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Stormwater Management Report and Servicing Brief

Site Redevelopment
1925 Merivale Rd
Nepean, Ontario

Prepared for:

Peter Drummond & Son Ltd.

Attn: Russell Drummond

LRL File No.: 240272

November 11, 2025



TABLE OF CONTENTS

| | | |
|-----------|---|-----------|
| 1 | INTRODUCTION AND SITE DESCRIPTION | 1 |
| 2 | EXISTING SITE AND DRAINAGE DESCRIPTION | 2 |
| 3 | SCOPE OF WORK | 2 |
| 4 | REGULATORY APPROVALS | 3 |
| 5 | WATER SUPPLY AND FIRE PROTECTION | 3 |
| 5.1 | Existing Water Supply Services..... | 3 |
| 5.2 | Water Supply Servicing Design | 3 |
| 6 | SANITARY SERVICE | 5 |
| 6.1 | Existing Sanitary Sewer Services..... | 5 |
| 6.2 | Sanitary Sewer Servicing Design | 5 |
| 7 | STORMWATER MANAGEMENT | 6 |
| 7.1 | Existing Stormwater Infrastructure | 6 |
| 7.2 | Design Criteria | 6 |
| 7.2.1 | Water Quality | 6 |
| 7.2.2 | Water Quantity | 7 |
| 7.3 | Method of Analysis | 7 |
| 7.4 | Proposed Stormwater Quantity Controls..... | 7 |
| 8 | EROSION AND SEDIMENT CONTROL | 9 |
| 9 | CONCLUSION | 10 |
| 10 | REPORT CONDITIONS AND LIMITATIONS | 11 |



APPENDICES

- Appendix A Pre-consultation / Correspondence
- Appendix B Water Supply Calculations
- Appendix C Wastewater Calculations
- Appendix D Stormwater Management Calculations
- Appendix E Civil Engineering Drawings
- Appendix F Survey, As-Built Drawings

LIST OF TABLES

| | |
|--|---|
| Table 1: City of Ottawa Water Servicing Design Parameters..... | 3 |
| Table 2: Summary of Boundary Conditions | 4 |
| Table 3: Fire Protection Summary Table | 5 |
| Table 4: City of Ottawa Wastewater Design Parameters | 5 |
| Table 5: Post-development Drainage Areas and Runoff Coefficients | 8 |
| Table 6: Summary of Stormwater Release Rates & Storage (100-yr)..... | 9 |

LIST OF FIGURES

| | |
|--|---|
| Figure 1 – Aerial View of Proposed Development | 1 |
|--|---|



1 INTRODUCTION AND SITE DESCRIPTION

LRL Associates Ltd. was retained by Peter Drummond & Son Ltd. to complete a Stormwater Management Analysis and Servicing Brief for the proposed site redevelopment located at 1925 Merivale Road, Nepean, Ontario. The property is legally described as Part of Lot 27, Concession A (Rideau Front), City of Ottawa, and is designated under the General Industrial Zone (IG). The location of the proposed development can be viewed in Figure 1.



Figure 1: Aerial View of Proposed Development

The development proposes construction of a convenience store (± 298 sqm) with a parking lot. The site will be accessed via a 12.0 m wide entrance located off Merivale Road, with an additional entrance proposed from Bongard Avenue. For additional details of the proposed development, refer to Site Plan C201 included in Appendix E.

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

2 EXISTING SITE AND DRAINAGE DESCRIPTION

The subject site measures approximately 0.673 ha and is currently occupied with a paved parking lot, with minimal landscaping. Existing site elevations range from 89.34 at the northwest corner to 90.1 at the southeast corner.

City of Ottawa mapping (geoOttawa) indicates the following infrastructures located within the adjacent rights-of-way:

Bongard Avenue

- 305 mm diameter DI watermain
- 300 mm diameter clay sanitary sewer
- 675 mm diameter concrete storm sewer

Merivale Road

- 406 mm diameter CI watermain
- 450 mm diameter concrete sanitary sewer
- 1050 mm diameter concrete storm sewer

The design intentions are to connect sanitary, storm and water off existing infrastructure on Bongard Avenue.

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 control objectives will be achieved.
- Demonstrate how the target quality control 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 Ontario Building Code (OBC) 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 proposed development.
- Calculate peak flow rates from the proposed development.
- Describe the proposed sanitary sewer system.

4 REGULATORY APPROVALS

An MECP Environmental Compliance Approval (ECA) is 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 (RVCA) 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

The subject property is located to the north of an existing 305 mm dia. watermain along Bongard Avenue.

5.2 Water Supply Servicing Design

The proposed water servicing consists of 50 mm dia. water service line which will be connected to the existing 305 mm dia. watermain on Bongard Ave. at the south end of the site. For water servicing layout, refer to Site Servicing Plan C401 in Appendix E.

Table 1 summarizes the City of Ottawa Design Guidelines design parameters employed in water servicing design.

Table 1: City of Ottawa Water Servicing Design Parameters

| Design Parameters | Value |
|---------------------------------------|-----------------------|
| Average Day Demand - Commercial | 28,000 L/gross ha/day |
| Average Day Demand - Light Industrial | 35,000 L/gross ha/day |



| | |
|--|---|
| Maximum Day Demand-Commercial/Industrial | 1.5 × Average Day Demand |
| Maximum Hour Demand-Commercial/Industrial | 1.8 × Maximum Day Demand |
| Minimum Depth of Cover | 2.4 m from top of watermain to finished grade |
| The maximum pressure in the distribution system shall not exceed | 552 kPa (80 psi) |
| Desired operating pressure during Maximum Day Flow | 345 kPa (50 psi) to 552 kPa (80 psi) |
| Minimum allowable pressure during Peak Hour Flow | 275 kPa (40 psi) |
| Minimum allowable pressure during Fire Flow Conditions | 140 kPa (20 psi) |

Below is a summary of anticipated water demands calculated by using the parameters mentioned in Table 1. Refer to Appendix B for calculation details.

- Average Day Demand = 0.22 L/s
- Maximum Day Demand = 0.33 L/s
- Peak Hour Demand = 0.59 L/s

The City of Ottawa provided boundary conditions associated with the estimated water demand (correspondence included in Appendix B). Table 2 below summarizes the boundary conditions for the proposed development. Based on the boundary conditions HGL, the residual pressure at the proposed connection is calculated. The residual pressure is consistent with the desired pressure mentioned in Table 1.

Table 2: Summary of Boundary Conditions

| Design Parameters | HGL | *Residual Pressure |
|---------------------|----------------------|--------------------|
| | (m H ₂ O) | kPa (psi) |
| Minimum HGL | 125.8 | 350.1 (50.78) |
| Maximum HGL | 131.7 | 407.96 (59.17) |
| Max Day + Fire Flow | 127.5 | 366.77 (53.20) |

**Assumed ground elevation at the proposed connection = 90.1*



The estimated fire flow of the proposed building was determined, in accordance with Ontario Building Code, to be 30 L/s.

A fire hydrant located at the southwest corner of the site is expected to provide required fire flow. This fire hydrant is shown on the Grading Plan C301.

Table 3 below summarizes the aggregate fire flow of the contributing fire hydrant in proximity to the proposed subject site based on Table 18.5.4.3 of *ISTB-2018-02*.

Table 3: Fire Protection Summary Table

| Fire Flow Demand (L/min) | Fire Hydrant(s) within 76m | Available Combined Fire Flow (L/min) |
|--------------------------|----------------------------|--------------------------------------|
| 1800 | 1 | 5678 |

From Table 3, it is evident that the available fire flow from the contributing fire hydrant (5678 L/min) exceeds the required fire flow.

6 SANITARY SERVICE

6.1 Existing Sanitary Sewer Services

There is an existing 300 mm dia. sanitary sewer along Bongard Avenue at the south end of the subject site.

6.2 Sanitary Sewer Servicing Design

The proposed development will be serviced via 150 mm dia. sanitary sewers which will be connected to the existing 300mm dia. sanitary sewer on Bongard Av. Refer to Servicing Plan C401 for the proposed sanitary servicing layout. Table 4 summarizes the City of Ottawa Design Guidelines design parameters used in the estimation of wastewater flow.

Table 4: City of Ottawa Wastewater Design Parameters

| Design Parameters | Value |
|-------------------------------|-----------------------|
| Commercial Average Flow | 28,000 L/gross ha/day |
| Average Light Industrial Flow | 35,000 L/gross ha/day |



| | |
|--------------------------------------|--------------------------------------|
| Commercial Peak Factor | 1.5 |
| Industrial Peak Factor | Appendix 4-B (City Guidelines-Sewer) |
| Infiltration Allowance (Dry Weather) | 0.05 L/s/gross ha |
| Infiltration Allowance (Wet Weather) | 0.28 L/s/gross ha |
| Total Infiltration Allowance | 0.33 L/s/gross ha |

Based on these parameters, the anticipated post-development peak design wastewater flow for the subject site is calculated 2.13 L/s. Refer to Appendix C for calculation details.

7 STORMWATER MANAGEMENT

7.1 Existing Stormwater Infrastructure

An existing 675 mm diameter concrete storm sewer runs along the south limit of the site on Bongard Avenue, and a 1050 mm diameter concrete storm sewer is located along Merivale Road. In pre-development conditions, the stormwater runoff is expected to flow uncontrolled overland towards the Bongard Avenue and Merivale Road rights-of-way. Refer to Appendix D for pre-development catchment information, as well as as-built drawings in Appendix F.

7.2 Design Criteria

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

7.2.1 Water Quality

For quality control, based on the pre-consultation meeting note, the subject site is required to provide an enhanced water quality protection (80% TSS removal). To meet water quality objectives, the proposed stormwater management system includes an Oil/Grit Separator (OGS), specifically the Stormceptor Model EFO4 (or approved equivalent). The proposed unit features the following capacities:

- Maximum Sediment Capacity = 1,190 L



- Maximum Hydrocarbon Storage Capacity = 265 L

Greater details of the proposed treatment unit can be found in Appendix D.

7.2.2 Water Quantity

The allowable release rate for the subject site has been calculated to 5-yr pre-development level and was determined 97.47 L/s. The post-development storm events up to and including 100-yr storm will be controlled to 5-yr pre-development level. For calculations, refer to STM design calculation sheets in Appendix D.

7.3 Method of Analysis

The modified Rational Method has been used to calculate the peak flow rate from the proposed site and to quantify the storage required for quantity control for the proposed development.

$$Q = 2.78CIA$$

Where,

Q = Flow (L/s)

C = Runoff Coefficient

I = Rainfall Intensity (mm/hr), determined from the City of Ottawa IDF curves

A = Area (ha)

Refer to Appendix D for runoff and storage calculations.

7.4 Proposed Stormwater Quantity Controls

The proposed stormwater management quantity control for this development will be accomplished using an Inlet Control Devices (ICD). Storage required, due to quantity control measures, will be accommodated through surface storage within the parking lot. A network of storm sewers is proposed to service the site which will outlet to the existing sewer along Bongard Avenue. Refer to Site Servicing Plan C401 and Appendix D for calculation details.

The existing site is delineated by catchments ECA-01 which currently drains uncontrolled towards the adjacent rights-of-way. Refer to Pre-development Watershed Plan C701 (Appendix E).



The site has been analyzed, and post-development watersheds have been allocated. Two catchment areas (CA-08 and CA-09) consisting of minimal paved and grass area will flow uncontrolled off the site. For additional details, refer to Post-development Watershed Plan C702 (Appendix E). Table 5 summarizes post-development drainage areas and associated runoff coefficient. Additional details and calculations can be found in Appendix D.

Table 5: Post-development Drainage Areas and Runoff Coefficients

| Catchments | Area (ha) | Weighted Runoff Coefficient (C) |
|----------------------|------------------|--|
| CA-01 (controlled) | 0.049 | 0.69 |
| CA-02 (controlled) | 0.110 | 0.66 |
| CA-03 (controlled) | 0.174 | 0.89 |
| CA-04 (controlled) | 0.086 | 0.84 |
| CA-05 (controlled) | 0.071 | 0.77 |
| CA-06 (controlled) | 0.049 | 0.78 |
| CA-07 (controlled) | 0.084 | 0.76 |
| CA-08 (uncontrolled) | 0.019 | 0.64 |
| CA-09 (uncontrolled) | 0.032 | 0.35 |
| Total | 0.673 | 0.76 |

Controlled overland flow within the site is captured by three catch basins and four catch basin manholes. An inlet control device (ICD), Hydrovex Vortex Flow Regulator 250VHV-2 (or approved equivalent), is proposed at STM CBMH07 to restrict the collected runoff and control the release rate at 83.16 L/s (H=2.84 m). For additional details of the selected ICD, refer to Appendix D.

Table 6 summarizes the release rates, storage volume required and available storage in the proposed site. Refer to Appendix D for runoff and storage calculation details.



Table 6: Summary of Stormwater Release Rates & Storage (100-yr)

| Catchments | Area (ha) | Release Rate (L/s) | Storage Required (m ³) | Storage Provided (m ³) |
|---------------------------------------|--------------|--------------------|------------------------------------|------------------------------------|
| CA-01 to CA-07 (Controlled by ICD) | 0.622 | 83.16 | 145.56 | 191.50 |
| CA-08 to CA-09 (Uncontrolled) | 0.051 | 14.31 | N/A | N/A |
| Total | 0.673 | 50.04 | 145.56 | 191.50 |

The runoff exceeding the allowable release rate will be stored on-site via surficial ponding. For 100-yr storm event, it is calculated that a total of 145.56 m³ of storage will be required to attenuate flows to the allowable release rate of 83.16 L/s (controlled release). The required storage will be accommodated through surface ponding in the parking lot which will provide 191.50 m³ of total storage, thus exceeds the required storage.

The required storage for 2-yr storm will be accommodated underground within the pipes and storm structures. The storm events greater than 100-yr will flow overland towards Merivale Road via the designated spillover point at the northwest entrance, set at 100-yr HWL elevation of 89.95 m. Refer to Grading Plan (C301). The maximum ponding elevation and storage depths can be found on Stormwater Management Plan C601 (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.MUNI 805. Refer to Erosion and Sediment Control Plan C101 for additional details.



9 CONCLUSION

This Stormwater Management and Servicing Report for the proposed redevelopment located at 1925 Merivale Rd presents the rationale and details for the servicing requirements for the subject property. In accordance with the report objectives, the servicing requirements for the subject site are summarized below.

Water Service

- The anticipated peak hour demand of the proposed development is 0.59 L/s.
- The required fire flow is 30 L/s, calculated using the OBC method.
- A fire hydrant located at the southwest corner of the site is available to service the proposed development.
- The proposed development will be serviced with 50 mm dia. water servicing which will connect to the existing 305 mm dia. watermain along Bongard Avenue.
- Boundary conditions received from the City of Ottawa show that adequate pressure is available to service the proposed development.

Sanitary Service

- The anticipated sanitary flow from the proposed development is 2.13 L/s.
- The proposed development will be serviced by a network of 150 mm dia. sanitary sewers which will connect to the existing 300 mm dia. SAN sewer along Bongard Avenue.

Stormwater Management

- The stormwater quality control requirements of 80% TSS removal will be achieved with the installation of an OGS (Stormceptor EFO4 or approved equivalent).
- The storm water release rates from the proposed development will meet the calculated total allowable release rate of 97.47 L/s.
- Stormwater quantity control objectives will be met by restricting the release rate to 83.16 L/s and stormwater surface storage within the parking lot which will provide a total storage of 191.50 m³.



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.

Maxime Longtin

Maxime Longtin
Civil Engineering Technologist



Mohan Basnet, P.Eng.
Civil Engineer



APPENDIX A

Pre-consultation / Correspondance

July 15, 2025

Jonah Bonn
Landscape LTD.
Via email: jbonn@firstbay.ca

**Subject: Pre-Consultation: Meeting Feedback
Proposed Site Plan Control Application – 1925 Merivale Rd**

Please find below information regarding next steps as well as consolidated comments from the above-noted pre-consultation meeting held on July 4, 2025.

Pre-Consultation Preliminary Assessment

Next Steps

1. A review of the proposal and materials submitted for the above-noted pre-consultation has been undertaken. For your next submission, please submit the required Application Form, together with the necessary studies and/or plans to planningcirculations@ottawa.ca, copy (cc:) to the Emily Charby and John Bernier.
2. In your subsequent pre-consultation or application submission, please ensure that all comments or issues detailed herein are addressed. A detailed cover letter stating how each issue has been addressed is requested with the submission materials. Please coordinate the numbering of your responses within the cover letter with the comment number(s) herein.
3. Please note, if your development proposal changes significantly in scope, design, or density it is recommended that a subsequent pre-consultation application be submitted.

Supporting Information and Material Requirements

1. The attached **Study and Plan Identification List** outlines the information and material that has been identified, during this phase of pre-consultation, as either required (R) or advised (A) as part of a future complete application submission.
 - a. The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline the specific requirements that must be met for each plan or study to be deemed adequate.

Consultation with Technical Agencies

1. You are encouraged to consult with technical agencies early in the development process and throughout the development of your project concept. A list of technical agencies and their contact information is enclosed.

Planning

Comments:

1. Official Plan
 - a. Pursuant Schedules A and B3 in the Official Plan, the subject site is designated Industrial and Logistics in the Outer Urban Transect.
 - b. Per Schedule C4 – Urban Road Network, Merivale Rd is classified as a Arterial Road.
2. Zoning
 - a. The subject site is split zoned IG (General Industrial) and IH1 (Heavy Industrial)
 - b. Staff have no concerns with the proposed uses of the site (Gas bar and Convenience store) which are both permitted as of right within these zones.
3. Design guidelines
 - a. To align with the City's expectations for site design, please address the following items. Refer to [Design Guidelines for Gas Stations](#) for additional direction.
 - i. Explore opportunities to provide a 2.0 metre wide pedestrian walkway that connects to existing public sidewalks along Bongard Avenue and Merivale Road to support pedestrian connectivity.
 - ii. Ensure street trees are planted at intervals of 7.0 to 10.0 metres along Bongard Avenue and Merivale Road to enhance the streetscape and contribute to the urban canopy.
 - iii. Please incorporate soft landscaping throughout the site, including around the convenience store, along the site's perimeter, and as a buffer adjacent to the northern lot line.
 - iv. Consider including pavement markings and directional signage to improve on-site circulation, enhance clarity, and support safe navigation by both vehicles and pedestrians.

- v. Demonstrate on plan areas for temporary snow storage without conflicting with site circulation, landscaping and utility boxes.
4. Please ensure closed entrance along Merivale Road be fully restored in accordance with the City's Standards, including replacement of depressed curbs, reinstatement of sidewalks with concrete to proper grade, and proper landscaping.
5. Landscape requirements
 - a. Please provide the measurements of the landscaping buffers within the site plan.
 - b. Section 4.8.2 of the Official Plan states that development shall preserve and provide space for mature, healthy trees, and accommodate space for tree planting. Please review opportunities to provide trees and additional landscaping.
6. Parking requirements
 - a. Per Section 101 of the Zoning By-law 3.4 spaces per the 100 m² of the GFA are required. The development proposes 15 + 1 accesible space, while only 10 + 1 accesible space is required.
 - b. Please ensure compliance with the loading space provisions in Section 113 of the Zoning By-law.
 - c. Staff appreciate the provision of bike parking and electric vehicle charging spaces.
7. Required Applications:
 - a. A Site Plan Control – Standard application – more information on process, timelines, fees, etc. can be found [here](#).
 - b. Should zoning relief be required more information can be found [here](#).

Emily Charby, Planner I, for follow-up questions.

Urban Design

8. Submission requirements:
 - a. Site Plan
 - b. Landscape Plan
 - c. Elevations (including canopy)

- d. Conceptual Floor Plans
9. Preliminary Design Comments:
- a. Urban Design Guidelines for Gas Stations apply and should be referred to in the design of the site.
 - b. Overall, look for opportunities to reduce hard surface and provide additional landscaping on the site.
 - c. Reduce width of accesses to define entrances and provide additional landscaping where possible. Please consider closing the access to 1905 Merivale.
 - d. Ensure that the landscaped buffer surrounding the site is sufficient to plant trees, a minimum of 3m should be provided. The diesel pumps may need to be moved to the south.
 - e. Provide additional trees and landscape plantings in the ROW.
 - f. Please ensure that the proposed EV spaces will not impact the existing trees. If so, they should be relocated.
 - g. Provide additional plantings and landscaping internal to the site. For example a landscaped island to the north of the proposed convenience store and foundation plantings around the building can be provided.
 - h. Please provide the bike parking in a more visible location fronting Merivale Road.
 - i. Please dimension pedestrian walkways on the site plan. A minimum of 2 m should be provided.

Feel free to contact Lisa Stern, Urban Design, for follow-up questions.

Engineering

Comments:

10. The Stormwater Management Criteria, for the subject site, is to be based on the following:
- a. **Water Quality Control:** provide enhanced levels of protection of 80% for total suspended solids removal.
 - b. **Water Quantity Control:** In the absence of area specific SWM criteria please control post-development runoff from the redeveloped area, up to and including the 100-year storm event, to a 5-year pre-development level.

- i. The pre-development runoff coefficient will need to be determined as per existing conditions but in no case more than 0.5. [If 0.5 applies it needs to be clearly demonstrated in the report that the pre-development runoff coefficient is greater than 0.5].
 - ii. The time of concentration (T_c) used to determine the pre-development condition should be calculated. T_c should not be less than 10 min. since IDF curves become unrealistic at less than 10 min; T_c of 10 minutes shall be used for all post-development calculations.
 - iii. Any storm events greater than the established 2-year allowable release rate, up to and including the 100-year storm event, shall be detained on-site. For events greater than 100 years, spillage must be directed to a public ROW and not to neighboring private property.
- c. Please provide a Pre-Development Drainage Area Plan to define the pre-development drainage areas/patterns. Existing drainage patterns shall be maintained and discussed as part of the proposed SWM solution.
- d. Ponding Notes:
- i. 100-year spill elevation must be 300mm lower than any building opening or ramp.
 - ii. Demonstrate that the stress test spill elevation (100-year +20% event) does not spill onto any permanent structures.
 - iii. The maximum permissible ponding depth for the 100-year storm event is 350mm. No spilling to adjacent sites.
 - iv. Please note that as per Technical Bulletin PIEDTB-2016-01 section 8.3.11.1 (p.12 of 14) there shall be no surface ponding on private parking areas during the 2-year storm rainfall event. 100-year spill elevation must be 300mm lower than any building opening or ramp
- e. Document how any foundation drainage system will be integrated into the servicing design and show the positive outlet on the plan. Foundation drainage is to be independently connected to sewer main unless being pumped with appropriate back up power, sufficient sized pump and back flow prevention. It is recommended that the foundation drainage system be drained by a sump pump connection to the storm sewer to minimize risk of basement flooding as it will provide the best protection from the uncontrolled sewer system compared to relying on the backwater valve.

- f. Please note that the minimum orifice dia. for a plug style ICD is 83mm and the minimum flow rate from a vortex ICD is 6 L/s in order to reduce the likelihood of plugging.
- g. If rooftop control and storage is proposed as part of the SWM solutions, sufficient details (Cl. 8.3.8.4) shall be discussed and documented in the report and on the plans. Roof drains are to be connected downstream of any incorporated ICDs within the SWM system and not to the foundation drain system. Provide a Roof Drain Plan as part of the submission.
- h. **Underground Storage:** Please note that the Modified Rational Method for storage computation in the Sewer Design Guidelines was originally intended to be used for above ground storage (i.e. parking lot) where the change in head over the orifice varied from 1.5 m to 1.2 m (assuming a 1.2 m deep CB and a max ponding depth of 0.3 m). This change in head was small and hence the release rate fluctuated little, therefore there was no need to use an average release rate.
 - i. When underground storage is used, the release rate fluctuates from a maximum peak flow based on maximum head down to a release rate of zero. This difference is large and has a significant impact on storage requirements. We therefore require that an average release rate equal to 50% of the peak allowable rate shall be applied to estimate the required volume. Alternatively, the consultant may choose to use a submersible pump in the design to ensure a constant release rate. In the event that there is a disagreement from the designer regarding the required storage, The City will require that the designer demonstrate their rationale utilizing dynamic modelling, that will then be reviewed by City modelers in the Water Resources Group. Regarding all proposed UG storage, ground water levels (and in particular HGW levels) will need to be reviewed to ensure that the proposed system does not become surcharged and thereby ineffective.
 - ii. Provide information on type of underground storage system including product name and model, number of chambers, chamber configuration, confirm invert of chamber system, top of chamber system, required cover over system and details, interior bottom slope (for self-cleansing), chart of storage values, length, width and height, capacity, entry ports (maintenance) etc. UG storage to provide actual 5- and 100-year event storage requirements.

11. General Servicing

- a. 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.

- b. Where servicing involves three or more service trenches, either a full road width or full lane width 40 mm asphalt overlay will be required, as per amended Road Activity By-Law 2003-445 and City Standard Detail Drawing R10. The extent of the overlay must be shown on the grading plan or a road reinstatement plan.
- c. CCTV sewer inspection of city infrastructure is required to record pre and post construction conditions and ensure there is no damage to City Assets.
- d. Existing sewers require a CCTV inspection and report to ensure existing sewers to be re-used are in good working order and meet current minimum size requirements.
- e. Connections to trunk sewers, easement sewers and backbone watermains are typically not permitted.
- f. If severance is planned, this needs to be addressed in servicing to satisfy severance requirements. Where a large parcel with multiple buildings is planned, City will require an ultimate servicing plan so as to appropriately understand how severance requirements are being met.
- g. Sewer connections to be made above the springline of the sewer main as per:
 - i. Std Dwg S11.1 for flexible main sewers – connections made using approved tee or wye fittings.
 - ii. Std Dwg S11 (For rigid main sewers) – lateral must be less than 50% the diameter of the sewermain.
 - iii. Std Dwg S11 (For rigid main sewers) – lateral must be less than 50% the diameter of the sewermain.
 - iv. No submerged outlet connections.

12. Storm Sewer

- a. A 525mm dia. concrete storm sewer (1979) is available within Bongard Avenue.
- b. A storm sewer monitoring maintenance hole is required to be installed at the property line (on the private side of the property) as per City of Ottawa Sewer-Use By-Law 2003-514 (14) Monitoring Devices.

13. Sanitary Sewer

- a. A 300 mm dia. concrete sanitary sewer (1979) is available within Bongard Avenue.
- b. Please provide the Sanitary sewer discharge and we will confirm if sanitary sewer main has the capacity.
- c. Include correspondence from the Architect within the Appendix of the report confirming the number of residential units per building and a unit type breakdown for each of the buildings to support the calculated building populations.
- d. Please apply the wastewater design flow parameters in Technical Bulletin PIEDTB-2018-01.
- e. Sanitary sewer monitoring maintenance hole is required to be installed at the property line (on the private side of the property) as per City of Ottawa Sewer-Use By-Law 2003-514 (14) Monitoring Devices.
- f. A backwater valve is required on the sanitary service for protection.

14. Water:

- a. A 300 mm dia. DI watermain (1973) is available within Bongard Avenue.
- b. Water Supply Redundancy: Residential buildings with a basic day demand greater than 50m³/day (0.57 L/s) or with 50+ units are required to be connected to a minimum of two water services, with each their own meter, separated by an isolation valve to avoid a vulnerable service area.
- c. Water Boundary condition requests must include the location of the service (map or plan with connection location(s) indicated) and the expected loads required by the proposed development, including calculations. Please provide the following information:
 - i. Plan showing the proposed location of service(s).
 - ii. Type of development and the amount of fire flow required (L/min).
Note: The OBC method can be used if the fire demand for the private property is less than 9,000 L/min. If the OBC fire demand reaches 9000 L/min, then the FUS method is to be used.
 - iii. Average daily demand: __L/s.
 - iv. Maximum daily demand: __L/s.
 - v. Maximum hourly daily demand: __L/s.
 - vi. Note: Use Table 3-3 of the MOE Design Guidelines for Drinking-Water System to determine Maximum Day and Maximum Hour

peaking factors for 0 to 500 persons and use Table 4.2 of the Ottawa Design Guidelines, Water Distribution for 501 to 3,000 persons.

- d. Please review Technical Bulletin ISTB-2018-02, maximum fire flow hydrant capacity is provided in Section 3 Table 1 of Appendix I. A hydrant coverage figure shall be provided and demonstrate there is adequate fire protection for the proposal.
- e. A Water Data Card will have to be submitted to size the water meters.
- f. Any proposed emergency route is to be to the satisfaction of Fire Services.

15. Vibration and settlement monitoring on Backbone Watermain

- a. A 400mm dia. backbone watermain is located within Merivale Road. Please note that to ensure the integrity of the nearby watermain the applicant may be required to develop a Vibration and Settlement Monitoring Program. A Vibration and settlement Monitoring Specialist Engineer shall undertake monitoring, develop a vibration and settlement monitoring plan, and prepare a protection plan, an emergency response plan, ensure conformance and shall issue certificates of conformance. The Vibration and settlement Monitoring Specialist Engineer shall be a licensed engineer in the Province of Ontario with a minimum of five years of experience in the field of Vibration and settlement monitoring. Vibration and settlement monitors are to be placed directly on the watermain. The maximum peak particle velocities are to be in accordance with Table 1 of the City of Ottawa Specification F-1201.
- b. In addition to requirement of a vibration specialist engineer required to design and monitor vibration, a certificate of liability insurance shall be submitted to the City wherein the Owner is the named insured, and the City of Ottawa is an additional insured. The limits of the policy shall be in the amount of \$25,000,000 and shall be kept in full force and effect for the term of the construction work.

16. Grading and Erosion

- a. Post-development site grading shall match existing property line grades in order to minimize disruption to the adjacent residential properties. A topographical plan of survey shall be provided as part of the submission and a note provided on the plans.
- b. Erosion and sediment control plan must be provided.
- c. Any portion of the subject property which is intended to be used for permanent or temporary snow storage shall be as shown on the approved

site plan and grading plan. Snow storage shall not interfere with approved grading and drainage patterns or servicing. Snow storage areas shall be setback from the property lines, foundations, fencing or landscaping a minimum of 1.5m. Snow storage areas shall not occupy driveways, aisles, required parking spaces or any portion of a road allowance. If snow is to be removed from the site, please indicate this on the plan(s).

- d. Street catch basins are not to be located at any proposed entrances.

17. Environmental

- a. A Phase I ESA is required to be completed in accordance with Ontario Regulation 153/04 in support of this development proposal to determine the potential for site contamination. Depending on the Phase I recommendations a Phase II ESA may be required.
- b. The Phase I ESA shall provide all the required Environmental Source Information as required by O. Reg. 153/04. ERIS records are available to public at a reasonable cost and need to be included in the ESA report to comply with O.Reg. 153/04 and the Official Plan. The City will not be in a position to approve the Phase I ESA without the inclusion of the ERIS reports.
- c. [Official Plan: Section 10. Protection of Health and Safety \(ottawa.ca\)](#)

18. Environmental Compliance Approval

- a. The consultant shall determine if this project will be subject to an Environmental Compliance Approval (ECA) for Private Sewage Works. It shall be determined if the exemptions set out under Ontario Regulation 525/98: *Approval Exemptions* are satisfied. All regulatory approvals shall be documented and discussed in the report.
- b. Please note that an ECA is required for:
 - i. Stormwater management works servicing more than one parcel of land
 - ii. Stormwater management works discharging to a combined sewer.
 - iii. A storm or sanitary sewer servicing multiple parcels.
- c. An MECP ECA is required for the proposed development due to the site's industrial uses. Please contact the Ministry of the Environment, Conservation and Parks, Ottawa District Office to arrange a pre-submission consultation.

