Stormwater Management Report and Servicing Brief

Proposed Light Industrial Building
1195 Newmarket Street
Ottawa, Ontario

Prepared for:

1199 Newmarket Holdings Inc
A-3488 Chemin Cote Des Neiges
Montreal, QC

Attention: Mr. Mathieu Keyser

LRL File No.: 210956

May 05, 2022

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1 INTRODUCTION AND SITE DESCRIPTION

LRL Associates Ltd. was retained by 1199 Newmarket Holdings Inc to complete a Stormwater Management Analysis and Servicing Brief for a proposed one (1) storey light industrial building development located at 1195 Newmarket Street, Ottawa, Ontario. The property is legally described as Part of Lot 26, Concession 2 (Ottawa Front), being all of PIN 04263-0267 (LT), City of Ottawa, refer to the Survey included in Appendix F. The location of the proposed development can be viewed in Figure 1 below.

Figure 1: Aerial View of Proposed Development

The proposed light industrial building will have a footprint of 1.043 ha. The site will encompass a paved parking area in the eastern portion of the lot and loading dock area in the west. The proposed development will have two (2) vehicular entrance with a depressed sidewalk on Newmarket St and one pedestrian entrance via a pathway to Newmarket St. For additional detail, refer to the Site Development Plan included in Appendix F.

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

2 EXISTING SITE AND DRAINAGE DESCRIPTION

The portion of land to be developed has a trapezoidal shape with a frontage of approximately 130 m along Newmarket St, an average depth of approximately 204 m and surface area of approximately 2.59 ha. The property is surrounded by the existing ditches in the west end and part of east end, railway track in the north and Newmarket St in the south.

Currently, the majority of site consists of gravel area with a small portion of landscape area. Stormwater from the existing site flow overland uncontrolled towards the existing ditches in the west and east end.

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/quality control objectives will be achieved.

Water services

- Calculate the expected water supply demand at average and peak conditions.
- Calculate the required fire flow as per the 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 proposed development.
- Describe the proposed sanitary sewer system.

4 REGULATORY APPROVALS

An MECP Environmental Compliance Approval (ECA) is expected to be required for installation of the proposed storm and sanitary sewers within the site. A Permit to Take Water is not anticipated to be required for pumping requirements for sewer installation. The Rideau Valley Conservation Authority (RVCA) will need to be consulted in order to obtain municipal approval for site development. No other approval requirements from other regulatory agencies are anticipated.

5 STORMWATER MANAGEMENT

5.1 Existing Stormwater Infrastructure

The topography of the site in pre-development conditions was reviewed to determine the direction of flow from overland runoff. In pre-development conditions, majority of the stormwater appears to flow uncontrolled overland towards the existing ditch in the west. The balance of the site appears to flow uncontrolled overland into the existing ditch in the east and south end. Refer to Pre-development Watershed Plan (C701) in Appendix E. The west end of the subject property bordered by an existing ditch appears to be available to receive post-development runoff from the subject site.

5.2 Design Criteria

The stormwater management criteria for this development is based on pre-consultation with 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).

5.2.1 Water Quality

For stormwater quality control, an Oil/Grit Separator (OGS) is proposed as a part of the design. This treatment unit, Stormceptor Model EFO8 (or approved equivalent), will provide an enhanced

water quality treatment (>80% TSS removal) which is a typical removal rate required by RVCA. Refer to Servicing Plan C401 for the location of proposed OGS and Appendix B for additional design details provided by the manufacturer.

5.2.2 Water Quantity

All storm events up to and including the 100-year event will be controlled to the respective pre-development levels. The site's major overland flow route has been designed to ensure that storm events beyond the 100-year design storm can be safely conveyed overland towards the existing ditch. The minor system (storm sewers) within the site are sized to convey the 5-year storm event flow from the site to the existing ditch on the west end.

Based on the pre-development catchment area calculations, the pre-development weighted runoff was found to be C=0.9. Detailed calculations can be found in Appendix B.

The post-development conditions resulted an increase in impervious surfaces, therefore, quantity control needs to be implemented. The allowable release rate is calculated using the maximum runoff coefficient of C=0.5, as per the City of Ottawa requirement.

5.3 Method of Analysis

The modified Rational Method has been used to calculate the runoff rate from the site, and to quantify the detention storage required for quantity control of the development. Refer to Appendix B for runoff, release rate as well as storage calculations.

5.4 Allowable Release Rate

The maximum allowable release rate was calculated for pre-development level using a runoff coefficient C=0.5, for both minor and major storms (2-year up to 100-year storms), using a time of concentration of 10 minutes. Table 1 below summarize allowable release rates.

Table 1: Summary of Allowable Release Rates

Return Period	Release Rate (L/s)
100-Yr	618.51
5-Yr	360.91
2-Yr	266.04

The Rational Method runoff coefficients (C) for each catchment have been calculated based on appropriately assigned coefficients weighted by area of land cover within the drainage area. A summary of catchment areas with calculated C values is included in Appendix B.

5.5 Proposed Stormwater Quantity Controls

The proposed stormwater management quantity control for this development will be accomplished using a flow restrictor in the storm sewer, as well as roof drains restricting the flow leaving the rooftop. Ponding required as a result of quantity control will be accomplished through a

combination of rooftop storage and parking lot surface storage. The proposed site storm sewer and stormwater management system are shown on Site Servicing Plan C401 and Stormwater Management Plan C601 (Appendix E) and detailed calculation design sheets can be found in Appendix B.
The existing site is delineated by catchment EWS-01 (see Pre-development Watershed Plan C701 in Appendix E) which currently drains uncontrolled off the site towards the existing ditch.

The site has been analyzed and post-development watersheds have been allocated, see Post-development Watershed Plan C702 in Appendix E. Proposed site grading will provide positive overland drainage towards the proposed storm water management systems. Runoff from roof (WS-01) will be controlled using adjustable flow control roof drains and eventually conveyed to the existing ditch in the west. Runoff from west loading dock areas (WS-02 to WS-06) will be captured by CBMH02/03/04/05/CB06 and controlled by installing an ICD1 at the outlet of CBMH02. Runoff from the east parking lot (WS-07 to WS-09) will be captured by CBMH08/09/10 and controlled by an ICD2 installed at the outlet of CBMH08. A few catchments (WS-12 to WS-15) along the property line will drain uncontrolled off the site. Runoff from watersheds WS-10 and WS-11 will be captured by CBMH01 and CBMH07, however it flows uncontrolled i.e. downstream of ICD. Table 2 summarizes the drainage areas and runoff coefficients, calculations can be found in Appendix B.

Table 2: Post-Development Drainage Areas

Drainage Area Name	Area (ha)	Weighted Runoff Coefficient	100-year Weighted Runoff Coefficient (25% increase)
WS-01 (controlled)	1.044	0.90	1.00
WS-02 (controlled)	0.124	0.90	1.00
WS-03 (controlled)	0.122	0.90	1.00
WS-04 (controlled)	0.149	0.90	1.00
WS-05 (controlled)	0.163	0.90	1.00
WS-06 (controlled)	0.094	0.90	1.00
WS-07 (controlled)	0.102	0.90	1.00
WS-08 (controlled)	0.084	0.90	1.00
WS-09 (controlled)	0.063	0.87	1.00
WS-10 (uncontrolled)	0.049	0.90	1.00
WS-11 (uncontrolled)	0.212	0.90	1.00
WS-12 (uncontrolled)	0.101	0.20	0.25

WS-13 (uncontrolled)	0.069	0.28	0.35
WS-14 (uncontrolled)	0.022	0.79	0.99
WS-15 (uncontrolled)	0.095	0.32	0.40

Tables 3 summarizes the release rates and storage volumes required to meet the allowable release rate for 100-, 5- and 2-year flows.

Table 3: Stormwater Release Rate & Storage Volume Summary

Description	Area (ha)	Release Rate (L/s)			Storage Required (m^3)			Storage Provided (m^3)
		100-Yr	5-Yr	2-Yr	100-Yr	5-Yr	2-Yr	
WS-01 (Roof Controlled)	1.044	106.12	78.52	68.02	292.98	126.20	83.95	302.00
WS-02 to WS-06 (ICD1 Controlled)	0.653	93.51	93.51	93.51	149.15	45.97	19.14	310.68
WS-07 to WS-09 (ICD2 Controlled)	0.248	34.87	34.87	34.87	57.27	17.50	7.40	93.44
WS-10 to WS-15 (Uncontrolled)	0.548	199.66	93.21	68.71	N/A	N/A	N/A	N/A
Total	**2.492**	**434.17**	**300.12**	**265.18**	**499.41**	**189.67**	**110.49**	**706.12**

As described above, the runoff exceeding the allowable release rate will be stored on-site via surficial ponding and the building rooftop. The maximum ponding elevation and depths can be found on drawing “C601 – Stormwater Management Plan” of Appendix E.

To ensure that the post-development release rate does not increase pre-development level, the stormwater will be controlled at CBMH02 and CBMH08 using Inlet Control Devices (ICDs), Hydrovex Vortex Flow Regulator 250VHV-2 and 150VHV-2 (or approved equivalent). These ICDs will control the stormwater runoff quantity during the storm events greater than 2-year. Greater details of the proposed ICD can be found in Appendix B.

In the west loading dock areas, the site is graded to have a high-water level (HWL) of 67.55 m while providing surface storages at CBMH02/03/04/05/CB06 with a maximum release rate of 93.51 L/s (H=1.53 m) at the outlet of CBMH02. Likewise, in the east parking lot, the site is graded to have an HWL of 68.15 m while providing surface storages at CBMH08/09/CB10 with a maximum controlled release rate of 34.87 L/s (H=1.86 m) at the outlet of CBMH08. The surface storage ponding induced by ICD1 and ICD2 can be seen on drawing C601 (Appendix E).

It is important to note that while the storage required for 100- and 5-year storm events are proposed to be accommodated in the parking lot surface. The storage associated with 2-year storm event will be accommodated underground within the STM sewer systems i.e. oversized pipes and CBMH/CB which will provide a total storage of 19.9 m^3 and 51.49 m^3 respectively in the east parking lot and west loading dock area. Refer to storage calculations in Appendix B.

Rooftop Storage & Release Rates

Rooftop detention of stormwater will be achieved through outlet control with the use of total 56 (56) proposed roof drains. The flow through these drains is dependent on the height of water above the drains (head) and the type & setting of the drain. The rooftop ponding areas each with a single roof drain restricts the discharge to 1.89 L/s per roof drain (at a maximum head of 150 mm during the 100-year storm event). This results in a total release rate of 106.12 L/s from the roof during 100-yr storm event. The proposed Watts roof drains are appropriately selected with an adjustable flow control set to “Fully Exposed” which will allow a maximum discharge of 1.89 L/s at a maximum flow depth of 0.15 m. Refer to Appendix B for additional detail on rooftop release rate and storage calculations and drawing C601 (Appendix E) for the extent of roof top storage & summary table.

6 WATER SUPPLY AND FIRE PROTECTION

6.1 Existing Water Supply Services and Fire Hydrant Coverage

The subject property is located to the north of an existing 203 mm dia. water main running in the east-west direction on the north side of Newmarket St. There are three (3) existing fire hydrant (FH) along Newmarket St in proximity to the proposed site.

6.2 Water Supply Demand and Fire Flow

It was anticipated that the proposed building will consist of 36 sinks, 27 water closets, 9 urinals and 10 hose bibbs. Based on OBC Table 7.6.3.2.A, estimated fixtures are converted into an equivalent fixture units and eventually domestic water demands are calculated as summarized below, see Appendix C for calculation details.

- Average day demand = 3.85 L/s
- Maximum daily demand = 5.78 L/s
- Peak hour demand = 10.40 L/s

Water demand calculations were also determined based on Table 4.2 of the City of Ottawa Design Guidelines-Water Distribution using an average water demand of 35000 L/ha.day. This method resulted an average day demand of 1.01 L/s. Since the fixture unit method resulted a more conservative water demand, this method was adopted in subsequent water serviceability analysis.

As reported above, the average day demand for this industrial site is greater than 50 m^3/day (0.58 L/s). Therefore, as per City of Ottawa Technical Bulletin ISTB-2021-03, to avoid the creation of a

vulnerable service area, two watermains connections (separated by an isolation valve) are proposed for this site.

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

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

where,

F = The required fire flow (L/min)

C = Coefficient related to the type of construction

A = The total floor area (m^2)

Table 4 summarizes the input parameters used for the fire flow calculations, refer to Appendix C for the fire flow calculation sheets.

Table 4: Input Parameters for Fire Flow Calculations

Type of Construction	Combustibility Contents	Automatic Sprinkler System	Exposure Distance			
			North	East	South	West
Non-Combustible (C = 0.8)	Combustible	Yes	> 45m	30.1-45m	> 45m	30.1-45m

The estimated fire flow demand was calculated 14 000 L/min, see Appendix B for calculation details. Table 5 summarizes the aggregate fire flow of the contributing fire hydrants near the proposed development based on Table 18.5.4.3 of City's Technical Bulletin ISTB-2018-02.

Table 5: Fire Protection Summary Table

Building	Fire Flow Demand (L/min)	Fire Hydrant (s) within 76m	Available Combined Fire Flow (L/min)
Proposed 1 Storey Industrial Building	14000	3	3×5678 =17034

The total available fire flow from contributing fire hydrants is 17034 L/min (Table 5) which is greater than the required fire flow demand.

6.3 Water Supply Servicing Design

The proposed building will be serviced by a new 200 mm dia. dual watermain services which will provide water for both domestic and fire protection water demand (i.e. sprinkler system). The proposed service will be connected to the existing watermain on Newmarket St to the south of the proposed building. Refer to servicing plan C401 for the layout of the proposed water services.

Table 6 below summarizes the design criteria which have been respected during the design of the water service connections at this development.

Table 6: Water Supply Design Criteria

Design Parameter	Value
Minimum cover	2.4 m
Desired pressure range under maximum daily flow condition	50 and 80 psi
Minimum pressure under peak hourly flow condition	40 psi
Minimum pressure under the maximum day plus fire flow condition	20 psi

The boundary conditions provided by the City at the Newmarket St connection expressed as the level of hydraulic grade line (HGL) are summarized in Table 7.

Table 7: Boundary Conditions

Water Pressure at Newmarket St.			
HGL (m)		Pressure*	
		kPa	psi
Minimum	109.9 m	436.20	63.27
Maximum	118.0 m	515.63	74.79
Max Day + Fire Flow	92.0 m	260.66	37.81
*Assumed ground elevation at the connection point = 65.42 m			

Hydraulic analysis of the proposed watermain servicing network was performed using EPANET (Version 2.2). The modeling results show available pressures at the service entry node 73.35 psi, 64.83 psi and 36.40 psi for Avg Day, Peak Hour and Maximum Day + Fire Flow scenarios, respectively. As such the available pressure mentioned above corroborates with the City design criteria mentioned in Table 6. For modeling results, see Appendix B.

7 SANITARY SERVICE

7.1 Existing Sanitary Sewer Services

Existing infrastructure surrounding the proposed development were reviewed. It was determined that there is an existing 375 mm dia. sanitary sewer running west along Newmarket St for potential connection.

7.2 Sanitary Sewer Servicing Design

The parameters used to calculate the anticipated sanitary flows include light industrial flow of 35 000 L/ha/day and industrial peak factor as per Appendix 4-B of City's guideline. Based on these

parameters and the total site area of 2.59 ha, the total anticipated sanitary flow was estimated to 6.63 L/s. Refer to Appendix D for the site sanitary sewer design sheet.

The proposed new building will be serviced with a new 200 mm dia. sanitary service which will connect to the existing SAN MH located in the south end. Refer to Servicing Plan (C401) for the proposed sanitary servicing.

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 erosion and sediment control details.

9 CONCLUSION

This Stormwater Management Report and Servicing Brief for the proposed development at 1195 Newmarket St. 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:

Stormwater Management

- The post-development storm water release rates from the proposed site will be less than pre-development allowable release rates.
- Stormwater quantity control objectives will be met through on-site stormwater ponding on the roof and parking lot surface storage.
- Stormwater quality control objectives will be met through on-site stormwater treatment unit-Oil/Grit Separator (OGS).

Water Service

- The anticipated maximum hour demand of the proposed development, based on Fixture Unit method, is 10.40 L/s.
- The maximum required fire flow was calculated at 233.3 L/s using the FUS method.
- For fire protection, there are three (3) existing fire hydrant along Newmarket St. in proximity to the proposed building.
- The proposed building will be serviced by a new 200 mm dia. watermain service to be connected to the existing 203 mm dia. watermain along Newmarket St.

Sanitary Service

- The anticipated sanitary peak flow from the proposed development is 6.63 L/s.
- The proposed building will be serviced by a new 200 mm dia. sanitary service to be connected to the existing SAN MH.

10 REPORT CONDITIONS AND LIMITATIONS

The report conclusions are applicable only to this specific project described in the preceding pages. Any changes, modifications or additions will require a subsequent review by LRL Associates Ltd. to ensure the compatibility with the recommendations contained in this document. If you have any questions or comments, please contact the undersigned.

Prepared by:
LRL Associates Ltd.

Maxime Longtin
Civil Engineering Technologist

Mohan Basnet, P.Eng.
Civil Engineer

APPENDIX A

Pre-consultation/Correspondence

Site Plan Pre- Application Consultation Notes

Date: Aug 19, 2020
Site Location: 1195 Newmarket
Type of Development: ☐ **Residential (**☐ **townhomes,** ☐ **stacked,** ☐ **singles,** ☐ **apartments),** ☐ **Office Space,** ☐ **Commercial,** ☐ **Retail,** ☐ **Institutional,** ☒ **Industrial, Other:** N/A
Owner/Agent: 1199 Newmarket Holdings Ltd./Peter Hume
Project Manager: Adam Baker
Assigned Planner: Sarah Ezzio

Infrastructure

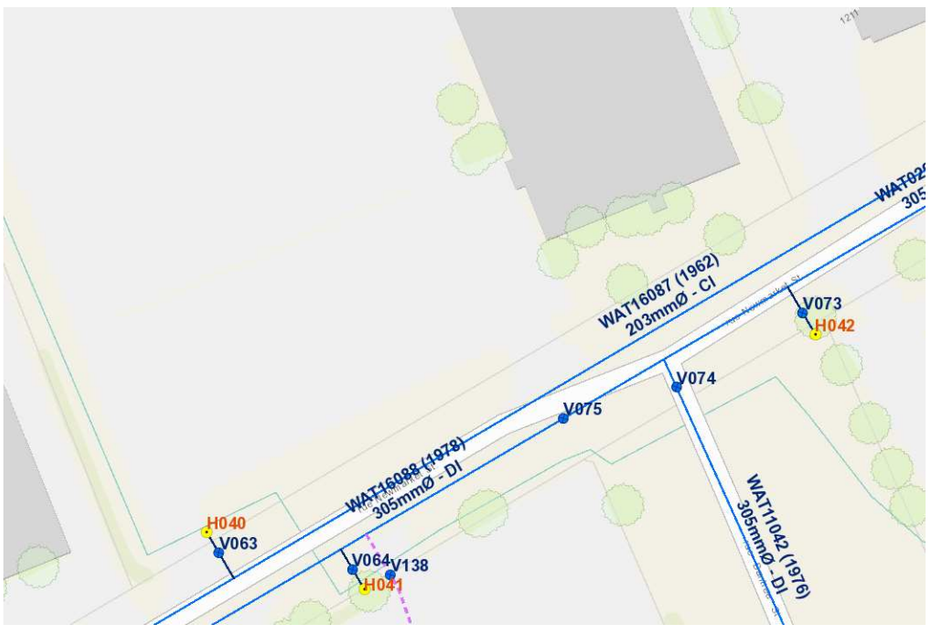
Water

Water District Plan No: 356-023
Existing public services:

- Newmarket Street (North side) – 203 mm CI
- Newmarket Street (South Side) – 305mm DI

Existing connection:

- Existing on-site water service must be shown on the plans. The existing on-site water services will be blanked at the watermain if it will not be reused.



Watermain Frontage Fees to be paid ($190.00 per metre) ☐ **Yes** ☒ **No**

- Service areas with a basic demand greater than 50 m^3/day shall be connected with a minimum of two water services, separated by an isolation valve, to avoid creation of vulnerable service area.
- A District Metering Area Chamber (DMA) is required for services 150mm or greater in diameter.

Boundary conditions:
Civil consultant must request boundary conditions from the City's assigned Project Manager prior to first submission.

- Water boundary condition requests must include the location of the service(s) and the expected loads required by the proposed developments. Please provide all the following information:
    - Location of service(s)
    - Type of development and the amount of fire flow required (as per FUS, 1999).

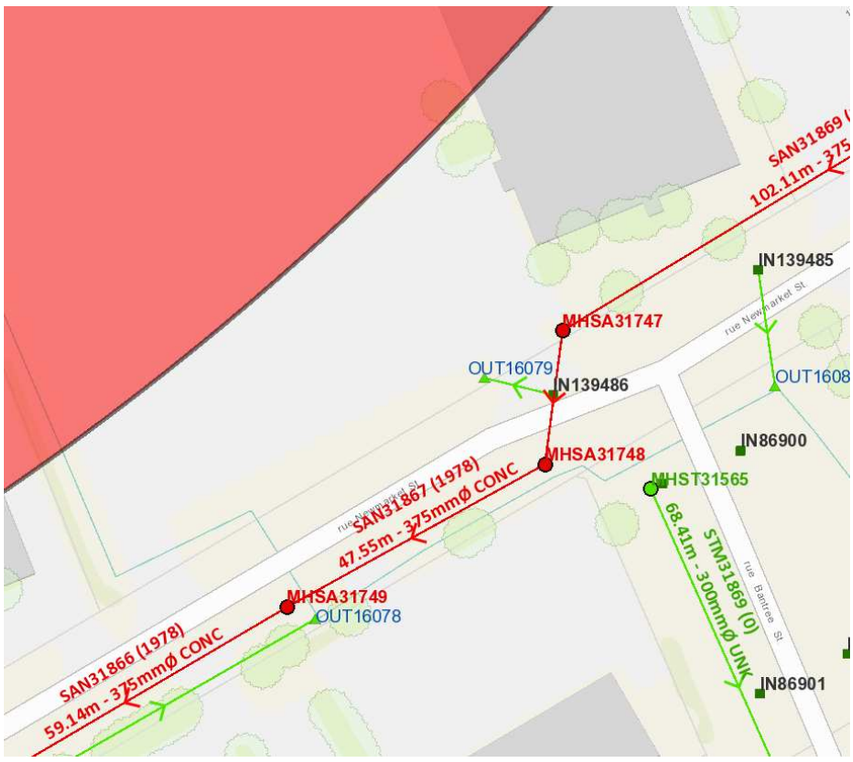
- Average daily demand: ___ l/s.
- Maximum daily demand: ___l/s.
- Maximum hourly daily demand: ___ l/s.

- Fire protection (Fire demand, Hydrant Locations)
- A water meter sizing questionnaire [water card] will have to be completed prior to receiving a water permit (water card will be provided post approval)

Sanitary Sewer

Existing public services:

- Newmarket Street – 375mm Conc.



Existing connection:

- Existing on-site sanitary service must be shown on the plans. If existing sanitary sewer is to be reused, provide CCTV inspection report along with consultant's assessment of the existing sewer conditions. Existing on-site sanitary sewer to be capped and abandoned to City of Ottawa standards at the property line if it will not be reused.

Is a monitoring manhole required on private property? ☒ **Yes** ☐ **No**

- The designer should be aware there may be limited capacity in the downstream sanitary sewer system. The sanitary demand needs to be coordinated with the City Planning Dept. to determine if the existing sanitary sewer system has sufficient capacity to support the proposed rezoning. Provide sanitary demands to the City project manager for coordination.

- Any premise in which there is commercial or institutional food preparation shall install a grease and oil inceptor on all fixtures.

Storm Sewer

Existing public services:

- Newmarket Street – Roadside Ditches
- A watercourse runs along the western property line of the property.

Storm Sewer Notes:

- For concrete sewer pipe, maintenance holes shall be installed when the service is greater than 50% of the diameter of the mainline concrete pipe
- Ensure that the proposed drive lane entrance to the underground parking garage is protected from the major overland flow route along Carling Ave.
- The Environmental Site Assessment (ESA) may provide recommendations where site contamination may be present. The recommendations from the ESA need to be coordinated with the servicing report to ensure compliance with the Sewer Use By-Law.

Stormwater Management

Quality Control:

- Rideau Valley Conservation Authority to confirm quality control requirements.

Quantity Control:

- Master Servicing Study: N/A
- Quantity – The post-development stormwater flows leaving the site must be controlled to the pre-development conditions.

