Stormwater Management Report and Servicing Brief

Proposed New Commercial Development
6111 Hazeldean Rd
Stittsville (Ottawa), Ontario
Rev 02

Prepared for:

Halo Car Wash Inc.
18 Adelaide Street
Maxville, ON
K0C 1T0

Attention: Mr. Brad Moore

LRL File No.: 200100
Site Plan Control No.:

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

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1 INTRODUCTION AND SITE DESCRIPTION

LRL Associates Ltd. was retained by Halo Car Wash Inc. to complete a Stormwater Management Analysis and Servicing Brief for the construction of multi-use commercial development located at 6111 Hazeldean Road, Stittsville (Ottawa), Ontario. The property is legally described as Part of Lot 24, Concession 12, Ward 6-Stittsville-Kanata West and Zoning AM9[1699]-h. The location of the proposed development can be viewed in Figure 1.

Figure 1: Arial View of Proposed Development

The development proposes construction of multi-use commercial development including Halo Tunnel Car Wash (485 sqm), Mr Lube Automotive Maintenance Facility (221 sqm), a Starbucks restaurant (175 sqm), and two additional commercial buildings (146 sqm and 190 sqm in sizes). The site will be accessible from (i) a 9.5 m wide RI/RO entrance located off of Hazeldean Rd, (ii) a new 9.3m wide signalized entrance located off of the proposed access road to be constructed along the east of the site, extending north from Hazeldean Road (herein referred to as ‘ main access’, and (iii) a new 9.0m wide entrance located off main access. 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 new development. Should there be any changes in the design features, which may relate to the stormwater considerations, LRL Associates Ltd. should be advised to review the report recommendations.

2 EXISTING SITE AND DRAINAGE DESCRIPTION

The subject site measures approximately 1.85 ha and is currently undeveloped, consisting of grassed area and an asphalt driveway near the southeast end. Elevations of existing site range between 113.95 near the northeast corner to 117.34 at the southwest corner of the site.

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

Ch. Hazeldean Rd

- 762 mm diameter STC watermain
- 375 mm diameter PVC storm sewer

Existing 600 mm diameter storm stub and 200 mm diameter sanitary stub has been provided to service the site at the northwest corner. For water servicing, a 200 mm diameter stub has been provided at Hazeldean Rd. near the southwest corner of the site. In addition, a private water main is available within the City parcel at the north east corner of the site.

3 SCOPE OF WORK

As per applicable guidelines, the scope of work includes the following:

Stormwater management

- Calculate the allowable stormwater release rate.
- Calculate the anticipated post-development stormwater release rates.
- Demonstrate how the target quantity objectives will be achieved.

Water services

- Calculate the expected water supply demand at average and peak conditions.
- Calculate the required fire flow as per the Fire Underwriters Survey (FUS) method.
- Confirm the adequacy of water supply and pressure during peak flow and fire flow.
- Describe the proposed water distribution network and connection to the existing system.

Sanitary services

- Describe the existing sanitary sewers available to receive wastewater from the building.
- Calculate peak flow rates from the development.
- Describe the proposed sanitary sewer system.

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 Mississippi Valley Conservation Authority (MVCA) will need to be consulted in order to obtain municipal approval for site development. No other approval requirements from other regulatory agencies are anticipated.

5 WATER SUPPLY AND FIRE PROTECTION

5.1 Existing Water Supply Services

The subject property lies within the City of Ottawa 3W water distribution network pressure zone. The subject property is located to the north of an existing 762 mm dia. watermain along Hazeldean Rd. A 200 mm dia. water service stub is available near the southwest corner of the property. In addition, there is 200 mm dia. private watermain available near the northeast corner of subject property along the City parcel.

5.2 Water Supply Servicing Design

The subject property is proposed to be serviced via a 200 mm dia. service main to be connected to the 200 mm dia. watermain stub located within Hazeldean Rd. at the southwest corner of the site. To provide redundant supply, a second connection is proposed to be connected with a private main (in the City parcel) at the northeast corner of the subject site. For servicing layout, refer to Site Servicing Plan C401 in Appendix E.

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

Table 1: City of Ottawa 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
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)

The required water supply requirements for the proposed commercial & industrial development calculated by using the parameters in Table 1 are included in Appendix B.

Below is the summary of anticipated water demands

- Average Day Demand = 0.64 L/s
- Maximum Day Demand = 0.96 L/s
- Peak Hour Demand = 1.73 L/s

The City of Ottawa was contacted to obtain boundary conditions associated with the estimated domestic water demand and fire flow demand. Table 2 summarizes the boundary conditions of the proposed development.

Table 2: Summary of Boundary Conditions

Demand Scenario	Anticipated Demand (L/s)	Connection-1 (Hazeldean Rd)		Connection-2 (Bandelier Way)	
		Head (m)	Pressure[1] (psi)	Head (m)	Pressure[2] (psi)
Maximum HGL	0.64	159.9	59.6	160.0	63.5
Peak Hour	1.73	156.6	55.0	156.5	58.6
Max Day plus Fire 1	0.96+75	157.6	56.3	155.8	57.7
Max Day plus Fire 2	0.96+53.33	157.7	56.4	156.7	58.9
Max Day plus Fire 3	0.96+88.33	157.5	56.2	155.2	56.7
Max Day plus Fire 4	0.96+78.33	157.6	56.3	155.7	57.4

[1] Ground Elevation = 118.0 m
[2] Ground Elevation = 115.3 m

As indicated in Table 2, pressures in all scenarios meet the required pressure range stated in Table 1 as per City of Ottawa Design Guidelines. Refer to Appendix B for correspondence and Boundary Conditions.

The estimated fire flow for the proposed buildings was determined in accordance with Fire Underwriters Survey (FUS) using the formula:

$$\boldsymbol{F = 220C\sqrt{A}}$$

where,

F = The required fire flow (L/min)

C = Coefficient related to the type of construction

A = The total floor area (m^2)

The estimated fire flow demand was ranged from 3200 to 5300 L/min, see Appendix B for calculation details.

Three (3) new fire hydrants are proposed to install on-site. Refer to Site Servicing Plan C401 for fire hydrant locations. Additionally, there are two (2) fire hydrants in proximity to the site (within 150 m), one near southwest corner on Hazeldean Rd and the second one in the north on Bandelier Way.

Table 3 summarizes the required fire flows and aggregate fire flow of the contributing hydrants based on Table 18.5.4.3 of ISTB-2018-02.

Table 3: Fire Protection Summary Table

Building	Required Fire Flow (L/min)	Available Combined Fire Flow (L/min)
Proposed Commercial Bldg #1	4500	5678×3(on-site FH) +3785×2 (off-site FH) = **24,604**
Proposed Commercial Building #2	3200	
Proposed Halo Car Wash	5300	
Proposed Mr Lube	4700	
Total	**17,700**	

From Table 3, it is evident that available combined fire flow exceeds the required fire flow (FF) for all four buildings.

A certified fire protection system specialist will need to be employed to design the building's fire suppression system and confirm the actual fire flow.

6 SANITARY SERVICE

6.1 Existing Sanitary Sewer Services

There is an existing 200 mm dia. sanitary sewer service stub extending to the property line from Bandelier Street at the northwest corner of the subject site.

6.2 Sanitary Sewer Servicing Design

The proposed development will be serviced via 200 mm dia. sanitary sewers which will connect to the existing 200mm dia. sanitary service stub extending to the subject site's property line at the northwest corner. Refer to LRL drawing 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
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, City of Ottawa's Appendix 4-A (Daily Sewage Flow For Various Types of Establishments), and the car wash information provided by Halo Car Wash, the anticipated post-development peak design wastewater flow was calculated to be 1.99 L/s. Refer to Appendix C for further information on wastewater flow calculations and the sewer design sheet.

Anticipated wastewater flows from the existing site was reported in the *Stormwater Management, Watermain, Storm Sewer and Sanitary Sewer Design Brief (Potter's Key Subdivision Report)* prepared by Atrel Engineering, dated February 2017 (Revision 5). A peak design wastewater flow of 2.13 L/s was contemplated for this site (see Appendix C).

7 STORMWATER MANAGEMENT

7.1 Existing Stormwater Infrastructure

There is an existing 600 mm diameter storm sewer stub extending to the property line at the northwest corner of the site from the drainage easement which connects the subject property to Bandelier Way. The storm sewer flows easterly and northerly to the Jackson Trails Stormwater Management Facility (Wet Pond).

In pre-development conditions, the stormwater runoff would flow uncontrolled overland to the low-lying area towards the northeast corner of the subject site. Refer to Appendix D for pre- and post-development watershed information.

7.2 Design Criteria

The stormwater management criteria for this development is based on Potter's Key Design Brief as well as 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 (SWMPD Manual).

7.2.1 Water Quality

The subject property is located within the Feedmill Creek Watershed and is within the area of the Carp River Watershed Subwatershed Study (CRWSS) and is subjected to review by the Mississippi Valley Conservation Authority (MVCA). It was determined that an enhanced level of protection, 80% Total Suspended Solids (TSS) removal, would be required for all contaminated stormwater runoff from the proposed development. Correspondence with MVCA is included in Appendix A.

A Stormceptor model EF08 Oil/Grit Separator (OGS) is proposed downstream of STM MH24 which will provide the required 80% TSS removal as required by MVCA. Refer to Appendix D for details on OGS.

7.2.2 Water Quantity

The allowable release rate for the site has been contemplated in the Potter's Key Subdivision Report and was determined to be **70 L/s/ha**. Refer to *Stormwater Criteria for Future Development Commerical Area* included in Appendix D. Based on this pre-determined release rate, the allowable release rate of the subject site is calculated and is summarized in Table 5.

Table 5: Allowable Release Rate

Site	Area	Allowable Release Rate	
	(ha)	(L/s/ha)	(L/s)
Proposed Development	1.345	70	94.16
Future Development (Phase 2)	0.511	70	35.70
Total	**1.856**	**70**	**129.86**

7.3 Method of Analysis

The 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 storage calculations.

7.4 Proposed Stormwater Quantity Controls

The proposed stormwater management quantity control for this development will be accomplished using an Inlet Control Device (ICD) in the storm sewer. Ponding required as a result of quantity control will be accomplished through surface storage and underground storage in the parking lots

A network of storm sewers is proposed to service the site and outlet to the existing 600 mm diameter storm sewer stub at the northwest corner of the site. The proposed site storm sewers and stormwater management system are shown on Site Servicing Plan C401 and detailed calculations including the design sheet can be found in Appendix D.

The existing site is delineated by catchments EWS-01 which currently drains un-controlled towards the low-lying area in the northeast corner. Refer to Pre-development Watershed Plan C701 included in Appendix E.

The site has been analyzed and post-development watersheds have been allocated. A few watersheds (WS-07 and WS-25 in Halo Car Wash area, and WS-08, WS-10 and WS-15 in Mr Lube area) consisting of grass and asphalt area will flow un-controlled off the site. Refer to Post-development Watershed Plan C702 included in Appendix E.

Overland flow in Halo Car Wash area within watersheds WS-01, WS-02, WS-03, WS-04, WS-05, WS-06 and WS-18 (Total 0.42 ha) will be captured by six CBMHs (CBMH01-CBMH06). An ICD, Hydrovex Vortex Flow Regulator 100VHV-1 or approved equivalent, is proposed at CBMH06 to restrict the collected runoff and control the release rate at 14.77 L/s (H=2.15 m). For additional details on select ICD, refer to Appendix D.

Likewise, overland flow in Mr Lube area within watersheds WS-09, WS-11, WS-12, WS-13, WS-14, WS-16 and WS-17 (Total 0.40 ha) will be captured by four CBMHs (CBMH09-CBMH12). An ICD, Hydrovex Vortex Flow Regulator 100VHV-2 or approved equivalent, is proposed at CBMH12 to restrict the collected runoff and control the release rate at 15.47 L/s (H=2.14 m).

Finally, overland flow from the commercial area within the watersheds WS-19, WS-20, WS-21, WS-22, WS-23 and WS-24 (Total 0.41 ha) will be captured by six CBMHs (CBMH17-CBMH22). An ICD, Hydrovex Vortex Flow Regulator 125VHV-2 or approved equivalent, is proposed at CBMH22 to restrict the runoff and control release rate at 31.73 L/s (H=2.88 m).

Proposed grading will control the flow of stormwater and provide positive overland drainage towards catch basins and manholes for a controlled release. Refer to Grading Plan C301 in Appendix E.

All overland stormwater captured will ultimately be conveyed, via underground storm sewers, to the City storm sewer running along Bandelier Way at a maximum release rate of 61.98 L/s from the proposed development.

Table 6 summarizes post-development drainage areas. Additional details and calculations can be found in Appendix D.

Table 6: Drainage Areas and Runoff Coefficients

Site	Watersheds	Area (ha)	Weighted Runoff Coefficient	100-Year Weighted Runoff Coefficient (25% increase)
Halo Car Wash	WS-01 (controlled)	0.095	0.64	0.79
	WS-02 (controlled)	0.091	0.90	1.00
	WS-03 (controlled)	0.075	0.90	1.00
	WS-04 (controlled)	0.042	0.82	1.00
	WS-05 (controlled)	0.044	0.90	1.00
	WS-06 (controlled)	0.023	0.87	1.00
	WS-16 (controlled)	0.050	0.78	0.97
	WS-07 (un-controlled)	0.032	0.67	0.83
	WS-23 (un-controlled)	0.045	0.25	0.31
Mr Lube	WS-08 (controlled)	0.029	0.20	0.25
	WS-09 (controlled)	0.044	0.90	1.00
	WS-10 (controlled)	0.060	0.79	0.99
	WS-11 (controlled)	0.031	0.71	0.89
	WS-12 (controlled)	0.049	0.84	1.00
	WS-14 (controlled)	0.049	0.90	1.00
	WS-15 (controlled)	0.088	0.81	1.00
	WS-13 (un-controlled)	0.045	0.43	0.54
Commercial Area	WS-17 (controlled)	0.151	0.79	0.99
	WS-18 (controlled)	0.068	0.79	0.98
	WS-19 (controlled)	0.115	0.57	0.71
	WS-20 (controlled)	0.042	0.90	1.00
	WS-21 (controlled)	0.034	0.90	1.00
	WS-22 (controlled)	0.044	0.88	1.00
	Total	**1.345**	**0.75**	**0.94**

Table 7 summarizes the release rates from the proposed site.

Table 7: Summary of Proposed Development Stormwater Release Rates

Site Description	Controlled Release Rate	Un-controlled Release Rate	Total
	(L/s)	(L/s)	(L/s)
Halo Car Wash	14.77	20.09	34.86
Mr Lube	15.47	12.10	27.57
Commercial Area	31.73	0.00	31.73
Total	**61.98**	**32.18**	**94.16**

Table 8 summarizes the storage volumes required to meet the allowable release rate at 100-year storm event and the storage provided.

Table 8: Summary of Storage Volume (100-Year)

Site Description	Storage Required (m^3)			Storage Provided (m^3)			
				Surface Storage	Underground Storage		Total (m^3)
	100-yr	5-yr	2-yr		Oversized Pipe	CB/CBMH	
Halo Car Wash	224.68	86.93	58.26	132.55	71.44	29.30	223.44
Mr Lube	167.20	61.66	40.69	55.38	76.85	33.26	167.36
Commercial Area	184.76	64.72	58.02	129.79	37.22	28.23	192.77
Total	**576.64**	**213.31**	**156.97**	**317.72**	**185.50**	**90.79**	**594.01**

The runoff exceeding the allowable release rate will be stored on-site via surficial ponding and underground storage. For 100-yr storm event, it is calculated that a total of 576.64 m^3 of storage will be required to attenuate flows to the allowable release rate of 61.98 L/s (controlled release). The total storage provided is 594.01 m^3, thus exceeds the required storage.

From Table 3, it is evident that the storage required for 2- and 5-yr storm events are less than available underground storages, therefore surface ponding will not occur.

Refer to Appendix D for details on runoff and storage calculations. The 100-year maximum ponding elevation and depths can be found on Stormwater Management Plan C601 in Appendix E.

8 Erosion and Sediment Control

During construction, erosion and sediment controls will be provided primarily via a sediment control fence to be erected along the perimeter of the site where runoff has the potential of leaving the site. Inlet sediment control devices are also to be provided in any catch basin and/or manholes in and around the site that may be impacted by the site construction. Construction and maintenance requirements for erosion and sediment controls are to comply with Ontario Provincial Standard Specification OPSS 577. Refer to Erosion and Sediment Control Plan C101 for additional details.

9 CONCLUSION

This Stormwater Management and Servicing Report for the proposed development at 6111 Hazeldean 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 development are summarized below.

Water Service

- The anticipated maximum hour demand of the proposed development is 1.73 L/s.
- The maximum required fire flows were calculated at 75 and 53.33 L/s for two commercial buildings, 88.33 L/s for Halo Car Wash and 78.33 L/s for Mr Lube. The fire flow water demands were calculated using the FUS method.
- Three (3) on-site fire hydrants are proposed to service the proposed development.
- The new development and future expansion will be serviced with a new 200 mmΦ watermain to be connected to the existing 200 mmΦ watermain stub at Ch. Hazeldean Rd and a proposed second connection to a private main on City parcel at the Northeast corner of the subject site.

Sanitary Service

- The anticipated sanitary flow from the proposed development is 1.99 L/s.
- The proposed development will be serviced by a network of 200 mm dia. sanitary sewers that connect to the existing 200mm dia. sanitary stub extended into the site at the Northwest corner.

Stormwater Management

- Stormwater quality control requirements of 80% TSS removal will be met via the use of an Oil/Grit Separator (Stormceptor model EF08 or approved equivalent).
- The storm water release rates from the proposed development will meet contemplated allowable release rate of 94.16 L/s (61.98 L/s controlled and 32.18 L/s un-controlled).
- Stormwater quantity control objectives will be met through on-site stormwater surface storage in the parking lots and underground storage in oversized pipes and CBMH.

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.

Mohan Basnet, P.Eng.
Civil Engineer

APPENDIX A

Pre-consultation / Correspondance

DEVELOPMENT SERVICING STUDY CHECKLIST	
Project #: 200100	
Date: 2021-06-11	
4.1 General Content	
Executive Summary (for larger reports only).	N/A
Date and revision number of the report.	Report Cover Sheet
Location map and plan showing municipal address, boundary, and layout of proposed development.	Drawings/Figures
Plan showing the site and location of all existing services.	Figure 1
Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	Section 1.0
Summary of Pre-consultation Meetings with City and other approval agencie	Section 4.0 & Appendix A
Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	Section 5.1, 6.1, 7.1
Statement of objectives and servicing criteria.	Section 3.0
Identification of existing and proposed infrastructure available in the immediate area.	Section 5.1, 6.1, 7.1
Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	Section 7.0
Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	C301

Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	N/A
Proposed phasing of the development, if applicable.	N/A
Reference to geotechnical studies and recommendations concerning servicing.	C401
All preliminary and formal site plan submissions should have the following information:	
◦Metric scale	
◦North arrow (including construction North)	
◦Key plan	
◦Name and contact information of applicant and property owner	C401
◦Property limits including bearings and dimensions	
◦Existing and proposed structures and parking areas	
◦Easements, road widening and rights-of-way	
◦Adjacent street names	

4.2 Development Servicing Report: Water

Confirm consistency with Master Servicing Study, if available	N/A
Availability of public infrastructure to service proposed development	Section 5.1
Identification of system constraints	Section 5.1
Identify boundary conditions	Section 5.2
Confirmation of adequate domestic supply and pressure	Section 5.2
Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	Section 5.2

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

4.3 Development Servicing Report: Wastewater

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

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

4.4 Development Servicing Report: Stormwater Checklist

Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)	Section 7.1

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

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

4.5 Approval and Permit Requirements: Checklist

Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.	N/A
Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	N/A
Changes to Municipal Drains.	N/A
Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	N/A

4.6 Conclusion Checklist

Clearly stated conclusions and recommendations	Section 9.0
Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	Noted
All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario	Noted

Mohan Basnet

From: Philippe Paquette
Sent: November 10, 2020 12:34 PM
To: Mohan Basnet; Maxime Longtin
Subject: FW: Pre-consult Follow Up - 6111 Hazeldean
Attachments: Pre-con Applicant's Study and Plan Identification List.pdf; MFP4003520200306105007_6B40C942.pdf

Hello guys,
might be a good thing if you go thru these before going further.
regards
Philippe

From: Shen, Stream <Stream.Shen@ottawa.ca>
Sent: March 6, 2020 3:56 PM
To: Philippe Paquette <ppaquette@lrl.ca>
Cc: Ren, Jeffrey <jeffrey.ren@ottawa.ca>; Turkington, Seana <Seana.Turkington@ottawa.ca>; Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>; Gervais, Josiane <josiane.gervais@ottawa.ca>
Subject: Pre-consult Follow Up - 6111 Hazeldean

Hi Philippe,

Please find below the Pre-Application Consultation Meeting notes for the meeting held on March 4, 2020 for the property at 6111 Hazeldean Road. The proposal requires a Site Plan Control (Complex) and a Lifting Holding By-law applications in order to allow the development of car wash by Halo Car Wash. Information on process, timeline and fees for the different applications can be found here. I have also attached the required Plans & Study List for application submission.

Attendees:
Stream Shen – Planner, City of Ottawa
Seana Turkington – Planner (Committee of Adjustment), City of Ottawa
Santhosh Kuruvilla – Project Manager (Infrastructure), City of Ottawa
Joisane Gervais – Project Manager (Transportation), City of Ottawa
Jeffrey Ren – Co-op Student, City of Ottawa
Philippe Paquette – LRL Associates Ltd.
Brad Lookwood – Halo Car Wash
Brad Moore – Halo Car Wash

Below are staff's preliminary comments based on the information available at the time of pre-con meeting:

Planning

- The site is zoned AM9[1699]h according to the City's Zoning By-law.
- The holding symbol indicates that the following conditions must be satisfied prior to removal of the holding symbol:
  (a) it must be demonstrated that the Jackson Trails pumping station has sufficient capacity to accept flows from the development at 6111 Hazeldean Road to the satisfaction of the City, and
  (b) it must be demonstrated that sufficient capacity downstream of the Jackson Trails pumping station is available for the development at 6111 Hazeldean Road.

- For 2 or more planning applications submitted at the same time and for the same lands, each planning fee will be reduced by 10%.
- 50% of lot width within 3 metres of the front lot line must be occupied by building. There is an exception if the hydro line in front of the site is a high voltage line.
- Please contact Hydro Ottawa to confirm the required setback from the overhead line.
- Please confirm if there is an existing access easement to utilize the signalized intersection and driveway on the adjacent lot.
- Please note that area falls within the Feedermill Creek Rehabilitation Area. Area specific development charges for creek restoration exist for the subject site and can be found as item 9 in the link below. http://app05.ottawa.ca/sirepub/mtgviewer.aspx?meetid=7868&doctype=AGENDA
- Please note that the subject site is within an area of high archaeological potential. Minto may have conducted archaeological assessments as part of a previous subdivision application, please contact Minto to confirm if an archaeological assessment has already been conducted.
- Parkland dedication or cash-in-lieu of parkland may be required as part of this development and will be based on the City's Parkland Dedication By-law. It may be possible that Minto has already paid cash-in-lieu of parkland as part of a previous subdivision application; if this has been previously paid, please provide evidence of payment or dedication.
- You are encouraged to contact the Ward Councillor, Councillor Glen Gower, at glen.gower@ottawa.ca about the proposal.
- If a parcel is severed but continues to be developed and owned by one entity, the 2 parcels may qualify as one lot for the purpose of zoning. If the lots no longer qualify as one lot for the purpose of zoning, additional landscaped buffers for parking areas may be required.

Committee of Adjustment

- No major issues with severances. The Planning Department is a commenting agency for Committee of Adjustment files, however the final approval rests with the Committee.
- Please note that Committee of Adjustment applications are typically submitted after first round comments for Site Plan Control have been received.
- If a parcel is severed and the newly created parcels share services, there may be additional requirements such as easements. Easement may be established through consent process.
- The consent process may introduce additional conditions with 1 year to clear conditions or the severance may lapse.
- It is recommended that the applicant notifies the file lead for site plan control (Stream) prior to applying for a severance.
- An informal pre-consultation for a severance with a Committee of Adjustment planner is also suggested.

Feel free to contact Planner (Committee of Adjustment), Seana Turkington, at seana.turkington@ottawa.ca, for follow-up questions.

Planning Forester

- a Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City; an approved TCR is a requirement of Site Plan or Plan of Subdivision approval
- any removal of privately-owned trees 10cm or larger in diameter requires a tree permit issued under the Urban Tree Conservation Bylaw; the permit is based on the approved TCR
- any removal of City-owned trees will require the permission of Forestry Services who will also review the submitted TCR
- the TCR must list all trees on site by species, diameter and health condition – separate stands of trees may be combined using averages
- If trees are to be removed, the TCR must clearly show where they are, and document the reason they can not be retained – please provide a plan showing retained and removed treed areas
- The TCR may be combined with the LP
- Please ensure newly planted trees have an adequate soil volume for their size at maturity

For more information on the process or help with tree retention options, feel free to contact Forester, Mark Richardson, at mark.richardson@ottawa.ca.

Engineering

- The Servicing Study Guidelines for Development Applications are available at the following link: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans
- Record drawings & reports and utility plans are available for purchase from the City's Information Centre. Contact the City's Information Centre by email at informationcentre@ottawa.ca or by phone at (613) 580-2424 x44455
- Stormwater quantity control criteria – be consistent with the stormwater criteria specified in the Design Brief of Potter's Key Subdivision (City file # D07-16-14-0013).
- Existing sanitary and storm sewer stubs are located on the north-west corner of the subject site for service connections.
- Existing watermain stub is located at south-west of this parcel, fronting the property on the west.
- Stormwater quality control – Consult with the Conservation Authority (MVCA) for their requirements. Include the correspondence with MVCA in the stormater/site servicing report.
- MECP ECA (Environmental Compliance Approval) is required due to proposed use (industrial sewage works) of the building (car wash) and potential servicing (stormwater) of more than one parcel. ECA application will be direct submission to MECP (MOE).
- Clearly show and label the property lines on all sides of the property.
- Clearly show and label all the easements (if any) on the property, on all plans.
- When calculating the post development composite runoff coefficient (C), please provide a drawing showing the individual drainage area and its runoff coefficient.
- When using the modified rational method to calculate the storage requirements for the site, the underground storage should not be included in the overall available storage. The modified rational method assumes that the restricted flow rate is constant throughout the storm which, in this case, underestimates the storage requirement prior to the 1:100 year head elevation being reached. Alternately, if you wish to include the underground storage, you may use an assumed average release rate equal to 50% of the peak allowable rate. Otherwise, disregard the underground storage as available storage or provide modeling to support the design.
- Engineering plans are to be submitted on standard A1 size (594mm x 841mm) sheets.
- Phase 1 ESA and Phase 2 ESA must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.
- Provide the following information for water main boundary conditions:
    1. Location map with water service connection location
    2. Average daily demand (l/s)
    3. Maximum daily demand (l/s)
    4. Maximum hourly demand (l/s)
    5. Fire flow demand (provide detailed fire flow calculations based on the fire underwriters survey method)
- If you are proposing any exterior light fixtures, all must be included and approved as part of the site plan approval. Therefore, the lights must be clearly identified by make, model and part number. All external light fixtures must meet the criteria for full cut-off classification as recognized by the Illuminating Engineering Society of North America (IESNA or IES), and must result in minimal light spillage onto adjacent properties (as a guideline, 0.5 fc is normally the maximum allowable spillage). In order to satisfy these criteria, the applicant must provide certification from an acceptable professional engineer. The location of all exterior fixtures, a table showing the fixture types (including make, model, part number), and the mounting heights must be included on a plan.

Feel free to contact Infrastructure Project Manager, Santhosh Kuruvilla, at santhosh.kuruvilla@ottawa.ca, for follow-up questions.

Transportation

- Follow Traffic Impact Assessment Guidelines

    - Screening form was reviewed. A TIA is required.
    - Start this process asap. The application will not be deemed complete until the submission of the draft step 1-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable).
    - Request base mapping asap if RMA is required. Contact Engineering Services (https://ottawa.ca/en/city-hall/planning-and-development/engineering-services)
- Sight triangle as per Zoning by-law is 6 m x 6 m measure on the curb line.
- Access on Hazeldean would be limited to right-in/right-out.
- On site plan:
    - Show all details of the roads abutting the site up to and including the opposite curb; include such items as pavement markings, accesses and/or sidewalks.
    - Show dimensions of drive-through queuing spaces on site plan.
    - Turning movement diagrams required for all accesses showing the largest vehicle to access/egress the site.
    - Turning movement diagrams required for internal movements (loading areas, garbage).
    - Show all curb radii measurements; ensure that all curb radii are reduced as much as possible.
    - Show lane/aisle widths.
    - Sidewalk is to be continuous across access on Hazeldean as per City Specification 7.1.
    - Pedestrian pathway (along main access, east of property boundary) should be on subject property. Preference would be to see the internal pedestrian pathway connecting north to ped cut-through to Bandelier Way.
    - Grey out any area that will not be impacted by this application.
- AODA legislation is in effect for all organizations, please ensure that the design conforms to these standards.
- Noise Impact Study (as per City of Ottawa Environmental Noise Control Guidelines) required for the following:
    - Stationary due to the proximity to neighbouring noise sensitive land uses.

- Feel free to contact Transportation Project Manager, Josiane Gervais, at josiane.gervais@ottawa.ca, for follow-up questions.

Please refer to the links to "Guide to preparing studies and plans" and fees for further information. Additional information is available related to building permits, development charges, and the Accessibility Design Standards. Be aware that other fees and permits may be required, outside of the development review process. You may obtain background drawings by contacting informationcentre@ottawa.ca.

These pre-con comments are valid for one year. If you submit a development application(s) after this time, you may be required to meet for another pre-consultation meeting and/or the submission requirements may change. You are as well encouraged to contact us for a follow-up meeting if the plan/concept will be further refined.

Please do not hesitate to contact me if you have any questions.
Sincerely,

Stream Shen MCIP RPP
Planner II | Urbaniste II
Development Review | Examen des projets d'aménagement

110 Laurier Avenue West, 4th Floor
Ottawa, ON K1P 1J1
613.580.2424 ext. 24488
stream.shen@ottawa.ca

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'

Mohan Basnet

From: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Sent: March 23, 2020 6:02 PM
To: Philippe Paquette
Cc: Brad Moore; Brad Lockwood
Subject: RE: 20-0272 - RE: Potential new development - 6111 Hazeldean Ottawa (LRL#200100)

Confirmed. Please use the stormwater criteria that you specified below for the subject application.

Santhosh

From: Philippe Paquette <ppaquette@lrl.ca>
Sent: March 23, 2020 3:01 PM
To: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Cc: Brad Moore <b.moore@macewen.ca>; Brad Lockwood <b.lockwood@macewen.ca>
Subject: RE: 20-0272 - RE: Potential new development - 6111 Hazeldean Ottawa (LRL#200100)

Santhosh,
Please refer to Page 3 & 4 of the report section 3.2 & 3.4
Pls confirm
Thanks
Philippe

From: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Sent: March 23, 2020 2:57 PM
To: Philippe Paquette <ppaquette@lrl.ca>
Cc: Brad Moore <b.moore@macewen.ca>; Brad Lockwood <b.lockwood@macewen.ca>
Subject: RE: 20-0272 - RE: Potential new development - 6111 Hazeldean Ottawa (LRL#200100)

Hi Philippe,

Since I am not very familiar with the Potter's Key report, could you please let me know, on what page you found this stormwater criteria that you specified below in your email (highlighted in green)? As long as you follow the criteria that specified in the report for the subject application, the City is ok with it. Please copy and include this criteria in the appendix of your site servicing report for reference.

Thanks,

Santhosh Kuruvilla, P.E., P.Eng.

From: Philippe Paquette <ppaquette@lrl.ca>
Sent: March 23, 2020 2:22 PM
To: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Cc: Brad Moore <b.moore@macewen.ca>; Brad Lockwood <b.lockwood@macewen.ca>
Subject: FW: 20-0272 - RE: Potential new development - 6111 Hazeldean Ottawa (LRL#200100)

As per the attached Atrel SWM report, can you confirm that the maximum allowable release rate for this property is 70l/s/ha? All storm sewers needs to be designed for a 2 year event and Tc of 10 min?
Regards

Philippe Paquette, C.E.T. and Project Manager
Certified Engineering Technologist

LRL Associates Ltd.
5430 Canotek Road
Ottawa, Ontario K1J 9G2

T (613) 842-3434 or (877) 632-5664 ext 209
C (613) 880-9793
F (613) 842-4338
E ppaquette@lrl.ca
W www.lrl.ca

Given the current COVID-19 situation, please be aware that LRL has implemented alternative working conditions for our team. Many of us have now transitioned to working from home; however, communication and workability remains one of our top priorities.
We will continue to be reachable by cell phone or by calling LRL at 613-842-3434 which will prompt you to enter the extension of the person you are trying to reach.
In addition, we will continue to have access to all e-mail correspondence and do our best to return all inquiries in a timely manner.

From: ISD Information Centre / Centre Information <informationcentre@ottawa.ca>
Sent: March 10, 2020 11:35 AM
To: Philippe Paquette <ppaquette@lrl.ca>
Subject: 20-0272 - RE: Potential new development - 6111 Hazeldean Ottawa (LRL#200100)

Good morning Philippe,

Attached is the plan of the easement, report and work order for the location requested.

The City of Ottawa's Financial Services Branch will send out an invoice at the end of the month. ***Please retain the attached work order for your records. A copy will not be included with the invoice sent at the end of the month****.*

If you have any concerns regarding this information, please refer to the contact information below.

Thank you.

Kindest regards,

Brenda Testa
Technical Records Clerk
Information Centre Unit

For further information, please contact;

Geospatial Analytics Technology & Solutions Branch - Information Centre Unit

Phone: 613-580-2424 x 44455
Email: informationcentre@ottawa.ca

From: Philippe Paquette <ppaquette@lrl.ca>
Sent: March 10, 2020 8:28 AM
To: ISD Information Centre / Centre Information <informationcentre@ottawa.ca>
Subject: RE: 20-0272 - RE: Potential new development - 6111 Hazeldean Ottawa (LRL#200100)

For now just send us the SWM report, servicing brief and sewer as builts (plan and profiles) at the servicing easements (connection points). Our client wishes to develop the property attached. We want to know what are the sewer restrictions for this property.
Many thanks
Regards

Philippe Paquette, C.E.T. and Project Manager
Certified Engineering Technologist

LRL Associates Ltd.
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Ottawa, Ontario K1J 9G2

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F (613) 842-4338
E ppaquette@lrl.ca
W www.lrl.ca
We care deeply, so let us know how we did by completing our Customer Satisfaction Survey.

From: ISD Information Centre / Centre Information <informationcentre@ottawa.ca>
Sent: March 9, 2020 3:17 PM
To: Philippe Paquette <ppaquette@lrl.ca>
Subject: 20-0272 - RE: Potential new development - 6111 Hazeldean Ottawa (LRL#200100)

Good afternoon Phillipe,

Thank you for your request for Infrastructure Information.

Will you need the entire contract of plan D07-16-14-0013, our city file reference number 17314?

Please provide the Project Manager's name if this is a City of Ottawa / Ville d'Ottawa project.

If this is not a City of Ottawa / Ville d'Ottawa project, the following fee schedule is applicable:

Item	Fee*
Administration Fee	$78.00
Engineering Plans - pdf	$16.00
UCC Central Registry Utility Plans - pdf	$45.00
UCC MicroStation or AutoCad 1:250 (187m x 125m)	$143.00
Water/Sewer Distribution Plans	$45.00
Report fee	$31.00

*HST is applicable on all fees

If you require a cost estimate please let us know within 24 hours of receiving this reply.

For further information, please contact:

Geospatial Analytics Technology & Solutions Branch - Information Centre Unit

Phone: 613-580-2424 x 44455
Email: informationcentre@ottawa.ca

From: Philippe Paquette <ppaquette@lrl.ca>
Sent: March 09, 2020 1:44 PM
To: ISD Information Centre / Centre Information <informationcentre@ottawa.ca>
Cc: Brad Moore <b.moore@macewen.ca>; Brad Lockwood <b.lockwood@macewen.ca>; Maxime Longtin <mlongtin@lrl.ca>
Subject: Potential new development - 6111 Hazeldean Ottawa (LRL#200100)

We would like to get copies of the following documents for the Potter's Key Subdivision in Stittsville Ont. (City of Ottawa file: D07-16-14-0013)

-Servicing study.
-SWM report.
-As-builts engineering dwgs.

Call me on my cell if you have questions or comments
Regards

Philippe Paquette, C.E.T. and Project Manager
Certified Engineering Technologist

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'

Mohan Basnet

From: Philippe Paquette
Sent: April 2, 2020 8:58 PM
To: Brad Moore
Cc: Kuruvilla, Santhosh; Shen, Stream; Maxime Longtin
Subject: FW: 20-0272 - RE: Potential new development - 6111 Hazeldean Ottawa (LRL#200100)
Attachments: IMG_20200402_2026016.jpg; Tech-bulletin-ISTB-2018-01-Sewer.pdf; Ottawa Design Guidelines - Sewer October 2012.pdf; figure 4B.PNG

Brad,
find attached all the documents Santhosh is referring to in his email bellow + preliminary sanitary peak flows calculations for the entire property (1.85 ha.). Call me tomorrow to discuss.

Santosh, I would really appreciate if you check quickly my calculations to make sure all meets the city of Ottawa requirements.

Call me both if you have questions or comments.
Regards

From: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Sent: April 2, 2020 5:57 PM
To: Philippe Paquette <ppaquette@lrl.ca>
Cc: Brad Moore <b.moore@macewen.ca>; Shen, Stream <Stream.Shen@ottawa.ca>; Maxime Longtin <mlongtin@lrl.ca>
Subject: Re: 20-0272 - RE: Potential new development - 6111 Hazeldean Ottawa (LRL#200100)

Hello Philippe,

What you are proposing on the subject site is a car wash and it is considered an industrial use. In order to estimate the allowable sanitary release rate for this site, please refer to the latest City of Ottawa Sewer Design Guideline, section 4 and the Technical Bulletin ISTB-2018-01. The sanitary release rate for this site must be less than or equal to the allowable release rate.

Based on my understanding, there was a recent upgrade done to the Jackson Trails pump station (JTPS) and it has a current capacity of 120 L/s. In order to confirm the current capacity, I sent an email today to our waste water collection branch and the consultant who designed the upgrade of JTPS. So far I haven't received a reply from either of them. Once I get a reply, I will confirm the current pumping capacity.

Please adhere to the City of Ottawa Guidelines and Technical Bulletins..

Thanks,

Santhosh

From: Philippe Paquette <ppaquette@lrl.ca>
Sent: Thursday, April 2, 2020 1:41 PM
To: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>; Shen, Stream <Stream.Shen@ottawa.ca>
Cc: Brad Moore <b.moore@macewen.ca>; Maxime Longtin <mlongtin@lrl.ca>
Subject: RE: 20-0272 - RE: Potential new development - 6111 Hazeldean Ottawa (LRL#200100)

Based on our discussion of this morning can you confirmed that our property of 1.85 Ha. will be allowed to discharge 92,500L/day (1.85 ha.x50,000 l/d/ha) as per section 5.2 & 5.4 of the Atrel report that was used to design the Potter's Key subdivision. Also, since we are using accurate water meter flow counts for the car wash and no theoretical volumes, the 1.5 peaking factor for commercial use doesn't apply.
Please confirm the above plus the pumping station capacity upgrades ASAP.
Many thanks

Philippe Paquette, C.E.T. and Project Manager
Certified Engineering Technologist

LRL Associates Ltd.
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Ottawa, Ontario K1J 9G2

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We will continue to be reachable by cell phone or by calling LRL at 613-842-3434 which will prompt you to enter the extension of the person you are trying to reach.
In addition, we will continue to have access to all e-mail correspondence and do our best to return all inquiries in a timely manner.

From: Philippe Paquette
Sent: April 1, 2020 6:53 PM
To: 'Kuruvilla, Santhosh' <Santhosh.Kuruvilla@ottawa.ca>; Shen, Stream <Stream.Shen@ottawa.ca>
Cc: Brad Moore <b.moore@macewen.ca>; Maxime Longtin <mlongtin@lrl.ca>
Subject: RE: 20-0272 - RE: Potential new development - 6111 Hazeldean Ottawa (LRL#200100)

Ok thanks!

From: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Sent: April 1, 2020 6:02 PM
To: Philippe Paquette <ppaquette@lrl.ca>; Shen, Stream <Stream.Shen@ottawa.ca>
Cc: Brad Moore <b.moore@macewen.ca>; Maxime Longtin <mlongtin@lrl.ca>
Subject: RE: 20-0272 - RE: Potential new development - 6111 Hazeldean Ottawa (LRL#200100)

Hi Philippe,

In order to provide you an answer, I will have to check with our Asset Management Group. I am not sure if I can give you an answer prior to April 3, 2020. I will do my best to give you an answer as soon as possible.

Based on my understanding, recently, there was an upgrade done to this pumping station and it has adequate capacity to receive flow from its full catchment area. As I indicated above, I will check with our Asset Management Group and get back to you.

Thanks,

Santhosh

From: Philippe Paquette <ppaquette@lrl.ca>
Sent: April 01, 2020 3:17 PM
To: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>; Shen, Stream <Stream.Shen@ottawa.ca>
Cc: Brad Moore <b.moore@macewen.ca>; Maxime Longtin <mlongtin@lrl.ca>
Subject: RE: 20-0272 - RE: Potential new development - 6111 Hazeldean Ottawa (LRL#200100)

Quick question for you? When we read the Atrel report (see attached) it says that The Hazeldean pumping station (owned and operated by the City of Ottawa) has a maximum capacity of 120 l/s. It also says in the report that no upgrades are required to the pumping station if the incoming flows are less than 10 l/s. Past 10 l/s minor upgrades are required. Considering that our car wash will have peak flows of 14.80 l/s or 9.90 l/s if water is being reclaimed (see attached water demand table) is there a way that the City of Ottawa can confirm the actual working capacity of the lift station and if there's some room left below the 10 l/s limit? If upgrades are required based on our new development peak flows, who will be responsible to upgrade the station? The report says Minto, but Minto says its the city responsabilty? Who shall we believe?

Can you please send some clarification ASAP as this property deal will be closing April 3rd.
Regards

Philippe Paquette, C.E.T. and Project Manager
Certified Engineering Technologist

LRL Associates Ltd.
5430 Canotek Road
Ottawa, Ontario K1J 9G2

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In addition, we will continue to have access to all e-mail correspondence and do our best to return all inquiries in a timely manner.

From: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Sent: March 23, 2020 6:02 PM
To: Philippe Paquette <ppaquette@lrl.ca>
Cc: Brad Moore <b.moore@macewen.ca>; Brad Lockwood <b.lockwood@macewen.ca>
Subject: RE: 20-0272 - RE: Potential new development - 6111 Hazeldean Ottawa (LRL#200100)

Confirmed. Please use the stormwater criteria that you specified below for the subject application.

