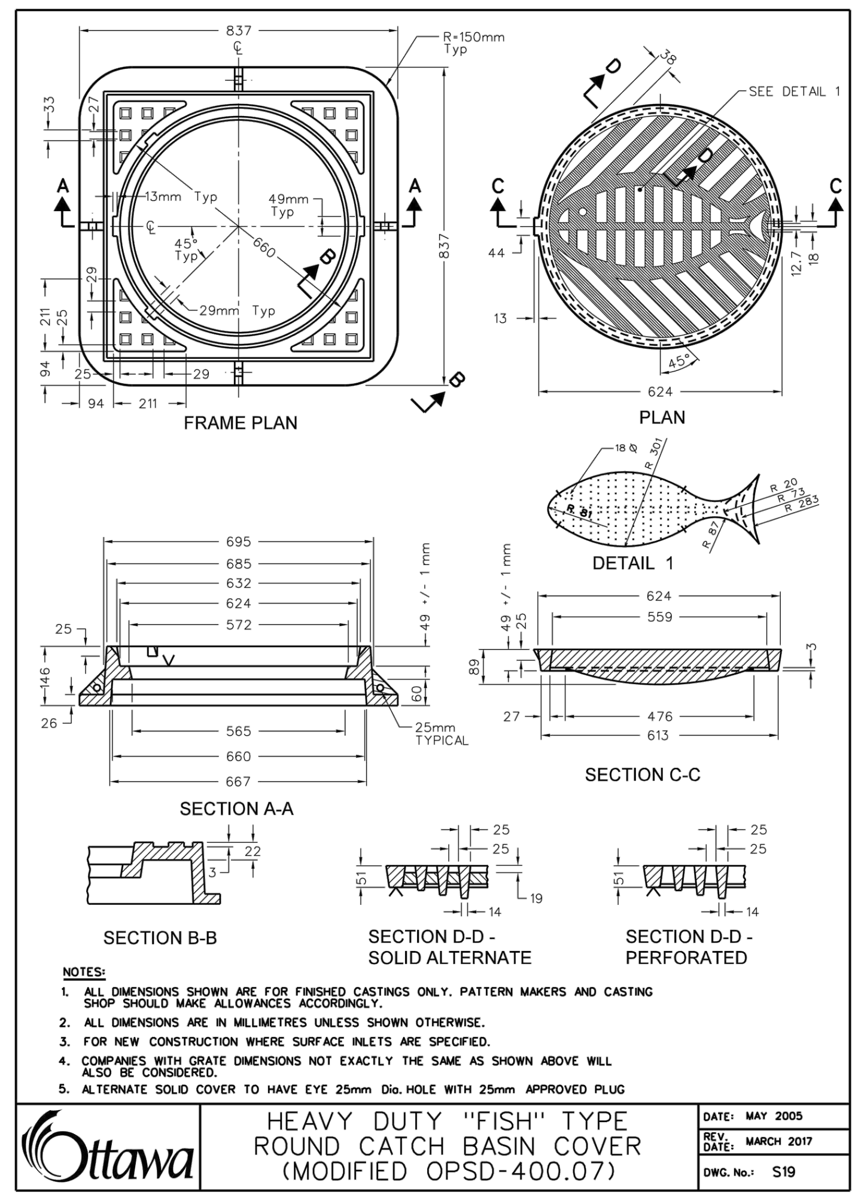


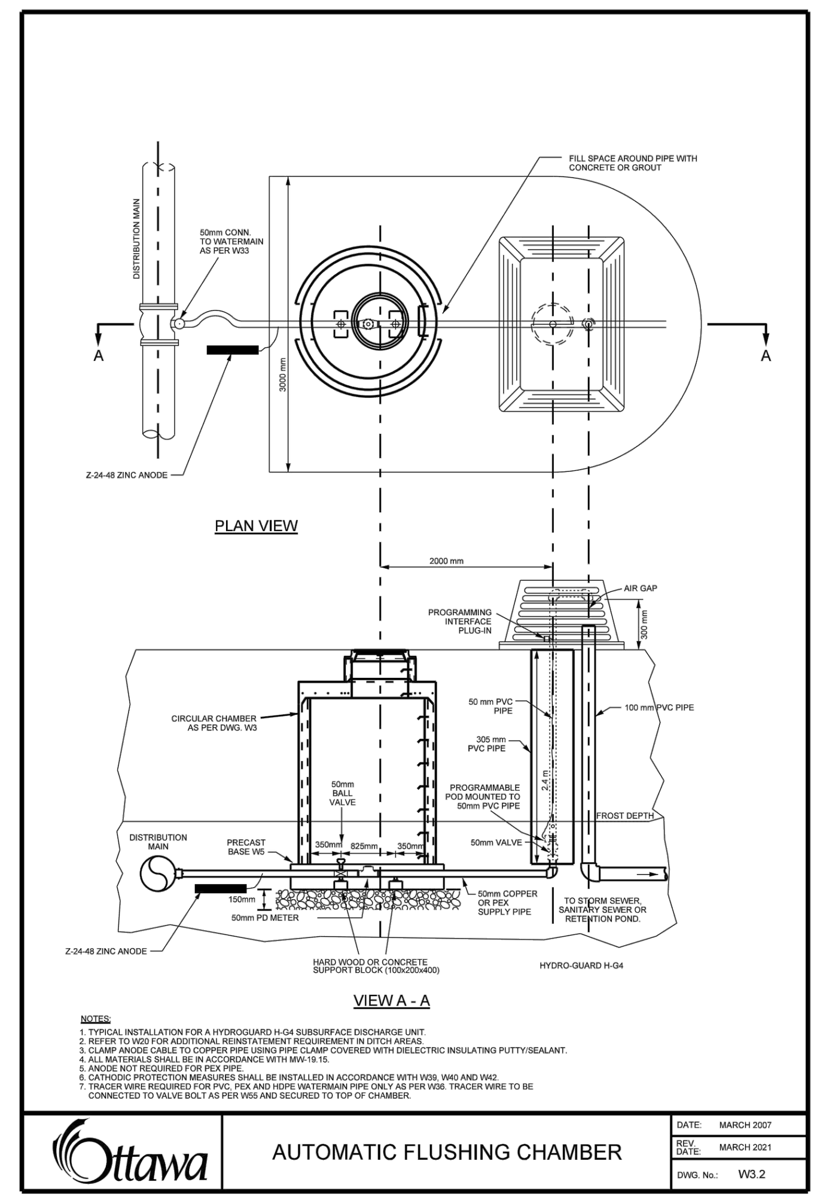


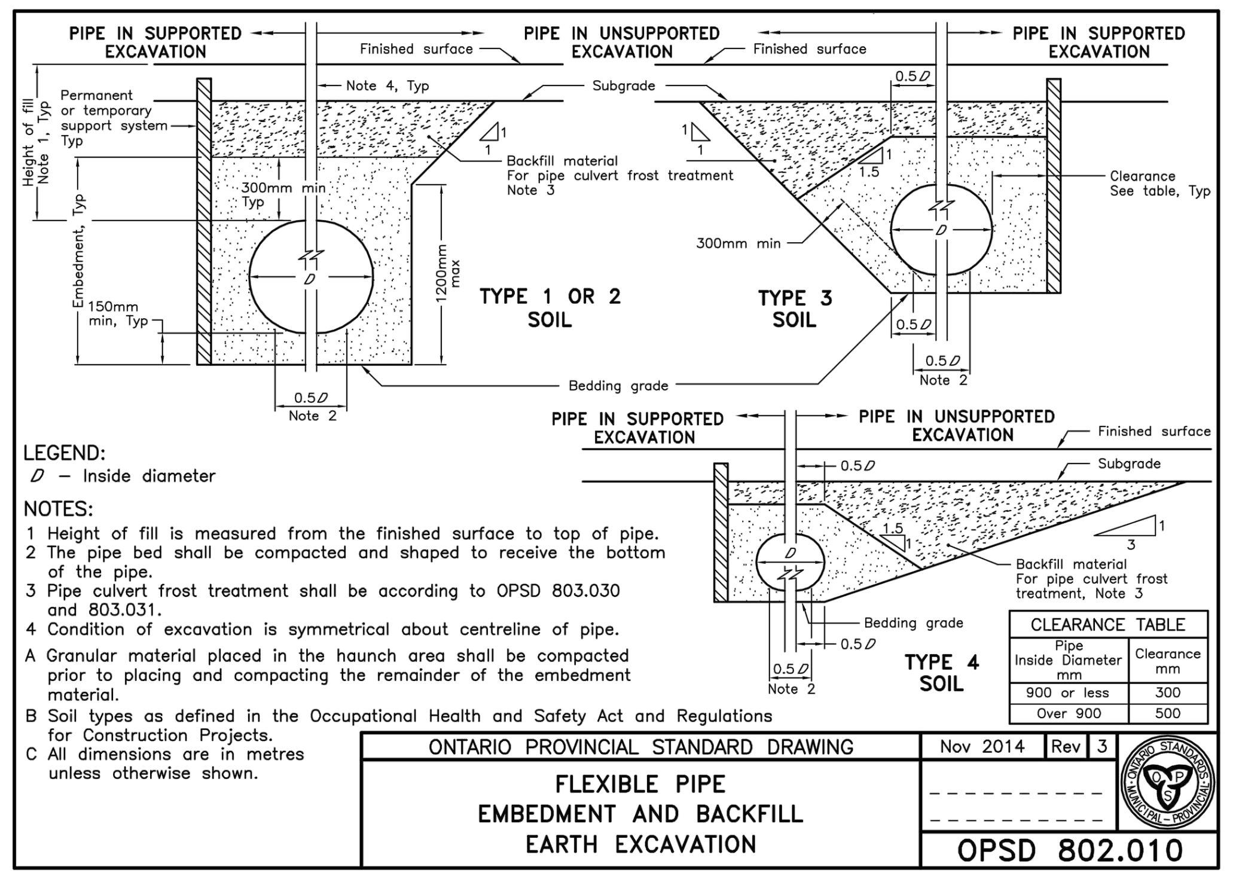


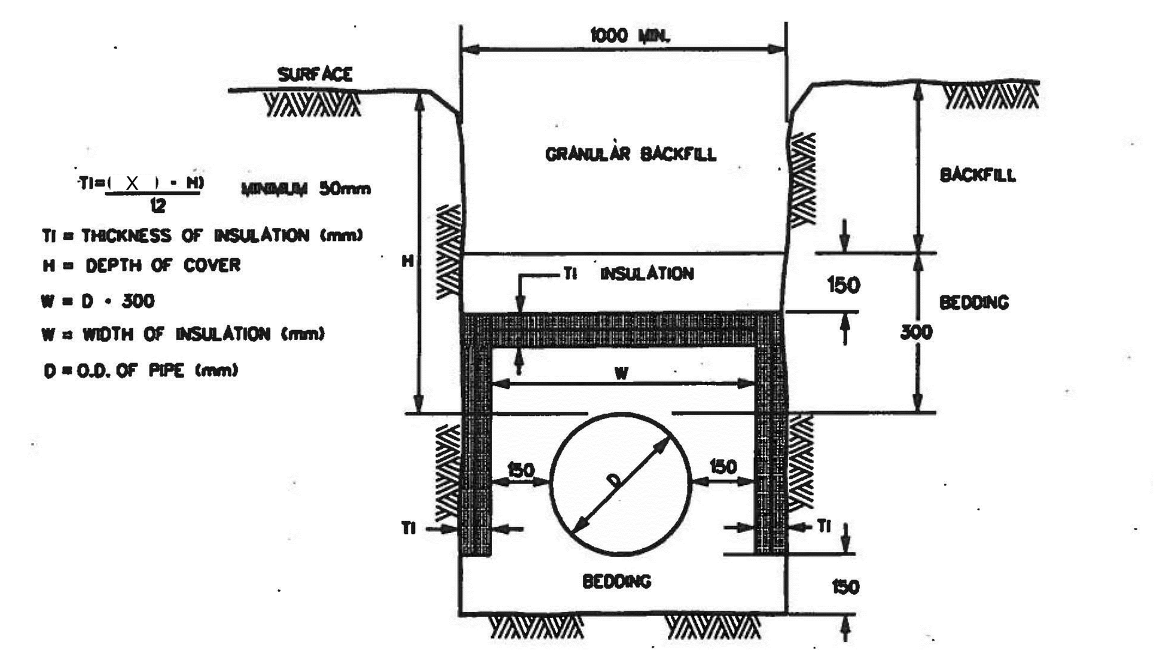








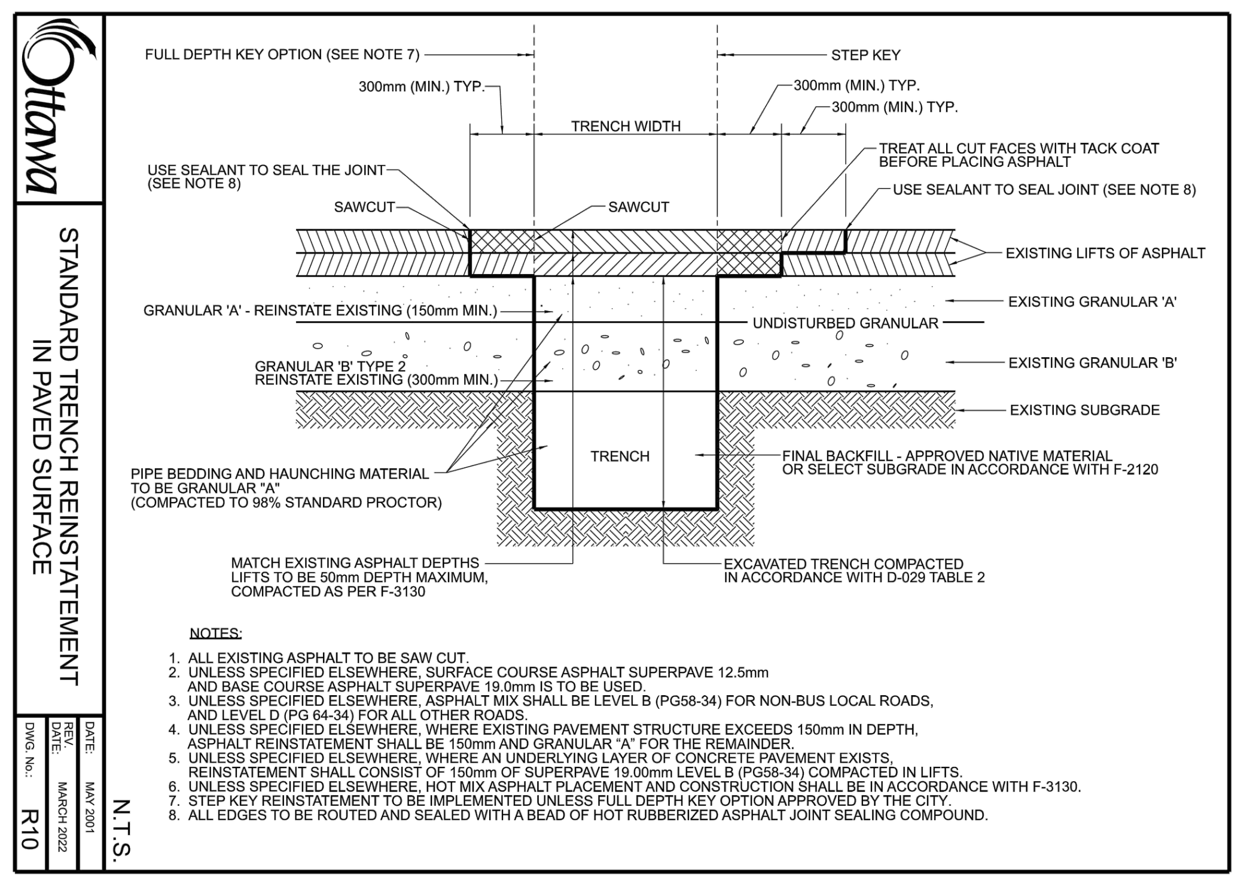




NOTES:
-FOR STORM INSULATION USE AN X VALUE OF 2000 IN THE ABOVE "TI" EQUATION.
-FOR SANITARY INSULATION USE AN X VALUE OF 2500 IN THE ABOVE "TI" EQUATION.
-FOR WATERMAIN INSULATION USE AN X VALUE OF 2400 IN THE ABOVE "TI" EQUATION.
-INCREMENTS OF INSULATION THICKNESS SHALL BE ADJUSTABLE TO 25mm.
-STAGGER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

TYPICAL STORM AND SANITARYSEWER AND WATERMAIN INSULATION DETAIL

(N.T.S.)



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DESIGNED BY:	DRAWN BY:	APPROVED BY:
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PROJECT
NAVAN STACKED TOWN HOMES
6001/6005 RENAUD RD, OTTAWA, ONTARIO

DRAWING TITLE
CONSTRUCTION DETAIL PLAN

PROJECT NO.
210216

DATE
NOVEMBER 2021

C901

CITY FILE # D07-12-21-0239

DWG # 18659

User Inputs

Chamber Model:	MC-3500
Outlet Control Structure:	No
Project Name:	6001/6005 Renaud
Engineer:	N/A
Project Location:	Ontario
Measurement Type:	Metric
Required Storage Volume:	102.01 cubic meters.
Stone Porosity:	40%
Stone Foundation Depth:	229 mm.
Stone Above Chambers:	305 mm.
Average Cover Over Chambers:	458 mm.
Design Constraint Dimensions:	(6.10 m. x 25.00 m.)