- i. Emily Diamond at (613) 521-3450, ext. 238 or Emily.Diamond@ontario.ca
- d. [Environmental Compliance Approval | Ontario.ca](#)

19. Geotechnical

- a. A Geotechnical Study/Investigation shall be prepared in support of this development proposal.
- b. Reducing the groundwater level in this area can lead to potential damages to surrounding structures due to excessive differential settlements of the ground. The impact of groundwater lowering on adjacent properties needs to be discussed and investigated to ensure there will be no short term and long-term damages associated with lowering the groundwater in this area.
- c. Geotechnical Study shall be consistent with the Geotechnical Investigation and Reporting Guidelines for Development Applications. [Geotechnical Investigation and Reporting \(ottawa.ca\)](#)
- d. If Sensitive marine clay soils are present in this area that are susceptible to soil shrinkage that can lead to foundation and building damages. All six (6) conditions listed in the Tree Planting in Sensitive Marine Clay Soils-2017 Guidelines are required to be satisfied. Note that if the plasticity index of the soil is determined to be less than 40% a minimum separation between a street tree and the proposed building foundations of 4.5m will need to be achieved. A memorandum addressing the Tree in Clay Soil Guidelines prepared by a geotechnical engineer is required to be provided to the City. [Tree Planting in Sensitive Marine Clay Soils - 2017 Guidelines \(ottawa.ca\)](#)

20. Slope Stability Assessment Reports

- a. A report addressing the stability of slopes, prepared by a qualified geotechnical engineer licensed in the Province of Ontario, should be provided wherever a site has slopes (existing or proposed) steeper than 5 horizontal to 1 vertical (i.e., 11 degree inclination from horizontal) and/or more than 2 meter in height.
- b. A report is also required for sites having retaining walls greater than 1 meter high, that addresses the global stability of the proposed retaining walls.
- c. [Slope Stability Guidelines for Development Applications \(ottawa.ca\)](#)

21. Pre-Construction Survey

- a. Pre-Construction (Piling/Hoe Ramming or close proximity to City Assets) and/or Pre-Blasting (if applicable) Survey required for any buildings/dwellings in proximity of 75m of site and circulation of notice of vibration/noise to residents within 150 m of site. Conditions for Pre-Construction/ Pre-Blast Survey & Use of Explosives will be applied to agreements. Refer to City's Standard S.P. No. F-1201 entitled Use of Explosives, as amended.

22. Regarding Quantity Estimates

- a. Please note that external Garbage and/or bicycle storage structures are to be added to QE under Landscaping as it is subject to securities. In addition, sump pumps for Sanitary and Storm laterals and/or cisterns are to be added to QE under Hard items as it is subject to securities, even though it is internal and is spoken to under SWM and Site Servicing Report and Plan.

23. Capital Works Projects Scheduled

- a. Watermain Cathodic Protection construction project is scheduled to start this year (2025). If applicable, please contact Kevin Miller at (Kevin.Miller@ottawa.ca) to determine if any scheduling conflicts will occur with the proposed site plan.
- b. Construction approach – Please contact the Right-of-Ways Permit Office TMconstruction@ottawa.ca early in the planning process to determine the ability to construct site.

Please refer to the City of Ottawa Guide to Preparing Studies and Plans [Engineering]: [Planning application submission information and materials](#). The guide outlines the requirement for a statement to be provided on the plan about where the property boundaries have been derived from.

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)

Feel free to contact Anton Chetrar, Project Manager, for follow-up questions at anton.chetrar@ottawa.ca .

Transportation

Comments:

24. Follow Transportation Impact Assessment Guidelines:

- a. A Transportation Impact Assessment is required. Please submit the Scoping report to rochelle.fortier@ottawa.ca at your earliest convenience.

The applicant is responsible to submit the Scoping Report and must allow for a 14 day circulation period and sign-off prior to the Strategy Report submission.

- b. The Strategy Report must be submitted for review at the latest with the formal submission package. The applicant is still encouraged to submit the Strategy Report to the TPM before submission of the Site Plan application and allow for a 14 day circulation period.
 - c. If an RMA is required to support the proposed development, the functional plan and/or RMA plans must be submitted with the formal submission to deem complete, per the TIA Guidelines. Request base mapping asap if RMA is required. Contact [Engineering Services](#).
25. Ensure that the development proposal complies with the Right-of-Way protection requirements - See [Schedule C16 of the Official Plan](#).
- a. ROW must be unincumbered and conveyed at no cost to the City. Note that conveyance of the ROW will be required prior to registration of the SP agreement. Additional information on the conveyance process can be provided upon request.
 - b. Any requests for exceptions to ROW protection requirements must be discussed with Transportation Planning and concurrence provided by Transportation Planning management. The applicant shall submit support evidence and rationale to support any relief to Transportation Planning satisfaction.
26. Dimension clear throat length on site plan and follow TAC guidelines. The clear throat length is measured from the ends of the driveway curb return radii at the roadway and the point of first conflict on-site.
27. Corner clearances should follow minimum distances set out within TAC Figure 8.8.2.
28. Upgrade existing transit stop #0606 to include a paved transit shelter/standing area/shelter pad to the specifications of the City.
29. The closure of an existing private approach shall reinstate the sidewalk, shoulder, curb, and boulevard to City standards.
30. As the proposed site is for general public use, AODA legislation applies.
- a. Ensure all crosswalks located internally on the site provide a TWSI at the depressed curb, per requirements of the Integrated Accessibility Standards Regulation under the AODA.
 - b. Clearly define accessible parking stalls and ensure they meet AODA standards (include an access aisle next to the parking stall and a pedestrian curb ramp at the end of the access aisle, as required).
 - c. Please consider using the [City's Accessibility Design Standards](#), which provide a summary of AODA requirements.
31. On site plan:

- a. Ensure site accesses meet the [City's Private Approach Bylaw](#) and all driveways/aisles meet the requirements outlined in [Section 107 of the Zoning By-law](#).
- b. Show all details of the roads abutting the site; include such items as pavement markings, accesses and/or sidewalks.
- c. Turning movement diagrams required for all accesses showing the largest vehicle to access/egress the site.
- d. Turning movement diagrams required for internal movements (loading areas, garbage).
- e. Show all curb radii measurements; ensure that all curb radii are reduced as much as possible and fall within TAC guidelines (Figure 8.5.1).
- f. Show dimensions for site elements (i.e. lane/aisle widths, access width and throat length, parking stalls, sidewalks, pedestrian pathways, etc.)
- g. Sidewalk is to be continuous across access as per City Specification 7.1.
- h. Grey out any area that will not be impacted by this application.

Feel free to contact Rochelle Fortier-Lesage, Transportation Project Manager, for follow-up questions.

Environment

Comments:

32. There are no triggers for an Environmental Impact Study.
33. Bird-Safe Design Guidelines - Please review and incorporate bird safe design elements, where feasible. Some of the risk factors include glass and related design traps such as corner glass and fly-through conditions, ventilation grates and open pipes, landscaping, light pollution. More guidance and solutions are available in the guidelines which can be found here:
https://documents.ottawa.ca/sites/documents/files/birdsafedesign_guidelines_en.pdf
34. Please consider if there are features that can be added reduce the urban heat island effect (see OP 10.3). For example, this impact can be reduced by adding large canopy trees, green roofs or vegetation walls, or incorporating building with low heat absorbing materials.

Feel free to contact Matthew Hayley, Environmental Planner, for follow-up questions.

Forestry

Comments:

35. A Tree Conservation Report is required (guidelines below), detailing the condition of existing trees on site, and providing tree retention recommendations, protection, and mitigation measures.
- a. Retention of healthy and retainable trees must be prioritised. In particular, the trees at the SW and SE corners of the site should be protected and tied in to the new landscape buffers.
36. Provide new plantings along the Merivale and Bongard frontages, located in the rights-of-way where possible.
- a. New tree plantings should be shown on a Landscape Plan (guidelines below)
 - b. New trees should be planted to provide shade to the bus stop on Merivale.
 - c. Replacement trees should be planted at the south of the site, to shade the proposed EV charging stations.
 - d. Provide new plantings in the new landscape buffer at the East edge of the site, to mitigate the heat island effect.
 - e. If the softscaped island next to the convenience store can be enlarged, please provide new tree plantings there.
 - f. New tree plantings should prioritize the selection of large-growing trees.
 - g. Please ensure that signage does not interfere with new or existing trees.
37. The following Tree Conservation Report (TCR) guidelines have been adapted from the Schedule E of the Tree Protection By-law – for more information on these requirements please contact julian.alvarez-barkham@ottawa.ca
- a. A Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City.
 - i. An approved TCR is a requirement of Site Plan approval.
 - b. Any removal of privately-owned trees 10cm or larger in diameter within the urban area, or city-owned trees of any diameter requires a tree permit issued under the Tree Protection Bylaw (Bylaw 2020 – 340); the permit will be based on an approved TCR and made available at or near plan approval.
 - c. The TCR must contain 2 separate plans:

- i. Plan/Map 1 - show existing conditions with tree cover information.
 - ii. Plan/Map 2 - show proposed development with tree cover information.
- d. The TCR must list all trees on site, as well as off-site trees if the CRZ (critical root zone) extends into the developed area, by species, diameter, and health condition.
- i. For ease of review, the Planning Forester suggests that all trees be numbered and referenced in an inventory table.
- e. Please identify trees by ownership – private onsite, private on adjoining site, city owned, co-owned (trees on a property line)
- f. If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained.
- i. Compensation may be required for the removal of city owned trees.
- g. The removal of trees on a property line will require the permission of both property owners.
- h. All retained trees must be shown, and all retained trees within the area impacted by the development process must be protected as per City guidelines available on the Tree Protection Specification or by searching Ottawa.ca.
- i. The location of tree protection fencing must be shown on the plan.
 - ii. Show the critical root zone of the retained trees.
- i. As per the Official Plan §4.8.2, the retention of healthy trees must be prioritized wherever possible. Please seek opportunities for retention of trees that will contribute to the design and function of the site.
38. The following Landscape Plan (LP) guidelines have been adapted from Schedule E of the Tree Protection By-law – for more information on these requirements please contact julian.alvarez-barkham@ottawa.ca
- a. Please ensure any retained trees are shown on the LP.
 - b. Minimum Setbacks
 - i. Maintain 1.5m from sidewalk or MUP/cycle track or water service laterals.
 - ii. Maintain 2.5m from curb.

- iii. Coniferous species require a minimum 4.5m setback from curb, sidewalk, or MUP/cycle track/pathway.
 - iv. Maintain 7.5m between large growing trees, and 4m between small growing trees. Park or open space planting should consider 10m spacing, except where otherwise approved in naturalization / afforestation areas.
 - v. Adhere to Ottawa Hydro's planting guidelines (species and setbacks) when planting around overhead primary conductors.
- b. Tree specifications
- i. Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.
 - ii. Maximize the use of large deciduous species wherever possible to maximize future canopy coverage.
- c. Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification; and if possible, include watering and warranty as described in the specification.
- d. No root barriers, dead-man anchor systems, or planters are permitted.
- e. No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree)
- f. Hard surface planting
- i. If there are hard surface plantings, a planting detail must be provided.
 - ii. Curb style planter design is highly recommended.
 - iii. No grates are to be used and if guards are required, City of Ottawa standard (which can be provided) shall be used.
- c. Trees are to be planted at grade.
- d. Soil Volume - Please demonstrate as per the **Landscape Plan Terms of Reference** that the available soil volumes for new plantings will meet or exceed the following:

| Tree Type/Size | Single Tree Soil Volume (m ³) | Multiple Tree Soil Volume (m ³ /tree) |
|----------------|---|--|
| Ornamental | 15 | 9 |
| Columnar | 15 | 9 |
| Small | 20 | 12 |
| Medium | 25 | 15 |
| Large | 30 | 18 |
| Conifer | 25 | 15 |

- i. It is strongly suggested that the proposed species list include a column listing the available soil volume.
- e. Sensitive Marine Clay - Please follow the City's 2017 Tree Planting in Sensitive Marine Clay guidelines.
- f. The City requests that consideration be given to planting native species wherever there is a high probability of survival to maturity.
- g. Efforts shall be made to provide as much future canopy cover as possible at a site level, through tree planting and tree retention. The Landscape Plan shall show/document that the proposed tree planting and retention will contribute to the City's overall canopy cover over time. **Please provide a projection of the future canopy cover for the site to 40 years.**

Feel free to contact Julian Alvarez-Barkham, Forester, for follow-up questions.

Parkland

Comments:

- 39. Cash-in-lieu of parkland will be required.
- 40. The calculation will be based on a two (2) percent rate applied to a portion of the land to be established by the percentage of increase in gross floor area (GFA). For the purpose of the calculation, please provide the existing and total GFA after redevelopment.
- 41. For information purposes, please see below definition of GFA:

"gross floor area" means the total area of each floor whether located above, at or below grade, measured from the interiors of outside walls and including floor area occupied by interior walls and floor area created by bay windows, but excluding: floor area occupied by shared mechanical, service and electrical equipment that serve the building; common hallways, corridors, stairwells, elevator shafts and other voids, steps and landings; bicycle parking; motor vehicle parking or loading facilities; common laundry, storage and washroom facilities that serve the building or tenants; common storage areas that are accessory to the principal use of the building, common amenity area and play areas accessory to a principal use on the lot; and living quarters for a caretaker of the building;

Feel free to contact steve.gauthier@ottawa.ca for follow-up questions.

Submission Requirements and Fees

- 1. The attached **Study and Plan Identification List** outlines the information and material that has been identified as either required (R) or advised (A) as part of a future complete application submission.



- a. The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline the specific requirements that must be met for each plan or study to be deemed adequate.
2. All of the above comments or issues should be addressed to ensure the effectiveness of the application submission review.

Should there be any questions, please do not hesitate to contact myself or the contact identified for the above areas / disciplines.

Yours Truly,
Emily Charby

- c.c. John Bernier, Planner II
Lisa Stern, Urban Design
Anton Chetrar, Project Manager, Infrastructure Approvals
Julian Alvarez-Barkham, Forestry
Steve Gauthier, Parks Planner
Rochelle Fortier, Transportation Project Manager
Matthew Hayley, Environmental Planner

APPENDIX B
Water Supply Calculations



Water Service Calculations

LRL File No. : 250161

Project : Proposed Development-Drummond Gas

Location : 1925 Merivale Rd, Nepean

Date : September 23, 2025

Designed by : M.B.

Water Demand

Site area = ha

Average day demand = 28000 L / ha·day (based on City of Ottawa guidelines)
= 18844 L / day
= 0.22 L / s

Maximum daily peak factor = 1.5
Maximum daily demand = 0.33 L / s

Maximum hour peak factor = 1.8
Maximum hour demand = 0.59 L / s

Mohan Basnet

From: Chetrar, Anton <anton.chetrar@ottawa.ca>
Sent: October 3, 2025 8:39 AM
To: Mohan Basnet
Cc: Maxime Longtin; Fawzi, Mohammed
Subject: RE: 1925 Merivale Rd_Boundary Condition
Attachments: 1925 Merivale Road September 2025.pdf

Hi Mohan,

The following are boundary conditions, HGL, for hydraulic analysis at 1925 Merivale Road (zone 2W2C) assumed to be connected to the 305mm on Bongard Avenue (see attached PDF for location).

Minimum HGL = 125.8 m

Maximum HGL = 131.7 m

Max Day + Fire Flow (30.0 L/s) = 127.5 m

These are for current conditions and are based on computer model simulation.

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.

"The IWSD has recently updated their water modelling software. Any significant difference between previously received BC results and newly received BC results could be attributed to this update."

Please let me know if you have any questions.

Regards,

Anton Chetrar | P. Eng

Project Manager, Infrastructure - Gestionnaire de projet, Projets d'infrastructure

Development Review All Wards (DRAW) | Direction de l'examen des projets d'aménagement -Tous les quartiers (EPATQ)

Planning, Development and Building Services Department (PDBS) and Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB)

City of Ottawa | Ville d'Ottawa

110 Laurier Avenue West | 110 avenue Laurier Ouest

Ottawa, ON K1P 1J1

Tel. | Tél. 613.580.2424 ext.60865

anton.chetrar@ottawa.ca

From: Mohan Basnet <mbasnet@lrl.ca>
Sent: September 25, 2025 11:43 AM
To: Chettrar, Anton <anton.chettrar@ottawa.ca>
Cc: Maxime Longtin <mlongtin@lrl.ca>
Subject: RE: 1925 Merivale Rd_Boundary Condition

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Hi Anton,

The area of the proposed one-storey "C" store is approx. 300 sqm, thus based on OBC, the minimum RFF is 1800 L/min (30 L/s).

Please find attached OBC reference, as well as domestic water demand calculations.

Does this suffice?

Thank you.

Mohan Basnet, P.Eng., Ph.D., Senior Engineer



LRL ENGINEERING | INGÉNIERIE

Head Office – 5430 Canotek Rd., Ottawa, ON
T +1 613-842-3434 **C** +1 613-229-6819 **E** mbasnet@lrl.ca
Ottawa | Pembroke | Moncton
www.lrl.ca

From: Chettrar, Anton <anton.chettrar@ottawa.ca>
Sent: September 25, 2025 8:22 AM
To: Mohan Basnet <mbasnet@lrl.ca>
Cc: Maxime Longtin <mlongtin@lrl.ca>
Subject: RE: 1925 Merivale Rd_Boundary Condition

Hi Mohan,

Please provide fire flow calculations (OBC method) for review and the site plan used for the calculations.

Let me know if any questions.

Regards,

Anton Chettrar | P. Eng

Project Manager, Infrastructure - Gestionnaire de projet, Projets d'infrastructure

Development Review All Wards (DRAW) | Direction de l'examen des projets d'aménagement - Tous les quartiers (EPATQ)

Planning, Development and Building Services Department (PDBS) and Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB)

City of Ottawa | Ville d'Ottawa

110 Laurier Avenue West | 110 avenue Laurier Ouest
Ottawa, ON K1P 1J1
Tel. | Tél. 613.580.2424 ext.60865
anton.chetrar@ottawa.ca

Classified as City of Ottawa - Internal / Ville d'Ottawa - classé interne

From: Mohan Basnet <mbasnet@lrl.ca>
Sent: September 24, 2025 1:55 PM
To: Chetrar, Anton <anton.chetrar@ottawa.ca>
Cc: Maxime Longtin <mlongtin@lrl.ca>
Subject: 1925 Merivale Rd_Boundary Condition

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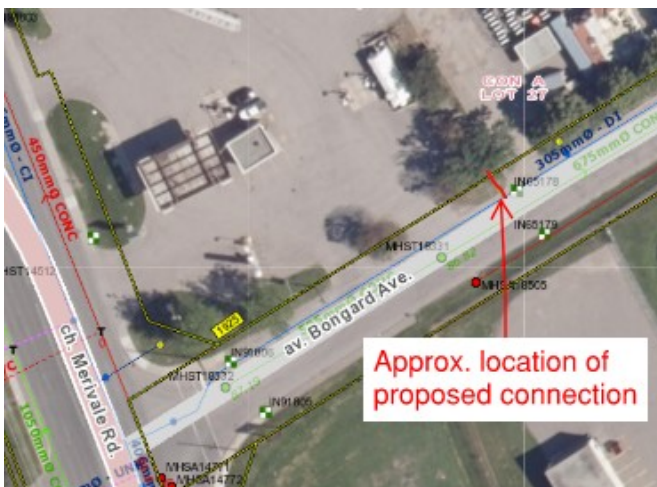
Hi Anton,

We are working on the serviceability design for a site re-development project located at 1925 Merivale Rd, Ottawa and require boundary condition to proceed.

Please use the following site parameters to provide boundary conditions.

- Average Day Demand: 0.22 L/s
- Maximum Day Demand: 0.33 L/s
- Peak Hour Demand: 0.59 L/s
- Fire Flow (OBC) Demand: 30 L/s

Please refer to the attached draft servicing plan for the proposed connection.



Thank you.

Mohan Basnet, P.Eng., Ph.D., Senior Engineer



LRL ENGINEERING | INGÉNIERIE

Head Office – 5430 Canotek Rd., Ottawa, ON

T +1 613-842-3434 C +1 613-229-6819 E mbasnet@lrl.ca

Ottawa | Pembroke | Moncton

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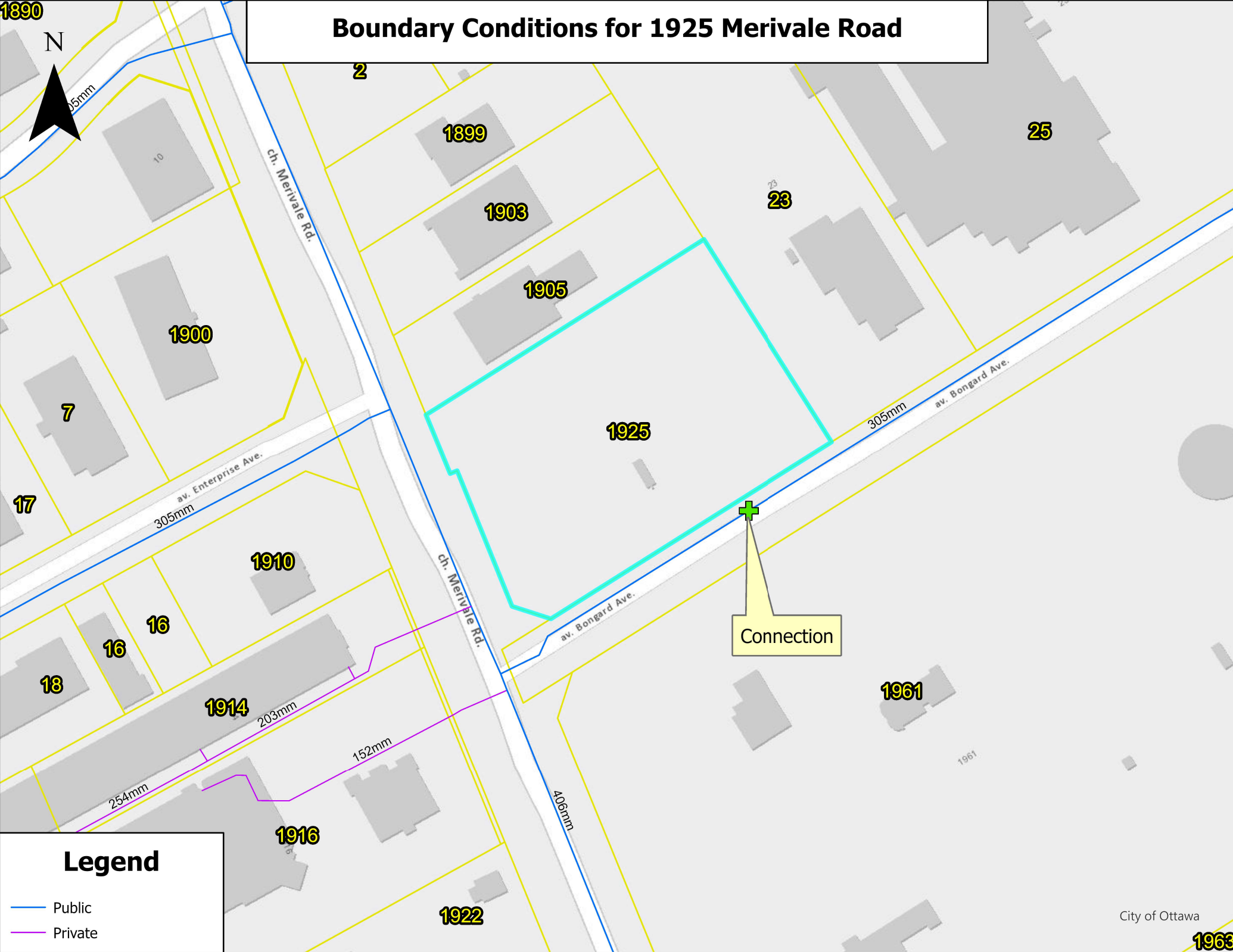
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Boundary Conditions for 1925 Merivale Road



Legend

- Public
- Private

APPENDIX C
Wastewater Calculations

LRL Associates Ltd.
Sanitary Sewer Design Sheet



LRL File No.: 250161
Project: Proposed Development-Drummond Gas
Location: 1925 Merivale Rd, Nepean
Designed: M.L.
Checked: M.B.
Date: November 11, 2025
DWG. Reference: C401

Sanitary Design Parameters

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

Average Daily Flow = 280 L/p/day
 Industrial Peak Factor = as per Appendix 4-B
 Extraneous Flow = 0.33 L/s/ha

Pipe Design Parameters

Maximum Velocity = 3.00 m/s
 Minimum Velocity = 0.60 m/s
 Manning's n = 0.013

| LOCATION | | | RESIDENTIAL | | | | | COMMERCIAL | | INDUSTRIAL | | | INSTITUTIONAL | | C+I+I | INFILTRATION | | | TOTAL FLOW, Q | PIPE | | | | | | | |
|-------------|------------|----------|-------------|------|-------|------|------------|------------|------|------------|-------|------------|---------------|------|------------|--------------|------------|------------|---------------|--------------|--------|------|-------|----------|--------------|--------------|---------------|
| STREET | FROM | TO | AREA | POP. | ACCU. | | PEAK FACT. | PEAK FLOW | AREA | ACCU. AREA | AREA | ACCU. AREA | PEAK FACT. | AREA | ACCU. AREA | PEAK FLOW | TOTAL AREA | ACCU. AREA | | INFILT. FLOW | LENGTH | DIA. | SLOPE | MATERIAL | CAP. Q(FULL) | VEL. V(FULL) | RATIO Q/QFULL |
| | | | (Ha) | | AREA | POP. | | (L/s) | (Ha) | (Ha) | | (Ha) | | (Ha) | (Ha) | (L/s) | (Ha) | (Ha) | (L/s) | (L/s) | (m) | (mm) | (%) | | (L/s) | (m/s) | |
| | BLDG /STUB | SAN MH01 | | | | | | | | | 0.673 | 0.67 | 7.0 | | | 1.91 | 0.673 | 0.673 | 0.22 | 2.13 | 5.6 | 150 | 1.50% | PVC | 18.65 | 1.06 | 0.11 |
| | | SAN MH01 | | | | | | | | | | | | | | | | | | 2.13 | 34.9 | 150 | 1.50% | PVC | 18.65 | 1.06 | 0.11 |
| Bongard Av. | SAN MH02 | Ex. SAN | | | | | | | | | | | | | | | | | | 2.13 | 17.5 | 150 | 1.50% | PVC | 18.65 | 1.06 | 0.11 |

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

APPENDIX D
Stormwater Management Calculations

LRL Associates Ltd.