Santhosh

From: Philippe Paquette <ppaquette@lrl.ca>
Sent: March 23, 2020 3:01 PM
To: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Cc: Brad Moore <b.moore@macewen.ca>; Brad Lockwood <b.lockwood@macewen.ca>
Subject: RE: 20-0272 - RE: Potential new development - 6111 Hazeldean Ottawa (LRL#200100)

Please refer to Page 3 & 4 of the report section 3.2 & 3.4
Pls confirm
Thanks
Philippe

From: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Sent: March 23, 2020 2:57 PM
To: Philippe Paquette <ppaquette@lrl.ca>
Cc: Brad Moore <b.moore@macewen.ca>; Brad Lockwood <b.lockwood@macewen.ca>
Subject: RE: 20-0272 - RE: Potential new development - 6111 Hazeldean Ottawa (LRL#200100)

Hi Philippe,

Since I am not very familiar with the Potter's Key report, could you please let me know, on what page you found this stormwater criteria that you specified below in your email (highlighted in green)? As long as you follow the criteria that specified in the report for the subject application, the City is ok with it. Please copy and include this criteria in the appendix of your site servicing report for reference.

Thanks,

Santhosh Kuruvilla, P.E., P.Eng.

From: Philippe Paquette <ppaquette@lrl.ca>
Sent: March 23, 2020 2:22 PM
To: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Cc: Brad Moore <b.moore@macewen.ca>; Brad Lockwood <b.lockwood@macewen.ca>
Subject: FW: 20-0272 - RE: Potential new development - 6111 Hazeldean Ottawa (LRL#200100)

As per the attached Atrel SWM report, can you confirm that the maximum allowable release rate for this property is 70l/s/ha? All storm sewers needs to be designed for a 2 year event and Tc of 10 min?
Regards

Philippe Paquette, C.E.T. and Project Manager
Certified Engineering Technologist

LRL Associates Ltd.
5430 Canotek Road
Ottawa, Ontario K1J 9G2

T (613) 842-3434 or (877) 632-5664 ext 209
C (613) 880-9793
F (613) 842-4338
E ppaquette@lrl.ca
W www.lrl.ca

Given the current COVID-19 situation, please be aware that LRL has implemented alternative working conditions for our team. Many of us have now transitioned to working from home; however, communication and workability remains one of our top priorities.
We will continue to be reachable by cell phone or by calling LRL at 613-842-3434 which will prompt you to enter the extension of the person you are trying to reach.

In addition, we will continue to have access to all e-mail correspondence and do our best to return all inquiries in a timely manner.

From: ISD Information Centre / Centre Information <informationcentre@ottawa.ca>
Sent: March 10, 2020 11:35 AM
To: Philippe Paquette <ppaquette@lrl.ca>
Subject: 20-0272 - RE: Potential new development - 6111 Hazeldean Ottawa (LRL#200100)

Good morning Philippe,
Attached is the plan of the easement, report and work order for the location requested.
The City of Ottawa's Financial Services Branch will send out an invoice at the end of the month.
Please retain the attached work order for your records. A copy will not be included with the invoice sent at the end of the month.
If you have any concerns regarding this information, please refer to the contact information below.
Thank you.

Kindest regards,

Brenda Testa
Technical Records Clerk
Information Centre Unit

For further information, please contact;

Geospatial Analytics Technology & Solutions Branch - Information Centre Unit

Phone: 613-580-2424 x 44455
Email: informationcentre@ottawa.ca

From: Philippe Paquette <ppaquette@lrl.ca>
Sent: March 10, 2020 8:28 AM
To: ISD Information Centre / Centre Information <informationcentre@ottawa.ca>
Subject: RE: 20-0272 - RE: Potential new development - 6111 Hazeldean Ottawa (LRL#200100)

For now just send us the SWM report, servicing brief and sewer as builts (plan and profiles) at the servicing easements (connection points). Our client wishes to develop the property attached. We want to know what are the sewer restrictions for this property.
Many thanks
Regards

Philippe Paquette, C.E.T. and Project Manager
Certified Engineering Technologist

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Ottawa, Ontario K1J 9G2

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F (613) 842-4338
E ppaquette@lrl.ca
W www.lrl.ca
We care deeply, so let us know how we did by completing our Customer Satisfaction Survey.

From: ISD Information Centre / Centre Information <informationcentre@ottawa.ca>
Sent: March 9, 2020 3:17 PM
To: Philippe Paquette <ppaquette@lrl.ca>
Subject: 20-0272 - RE: Potential new development - 6111 Hazeldean Ottawa (LRL#200100)

Good afternoon Phillipe,

Thank you for your request for Infrastructure Information.

Will you need the entire contract of plan D07-16-14-0013, our city file reference number 17314?

Please provide the Project Manager's name if this is a City of Ottawa / Ville d'Ottawa project.

If this is not a City of Ottawa / Ville d'Ottawa project, the following fee schedule is applicable:

Item	Fee*
Administration Fee	$78.00
Engineering Plans - pdf	$16.00
UCC Central Registry Utility Plans - pdf	$45.00
UCC MicroStation or AutoCad 1:250 (187m x 125m)	$143.00

Water/Sewer Distribution Plans	$45.00
Report fee	$31.00

*HST is applicable on all fees

If you require a cost estimate please let us know within 24 hours of receiving this reply.

For further information, please contact:

Geospatial Analytics Technology & Solutions Branch - Information Centre Unit

Phone: 613-580-2424 x 44455
Email: informationcentre@ottawa.ca

From: Philippe Paquette <ppaquette@lrl.ca>
Sent: March 09, 2020 1:44 PM
To: ISD Information Centre / Centre Information <informationcentre@ottawa.ca>
Cc: Brad Moore <b.moore@macewen.ca>; Brad Lockwood <b.lockwood@macewen.ca>; Maxime Longtin <mlongtin@lrl.ca>
Subject: Potential new development - 6111 Hazeldean Ottawa (LRL#200100)

We would like to get copies of the following documents for the Potter's Key Subdivision in Stittsville Ont. (City of Ottawa file: D07-16-14-0013)

-Servicing study.
-SWM report.
-As-builts engineering dwgs.

Call me on my cell if you have questions or comments
Regards

Philippe Paquette, C.E.T. and Project Manager
Certified Engineering Technologist

LRL Associates Ltd.
5430 Canotek Road
Ottawa, Ontario K1J 9G2

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We care deeply, so let us know how we did by completing our Customer Satisfaction Survey.

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'
'

'

Mohan Basnet

From: Erica Ogden <eogden@mvc.on.ca>
Sent: November 13, 2020 3:41 PM
To: Philippe Paquette
Cc: Planning
Subject: RE: New Commercial development Halo Car Wash, 6111 Hazeldean road Stittsville ON. (LRL#200100)

Hello Philippe,

Thank you for your e-mail. The site is located within the Feedmill Creek watershed, and is within the area of the Carp River Watershed Subwatershed Study (CRWSS) (Robinson Consultants, December 2004). The Feedmill Creek Stormwater Management Criteria Study (JFSA, April 20, 2018) is also applicable to the subject property.

As noted in the City's pre-consultation comments, the stormwater quantity control for the subject property must be consistent with the criteria noted in the Design Brief of the Potter's Key Subdivision.

As per the CRWSS, an enhanced level of protection (80% Total Suspended Solids removal) is required for water quality. Feedmill Creek supports a cold water fish community and therefore temperature controls are also important. The site is within a moderate groundwater recharge area which has an infiltration target of 104 mm/yr.

If you have any questions, please feel free to contact me.

Thank you,

Erica C. Ogden, MCIP, RPP | Environmental Planner | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON K7C 3P1
www.mvc.on.ca |c. 613 451 0463 |o. 613 253 0006 ext. 229| eogden@mvc.on.ca

---

From: Philippe Paquette <ppaquette@lrl.ca>
Sent: November 10, 2020 3:36 PM
To: Planning <planning@mvc.on.ca>
Cc: Maxime Longtin <mlongtin@lrl.ca>; Mohan Basnet <mbasnet@lrl.ca>; bmoore@macewen.ca; Bill Holzman <b.holzman@holzmanconsultants.com>
Subject: New Commercial development Halo Car Wash, 6111 Hazeldean road Stittsville ON. (LRL#200100)

Hello Mike,
As mentioned in the pre-consultation meeting notes attached (see bullet #6 under Engineering) for the above mentioned project, we are asking the MVCA to pre-consult with us and advise us on what are the requirements for storm water management quality. As per the attached plan, an OSG structure will be installed downstream of the proposed storm sewer network and be controlling 80% TSS removal for the entire site.
Have a look at the attached documents and let us know if our proposal make any sense.

Many Thanks

Philippe Paquette, C.E.T.
Certified Engineering Technologist

LRL Associates Ltd.
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Ottawa, Ontario K1J 9G2

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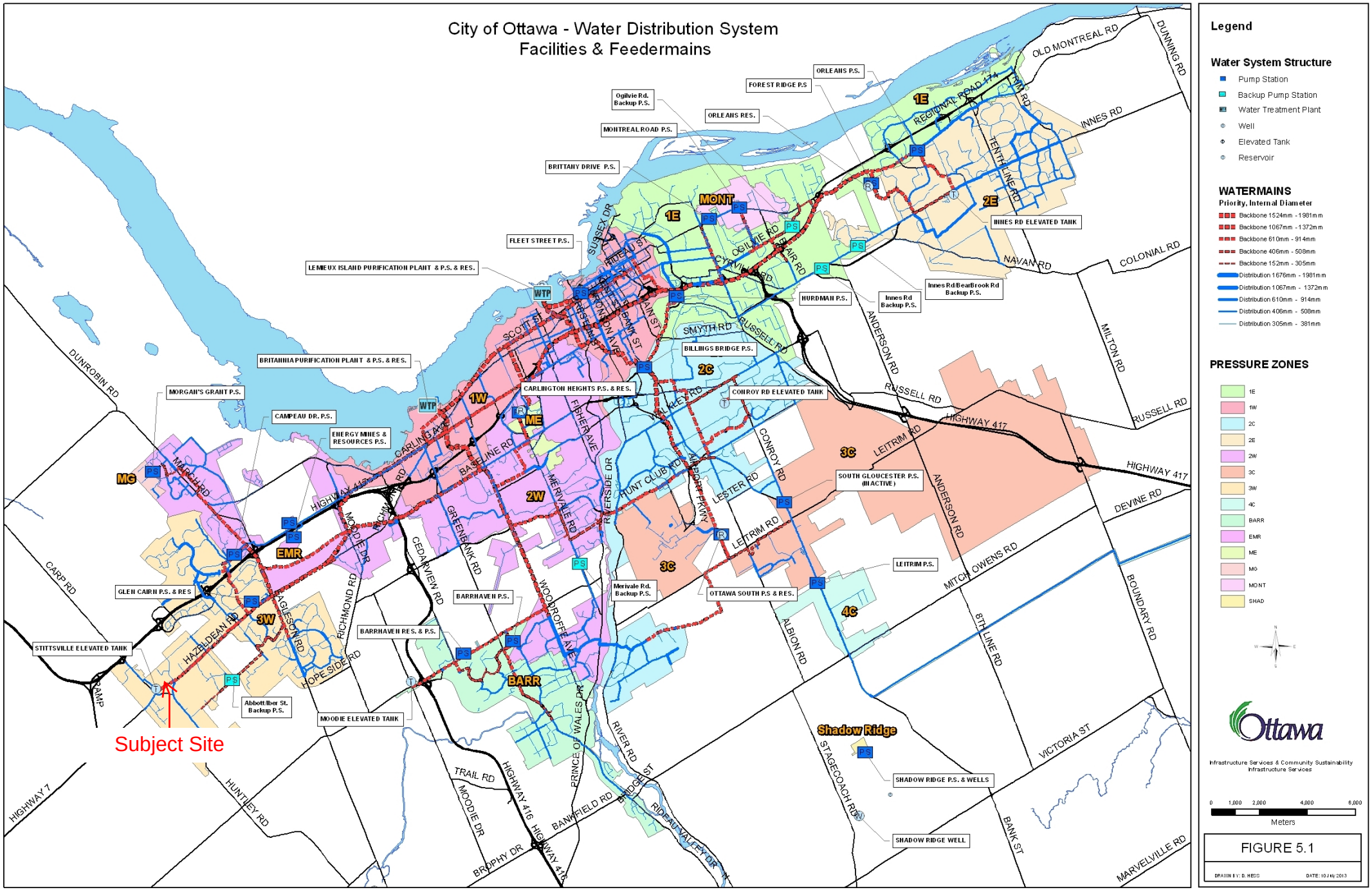
We will continue to be reachable by cell phone or by calling LRL at 613-842-3434 which will prompt you to enter the extension of the person you are trying to reach.
In addition, we will continue to have access to all e-mail correspondence and do our best to return all inquiries in a timely manner.

APPENDIX B

Water Supply Calculations


City of Ottawa - Water Distribution System
Facilities & Feedermains
Subject Site
ORLEANS P.S.
FOREST RIDGE P.S
Ogilvie Rd. Backup P.S.
ORLEANS RES.
MONTREAL ROAD P.S.
BRITTANY DRIVE P.S.
FLEET STREET P.S.
LEMIEUX ISLAND PURIFICATION PLANT & P.S. & RES.
BRITANNIA PURIFICATION PLANT & P.S. & RES.
MORGAN'S GRANT P.S.
CAMPEAU DR. P.S.
ENERGY MINES & RESOURCES P.S.
GLEN CAIRN P.S. & RES
STITTSVILLE ELEVATED TANK
Abbottlber St. Backup P.S.
MOODIE ELEVATED TANK
BARRHAVEN RES. & P.S.
BARRHAVEN P.S.
CARLINGTON HEIGHTS P.S. & RES.
Merivale Rd. Backup P.S.
OTTAWA SOUTH P.S. & RES.
SOUTH GLOUCESTER P.S. (INACTIVE)
LEITRIM P.S.
CONROY RD ELEVATED TANK
BILLINGS BRIDGE P.S.
HURDMAN P.S.
Innes Rd Backup P.S.
Innes Rd/BearBrook Rd Backup P.S.
INNES RD ELEVATED TANK
SHADOW RIDGE P.S. & WELLS
SHADOW RIDGE WELL
Shadow Ridge
MONT
1E
2E
2C
1W
2W
3C
3W
4C
ME
MG
EMR
BARR
WTP
OLD MONTREAL RD
DUNNING RD
REGIONAL ROAD 174
INNES RD
TENTH LINE RD
NAVAN RD
COLONIAL RD
SUSSEX DR
OGILVIE RD
CYRVILLE RD
BLAIR RD
MURRAY ST
RIDEAU ST
SCOTT ST
SOMERSET ST W
QUEEN ST
WELLINGTON ST W
SMYTH RD
RUSSELL RD
ANDERSON RD
MILTON RD
DUNROBIN RD
CARLING AVE
BASELINE RD
FISHER AVE
MERIVALE RD
RIVERSIDE DR
HUNT CLUB RD
AIRPORT PKWY
LESTER RD
CONROY RD
LEITRIM RD
HIGHWAY 417
DEVINE RD
MITCH OWENS RD
BOUNDARY RD
6TH LINE RD
ALBION RD
MARCH RD
HIGHWAY 417
RICHMOND RD
MOODIE DR
CEDARVIEW RD
GREENBANK RD
WOODROFFE AVE
CARP RD
HAZELDEAN RD
EAGLESON RD
HOPE SIDE RD
RAMP
HIGHWAY 7
HUNTLEY RD
TRAIL RD
MOODIE DR
BROPHY DR
HIGHWAY 416
PRINCE OF WALES DR
BANKFIELD RD
RIVER RD
BRIDGE ST
RIDEAU VALLEY DR
STAGECOACH RD
VICTORIA ST
BANK ST
MARVELVILLE RD
Legend
Water System Structure
Pump Station
Backup Pump Station
Water Treatment Plant
Well
Elevated Tank
Reservoir
WATERMAINS
Priority, Internal Diameter
Backbone 1524mm - 1981mm
Backbone 1067mm - 1372mm
Backbone 610mm - 914mm
Backbone 406mm - 508mm
Backbone 152mm - 305mm
Distribution 1676mm - 1981mm
Distribution 1067mm - 1372mm
Distribution 610mm - 914mm
Distribution 406mm - 508mm
Distribution 305mm - 381mm
PRESSURE ZONES
1E
1W
2C
2E
2W
3C
3W
4C
BARR
EMR
ME
MG
MONT
SHAD
Ottawa
Infrastructure Services & Community Sustainability
Infrastructure Services
0 1,000 2,000 4,000 6,000
Meters
FIGURE 5.1
DRAWN BY: D. HEDS
DATE: 10 July 2013

Water Service Calculations

LRL File No. : 200100
Project : 6111 Hazeldean Rd
Date : November 25, 2020
Designed by : Mohan Basnet

Water Demand

1. Commerical Area (except Car Wash Area)

Site area = 1.34 ha

Average Day Demand:

$Q_{average}$ =	*28*	m^3 / *ha·day*	(as per Table 4.2 of Ottawa Design Guidelines-Water Distribution)
$Q_{average}$ =	37	m^3 / day	
$Q_{average}$ =	37397	L / day	
$Q_{average}$ =	**0.43**	**L / s**	

Maximum daily peak factor: 1.5

Maximum daily demand =	56095	L / day
=	**0.65**	**L / s**

Maximum hour peak factor: 1.8

Maximum hour demand =	100971	L / day
=	**1.17**	**L / s**

2. Light Industrial Area (Car Wash Area)

Site area = 0.51 ha

Average Day Demand:

$Q_{average}$ =	*35*	m^3 / *ha·day*	(as per Table 4.2 of Ottawa Design Guidelines-Water Distribution)
$Q_{average}$ =	18	m^3 / day	
$Q_{average}$ =	17969	L / day	
$Q_{average}$ =	**0.21**	**L / s**	

Maximum daily peak factor: 1.5

Maximum daily demand =	26954	L / day
=	**0.31**	**L / s**

Maximum hour peak factor: 1.8

Maximum hour demand =	48516	L / day
=	**0.56**	**L / s**

Total Water Demand

Average Day Demand =	**0.64**	**L / s**
Maximum daily demand =	**0.96**	**L / s**
Maximum hour demand =	**1.73**	**L / s**

Fire Flow Calculations - Proposed Commercial Bldg including Starbucks

LRL File No. 200100
Date November 23, 2020
Method Fire Underwriters Survey (FUS)
Prepared by Mohan Basnet

Step	Task	Term	Options	Multiplier	Choose:	Value	Unit	Fire Flow
Structural Framing Material								
1	Choose frame used for building	Coefficient C related to the type of construction	Wood Frame	1.5	Ordinary Construction	1		
			Ordinary Construction	1.0				
			Non-combustible construction	0.8				
			Fire resistive construction <2 hrs	0.7				
			Fire resistive construction >2 hrs	0.6				
Floor Space Area (A)								
2	Total area					321	m^2	
3	Obtain fire flow before reductions	Required fire flow	Fire Flow = 220 x C x $A^{0.5}$				L/min	3,942
Reductions or surcharge due to factors affecting burning								
4	Choose combustibility of contents	Occupancy hazard reduction or surcharge	Non-combustible	-25%	Combustible	0%	L/min	3,942
			Limited combustible	-15%				
			Combustible	0%				
			Free burning	15%				
			Rapid burning	25%				
5	Choose reduction for sprinklers	Sprinkler reduction	Full automatic sprinklers	-30%	False	0%	L/min	3,942
			Water supply is standard for both the system and fire department hose lines	-10%	False	0%		
			Fully supervised system	-10%	False	0%		
6	Choose separation	Exposure distance between units	North side	>45m	0%		L/min	4,533
			East side	20.1 to 30m	10%			
			South side	>45m	0%			
			West side	30.1 to 45m	5%	15%		
Net required fire flow								
7	Obtain fire flow, duration, and volume				Minimum required fire flow rate (rounded to nearest 100)		L/min	4,500
					Minimum required fire flow rate		L/s	75.0
					Required duration of fire flow		hr	1.75

Fire Flow Calculations - Proposed Commercial bldg

LRL File No. 200100
Date November 23, 2020
Method Fire Underwriters Survey (FUS)
Prepared by Mohan Basnet

Step	Task	Term	Options	Multiplier	Choose:	Value	Unit	Fire Flow
Structural Framing Material								
1	Choose frame used for building	Coefficient C related to the type of construction	Wood Frame	1.5	Ordinary Construction	1		
			Ordinary Construction	1.0				
			Non-combustible construction	0.8				
			Fire resistive construction <2 hrs	0.7				
			Fire resistive construction >2 hrs	0.6				
Floor Space Area (A)								
2	Total area					190	m^2	
3	Obtain fire flow before reductions	Required fire flow	Fire Flow = 220 x C x $A^{0.5}$				L/min	3,032
Reductions or surcharge due to factors affecting burning								
4	Choose combustibility of contents	Occupancy hazard reduction or surcharge	Non-combustible	-25%	Combustible	0%	L/min	3,032
			Limited combustible	-15%				
			Combustible	0%				
			Free burning	15%				
			Rapid burning	25%				
5	Choose reduction for sprinklers	Sprinkler reduction	Full automatic sprinklers	-30%	False	0%	L/min	3,032
			Water supply is standard for both the system and fire department hose lines	-10%	False	0%		
			Fully supervised system	-10%	False	0%		
6	Choose separation	Exposure distance between units	North side	>45m	0%		L/min	3,184
			East side	30.1 to 45m	5%			
			South side	>45m	0%			
			West side	>45m	0%	5%		
Net required fire flow								
7	Obtain fire flow, duration, and volume	Minimum required fire flow rate (rounded to nearest 100)					L/min	3,200
		Minimum required fire flow rate					L/s	53.3
		Required duration of fire flow					hr	1.25

Fire Flow Calculations - NEW HALO CAR WASH

LRL File No. 200100
Date November 23, 2020
Method Fire Underwriters Survey (FUS)
Prepared by Mohan Basnet

Step	Task	Term	Options	Multiplier	Choose:	Value	Unit	Fire Flow
Structural Framing Material								
1	Choose frame used for building	Coefficient C related to the type of construction	Wood Frame	1.5	Ordinary Construction	1		
			Ordinary Construction	1.0				
			Non-combustible construction	0.8				
			Fire resistive construction <2 hrs	0.7				
			Fire resistive construction >2 hrs	0.6				
Floor Space Area (A)								
2	Total area					485	m^2	
3	Obtain fire flow before reductions	Required fire flow	Fire Flow = 220 x C x $A^{0.5}$				L/min	4,845
Reductions or surcharge due to factors affecting burning								
4	Choose combustibility of contents	Occupancy hazard reduction or surcharge	Non-combustible	-25%	Combustible	0%	L/min	4,845
			Limited combustible	-15%				
			Combustible	0%				
			Free burning	15%				
			Rapid burning	25%				
5	Choose reduction for sprinklers	Sprinkler reduction	Full automatic sprinklers	-30%	False	0%	L/min	4,845
			Water supply is standard for both the system and fire department hose lines	-10%	False	0%		
			Fully supervised system	-10%	False	0%		
6	Choose separation	Exposure distance between units	North side	>45m	0%		L/min	5,329
			East side	>45m	0%			
			South side	>45m	0%			
			West side	20.1 to 30m	10%	10%		
Net required fire flow								
7	Obtain fire flow, duration, and volume				Minimum required fire flow rate (rounded to nearest 100)		L/min	5,300
					Minimum required fire flow rate		L/s	88.3
					Required duration of fire flow		hr	1.75

Fire Flow Calculations - PROPOSED MR LUBE

LRL File No. 200100
Date November 23, 2020
Method Fire Underwriters Survey (FUS)
Prepared by Mohan Basnet

Step	Task	Term	Options	Multiplier	Choose:	Value	Unit	Fire Flow
Structural Framing Material								
1	Choose frame used for building	Coefficient C related to the type of construction	Wood Frame	1.5	Ordinary Construction	1		
			Ordinary Construction	1.0				
			Non-combustible construction	0.8				
			Fire resistive construction <2 hrs	0.7				
			Fire resistive construction >2 hrs	0.6				
Floor Space Area (A)								
2	Total area					221	m^2	
3	Obtain fire flow before reductions	Required fire flow	Fire Flow = 220 x C x $A^{0.5}$				L/min	3,271
Reductions or surcharge due to factors affecting burning								
4	Choose combustibility of contents	Occupancy hazard reduction or surcharge	Non-combustible	-25%	Rapid burning	25%	L/min	4,088
			Limited combustible	-15%				
			Combustible	0%				
			Free burning	15%				
			Rapid burning	25%				
5	Choose reduction for sprinklers	Sprinkler reduction	Full automatic sprinklers	-30%	False	0%	L/min	4,088
			Water supply is standard for both the system and fire department hose lines	-10%	False	0%		
			Fully supervised system	-10%	False	0%		
6	Choose separation	Exposure distance between units	North side	30.1 to 45m	5%		L/min	4,701
			East side	20.1 to 30m	10%			
			South side	>45m	0%			
			West side	>45m	0%	15%		
Net required fire flow								
7	Obtain fire flow, duration, and volume				Minimum required fire flow rate (rounded to nearest 100)		L/min	4,700
					Minimum required fire flow rate		L/s	78.3
					Required duration of fire flow		hr	1.75

Boundary Conditions
6111 Hazeldean Road

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	38	0.64
Maximum Daily Demand	58	0.96
Peak Hour	104	1.73
Fire Flow Demand #1	4,500	75.00
Fire Flow Demand #2	3,200	53.33
Fire Flow Demand #3	5,300	88.33
Fire Flow Demand #4	4,700	78.33

Location

Results

Connection 1 – Hazeldean Rd.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	159.9	59.6
Peak Hour	156.6	55.0
Max Day plus Fire 1	157.6	56.3
Max Day plus Fire 2	157.7	56.4
Max Day plus Fire 3	157.5	56.2
Max Day plus Fire 4	157.6	56.3

[1] Ground Elevation = 118.0 m

Connection 2 – Bandelier Way

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	160.0	63.5
Peak Hour	156.5	58.6
Max Day plus Fire 1	155.8	57.7
Max Day plus Fire 2	156.7	58.9
Max Day plus Fire 3	155.2	56.7
Max Day plus Fire 4	155.7	57.4

[1] Ground Elevation = 115.3 m

Disclaimer

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

Mohan Basnet

From: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Sent: January 13, 2021 2:09 PM
To: Mohan Basnet
Subject: FW: 200100-6111 Hazeldean Boundary Conditions
Attachments: RE: 6111 Hazeldean Road Boundary Conditions

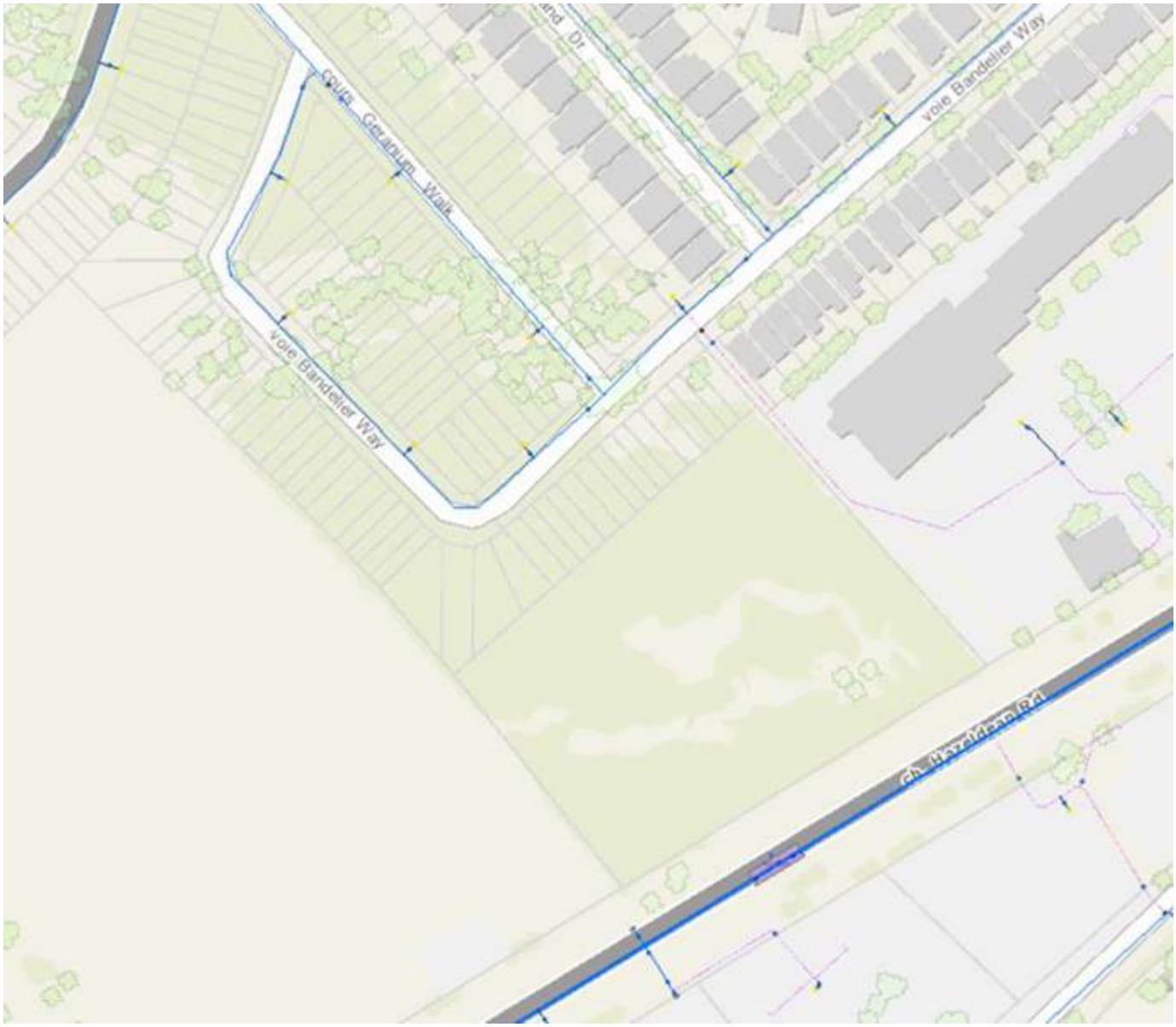
Hi Mohan,

Per your email I sent your request to our Infrastructure Planning for the boundary condition at the connection 2. See their response below.

Thanks,
Hi Santosh,

Infrastructure Planning Response

We only provide BC from public mains. Please refer back to the consultant that their connection 2 location is at a private main where the City does not provide a BC from. As such we took connection 2 to the nearest public main. They should be able to extract HGL from the BC provided already provided.



From: Kuruvilla, Santhosh
Sent: January 11, 2021 4:40 PM
To: Mohan Basnet <mbasnet@lrl.ca>
Subject: RE: 200100-6111 Hazeldean Boundary Conditions

Hi Mohan,

I will look into it and get back to you.

Santhosh

From: Mohan Basnet <mbasnet@lrl.ca>
Sent: January 11, 2021 4:13 PM

To: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Subject: RE: 200100-6111 Hazeldean Boundary Conditions

Hi Santhosh,

Thank you for this.

As we discussed previously, I thought the proposed 2nd connection will be at the City Parcel (northeast corner of the subject site as shown in the schematic below).

Could you please advise?

Thanks,

Mohan

Mohan Basnet, P.Eng.
Civil Engineering Services
LRL Associates Ltd.
5430 Canotek Road
Ottawa, Ontario K1J 9G2
T (613) 842-3434 or (877) 632-5664 ext 213
F (613) 842-4338
E mbasnet@lrl.ca
W www.lrl.ca

Given the current COVID-19 situation, please be aware that LRL has implemented alternative working conditions for our team. Many of us have now transitioned to working from home; however, communication and workability remains one of our top priorities.
We will continue to be reachable by cell phone or by calling LRL at 613-842-3434 which will prompt you to enter the extension of the person you are trying to reach.
In addition, we will continue to have access to all e-mail correspondence and do our best to return all inquiries in a timely manner.

From: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Sent: January 11, 2021 4:07 PM
To: Mohan Basnet <mbasnet@lrl.ca>
Subject: RE: 200100-6111 Hazeldean Boundary Conditions

Hi Mohan,

Please find attached the water boundary conditions for the subject application.

Thanks,

Santhosh

From: Mohan Basnet <mbasnet@lrl.ca>
Sent: December 07, 2020 2:12 PM
To: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Subject: 200100-6111 Hazeldean Boundary Conditions

Hi Santhosh,

Please find below & attached the required information for the water boundary conditions. As discussed, the proposed connections are shown below.

Type of Development: Multi-use Commercial Development
No. of Units: 5
Site Address: 6111 Hazeldean Road, Stittsville (Ottawa), Ontario

Type of Demands	(L/min)	(L/s)	Remarks
Average Day Demand	38.5	0.64	
Maximum Daily Demand	57.8	0.96	
Maximum Hour Demand	104	1.73	
Fire Flow Demand #1	4,500	75.00	Proposed Commercial Bldg #1 including Starbucks (±321
Fire Flow Demand #2	3,200	53.33	Proposed Commercial Bldg #2 (±190 sqm)
Fire Flow Demand #3	5,300	88.33	Proposed Halo Car Wash (±485 sqm)
Fire Flow Demand #4	4,700	78.33	Proposed Mr Lube (±221 sqm)

Proposed Connection -1 @ Hazeldean Road (existing stub)
Proposed Connection-2 @ City Parcel (northeast corner of the subject site)

FUS Calculations – Attached
Hydrant Coverage Plan – Attached. Please note that three (3) on-site Fire Hydrants are being considered to meet the RFF.

Please let me know if you have any questions.

Thank you,

Mohan Basnet, P.Eng.
Civil Engineering Services
LRL Associates Ltd.
5430 Canotek Road
Ottawa, Ontario K1J 9G2

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APPENDIX C

Wastewater Calculations

MINTO COMMUNITIES INC.

STORMWATER MANAGEMENT, WATERMAIN, STORM SEWER AND SANITARY SEWER

DESIGN BRIEF

PART OF LOT 23 AND 24
CONCESSION 12

POTTER'S KEY SUBDIVISION

CITY OF OTTAWA

FEBRUARY 2017

ATREL Engineering Ltd Ltée
Engineers - Ingénieurs

(Revision 5)

SANITARY SEWER COMPUTATION FORM

DATE: **February 2017**
DESIGNED BY: VLL
CHECKED BY: AGS

PROJECT: **POTTER'S KEY SUBDIVISION**
CLIENT: Minto Communities Inc.
PROJECT #: 131003
BY: ATREL ENGINEERING LTD

q= 350 l/cap.day
I= 0.28 l/ha.s
PVC/CONC N= 0.013
OTHER N= 0.024

Table 20
Single dwelling= 3.4 person/unit
Townhouse= 2.7 person/unit

STREET NAMES	LOCATION FROM (Up)		LOCATION TO (Down)		RESIDENTIAL INDIVIDUAL AREA (ha.)	RESIDENTIAL INDIVIDUAL POP.	RESIDENTIAL CUMULATIVE AREA (ha.)	RESIDENTIAL CUMULATIVE POP.	RESIDENTIAL PEAKING FACTOR M	RESIDENTIAL FLOW Q(p) (L/S)	COMMERCIAL , INSTITUTIONAL INDIVIDUAL AREA (ha.)	COMMERCIAL , INSTITUTIONAL INDIVIDUAL POP.	COMMERCIAL , INSTITUTIONAL CUMULATIVE AREA (ha.)	COMMERCIAL , INSTITUTIONAL CUMULATIVE POP.	COMMERCIAL , INSTITUTIONAL PEAKING FACTOR M	COMMERCIAL , INSTITUTIONAL FLOW Q(p) (L/S)	PEAKING FACTOR M	FLOW Q(p) (L/S)	PEAK EXT.FLOW Q(i) (L/S)	PEAK DES. Q(d) (L/S)	SEWER DATA TYPE PIPE	DIA. (N0M) (mm)	DIA. (ACT) (MM)	SLOPE (%)	LENGTH (M)	CAP. (L/S)	Remaining Capacity (%)	VEL. (M/S)	UpStream Obv. (M)	UpStream Inv. (M)	DwnStream Obv. (M)	DwnStream Inv. (M)
Eaglehead Crescent	MH	150	MH	151	0.56	41.0	0.56	41	4.00	0.66									0.16	0.82	PVC	200	201.2	0.85	72.5	30.71	97%	0.97	115.06	114.86	114.44	114.24
Eaglehead Crescent	MH	151	MH	152	0.21	7.0	0.77	48	4.00	0.78									0.22	0.99	PVC	200	201.2	0.85	11.0	30.71	97%	0.97	114.41	114.21	114.32	114.12
Eaglehead Crescent	MH	152	MH	154	0.80	38.0	1.57	86	4.00	1.39									0.44	1.83	PVC	200	201.2	0.85	108.5	30.71	94%	0.97	114.14	113.94	113.22	113.02
Park 2	MH	153	MH	154	0.37		0.37												0.10	0.10	PVC	200	201.2	1.00	11.0	33.31	100%	1.05	114.13	113.93	114.02	113.82
Eaglehead Crescent	MH	154	MH	155	0.16	7.0	2.10	93	4.00	1.51									0.59	2.09	PVC	200	201.2	0.85	36.0	30.71	93%	0.97	113.22	113.02	112.91	112.71
Eaglehead Crescent	MH	155	MH	156	0.30	14.0	2.40	107	4.00	1.73									0.67	2.41	PVC	200	201.2	0.50	39.5	23.55	90%	0.74	112.88	112.68	112.68	112.48
Eaglehead Crescent	MH	156	MH	157			2.40	107	4.00	1.73									0.67	2.41	PVC	200	201.2	0.50	11.0	23.55	90%	0.74	112.65	112.45	112.59	112.39
Eaglehead Crescent	MH	157	MH	165	0.38	17.0	2.78	124	4.00	2.01									0.78	2.79	PVC	200	201.2	1.24	73.5	37.09	92%	1.17	112.56	112.36	111.65	111.45
Bandelier Way	MH	160	MH	162	0.17	14.0	0.17	14	4.00	0.23									0.05	0.27	PVC	200	201.2	0.65	40.0	26.86	99%	0.84	114.18	113.98	113.92	113.72
Geranium Walk	MH	161	MH	162	0.40	34.0	0.40	34	4.00	0.55									0.11	0.66	PVC	200	201.2	0.65	63.0	26.86	98%	0.84	114.28	114.08	113.87	113.67
Geranium Walk	MH	162	MH	163	0.23	17.0	0.80	65	4.00	1.05									0.22	1.28	PVC	200	201.2	0.50	45.5	23.55	95%	0.74	113.32	113.12	113.09	112.89
Geranium Walk	MH	163	MH	165	0.18	11.0	0.98	76	4.00	1.23									0.27	1.51	PVC	200	201.2	0.50	37.5	23.55	94%	0.74	113.06	112.86	112.87	112.67
Kimpton Drive	MH	165	MH	166	0.07		16.43	1020	3.79	15.68									4.60	20.28	PVC	375	366.4	0.20	41.0	73.72	72%	0.70	111.58	111.21	111.50	111.13
Kimpton Drive	MH	166	CAP	Kimpt. Dr	0.13	4.0	16.56	1024	3.79	15.74									4.64	20.37	CONC	375	381.0	0.20	21.0	81.80	75%	0.72	109.04	108.67	109.00	108.63
Kimpton Drive	CAP	Kimpt. Dr	EX	8 A			16.56	1024	3.79	15.74									4.64	20.37	CONC	375	381.0	0.20	43.0	81.80	75%	0.72	109.00	108.63	108.91	108.54
Bandelier Way	MH	160	MH	170	0.26	19.0	0.26	19	4.00	0.31									0.07	0.38	PVC	200	201.2	0.75	44.5	28.85	99%	0.91	114.05	113.85	113.72	113.52
Bandelier Way	MH	170	MH	171	0.12	6.0	0.38	25	4.00	0.41									0.11	0.51	PVC	200	201.2	0.75	10.0	28.85	98%	0.91	113.69	113.49	113.61	113.41
Bandelier Way	MH	171	MH	172	0.61	57.0	0.99	82	4.00	1.33									0.28	1.61	PVC	200	201.2	0.75	71.0	28.85	94%	0.91	113.58	113.38	113.05	112.85
Bandelier Way	MH	172	MH	173	0.40	36.0	1.39	118	4.00	1.91									0.39	2.30	PVC	200	201.2	0.65	54.0	26.86	91%	0.84	113.05	112.85	112.70	112.50
Bandelier Way	MH	173	MH	175			1.39	118	4.00	1.91									0.39	2.30	PVC	200	201.2	0.65	3.0	26.86	91%	0.84	112.67	112.47	112.65	112.45
Commercial (by others)	STUB	101	MH	174	1.17	70.0	1.17	70	4.00	1.13	9.02	1292.0	9.02	1292	1.50	7.85			2.85	11.84	PVC	300	299.2	0.23	7.5	46.05	74%	0.65	111.32	111.02	111.30	111.00
Commercial (by Minto)	STUB	102	MH	174							1.85	265.0	1.85	265	1.50	1.61			0.52	2.13	PVC	200	201.2	0.35	6.0	19.71	89%	0.62	111.29	111.09	111.27	111.07
Easement	MH	174	MH	175			1.17	70	4.00	1.13			10.87	1557	1.50	9.46			3.37	13.97	PVC	300	299.2	0.23	55.5	46.05	70%	0.65	111.27	110.97	111.14	110.84
Bandelier Way	MH	175	MH	176	0.13	6.0	2.69	194	4.00	3.14			10.87	1557	1.50	9.46			3.80	16.40	PVC	300	299.2	0.23	8.5	46.05	64%	0.65	111.08	110.78	111.06	110.76
Bandelier Way	MH	176	MH	177	0.52	52.0	3.21	246	4.00	3.99			10.87	1557	1.50	9.46			3.94	17.39	PVC	300	299.2	0.23	68.5	46.05	62%	0.65	111.03	110.73	110.87	110.57
Geranium Walk	MH	161	MH	177	0.72	68.0	0.72	68	4.00	1.10									0.20	1.30	PVC	200	201.2	1.50	113.5	40.80	97%	1.28	114.14	113.94	112.44	112.24
Bandelier Way	MH	177	CAP	Bandelier Way	0.17	14.0	4.10	328	4.00	5.31			10.87	1557	1.50	9.46			4.19	18.97	CONC	300	304.8	0.20	38.0	44.55	57%	0.61	110.87	110.57	110.80	110.50
Street No.2	CAP	Bandelier Way	EX	14 A			4.10	328	4.00	5.31			10.87	1557	1.50	9.46			4.19	18.97	CONC	300	304.8	0.20	43.0	45.12	58%	0.62	110.80	110.50	110.71	110.41

Existing Sanitary Sewers

LICENSED PROFESSIONAL ENGINEER
A. G. Y. SAUVE
100142393
Feb. 24, 2017
PROVINCE OF ONTARIO

Sanitary Service Calculations

LRL File No. : 200100
Project : Halo Car Wash
Address 6111 Hazeldean Rd, Stittsville, ON
Date : June 11, 2021
Designed by : Mohan Basnet

SAN Design Flow

Site Description	Qty	L/Qty	Total	
			L/day	L/s
Halo Car Wash				
Employees	2	75	150	0.002
Total x Peak Factor (1.5)				0.003
*Anticipated cars per day	655	132	86460	1.001
				1.003
Mr. Lube				
Floor drains	2	375	750	0.009
Anticipated cars per day	50	40	2000	0.023
Total x Peak Factor (1.5)				**0.048**
Starbucks				
Seats	25	125	3125	0.036
Total x Peak Factor (1.5)				**0.054**
Commercial 1 (next to Starbucks)				
Floor area 146m^2	146	5	730	0.008
Parking spots	5	6	30	0.000
Total x Peak Factor (1.5)				**0.013**
Commercial 2 (stand alone building)				
Floor area 190m^2	190	5	950	0.011
Parking spots	7	6	42	0.000
Total x Peak Factor (1.5)				**0.017**
Total excluding infiltration allowances				1.136
Infiltration 0.33 L/s/ha	1.34			0.442
Total including infiltration allowances				**1.578**
Future Development				
Area (ha)	0.51	28000	14280	0.165
Total x Peak Factor (1.5)				0.248
Infiltration 0.33 L/s/ha				0.168
Total including infiltration allowances				**0.416**
Grand Total				**1.994**
Permitted (Per Potter's Key Subdivision Report)				**2.130**

Note

*Fresh water consumption per car is 132 L with water reclaim system (info by Halo Car Wash)
SAN release rate from Halo Car Wash will be controlled at 1 L/s (see Drawing C401)

LRL File No. 200100
Project: Halo Car Wash
Location: 6111 Hazeldean Rd, Stittsville, ON
Date: June 10, 2021

Sanitary Design Parameters

Average Daily Flow = 280 L/p/day
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

Industrial Peak Factor = as per Appendix 4-B = 7.4
Extraneous Flow = 0.33 L/s/gross ha
(as Per Tech Bulleting ISTB-2018-01)

Pipe Design Parameters

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

LOCATION			RESIDENTIAL AREA AND POPULATION						COMMERCIAL		INDUSTRIAL			INSTITUTIONAL		C+I+I	INFILTRATION			TOTAL	PIPE					
STREET/ SITE	FROM MH	TO MH	AREA (Ha)	POP.	CUMMULATIVE AREA (Ha)	CUMMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (Ha)	ACCU. AREA (Ha)	AREA (Ha)	ACCU. AREA (Ha)	PEAK FACT.	AREA (Ha)	ACCU. AREA (Ha)	PEAK FLOW (l/s)	TOTAL AREA (Ha)	ACCU. AREA (Ha)	INFILT. FLOW (l/s)	FLOW (l/s)	LENGTH (m)	DIA. (mm)	SLOPE (%)	MATERIAL	CAP. (FULL) (l/s)	VEL. (FULL) (m/s)
Mr Lube	Bldg.	SAN MH01							0.28	0.28						0.048	0.28	0.28	0.09	0.14	3.0	150	2.00%	PVC	21.54	1.22
	SAN MH01	SAN MH02																		0.14	19.3	150	0.50%	PVC	10.77	0.61
	SAN MH02	SAN MH03																		0.14	31.1	200	0.50%	PVC	23.19	0.74
Halo Car Wash	Bldg.	SAN MH04									0.53	0.53				0.003	0.53	0.53	0.17	0.18	20.4	150	2.00%	PVC	21.54	1.22
	SAN MH04	SAN MH10																		0.18	16.4	200	2.00%	PVC	46.38	1.48
	**Forcemain	SAN MH10																		1.00	14.7	75				
	SAN MH10	SAN MH03																		1.18	31.6	200	2.00%	PVC	46.38	1.48
	SAN MH03	SAN MH05																		1.32	31.6	200	0.50%	PVC	23.19	0.74
Comm. Area	Starbucks	SAN MH07							0.27	0.27						0.067	0.27	0.27	0.09	0.15	22.5	150	2.00%	PVC	21.54	1.22
	Comm Bldg	SAN MH07							0.27	0.27						0.017	0.27	0.27	0.09	0.10	13.0	150	2.00%	PVC	21.54	1.22
	SAN MH07	SAN MH05																		0.26	48.6	200	3.00%	PVC	56.81	1.81
*Phase 2	STUB	SAN MH05							0.51	0.51						0.248	0.51	0.51	0.17	0.42	6.8	200	1.00%	PVC	32.80	1.04
	SAN MH05	SAN MH08																		1.99	40.7	200	0.50%	PVC	23.19	0.74
	SAN MH08	Ex. STUB																		1.99	37.6	200	0.50%	PVC	23.19	0.74

Designed: M. B./P.P	PROJECT: Halo Car Wash		
Checked: M.B.	LOCATION: 6111 Hazeldean, Ottawa		
Dwg. Reference: C401	File Ref.: 200100	Date: 2021-06-10	Sheet No. 1 of 1

APPENDIX D

Stormwater Management Calculations

MINTO COMMUNITIES INC.