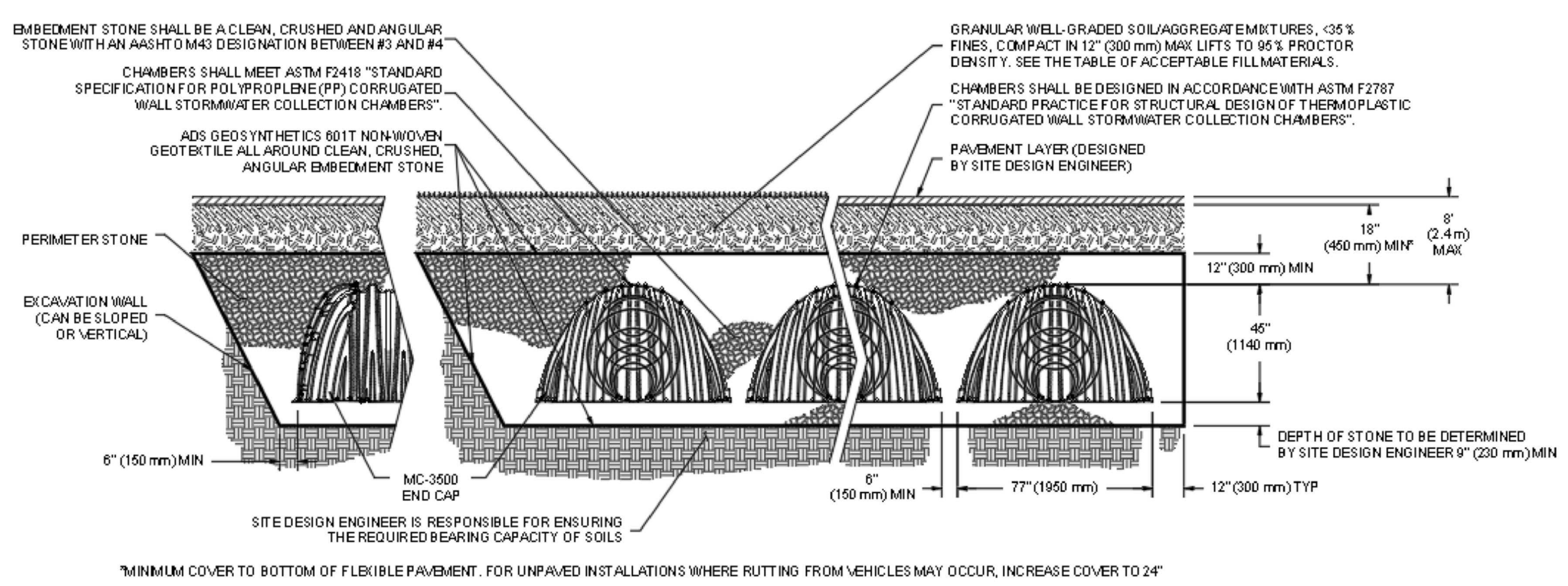
Results

System Volume and Bed Size

Installed Storage Volume:	111.11 cubic meters.
Storage Volume Per Chamber:	3.12 cubic meters.
Number Of Chambers Required:	19
Number Of End Caps Required:	4
Chamber Rows:	2
Maximum Length:	24.80 m.
Maximum Width:	4.68 m.
Approx. Bed Size Required:	111.28 square meters.

System Components

Amount Of Stone Required:	126 cubic meters
Volume Of Excavation (Not Including Fill):	187 cubic meters
Total Non-woven Geotextile Required:	386 square meters
Woven Geotextile Required (excluding Isolator Row):	14 square meters
Woven Geotextile Required (Isolator Row):	74 square meters
Total Woven Geotextile Required:	88 square meters
Impervious Liner Required:	0 square meters

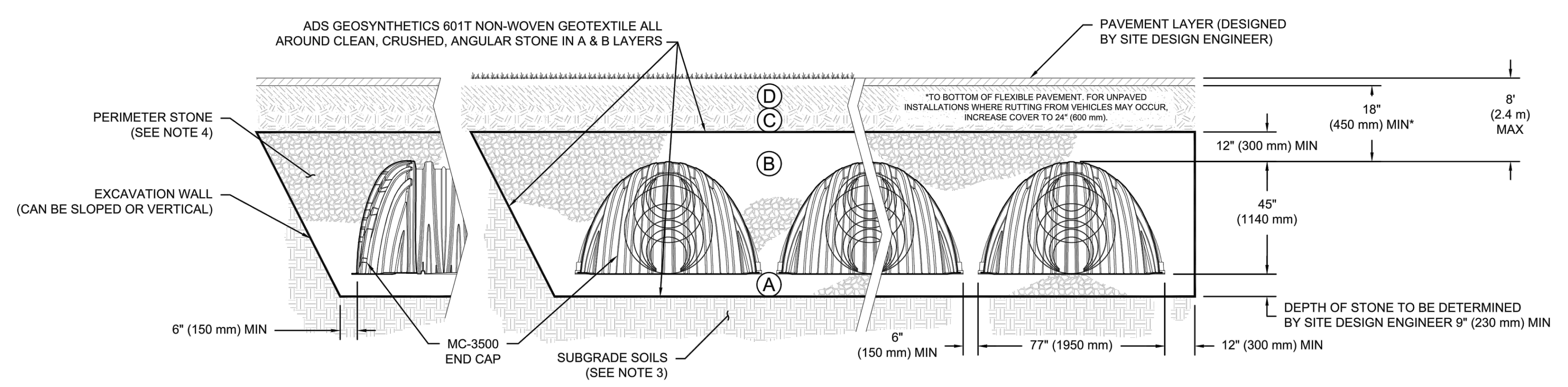


*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 24"

ACCEPTABLE FILL MATERIALS: STORMTECH MC-3500 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
2. MC-3500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

NAVAN STACKED TOWNS
OTTAWA, AL

StormTech® Chamber System

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

SHEET 3 OF 6

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.