Storm Watershed Summary



LRL File No. 250161

Project: Proposed Development-Drummond Gas

Location: 1925 Merivale Rd, Nepean

Date: November 11, 2025

Designed: M. Longtin

Checked: M. Basnet

Dwg Reference: C701, C702

Pre-Development Catchments

| Catchment | C = 0.20 | C = 0.80 | C = 0.90 | Total Area (ha) | Combined C |
|-----------------------|--------------|--------------|--------------|-----------------|-------------|
| ECA-01 (uncontrolled) | 0.066 | 0.000 | 0.607 | 0.673 | 0.83 |
| Total | 0.066 | 0.000 | 0.607 | 0.673 | 0.83 |

Post-Development Catchments

| Catchment | C = 0.20 | C = 0.8 | C = 0.90 | Total Area (ha) | Combined C |
|----------------------|--------------|--------------|--------------|-----------------|-------------|
| CA-01 (controlled) | 0.015 | 0.000 | 0.035 | 0.049 | 0.69 |
| CA-02 (controlled) | 0.038 | 0.000 | 0.072 | 0.110 | 0.66 |
| CA-03 (controlled) | 0.002 | 0.000 | 0.172 | 0.174 | 0.89 |
| CA-04 (controlled) | 0.007 | 0.000 | 0.079 | 0.086 | 0.84 |
| CA-05 (controlled) | 0.013 | 0.000 | 0.058 | 0.071 | 0.77 |
| CA-06 (controlled) | 0.008 | 0.000 | 0.041 | 0.049 | 0.78 |
| CA-07 (controlled) | 0.017 | 0.000 | 0.067 | 0.084 | 0.76 |
| CA-08 (uncontrolled) | 0.007 | 0.000 | 0.012 | 0.019 | 0.64 |
| CA-09 (uncontrolled) | 0.026 | 0.000 | 0.007 | 0.032 | 0.35 |
| Total | 0.132 | 0.000 | 0.541 | 0.673 | 0.76 |



LRL File No. 250161
Project: Proposed Development-Drummond Gas
Location: 1925 Merivale Rd, Nepean
Date: November 11, 2025
Designed: M. Longtin
Checked: M. Basnet
Drawing Ref.: C601

**Stormwater Management
 Design Sheet**

STORM - 100 YEAR

Runoff Equation

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

Pre-Development Release Rate

IDF Curve Equations

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

C = 0.50 (max of 0.5 as per City Guidelines)
 I₁₀₀ = 178.6 mm/hr
 T_d = 10 min
 A = 0.673 ha
 100 Year Release Rate = 167.04 L/s
 Allowable Release Rate = 97.47 L/s (5 Year Pre-development Release Rate)

Post-development Stormwater Management

| | | | | $\Sigma R_{2&5}$ | ΣR_{100} |
|-----------------------------|--------------|-----------|--------------|------------------|------------------|
| Total Site Area = | 0.673 | ha | $\Sigma R =$ | 0.76 | 0.95 |
| CA-01 (controlled) | 0.049 | ha | R = | 0.69 | 0.87 |
| CA-02 (controlled) | 0.110 | ha | R = | 0.66 | 0.82 |
| CA-03 (controlled) | 0.174 | ha | R = | 0.89 | 1.00 |
| CA-04 (controlled) | 0.086 | ha | R = | 0.84 | 1.00 |
| CA-05 (controlled) | 0.071 | ha | R = | 0.77 | 0.97 |
| CA-06 (controlled) | 0.049 | ha | R = | 0.78 | 0.98 |
| CA-07 (controlled) | 0.084 | ha | R = | 0.76 | 0.95 |
| Total (controlled) | 0.622 | ha | R = | 0.79 | 0.99 |
| CA-08 (uncontrolled) | 0.019 | ha | R = | 0.64 | 0.80 |
| CA-09 (uncontrolled) | 0.032 | ha | R = | 0.35 | 0.43 |
| Total (uncontrolled) | 0.051 | ha | R = | 0.45 | 0.57 |
| Total | 0.673 | ha | R = | 0.76 | 0.95 |

100 Year Post-development Stormwater Management

| Time (min) | Intensity (mm/hr) | Controlled Runoff (L/s) | Storage Volume (m ³) | Controlled Release Rate (L/s) | Uncontrolled Runoff (L/s) | Total Release Rate (L/s) |
|------------|-------------------|-------------------------|----------------------------------|-------------------------------|---------------------------|--------------------------|
| 10 | 178.56 | 304.36 | 132.72 | 83.16 | 14.31 | 97.47 |
| 15 | 142.89 | 243.57 | 144.37 | 83.16 | 11.45 | 94.61 |
| 20 | 119.95 | 204.46 | 145.56 | 83.16 | 9.61 | 92.77 |
| 25 | 103.85 | 177.01 | 140.78 | 83.16 | 8.32 | 91.48 |
| 30 | 91.87 | 156.59 | 132.18 | 83.16 | 7.36 | 90.52 |
| 35 | 82.58 | 140.76 | 120.96 | 83.16 | 6.62 | 89.78 |
| 40 | 75.15 | 128.09 | 107.83 | 83.16 | 6.02 | 89.18 |
| 45 | 69.05 | 117.70 | 93.26 | 83.16 | 5.53 | 88.69 |
| 50 | 63.95 | 109.01 | 77.56 | 83.16 | 5.12 | 88.29 |
| 55 | 59.62 | 101.63 | 60.96 | 83.16 | 4.78 | 87.94 |
| 60 | 55.89 | 95.28 | 43.61 | 83.16 | 4.48 | 87.64 |
| 65 | 52.65 | 89.74 | 25.65 | 83.16 | 4.22 | 87.38 |
| 70 | 49.79 | 84.87 | 7.18 | 83.16 | 3.99 | 87.15 |
| 75 | 47.26 | 80.55 | 0.00 | 83.16 | 3.79 | 86.95 |
| 80 | 44.99 | 76.69 | 0.00 | 83.16 | 3.61 | 86.77 |
| 85 | 42.95 | 73.22 | 0.00 | 83.16 | 3.44 | 86.60 |
| 90 | 41.11 | 70.08 | 0.00 | 83.16 | 3.29 | 86.46 |
| 95 | 39.43 | 67.22 | 0.00 | 83.16 | 3.16 | 86.32 |
| 100 | 37.90 | 64.61 | 0.00 | 83.16 | 3.04 | 86.20 |
| 105 | 36.50 | 62.21 | 0.00 | 83.16 | 2.92 | 86.09 |
| 110 | 35.20 | 60.00 | 0.00 | 83.16 | 2.82 | 85.98 |
| 115 | 34.01 | 57.96 | 0.00 | 83.16 | 2.72 | 85.89 |
| 120 | 32.89 | 56.07 | 0.00 | 83.16 | 2.64 | 85.80 |

On-site stormwater detention

Storage required = 145.56 m³
 Storage provided = 191.50 m³ (Refer to DWG C601)



LRL File No. 250161
 Project: Proposed Development-Drummond Gas
 Location: 1925 Merivale Rd, Nepean
 Date: November 11, 2025
 Designed: M. Longtin
 Checked: M. Basnet
 Drawing Ref.: C601

Stormwater Management
 Design Sheet

STORM - 5 YEAR

Runoff Equation

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

Pre-Development Release Rate

IDF Curve Equations

$I_5 = 998.071 / (T_d + 6.053)^{0.814}$ A = 998.071 B = 0.814 C = 6.053

C = 0.50 (max of 0.5 as per City Guidelines)
 $I_5 = 104.2$ mm/hr
 $T_d = 10$ min
 A = 0.673 ha
 5 Year Release Rate = **97.47** L/s (Allowable Release Rate)

Post-development Stormwater Management

| | Total Site Area = | 0.673 | ha | $\Sigma R =$ | $\Sigma R_{2&5}$ |
|--|-----------------------------|--------------|-----------|--------------|------------------|
| | CA-01 (controlled) | 0.049 | ha | R = | 0.69 |
| | CA-02 (controlled) | 0.110 | ha | R = | 0.66 |
| | CA-03 (controlled) | 0.174 | ha | R = | 0.89 |
| | CA-04 (controlled) | 0.086 | ha | R = | 0.84 |
| | CA-05 (controlled) | 0.071 | ha | R = | 0.77 |
| | CA-06 (controlled) | 0.049 | ha | R = | 0.78 |
| | CA-07 (controlled) | 0.084 | ha | R = | 0.76 |
| | Total (controlled) | 0.622 | ha | R = | 0.79 |
| | CA-08 (uncontrolled) | 0.019 | ha | R = | 0.64 |
| | CA-09 (uncontrolled) | 0.032 | ha | R = | 0.35 |
| | Total (uncontrolled) | 0.051 | ha | R = | 0.45 |
| | Total | 0.673 | ha | R = | 0.76 |

5 Year Post-development Stormwater Management

| Time (min) | Intensity (mm/hr) | Controlled Runoff (L/s) | Storage Volume (m ³) | Controlled Release Rate (L/s) | Uncontrolled Runoff (L/s) | Total Release Rate (L/s) |
|------------|-------------------|-------------------------|----------------------------------|-------------------------------|---------------------------|--------------------------|
| 10 | 104.19 | 142.08 | 35.35 | 83.16 | 6.68 | 89.84 |
| 15 | 83.56 | 113.94 | 27.70 | 83.16 | 5.36 | 88.52 |
| 20 | 70.25 | 95.80 | 15.16 | 83.16 | 4.50 | 87.66 |
| 25 | 60.90 | 83.04 | 0.00 | 83.16 | 3.90 | 87.06 |
| 30 | 53.93 | 73.54 | 0.00 | 83.16 | 3.46 | 86.62 |
| 35 | 48.52 | 66.16 | 0.00 | 83.16 | 3.11 | 86.27 |
| 40 | 44.18 | 60.25 | 0.00 | 83.16 | 2.83 | 85.99 |
| 45 | 40.63 | 55.40 | 0.00 | 83.16 | 2.60 | 85.77 |
| 50 | 37.65 | 51.35 | 0.00 | 83.16 | 2.41 | 85.57 |
| 55 | 35.12 | 47.90 | 0.00 | 83.16 | 2.25 | 85.41 |
| 60 | 32.94 | 44.92 | 0.00 | 83.16 | 2.11 | 85.27 |
| 65 | 31.04 | 42.33 | 0.00 | 83.16 | 1.99 | 85.15 |
| 70 | 29.37 | 40.05 | 0.00 | 83.16 | 1.88 | 85.04 |
| 75 | 27.89 | 38.03 | 0.00 | 83.16 | 1.79 | 84.95 |
| 80 | 26.56 | 36.22 | 0.00 | 83.16 | 1.70 | 84.86 |
| 85 | 25.37 | 34.59 | 0.00 | 83.16 | 1.63 | 84.79 |
| 90 | 24.29 | 33.12 | 0.00 | 83.16 | 1.56 | 84.72 |
| 95 | 23.31 | 31.78 | 0.00 | 83.16 | 1.49 | 84.65 |
| 100 | 22.41 | 30.56 | 0.00 | 83.16 | 1.44 | 84.60 |
| 105 | 21.58 | 29.43 | 0.00 | 83.16 | 1.38 | 84.54 |
| 110 | 20.82 | 28.39 | 0.00 | 83.16 | 1.33 | 84.50 |
| 115 | 20.12 | 27.44 | 0.00 | 83.16 | 1.29 | 84.45 |
| 120 | 19.47 | 26.55 | 0.00 | 83.16 | 1.25 | 84.41 |

On-site stormwater detention

Storage required = 35.35 m³



LRL File No. 250161
 Project: Proposed Development-Drummond Gas
 Location: 1925 Merivale Rd, Nepean
 Date: November 11, 2025
 Designed: M. Longtin
 Checked: M. Basnet
 Drawing Ref.: C601

**Stormwater Management
 Design Sheet**

STORM - 2 YEAR

Runoff Equation

Q = 2.78CIA (L/s)
 C = Runoff coefficient
 I = Rainfall intensity (mm/hr) = A / (T_d + C)^{0.810}
 A = Area (ha)
 T_d = Time of duration (min)

Pre-Development Release Rate

IDF Curve Equations

I₂ = 732.951 / (T_d + 6.199)^{0.810} A = 732.951 B = 0.810 C = 6.199

C = 0.50 (max of 0.5 as per City Guidelines)
 I₂ = 76.8 mm/hr
 T_d = 10 min
 A = 0.67 ha
 2 Year Release Rate = **71.85** L/s

Post-development Stormwater Management

| | | | | ΣR = | ΣR _{2&5} |
|--|-----------------------------|--------------|-----------|------------|-----------------------|
| | Total Site Area = | 0.673 | ha | | 0.76 |
| | CA-01 (controlled) | 0.049 | ha | R = | 0.69 |
| | CA-02 (controlled) | 0.110 | ha | R = | 0.66 |
| | CA-03 (controlled) | 0.174 | ha | R = | 0.89 |
| | CA-04 (controlled) | 0.086 | ha | R = | 0.84 |
| | CA-05 (controlled) | 0.071 | ha | R = | 0.77 |
| | CA-06 (controlled) | 0.049 | ha | R = | 0.78 |
| | CA-07 (controlled) | 0.084 | ha | R = | 0.76 |
| | Total (controlled) | 0.622 | ha | R = | 0.79 |
| | CA-08 (uncontrolled) | 0.019 | ha | R = | 0.64 |
| | CA-09 (uncontrolled) | 0.032 | ha | R = | 0.35 |
| | Total (uncontrolled) | 0.051 | ha | R = | 0.45 |
| | Total | 0.673 | ha | R = | 0.76 |

2 Year Post-development Stormwater Management

| Time (min) | Intensity (mm/hr) | Controlled Runoff (L/s) | Storage Volume (m ³) | *Controlled Release Rate (L/s) | Uncontrolled Runoff (L/s) | Total Release Rate (L/s) |
|------------|-------------------|-------------------------|----------------------------------|--------------------------------|---------------------------|--------------------------|
| 10 | 76.81 | 104.73 | 37.89 | 41.58 | 4.92 | 46.50 |
| 15 | 61.77 | 84.23 | 38.38 | 41.58 | 3.96 | 45.54 |
| 20 | 52.03 | 70.95 | 35.25 | 41.58 | 3.34 | 44.92 |
| 25 | 45.17 | 61.59 | 30.02 | 41.58 | 2.90 | 44.48 |
| 30 | 40.04 | 54.60 | 23.44 | 41.58 | 2.57 | 44.15 |
| 35 | 36.06 | 49.17 | 15.94 | 41.58 | 2.31 | 43.89 |
| 40 | 32.86 | 44.82 | 7.76 | 41.58 | 2.11 | 43.69 |
| 45 | 30.24 | 41.24 | 0.00 | 41.58 | 1.94 | 43.52 |
| 50 | 28.04 | 38.24 | 0.00 | 41.58 | 1.80 | 43.38 |
| 55 | 26.17 | 35.69 | 0.00 | 41.58 | 1.68 | 43.26 |
| 60 | 24.56 | 33.49 | 0.00 | 41.58 | 1.57 | 43.15 |
| 65 | 23.15 | 31.57 | 0.00 | 41.58 | 1.48 | 43.06 |
| 70 | 21.91 | 29.88 | 0.00 | 41.58 | 1.40 | 42.99 |
| 75 | 20.81 | 28.38 | 0.00 | 41.58 | 1.33 | 42.91 |
| 80 | 19.83 | 27.04 | 0.00 | 41.58 | 1.27 | 42.85 |
| 85 | 18.94 | 25.83 | 0.00 | 41.58 | 1.21 | 42.79 |
| 90 | 18.14 | 24.74 | 0.00 | 41.58 | 1.16 | 42.74 |
| 95 | 17.41 | 23.75 | 0.00 | 41.58 | 1.12 | 42.70 |
| 100 | 16.75 | 22.84 | 0.00 | 41.58 | 1.07 | 42.65 |
| 105 | 16.13 | 22.00 | 0.00 | 41.58 | 1.03 | 42.61 |
| 110 | 15.57 | 21.23 | 0.00 | 41.58 | 1.00 | 42.58 |
| 115 | 15.05 | 20.52 | 0.00 | 41.58 | 0.96 | 42.55 |
| 120 | 14.56 | 19.86 | 0.00 | 41.58 | 0.93 | 42.51 |

Note: *50% of maximum controlled release rate for underground storage calculation

On-site stormwater detention

Storage required = 38.38 m³
 Storage provided = 39.24 m³ (Underground Storage)

| STM Pipe | | Volume | STM Structures | Dia. (m) | Depth (m) | Volume (m ³) |
|--------------|------------|-------------------|----------------|----------|--------------|--------------------------|
| Dia. (m) | Length (m) | (m ³) | | | | |
| 0.45 | 23.40 | 3.72 | CB01 | 1.2 | 1.94 | 2.19 |
| 0.45 | 22.6 | 3.60 | CBMH02 | 1.2 | 2.14 | 2.42 |
| 0.3 | 35 | 2.48 | CB03 | 1.2 | 2 | 2.26 |
| 0.375 | 53.9 | 5.96 | CBMH04 | 1.2 | 2.22 | 2.51 |
| 0.375 | 24 | 2.65 | CB05 | 1.2 | 2.07 | 2.34 |
| 0.3 | 34.4 | 2.43 | CBMH06 | 1.2 | 2.24 | 2.53 |
| | | | CBMH07 | 1.5 | 2.34 | 4.14 |
| Total | | 20.83 | | | Total | 18.40 |

LRL Associates Ltd.
Storm Sewer Design Sheet



LRL File No. 250161
Project: Proposed Development-Drummond Gas
Location: 1925 Merivale Rd, Nepean
Date: November 11, 2025
Designed: M. Longtin
Checked: M. Basnet
Dwg. Ref.: C401,C702

Rational Method
 Q = 2.78CIA
 Q = Peak flow (L/s)
 A = Drainage area (ha)
 C = Runoff coefficient
 I = Rainfall intensity (mm/hr)
Runoff coefficient (C)
 Grass = 0.2
 Gravel = 0.8
 Asphalt / rooftop = 0.9

IDF curve
 Ottawa Macdonald-Cartier International Airport
 Storm event: 5 Years
Intensity equation:
 $I_5 = 998.071 / (Td + 6.053)^{0.814}$ (mm/hr)
Pipe Design Parameters
 Minimum 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. | Rainfall Intensity | Peak Flow (Q) | Controlled Flow (Q) | Pipe Dia. | Type | Slope | Length | Capacity Full (Q _{FULL}) | Velocity Full | Time of Flow | Ratio Q/Q _{FULL} |
| | | | | | | | | | (mm/hr) | (L/s) | (L/s) | | | | | | | | |
| CA-01 | CB01 | CBMH02 | 0.015 | 0.000 | 0.035 | 0.09 | 0.09 | 10.00 | 104.19 | 9.83 | | 300 | PVC | 0.40% | 35.0 | 61.16 | 0.87 | 0.67 | 0.16 |
| CA-02 | CBMH02 | CBMH04 | 0.038 | 0.000 | 0.072 | 0.20 | 0.30 | 10.67 | 100.76 | 29.77 | | 450 | PVC | 0.20% | 22.6 | 127.50 | 0.80 | 0.47 | 0.23 |
| CA-03 | CB03 | CBMH04 | 0.002 | 0.000 | 0.172 | 0.43 | 0.43 | 10.00 | 104.19 | 44.93 | | 375 | PVC | 0.30% | 53.9 | 96.03 | 0.87 | 1.03 | 0.47 |
| CA-04 | CBMH04 | CBMH07 | 0.007 | 0.000 | 0.079 | 0.20 | 0.93 | 11.14 | 98.51 | 91.48 | | 450 | PVC | 0.24% | 23.4 | 139.67 | 0.88 | 0.44 | 0.65 |
| CA-05 | CB05 | CBMH06 | 0.013 | 0.000 | 0.058 | 0.15 | 0.15 | 10.00 | 104.19 | 15.80 | | 300 | PVC | 0.40% | 34.4 | 61.16 | 0.87 | 0.66 | 0.26 |
| CA-06 | CBMH06 | CBMH07 | 0.008 | 0.000 | 0.041 | 0.11 | 0.26 | 10.66 | 100.82 | 26.11 | | 375 | PVC | 0.30% | 24.0 | 96.03 | 0.87 | 0.46 | 0.27 |
| CA-07 | CBMH07 | OGS | 0.017 | 0.000 | 0.067 | 0.18 | 1.36 | 11.59 | 96.49 | 131.58 | 83.16 | 300 | PVC | 1.50% | 8.9 | 118.43 | 1.68 | 0.09 | 0.70 |
| Bongard Av. | OGS | Ex. STM | 0.000 | 0.000 | 0.000 | 0.00 | 1.36 | 11.68 | 96.10 | 131.04 | 83.16 | 300 | PVC | 1.50% | 13.1 | 118.43 | 1.68 | 0.13 | 0.70 |

Imbrium® Systems
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

11/10/2025

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

| | |
|-------------------|---------------------------------|
| Project Name: | 1925 Merivale Road |
| Project Number: | 250161 |
| Designer Name: | Jessica Steffler |
| Designer Company: | Rinker Materials |
| Designer Email: | jessica.steffler@RinkerPipe.com |
| Designer Phone: | 519-239-6958 |
| EOR Name: | Maxime Longtin |
| EOR Company: | LRL Associates Ltd. |
| EOR Email: | mlongtin@lrl.ca |
| EOR Phone: | 613-915-8043 |

| | |
|------------|-----|
| Site Name: | OGS |
|------------|-----|

| | |
|-------------------------|------|
| Drainage Area (ha): | 0.62 |
| Runoff Coefficient 'c': | 0.79 |

| | |
|-----------------------------|------|
| Particle Size Distribution: | Fine |
| Target TSS Removal (%): | 80.0 |

| | |
|--|-------|
| Required Water Quality Runoff Volume Capture (%): | 90.00 |
| Estimated Water Quality Flow Rate (L/s): | 15.81 |
| Oil / Fuel Spill Risk Site? | Yes |
| Upstream Flow Control? | Yes |
| Upstream Orifice Control Flow Rate to Stormceptor (L/s): | 83.16 |
| Peak Conveyance (maximum) Flow Rate (L/s): | |
| Influent TSS Concentration (mg/L): | 200 |
| Estimated Average Annual Sediment Load (kg/yr): | 572 |
| Estimated Average Annual Sediment Volume (L/yr): | 465 |

| Net Annual Sediment (TSS) Load Reduction Sizing Summary | |
|---|--------------------------|
| Stormceptor Model | TSS Removal Provided (%) |
| EFO4 | 83 |
| EFO5 | 88 |
| EFO6 | 92 |
| EFO8 | 96 |
| EFO10 | 98 |
| EFO12 | 100 |

| | |
|---|----------------|
| Recommended Stormceptor EFO Model: | EFO4 |
| Estimated Net Annual Sediment (TSS) Load Reduction (%): | 83 |
| Water Quality Runoff Volume Capture (%): | > 90 |



THIRD-PARTY TESTING AND VERIFICATION

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

PERFORMANCE

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

PARTICLE SIZE DISTRIBUTION (PSD)

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

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



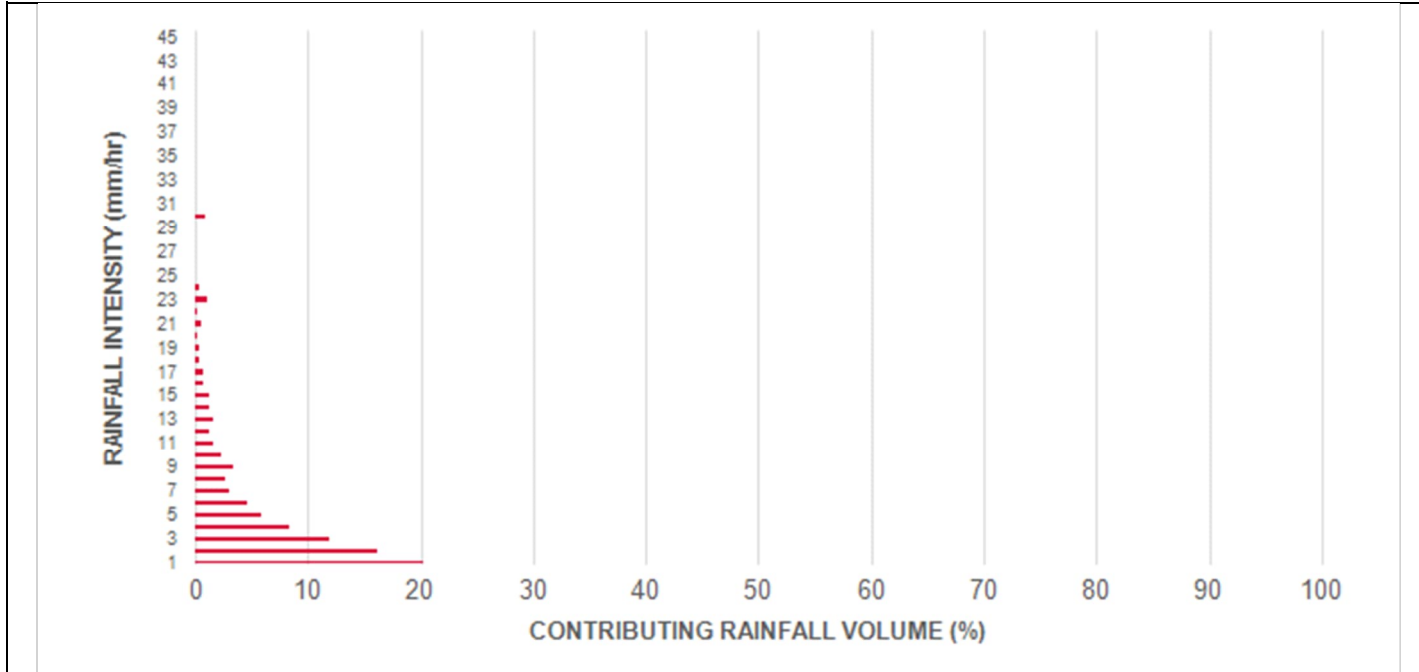
Upstream Flow Controlled Results

| Rainfall Intensity (mm / hr) | Percent Rainfall Volume (%) | Cumulative Rainfall Volume (%) | Flow Rate (L/s) | Flow Rate (L/min) | Surface Loading Rate (L/min/m²) | Removal Efficiency (%) | Incremental Removal (%) | Cumulative Removal (%) |
|--|-----------------------------|--------------------------------|-----------------|-------------------|---------------------------------|------------------------|-------------------------|------------------------|
| 0.50 | 8.6 | 8.6 | 0.68 | 41.0 | 34.0 | 100 | 8.6 | 8.6 |
| 1.00 | 20.3 | 29.0 | 1.36 | 82.0 | 68.0 | 100 | 20.3 | 29.0 |
| 2.00 | 16.2 | 45.2 | 2.72 | 163.0 | 136.0 | 92 | 14.9 | 43.9 |
| 3.00 | 12.0 | 57.2 | 4.08 | 245.0 | 204.0 | 83 | 10.0 | 53.9 |
| 4.00 | 8.4 | 65.6 | 5.45 | 327.0 | 272.0 | 80 | 6.7 | 60.6 |
| 5.00 | 5.9 | 71.6 | 6.81 | 408.0 | 340.0 | 77 | 4.6 | 65.2 |
| 6.00 | 4.6 | 76.2 | 8.17 | 490.0 | 408.0 | 74 | 3.4 | 68.6 |
| 7.00 | 3.1 | 79.3 | 9.53 | 572.0 | 477.0 | 71 | 2.2 | 70.7 |
| 8.00 | 2.7 | 82.0 | 10.89 | 654.0 | 545.0 | 67 | 1.8 | 72.6 |
| 9.00 | 3.3 | 85.3 | 12.25 | 735.0 | 613.0 | 65 | 2.2 | 74.7 |
| 10.00 | 2.3 | 87.6 | 13.62 | 817.0 | 681.0 | 64 | 1.5 | 76.2 |
| 11.00 | 1.6 | 89.2 | 14.98 | 899.0 | 749.0 | 64 | 1.0 | 77.2 |
| 12.00 | 1.3 | 90.5 | 16.34 | 980.0 | 817.0 | 63 | 0.8 | 78.0 |
| 13.00 | 1.7 | 92.2 | 17.70 | 1062.0 | 885.0 | 62 | 1.1 | 79.1 |
| 14.00 | 1.2 | 93.5 | 19.06 | 1144.0 | 953.0 | 62 | 0.8 | 79.9 |
| 15.00 | 1.2 | 94.6 | 20.42 | 1225.0 | 1021.0 | 61 | 0.7 | 80.6 |
| 16.00 | 0.7 | 95.3 | 21.79 | 1307.0 | 1089.0 | 59 | 0.4 | 81.0 |
| 17.00 | 0.7 | 96.1 | 23.15 | 1389.0 | 1157.0 | 58 | 0.4 | 81.4 |
| 18.00 | 0.4 | 96.5 | 24.51 | 1471.0 | 1225.0 | 56 | 0.2 | 81.6 |
| 19.00 | 0.4 | 96.9 | 25.87 | 1552.0 | 1294.0 | 55 | 0.2 | 81.9 |
| 20.00 | 0.2 | 97.1 | 27.23 | 1634.0 | 1362.0 | 53 | 0.1 | 82.0 |
| 21.00 | 0.5 | 97.5 | 28.59 | 1716.0 | 1430.0 | 51 | 0.2 | 82.2 |
| 22.00 | 0.2 | 97.8 | 29.96 | 1797.0 | 1498.0 | 49 | 0.1 | 82.3 |
| 23.00 | 1.0 | 98.8 | 31.32 | 1879.0 | 1566.0 | 47 | 0.5 | 82.8 |
| 24.00 | 0.3 | 99.1 | 32.68 | 1961.0 | 1634.0 | 45 | 0.1 | 82.9 |
| 25.00 | 0.9 | 100.0 | 34.04 | 2042.0 | 1702.0 | 43 | 0.4 | 83.3 |
| 30.00 | 0.9 | 100.9 | 40.85 | 2451.0 | 2042.0 | 36 | 0.3 | 83.7 |
| 35.00 | -0.9 | 100.0 | 47.66 | 2859.0 | 2383.0 | 31 | N/A | 83.4 |
| 40.00 | 0.0 | 100.0 | 54.47 | 3268.0 | 2723.0 | 27 | 0.0 | 83.4 |
| 45.00 | 0.0 | 100.0 | 61.27 | 3676.0 | 3064.0 | 24 | 0.0 | 83.4 |
| Estimated Net Annual Sediment (TSS) Load Reduction = | | | | | | | | 83 % |

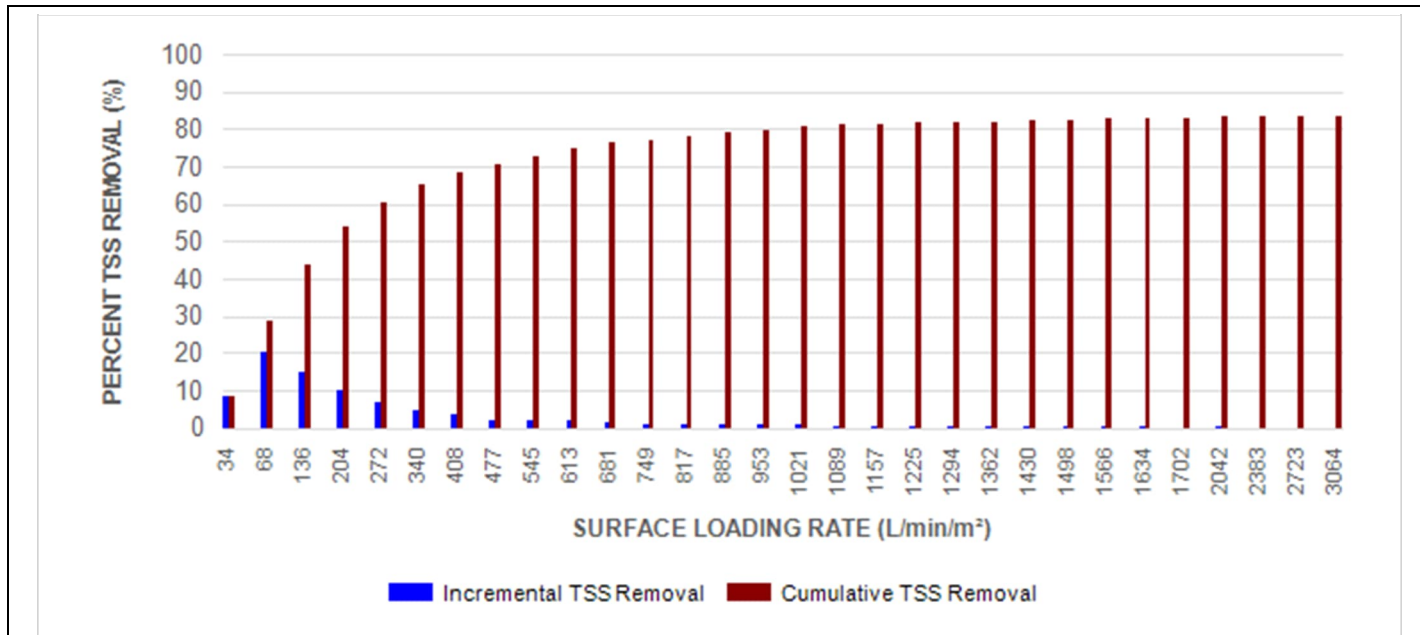
Climate Station ID: 6105978 Years of Rainfall Data: 20



RAINFALL DATA FROM OTTAWA CDA RCS RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

| Stormceptor EF / EFO | Model Diameter | | Min Angle Inlet / Outlet Pipes | Max Inlet Pipe Diameter | | Max Outlet Pipe Diameter | | Peak Conveyance Flow Rate | |
|-------------------------|----------------|------|-----------------------------------|----------------------------|------|-----------------------------|------|------------------------------|-------|
| | (m) | (ft) | | (mm) | (in) | (mm) | (in) | (L/s) | (cfs) |
| EF4 / EFO4 | 1.2 | 4 | 90 | 609 | 24 | 609 | 24 | 425 | 15 |
| EF5 / EFO5 | 1.5 | 5 | 90 | 762 | 30 | 762 | 30 | 710 | 25 |
| EF6 / EFO6 | 1.8 | 6 | 90 | 914 | 36 | 914 | 36 | 990 | 35 |
| EF8 / EFO8 | 2.4 | 8 | 90 | 1219 | 48 | 1219 | 48 | 1700 | 60 |
| EF10 / EFO10 | 3.0 | 10 | 90 | 1828 | 72 | 1828 | 72 | 2830 | 100 |
| EF12 / EFO12 | 3.6 | 12 | 90 | 1828 | 72 | 1828 | 72 | 2830 | 100 |

SCOUR PREVENTION AND ONLINE CONFIGURATION

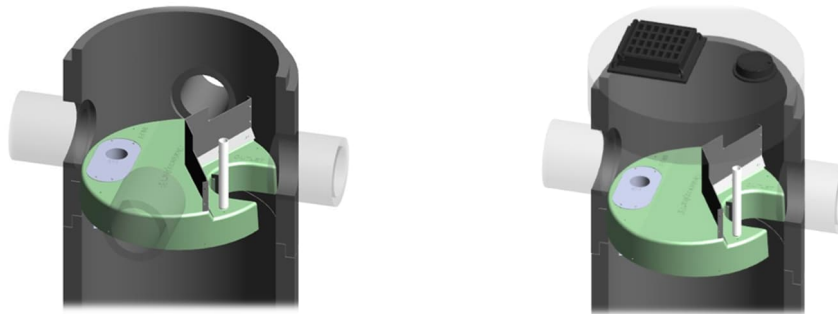
► Stormceptor® EF and EFO feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV Procedure for Laboratory Testing of Oil-Grit Separators, and the exceptional scour test performance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

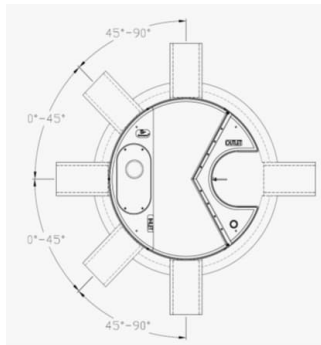
DESIGN FLEXIBILITY

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

OIL CAPTURE AND RETENTION

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





INLET-TO-OUTLET DROP

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

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

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

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

| Stormceptor EF / EFO | Model Diameter | | Depth (Outlet Pipe Invert to Sump Floor) | | Oil Volume | | Recommended Sediment Maintenance Depth * | | Maximum Sediment Volume * | | Maximum Sediment Mass ** | |
|----------------------|----------------|------|--|------|------------|-------|--|------|---------------------------|--------------------|--------------------------|--------|
| | (m) | (ft) | (m) | (ft) | (L) | (Gal) | (mm) | (in) | (L) | (ft ³) | (kg) | (lb) |
| EF4 / EFO4 | 1.2 | 4 | 1.52 | 5.0 | 265 | 70 | 203 | 8 | 1190 | 42 | 1904 | 5250 |
| EF5 / EFO5 | 1.5 | 5 | 1.62 | 5.3 | 420 | 111 | 305 | 10 | 2124 | 75 | 2612 | 5758 |
| EF6 / EFO6 | 1.8 | 6 | 1.93 | 6.3 | 610 | 160 | 305 | 12 | 3470 | 123 | 5552 | 15375 |
| EF8 / EFO8 | 2.4 | 8 | 2.59 | 8.5 | 1070 | 280 | 610 | 24 | 8780 | 310 | 14048 | 38750 |
| EF10 / EFO10 | 3.0 | 10 | 3.25 | 10.7 | 1670 | 440 | 610 | 24 | 17790 | 628 | 28464 | 78500 |
| EF12 / EFO12 | 3.6 | 12 | 3.89 | 12.8 | 2475 | 655 | 610 | 24 | 31220 | 1103 | 49952 | 137875 |

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

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

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

STANDARD STORMCEPTOR EF/EFO DRAWINGS

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

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

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

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

PART 1 – GENERAL

1.1 WORK INCLUDED

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

1.2 REFERENCE STANDARDS & PROCEDURES

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

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

1.3 SUBMITTALS

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

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

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

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

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

| | | |
|-------|-------------------------------------|---|
| 2.1.1 | 4 ft (1219 mm) Diameter OGS Units: | 1.19 m ³ sediment / 265 L oil |
| | 5 ft (1524 mm) Diameter OGS Units: | 1.95 m ³ sediment / 420 L oil |
| | 6 ft (1829 mm) Diameter OGS Units: | 3.48 m ³ sediment / 609 L oil |
| | 8 ft (2438 mm) Diameter OGS Units: | 8.78 m ³ sediment / 1,071 L oil |
| | 10 ft (3048 mm) Diameter OGS Units: | 17.78 m ³ sediment / 1,673 L oil |
| | 12 ft (3657 mm) Diameter OGS Units: | 31.23 m ³ sediment / 2,476 L oil |

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

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

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

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

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

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

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

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

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

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

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

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

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

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

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance

results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m² to 2600 L/min/m²) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators**. However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

STANDARD SPECIFICATION FOR “OIL GRIT SEPARATOR” (OGS) STORMWATER QUALITY TREATMENT DEVICE WITH THIRD-PARTY VERIFIED LIGHT LIQUID RE-ENTRAINMENT SIMULATION PERFORMANCE TESTING RESULTS

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, designing, maintaining, and constructing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, **specifically an OGS device that has been third-party tested for oil and fuel retention capability using a protocol for light liquid re-entrainment simulation testing, with testing results and a Statement of Verification in accordance with all the provisions of ISO 14034 Environmental Management – Environmental Technology Verification (ETV)**. Work includes supply and installation of concrete bases, precast sections, and the appropriate precast section with OGS internal components correctly installed within the system, watertight sealed to the precast concrete prior to arrival to the project site.