STORMWATER MANAGEMENT, WATERMAIN, STORM SEWER AND SANITARY SEWER

DESIGN BRIEF

PART OF LOT 23 AND 24
CONCESSION 12

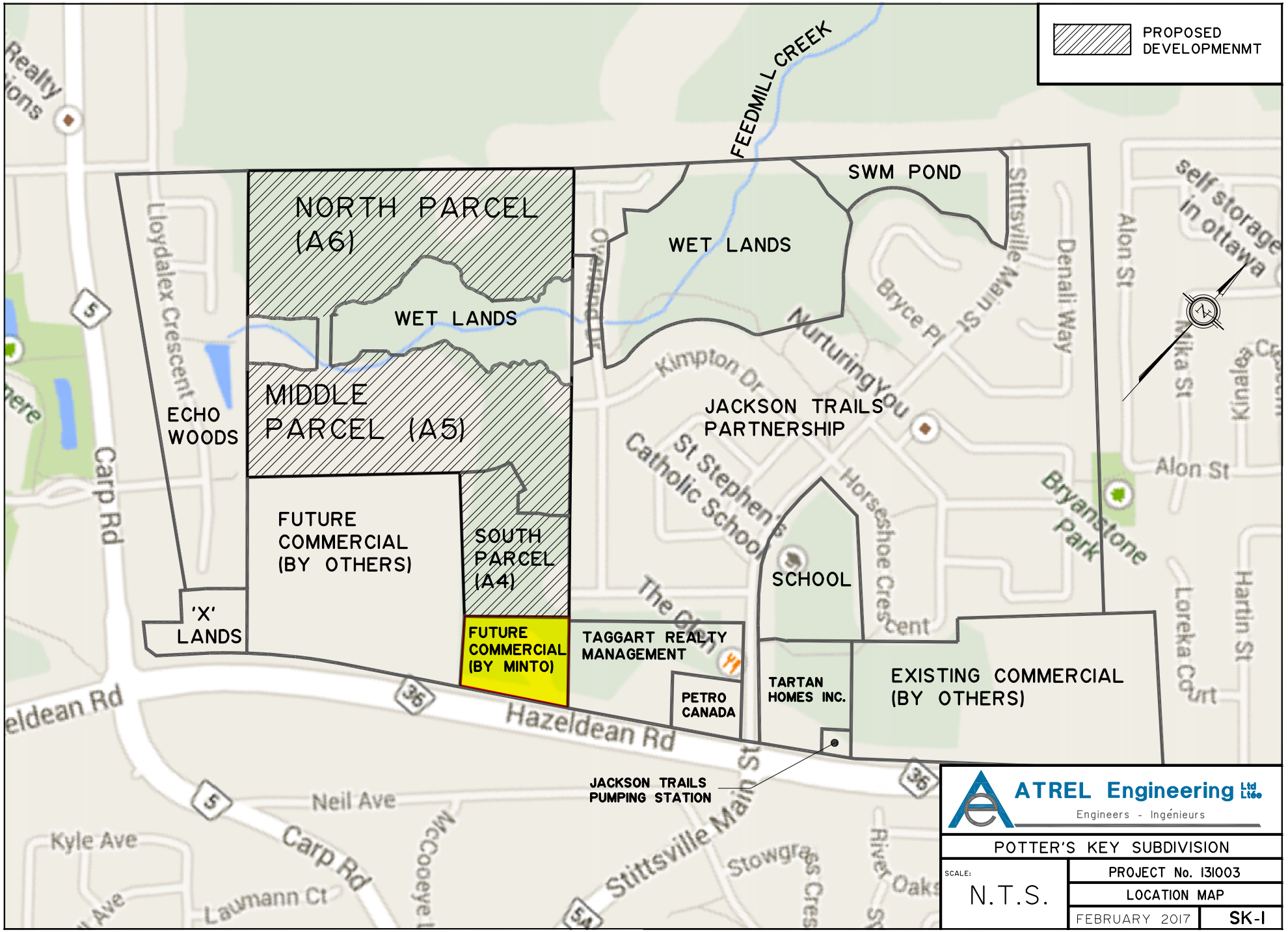
POTTER'S KEY SUBDIVISION

CITY OF OTTAWA

FEBRUARY 2017

ATREL Engineering Ltd Ltée
Engineers - Ingénieurs

(Revision 5)


PROPOSED DEVELOPMENMT
FEEDMILL CREEK
NORTH PARCEL (A6)
WET LANDS
SWM POND
WET LANDS
MIDDLE PARCEL (A5)
ECHO WOODS
FUTURE COMMERCIAL (BY OTHERS)
SOUTH PARCEL (A4)
'X' LANDS
FUTURE COMMERCIAL (BY MINTO)
TAGGART REALTY MANAGEMENT
PETRO CANADA
TARTAN HOMES INC.
EXISTING COMMERCIAL (BY OTHERS)
JACKSON TRAILS PARTNERSHIP
SCHOOL
JACKSON TRAILS PUMPING STATION
Lloydalex Crescent
Carp Rd
Hazeldean Rd
Neil Ave
Kyle Ave
Laumann Ct
Stittsville Main St
Kimpton Dr
Nurturingyou
Bryce Pl
Denali Way
Alon St
Bryanstone Park
Horseshoe Crescent
Loreka Court
Hartin St
self storage in ottawa
ATREL Engineering Ltd
Engineers - Ingénieurs
POTTER'S KEY SUBDIVISION
SCALE: N.T.S.
PROJECT No. 131003
LOCATION MAP
FEBRUARY 2017
SK-1

b) Major System

i. Grading design is to be based on split lot drainage.
ii. On street routing must be provided and illustrated on the grade control plan to carry flows exceeding the minor system capacity towards the wetland. This routing must incorporate a maximum 0.30m grade difference between any high points and the adjacent upstream low point. An overall positive slope of at least 0.10% will be required across consecutive high points for routing purposes.

c) Water Quality

As per the "Jackson Trails Stormwater Management Design Brief" dated June 2006, an Enhanced Level of Protection (80 % removal of Total Suspended Solids) will be achieved in the stormwater management wet pond. The Best Management Practices should also be implemented within the subdivision design and during construction.

3.3 Tributary Area

The proposed development of Potter's Key Subdivision (± 20.07 ha.) is adjacent to a future residential land parcel (1.17 ha.), two future commercial areas of 9.02 ha. (owned by others) and 1.85 ha.(owned by Minto), all of which are included in this analysis. The storm drainage area is divided in several sub-basin areas in order to assess the flow to each pipes (see plan 131003-STM1 and 131003-STM2). A runoff coefficient was calculated for each area using 0.20 for grass and 0.90 for asphalt and roofs.

3.4 Theoretical Flows

The storm flows are calculated using the 2 year Intensity Duration Frequency (IDF) curve from the City of Ottawa. In addition, the inflow into the proposed storm sewers shall be restricted to 70 L/s/ha via inlet control devices and catch basin interconnections as per Jackson Trails – Stormwater Management Design Brief. A "Flow Restrictors and Catchbasin Table" can be found on plan 131003-TD1 showing J.F.S.A's calculate 100 year ponding elevation for each individual catchbasin as well as their inverts, type of flow restrictor and top of grates. Furthermore, the table shows the head on the flow restrictor calculated with J.F.S.A's 100 year ponding elevation. The table serves as a verification that no more than 70 l/s/ha. will be released into the minor system during the 100 year storm event.

STORM SEWER COMPUTATION FORM

DESIGNED BY: VLL
CHECKED BY: AGS

POTTER'S KEY SUBDIVISION
Minto Communities Inc.
131003
ATREL ENGINEERING LTD
February, 2017

STORM FREQUENCY : 2 YEAR
RATIONAL METHOD Q= 2.78 AIR
PVC/CONC N= 0.013
CSP N= 0.024
CORR N= 0.021

Table 1

STREET NAMES	LOCATION FROM (Up)		LOCATION TO (Down)		AREA (ha.) RUNOFF COEFFICIENT 0.20	0.45	0.55	0.58	0.70	0.75	0.61	0.87	RATIONAL METHOD INDIV. 2.78AR	ACCUM. 2.78AR	2 YEAR TIME CONC. (MIN)	RAINF. INTENS. (MM/HR)	FLOW (L/S)	ACTUAL PIPE FLOW (L/S)	PIPE TYPE	DIA. (N0M) (mm)	(ACT)	SLOPE (%)	LENGTH (M)	SEWER DATA CAP. (L/S)	Remaining Capacity (%)	VEL. (M/S)	TIME OF FLOW (MIN)	UpStream Obv. (M)	Inv. (M)	Forced drop (M)	Inv to Inv (M)	DwStream Obv. (M)	Inv. (M)	UpStream Hgl at UP-MH (M)	Hgl Out UP-MH (M)	Down MH Hgl (M)	UpStream USF ELEV (M)	HGL FREEBOARD (M)
Eaglehead Crescent	MH	550	MH	551			0.25		0.33				1.02	1.02	10.00	76.81	78.69	78.69	PVC	375	366.4	0.85	72.5	151.97	48%	1.44	0.84	115.27	114.90		no	114.65	114.28	115.27	115.27	114.65	115.75	0.48
Eaglehead Crescent	MH	551	MH	552										1.02	10.84	73.73	75.53	75.53	PVC	375	366.4	0.85	11.0	151.97	50%	1.44	0.13	114.62	114.25		no	114.53	114.16	114.63	114.62	114.55	115.43	0.81
Eaglehead Crescent	MH	552	MH	554			0.72		0.35				1.78	2.81	10.97	73.29	205.68	205.68	CONC	450	457.2	0.85	108.5	274.22	25%	1.67	1.08	114.53	114.08		no	113.61	113.16	114.55	114.53	113.61	115.97	1.44
Park 2	MH	553	MH	554	0.36								0.20	0.20	10.00	76.81	15.37	15.37	PVC	300	299.2	1.00	11.0	96.02	84%	1.37	0.13	113.72	113.42		no	113.61	113.31	113.72	113.72	113.61	n/a	n/a
Eaglehead Crescent	MH	554	MH	555										3.01	12.05	69.74	209.68	209.68	CONC	450	457.2	0.85	36.0	274.22	24%	1.67	0.36	113.61	113.16		no	113.30	112.85	113.61	113.61	113.30	114.44	0.83
Eaglehead Crescent	MH	555	MH	556					0.26				0.51	3.51	12.41	68.65	241.14	241.14	CONC	525	533.4	0.50	41.0	317.25	24%	1.42	0.48	113.30	112.78		no	113.09	112.57	113.30	113.30	113.09	114.04	0.74
Eaglehead Crescent	MH	556	MH	557										3.51	12.89	67.25	236.22	236.22	CONC	525	533.4	0.50	11.5	317.25	26%	1.42	0.14	113.06	112.54		no	113.00	112.48	113.08	113.06	113.00	113.97	0.91
Eaglehead Crescent	MH	557	MH	565			0.22		0.23				0.78	4.30	13.02	66.86	287.26	287.26	CONC	525	533.4	0.50	73.0	317.25	9%	1.42	0.86	112.97	112.45	0.23	no	112.60	112.08	113.00	112.97	112.60	113.73	0.76
Bandelier Way	MH	560	MH	562						0.08			0.17	0.17	10.00	76.81	12.81	12.81	PVC	300	299.2	0.70	44.5	80.34	84%	1.14	0.65	114.34	114.04		no	114.03	113.73	114.34	114.34	114.03	114.87	0.53
Geranium Walk	MH	561	MH	562											10.00	76.81			PVC	300	299.2	0.65	68.5	77.42	100%	1.10	1.04	114.48	114.18		no	114.03	113.73	114.48	114.48	114.03	115.27	0.79
Geranium Walk	MH	562	MH	563		0.24				0.39			1.11	1.28	11.04	73.04	93.51	93.51	PVC	375	366.4	0.90	44.0	156.38	40%	1.48	0.49	114.03	113.66	0.40	no	113.63	113.26	114.03	114.03	113.63	115.25	1.22
Geranium Walk	MH	563	MH	565					0.10				0.19	1.47	11.53	71.39	105.29	105.29	PVC	375	366.4	0.65	39.0	132.90	21%	1.26	0.52	113.20	112.83	0.58	no	112.95	112.58	113.22	113.20	112.95	114.77	1.57
Kimpton Drive	MH	565	MH	566					0.17				0.33	13.10	16.33	58.80	770.32	770.32	CONC	1050	1066.8	0.12	39.0	986.85	22%	1.10	0.59	112.37	111.32	0.60	no	112.32	111.27	112.37	112.37	112.32	n/a	n/a
Kimpton Drive	MH	566	MH	Kimpton Drive		0.43							0.54	13.64	16.92	57.58	785.32	785.32	CONC	1350	1371.6	0.12	22.0	1928.87	59%	1.31	0.28	111.72	110.37		no	111.69	110.34	111.73	111.72	111.69	n/a	n/a
Kimpton Drive	MH	Kimpton Drive	MH	8										13.64	17.20	57.02	777.68	777.68	CONC	1350	1371.6	0.12	41.5	1928.87	60%	1.31	0.53	111.69	110.34		no	111.64	110.29	111.69	111.69	111.64	n/a	n/a
Bandelier Way	MH	1560	MH	570						0.26			0.54	0.54	10.00	76.81	41.64	41.64	PVC	300	299.2	0.70	44.0	80.34	48%	1.14	0.64	114.27	113.97		no	113.96	113.66	114.27	114.27	113.96	114.88	0.61
Bandelier Way	MH	570	MH	571										0.54	10.64	74.43	40.35	40.35	PVC	300	299.2	0.70	9.5	80.34	50%	1.14	0.14	113.93	113.63		no	113.86	113.56	113.94	113.93	113.87	114.51	0.58
Bandelier Way	MH	571	MH	572		0.46							0.58	1.12	10.78	73.93	82.62	82.62	PVC	375	366.4	0.70	71.0	138.31	40%	1.31	0.90	113.86	113.49		no	113.36	112.99	113.87	113.86	113.36	114.51	0.65
Bandelier Way	MH	572	MH	575		0.22				0.40			1.11	2.23	11.68	70.90	157.88	157.88	CONC	450	457.2	0.65	57.5	239.80	34%	1.46	0.66	113.36	112.91	0.04	no	112.99	112.54	113.36	113.36	113.19	114.07	0.71
Commercial (by others)	MH	501	MH	574				1.18		8.86			20.38	20.38	15.00	61.77	1258.61	1258.61	CONC	1050	1066.8	0.27	6.0	1480.28	15%	1.66	0.06	113.22	112.17		no	113.20	112.15	113.39	113.39	113.38	n/a	n/a
Commercial (by Minto)	MH	502	MH	574						1.81			3.77	3.77	10.11	76.39	288.28	288.28	CONC	600	609.6	0.27	9.0	332.84	13%	1.14	0.13	113.20	112.60	0.01	no	113.18	112.58	113.40	113.40	113.38	n/a	n/a
Easement	MH	574	MH	575										24.15	15.06	61.63	1488.34	1488.34	CONC	1050	1066.8	0.30	53.0	1560.35	5%	1.75	0.51	113.17	112.12		no	113.01	111.96	113.38	113.33	113.19	n/a	n/a
Bandelier Way	MH	575	MH	576										26.38	15.57	60.46	1594.71	1594.71	CONC	1050	1066.8	0.45	12.0	1911.03	17%	2.14	0.09	112.95	111.90		no	112.90	111.85	113.19	112.99	112.95	113.77	0.78
Bandelier Way	MH	576	MH	577		0.19				0.33			0.93	27.30	15.66	60.25	1644.95	1644.95	CONC	1200	1219.2	0.27	72.5	2113.43	22%	1.81	0.67	112.90	111.70		no	112.70	111.50	112.95	112.90	112.70	113.77	0.87
Geranium Walk	MH	10561	MH	577		0.62				0.49			1.80	1.80	10.00	76.81	138.05	138.05	PVC	375	366.4	1.50	113.0	201.88	32%	1.91	0.98	114.40	114.03		no	112.70	112.33	114.40	114.40	112.70	115.15	0.75
Bandelier Way	MH	577	MH	Bandelier Way		0.36				0.25			0.97	30.07	16.33	58.80	1768.17	1768.17	CONC	1350	1371.6	0.20	36.5	2490.17	29%	1.69	0.36	112.70	111.35		no	112.63	111.28	112.70	112.70	112.63	113.93	1.23
Bandelier Way	MH	Bandelier Way	MH	14							0.14		0.24	30.31	16.69	58.05	1759.40	1759.40	CONC	1350	1371.6	0.20	41.5	2490.17	29%	1.69	0.41	112.63	111.28		no	112.55	111.20	112.63	112.63	112.55	n/a	n/a

Existing Storm Sewer

LRL Associates Ltd.
Storm Watershed Summary

LRL File No. 200100
Project: Proposed Development
Location: 6111 Hazeldean Rd (Stittsville, ON)
Date: June 10, 2021
Designed: M. Longtin
Checked: M. Basnet
Dwg Reference: C701, C702

Pre-Development Catchments

Watershed	C = 0.20	C = 0.80	C = 0.90	Total Area (ha)	Combined C
EWS-01 (un-controlled)	0.511	0.000	0.000	0.511	0.20
EWS-02 (un-controlled)	1.287	0.000	0.058	1.345	0.23
Total	**1.798**	**0.000**	**0.058**	**1.856**	**0.22**

Post-Development Catchments

Watershed	C = 0.20	C = 0.8	C = 0.90	Total Area (ha)	Combined C
WS-01 (controlled)	0.036	0.000	0.059	0.095	0.64
WS-02 (controlled)	0.000	0.000	0.091	0.091	0.90
WS-03 (controlled)	0.000	0.000	0.075	0.075	0.90
WS-04 (controlled)	0.005	0.000	0.038	0.042	0.82
WS-05 (controlled)	0.000	0.000	0.044	0.044	0.90
WS-06 (controlled)	0.001	0.000	0.022	0.023	0.87
WS-16 (controlled)	0.009	0.000	0.041	0.050	0.78
WS-07 (un-controlled)	0.011	0.000	0.021	0.032	0.67
WS-23 (un-controlled)	0.042	0.000	0.003	0.045	0.25
WS-08 (controlled)	0.029	0.000	0.000	0.029	0.20
WS-09 (controlled)	0.000	0.000	0.044	0.044	0.90
WS-10 (controlled)	0.009	0.000	0.051	0.060	0.79
WS-11 (controlled)	0.008	0.000	0.023	0.031	0.71
WS-12 (controlled)	0.004	0.000	0.045	0.049	0.84
WS-14 (controlled)	0.000	0.000	0.049	0.049	0.90
WS-15 (controlled)	0.012	0.000	0.076	0.088	0.81
WS-13 (un-controlled)	0.030	0.000	0.015	0.045	0.43
WS-17 (controlled)	0.023	0.000	0.128	0.151	0.79
WS-18 (controlled)	0.011	0.000	0.057	0.068	0.79
WS-19 (controlled)	0.054	0.000	0.061	0.115	0.57
WS-20 (controlled)	0.000	0.000	0.042	0.042	0.90
WS-21 (controlled)	0.000	0.000	0.034	0.034	0.90
WS-22 (controlled)	0.001	0.000	0.043	0.044	0.88
Total	**0.284**	**0.000**	**1.061**	**1.345**	**0.75**

LRL File No. 200100
Project: Proposed Development
Location: 6111 Hazeldean Rd (Stittsville, ON)
Date: June 11, 2021
Designed: M. Basnet
Drawing Ref.: C601

Stormwater Management

STORM - 100 YEAR

Runoff Equation

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

Pre-Development Catchments within Development Area

	Total Area =	**1.856**	**ha**	**∑R =**	**0.22**
Un-Controlled	EWS-01 (Future Development)	0.511	ha	R =	0.20
	EWS-02 (Proposed Development)	1.345	ha	R =	0.23
	Total Un-controlled =	**1.856**	**ha**	**∑R =**	**0.22**

Pre-Development Release Rate

IDF Curve Equations

100-Year, I_{100} = 1735.688 / (Td + 6.014)$^{0.820}$ A = 1735.688 B = 0.820 C = 6.014

5-Year, I_5 = 998.071 / (Td + 6.053)$^{0.814}$ A = 998.071 B = 0.814 C = 6.053

2-Year, I_2 = 732.951 / (Td + 6.199)$^{0.810}$ A = 732.951 B = 0.810 C = 6.199

C =	0.23		
I_{100} =	178.6	mm/hr	
I_5 =	104.2	mm/hr	
I_2 =	76.8	mm/hr	
Td =	10	min	
A =	1.35	ha	
100-year Release Rate =	153.71	L/s	
5-year Release Rate =	89.69	L/s	
2-year Release Rate =	66.11	L/s	
Allowable Release Rate =	**70**	**L/ha/s**	*(as determined for Potter's Key Subdivision Report by Atrel Engineering (Rev 5) dated February 2017)*
Proposed Development Allowable Release Rate =	**94.16**	**L/s**	(Proposed development, A=1.34 ha)
Future Development Allowable Release Rate =	**35.70**	**L/s**	(Future development, A=0.51 ha)
Total =	**129.86**	**L/s**	

LRL File No. 200100
Project: Proposed Development
Location: 6111 Hazeldean Rd (Stittsville, ON)
Date: June 11, 2021
Designed: M. Basnet
Drawing Ref.: C601

Stormwater Management

Post-development Stormwater Management

					$\sum R_{2\&5}$	$\sum R_{100}$
	Total Site Area =	**1.345**	**ha**	**$\sum$R =**	**0.75**	**0.94**
Halo Car Wash	WS-01 (controlled)	0.095	ha	R =	0.64	0.79
	WS-02 (controlled)	0.091	ha	R =	0.90	1.00
	WS-03 (controlled)	0.075	ha	R =	0.90	1.00
	WS-04 (controlled)	0.042	ha	R =	0.82	1.00
	WS-05 (controlled)	0.044	ha	R =	0.90	1.00
	WS-06 (controlled)	0.023	ha	R =	0.87	1.00
	WS-16 (controlled)	0.050	ha	R =	0.78	0.97
	Total (Controlled)	**0.421**	**ha**	**R =**	**0.82**	**1.00**
	WS-07 (un-controlled)	0.032	ha	R =	0.67	0.83
	WS-23 (un-controlled)	0.045	ha	R =	0.25	0.31
	Total (Un-controlled)	**0.077**	**ha**	**R =**	**0.42**	**0.53**
	Total (Controlled+Un-controlled)	**0.498**	**ha**	**R =**	**0.76**	**0.94**
Mr Lube	WS-08 (controlled)	0.029	ha	R =	0.20	0.25
	WS-09 (controlled)	0.044	ha	R =	0.90	1.00
	WS-10 (controlled)	0.060	ha	R =	0.79	0.99
	WS-11 (controlled)	0.031	ha	R =	0.71	0.89
	WS-12 (controlled)	0.049	ha	R =	0.84	1.00
	WS-14 (controlled)	0.049	ha	R =	0.90	1.00
	WS-15 (controlled)	0.088	ha	R =	0.81	1.00
	Total (Controlled)	**0.349**	**ha**	**R =**	**0.77**	**0.97**
	WS-13 (un-controlled)	0.045	ha	R =	0.43	0.54
	Total (Un-controlled)	**0.045**	**ha**	**R =**	**0.43**	**0.54**
	Total (Controlled+Un-controlled)	**0.394**	**ha**	**R =**	**0.74**	**0.92**
Commercial Area	WS-17 (controlled)	0.151	ha	R =	0.79	0.99
	WS-18 (controlled)	0.068	ha	R =	0.79	0.98
	WS-19 (controlled)	0.115	ha	R =	0.57	0.71
	WS-20 (controlled)	0.042	ha	R =	0.90	1.00
	WS-21 (controlled)	0.034	ha	R =	0.90	1.00
	WS-22 (controlled)	0.044	ha	R =	0.88	1.00
	Total (Controlled)	**0.453**	**ha**	**R =**	**0.76**	**0.95**
	Total (Un-controlled)	**0.000**	**ha**	**R =**	**0.00**	**0.00**
	Total (Controlled+Un-controlled)	**0.453**	**ha**	**R =**	**0.76**	**0.95**

LRL File No. 200100
Project: Proposed Development
Location: 6111 Hazeldean Rd (Stittsville, ON)
Date: June 11, 2021
Designed: M. Basnet
Drawing Ref.: C601

Stormwater Management

1) 100 Year Post-development Stormwater Management (Halo Car Wash)

Un-controlled Runoff

C =	0.53	
I_{100} =	178.6	mm/hr
Td =	10	min
A =	0.077	ha
Un-controlled Release Rate =	**20.09**	L/s
Allowable Release Rate =	**34.86**	L/s
Controlled Release Rate =	**14.77**	L/s

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	*Controlled Release Rate (L/s)	Un-controlled Runoff (L/s)	Total Release Rate (L/s)
10	178.56	209.08	121.02	7.39	20.09	27.47
15	142.89	167.32	143.94	7.39	16.07	23.46
20	119.95	140.45	159.68	7.39	13.49	20.88
25	103.85	121.60	171.32	7.39	11.68	19.07
30	91.87	107.57	180.33	7.39	10.33	17.72
35	82.58	96.69	187.54	7.39	9.29	16.68
40	75.15	87.99	193.45	7.39	8.45	15.84
45	69.05	80.85	198.36	7.39	7.77	15.15
50	63.95	74.89	202.50	7.39	7.19	14.58
55	59.62	69.82	206.01	7.39	6.71	14.09
60	55.89	65.45	209.02	7.39	6.29	13.67
65	52.65	61.65	211.61	7.39	5.92	13.31
70	49.79	58.30	213.84	7.39	5.60	12.99
75	47.26	55.33	215.76	7.39	5.32	12.70
80	44.99	52.68	217.41	7.39	5.06	12.45
85	42.95	50.30	218.84	7.39	4.83	12.22
90	41.11	48.14	220.06	7.39	4.62	12.01
95	39.43	46.18	221.09	7.39	4.44	11.82
100	37.90	44.38	221.97	7.39	4.26	11.65
105	36.50	42.74	222.70	7.39	4.11	11.49
110	35.20	41.22	223.29	7.39	3.96	11.35
115	34.01	39.82	223.77	7.39	3.83	11.21
120	32.89	38.52	224.14	7.39	3.70	11.09
125	31.86	37.31	224.41	7.39	3.58	10.97
130	30.90	36.18	224.58	7.39	3.48	10.86
135	30.00	35.12	224.67	7.39	3.37	10.76
140	29.15	34.14	224.68	7.39	3.28	10.67
145	28.36	33.21	224.62	7.39	3.19	10.58
150	27.61	32.33	224.49	7.39	3.11	10.49
155	26.91	31.50	224.29	7.39	3.03	10.41
160	26.24	30.72	224.04	7.39	2.95	10.34
165	25.61	29.99	223.73	7.39	2.88	10.27
170	25.01	29.29	223.36	7.39	2.81	10.20
175	24.44	28.62	222.95	7.39	2.75	10.14
180	23.90	27.99	222.49	7.39	2.69	10.08
185	23.39	27.39	221.99	7.39	2.63	10.02
190	22.90	26.81	221.44	7.39	2.58	9.96
195	22.43	26.26	220.86	7.39	2.52	9.91
200	21.98	25.74	220.23	7.39	2.47	9.86
205	21.55	25.24	219.57	7.39	2.42	9.81
210	21.14	24.76	218.88	7.39	2.38	9.77
215	20.75	24.30	218.15	7.39	2.33	9.72
220	20.37	23.86	217.40	7.39	2.29	9.68
225	20.01	23.43	216.61	7.39	2.25	9.64
230	19.66	23.02	215.80	7.39	2.21	9.60
235	19.33	22.63	214.96	7.39	2.17	9.56
240	19.01	22.25	214.09	7.39	2.14	9.53

* 50% of allowable controlled release rate as the underground storage is proposed

On-site Stormwater Retention

Total Storage Required =	**224.68**	**m^3**

Storage Provided

Underground Pipe Storage

Length =	161.7	m
Pipe Dia.=	0.75	m
Storage =	**71.44**	**m^3**

	Surface Storage	Underground MH Storage	
CBMH01	26.43	4.27	m^3
CBMH02	26.55	4.58	m^3
CBMH03	16.02	4.86	m^3
CBMH04	11.23	5.16	m^3
CBMH05	37.98	5.04	m^3
CBMH06	14.34	5.39	m^3
Total =	**132.55**	**29.30**	**m^3**
Total Storage Provided =	**233.29**	**m^3**	

LRL File No. 200100
Project: Proposed Development
Location: 6111 Hazeldean Rd (Stittsville, ON)
Date: June 11, 2021
Designed: M. Basnet
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Stormwater Management

2) 100 Year Post-development Stormwater Management (Mr Lube)

Un-controlled Runoff

C =	0.54	
I_{100} =	178.6	mm/hr
Td =	10	min
A =	0.05	ha
Un-controlled Release Rate =	**12.10**	L/s
Allowable Release Rate =	**27.57**	L/s
Controlled Release Rate =	**15.47**	L/s

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	*Controlled Release Rate (L/s)	Un-controlled Runoff (L/s)	Total Release Rate (L/s)
10	178.56	167.69	95.97	7.74	12.10	19.84
15	142.89	134.20	113.82	7.74	9.68	17.42
20	119.95	112.65	125.90	7.74	8.13	15.86
25	103.85	97.53	134.69	7.74	7.04	14.77
30	91.87	86.28	141.37	7.74	6.23	13.96
35	82.58	77.55	146.62	7.74	5.60	13.33
40	75.15	70.57	150.81	7.74	5.09	12.83
45	69.05	64.85	154.20	7.74	4.68	12.42
50	63.95	60.06	156.98	7.74	4.33	12.07
55	59.62	56.00	159.26	7.74	4.04	11.78
60	55.89	52.49	161.12	7.74	3.79	11.52
65	52.65	49.44	162.66	7.74	3.57	11.30
70	49.79	46.76	163.90	7.74	3.37	11.11
75	47.26	44.38	164.90	7.74	3.20	10.94
80	44.99	42.25	165.68	7.74	3.05	10.79
85	42.95	40.34	166.28	7.74	2.91	10.65
90	41.11	38.61	166.71	7.74	2.79	10.52
95	39.43	37.04	167.00	7.74	2.67	10.41
100	37.90	35.60	167.16	7.74	2.57	10.31
105	36.50	34.28	167.20	7.74	2.47	10.21
110	35.20	33.06	167.14	7.74	2.39	10.12
115	34.01	31.94	166.98	7.74	2.30	10.04
120	32.89	30.89	166.73	7.74	2.23	9.97
125	31.86	29.92	166.40	7.74	2.16	9.90
130	30.90	29.02	166.00	7.74	2.09	9.83
135	30.00	28.17	165.52	7.74	2.03	9.77
140	29.15	27.38	164.99	7.74	1.98	9.71
145	28.36	26.63	164.39	7.74	1.92	9.66
150	27.61	25.93	163.75	7.74	1.87	9.61
155	26.91	25.27	163.05	7.74	1.82	9.56
160	26.24	24.64	162.30	7.74	1.78	9.51
165	25.61	24.05	161.51	7.74	1.74	9.47
170	25.01	23.49	160.67	7.74	1.69	9.43
175	24.44	22.96	159.80	7.74	1.66	9.39
180	23.90	22.45	158.88	7.74	1.62	9.36
185	23.39	21.97	157.94	7.74	1.58	9.32
190	22.90	21.50	156.95	7.74	1.55	9.29
195	22.43	21.07	155.94	7.74	1.52	9.26
200	21.98	20.64	154.90	7.74	1.49	9.23
205	21.55	20.24	153.83	7.74	1.46	9.20
210	21.14	19.86	152.73	7.74	1.43	9.17
215	20.75	19.49	151.60	7.74	1.41	9.14
220	20.37	19.13	150.45	7.74	1.38	9.12
225	20.01	18.79	149.28	7.74	1.36	9.09
230	19.66	18.47	148.08	7.74	1.33	9.07
235	19.33	18.15	146.86	7.74	1.31	9.05
240	19.01	17.85	145.62	7.74	1.29	9.02

* 50% of allowable controlled release rate as the underground storage is proposed

On-site Stormwater Retention

Total Storage Required = 167.20 m^3

Storage Provided

Underground Pipe Storage					
Length =	81.10	9.6	75.80	64.7	m
Pipe Dia.=	0.975	0.75	0.45	0.3	m
Storage =	**60.55**	**4.24**	**12.06**	**4.57**	m^3

	Surface Storage	Underground Storage	
CBMH09	4.03	9.13	m^3
CBMH10	30.33	9.27	m^3
CBMH11	13.20	4.91	m^3
CBMH12	7.82	9.95	m^3
Total =	**55.38**	**33.26**	**m^3**

Total Storage Provided = 170.06 m^3

LRL File No. 200100
Project: Proposed Development
Location: 6111 Hazeldean Rd (Stittsville, ON)
Date: June 11, 2021
Designed: M. Basnet
Drawing Ref.: C601

Stormwater Management

3) 100 Year Post-development Stormwater Management (Commercial Area)

Un-controlled Runoff

C =	0.00		(N/A)
I_{100} =	178.6	mm/hr	
Td =	10	min	
A =	0.00	ha	(N/A)
Un-controlled Release Rate =	**0.00**	L/s	(N/A)
Allowable Release Rate =	**31.73**	L/s	
Controlled Release Rate =	**31.73**	L/s	

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	*Controlled Release Rate (L/s)	Un-controlled Runoff (L/s)	Total Release Rate (L/s)
10	178.56	214.49	119.17	15.87	0.00	15.87
15	142.89	171.64	140.20	15.87	0.00	15.87
20	119.95	144.08	153.86	15.87	0.00	15.87
25	103.85	124.74	163.31	15.87	0.00	15.87
30	91.87	110.35	170.08	15.87	0.00	15.87
35	82.58	99.19	174.99	15.87	0.00	15.87
40	75.15	90.26	178.56	15.87	0.00	15.87
45	69.05	82.94	181.11	15.87	0.00	15.87
50	63.95	76.82	182.87	15.87	0.00	15.87
55	59.62	71.62	183.99	15.87	0.00	15.87
60	55.89	67.14	184.59	15.87	0.00	15.87
65	52.65	63.24	184.76	15.87	0.00	15.87
70	49.79	59.81	184.56	15.87	0.00	15.87
75	47.26	56.76	184.04	15.87	0.00	15.87
80	44.99	54.04	183.25	15.87	0.00	15.87
85	42.95	51.60	182.23	15.87	0.00	15.87
90	41.11	49.38	180.99	15.87	0.00	15.87
95	39.43	47.37	179.57	15.87	0.00	15.87
100	37.90	45.53	177.98	15.87	0.00	15.87
105	36.50	43.84	176.24	15.87	0.00	15.87
110	35.20	42.29	174.37	15.87	0.00	15.87
115	34.01	40.85	172.37	15.87	0.00	15.87
120	32.89	39.51	170.27	15.87	0.00	15.87
125	31.86	38.27	168.05	15.87	0.00	15.87
130	30.90	37.12	165.75	15.87	0.00	15.87
135	30.00	36.03	163.35	15.87	0.00	15.87
140	29.15	35.02	160.88	15.87	0.00	15.87
145	28.36	34.06	158.33	15.87	0.00	15.87
150	27.61	33.17	155.71	15.87	0.00	15.87
155	26.91	32.32	153.02	15.87	0.00	15.87
160	26.24	31.52	150.27	15.87	0.00	15.87
165	25.61	30.76	147.47	15.87	0.00	15.87
170	25.01	30.04	144.61	15.87	0.00	15.87
175	24.44	29.36	141.70	15.87	0.00	15.87
180	23.90	28.71	138.74	15.87	0.00	15.87
185	23.39	28.09	135.74	15.87	0.00	15.87
190	22.90	27.51	132.69	15.87	0.00	15.87
195	22.43	26.94	129.60	15.87	0.00	15.87
200	21.98	26.41	126.48	15.87	0.00	15.87
205	21.55	25.89	123.32	15.87	0.00	15.87
210	21.14	25.40	120.12	15.87	0.00	15.87
215	20.75	24.93	116.89	15.87	0.00	15.87
220	20.37	24.47	113.63	15.87	0.00	15.87
225	20.01	24.04	110.33	15.87	0.00	15.87
230	19.66	23.62	107.01	15.87	0.00	15.87
235	19.33	23.22	103.66	15.87	0.00	15.87
240	19.01	22.83	100.29	15.87	0.00	15.87

* 50% of allowable controlled release rate as the underground storage is proposed

On-site Stormwater Retention

Total Storage Required =	**184.76**	**m^3**

Storage Provided

Underground Pipe Storage

Length =	104	m
Pipe Dia. =	0.675	m
Storage =	**37.22**	**m^3**

	Surface Storage	Underground Storage	
CBMH18	32.30	5.77	m^3
CBMH19	46.96	6.16	m^3
CBMH17	12.49	4.33	m^3
CBMH20	8.07	0.75	m^3
CBMH21	7.72	4.66	m^3
CBMH22	22.25	6.56	m^3
Total =	**129.79**	**28.23**	**m^3**

Total Storage Provided = **195.24** **m^3**

LRL File No. 200100
Project: Proposed Development
Location: 6111 Hazeldean Rd (Stittsville, ON)
Date: June 11, 2021
Designed: M. Basnet
Drawing Ref.: C601

Stormwater Management

Summary of Release Rate (100-Year)

Site Description	Controlled Release Rate	Un-controlled Release Rate	Total
	(L/s)	(L/s)	(L/s)
Halo Car Wash	14.77	20.09	34.86
Mr Lube	15.47	12.10	27.57
Commercial Area	31.73	0.00	31.73
Total	**61.98**	**32.18**	**94.16**

Summary of On-site Storage (100-Year)

Site Description	Storage Required (m^3)	Storage Provided (m^3)			
		Surface Storage	Underground Storage		Total (m^3)
			Oversized Pipe	CBMH	
Halo Car Wash	224.68	132.55	71.44	29.30	233.29
Mr Lube	167.20	55.38	76.85	33.26	165.49
Commercial Area	184.76	129.79	37.22	28.23	195.24
Total	**576.64**	**317.72**	**185.50**	**90.79**	**594.01**

LRL File No. 200100
Project: Proposed Development
Location: 6111 Hazeldean Rd (Stittsville, ON)
Date: June 7, 2021
Designed: M. Basnet
Drawing Ref.: C601

Stormwater Management

STORM - 5 YEAR

Runoff Equation

Q = 2.78CIA (L/s)

C = Runoff coefficient

I = Rainfall intensity (mm/hr) = A / (Td + C)$^{\beta}$

A = Area (ha)

Td = Time of duration (min)

Pre-Development Catchments within Development Area

	Total Area =	**1.856**	**ha**	**∑R =**	**0.22**
Un-Controlled	EWS-01 (Future Development)	0.511	ha	R =	0.20
	EWS-02 (Proposed Development)	1.345	ha	R =	0.23
	Total Un-controlled =	**1.856**	**ha**	**∑R =**	**0.22**

Pre-Development Release Rate

IDF Curve Equations

100-Year, I_{100} = 1735.688 / (Td + 6.014)$^{0.820}$ A = 1735.688 B = 0.820 C = 6.014