Ministry of Environment, Conservation and Parks (MECEP)

All development applications should be considered for an Environmental Compliance Approval, under MECP regulations.

a. The consultants determine if an approval for sewage works under Section 53 of OWRA is required and determines what type of application. The City's project manager may help confirm and coordinate with the MECP as required.
b. The project will be either transfer of review (standard), transfer of review (additional), direct submission, or exempt as per O. Reg. 525/98.
c. Pre-consultation is not required if applying for standard or additional works (Schedule A of the Agreement) under Transfer Review.
d. Pre-consultation with local District office of MECP is recommended for direct submission.
e. Consultant completes an MECP request form for a pre-consultation. Sends request to moeccottawasewage@ontario.ca
f. ECA applications are required to be submitted online through the MECP portal. A business account required to submit ECA application. For more information visit https://www.ontario.ca/page/environmental-compliance-approval
g. It is unclear if the proposed development will remain as one property. An ECA will be required where the stormwater management services more than one property parcel.

NOTE: Site Plan Approval, or Draft Approval, is required before any Ministry of the Environment and Climate Change (MOECC) application is sent

General Service Design Comments

- The City of Ottawa requests that all new services be located within the existing service trench to minimize necessary road cuts.
- Monitoring manholes should be located within the property near the property line in an accessible location to City forces and free from obstruction (i.e. not a parking).
- Where service length is greater than 30 m between the building and the first maintenance hole / connection, a cleanout is required.
- The City of Ottawa Standard Detail Drawings should be referenced where possible for all work within the Public Right-of-Way.
- The upstream and downstream manhole top of grate and invert elevations are required for all new sewer connections.
- Services crossing the existing watermain or sewers need to clearly provide the obvert/invert elevations to demonstration minimum separation distances. A watermain crossing table may be provided.

Other

Are there are Capital Works Projects scheduled that will impact the application? ☐ **Yes** ☒ **No**

References and Resources

- As per section 53 of the Professional Engineers Act, O. Reg 941/40, R.S.O. 1990, all documents prepared by engineers must be signed and dated on the seal.
- All required plans are to be submitted on standard A1 size sheets (594mm x 841mm) sheets, utilizing a reasonable and appropriate metric scale as per City of Ottawa Servicing and Grading Plan Requirements: title blocks are to be placed on the right of the sheets and not along the bottom. Engineering plans may be combined, but the Site Plans must be provided separately. Plans shall include the survey monument used to confirm datum. Information shall be provided to enable a non-surveyor to locate the survey monument presented by the consultant.
- All required plans & reports are to be provided in *.pdf format (at application submission and for any, and all, re-submissions)
- Please find relevant City of Ottawa Links to Preparing Studies and Plans below: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans#standards-policies-and-guidelines
- To request City of Ottawa plan(s) or report information please contact the City of Ottawa Information Centre:
  InformationCentre@ottawa.ca<mailto:InformationCentre@ottawa.ca>
  (613) 580-2424 ext. 44455
- geoOttawa
  http://maps.ottawa.ca/geoOttawa/

SITE PLAN APPLICATION – Municipal servicing

For information on preparing required studies and plans refer to:

http://ottawa.ca/en/development-application-review-process-0/guide-preparing-studies-and-plans

S/A	Number of copies	ENGINEERING		S/A	Number of copies
S		1. Site Servicing Plan	2. Site Servicing Study	S	
S		3. Grade Control and Drainage Plan	4. Geotechnical Study	S	
		5. Composite Utility Plan	6. Groundwater Impact Study		
		7. Servicing Options Report	8. Wellhead Protection Study		
		9. Community Transportation Study and/or Transportation Impact Study / Brief	10. Erosion and Sediment Control Plan / Brief	S	
S		11. Storm water Management Report	12. Hydro-geological and Terrain Analysis		
		13. Water main Analysis	14. Noise / Vibration Study		
		15. Roadway Modification Design Plan	16. Confederation Line Proximity Study		

S/A	Number of copies	ENVIRONMENTAL		S/A	Number of copies
S		17. Phase 1 Environmental Site Assessment	18. Impact Assessment of adjacent Waste Disposal/Former Landfill Site		
		19. Phase 2 Environmental Site Assessment (depends on the outcome of Phase 1)	20. Assessment of Landform Features		
		21. Record of Site Condition	22. Mineral Resource Impact Assessment		
		23. Tree Conservation Report	24. Environmental Impact Statement / Impact Assessment of Endangered Species		
		25. Mine Hazard Study / Abandoned Pit or Quarry Study			

It is important to note that the need for additional studies and plans may result during application review. If following the submission of your application, it is determined that material that is not identified in this checklist is required to achieve complete application status, in accordance with the Planning Act and Official Plan requirements, City Planning will notify you of outstanding material required within the required 30 day period. Mandatory pre-application consultation will not shorten the City's standard processing timelines, or guarantee that an application will be approved. It is intended to help educate and inform the applicant about submission requirements as well as municipal processes, policies, and key issues in advance of submitting a formal development application. This list is valid for one year following the meeting date. If the application is not submitted within this timeframe the applicant must again pre-consult with the City.

Notes:

4. Geotechnical Study / Slope Stability Study – required as per Official Plan section 4.8.3. All site plan applications need to demonstrate the soils are suitable for development. A Slope Stability Study may be required with unique circumstances (Schedule K or topography may define slope stability concerns).

10. Erosion and Sediment Control Plan – required with all site plan applications as per Official Plan section 4.7.3.

11. Stormwater Management Report/Brief - required with all site plan applications as per Official Plan section 4.7.6.

14. Noise and Vibration Study – a Noise Study will be required if the noise sensitive development is proposed within 250 metres of an existing or proposed highway or a railway right-of-way, or 100 metres of an arterial or collector roadway or rapid-transit corridor. A Vibration Study will be required if the proposed development is within 75 metres of either an existing or proposed railway ROW. A Noise Study may also be required if the proposed development is adjacent to an existing or proposed stationary noise source..

APPENDIX B

Stormwater Management Calculations

LRL Associates Ltd.
Storm Watershed Summary

LRL File No. 210956
Project: Proposed Development-Light Industrial Building
Location: 1195 Newmarket
Date: May 3, 2022
Designed: M. Longtin
Checked: Mohan 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 (uncontrolled)	0.542	0.000	1.950	2.492	0.75
Total	**0.542**	**0.000**	**1.950**	**2.492**	**0.75**

Post-Development Catchments

Watershed	C = 0.20	C = 0.80	C = 0.90	Total Area (ha)	Combined C
WS-01 (controlled)	0.000	0.000	1.044	1.044	0.90
WS-02 (controlled)	0.000	0.000	0.124	0.124	0.90
WS-03 (controlled)	0.000	0.000	0.122	0.122	0.90
WS-04 (controlled)	0.000	0.000	0.149	0.149	0.90
WS-05 (controlled)	0.000	0.000	0.163	0.163	0.90
WS-06 (controlled)	0.000	0.000	0.094	0.094	0.90
WS-07 (controlled)	0.000	0.000	0.102	0.102	0.90
WS-08 (controlled)	0.000	0.000	0.084	0.084	0.90
WS-09 (controlled)	0.003	0.000	0.060	0.063	0.87
WS-10 (uncontrolled)	0.000	0.000	0.049	0.049	0.90
WS-11 (uncontrolled)	0.000	0.000	0.212	0.212	0.90
WS-12 (uncontrolled)	0.101	0.000	0.000	0.101	0.20
WS-13 (uncontrolled)	0.061	0.000	0.008	0.069	0.28
WS-14 (uncontrolled)	0.004	0.000	0.019	0.022	0.79
WS-15 (uncontrolled)	0.079	0.000	0.016	0.095	0.32
Total	**0.247**	**0.000**	**2.245**	**2.492**	**0.83**

LRL
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LRL File No. 210956
Project: Proposed Development-Light Industrial Building
Location: 1195 Newmarket
Date: May 3, 2022
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 =	**2.492**	**ha**	**∑R =**	**0.75**
	EWS-01 (uncontrolled)	2.492	ha	R =	0.75
	Total Uncontrolled =	**2.492**	**ha**	**∑R =**	**0.75**

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 =	0.50	(max 0.5 as per City Guidelines-Sewer)
I_{100} =	178.6	mm/hr
I_5 =	104.2	mm/hr
I_2 =	76.8	mm/hr
Td =	10	min

100-year Release Rate =	618.51	L/s
5-year Release Rate =	360.91	L/s
2-year Release Rate =	266.04	L/s

Post-development Stormwater Management

					$\sum R_{2\&5}$	$\sum R_{100}$
	Total Site Area =	**2.492**	**ha**	**∑R =**	**0.83**	**1.00**
Roof	WS-01 (controlled)	1.044	ha	R =	0.90	1.00
	WS-02 (controlled)	0.124	ha	R =	0.90	1.00
	WS-03 (controlled)	0.122	ha	R =	0.90	1.00
	WS-04 (controlled)	0.149	ha	R =	0.90	1.00
	WS-05 (controlled)	0.163	ha	R =	0.90	1.00
	WS-06 (controlled)	0.094	ha	R =	0.90	1.00
	Controlled by ICD1	*0.653*	*ha*	*R =*	*0.90*	*1.00*
	WS-07 (controlled)	0.102	ha	R =	0.90	1.00
	WS-08 (controlled)	0.084	ha	R =	0.90	1.00
	WS-09 (controlled)	0.063	ha	R =	0.87	1.00
	Controlled by ICD2	*0.248*	*ha*	*R =*	*0.89*	*1.00*
	Total (Controlled)	**1.944**	**ha**	**R =**	**0.90**	**1.00**
	WS-10 (uncontrolled)	0.049	ha	R =	0.90	1.00
	WS-11 (uncontrolled)	0.212	ha	R =	0.90	1.00
	WS-12 (uncontrolled)	0.101	ha	R =	0.20	0.25
	WS-13 (uncontrolled)	0.069	ha	R =	0.28	0.35
	WS-14 (uncontrolled)	0.022	ha	R =	0.79	0.99
	WS-15 (uncontrolled)	0.095	ha	R =	0.32	0.40
	Total (Uncontrolled)	**0.548**	**ha**	**R =**	**0.59**	**0.73**
	Total	**2.492**	**ha**	**R =**	**0.83**	**1.00**

100-Year Total Uncontrolled Runoff =	**199.66**	**L/s**

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LRL File No. 210956
Project: Proposed Development-Light Industrial Building
Location: 1195 Newmarket
Date: May 3, 2022
Designed: M. Basnet
Drawing Ref.: C601

Stormwater Management

STORM - 100 YEAR

100-Year Post-development Stormwater Management (WS-01 Roof: East Subcatchment)

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	178.56	96.71	46.66	18.95	0.00	18.95
15	142.89	77.40	52.60	18.95	0.00	18.95
20	119.95	64.97	55.22	18.95	0.00	18.95
25	103.85	56.25	55.95	18.95	0.00	18.95
30	91.87	49.76	55.46	18.95	0.00	18.95
35	82.58	44.73	54.13	18.95	0.00	18.95
40	75.15	40.70	52.20	18.95	0.00	18.95
45	69.05	37.40	49.82	18.95	0.00	18.95
50	63.95	34.64	47.07	18.95	0.00	18.95
55	59.62	32.29	44.04	18.95	0.00	18.95
60	55.89	30.27	40.77	18.95	0.00	18.95
65	52.65	28.52	37.30	18.95	0.00	18.95
70	49.79	26.97	33.68	18.95	0.00	18.95
75	47.26	25.60	29.90	18.95	0.00	18.95
80	44.99	24.37	26.01	18.95	0.00	18.95
85	42.95	23.27	22.01	18.95	0.00	18.95
90	41.11	22.27	17.91	18.95	0.00	18.95
95	39.43	21.36	13.73	18.95	0.00	18.95
100	37.90	20.53	9.48	18.95	0.00	18.95
105	36.50	19.77	5.16	18.95	0.00	18.95
110	35.20	19.07	0.77	18.95	0.00	18.95
115	34.01	18.42	0.00	18.95	0.00	18.95
120	32.89	17.82	0.00	18.95	0.00	18.95

On-site stormwater detention

Storage required = 55.95 m^3

Storage provided

Avaiable roof surface for storage = 1136.00 m^2
Maximum ponding depth = 150 mm
Avaialbe roof storage = 56.80 m^3
Proposed roof drains: WATTS adjustable roof drain w/ weir opening-FULLY EXPOSED
Maximum flow per roof drain = 1.90 L/s
Number of roof drain = 10
Total flow from roof drains = 18.95 L/s

100-Year Post-development Stormwater Management (WS-01 Roof: Middle Subcatchment)

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	178.56	210.18	101.09	41.69	0.00	41.69
15	142.89	168.20	113.86	41.69	0.00	41.69
20	119.95	141.19	119.40	41.69	0.00	41.69
25	103.85	122.24	120.82	41.69	0.00	41.69
30	91.87	108.14	119.60	41.69	0.00	41.69
35	82.58	97.20	116.57	41.69	0.00	41.69
40	75.15	88.45	112.23	41.69	0.00	41.69
45	69.05	81.28	106.89	41.69	0.00	41.69
50	63.95	75.28	100.77	41.69	0.00	41.69
55	59.62	70.18	94.02	41.69	0.00	41.69
60	55.89	65.79	86.77	41.69	0.00	41.69
65	52.65	61.97	79.09	41.69	0.00	41.69
70	49.79	58.61	71.05	41.69	0.00	41.69
75	47.26	55.62	62.70	41.69	0.00	41.69
80	44.99	52.96	54.08	41.69	0.00	41.69
85	42.95	50.56	45.24	41.69	0.00	41.69
90	41.11	48.39	36.18	41.69	0.00	41.69
95	39.43	46.42	26.95	41.69	0.00	41.69
100	37.90	44.61	17.55	41.69	0.00	41.69
105	36.50	42.96	8.00	41.69	0.00	41.69
110	35.20	41.44	0.00	41.69	0.00	41.69
115	34.01	40.03	0.00	41.69	0.00	41.69
120	32.89	38.72	0.00	41.69	0.00	41.69

On-site stormwater detention

Storage required = 120.82 m^3

Storage provided

Avaiable roof surface for storage = 2529.00 m^2
Maximum ponding depth = 150 mm
Avaialbe roof storage = 126.45 m^3
Proposed roof drains: WATTS adjustable roof drain w/ weir opening-FULLY EXPOSED
Maximum flow per roof drain = 1.90 L/s
Number of roof drain = 22
Total flow from roof drains = 41.69 L/s

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LRL File No. 210956
Project: Proposed Development-Light Industrial Building
Location: 1195 Newmarket
Date: May 3, 2022
Designed: M. Basnet
Drawing Ref.: C601

Stormwater Management

STORM - 100 YEAR

100-Year Post-development Stormwater Management (WS-01 Roof: West Subcatchment)

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	178.56	211.42	99.56	45.48	0.00	45.48
15	142.89	169.19	111.34	45.48	0.00	45.48
20	119.95	142.02	115.85	45.48	0.00	45.48
25	103.85	122.96	116.22	45.48	0.00	45.48
30	91.87	108.77	113.93	45.48	0.00	45.48
35	82.58	97.78	109.82	45.48	0.00	45.48
40	75.15	88.97	104.39	45.48	0.00	45.48
45	69.05	81.76	97.95	45.48	0.00	45.48
50	63.95	75.72	90.73	45.48	0.00	45.48
55	59.62	70.60	82.88	45.48	0.00	45.48
60	55.89	66.18	74.52	45.48	0.00	45.48
65	52.65	62.34	65.73	45.48	0.00	45.48
70	49.79	58.95	56.58	45.48	0.00	45.48
75	47.26	55.95	47.12	45.48	0.00	45.48
80	44.99	53.27	37.39	45.48	0.00	45.48
85	42.95	50.86	27.43	45.48	0.00	45.48
90	41.11	48.68	17.26	45.48	0.00	45.48
95	39.43	46.69	6.91	45.48	0.00	45.48
100	37.90	44.88	0.00	45.48	0.00	45.48
105	36.50	43.21	0.00	45.48	0.00	45.48
110	35.20	41.68	0.00	45.48	0.00	45.48
115	34.01	40.26	0.00	45.48	0.00	45.48
120	32.89	38.95	0.00	45.48	0.00	45.48

On-site stormwater detention

Storage required = 116.22 m^3

Storage provided

Avaiable roof surface for storage = 2375.00 m^2
Maximum ponding depth = 150 mm
Avaialbe roof storage = 118.75 m^3
Proposed roof drains: WATTS adjustable roof drain w/ weir opening-FULLY EXPOSED
Maximum flow per roof drain = 1.90 L/s
Number of roof drain = 24
Total flow from roof drains = 45.48 L/s

100-Year Post-development Stormwater Management (controlled by ICD1)

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	178.56	323.95	138.26	93.51	0.00	93.51
15	142.89	259.24	149.15	93.51	0.00	93.51
20	119.95	217.62	148.92	93.51	0.00	93.51
25	103.85	188.40	142.33	93.51	0.00	93.51
30	91.87	166.67	131.68	93.51	0.00	93.51
35	82.58	149.82	118.23	93.51	0.00	93.51
40	75.15	136.33	102.76	93.51	0.00	93.51
45	69.05	125.27	85.75	93.51	0.00	93.51
50	63.95	116.03	67.54	93.51	0.00	93.51
55	59.62	108.17	48.37	93.51	0.00	93.51
60	55.89	101.41	28.41	93.51	0.00	93.51
65	52.65	95.51	7.79	93.51	0.00	93.51
70	49.79	90.33	0.00	93.51	0.00	93.51
75	47.26	85.73	0.00	93.51	0.00	93.51
80	44.99	81.62	0.00	93.51	0.00	93.51
85	42.95	77.93	0.00	93.51	0.00	93.51
90	41.11	74.58	0.00	93.51	0.00	93.51
95	39.43	71.54	0.00	93.51	0.00	93.51
100	37.90	68.76	0.00	93.51	0.00	93.51
105	36.50	66.21	0.00	93.51	0.00	93.51
110	35.20	63.87	0.00	93.51	0.00	93.51
115	34.01	61.69	0.00	93.51	0.00	93.51
120	32.89	59.68	0.00	93.51	0.00	93.51

On-site stormwater detention

Storage required = 149.15 m^3
Storage provided = 310.68 m^3 (Parking lot surface storage)

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LRL File No. 210956
Project: Proposed Development-Light Industrial Building
Location: 1195 Newmarket
Date: May 3, 2022
Designed: M. Basnet
Drawing Ref.: C601

Stormwater Management

STORM - 100 YEAR

100-Year Post-development Stormwater Management (controlled by ICD2)

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	178.56	122.96	52.85	34.87	0.00	34.87
15	142.89	98.40	57.17	34.87	0.00	34.87
20	119.95	82.60	57.27	34.87	0.00	34.87
25	103.85	71.51	54.95	34.87	0.00	34.87
30	91.87	63.26	51.10	34.87	0.00	34.87
35	82.58	56.86	46.18	34.87	0.00	34.87
40	75.15	51.75	40.49	34.87	0.00	34.87
45	69.05	47.55	34.22	34.87	0.00	34.87
50	63.95	44.04	27.50	34.87	0.00	34.87
55	59.62	41.06	20.40	34.87	0.00	34.87
60	55.89	38.49	13.02	34.87	0.00	34.87
65	52.65	36.25	5.38	34.87	0.00	34.87
70	49.79	34.29	0.00	34.87	0.00	34.87
75	47.26	32.54	0.00	34.87	0.00	34.87
80	44.99	30.98	0.00	34.87	0.00	34.87
85	42.95	29.58	0.00	34.87	0.00	34.87
90	41.11	28.31	0.00	34.87	0.00	34.87
95	39.43	27.15	0.00	34.87	0.00	34.87
100	37.90	26.10	0.00	34.87	0.00	34.87
105	36.50	25.13	0.00	34.87	0.00	34.87
110	35.20	24.24	0.00	34.87	0.00	34.87
115	34.01	23.42	0.00	34.87	0.00	34.87
120	32.89	22.65	0.00	34.87	0.00	34.87

On-site stormwater detention

Storage required = **57.27** m^3
Storage provided = **93.44** m^3 (Parking lot surface storage)

Summary (100-Year)

Catchments	Realease (L/s)
Roof Controlled	
East	18.95
Middle	41.69
West	45.48
ICD1 Controlled	93.51
ICD2 Controlled	34.87
Uncontrolled	199.66
Total	**434.17**

LRL File No. 210956
Project: Proposed Development-Light Industrial Building
Location: 1195 Newmarket
Date: May 3, 2022
Designed: M. Basnet
Drawing Ref.: C601

Stormwater Management

STORM - 100 YEAR + "Stress Test"

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 =	**2.492**	**ha**	**∑R =**	**0.75**
	EWS-01 (uncontrolled)	2.492	ha	R =	0.75
	Total Uncontrolled =	**2.492**	**ha**	**∑R =**	**0.75**

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 =	0.50	(max 0.5 as per City Guidelines-Sewer)
I_{100} =	178.6	mm/hr
I_5 =	104.2	mm/hr
I_2 =	76.8	mm/hr
Td =	10	min

100-year Release Rate =	618.51	L/s
5-year Release Rate =	360.91	L/s
2-year Release Rate =	266.04	L/s

Post-development Stormwater Management

					$\sum R_{2\&5}$	$\sum R_{100}$
	Total Site Area =	**2.492**	**ha**	**∑R =**	**0.83**	**1.00**
Roof	WS-01 (controlled)	1.044	ha	R =	0.90	1.00
	WS-02 (controlled)	0.124	ha	R =	0.90	1.00
	WS-03 (controlled)	0.122	ha	R =	0.90	1.00
	WS-04 (controlled)	0.149	ha	R =	0.90	1.00
	WS-05 (controlled)	0.163	ha	R =	0.90	1.00
	WS-06 (controlled)	0.094	ha	R =	0.90	1.00
	Controlled by ICD1	*0.653*	*ha*	*R =*	*0.90*	*1.00*
	WS-07 (controlled)	0.102	ha	R =	0.90	1.00
	WS-08 (controlled)	0.084	ha	R =	0.90	1.00
	WS-09 (controlled)	0.063	ha	R =	0.87	1.00
	Controlled by ICD2	*0.248*	*ha*	*R =*	*0.89*	*1.00*
	Total (Controlled)	**1.944**	**ha**	**R =**	**0.90**	**1.00**
	WS-10 (uncontrolled)	0.049	ha	R =	0.90	1.00
	WS-11 (uncontrolled)	0.212	ha	R =	0.90	1.00
	WS-12 (uncontrolled)	0.101	ha	R =	0.20	0.25
	WS-13 (uncontrolled)	0.069	ha	R =	0.28	0.35
	WS-14 (uncontrolled)	0.022	ha	R =	0.79	0.99
	WS-15 (uncontrolled)	0.095	ha	R =	0.32	0.40
	Total (Uncontrolled)	**0.548**	**ha**	**R =**	**0.59**	**0.73**
	Total	**2.492**	**ha**	**R =**	**0.83**	**1.00**

100-Year Total Uncontrolled Runoff =	**239.59**	**L/s**

LRL
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LRL File No. 210956
Project: Proposed Development-Light Industrial Building
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Drawing Ref.: C601

Stormwater Management

STORM - 100 YEAR + "Stress Test"

100-Year + "Stress Test" Post-development Stormwater Management (WS-01 Roof: East Subcatchment)

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	214.27	116.06	58.26	18.95	0.00	18.95
15	171.47	92.88	66.53	18.95	0.00	18.95
20	143.94	77.96	70.82	18.95	0.00	18.95
25	124.62	67.50	72.82	18.95	0.00	18.95
30	110.24	59.71	73.37	18.95	0.00	18.95
35	99.09	53.67	72.92	18.95	0.00	18.95
40	90.17	48.84	71.74	18.95	0.00	18.95
45	82.86	44.88	70.01	18.95	0.00	18.95
50	76.74	41.57	67.85	18.95	0.00	18.95
55	71.55	38.75	65.35	18.95	0.00	18.95
60	67.07	36.33	62.57	18.95	0.00	18.95
65	63.18	34.22	59.55	18.95	0.00	18.95
70	59.75	32.36	56.33	18.95	0.00	18.95
75	56.71	30.71	52.94	18.95	0.00	18.95
80	53.99	29.24	49.40	18.95	0.00	18.95
85	51.54	27.92	45.74	18.95	0.00	18.95
90	49.33	26.72	41.96	18.95	0.00	18.95
95	47.32	25.63	38.08	18.95	0.00	18.95
100	45.48	24.64	34.11	18.95	0.00	18.95
105	43.80	23.72	30.06	18.95	0.00	18.95
110	42.24	22.88	25.94	18.95	0.00	18.95
115	40.81	22.10	21.75	18.95	0.00	18.95
120	39.47	21.38	17.50	18.95	0.00	18.95

On-site stormwater detention

Storage required = **73.37** **m^3** For storm event > 100-yr the runoff will overflow through scuppers to be installed at 150 mm (max. ponding depth) above roof drain

Storage provided

Avaiable roof surface for storage = 1136.00 m^2
Maximum ponding depth = 150 mm
Avaialbe roof storage = **56.80** **m^3**
Proposed roof drains: WATTS adjustable roof drain w/ weir opening-FULLY EXPOSED
Maximum flow per roof drain = 1.90 L/s
Number of roof drain = 10
Total flow from roof drains = 18.95 L/s