1.2 REFERENCE STANDARDS

1.2.1 For Canadian projects only, the following reference standards apply:

CAN/CSA-A257.4-14: Joints for Circular Concrete Sewer and Culvert Pipe, Manhole Sections, and Fittings Using Rubber Gaskets

CAN/CSA-A257.4-14: Precast Reinforced Circular Concrete Manhole Sections, Catch Basins, and Fittings

CAN/CSA-S6-00: Canadian Highway Bridge Design Code

1.2.2 For ALL projects, the following reference standards apply:

ASTM D-4097: Contact Molded Glass Fiber Reinforced Chemical Resistant Tanks

ASTM C 478: Specification for Precast Reinforced Concrete Manhole Sections

ASTM C 443: Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets

ASTM C 891: Standard Practice for Installation of Underground Precast Concrete Utility Structures

ASTM D2563: Standard Practice for Classification of Visual Defects in Reinforced Plastics

1.3 SHOP DRAWINGS

1.3.1 Shop drawings shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail the precast concrete components and OGS internal components prior to shipment, including the sequence for installation.

1.3.2 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record. Any and all changes to project cost estimates, bonding amounts, plan check fees for revision of approved documents, or design impacts due to regulatory requirements as a result of a product substitution shall be coordinated by the Contractor with the Engineer of Record.

1.4 HANDLING AND STORAGE

Prevent damage to materials during storage and handling.

1.4.1 OGS internal components supplied by the Manufacturer for attachment to the precast concrete vessel shall be pre-fabricated, bolted to the precast and watertight sealed to the precast vessel surface prior to site delivery to ensure Manufacturer's internal assembly process and quality control processes are fully adhered to, and to prevent materials damage on site.

1.4.2 Follow all instructions including the sequence for installation in the shop drawings during installation.

PART 2 – PRODUCTS

2.1 GENERAL

2.1.1 The OGS vessel shall be cylindrical and constructed from precast concrete riser and slab components.

2.1.2 The precast concrete OGS internal components shall include a fiberglass insert bolted and watertight sealed inside the precast concrete vessel, prior to site delivery. Primary internal components that are to be anchored and watertight sealed to the precast concrete vessel shall be done so only by the Manufacturer prior to arrival at the job site to ensure product quality.

2.1.3 The OGS shall be allowed to be specified and have the ability to function as a 240-degree bend structure in the stormwater drainage system, or as a junction structure.

2.1.4 The OGS to be specified shall have the capability to accept influent flow from an inlet grate and an inlet pipe.

2.2 PRECAST CONCRETE SECTIONS

All precast concrete components shall be designed and manufactured to meet highway loading conditions per State/Provincial or local requirements.

2.3 GASKETS

Only profile neoprene or nitrile rubber gaskets that are oil resistant shall be accepted. For Canadian projects only, gaskets shall be in accordance to CSA A257.4-14. Mastic sealants, butyl tape/rope or Conseal CS-101 alone are not acceptable gasket materials.

2.4 JOINTS

The concrete joints shall be watertight and meet the design criteria according to ASTM C-990. For projects where joints require gaskets, the concrete joints shall be watertight and oil resistant and meet the design criteria according to ASTM C-443. Mastic sealants or butyl tape/rope alone are not an acceptable alternative.

2.5 FRAMES AND COVERS

Frames and covers shall be manufactured in accordance with State/Provincial or local requirements for inspection and maintenance access purposes. A minimum of one cover, at least 22-inch (560 mm) in diameter, shall be clearly embossed with the OGS manufacturer's product name to properly identify this asset's purpose is for stormwater quality treatment.

2.6 PRECAST CONCRETE

All precast concrete components shall conform to the appropriate CSA or ASTM specifications.

2.7 FIBERGLASS

The fiberglass portion of the OGS device shall be constructed in accordance with ASTM D2563, and in accordance with the PS15-69 manufacturing standard, and shall only be installed, bolted and watertight sealed to the precast concrete by the Manufacturer prior to arrival at the project site to ensure product quality.

2.8 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a fiberglass insert for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The total sediment storage capacity shall be a minimum 40 ft³ (1.1 m³). The total petroleum hydrocarbon storage capacity shall be a minimum 50 gallons (189 liters). The access opening to the sump of the OGS device for periodic inspection and maintenance purposes shall be a minimum 16 inches (406 mm) in diameter.

2.9 LADDERS

Ladder rungs shall be provided upon request or to comply with State/Provincial or local requirements.

2.10 INSPECTION

All precast concrete sections shall be level and inspected to ensure dimensions, appearance, integrity of internal components, and quality of the product meets State/Provincial or local specifications and associated standards.

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

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

3.2 HYDROLOGY AND RUNOFF VOLUME

The OGS device shall be engineered, designed and sized to treat a minimum of 90 percent of the average annual runoff volume, unless otherwise stated by the Engineer of Record, using historical rainfall data. Rainfall data sets should be comprised of a minimum 15-years of rainfall data or a longer continuous period if available for a given location, but in all cases a minimum 5-year period of rainfall data.

3.3 ANNUAL (TSS) SEDIMENT LOAD AND STORAGE CAPACITY

The OGS device shall be capable of removing and have sufficient storage capacity for the calculated annual total suspended solids (TSS) mass load and volume without scouring previously captured pollutants prior to maintenance being required. The annual (TSS) sediment load and volume transported from the drainage area should be calculated and compared to the OGS device's available storage capacity by the specifying Engineer to ensure adequate capacity between maintenance cycles. Sediment loadings shall be determined by land use and defined as a minimum of 450 kg (992 lb) of sediment (TSS) per impervious hectare of drainage area per year, or greater based on land use, as noted in Table 1 below.

Annual sediment volume calculations shall be performed using the projected average annual treated runoff volume, a typical sediment bulk density of 1602 kg/m³ (100 lbs/ft³) and an assumed Event Mean Concentration (EMC) of 125 mg/L TSS in the runoff, or as otherwise determined by the Engineer of Record.

Example calculation for a 1.3-hectares parking lot site:

- 1.28 meters of rainfall depth, per year
- 1.3 hectares of 100% impervious drainage area
- EMC of 125 mg/L TSS in runoff
- Treatment of 90% of the average annual runoff volume
- Target average annual TSS removal rate of 60% by OGS

Annual Runoff Volume:

- 1.28 m rain depth x 1.3 ha x 10,000 m²/ha= 16,640 m³ of runoff volume
- 16,640 m³ x 1000 L/m³ = 16,640,000 L of runoff volume
- 16,640,000 L x 0.90 = 14,976,000 L to be treated by OGS unit

Annual Sediment Mass and Sediment Volume Load Calculation:

- 14,976,000 L x 125 mg/L x kg/1,000,000 mg = 1,872 kg annual sediment mass
- 1,872 kg x m³/1602 kg = 1.17 m³ annual sediment volume
- 1.17 m³ x 60% TSS removal rate by OGS = 0.70 m³ minimum expected annual storage requirement in OGS

As a guideline, the U.S. EPA has determined typical annual sediment loads per drainage area for various sites by land use (see Table 1). Certain States, Provinces and local jurisdictions have also established such guidelines.

| | Commercial | Parking Lot | Residential | | | Highways | Industrial | Shopping Center |
|-----------------|------------|-------------|-------------|------|-----|----------|------------|-----------------|
| | | | High | Med. | Low | | | |
| (lbs/acre/yr) | 1,000 | 400 | 420 | 250 | 10 | 880 | 500 | 440 |
| (kg/hectare/yr) | 1,124 | 450 | 472 | 281 | 11 | 989 | 562 | 494 |

Source: U.S. EPA Stormwater Best Management Practice Design Guide Volume 1, Appendix D, Table D-1, Burton and Pitt 2002

3.4 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in Table 2, Section 3.5, and based on third-party performance testing conducted in accordance with the Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit Separators**. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol *Procedure for Laboratory Testing of Oil-Grit Separators*, as follows:

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

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

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

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

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 3.3.

3.4.5 The Peclet Number is not an approved method or model for calculating TSS removal, sizing, or scaling OGS devices.

3.4.6 If an alternate OGS device is proposed, supporting documentation shall be submitted that demonstrates:

- Canadian ETV or ISO 14034 ETV Verification Statement which verifies third-party performance testing conducted in accordance with the **Procedure for Laboratory Testing of Oil-Grit Separators**, including the Light Liquid Re-entrainment Simulation Testing.
- Equal or better sediment (TSS) removal of the PSD specified in Table 2 at equivalent surface loading rates, as compared to the OGS device specified herein.
- Equal or better Light Liquid Re-entrainment Simulation Test results (using low-density polyethylene beads as a surrogate for light liquids such as oil and fuel) at equivalent surface loading rates, as compared to the OGS device specified herein. However, an alternative OGS device shall not be allowed as a substitute if the Light Liquid Re-entrainment Simulation Test was performed with screening components within the OGS device that are effective at retaining the low-density polyethylene beads, but would not be expected to retain light liquids such as oil and fuel.
- Equal or greater sediment storage capacity, as compared to the OGS device specified herein.
- Supporting documentation shall be signed and sealed by a local registered Professional Engineer. All costs associated with preparing and certifying this documentation shall be born solely by the Contractor.

3.5 PARTICLE SIZE DISTRIBUTION (PSD) FOR SIZING

The OGS device shall be sized to achieve the Engineer-specified average annual percent sediment (TSS) removal based solely on the test sediment used in the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators**. This test sediment is comprised of inorganic ground silica with a specific gravity of 2.65, uniformly mixed, and containing a broad range of particle sizes as specified in Table 2. No alternative PSDs or deviations from Table 2 shall be accepted.

| Table 2 Canadian ETV Program Procedure for Laboratory Testing of Oil-Grit Separators Particle Size Distribution (PSD) of Test Sediment | | |
|--|-----------------------------------|-------------------------|
| Particle Diameter (Microns) | % by Mass of All Particles | Specific Gravity |
| 1000 | 5% | 2.65 |
| 500 | 5% | 2.65 |
| 250 | 15% | 2.65 |
| 150 | 15% | 2.65 |
| 100 | 10% | 2.65 |
| 75 | 5% | 2.65 |
| 50 | 10% | 2.65 |
| 20 | 15% | 2.65 |
| 8 | 10% | 2.65 |
| 5 | 5% | 2.65 |
| 2 | 5% | 2.65 |

3.6 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party scour testing conducted and have in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators**. This scour testing is conducted with the device pre-loaded with test sediment comprised of the particle size distribution (PSD) illustrated in Table 2.

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

Data generated from laboratory scour testing performed with an OGS device pre-loaded with a coarser PSD than in Table 2 (i.e. the coarser PSD has no particles in the 1-micron to 50-micron size range, or the D₅₀ of the test sediment exceeds 75 microns) shall not be acceptable for the determination of the device's suitability for on-line installation.

3.7 DESIGN ACCOUNTING FOR BYPASS

3.7.1 The OGS device shall be specified to achieve the TSS removal performance and water quality objectives without washout of previously captured pollutants. The OGS device shall also have sufficient hydraulic conveyance capacity to convey the peak storm event, in accordance with hydraulic conditions per the Engineer of Record. To ensure this is achieved, there are two design options with associated requirements:

3.7.1.1 The OGS device shall be placed **off-line** with an upstream diversion structure (typically in an upstream manhole) that only allows the water quality volume to be diverted to the OGS device, and excessive flows diverted downstream around the OGS device to prevent high flow washout of pollutants previously captured. This design typically incorporates a triangular layout including an upstream bypass manhole with an appropriately engineered weir wall, the OGS device, and a downstream junction manhole, which is connected to both the OGS device and bypass structure. In this case with an external bypass required, the OGS device manufacturer must provide calculations and designs for all structures, piping and any other required material applicable to the proper functioning of the system, stamped by a Professional Engineer.

3.7.1.2 Alternatively, OGS devices in compliance with Section 3.6 shall be acceptable for an **on-line** design configuration, thereby eliminating the requirement for an upstream bypass manhole and downstream junction manhole.

3.7.2 The OGS device shall also have sufficient hydraulic conveyance capacity to convey the peak storm event, in accordance with hydraulic conditions per the Engineer of Record. If an alternate OGS device is proposed, supporting documentation shall be submitted that demonstrates equal or better hydraulic conveyance capacity as compared to the OGS device specified herein. This documentation shall be signed and sealed by a local registered Professional Engineer. All costs associated with preparing and certifying this documentation shall be born solely by the Contractor.

3.8 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

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

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

3.9 PETROLEUM HYDROCARBONS AND FLOATABLES STORAGE CAPACITY

Petroleum hydrocarbons and floatables storage capacity in the OGS device shall be a minimum 50 gallons (189 Liters), or more as specified.

3.9.1 The OGS device shall have gasketed precast concrete joints that are watertight, and oil resistant and meet the design criteria according to ASTM C-443 to provide safe oil and other hydrocarbon materials storage and ground water protection. Mastic sealants or butyl tape/rope alone are not an acceptable alternative.

3.10 SURFACE LOADING RATE SCALING OF DIFFERENT MODEL SIZES

The reference device for scaling shall be an OGS device that has been third-party tested in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators**. Other model sizes of the tested device shall only be scaled such that the claimed TSS removal efficiency of the scaled device shall be no greater than the TSS removal efficiency of the tested device at identical **surface loading rates** (flow rate divided by settling surface area). The depth of other model sizes of the tested device shall be scaled in accordance with the depth scaling provisions within Section 6.0 of the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators**.

3.10.1 The Peclet Number and volumetric scaling are not approved methods for scaling OGS devices.

PART 4 – INSPECTION & MAINTENANCE

The OGS manufacturer shall provide an Owner's Manual upon request. Maintenance shall be performed by a professional service provider who has experience in cleaning OGS devices and has been trained and certified in applicable health and safety practices, including confined space entry procedures.

- 4.1 A Quality Assurance Plan that provides inspection for a minimum of 5 years shall be included with the OGS stormwater quality device, and written into the Environmental Compliance Approval (ECA) or the appropriate State/Provincial or local approval document.
- 4.2 OGS device inspection shall include determination of sediment depth and presence of petroleum hydrocarbons below the insert. Inspection shall be easily conducted from finished grade through a frame and cover of at least 22 inch (560 mm) in diameter.
- 4.3 Inspection and pollutant removal shall be conducted periodically. For routine maintenance cleaning activities, pollutant removal shall typically utilize a truck equipped with vacuum apparatus, and shall be easily conducted from finished grade through a frame and cover of at least 22-inches (560 mm) in diameter.
- 4.4 Diameter of the maintenance access opening to the lower chamber and sump shall be scaled consistently across all model sizes, and shall be 1/3 the inside diameter of the OGS structure, or larger.
- 4.5 No confined space entry shall be required for routine inspection and maintenance cleaning activities.

- 4.6 For OGS model sizes of diameter 72 inches (1828 mm) and greater, the access opening to the OGS device's lower chamber and sump shall be large enough to allow a maintenance worker to enter the lower chamber to facilitate non-routine maintenance cleaning activities and repairs, as needed.
- 4.7 The orifice-containing component (i.e. drop pipe, duct, chute, etc.) of the OGS device used to control flow rate into the lower chamber shall be removable from the insert to facilitate cleaning, repair, or replacement of the orifice-containing component, as needed.

PART 5 – EXECUTION

5.1 PRECAST CONCRETE INSTALLATION

The installation of the precast concrete OGS stormwater quality treatment device shall conform to ASTM C 891, ASTM C 478, ASTM C 443, CAN/CSA-A257.4-14, CAN/CSA-A257.4-14, CAN/CSA-S6-00 and all highway, State/Provincial, or local specifications for the construction of manholes. Selected sections of a general specification that are applicable are summarized below. The Contractor shall furnish all labor, equipment and materials necessary to offload, assemble as needed the OGS internal components as specified in the Shop Drawings.

5.2 EXCAVATION

5.2.1 Excavation for the installation of the OGS stormwater quality treatment device shall conform to highway, State/Provincial or local specifications. Topsoil that is removed during the excavation for the OGS stormwater quality treatment device shall be stockpiled in designated areas and not be mixed with subsoil or other materials. Topsoil stockpiles and the general site preparation for the installation of the OGS stormwater quality device shall conform to highway, State/Provincial or local specifications.

5.2.2 The OGS device shall not be installed on frozen ground. Excavation shall extend a minimum of 12 inch (300 mm) from the precast concrete surfaces plus an allowance for shoring and bracing where required. If the bottom of the excavation provides an unsuitable foundation additional excavation may be required.

5.2.3 In areas with a high water table, continuous dewatering shall be provided to ensure that the excavation is stable and free of water.

5.3 BACKFILLING

Backfill material shall conform to highway, State/Provincial or local specifications. Backfill material shall be placed in uniform layers not exceeding 12 inches (300 mm) in depth and compacted to highway, State/Provincial or local specifications.

5.4 OGS WATER QUALITY DEVICE CONSTRUCTION SEQUENCE

5.4.1 The precast concrete OGS stormwater quality treatment device is installed and leveled in sections in the following sequence:

- aggregate base
- base slab, or base
- riser section(s) (if required)
- riser section w/ pre-installed fiberglass insert
- upper riser section(s)
- internal OGS device components
- connect inlet and outlet pipes
- riser section, top slab and/or transition (if required)
- frame and access cover

5.4.2 The precast concrete base shall be placed level at the specified grade. The entire base shall be in contact with the underlying compacted granular material. Subsequent sections, complete with oil resistant, watertight joint seals, shall be installed in accordance with the precast concrete manufacturer's recommendations.

5.4.3 Adjustment of the OGS stormwater quality treatment device can be performed by lifting the upper sections free of the excavated area, re-leveling the base, and re-installing the sections. Damaged sections and gaskets shall be repaired or replaced as necessary. Once the OGS stormwater quality treatment device has been constructed, any lift holes must be plugged with mortar.

5.5 DROP PIPE AND OIL INSPECTION PIPE

Once the upper precast concrete riser has been attached to the lower precast concrete riser section, the OGS device Drop Pipe and Oil Inspection Pipe must be attached, and watertight sealed to the fiberglass insert using Sikaflex 1a. Installation instructions and required materials shall be provided by the OGS manufacturer.

5.6 INLET AND OUTLET PIPES

Inlet and outlet pipes shall be securely set using grout or approved pipe seals (flexible boot connections, where applicable) so that the structure is watertight. Non-secure inlets and outlets will result in improper performance.

5.7 FRAME AND COVER OR FRAME AND GRATE INSTALLATION

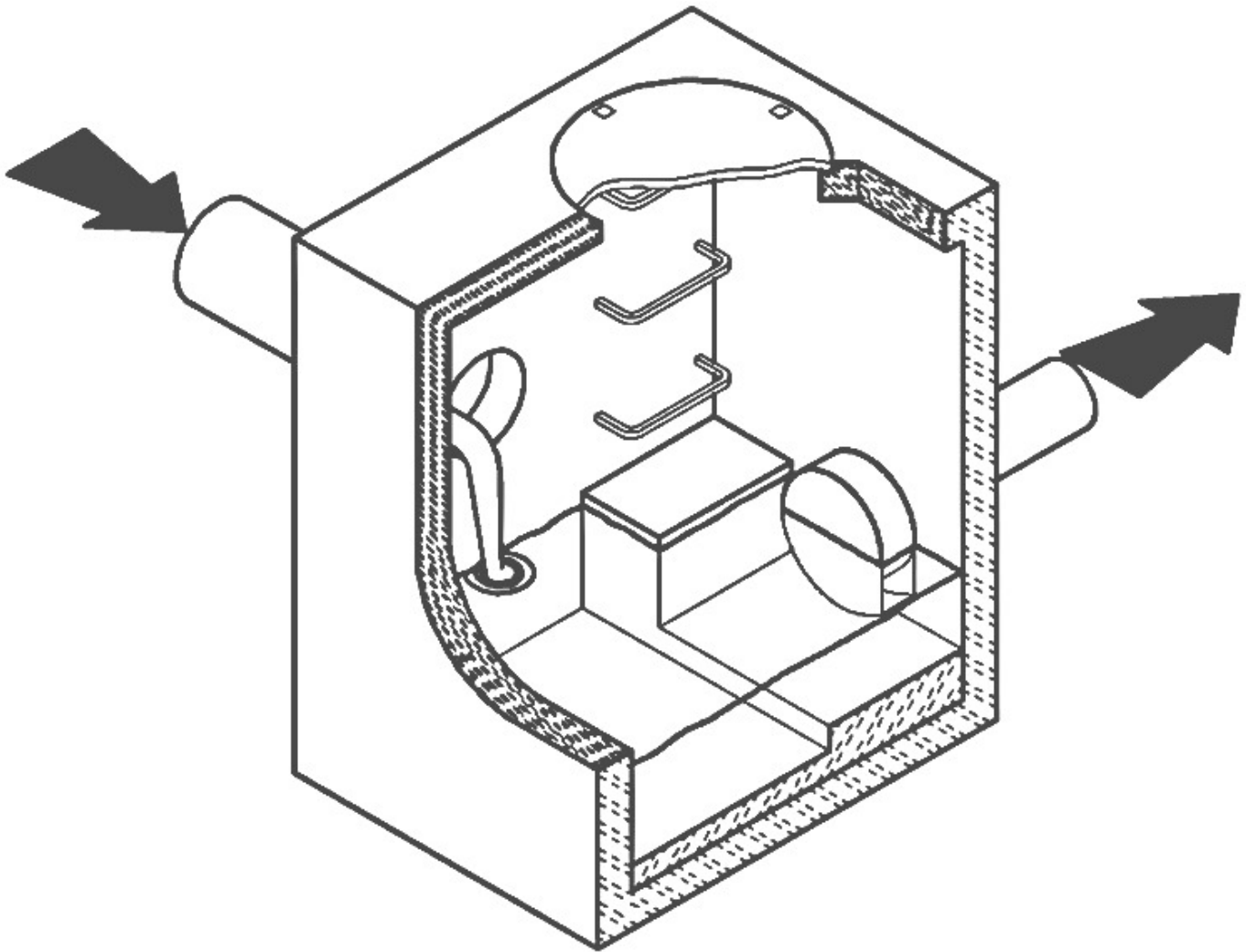
Precast concrete adjustment units shall be installed to set the frame and cover/grate at the required elevation. The adjustment units shall be laid in a full bed of mortar with successive units being joined using sealant recommended by the manufacturer. Frames for the cover/grate should be set in a full bed of mortar at the elevation specified.

5.7.1 A minimum of one cover, at least 22-inch (560 mm) in diameter, shall be clearly embossed with the OGS device brand or product name to properly identify this asset's purpose is for stormwater quality treatment.

CSO/STORMWATER MANAGEMENT



HYDROVEX[®] VHV / SVHV
Vertical Vortex Flow Regulator



JOHN MEUNIER

HYDROVEX® VHV / SVHV VERTICAL VORTEX FLOW REGULATOR

APPLICATIONS

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

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

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

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

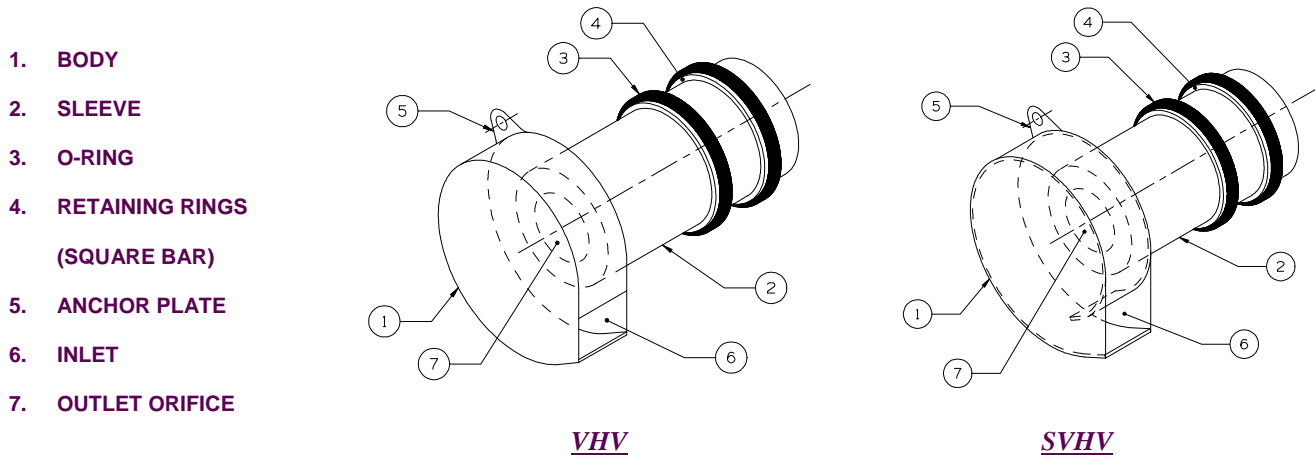


FIGURE 1: HYDROVEX® VHV-SVHV VERTICAL VORTEX FLOW REGULATORS

ADVANTAGES

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

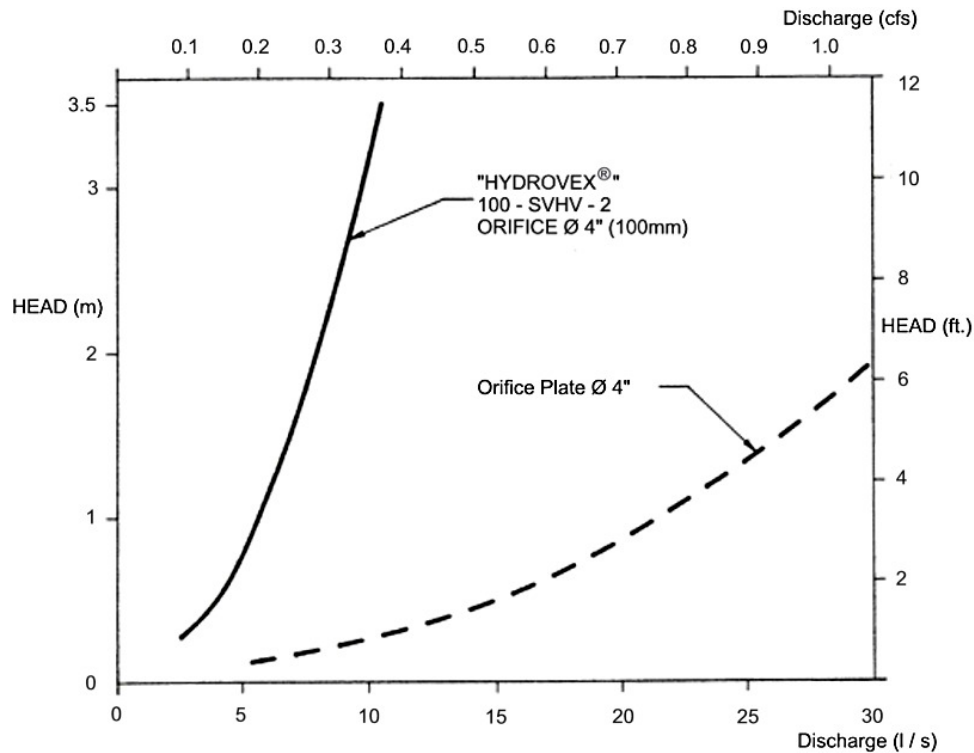


FIGURE 2: DISCHARGE CURVE SHOWING A HYDROVEX® FLOW REGULATOR VS AN ORIFICE PLATE

SELECTION

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

Example:

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

INSTALLATION REQUIREMENTS

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

SPECIFICATIONS

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

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

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

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

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



Typical VHV model in factory

OPTIONS



FV – SVHV (mounted on sliding plate)



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



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



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



VHV with air vent for minimal slopes



VHV Vertical Vortex Flow Regulator

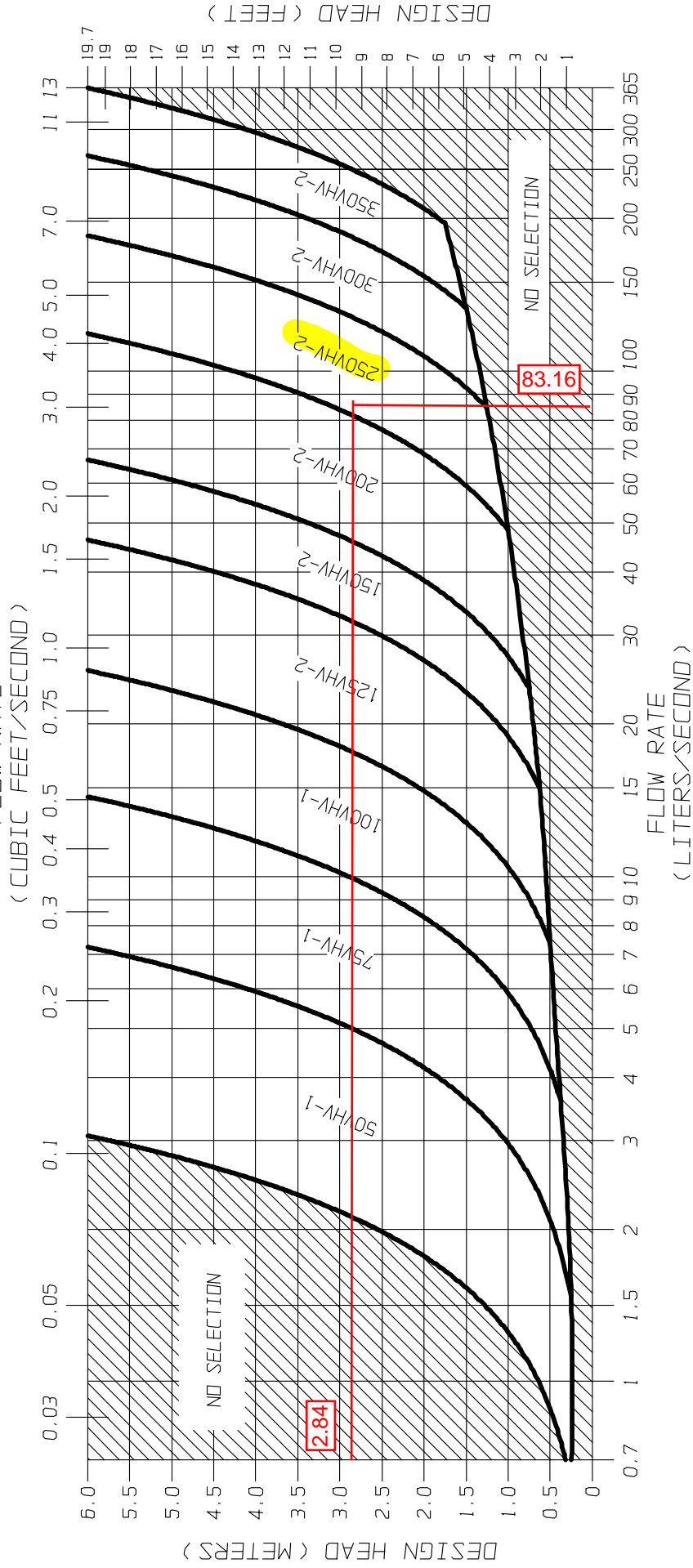
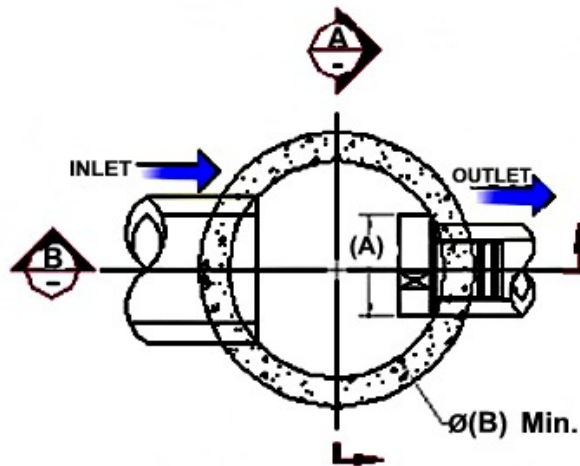


FIGURE 3 - VHV

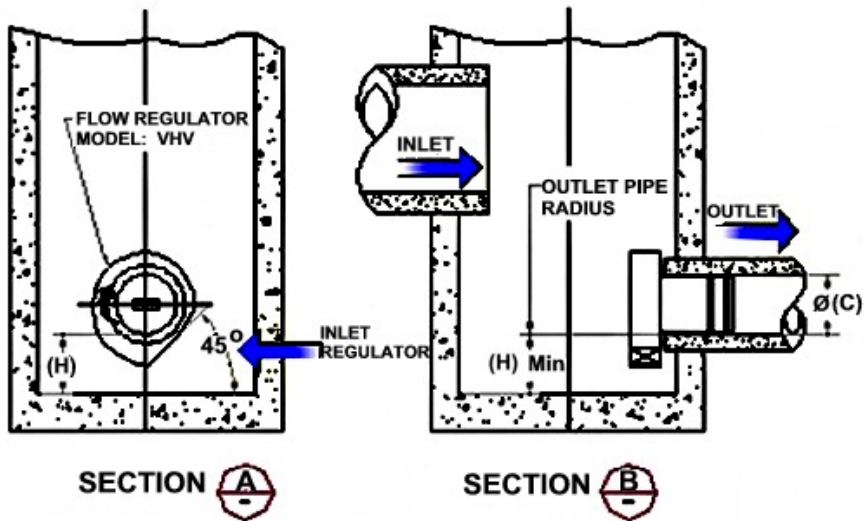
JOHN MEUNIER

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

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



CIRCULAR WELL



SECTION A-A

SECTION B-B

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

Head Office

4105 Sartelon

Saint-Laurent (Quebec) Canada H4S 2B3

Tel.: 514-334-7230 www.johnmeunier.com

Fax: 514-334-5070 cs@johnmeunier.com

Ontario Office

2000 Argentia Road, Plaza 4, Unit 430

Mississauga (Ontario) Canada L5N 1W1

Tel.: 905-286-4846 www.johnmeunier.com

Fax: 905-286-0488 ontario@johnmeunier.com

USA Office

2209 Menlo Avenue

Glenside, PA USA 19038

Tel.: 412-417-6614 www.johnmeunier.com

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

APPENDIX E
Civil Engineering Drawings

GENERAL NOTES

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

EROSION AND SEDIMENT CONTROL NOTES

GENERAL

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

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

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

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

THE CONTRACTOR SHALL PERIODICALLY (WEEKLY), 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 WATERCOURSE AND AVOIDS DAMAGE TO EXISTING SITE FEATURES. THE SEDIMENT SHALL BE REMOVED FROM THE SITE AT THE CONTRACTORS EXPENSE AND MANAGED IN COMPLIANCE WITH REQUIREMENTS FRO EXCESS EARTH MATERIAL, AS SPECIFIED ELSEWHERE IN THE CONTRACT.

THE CONTRACTOR IS REQUIRED TO IMPLEMENT SEDIMENT AND EROSION CONTROL MEASURES AT LEAST ONE WEEK BEFORE THE COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES. THESE MEASURES SHOULD BE THOROUGHLY INSTALLED TO EFFECTIVELY MANAGE SOIL EROSION AND SEDIMENT RUNOFF. FOLLOWING INSTALLATION, THE CONTRACTOR MUST CONDUCT INSPECTIONS OF THESE CONTROL MEASURES ON A WEEKLY BASIS TO ENSURE THEIR ONGOING EFFECTIVENESS AND FUNCTIONALITY.

IN ADDITION TO THE REGULAR WEEKLY INSPECTIONS, THE CONTRACTOR MUST ALSO CARRY OUT ADDITIONAL INSPECTIONS IN THE AFTERMATH OF ANY MAJOR RAINFALL EVENTS. THIS WILL HELP ASSESS THE PERFORMANCE OF THE EROSION CONTROL MEASURES UNDER INCREASED WATER FLOW CONDITIONS. ANY DEFICIENCIES OR DAMAGES IDENTIFIED DURING THESE INSPECTIONS MUST BE PROMPTLY REPAIRED TO MAINTAIN COMPLIANCE AND ENSURE THE INTEGRITY OF THE CONSTRUCTION SITE.

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 CONTRACTORS 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 CONTRACTORS 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

- 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.
- THE CONTRACTOR MUST IMPLEMENT ALL NECESSARY MEASURES IN ORDER TO PREVENT LEAKS, DISCHARGES OR SPILLS OF POLLUTANTS, DELETERIOUS MATERIALS, OR OTHER SUCH MATERIALS OR SUBSTANCES WHICH WOULD OR COULD CAUSE AN ADVERSE IMPACT TO THE NATURAL ENVIRONMENT.
- IN THE EVENT OF A LEAK, DISCHARGE OR SPILL OF POLLUTANT, DELETERIOUS MATERIAL OR OTHER SUCH MATERIAL OR SUBSTANCE WHICH WOULD OR COULD CAUSE AN ADVERSE IMPACT TO THE NATURAL ENVIRONMENT, THE CONTRACTOR SHALL:
 - IMMEDIATELY NOTIFY APPROPRIATE FEDERAL, PROVINCIAL, AND LOCAL GOVERNMENT MINISTRIES, DEPARTMENTS, AGENCIES, AND AUTHORITIES OF THE INCIDENT IN ACCORDANCE WITH ALL CURRENT LAWS, LEGISLATION, ACTS, BY-LAWS, PERMITS, APPROVALS, ETC.
 - TAKE IMMEDIATE MEASURES TO CONTAIN THE MATERIAL OR SUBSTANCE, AND TO TAKE SUCH MEASURES TO MITIGATE AGAINST ADVERSE IMPACTS TO THE NATURAL ENVIRONMENT.
 - RESTORE THE AFFECTED AREA TO THE ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE AUTHORITIES HAVING JURISDICTION.

MUD MAT NOTES

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

SITE GRADING NOTES

- PRIOR TO THE COMMENCEMENT OF THE SITE GRADING WORKS, ALL SILTATION CONTROL DEVICES SHALL BE INSTALLED AND OPERATIONAL PER EROSION CONTROL PLAN.
- ALL GRANULAR AND PAVEMENT FOR ROADS/PARKING AREAS SHALL BE CONSTRUCTED IN ACCORDANCE WITH GEOTECHNICAL ENGINEER'S RECOMMENDATIONS.
- ALL TOPSOIL AND ORGANIC MATERIAL SHALL BE STRIPPED WITHIN THE ROAD AND PARKING AREAS ALLOWANCE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
- CONCRETE CURB SHALL BE IN ACCORDANCE WITH THE CITY OF OTTAWA STD. SC1.1 PROVISION SHALL BE MADE OR CURB DEPRESSIONS AS INDICATED ON ARCHITECTURAL SITE PLAN. CONCRETE SIDEWALK SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD SC1.4. ALL CURBS, CONCRETE ISLANDS, AND SIDEWALKS SHOWN O THIS DRAWING ARE TO BR PRICED IN SITE WORKS PORTION OF THE CONTRACT.
- 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.
- SPALLS 'X' SHALT BE PLACED TO A MINIMUM DEPTH OF 50MM AROUND ALL STRUCTURES WITHIN THE PAVEMENT AREA.
- SUB-EXCAVATE SOFT AREAS AND FILL WITH GRANULAR 'B' COMPACTED IN MAXIMUM 300MM LIFTS.
- ALL WORK ON THE MUNICIPAL RIGHT OF WAY AND EASEMENTS TO BE INSPECTED BY THE MUNICIPALITY PRIOR BACKFILLING.
- CONTRACTOR TO OBTAIN A ROAD OCCUPANCY PERMIT 48 HOURS PRIOR TO COMMENCING ANY WORK WITHIN THE MUNICIPAL ROAD ALLOWANCE, IF REQUIRED BY THE MUNICIPALITY.
- ALL PAVEMENT MARKING FEATURES AND SITE SIGNAGE SHALL BE PLACED PER ARCHITECTURAL SITE PLAN. LINE PAINTING AND DIRECTIONAL SYMBOLS SHALL BE APPLIED WITH A MINIMUM OF TWO COATS OF ORGANIC SOLVENT PAINT.
- REFER TO ARCHITECTURAL SITE PLAN FOR DIMENSIONS AND SITE DETAILS.
- STEP JOINTS ARE TO BE USED WHERE PROPOSED ASPHALT MEETS EXISTING ASPHALT. ALL JOINTS MUST BE SEALED.
- SIDEWALKS TO BE 13MM & BEVELED AT 2:1 OR 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.
- WHERE APPLICABLE THE CONTRACTOR IS TO SUBMIT SHOP DRAWINGS TO THE ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION. SHOP DRAWINGS MUST BE SITE SPECIFIC, SIGNED AND SEALED BY A LICENSED STRUCTURAL ENGINEER. THE CONTRACTOR WILL ALSO BE REQUIRED TO SUPPLY AND GEOTECHNICAL CERTIFICATION OF THE AS-CONSTRUCTED RETAINING WALL TO THE ENGINEER PRIOR TO FINAL ACCEPTANCE.

ROADWORK SPECIFICATIONS

- ROADWORK TO BE COMPLETED IN ACCORDANCE WITH GEOTECHNICAL REPORT, PREPARED BY LRL ASSOCIATES. DATED NOVEMBER 2020.
- 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.
- THE SUBGRADE SHALL BE CROWNED AND SLOPED AT LEAST 2% AND PROOF ROLLED WITH HEAVY ROLLERS.
- SUB-EXCAVATE SOFT AREAS AND FILL WITH GRANULAR 'B' TYPE II COMPACTED IN MAXIMUM 300MM LIFTS.
- ALL GRANULAR FOR ROADS SHALL BE COMPACTED TO MINIMUM OF 100% STANDARD PROCTOR DENSITY MAXIMUM DRY DENSITY (SPMDD).
- CONCRETE RAMP C/W TACTILE WALKING SURFACE INDICATORS COMPONENT AS PER OPSD 310.039. TACTILE WALKING SURFACE INDICATORS TO BE INSTALLED AT ALL RAMPS. MATERIAL TO BE POLYMER COMPOSITE, COLOR GREY

SANITARY, FOUNDATION DRAIN, STORM SEWER AND WATERMAIN NOTES

GENERAL

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

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

STORM

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

WATERMAIN

- ALL WATERMAIN INSTALLATION SHALL CONFORM TO THE LATEST REVISIONS OF THE CITY OF OTTAWA AND THE ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) AND SPECIFICATIONS (OPSS).
- ALL PVC WATERMANS SHALL BE AWWA C-900 CLASS 150, SDR 18 OR APPROVED EQUIVALENT.
- ALL WATER SERVICES LESS THAN OR EQUAL TO 50MM IN DIAMETER TO BE TYPE 'K' COPPER.
- WATERMAIN TRENCH AND BEDDING SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARD W17. UNLESS SPECIFIED OTHERWISE, BEDDING AND COVER MATERIAL SHALL BE SPECIFIED BY THE PROJECT GEOTECHNICAL ENGINEER.
- ALL PVC WATERMANS, SHALL BE INSTALLED WITH A 10 GAUGE STRANDED COPPER TWU OR RWU TRACER WIRE IN ACCORDANCE WITH CITY OF OTTAWA STD. W38.
- CATHODIC PROTECTION IS REQUIRED ON ALL METALLIC FITTINGS PER CITY OF OTTAWA STD.25.5 AND W25.6.
- VALVE BOXES SHALL BE INSTALLED PER CITY OF OTTAWA STD W24.
- WATERMAIN IN FILL AREAS TO BE INSTALLED WITH RESTRAINED JOINTS PER CITY OF OTTAWA STD.25.5 AND W25.6.
- THRUST BLOCKING OF WATERMANS TO BE INSTALLED PER CITY OF OTTAWA STD. W25.3 AND W25.4.
- THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY CAPS, PLUGS, BLOW-OFFS, AND NOZZLES REQUIRED FOR TESTING AND DISINFECTION OF THE WATERMAIN.
- WATERMAIN CROSSING OVER AND BELOW SEWERS SHALL BE IN ACCORDANCE WITH THE CITY OF OTTAWA STD. W25.2 AND W25, RESPECTIVELY.
- WATER SERVICES ARE TO BE INSULATED PER CITY STD. W23 WHERE SEPARATION BETWEEN SERVICES AND MAINTENANCE HOLES ARE LESS THAN 2.4M.
- THE MINIMUM VERTICAL CLEARANCE BETWEEN WATERMAIN AND SEWER/UTILITY IS 0.5M PER MOE GUIDELINES. FOR CROSSING UNDER SEWERS, ADEQUATE STRUCTURAL SUPPORT FOR THE SEWER IS REQUIRED TO PREVENT EXCESSIVE DEFLECTION OF JOINTS AND SETTLING. THE LENGTH OF WATER PIPE SHALL BE CENTERED AT THE POINT OF CROSSING TO ENSURE THAT THE JOINTS WILL BE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE SEWER.
- ALL WATERMANS SHALL HAVE A MINIMUM COVER OR 2.4M, OTHERWISE THERMAL INSULATION IS REQUIRED AS PER STD DWG W22.
- GENERAL WATER PLANT TO UTILITY CLEARANCE AS PER STD DWG W20.
- FIRE HYDRANT INSTALLATION AS PER STD DWG W19. ALL BOTTOM OF HYDRANT FLANGE ELEVATIONS TO BE INSTALLED 0.10M ABOVE PROPOSED FINISHED GRADE AT HYDRANT. FIRE HYDRANT LOCATION AS PER STD DWG W18.
- BUILDING SERVICE TO BE CAPPED 1.0M OFF THE FACE OF THE BUILDING UNLESS OTHERWISE NOTED AND MUST BE RESTRAINED A MINIMUM OF 12M BACK FROM STUB.
- ALL WATERMANS SHALL BE HYDROSTATICALLY TESTED IN ACCORDANCE WITH THE CITY OF OTTAWA AND ONTARIO GUIDELINES UNLESS OTHERWISE DIRECTED. PROVISIONS FOR FLUSHING WATER LINE PRIOR TO TESTING, ETC. MUST BE PROVIDED.
- ALL WATERMANS SHALL BE BACTERIOLOGICALLY TESTED IN ACCORDANCE WITH THE CITY OF OTTAWA AND ONTARIO GUIDELINES. ALL CHLORINATED WATER TO BE DISCHARGED AND PRE-TREATED TO ACCEPTABLE LEVELS PRIOR TO DISCHARGE. ALL DISCHARGED WATER MUST BE CONTROLLED AND TREATED SO AS NOT TO ADVERSELY EFFECT ENVIRONMENT. IT IS RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT ALL MUNICIPAL AND/OR PROVINCIAL REQUIREMENTS ARE FOLLOWED.
- ALL WATERMAIN STUBS SHALL BE TERMINATED WITH A PLUG AND 50MM BLOW OFF UNLESS OTHERWISE NOTED.

USE AND INTERPRETATION OF DRAWINGS

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

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

AS INSTRUMENTS OF SERVICE, ALL DRAWINGS, SPECIFICATIONS, CAD FILES OR OTHER ELECTRONIC MEDIA AND 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 CONDITIONS, WHETHER THEY CONVEY, OR FOR PROBLEMS WHICH ARISE FROM OTHERS' FAILURE TO OBTAIN AND/OR FOLLOW THE ENGINEER'S GUIDELINES AND THAT FURTHER REQUIRES THE CONTRACTOR TO INDEMNIFY BOTH LRL AND THE CLIENT FROM ANY LIABILITY OR COST ARISING FROM SUCH CHANGES MADE WITHOUT SUCH PROPER AUTHORIZATION.

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

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| 01 | ISSUED FOR APPROVAL | M.L. | 11 NOV 2025 |
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| No. | REVISIONS | BY | DATE |
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NOT AUTHENTIC UNLESS SIGNED AND DATED



LRL

ENGINEERING | INGÉNIERIE

5430 Canotek Road | Ottawa, ON, K1J 9G2

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

CLIENT

PETER DRUMMOND & SON LTD.

| | | |
|--------------|-----------|--------------|
| DESIGNED BY: | DRAWN BY: | APPROVED BY: |
| M.L. | M.L. | M.B. |

PROJECT

SITE RE-DEVELOPMENT
1925 MERIVALE RD
OTTAWA, ON

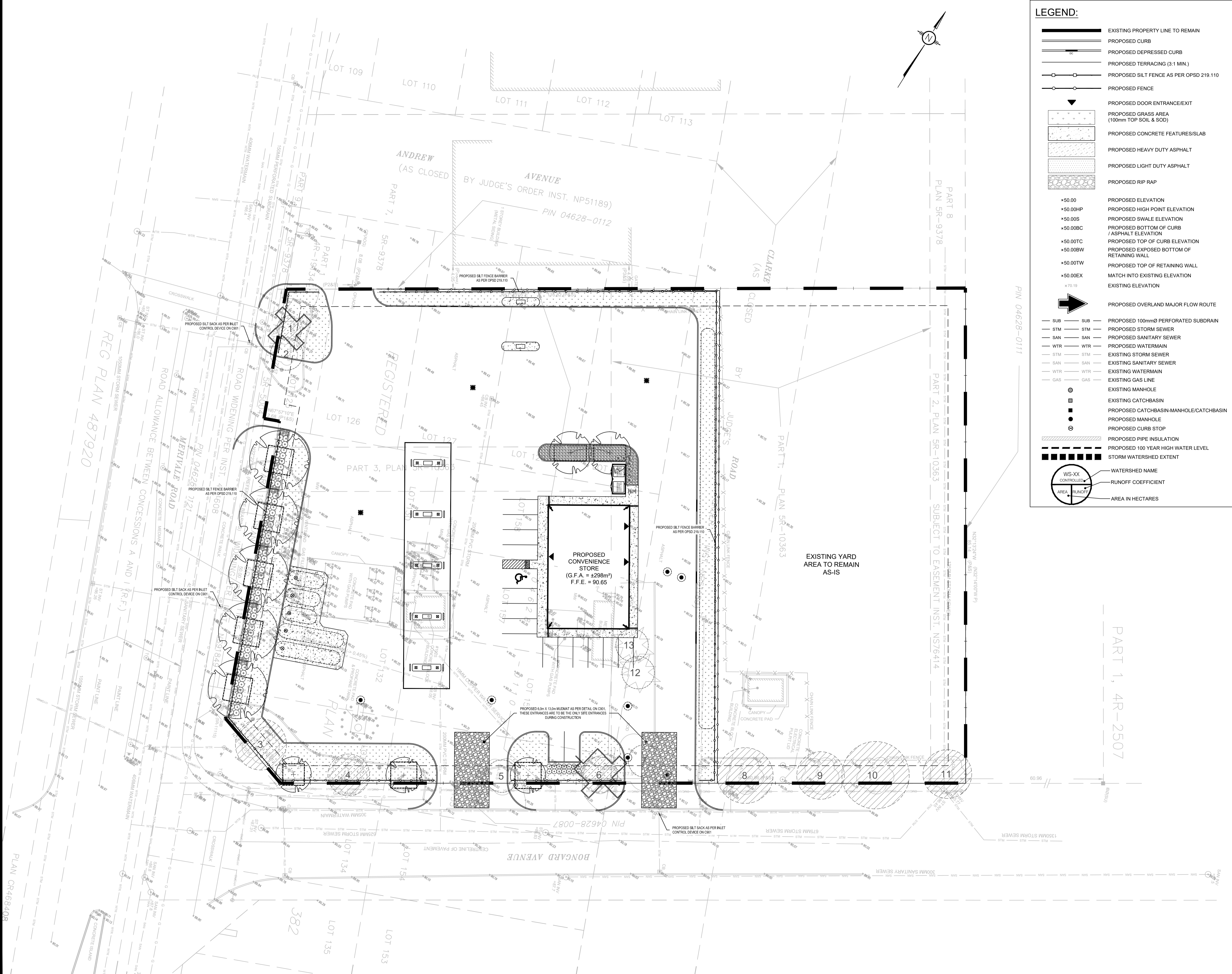
DRAWING TITLE

GENERAL NOTES

PROJECT NO.

250161

C001



LEGEND:

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

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

CLIENT
PETER DRUMMOND & SON LTD.

DESIGNED BY: M.L. DRAWN BY: M.L. APPROVED BY: M.B.

PROJECT
**SITE RE-DEVELOPMENT
 1925 MERIVALE RD
 OTTAWA, ON**

DRAWING TITLE
**EROSION AND SEDIMENT
 CONTROL PLAN**

PROJECT NO.
250161 C101



LEGEND:

| | |
|--|---|
| | EXISTING PROPERTY LINE TO REMAIN |
| | PROPOSED CURB |
| | PROPOSED DEPRESSED CURB |
| | PROPOSED TERRACING (3:1 MIN.) |
| | PROPOSED SILT FENCE AS PER OPSD 219.110 |
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| | EXISTING SANITARY SEWER |
| | EXISTING WATERMAIN |
| | EXISTING GAS LINE |
| | EXISTING MANHOLE |
| | EXISTING CATCHBASIN |
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CLIENT
PETER DRUMMOND & SON LTD.

DESIGNED BY: M.L. DRAWN BY: M.L. APPROVED BY: M.B.

PROJECT
**SITE RE-DEVELOPMENT
1925 MERIVALE RD
OTTAWA, ON**

DRAWING TITLE
DEMOLITION PLAN

PROJECT NO.
250161 C102



KEY PLAN
N.T.S.

| DETAILS OF DEVELOPMENT | | |
|------------------------|-------------|-----------|
| DATA | REQUIRED | PROVIDED |
| ZONING IG | | |
| SETBACKS | FY 3.0m | 21.9m |
| | RY 3.0m | 58.0m |
| | INT.SY 3.0m | 26.4m |
| | EXT.SY 3.0m | 16.3m |
| NET LOT AREA (sqm) | 10,364sqm | |
| BUILDING COVERAGE | 65% (MAX) | 2.9% |
| BUILDING HEIGHT | 11.0m (MAX) | 7.2m |
| GROSS FLOOR AREA | 2988sqm | |
| No. of UNITS | 1 | |
| LOADING SPACES | 1 | 1 |
| PARKING: | 10 + 1 HC | 15 + 1 HC |
| No. of STOREYS | 1 | |
| OTHER: | | |

LEGEND:

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- PROPOSED CURB
- PROPOSED DEPRESSED CURB
- PROPOSED TERRACING (3:1 MIN.)
- PROPOSED SILT FENCE AS PER OPSD 219.110
- PROPOSED FENCE
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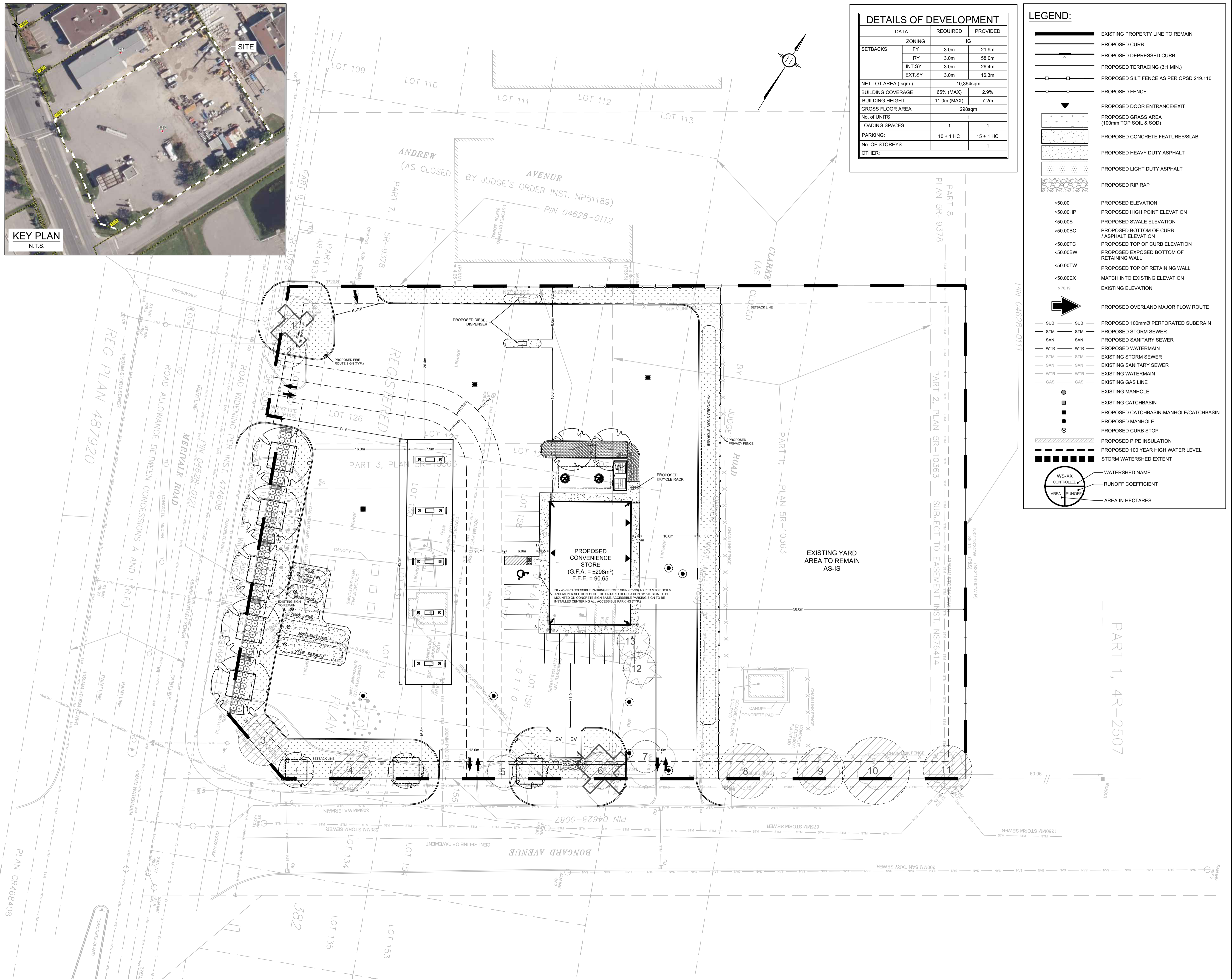
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CLIENT: PETER DRUMMOND & SON LTD.

DESIGNED BY: M.L. DRAWN BY: M.L. APPROVED BY: M.B.