5-Year, I_5 = 998.071 / (Td + 6.053)$^{0.814}$ A = 998.071 B = 0.814 C = 6.053

2-Year, I_2 = 732.951 / (Td + 6.199)$^{0.810}$ A = 732.951 B = 0.810 C = 6.199

C =	0.23		
I_{100} =	178.6	mm/hr	
I_5 =	104.2	mm/hr	
I_2 =	76.8	mm/hr	
Td =	10	min	
A =	1.35	ha	
100-year Release Rate =	153.71	L/s	
5-year Release Rate =	89.69	L/s	
2-year Release Rate =	66.11	L/s	
Allowable Release Rate =	**70**	L/ha/s	*(as determined for Potter's Key Subdivision Report by Atrel Engineering (Rev 5) dated February 2017)*
Proposed Development Allowable Release Rate =	**94.16**	**L/s**	(Proposed development, A=1.34 ha)
Future Development Allowable Release Rate =	**35.70**	**L/s**	(Future development, A=0.51 ha)
Total =	**129.86**	**L/s**	

Post-development Stormwater Management

					$\sum R_{2\&5}$	$\sum R_{100}$
	Total Site Area =	**1.345**	**ha**	**∑R =**	**0.75**	**0.94**
Halo Car Wash	WS-01 (controlled)	0.095	ha	R =	0.64	0.79
	WS-02 (controlled)	0.091	ha	R =	0.90	1.00
	WS-03 (controlled)	0.075	ha	R =	0.90	1.00
	WS-04 (controlled)	0.042	ha	R =	0.82	1.00
	WS-05 (controlled)	0.044	ha	R =	0.90	1.00
	WS-06 (controlled)	0.023	ha	R =	0.87	1.00
	WS-16 (controlled)	0.050	ha	R =	0.78	0.97
	Total (Controlled)	**0.421**	**ha**	**R =**	**0.82**	**1.00**
	WS-07 (un-controlled)	0.032	ha	R =	0.67	0.83
	WS-23 (un-controlled)	0.045	ha	R =	0.25	0.31
	Total (Un-controlled)	**0.077**	**ha**	**R =**	**0.42**	**0.53**
	Total (Controlled+Un-controlled)	**0.498**	**ha**	**R =**	**0.76**	**0.94**
Mr Lube	WS-08 (controlled)	0.029	ha	R =	0.20	0.25
	WS-09 (controlled)	0.044	ha	R =	0.90	1.00
	WS-10 (controlled)	0.060	ha	R =	0.79	0.99
	WS-11 (controlled)	0.031	ha	R =	0.71	0.89
	WS-12 (controlled)	0.049	ha	R =	0.84	1.00
	WS-14 (controlled)	0.049	ha	R =	0.90	1.00
	WS-15 (controlled)	0.088	ha	R =	0.81	1.00
	Total (Controlled)	**0.349**	**ha**	**R =**	**0.77**	**0.97**
	WS-13 (un-controlled)	0.045	ha	R =	0.43	0.54
	Total (Un-controlled)	**0.045**	**ha**	**R =**	**0.43**	**0.54**
	Total (Controlled+Un-controlled)	**0.394**	**ha**	**R =**	**0.74**	**0.92**
Commercial Area	WS-17 (controlled)	0.151	ha	R =	0.79	0.99
	WS-18 (controlled)	0.068	ha	R =	0.79	0.98
	WS-19 (controlled)	0.115	ha	R =	0.57	0.71
	WS-20 (controlled)	0.042	ha	R =	0.90	1.00
	WS-21 (controlled)	0.034	ha	R =	0.90	1.00
	WS-22 (controlled)	0.044	ha	R =	0.88	1.00
	Total (Controlled)	**0.453**	**ha**	**R =**	**0.76**	**0.95**
	Total (Un-controlled)	**0.000**	**ha**	**R =**	**0.00**	**0.00**
	Total (Controlled+Un-controlled)	**0.453**	**ha**	**R =**	**0.76**	**0.95**

1) 5 Year Post-development Stormwater Management (Halo Car Wash)

Un-controlled Runoff

C =	0.42	
I_5 =	104.2	mm/hr
Td =	10	min
A =	0.077	ha
Un-controlled Release Rate =	**9.38**	L/s
Allowable Release Rate =	**34.86**	L/s
Controlled Release Rate =	**14.77**	L/s

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	*Controlled Release Rate (L/s)	Un-controlled Runoff (L/s)	Total Release Rate (L/s)
10	104.19	99.60	55.33	7.39	9.38	16.76
15	83.56	79.88	65.24	7.39	7.52	14.91
20	70.25	67.16	71.72	7.39	6.32	13.71
25	60.90	58.21	76.24	7.39	5.48	12.87
30	53.93	51.55	79.50	7.39	4.85	12.24
35	48.52	46.38	81.89	7.39	4.37	11.75
40	44.18	42.24	83.64	7.39	3.98	11.36
45	40.63	38.84	84.92	7.39	3.66	11.04
50	37.65	35.99	85.82	7.39	3.39	10.78
55	35.12	33.58	86.42	7.39	3.16	10.55
60	32.94	31.49	86.78	7.39	2.96	10.35
65	31.04	29.68	86.93	7.39	2.79	10.18
70	29.37	28.08	86.90	7.39	2.64	10.03
75	27.89	26.66	86.73	7.39	2.51	9.90
80	26.56	25.39	86.42	7.39	2.39	9.78
85	25.37	24.25	86.01	7.39	2.28	9.67
90	24.29	23.22	85.49	7.39	2.19	9.57
95	23.31	22.28	84.88	7.39	2.10	9.48
100	22.41	21.42	84.20	7.39	2.02	9.40
105	21.58	20.63	83.44	7.39	1.94	9.33
110	20.82	19.91	82.62	7.39	1.87	9.26
115	20.12	19.23	81.74	7.39	1.81	9.20
120	19.47	18.61	80.80	7.39	1.75	9.14
125	18.86	18.03	79.82	7.39	1.70	9.08
130	18.29	17.49	78.79	7.39	1.65	9.03
135	17.76	16.98	77.72	7.39	1.60	8.99
140	17.27	16.51	76.61	7.39	1.55	8.94
145	16.80	16.06	75.47	7.39	1.51	8.90
150	16.36	15.64	74.29	7.39	1.47	8.86
155	15.95	15.25	73.08	7.39	1.44	8.82
160	15.56	14.87	71.84	7.39	1.40	8.79
165	15.18	14.52	70.57	7.39	1.37	8.75
170	14.83	14.18	69.28	7.39	1.33	8.72
175	14.50	13.86	67.96	7.39	1.30	8.69
180	14.18	13.56	66.62	7.39	1.28	8.66
185	13.88	13.27	65.25	7.39	1.25	8.64
190	13.59	12.99	63.87	7.39	1.22	8.61
195	13.31	12.73	62.47	7.39	1.20	8.59
200	13.05	12.47	61.05	7.39	1.17	8.56
205	12.80	12.23	59.61	7.39	1.15	8.54
210	12.56	12.00	58.15	7.39	1.13	8.52
215	12.32	11.78	56.68	7.39	1.11	8.50
220	12.10	11.57	55.19	7.39	1.09	8.48
225	11.89	11.36	53.69	7.39	1.07	8.46
230	11.68	11.17	52.17	7.39	1.05	8.44
235	11.48	10.98	50.64	7.39	1.03	8.42
240	11.29	10.80	49.10	7.39	1.02	8.40

* 50% of allowable controlled release rate as the underground storage is proposed

On-site Stormwater Retention

Total Storage Required = 86.93 m^3

2) 5 Year Post-development Stormwater Management (Mr Lube)

Un-controlled Runoff

C =	0.43	
I_5 =	104.2	mm/hr
Td =	10	min
A =	0.05	ha
Un-controlled Release Rate =	**5.65**	L/s
Allowable Release Rate =	**27.57**	L/s
Controlled Release Rate =	**15.47**	L/s

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	*Controlled Release Rate (L/s)	Un-controlled Runoff (L/s)	Total Release Rate (L/s)
10	104.19	78.28	42.33	7.74	5.65	13.39
15	83.56	62.78	49.54	7.74	4.53	12.27
20	70.25	52.78	54.05	7.74	3.81	11.55
25	60.90	45.75	57.02	7.74	3.30	11.04
30	53.93	40.52	59.00	7.74	2.92	10.66
35	48.52	36.45	60.30	7.74	2.63	10.37
40	44.18	33.20	61.10	7.74	2.40	10.13
45	40.63	30.53	61.53	7.74	2.20	9.94
50	37.65	28.29	61.66	7.74	2.04	9.78
55	35.12	26.39	61.55	7.74	1.90	9.64
60	32.94	24.75	61.25	7.74	1.79	9.52
65	31.04	23.32	60.79	7.74	1.68	9.42
70	29.37	22.07	60.19	7.74	1.59	9.33
75	27.89	20.95	59.47	7.74	1.51	9.25
80	26.56	19.96	58.66	7.74	1.44	9.18
85	25.37	19.06	57.75	7.74	1.38	9.11
90	24.29	18.25	56.76	7.74	1.32	9.05
95	23.31	17.51	55.71	7.74	1.26	9.00
100	22.41	16.83	54.59	7.74	1.21	8.95
105	21.58	16.22	53.42	7.74	1.17	8.91
110	20.82	15.64	52.19	7.74	1.13	8.87
115	20.12	15.12	50.92	7.74	1.09	8.83
120	19.47	14.63	49.61	7.74	1.06	8.79
125	18.86	14.17	48.25	7.74	1.02	8.76
130	18.29	13.75	46.87	7.74	0.99	8.73
135	17.76	13.35	45.45	7.74	0.96	8.70
140	17.27	12.97	43.99	7.74	0.94	8.67
145	16.80	12.62	42.51	7.74	0.91	8.65
150	16.36	12.29	41.01	7.74	0.89	8.62
155	15.95	11.98	39.48	7.74	0.86	8.60
160	15.56	11.69	37.92	7.74	0.84	8.58
165	15.18	11.41	36.35	7.74	0.82	8.56
170	14.83	11.14	34.75	7.74	0.80	8.54
175	14.50	10.89	33.14	7.74	0.79	8.52
180	14.18	10.65	31.50	7.74	0.77	8.51
185	13.88	10.43	29.85	7.74	0.75	8.49
190	13.59	10.21	28.19	7.74	0.74	8.47
195	13.31	10.00	26.51	7.74	0.72	8.46
200	13.05	9.80	24.81	7.74	0.71	8.44
205	12.80	9.61	23.10	7.74	0.69	8.43
210	12.56	9.43	21.38	7.74	0.68	8.42
215	12.32	9.26	19.64	7.74	0.67	8.40
220	12.10	9.09	17.89	7.74	0.66	8.39
225	11.89	8.93	16.13	7.74	0.64	8.38
230	11.68	8.78	14.36	7.74	0.63	8.37
235	11.48	8.63	12.58	7.74	0.62	8.36
240	11.29	8.49	10.79	7.74	0.61	8.35

* 50% of allowable controlled release rate as the underground storage is proposed

On-site Stormwater Retention

Total Storage Required = 61.66 m^3

3) 5 Year Post-development Stormwater Management (Commercial Area)

Un-controlled Runoff

C =	0.00		(N/A)
I_{100} =	104.2	mm/hr	
Td =	10	min	
A =	0.00	ha	(N/A)
Un-controlled Release Rate =	**0.00**	L/s	(N/A)
Allowable Release Rate =	**31.73**	L/s	
Controlled Release Rate =	**31.73**	L/s	

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	*Controlled Release Rate (L/s)	Un-controlled Runoff (L/s)	Total Release Rate (L/s)
10	104.19	100.13	50.56	15.87	0.00	15.87
15	83.56	80.30	57.99	15.87	0.00	15.87
20	70.25	67.51	61.97	15.87	0.00	15.87
25	60.90	58.52	63.98	15.87	0.00	15.87
30	53.93	51.82	64.72	15.87	0.00	15.87
35	48.52	46.62	64.59	15.87	0.00	15.87
40	44.18	42.46	63.83	15.87	0.00	15.87
45	40.63	39.04	62.58	15.87	0.00	15.87
50	37.65	36.18	60.95	15.87	0.00	15.87
55	35.12	33.75	59.03	15.87	0.00	15.87
60	32.94	31.66	56.85	15.87	0.00	15.87
65	31.04	29.83	54.47	15.87	0.00	15.87
70	29.37	28.23	51.91	15.87	0.00	15.87
75	27.89	26.80	49.20	15.87	0.00	15.87
80	26.56	25.53	46.37	15.87	0.00	15.87
85	25.37	24.38	43.41	15.87	0.00	15.87
90	24.29	23.34	40.36	15.87	0.00	15.87
95	23.31	22.40	37.22	15.87	0.00	15.87
100	22.41	21.53	34.00	15.87	0.00	15.87
105	21.58	20.74	30.71	15.87	0.00	15.87
110	20.82	20.01	27.35	15.87	0.00	15.87
115	20.12	19.33	23.93	15.87	0.00	15.87
120	19.47	18.71	20.46	15.87	0.00	15.87
125	18.86	18.12	16.94	15.87	0.00	15.87
130	18.29	17.58	13.38	15.87	0.00	15.87
135	17.76	17.07	9.77	15.87	0.00	15.87
140	17.27	16.59	6.12	15.87	0.00	15.87
145	16.80	16.15	2.44	15.87	0.00	15.87
150	16.36	15.72	0.00	15.87	0.00	15.87
155	15.95	15.32	0.00	15.87	0.00	15.87
160	15.56	14.95	0.00	15.87	0.00	15.87
165	15.18	14.59	0.00	15.87	0.00	15.87
170	14.83	14.25	0.00	15.87	0.00	15.87
175	14.50	13.93	0.00	15.87	0.00	15.87
180	14.18	13.63	0.00	15.87	0.00	15.87
185	13.88	13.34	0.00	15.87	0.00	15.87
190	13.59	13.06	0.00	15.87	0.00	15.87
195	13.31	12.79	0.00	15.87	0.00	15.87
200	13.05	12.54	0.00	15.87	0.00	15.87
205	12.80	12.30	0.00	15.87	0.00	15.87
210	12.56	12.07	0.00	15.87	0.00	15.87
215	12.32	11.84	0.00	15.87	0.00	15.87
220	12.10	11.63	0.00	15.87	0.00	15.87
225	11.89	11.42	0.00	15.87	0.00	15.87
230	11.68	11.23	0.00	15.87	0.00	15.87
235	11.48	11.04	0.00	15.87	0.00	15.87
240	11.29	10.85	0.00	15.87	0.00	15.87

* 50% of allowable controlled release rate as the underground storage is proposed

On-site Stormwater Retention

Total Storage Required = 64.72 m^3

LRL File No. 200100
Project: Proposed Development
Location: 6111 Hazeldean Rd (Stittsville, ON)
Date: June 7, 2021
Designed: M. Basnet
Drawing Ref.: C601

Stormwater Management

STORM - 2 YEAR

Runoff Equation

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

Pre-Development Catchments within Development Area

	Total Area =	**1.856**	**ha**	**∑R =**	**0.22**
Un-Controlled	EWS-01 (Future Development)	0.511	ha	R =	0.20
	EWS-02 (Proposed Development)	1.345	ha	R =	0.23
	Total Un-controlled =	**1.856**	**ha**	**∑R =**	**0.22**

Pre-Development Release Rate

IDF Curve Equations

100-Year, I_{100} = 1735.688 / (Td + 6.014)$^{0.820}$ A = 1735.688 B = 0.820 C = 6.014

5-Year, I_5 = 998.071 / (Td + 6.053)$^{0.814}$ A = 998.071 B = 0.814 C = 6.053

2-Year, I_2 = 732.951 / (Td + 6.199)$^{0.810}$ A = 732.951 B = 0.810 C = 6.199

C =	0.23		
I_{100} =	178.6	mm/hr	
I_5 =	104.2	mm/hr	
I_2 =	76.8	mm/hr	
Td =	10	min	
A =	1.35	ha	
100-year Release Rate =	153.71	L/s	
5-year Release Rate =	89.69	L/s	
2-year Release Rate =	66.11	L/s	
Allowable Release Rate =	**70**	L/ha/s	*(as determined for Potter's Key Subdivision Report by Atrel Engineering (Rev 5) dated February 2017)*
Proposed Development Allowable Release Rate =	**94.16**	**L/s**	(Proposed development, A=1.34 ha)
Future Development Allowable Release Rate =	**35.70**	**L/s**	(Future development, A=0.51 ha)
Total =	**129.86**	**L/s**	

Post-development Stormwater Management

					$\sum R_{2\&5}$	$\sum R_{100}$
	Total Site Area =	**1.345**	**ha**	**∑R =**	**0.75**	**0.94**
Halo Car Wash	WS-01 (controlled)	0.095	ha	R =	0.64	0.79
	WS-02 (controlled)	0.091	ha	R =	0.90	1.00
	WS-03 (controlled)	0.075	ha	R =	0.90	1.00
	WS-04 (controlled)	0.042	ha	R =	0.82	1.00
	WS-05 (controlled)	0.044	ha	R =	0.90	1.00
	WS-06 (controlled)	0.023	ha	R =	0.87	1.00
	WS-16 (controlled)	0.050	ha	R =	0.78	0.97
	Total (Controlled)	**0.421**	**ha**	**R =**	**0.82**	**1.00**
	WS-07 (un-controlled)	0.032	ha	R =	0.67	0.83
	WS-23 (un-controlled)	0.045	ha	R =	0.25	0.31
	Total (Un-controlled)	**0.077**	**ha**	**R =**	**0.42**	**0.53**
	Total (Controlled+Un-controlled)	**0.498**	**ha**	**R =**	**0.76**	**0.94**
Mr Lube	WS-08 (controlled)	0.029	ha	R =	0.20	0.25
	WS-09 (controlled)	0.044	ha	R =	0.90	1.00
	WS-10 (controlled)	0.060	ha	R =	0.79	0.99
	WS-11 (controlled)	0.031	ha	R =	0.71	0.89
	WS-12 (controlled)	0.049	ha	R =	0.84	1.00
	WS-14 (controlled)	0.049	ha	R =	0.90	1.00
	WS-15 (controlled)	0.088	ha	R =	0.81	1.00
	Total (Controlled)	**0.349**	**ha**	**R =**	**0.77**	**0.97**
	WS-13 (un-controlled)	0.045	ha	R =	0.43	0.54
	Total (Un-controlled)	**0.045**	**ha**	**R =**	**0.43**	**0.54**
	Total (Controlled+Un-controlled)	**0.394**	**ha**	**R =**	**0.74**	**0.92**
Commercial Area	WS-17 (controlled)	0.151	ha	R =	0.79	0.99
	WS-18 (controlled)	0.068	ha	R =	0.79	0.98
	WS-19 (controlled)	0.115	ha	R =	0.57	0.71
	WS-20 (controlled)	0.042	ha	R =	0.90	1.00
	WS-21 (controlled)	0.034	ha	R =	0.90	1.00
	WS-22 (controlled)	0.044	ha	R =	0.88	1.00
	Total (Controlled)	**0.453**	**ha**	**R =**	**0.76**	**0.95**
	Total (Un-controlled)	**0.000**	**ha**	**R =**	**0.00**	**0.00**
	Total (Controlled+Un-controlled)	**0.453**	**ha**	**R =**	**0.76**	**0.95**

1) 2 Year Post-development Stormwater Management (Halo Car Wash)

Un-controlled Runoff

C =	0.42	
I_2 =	76.81	mm/hr
Td =	10	min
A =	0.077	ha
Un-controlled Release Rate =	**6.91**	L/s
Allowable Release Rate =	**34.86**	L/s
Controlled Release Rate =	**14.77**	L/s

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	*Controlled Release Rate (L/s)	Un-controlled Runoff (L/s)	Total Release Rate (L/s)
10	76.81	73.42	39.62	7.39	6.91	14.30
15	61.77	59.05	46.49	7.39	5.56	12.95
20	52.03	49.74	50.82	7.39	4.68	12.07
25	45.17	43.18	53.69	7.39	4.06	11.45
30	40.04	38.28	55.61	7.39	3.60	10.99
35	36.06	34.47	56.88	7.39	3.24	10.63
40	32.86	31.42	57.67	7.39	2.96	10.34
45	30.24	28.91	58.10	7.39	2.72	10.11
50	28.04	26.81	58.26	7.39	2.52	9.91
55	26.17	25.02	58.18	7.39	2.36	9.74
60	24.56	23.48	57.92	7.39	2.21	9.60
65	23.15	22.13	57.50	7.39	2.08	9.47
70	21.91	20.95	56.95	7.39	1.97	9.36
75	20.81	19.90	56.29	7.39	1.87	9.26
80	19.83	18.96	55.53	7.39	1.78	9.17
85	18.94	18.11	54.69	7.39	1.70	9.09
90	18.14	17.34	53.77	7.39	1.63	9.02
95	17.41	16.65	52.78	7.39	1.57	8.95
100	16.75	16.01	51.73	7.39	1.51	8.89
105	16.13	15.42	50.63	7.39	1.45	8.84
110	15.57	14.88	49.47	7.39	1.40	8.79
115	15.05	14.38	48.28	7.39	1.35	8.74
120	14.56	13.92	47.04	7.39	1.31	8.70
125	14.11	13.49	45.77	7.39	1.27	8.66
130	13.69	13.09	44.46	7.39	1.23	8.62
135	13.30	12.71	43.11	7.39	1.20	8.58
140	12.93	12.36	41.74	7.39	1.16	8.55
145	12.58	12.02	40.35	7.39	1.13	8.52
150	12.25	11.71	38.92	7.39	1.10	8.49
155	11.94	11.42	37.48	7.39	1.07	8.46
160	11.65	11.14	36.01	7.39	1.05	8.44
165	11.37	10.87	34.52	7.39	1.02	8.41
170	11.11	10.62	33.00	7.39	1.00	8.39
175	10.86	10.39	31.48	7.39	0.98	8.36
180	10.63	10.16	29.93	7.39	0.96	8.34
185	10.40	9.94	28.37	7.39	0.94	8.32
190	10.19	9.74	26.79	7.39	0.92	8.30
195	9.98	9.54	25.19	7.39	0.90	8.29
200	9.78	9.35	23.59	7.39	0.88	8.27
205	9.60	9.17	21.96	7.39	0.86	8.25
210	9.42	9.00	20.33	7.39	0.85	8.23
215	9.24	8.84	18.68	7.39	0.83	8.22
220	9.08	8.68	17.03	7.39	0.82	8.20
225	8.92	8.52	15.36	7.39	0.80	8.19
230	8.76	8.38	13.68	7.39	0.79	8.18
235	8.62	8.24	11.99	7.39	0.78	8.16
240	8.47	8.10	10.29	7.39	0.76	8.15

* 50% of allowable controlled release rate as the underground storage is proposed

On-site Stormwater Retention

Total Storage Required =	**58.26**	**m^3**

2) 2 Year Post-development Stormwater Management (Mr Lube)

Un-controlled Runoff

C =	0.43	
I_2 =	76.8	mm/hr
Td =	10	min
A =	0.05	ha
Un-controlled Release Rate =	**4.16**	L/s
Allowable Release Rate =	**27.57**	L/s
Controlled Release Rate =	**15.47**	L/s

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	*Controlled Release Rate (L/s)	Un-controlled Runoff (L/s)	Total Release Rate (L/s)
10	76.81	57.71	29.98	7.74	4.16	11.90
15	61.77	46.41	34.80	7.74	3.35	11.09
20	52.03	39.09	37.63	7.74	2.82	10.56
25	45.17	33.93	39.30	7.74	2.45	10.19
30	40.04	30.09	40.23	7.74	2.17	9.91
35	36.06	27.09	40.65	7.74	1.95	9.69
40	32.86	24.69	40.69	7.74	1.78	9.52
45	30.24	22.72	40.45	7.74	1.64	9.38
50	28.04	21.07	39.99	7.74	1.52	9.26
55	26.17	19.66	39.36	7.74	1.42	9.16
60	24.56	18.45	38.57	7.74	1.33	9.07
65	23.15	17.39	37.66	7.74	1.26	8.99
70	21.91	16.46	36.65	7.74	1.19	8.92
75	20.81	15.64	35.55	7.74	1.13	8.86
80	19.83	14.90	34.38	7.74	1.07	8.81
85	18.94	14.23	33.13	7.74	1.03	8.76
90	18.14	13.63	31.83	7.74	0.98	8.72
95	17.41	13.08	30.47	7.74	0.94	8.68
100	16.75	12.58	29.07	7.74	0.91	8.64
105	16.13	12.12	27.62	7.74	0.87	8.61
110	15.57	11.70	26.14	7.74	0.84	8.58
115	15.05	11.30	24.62	7.74	0.82	8.55
120	14.56	10.94	23.07	7.74	0.79	8.53
125	14.11	10.60	21.49	7.74	0.76	8.50
130	13.69	10.29	19.88	7.74	0.74	8.48
135	13.30	9.99	18.25	7.74	0.72	8.46
140	12.93	9.71	16.59	7.74	0.70	8.44
145	12.58	9.45	14.91	7.74	0.68	8.42
150	12.25	9.20	13.21	7.74	0.66	8.40
155	11.94	8.97	11.50	7.74	0.65	8.38
160	11.65	8.75	9.76	7.74	0.63	8.37
165	11.37	8.55	8.01	7.74	0.62	8.35
170	11.11	8.35	6.25	7.74	0.60	8.34
175	10.86	8.16	4.47	7.74	0.59	8.33
180	10.63	7.98	2.67	7.74	0.58	8.31
185	10.40	7.81	0.86	7.74	0.56	8.30
190	10.19	7.65	0.00	7.74	0.55	8.29
195	9.98	7.50	0.00	7.74	0.54	8.28
200	9.78	7.35	0.00	7.74	0.53	8.27
205	9.60	7.21	0.00	7.74	0.52	8.26
210	9.42	7.07	0.00	7.74	0.51	8.25
215	9.24	6.94	0.00	7.74	0.50	8.24
220	9.08	6.82	0.00	7.74	0.49	8.23
225	8.92	6.70	0.00	7.74	0.48	8.22
230	8.76	6.58	0.00	7.74	0.48	8.21
235	8.62	6.47	0.00	7.74	0.47	8.20
240	8.47	6.37	0.00	7.74	0.46	8.20

* 50% of allowable controlled release rate as the underground storage is proposed

On-site Stormwater Retention

Total Storage Required = 40.69 m^3

3) 2 Year Post-development Stormwater Management (Commercial Area)

Un-controlled Runoff

C =	0.00		(N/A)
I_2 =	76.8	mm/hr	
Td =	10	min	
A =	0.00	ha	(N/A)
Un-controlled Release Rate =	**0.00**	L/s	(N/A)
Allowable Release Rate =	**31.73**	L/s	
Controlled Release Rate =	**31.73**	L/s	

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate (L/s)	Un-controlled Runoff (L/s)	Total Release Rate (L/s)
10	76.81	92.26	45.84	15.87	0.00	15.87
15	61.77	74.20	52.50	15.87	0.00	15.87
20	52.03	62.50	55.96	15.87	0.00	15.87
25	45.17	54.25	57.58	15.87	0.00	15.87
30	40.04	48.10	58.02	15.87	0.00	15.87
35	36.06	43.31	57.64	15.87	0.00	15.87
40	32.86	39.48	56.67	15.87	0.00	15.87
45	30.24	36.32	55.24	15.87	0.00	15.87
50	28.04	33.68	53.45	15.87	0.00	15.87
55	26.17	31.44	51.38	15.87	0.00	15.87
60	24.56	29.50	49.08	15.87	0.00	15.87
65	23.15	27.81	46.58	15.87	0.00	15.87
70	21.91	26.32	43.92	15.87	0.00	15.87
75	20.81	25.00	41.11	15.87	0.00	15.87
80	19.83	23.82	38.18	15.87	0.00	15.87
85	18.94	22.76	35.14	15.87	0.00	15.87
90	18.14	21.79	32.01	15.87	0.00	15.87
95	17.41	20.92	28.79	15.87	0.00	15.87
100	16.75	20.12	25.50	15.87	0.00	15.87
105	16.13	19.38	22.14	15.87	0.00	15.87
110	15.57	18.70	18.72	15.87	0.00	15.87
115	15.05	18.07	15.24	15.87	0.00	15.87
120	14.56	17.49	11.71	15.87	0.00	15.87
125	14.11	16.95	8.13	15.87	0.00	15.87
130	13.69	16.44	4.51	15.87	0.00	15.87
135	13.30	15.97	0.85	15.87	0.00	15.87
140	12.93	15.53	0.00	15.87	0.00	15.87
145	12.58	15.11	0.00	15.87	0.00	15.87
150	12.25	14.72	0.00	15.87	0.00	15.87
155	11.94	14.35	0.00	15.87	0.00	15.87
160	11.65	14.00	0.00	15.87	0.00	15.87
165	11.37	13.66	0.00	15.87	0.00	15.87
170	11.11	13.35	0.00	15.87	0.00	15.87
175	10.86	13.05	0.00	15.87	0.00	15.87
180	10.63	12.76	0.00	15.87	0.00	15.87
185	10.40	12.49	0.00	15.87	0.00	15.87
190	10.19	12.24	0.00	15.87	0.00	15.87
195	9.98	11.99	0.00	15.87	0.00	15.87
200	9.78	11.75	0.00	15.87	0.00	15.87
205	9.60	11.53	0.00	15.87	0.00	15.87
210	9.42	11.31	0.00	15.87	0.00	15.87
215	9.24	11.10	0.00	15.87	0.00	15.87
220	9.08	10.90	0.00	15.87	0.00	15.87
225	8.92	10.71	0.00	15.87	0.00	15.87
230	8.76	10.53	0.00	15.87	0.00	15.87
235	8.62	10.35	0.00	15.87	0.00	15.87
240	8.47	10.18	0.00	15.87	0.00	15.87

* 50% of allowable controlled release rate as the underground storage is proposed

On-site Stormwater Retention

Total Storage Required = 58.02 m^3

LRL File No. 200100
Project: Proposed Development
Location: 6111 Hazeldean Rd (Stittsville, ON)
Date: June 11, 2021
Designed: M. Basnet
Dwg. Reference: 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: 2 Years
Intensity equation:
$I_2 = 732.951 / (Td + 6.199)^{0.810}$ (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}
								(min)	(mm/hr)	(L/s)	(L/s)	(mm)		(%)	(m)	(L/s)	(m/s)	(min)	
WS-16	CB01	CBMH01	0.009	0.000	0.041	0.11	0.11	10.00	76.81	8.30		750	PVC	1.00%	37.3	1113.28	2.52	0.25	0.01
WS-01	CBMH01	MH106	0.036	0.000	0.059	0.17	0.28	10.25	75.87	20.98		750	PVC	0.35%	24.6	658.62	1.49	0.28	0.03
	MH106	CBMH05					0.28	10.52	74.86	20.70		750	PVC	0.35%	22.3	658.62	1.49	0.25	0.03
WS-05	CBMH05	CBMH06	0.000	0.000	0.044	0.11	0.39	10.77	73.97	28.67		750	PVC	0.35%	22.3	658.62	1.49	0.25	0.04
WS-02	CBMH02	CBMH03	0.000	0.000	0.091	0.23	0.23	10.00	76.81	17.54		750	PVC	0.35%	23.2	658.62	1.49	0.26	0.03
WS-03	CBMH03	CBMH04	0.000	0.000	0.075	0.19	0.42	10.26	75.82	31.57		750	PVC	0.35%	16.1	658.62	1.49	0.18	0.05
WS-04	CBMH04	CBMH06	0.005	0.000	0.038	0.10	0.51	10.44	75.16	38.53		750	PVC	0.35%	15.9	658.62	1.49	0.18	0.06
WS-06	*CBMH06	MH07	0.001	0.000	0.022	0.06	0.90	11.02	73.10	65.81	14.77	300	PVC	0.50%	16.9	68.38	0.97	0.29	0.96
	MH07	MH16					0.90	11.31	72.11	64.93	14.77	300	PVC	0.50%	32.1	68.38	0.97	0.55	0.95
WS-08	CB08	CBMH09	0.029	0.000	0.000	0.02	0.02	10.00	76.81	1.25		750	PVC	0.25%	9.6	556.64	1.26	0.13	0.00
WS-09	CBMH09	CBMH10	0.000	0.000	0.044	0.11	0.13	10.13	76.32	9.57		975	Concrete	0.25%	28.30	1120.53	1.50	0.31	0.01
WS-10	CBMH10	CBMH12	0.009	0.000	0.051	0.13	0.26	10.44	75.15	19.29		975	Concrete	0.25%	26.80	1120.53	1.50	0.30	0.02
WS-11	CBMH11	CBMH12	0.008	0.000	0.023	0.06	0.06	10.00	76.81	4.74		975	Concrete	0.25%	26.00	1120.53	1.50	0.29	0.00
WS-15	CBMH103	CBMH104	0.012	0.000	0.076	0.20	0.20	10.00	76.81	15.09		450	PVC	0.50%	8.30	201.60	1.27	0.11	0.07
WS-14	CBMH104	CBMH105	0.000	0.000	0.049	0.12	0.32	10.77	73.97	23.51		450	PVC	0.50%	58.50	201.60	1.27	0.77	0.12
	CBMH105	MH100					0.32	10.85	73.68	23.42		450	PVC	0.50%	6.40	201.60	1.27	0.08	0.12
	MH100	STM/ CBMH12					0.32	10.89	73.56	23.38		450	PVC	0.50%	2.60	201.60	1.27	0.03	0.12
WS-12	*CBMH12	MH16	0.004	0.000	0.045	0.12	0.64	10.74	74.08	47.13	15.47	300	PVC	0.50%	7.10	68.38	0.97	0.12	0.69
	MH16	MH23					1.54	11.86	70.32	108.05	30.25	450	PVC	0.30%	74.10	156.16	0.98	1.26	0.69
WS-18	CBMH18	CBMH19	0.011	0.000	0.057	0.15	0.15	10.00	76.81	11.42		675	PVC	0.50%	17.1	594.39	1.66	0.17	0.02
WS-19	CBMH19	CBMH22	0.054	0.000	0.061	0.18	0.33	10.17	76.15	25.15		675	PVC	0.50%	20.80	594.39	1.66	0.21	0.04
WS-17	CBMH17	CBMH22	0.023	0.000	0.128	0.33	0.33	10.00	76.81	25.56		675	PVC	0.50%	20.10	594.39	1.66	0.20	0.04
WS-20	CBMH20	CBMH21	0.000	0.000	0.042	0.11	0.11	10.00	76.81	8.15		675	PVC	0.50%	6.90	594.39	1.66	0.07	0.01
WS-21	CBMH21	CBMH22	0.000	0.000	0.034	0.08	0.19	10.07	76.54	14.61		675	PVC	0.50%	21.50	594.39	1.66	0.22	0.02
WS-22	*CBMH22	MH23					0.85	10.38	75.37	64.38	31.73	300	PVC	1.00%	17.40	96.70	1.37	0.21	0.67
**Phase 2						1.07	1.07	10.11	76.39	81.37	TBD	300	PVC	1.00%	5.30	96.70	1.37	0.06	0.84
	MH23	MH24					3.46	13.12	66.59	230.12	61.98	600	PVC	0.30%	40.40	336.31	1.19	0.57	0.68
	MH24	OGS					3.46	13.69	65.05	224.80	61.98	600	PVC	0.30%	6.80	336.31	1.19	0.10	0.67
	OGS	Ext. STUB					3.46	13.78	64.80	223.93	61.98	600	PVC	0.38%	28.00	378.50	1.34	0.35	0.59

* CBMH with an inlet control device (ICD)
** C value assumed as 0.75 as per Potter's Key Subdivision Report

Stormceptor®

FORTERRA

Stormceptor® EF Sizing Report

STORMCEPTOR®
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

01/08/2021

Province:	Ontario
City:	Stittsville
Nearest Rainfall Station:	OTTAWA MACDONALD-CARTIER INT'L AP
NCDC Rainfall Station Id:	6000
Years of Rainfall Data:	37

Site Name:	6111 Hazeldean Rd.

Drainage Area (ha):	1.345
Runoff Coefficient 'c':	0.73

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0
Required Water Quality Runoff Volume Capture (%):	90.0

Estimated Water Quality Flow Rate (L/s):	35.48
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	

Project Name:	6111 Hazeldean Rd.
Project Number:	200100
Designer Name:	Brandon O'Leary
Designer Company:	Forterra
Designer Email:	brandon.oleary@forterrabp.com
Designer Phone:	905-630-0359
EOR Name:	Mohan Basnet
EOR Company:	LRL Associates Ltd.
EOR Email:	mbasnet@lrl.ca
EOR Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	67
EFO6	77
EFO8	83
EFO10	86
EFO12	88

Recommended Stormceptor EFO Model: EFO8

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

Water Quality Runoff Volume Capture (%): > 90

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THIRD-PARTY TESTING AND VERIFICATION

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

PERFORMANCE

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

PARTICLE SIZE DISTRIBUTION (PSD)

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

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

Stormceptor® EF Sizing Report

Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
1	51.3	51.3	2.73	164.0	35.0	93	47.7	47.7
2	8.7	60.0	5.46	328.0	70.0	90	7.8	55.5
3	5.8	65.8	8.19	491.0	105.0	87	5.0	60.6
4	4.6	70.4	10.92	655.0	139.0	83	3.8	64.4
5	4.2	74.6	13.65	819.0	174.0	79	3.3	67.7
6	3.2	77.8	16.38	983.0	209.0	75	2.4	70.1
7	2.6	80.4	19.11	1146.0	244.0	72	1.9	72.0
8	2.4	82.8	21.84	1310.0	279.0	70	1.7	73.7
9	1.9	84.7	24.57	1474.0	314.0	66	1.3	74.9
10	1.6	86.3	27.30	1638.0	348.0	63	1.0	75.9
11	1.3	87.6	30.02	1801.0	383.0	60	0.8	76.7
12	1.1	88.7	32.75	1965.0	418.0	58	0.6	77.3
13	1.3	90.0	35.48	2129.0	453.0	57	0.7	78.1
14	1.1	91.1	38.21	2293.0	488.0	56	0.6	78.7
15	0.6	91.7	40.94	2457.0	523.0	54	0.3	79.0
16	0.8	92.5	43.67	2620.0	558.0	54	0.4	79.4
17	0.7	93.2	46.40	2784.0	592.0	52	0.4	79.8
18	0.5	93.7	49.13	2948.0	627.0	52	0.3	80.1
19	0.6	94.3	51.86	3112.0	662.0	52	0.3	80.4
20	0.5	94.8	54.59	3275.0	697.0	52	0.3	80.6
21	0.2	95.0	57.32	3439.0	732.0	51	0.1	80.7
22	0.4	95.4	60.05	3603.0	767.0	51	0.2	80.9
23	0.5	95.9	62.78	3767.0	801.0	51	0.3	81.2
24	0.4	96.3	65.51	3931.0	836.0	51	0.2	81.4
25	0.1	96.4	68.24	4094.0	871.0	51	0.1	81.5

Stormceptor® EF Sizing Report

Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
26	0.3	96.7	70.97	4258.0	906.0	51	0.2	81.6
27	0.4	97.1	73.70	4422.0	941.0	50	0.2	81.8
28	0.2	97.3	76.43	4586.0	976.0	50	0.1	81.9
29	0.2	97.5	79.16	4749.0	1011.0	50	0.1	82.0
30	0.2	97.7	81.89	4913.0	1045.0	50	0.1	82.1
31	0.1	97.8	84.62	5077.0	1080.0	49	0.0	82.2
32	0.2	98.0	87.35	5241.0	1115.0	49	0.1	82.2
33	0.1	98.1	90.07	5404.0	1150.0	49	0.0	82.3
34	0.1	98.2	92.80	5568.0	1185.0	48	0.0	82.3
35	0.1	98.3	95.53	5732.0	1220.0	48	0.0	82.4
36	0.2	98.5	98.26	5896.0	1254.0	48	0.1	82.5
37	0.0	98.5	100.99	6060.0	1289.0	47	0.0	82.5
38	0.1	98.6	103.72	6223.0	1324.0	47	0.0	82.5
39	0.1	98.7	106.45	6387.0	1359.0	47	0.0	82.6
40	0.1	98.8	109.18	6551.0	1394.0	46	0.0	82.6
41	0.1	98.9	111.91	6715.0	1429.0	45	0.0	82.7
42	0.1	99.0	114.64	6878.0	1463.0	44	0.0	82.7
43	0.2	99.2	117.37	7042.0	1498.0	43	0.1	82.8
44	0.1	99.3	120.10	7206.0	1533.0	42	0.0	82.8
45	0.1	99.4	122.83	7370.0	1568.0	41	0.0	82.9
46	0.0	99.4	125.56	7534.0	1603.0	40	0.0	82.9
47	0.1	99.5	128.29	7697.0	1638.0	40	0.0	82.9
48	0.0	99.5	131.02	7861.0	1673.0	39	0.0	82.9
49	0.0	99.5	133.75	8025.0	1707.0	38	0.0	82.9
50	0.0	99.5	136.48	8189.0	1742.0	37	0.0	82.9
Estimated Net Annual Sediment (TSS) Load Reduction =								**83 %**