SUBJECT TO APPROVAL

No.	REVISIONS	BY	DATE
02	ISSUED FOR MUNICIPAL APPROVAL	K.H.	09 JUN 2023
01	ISSUED FOR MUNICIPAL APPROVAL	A.S.	24 DEC 2021

LICENSED PROFESSIONAL ENGINEER
V. JOHNSON
100510576
06-09-2023
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
1173 CYRVILLE RD, SUITE 202,
OTTAWA ON K1J 7S6

DESIGNED BY:	DRAWN BY:	APPROVED BY:
K.H.	K.H.	V.J.

PROJECT
NAVAN STACKED TOWN HOMES
6001/6005 RENAUD RD,
OTTAWA, ONTARIO

DRAWING TITLE
CONSTRUCTION DETAIL PLAN

PROJECT NO.
210216

DATE
NOVEMBER 2021

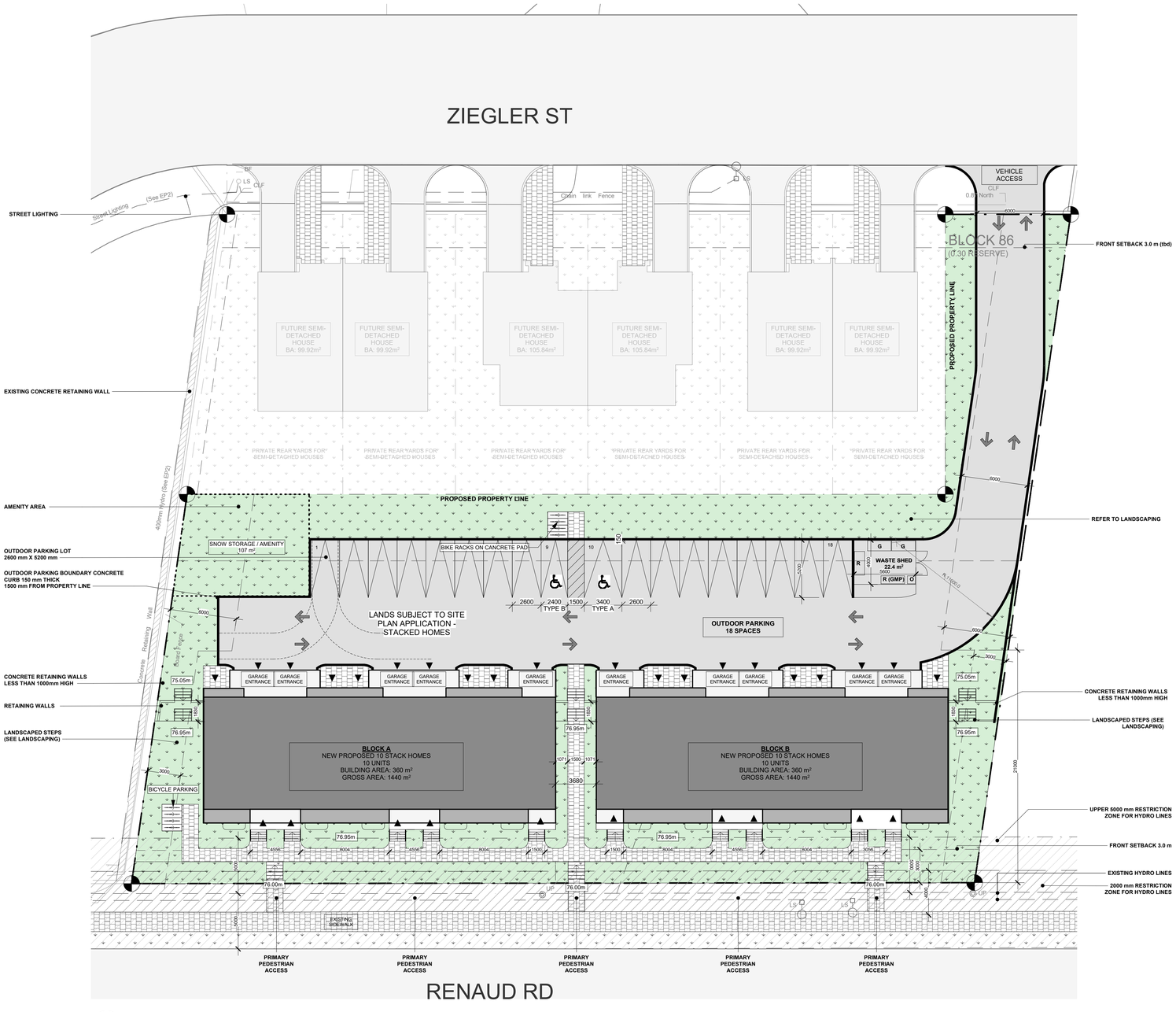
C902

CITY FILE # D07-12-21-0239

DWG # 18659

DRAWINGS/FIGURES

Proposed Site Plan
Legal Survey
As-builts



1 / A050 SITE PLAN
1 : 200

SITE CONTEXT

LEGEND

SURFACES

- PROPOSED GRASS
- RIVERSTONE
- CONCRETE PAVERS
- POURED CONCRETE
- ASPHALT PAVING
- PROPOSED NEW BUILDING
- CONCRETE RETAINING WALL
- EXISTING BUILDING TO BE DEMOLISHED

LINES

- PROPERTY LINE
- SETBACK LINE
- EXISTING FENCE
- NEW FENCE
- 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
- UTILITY POLE
- 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 :

0m 0.5m 1m 2m 4m

PROJECT INFORMATION

SITE SUMMARY

ADDRESS	6001-6005 RENAUD, OTTAWA, ON
PROPOSED ZONING	R4Z
SITE AREA	4598.69 m²
PROPOSED USE	RESIDENTIAL
BUILDING AREA	720.00 m²

ZONING SUMMARY

	REQUIRED	PROPOSED
LOT AREA	N/A	2913.14 m²
LOT WIDTH	N/A	76.12 m
MAX. BUILDING HEIGHT	18.00 m	12.02 m
MAX. PARAPET HEIGHT (Above max. building)	N/A	N/A
SET BACKS : - FRONT YARD	3.00 m	5.39 m
- CORNER SIDE YARD	3.00 m(min.)	N/A
- INTERIOR SIDE YARD	3.00 m/ 6.00m	3.10 m
- REAR YARD	6.00 m	15.88 m
- ADDITIONAL REQ	N/A	N/A
MIN LANDSCAPED AREA	30% OF LOT	35% (1021.6 m2)