100-Year + "Stress Test" Post-development Stormwater Management (WS-01 Roof: Middle Subcatchment)

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	214.27	252.21	126.31	41.69	0.00	41.69
15	171.47	201.84	144.13	41.69	0.00	41.69
20	143.94	169.43	153.29	41.69	0.00	41.69
25	124.62	146.68	157.49	41.69	0.00	41.69
30	110.24	129.76	158.53	41.69	0.00	41.69
35	99.09	116.64	157.40	41.69	0.00	41.69
40	90.17	106.14	154.68	41.69	0.00	41.69
45	82.86	97.53	150.78	41.69	0.00	41.69
50	76.74	90.33	145.93	41.69	0.00	41.69
55	71.55	84.22	140.34	41.69	0.00	41.69
60	67.07	78.95	134.14	41.69	0.00	41.69
65	63.18	74.36	127.42	41.69	0.00	41.69
70	59.75	70.33	120.28	41.69	0.00	41.69
75	56.71	66.75	112.76	41.69	0.00	41.69
80	53.99	63.55	104.92	41.69	0.00	41.69
85	51.54	60.67	96.81	41.69	0.00	41.69
90	49.33	58.07	88.44	41.69	0.00	41.69
95	47.32	55.70	79.86	41.69	0.00	41.69
100	45.48	53.54	71.08	41.69	0.00	41.69
105	43.80	51.55	62.13	41.69	0.00	41.69
110	42.24	49.72	53.02	41.69	0.00	41.69
115	40.81	48.03	43.76	41.69	0.00	41.69
120	39.47	46.46	34.37	41.69	0.00	41.69

On-site stormwater detention

Storage required = **158.53** **m^3** For storm event > 100-yr the runoff will overflow through scuppers to be installed at 150 mm (max. ponding depth) above roof drain

Storage provided

Avaiable roof surface for storage = 2529.00 m^2
Maximum ponding depth = 150 mm
Avaialbe roof storage = **126.45** **m^3**
Proposed roof drains: WATTS adjustable roof drain w/ weir opening-FULLY EXPOSED
Maximum flow per roof drain = 1.90 L/s
Number of roof drain = 22
Total flow from roof drains = 41.69 L/s

LRL
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LRL File No. 210956
Project: Proposed Development-Light Industrial Building
Location: 1195 Newmarket
Date: May 3, 2022
Designed: M. Basnet
Drawing Ref.: C601

Stormwater Management

STORM - 100 YEAR + "Stress Test"

100-Year + "Stress Test" Post-development Stormwater Management (WS-01 Roof: West Subcatchment)

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	214.27	253.70	124.93	45.48	0.00	45.48
15	171.47	203.03	141.79	45.48	0.00	45.48
20	143.94	170.43	149.94	45.48	0.00	45.48
25	124.62	147.55	153.10	45.48	0.00	45.48
30	110.24	130.53	153.09	45.48	0.00	45.48
35	99.09	117.33	150.89	45.48	0.00	45.48
40	90.17	106.77	147.09	45.48	0.00	45.48
45	82.86	98.11	142.10	45.48	0.00	45.48
50	76.74	90.87	136.16	45.48	0.00	45.48
55	71.55	84.72	129.48	45.48	0.00	45.48
60	67.07	79.42	122.17	45.48	0.00	45.48
65	63.18	74.80	114.36	45.48	0.00	45.48
70	59.75	70.74	106.10	45.48	0.00	45.48
75	56.71	67.14	97.48	45.48	0.00	45.48
80	53.99	63.92	88.53	45.48	0.00	45.48
85	51.54	61.03	79.31	45.48	0.00	45.48
90	49.33	58.41	69.83	45.48	0.00	45.48
95	47.32	56.03	60.14	45.48	0.00	45.48
100	45.48	53.85	50.24	45.48	0.00	45.48
105	43.80	51.86	40.17	45.48	0.00	45.48
110	42.24	50.02	29.94	45.48	0.00	45.48
115	40.81	48.32	19.57	45.48	0.00	45.48
120	39.47	46.74	9.06	45.48	0.00	45.48

On-site stormwater detention

Storage required = **153.10** **m^3**

For storm event > 100-yr the runoff will overflow through scuppers to be installed at 150 mm (max. ponding depth) above roof drain

Storage provided

Avaiable roof surface for storage = 2375.00 m^2
Maximum ponding depth = 150 mm
Avaialbe roof storage = **118.75** **m^3**
Proposed roof drains: WATTS adjustable roof drain w/ weir opening-FULLY EXPOSED
Maximum flow per roof drain = 1.90 L/s
Number of roof drain = 24
Total flow from roof drains = 45.48 L/s

100-Year + "Stress Test" Post-development Stormwater Management (controlled by ICD1)

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	214.27	388.74	177.13	93.51	0.00	93.51
15	171.47	311.09	195.82	93.51	0.00	93.51
20	143.94	261.14	201.15	93.51	0.00	93.51
25	124.62	226.08	198.85	93.51	0.00	93.51
30	110.24	200.00	191.68	93.51	0.00	93.51
35	99.09	179.78	181.16	93.51	0.00	93.51
40	90.17	163.60	168.20	93.51	0.00	93.51
45	82.86	150.33	153.39	93.51	0.00	93.51
50	76.74	139.23	137.15	93.51	0.00	93.51
55	71.55	129.81	119.76	93.51	0.00	93.51
60	67.07	121.69	101.42	93.51	0.00	93.51
65	63.18	114.62	82.29	93.51	0.00	93.51
70	59.75	108.40	62.50	93.51	0.00	93.51
75	56.71	102.88	42.14	93.51	0.00	93.51
80	53.99	97.95	21.28	93.51	0.00	93.51
85	51.54	93.51	0.00	93.51	0.00	93.51
90	49.33	89.50	0.00	93.51	0.00	93.51
95	47.32	85.85	0.00	93.51	0.00	93.51
100	45.48	82.52	0.00	93.51	0.00	93.51
105	43.80	79.46	0.00	93.51	0.00	93.51
110	42.24	76.64	0.00	93.51	0.00	93.51
115	40.81	74.03	0.00	93.51	0.00	93.51
120	39.47	71.61	0.00	93.51	0.00	93.51

On-site stormwater detention

Storage required = **201.15** **m^3**
Storage provided = **310.68** **m^3** (Parking lot surface storage)

LRL File No. 210956
Project: Proposed Development-Light Industrial Building
Location: 1195 Newmarket
Date: May 3, 2022
Designed: M. Basnet
Drawing Ref.: C601

Stormwater Management

STORM - 100 YEAR + "Stress Test"

100-Year + "Stress Test" Post-development Stormwater Management (controlled by ICD2)

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	214.27	147.55	67.60	34.87	0.00	34.87
15	171.47	118.08	74.88	34.87	0.00	34.87
20	143.94	99.12	77.09	34.87	0.00	34.87
25	124.62	85.81	76.41	34.87	0.00	34.87
30	110.24	75.91	73.87	34.87	0.00	34.87
35	99.09	68.24	70.06	34.87	0.00	34.87
40	90.17	62.09	65.33	34.87	0.00	34.87
45	82.86	57.06	59.90	34.87	0.00	34.87
50	76.74	52.85	53.92	34.87	0.00	34.87
55	71.55	49.27	47.50	34.87	0.00	34.87
60	67.07	46.19	40.73	34.87	0.00	34.87
65	63.18	43.50	33.65	34.87	0.00	34.87
70	59.75	41.14	26.33	34.87	0.00	34.87
75	56.71	39.05	18.79	34.87	0.00	34.87
80	53.99	37.18	11.06	34.87	0.00	34.87
85	51.54	35.49	3.16	34.87	0.00	34.87
90	49.33	33.97	0.00	34.87	0.00	34.87
95	47.32	32.59	0.00	34.87	0.00	34.87
100	45.48	31.32	0.00	34.87	0.00	34.87
105	43.80	30.16	0.00	34.87	0.00	34.87
110	42.24	29.09	0.00	34.87	0.00	34.87
115	40.81	28.10	0.00	34.87	0.00	34.87
120	39.47	27.18	0.00	34.87	0.00	34.87

On-site stormwater detention

Storage required = **77.09** m^3

Storage provided = **93.44** m^3 (Parking lot surface storage)

Summary (100-Year + "Stress Test")

Catchments	Realease (L/s)
Roof Controlled	
East	18.95
Middle	41.69
West	45.48
ICD1 Controlled	93.51
ICD2 Controlled	34.87
Uncontrolled	239.59
Total	**474.10**

LRL File No. 210956
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Stormwater Management

STORM - 5 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 =	**2.492**	**ha**	**∑R =**	**0.75**
	EWS-01 (uncontrolled)	2.492	ha	R =	0.75
	Total Uncontrolled =	**2.492**	**ha**	**∑R =**	**0.75**

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 =	0.50	(max 0.5 as per City Guidelines-Sewer)
I_{100} =	178.6	mm/hr
I_5 =	104.2	mm/hr
I_2 =	76.8	mm/hr
Td =	10	min

100-year Release Rate =	618.51	L/s
5-year Release Rate =	360.91	L/s
2-year Release Rate =	266.04	L/s

Post-development Stormwater Management

					$\sum R_{2\&5}$	$\sum R_{100}$
	Total Site Area =	**2.492**	**ha**	**∑R =**	**0.83**	**1.00**
Roof	WS-01 (controlled)	1.044	ha	R =	0.90	1.00
	WS-02 (controlled)	0.124	ha	R =	0.90	1.00
	WS-03 (controlled)	0.122	ha	R =	0.90	1.00
	WS-04 (controlled)	0.149	ha	R =	0.90	1.00
	WS-05 (controlled)	0.163	ha	R =	0.90	1.00
	WS-06 (controlled)	0.094	ha	R =	0.90	1.00
	Controlled by ICD1	*0.653*	*ha*	*R =*	*0.90*	*1.00*
	WS-07 (controlled)	0.102	ha	R =	0.90	1.00
	WS-08 (controlled)	0.084	ha	R =	0.90	1.00
	WS-09 (controlled)	0.063	ha	R =	0.87	1.00
	Controlled by ICD2	*0.248*	*ha*	*R =*	*0.89*	*1.00*
	Total (Controlled)	**1.944**	**ha**	**R =**	**0.90**	**1.00**
	WS-10 (uncontrolled)	0.049	ha	R =	0.90	1.00
	WS-11 (uncontrolled)	0.212	ha	R =	0.90	1.00
	WS-12 (uncontrolled)	0.101	ha	R =	0.20	0.25
	WS-13 (uncontrolled)	0.069	ha	R =	0.28	0.35
	WS-14 (uncontrolled)	0.022	ha	R =	0.79	0.99
	WS-15 (uncontrolled)	0.095	ha	R =	0.32	0.40
	Total (Uncontrolled)	**0.548**	**ha**	**R =**	**0.59**	**0.73**
	Total	**2.492**	**ha**	**R =**	**0.83**	**1.00**

100-Year Total Uncontrolled Runoff =	**93.21**	**L/s**

LRL
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LRL File No. 210956
Project: Proposed Development-Light Industrial Building
Location: 1195 Newmarket
Date: May 3, 2022
Designed: M. Basnet
Drawing Ref.: C601

Stormwater Management

STORM - 5 YEAR

5-Year Post-development Stormwater Management (WS-01 Roof: East Subcatchment)

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	104.19	50.79	21.93	14.24	0.00	14.24
15	83.56	40.73	23.84	14.24	0.00	14.24
20	70.25	34.25	24.01	14.24	0.00	14.24
25	60.90	29.69	23.17	14.24	0.00	14.24
30	53.93	26.29	21.69	14.24	0.00	14.24
35	48.52	23.65	19.77	14.24	0.00	14.24
40	44.18	21.54	17.52	14.24	0.00	14.24
45	40.63	19.81	15.03	14.24	0.00	14.24
50	37.65	18.35	12.35	14.24	0.00	14.24
55	35.12	17.12	9.52	14.24	0.00	14.24
60	32.94	16.06	6.56	14.24	0.00	14.24
65	31.04	15.13	3.49	14.24	0.00	14.24
70	29.37	14.32	0.34	14.24	0.00	14.24
75	27.89	13.59	0.00	14.24	0.00	14.24
80	26.56	12.95	0.00	14.24	0.00	14.24
85	25.37	12.37	0.00	14.24	0.00	14.24
90	24.29	11.84	0.00	14.24	0.00	14.24
95	23.31	11.36	0.00	14.24	0.00	14.24
100	22.41	10.92	0.00	14.24	0.00	14.24
105	21.58	10.52	0.00	14.24	0.00	14.24
110	20.82	10.15	0.00	14.24	0.00	14.24
115	20.12	9.81	0.00	14.24	0.00	14.24
120	19.47	9.49	0.00	14.24	0.00	14.24

On-site stormwater detention

Storage required = 24.01 m^3

Storage provided

Avaiable roof surface for storage = 638.45 m^2
Maximum ponding depth = 113 mm
Avaialbe roof storage = 24.05 m^3
Proposed roof drains: WATTS adjustable roof drain w/ weir opening-FULLY EXPOSED
Maximum flow per roof drain = 1.42 L/s
Number of roof drain = 10
Total flow from roof drains = 14.24 L/s

5-Year Post-development Stormwater Management (WS-01 Roof: Middle Subcatchment)

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	104.19	110.38	47.43	31.32	0.00	31.32
15	83.56	88.52	51.47	31.32	0.00	31.32
20	70.25	74.42	51.72	31.32	0.00	31.32
25	60.90	64.51	49.78	31.32	0.00	31.32
30	53.93	57.13	46.45	31.32	0.00	31.32
35	48.52	51.40	42.16	31.32	0.00	31.32
40	44.18	46.81	37.16	31.32	0.00	31.32
45	40.63	43.04	31.64	31.32	0.00	31.32
50	37.65	39.89	25.69	31.32	0.00	31.32
55	35.12	37.21	19.42	31.32	0.00	31.32
60	32.94	34.90	12.87	31.32	0.00	31.32
65	31.04	32.89	6.10	31.32	0.00	31.32
70	29.37	31.12	0.00	31.32	0.00	31.32
75	27.89	29.54	0.00	31.32	0.00	31.32
80	26.56	28.14	0.00	31.32	0.00	31.32
85	25.37	26.87	0.00	31.32	0.00	31.32
90	24.29	25.73	0.00	31.32	0.00	31.32
95	23.31	24.69	0.00	31.32	0.00	31.32
100	22.41	23.74	0.00	31.32	0.00	31.32
105	21.58	22.86	0.00	31.32	0.00	31.32
110	20.82	22.06	0.00	31.32	0.00	31.32
115	20.12	21.31	0.00	31.32	0.00	31.32
120	19.47	20.62	0.00	31.32	0.00	31.32

On-site stormwater detention

Storage required = 51.72 m^3

Storage provided

Avaiable roof surface for storage = 1404.59 m^2
Maximum ponding depth = 113 mm
Avaialbe roof storage = 52.91 m^3
Proposed roof drains: WATTS adjustable roof drain w/ weir opening-FULLY EXPOSED
Maximum flow per roof drain = 1.42 L/s
Number of roof drain = 22
Total flow from roof drains = 31.32 L/s

LRL File No. 210956
Project: Proposed Development-Light Industrial Building
Location: 1195 Newmarket
Date: May 3, 2022
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Drawing Ref.: C601

Stormwater Management

STORM - 5 YEAR

5-Year Post-development Stormwater Management (WS-01 Roof: West Subcatchment)

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	104.19	111.03	46.84	32.96	0.00	32.96
15	83.56	89.04	50.47	32.96	0.00	32.96
20	70.25	74.86	50.28	32.96	0.00	32.96
25	60.90	64.89	47.90	32.96	0.00	32.96
30	53.93	57.47	44.11	32.96	0.00	32.96
35	48.52	51.70	39.35	32.96	0.00	32.96
40	44.18	47.08	33.89	32.96	0.00	32.96
45	40.63	43.29	27.90	32.96	0.00	32.96
50	37.65	40.12	21.49	32.96	0.00	32.96
55	35.12	37.43	14.74	32.96	0.00	32.96
60	32.94	35.11	7.72	32.96	0.00	32.96
65	31.04	33.08	0.47	32.96	0.00	32.96
70	29.37	31.30	0.00	32.96	0.00	32.96
75	27.89	29.72	0.00	32.96	0.00	32.96
80	26.56	28.31	0.00	32.96	0.00	32.96
85	25.37	27.03	0.00	32.96	0.00	32.96
90	24.29	25.88	0.00	32.96	0.00	32.96
95	23.31	24.83	0.00	32.96	0.00	32.96
100	22.41	23.88	0.00	32.96	0.00	32.96
105	21.58	23.00	0.00	32.96	0.00	32.96
110	20.82	22.19	0.00	32.96	0.00	32.96
115	20.12	21.44	0.00	32.96	0.00	32.96
120	19.47	20.75	0.00	32.96	0.00	32.96

On-site stormwater detention

Storage required = 50.47 m^3

Storage provided

Avaiable roof surface for storage = 1425.72 m^2
Maximum ponding depth = 109 mm
Avaialbe roof storage = 51.80 m^3
Proposed roof drains: WATTS adjustable roof drain w/ weir opening-FULLY EXPOSED
Maximum flow per roof drain = 1.37 L/s
Number of roof drain = 24
Total flow from roof drains = 32.96 L/s

5-Year Post-development Stormwater Management (controlled by ICD1)

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	104.19	170.13	45.97	93.51	0.00	93.51
15	83.56	136.43	38.63	93.51	0.00	93.51
20	70.25	114.71	25.43	93.51	0.00	93.51
25	60.90	99.43	8.87	93.51	0.00	93.51
30	53.93	88.05	0.00	93.51	0.00	93.51
35	48.52	79.22	0.00	93.51	0.00	93.51
40	44.18	72.14	0.00	93.51	0.00	93.51
45	40.63	66.34	0.00	93.51	0.00	93.51
50	37.65	61.48	0.00	93.51	0.00	93.51
55	35.12	57.35	0.00	93.51	0.00	93.51
60	32.94	53.79	0.00	93.51	0.00	93.51
65	31.04	50.69	0.00	93.51	0.00	93.51
70	29.37	47.96	0.00	93.51	0.00	93.51
75	27.89	45.54	0.00	93.51	0.00	93.51
80	26.56	43.37	0.00	93.51	0.00	93.51
85	25.37	41.42	0.00	93.51	0.00	93.51
90	24.29	39.66	0.00	93.51	0.00	93.51
95	23.31	38.05	0.00	93.51	0.00	93.51
100	22.41	36.59	0.00	93.51	0.00	93.51
105	21.58	35.24	0.00	93.51	0.00	93.51
110	20.82	34.00	0.00	93.51	0.00	93.51
115	20.12	32.85	0.00	93.51	0.00	93.51
120	19.47	31.79	0.00	93.51	0.00	93.51

On-site stormwater detention

Storage required = 45.97 m^3
Storage provided = 310.68 m^3 (Parking lot surface storage)

LRL File No. 210956
Project: Proposed Development-Light Industrial Building
Location: 1195 Newmarket
Date: May 3, 2022
Designed: M. Basnet
Drawing Ref.: C601

Stormwater Management

STORM - 5 YEAR

5-Year Post-development Stormwater Management (controlled by ICD2)

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	104.19	64.05	17.50	34.87	0.00	34.87
15	83.56	51.36	14.84	34.87	0.00	34.87
20	70.25	43.18	9.97	34.87	0.00	34.87
25	60.90	37.43	3.84	34.87	0.00	34.87
30	53.93	33.15	0.00	34.87	0.00	34.87
35	48.52	29.82	0.00	34.87	0.00	34.87
40	44.18	27.16	0.00	34.87	0.00	34.87
45	40.63	24.97	0.00	34.87	0.00	34.87
50	37.65	23.14	0.00	34.87	0.00	34.87
55	35.12	21.59	0.00	34.87	0.00	34.87
60	32.94	20.25	0.00	34.87	0.00	34.87
65	31.04	19.08	0.00	34.87	0.00	34.87
70	29.37	18.05	0.00	34.87	0.00	34.87
75	27.89	17.14	0.00	34.87	0.00	34.87
80	26.56	16.33	0.00	34.87	0.00	34.87
85	25.37	15.59	0.00	34.87	0.00	34.87
90	24.29	14.93	0.00	34.87	0.00	34.87
95	23.31	14.33	0.00	34.87	0.00	34.87
100	22.41	13.77	0.00	34.87	0.00	34.87
105	21.58	13.27	0.00	34.87	0.00	34.87
110	20.82	12.80	0.00	34.87	0.00	34.87
115	20.12	12.37	0.00	34.87	0.00	34.87
120	19.47	11.97	0.00	34.87	0.00	34.87

On-site stormwater detention

Storage required = **17.50** m^3

Storage provided = **93.44** m^3 (Parking lot surface storage)

Summary (5-Year)

Catchments	Realease (L/s)
Roof Controlled	
East	14.24
Middle	31.32
West	32.96
ICD1 Controlled	93.51
ICD2 Controlled	34.87
Uncontrolled	93.21
Total	**300.12**

LRL
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LRL File No. 210956
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Stormwater Management

STORM - 2 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 =	**2.492**	**ha**	**∑R =**	**0.75**
	EWS-01 (uncontrolled)	2.492	ha	R =	0.75
	Total Uncontrolled =	**2.492**	**ha**	**∑R =**	**0.75**

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 =	0.50	(max 0.5 as per City Guidelines-Sewer)
I_{100} =	178.6	mm/hr
I_5 =	104.2	mm/hr
I_2 =	76.8	mm/hr
Td =	10	min

100-year Release Rate =	618.51	L/s
5-year Release Rate =	360.91	L/s
2-year Release Rate =	266.04	L/s

Post-development Stormwater Management

					$\sum R_{2\&5}$	$\sum R_{100}$
	Total Site Area =	**2.492**	**ha**	**∑R =**	**0.83**	**1.00**
Roof	WS-01 (controlled)	1.044	ha	R =	0.90	1.00
	WS-02 (controlled)	0.124	ha	R =	0.90	1.00
	WS-03 (controlled)	0.122	ha	R =	0.90	1.00
	WS-04 (controlled)	0.149	ha	R =	0.90	1.00
	WS-05 (controlled)	0.163	ha	R =	0.90	1.00
	WS-06 (controlled)	0.094	ha	R =	0.90	1.00
	Controlled by ICD1	*0.653*	*ha*	*R =*	*0.90*	*1.00*
	WS-07 (controlled)	0.102	ha	R =	0.90	1.00
	WS-08 (controlled)	0.084	ha	R =	0.90	1.00
	WS-09 (controlled)	0.063	ha	R =	0.87	1.00
	Controlled by ICD2	*0.248*	*ha*	*R =*	*0.89*	*1.00*
	Total (Controlled)	**1.944**	**ha**	**R =**	**0.90**	**1.00**
	WS-10 (uncontrolled)	0.049	ha	R =	0.90	1.00
	WS-11 (uncontrolled)	0.212	ha	R =	0.90	1.00
	WS-12 (uncontrolled)	0.101	ha	R =	0.20	0.25
	WS-13 (uncontrolled)	0.069	ha	R =	0.28	0.35
	WS-14 (uncontrolled)	0.022	ha	R =	0.79	0.99
	WS-15 (uncontrolled)	0.095	ha	R =	0.32	0.40
	Total (Uncontrolled)	**0.548**	**ha**	**R =**	**0.59**	**0.73**
	Total (Controlled+Uncontrolled)	**2.492**	**ha**	**R =**	**0.83**	**1.00**

100-Year Total Uncontrolled Runoff = 68.71 L/s

2-Year Post-development Stormwater Management (WS-01 Roof: East Subcatchment)

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	76.81	37.44	15.02	12.41	0.00	12.41
15	61.77	30.11	15.93	12.41	0.00	12.41
20	52.03	25.36	15.54	12.41	0.00	12.41
25	45.17	22.02	14.41	12.41	0.00	12.41
30	40.04	19.52	12.80	12.41	0.00	12.41
35	36.06	17.58	10.85	12.41	0.00	12.41
40	32.86	16.02	8.66	12.41	0.00	12.41
45	30.24	14.74	6.29	12.41	0.00	12.41
50	28.04	13.67	3.77	12.41	0.00	12.41
55	26.17	12.76	1.14	12.41	0.00	12.41
60	24.56	11.97	0.00	12.41	0.00	12.41
65	23.15	11.29	0.00	12.41	0.00	12.41
70	21.91	10.68	0.00	12.41	0.00	12.41
75	20.81	10.15	0.00	12.41	0.00	12.41
80	19.83	9.67	0.00	12.41	0.00	12.41
85	18.94	9.23	0.00	12.41	0.00	12.41
90	18.14	8.84	0.00	12.41	0.00	12.41
95	17.41	8.49	0.00	12.41	0.00	12.41
100	16.75	8.16	0.00	12.41	0.00	12.41
105	16.13	7.86	0.00	12.41	0.00	12.41
110	15.57	7.59	0.00	12.41	0.00	12.41
115	15.05	7.33	0.00	12.41	0.00	12.41
120	14.56	7.10	0.00	12.41	0.00	12.41