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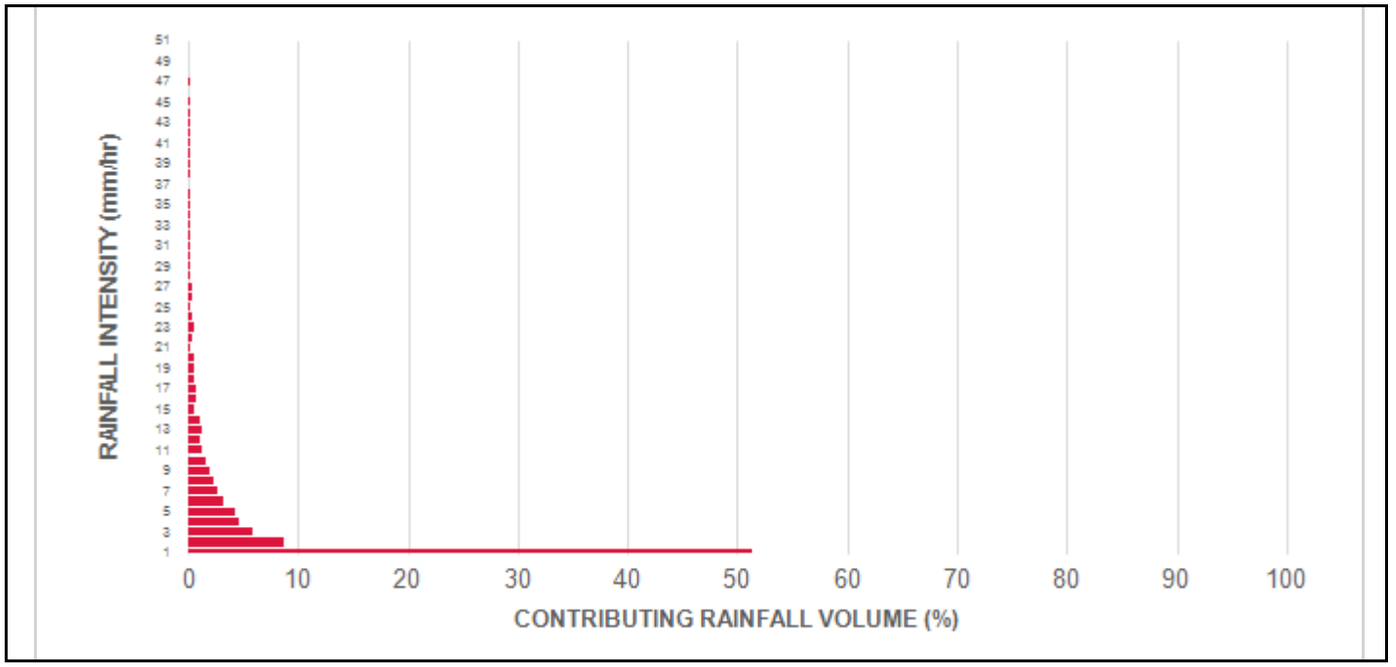
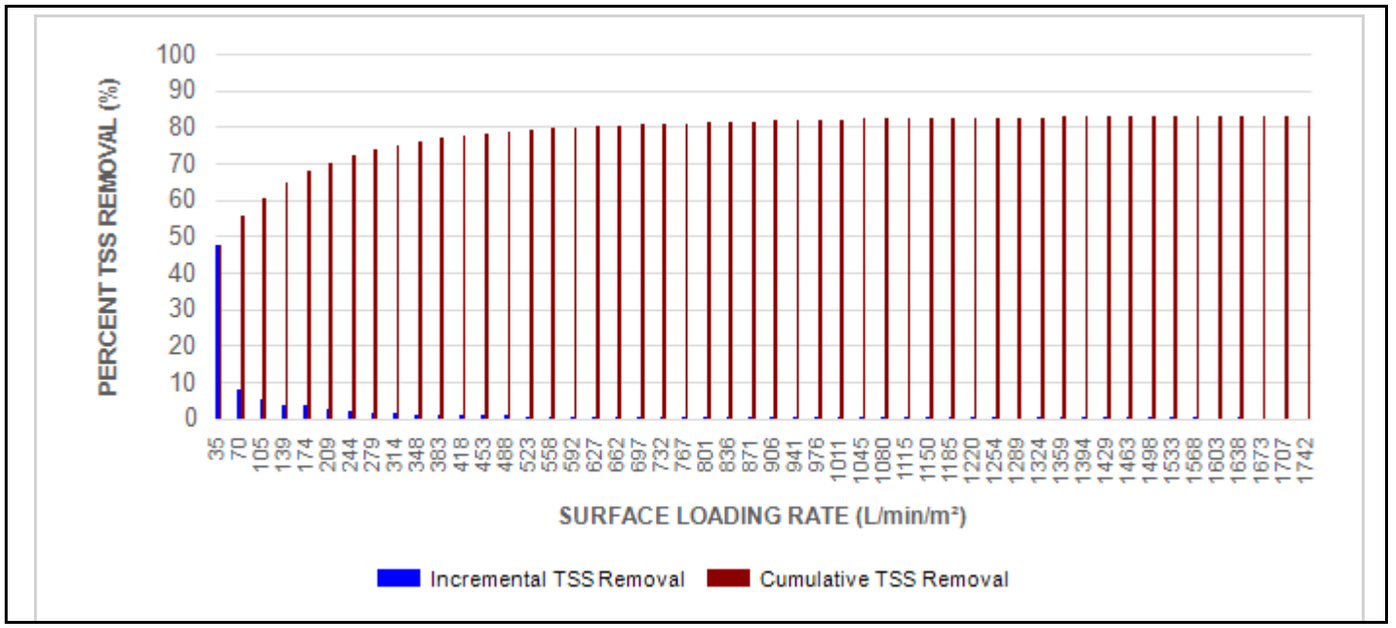
RAINFALL DATA FROM OTTAWA MACDONALD-CARTIER INT'L AP RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



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Maximum Pipe Diameter / Peak Conveyance

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

SCOUR PREVENTION AND ONLINE CONFIGURATION

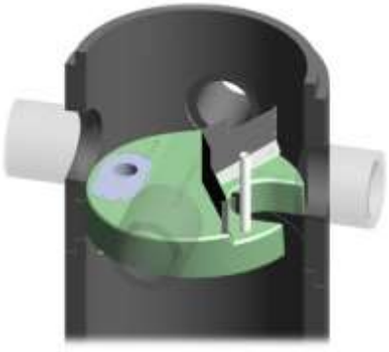
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test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

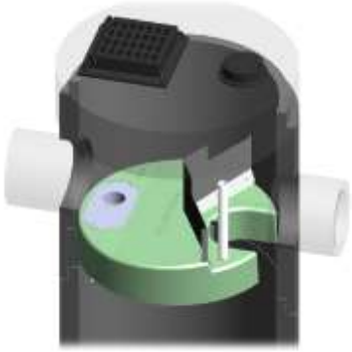
DESIGN FLEXIBILITY

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

OIL CAPTURE AND RETENTION

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





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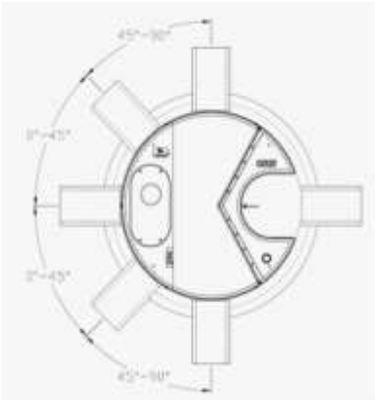

INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.
0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.
45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

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

Pollutant Capacity

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

*Increased sump depth may be added to increase sediment storage capacity
** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

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

STANDARD STORMCEPTOR EF/EFO DRAWINGS

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

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

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

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

PART 1 – GENERAL

1.1 WORK INCLUDED

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

1.2 REFERENCE STANDARDS & PROCEDURES

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

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit** S**eparators**

1.3 SUBMITTALS

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

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

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

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

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

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

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

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

3.2 SIZING METHODOLOGY

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

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

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

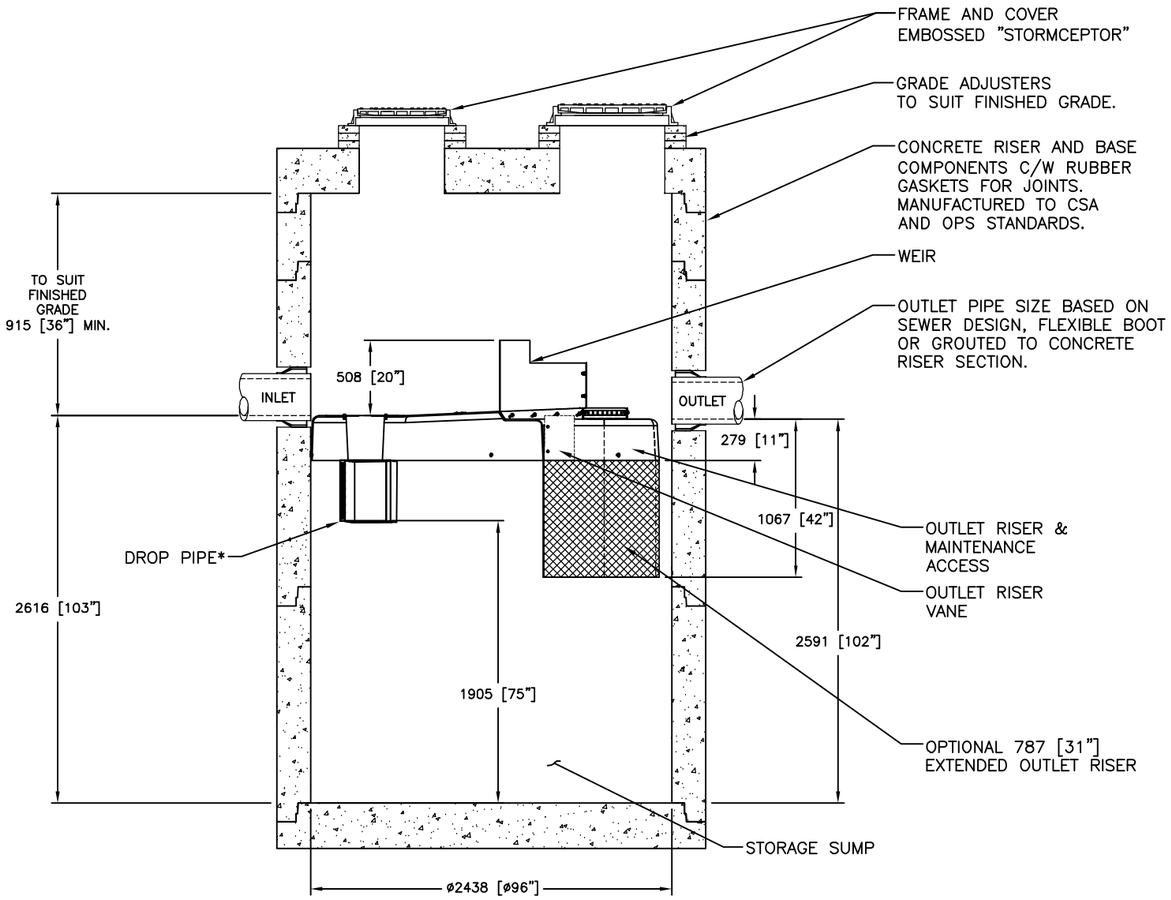
3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

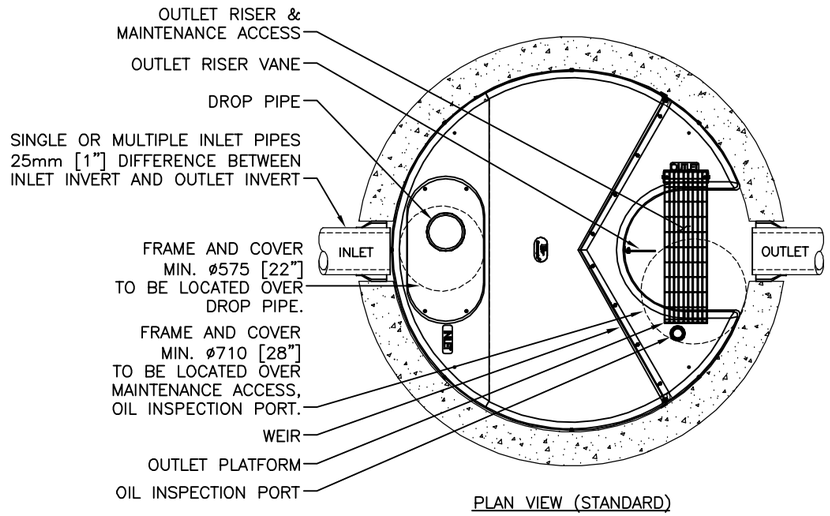
The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO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

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/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.

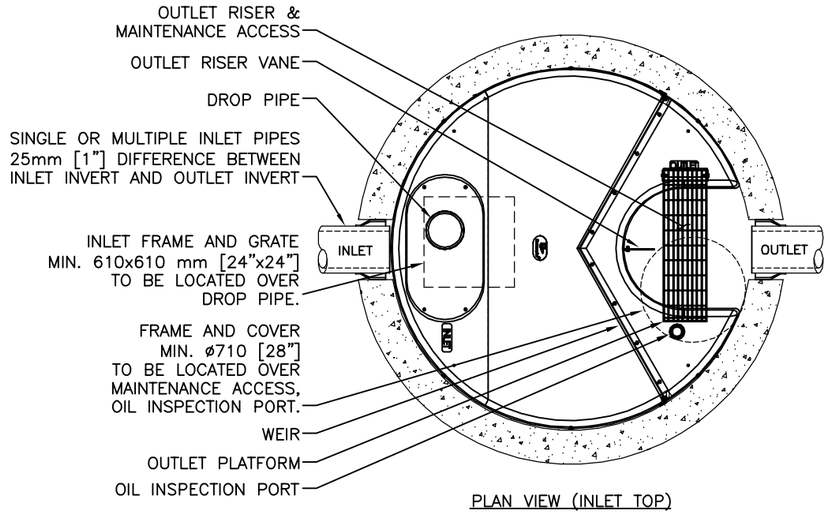
DRAWING NOT TO BE USED FOR CONSTRUCTION



SECTION VIEW



PLAN VIEW (STANDARD)



PLAN VIEW (INLET TOP)

GENERAL NOTES:

* MAXIMUM SURFACE LOADING RATE (SLR) INTO LOWER CHAMBER THROUGH DROP PIPE IS 1135 L/min/m^2 (27.9 gpm/ft^2) FOR STORMCEPTOR EF8 AND 535 L/min/m^2 (13.1 gpm/ft^2) FOR STORMCEPTOR EFO8 (OIL CAPTURE CONFIGURATION).

1. ALL DIMENSIONS INDICATED ARE IN MILLIMETERS (INCHES) UNLESS OTHERWISE SPECIFIED.
2. STORMCEPTOR STRUCTURE INLET AND OUTLET PIPE SIZE AND ORIENTATION SHOWN FOR INFORMATIONAL PURPOSES ONLY.
3. UNLESS OTHERWISE NOTED, BYPASS INFRASTRUCTURE, SUCH AS ALL UPSTREAM DIVERSION STRUCTURES, CONNECTING STRUCTURES, OR PIPE CONDUITS CONNECTING TO COMPLETE THE STORMCEPTOR SYSTEM SHALL BE PROVIDED AND ADDRESSED SEPARATELY.
4. DRAWING FOR INFORMATION PURPOSES ONLY. REFER TO ENGINEER'S SITE/UTILITY PLAN FOR STRUCTURE ORIENTATION.
5. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED)
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT THE DEVICE FROM CONSTRUCTION-RELATED EROSION RUNOFF.
E. DEVICE ACTIVATION, BY CONTRACTOR, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE STORMCEPTOR UNIT IS CLEAN AND FREE OF DEBRIS.

FOR SITE SPECIFIC DRAWINGS PLEASE CONTACT YOUR LOCAL STORMCEPTOR REPRESENTATIVE. SITE SPECIFIC DRAWINGS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME. SOME FIELD REVISIONS TO THE SYSTEM LOCATION OR CONNECTION PIPING MAY BE NECESSARY BASED ON AVAILABLE SPACE OR SITE CONFIGURATION REVISIONS. ELEVATIONS SHOULD BE MAINTAINED EXCEPT WHERE NOTED ON BYPASS STRUCTURE (IF REQUIRED).

STANDARD DETAIL
NOT FOR CONSTRUCTION

SITE SPECIFIC DATA REQUIREMENTS

STORMCEPTOR MODEL	EFO8				
STRUCTURE ID					*
HYDROCARBON STORAGE REQ'D (L)					*
WATER QUALITY FLOW RATE (L/s)					*
PEAK FLOW RATE (L/s)					*
RETURN PERIOD OF PEAK FLOW (yrs)					*
DRAINAGE AREA (HA)					*
DRAINAGE AREA IMPERVIOUSNESS (%)					*
PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	*	*	*	*	*
INLET #2	*	*	*	*	*
OUTLET	*	*	*	*	*

* PER ENGINEER OF RECORD

MARK	DATE	REVISION DESCRIPTION	BY
1	6/8/18	OUTLET PLATFORM	JSK
0	5/26/17	INITIAL RELEASE	JSK

Stormceptor® EF

SCALE = NTS

imbrium®
7607 RIDGE ROAD, SUITE 350, HANOVER, MD 21076
USA 888-279-8528 CA 800-388-4501 INTL +1-416-960-9900

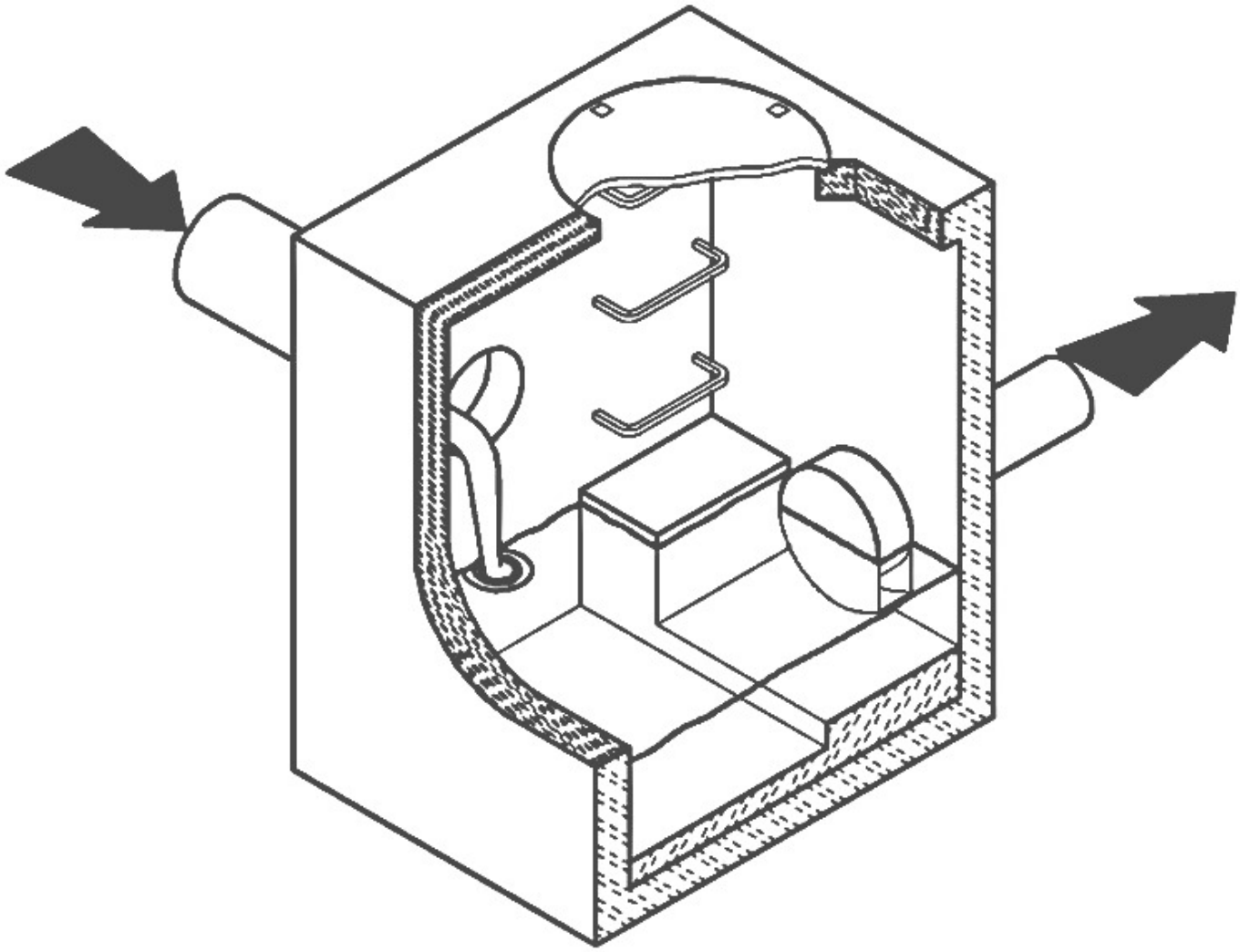
DATE:	10/13/2017
DESIGNED: JSK	DRAWN: JSK
CHECKED: BSF	APPROVED: *
PROJECT No.: EFO8	SEQUENCE No.: *
SHEET:	1 OF 1

I:\IMBRIUM\PRODUCTS\STORMCEPTOR EFO4 DRAWINGS & DETAILS\STANDARD DETAILS\EFO8 STANDARD DETAILS\EFO8-DETAIL.DWG 10/19/2018 9:54 AM

CSO/STORMWATER MANAGEMENT

HYDROVEX® VHV / SVHV

Vertical Vortex Flow Regulator



JOHN MEUNIER

APPLICATIONS

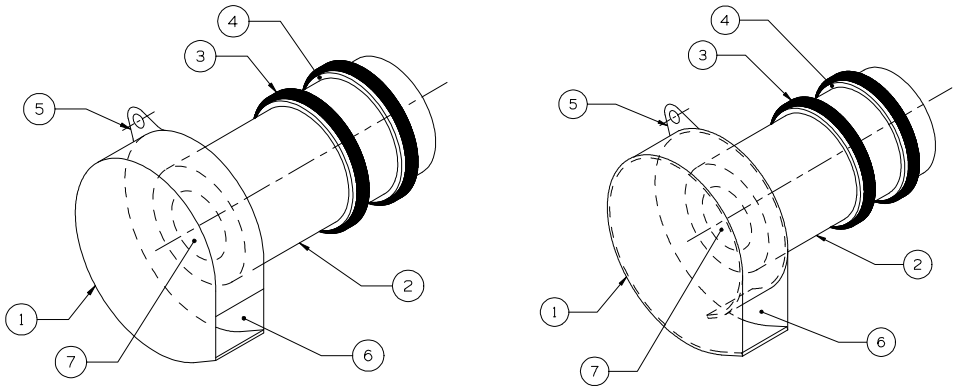
One of the major problems of urban wet weather flow management is the runoff generated after a heavy rainfall. During a storm, uncontrolled flows may overload the drainage system and cause flooding. Due to increased velocities, sewer pipe wear is increased dramatically and results in network deterioration.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

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

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

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

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



VHV ***SVHV***

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

ADVANTAGES

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

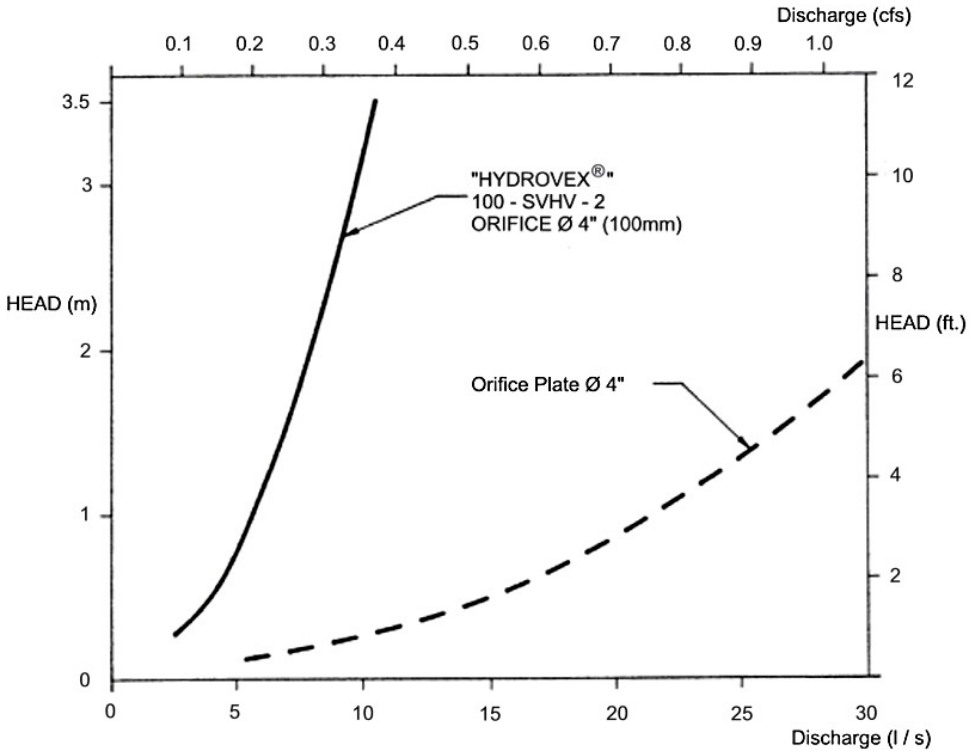


FIGURE 2: DISCHARGE CURVE SHOWING A HYDROVEX® FLOW REGULATOR VS AN ORIFICE PLATE

SELECTION

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

Example:

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

INSTALLATION REQUIREMENTS

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

SPECIFICATIONS

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

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

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

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

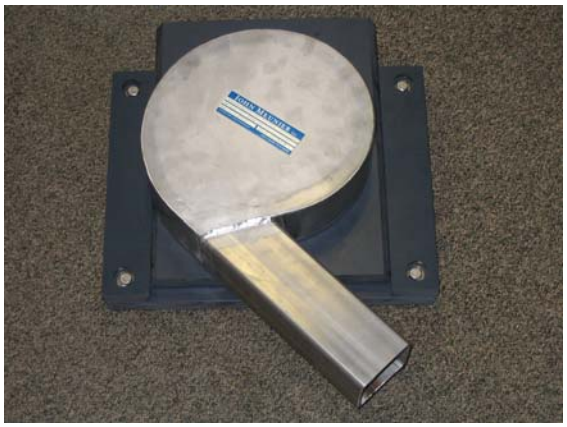
- ***project design flow rate***
- ***pressure head***
- ***chamber's outlet pipe diameter and type***

Typical VHV model in factory

OPTIONS

FV – SVHV (mounted on sliding plate)

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



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

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

VHV with air vent for minimal slopes

HYDROVEX®

VHV Vertical Vortex Flow Regulator

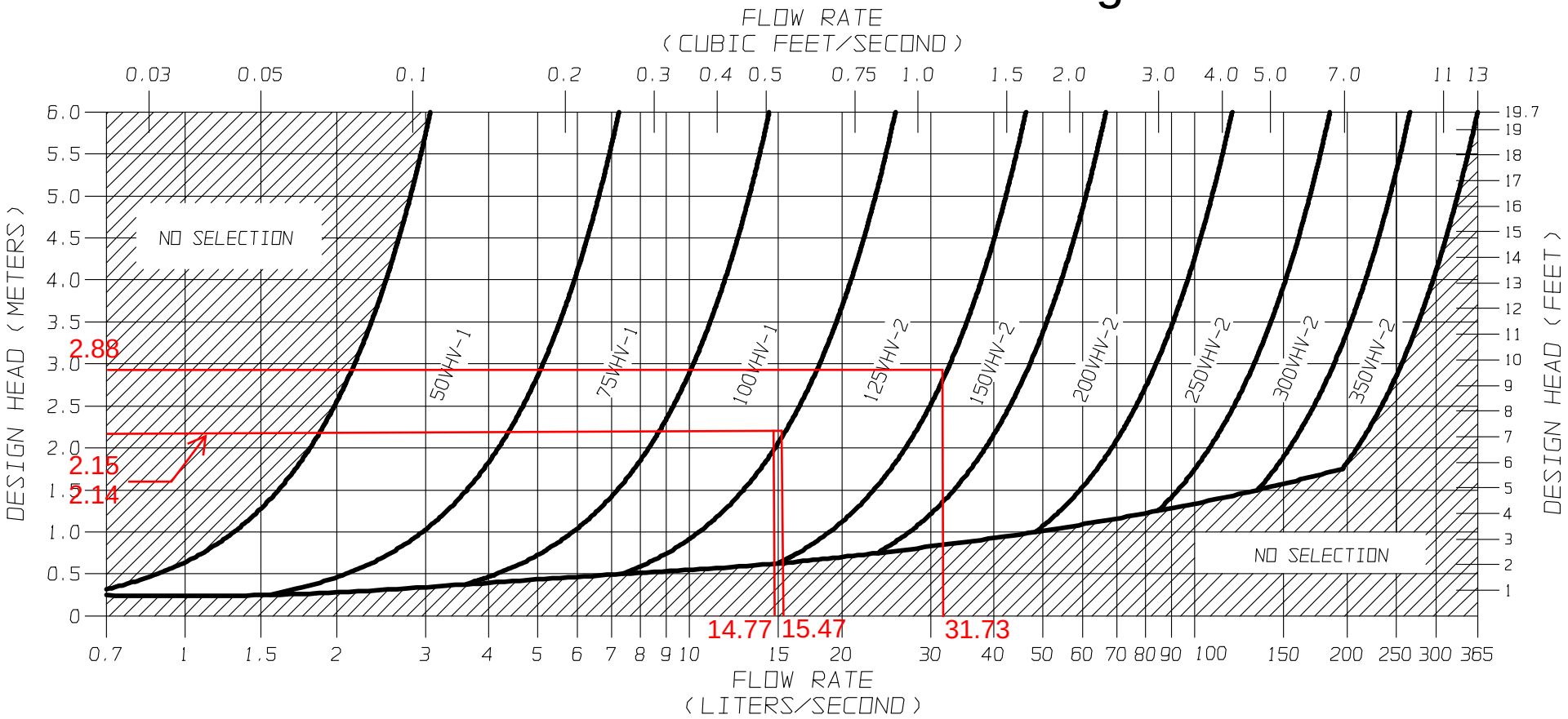
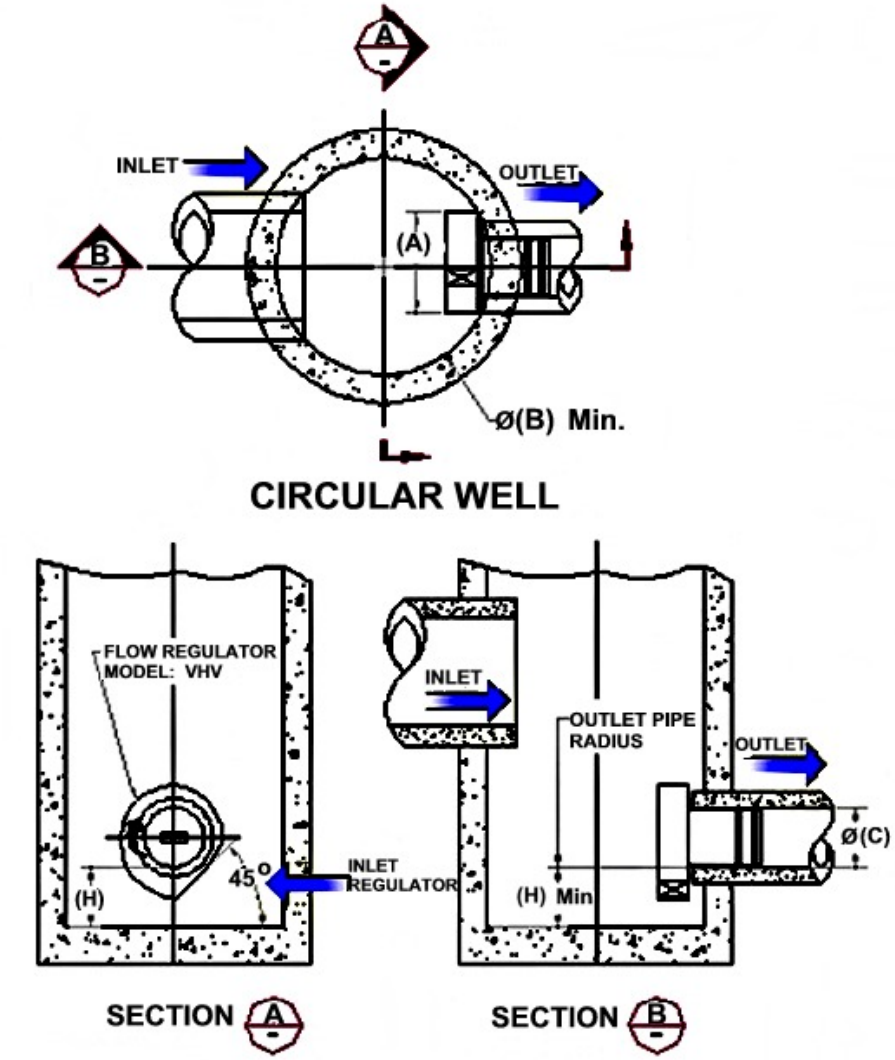


FIGURE 3 - VHV

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



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 cso@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 asteele@johnmeunier.com

Revised: 2011-05-03

APPENDIX E

Civil Engineering Drawings

PROPOSED DEVELOPMENT
6111 HAZELDEAN RD
STITTSVILLE, ON

REVISION 02

KEY PLAN (N.T.S.)

DRAWING INDEX	
TITLE PAGE	
GENERAL NOTES PLAN	C000
SEDIMENT AND EROSION CONTROL PLAN	C101
DEMOLITION PLAN	C102
SITE DEVELOPMENT PLAN	C201
GRADING AND DRAINAGE PLAN	C301
SERVICING PLAN	C401
STORMWATER MANAGEMENT PLAN	C601
PRE-DEVELOPMENT WATERSHED PLAN	C701
POST-DEVELOPMENT WATERSHED PLAN	C702
SANITARY WATERSHED PLAN	C703
CONSTRUCTION DETAIL PLAN	C901

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

PROPOSED DEVELOPMENT
6111 HAZELDEAN ROAD
REV.02 - RE-ISSUED FOR APPROVAL - JUNE 11TH, 2021
LRL PROJECT no: 200100

LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2021-06-11
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

GENERAL NOTES

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

EROSION AND SEDIMENT CONTROL NOTES

GENERAL

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

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

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

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

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

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

CONTRACTOR'S RESPONSIBILITIES

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

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

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

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

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

SPILL CONTROL NOTES

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

MUD MAT NOTES

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

SITE GRADING NOTES

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

ROADWORK SPECIFICATIONS

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

SANITARY, FOUNDATION DRAIN, STORM SEWER AND WATERMAIN NOTES

GENERAL

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

SANITARY

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

STORM

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

WATERMAIN

30. ALL WATERMAIN INSTALLATION SHALL CONFORM TO THE LATEST REVISIONS OF THE CITY OF OTTAWA AND THE ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) AND SPECIFICATIONS (OPSS).
31. ALL PVC WATERMAINS SHALL BE AWWA C-900 CLASS 150, SDR 18 OR APPROVED EQUIVALENT.
32. ALL WATER SERVICES LESS THAN OR EQUAL TO 50MM IN DIAMETER TO BE TYPE 'K' COPPER.
33. WATERMAIN TRENCH AND BEDDING SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARD W17. UNLESS SPECIFIED OTHERWISE. BEDDING AND COVER MATERIAL SHALL BE SPECIFIED BY THE PROJECT GEOTECHNICAL ENGINEER.
34. ALL PVC WATERMAINS, SHALL BE INSTALLED WITH A 10 GAUGE STRANDED COPPER TWU OR RWU TRACER WIRE IN ACCORDANCE WITH CITY OF OTTAWA STD. W.36.
35. CATHODIC PROTECTION IS REQUIRED ON ALL METALLIC FITTINGS PER CITY OF OTTAWA STD.25.5 AND W25.6.
36. VALVE BOXES SHALL BE INSTALLED PER CITY OF OTTAWA STD W24.
37. WATERMAIN IN FILL AREAS TO BE INSTALLED WITH RESTRAINED JOINTS PER CITY OF OTTAWA STD.25.5 AND W25.6.
38. THRUST BLOCKING OF WATERMAINS TO BE INSTALLED PER CITY OF OTTAWA STD. W25.3 AND W25.4.
39. THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY CAPS, PLUGS, BLOW-OFFS, AND NOZZLES REQUIRED FOR TESTING AND DISINFECTION OF THE WATERMAIN.
40. WATERMAIN CROSSING OVER AND BELOW SEWERS SHALL BE IN ACCORDANCE WITH THE CITY OF OTTAWA STD. W25,2 AND W25, RESPECTIVELY.
41. WATER SERVICES ARE TO BE INSULATED PER CITY STD. W23 WHERE SEPARATION BETWEEN SERVICES AND MAINTENANCE HOLES ARE LESS THAN 2.4M.
42. THE MINIMUM VERTICAL CLEARANCE BETWEEN WATERMAIN AND SEWER/UTILITY IS 0.5M PER MOE GUIDELINES. FOR CROSSING UNDER SEWERS, ADEQUATE STRUCTURAL SUPPORT FOR THE SEWER IS REQUIRED TO PREVENT EXCESSIVE DEFLECTION OF JOINTS AND SETTLING. THE LENGTH OF WATER PIPE SHALL BE CENTERED AT THE POINT OF CROSSING TO ENSURE THAT THE JOINTS WILL BE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE SEWER.
43. ALL WATERMAINS SHALL HAVE A MINIMUM COVER OR 2.4M, OTHERWISE THERMAL INSULATION IS REQUIRED AS PER STD DWG W22.
44. GENERAL WATER PLANT TO UTILITY CLEARANCE AS PER STD DWG R20.
45. FIRE HYDRANT INSTALLATION AS PER STD DWG W19, ALL BOTTOM OF HYDRANT FLANGE ELEVATIONS TO BE INSTALLED 0.10M ABOVE PROPOSED FINISHED GRADE AT HYDRANT; FIRE HYDRANT LOCATION AS PER STD DWG W18.
46. BUILDING SERVICE TO BE CAPPED 1.0M OFF THE FACE OF THE BUILDING UNLESS OTHERWISE NOTED AND MUST BE RESTRAINED A MINIMUM OF 12M BACK FROM STUB.
47. ALL WATERMAINS SHALL BE HYDROSTATICALLY TESTED IN ACCORDANCE WITH THE CITY OF OTTAWA AND ONTARIO GUIDELINES UNLESS OTHERWISE DIRECTED. PROVISIONS FOR FLUSHING WATER LINE PRIOR TO TESTING, ETC. MUST BE PROVIDED.
48. ALL WATERMAINS SHALL BE BACTERIOLOGICALLY TESTED IN ACCORDANCE WITH THE CITY OF OTTAWA AND ONTARIO GUIDELINES. ALL CHLORINATED WATER TO BE DISCHARGED AND PRETREATED TO ACCEPTABLE LEVELS PRIOR TO DISCHARGE. ALL DISCHARGED WATER MUST BE CONTROLLED AND TREATED SO AS NOT TO ADVERSELY EFFECT ENVIRONMENT. IT IS RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT ALL MUNICIPAL AND/OR PROVINCIAL REQUIREMENTS ARE FOLLOWED.
49. ALL WATERMAIN STUBS SHALL BE TERMINATED WITH A PLUG AND 50MM BLOW OFF UNLESS OTHERWISE NOTED.
50. ALL WATERMAIN AND WATER SERVICES ARE TO BE INSTALLED 2.4m BELOW GROUND SURFACE. REFER TO CROSSING TABLE FOR CR-XX CROSSINGS ON C401

USE AND INTERPRETATION OF DRAWINGS

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

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

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

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

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

UNAUTHORIZED CHANGES:

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

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

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

GENERAL NOTES:

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

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

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

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

No.	REVISIONS	BY	DATE
02	RE-ISSUED FOR APPROVAL	P.P.	11 JUN 2021
01	ISSUED FOR APPROVAL	P.P.	05 FEB 2021

LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2021-06-11
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

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

CLIENT
HALO CAR WASH

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

PROJECT
PROPOSED DEVELOPMENT
6111 HAZELDEAN RD
STITTSVILLE, ON

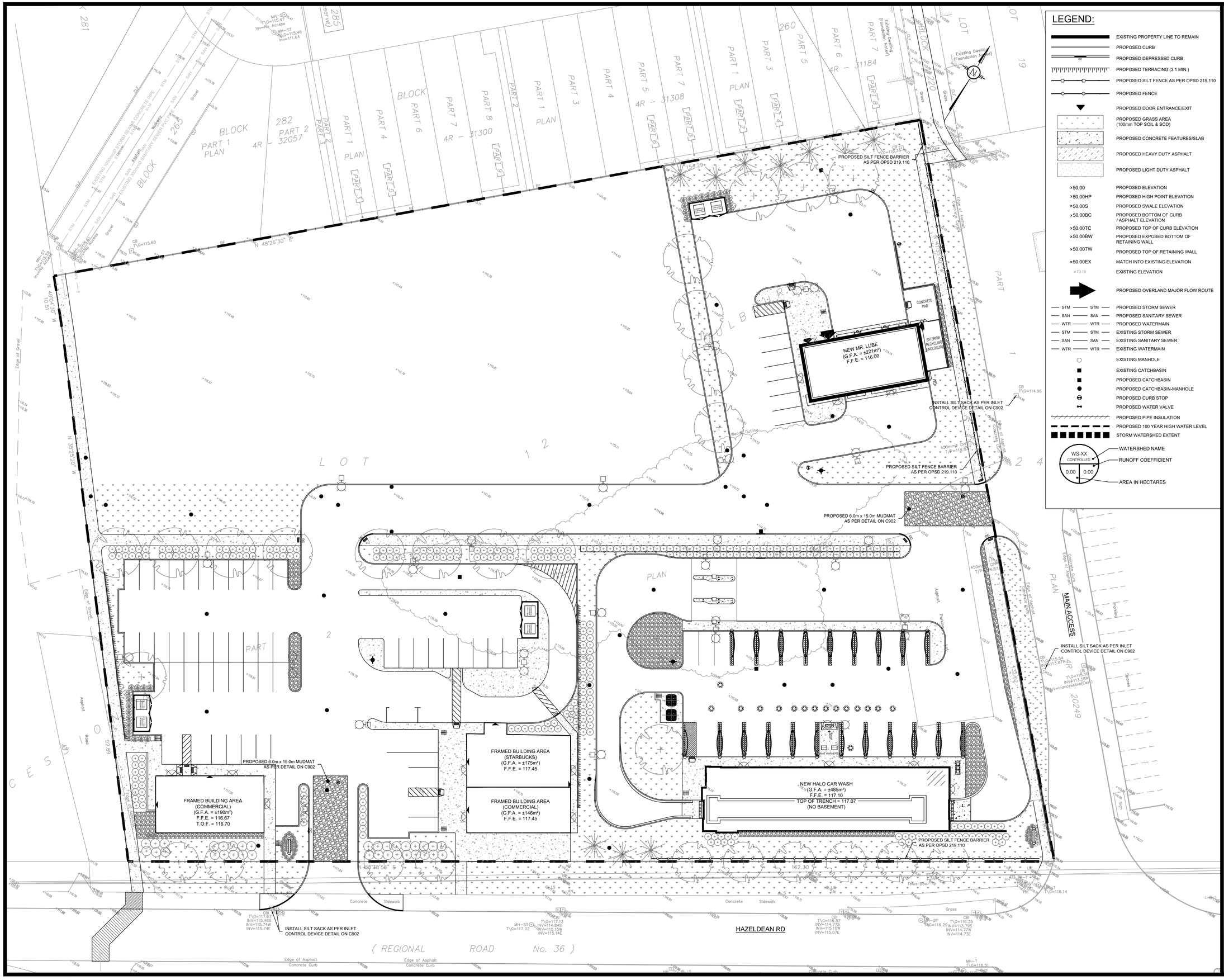
DRAWING TITLE
GENERAL NOTES PLAN

PROJECT NO. 200100
DATE APRIL 2020

C001

D07-12-20-0113

18226



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
- ×50.00 PROPOSED ELEVATION
- ×50.00HP PROPOSED HIGH POINT ELEVATION
- ×50.00S PROPOSED SWALE ELEVATION
- ×50.00BC PROPOSED BOTTOM OF CURB / ASPHALT ELEVATION
- ×50.00TC PROPOSED TOP OF CURB ELEVATION
- ×50.00BW PROPOSED EXPOSED BOTTOM OF RETAINING WALL
- ×50.00TW PROPOSED TOP OF RETAINING WALL
- ×50.00EX MATCH INTO EXISTING ELEVATION
- ×70.19 EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- STM STM PROPOSED STORM SEWER
- SAN SAN PROPOSED SANITARY SEWER
- WTR WTR PROPOSED WATERMAIN
- STM STM EXISTING STORM SEWER
- SAN SAN EXISTING SANITARY SEWER
- WTR WTR EXISTING WATERMAIN
- EXISTING MANHOLE
- EXISTING CATCHBASIN
- PROPOSED CATCHBASIN
- PROPOSED CATCHBASIN-MANHOLE
- PROPOSED CURB STOP
- PROPOSED WATER VALVE
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WS-XX CONTROLLED — WATERSHED NAME
- 0.00 — RUNOFF COEFFICIENT
- 0.00 — AREA IN HECTARES

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5m 2 0 5 10m

SCALE: 1:300

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01	ISSUED FOR APPROVAL	P.P.	05 FEB 2021

LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2021-06-11
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

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

CLIENT

HALO CAR WASH

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

PROJECT

PROPOSED DEVELOPMENT
6111 HAZELDEAN RD
STITTSVILLE, ON

DRAWING TITLE

EROSION AND SEDIMENT CONTROL PLAN

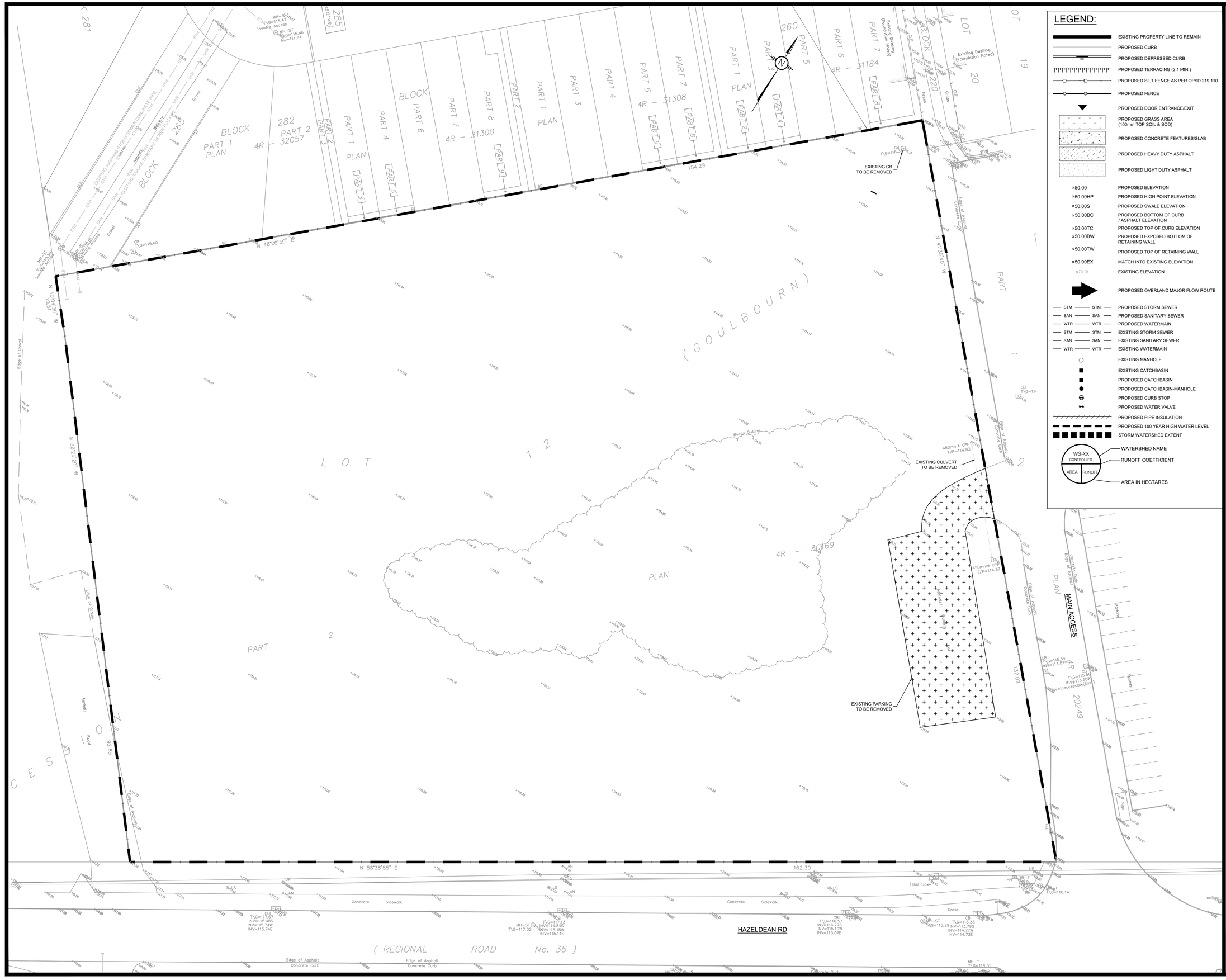
PROJECT NO. 200100

DATE APRIL 2020

C101

D07-12-20-0113

18226



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- PROPOSED TERRACING (3:1 MIN.)
- PROPOSED SILT FENCE AS PER OPSD 219.110
- PROPOSED FENCE
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- EXISTING CATCHBASIN
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  - WATERSHED NAME
  - RUNOFF COEFFICIENT
  - AREA IN HECTARES

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5m 2 0 5 10m
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LICENSED PROFESSIONAL ENGINEER
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100501996
2021-06-11
PROVINCE OF ONTARIO

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CLIENT
HALO CAR WASH

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

PROJECT
PROPOSED DEVELOPMENT
6111 HAZELDEAN RD
STITTSVILLE, ON

DRAWING TITLE
DEMOLITION PLAN

PROJECT NO.
200100
DATE
APRIL 2020

C102

D07-12-20-0113

18226

DETAILS OF DEVELOPMENT

DATA		REQUIRED	PROVIDED
ZONING		AM9 (1699)-h - AREA C	
SETBACKS	FY	5.0m	5.0m
	RY	10.0m	35.1m
	INT.SY	N/A	3.0m
	EXT.SY	N/A	N/A
NET LOT AREA (sqm)		18,490sqm	
BUILDING COVERAGE		N/A	6.6 %
BUILDING HEIGHT		20.0m (MAX)	8.0m (CARWASH)
GROSS FLOOR AREA		1,217 sqm	
No. of UNITS		5	
LOADING SPACES		N/A	2
PARKING:		32 + 4 HC	72 + 6 HC
CAR WASH : NONE		0	
AUTOMOBILE SERVICE STATION : 2 PER SERVICE BAY		6	
RESTAURANT - FAST FOOD : 10 PER 100sqm		18	
RETAIL : 3.4 PER 100sqm		5	
RETAIL : 3.4 PER 100sqm		7	
No. OF STOREYS			1
OTHER:			

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- STORM WATERSHED EXTENT
- WS-XX CONTROLLED 0.00 0.00 — WATERSHED NAME / RUNOFF COEFFICIENT / AREA IN HECTARES

PHASE 2 - FUTURE DEVELOPMENT
AREA = 0.51 ha.