VEHICULAR PARKING

	REQUIRED	PROPOSED
MIN PARKING SPACES	24	24(10 int)
MIN VISITOR PARKING SPACES	4	4
MIN ACCESSIBLE PRKG SPACES (incl. in count)	1	1

BICYCLE PARKING

	REQUIRED	PROPOSED
MIN PARKING SPACES	5	8
	REQUIRED	PROPOSED

WASTE CONTAINERS

GARBAGE (0.231 y³ / unit)	5	6
RECYCLING GMP (0.018 y³ / unit)	2	2
RECYCLING FIBRE (0.062 y³ / unit)	2	2
ORGANICS (L)	240	240

AMENITY AREA

	REQUIRED	PROPOSED
PRIVATE	60.00 m²	151.00 m² BALCONIES
COMMUNAL	60.00 m²	107.00 m² EXTERIOR

BUILDING SUMMARY

	UNITS	GFA - OBC
SEMI-BASEMENT		420.00 m²
GROUND	20	313.00 m²
LEVEL 2		361.00 m²
LEVEL 3	20	321.00 m²

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

NOT FOR CONSTRUCTION / PAS POUR CONSTRUCTION

PROJECT TEAM / ÉQUIPE DU PROJET :

KEY PLAN / PLAN CLÉ :

CLIENT :

Landric HOMES

revision	description	date
1.7	ISSUED FOR SPC	23-04-28
1.6	ISSUED FOR SPC	23-04-05
1.4	ISSUED FOR 66%	23-02-24
1.3	City discussion	22-11-16
1.2	City discussion	22-10-27
1.1	Issued for 33%	22-10-12
1.0	SITE PLAN	22-10-11

PROJECT NAME / NOME DU PROJET :

6001-6005 Renaud

DRAWING NAME / NOM DU DESSIN :

SITE PLAN

DRAWING INFORMATION / INFORMATION DU DESSIN :

PROJECT NO. / NO. DE PROJET :	22170
DATE :	2023-04-28
DRAWN BY / DESSINÉ PAR :	E.T.
REVIEWED BY / VÉRIFIÉ PAR :	L.G.
SCALE / ÉCHELLE :	As indicated
PROJECT PHASE / PHASE DU PROJET :	1

DWG NO. / NO. DESSIN :

A050

REVISION NO. / NO. DE RÉVISION : 1.7

D07-12-21-0239

#18659

BIM 360://22170 - 6001-6005 Renaud/22170_6001-6005Renaud_DOCUMENTATION.rvt

TOPOGRAPHICAL PLAN OF SURVEY OF

PART OF LOT 7
CONCESSION 3 (OTTAWA FRONT)
(Geographic Township of Gloucester)
CITY OF OTTAWA

Surveyed by Annis, O'Sullivan, Vollebekk Ltd.

Scale 1 : 250

10 7.5 5.0 2.5 0 5 10 Metres

Metric

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

Surveyor's Certificate

I CERTIFY THAT :

1. This survey and plan are correct and in accordance with the Surveys Act, the Surveyors Act and the regulations made under them.
2. The survey was completed on May 7, 2021.

May 14, 2021 — Date

"Tyler Allison"
Tyler J. Allison
Ontario Land Surveyor

Rev.	Date	
1	Oct. 1/21	Add Pole Conductors and Pole Transformer

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

Notes & Legend

	Denotes	
—□—	"	Survey Monument Planted
—■—	"	Survey Monument Found
SIB	"	Standard Iron Bar
SSIB	"	Short Standard Iron Bar
IB	"	Iron Bar
OU	"	Origin Unknown
NBW	"	Nail & Washer
(WIT)	"	Witness
Meas.	"	Measured
(AOG)	"	Annis, O'Sullivan, Vollebekk Ltd.
(PI)	"	Registered Plan 4M-1400
(P2)	"	Registered Plan 4M-1373
(P3)	"	Plan 5R-5324
(P4)	"	Plan by Stantec Job No. 161650000-109, Ref 4M-1400
EPI	"	Plan and Profile of Ziegler Street (T.L. Mak Engineer Consultants, Project 805-47) Drawing P-2 Rev. 5 "As Recorded" 07/22/14
EP2	"	City of Ottawa U.C.C. Central Registry Data, Sheet J-29-24, Dated August 2015
EP3	"	Plan and Profile of Renaud Road (Stantec Project 160400704) Drawing PP-2 Rev. 7 "As Recorded" 11/12/12
EP4	"	City of Ottawa U.C.C. Central Registry Data, Sheet J-29-30, Dated August 2015
(DI)	"	Inst. CT257733
	"	Deciduous Tree
	"	Coniferous Tree
FH	"	Fire Hydrant
MH-ST	"	Maintenance Hole (Storm Sewer)
MH-S	"	Maintenance Hole (Sanitary)
MH	"	Maintenance Hole (Unitentified)
CB	"	Catch Basin
GM	"	Gas Meter
S	"	Sign
CLF	"	Chain Link Fence
BF	"	Board Fence
UP	"	Utility Pole
LS	"	Light Standard
A/C	"	Air Conditioner
Ø	"	Diameter
+ 65.00	"	Location of Elevations
+ 65.00*	"	Top of Concrete Curb Elevation
+ 65.00	"	Top of Retaining Wall Elevation
C/L	"	Centreline
	"	Property Line
ST	"	Underground Storm Sewer
S	"	Underground Sanitary Sewer
W	"	Underground Water
P	"	Underground Power
G	"	Underground Gas
OHW	"	Overhead Wires

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
V-11295

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

Bearings are grid, derived from Can-Net 2016 Real Time Network GPS observations and are referenced to Specified Control Points 01919680184 and 01919843761, MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

Coordinate values are to urban accuracy in accordance with O. Reg. 216/10.