On-site stormwater detention

Storage required = 15.93 m^3

Storage provided

Avaiable roof surface for storage = 485.11 m^2
Maximum ponding depth = 98.5 mm
Avaialbe roof storage = 15.93 m^3
Proposed roof drains: WATTS adjustable roof drain w/ weir opening-FULLY EXPOSED
Maximum flow per roof drain = 1.24 L/s
Number of roof drain = 10
Total flow from roof drains = 12.41 L/s

LRL
ENGINEERING | INGÉNIERIE

LRL File No. 210956
Project: Proposed Development-Light Industrial Building
Location: 1195 Newmarket
Date: May 3, 2022
Designed: M. Basnet
Drawing Ref.: C601

Stormwater Management

STORM - 2 YEAR

2-Year Post-development Stormwater Management (WS-01 Roof: Middle Subcatchment)

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	76.81	81.36	32.53	27.15	0.00	27.15
15	61.77	65.43	34.45	27.15	0.00	27.15
20	52.03	55.12	33.56	27.15	0.00	27.15
25	45.17	47.85	31.04	27.15	0.00	27.15
30	40.04	42.42	27.48	27.15	0.00	27.15
35	36.06	38.20	23.20	27.15	0.00	27.15
40	32.86	34.82	18.39	27.15	0.00	27.15
45	30.24	32.03	13.18	27.15	0.00	27.15
50	28.04	29.71	7.66	27.15	0.00	27.15
55	26.17	27.72	1.89	27.15	0.00	27.15
60	24.56	26.02	0.00	27.15	0.00	27.15
65	23.15	24.53	0.00	27.15	0.00	27.15
70	21.91	23.21	0.00	27.15	0.00	27.15
75	20.81	22.05	0.00	27.15	0.00	27.15
80	19.83	21.01	0.00	27.15	0.00	27.15
85	18.94	20.07	0.00	27.15	0.00	27.15
90	18.14	19.22	0.00	27.15	0.00	27.15
95	17.41	18.45	0.00	27.15	0.00	27.15
100	16.75	17.74	0.00	27.15	0.00	27.15
105	16.13	17.09	0.00	27.15	0.00	27.15
110	15.57	16.49	0.00	27.15	0.00	27.15
115	15.05	15.94	0.00	27.15	0.00	27.15
120	14.56	15.43	0.00	27.15	0.00	27.15

On-site stormwater detention
Storage required = 34.45 m^3
Storage provided
Avaiable roof surface for storage = 1055.36 m^2
Maximum ponding depth = 97.95 mm
Avaialbe roof storage = 34.46 m^3
Proposed roof drains: WATTS adjustable roof drain w/ weir opening-FULLY EXPOSED
Maximum flow per roof drain = 1.23 L/s
Number of roof drain = 22
Total flow from roof drains = 27.15 L/s

2-Year Post-development Stormwater Management (WS-01 Roof: West Subcatchment)

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	76.81	81.85	31.99	28.53	0.00	28.53
15	61.77	65.82	33.57	28.53	0.00	28.53
20	52.03	55.45	32.30	28.53	0.00	28.53
25	45.17	48.13	29.41	28.53	0.00	28.53
30	40.04	42.67	25.46	28.53	0.00	28.53
35	36.06	38.43	20.79	28.53	0.00	28.53
40	32.86	35.02	15.59	28.53	0.00	28.53
45	30.24	32.22	9.99	28.53	0.00	28.53
50	28.04	29.88	4.07	28.53	0.00	28.53
55	26.17	27.89	0.00	28.53	0.00	28.53
60	24.56	26.17	0.00	28.53	0.00	28.53
65	23.15	24.67	0.00	28.53	0.00	28.53
70	21.91	23.35	0.00	28.53	0.00	28.53
75	20.81	22.18	0.00	28.53	0.00	28.53
80	19.83	21.13	0.00	28.53	0.00	28.53
85	18.94	20.19	0.00	28.53	0.00	28.53
90	18.14	19.33	0.00	28.53	0.00	28.53
95	17.41	18.56	0.00	28.53	0.00	28.53
100	16.75	17.85	0.00	28.53	0.00	28.53
105	16.13	17.19	0.00	28.53	0.00	28.53
110	15.57	16.59	0.00	28.53	0.00	28.53
115	15.05	16.03	0.00	28.53	0.00	28.53
120	14.56	15.52	0.00	28.53	0.00	28.53

On-site stormwater detention
Storage required = 33.57 m^3
Storage provided
Avaiable roof surface for storage = 1067.78 m^2
Maximum ponding depth = 94.33 mm
Avaialbe roof storage = 33.57 m^3
Proposed roof drains: WATTS adjustable roof drain w/ weir opening-FULLY EXPOSED
Maximum flow per roof drain = 1.19 L/s
Number of roof drain = 24
Total flow from roof drains = 28.53 L/s

LRL
ENGINEERING | INGENIERIE

LRL File No. 210956
Project: Proposed Development-Light Industrial Building
Location: 1195 Newmarket
Date: May 3, 2022
Designed: M. Basnet
Drawing Ref.: C601

Stormwater Management

STORM - 2 YEAR

2-Year Post-development Stormwater Management (controlled by ICD1)

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	*Controlled Release Rate (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	76.81	125.41	47.19	46.76	0.00	46.76
15	61.77	100.85	48.69	46.76	0.00	46.76
20	52.03	84.96	45.84	46.76	0.00	46.76
25	45.17	73.75	40.49	46.76	0.00	46.76
30	40.04	65.38	33.53	46.76	0.00	46.76
35	36.06	58.88	25.45	46.76	0.00	46.76
40	32.86	53.66	16.57	46.76	0.00	46.76
45	30.24	49.38	7.07	46.76	0.00	46.76
50	28.04	45.79	0.00	46.76	0.00	46.76
55	26.17	42.73	0.00	46.76	0.00	46.76
60	24.56	40.10	0.00	46.76	0.00	46.76
65	23.15	37.80	0.00	46.76	0.00	46.76
70	21.91	35.78	0.00	46.76	0.00	46.76
75	20.81	33.98	0.00	46.76	0.00	46.76
80	19.83	32.38	0.00	46.76	0.00	46.76
85	18.94	30.93	0.00	46.76	0.00	46.76
90	18.14	29.62	0.00	46.76	0.00	46.76
95	17.41	28.43	0.00	46.76	0.00	46.76
100	16.75	27.34	0.00	46.76	0.00	46.76
105	16.13	26.34	0.00	46.76	0.00	46.76
110	15.57	25.42	0.00	46.76	0.00	46.76
115	15.05	24.57	0.00	46.76	0.00	46.76
120	14.56	23.78	0.00	46.76	0.00	46.76

*Note: 50% of allowed release rate for underground storage calculation for 2-yr storm

On-site stormwater detention

Storage required = 48.69 m^3
Underground storage provided = 51.49 m^3

Storage Calculations

Surface Storage(m^3)

CMMH02	35.91
CMMH03	119.65
CMMH04	78.79
CMMH05	71.75
CMMH06	4.58
Total	**310.68**

Underground Storage(m^3)

	A(m^2)	H(m)	V(m^3)	Remarks
CMMH02	4.52	1.28	5.79	2.4m dia MH
CMMH03	4.52	1.12	5.07	2.4m dia MH
CMMH04	4.52	1.06	4.80	2.4m dia MH
CMMH05	4.52	0.95	4.30	2.4m dia MH
CB06	0.36	0.94	0.34	0.6m*0.6m CB
Total			**20.29**	

Underground Pipe Storage(m3)

	450mm	375mm	300mm	**Total**
L(m)	147.2	0	0	
A(m^2)	0.21	0.11	0.07	
V(m^3)	**31.20**	**0.00**	**0.00**	**31.20**

LRL
ENGINEERING | INGÉNIERIE

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Stormwater Management

STORM - 2 YEAR

2-Year Post-development Stormwater Management (controlled by ICD2)

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	*Controlled Release Rate (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	76.81	47.21	17.86	17.44	0.00	17.44
15	61.77	37.97	18.48	17.44	0.00	17.44
20	52.03	31.98	17.46	17.44	0.00	17.44
25	45.17	27.76	15.49	17.44	0.00	17.44
30	40.04	24.61	12.92	17.44	0.00	17.44
35	36.06	22.17	9.93	17.44	0.00	17.44
40	32.86	20.20	6.63	17.44	0.00	17.44
45	30.24	18.59	3.11	17.44	0.00	17.44
50	28.04	17.24	0.00	17.44	0.00	17.44
55	26.17	16.09	0.00	17.44	0.00	17.44
60	24.56	15.10	0.00	17.44	0.00	17.44
65	23.15	14.23	0.00	17.44	0.00	17.44
70	21.91	13.47	0.00	17.44	0.00	17.44
75	20.81	12.79	0.00	17.44	0.00	17.44
80	19.83	12.19	0.00	17.44	0.00	17.44
85	18.94	11.64	0.00	17.44	0.00	17.44
90	18.14	11.15	0.00	17.44	0.00	17.44
95	17.41	10.70	0.00	17.44	0.00	17.44
100	16.75	10.29	0.00	17.44	0.00	17.44
105	16.13	9.92	0.00	17.44	0.00	17.44
110	15.57	9.57	0.00	17.44	0.00	17.44
115	15.05	9.25	0.00	17.44	0.00	17.44
120	14.56	8.95	0.00	17.44	0.00	17.44

*Note: 50% of allowed release rate for underground storage calculation for 2-yr storm

On-site stormwater detention

Storage required = 18.48 m^3
Underground storage provided = 19.90 m^3

Storage Calculations

Surface Storage(m^3)

CBMH08	29.8
CBMH09	29.01
CB10	34.63
Total	**93.44**

Underground Storage(m^3)

	A(m^2)	H(m)	V(m^3)	Remarks
CBMH08	1.13	1.56	1.76	1.2m dia MH
CBMH09	1.13	1.39	1.57	1.2m dia MH
CB10	0.36	1.16	0.42	0.6m*0.6m CB
Total			**3.75**	

Underground Pipe Storage(m3)

	450mm	375mm	300mm	**Total**
L(m)	101.6	0	0	
A(m^2)	0.16	0.11	0.07	
V(m^3)	**16.15**	**0.00**	**0.00**	**16.15**

Summary (2-Year)

Catchments	Realease (L/s)
Roof Controlled	
East	12.41
Middle	27.15
West	28.53
ICD1 Controlled	93.51
ICD2 Controlled	34.87
Uncontrolled	68.71
Total	**265.18**

LRL Associates Ltd.

Storm Design Sheet

LRL File No.	210956
Project:	Proposed Development
Location:	1195 Newmarket
Date:	2022-05-03
Designed:	M. Longtin
Checked:	M. Basnet
Drawing Reference:	C702, C401

Storm Design Parameters

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	0.80
Asphalt / rooftop	0.90

IDF Equation (5 year event, intensity in mm/hr)

(Ottawa Macdonald-Cartier International Airport)

$I_5 = 998.071 / (Td + 6.053)^{0.814}$

Min. velocity = 0.80 m/s

Manning's "n" = 0.013

LOCATION			AREA (ha)			FLOW						STORM SEWER							
WATERSHED / STREET	From MH	To MH	C = 0.20	C = 0.80	C = 0.90	Indiv. 2.78AC	Accum. 2.78AC	Time of Conc. (min.)	Rainfall Intensity (mm/hr)	Peak Flow Q (L/s)	Controlled Flow Q (L/s)	Pipe Diameter (mm)	Type	Slope (%)	Length (m)	Capacity Full (L/s)	Velocity Full (m/s)	Time of Flow (min.)	Ratio (Q/Q_{FULL})
WS-01	Roof Drain	Ex. Ditch	0.00	0.00	1.04	2.61	2.61	10.00	104.19	272.20	78.52	450	PVC	1.00%	31.30	285.1	1.79	0.29	0.95
WS-02	CB06	CBMH05	0.00	0.00	0.12	0.31	0.31	10.00	104.19	32.33		450	CONC	0.35%	35.8	168.7	1.06	0.56	0.19
WS-03	CBMH05	CBMH04	0.00	0.00	0.12	0.31	0.62	10.56	101.31	62.41		450	CONC	0.25%	32.9	142.6	0.90	0.61	0.44
WS-04	CBMH04	CBMH03	0.00	0.00	0.15	0.37	0.99	11.17	98.37	97.27		450	CONC	0.20%	38.6	127.5	0.80	0.80	0.76
WS-05	CBMH03	CBMH02	0.00	0.00	0.16	0.41	1.40	11.98	94.79	132.39		450	CONC	0.20%	39.9	127.5	0.80	0.83	1.04
WS-06	CBMH02	CBMH01	0.00	0.00	0.09	0.24	1.63	12.81	91.39	149.22	93.51	450	CONC	0.25%	45.6	142.6	0.90	0.85	1.05
WS-07	CB10	CBMH09	0.00	0.00	0.10	0.25	0.25	10.00	104.19	26.49		450	CONC	0.35%	56.3	168.7	1.06	0.88	0.16
WS-08	CBMH09	CBMH08	0.00	0.00	0.08	0.21	0.46	10.88	99.74	46.19		450	PVC	0.35%	45.3	168.7	1.06	0.71	0.27
WS-09	CBMH08	CBMH07	0.00	0.00	0.06	0.15	0.61	11.60	96.45	59.29	34.87	300	PVC	0.35%	51.3	57.2	0.81	1.06	1.04
WS-10	CBMH07	CBMH01	0.00	0.00	0.05	0.12	0.74	12.65	92.00	67.76	34.87	375	CONC	0.25%	68.8	87.7	0.79	1.44	0.77
WS-11	CBMH01	OGS	0.00	0.00	0.21	0.53	2.37	14.10	86.59	205.16	128.38	450	CONC	0.40%	5.0	180.3	1.13	0.07	0.71
	OGS	Ex. Ditch					2.37	14.17	86.33	204.55	128.38	450	CONC	0.45%	31.4	191.3	1.20	0.44	0.67

Note

The Peak flow will be controlled by the inlet control devices ICD1 and ICD2 to be installed at the outlet of STM CBMH02 and CBMH08, respectively.

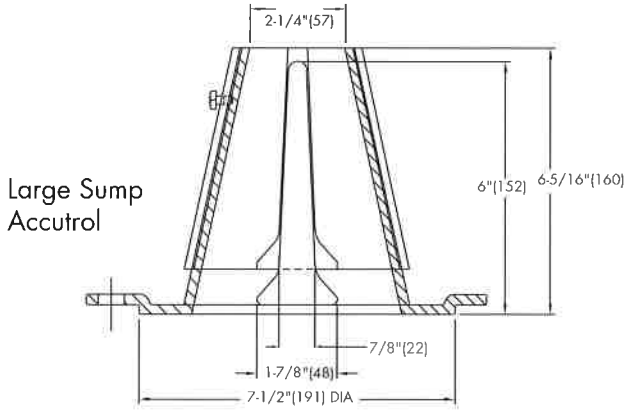
ADJUSTABLE ACCUTROL (for Large Sump Roof Drains only)

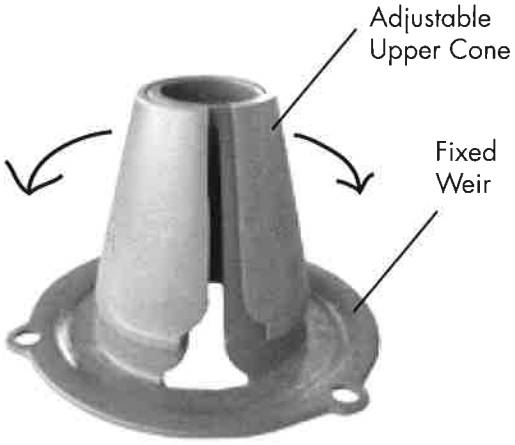
For more flexibility in controlling flow with heads deeper than 2", Watts Drainage offers the Adjustable Accutrol. The Adjustable Accutrol Weir is designed with a single parabolic opening that can be covered to restrict flow above 2" of head to less than 5 gpm per inch, up to 6" of head. To adjust the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

EXAMPLE:

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

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





1/2 Weir Opening Exposed Shown Above

TABLE 1. Adjustable Accutrol Flow Rate Settings

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

Job Name _____ **Model No.** _____

Job Location _____ Contractor _____

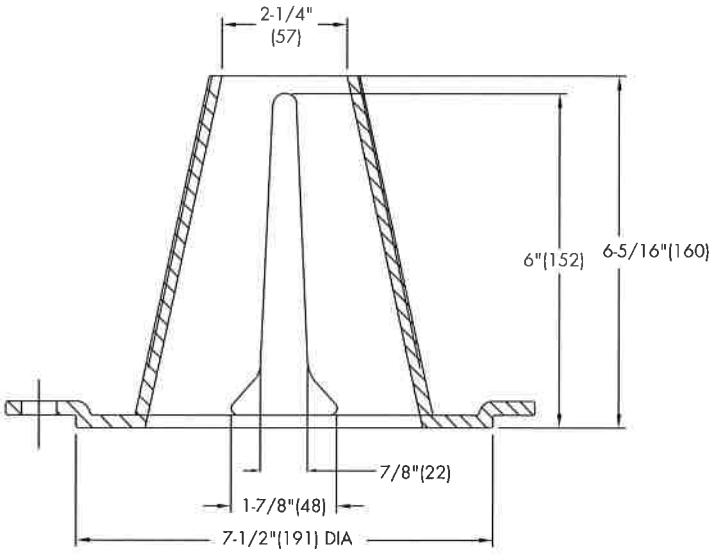
Engineer _____ Representative _____

CANADA: 5435 North Service Road, Burlington, ON, L7L 5H7 TEL: 905-332-6718 TOLL-FREE: 1-888-208-8927 Website: www.wattscanada.ca

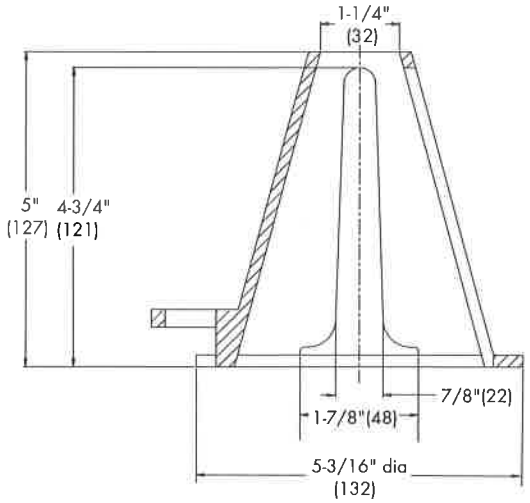
ACCUTROL WEIR FLOW CONTROL

SPECIFICATION: Watts Drainage Products epoxy coated cast iron Accutrol Weir is designed with parabolic openings which limit the flow of rain water off a roof. Each weir slot controls flow to 5 gpm per inch of head to a maximum of 30 gpm at 6" head(for large sump), 25 gpm at 5" head(for small sump) . The Accutrol Weir is secured to the flashing clamp of the roof drain. The Accutrol Weir is available with 1 to 4 slots for the large sump drain and up to 3 slots for the small sump drain.

For Large Sump Roof Drains Specify the "-A" option and number of slots required. (ie. "RD-100-A2" for two slot weir)
For Small Sump Roof Drains Specify the "-A" option and number of slots required. (ie. "RD-200-A1" for one slot weir)



LARGE SUMP ACCUTROL WEIR



SMALL SUMP ACCUTROL WEIR

Job Name _____ **Model No.** _____

Job Location _____ Contractor _____

Engineer _____ Representative _____

Stormceptor®

FORTERRA

Stormceptor® EF Sizing Report

STORMCEPTOR®
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

05/04/2022

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

Site Name:	1195 Newmarket St.

Drainage Area (ha):	2.205
Runoff Coefficient 'c':	0.90

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

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

Project Name:	1195 Newmarket St.
Project Number:	210956
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:	613-842-3434

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	59
EFO6	74
EFO8	83
EFO10	88
EFO12	92

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

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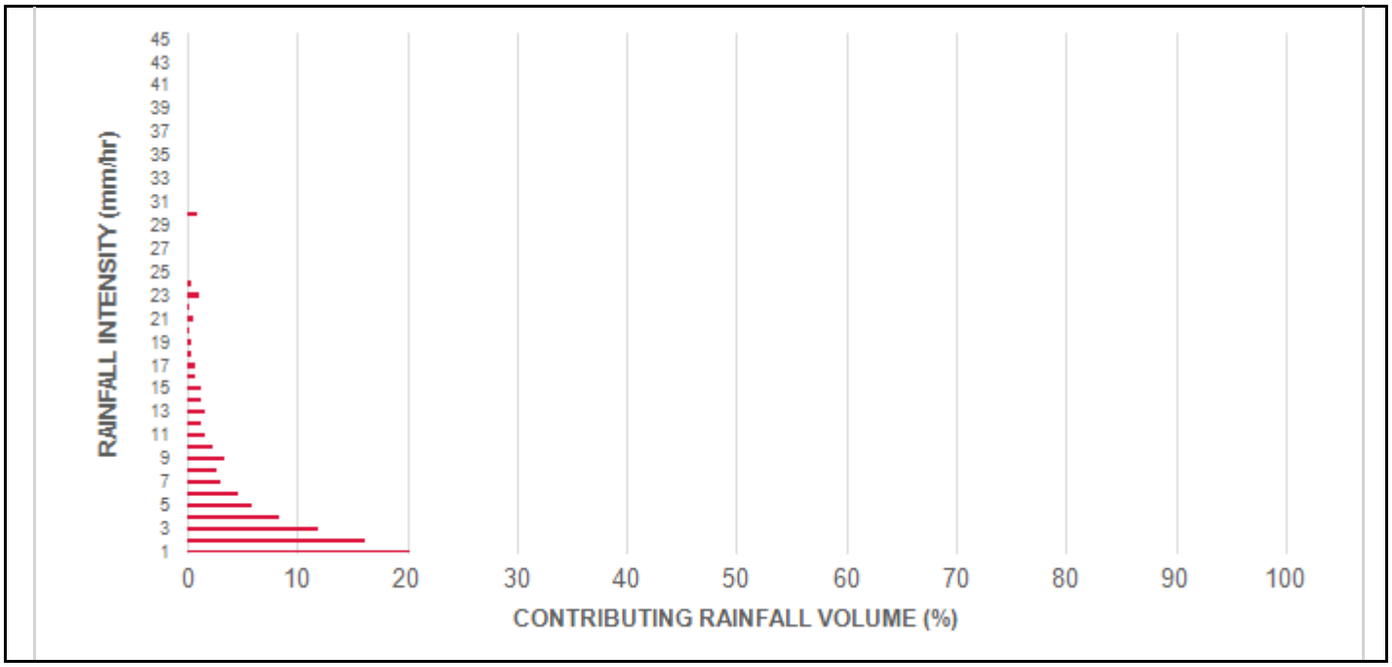
Stormceptor® EF Sizing Report