NEW MR. LUBE
(G.F.A. = ±221m²)
F.F.E. = 116.00

NEW HALO CAR WASH
(G.F.A. = ±485m²)
F.F.E. = 117.10
TOP OF TRENCH = 117.07
(NO BASEMENT)

FRAMED BUILDING AREA (COMMERCIAL)
(G.F.A. = ±190m²)
F.F.E. = 116.67
T.O.F. = 116.70

FRAMED BUILDING AREA (STARBUCKS)
(G.F.A. = ±175m²)
F.F.E. = 117.45

FRAMED BUILDING AREA (COMMERCIAL)
(G.F.A. = ±146m²)
F.F.E. = 117.45

PROPOSED 56m ACCOUSTIC FENCE AS PER DETAIL ON C902

PROPOSED CONCRETE BARRIER CURB AS PER OPSD 600.110 (TYP.)

PROPOSED CONCRETE SIDEWALK AS PER OPSD 310.010 (TYP.)

PROPOSED CONCRETE RAMP C/W TACTILE WALKING SURFACE INDICATORS COMPONENT AS PER OPSD 310.039. TACTILE WALKING SURFACE INDICATORS TO BE INSTALLED AT ALL RAMPS

30 x 45 cm "ACCESSIBLE PARKING PERMIT" SIGN (Rb-93) AS PER MTO BOOK 5 AND AS PER SECTION 11 OF THE ONTARIO REGULATION 581/90. SIGN TO BE MOUNTED ON CONCRETE SIGN BASE. ACCESSIBLE PARKING SIGN TO BE INSTALLED CENTERING ALL ACCESSIBLE PARKING

PROPOSED DEVELOPMENT GROUND SIGN

DIRECTIONAL DIVIDING LINE AS PER ONTARIO TRAFFIC MANUAL (TYP.)

STOP LINE AS PER ONTARIO TRAFFIC MANUAL (TYP.)

PROPOSED DEPRESSED CURB AT ENTRANCE AS PER CITY OF OTTAWA DETAIL SC7.1

RA-1 STOP SIGN AS PER ONTARIO TRAFFIC MANUAL TO BE MOUNTED ON GALVANIZED STEEL POST
RA-1 STOP SIGNS TO BE INSTALLED AT ALL STOP LINES

PROPOSED HALO CAR WASH & MR. LUBE GROUND SIGN

PROPOSED 10m LONG - 4m HIGH SOUND BARRIER WALL AS PER NOISE STUDY REPORT

CONCRETE PAD

EXTERIOR RECYCLING ENCLOSURE

PROP EARTH BIN AS PER DETAIL ON C901

FIRE ROUTE

EXIT

MAIN ACCESS

HAZELDEAN RD

(ROAD No. 36)

Edge of Gravel

Edge of Asphalt

Concrete Curb

Asphalt

Concrete Sidewalk

Grass

Parking Spaces

Existing Dwelling (Foundation Noted)

Existing Dwelling (Foundation Noted)

PART 1 PLAN 20R-22049

LOT 1 2 L O T

BLOCK 20

LOT 19 20

PART 1 PLAN

PART 7 4R - 31300

PART 8 4R - 31300

PART 5 4R - 31308

PART 7 4R - 31184

PART 6 4R - 31184

PART 5

PART 6

PART 7

PART 8

PART 9

PART 1

PART 2

PART 3

PART 4

N 48°26'30" E

N 40°04'30" W 10.06m

S 49°33'30" E 62.30m

N 49°33'20" W

S 49°33'20" E

25.0m (TYP.)

11.6m

30.2m

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CLIENT
HALO CAR WASH

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

PROJECT
PROPOSED DEVELOPMENT
6111 HAZELDEAN RD
STITTSVILLE, ON

DRAWING TITLE
SITE DEVELOPMENT PLAN

PROJECT NO.
200100

DATE
APRIL 2020

C201

D07-12-20-0113

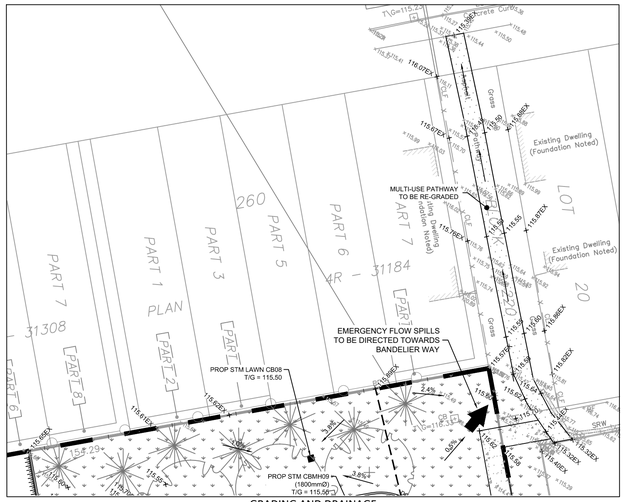
18226

PAVEMENT STRUCTURE

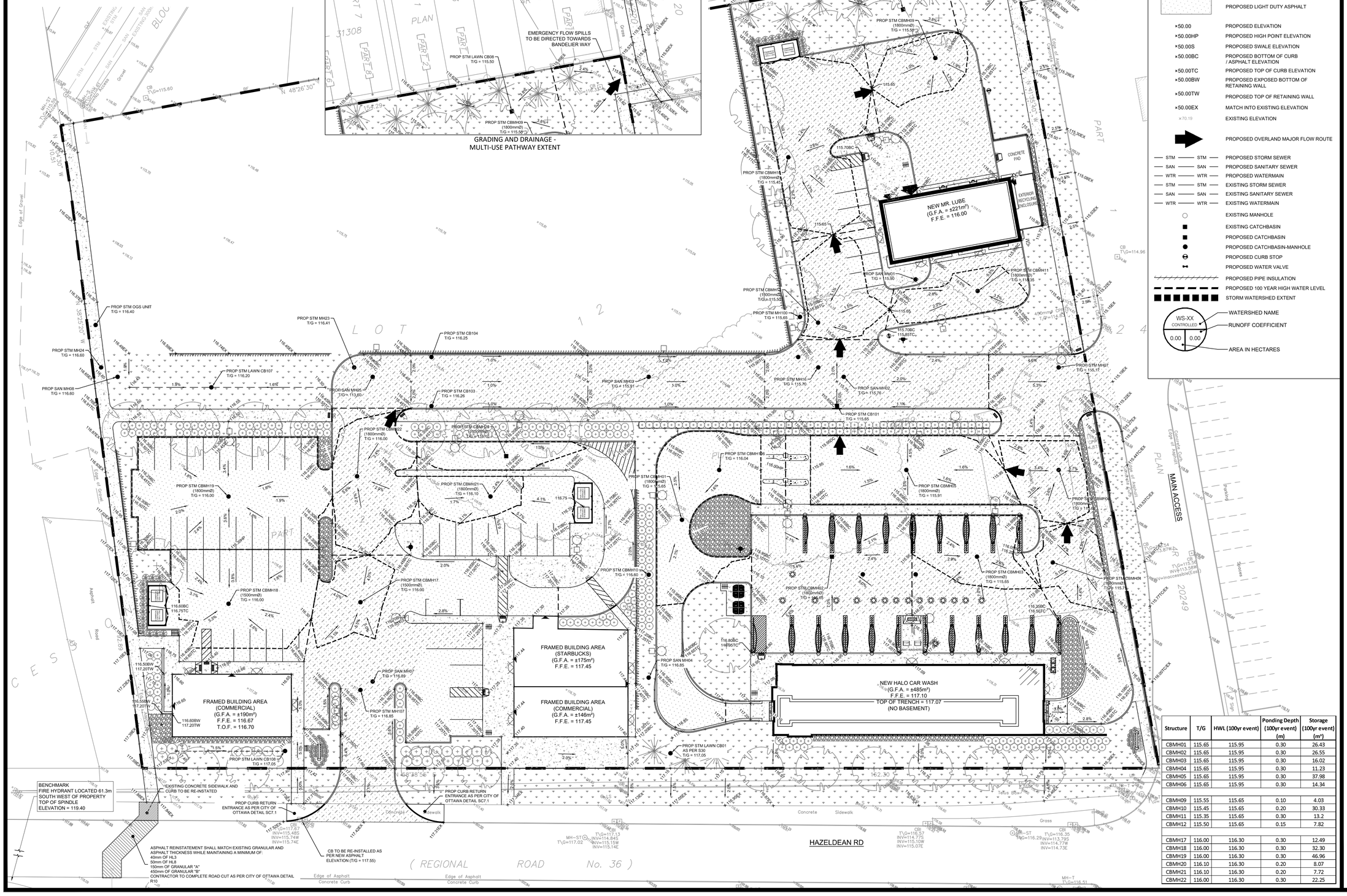
COURSE	MATERIAL	THICKNESS (mm) AUTOMOBILE PARKING	THICKNESS (mm) TRUCK ROUTE (HEAVY TRAFFIC)
SURFACE	HL.3/SP12.5	50	40
BINDER	HL.8/SP19.0	--	50
BASECOURSE	OPSS GRANULAR "A"	150	150
SUBBASE	OPSS GRANULAR "B" TYPE II	300	400

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 FILL MATERIAL APPROVED BY THE GEOTECHNICAL ENGINEER. THE SUBGRADE SHOULD BE SHAPED AND CROWNED TO PROMOTE DRAINAGE OF THE SITE DRAINAGE STRUCTURES. FOLLOWING APPROVAL OF THE PREPARATION OF THE SUBGRADE, THE PAVEMENT GRANULARS MAY BE PLACED.

PAVEMENT STRUCTURE AS PER GEOTECHNICAL REPORT PREPARED BY LRL, DATED SEPTEMBER 30th, 2020.



GRADING AND DRAINAGE - MULTI-USE PATHWAY EXTENT



LEGEND:

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- STORM WATERSHED EXTENT
- WS-XX CONTROLLED 0.00 0.00 — WATERSHED NAME / RUNOFF COEFFICIENT / AREA IN HECTARES

Structure	T/G	HWL (100yr event)	Ponding Depth (100yr event) (m)	Storage (100yr event) (m³)
CBMH01	115.65	115.95	0.30	26.43
CBMH02	115.65	115.95	0.30	26.55
CBMH03	115.65	115.95	0.30	16.02
CBMH04	115.65	115.95	0.30	11.23
CBMH05	115.65	115.95	0.30	37.98
CBMH06	115.65	115.95	0.30	14.34
CBMH09	115.55	115.65	0.10	4.03
CBMH10	115.45	115.65	0.20	30.33
CBMH11	115.35	115.65	0.30	13.2
CBMH12	115.50	115.65	0.15	7.82
CBMH17	116.00	116.30	0.30	12.49
CBMH18	116.00	116.30	0.30	32.30
CBMH19	116.00	116.30	0.30	46.96
CBMH20	116.10	116.30	0.20	8.07
CBMH21	116.10	116.30	0.20	7.72
CBMH22	116.00	116.30	0.30	22.25

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5m 2 0 5 10m
SCALE: 1:300

No.	REVISIONS	BY	DATE
02	RE-ISSUED FOR APPROVAL	P.P.	11 JUN 2021
01	ISSUED FOR APPROVAL	P.P.	05 FEB 2021

LICENSED PROFESSIONAL ENGINEER M. BASNET 100501996 2021-06-11 PROVINCE OF ONTARIO
NOT AUTHENTIC UNLESS SIGNED AND DATED

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

CLIENT
HALO CAR WASH

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

PROJECT
PROPOSED DEVELOPMENT
6111 HAZELDEAN RD
STITTSVILLE, ON

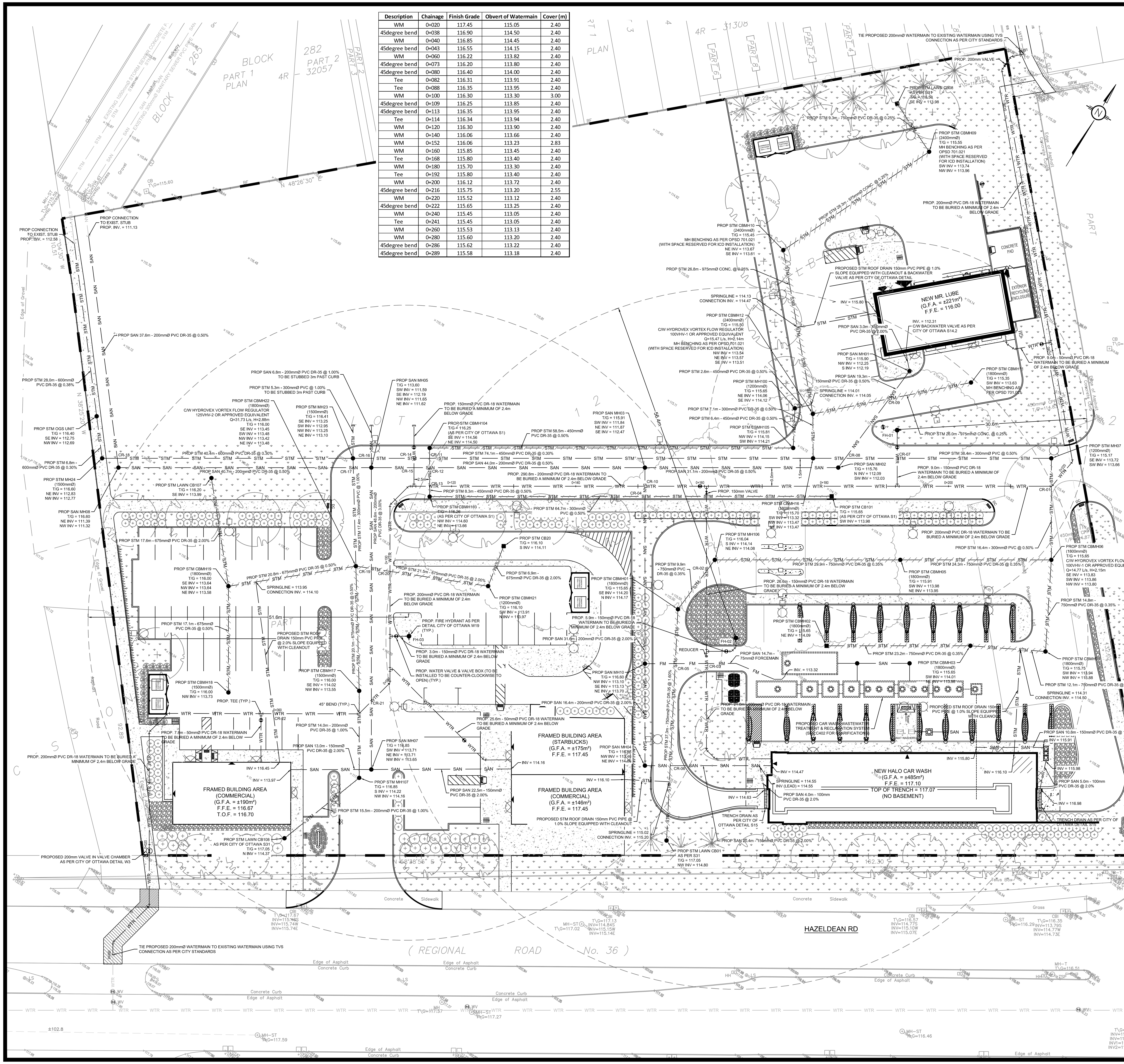
DRAWING TITLE
GRADING AND DRAINAGE PLAN

PROJECT NO. 200100
DATE APRIL 2020

C301

D07-12-20-0113

18226



Description	Chainage	Finish Grade	Obvert of Watermain	Cover (m)
WM	0+020	117.45	115.05	2.40
45degree bend	0+038	116.90	114.50	2.40
WM	0+040	116.85	114.45	2.40
45degree bend	0+043	116.55	114.15	2.40
WM	0+060	116.22	113.82	2.40
45degree bend	0+073	116.20	113.80	2.40
45degree bend	0+080	116.40	114.00	2.40
Tee	0+082	116.31	113.91	2.40
Tee	0+088	116.35	113.95	2.40
WM	0+100	116.30	113.30	3.00
45degree bend	0+109	116.25	113.85	2.40
45degree bend	0+113	116.35	113.95	2.40
Tee	0+114	116.34	113.94	2.40
WM	0+120	116.30	113.90	2.40
WM	0+140	116.06	113.66	2.40
WM	0+152	116.06	113.23	2.83
WM	0+160	115.85	113.45	2.40
Tee	0+168	115.80	113.40	2.40
WM	0+180	115.70	113.30	2.40
Tee	0+192	115.80	113.40	2.40
WM	0+200	116.12	113.72	2.40
45degree bend	0+216	115.75	113.20	2.55
WM	0+220	115.52	113.12	2.40
45degree bend	0+222	115.65	113.25	2.40
WM	0+240	115.45	113.05	2.40
Tee	0+241	115.45	113.05	2.40
WM	0+260	115.53	113.13	2.40
WM	0+280	115.60	113.20	2.40
45degree bend	0+286	115.62	113.22	2.40
45degree bend	0+289	115.58	113.18	2.40

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- WS-XX CONTROLLED 0.00 0.00 — WATERSHED NAME; RUNOFF COEFFICIENT; AREA IN HECTARES

Crossing #	WM	STM	SAN	Depth Separation (m)
CR-01	113.20 (obv.)	113.74 (inv.)	N/A	0.54
CR-02	113.39 (obv.)	113.82 (inv.)	N/A	0.43
CR-03	113.43 (inv.)	N/A	113.55 (inv.)	0.82
CR-04	N/A	114.83 (inv.)	112.48 (obv.)	2.35
CR-05	N/A	114.23 (inv.)	112.51 (obv.)	1.72
CR-06	N/A	114.60 (inv.)	114.29 (obv.)	0.31
CR-07	113.00 (obv.)	113.54 (inv.)	N/A	0.54
CR-08	N/A	113.50 (inv.)	112.25 (obv.)	1.25
CR-09	N/A	113.60 (inv.)	112.31 (obv.)	1.29
CR-10	113.23 (obv.)	N/A	113.53 (inv.)	0.30
CR-11	N/A	114.57 (inv.) (CB lead) 113.62 (obv)	N/A	0.95
CR-12	N/A	114.58 (inv.)	111.87 (obv)	2.71
CR-13	113.87 (obv.)	114.59 (inv.)	N/A	0.72
CR-14	113.90 (inv.)	113.58 (obv.)	N/A	0.32
CR-15	113.92 (inv.)	N/A	111.86 (obv.)	2.06
CR-16	N/A	113.11 (inv.)	111.87 (obv.)	1.24
CR-17	N/A	113.26 (inv.)	111.78 (obv.)	1.48
CR-18	N/A	112.84 (inv.)	111.51 (obv.)	1.33
CR-19	N/A	113.53 (inv.)	112.88 (obv.)	0.65
CR-20*	113.30 (obv.)	113.60 (inv.)	N/A	0.30
CR-21	113.80 (obv.)	N/A	113.50 (obv.)	0.30
CR-22	113.80 (obv.)	114.32 (inv.)	N/A	0.52

*Unshrinkable backfill as per opss 1359 is to be used where a minimum of 0.3m can't be achieved

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5m 2 0 5 10m

SCALE: 1:300

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LICENSED PROFESSIONAL ENGINEER M. BASNET 100501996 2021-06-11 PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

LRL ENGINEERING | INGÉNIERIE

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

CLIENT

HALO CAR WASH

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

PROJECT

PROPOSED DEVELOPMENT
6111 HAZELDEAN RD
STITTSVILLE, ON

DRAWING TITLE

SERVICING PLAN

PROJECT NO.
200100

DATE
APRIL 2020

C401

D07-12-20-0113

18226

PLAN

PROP SAN MH10
T/G = 116.60
NW INV = 113.10
SE INV = 113.13
NE INV = 113.70

PROP. 114,000L EQUILIBRATING TANK C/W TWO (2) EFFLUENT PUMPS WORKING IN CYCLES ENSURING CONSTANT FLOW 1.0L/s AT ALL TIMES

PROP SAN 22.0m - 75mm FORCEMAIN

BEND 22.5°

PROP SAN 2.8m - 150mm PVC DR-35 @ 1.8%

PROP SAN MH11
T/G = 116.10
NE INV = 115.38
SE INV = 115.49
SW INV = 115.35

PROP SAN 7.8m - 150mm PVC DR-35 @ 1.0%

PROP SAN MH12
T/G = 116.13
SE INV = 115.48
SW INV = 115.46

PROP SAN 2.5m - 150mm PVC DR-35 @ 1.0%

PROP SAN 0.6m - 150mm PVC DR-35

PROP SAN 1.2m - 200mm PVC DR-35 @ 4.2%

PROP SAN 2.0m - 100mm PVC DR-35 @ 1.0%

PROP SAN 7.0m - 100mm PVC DR-35 @ 1.0%

PROP SAN 17.0m - 200mm PVC DR-35 @ 1.00%

RAMP

MAT WASHERS

NEW HALO CAR WASH
(G.F.A. = ±485m²)
F.F.E. = 117.10
TOP OF TRENCH = 117.07
(NO BASEMENT)

PIT ELEV. = 115.95
PIPE INV. = 115.88

LEGEND:

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2m 0.5 0 2 4m
SCALE: 1:100

No.	REVISIONS	BY	DATE
02	RE-ISSUED FOR APPROVAL	P.P.	11 JUN 2021
01	ISSUED FOR APPROVAL	P.P.	05 FEB 2021

LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2021-06-11
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

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

CLIENT
HALO CAR WASH

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

PROJECT
PROPOSED DEVELOPMENT
6111 HAZELDEAN RD
STITTSVILLE, ON

DRAWING TITLE
CAR WASH WASTEWATER TREATMENT & RECLAMATION SYSTEM

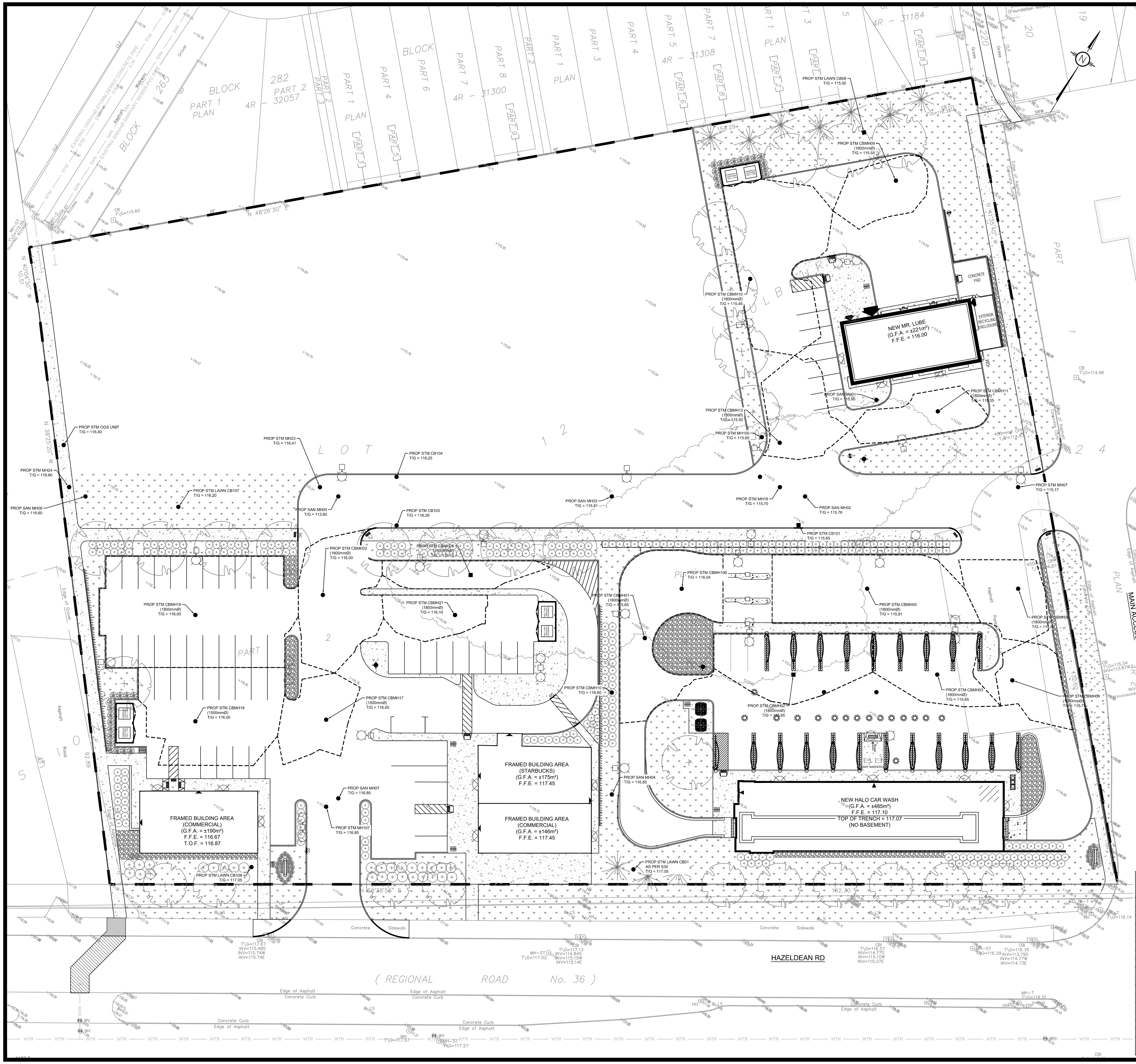
PROJECT NO.
200100

DATE
APRIL 2020

C402

D07-12-20-0113

18226



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- WS-XX CONTROLLED 0.00 0.00 — WATERSHED NAME; RUNOFF COEFFICIENT; AREA IN HECTARES

Structure	T/G	HWL (100yr event)	Ponding Depth (100yr event) (m)	Storage (100yr event) (m³)
CBMH01	115.65	115.95	0.30	26.43
CBMH02	115.65	115.95	0.30	26.55
CBMH03	115.65	115.95	0.30	16.02
CBMH04	115.65	115.95	0.30	11.23
CBMH05	115.65	115.95	0.30	37.98
CBMH06	115.65	115.95	0.30	14.34
CBMH09	115.55	115.65	0.10	4.03
CBMH10	115.45	115.65	0.20	30.33
CBMH11	115.35	115.65	0.30	13.2
CBMH12	115.50	115.65	0.15	7.82
CBMH17	116.00	116.30	0.30	12.49
CBMH18	116.00	116.30	0.30	32.30
CBMH19	116.00	116.30	0.30	46.96
CBMH20	116.10	116.30	0.20	8.07
CBMH21	116.10	116.30	0.20	7.72
CBMH22	116.00	116.30	0.30	22.25

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CLIENT
HALO CAR WASH

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

PROJECT
PROPOSED DEVELOPMENT
6111 HAZELDEAN RD
STITTSVILLE, ON

DRAWING TITLE
STORMWATER MANAGEMENT PLAN

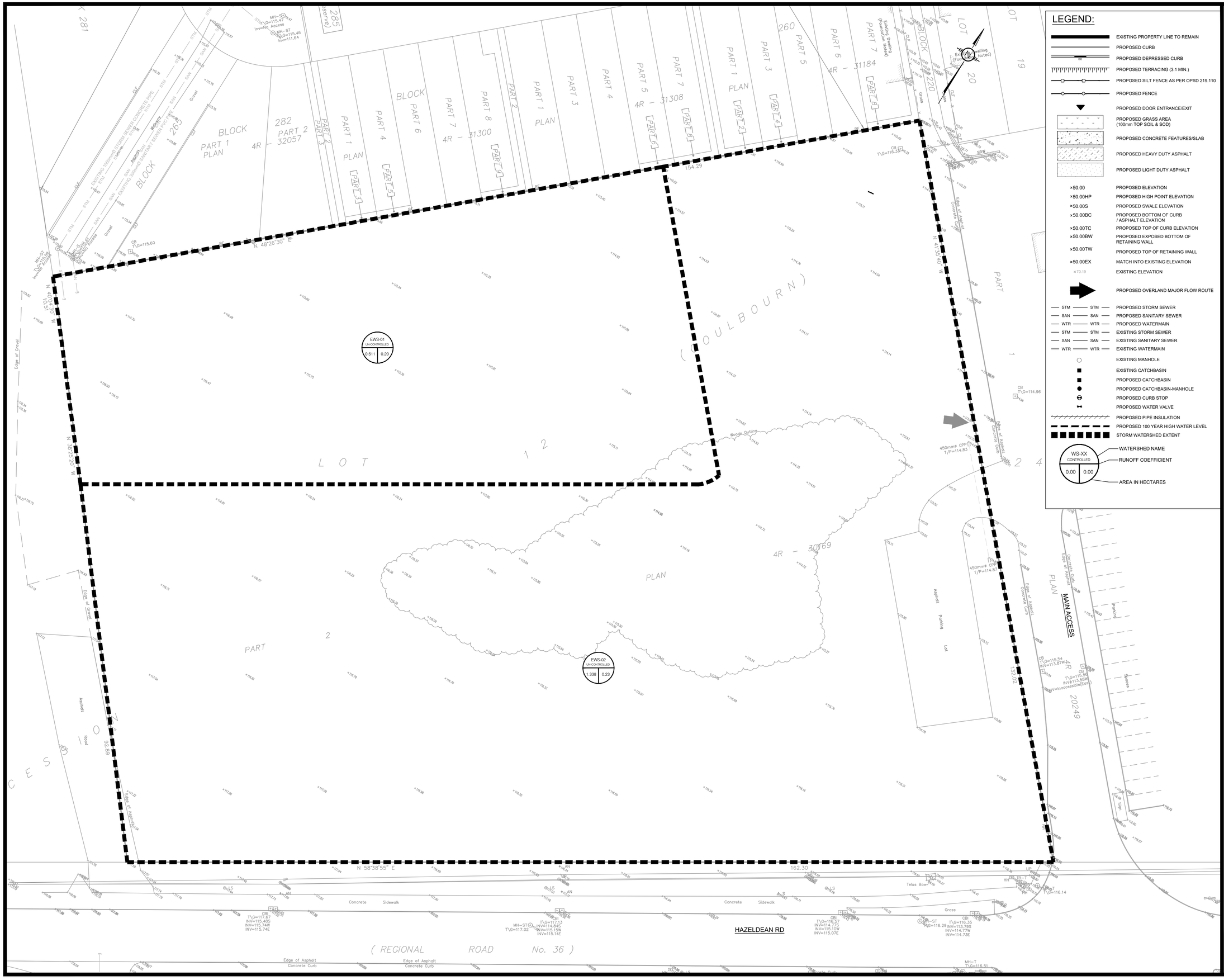
PROJECT NO.
200100

DATE
APRIL 2020

C601

D07-12-20-0113

18226



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DRAWING TITLE
PRE-DEVELOPMENT
WATERSHED PLAN

PROJECT NO.
200100

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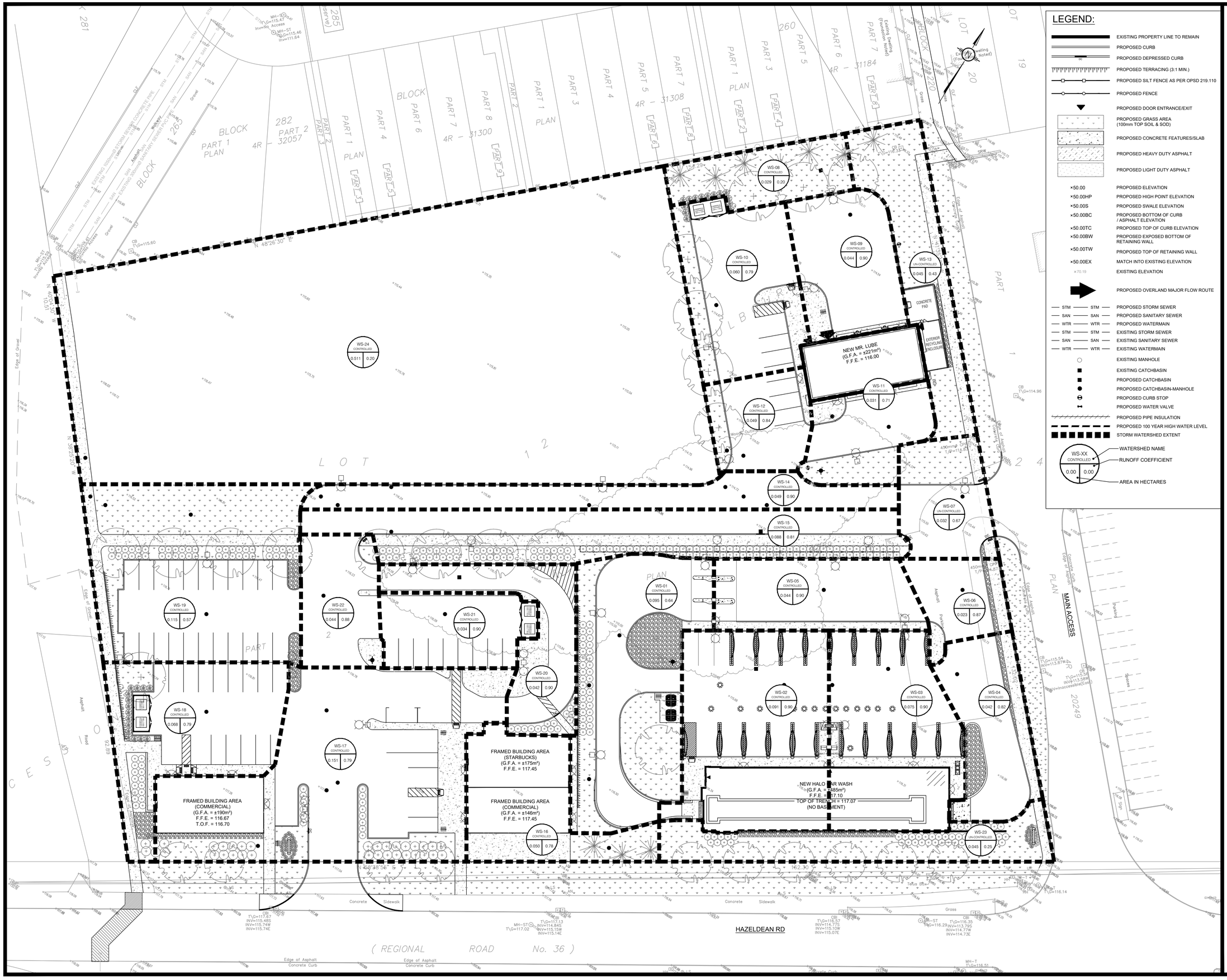

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No.	REVISIONS	BY	DATE
02	RE-ISSUED FOR APPROVAL	P.P.	11 JUN 2021
01	ISSUED FOR APPROVAL	P.P.	05 FEB 2021

LICENSED PROFESSIONAL ENGINEER M. BASNET 100501996 2021-06-11 PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

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

CLIENT
HALO CAR WASH

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

PROJECT
PROPOSED DEVELOPMENT
6111 HAZELDEAN RD
STITTSVILLE, ON

DRAWING TITLE
POST-DEVELOPMENT WATERSHED PLAN

PROJECT NO.
200100

DATE
APRIL 2020

C702

D07-12-20-0113

18226

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
- ×50.00 PROPOSED ELEVATION
- ×50.00HP PROPOSED HIGH POINT ELEVATION
- ×50.00S PROPOSED SWALE ELEVATION
- ×50.00BC PROPOSED BOTTOM OF CURB / ASPHALT ELEVATION
- ×50.00TC PROPOSED TOP OF CURB ELEVATION
- ×50.00BW PROPOSED EXPOSED BOTTOM OF RETAINING WALL
- ×50.00TW PROPOSED TOP OF RETAINING WALL
- ×50.00EX MATCH INTO EXISTING ELEVATION
- ×70.19 EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- STM STM PROPOSED STORM SEWER
- SAN SAN PROPOSED SANITARY SEWER
- WTR WTR PROPOSED WATERMAIN
- STM STM EXISTING STORM SEWER
- SAN SAN EXISTING SANITARY SEWER
- WTR WTR EXISTING WATERMAIN
- EXISTING MANHOLE
- EXISTING CATCHBASIN
- PROPOSED CATCHBASIN
- PROPOSED CATCHBASIN-MANHOLE
- PROPOSED CURB STOP
- PROPOSED WATER VALVE
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WS-XX CONTROLLED — WATERSHED NAME
- 0.00 — RUNOFF COEFFICIENT
- 0.00 — AREA IN HECTARES

SA-03 0.28

SA-01 0.53

SA-02 0.53

NEW MR. LUBE
(G.F.A. = ±221m²)
F.F.E. = 116.00

CONCRETE PAD

EXTERIOR RECYCLING ENCLOSURE

FRAMED BUILDING AREA
(COMMERCIAL)
(G.F.A. = ±190m²)
F.F.E. = 116.67
T.O.F. = 116.70

FRAMED BUILDING AREA
(STARBUCKS)
(G.F.A. = ±175m²)
F.F.E. = 117.45

FRAMED BUILDING AREA
(COMMERCIAL)
(G.F.A. = ±146m²)
F.F.E. = 117.45

NEW HALO CAR WASH
(G.F.A. = ±485m²)
F.F.E. = 117.10
TOP OF TRENCH = 117.07
(NO BASEMENT)

HAZELDEAN RD

(REGIONAL ROAD No. 36)

MAIN ACCESS

N 48°26'30" E 162.30

N 41°33'30" W 292.89

N 48°26'30" E 162.30

N 41°33'30" W 10.31

N 35°25'20" W 32.89

USE AND INTERPRETATION OF DRAWINGS

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

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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 AVAILABE RECORDS, BUT MAY NOT BE COMPLETE OR TO DATE. CONTRACTOR SHALL VERIFY IN FIELD FOR LOCATION AND ELEVATION OF PIPES AND CHECK WITH THE UTILITY COMPANIES BEFORE DIGGING OR PERFORMING WORK.