01919680184	Northing	5040610.16	Easting	384736.56
01919843761	Northing	5036178.12	Easting	372436.11

ELEVATION NOTES

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

UTILITY NOTES

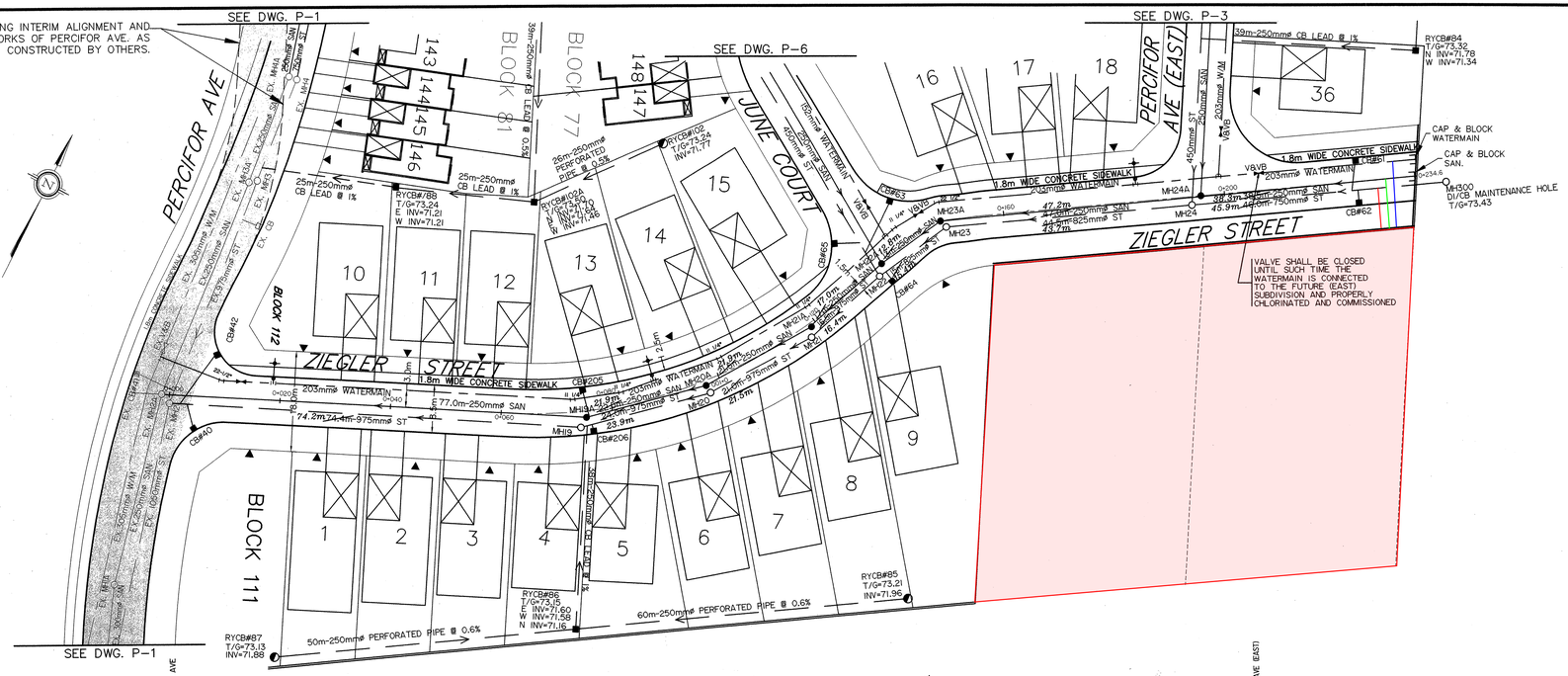
1. This drawing cannot be accepted as acknowledging all of the utilities and it will be the responsibility of the user to contact the respective utility authorities for confirmation.
2. Only visible surface utilities were located.
3. A field location of underground plant by the pertinent utility authority is mandatory before any work involving breaking ground, probing, excavating etc.
4. Underground services (including invert elevations) shown are compiled from EP1, EP2, EP3 and EP4 and are subject to field confirmation.

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
165 Bay Street
Embrun, Ont. K0A 1W1
Phone: (613) 443-3364
Email: embrun@aovltd.com
Ontario Land Surveyors

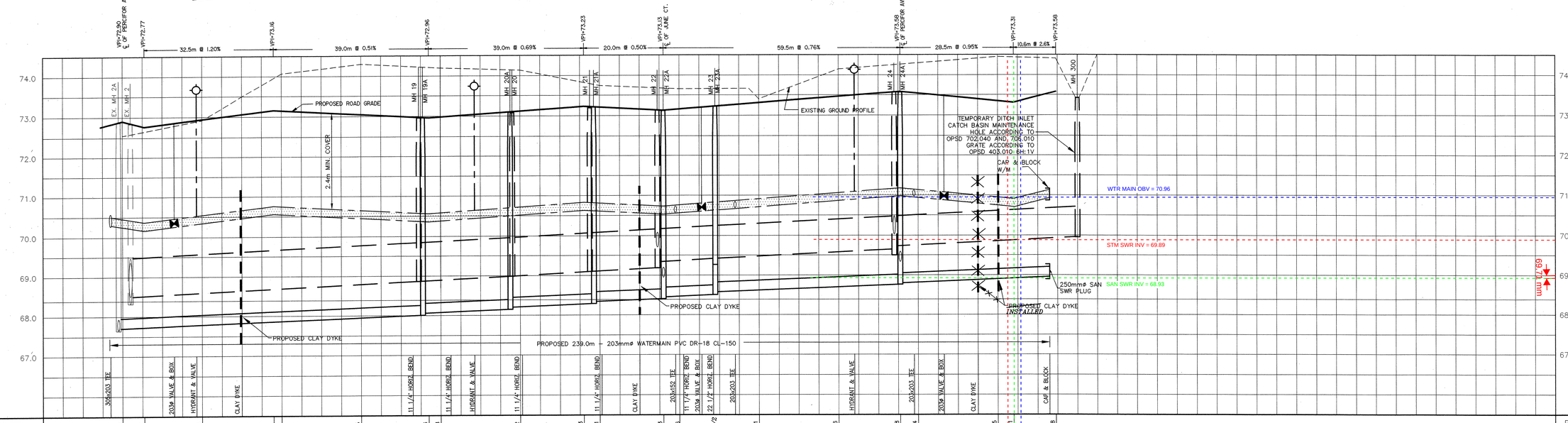
Job No. E-11136-21 A.M.