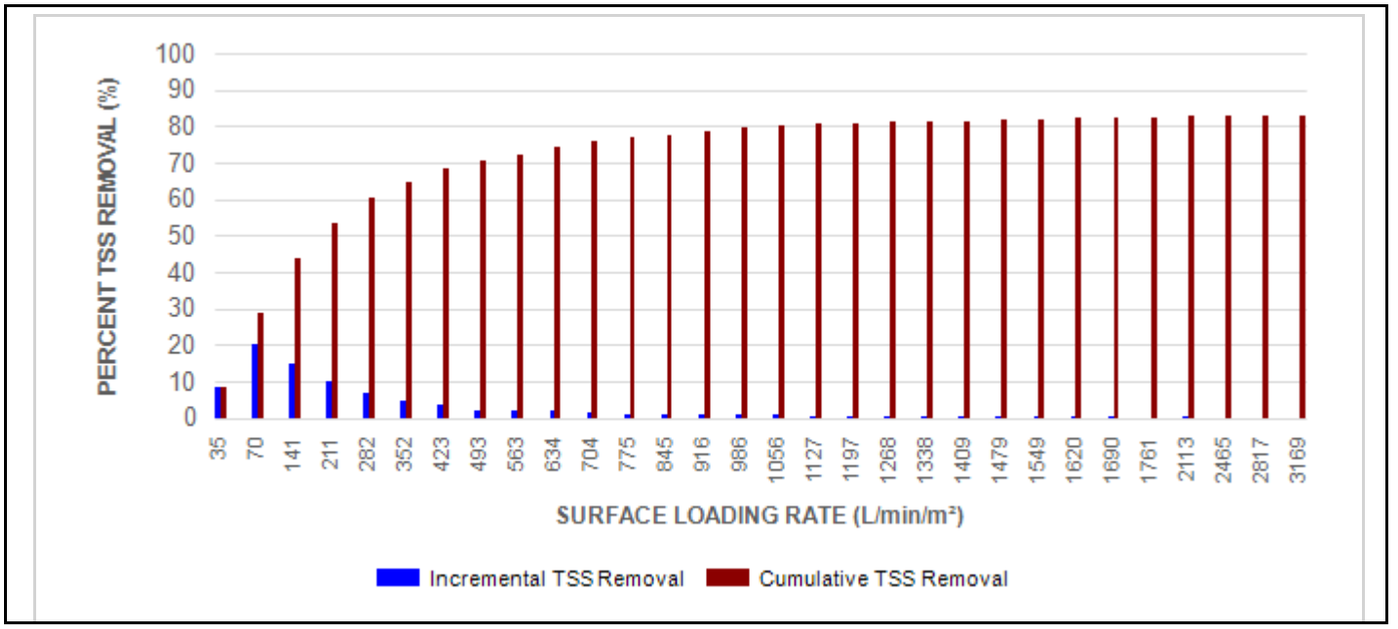
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.5	8.6	8.6	2.76	166.0	35.0	100	8.6	8.6
1	20.3	29.0	5.52	331.0	70.0	100	20.3	29.0
2	16.2	45.2	11.03	662.0	141.0	91	14.7	43.7
3	12.0	57.2	16.55	993.0	211.0	83	9.9	53.6
4	8.4	65.6	22.07	1324.0	282.0	79	6.7	60.3
5	5.9	71.6	27.58	1655.0	352.0	76	4.5	64.8
6	4.6	76.2	33.10	1986.0	423.0	73	3.4	68.2
7	3.1	79.3	38.62	2317.0	493.0	70	2.1	70.3
8	2.7	82.0	44.14	2648.0	563.0	66	1.8	72.2
9	3.3	85.3	49.65	2979.0	634.0	64	2.1	74.3
10	2.3	87.6	55.17	3310.0	704.0	64	1.5	75.8
11	1.6	89.2	60.69	3641.0	775.0	63	1.0	76.8
12	1.3	90.5	66.20	3972.0	845.0	63	0.8	77.6
13	1.7	92.2	71.72	4303.0	916.0	62	1.1	78.7
14	1.2	93.5	77.24	4634.0	986.0	62	0.8	79.4
15	1.2	94.6	82.75	4965.0	1056.0	60	0.7	80.1
16	0.7	95.3	88.27	5296.0	1127.0	59	0.4	80.5
17	0.7	96.1	93.79	5627.0	1197.0	57	0.4	80.9
18	0.4	96.5	99.30	5958.0	1268.0	56	0.2	81.2
19	0.4	96.9	104.82	6289.0	1338.0	54	0.2	81.4
20	0.2	97.1	110.34	6620.0	1409.0	52	0.1	81.5
21	0.5	97.5	115.86	6951.0	1479.0	49	0.2	81.7
22	0.2	97.8	121.37	7282.0	1549.0	47	0.1	81.8
23	1.0	98.8	126.89	7613.0	1620.0	45	0.5	82.3
24	0.3	99.1	132.41	7944.0	1690.0	43	0.1	82.4
25	0.0	99.1	137.92	8275.0	1761.0	42	0.0	82.4
30	0.9	100.0	165.51	9930.0	2113.0	35	0.3	82.7
35	0.0	100.0	193.09	11586.0	2465.0	30	0.0	82.7
40	0.0	100.0	220.68	13241.0	2817.0	26	0.0	82.7
45	0.0	100.0	248.26	14896.0	3169.0	24	0.0	82.7
Estimated Net Annual Sediment (TSS) Load Reduction =								**83 %**

Climate Station ID: 6105978 *Years of Rainfall Data*: 20

RAINFALL DATA FROM OTTAWA CDA RCS RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL
FOR THE RECOMMENDED STORMCEPTOR® MODEL



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Maximum Pipe Diameter / Peak Conveyance

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

SCOUR PREVENTION AND ONLINE CONFIGURATION

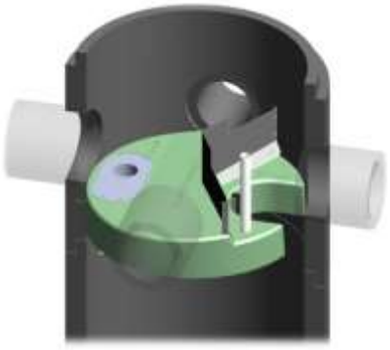
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test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

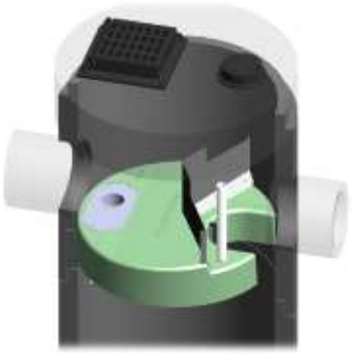
DESIGN FLEXIBILITY

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

OIL CAPTURE AND RETENTION

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





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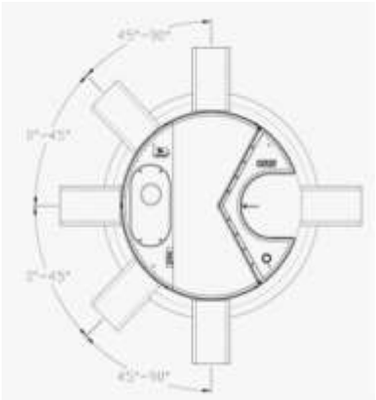

INLET-TO-OUTLET DROP

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

HEAD LOSS

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

Pollutant Capacity

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

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

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

STANDARD STORMCEPTOR EF/EFO DRAWINGS

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

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

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

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

PART 1 – GENERAL

1.1 WORK INCLUDED

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

1.2 REFERENCE STANDARDS & PROCEDURES

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

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

1.3 SUBMITTALS

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

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

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

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

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

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

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

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

3.2 SIZING METHODOLOGY

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

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m^2 to 1400 L/min/m^2, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m^2 and 1400 L/min/m^2 shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m^2 shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m^2. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m^2.

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

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

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in

accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

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

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

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

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m^2 to 2600 L/min/m^2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

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

PART 1 – GENERAL

1.1 WORK INCLUDED

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

1.2 REFERENCE STANDARDS & PROCEDURES

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

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

1.3 SUBMITTALS

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

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

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

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

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

2.1.1

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

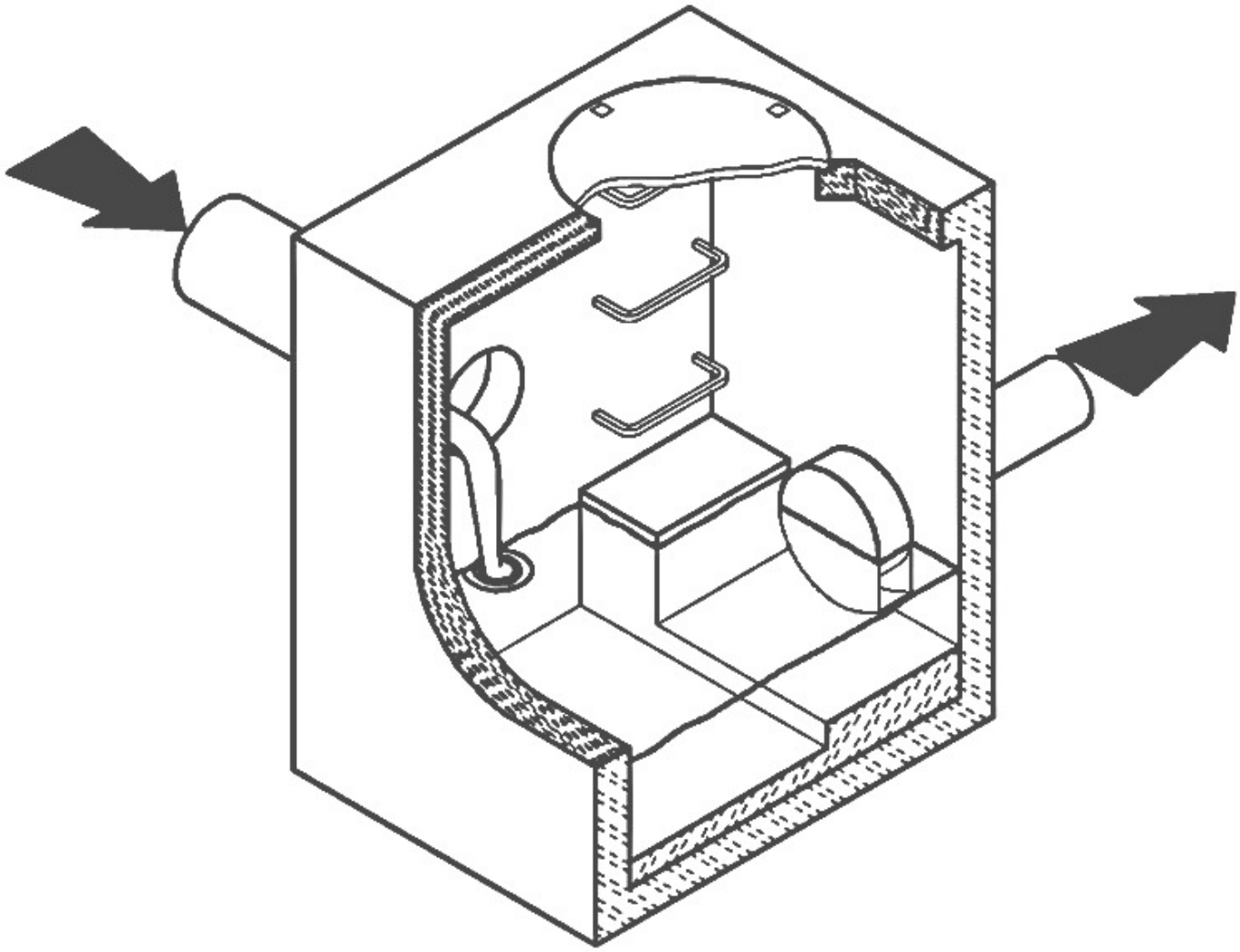
3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

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/m^2 to 2600 L/min/m^2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators**. However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

CSO/STORMWATER MANAGEMENT

HYDROVEX® VHV / SVHV
Vertical Vortex Flow Regulator



JOHN MEUNIER

APPLICATIONS

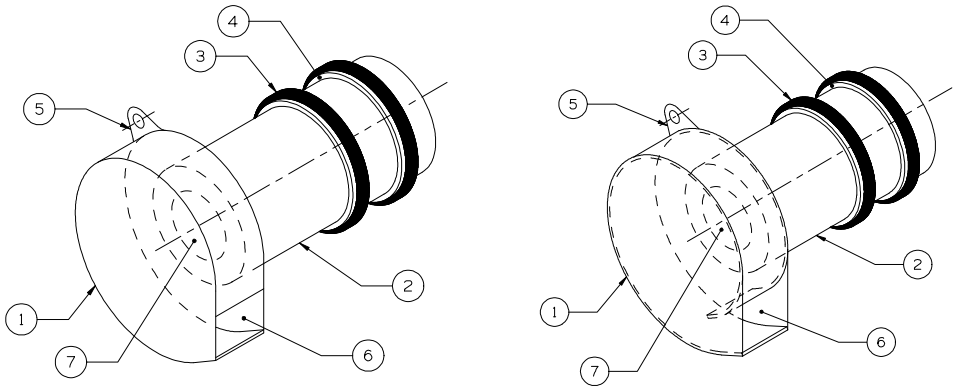
One of the major problems of urban wet weather flow management is the runoff generated after a heavy rainfall. During a storm, uncontrolled flows may overload the drainage system and cause flooding. Due to increased velocities, sewer pipe wear is increased dramatically and results in network deterioration. 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.

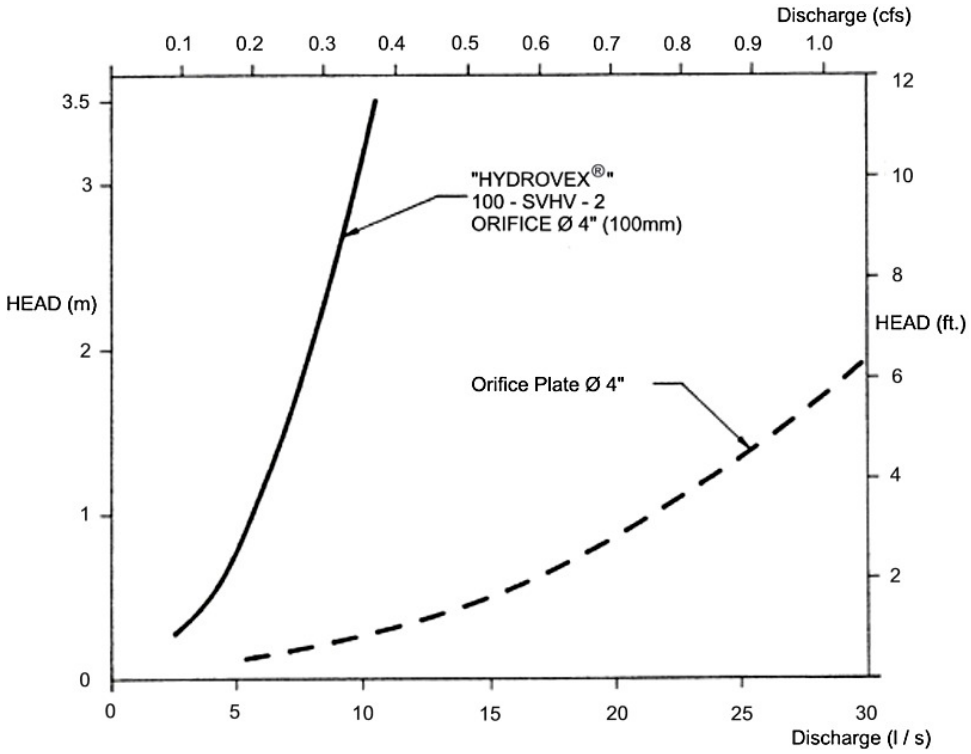


FIGURE 2: DISCHARGE CURVE SHOWING A HYDROVEX® FLOW REGULATOR VS AN ORIFICE PLATE

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:

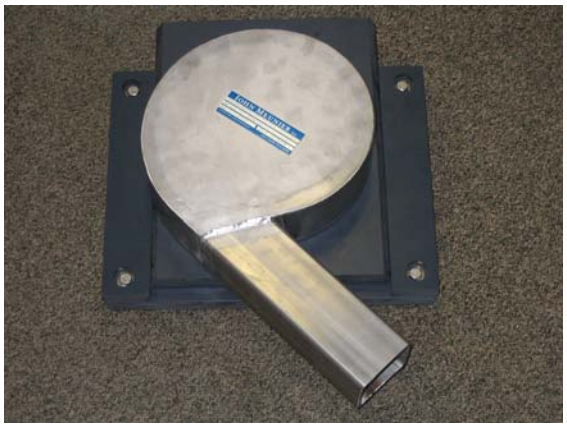
- ***project design flow rate***
- ***pressure head***
- ***chamber's outlet pipe diameter and type***

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

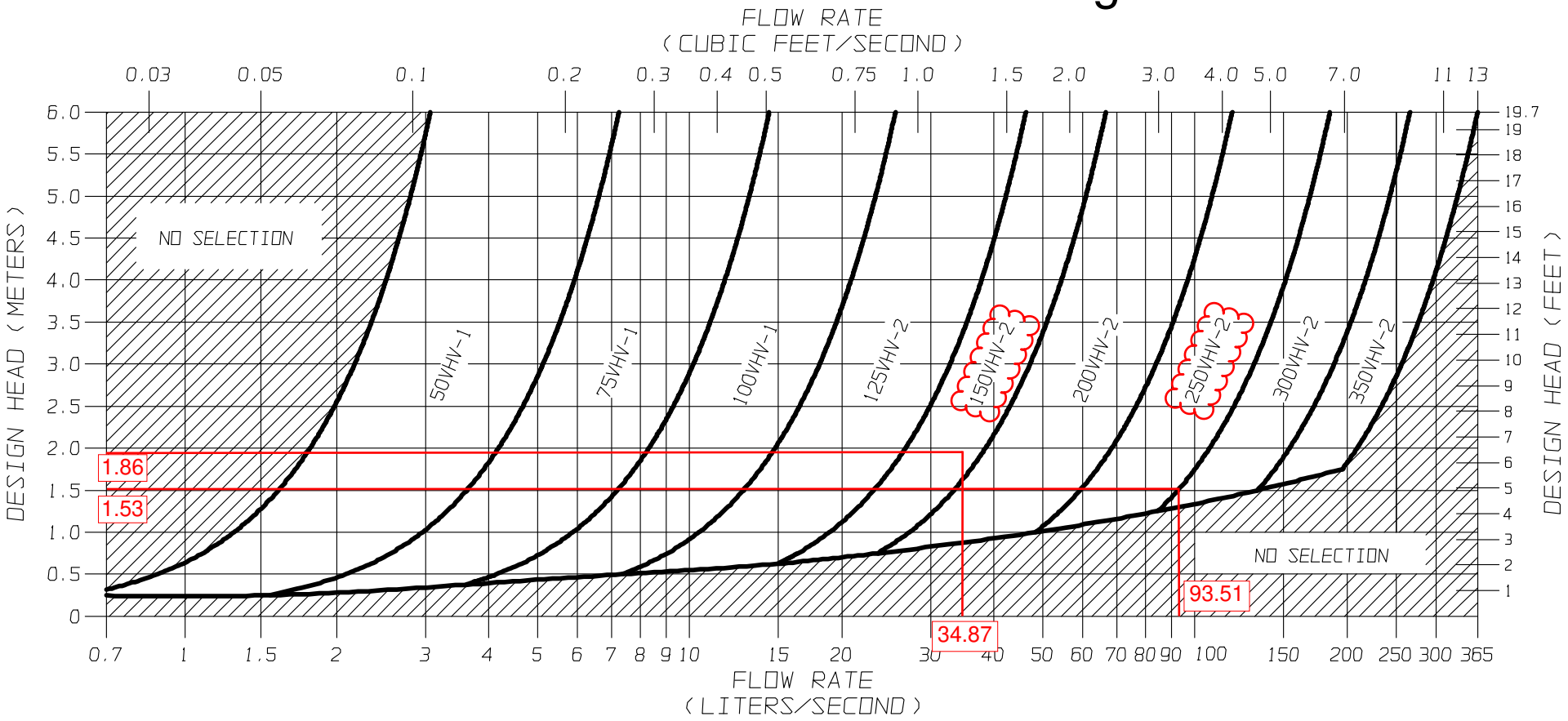
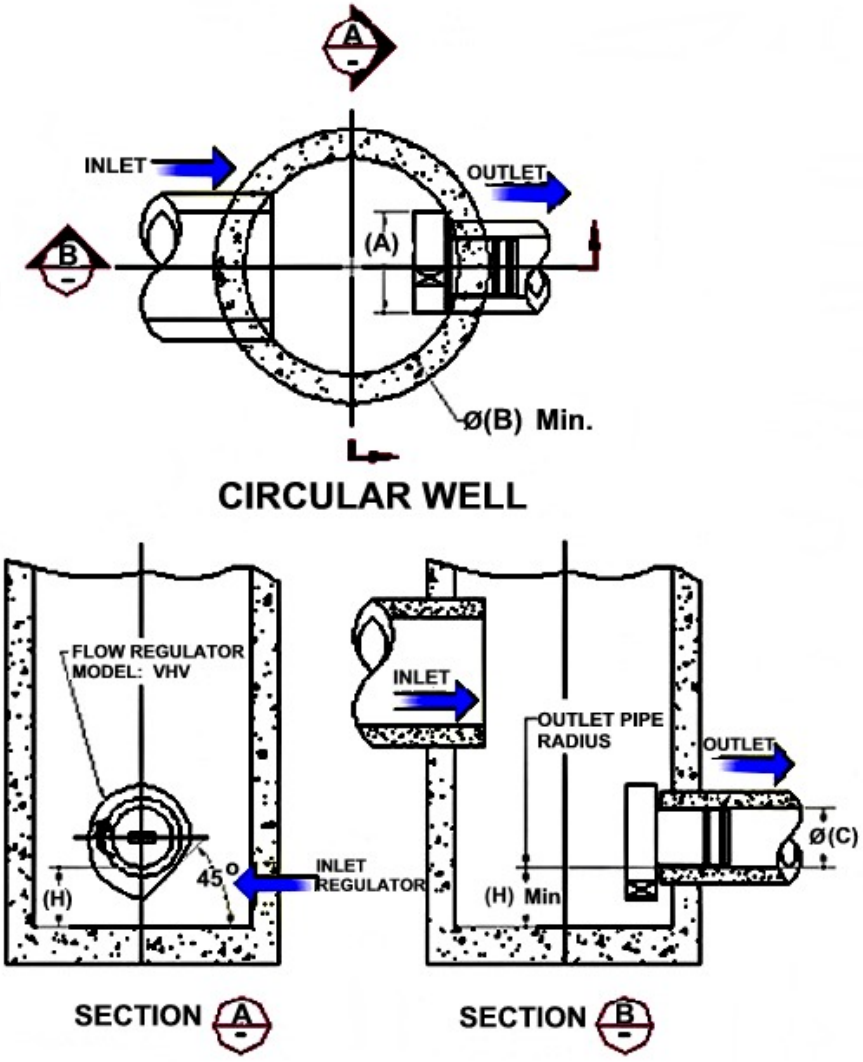


FIGURE 3 - VHV

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

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Revised: 2011-05-03

FLOW CONTROL ROOF DRAINAGE DECLARATION

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

Permit Application No.

Project Name:
New Warehouse

Building Location:
1195 Newmarket Street, Ottawa, Ontario

Municipality:
Ottawa

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

M1. ❑ Conventionally drained roof (no flow control roof drains used).

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

(a) the maximum drain down time does not exceed 24h,
(b) one or more scuppers are installed so that the maximum depth of water on the roof cannot exceed 150mm,
(c) drains are located not more than 15m from the edge of roof and not more than 30m from adjacent drains, and
(d) there is at least one drain for each 900 sq.m.

M3. ❑ A flow control drainage system that does not meet the minimum drainage criteria described in M2 has been incorporated in this design.

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name:
Sébastien Soucy, P.Eng

Firm:
LRL Associates Ltd.

Phone #:
613-842.3434

City: Ottawa
Province: Ontario

Mechanical Engineer's Seal

S1. ❑ The design parameters incorporated into the overall structural design are consistent with the information provided by the Mechanical Engineer in M2. Loads due to rain are not considered to act simultaneously with loads due to snow as per Sentence 4.1.7.3 (3) OBC.

S2. ❑ The structure has been designed incorporating the additional structural loading due to rain acting simultaneously with the snow load. The design parameters are consistent with the control flow drainage system designed by the mechanical engineer.

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name:
Stephane Leclerc

Firm:
LRL Associates Ltd.

Phone #:
613-842-3434

City: Ottawa
Province: Ontario

Structural Engineer's Seal

APPENDIX C

Water Supply Calculations

Water Service Calculations

LRL File No.: 210956
Project: Prop Warehouse, 1195 Newmarket St, Ottawa
Date: March 18th, 2022
Designed: M. Longtin
Checked: M. Basnet

Water Demand

Fixtures	Qty.	Fixture Units/Fixture (OBC Table 7.6.3.2.A)	Total
Sink	36	1.4	50.4
Water closets	27	3	81
Urinal	9	3	27
Hose bibb	10	2.5	25
		Total fixture units	**183.4**

Conversion of fixture units to equivalent gpm = 61 gpm (as per PS&D)

Average water demand = 332913.6 L / day
= **3.85** **L/s**

Maximum daily peak factor = 1.5
Maximum daily demand = 499370 L / day
= **5.78** **L / s**

Maximum hourly peak factor = 1.8
Maximum hourly demand = 898867 L / day
= **10.40** **L / s**

Fire Flow Calculations

LRL File No. 210956
Project: Proposed Warehouse Building
Location: 1195 Newmarket St, Ottawa
Date: March 18, 2022
Method: Fire Underwriter's Survey (FUS)
Prepared by: M. 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	Non-combustible constructio	**0.8**		
			Ordinary Construction	1.0				
			Non-combustible construction	0.8				
			Fire resistive construction <2 hrs	0.7				
			Fire resistive construction >2 hrs	0.6				
Floor Space Area (A)								
2	Total area					**12,635**	m^2	
3	Obtain fire flow before reductions	Required fire flow (rounded to nearest 1000)	Fire Flow = 220 x C x $A^{0.5}$				L/min	**20,000**
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	**20,000**
			Limited combustible	-15%				
			Combustible	0%				
			Free burning	15%				
			Rapid burning	25%				
5	Choose reduction for sprinklers	Sprinkler reduction	Full automatic sprinklers	-30%	True	**-30%**	L/min	**12,000**
			Water supply is standard for both the system and fire department hose lines	-10%	False	**0%**		
			Fully supervised system	-10%	True	**-10%**		
6	Choose separation	Exposure distance between units	North side	>45m	0%		L/min	**14,000**
			East side	30.1 to 45m	5%			
			South side	>45m	0%			
			West side	30.1 to 45m	5%	**10%**		
Net required fire flow								
7	Obtain fire flow, duration, and volume	Minimum required fire flow rate (rounded to nearest 1000)					L/min	**14,000**
		Minimum required fire flow rate					L/s	**233.3**
		Required duration of fire flow					hr	**3**

Mohan Basnet

From: Cassidy, Tyler <tyler.cassidy@ottawa.ca>
Sent: April 6, 2022 2:28 PM
To: Mohan Basnet
Cc: Maxime Longtin
Subject: RE: LRL 210956-Boundary Conditions at 1195 Newmarket St
Attachments: 1195 Newmarket Street March 2022.pdf

Hi Mohan,

Please find attached & below the boundary condition results based on your provided demands for 1195 Newmarket Place:

The following are boundary conditions, HGL, for hydraulic analysis at 1195 Newmarket Street (zone 1E) assumed to be a dual connection to the 203 mm watermain on Newmarket Street (see attached PDF for location).