PROJECT: SITE RE-DEVELOPMENT
1925 MERIVALE RD
OTTAWA, ON

DRAWING TITLE: SITE DEVELOPMENT PLAN

PROJECT NO. 250161 C201

PAVEMENT STRUCTURE

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

NOTE:
 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 EARTH DRAINAGE STRUCTURES. FOLLOWING APPROVAL OF THE PREPARATION OF THE SUBGRADE, THE PAVEMENT GRANULARS MAY BE PLACED.
 REFER TO GEOTECHNICAL REPORT PREPARED BY PATERSON GROUP, DATED APRIL 25, 2025

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| No. | REVISIONS | BY | DATE |
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| 01 | ISSUED FOR APPROVAL | M.L. | 11 NOV 2025 |

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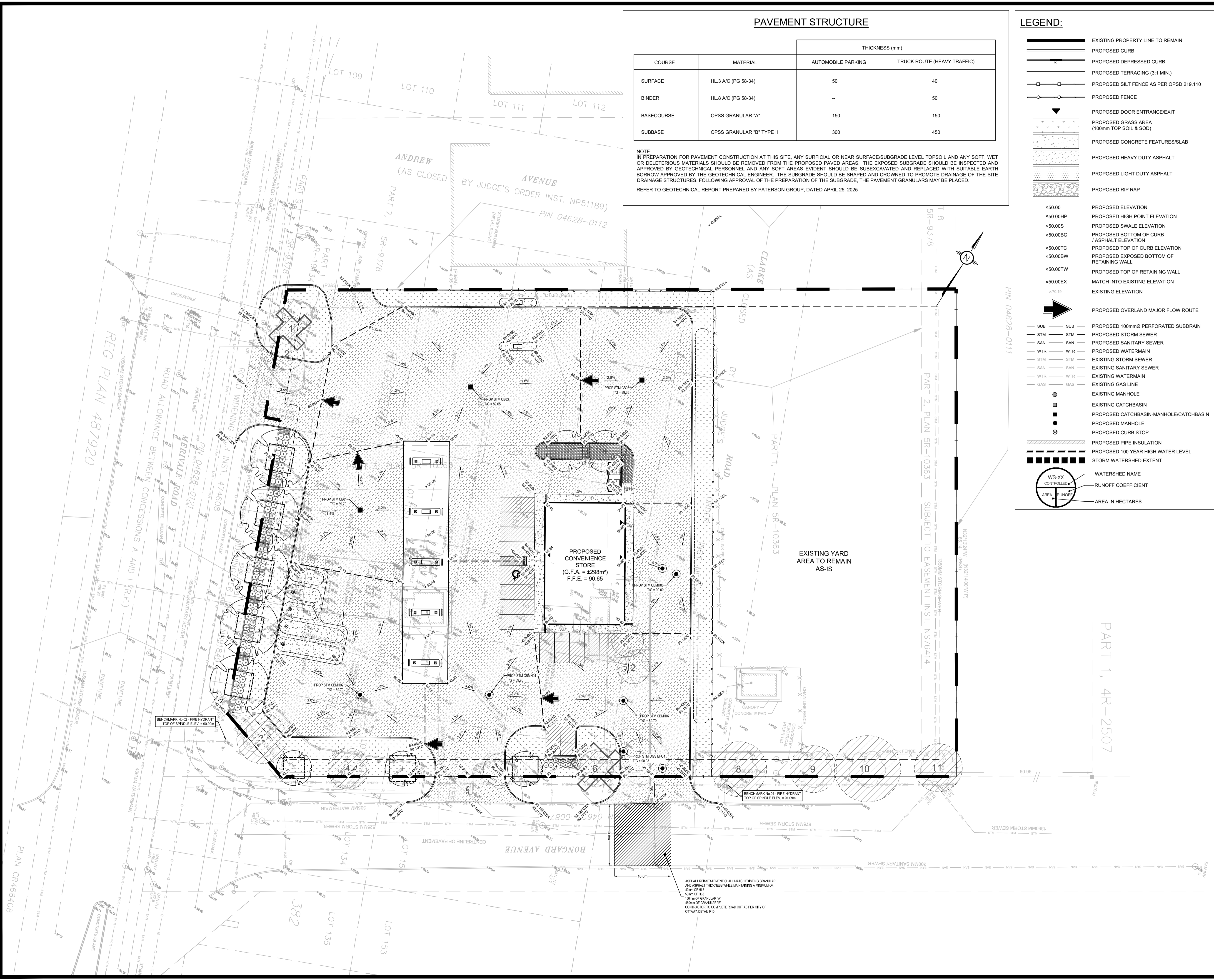
CLIENT
PETER DRUMMOND & SON LTD.

DESIGNED BY: M.L. DRAWN BY: M.L. APPROVED BY: M.B.

PROJECT
**SITE RE-DEVELOPMENT
 1925 MERIVALE RD
 OTTAWA, ON**

DRAWING TITLE
GRADING AND DRAINAGE PLAN

PROJECT NO.
250161 C301



- PRELIMINARY CONSTRUCTION MANAGEMENT PLAN**
1. WILL CONSTRUCTION REQUIRE THE TEMPORARY DETOUR OF A BUS ROUTE? NO DETOUR OF A BUS ROUTE WILL BE REQUIRED.
 2. WILL THIS WORK BLOCK A BIKE LANE? NO BIKE LANE WILL BE BLOCKED DURING CONSTRUCTION.
 3. WILL THIS WORK BLOCK A SIDEWALK? A SIDEWALK WILL BE BLOCKED PARTIALLY DURING CONSTRUCTION.
 4. WILL THIS WORK REQUIRE A LANE OF TRAFFIC TO BE CLOSED? PARTIAL SECTIONS OF THE ROAD FOR CONNECTION PURPOSES.

PAVEMENT STRUCTURE

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

NOTE:
 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. REFER TO GEOTECHNICAL REPORT PREPARED BY PATERSON GROUP, DATED APRIL 25, 2025.

LEGEND:

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

USE AND INTERPRETATION OF DRAWINGS

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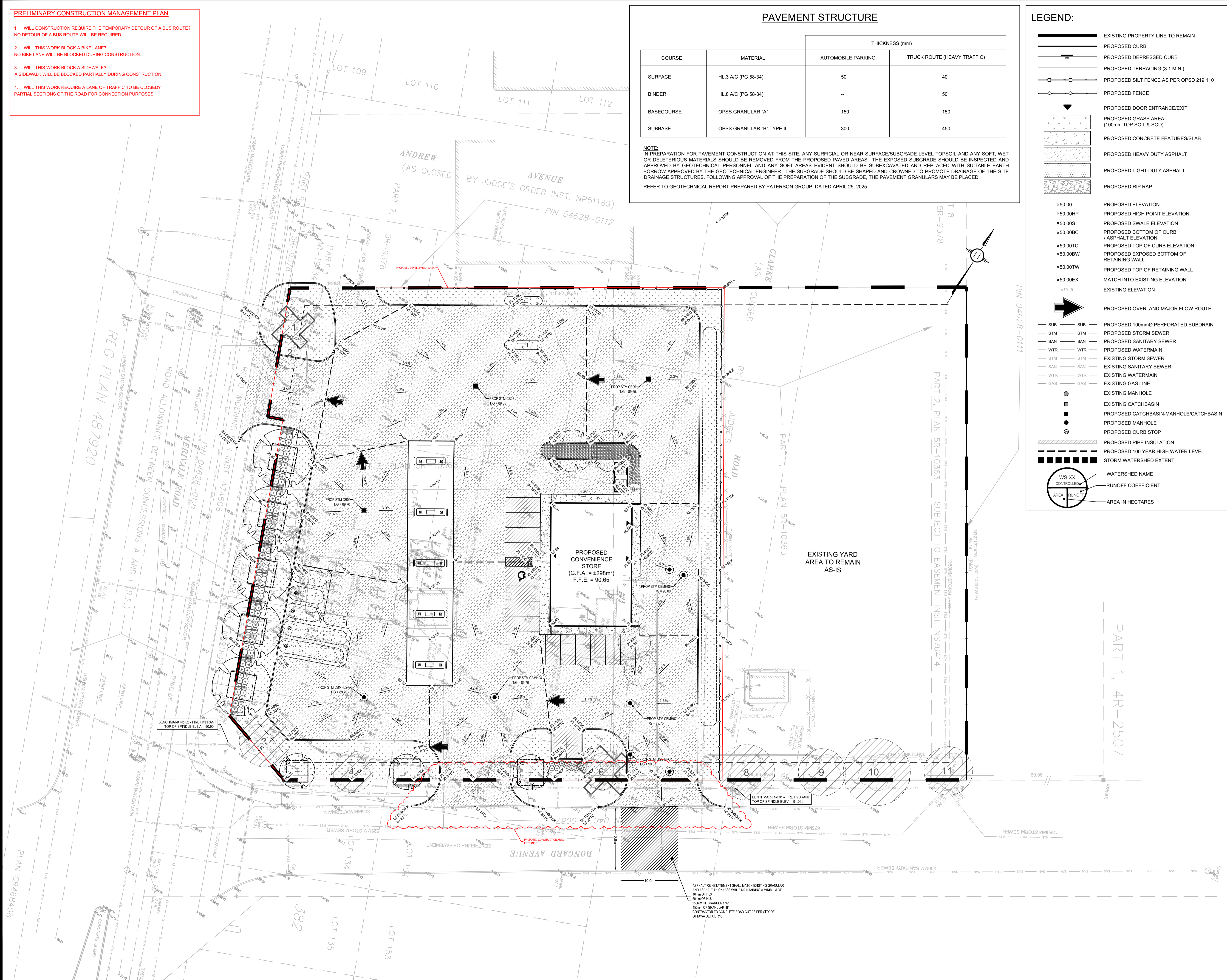
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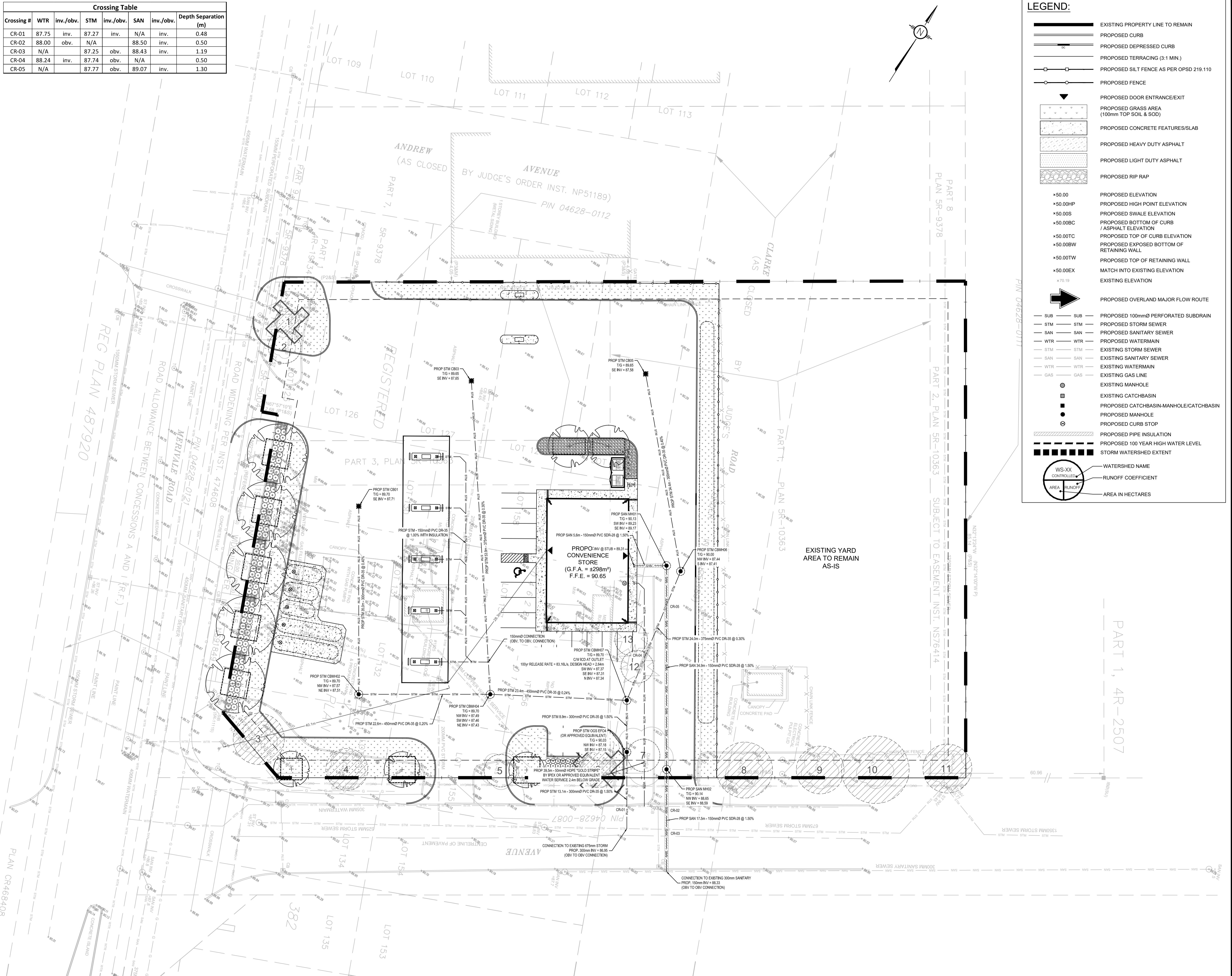
DESIGNED BY: M.L. DRAWN BY: M.L. APPROVED BY: M.B.

PROJECT
**SITE RE-DEVELOPMENT
 1925 MERIVALE RD
 OTTAWA, ON**

DRAWING TITLE
**PRE CONSTRUCTION
 MANAGEMENT PLAN**

PROJECT NO.
250161 C302

| Crossing Table | | | | | | | |
|----------------|-------|-----------|-------|-----------|-------|-----------|----------------------|
| Crossing # | WTR | inv./obv. | STM | inv./obv. | SAN | inv./obv. | Depth Separation (m) |
| CR-01 | 87.75 | inv. | 87.27 | inv. | N/A | inv. | 0.48 |
| CR-02 | 88.00 | obv. | N/A | obv. | 88.50 | inv. | 0.50 |
| CR-03 | N/A | N/A | 87.25 | obv. | 88.43 | inv. | 1.19 |
| CR-04 | 88.24 | inv. | 87.74 | obv. | N/A | inv. | 0.50 |
| CR-05 | N/A | 87.77 | obv. | 89.07 | inv. | inv. | 1.30 |



LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
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- PROPOSED DEPRESSED CURB
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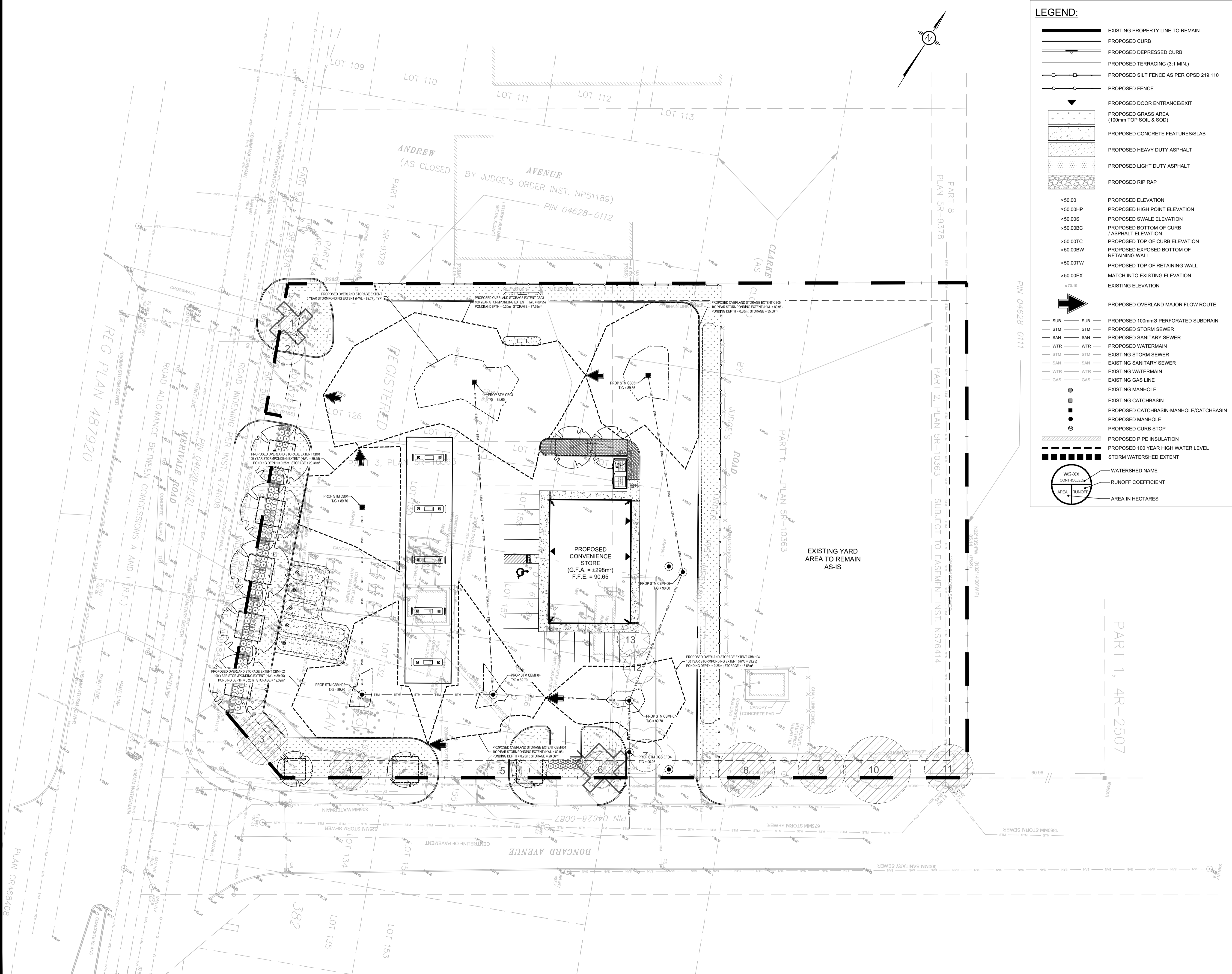
CLIENT: **PETER DRUMMOND & SON LTD.**

DESIGNED BY: M.L. DRAWN BY: M.L. APPROVED BY: M.B.

PROJECT: **SITE RE-DEVELOPMENT
1925 MERVALE RD
OTTAWA, ON**

DRAWING TITLE: **SERVICING PLAN**

PROJECT NO.: **250161 C401**



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
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- PROPOSED HIGH POINT ELEVATION
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- PROPOSED TOP OF CURB ELEVATION
- PROPOSED EXPOSED BOTTOM OF RETAINING WALL
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- PROPOSED MATCH INTO EXISTING ELEVATION
- EXISTING ELEVATION
- ➔ PROPOSED OVERLAND MAJOR FLOW ROUTE
- SUB — PROPOSED 100mmØ PERFORATED SUBDRAIN
- STM — PROPOSED STORM SEWER
- SAN — PROPOSED SANITARY SEWER
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- WTR — EXISTING WATERMAIN
- GAS — EXISTING GAS LINE
- EXISTING MANHOLE
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- PROPOSED MANHOLE
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- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WS-XX CONTROLLED WATERSHED NAME
- AREA RUNOFF RUNOFF COEFFICIENT
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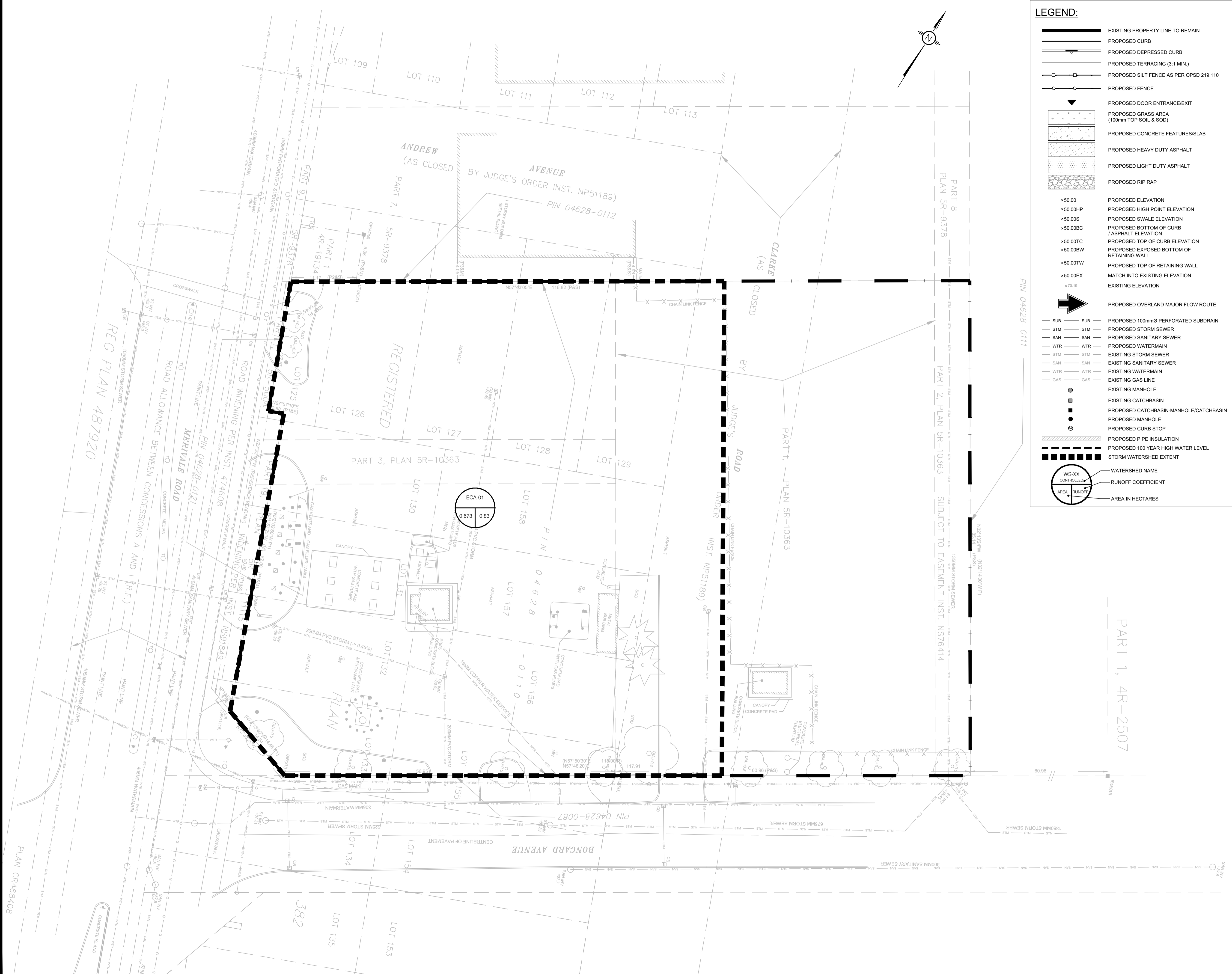
CLIENT
PETER DRUMMOND & SON LTD.

DESIGNED BY: M.L. DRAWN BY: M.L. APPROVED BY: M.B.

PROJECT
**SITE RE-DEVELOPMENT
1925 MERIVALE RD
OTTAWA, ON**

DRAWING TITLE
STORMWATER MANAGEMENT PLAN

PROJECT NO.
250161 C601



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
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- PROPOSED EXPOSED BOTTOM OF RETAINING WALL
- PROPOSED TOP OF RETAINING WALL
- MATCH INTO EXISTING ELEVATION
- EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- PROPOSED 100mmØ PERFORATED SUBDRAIN
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED WATERMAIN
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- EXISTING GAS LINE
- EXISTING MANHOLE
- EXISTING CATCHBASIN
- PROPOSED CATCHBASIN-MANHOLE/CATCHBASIN
- PROPOSED MANHOLE
- PROPOSED CURB STOP
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- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WATERSHED NAME
- RUNOFF COEFFICIENT
- AREA IN HECTARES

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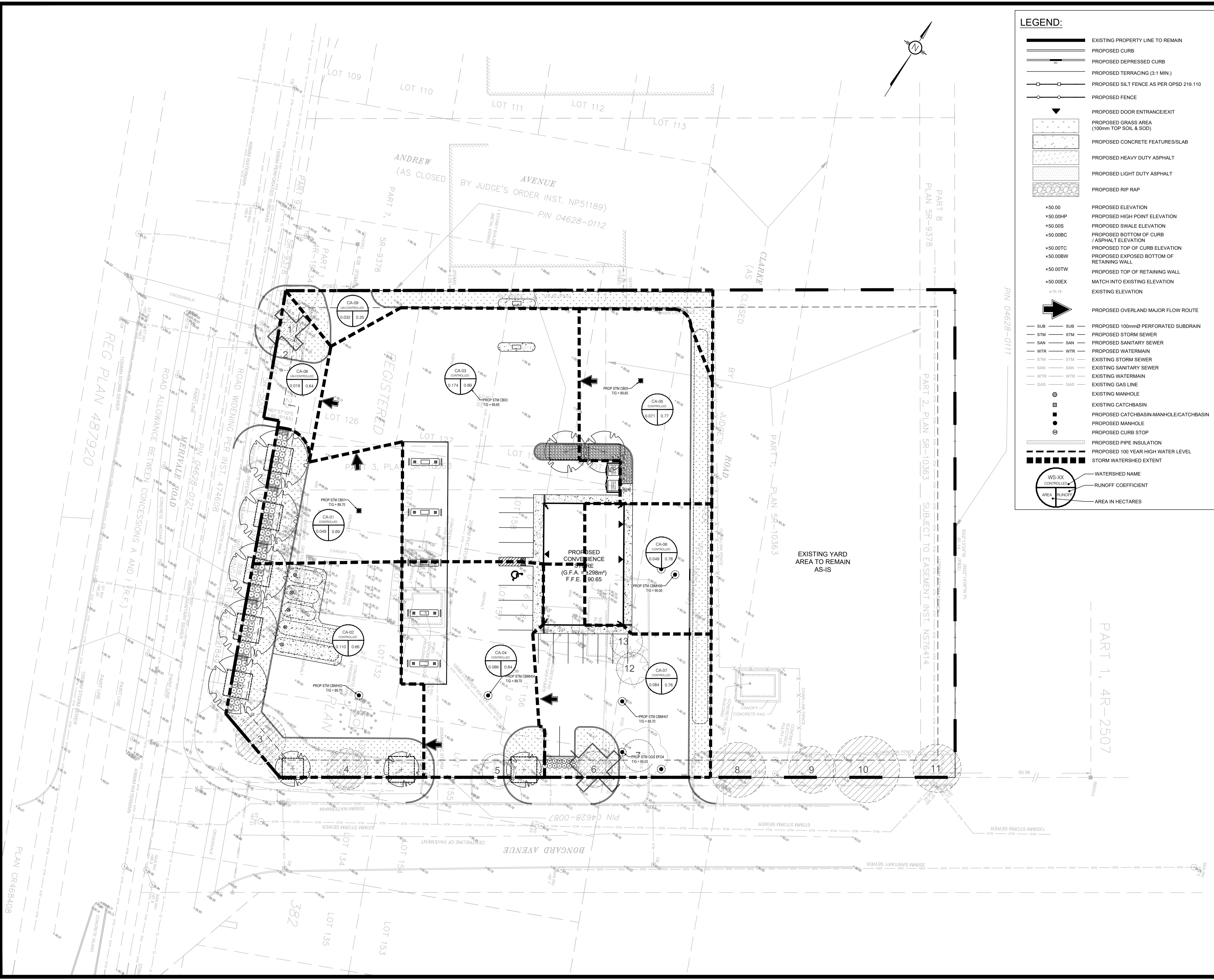
CLIENT
PETER DRUMMOND & SON LTD.

DESIGNED BY: M.L. DRAWN BY: M.L. APPROVED BY: M.B.