ROAD ALLOWANCE BETWEEN CONCESSIONS 3 AND 4 (OTTAWA FRONT) KNOWN AS RENAUD ROAD (FOURTH LINE ROAD)

EXISTING INTERIM ALIGNMENT AND SURFACE WORKS OF PERCIFOR AVE. AS CONSTRUCTED BY OTHERS.



"T.L. MAK ENGINEERING CONSULTANTS LTD. AGREED TO PERFORM *A GENERAL REVIEW OF CONSTRUCTION ACTIVITIES DURING THE INSTALLATION OF SANITARY AND STORM SEWERS AND A WATERMAIN FOR THIS PROJECT. IT IS* T.L. MAK ENGINEERING CONSULTANTS LTD.*'S OPINION, TO THE BEST OF KNOWLEDGE AVAILABLE, THAT THIS WORK HAS BEEN DONE IN GENERAL CONFORMANCE WITH CITY OF OTTAWA STANDARDS ACCORDING TO THE DESIGN AND DRAWINGS THAT HAVE BEEN APPROVED BY THE CITY OF OTTAWA.*"



NOTES:

1. EXISTING SERVICES AND UTILITIES SHOWN ON THIS DRAWING WERE TAKEN FROM THE BEST AVAILABLE RECORDS BUT ARE NOT COMPLETE. CONTRACTOR IS REQUIRED TO CHECK IN THE FIELD FOR LOCATION AND ELEVATION OF PIPES AND CHECK WITH UTILITY COMPANIES BEFORE DIGGING.
2. ANY SURFACE OR SUBSURFACE INFORMATION AND DATA FURNISHED TO THE CONTRACTOR IN RELATION TO THE CONTRACT AS INDICATED ON THE DRAWINGS OR BY REPORT, IS NOT INTENDED AS A REPRESENTATION OF WARRANTY, BUT IS FURNISHED IN ORDER THAT THE CONTRACTOR MAY HAVE ACCESS TO THE SAME INFORMATION WHICH IS AVAILABLE TO THE OWNER AND ENGINEERS WILL NOT BE RESPONSIBLE FOR THE ACCURACY THEREOF OR ANY DEDUCTION, INTERPRETATION OR CONCLUSION DRAWN THEREFROM BY THE CONTRACTOR.
3. CONTRACTOR IS ADVISED TO COLLECT INFORMATION ON SOIL CONDITIONS AS DEEMED NECESSARY.
4. CONSTRUCT CLAY DYKE AS SHOWN ON THE LOCATION OF THIS DRAWING AND REFER TO DWG. No. CD-1 FOR DETAILS.
5. ROADWAY CATCH BASIN LEAD SHALL BE 200mmø PVC AT SLOPE OF 1% (MIN.) UNLESS OTHERWISE NOTED.
6. REFER TO STANTEC CONSULTING'S SWM REPORT INLET CONTROL DATA TABLE FOR DETAILS OF CB LEAD INVERT ELEVATION AND INLET CONTROL DEVICE (ICD) INSERTS.
7. SEWER BEDDING SHALL BE CLASS "B" UNLESS OTHERWISE NOTED.
8. CONSTRUCT ALL STORM AND SANITARY SEWER SYSTEMS IN ACCORDANCE WITH CITY OF OTTAWA'S LATEST REVISED STANDARDS OTHERWISE AS PER OPSS REQUIREMENTS AND DONE TO THE SATISFACTION OF THE ENGINEERS AND THE CITY.
9. ALL WATERWORKS TO BE CONSTRUCTED TO THE CITY OF OTTAWA'S LATEST REVISED STANDARDS AND REQUIREMENTS.
10. CATHODIC PROTECTION FOR PVC PRESSURE PIPE WATERMAIN SYSTEM AS PER CITY'S WS-40 DETAILS.
11. MAXIMUM ALLOWABLE DEFLECTION IS 1.5° PER PIPE FOR 150mm AND 200mm DIAMETER WATERMAIN.

NO.	REVISION	DATE	BY
5	*AS RECORDED*	*07/22/14*	*TLM*
4	ADDED 1.8m SIDEWALK ON ZIEGLER ST. AND ADJUSTED HYDRANT LOCATION	04/01/09	TLM
3	REVISED REF. NO. OF LOTS & TOWNS PER SUBDIVISION 4M-PLAN AND PER CITY'S COMMENTS OF 10/09/08	02/23/09	TLM
2	REVISIONS AS PER CITY'S COMMENTS OF AUG.14/08	09/12/08	TLM
1	REVISIONS AS PER CITY'S COMMENTS OF FEB./08	06/10/08	TLM

RECORD DRAWING
DATE July22/14

SCALE
1:500 HORIZONTAL
1:50 VERTICAL

DESIGN T.L.M.
CHECKED T.L.M.
DRAWN BY B.V.
CHECKED T.L.M.
APPROVED T.L.M.

PROJECT LOCATION
PART OF LOT 7, CONCESSION 3 (OF)
GEOGRAPHIC TOWNSHIP OF GLOUCESTER
CITY OF OTTAWA
FORMERLY IN THE CITY OF GLOUCESTER

PROJECT
JEAN GUY RIVARD SUBDIVISION
BRADLEY ESTATES NORTH
PLAN AND PROFILE
ZEIGLER STREET (STA. 0-003 TO 0+240)

T.L. MAK ENGINEERING CONSULTANTS LTD.
CONSULTING ENGINEERS
14962

PROJECT No.	DATE	DRAWING No.
805-47	FEBRUARY 2007	P-2

D07-16-08-0009