Minimum HGL: 109.9 m

Maximum HGL: 118.0 m

Max Day + FF (233.3 L/s): 92.0 m

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

Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.

Thank you,

Tyler Cassidy, EIT
Infrastructure Project Manager,
Planning, Real Estate and Economic Development Department / Direction générale de la planification, des biens immobiliers et du développement économique - South Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 12977, Tyler.Cassidy@ottawa.ca

From: Mohan Basnet <mbasnet@lrl.ca>
Sent: March 28, 2022 1:39 PM
To: Cassidy, Tyler <tyler.cassidy@ottawa.ca>
Cc: Maxime Longtin <mlongtin@lrl.ca>
Subject: RE: LRL 210956-Boundary Conditions at 1195 Newmarket St

Thank you Tyler

Mohan Basnet, P.Eng.
Civil Engineering Services
LRL Engineering
5430 Canotek Road
Ottawa, Ontario K1J 9G2
T (613) 842-3434
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: Cassidy, Tyler <tyler.cassidy@ottawa.ca>
Sent: March 28, 2022 10:01 AM
To: Mohan Basnet <mbasnet@lrl.ca>
Subject: RE: LRL 210956-Boundary Conditions at 1195 Newmarket St

Hi Mohan,

I have sent your request for boundary conditions to our Water Resources group. Please allow for up to 10 business days for them to fulfill the request. I will forward the results once they become available.

Please note that I will be the Infrastructure Project Manager for this application.

Thank you,

Tyler Cassidy, EIT
Infrastructure Project Manager,
Planning, Real Estate and Economic Development Department / Direction générale de la planification, des biens immobiliers et du développement économique - South Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 12977, Tyler.Cassidy@ottawa.ca

From: Mohan Basnet <mbasnet@lrl.ca>
Sent: March 18, 2022 4:11 PM

To: Baker, Adam <adam.baker@ottawa.ca>
Subject: LRL 210956-Boundary Conditions at 1195 Newmarket St

,

We are working on serviceability study for the proposed warehouse building at 1195 Newmarket St, Ottawa and require boundary conditions at this site to proceed. Please use the following data to provide the required boundary conditions.

- Service location: please see schematic attached which also show fire hydrants nearby
- Type of development: proposed warehouse building
- Average daily demand: 3.85 L/s
- Maximum daily demand: 5.78 L/s
- Peak hourly demand: 10.40 L/s
- FUS fire flow demand: 233.3 L/s

For your reference, I have also included copies of domestic water demand calculations and FUS fire flow calculations along with this email.

Thank you and please let me know if you have any questions.

Mohan

Mohan Basnet, P.Eng.
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Many of us have now transitioned to working from home; however, communication and workability remains one of our top priorities.
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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.

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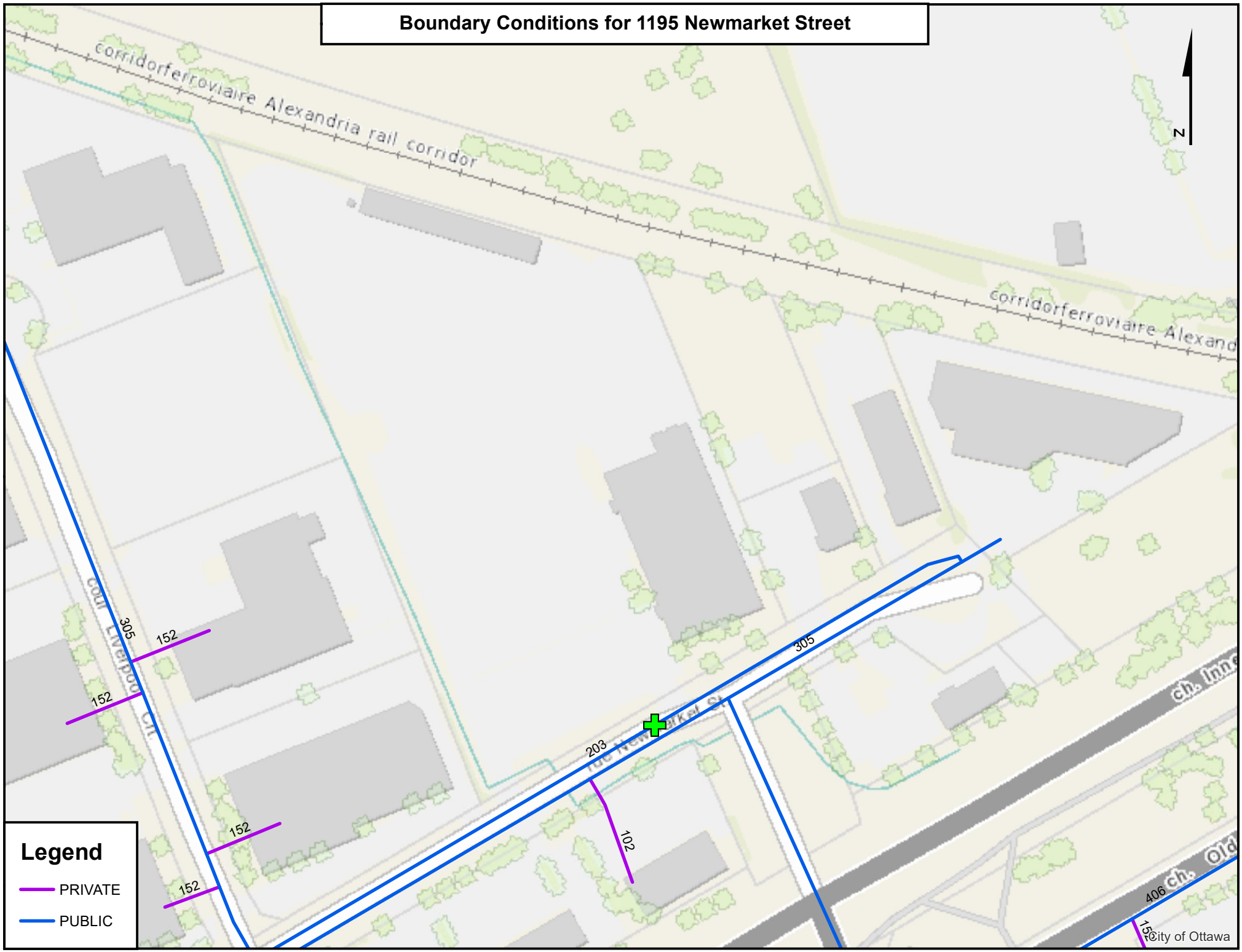
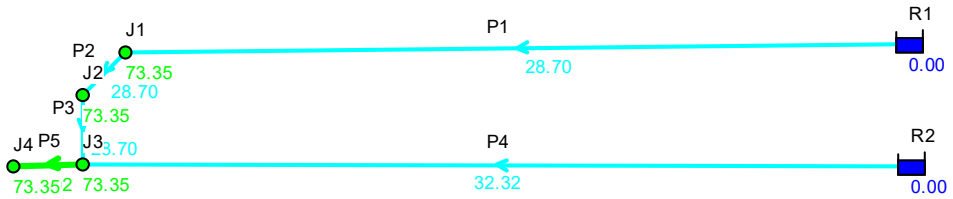
Boundary Conditions for 1195 Newmarket Street



Pressure
25.00
50.00
75.00
100.00
psi

Flow
25.00
50.00
75.00
100.00
GPM

Hydraulic Analysis-Avg Day Demand



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*********************************************************************
*                          E P A N E T                              *
*                  Hydraulic and Water Quality                      *
*                  Analysis for Pipe Networks                       *
*                        Version 2.2                                *
*********************************************************************
```

Input File: Scenario 1-Avg Day.net

Link - Node Table:

Link ID	Start Node	End Node	Length ft	Diameter in
P1	R1	J1	50.18	8
P2	J1	J2	8.2	8
P3	J2	J3	8.2	8
P4	R2	J3	53.46	8
P5	J3	J4	6.56	8

Node Results:

Node ID	Demand GPM	Head ft	Pressure psi	Quality	
J1	0.00	387.04	73.35	0.00	
J2	0.00	387.04	73.35	0.00	
J3	0.00	387.04	73.35	0.00	
J4	61.02	387.04	73.35	0.00	
R1	-28.70	387.04	0.00	0.00	Reservoir
R2	-32.32	387.04	0.00	0.00	Reservoir

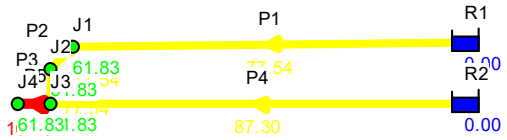
Link Results:

Link ID	Flow GPM	Velocity fps	Unit Headloss ft/Kft	Status
P1	28.70	0.18	0.02	Open
P2	28.70	0.18	0.02	Open
P3	28.70	0.18	0.02	Open
P4	32.32	0.21	0.02	Open
P5	61.02	0.39	0.08	Open

Pressure
25.00
50.00
75.00
100.00
psi

Flow
25.00
50.00
75.00
100.00
GPM

Hydraulic Analysis-Peak Hour Demand



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*********************************************************************
*                          E P A N E T                              *
*                  Hydraulic and Water Quality                      *
*                  Analysis for Pipe Networks                       *
*                        Version 2.2                                *
*********************************************************************
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Input File: Scenario 2-Peak Hour.net

Link - Node Table:

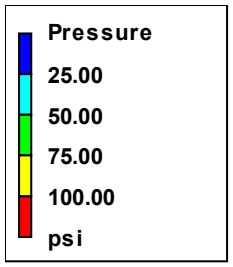
Link ID	Start Node	End Node	Length ft	Diameter in
P1	R1	J1	50.18	8
P2	J1	J2	8.2	8
P3	J2	J3	8.2	8
P4	R2	J3	53.46	8
P5	J3	J4	6.56	8

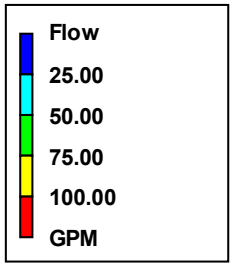
Node Results:

Node ID	Demand GPM	Head ft	Pressure psi	Quality	
J1	0.00	360.46	61.83	0.00	
J2	0.00	360.46	61.83	0.00	
J3	0.00	360.46	61.83	0.00	
J4	164.84	360.46	61.83	0.00	
R1	-77.54	360.47	0.00	0.00	Reservoir
R2	-87.30	360.47	0.00	0.00	Reservoir

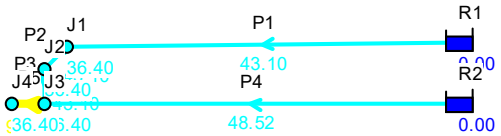
Link Results:

Link ID	Flow GPM	Velocity fps	Unit Headloss ft/Kft	Status
P1	77.54	0.49	0.12	Open
P2	77.54	0.49	0.12	Open
P3	77.54	0.49	0.12	Open
P4	87.30	0.56	0.15	Open
P5	164.84	1.05	0.50	Open





Hydraulic Analysis-Max Day+Fire Flow



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*********************************************************************
*                          E P A N E T                              *
*                  Hydraulic and Water Quality                      *
*                  Analysis for Pipe Networks                       *
*                        Version 2.2                                *
*********************************************************************
```

Input File: Scenario 3-Max Day+Fire.net

Link - Node Table:

Link ID	Start Node	End Node	Length ft	Diameter in
P1	R1	J1	50.18	8
P2	J1	J2	8.2	8
P3	J2	J3	8.2	8
P4	R2	J3	53.46	8
P5	J3	J4	6.56	8

Node Results:

Node ID	Demand GPM	Head ft	Pressure psi	Quality	
J1	0.00	301.76	36.40	0.00	
J2	0.00	301.76	36.40	0.00	
J3	0.00	301.76	36.40	0.00	
J4	91.62	301.76	36.40	0.00	
R1	-43.10	301.76	0.00	0.00	Reservoir
R2	-48.52	301.76	0.00	0.00	Reservoir

Link Results:

Link ID	Flow GPM	Velocity fps	Unit Headloss ft/Kft	Status
P1	43.10	0.28	0.04	Open
P2	43.10	0.28	0.04	Open
P3	43.10	0.28	0.04	Open
P4	48.52	0.31	0.05	Open
P5	91.62	0.58	0.17	Open

APPENDIX D

Sanitary Calculations

LRL File No.: 210956
Project: Proposed Warehouse Building
Location: 1195 Newmarket St, Ottawa, ON
Date: 2022-03-14
Designed: M. Basnet

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
Extraneous Flow = 0.33 L/s/gross ha
(as Per Tech Bulletin 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)
	SAN MH01	EX. SAN MH									2.602	2.602	5.50			5.80	2.60	2.60	0.86	6.66	8.2	200	2.00%	PVC	46.38	1.48

APPENDIX E

Civil Engineering Drawings

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.

LEGEND:

	EXISTING PROPERTY LINE TO REMAIN
	PROPOSED CURB
DC	PROPOSED DEPRESSED CURB
	PROPOSED TERRACING (3:1 MIN.)
	PROPOSED SILT FENCE AS PER OPSD 219.110
	PROPOSED FENCE
	PROPOSED DOOR ENTRANCE/EXIT
	PROPOSED GRASS AREA (100mm TOP SOIL & SOD)
	PROPOSED CONCRETE FEATURES/SLAB
	PROPOSED HEAVY DUTY ASPHALT
	PROPOSED LIGHT DUTY ASPHALT
	PROPOSED RIP RAP
×50.00	PROPOSED ELEVATION
×50.00HP	PROPOSED HIGH POINT ELEVATION
×50.00S	PROPOSED SWALE ELEVATION
×50.00BC	PROPOSED BOTTOM OF CURB / ASPHALT ELEVATION
×50.00TC	PROPOSED TOP OF CURB ELEVATION
×50.00BW	PROPOSED EXPOSED BOTTOM OF RETAINING WALL
×50.00TW	PROPOSED TOP OF RETAINING WALL
×50.00EX	MATCH INTO EXISTING ELEVATION
×70.19	EXISTING ELEVATION
	PROPOSED OVERLAND MAJOR FLOW ROUTE
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
GAS — GAS	EXISTING GAS LINE
	EXISTING MANHOLE
	EXISTING CATCHBASIN
	PROPOSED CATCHBASIN-MANHOLE/CATCHBASIN
	PROPOSED CATCHBASIN-MANHOLE
	PROPOSED CURB STOP
	PROPOSED 5 YEAR HIGH WATER LEVEL
	PROPOSED 100 YEAR HIGH WATER LEVEL
	STORM WATERSHED EXTENT

WS-XX CONTROLLED / AREA / RUNOFF: WATERSHED NAME; RUNOFF COEFFICIENT; AREA IN HECTARES

PAVEMENT STRUCTURE

COURSE	MATERIAL	THICKNESS (mm) AUTOMOBILE PARKING	THICKNESS (mm) TRUCK ROUTE (HEAVY TRAFFIC)
SURFACE	SP12.5 FC1 C	40	40
BINDER	SP19.0 D	70	120
BASECOURSE	OPSS GRANULAR "A"	150	150
SUBBASE	OPSS GRANULAR "B" TYPE II	150	200

NOTE:
IN PREPARATION FOR PAVEMENT CONSTRUCTION AT THIS SITE, ANY SURFICIAL OR NEAR SURFACE/SUBGRADE LEVEL TOPSOIL AND ANY SOFT, WET OR DELETERIOUS MATERIALS SHOULD BE REMOVED FROM THE PROPOSED PAVED AREAS. THE EXPOSED SUBGRADE SHOULD BE INSPECTED AND APPROVED BY GEOTECHNICAL PERSONNEL AND ANY SOFT AREAS EVIDENT SHOULD BE SUBEXCAVATED AND REPLACED WITH SUITABLE EARTH BORROW APPROVED BY THE GEOTECHNICAL ENGINEER. THE SUBGRADE SHOULD BE SHAPED AND CROWNED TO PROMOTE DRAINAGE OF THE SITE DRAINAGE STRUCTURES. FOLLOWING APPROVAL OF THE PREPARATION OF THE SUBGRADE, THE PAVEMENT GRANULARS MAY BE PLACED.

PAVEMENT STRUCTURE IS AS PER MOST RENT GEOTECHNICAL INVESTIGATION PREPARED BY ORTAM GROUP INC. REFER TO THIS REPORT FOR ADDITIONAL DETAILS.

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

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No.	REVISIONS	BY	DATE
01	ISSUED FOR APPROVAL	M.L.	05 MAY 2022

LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2022/05/05
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
1199 NEWMARKET HOLDINGS INC.

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

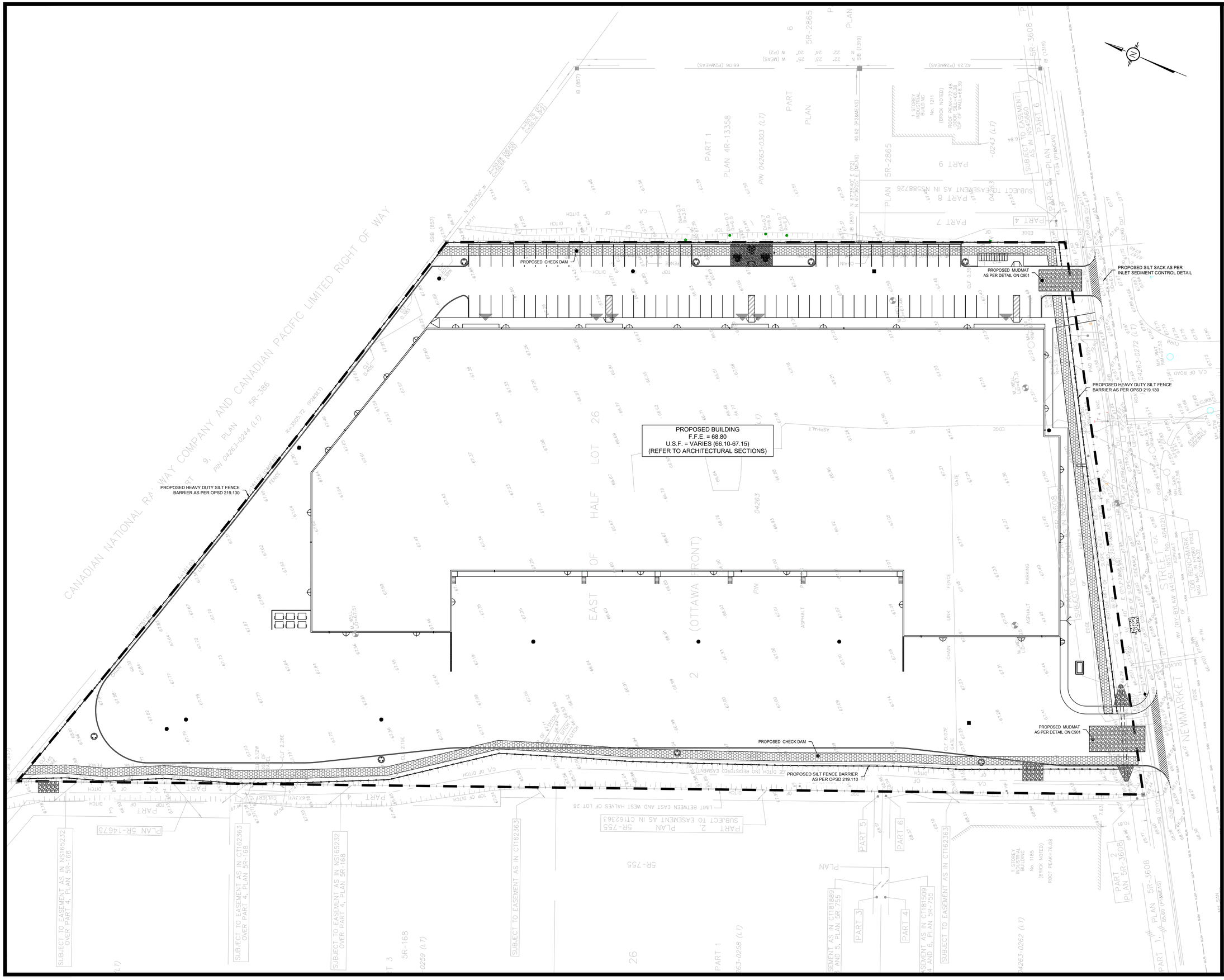
PROJECT
1195 NEWMARKET STREET
OTTAWA, ON

DRAWING TITLE
GENERAL NOTES

PROJECT NO.
210956

DATE
MARCH 2022

C001



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No.	REVISIONS	BY	DATE
01	ISSUED FOR APPROVAL	M.L.	05 MAY 2022

LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2022/05/05
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

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

CLIENT
1199 NEWMARKET HOLDINGS INC.

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

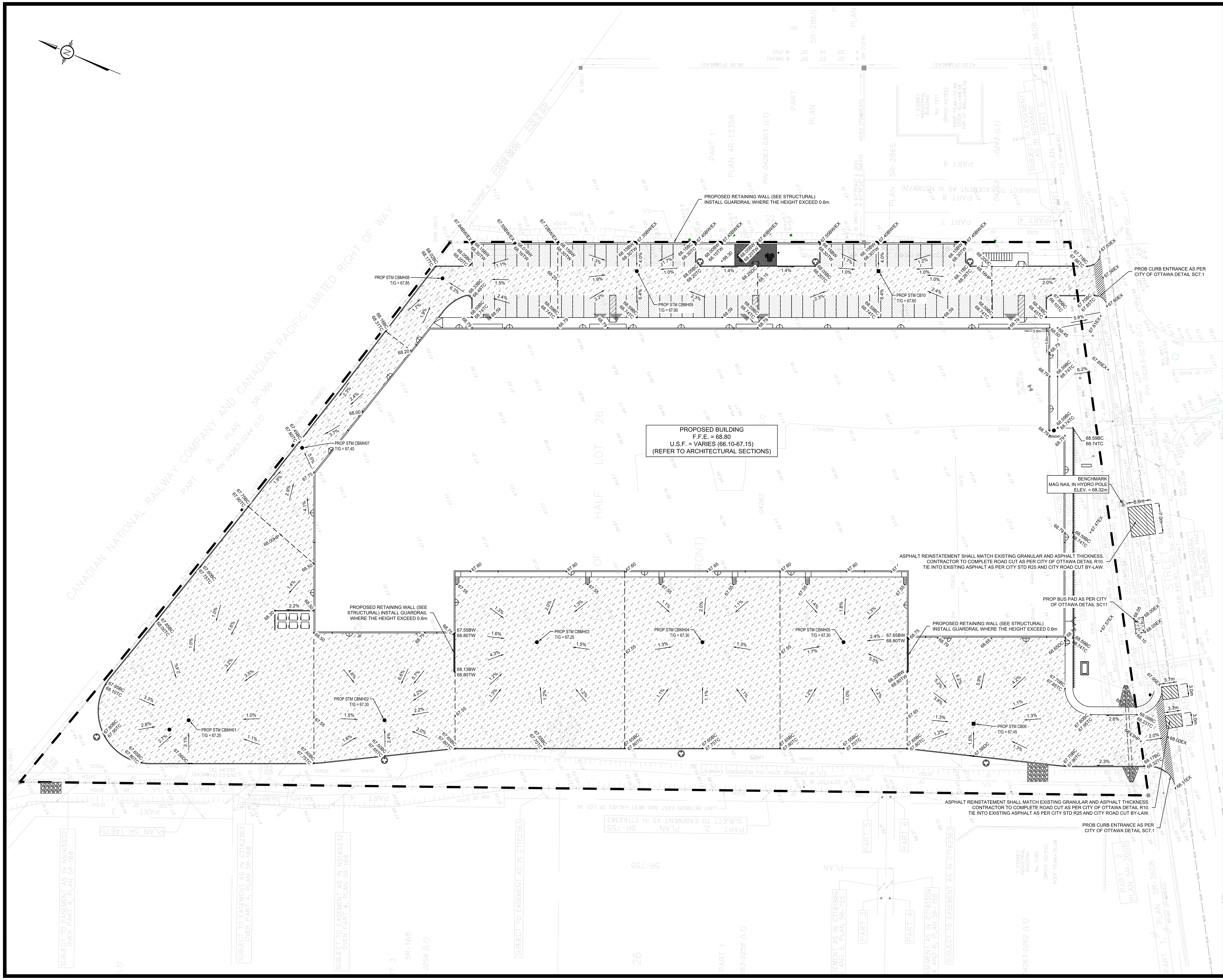
PROJECT
1195 NEWMARKET STREET
OTTAWA, ON

DRAWING TITLE
EROSION AND SEDIMENT CONTROL PLAN

PROJECT NO.
210956

DATE
MARCH 2022

C101



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5m 0 10 20m

SCALE: 1:400

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01	ISSUED FOR APPROVAL	M.L.	05 MAY 2022

LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2022/05/05
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

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

CLIENT
1199 NEWMARKET HOLDINGS INC.