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

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

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

5m 2 0 5 10m

SCALE: 1:300

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100501996
2021-06-11
PROVINCE OF ONTARIO

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PROPOSED DEVELOPMENT
6111 HAZELDEAN RD
STITTSVILLE, ON

DRAWING TITLE
SANITARY WATERSHED PLAN

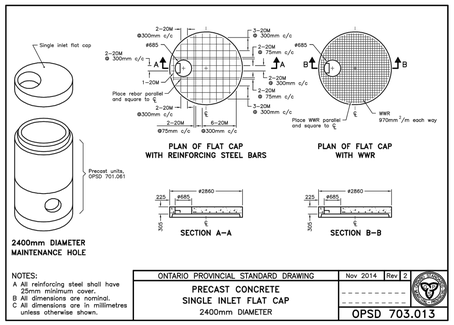
PROJECT NO.
200100

DATE
APRIL 2020

C703

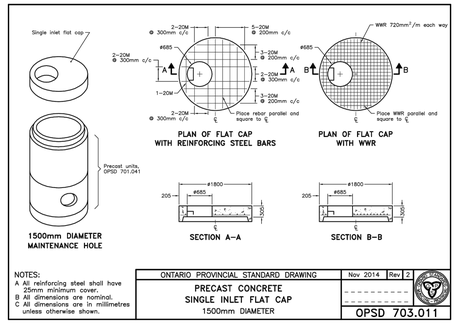
D07-12-20-0113

18226



NOTES:
A All reinforcing steel shall have 25mm minimum cover.
B All dimensions are nominal.
C All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 2
PRECAST CONCRETE SINGLE INLET FLAT CAP 2400mm DIAMETER		OPSD 703.013



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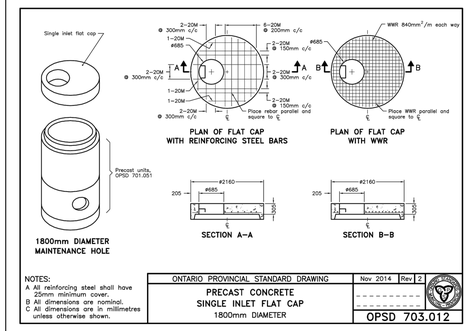
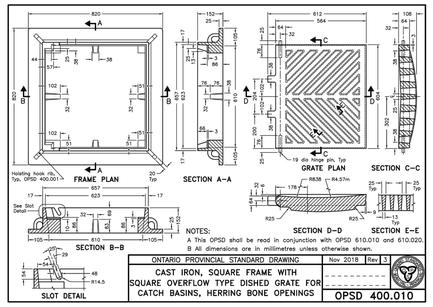
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 2
PRECAST CONCRETE SINGLE INLET FLAT CAP 1500mm DIAMETER		OPSD 703.011



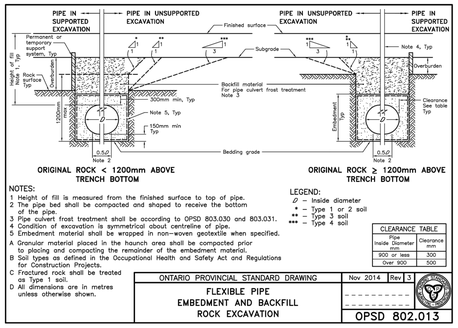
NOTES:
A All reinforcing steel shall have 25mm minimum cover.
B All dimensions are nominal.
C All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 2
PRECAST CONCRETE SINGLE INLET FLAT CAP 1800mm DIAMETER		OPSD 703.012



NOTES:
A This OPSD shall be read in conjunction with OPSD 610.010 and 610.020.
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev 3
CAST IRON, SQUARE FRAME WITH SQUARE OVERFLOW TYPE DISHED GRATE FOR CATCH BASINS, HERRING BONE OPENINGS		OPSD 400.010

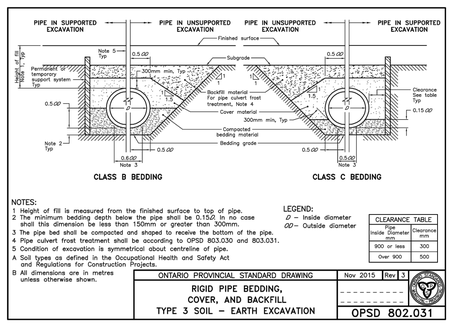


NOTES:
1 Height of fill is measured from the finished surface to top of pipe.
2 The pipe bed shall be compacted and shaped to receive the bottom of the pipe.
3 Pipe culvert frost treatment shall be according to OPSD 803.030 and 803.031.
4 Condition of excavation is symmetrical about centreline of pipe.
5 Embedment material shall be wrapped in non-woven geotextile when specified.
A Granular material placed in the haunch area shall be compacted prior to placing and compacting the remainder of the embedment material.
B Soil types as defined in the Occupational Health and Safety Act and Regulations for Construction Projects.
C Fractured rock shall be treated as Type 1 soil.
D All dimensions are in metres unless otherwise shown.

LEGEND:
$\varnothing$ – Inside diameter
* – Type 1 or 2 soil
** – Type 3 soil
*** – Type 4 soil

CLEARANCE TABLE	
Pipe Inside Diameter mm	Clearance mm
900 or less	300
Over 900	500

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 3
FLEXIBLE PIPE EMBEDMENT AND BACKFILL ROCK EXCAVATION		OPSD 802.013

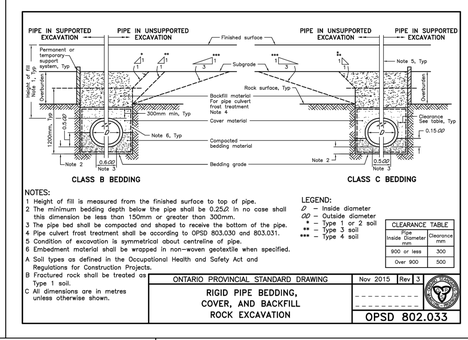


NOTES:
1 Height of fill is measured from the finished surface to top of pipe.
2 The minimum bedding depth below the pipe shall be 0.15Ø. In no case shall this dimension be less than 150mm or greater than 300mm.
3 The pipe bed shall be compacted and shaped to receive the bottom of the pipe.
4 Pipe culvert frost treatment shall be according to OPSD 803.030 and 803.031.
5 Condition of excavation is symmetrical about centreline of pipe.
6 Embedment material shall be wrapped in non-woven geotextile when specified.
A Soil types as defined in the Occupational Health and Safety Act and Regulations for Construction Projects.
B All dimensions are in metres unless otherwise shown.

LEGEND:
$\varnothing$ – Inside diameter
$\Delta\varnothing$– Outside diameter

CLEARANCE TABLE	
Pipe Inside Diameter mm	Clearance mm
900 or less	300
Over 900	500

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev 3
RIGID PIPE BEDDING, COVER, AND BACKFILL TYPE 3 SOIL – EARTH EXCAVATION		OPSD 802.031

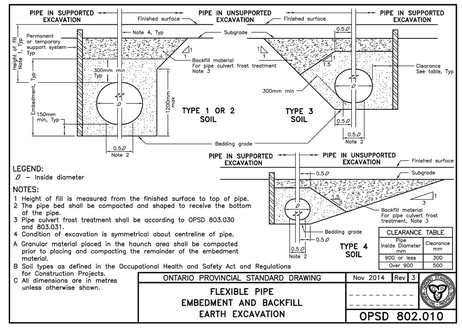


NOTES:
1 Height of fill is measured from the finished surface to top of pipe.
2 The minimum bedding depth below the pipe shall be 0.25Ø in no case shall this dimension be less than 150mm or greater than 300mm.
3 The pipe bed shall be compacted and shaped to receive the bottom of the pipe.
4 Pipe culvert frost treatment shall be according to OPSD 803.030 and 803.031.
5 Condition of excavation is symmetrical about centreline of pipe.
6 Embedment material shall be wrapped in non-woven geotextile when specified.
A Soil types as defined in the Occupational Health and Safety Act and Regulations for Construction Projects.
B Fractured rock shall be treated as Type 1 soil.
C All dimensions are in metres unless otherwise shown.

LEGEND:
$\varnothing$ – Inside diameter
$\Delta\varnothing$ – Outside diameter
* – Type 1 or 2 soil
** – Type 3 soil
*** – Type 4 soil

CLEARANCE TABLE	
Pipe Inside Diameter mm	Clearance mm
900 or less	300
Over 900	500

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev 3
RIGID PIPE BEDDING, COVER, AND BACKFILL ROCK EXCAVATION		OPSD 802.033



LEGEND:
$\varnothing$ – Inside diameter

NOTES:
1 Height of fill is measured from the finished surface to top of pipe.
2 The pipe bed shall be compacted and shaped to receive the bottom of the pipe.
3 Pipe culvert frost treatment shall be according to OPSD 803.030 and 803.031.
4 Condition of excavation is symmetrical about centreline of pipe.
A Granular material placed in the haunch area shall be compacted prior to placing and compacting the remainder of the embedment material.
B Soil types as defined in the Occupational Health and Safety Act and Regulations for Construction Projects.
C All dimensions are in metres unless otherwise shown.

CLEARANCE TABLE	
Pipe Inside Diameter mm	Clearance mm
900 or less	300
Over 900	500

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 3
FLEXIBLE PIPE EMBEDMENT AND BACKFILL EARTH EXCAVATION		OPSD 802.010

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

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

NOTES:
1 When sidewalk is continuously adjacent, the dropped curb at entrances shall be reduced to 75mm.
2 For slipforming procedure a 5% batter is acceptable.
A Treatment at entrances shall be according to OPSD 351.010.
B Outlet treatment shall be according to the OPSD 610 Series.
C The transition from one curb type to another shall be a minimum length of 3.0m, except in conjunction with guide rail where it shall be according to the OPSD 900 Series.
D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2012	Rev 2
CONCRETE BARRIER CURB		OPSD 600.110

NOTES:
1 Sidewalk thickness at residential driveways and adjacent to curb shall be 150mm. At commercial and industrial driveways, the thickness shall be 200mm.
2 Sidewalk width shall be wider when specified.
3 The OPSD shall be read in conjunction with OPSD 310.030, 310.031, 310.032, 310.033 and 310.039.
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev 2
CONCRETE SIDEWALK		OPSD 310.010

NOTES:
1 The sump is measured from the lowest invert.
A Granular backfill shall be placed to a minimum thickness of 300mm all around the maintenance hole.
B Precast concrete components shall be according to OPSD 701.030, 701.031, or 701.032.
C Structure exceeding 5.0m in depth shall include safety platform according to OPSD 404.020.
D Pipe support according to OPSD 708.020.
E For benching and pipe opening details, see OPSD 701.021.
F For adjustment unit and frame installation, see OPSD 704.010.
G All dimensions are nominal.
H All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 5
PRECAST CONCRETE MAINTENANCE HOLE 1200mm DIAMETER		OPSD 701.010

ONTARIO PROVINCIAL STANDARD DRAWING	N.T.S.	
CATHODIC PROTECTION FOR PVC WATERMAIN SYSTEMS	DATE: MAY 2001	
	REVISED: MARCH 2013	
	DWG No.: W40	

NOTES:
FOR WATERMAIN 100mm (NOMINAL) TO 400mm (NOMINAL)
1. BARREL TO BARREL SEPARATION (S) SHALL BE 250mm MINIMUM.
2. THRUST BLOCKS FOR MAINS LARGER THAN 400mm (NOMINAL) SHALL BE PER SPECIAL DESIGN.
3. FOR 300mm (NOMINAL) AND 400mm (NOMINAL) MAINS, BENDS SHALL BE MAX. 22.5°.
4. REFER TO W26.1 FOR RESTRAINED LENGTH REQUIREMENTS.
5. REFER TO W26.5 FOR RESTRAINED LENGTH REQUIREMENTS.
6. REFER TO W26.3 AND W26.4 FOR THRUST BLOCK REQUIREMENTS.
7. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
8. DESIGNED TO MEET THE INTENT OF THE MOE WATERMAIN DESIGN CRITERIA JUNE 2012.

	WATERMAIN CROSSING OVER SEWER	DATE: MAY 2001
Ottawa		REVISED: MARCH 2013
		DWG No.: W75.2

NOTES
FOR ALL WATERMAINS
1. SEE DETAIL W20 FOR HYDRANTS IN DITCH AREAS.
2. FOR WATERMAINS 400mm AND UNDER, LOCATE VALVE WITHIN 1.0m OF CENTRELINE. RETAINING/RESTRAINING DEVICES TO BE UTILIZED. FOR WATERMAINS 600mm AND OVER, BOLT VALVE WITH FLANGED END DIRECTLY TO FLANGED TEE.
3. RETAINING/RESTRAINING DEVICES TO BE UTILIZED.
4. HYDRANT BREAKABLE FLANGE ELEVATION TO BE ESTABLISHED PRIOR TO INSTALLATION. REFER TO MW-19.4 AND F-441A.
5. SEE SPF-2120 FOR BACKFILL REQUIREMENTS IN THIS AREA.
6. = SEE F-441A FOR HYDRANT LOCATION REQUIREMENTS.
7. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.

	HYDRANT INSTALLATION	DATE: MAY 2001
Ottawa		REVISED: MARCH 2013
		DWG No.: W19

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
2. APPROVED 610 X WIDTH OF CURB RAMP (150MM) TACTILE WALKING SURFACE INDICATOR, COLOUR TO BE YELLOW AS PER OPSD 310.039 AND 310.045 AS PER SC1.
3. CURB RAMPS TO BE AS PER SC1.1, SC1.2 AND SC1.3.
4. SIDEWALK DETAILS SEE SC2 AND SC3.
5. CURB RAMPS AS PER SC4 AND SC7.
6. CONTROLLED MEANS SIGNALIZED OR A 4–WAY STOP INTERSECTION.
7. SUBJECT TO AVOIDANCE OF MEDIANS, CROSSWALK LINES TO BE CENTRED ON THE CURB RAMP.
8. FOR CURB RAMPS, SLOPE OF 2% TO 5%, MAXIMUM 8%.
9. MAXIMUM SLOPE VARIES, SEE PRIVATE APPROACH BYLAW

	CURB RETURN ENTRANCES	DATE: MARCH 2007
Ottawa		REVISED: MARCH 2017
		DWG No.: SC7.1

NOTES:
1 Outlet hole size 525mm diameter maximum, location as required.
2 200mm diameter knockout to accommodate subdrain. Knockout shall be 60mm deep.
A Centre reinforcing in base slab and walls @20mm.
B Granular backfill shall be placed to a minimum thickness of 300mm all around the catch basin.
C Frame, grate, and adjustment units shall be installed according to OPSD 704.010.
D Pipe support shall be according to OPSD 708.020.
E All dimensions are nominal.
F All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 3
PRECAST CONCRETE CATCH BASIN 600x600mm		OPSD 705.010

NOTES
1. INTERCEPTOR TRENCH DRAINS IN THE ROADWAY ARE ONLY TO BE USED ON AN EXCEPTION BASIS FOR 3 SEASON RETROFIT APPLICATIONS.
2. FOR INTERMITTENT APPLICATIONS, CONSULT THE MANUFACTURER FOR CONNECTION DETAILS.
3. STANDARD CURB DETAILS TO BE USED AND NOTCHED AS SHOWN.
4. DRAIN TO HAVE MINIMUM 150mm OF CONCRETE ON ALL SIDES AS SHOWN.
5. CONCRETE TO BE 40 MPA 5–28–40 AND BE REVEILLED TO TOP OF GRATE.
6. FOR EACH CONTINUOUS RUN THE FIRST AND LAST GRATES TO BE REMOVABLE. FOR OTHER LOCATIONS GRATES TO BE FIXED
7. TRENCH DRAINS TO CONNECT TO NEAREST CB OR DITCH WHERE APPROPRIATE.
8. SEE MS.22–10 FOR APPROVED PRODUCTS.

	TRENCH DRAINS (EXCEPTION BASIS ONLY)	N.T.S.
Ottawa		DATE: MAY 2001
		REVISED: MARCH 2008
		DWG No.: S15

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LICENSED PROFESSIONAL ENGINEER M. BASNET 100501996 2021-06-11 PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

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

CLIENT
HALO CAR WASH

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

PROJECT
PROPOSED DEVELOPMENT
6111 HAZELDEAN RD
STITTSVILLE, ON

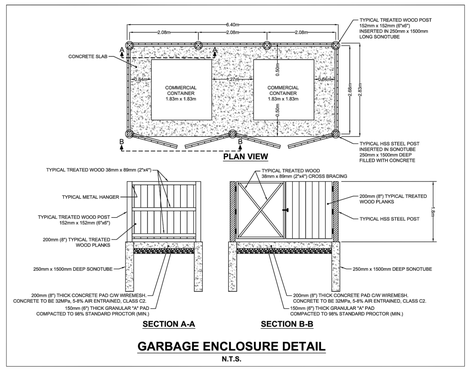
DRAWING TITLE
CONSTRUCTION DETAIL PLAN

PROJECT NO.
200100

DATE
APRIL 2020

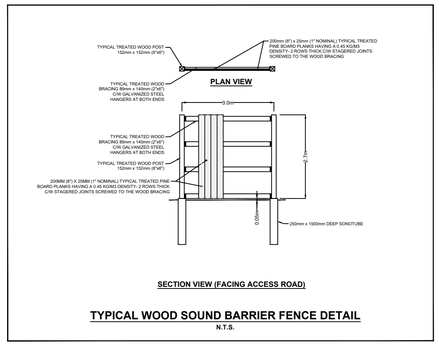
C901

D07-12-20-0113



GARBAGE ENCLOSURE DETAIL

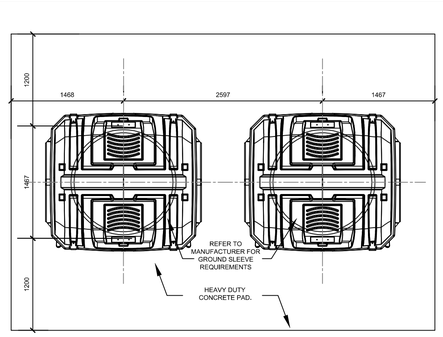
N.T.S.



SECTION VIEW (FACING ACCESS ROAD)

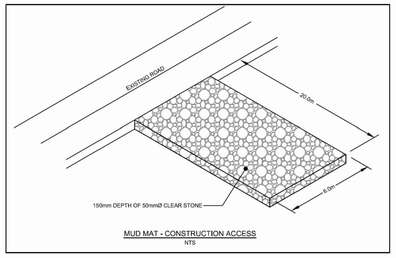
TYPICAL WOOD SOUND BARRIER FENCE DETAIL

N.T.S.



EARTH BIN DETAIL

(SCALE : 1:40)



MUD MAT - CONSTRUCTION ACCESS

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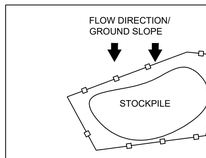
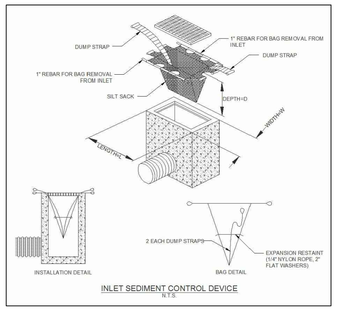


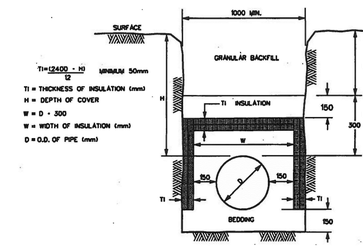
STOCKPILE EROSION PROTECTION

N.T.S.



INLET SEDIMENT CONTROL DEVICE

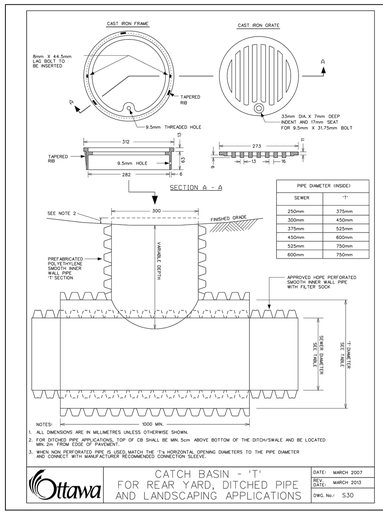
N.T.S.

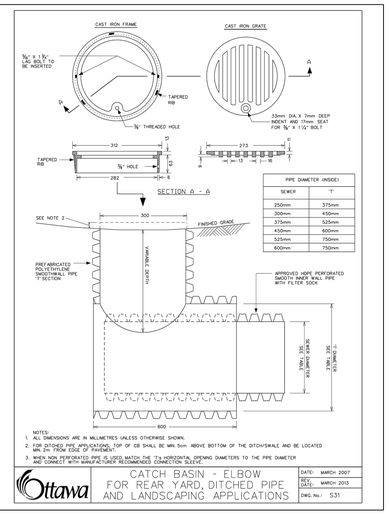


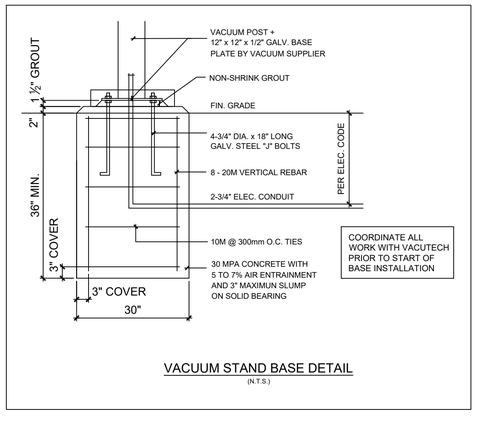
NOTES:
-FOR STORM INSULATION USE AN X VALUE OF 2000 IN THE ABOVE "TI" EQUATION.
-FOR SANITARY INSULATION USE AN X VALUE OF 2500 IN THE ABOVE "TI" EQUATION.
-FOR WATERMAIN INSULATION USE AN X VALUE OF 2400 IN THE ABOVE "TI" EQUATION.
-INCREMENTS OF INSULATION THICKNESS SHALL BE ADJUSTABLE TO 25mm.
-STAGGER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

TYPICAL STORM AND SANITARYSEWER AND WATERMAIN INSULATION DETAIL

(N.T.S.)







VACUUM STAND BASE DETAIL

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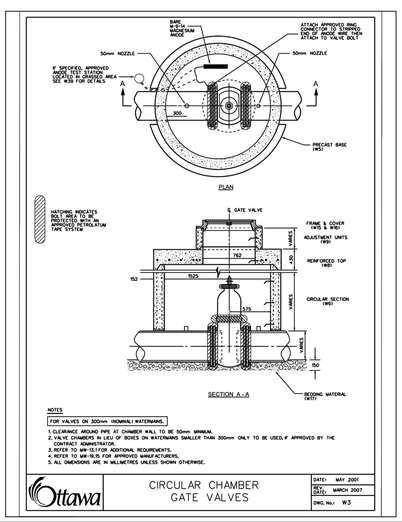
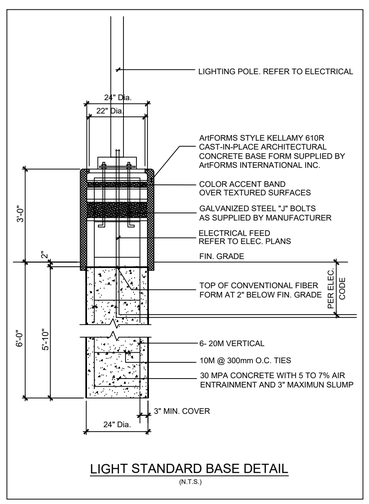
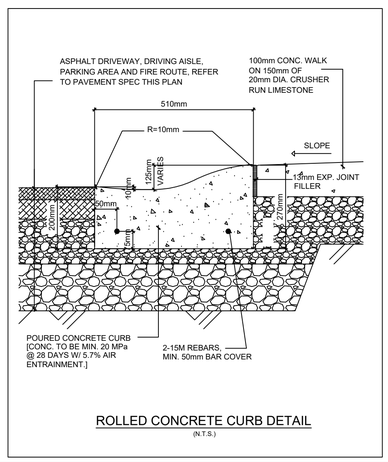




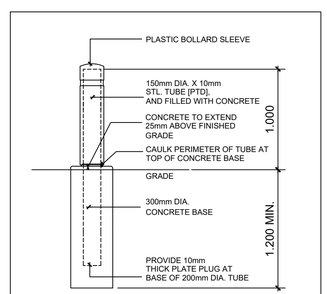
LIGHT STANDARD BASE DETAIL

(N.T.S.)



ROLLED CONCRETE CURB DETAIL

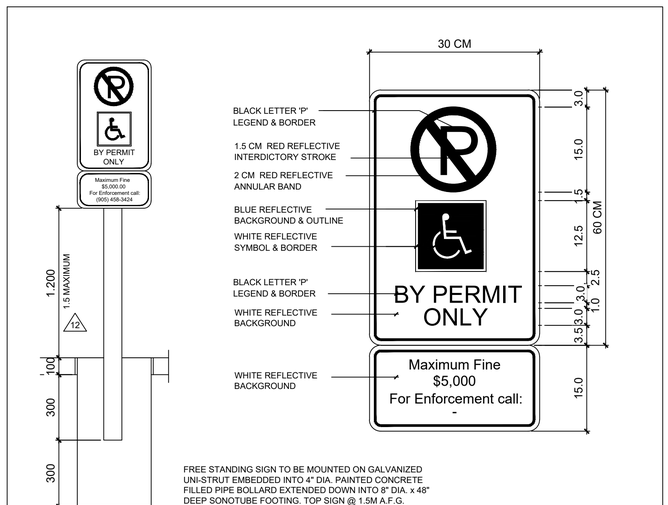
(N.T.S.)



8" DIA. CONCRETE FILLED STEEL BOLLARD SET INTO 12" DIA. x 48" DEEP CONCRETE SONO-TUB. BOLLARD SHALL BE 36" HIGH AND PAINTED REFLECTIVE YELLOW.

BOLLARD DETAIL

(N.T.S.)



FREE STANDING SIGN TO BE MOUNTED ON GALVANIZED UNI-STRUT EMBEDDED INTO 4" DIA. PAINTED CONCRETE FILLED PIPE BOLLARD EXTENDED DOWN INTO 8" DIA. x 48" DEEP SONOTUBE FOOTING. TOP SIGN @ 1.5M A.F.G.

PARKING & FIRE ROUTE SIGNS DETAIL

(N.T.S.)

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LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2021-06-11
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

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CLIENT

HALO CAR WASH

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

PROJECT

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6111 HAZELDEAN RD
STITTSVILLE, ON

DRAWING TITLE

CONSTRUCTION DETAIL PLAN

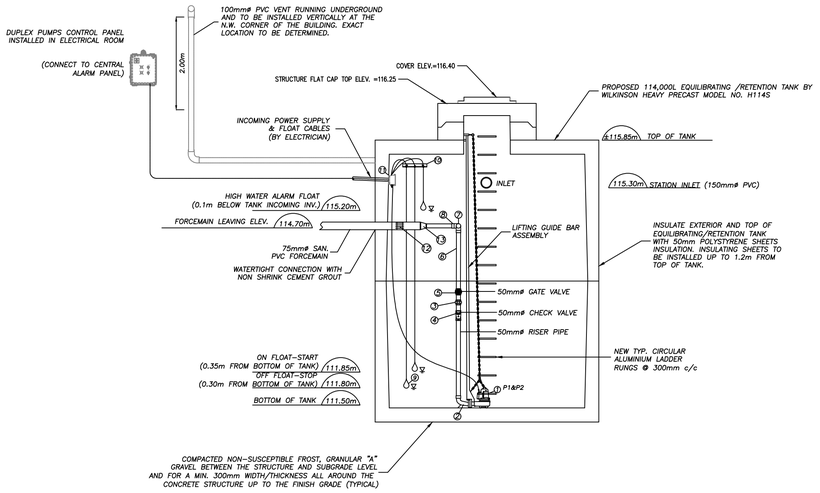
PROJECT NO.
200100

DATE
APRIL 2020

C902

D07-12-20-0113

18226



SANITARY PUMPING STATION SCHEMATIC AND DETAILS

(N.T.S.)

EQUIPMENT SPECIFICATIONS

1. 2x NEW SEWAGE PUMPS, 1 L/s AT 12.5m TOTAL DYNAMIC HEAD (TBC).
2. 50mm NPT DUCTILE IRON BASE ELBOW
3. 50mm NPT GALVANIZED THREADED UNION
4. 50mm NPT BRONZE SWING CHECK VALVE
5. 50mm NPT BRONZE GATE VALVE
6. 50mm SCHEDULE 40 GALVANIZED STEEL RISER PIPE
7. 50mm x90° GALVANIZED THREADED ELBOW
8. 50mmx50mmx50mm GALVANIZED THREADED TEE
9. 3 x FLOAT SWITCHES LEVEL CONTROL
10. GALVANIZED FLOAT SUPPORT BRACKET
11. PVC JUNCTION BOX (POWER AND LEVEL CONTROLS)
12. 75mmø DRESSER TRANSITION COUPLING, STYLE 38
13. 75mm x 50mm GALVANIZED CONCENTRIC INCREASER FITTING

MODE OF OPERATION

-BOTH PUMPS WILL ALTERNATE THE PUMPING CYCLE

-WHEN THE SEWAGE LEVEL REACHES THE "ON FLOAT", PUMP No.1 IS ENERGIZED AND THE PUMPING CYCLE STARTS.

-AFTER ONE HOUR OF OPERATION, PUMP No.1 SHUTS DOWN AND PUMP No.2 STARTS. THIS CYCLE WILL BE REPEATED 12 TIMES A DAY (24HOURS PERIOD)

-WHEN THE SEWAGE LEVEL REACHES THE "OFF FLOAT", THE PUMP SHUTS DOWN AND THE PUMPING CYCLE STOPS.

-THE FOLLOWING CYCLES SHALL START WITH THE PUMP WHICH DID NOT END THE PREVIOUS CYCLE.

-WHEN THE SEWAGE LEVEL REACHES THE "HIGH WATER ALARM FLOAT", A SIGNAL IS TRIGGERED AND SENT TO THE AUDIBLE & VISUAL ALARMS AT THE PUMPS DUPLEX CONTROL PANEL.

-WHEN PUMP FAILURE OCCURS (EITHER ONE), A SIGNAL IS SENT TO THE AUDIBLE & VISUAL ALARMS AT THE PUMP DUPLEX CONTROL PANEL AND THE OTHER PUMP SHALL WORK EVERY CYCLE UNTIL THE DEFECTIVE PUMP IS REPLACED/REPAIRED OR RESET.

** PROVIDE SHOP DRAWINGS OF ALL EQUIPMENT AND STRUCTURE FOR ENGINEER APPROVAL PRIOR TO ORDER AND INSTALL**

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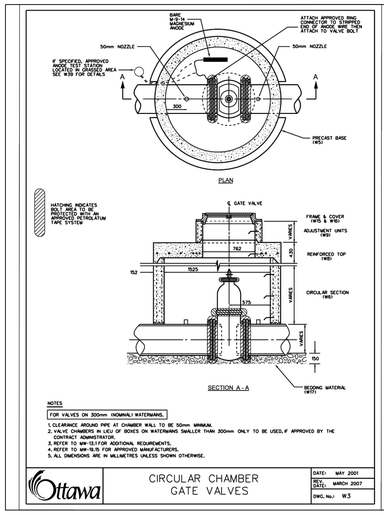

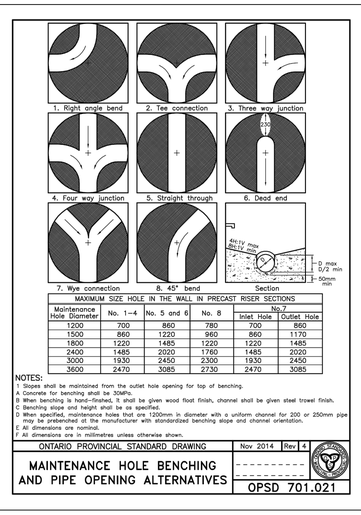

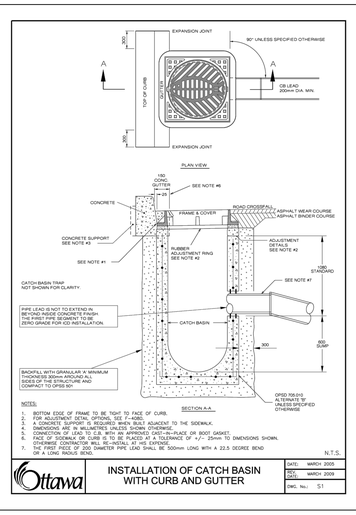

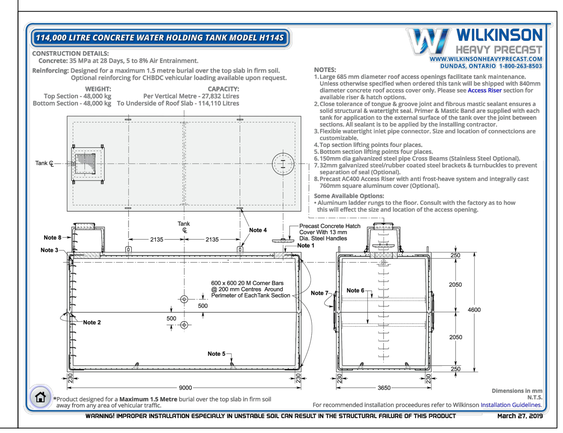

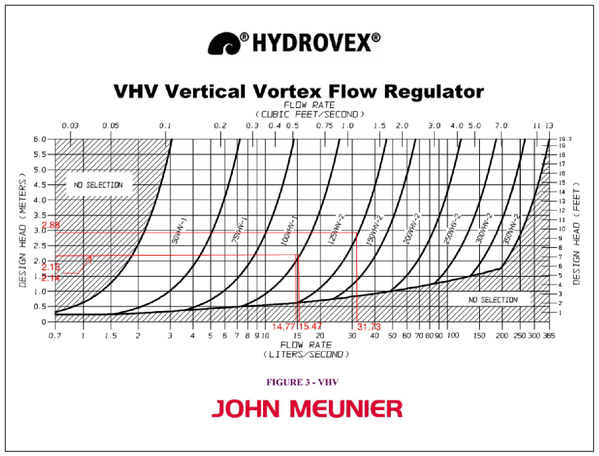

FIGURE 3 - VHV

JOHN MEUNIER

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02	RE-ISSUED FOR APPROVAL	P.P.	11 JUN 2021
01	ISSUED FOR APPROVAL	P.P.	05 FEB 2021

LICENSED PROFESSIONAL ENGINEER M. BASNET 100501996 2021-06-11 PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

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

CLIENT

HALO CAR WASH

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

PROJECT

PROPOSED DEVELOPMENT
6111 HAZELDEAN RD
STITTSVILLE, ON

DRAWING TITLE

CONSTRUCTION DETAIL PLAN

PROJECT NO.
200100

DATE
APRIL 2020

C903

D07-12-20-0113

APPENDIX F
Survey, As-Built, Architectural Drawings

TOPOGRAPHICAL SKETCH OF

6111 HAZELDEAN ROAD
CITY OF OTTAWA

Prepared by Annis, O'Sullivan, Vollebekk Ltd.
Field Work Completed September 21, 2020.

Scale 1 : 300

12 9 6 3 0 6 12 Metres

Metric

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

Notes & Legend

Denotes

(AOG)	=	Annis, O'Sullivan, Vollebekk Ltd.
FH	=	Fire Hydrant
WV	=	Water Valve
SP	=	Water Stand Post
MH-S	=	Maintenance Hole (Sanitary)
MH-ST	=	Maintenance Hole (Storm Sewer)
MH-T	=	Maintenance Hole (Traffic)
MH-H	=	Maintenance Hole (Hydro)
MH	=	Maintenance Hole (Unidentified)
VC	=	Valve Chamber (Watermain)
OHW	=	Overhead Wires
CB	=	Catch Basin
CBI	=	Catch Basin Inlet
CPP	=	Corrugated Plastic Pipe
T/P	=	Top of Pipe
T/G	=	Top of Grate
TB-T	=	Traffic Terminal Box
TSP	=	Traffic Signal Post
S	=	Sign
BF	=	Board Fence
CLF	=	Chain Link Fence
INV	=	Invert
Ø	=	Diameter
UP	=	Utility Pole
AN	=	Anchor
HH	=	Handhole
LS	=	Light Standard
65.00	=	Location of Elevations
65.00	=	Top of Concrete Curb Elevation
	=	Property Line

Bearings are grid, and are referred to the Central Meridian of MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

SITE AREA = 18494.4 m²

BOUNDARY INFORMATION COMPILED FROM PLAN 4R-30619.