PROJECT
**SITE RE-DEVELOPMENT
1925 MERIVALE RD
OTTAWA, ON**

DRAWING TITLE
**PRE-DEVELOPMENT
WATERSHED PLAN**

PROJECT NO.
250161 C701



LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
- PROPOSED CURB
- PROPOSED DEPRESSED CURB
- PROPOSED TERRACING (3:1 MIN.)
- PROPOSED SILT FENCE AS PER OPSD 219.110
- PROPOSED FENCE
- PROPOSED DOOR ENTRANCE/EXIT
- PROPOSED GRASS AREA (100mm TOP SOIL & SOD)
- PROPOSED CONCRETE FEATURES/SLAB
- PROPOSED HEAVY DUTY ASPHALT
- PROPOSED LIGHT DUTY ASPHALT
- PROPOSED RIP RAP
- PROPOSED ELEVATION
- PROPOSED HIGH POINT ELEVATION
- PROPOSED SWALE ELEVATION
- PROPOSED BOTTOM OF CURB / ASPHALT ELEVATION
- PROPOSED TOP OF CURB ELEVATION
- PROPOSED EXPOSED BOTTOM OF RETAINING WALL
- PROPOSED TOP OF RETAINING WALL
- MATCH INTO EXISTING ELEVATION
- EXISTING ELEVATION
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- PROPOSED STORM SEWER
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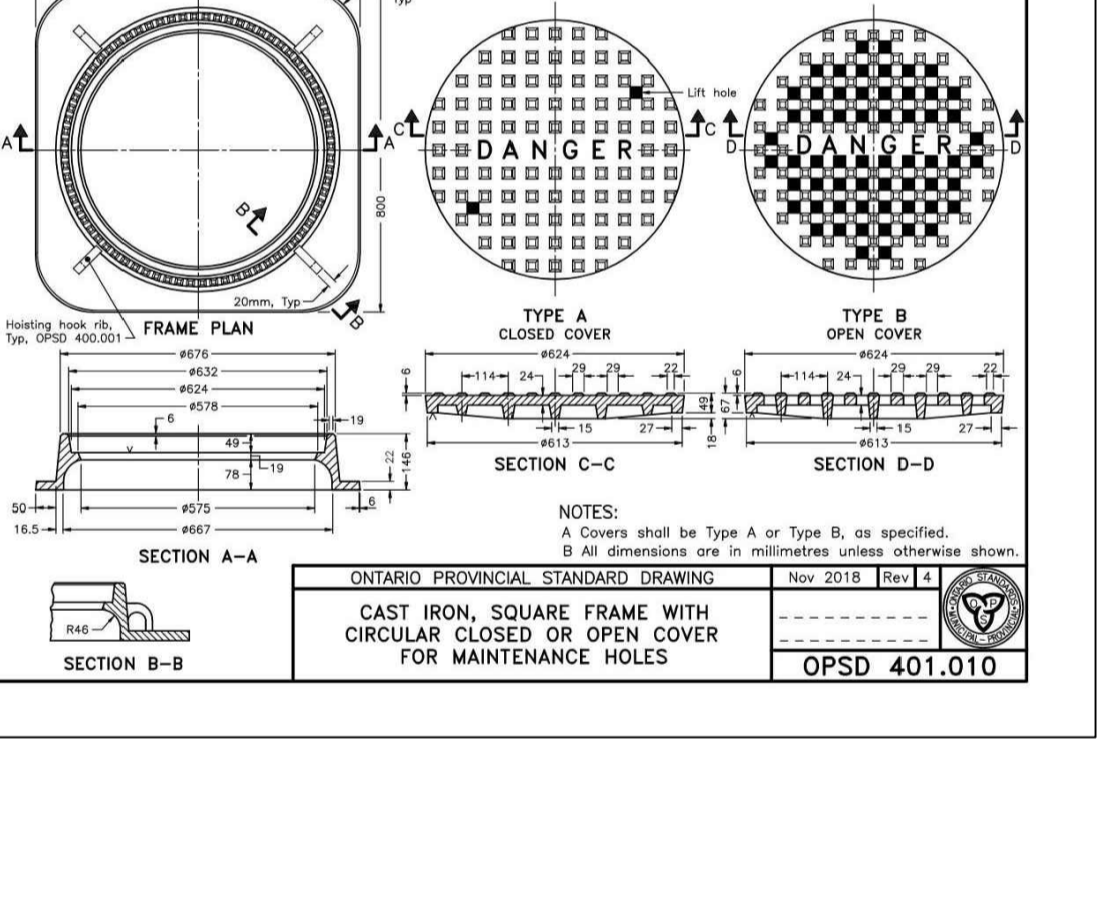
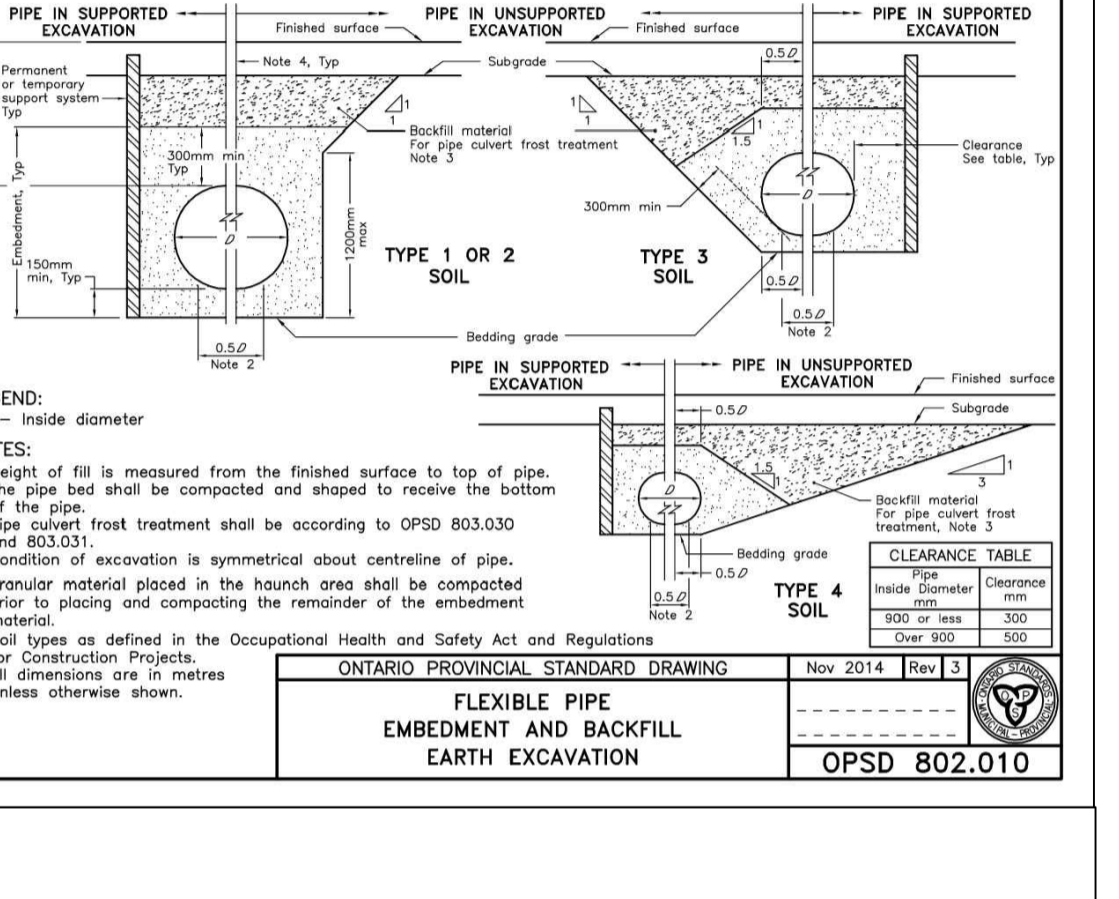
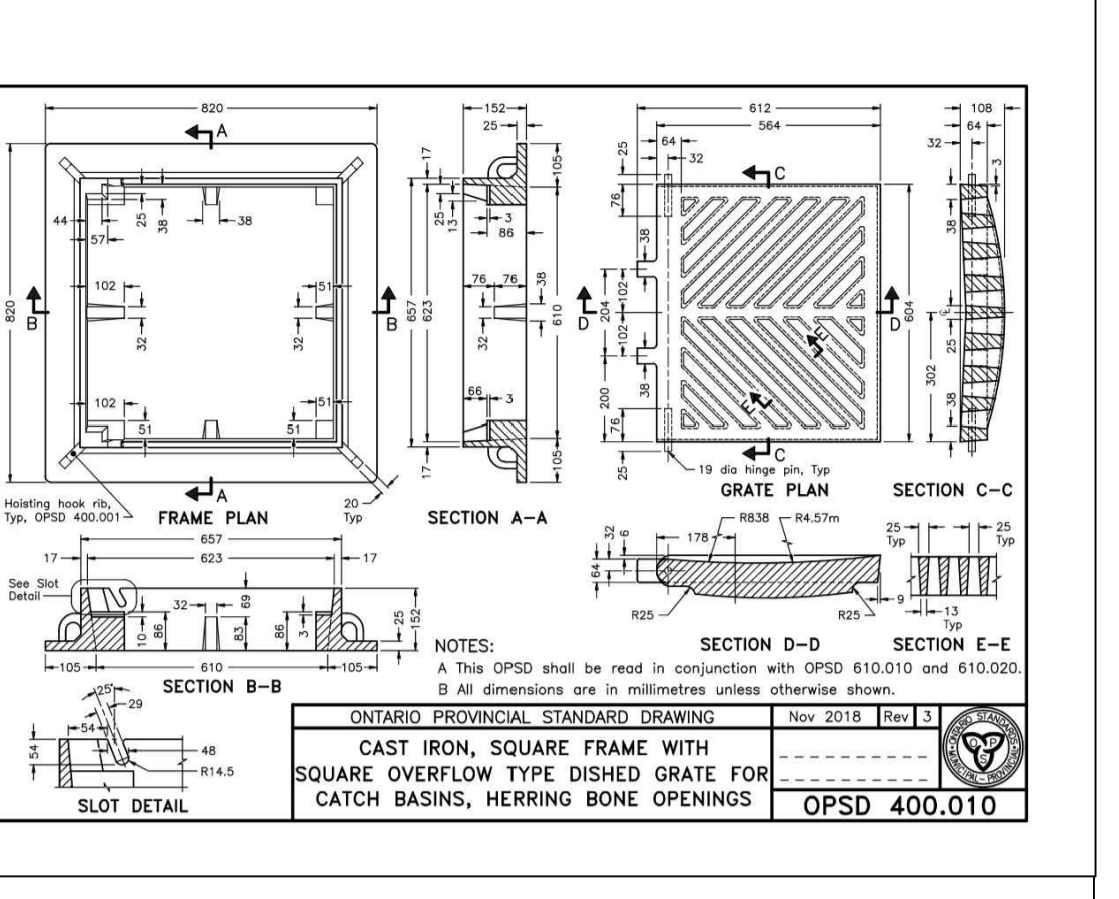
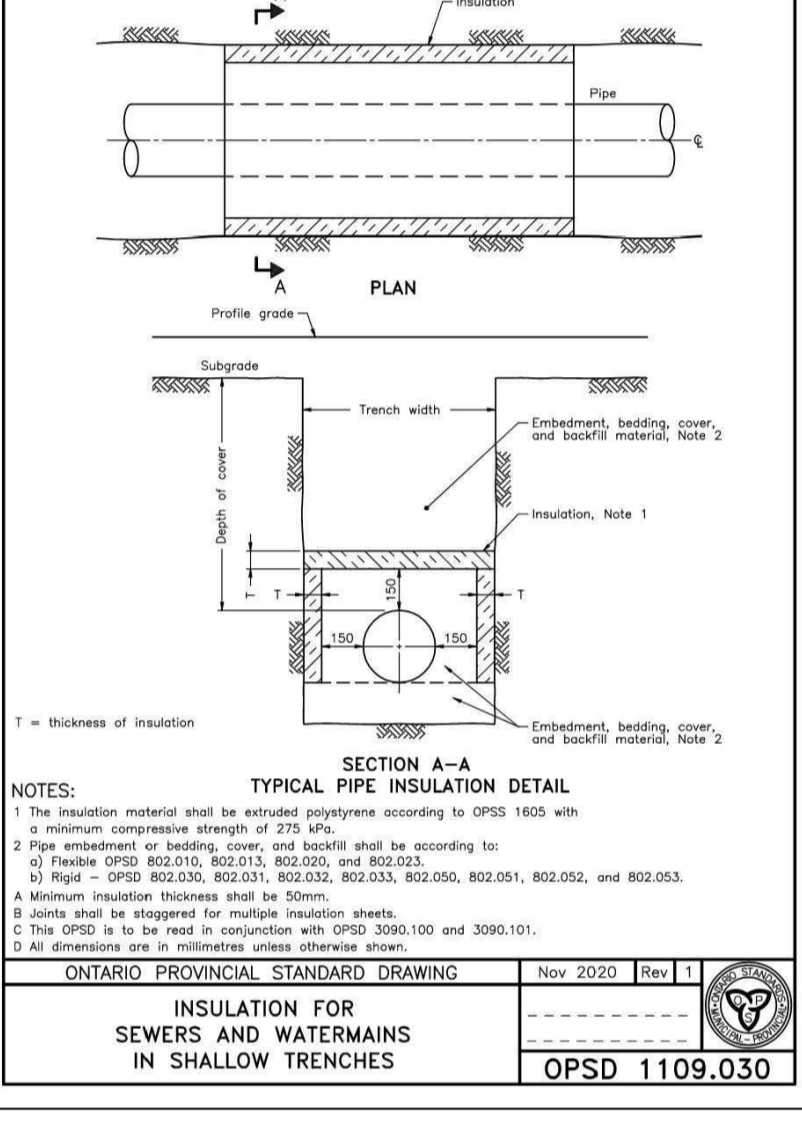
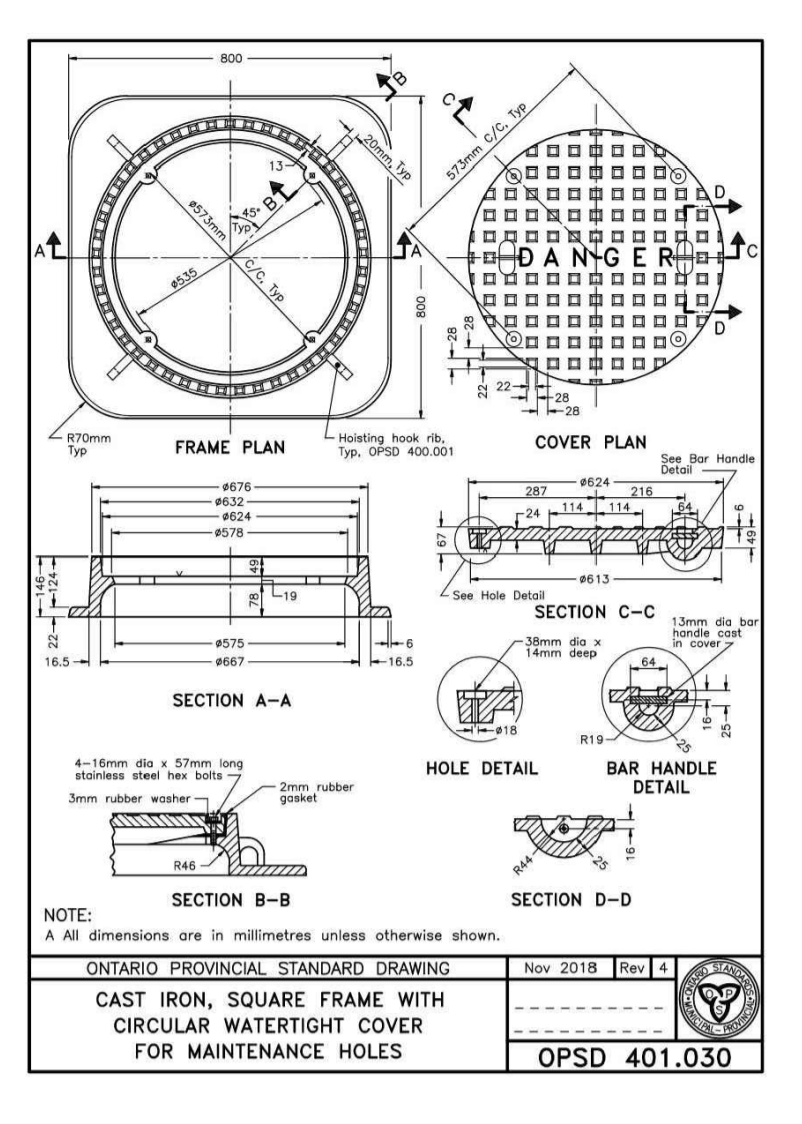
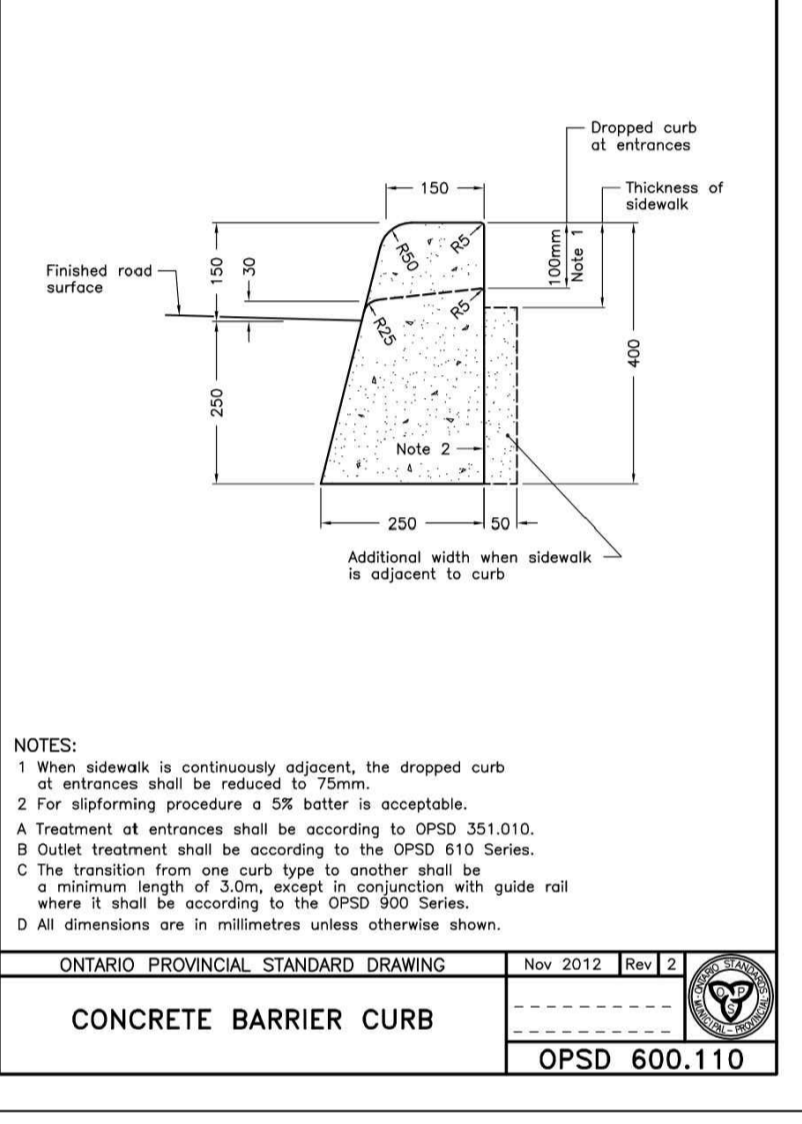
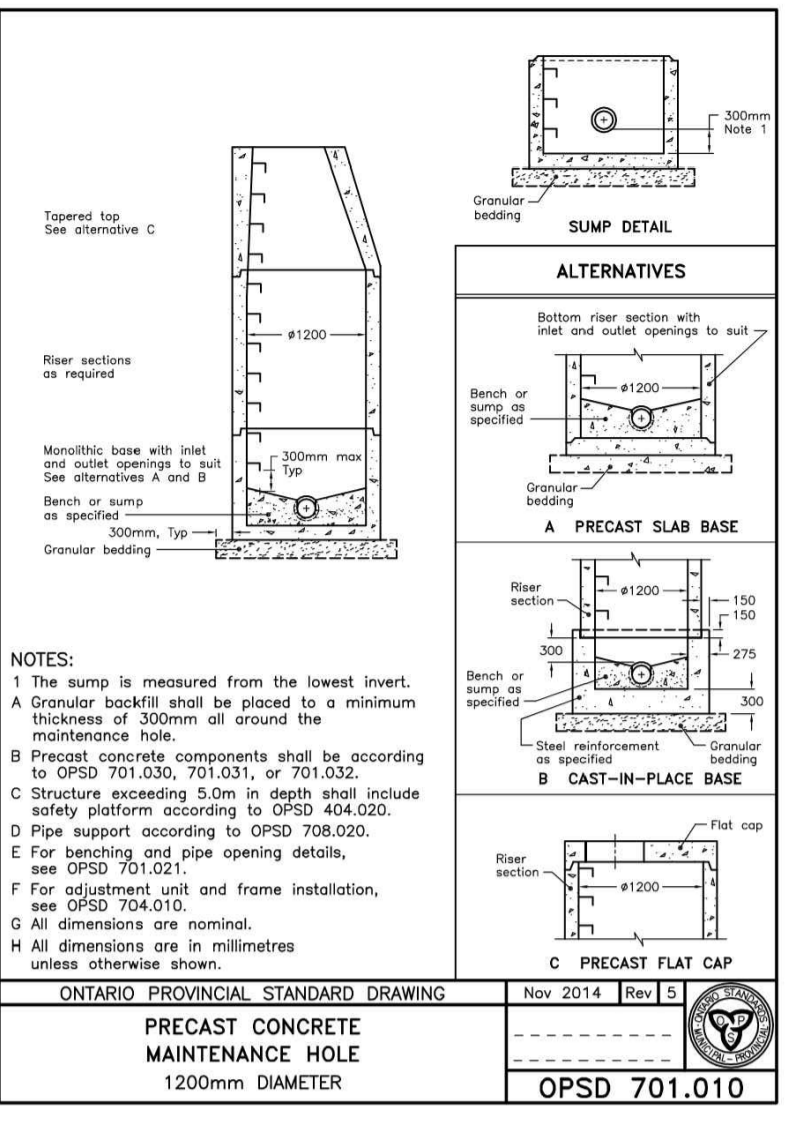
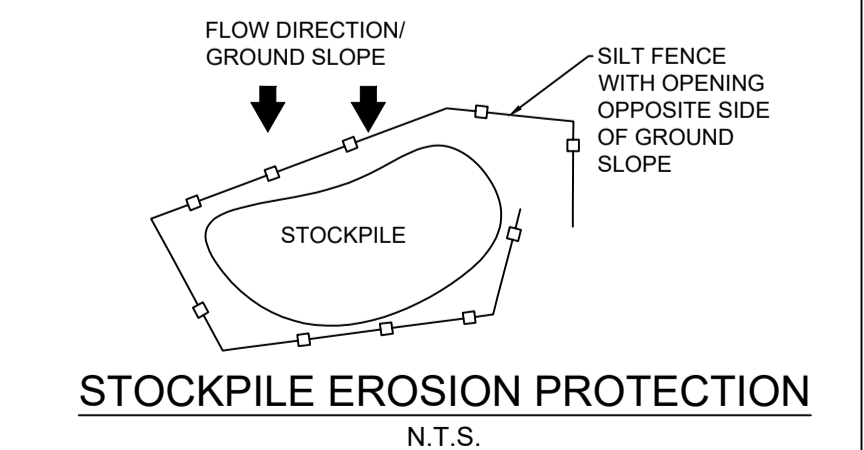
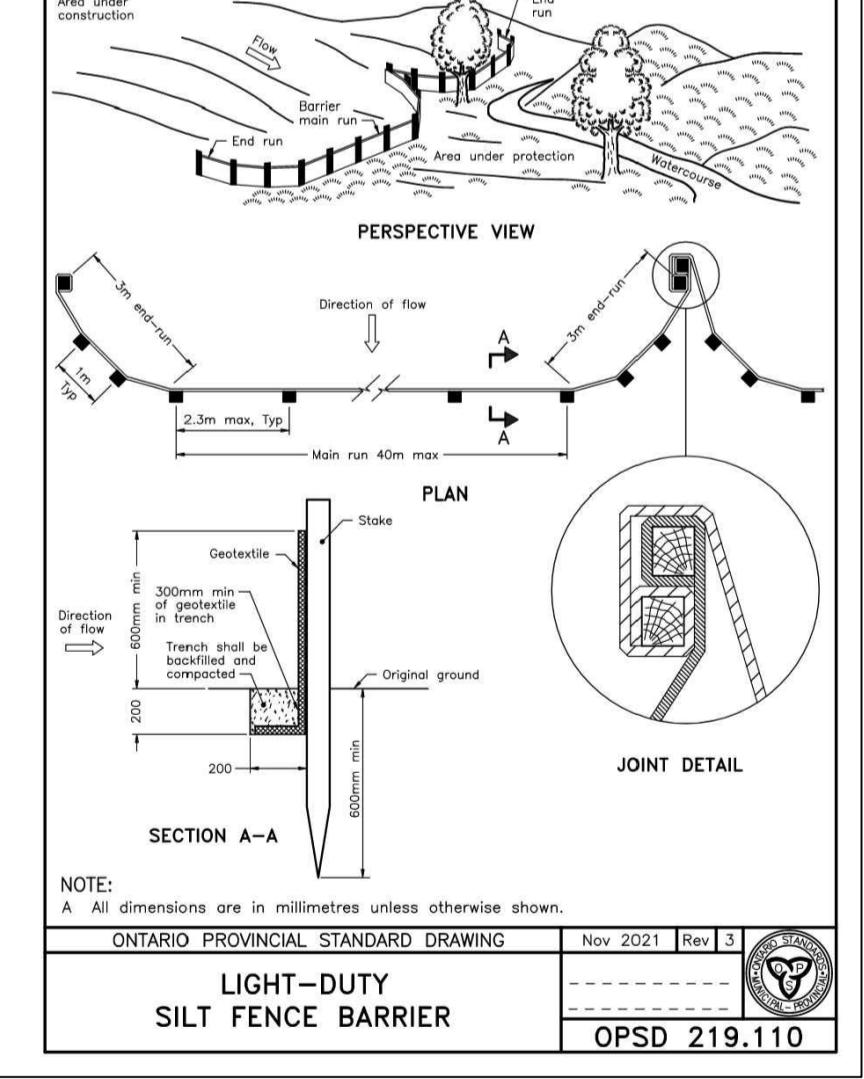
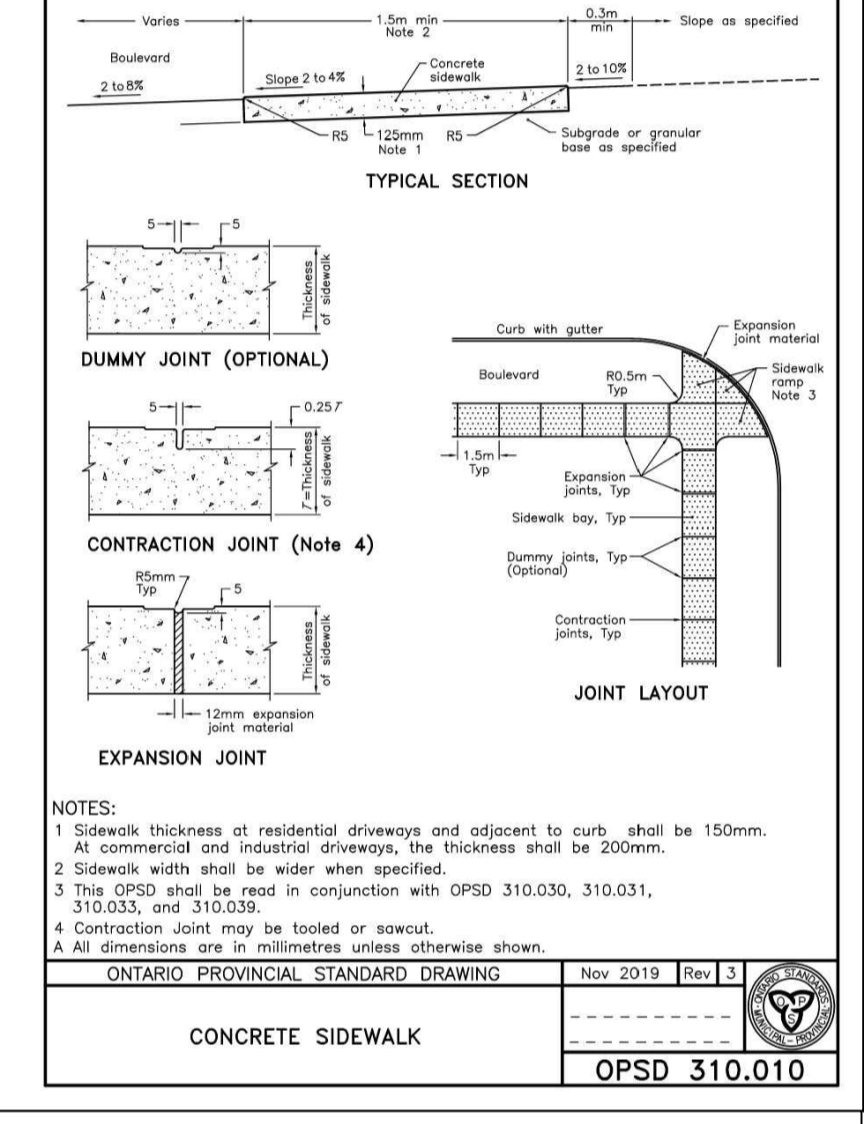
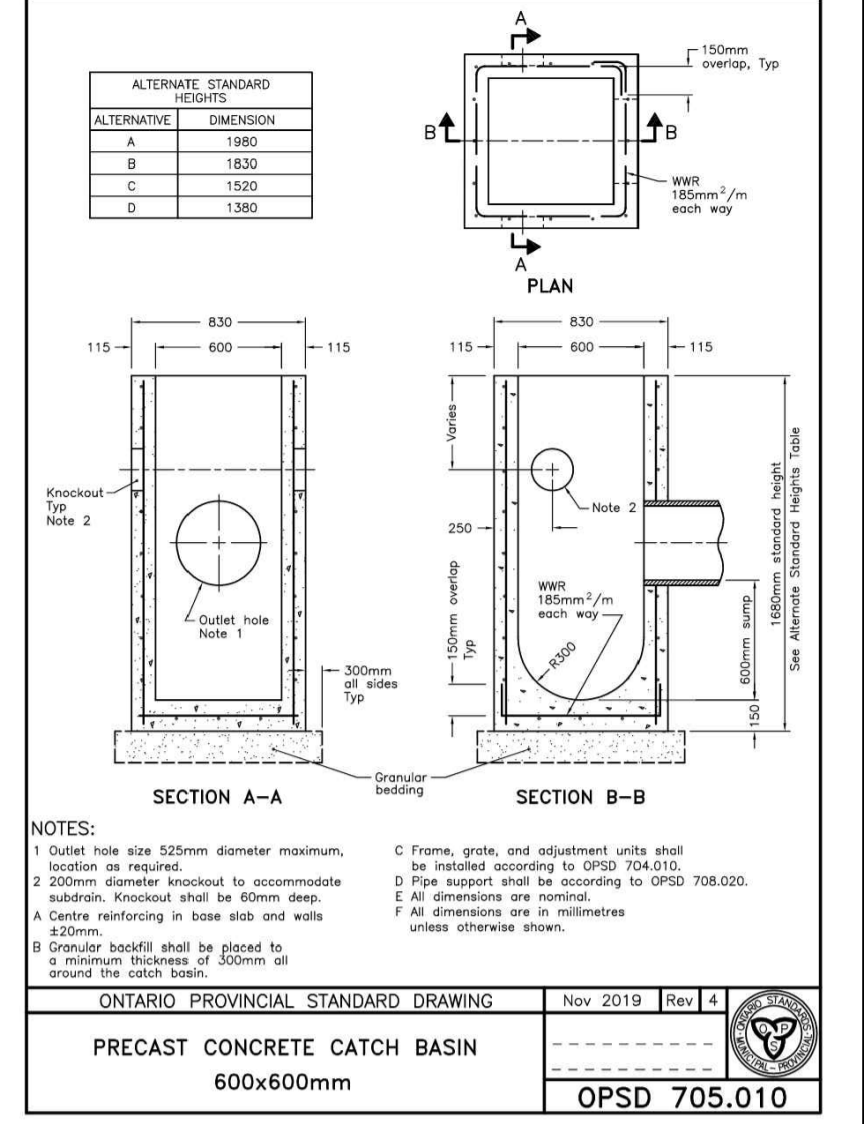
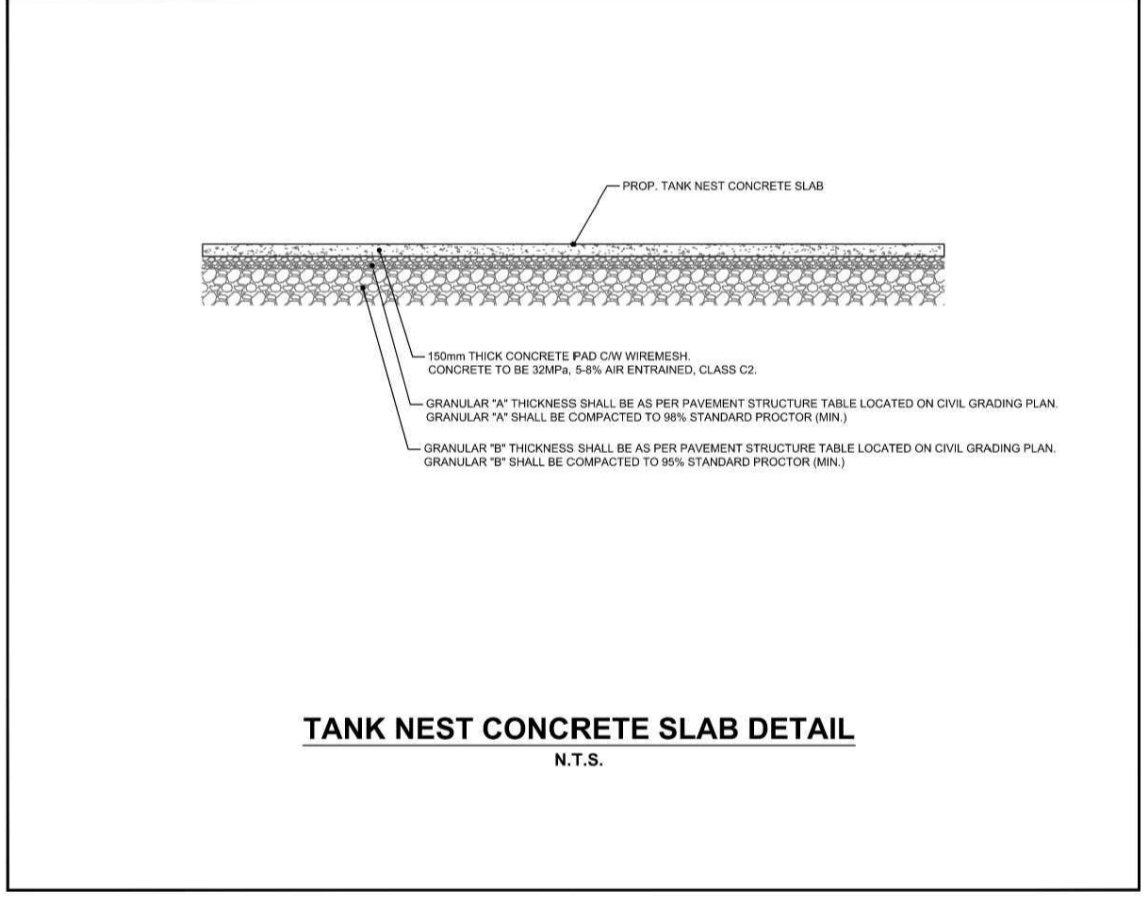
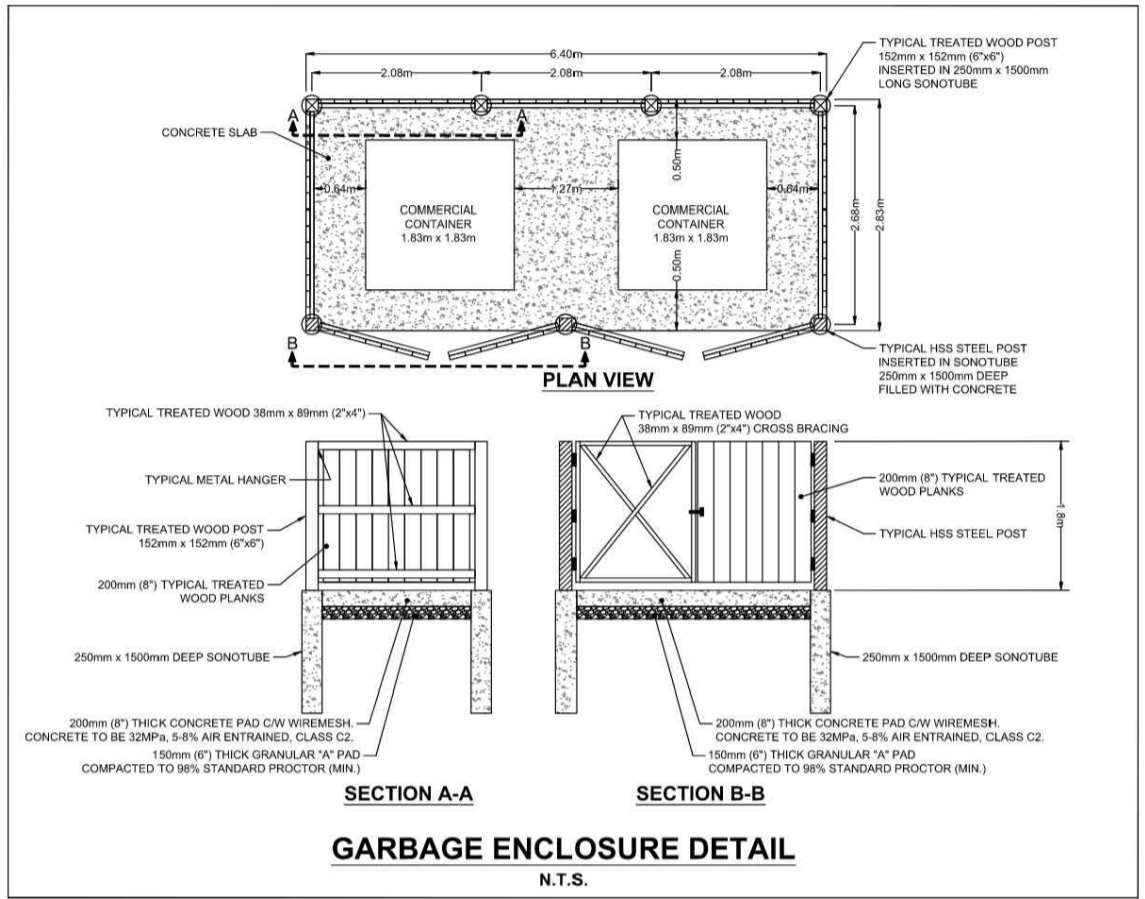
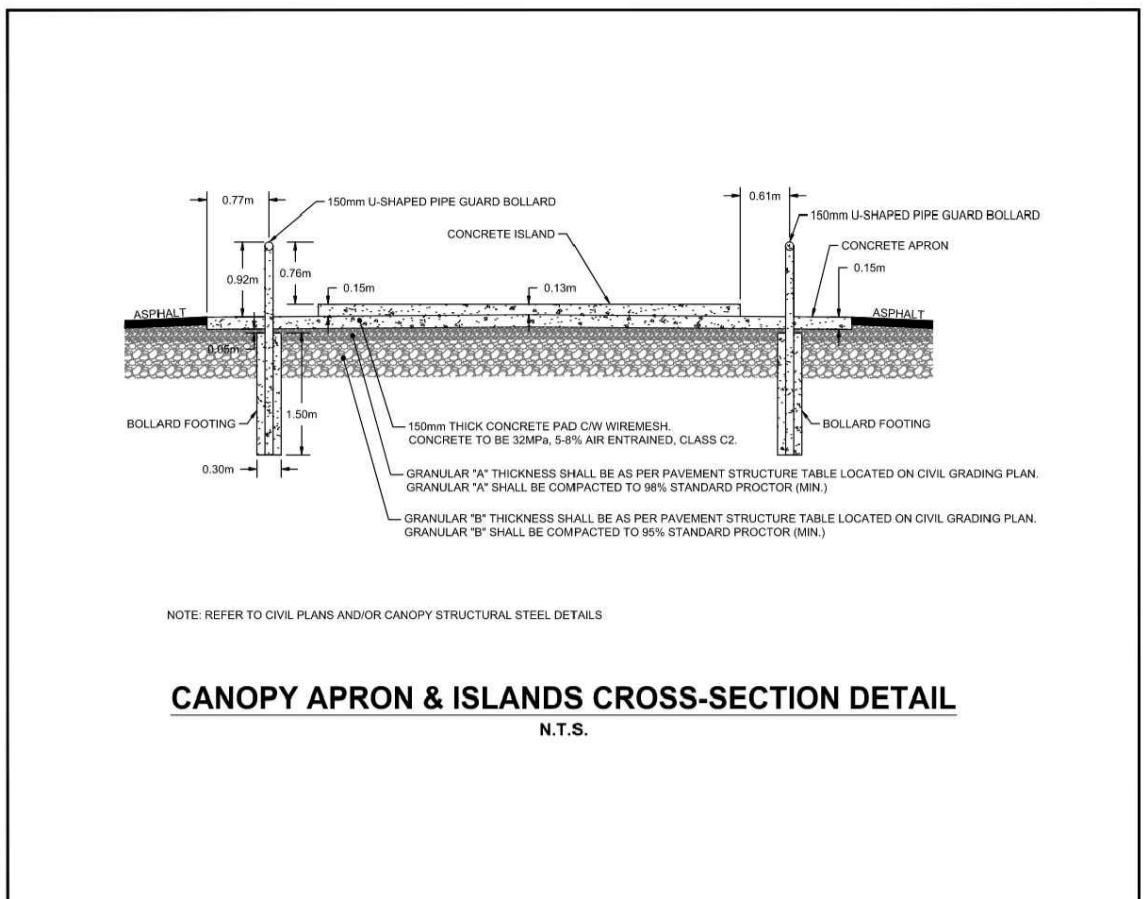
CLIENT
PETER DRUMMOND & SON LTD.