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

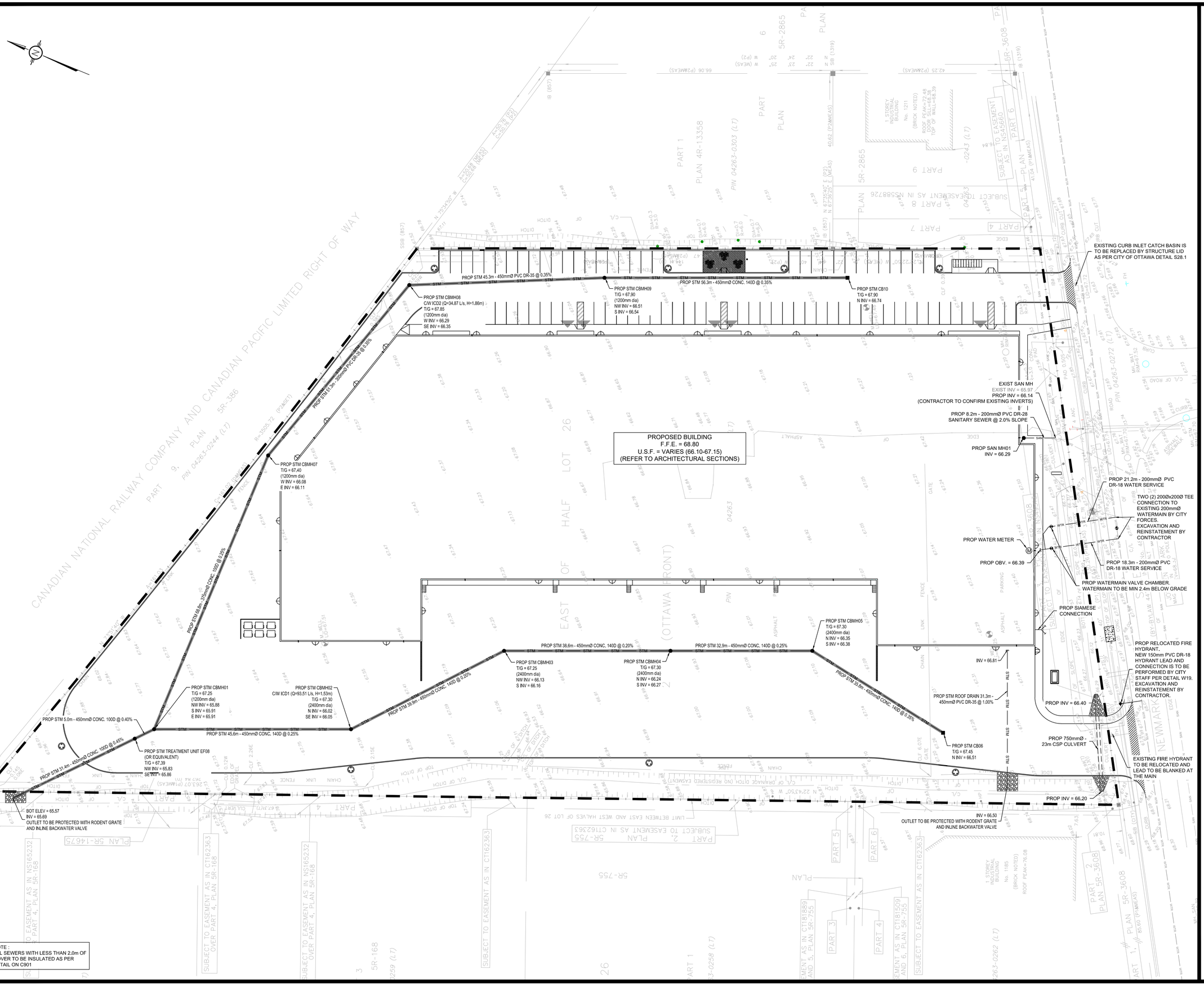
PROJECT
1195 NEWMARKET STREET
OTTAWA, ON

DRAWING TITLE
GRADING AND DRAINAGE PLAN

PROJECT NO.
210956

DATE
MARCH 2022

C301



NOTE :
ALL SEWERS WITH LESS THAN 2.0m OF COVER TO BE INSULATED AS PER DETAIL ON C901

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M.L.	M.L.	M.B.

PROJECT
1195 NEWMARKET STREET
OTTAWA, ON

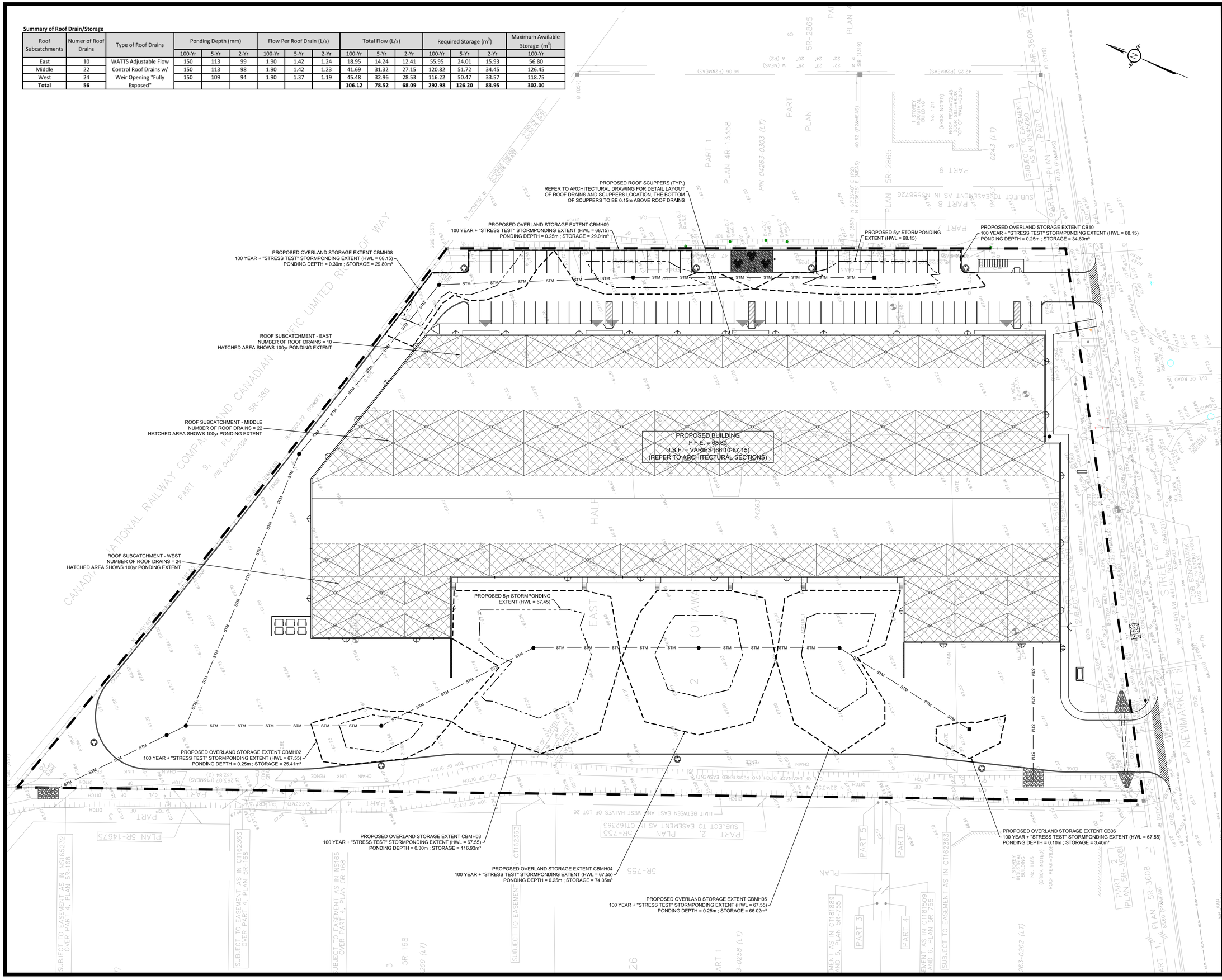
DRAWING TITLE
SERVICING PLAN

PROJECT NO.
210956
DATE
MARCH 2022

C401

Summary of Roof Drain/Storage

Roof Subcatchments	Numer of Roof Drains	Type of Roof Drains	Ponding Depth (mm)			Flow Per Roof Drain (L/s)			Total Flow (L/s)			Required Storage (m^3)			Maximum Available Storage (m^3)
			100-Yr	5-Yr	2-Yr	100-Yr	5-Yr	2-Yr	100-Yr	5-Yr	2-Yr	100-Yr	5-Yr	2-Yr	100-Yr
East	10	WATTS Adjustable Flow Control Roof Drains w/ Weir Opening "Fully Exposed"	150	113	99	1.90	1.42	1.24	18.95	14.24	12.41	55.95	24.01	15.93	56.80
Middle	22		150	113	98	1.90	1.42	1.23	41.69	31.32	27.15	120.82	51.72	34.45	126.45
West	24		150	109	94	1.90	1.37	1.19	45.48	32.96	28.53	116.22	50.47	33.57	118.75
Total	**56**								**106.12**	**78.52**	**68.09**	**292.98**	**126.20**	**83.95**	**302.00**



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No.	REVISIONS	BY	DATE
01	ISSUED FOR APPROVAL	M.L.	05 MAY 2022

LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2022/05/05
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

LRJ
ENGINEERING | INGÉNIERIE
5430 Canotek Road I Ottawa, ON, K1J 9G2
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CLIENT
1199 NEWMARKET HOLDINGS INC.

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

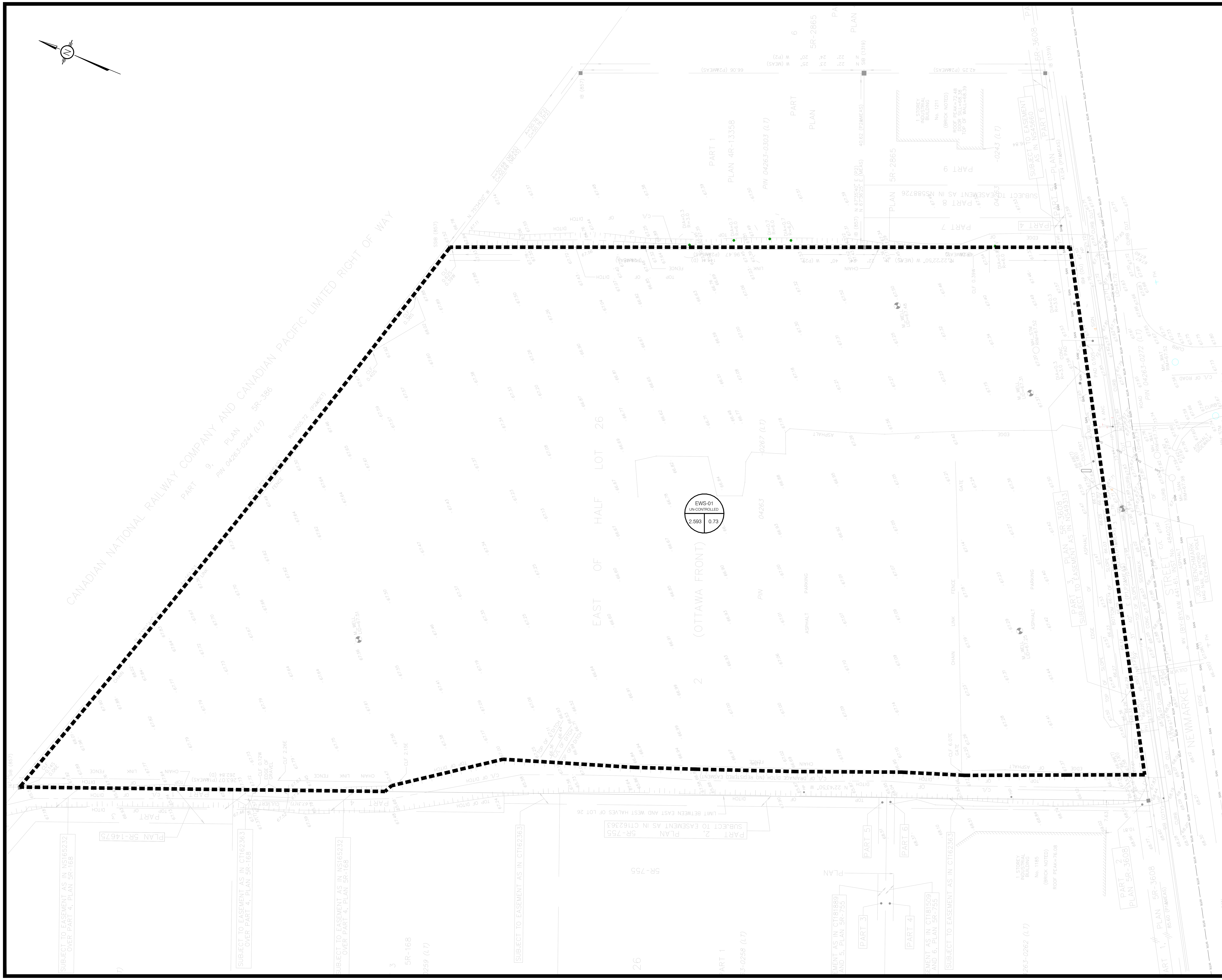
PROJECT
1195 NEWMARKET STREET
OTTAWA, ON

DRAWING TITLE
STORMWATER MANAGEMENT PLAN

PROJECT NO.
210956

DATE
MARCH 2022

C601



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SCALE: 1:400

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01	ISSUED FOR APPROVAL	M.L.	05 MAY 2022

LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2022/05/05
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

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CLIENT
1199 NEWMARKET HOLDINGS INC.

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

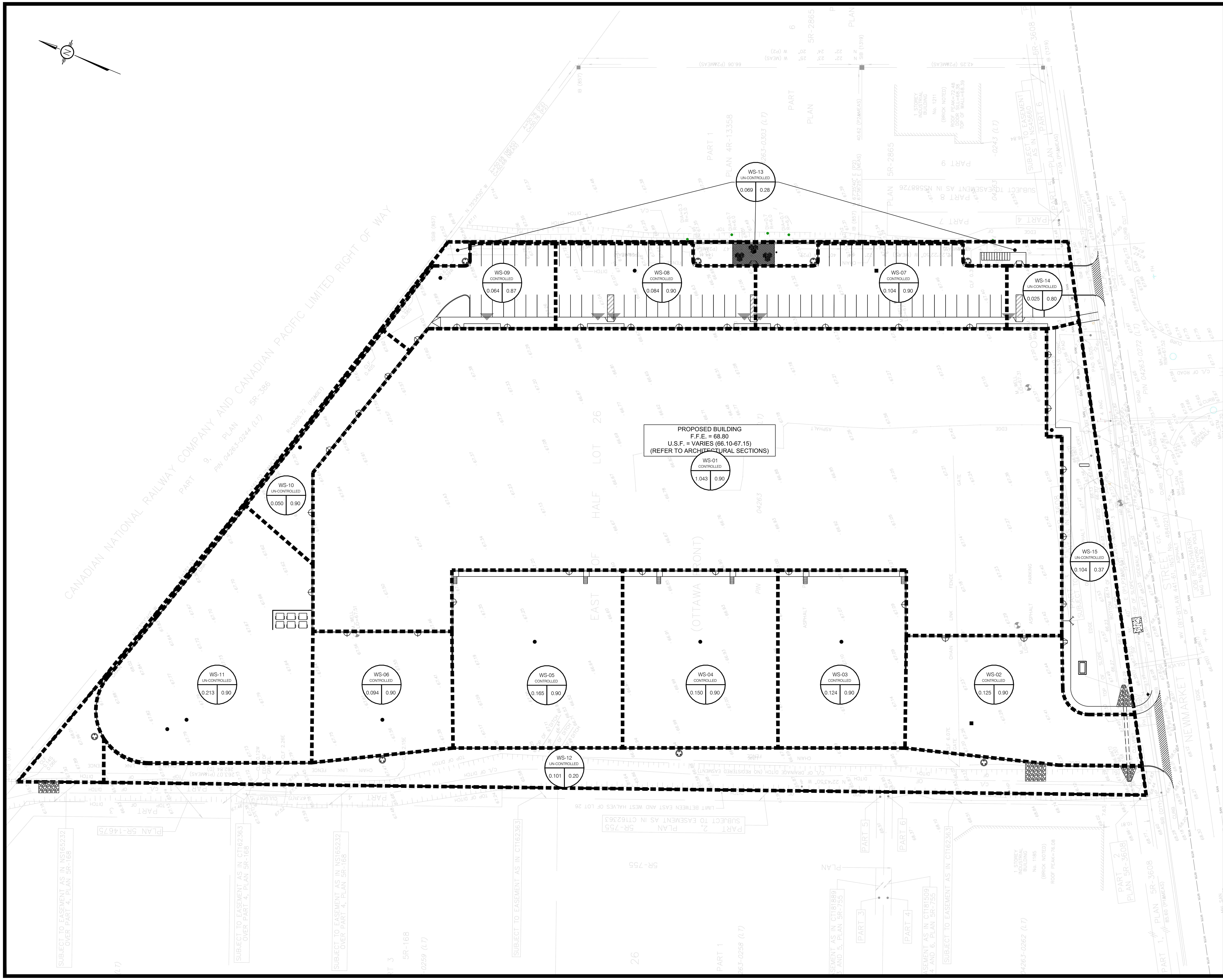
PROJECT
1195 NEWMARKET STREET
OTTAWA, ON

DRAWING TITLE
PRE-DEVELOPMENT WATERSHED PLAN

PROJECT NO.
210956

DATE
MARCH 2022

C701



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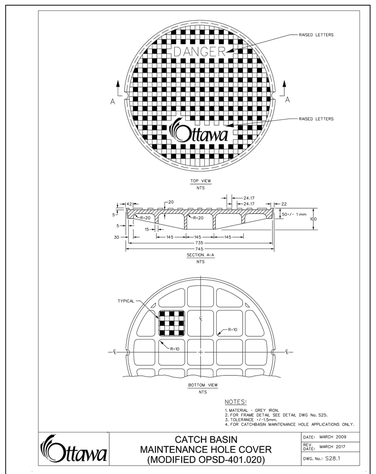
OTTAWA, ON

DRAWING TITLE
POST-DEVELOPMENT
WATERSHED PLAN

PROJECT NO.
210956

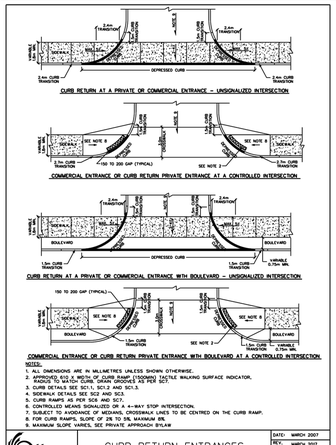
DATE
MARCH 2022

C702



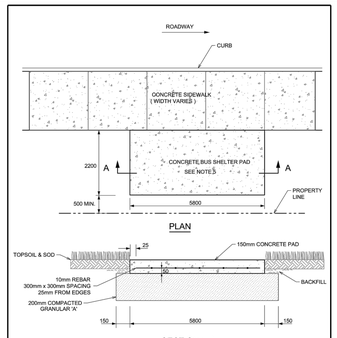
NOTES:
1. MATERIAL - GREY IRON.
2. FRAME DETAIL SEE DETAIL DWG No. S25.
3. FOR CATCHBASIN MAINTENANCE HOLE APPLICATIONS ONLY.
4. FOR CATCHBASIN MAINTENANCE HOLE APPLICATIONS ONLY.

CATCH BASIN MAINTENANCE HOLE COVER (MODIFIED OPSD-401.020)	DATE: MARCH 2009 REV. DATE: MARCH 2017 DWG No.: S28.1



NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
2. SURFACES ACH A WIDTH OF CURB RAMP STANDARD CASTLE WALKING SURFACE INDICATOR, ADJACENT TO MATCH CURB, GRAIN GROOVES AS PER SC7.
3. CURB DETAILS SEE SC1.1, SC1.2 AND SC1.3.
4. SIDEWALK DETAILS SEE SC2 AND SC3.
5. CURB RAMPS AS PER SC8 AND SC7.
6. CONTROLLED MEANS SIGNALIZED OR 1 4-WAY STOP INTERSECTION.
7. SUBJECT TO AVOIDANCE OF UTILITIES, CROSSWALKS TO BE CENTRED ON THE CURB RAMP.
8. FOR CURB RAMP SLOPE, SEE SC7.1, MAXIMUM SLOPE VARIES, SEE PRIVATE APPROACH BYLAW

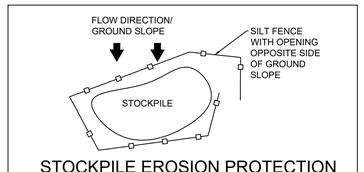
CURB RETURN ENTRANCES	DATE: MARCH 2007 REV. DATE: MARCH 2017 DWG No.: SC7.1



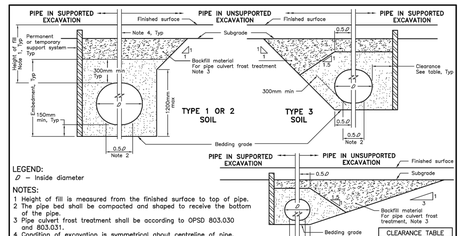
NOTES:
1. CONCRETE PADS TO BE IN ACCORDANCE WITH OPSS AND CITY OF OTTAWA STANDARDS.
2. PADS TO BE SLOPED 2% MAX. TOWARDS THE ROAD UNLESS OTHERWISE DIRECTED BY THE CONTRACT ADMINISTRATOR.
3. THE SURFACE ELEVATION OF THE PAD MUST BE FLUSH TO THE SURFACE ELEVATION OF ADJACENT GRADE (SIDEWALK OR BOULEVARD).
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.
5. FINISH TO MATCH SIDEWALK.

N.T.S.

CONCRETE SHELTER PAD ADJACENT TO SIDEWALK	DATE: MARCH 2018 REV. DATE: DWG. No.: SC11



STOCKPILE EROSION PROTECTION
N.T.S.

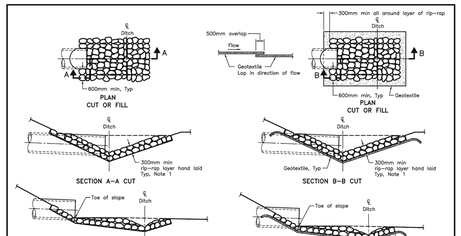


LEGEND:
D – Inside diameter

NOTES:
1 Height of fill is measured from the finished surface to top of pipe.
2 The bedding 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 millimetres unless otherwise shown.

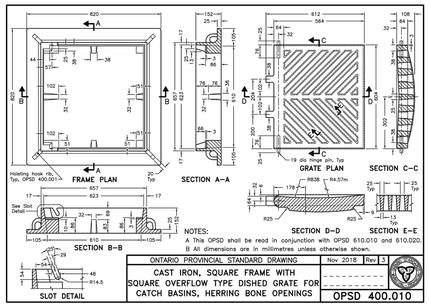
CLEARANCE TABLE	
Pipe Inside Diameter mm:	Clearance mm
900 or less	300
Over 900	500

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



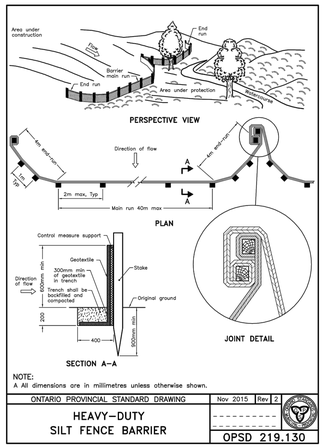
NOTES:
1 The thickness of the rip–rap layer shall be at least 1.5 times the rip–rap mean diameter.
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev 3
GENERAL RIP–RAP LAYOUT FOR SEWER AND CULVERT OUTLETS		
OPSD 810.010		



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		



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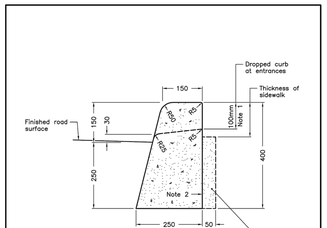
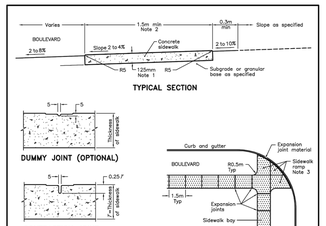
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev 2
HEAVY–DUTY SILT FENCE BARRIER		
OPSD 219.130		



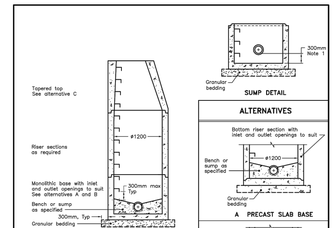
NOTES:
1 When sidewalk is continuously adjacent, the dropped curb at entrances shall be reduced to 75mm.
2 For slipforming procedure a 5% batter is acceptable.
A Treatment at entrances shall be according to OPSD 351.010.
B Outlet treatment shall be according to the OPSD 610 Series.
C The transition from 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.
A All dimensions are in millimetres unless otherwise shown.