ELEVATION NOTES

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

UTILITY NOTES

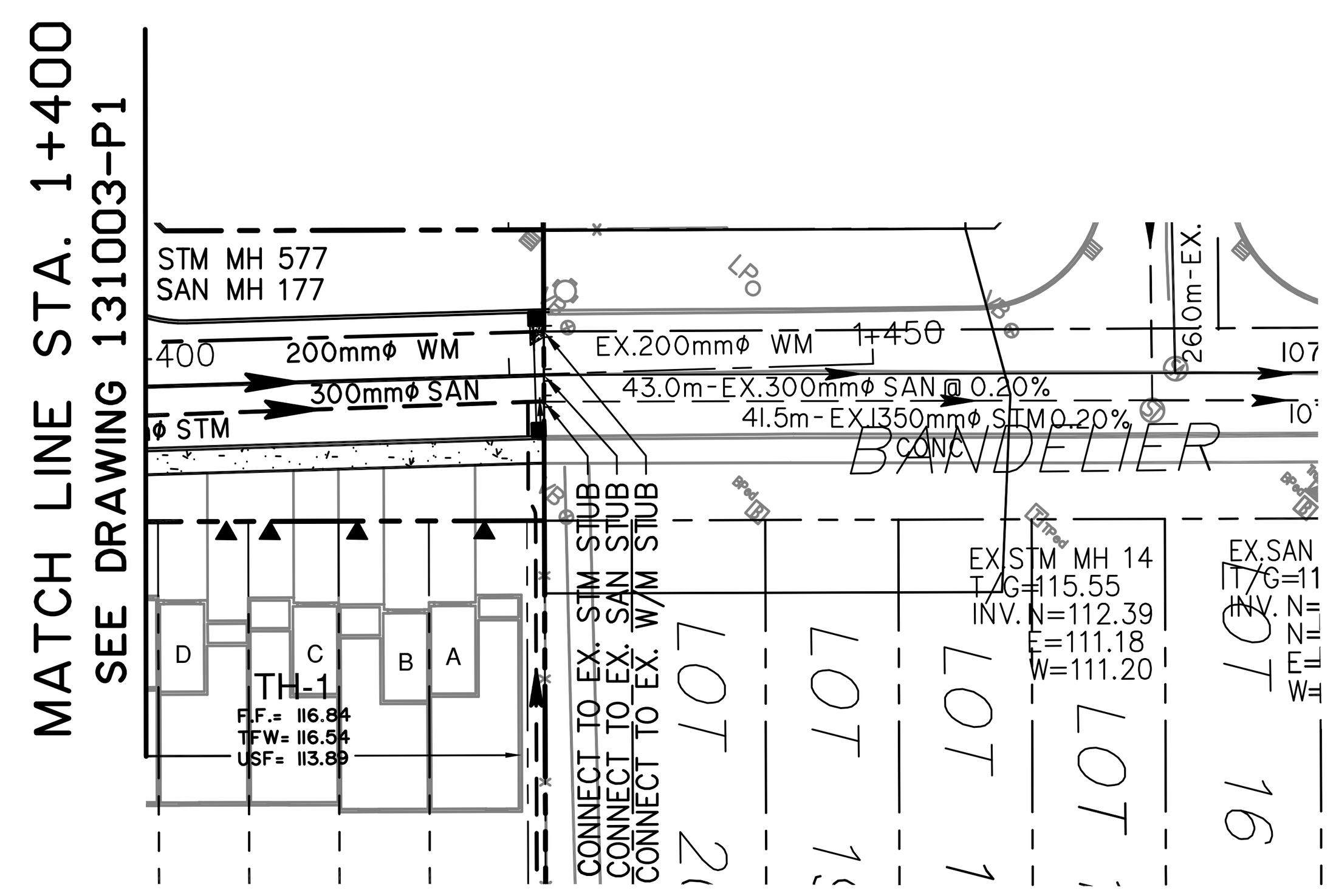
1. This drawing cannot be accepted as acknowledging all of the utilities and it will be the responsibility of the user to contact the respective utility authorities for confirmation.
2. Only visible surface utilities were located.
3. A field location of underground plant by the pertinent utility authority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

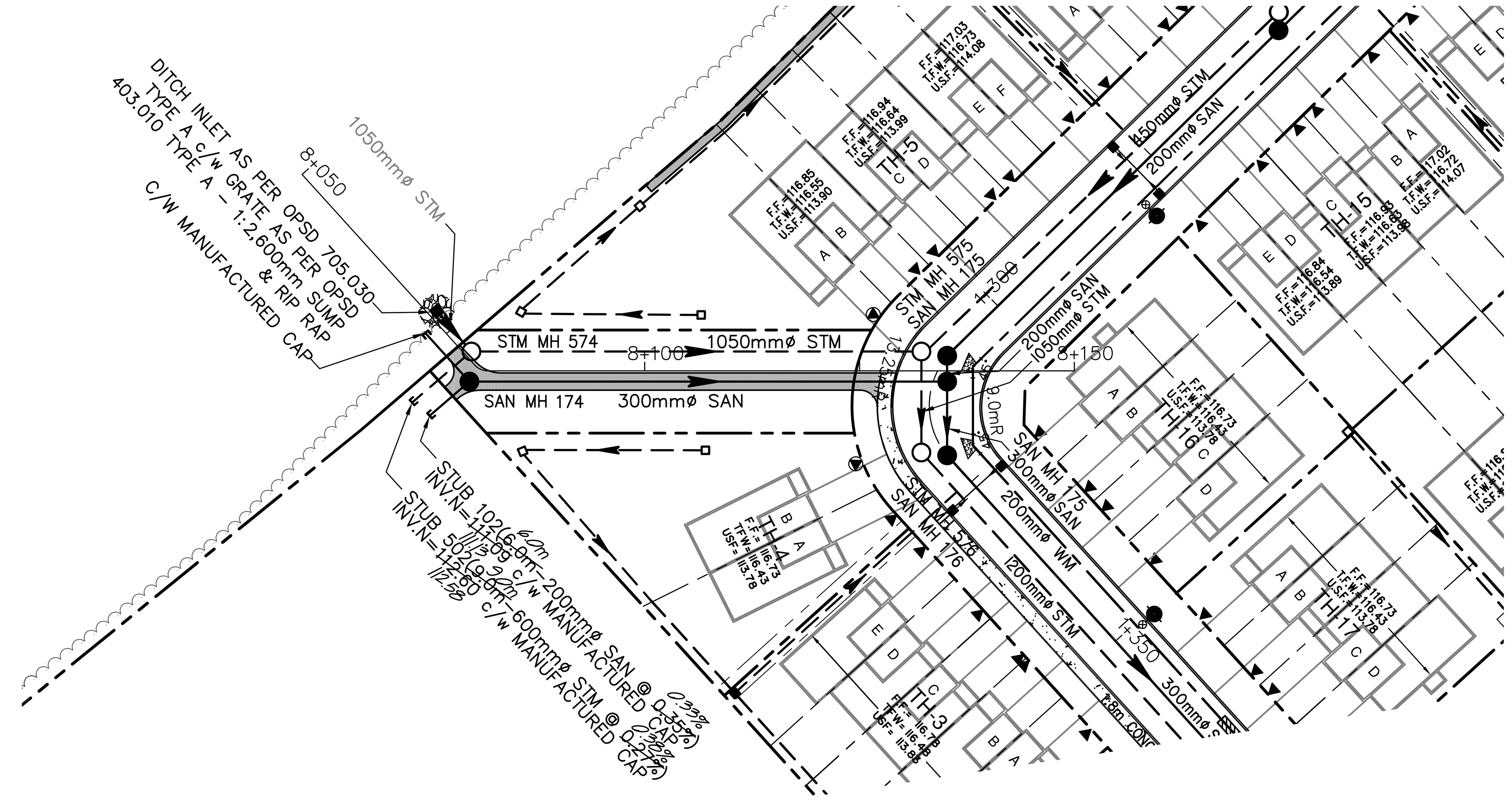
SITE BENCHMARK No.1
FIRE HYDRANT
Top of Spindle
Elevation=116.61

SITE BENCHMARK No.2
FIRE HYDRANT
Top of Spindle
Elevation=119.40

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: nepean@aovltd.com
Ontario Land Surveyors

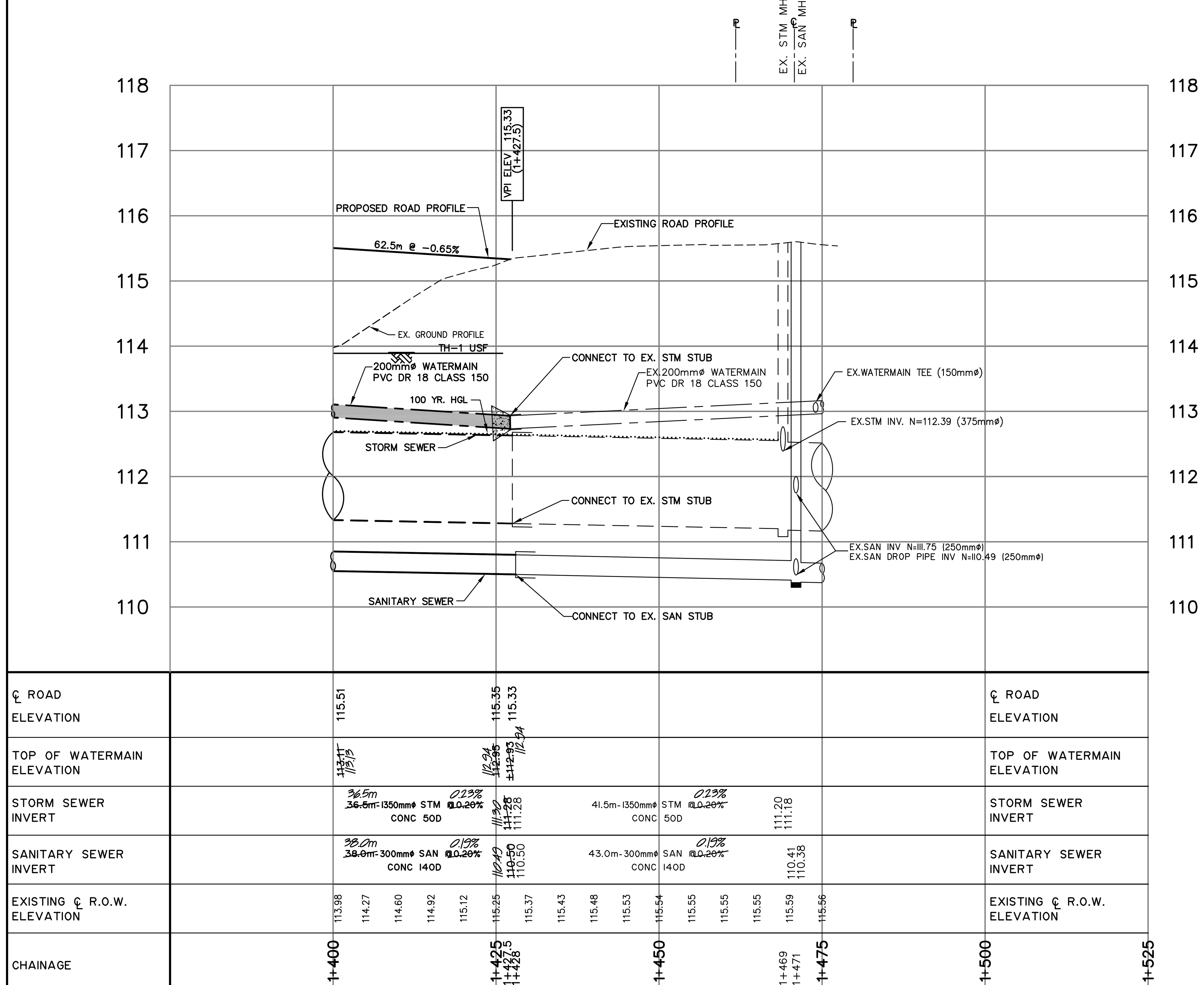
Job No. 20BBI-20 6111hazeldeanRd PHL924Cont2 T. F. DG





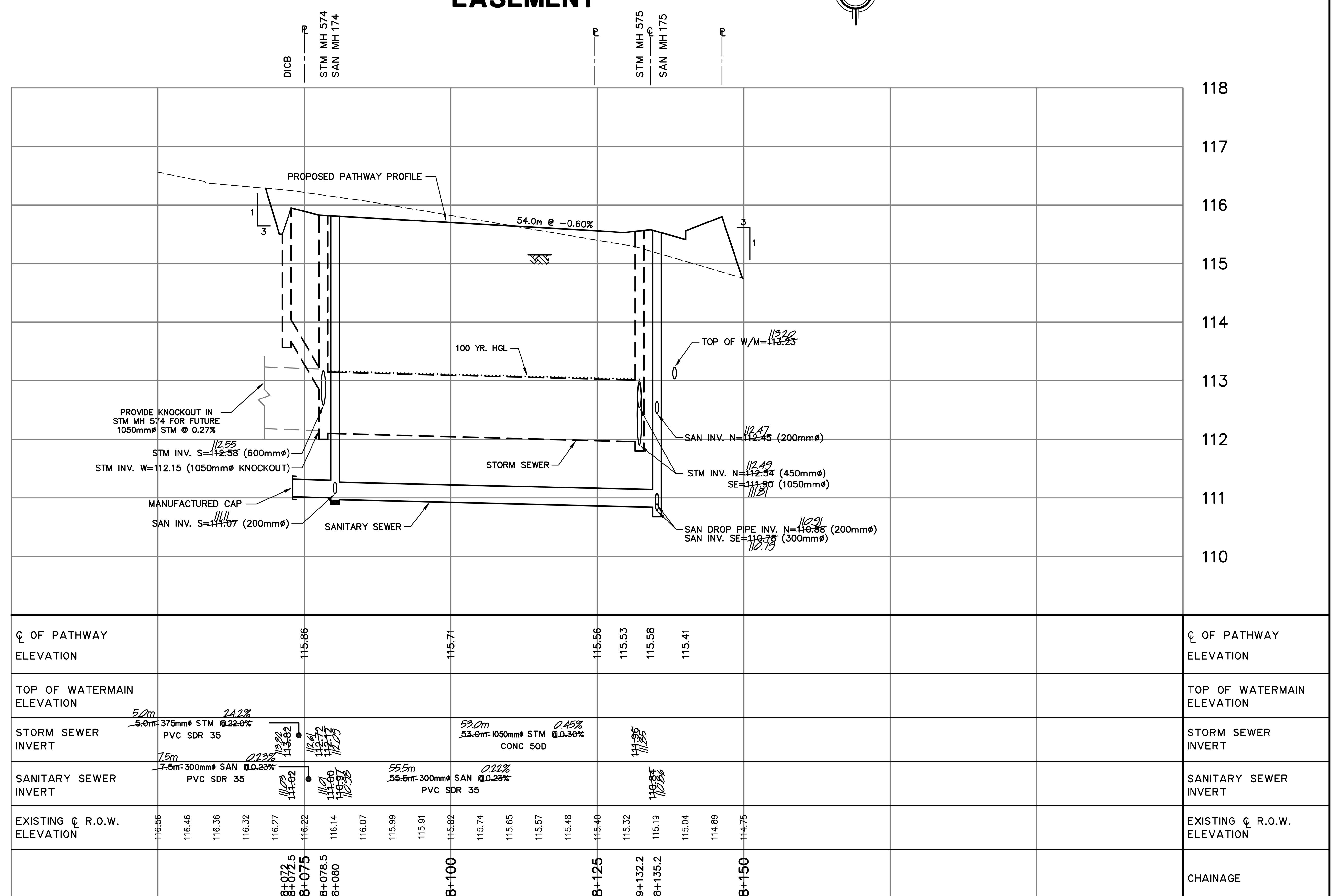
OVERLAND DRIVE

BANDELIER WAY



EASEMENT

BANDELIER WAY



LEGEND:

(COW) CUT OFF WALL (1.5m WIDE) AS PER CITY STANDARD S8

(SL) SAFETY LANDING

OUTSIDE PROPOSED DEVELOPMENT

TEST PIT REFUSAL

NOTES:

1. WATERMAIN CROSSING BELOW AND OVER SEWERS AS PER CITY STD W25 AND STD W25.2 RESPECTIVELY.
2. THERMAL INSULATION OF WATERMAIN NEAR OPEN STRUCTURES AS PER CITY STD W23.

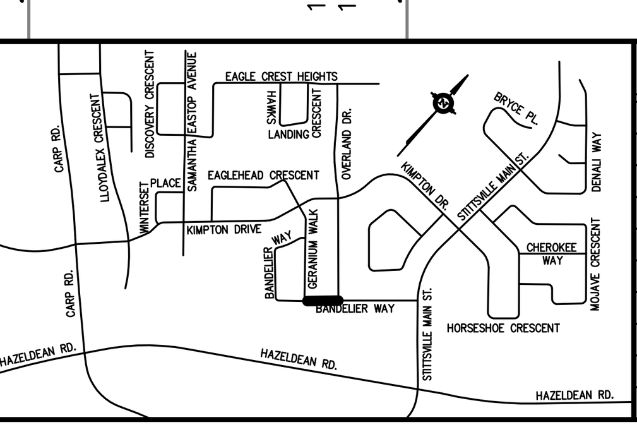
RECORD DRAWING

JANUARY 03, 2018

THIS "RECORD DRAWING" HAS BEEN PREPARED BASED ON INSPECTIONS AND OBSERVATIONS UNDERTAKEN BY FIELD STAFF DURING KEY STAGES OF CONSTRUCTION AND ON INFORMATION SUBMITTED, IN PART BY OTHERS. WHILE THIS INFORMATION IS BELIEVED TO BE RELIABLE, ATREL ENGINEERING LTD IS NOT RESPONSIBLE FOR ITS ACCURACY, OR FOR ERRORS OR OMISSIONS THAT MAY HAVE BEEN INCORPORATED INTO THIS DRAWING AS A RESULT.

NOTE:

THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.



No.	REVISION △-APPLIES WHEN DRAWING MODIFIED	DATE	BY
4	AS PER CITY COMMENTS	DEC. 06/16	JMD
5	FOR ORDERING	FEB. 3/17	JMD
6	AS PER CITY COMMENTS	FEB. 9/17	JMD
7	ISSUED FOR TENDER	FEB. 23/17	JMD
8	ISSUED FOR CONSTRUCTION	MAR. 31/17	JMD
9	SUBMITTED FOR APPROVAL	APR. 12/17	JMD
10	ISSUED FOR ROAD CONSTRUCTION	MAY 17/17	JMD
11	REVISED COMPOSITE UTILITY PLAN	JUNE 06/17	AGS
12	AS PER CITY COMMENTS	AUG. 02/17	AGS
13	RECORD DRAWINGS	JAN. 03/18	AGS

SCALE: 1:500 HORIZONTAL (5m 0 15m); 1:50 VERTICAL (0.5m 0 1.5m)

DESIGN: VLL
CHECKED: AGS
DRAWN: MAL
CHECKED: AGS
APPROVED: AGS

ATREL Engineering Ltd Ltée
Engineers - Ingénieurs
1-2884 CHAMBERLAND STREET, ROCKLAND, ONTARIO K4K 1M6
TEL.: (613) 446-7423

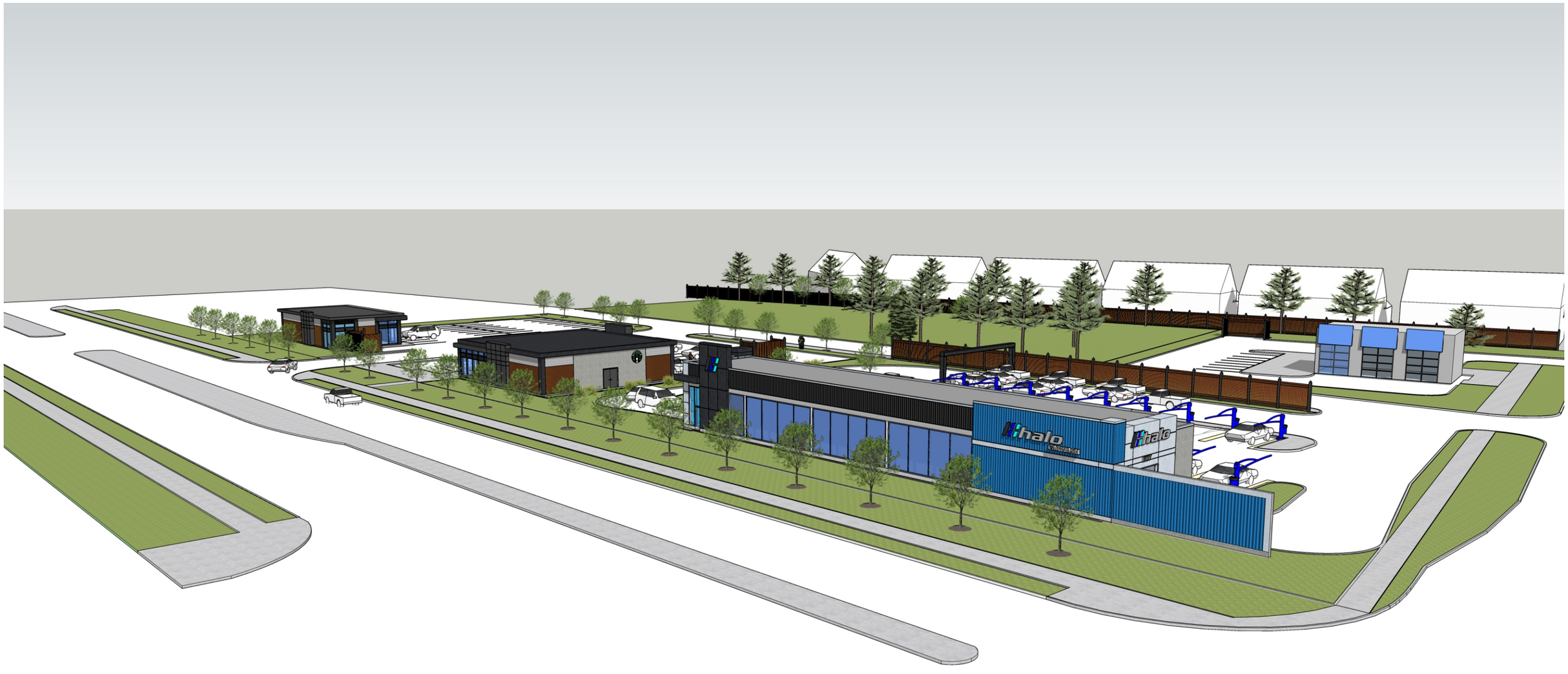
CITY OF OTTAWA
POTTER'S KEY SUBDIVISION (STITTSVILLE)

MINTO COMMUNITIES INC.

PLAN AND PROFILE
BANDELIER WAY
STATION 1+400 TO STATION 1+725

CLIENT No. 148
PROJECT No. 131003
DATE JANUARY, 2014
DRAWING No. 131003-P2

D07-16-14-0013

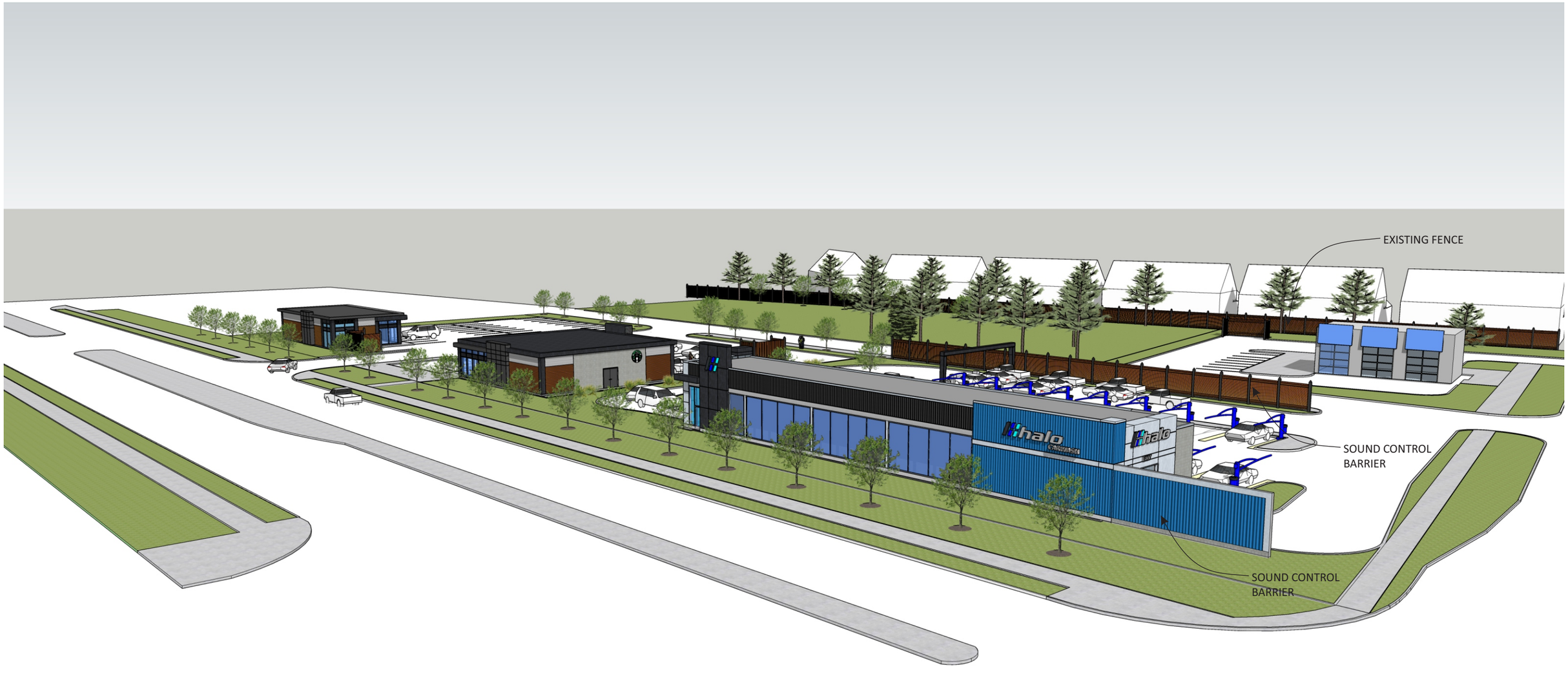


6111 Hazeldean Road

Site Overview

04 February 2021

MCROBIE
ARCHITECTS + INTERIOR DESIGNERS

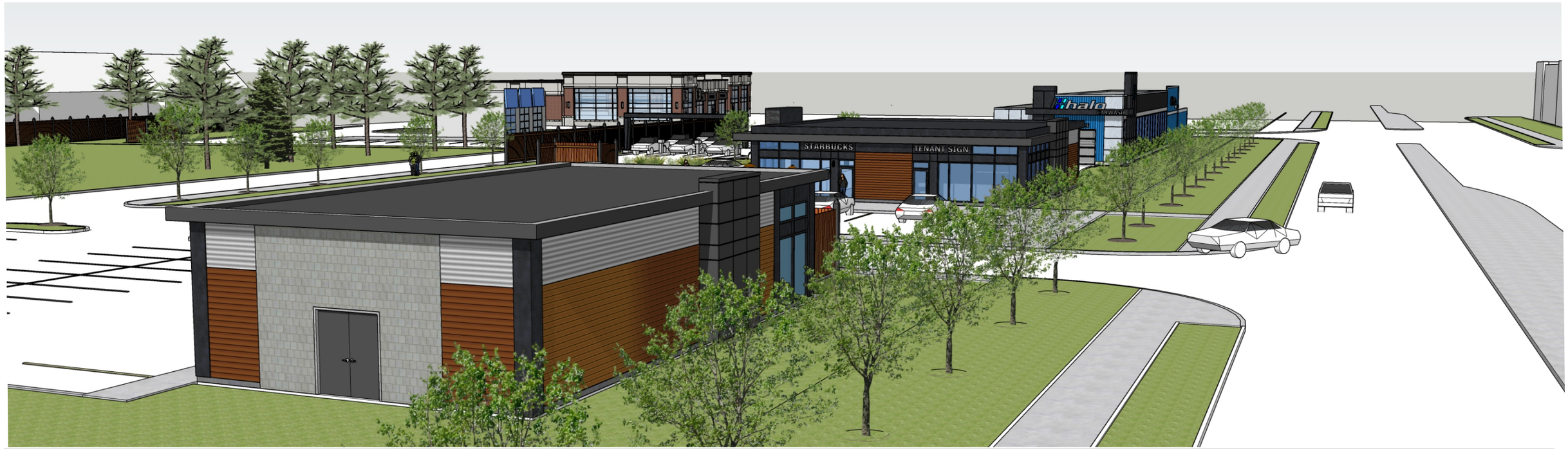


6111 Hazeldean Road

Site Overview

04 February 2021

MCROBIE
ARCHITECTS + INTERIOR DESIGNERS

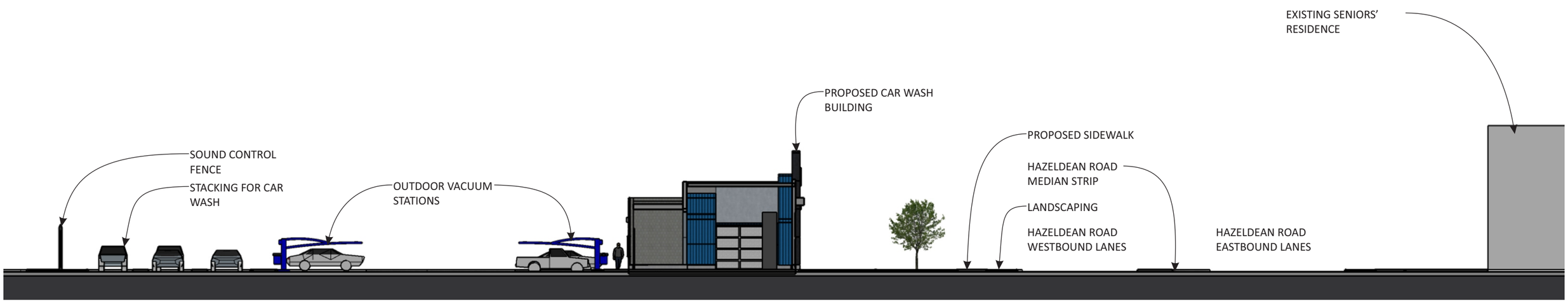


6111 Hazeldean Road

Site Overview

04 February 2021

MCROBIE
ARCHITECTS + INTERIOR DESIGNERS

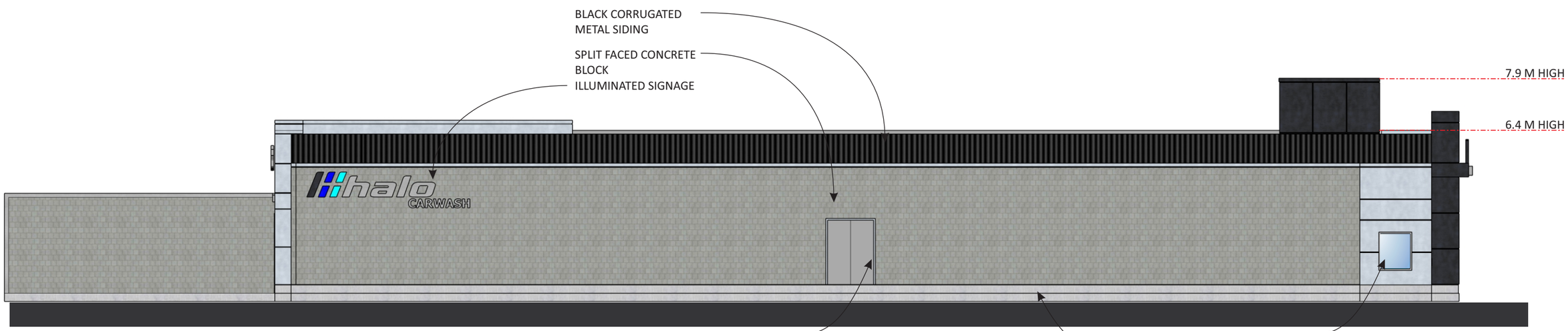


6111 Hazeldean Road

Streetscape Section

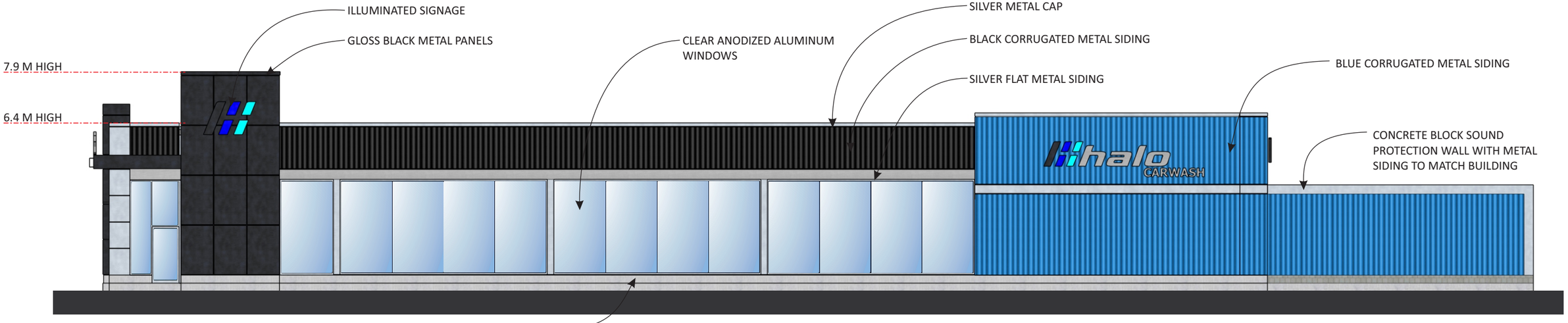
04 February 2021

MCROBIE
ARCHITECTS + INTERIOR DESIGNERS



NORTH ELEVATION

WALL AREA - 261 SQ.M. 1.5% GLAZING



SOUTH ELEVATION

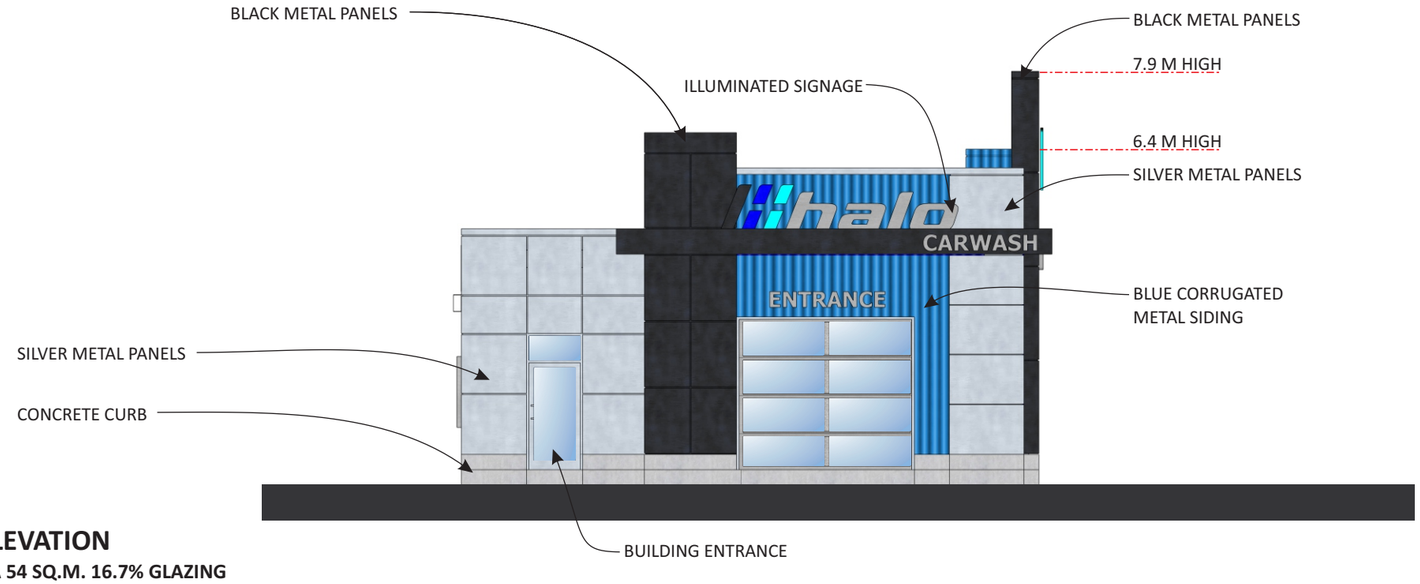
WALL AREA - 261 SQ.M. 35.5% GLAZING

6111 Hazeldean Road

ELEVATION STUDY - Halo Car Wash

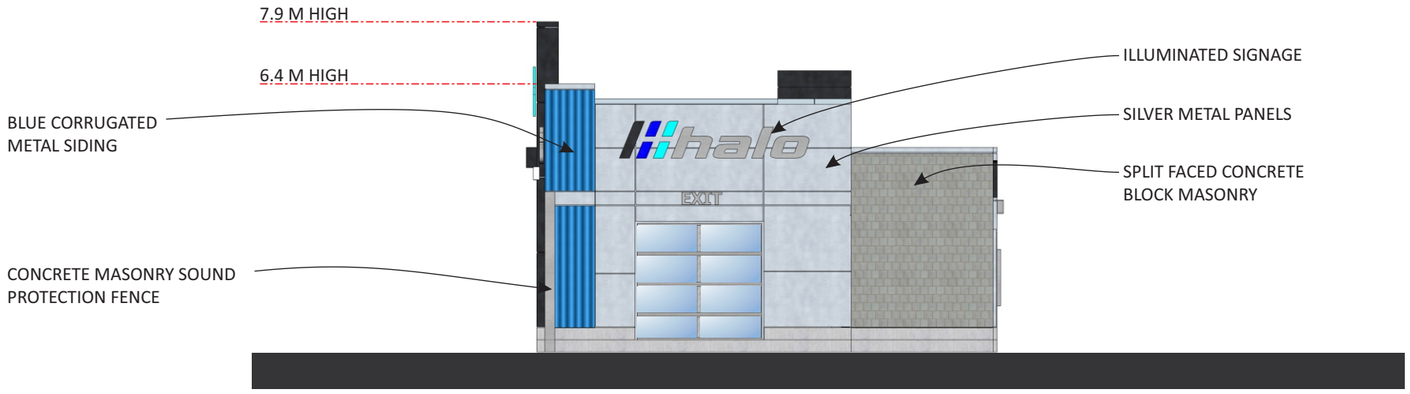
04 February 2021

MCROBIE
ARCHITECTS + INTERIOR DESIGNERS



WEST ELEVATION

WALL AREA 54 SQ.M. 16.7% GLAZING



EAST ELEVATION

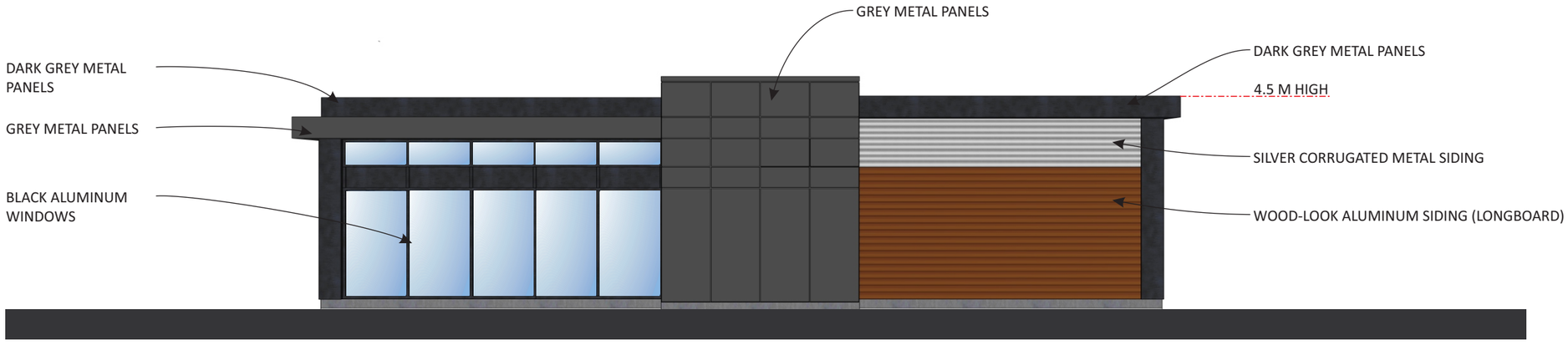
WALL AREA 54 SQ.M. 13.3% GLAZING

6111 Hazeldean Road

ELEVATION STUDY - Halo Car Wash

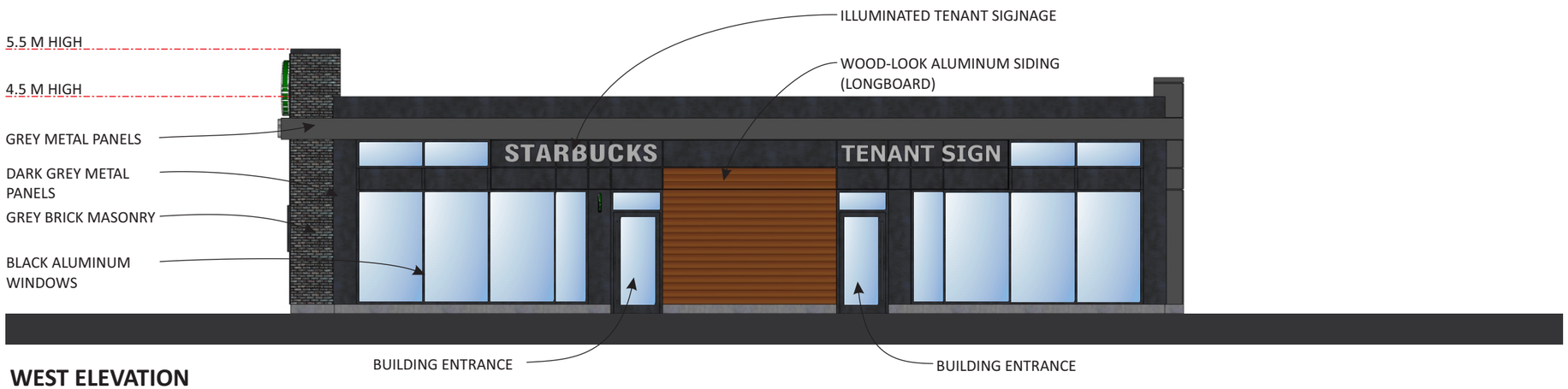
04 February 2021

MCROBIE
ARCHITECTS + INTERIOR DESIGNERS



SOUTH ELEVATION

WALL AREA 83 SQ.M. 18% GLAZING



WEST ELEVATION

WALL AREA 81 SQ.M. 26% GLAZING

6111 Hazeldean Road

ELEVATION STUDY - Multi-Tenant Building 1

04 February 2021

MCROBIE
ARCHITECTS + INTERIOR DESIGNERS

EAST ELEVATION

WALL AREA 81 SQ.M. - 0% GLAZING

NORTH ELEVATION

WALL AREA 83 SQ.M. 12% GLAZING

6111 Hazeldean Road

ELEVATION STUDY - Multi-Tenant Building 1

04 February 2021

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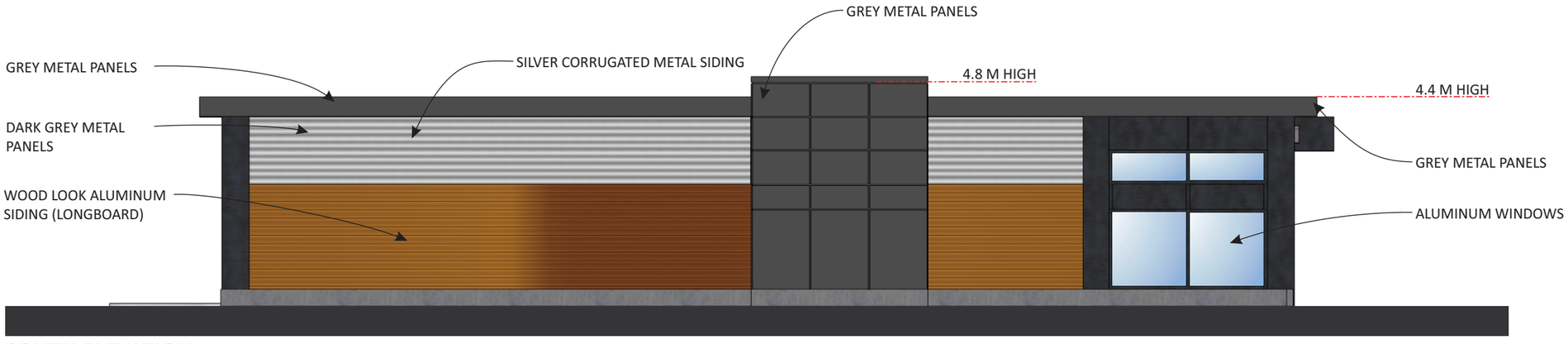
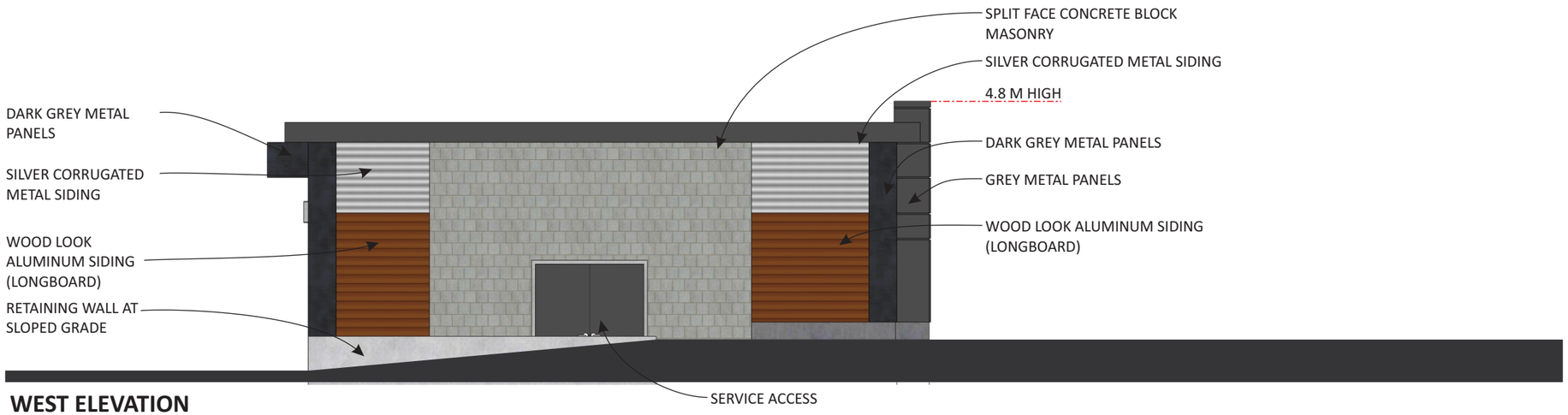
ARCHITECTS + INTERIOR DESIGNERS



SOUTH ELEVATION

WALL AREA 72 SQ.M. 6% GLAZING



WEST ELEVATION

WALL AREA 44 SQ.M. 15% GLAZING

6111 Hazeldean Road

ELEVATION STUDY - Multi-Tenant Building 2

04 February 2021

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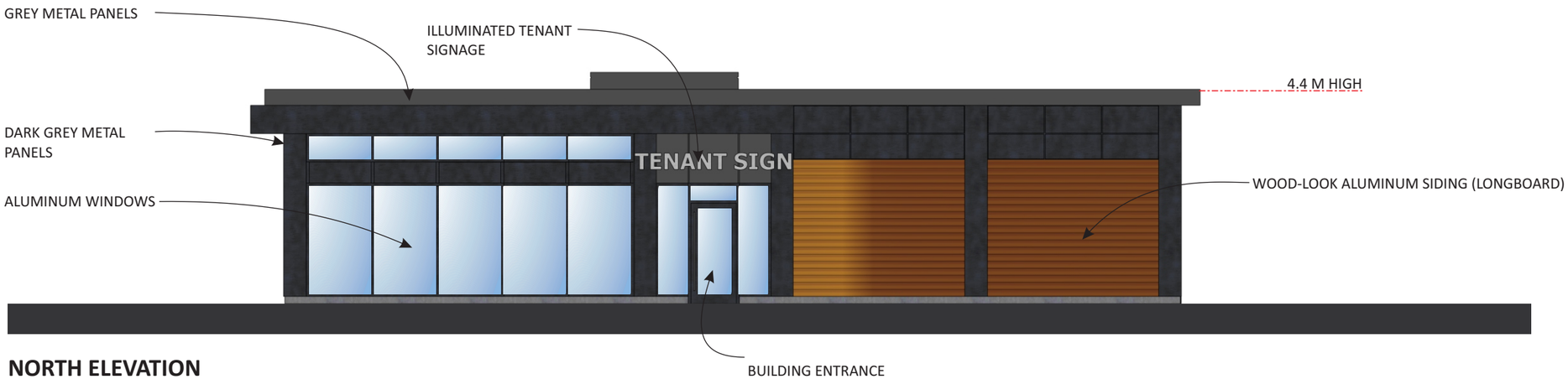
ARCHITECTS + INTERIOR DESIGNERS

EAST ELEVATION

WALL AREA 44 SQ.M. 15% GLAZING



NORTH ELEVATION

WALL AREA 84 SQ.M. 22% GLAZING

6111 Hazeldean Road

ELEVATION STUDY - Multi-Tenant Building 2

04 February 2021

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