DESIGNED BY: M.L. DRAWN BY: M.L. APPROVED BY: M.B.

PROJECT
**SITE RE-DEVELOPMENT
 1925 MERIVALE RD
 OTTAWA, ON**

DRAWING TITLE
**POST-DEVELOPMENT
 WATERSHED PLAN**

PROJECT NO.
250161 C702



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PROJECT
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1925 MERIVALE RD
OTTAWA, ON**

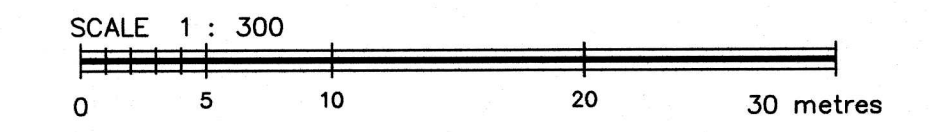
DRAWING TITLE
CONSTRUCTION DETAIL PLAN

PROJECT NO.
250161 C901

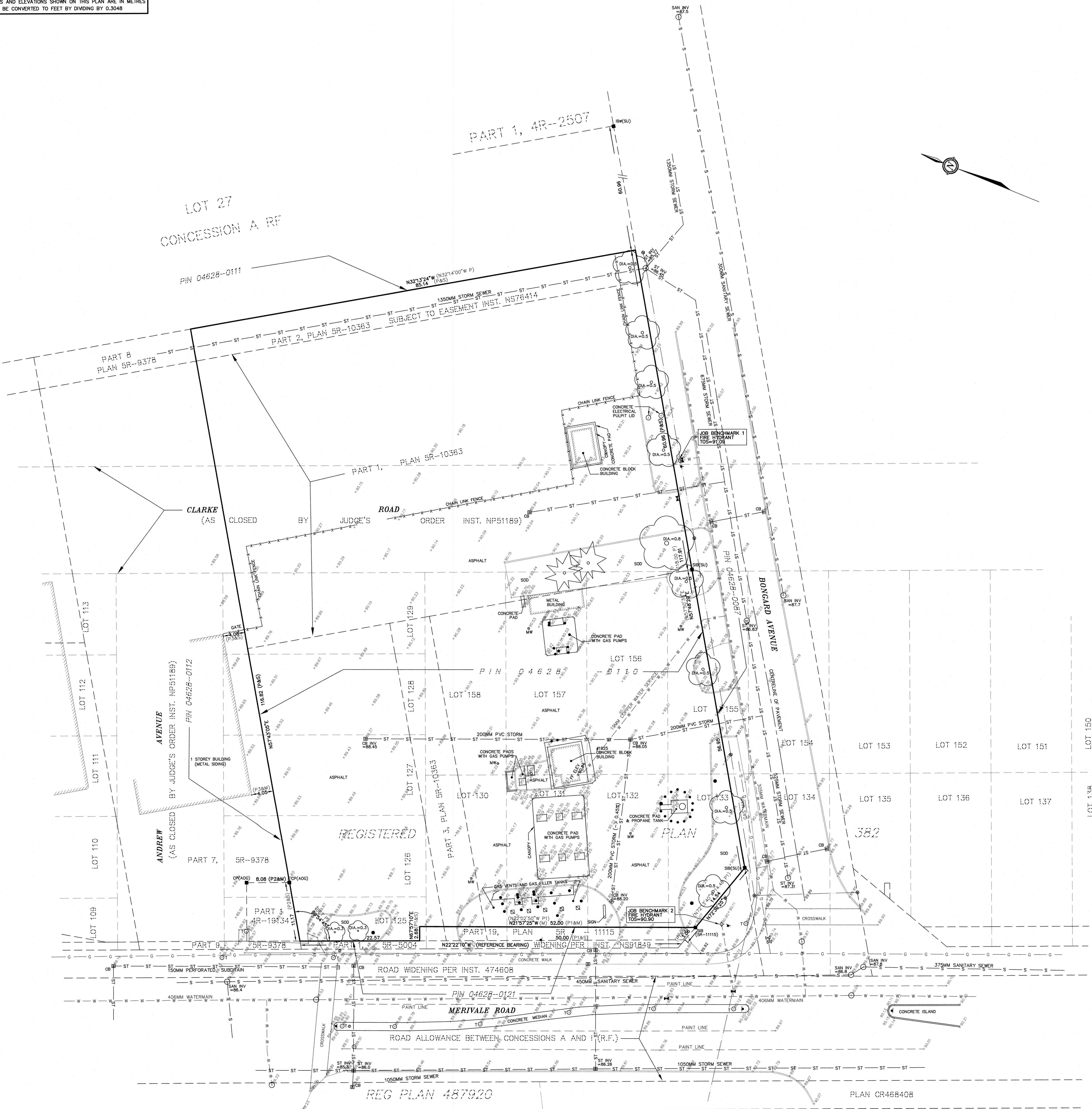
APPENDIX F
Survey, As-Builts

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

TOPOGRAPHIC SURVEY OF
LOTS 156, 157 & 158
and PART OF LOTS 125, 126, 127, 128,
129, 130, 131, 132, 133 & 155
and PART OF CLARKE RD (AS CLOSED
BY BY-LAW NP51189)
REGISTERED PLAN 382
and PART OF LOT 27, CONCESSION A
(RIDEAU FRONT)
CITY OF OTTAWA



FAIRHALL, MOFFATT & WOODLAND LIMITED
ONTARIO LAND SURVEYORS



LEGEND

| | |
|-------|--|
| □ | SURVEY MONUMENT SET |
| ■ | SURVEY MONUMENT FOUND |
| SIB | STANDARD IRON BAR |
| SSIB | SHORT STANDARD IRON BAR |
| IB | IRON BAR |
| CP | CONCRETE NAIL AND WASHER |
| ● | ROUND |
| (P) | PLAN 5R-10363 |
| (P1) | PLAN 5R-11115 |
| (P2) | PLAN 4R-19134 |
| (P3) | PLAN BY FAIRHALL MOFFATT AND WOODLAND LIMITED DATED DEC. 14, 1973 (REF#4-382NP) |
| (P4) | PLAN 4R-2507 |
| (S) | SET |
| (M) | MEASURED |
| (857) | FAIRHALL, MOFFATT & WOODLAND LIMITED, O.L.S. |
| (SU) | SOURCE UNKNOWN |
| (WT) | WITNESS |
| DIA | DIAMETER |
| INV. | INVERT |
| PIN | PROPERTY IDENTIFIER NUMBER |
| (A00) | ANNIS O'SULLIVAN VOLEBEKK LTD. |
| ○ | MANHOLE |
| □ | CATCH BASIN |
| + | GAS VALVE |
| + | WATER VALVE |
| — | WATERMAIN |
| — | OVERHEAD UTILITY WIRES |
| — | UNDERGROUND BELL |
| — | UNDERGROUND HYDRO |
| — | GAS MAIN |
| — | STORM SEWER |
| — | SANITARY SEWER |
| — | CURB |
| ● | LAMP STANDARD |
| ○ | UTILITY POLE |
| — | GUY WIRE AND ANCHOR |
| ● | BOLLARD |
| + | SIGN |
| + | CONIFEROUS TREE |
| ○ | DECIDUOUS TREE |
| □ | WENT |
| ○ | FILLING PIPE |
| ○ | TRAFFIC LIGHT |
| ○ | FIRE HYDRANT |
| ○ | MONITORING WELL |
| ○ | TRAFFIC MANHOLE |
| FF | FINISHED FLOOR |

ELEVATION NOTES

- ELEVATIONS SHOWN HEREON ARE REFERRED TO GEODETIC DATUM (CGVD28).
- ELEVATIONS FOR MANHOLE COVERS AND CATCH BASINS HAVE TO BE INDEPENDENTLY CONFIRMED BEFORE THEY CAN BE ACCEPTED FOR FINAL DESIGN OR CONSTRUCTION PURPOSES.
- IT IS THE RESPONSIBILITY OF THE USER OF THIS INFORMATION TO VERIFY THAT THE JOB BENCHMARKS HAVE NOT BEEN ALTERED OR DISTURBED AND THAT THEIR RELATIVE ELEVATION AND DESCRIPTION AGREE WITH THE INFORMATION SHOWN ON THIS DRAWING.

UTILITY NOTES

- THIS DRAWING CANNOT BE ACCEPTED AS ACKNOWLEDGING ALL OF THE UNDERGROUND UTILITIES AND IT WILL BE THE RESPONSIBILITY OF THE USER TO CONTACT THE RESPECTIVE UTILITY AUTHORITIES FOR CONFIRMATION OR LOCATION.
- UNDERGROUND UTILITIES, AS REPORTED ON THIS DRAWING, ARE NOT BASED ON AN ACTUAL 'FIELD LOCATE' BY THE RESPECTIVE UTILITY AGENCIES BUT HAVE BEEN COMPILED FROM DATA OBTAINED FROM THE FOLLOWING SOURCE:
a) CITY OF OTTAWA PUBLIC UTILITIES REGISTRY
- BEFORE ANY WORK INVOLVING PROBING, EXCAVATING, ETC., A FIELD LOCATION OF UNDERGROUND PLANT BY THE PERTINENT UTILITY AUTHORITY IS MANDATORY.

NOTES

- BEARINGS HEREON ARE ASTROMOMIC AND ARE REFERRED TO THE NORTHERLY LIMIT OF MERIVALE AVENUE AS SHOWN ON PLAN 5R-11115, HAVING A BEARING OF N22°22'10"W.

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

- THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYS ACT, THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.
- THE SURVEY WAS COMPLETED ON APR. 23 2025.

2025/07/03
DATE

JOHN H. GUTRI
ONTARIO LAND SURVEYOR

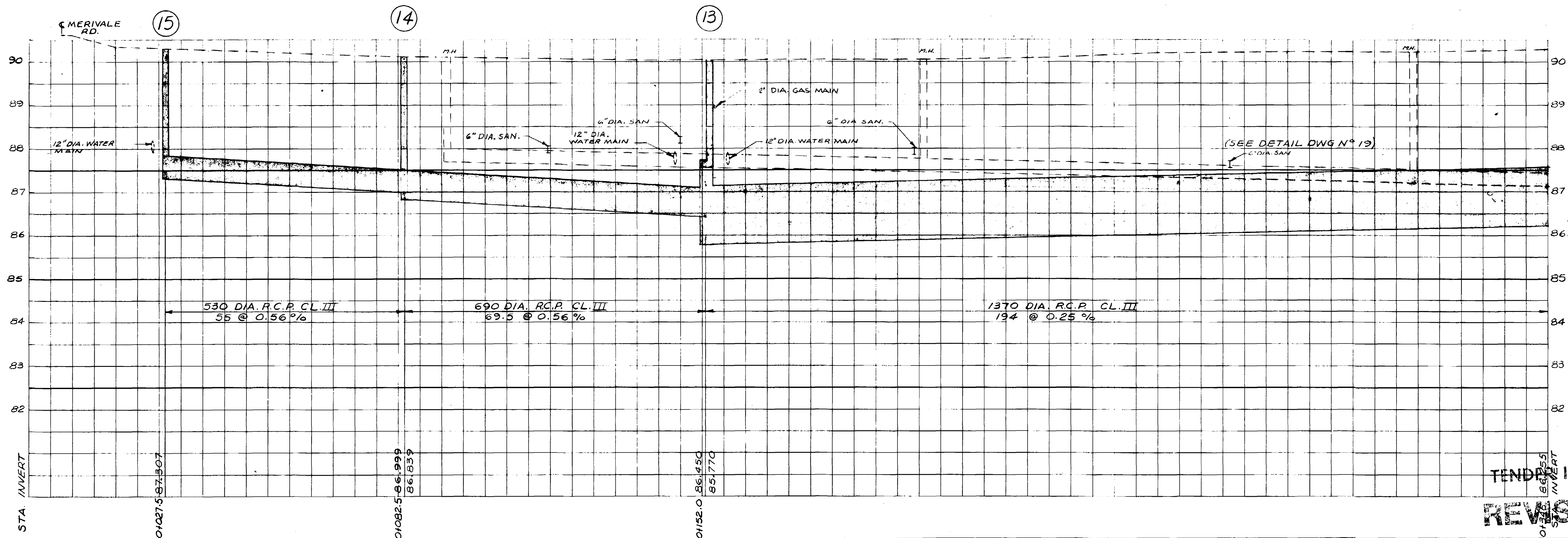
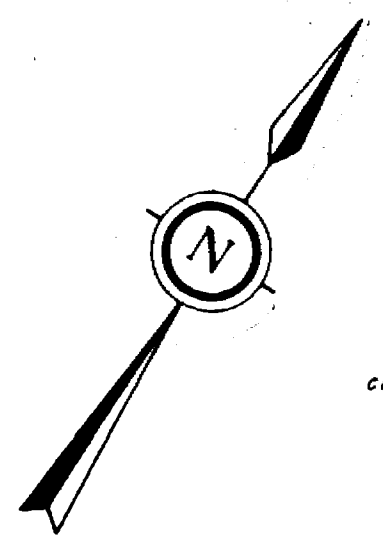
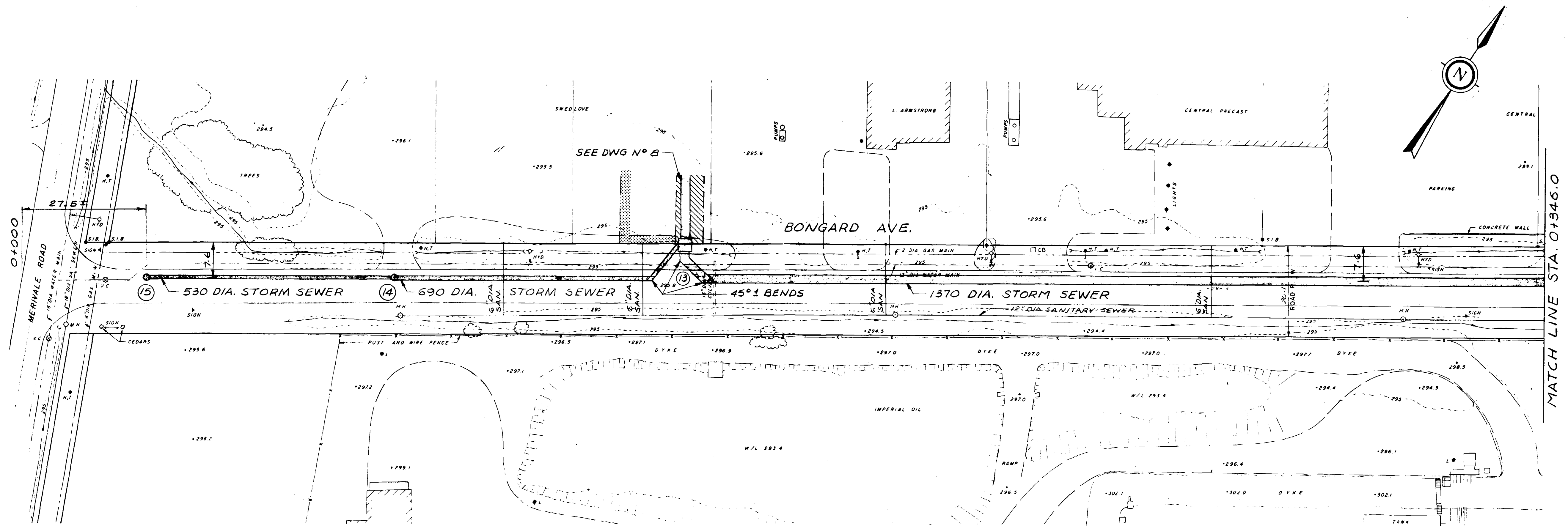
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ASSOCIATION OF ONTARIO
LAND SURVEYORS
PLAN SUBMISSION FORM
V-106913

THIS PLAN IS NOT VALID
UNLESS IT IS AN UNDOUBTED
ORIGINAL COPY
ISSUED BY THE SURVEYOR
IN ACCORDANCE WITH
REGULATION 1006, SECTION 29 (3)

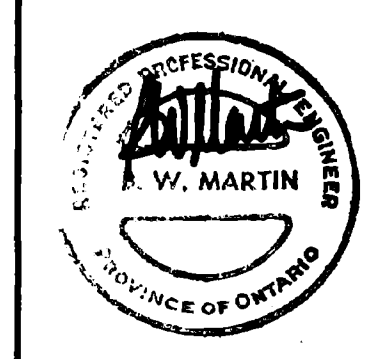
**Fairhall
Moffatt &
Woodland**
OTTAWA
Ontario Land Surveyors
Surveying and Land Information Services
100-600 TERRY FOX DRIVE, KANATA, ONTARIO K2L 4K6
TEL: (613) 591-2900 FAX: (613) 591-1425
www.fmw.on.ca

JOB No. AF12000
E 3656894, N 5021385
REFERENCE No. 8 - 382 NP
S:\2025\AF12000\DWG\off20_topo.dwg (kg)



- NOTES
1. PLAN AND PROFILE DIMENSIONS, STATIONS AND ELEVATIONS ARE IN METRIC UNITS (E.G. METERS, MILLIMETERS).
 2. ALL EXISTING UTILITIES AND GROUND ELEVATIONS IN PLAN ARE IN IMPERIAL UNITS.
 3. REGARDLESS OF CLASS OF PIPE SHOWN, ALL PIPE BENDS SHALL BE CLASS V.
 4. FOR ALL HYDRANT LATERAL CROSSINGS, SEE DETAIL SHEET. /9

| NO. | DESCRIPTION | BY | DATE |
|-----|-------------|----|------|
| | | | |



CITY OF NEPEAN
WORKS DEPARTMENT

MERIVALE CORRIDOR STORM SEWERS

BONGARD
PLAN AND PROFILE
STA. 0+027.5 TO STA. 0+346.0

De Leuw Cather CONSULTING ENGINEERS AND PLANNERS
DESIGNED BY BWM CHECKED BY HVM SCALE HOR. 1:500 VERT. 1:50
DRAWN BY ROP DATE 79-05-25 DE LEUW CATER PROJECT NO. 4561

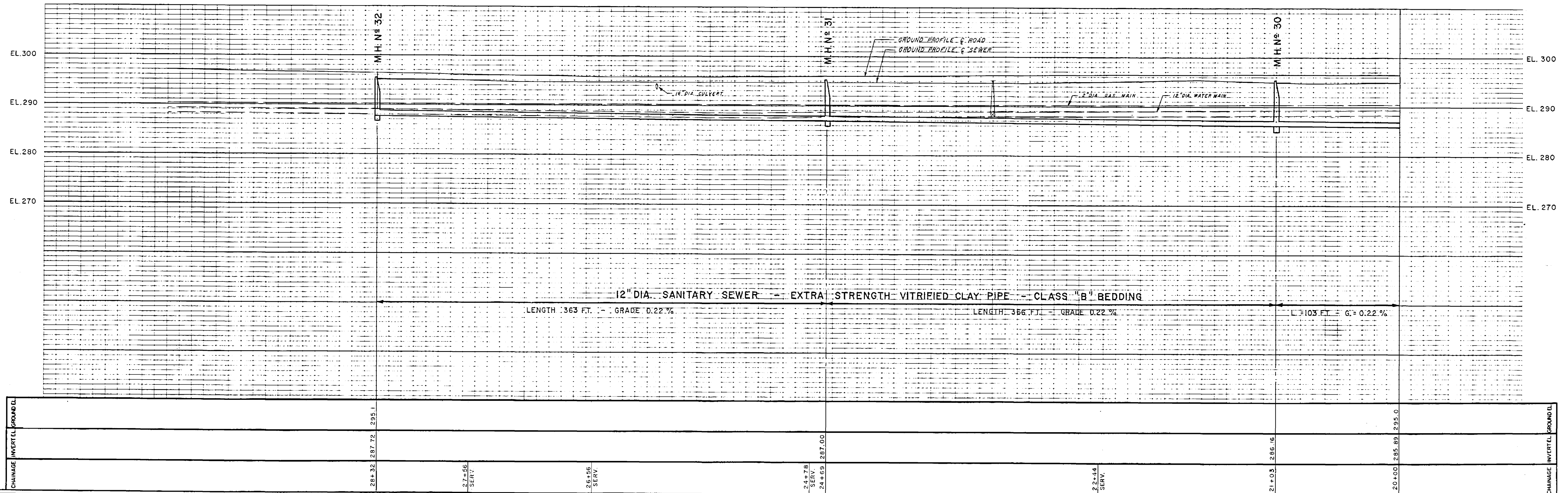
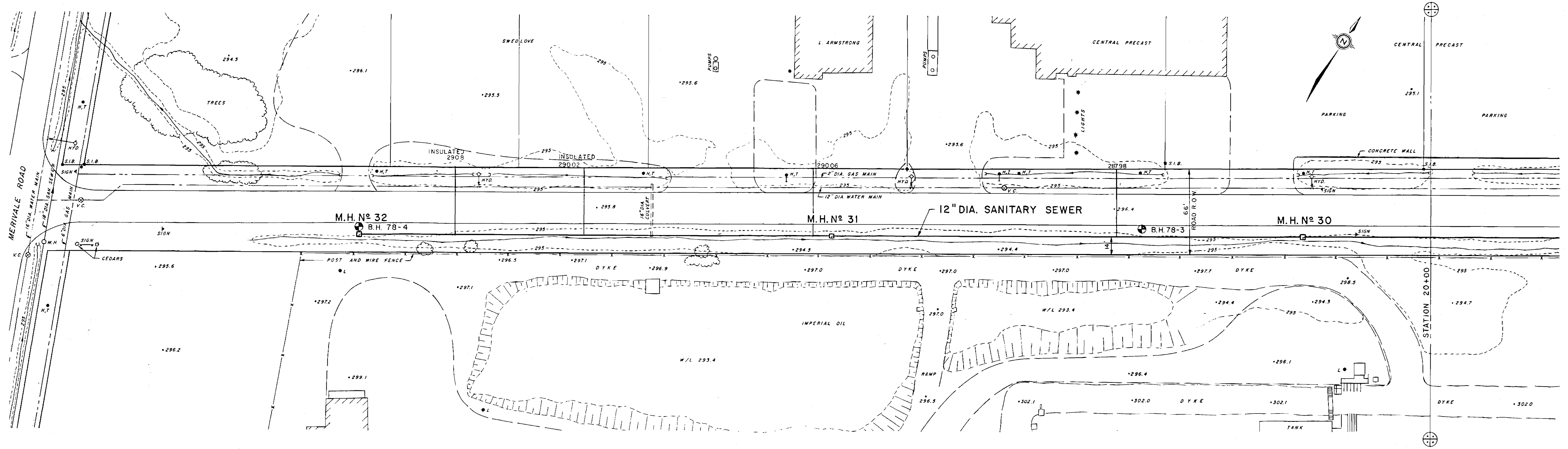
REVISIONS

9

TENDER ISSUE
REVISED

A B C D E F G H

BONGARD AVE.



| | | | | | |
|----------------|------------|--|--|--|----------------|
| NOTES | CHECKED | BONGARD AVE. STA. 20+00 TO STA. 28+32 | TOWNSHIP OF NEPEAN MERIVALE AREA SANITARY SEWERS | GORE & STORRIE LIMITED CONSULTING ENGINEERS | |
| | DESIGNER | | | DATE | FILE NO. |
| RECORD DRAWING | DATE | SIGNED | PROJECT MANAGER | MARCH 1978 | 463.18-D-15562 |
| | APRIL 1979 | <i>M. P. ...</i> | GORE & STORRIE LIMITED | SCALE | DRAWING NO. |
| | | | | HOR: 1" = 40' | 14 |
| | | | | VERT: 1" = 10' | |