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



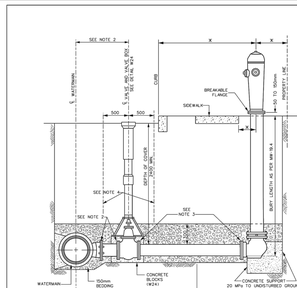
NOTES:
1 Sidewalk thickness at residential driveways and adjacent to curb shall be 150mm. At commercial and industrial driveways, the thickness shall be 200mm.
2 Sidewalk width shall be wider when specified.
3 This OPSD shall be read in conjunction with OPSD 310.030, 310.031, 310.032, 310.033 and 310.039.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

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



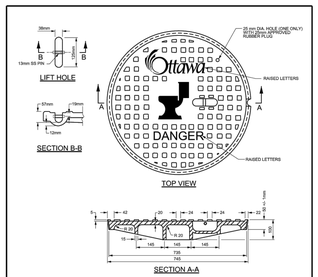
NOTES:
1 The sump is measured from the lowest invert.
A Granular backfill shall be placed to a minimum thickness of 300mm all around the maintenance hole.
B Precast concrete components shall be according to OPSD 701.030, 701.031, or 701.032.
C Structure exceeding 5.0m in depth shall include safety platform 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		



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-4414.
5. SEE SPP-2120 FOR BACKFILL REQUIREMENTS IN THIS AREA.
6. = SEE F-4414 FOR HYDRANT LOCATION REQUIREMENTS.
7. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.

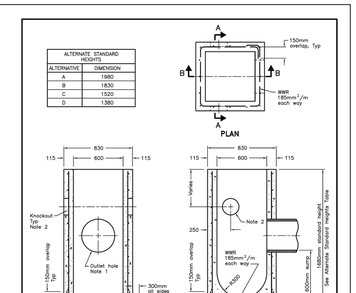
HYDRANT INSTALLATION	DATE: MAY 2001 REV. DATE: MARCH 2015 DWG. No.: W19



NOTES:
1. PIN TO BE SS.
2. FOR FRAME DETAIL SEE DWG No. S35.
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

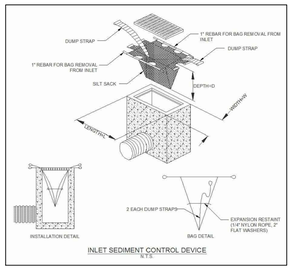
N.T.S.

STANDARD CIRCULAR SANITARY & COMBINED MAINTENANCE HOLE COVER	DATE: MARCH 2008 REV. DATE: MARCH 2017 DWG. No.: S24

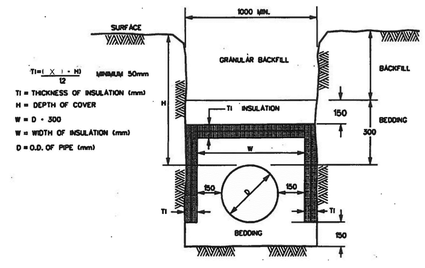


NOTES:
1 Outlet hole size 525mm diameter maximum, location as required.
2 200mm diameter knockout to accommodate subdrain. Knockout shall be 60mm deep.
A Centre reinforcing in base slab and walls as shown.
B Granular backfill shall be placed to a minimum thickness of 500mm all around the catch basin.
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 For benching and pipe opening details, see OPSD 701.021.
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		



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.)

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 CHANGES 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
01	ISSUED FOR APPROVAL	M.L.	05 MAY 2022

LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2022/05/05
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
1199 NEWMARKET HOLDINGS INC.

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

PROJECT
1195 NEWMARKET STREET
OTTAWA, ON

DRAWING TITLE
CONSTRUCTION DETAIL PLAN

PROJECT NO.
210956

DATE
MARCH 2022

C901

APPENDIX F

Survey
Architectural Drawings

ZONING MATRIX		
PROPERTY DESCRIPTION		
CITY OF OTTAWA PIN NUMBER		04263-0267 (LT)
MUNICIPAL ADDRESS		1195 Newmarkt St
LOT AREA		25,922m²
BUILDING INFORMATION		
BUILDING AREA:		10,439m²
PROPOSED USE:		WAREHOUSE
No. STOREYS:		1

ZONING TABLE		
CITY OF OTTAWA ZONING BY-LAW No. 2008-250		
IL - LIGHT INDUSTRIAL ZONE	**REQUIRED**	**PROPOSED**
MIN. LOT AREA	2,000 m²	25,922m²
MIN. LOT WIDTH	No minimum	n/a
MAX. LOT COVERAGE	65%	10439/25922x100 = 40%
MIN.FRONT YARD SETBACK	7.5m	Building setback = 7.5m
MIN. SIDE YARD SETBACK	7.5m	Building setback = 20m
MIN. REAR SETBACK	3.5m	Building setback = 8.4m
MIN. SETBACK WATERCOURSE	30m	Building setback = 30m
MAX. BUILDING HEIGHT	18m	14.6m
MIN. WIDTH LANDSCAPE	STREET: 3m	Varies, more than 3m
	OTHER CASES: N/A	n/a
VEHICLE PARKING SPACES (AREA C, SCHEDULE 1A) Table 101 - N95 warehouse	0.8 per 100m² for the first 5000m² of gross floor area (0.8x5000/100= 40)	82
	0.4 per 100m² above 5000m² of gross floor area (0.4x(10439-5000)/100=22)	
	total: 40+22= 62	
RESERVED PARKING SPACES (ACCESIBLE DESIGN GUIDELINES)	4	6 (3 type A, 3 type B)
BIKE PARKING SPACES (AREA C, SCHEDULE 1A) Table 111A	1 per 1000m² of gross floor area (10439/1000 = 10.4)	11

NOTE: PROPERTY INFORMATION WAS DERIVED FROM THE SITE SURVEY PREPARED BY J.D.BARNES LIMITED, DATED 2020-12-17

LEGEND:

- PROPERTY LINE
- MINIMUM BUILDING SETBACK
- SOFT LANDSCAPING
- CONCRETE SIDEWALK, WIDTH AS NOTED OR CONCRETE PAD
- PAVING STONES
- EXTERIOR LAMP POST ON CONCRETE BASE
- EXTERIOR WALL MOUNTED LIGHT FIXTURE
- EXTERIOR RECESSED LIGHT FIXTURE
- EXISTING TREE TO REMAIN, REFER TO LANDSCAPE PLAN AND TCR
- EXISTING TREE TO BE REMOVED, REFER TO LANDSCAPE PLAN AND TCR
- PROPOSED ENTRANCE
- ACCESSIBLE PARKING TYPE A: 3.4m x 5.2m TYPE B: 2.4m x 5.2m AISLE: 1.5m WIDE
- TWO WAY VEHICLE CIRCULATION, 6.7m MINIMUM

SITE NOTES:

- S1 STANDARD PARKING SPACE 2.6m X 5.2m
- S2 ASPHALT SURFACE
- S3 EXISTING FIRE HYDRANT
- S4 DEPRESSED CURB WITH TWSIs FOR BARRIER FREE ACCESS
- S5 SIAMESE CONNECTION
- S6 RELOCATED FIRE HYDRANT, MINIMUM 3m FROM THE DRIVEWAY, AND 0.6m FROM THE SIDEWALK, MAX 45m TO THE SIAMESE CONNECTION
- S7 DASHED LINE: FIRE ROUTE AS PER CODE REQUIREMENTS
- S8 SNOW STORAGE AREA, DOES NOT OCCUPY DRIVEWAY, AISLES, PARKING OR ROAD ALLOWANCE. MINIMUM 1.5m SETBACK
- S9 CONCRETE PAD NEXT TO EXISTING BUS STOP 2.2m x 3.5m AND 0.5m BACK FROM THE SIDEWALK
- S10 REFUSE AREA
- S11 42" HIGH GUARDRAIL AND RETAINING WALL
- S12 EXISTING FIRE HYDRANT TO BE RELOCATED, SEE S6
- S13 TRANSFORMER
- S14 BICYCLE PARKING SPACE, 0.6m x 1.8m WITH SECURE RACK, SEE LANDSCAPE PLAN
- S15 EXISTING HYDRO POLE
- S16 GROUND LEVEL LOADING DOOR
- S17 TYPICAL LOADING BAY
- S18 BACKLIT PYLON SIGN
- S19 1.83m HIGH CHAIN LINK FENCE ALONG ENTIRE PROPERTY LINE PARALLEL TO RAILWAY. VINE TO GROW ALONG THE FENCE
- S20 MASONRY SCREEN WALL, ±10'-0" HIGH, TO ALIGN WITH TOP OF ADJACENT MASONRY WALL
- S21 EXISTING LID TO BE RELOCATED
- S22 PICNIC AREA
- S23 INCREASE CURB RADIUS FOR ENTRY AND EXIT OF TRUCKS. REFER TO PAGES A15-A18 FOR TRUCK TURNING TEMPLATES
- S24 CORNER OF BUILDING AT FRONT YARD SETBACK. CANOPY OVERHANGS SETBACK BY LESS THAN 3.75m.
- S25 BUILDING SETBACK 30m FROM WATERCOURSE
- S26 REMOVE EXISTING CAR ENTRY AND REPAIR SIDEWALK
- S27 EXISTING STOP SIGN
- S28 HIGH WATER MARK COINCIDES WITH TOP OF DITCH
- S29 HATCHED AREA: DEPRESSED CURB AT SIDEWALK AS PER CITY CURB RETURN ENTRANCES DOCUMENT SC7.1
- S30 EXTERIOR METAL STAIR AND DOOR TO ACCESS BUILDING

PROPOSED SITE PLAN

1:400

GUPTA ARCHITECTURE INC.

345 VICTORIA, SUITE 300, WESTMOUNT (QC) H3Z 2N2
TEL. (514) 481-1055 www.g-architecture.com

LRL ENGINEERING
5430 CANOTEK ROAD
GLOUCESTER (ONTARIO) K1J 9G3
613-842-3434
WWW.LRL.CA

ENGINEER:

GROUPE ORTAM INC.
1200 RUE DE LOUVAIN OUEST
MONTREAL (QUEBEC) H4N 1G5
514-982-0990
WWW.ORTAMGROUPE.COM

ENGINEER:

GINO J.AIELLO LANDSCAPE ARCHITECT
110 DIDSBURY ROAD UNIT 9
OTTAWA (ONTARIO) K2E 0C2
613-852-1343
WWW.GJALA.COM

LANDSCAPE ARCHITECT:

J.D. BARNES LIMITED
62 STEACIE DRIVE, SUITE 103
KANATA (ONTARIO) K2K 2A9
613-731-7244
WWW.JDBARNES.COM

SURVEYOR:

HP URBAN
2405 ST. LAURENT BLVD, UNIT P
OTTAWA (ONTARIO) K1G 5B4
613-899-3464
PETER.HUME@HPURBAN.CA

APPLICANT:

L'ENTREPRENEUR DEVRA VÉRIFIER TOUTES DIMENSIONS ET CONDITIONS AU CHANTIER AVANT DE COMMENCER TOUT TRAVAIL. LES DIMENSIONS NE DOIVENT PAS ÊTRE MESURÉES DIRECTEMENT SUR CE DESSIN. CE PLAN DOIT ÊTRE IMPRIMÉ SUR UNE FEUILLE 24x36.

THE CONTRACTOR MUST VERIFY ALL DIMENSIONS AND CONDITIONS ON SITE PRIOR TO STARTING ANY WORK. DIMENSIONS ON THIS DRAWING ARE NOT TO BE SCALED. THIS PLAN MUST BE PRINTED ON A 24x36 SHEET.

PAS POUR CONSTRUCTION
NOT FOR CONSTRUCTION

ONTARIO ASSOCIATION OF ARCHITECTS
VIVEK GUPTA
LICENCE
7552

SCEAU/SEAL:

EMIS POUR/ISSUED FOR:	REV/REV:	DATE:
SITE PLAN APPLICATION - REV 1	00	2021-10-27
SITE PLAN APPLICATION - REV 2	01	2021-12-17
SITE PLAN APPLICATION - REV 3	02	2022-05-05

1199 NEWMARKET HOLDINGS LTD
A-3488 CHEMIN COTE-DES-NEIGES
MONTREAL, QC
H3H 2M6

CLIENT:

NEW LIGHT INDUSTRIAL BUILDING
1195 NEWMARKET STREET
OTTAWA, ONTARIO
K1B 1A6

PROJET/PROJECT:

SITE PLAN

TITRE/TITLE:

2021-10-05
DATE:

1:400
ÉCHELLE/SCALE:

18630
VGA PROJECT NO.

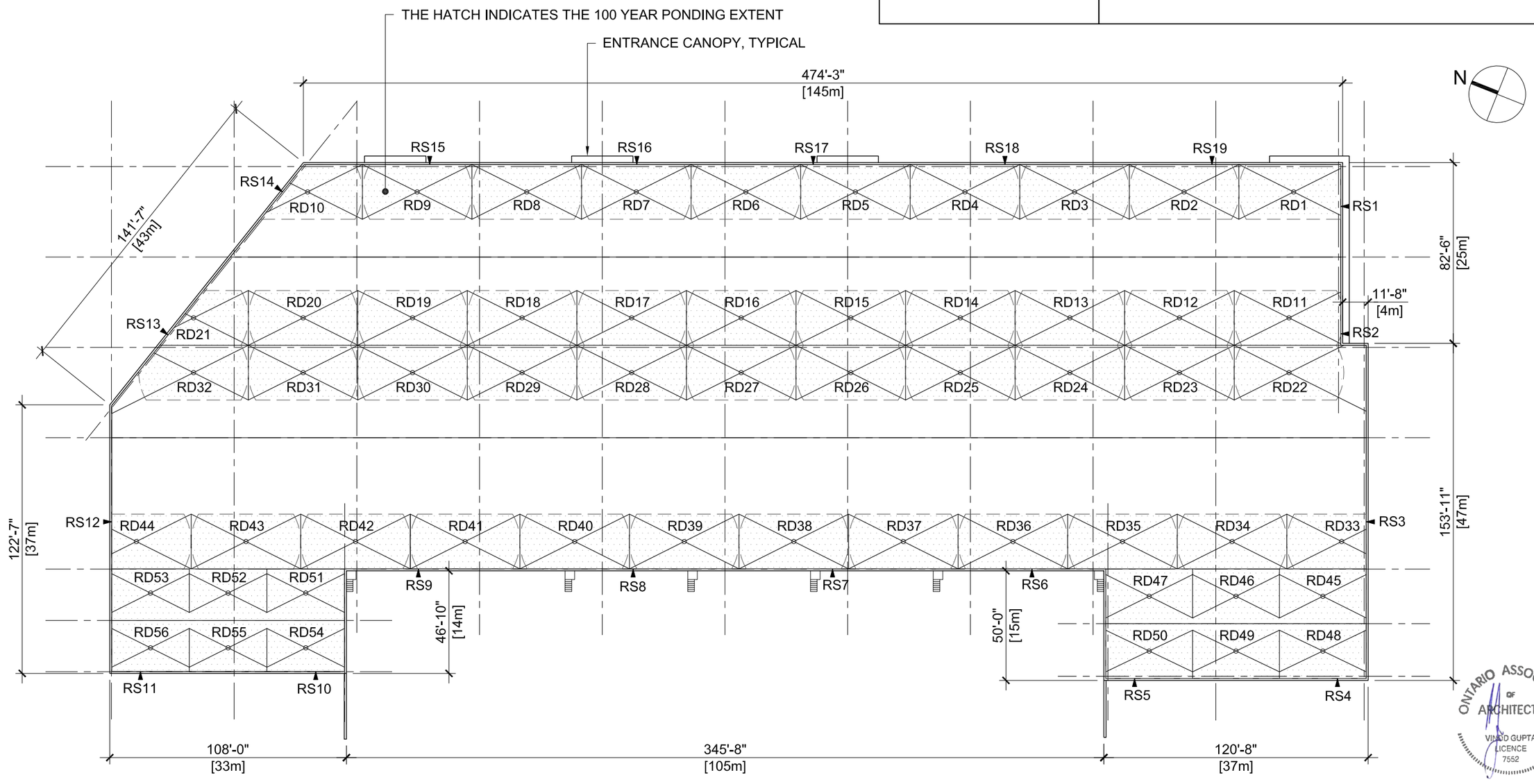
DESSINÉ PAR/ DRAWN BY: ADC
VÉRIFIÉ PAR/ VERIFIED BY: VG

A000
No PAGE/SHEET NO.

A IMPRIMER SUR FEUILLE 24x36 / TO PRINT ON 24x36 SHEET

PLAN # 18551 FILE #D07-12-21-0114

GENERAL STATES:	LEGEND:
ROOF AREA = 10,439m^2 ROOF SLOPE = 2% ROOF DRAINS = 56 SCUPPERS = 19 1 DRAIN FOR EACH 186m^2	RD# — FLOW CONTROL ROOF DRAIN. MAX 15m FROM THE EDGE OF THE ROOF AND MAX 30m FROM ADJACENT DRAINS RS# — ROOF SCUPPER, THE BOTTOM OF THE SCUPPER TO BE 0.15m ABOVE ROOF DRAIN. MAX 30m APART



ONTARIO ASSOCIATION OF ARCHITECTS
VINOD GUPTA
LICENCE
7552

GUPTA ARCHITECTURE INC.

345 VICTORIA, SUITE 300
WESTMOUNT (QC) H3Z 2N2
TEL. (514) 481-1055
www.g-architecture.com

PAS POUR CONSTRUCTION
NOT FOR CONSTRUCTION

ÉMIS POUR/ISSUED FOR:	RÉV/REV:	DATE:
SITE PLAN APPLICATION - REV 3	00	2022-05-05

PROPOSED ELEVATIONS
TITRE/TITLE:

1195 NEWMARKET STREET
OTTAWA, ONTARIO.
PROJET/PROJECT:

DESSIN REF: -
REF DWG:
VG-A NO. 18630

REF: -
DÉSSINÉ PAR/ DRAWN BY: RB
VÉRIFIÉ PAR/ VERIFIED BY: VG

DATE: 2022-04-29
ECHELLE/ SCALE: 1/64"=1'-0"

A10
NO. PAGE/ SHEET NO.

À IMPRIMER SUR FEUILLE 11x17 / TO PRINT ON 11x17 SHEET

PLAN # 18551 FILE #D07-12-21-0114

SURVEYOR'S REAL PROPERTY REPORT
WITH TOPOGRAPHIC DETAILS
PART 1 - PLAN SHOWING

PART OF EAST HALF OF LOT 26 CONCESSION 2 (OTTAWA FRONT) CITY OF OTTAWA

J.D. BARNES LIMITED

SCALE 1 : 400

10 0 10 20 30 metres

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

NOTES

BEARINGS ARE MTM GRID, AND DERIVED FROM GLOBAL NAVIGATION SATELLITE SYSTEMS (GNSS) BY REAL TIME NETWORK (RTN) OBSERVATIONS, MTM ZONE 9, NAD 83, (CSRS) (2010).

FOR BEARING COMPARISONS, A COUNTER-CLOCKWISE ROTATION OF 0°43'30" WAS APPLIED TO BEARINGS ON PLAN 5R-3608 TO CONVERT TO GRID BEARINGS.

DISTANCES ARE GROUND.

COMPLIANCE WITH ONTARIO BUILDING CODE SETBACK REQUIREMENTS ARE NOT VERIFIED BY THIS SURVEY.

NOTES ON TREES
-TREE DIMENSIONS ARE SHOWN +/- HEREON
-DIAMETER OF TREES TAKEN AT 1.2m ABOVE GRADE
-RADIUS DENOTES MEASUREMENT OF CROWN FROM CENTER OF TREE

PART 2 - SURVEY REPORT

- **DESCRIPTION**

PART OF LOT 26, CONCESSION 2 (OTTAWA FRONT), BEING ALL OF PIN 04263-0267 (LT), IN THE CITY OF OTTAWA

- **REGISTERED EASEMENTS AND/OR RIGHTS-OF-WAY**

SUBJECT TO AN EASEMENT IN FAVOUR OF THE CORPORATION OF THE CITY OF OTTAWA AS IN NS49313.

- **BOUNDARY FEATURES**

NOTE LOCATION OF THE DITCH, THE CULVERTS AND THE CONCRETE PAD ALONG THE SOUTHERLY LIMIT OF THE SUBJECT PROPERTY.

NOTE LOCATION OF THE CHAIN LINK FENCE, THE EDGE OF GRAVEL, THE DITCH AND THE CULVERT ALONG THE WESTERLY LIMIT OF THE SUBJECT PROPERTY.

NOTE LOCATION OF THE CHAIN LINK FENCE AND THE DITCH ALONG THE EASTERLY LIMIT OF THE SUBJECT PROPERTY.

NOTE LOCATION OF THE CHAIN LINK FENCE ALONG THE NORTHERLY LIMIT OF THE SUBJECT PROPERTY.

LEGEND

■	DENOTES	SURVEY MONUMENT FOUND
□	DENOTES	SURVEY MONUMENT SET
IB	DENOTES	IRON BAR
IBø	DENOTED	ROUND IRON BAR
SIB	DENOTED	STANDARD IRON BAR
SSIB	DENOTED	SHORT STANDARD IRON BAR
MEAS	DENOTES	MEASURED
Acc	DENOTES	ACCEPTED
857	DENOTES	FAIRHALL, MOFFATT & WOODLAND LTD.
1319	DENOTES	W.J. WEBSTER, O.L.S.
CITY	DENOTES	CITY OF OTTAWA
P	DENOTES	5R-168
P1	DENOTES	PLAN 5R-3608
P2	DENOTES	PLAN 4R-13358
D	DENOTES	DEED NS110679
———	DENOTES	PROPERTY LINE

N=NORTH / S=SOUTH / E=EAST / W=WEST

TOPOGRAPHIC LEGEND

CONC	DENOTES CONCRETE
CLF	DENOTES CHAIN LINK FENCE
C/L	DENOTES CENTERLINE
(G)	DENOTES GUTTER
(I)	DENOTES INVERT OF PIPE
(T)	DENOTES TOP OF PIPE
M_WELL	DENOTES MONITORING WELL
E_TR	DENOTES HYDRO TRANSFORMER
HP	DENOTES HYDRO POLE
ANC	DENOTES ANCHOR
FH	DENOTES FIRE HYDRANT
WV	DENOTES WATER VALVE
MH_WAT	DENOTES WATER MANHOLE
MH_STM	DENOTES STORM MANHOLE
MH_SAN	DENOTES SANITARY MANHOLE
CB	DENOTES CATCH BASIN
—SAN—	DENOTES UNDERGROUND SANITARY SEWER
—E—	DENOTES OVERHEAD HYDRO CABLE
—T—	DENOTES OVERHEAD TELEPHONE CABLE
DIA	DENOTES DIAMETER
R	DENOTES RADIUS
	DENOTES DECIDUOUS TREE

ELEVATION NOTE:

1. IT IS THE RESPONSIBILITY OF THE USER OF THIS INFORMATION TO VERIFY THAT THE SITE BENCHMARKS HAVE NOT BEEN ALTERED OR DISTURBED AND THAT IT'S RELATIVE ELEVATION AND DESCRIPTION AGREES WITH THE INFORMATION SHOWN ON THIS DRAWING

2. ELEVATIONS ARE GEODETIC AND ARE REFERRED TO CITY OF OTTAWA CONTROL POINT 113833001 HAVING A PUBLISHED ELEVATION OF 77.08 METRES (CGVD-1928 DATUM).

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE REGULATIONS MADE UNDER THEM.

2. THE SURVEY WAS COMPLETED ON NOVEMBER 10, 2020.

DECEMBER 17, 2020
DATE

GEORGE ZERVOS
ONTARIO LAND SURVEYOR

J.D.BARNES LIMITED
SURVEYING MAPPING GIS
LAND INFORMATION SPECIALISTS
62 STEACIE DRIVE, SUITE 103, KANATA, ON K2K 2A9
T: (613) 731-7244 F: (613) 254-8659 www.jdbarnes.com

DRAWN BY:	CHECKED BY:	REFERENCE NO.:
RP	GZ	20-10-162-00
PLOTTED: 12/17/2020		DATED: 12/17/20

PREPARED FOR: 1199 NEWMARKET HOLDINGS

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